

PROJECT MANUAL

FOR

COUNTY OF LASSEN DEPARTMENT OF PUBLIC WORKS

LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT

SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS

BIDS OPEN: 4:00 PM ON DECEMBER 8, 2020

BID SERIAL No. _____

NOVEMBER 2020

Lionakis No. 015437.05

LIONAKIS

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PROJECT MANUAL
FOR
COUNTY OF LASSEN DEPARTMENT OF PUBLIC WORKS
LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION
SEISMIC UPGRADE, ELEVATOR, AND ACCESSIBILITY IMPROVEMENTS
LIONAKIS JOB NO. 015437.05

OWNER:
COUNTY OF LASSEN
DEPARTMENT OF PUBLIC WORKS
707 Nevada Street, Suite 4
Susanville, CA 96130
530-251-8299

ARCHITECT:
LIONAKIS
1919 19th Street
Sacramento, CA 95811
916-558-1900



Nicholas Docous

License # C18997

STRUCTURAL ENGINEER:
LIONAKIS
1919 19th Street
Sacramento, CA 95811
916-558-1900



Darron E. Huntingdale

License # S4788

ELECTRICAL ENGINEER:
GLUMAC
910 Glenn Drive
Folsom, CA 95630
916-934-5103



Garrett D. Dutter

License # 21075

Agency Approval:

PROJECT MANUAL
FOR
COUNTY OF LASSEN DEPARTMENT OF PUBLIC WORKS
LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION
SEISMIC UPGRADE, ELEVATOR, AND ACCESSIBILITY IMPROVEMENTS

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DEFINITIONS AND TERMS

Wherever in the Standard Specifications, Notice to Contractors, Proposal, Contract, and Special Provisions or other contract documents where the following terms are used; the intent and meaning shall be interpreted as follows:

- Project Manual – this document containing Notice to Contractors, Proposal, Contract, Special Provisions and project specifications.
- Lassen County Department of Public Works for the State of California Department of Transportation or Department.
- The Board of Supervisors for the Director of Transportation.
- The Lassen County Director of Public Works acting either directly or through duly authorized agents for the Chief Engineer, Cal-Trans.
- The established laboratory of the Department of Public Works of Lassen County or laboratories authorized by the County to test materials and work involved in the contract for laboratory.
- The County of Lassen for the State where reference is made to the agency administering the Contract.
- Lassen County Auditor for the State Treasurer where reference is made to Contract payments.
- County – County of Lassen, State of California.
- Architect and Engineer are interchangeable.

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DEPARTMENT OF PUBLIC WORKS

NOTICE TO BIDDERS

SEALED PROPOSALS

FOR

**LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC UPGRADE,
ELEVATOR AND ACCESSIBILITY IMPROVEMENTS**

Will be received at the Office of the Director of Administrative Services, Lassen County, 221 South Roop Street, Susanville, California 96130, until 4:00 pm on December 8, 2020, at which time they will be publicly opened and read in the Office of the Director of Administrative Services at the above address.

General Work Description:

CONTRACTOR shall, at its sole cost and expense, furnish all facilities, equipment, and other materials necessary to complete seismic improvements, new elevator and exit stairs, site access improvements and electrical service upgrade in accordance with the plans and specifications for the project.

At the time this contract is awarded, the Contractor shall possess a Class A or B License or combination thereof for undertaking all aspects of project.

This contract is subject to the provisions of Section 22300 of the California Public Contract Code, which provides for the substitution of securities for any monies withheld by a public agency to ensure performance under a contract. The bidder's attention is directed to said Section 22300 of the Public Contract Code for the specific requirements and provisions for such substitutions of securities if requested by the Contractor.

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

Project Manual with special provisions, and proposal forms for bidding this project can only be obtained at the Lassen County Department of Public Works, Room 200, 707 Nevada Street Suite 4, Susanville, California 96130, FAX No. (530) 251-2675, Telephone No. (530) 251-8288, and it may be purchased at the following non-refundable prices:

Plans: \$ 10.00 Specifications: \$10.00 Mailing Fee: \$10.00

The successful bidder shall furnish a payment bond equal to one hundred percent (100%) of the contract price and a performance bond equal to one-hundred percent (100%) of the contract price.

The Contractor shall also furnish Certificates of Insurance, with the County of Lassen named as additional insured, in amounts and coverage as specified in the Project Manual.

A pre-bid meeting (non-mandatory but highly recommended) will be held at the project site, 220 South Lassen Street, Susanville, CA on November 10, 2020 at 2:00 PM.

The Department will consider bidder inquiries only when made in writing and shall be submitted to Lassen County Public Works by facsimile or email:

Lassen County Public Works
707 Nevada Street, Suite 4
Susanville, California 96130
Fax Number: (530) 251-2675
pheimbigner@co.lassen.ca.us

Inquiries or questions based on alleged patent ambiguity of the plans or specifications must be communicated as a bidder inquiry prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest.

The County of Lassen hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex or national origin in consideration for an award.

Pursuant to Section 1773 of the Labor Code the general prevailing wage rates in the county in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wage rates are predetermined and set forth in the serially numbered Project Manual issued for bidding purposes entitled, "Project Manual, County of Lassen, Department of Public Works for LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS" and in copies of said manual that may be examined at the offices described above where project special provisions and proposal forms may be seen. Current prevailing wage rates are available from the California Department of Industrial Relations' Internet web site at <http://www.dir.ca.gov>. Addenda to modify wage rates, if necessary, will be issued to holders of the above referenced manual. 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.

Contractor Registration with California Department of Industrial Relations (DIR):

Labor Code Section 1771.1(a):

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

The County of Lassen may waive any informalities or minor defects or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within sixty (60) days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the County and the bidder.

Board of Supervisors
County of Lassen
State of California

BY: _____
Pete Heimbigner
Director of Public Works

INFORMATION FOR BIDDERS

Will be received at the Office of Administrative Services, Lassen County, 221 South Roop Street, Susanville, California 96130, until 4:00 pm on December 8, 2020, at which time they will be publicly opened and read in the conference room at the above address.

Each Bid must be submitted to the County in a sealed envelope, addressed to Lassen County at 221 South Roop Street, Susanville, California 96130. Each sealed envelope containing a Bid must be plainly marked on the outside as Bid for LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – DEMOLITION PHASE. The envelope should show on the outside the name of the Bidder, the Bidder's address, and the Bidder's license number if applicable. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to Lassen County at 221 South Roop Street, Susanville, California 96130.

Bidding Schedule

November 10, 2020	Pre Bid Meeting - 2:00 PM, 220 South Lassen Street, Susanville, CA
November 24, 2020	Last day to submit Contractor Clarification Requests (5:00 PM close of business)
December 1, 2020	Last day that Addendum will be issued
December 8, 2020	Bid Opening – 4:00 PM at 221 South Roop Street, Susanville, CA

Bidders must satisfy themselves to the accuracy and completeness of the Bid Schedule by examination of the site and a review of the Drawings and Specifications including Addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work or of the nature or scope of the work to be done.

Individual bidders shall sign the Bid with their full name and address. A partner or a partnership submitting a Bid shall sign the Bid with his or her full name and the name and address of every member of the partnership shall be given. A duly authorized officer(s) of a corporation submitting a Bid shall sign the Bid with his/her/their full name(s) attested by the corporate seal, and the names and titles of all officers(s) of the corporation shall be given on the Bid.

The County will not consider for award more than one Bid from an individual, firm, partnership, corporation, or association under the same or different names.

Bids are required for the entire work described herein. A conditional or qualified bid will not be accepted.

The County may waive any informalities or minor defects or reject any and all bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw a Bid within sixty (60) days after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual Agreement between the County and the Bidder.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout. Some of the laws regarding wage rates, travel and subsistence payments, payroll records, apprentices, working hours and workers compensation are specified in Appendix A.

The County will provide to bidders upon request prior to bidding, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The Project Manual contains the provisions required for the construction of the project. Information obtained at any time from an officer, agent, or employee of the County or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any of the conditions of the Contract.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public works, as defined in this chapter, unless currently registered and qualified to perform public work pursuant

to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the

Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

Each bid must be accompanied by a Bid Bond payable to the County for ten percent (10%) of the total amount of the Bid. As soon as the qualifications have been received, and the Bid prices compared, the County will return the bonds of all except the three (3) lowest responsible bidders. Lowest responsible will also include "most qualified." When the Agreement is executed the bonds of the two (2) remaining unsuccessful bidders will be returned. The Bid Bond of the successful bidder will be retained until the Payment Bond and Performance Bond have been executed and approved, after which it will be returned. The Bid Bond must be executed on the bond form included in the Project Manual. A certified check payable to the County of Lassen may be used in lieu of a Bid Bond.

A Payment Bond in the amount of one hundred percent (100%) of the Contract Price and Performance Bond in the amount of one-hundred percent (100%) of the Contract Price, with a corporate surety approved by the County and authorized to do bonding in California, will be required for faithful performance of the Contract. The Performance Bond and the Payment Bond must be executed on the bond forms included in the Project Manual.

Attorneys-in-fact who sign Bid Bonds, Payment Bonds and Performance Bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the Contract is awarded will be required to execute the Agreement and obtain the Performance Bond, Payment Bond, and all required insurance within ten (10) calendar days from the date when Notice of Award is delivered to the bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the bidder to execute the Agreement, the County may at its option consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the County.

The County within ten (10) calendar days of receipt of acceptable insurance, Performance Bond, Payment Bond and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the County not execute the agreement within such period, the bidder may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the County.

The Notice to Proceed shall be issued within ten (10) calendar days of the execution of the Agreement by the County. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the County and Contractor. If the Notice to Proceed has not been issued within the ten (10) calendar day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The County may make such investigations as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the County all such information and data for this purpose as the County may request. The County reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the County that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein. The County reserves the right to reject any or all bids at its sole discretion.

Each bidder and Contractor shall be licensed in accordance with the laws of the State of California including but not limited to Chapter 9, Division III of the Business and Professions Code, Section 7000 et seq. Any bidder or Contractor not so licensed is subject to the penalties imposed by law.

The Contractor shall also furnish Certificates of Insurance in amounts and coverage as specified in this Project Manual, naming the County of Lassen and their consultants as additional insured.

The County of Lassen hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex or national origin in consideration for an award.

Each bidder is responsible for inspecting the site and for reading and being thoroughly familiar with the entire Project Manual.

The failure or omission of any bidder to do any of the foregoing shall in no way relieve any bidder from any obligation in respect to their Bid.

The County requests notification of discrepancies in, or omissions from the Project Manual, if any are found by a bidder.

A pre-bid meeting (non-mandatory but highly recommended) will be held at the project site, 220 South Lassen Street, Susanville, CA on November 10, 2020 at 2:00 PM.

Project is to be completed within 120 working days from date specified in Notice to Proceed.

PROPOSAL REQUIREMENTS AND CONDITIONS

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of and the submission of the bid.

The bidder's bond shall conform to the bond form in the Project Manual for the project and shall be properly filled out and executed. The bidder's bond form included in that book may be used. In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Project Manual and must be completed and submitted with bid.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of Title 49 CFR (Code of Federal Regulations) part 26 in the award and administration of US DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts.

Proposal Forms

The following forms shall be completed and included with the Contractor's Proposal.

Proposal
Contractor's Bid Sheet
Required listing of Subcontractors
Equal Employment Opportunity Certification
Public Contract Code Section 10232 Statement
Public Contract Code Section 10285.1 Statement
Public Contract Code Section 10162 Statement
Non-Collusion Affidavit
Signature Sheet
Bidder's Bond
Certificate of Acknowledgement

PROPOSAL TO THE COUNTY OF LASSEN

(Because some colored inks will not reproduce in copy machines, please use black ink to complete this Proposal.)

Name of Bidder: _____

Business P.O. Box _____

Business Address: _____

(Please include even if P.O. Box used)

City, State, Zip: _____

Telephone No: _____

(Include Area Code)

Fax No: _____

(Include Area Code)

Contractor License No. _____

DIR Registration No. _____

The work for which this proposal is submitted is for construction in accordance with the Special Provisions (including the payment of not less than the State General Prevailing Wage Rates), the project plans described below, including any addenda thereto, the contract annexed hereto, and also in conformance with the California Department of Transportation Standard Specifications, dated 2010.

The Special Provisions for the work to be done are dated March 2020 and are entitled:

PROJECT MANUAL, COUNTY OF LASSEN, DEPARTMENT OF
PUBLIC WORKS, LASSEN COUNTY HISTORIC COURTHOUSE
RENOVATION – SEISMIC UPGRADE, ELEVATOR AND
ACCESSIBILITY IMPROVEMENTS.

The project plans for the work to be done were approved March 2020 and are entitled:

COUNTY OF LASSEN, DEPARTMENT OF PUBLIC WORKS
LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION –
SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY
IMPROVEMENTS.

Bids are to be submitted for the entire work. In addition to the Base Bid, the Bidder shall complete any and all Additive/Alternative Bid(s)/Item(s) on the Bid Schedule. Failure to complete Additive/Alternative Bid(s)/Item(s) is reason to reject Bid Proposal. The lowest bid will be determined on the basis of the TOTAL BASE BID.

The bidder shall set forth for each unit basis item of work an item 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 this purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the item price bid on the basis of 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 Department'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 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 dollar 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 County of Lassen, and that discretion will be exercised in the manner deemed by the County of Lassen to best protect the public interest in the prompt and economical completion of the work. The decision of the County of Lassen 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 enter into the contract, furnish the bond in the sum required by the State Contract Act, with surety satisfactory to the County and certificates of insurance that may be required, within ten (10) calendar days after the bidder has received notice from the County that the contract has been awarded, the County of Lassen may, at its option, determine that the bidder has forfeiture of such security accompanying this proposal and the same shall be the property of the County.

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 he has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and he proposes, and agrees if this proposal is accepted, that he will contract with the County in the form of the copy of the contract annexed hereto, 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 he will take in full payment therefore the following item prices, to wit:

CONTRACTOR'S BID SHEET
Page 1 of 1

PROJECT MANUAL, COUNTY OF LASSEN, DEPARTMENT OF PUBLIC WORKS,
LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC
UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS.

BASE BID

Historic Courthouse Renovation Project – Seismic Upgrade, Elevator and Accessibility Improvements

Item No.	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Total
1	Mobilization & Bonding	LS	1		
2	Historic Protection and Treatment Work	LS	1		
3	Seismic Upgrade Work (inclusive of all trades)	LS	1		
4	Vertical Circulation Work for Elevator and Stairs (inclusive of all trades)	LS	1		
5	New Accessible Ramp and Walkways	LS	1		
6	Paving and Striping	LS	1		
7	Electrical Work for Main Electrical Room and Connection to Transformer	LS	1		

Total Bid _____

Bids are to be submitted for the entire work. The lowest bid will be determined on the basis of the TOTAL BASE BID.

NAME OF CONTRACTOR _____

BIDDER'S SIGNATURE _____

REQUIRED LISTING OF SUBCONTRACTORS

Pursuant to Section 4100 of the *California Public Contract Code* the bidder shall list the name and address of each subcontractor to whom the bidder proposes to subcontract portions of the work as required by provisions in Section 2-1.33C, "Subcontractors List," of the *Standard Specifications* and Section 2-1.01, "General," of the Special Provisions

Subcontractor Name Address Contractor License No. DIR Registration No.	Bid Item Number (s)	% of Bid Item (Describe portion of item subcontracted)	Dollar Value of Work

(The Bidder's execution of the signature portion of this Proposal shall also constitute an endorsement and execution of those certificates which are part of this proposal)

EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

(THE BIDDER'S EXECUTION ON THE SIGNATURE PORTION OF THIS PROPOSAL SHALL ALSO CONSTITUTE AN ENDORSEMENT AND EXECUTION OF THOSE CERTIFICATIONS WHICH ARE A PART OF THIS PROPOSAL)

The bidder, _____, proposed subcontractor,
_____, hereby certifies that he has _____, has not

participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that where required, he has filed with the Joint Reporting

Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of \$10,000 or under are exempt).

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7 (b) (1) prevents the award of contracts and subcontracts unless such contractors submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

PUBLIC CONTRACT SECTION 10232 STATEMENT

In accordance 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 Proposal. Signing this Proposal 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.

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

In conformance with *California Public Contract Code* Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury that the bidder has _____, has not _____ been convicted within the preceding three (3) 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 *California Public Contract Code* Section 1101, with any public entity, as defined in *California 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 Proposal. Signing this Proposal 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 accordance with *California 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?

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

NONCOLLUSION AFFIDAVIT

To the COUNTY of LASSEN
DEPARTMENT OF PUBLIC WORKS.

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.
Title Company

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 to 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, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such 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 _____[date], at _____[city], _____[state].

SIGNATURE SHEET

Accompanying this Proposal is _____ (NOTICE: INSERT THE WORDS "CASH (\$ _____)." "CASHIER'S CHECK, CERTIFIED CHECK," OR "BIDDER'S BOND," AS THE CASE MAY BE.) in amount equal to at least ten percent of the total of the bid.

The names of all persons interested in the foregoing proposal as principals are as follows:

IMPORTANT NOTICE. If the bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual copartners composing firm; if bidder of other interested person is an individual, state first and last names in full.

Licensed in conformance with an act providing for the registration of Contractors,

License No. _____ Classification(s) _____

ADDENDA - This Proposal is submitted with respect to the changes to the contract included in addenda number(s) _____

(Fill in addendum number(s) if addenda have been received and insert, in this Proposal, any Engineer's Estimate Sheets that were received as part of the addenda)

WARNING - If addenda have been issued by the Department and not noted above as being received by the bidder, this Proposal may be rejected.

By my signature on this proposal I certify, under penalty of perjury under the laws of the State of California, that the forgoing questionnaire and statements of *California Public Contract Code* Sections 10162, 10232 and 10285.1 and non-collusion affidavit are true and correct and that the bidder has complied with the requirements of Section 8103 of the Fair Employment and Housing Commission Regulations (Chapter 5, Title 2 of the *California Administrative Code*).

Date: _____

Signature and Title of Bidder

Business Address _____

Place of Business _____

Place of Residence _____

COUNTY OF LASSEN
DEPARTMENT OF PUBLIC WORKS

BIDDER'S BOND

We, _____ as Principal,

And _____
as Surety, are held and firmly bound unto the County of Lassen, hereinafter called the County, in the penal sum of ten percent (10%) of the total amount of the bid of the Principal above named, submitted by said Principal to the County of Lassen, State of California, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heir, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITON of this obligation is such that:

WHEREAS, the Principal has submitted to the Obligee, for LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS, Lassen County, for which bids are to be opened at 221 South Roop Street, Susanville, California on _____, 20____.

NOW, THEREFORE, If the aforesaid Principal is awarded the contract and , within the time and manner required under the specifications, after the prescribed forms are presented to him for signature, enters into a written contract, in the form prescribed, in accordance with the bid, and files the two bonds with the County, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall remain in full force an virtue.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20____.

_____(SEAL)

_____(SEAL)

_____(SEAL)

Principal
_____(SEAL)

Surety

By _____(SEAL)

Attorney-in-fact

NOTE: Signatures of those executing for the Surety must be properly acknowledged.

CERTIFICATE OF ACKNOWLEDGEMENT

State of California

County of Lassen

On this _____ day of _____ in the year 20____ before me, a notary public in and for the County and State aforesaid, personally appeared.

Known to me to be the person whose name is subscribed to the within instrument and known to me to be the attorney-in-fact of _____(subscribed) and acknowledged to me that he the name of the said company thereto as surety, and his own name as attorney-in-fact.

(SEAL)

Notary Public

AGREEMENT

**BETWEEN
LASSEN COUNTY
AND
??**

THIS AGREEMENT is made between the COUNTY OF LASSEN, a political subdivision of the State of California (hereinafter "COUNTY"), and _____, a California corporation, with a principal place of business at, _____ (hereinafter "CONTRACTOR").

This Agreement is made with reference to the following facts and circumstances:

WHEREAS COUNTY has the need for CONTRACTOR to provide services related LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT - SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS, 220 South Lassen Street, Susanville, CA and,

WHEREAS COUNTY desires to employ a CONTRACTOR to provide the services related to this project and,

WHEREAS CONTRACTOR is a qualified licensed Contractor in the State of California and desires to provide said services in conjunction with the project.

In consideration of the services to be rendered, the sums to be paid, and each and every covenant and condition contained herein, the parties hereto agree as follows:

1. SERVICES

The CONTRACTOR shall provide those services described in Attachment "A". CONTRACTOR shall provide said services at the time, place and in the manner specified in Attachment "A".

2. TERM

The term of the agreement shall be per the provisions in Section 8-1.04, "Start of Job Activities," in Section 8-1.05, "Time" and Section 8-1.10, "Liquidated Damages," of the State of California, Department of Transportation, *Standard Specifications*, 2010 and Project Manual for LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT - SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS.

The CONTRACTOR shall begin work within 10 calendar days after the date specified in the "Notice to Proceed," and shall diligently prosecute the same to completion before the expiration of

120 WORKING DAYS

beginning on the date that work begins or beginning on the date specified in the "Notice to Proceed," whichever occurs first.

The Contractor shall pay to the County of Lassen the sum of \$3,000.00 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

In the event the Contractor does not complete the work within the 120 working days as herein provided, for reasons or causes other than those provided for the Contract Documents hereof, COUNTY will be damaged. After considering such a breach and all aspects of the work, including, but not limited to, the type of installation, the current and future uses of facilities and premises, the disarrangement of the premises and facilities thereof during the work, and the additional cost and difficulty of using the disarranged facilities during the work, the parties agree that a reasonable daily damage for such a breach, if any, will be One Thousand, Nine Hundred Dollars and 00/100 (\$1,900.00) per day and the payment of the same, if any, is payment of liquidating damages and not a penalty. It is understood that this agreement for liquidated damages is entered into because the amount is manifestly reasonable under the circumstances existing at the time of this agreement and it would be extremely difficult or impossible to determine with any degree of accuracy the actual damages in case of any

such breach. In case of such breach, it is agreed that the Owner may deduct the amount thereof from any money due or to become due said Contractor under this contract.

3. PAYMENT

COUNTY shall pay CONTRACTOR for services rendered pursuant to this Agreement at the time and in the amount set forth in Attachment "B". The payment specified in Attachment "B" shall be the only payment made to CONTRACTOR for services rendered pursuant to this Agreement. CONTRACTOR shall submit all billing for said services to COUNTY in the manner specified in Attachment "B".

4. FACILITIES, EQUIPMENT AND OTHER MATERIALS AND OBLIGATIONS OF COUNTY

CONTRACTOR shall, at its sole cost and expense, furnish all facilities, equipment, and other materials which may be required for furnishing services pursuant to this Agreement.

COUNTY shall:

4.1 Monitor and evaluate CONTRACTOR's performance, expenditures and service levels for compliance with the terms of this Agreement.

4.2 Provide CONTRACTOR with reporting forms and/or formats and time frames for submission of reports.

4.3 Review all invoices submitted by CONTRACTOR for allowable costs and approve for payment as appropriate conditioned in the availability of state funds.

4.4 Retain ownership and have prompt access to any report, evaluations, preliminary findings, or data assembled/developed by CONTRACTOR under this Agreement.

5. ADDITIONAL PROVISIONS

Those additional provisions unique to this Agreement are set forth in Attachment "C".

6. GENERAL PROVISIONS

The general provisions set forth in Attachment "D" are part of this Agreement. Any inconsistency between said general provisions and any other terms or conditions of this Agreement shall be controlled by the other terms or conditions insofar as the latter are inconsistent with the general provisions.

7. DESIGNATED REPRESENTATIVES

Pete Heimbigner, Director of Public Works, is the designated representative of the COUNTY and will administer this Agreement for the COUNTY. _____ is the authorized representative for CONTRACTOR. Changes in the designated representatives shall occur only by advance written notice to the other party.

8. ATTACHMENTS

All attachments referred to herein are attached hereto and by this reference incorporated herein. Attachments include:

Attachment A - Services
Attachment B - Payment
Attachment C - Additional Provisions
Attachment D - General Provisions
Attachment E – Contractor's Proposal

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the dates shown opposite their respective signatures.

CONTRACTOR

Dated: _____

By: _____

Title: _____

By: _____

Title: _____

COUNTY
County of Lassen

Dated: _____

By: _____
Pete Heimbigner
Director of Public Works

Approved as to form:

Lassen County Counsel

ATTACHEMENT A: SCOPE OF SERVICES

AGREEMENT BETWEEN LASSEN COUNTY AND ??

SCOPE OF SERVICES

A.1 SCOPE OF SERVICES AND DUTIES.

The services to be provided by CONTRACTOR and the scope of CONTRACTOR's duties include the following:

A.1.1 Contractor shall furnish all materials, supplies, tools, equipment, labor and other services and expenses necessary to complete the project described herein, known as "LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT - SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS" provided by this Agreement as scheduled and, in addition, shall perform the following as scheduled.

A.1.1.1 The services in general, consist of interior demolition and abatement of asbestos and removal of lead based paint at the Lassen County Historic Courthouse per the project's project manual entitled "LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS" and project's plans entitled "COUNTY OF LASSEN, DEPARTMENT OF PUBLIC WORKS LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS", bid opening date of ??, 2020.

END OF ATTACHMENT "A"

ATTACHEMENT B: PAYMENT

AGREEMENT BETWEEN LASSEN COUNTY AND

PAYMENT

COUNTY shall pay CONTRACTOR as follows:

Compensation shall consist of the total bid price of \$_____ per the Contractor's proposal (Bid Sheet), attached hereto.

The Contractor shall accept the compensation provided in the contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced under the contract per the conditions in Section 9-1.03 "Payment Scope," State of California, Department of Transportation, Standard Specifications, 2010.

Monthly payments (partial payments) may be made based upon approved estimates submitted by the Contractor detailing the total amount of work done and acceptable materials furnished during the billing period per the requirements in Section 9-1.16 "Progress Payments," of the Standard Specifications. The estimates shall detail which bid items work was completed on as well as the quantity or percentage, depending on the unit of measurement of the bid item, of work completed per the Contractor' Proposal and Engineer's Estimate.

Monthly payments will be made within 30 days of an approved estimate.

The total contract cost shall not exceed the total bid price of \$_____ unless written authorization is issued by the COUNTY through approved Contract Change Orders per the requirements in Section 4, of the Standard Specifications.

END OF ATTACHMENT "B"

ATTACHEMENT C: ADDITIONAL PROVISIONS

AGREEMENT BETWEEN LASSEN COUNTY AND ???

CONTRACT BONDS

The successful bidder (Contractor) shall procure and maintain at Contractor's expense the following bonds, in the amounts indicated per the provisions in Section 3-1.05 "Contract Bonds" of the Standard Specifications and Project Manual for LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS..

Payment Bond - 100 percent of the contract price

Performance Bond - 100 percent of the contract price

The bonds will not be accepted unless each conforms to its respective bond form included within the above mentioned Project Manual, and is properly filled out and executed. Additional bond forms may be obtained at the Office of the Department of Public Works of Lassen County, 707 Nevada Street, Suite 4, Susanville, California 96130.

The provider of the bonds will be required to submit to the County the following:

- 1) A certificate from the clerk of the County in which the court or officer is located that the certificate of authority of the insurer has not been surrendered, revoked, cancelled, annulled, or suspended or, in the event that it has, that renewed authority has been granted.
- 2) The Contractor shall supply or cause to be supplied to the County of Lassen those documents required by California Civil Procedures Section 995.660. Any bond submitted must be issued by an admitted surety insurer to which the Insurance Commissioner of California has issued a certificate of authority to transact surety insurance in this state, as defined in Section 105 of the Insurance Code.

Contractor Registration with California Department of Industrial Relations (DIR):

Labor Code Section 1771.1(a):

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public works, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

END OF ATTACHMENT "C"

ATTACHEMENT D: GENERAL PROVISIONS

AGREEMENT BETWEEN LASSEN COUNTY AND ??

D.1 INDEPENDENT CONTRACTOR.

For all purposes arising out of this Agreement, CONTRACTOR shall be: an independent contractor and CONTRACTOR and each and every employee, agent, servant, partner, and shareholder of CONTRACTOR (collectively referred to as "The Contractor") shall not be, for any purpose of this Agreement, an employee of COUNTY. Furthermore, this Agreement shall not under any circumstance be construed or considered to be a joint powers agreement as described in California Government Code sections 6000, et seq., or otherwise. As an independent contractor, the following shall apply:

D.1.1 CONTRACTOR shall determine the method, details and means of performing the services to be provided by CONTRACTOR as described in this Agreement.

D.1.2 CONTRACTOR shall be responsible to COUNTY only for the requirements and results specified by this Agreement and, except as specifically provided in this Agreement, shall not be subject to COUNTY's control with respect to the physical actions or activities of CONTRACTOR in fulfillment of the requirements of this Agreement.

D.1.3 CONTRACTOR shall be responsible for its own operating costs and expenses, property and income taxes, workers' compensation insurance and any other costs and expenses in connection with performance of services under this Agreement.

D.1.4 CONTRACTOR is not, and shall not be, entitled to receive from or through COUNTY, and COUNTY shall not provide or be obligated to provide the CONTRACTOR with workers' compensation coverage, unemployment insurance coverage or any other type of employee or worker insurance or benefit coverage required or provided by any federal, state or local law or regulation for, or normally afforded to, any employee of COUNTY

D.1.5 The CONTRACTOR shall not be entitled to have COUNTY withhold or pay, and COUNTY shall not withhold or pay, on behalf of the CONTRACTOR any tax or money relating to the Social Security Old Age Pension Program, Social Security Disability Program or any other type of pension, annuity or disability program required or provided by any federal, state or local law or regulation for, or normally afforded to, an employee of COUNTY.

D.1.6 The CONTRACTOR shall not be entitled to participate in, or receive any benefit from, or make any claim against any COUNTY fringe benefit program including, but not limited to, COUNTY's pension plan, medical and health care plan, dental plan, life insurance plan, or other type of benefit program, plan or coverage designated for, provided to, or offered to COUNTY's employees.

D.1.7 COUNTY shall not withhold or pay on behalf of CONTRACTOR any federal, state or local tax including, but not limited to, any personal income tax owed by CONTRACTOR.

D.1.8. The CONTRACTOR is, and at all times during the term of this Agreement shall represent and conduct itself as, an independent contractor and not as an employee of COUNTY.

D.1.9 CONTRACTOR shall not have the authority, express or implied, to act on behalf of, bind or obligate the COUNTY any way without the written consent of the COUNTY.

D.2 LICENSES, PERMITS, ETC.

CONTRACTOR represents and warrants to COUNTY that it has all licenses, permits, qualifications, and approvals of whatsoever nature which are legally required for CONTRACTOR to practice its profession. CONTRACTOR represents and warrants to COUNTY that CONTRACTOR shall, at its sole cost and expense, keep in effect or

obtain at all times during the term of this Agreement any licenses, permits, and approvals which are legally required for CONTRACTOR to practice its profession at the time the services are performed.

D.3 CHANGE IN STATUTES OR REGULATIONS

If there is a change of statutes or regulations applicable to the subject matter of this Agreement, both parties agree to be governed by the new provisions, unless either party gives notice to terminate pursuant to the terms of this Agreement.

D.4 TIME

CONTRACTOR shall devote such time to the performance of services pursuant to this Agreement as may be reasonably necessary for the satisfactory performance of CONTRACTOR's obligations pursuant to this Agreement. Neither party shall be considered in default of this Agreement to the extent performance is prevented or delayed by any cause, present or future, which is beyond the reasonable control of the party.

D.5 INSURANCE

D.5.1 Prior to rendering services provided by the terms and conditions of this Agreement, CONTRACTOR shall acquire and maintain during the term of this Agreement insurance coverage (hereinafter referred to as "the insurance") through and with an insurer acceptable to COUNTY. The insurance shall contain the following coverages:

D.5.1.1 Comprehensive general liability insurance including comprehensive public liability insurance with minimum coverage of One Million Dollars (\$1,000,000) per occurrence and with not less than One Million Dollars (\$1,000,000) aggregate; CONTRACTOR shall insure both COUNTY and CONTRACTOR against any liability arising under or related to this Agreement.

D.5.1.2 Comprehensive automobile liability insurance with minimum coverage of Five Hundred Thousand Dollars (\$500,000) per occurrence and with not less than Five Hundred Thousand Dollars (\$500,000) on reserve in the aggregate, with combined single limit including owned, non-owned and hired vehicles.

D.5.1.3 Workers' Compensation Insurance coverage for all of CONTRACTOR's employees and other persons for whom CONTRACTOR is responsible to provide such insurance coverage, as provided by Division 4 and 4.5 of the California Labor Code.

D.5.2 The limits of insurance herein shall not limit the liability of the CONTRACTOR hereunder.

D.5.3 In respect to any insurance herein, if the aggregate limit available becomes less than that required above, other excess insurance shall be acquired and maintained immediately. For the purpose of any insurance term of this Agreement, "aggregate limit available" is defined as the total policy limits available for all claims made during the policy period.

D.5.4 Except for automobile liability insurance, the insurance shall name the COUNTY and COUNTY's officers, employees, agents and independent contractors as additional insureds and shall include an endorsement that no cancellation or material change adversely affecting any coverage provided by the insurance may be made until twenty (20) days after written notice is delivered to COUNTY.

D.5.5 The insurance policy forms, endorsements and insurer(s) issuing the insurance shall be satisfactory to COUNTY at its sole and absolute discretion. The amount of any deductible payable by the insured shall be subject to the prior approval of the COUNTY and the COUNTY, as a condition of its approval, may require such proof of the adequacy of CONTRACTOR's financial resources as it may see fit.

D.5.6 Prior to CONTRACTOR rendering services provided by this Agreement, and immediately upon acquiring additional insurance, CONTRACTOR shall deliver a certificate of insurance describing the insurance coverages and endorsements to:

Lassen County Department of Public Works
707 Nevada Street, Suite 4
Susanville, California 96130

Upon COUNTY's request, CONTRACTOR shall deliver certified copies of any insurance policies to COUNTY.

D.5.7 CONTRACTOR shall not render services under the terms and conditions of this Agreement unless each type of insurance coverage and endorsement is in effect and CONTRACTOR has delivered the certificate(s) of insurance to COUNTY as previously described. If CONTRACTOR shall fail to procure and maintain said insurance, COUNTY may, but shall not be required to, procure and maintain the same, and the premiums of such insurance shall be paid by CONTRACTOR to COUNTY upon demand. The policies of insurance provided herein which are to be provided by CONTRACTOR shall be for a period of not less than one year, it being understood and agreed that twenty (20) days prior to the expiration of any policy of insurance, CONTRACTOR will deliver to COUNTY a renewal or new policy to take the place of the policy expiring.

D.5.8 COUNTY shall have the right to request such further coverages and/or endorsements on the insurance as COUNTY deems necessary, at CONTRACTOR's expense. The amounts, insurance policy forms, endorsements and insurer(s) issuing the insurance shall be satisfactory to COUNTY in its sole and absolute discretion.

D.5.9 Any subcontractor(s), independent contractor(s) or any type of agent(s) performing or hired to perform any term or condition of this Agreement on behalf of CONTRACTOR, as may be allowed by this Agreement (hereinafter referred to as the "SECONDARY PARTIES"), shall comply with each term and condition of this Section D.5 entitled "INSURANCE". Furthermore, CONTRACTOR shall be responsible for the SECONDARY PARTIES' acts and satisfactory performance of the terms and conditions of this Agreement.

D.6 INDEMNITY

County shall not be liable for, and CONTRACTOR shall defend and indemnify COUNTY and its officers, agents, employees and volunteers (collectively 'County Parties'), against any and all claims, deductibles, self-insured retentions, demands, liability, judgments, awards, fines, mechanics' liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as 'Claims'), which arise out of or are in any way connected to the work covered by this Agreement arising either directly or indirectly from any act, error, omission or negligence of CONTRACTOR or its officers, employees, agents, contractors, licensees or servants, including, without limitation, claims caused by the concurrent negligent act, error or omission, of County Parties. However, CONTRACTOR shall have no obligation to defend or indemnify County Parties against claims caused by the active negligence, sole negligence or willful misconduct of County Parties.

D.7 CONTRACTOR NOT AGENT

Except as COUNTY may specify in writing, CONTRACTOR shall have no authority, express or implied, to act on behalf of COUNTY in any capacity whatsoever as an agent. CONTRACTOR shall have no authority, express or implied, pursuant to this Agreement to bind COUNTY to any obligation whatsoever.

D.8 ASSIGNMENT PROHIBITED

CONTRACTOR may not assign any right or obligation pursuant to this Agreement. Any attempted or purported assignment of any right or obligation pursuant to this Agreement shall be void and of no legal effect.

D.9 PERSONNEL

CONTRACTOR shall assign only competent personnel to perform services pursuant to this Agreement. In the event that COUNTY, in its sole discretion at any time during the term of this Agreement, desires the removal of any person or persons assigned by CONTRACTOR to perform services pursuant to this Agreement, CONTRACTOR shall remove any such person immediately upon receiving written notice from COUNTY of its desire for removal of such person or persons.

D.10 STANDARD OF PERFORMANCE

CONTRACTOR shall perform all services required pursuant to this Agreement in the manner and according to the standards observed by a competent practitioner of the profession in which CONTRACTOR is engaged. All products of whatsoever nature which CONTRACTOR delivers to COUNTY pursuant to this Agreement shall be prepared in a first class and workmanlike manner and shall conform to the standards of quality normally observed by a person practicing in CONTRACTOR's profession.

D.11 POSSESSORY INTEREST

The parties to this Agreement recognize that certain rights to property may create a "possessory interest", as those words are used in the California Revenue and Taxation Code section 107. For all purposes of compliance by COUNTY with Section 107.6 of the California Revenue and Taxation Code, this recital shall be deemed full compliance by the COUNTY. All questions of initial determination of possessory interest and valuation of such interest, if any, shall be the responsibility of the County Assessor and the contracting parties hereto. A taxable possessory interest may be created by this, if created, and the party in whom such an interest is vested will be subject to the payment of property taxes levied on such an interest.

D.12 TAXES

CONTRACTOR hereby grants to the COUNTY the authority to deduct from any payments to CONTRACTOR any COUNTY imposed taxes, fines, penalties and related charges which are delinquent at the time such payments under this Agreement are due to CONTRACTOR.

D.13 TERMINATION

COUNTY shall have the right to terminate this Agreement at any time by giving notice in writing of such termination to CONTRACTOR. In the event COUNTY gives notice of termination, CONTRACTOR shall immediately cease rendering service upon receipt of such written notice and the following shall apply:

D.13.1.1 CONTRACTOR shall deliver to COUNTY copies of all writings prepared by it pursuant this agreement. The term "writings" shall be construed to mean and include: handwriting, typewriting, printing, photocopying, photographing computer storage medium (tapes, disks, diskettes, etc.) and every other means of recording upon any tangible thing, and form of communication or representation, including letters, pictures, sounds, or symbols, or combinations thereof.

D.13.1.2 COUNTY shall pay CONTRACTOR the reasonable value of services rendered by CONTRACTOR to the date of termination pursuant to this Agreement not to exceed the amount documented by CONTRACTOR and approved by COUNTY as work accomplished to date; provided, however, that in no event shall any payment hereunder exceed _____ (\$). Further provided, however, COUNTY shall not in any manner be liable for lost profits which might have been made by CONTRACTOR had CONTRACTOR completed the services required by this Agreement. In this regard, CONTRACTOR shall furnish to COUNTY such financial information as in the judgment of the COUNTY is necessary to determine the reasonable value of the services rendered by CONTRACTOR. In the event of a dispute as to the reasonable value of the services rendered by CONTRACTOR, the decision of the COUNTY shall be final. The foregoing is cumulative and does not affect any right or remedy which COUNTY may have in law or equity.

D.14 OWNERSHIP OF INFORMATION

All professional and technical information developed under this Agreement and all work sheets, reports, and related data shall become and/or remain the property of COUNTY, and CONTRACTOR agrees to deliver reproducible copies of such documents to COUNTY on completion of the services hereunder. The COUNTY agrees to indemnify and hold CONTRACTOR harmless from any claim arising out of reuse of the information for other than this project.

D.15 WAIVER

A waiver by any party of any breach of any term, covenant or condition herein contained or a waiver of any right or remedy of such party available hereunder at law or in equity shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant or condition herein contained or of any continued or subsequent

right to the same right or remedy. No party shall be deemed to have made any such waiver unless it is in writing and signed by the party so waiving.

D.16 COMPLETENESS OF INSTRUMENT

This Agreement, together with its specific references and attachments, constitutes all of the agreements, understandings, representations, conditions, warranties and covenants made by and between the parties hereto. Unless set forth herein, neither party shall be liable for any representations made, express or implied.

D.17 SUPERSEDES PRIOR AGREEMENTS

It is the intention of the parties hereto that this Agreement shall supersede any prior agreements, discussions, commitments, representations, or agreements, written or oral, between the parties hereto.

D.18 ATTORNEY'S FEES

If any action at law or in equity, including an action for declaratory relief, is brought to enforce or interpret provisions of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees, which may be set by the Court in the same action or in a separate action brought for that purpose, in addition to any other relief to which such party may be entitled.

D.19 MINOR AUDITOR REVISION

In the event the Lassen County Auditor's office finds a mathematical discrepancy between the terms of the Agreement and actual invoices or payments, provided that such discrepancy does not exceed one percent (1%) of the Agreement amount, the Auditor's office may make the adjustment in any payment or payments without requiring an amendment to the Agreement to provide for such adjustment. Should the COUNTY or the CONTRACTOR disagree with such adjustment, they reserve the right to contest such adjustment and/or to request corrective amendment.

D.20 CAPTIONS

The captions of this Agreement are for convenience in reference only and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

D.21 DEFINITIONS

Unless otherwise provided in this Agreement, or unless the context otherwise requires, the following definitions and rules of construction shall apply herein.

D.21.1 Number and Gender. In this Agreement, the neuter gender includes the feminine and masculine, the singular includes the plural, and the word "person" includes corporations, partnerships, firms or associations, wherever the context so requires.

D.21.2 Mandatory and Permissive. "Shall" and "will" and "agrees" are mandatory. "May" is permissive.

D.22 TERM INCLUDES EXTENSIONS

All references to the term of this Agreement or the Agreement Term shall include any extensions of such term.

D.23 SUCCESSORS AND ASSIGNS

All representations, covenants and warranties specifically set forth in this Agreement, by or on behalf of, or for the benefit of any or all of the parties hereto, shall be binding upon and inure to the benefit of such party, its successors and assigns.

D.24 MODIFICATION

No modification or waiver of any provisions of this Agreement or its attachments shall be effective unless such waiver or modification shall be in writing, signed by all parties, and then shall be effective only for the period and on the condition, and for the specific instance for which given.

D.25 COUNTERPARTS

This Agreement may be executed simultaneously and in several counterparts, each of which shall be deemed an original, but which together shall constitute one and the same instrument.

D.26 OTHER DOCUMENTS

The parties agree that they shall cooperate in good faith to accomplish the object of this Agreement and, to that end, agree to execute and deliver such other and further instruments and documents as may be necessary and convenient to the fulfillment of these purposes.

D.27 PARTIAL INVALIDITY

If any term, covenant, condition or provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the provision and/or provisions shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

D.28 VENUE

It is agreed by the parties hereto that unless otherwise expressly waived by them, any action brought to enforce any of the provisions hereof or for declaratory relief hereunder shall be filed and remain in a court of competent jurisdiction in the County of Lassen, State of California.

D.29 CONTROLLING LAW

The validity, interpretation and performance of this Agreement shall be controlled by and construed under the laws of the State of California.

D.30 CALIFORNIA TORT CLAIMS ACT

Notwithstanding any term or condition of the Agreement, the provisions, and related provisions, of the California Tort Claims Act, Division 3.6 of the Government Code, are not waived by COUNTY and shall apply to any claim against COUNTY arising out of any acts or conduct under the terms and conditions of this Agreement.

D.31 TIME IS OF THE ESSENCE

Time is of the essence of this Agreement and each covenant and term herein.

D.32 AUTHORITY

All parties to this Agreement warrant and represent that they have the power and authority to enter into this Agreement in the names, titles and capacities herein stated and on behalf of any entities, persons, estates or firms represented or purported to be represented by such entity(s), person(s), estate(s) or firm(s) and that all formal requirements necessary or required by any state and/or federal law in order to enter into this Agreement are in full compliance. Further, by entering into this Agreement, neither party hereto shall have breached the terms or conditions of any other contract or agreement to which such party is obligated, which such breach would have a material effect hereon.

D.33 CORPORATE AUTHORITY

If CONTRACTOR is a corporation or public agency, each individual executing this Agreement on behalf of said corporation or public agency represents and warrants that he or she is duly authorized to execute and deliver this Agreement on behalf of said corporation, in accordance with a duly adopted resolution of the Board of Directors of said corporation or in accordance with the bylaws of said corporation or Board or Commission of said public agency, and that this Agreement is binding upon said corporation or public entity in accordance with its terms. If CONTRACTOR is a corporation, CONTRACTOR shall, within thirty (30) days after execution of this Agreement, deliver to COUNTY a certified copy of a resolution of the Board of Directors of said corporation authorizing or ratifying the execution of this Agreement.

D.34 CONFLICT OF INTEREST

D.34.1 Legal Compliance. CONTRACTOR agrees at all times in performance of this Agreement to comply with the law of the State of California regarding conflicts of interest, including, but not limited to, Article 4 of Chapter 1, Division 4, Title 1 of the California Government Code, commencing with Section 1090 and Chapter 7 of Title 9 of said Code, commencing with Section 87100, including regulations promulgated by the California Fair Political Practices Commission.

D.34.2 Advisement. CONTRACTOR agrees that if any facts come to its attention which raise any questions as to the applicability of this law, it will immediately inform the COUNTY designated representative and provide all information needed for resolution of the question.

D.34.3 Admonition. Without limitation of the covenants in subparagraphs D.34.1 and D.34.2, CONTRACTOR is admonished hereby as follows:

The statutes, regulations and laws referenced in this provision D.34 include, but are not limited to, a prohibition against any public officer, including CONTRACTOR for this purpose, from making any decision on behalf of COUNTY in which such officer has a direct or indirect financial interest. A violation occurs if the public officer influences or participates in any COUNTY decision which has the potential to confer any pecuniary benefit on CONTRACTOR or any business firm in which CONTRACTOR has an interest of any type, with certain narrow exceptions.

D.35 NONDISCRIMINATION

During the performance of this Agreement, CONTRACTOR shall not unlawfully discriminate against any employee of the CONTRACTOR or of the COUNTY or applicant for employment or for services or any member of the public because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age or sex. CONTRACTOR shall ensure that in the provision of services under this Agreement, its employees and applicants for employment and any member of the public are free from such discrimination. CONTRACTOR shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 12900 et seq.). The applicable regulations of the Fair Employment Housing Commission implementing Government Code Section 12900, set forth in Chapter 5, Division 4 of Title 2 of the California Code of Regulations are incorporated into this Agreement by reference and made a part hereof as if set forth in full. CONTRACTOR shall also abide by the Federal Civil Rights Act of 1964 and all amendments thereto, and all administrative rules and regulation issued pursuant to said Act. CONTRACTOR shall give written notice of its obligations under this clause to any labor agreement. CONTRACTOR shall include the non-discrimination and compliance provision of this paragraph in all subcontracts to perform work under this Agreement.

D.36 JOINT AND SEVERAL LIABILITY

If any party consists of more than one person or entity, the liability of each person or entity signing this Agreement shall be joint and several.

D.37 TAXPAYER I.D. NUMBER

The COUNTY shall not disburse any payments to CONTRACTOR pursuant to this Agreement until CONTRACTOR supplies the latter's Taxpayer Identification Number or Social Security Number by providing COUNTY with a completed IRS Form W-9.

D.38 NOTICES

All notices and demands of any kind which either party may require or desire to serve on the other in connection with this Agreement must be served in writing either by personal service or by registered or certified mail, return receipt requested, and shall be deposited in the United States Mail, with postage thereon fully prepaid, and addressed to the party so to be served as follows:

If to "COUNTY":

Lassen County Department of Public Works
707 Nevada Street, Suite 4
Susanville, California 96130
If to "CONTRACTOR":

END OF ATTACHMENT D

COUNTY OF LASSEN
DEPARTMENT OF PUBLIC WORKS

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal, and
_____, _____ as Surety, are held and firmly bound unto the County of Lassen,
hereinafter called the Owner, in the sum of (100%) of the contract amount _____ Dollars for the
payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and
successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that whereas the Principal entered into a certain contract, hereunto attached,
with the Owner, dated _____.

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms,
conditions, and agreements of said contract during the original term of said contract and any extension thereof that
may be granted by the Owner, with or without notice to the Surety and during the life of any guarantee required
under the contract and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions,
and agreements of any and all duly authorized modifications of said contract that may hereafter be made, then this
obligation to be void, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____
day of _____, 20____ the name and corporate seal of each corporate party being hereto affixed and these
presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Name of Principal: _____

Type of Organization: _____

By: _____

Title: _____

By: _____

Title: _____

Address: _____

(If Corporation, affix seal)

Name of Surety: _____

Address: _____

By: _____

Title: _____

(Affix corporate seal)

(Attach acknowledgement of signature of Surety. This bond must be recorded.)

COUNTY OF LASSEN
DEPARTMENT OF PUBLIC WORKS

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that _____, as Principal, and _____, as surety, incorporated under the laws of the State of _____, and duly authorized to execute bonds and undertakings under the laws of the State of California as sole Surety, as Surety, their heirs, administrators, successors, and assigns are held and firmly bound jointly and severally unto the County of Lassen, State of California, in the sum of (100% of the contract amount) _____ Dollars (\$ _____), lawful money of the United States, and unto any and all materialmen, persons, companies, or corporations furnished materials, provisions, provender, or other supplies used in, upon, for, or about the performance of the work contracted to be executed or performed under the contract hereinafter mentioned, including any and all duly authorized modifications of said contract that may hereafter be made and all persons, companies, or corporations renting or hiring teams or implements or machinery for or contributing to said work to be done and all persons entitled to file claims under Section 3181 of the Civil Code or their assign, for the payment of their claims in a total sum not exceeding \$ _____.

THE CONDITION of the forgoing obligation is that whereas the said Principal has entered into a contract dated _____ with _____ the County of Lassen to perform in accordance with the specifications for Lassen County.

NOW THEREFORE, if the above-bound Principal, contractor, person, company, or corporation or his or its subcontractor fails to pay any of the persons named in Section 3181 of the Civil Code for any materials, provisions, provender, or other supplied equipment or teams used in, upon, for, or about the performance of the work contracted to be done or for any work or labor done thereon of any kind or for any amounts due under the Unemployment Insurance Code with respect to such work or such work or labor, performed by any such claimant, of for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Division Two, Part 10, Chapter 19 of the Revenue and Taxation Code, with respect to such work and labor, the surety on this bond will pay for the same in an amount not exceeding the specified in this bond and also in case suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court, said attorney's fee to be taxed as costs in said suit and to be included in the judgment herein rendered.

The said surety, for value received hereby stipulates and agrees that no charge, extension of time, alteration, or addition to the terms of the contract or the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work or to the specifications and further that not final settlement between the County of Lassen and the Principal shall abridge the right of any beneficiary hereunder, whose claims may be unsatisfied.

This bond is executed and filed to comply with the provisions of Section 3247 to 3252, inclusive, of the Civil Code of the State of California.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument on this _____ day of _____, 20____, the corporate seal of each corporate party being affixed and these presents duly signed by its governing body.

Name of Principal: _____

Type of Organization: _____

By: _____

Title: _____

By: _____

Title: _____

Address: _____
(If Corporation, affix seal)

Name of Surety: _____

Address: _____

By: _____

Title: _____

(Affix corporate seal)

(Attach acknowledgement of signature of Surety. This bond must be recorded.)

NOTICE OF AWARD

To: _____

Project Description: LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – DEMOLITION PHASE. This work will consist, in general of interior demolition and abatement of asbestos and removal of lead based paint at the Lassen County Historic Courthouse.

The County has considered the Bid submitted by you for the above described Work in response to its Notice Inviting Sealed Bids dated____, 20____, and Information for Bidders.

You are hereby notified that you have been selected as the Contractor to complete the _____
_____Project for items in the amount of \$_____
_____, or as shown in the Bid.

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within ten (10) days from the date this Notice is delivered to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, County will be entitled to consider all your rights arising from the County's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The County will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the County.

Dated this _____ day of _____, 20____.

By: _____

Title:_____

Date:_____

ACCEPTANCE OF NOTICE OF AWARD

Receipt of the attached Notice of Award is hereby acknowledged by

This, the _____ day of _____, 20____.

By:_____

Title:_____

NOTICE TO PROCEED

To: _____

Date: _____

Project: LASSEN COUNTY HISTORIC COURTHOUSE
RENOVATION PROJECT – DEMOLITION PHASE

You are hereby notified to commence Work in accordance with the Agreement dated _____, 20__, on or before _____, 20__, and you are to complete the Work within **70** Working Days thereafter.

The date of completion of all Work is therefore _____, 20__.

You are required to return an acknowledged copy of this Notice to Proceed to the County.

LASSEN COUNTY

By: _____

Title: _____

ACCEPTANCE OF NOTICE TO PROCEED

Receipt of the above Notice to Proceed is hereby acknowledged by

This the _____ day of _____, 20__.

By: _____

Title: _____

GUARANTEE

TO

The County of Lassen ("COUNTY"), for construction of the _____

The undersigned guarantees all construction performed on this Project and also guarantees all material and equipment incorporated therein.

Contractor hereby grants to County for a period of one (1) year following the date of Final Acceptance of the Work completed, or such longer period specified in the Contract Documents, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work. This warranty only applies to new work, materials and equipment incorporated in the project per plans and specifications.

Neither final payment nor use nor occupancy of the Work performed by the Contractor shall constitute an acceptance of Work not done in accordance with this Guarantee or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom, which shall appear within one year, or longer if specified, from the date of Final Acceptance of the Work completed.

If within one (1) year after the date of Final Acceptance of the Work completed, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work that is found to be Defective, Contractor shall promptly, without cost to County and in accordance with County's written instructions, correct such Defective Work. Contractor shall remove any Defective Work rejected by County and replace it with Work that is not Defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, County may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, County shall have all rights and remedies granted by law.

Inspection of the Work shall not relieve Contractor of any of its obligations under the Contract Documents. Even though equipment, materials, or Work required to be provided under the Contract Documents have been inspected, accepted, and estimated for payment, Contractor shall, at its own expense, replace or repair any such equipment, material, or Work found to be Defective or otherwise not to comply with the requirements of the Contract Documents up to the end of the guarantee period.

All abbreviations and definitions of terms used in this Agreement shall have the meanings set forth in the Contract Documents, including, without means of limitation, Special Provisions.

The foregoing Guarantee is in addition to any other warranties of Contractor contained in the Contract Documents, and not in lieu of, any and all other liability imposed on Contractor under the Contract Documents and at law with respect to Contractor's duties, obligations, and performance under the Contract Documents. In the event of any conflict or inconsistency between the terms of this Guarantee and any warranty or obligation of the Contractor under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the higher level of obligation of the Contractor.

(SIGNATURE NEXT PAGE)

GUARANTEE

Date _____

Contractor's Name

Authorized Signature

Print Name

Title

Street Address

City, State, Zip Code

SPECIAL PROVISIONS

SECTION 1 SPECIFICATIONS AND PLANS

The work embraced herein shall be done in accordance with the Standard Specifications, Division I, General Provisions 1-9, 2010 of the Department of Transportation insofar as the same may apply and these special provisions.

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 the conflicting portions.

SECTION 2 PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Bidding" of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of and the submission of the bid.

The bidder's bond shall conform to the bond form in the Project Manual for the project and shall be properly filled out and executed. The bidder's bond form included in that manual may be used.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Project Manual. Signing the Proposal's Signature Sheet shall also constitute signature of the Noncollusion Affidavit.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of Title 49 CFR (Code of Federal Regulations) part 26 in the award and administration of US DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts.

SECTION 3 CONTRACT AWARD AND EXECUTION

3-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract.

Requests for relief of bid and bid protests are to be delivered to the following address:

Lassen County Department of Public Works
707 Nevada Street, Suite 4
Susanville, CA 96130
Attn: Director of Transportation
Or by facsimile to (530) 251-2675

The award of the contract will be made within 60 days after the opening of the proposals. This period will be subject to extension for a further period as may be agreed upon in writing between the Department and the bidder concerned.

The contract will be awarded to the lowest responsible bidder meeting the contract requirements. The contract shall be executed by the successful bidder and shall be returned, together with the contract bonds and the documents identified in Section 3-1.07, "Insurance Policies," of the Standard Specifications, to the Department so that it is received within 10 calendar days after the bidder has received the contract for execution. Failure to do so shall be just cause for forfeiture of the proposal guaranty. The executed contract documents shall be delivered to the following address:

Lassen County Department of Public Works
707 Nevada Street, Suite 4
Susanville, CA 96130

SECTION 4 BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Sections 8-1.04, "Start of Job Site Activities," 8-1.05, "Time", and 8-1.10, "Liquidated Damages," of the Standard Specifications and these special provisions.

Do not start work at the job site, except for measuring controlling field dimensions and locating utilities, until the Preconstruction Conference has occurred in accordance with SECTION 01 30 00, 1.3 PRECONSTRUCTION CONFERENCE.

The Contractor shall begin work within 10 calendar days after the date specified in the "Notice to Proceed" and shall diligently prosecute the same to completion before the expiration of:

70 WORKING DAYS

beginning on the date that work begins or beginning on the fifteenth calendar day after the date specified in the "Notice to Proceed," whichever occurs first.

The Contractor shall pay to the County of Lassen the sum of \$1,900.00 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

In the event the Contractor does not complete the work within the 70 working days as herein provided, for reasons or causes other than those provided for the Contract Documents hereof, County will be damaged. After considering such a breach and all aspects of the work, including, but not limited to, the type of installation, the current and future uses of facilities and premises, the disarrangement of the premises and facilities thereof during the work, and the additional cost and difficulty of using the disarranged facilities during the work, the parties agree that a reasonable daily damage for such a breach, if any, will be One Thousand Nine Hundred Dollars (\$1,900) per day and the payment of the same, if any, is payment of liquidating damages and not a penalty. It is understood that this agreement for liquidated damages is entered into because the amount is manifestly reasonable under the circumstances existing at the time of this agreement and it would be extremely difficult or impossible to determine with any degree of accuracy the actual damages in case of any such breach. In case of such breach, it is agreed that the Owner may deduct the amount thereof from any money due or to become due said Contractor under this contract.

SECTION 5 GENERAL

SECTION 5-1 MISCELLANEOUS

5-1.01 LABOR NON DISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM

(GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.02I(2), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of \$5,000 or more.

5-1.02 PREVAILING WAGE

Attention is directed to Section 7-1.02K, "Labor Code" of the Standard Specifications.

The general prevailing wage rates determined by the Director of Industrial Relations, for the county or counties in which the work is to be done, are available at the County of Lassen, Department of Public Works, 707 Nevada Street, Suite 4, Susanville, California. These wage rates are also included in the Project Manual for this project. Changes, if any, to the general prevailing wage rates will be available at the Department of Public Works or online at <https://www.dir.ca.gov/Public-Works/Prevailing-Wage.html>.

5-1.03 SUBCONTRACTING

Attention is directed to Section 5-1.13 "Subcontracting" of the Standard Specifications.

No subcontract releases the Contractor from the contract or relieves the Contractor of their responsibility for a subcontractor's work.

If the Contractor violates Pub Cont Code § 4100 et seq., the County may exercise the remedies provided under Pub Cont Code § 4110. The County may refer the violation to the Contractors State License Board as provided under Pub Cont Code § 4111.

The Contractor shall perform work equaling at least 30 percent of the value of the original total bid with the Contractor's own employees and equipment, owned or rented, with or without operators.

Each subcontract must comply with the contract.

Each subcontractor must have an active and valid State contractor's license with a classification appropriate for the work to be performed (Bus & Prof Code, § 7000 et seq.).

Submit copies of subcontracts upon request by the Engineer.

Before subcontracted work starts, submit a Subcontracting Request form.

Do not use a debarred contractor; a current list of debarred contractors is available at the Department of Industrial Relations' Web site.

Upon request by the Engineer, immediately remove and not again use a subcontractor who fails to prosecute the work satisfactorily.

Each subcontract and any lower tier subcontract that may in turn be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions. Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

5-1.04 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

A prime contractor or subcontractor shall pay any subcontractor not later than 10 days of receipt of each progress payment in accordance with the provision in Section 7108.5 of the California Business and Professions Code concerning prompt payment to subcontractors. The 10 days is applicable unless a longer period is agreed to in writing. Any delay or postponement of payment over 30 days may take place only for good cause and with the agency's prior written approval. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanction and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

5-1.05 PAYMENTS

Attention is directed to Section 9-1.16, "Progress Payments," and 9-1.17, "Payment After Contract Acceptance," of the Standard Specifications and these special provisions.

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

5-1.06 RECORDS

Attention is directed to Section 5-1.27, "Records"

The Contractor shall maintain cost accounting records as detailed in Section 5-1.27, "Records".

Cost accounting records shall include the information specified in Section 5-1.27D "Cost Accounting Records". Retain records in accordance with Section 5-1.27B, "Record Retention".

5-1.07 ARCHAEOLOGICAL DISCOVERIES

If archaeological materials, including but not limited to human skeletal material and disarticulated human bone, are discovered at the job site, protect and leave undisturbed and in place archaeological materials in accordance with the following codes and these special provisions:

1. California Public Resources Code, Division 5, Chapter 1.7 § 5097.5
2. California Public Resources Code, Division 5, Chapter 1.75 § 5097.98 and § 5097.99
3. California Administrative Code, Title 14 § 4308
4. California Penal Code, Part 1, Title 14 § 622-1/2
5. California Health and Safety Code, Division 7, Part 1, Chapter 2, § 7050.5

Archaeological materials are the physical remains of past human activity and include historic-period archaeological materials and prehistoric Native American archaeological materials. Nonhuman fossils are not considered to be archaeological except when showing direct evidence of human use or alteration or when found in direct physical association with archaeological materials as described in these special provisions.

Historic-period archaeological materials include cultural remains beginning with initial European contact in California, but at least 50 years old. Historical archaeological materials include:

1. Trash deposits or clearly defined disposal pits containing tin cans, bottles, ceramic dishes, or other refuse indicating previous occupation or use of the site
2. Structural remains of stone, brick, concrete, wood, or other building material found above or below ground or
3. Human skeletal remains from the historic period, with or without coffins or caskets, including any associated grave goods

Prehistoric Native American archaeological materials include:

1. Human skeletal remains or associated burial goods such as beads or ornaments
2. Evidence of tool making or hunting such as arrowheads and associated chipping debris of fine-grained materials such as obsidian, chert, or basalt
3. Evidence of plant processing such as pestles, grinding slabs, or stone bowls
4. Evidence of habitation such as cooking pits, stone hearths, packed or burnt earth floors or
5. Remains from food processing such as concentrations of discarded or burnt animal bone, shellfish remains, or burnt rocks used in cooking

Immediately upon discovery of archaeological materials, stop all work within a 60-foot radius of the archaeological materials and immediately notify the Engineer. Archaeological materials found during construction are the property of the State. Do not resume work within the 60-foot radius of the find until the Engineer gives you written approval. If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of an archaeological find or investigation or recovery of archaeological materials, you will be compensated for resulting losses and an extension of time will be granted in the same manner as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The Department may use other forces to investigate and recover archaeological materials from the location of the find. When ordered by the Engineer furnish labor, material, tools and equipment, to secure the location of the find, and assist in the investigation or recovery of archaeological materials and the cost will be paid for as extra work as provided in Section 4-1.05D, "Changes and Extra Work," of the Standard Specifications.

Full compensation for immediately notifying the Engineer upon discovery of archaeological materials and leaving undisturbed and in place archaeological materials discovered on the job site shall be considered as included in the contract price paid for various items of work involved and no additional compensation will be allowed therefore.

5-1.08 AREAS FOR CONTRACTOR'S USE

Nothing in these specifications shall be construed as allowing the Contractor to make any arrangements with any person to permit occupancy or use of any land, structure, or building within the limits of the contract for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the State and any owner, former owner, or tenant of the land, structure, or building. The Contractor shall not occupy State-owned property outside the right of way as shown on the plans or maps available in the office of the district in which the work is situated, unless the Contractor enters into a rental agreement with the Department. The agreement will be based on the fair rental values.

No area is available within the contract limits for the exclusive use of the Contractor.

5-1.09 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

This project lies within the boundaries of the Lahontan Regional Water Quality Control Board (RWQCB).

The Contractor shall know and comply with provisions of Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from the project site and areas of disturbance outside the project limits during construction. Attention is directed to Sections 7-1.01, "General," 7-1.02, "Laws," and 7-1.05, "Indemnification," and 7-1.06 "Insurance" of the Standard Specifications.

The Contractor shall be responsible for penalties assessed on the Contractor or the Department as a result of the Contractor's failure to comply with the provisions in "Water Pollution Control" of these special provisions or with the applicable provisions of the Federal, State, and local regulations and requirements.

Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the Department or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

5-1.10 GUARANTEE

GENERAL

Materials and equipment incorporated in the Work under Contract shall be new. All workmanship shall be first-class and by persons qualified in the respective trades.

- A. The Contractor shall guaranty all materials and equipment furnished and work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guaranty period. All special guaranties required by this specification shall be in writing and in the form required, and delivered to the owner before the final payment is made.
- B. In case of work performed by subcontractors and where guaranties are required under the various technical divisions of the specifications, warranties addressed to and in favor of the Owner shall be secured from said subcontractors and delivered to the owner upon completion of the work. The delivery of said guaranties shall not relieve the Contractor from any obligation assumed under any other provision of the Contract.
- C. If, within any guaranty and warranty period, defects develop due to faults in materials or workmanship, the Contractor shall, within ten days after written notice to the Contractor by the owner and without additional expense to the Owner.

1. Replace in satisfactory condition in every particular all of such guaranteed work, correct all defects therein, and;
 2. Make good all damage to the building or site, or equipment or contents thereof, which, in the opinion of the Owner is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, and;
 3. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guaranty.
- D. In any case wherein fulfilling the requirements of the Contract or, any guaranty embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Owner and guaranteed under such other contract.

5-1.11 CONTROL OF MATERIALS

Attention is directed to Section 6, "Control of Materials" Standard Specifications and its applicability to materials, quality control and testing.

5-1.12 WATERING

Construction water is available on site for use.

5-1.13 MOBILIZATION

Mobilization shall conform to the provision in Section 9-1.16D, "Mobilization" of the Standard Specifications and these special provisions.

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REVISED STANDARD SPECIFICATIONS DATED

07-15-16

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*.

[illegible]

ORGANIZATIONAL REVISIONS

07-15-16

PART 1 - 07-15-16

Transfer section 23 from division III to division IV.

PART 2 - 07-19-13

Transfer section 36 from division IV to division V.

[illegible]

DIVISION I GENERAL PROVISIONS

PART 3 - 1 GENERAL

07-15-16

Add between the 14th and 15th paragraphs of section 1-1.01:

PART 4 - 10-30-15

Specifications in a section titled *General* apply to all subordinate sections within the section.

Specifications in the general section of a division apply to all sections within the division.

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

PART 5 - 04-20-12

most recent

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

PART 6 - 04-20-12

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

Replace "MSDS" in the 1st table in section 1-1.06 with:

PART 7 - 10-17-14

MSDS^b

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

PART 8 - 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
LCS	Department's lane closure system
MPQP	<i>Material Plant Quality Program</i> published by the Department
PCMS	portable changeable message sign
POC	pedestrian overcrossing
QSD	qualified SWPPP developer
QSP	qualified SWPPP practitioner
SDS	safety data sheet
TRO	time-related overhead
WPC	water pollution control

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

PART 9 - 10-17-14

^bInterpret a reference to MSDS as a reference to SDS under 29 CFR 1910.1200.

PART 10 - 06-20-12

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

PART 11 - 10-19-12

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

PART 12 - 10-19-12

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

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

PART 13 - 10-19-12

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

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

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

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

PART 14 - 10-19-12

work

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

PART 15 - 10-19-12

delay: Event that extends the completion of an activity.

1. **excusable delay:** Delay caused by the Department and not reasonably foreseeable when the work began such as:
 - 1.1. Change in the work
 - 1.2. Department action that is not part of the Contract
 - 1.3. Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
 - 1.4. Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
 - 1.5. Department's failure to obtain timely access to the right-of-way
 - 1.6. Department's failure to review a submittal or provide notification in the time specified

2. **critical delay:** Excusable delay that extends the scheduled completion date
3. **concurrent delay:** Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
 - 3.1. Critical delay
 - 3.2. Delay to a controlling activity caused by you
 - 3.3. Non-working day

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

PART 16 - 10-19-12

work

Replace the definition of "traveled way" in section 1-1.07B with:

PART 17 - 01-15-16

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

Add to section 1-1.07B:

PART 18 - 10-30-15

abandon: Render unserviceable in place.

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

PART 19 - 10-19-12

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

PART 20 - 06-20-12

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

PART 21 - 10-30-15

modify: Add to or subtract from an appurtenant part.

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

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

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.

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

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

PART 22 - 04-20-12

703 B ST

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

PART 23 - 11-15-13

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

Replace "--" for the telephone number for the Office Engineer in the table in section 1-1.11 with:

PART 24 - 02-27-15

(916) 227-6299

Add to the table in section 1-1.11:

PART 25 - 10-30-15

<i>MPQP</i>	http://www.dot.ca.gov/manuals.htm	--	--
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AA

PART 26 - 2 BIDDING

06-03-16

Replace the headings and paragraphs in section 2 with:

PART 27 - 02-21-14

PART 28 - 2-1.01 GENERAL

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

The electronic bid specifications in section 2 apply if *Electronic Bidding Contract* is shown on the cover of the *Notice to Bidders and Special Provisions*.

PART 29 - 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

PART 30 - 2-1.03 RESERVED

PART 31 - 02-27-15

PART 32 - 2-1.04 CONTRACTOR REGISTRATION

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) 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)].

PART 33 - 02-21-14

PART 34 - 2-1.05 RESERVED

PART 35 - 10-17-14

PART 36 - 2-1.06 BID DOCUMENTS

PART 37 - 01-23-15

2-1.06A General

The *Project Manual* includes bid forms and certifications. For an electronic bid, the *Project Manual* includes forms not available through the electronic bidding service.

The *Notice to Bidders and Special Provisions* includes the *Notice to Bidders*, revised standard specifications, and special provisions.

The *Project Manual*, including *Project Manual* forms not available through the electronic bidding service, *Notice to Bidders and Special Provisions*, project plans, and any addenda to these documents may be accessed at the Bidders' Exchange website.

The *Standard Specifications* and *Standard Plans* may be viewed at the Bidders' Exchange website and may be purchased at the Publication Distribution Unit.

PART 38 - 10-17-14

2-1.06B Supplemental Project Information

The Department makes supplemental information available as specified in the special provisions.

Logs of test borings are supplemental project information.

If an *Information Handout* or cross sections are available, you may view them at the Contract Plans and Special Provisions link at the Bidders' Exchange website.

If rock cores are available, you may view them by sending a request to Coreroom@dot.ca.gov.

If other supplemental project information is available for inspection, you may view it by phoning in a request.

Make your request at least 7 days before viewing. Include in your request:

1. District-County-Route
2. Contract number
3. Viewing date
4. Contact information, including telephone number

For rock cores, also include the bridge number in your request.

If bridge as-built drawings are available:

1. For a project in District 1 through 6 or 10, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357
2. For a project in District 7, 8, 9, 11, or 12, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357, and they are available at the Office of Structure Maintenance and Investigations, Los Angeles, CA, telephone (213) 897-0877

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

PART 39 - 02-21-14

PART 40 - 2-1.08 RESERVED

PART 41 - 06-03-16

PART 42 - 2-1.09 BID ITEM LIST

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

PART 43 - 02-27-15

PART 44 - 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

PART 45 - 02-21-14

PART 46 - 2-1.11 RESERVED

PART 47 - 01-23-15

PART 48 - 2-1.12 DISADVANTAGED BUSINESS ENTERPRISES

2-1.12A General

Section 2-1.12 applies to a federal-aid contract.

Under 49 CFR 26.13(b):

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

Include this assurance in each subcontract you sign with a subcontractor.

2-1.12B Disadvantaged Business Enterprise Goal

2-1.12B(1) General

Section 2-1.12B applies if a DBE goal is shown on the *Notice to Bidders*.

The Department shows a goal for DBEs to comply with the DBE program objectives provided in 49 CFR 26.1.

Make work available to DBEs and select work parts consistent with available DBEs, including subcontractors, suppliers, service providers, and truckers.

Meet the DBE goal shown on the *Notice to Bidders* or demonstrate that you made adequate good faith efforts to meet this goal.

You are responsible to verify at bid opening the DBE firm is certified as a DBE by the California Unified Certification Program and possess the work codes applicable to the type of work the firm will perform on the Contract.

Determine that selected DBEs perform a commercially useful function for the type of work the DBE will perform on the Contract as provided in 49 CFR 26.55(c)(1)–(4). Under 49 CFR 26.55(c)(1)–(4), the DBE must be responsible for the execution of a distinct element of work and must carry out its responsibility by actually performing, managing, and supervising the work.

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

Credit for materials or supplies you purchase from DBEs will be evaluated on a contract-by-contract basis and counts toward the goal in the following manner:

1. 100 percent if the materials or supplies are obtained from a DBE manufacturer.
2. 60 percent if the materials or supplies are obtained from a DBE regular dealer.
3. Only fees, commissions, and charges for assistance in the procurement and delivery of materials or supplies, if they are obtained from a DBE that is neither a manufacturer nor regular dealer. 49 CFR 26.55 defines "manufacturer" and "regular dealer."

You receive credit toward the goal if you employ a DBE trucking company that is performing a commercially useful function. The Department uses the following factors in determining whether a DBE trucking company is performing a commercially useful function:

- The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.
- The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures, and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE truck leasing company and uses its own employees as drivers, it is entitled to credit for the total value of these hauling services.
- A lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

[49 Fed Reg 59595 (10/2/14) (to be codified at 49 CFR 26.55(d))]

PART 49 - 04-10-15

2-1.12B(2) DBE Commitment Submittal

Submit DBE information under section 2-1.33.

Submit a copy of the quote from each DBE shown on the DBE Commitment form that describes the type and dollar amount of work shown on the form. Submit a DBE Confirmation form for each DBE shown on the DBE Commitment form to establish that it will be participating in the Contract in the type and dollar amount of work shown on the form. If a DBE is participating as a joint venture partner, submit a copy of the joint venture agreement.

PART 50 - 01-23-15

2-1.12B(3) DBE Good Faith Efforts Submittal

You can meet the DBE requirements by either documenting commitments to DBEs to meet the Contract goal or by documenting adequate good faith efforts to meet the Contract goal. An adequate good faith effort means that the

bidder must show that it took all necessary and reasonable steps to achieve a DBE goal that, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to meet the DBE goal.

If you have not met the DBE goal, complete and submit the DBE Good Faith Efforts Documentation form under section 2-1.33 showing that you made adequate good faith efforts to meet the goal. Only good faith efforts directed toward obtaining participation by DBEs are considered.

Submit good faith efforts documentation within the specified time to protect your eligibility for award of the contract in the event the Department finds that the DBE goal has not been met.

Refer to 49 CFR 26 app A for guidance regarding evaluation of good faith efforts to meet the DBE goal.

The Department considers DBE commitments of other bidders in determining whether the low bidder made good faith efforts to meet the DBE goal.

PART 51 - 02-21-14

PART 52 - 2-1.13–2-1.14 RESERVED

PART 53 - 2-1.15 DISABLED VETERAN BUSINESS ENTERPRISES

2-1.15A General

Section 2-1.15 applies to a non-federal-aid contract.

Take necessary and reasonable steps to ensure that DVBEs have the opportunity to participate in the Contract.

Comply with Mil & Vet Code § 999 et seq.

2-1.15B Projects \$5 Million or Less

Section 2-1.15B applies to a project with an estimated cost of \$5 million or less.

Make work available to DVBEs and select work parts consistent with available DVBE subcontractors and suppliers.

Meet the goal shown on the *Notice to Bidders*.

Complete and submit the Certified DVBE Summary form under section 2-1.33. List all DVBE participation on this form.

If a DVBE joint venture is used, submit the joint venture agreement with the Certified DVBE Summary form.

List each 1st-tier DVBE subcontractor on the Subcontractor List form regardless of percentage of the total bid.

2-1.15C Projects More Than \$5 Million

2-1.15C(1) General

Section 2-1.15C applies to a project with an estimated cost of more than \$5 million.

The Department encourages bidders to obtain DVBE participation to ensure the Department achieves its State-mandated overall DVBE goal.

If you obtain DVBE participation:

1. Complete and submit the Certified DVBE Summary form under section 2-1.33. List all DVBE participation on this form.
2. List each 1st tier DVBE subcontractor in the Subcontractor List form regardless of percentage of the total bid.

If a DVBE joint venture is used, submit the joint venture agreement with the Certified DVBE Summary form.

2-1.15C(2) DVBE Incentive

The Department grants a DVBE incentive to each bidder who achieves a DVBE participation of 1 percent or greater (Mil & Vet Code 999.5 and Code of Regs § 1896.98 et seq.).

To receive this incentive, submit the Certified DVBE Summary form under section 2-1.33.

Bidders other than the apparent low bidder, the 2nd low bidder, and the 3rd low bidder may be required to submit the Certified DVBE Summary form if the bid ranking changes. If the Department requests a Certified DVBE Summary form from you, submit the completed form within 4 business days of the request.

2-1.15C(3) Incentive Evaluation

The Department applies the small business and non–small business preference during bid verification and proceeds with the evaluation specified below for DVBE incentive.

The DVBE incentive is a reduction, for bid comparison only, in the total bid submitted by the lesser of the following amounts:

1. Percentage of DVBE achievement rounded to 2 decimal places of the verified total bid of the low bidder
2. 5 percent of the verified total bid of the low bidder
3. \$250,000

The Department applies DVBE incentive and determines whether bid ranking changes.

A non–small business bidder cannot displace a small business bidder. However, a small business bidder with higher DVBE achievement can displace another small business bidder.

The Department proceeds with awarding the contract to the new low bidder and posts the new verified bid results at the Department's Web site.

PART 54 - 2-1.16–2-1.17 RESERVED

PART 55 - 2-1.18 SMALL BUSINESS AND NON–SMALL BUSINESS SUBCONTRACTOR PREFERENCES

2-1.18A General

Section 2-1.18 applies to a non-federal-aid contract.

The Department applies small business preferences and non–small business preferences under Govt Code § 14835 et seq. and 2 CA Code of Regs § 1896 et seq.

Any contractor, subcontractor, supplier, or service provider who qualifies as a small business is encouraged to apply for certification as a small business by submitting its application to the Department of General Services, Office of Small Business and DVBE Services.

Contract award is based on the total bid, not the reduced bid.

2-1.18B Small Business Preference

The Department allows a bidder certified as a small business by the Department of General Services, Office of Small Business and DVBE Services, a preference if:

1. Bidder submitted a completed Request for Small Business Preference or Non–Small Business Preference form with its bid
2. Low bidder did not request the preference or is not certified as a small business

The bidder's signature on the Request for Small Business Preference or Non–Small Business Preference form certifies that the bidder is certified as a small business at the date and time of bid or has submitted a complete application to the Department of General Services. The complete application and any required substantiating documentation must be received by the Department of General Services by 5:00 p.m. on the bid opening date.

The Department of General Services determines whether a bidder was certified on the bid opening date. The Department of Transportation confirms the bidder's status as a small business before applying the small business preference.

The small business preference is a reduction for bid comparison in the total bid submitted by the small business contractor by the lesser of the following amounts:

1. 5 percent of the verified total bid of the low bidder
2. \$50,000

If the Department determines that a certified small business bidder is the low bidder after the application of the small business preference, the Department does not consider a request for non–small business preference.

2-1.18C Non–Small Business Subcontractor Preference

The Department allows a bidder not certified as a small business by the Department of General Services, Office of Small Business and DVBE Services, a preference if:

1. Bidder submitted a completed Request for Small Business Preference or Non–Small Business Preference form with its bid
2. Certified Small Business Listing for the Non–Small Business Preference form shows that you are subcontracting at least 25 percent to certified small businesses

Each listed subcontractor and supplier must be certified as a small business at the date and time of bid or must have submitted a complete application to the Department of General Services. The complete application and any required substantiating documentation must be received by the Department of General Services by 5:00 p.m. on the bid opening date.

The non–small business subcontractor preference is a reduction for bid comparison in the total bid submitted by the non–small business contractor requesting the preference by the lesser of the following amounts:

1. 5 percent of the verified total bid of the low bidder
2. \$50,000

PART 56 - 2-1.19–2-1.26 RESERVED

PART 57 - 2-1.27 CALIFORNIA COMPANIES

Section 2-1.27 applies to a non-federal-aid contract.

PART 58 - Under Pub Cont Code § 6107, the Department gives preference to a "California company," as defined, for bid comparison purposes over a nonresident contractor from any state that gives or requires a preference to be given to contractors from that state on its public entity construction contracts.

PART 59 - Complete a California Company Preference form.

PART 60 - The California company reciprocal preference amount is equal to the preference amount applied by the state of the nonresident contractor with the lowest responsive bid unless the California company is eligible for a small business preference or a non–small business subcontractor preference, in which case the preference amount is the greater of the two, but not both.

PART 61 - If the low bidder is not a California company and a California company's bid with reciprocal preference is equal to or less than the lowest bid, the Department awards the contract to the California company on the basis of its total bid.

PART 62 - 2-1.28 RESERVED

PART 63 - 2-1.29 OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

PART 64 - 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 under section 2-1.33.

PART 65 - 2-1.30–2-1.32 RESERVED

PART 66 - 02-27-15

PART 67 - 2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

2-1.33A General

Complete the forms in the *Project Manual*.

Use the forms provided by the Department except as otherwise specified for a bidder's bond.

Do not fax forms except for the copies of forms with the public works contractor registration number submitted after the time of bid. Fax these copies to (916) 227-6282.

Submit the forms and copies of the forms to the Office Engineer.

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

If an agent other than the authorized corporate 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 Electronic Bids

Section 2-1.33B applies to electronic bids.

For an electronic bid, complete and submit the electronic portion of the *Project Manual* under the *Electronic Bidding Guide* at the Bidders' Exchange website and submit the paper forms as specified for a paper bid.

Your authorized digital signature is your confirmation of and agreement to all certifications and statements contained in the *Project Manual*.

On forms and certifications that you submit through the electronic bidding service, you agree that each form and certification where a signature is required is deemed as having your signature.

2-1.33C Paper Bids

Section 2-1.33C applies to paper bids.

Submit your bid and any *Project Manual* forms after you submit your bid:

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

2-1.33D Bid Form Submittal Schedules

2-1.33D(1) General

The *Project Manual* includes forms specific to the contract. The deadlines for the submittal of the forms vary depending on the requirements of each contract. Determine the requirements of the contract and submit the forms based on the applicable schedule specified in section 2-1.33D.

Bid forms and information on the form that are due after the time of bid may be submitted at the time of bid.

2-1.33D(2) Federal-Aid Contracts

2-1.33D(2)(a) General

Section 2-1.33D(2) applies to a federal-aid contract.

PART 68 - 04-10-15

2-1.33D(2)(b) Contracts with a DBE Goal

Section 2-1.33D(2)(b) applies if a DBE goal is shown on the *Notice to Bidders*.

Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a
Federal-Aid Contract with a DBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number
Copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid except for the public works contractor registration number
Copy of the Subcontractor List as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Small Business Status	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations ^a	Time of bid
DBE Commitment	No later than 4 p.m. on the 4th business day after bid opening
DBE Confirmation	No later than 4 p.m. on the 4th business day after bid opening
DBE Good Faith Efforts Documentation	No later than 4 p.m. on the 4th business day after bid opening

^aSubmit only if you choose the option.

PART 69 - 02-27-15

2-1.33D(2)(c) Contracts without a DBE Goal

Reserved

2-1.33D(2)(d)–2-1.33D(2)(h) Reserved

2-1.33D(3) Non-Federal-Aid Contracts

2-1.33D(3)(a) General

Section 2-1.33D(3) applies to non-federal-aid contracts.

2-1.33D(3)(b) Contracts with a DVBE Goal

Section 2-1.33D(3)(b) applies if a DVBE goal is shown on the *Notice to Bidders*.

PART 70 - Submit the bid forms according to the schedule shown in the following table:

**Bid Form Submittal Schedule for a
Non-Federal-Aid Contract with a DVBE Goal**

Form	Submittal deadline
Bid to the Department of Transportation	Time of bid except for the public works contractor registration number for a joint-venture contract
For a joint-venture contract, copy of the Bid to the Department of Transportation as submitted at the time of bid with the public works contractor registration number	10 days after bid opening
Subcontractor List	Time of bid
Opt Out of Payment Adjustments for Price Index Fluctuations ^a	Time of bid
Certified DVBE Summary	No later than 4 p.m. on the 4th business day after bid opening
California Company Preference	Time of bid
Request for Small Business Preference or Non–Small Business Preference ^a	Time of bid
Certified Small Business Listing for the Non–Small Business Preference ^a	No later than 4 p.m. on the 2nd business day after bid opening

^aSubmit only if you choose the option or preference.

2-1.33D(3)(c) Contracts without a DVBE Goal

Reserved

2-1.33D(3)(d)–2-1.33D(3)(h) Reserved

2-1.33D(4)–2-1.33D(9) Reserved

PART 71 - 02-21-14

PART 72 - 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
5. For an electronic bid, electronic bidder's bond by an admitted surety insurer submitted using an electronic registry service approved by the Department.

Submit cash, cashier's check, certified check, or bidder's bond to the Department at the Bidders Exchange before the bid opening time.

Submit electronic bidder's bond with the electronic bid.

If using a bidder's bond, you may use the form in the *Project Manual*. If you do not use the form in the *Project Manual*, use a form containing the same information.

PART 73 - 2-1.35–2-1.39 RESERVED

PART 74 - 2-1.40 BID WITHDRAWAL

For a paper bid:

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.
2. After the bid opening time, you cannot withdraw a bid.

For an electronic bid:

1. Bids are not filed with the Department until the date and time of bid opening.
2. A bidder may withdraw or revise a bid after it has been submitted to the electronic bidding service if this is done before the bid opening date and time.

PART 75 - 2-1.41–2-1.42 RESERVED

PART 76 - 2-1.43 BID OPENING

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

PART 77 - 2-1.44–2-1.45 RESERVED

PART 78 - 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

PART 79 - 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 the Office Engineer. The Relief of Bid Request form is available at the Department's website.

PART 81 - 2-1.49 SUBMITTAL FAILURE HISTORY

PART 82 - 2-1.50 BID RIGGING

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

PART 83 - 3 CONTRACT AWARD AND EXECUTION

PART 84 - 02-21-14

3-1.02A General

For a cost plus time based bid, the Department compares bids based on the sum of the item totals and the total bid for time.

1. If a small business bidder and a non-small business bidder request preferences and the reductions result in a tied bid, the Department awards the contract to the small business bidder.
2. If a DVBE small business bidder and a non-DVBE small business bidder request preferences and the reduction results in a tied bid, the Department awards the contract to the DVBE small business bidder.

PART 86 - 02-27-15

PART 88 - 10-19-12

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

PART 89 - 10-19-12

PART 90 - 01-23-15

PART 90 - 01-23-15

PART 92 - 07-27-12

PART 94 - 01-23-15

PART 95 - 02-27-15

PART 96 - 02-27-15

[illegible]

PART 98 - 10-30-15

[illegible]

PART 100 - 10-19-12

LASSEN COUNTY HISTORIC COURTHOUSE RENOVATION PROJECT – SEISMIC UPGRADE, ELEVATOR AND ACCESSIBILITY IMPROVEMENTS

Add to the list in the 4th paragraph of section 5-1.09A:

PART 101 - 10-19-12

9. Considering discussing with and involving all stakeholders in evaluating potential VECs

Add to the end of item 1.1 in the list in the 7th paragraph of section 5-1.09A:

PART 102 - 10-19-12

, including VECs

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

PART 103 - 10-19-12

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

PART 104 - 10-19-12

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

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

PART 105 - 10-19-12

field supervisory personnel

Replace the 8th paragraph of section 5-1.13A with:

PART 106 - 04-24-15

Each subcontractor must have an active and valid:

1. State contractor license with a classification appropriate for the work to be performed (Bus & Prof Code § 7000 et seq.)
2. Public works contractor registration number with the Department of Industrial Relations

Replace section 5-1.13B with:

PART 107 - 01-23-15

5-1.13B Disadvantaged Business Enterprises

5-1.13B(1) General

Section 5-1.13B applies to a federal-aid contract.

Use each DBE as listed on the DBE Commitment form unless you receive authorization for a substitution. Ensure that all subcontracts and agreements with DBEs to supply labor or materials are performed under 49 CFR 26.

Maintain records, including:

1. Name and business address of each 1st-tier subcontractor
2. Name and business address of each DBE subcontractor, DBE vendor, and DBE trucking company, regardless of tier
3. Date of payment and total amount paid to each business

If you are a DBE contractor, include the date of work performed by your own forces and the corresponding value of the work.

Before the 15th day of each month for the previous month's work, submit:

1. Monthly DBE Trucking Verification form
2. Monthly DBE Payment form

If a DBE is decertified before completing its work, the DBE must notify you in writing of the decertification date. If a business becomes a certified DBE before completing its work, the business must notify you in writing of the certification date. Submit the notifications. Upon work completion, complete a Disadvantaged Business Enterprises (DBE) Certification Status Change form. Submit the form within 30 days of Contract acceptance.

Upon work completion, complete a Final Report – Utilization of Disadvantaged Business Enterprises (DBE), First-Tier Subcontractors form. Submit it within 30 days of Contract acceptance. The Department withholds \$10,000 until the form is submitted. The Department releases the withhold upon submission of the completed form.

PART 108 - 04-10-15

5-1.13B(2) Performance of Disadvantaged Business Enterprises

Section 5-1.13(B)(2) applies if a DBE goal is shown on the *Notice to Bidders*.

DBEs must perform work or supply materials as listed on the DBE Commitment form.

Do not terminate or substitute a listed DBE for convenience and perform the work with your own forces or those of an affiliate, a non-DBE firm, or another DBE firm or obtain materials from other sources without authorization from the Department.

The Department authorizes a request to use other forces or sources of materials if it shows any of the following justifications:

1. Listed DBE fails or refuses to execute a written contract based on the plans and specifications for the project.
2. You stipulated that a bond is a condition of executing the subcontract and the listed DBE fails to meet your bond requirements.
3. Work requires a contractor license and the listed DBE does not have a valid license under the Contractors License Law.
4. Listed DBE fails or refuses to perform the work or furnish the listed materials.
5. Listed DBE's work is unsatisfactory and not in compliance with the Contract.
6. Listed DBE is ineligible to work on the project because of suspension or debarment.
7. Listed DBE becomes bankrupt or insolvent.
8. Listed DBE voluntarily withdraws with written notice from the Contract.
9. Listed DBE is ineligible to receive credit for the type of work required.
10. Listed DBE owner dies or becomes disabled resulting in the inability to perform the work on the Contract.
11. Department determines other documented good cause under 49 CFR 26.53.

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

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

If the Department authorizes the termination or substitution of a listed DBE, make good faith efforts to find another DBE. The substitute DBE must (1) perform at least the same dollar amount of work as the original DBE under the Contract to the extent needed to meet the DBE goal and (2) be certified as a DBE with the work code applicable to the type of work the DBE will perform on the Contract at the time of your request for substitution. Submit your documentation of good faith efforts within 7 days of your request for authorization of the substitution. The Department may authorize a 7-day extension of this submittal period at your request. Refer to 49 CFR 26 app A for guidance regarding evaluation of good faith efforts to meet the DBE goal.

Unless the Department authorizes a request to terminate or substitute a listed DBE, the Department does not pay for work unless it is performed or supplied by the DBE listed on the DBE Commitment form. You may be subject to other sanctions under 49 CFR 26.

Replace the paragraphs of section 5-1.13C with:

PART 109 - 11-15-13

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

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

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

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

Include in your substitution request:

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

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

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

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

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

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

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

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

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

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

PART 110 - 10-19-12

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

Replace section 5-1.20E with:

PART 111 - 05-30-14

5-1.20E Water Meter Charges

Section 5-1.20E applies if a bid item for water meter charges is shown on the Bid Item List. The charges are specified in a special provision for section 5-1.20E.

The local water authority will install the water meters.

The charges by the local water authority include:

1. Furnishing and installing each water meter
2. Connecting to the local water authority's main water line, including any required hot tap or tee
3. Furnishing and installing an extension pipe from the main water line to the water meter
4. Sterilizing the extension pipe

Make arrangements and pay the charges for the installation of the water meters.

If a charge is changed at the time of installation, the Department adjusts the lump sum price based on the difference between the specified charges and the changed charges.

Replace section 5-1.20F with:

PART 112 - 05-30-14

5-1.20F Irrigation Water Service Charges

Reserved

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

PART 113 - 10-19-12

Submit action and informational submittals to the Engineer.

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

PART 114 - 07-19-13

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

PART 115 - 07-19-13

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

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

PART 116 - 07-19-13

10. Survey monuments

Add to section 5-1.36C:

PART 117 - 07-20-12

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

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

Add to section 5-1.36:

PART 118 - 07-19-13

5-1.36E Survey Monuments

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

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

Do not resume work near the monument until authorized.

Add between the 1st and 2nd paragraphs of section 5-1.37A:

PART 119 - 10-19-12

Do not remove any padlock used to secure a portion of the work until the Engineer is present to replace it. Notify the Engineer at least 3 days before removing the lock.

Replace the 1st sentence of the 1st paragraph of section 5-1.39C(2) with:

PART 120 - 10-19-12

Section 5-1.39C(2) applies if a plant establishment period of 3 years or more is shown on the *Notice to Bidders*.

Replace "working days" in the 1st paragraph of section 5-1.43E(1)(a) with:

PART 121 - 10-19-12

original working days

Replace "settled" in the last paragraph of section 5-1.43E(1)(d) with:

PART 122 - 04-10-15

resolved

Replace items 3.1 and 3.2 in the list in the paragraph of section 5-1.43E(3)(b) with:

PART 123 - 04-24-15

- 3.1. One-time objection to the other's candidate without stating a reason
- 3.2. Objection to any of the other's subsequent candidates based on a specific breach of the candidate's responsibilities or qualifications under items 1 and 2 above

Add between "held" and "no later than" in the 2nd sentence of the 1st paragraph of section 5-1.43E(3)(e):

PART 124 - 10-30-15

no sooner than 30 days and

PART 125 - 6 CONTROL OF MATERIALS

Add between "replacing" and "Department-furnished" in the 1st sentence in the last paragraph of section 6-2.03:

lost or damaged

PART 127 - 04-19-13

Steel and iron materials must be melted and manufactured in the United States except:

- PART 128 - 10-24-15

PART 129 - 04-19-13

PART 130 - 10-30-15

Prepare and maintain QC records, including:

- Submit QC test data and QC test results within 2 business days of test completion.

Add between the 1st and 2nd paragraphs of section 6-3.05A:

PART 131 - 10-30-15

The Department may inspect, sample, and test materials for compliance with the Contract at any time.

The Department's independent assurance program is described in the Department's *Independent Assurance Manual: Procedures for Accreditation of Laboratories and Qualification of Testers*. For the manual, go to the METS website.

PART 132 - 10-30-15

Delete "if they are available at the job site" from the 3rd paragraph of section 6-3.05A.

Replace "Precast concrete members specified section 11-2" in the table in section 6-3.05B with:

PART 133 - 07-19-13

Precast concrete members specified as tier 1 or tier 2 in section 90-4.01D(1)

AA

PART 134 - 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

07-15-16

Replace the paragraphs in section 7-1.02I(2) with:

PART 135 - 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.
2. 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:

PART 136 - 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.

Replace "§§ 1727 and 1770–1815" in the 1st sentence of the 1st paragraph of section 7-1.02K(1) with:

PART 137 - 02-27-15

§ 1720 et seq.

Add to the end of the 2nd sentence in the 1st paragraph of section 7-1.02K(1):

PART 138 - 04-22-16

, and hauling and delivery of ready-mixed concrete.

Replace "\$50" in the 1st sentence in the 6th paragraph of section 7-1.02K(2) with:

PART 139 - 07-19-13

\$200

Add between the 4th and 5th paragraphs of section 7-1.02K(3):

PART 140 - 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

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

PART 141 - 07-19-13

\$100

Add between the 1st and 2nd sentences in the 2nd paragraph of section 7-1.02K(6)(b):

PART 142 - 10-30-15

Shop drawings of protective systems for which the Construction Safety Orders require design by a registered professional engineer must be sealed and signed by an engineer who is registered as a civil engineer in the State.

PART 143 - 05-30-14

Delete "water or" in the 9th paragraph of section 7-1.03.

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

PART 144 - 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 (foot)	Slope (horizontal:vertical)	
	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 39-7.02.

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 15-5.06.

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.

Add to the end of the 10th paragraph of section 7-1.03:

PART 145 - 10-30-15

Flagging must comply with section 12-1. The Department pays you for this work under section 12-1.04.

Add between the 1st and 2nd sentences of the 7th paragraph of section 7-1.04:

PART 146 - 10-30-15

Flagging must comply with section 12-1. The Department pays you for this work under section 12-1.04.

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

PART 147 - 09-16-11

25 days

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

PART 148 - 09-16-11

125 days

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

PART 149 - 09-16-11

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

PART 150 - 10-30-15

Delete "lane" in the 2nd sentence in the 27th paragraph of section 7-1.04.

Replace "§ 337.15" in the 3rd item in the list in the paragraph of section 7-1.06B with:

PART 151 - 05-06-16

§ 337.1

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

PART 152 - 02-12-16

Comply with 46 CFR 381.7(a)–(b).

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

PART 153 - 07-27-12

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

FHWA-1273 Nondiscrimination Clauses

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

Replace the form in section 7-1.11B with:

PART 154 - 07-20-12

FHWA-1273 – Revised May 1, 2012

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

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

ATTACHMENTS

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

I. GENERAL

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

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

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

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

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

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

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

II. NONDISCRIMINATION

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

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

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

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

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

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

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

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

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

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

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

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

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualified minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epis.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

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PART 155 - 8 PROSECUTION AND PROGRESS

07-15-16

Replace "working days" in the 1st paragraph of section 8-1.02B(1) with:

PART 156 - 10-19-12

original working days

Replace "working days" at each occurrence in the 1st paragraph of section 8-1.02C(1) with:

PART 157 - 10-19-12

original working days

PART 158 - 04-20-12

Delete the 4th paragraph of section 8-1.02C(1).

Replace "Contract" in the 9th paragraph of section 8-1.02C(1) with:

PART 159 - 10-19-12

work

Replace the 1st paragraph of section 8-1.02C(3)(a) with:

PART 160 - 04-20-12

Submit a description of your proposed schedule software for authorization.

PART 161 - 04-20-12

Delete the last paragraph of section 8-1.02C(3)(a).

Replace section 8-1.02C(3)(b) with:

PART 162 - 10-19-12

8-1.02C(3)(b) Reserved

PART 163 - 04-20-12

Delete the 3rd paragraph of section 8-1.02C(5).

Replace "Contract" in the last paragraph of section 8-1.02C(5) with:

PART 164 - 10-19-12

original

Replace "working days" in the 1st paragraph of section 8-1.02D(1) with:

PART 165 - 10-19-12

original working days

Replace "8-1.02D(1)" in the 2nd paragraph of section 8-1.02D(1) with:

PART 166 - 01-20-12

8-1.02C(1)

Replace "Contract" in the 3rd paragraph of section 8-1.02D(2) with:

PART 167 - 10-19-12

work

Replace "Contract" in item 9 in the list in the 4th paragraph of section 8-1.02D(4) with:

PART 168 - 10-19-12

work

Replace "Contract completion" in the 4th paragraph of section 8-1.02D(6) with:

PART 169 - 10-19-12

work completion

Replace "Contract working days" in the 4th paragraph of section 8-1.02D(6) with:

PART 170 - 10-19-12

original working days

PART 171 - 04-20-12

Delete items 1.3 and 1.4 in the list in the 1st paragraph of section 8-1.02D(10).

Replace the last paragraph of section 8-1.04B with:

PART 172 - 10-30-15

The Department does not adjust time for work performed before Contract approval.

Replace the 1st paragraph of section 8-1.05 with:

PART 173 - 10-30-15

Contract time starts on the earlier of the following:

1. Day you start job site activities after Contract approval
2. Last day specified to start job site activities in section 8-1.04

Replace the 2nd paragraph of section 8-1.05 with:

PART 174 - 10-19-12

Complete the work within the Contract time.

PART 175 - 10-19-12

Delete "unless the Contract is suspended for reasons unrelated to your performance" in the 4th paragraph of section 8-1.05.

Replace the headings and paragraphs in section 8-1.06 with:

PART 176 - 10-19-12

The Engineer may suspend work wholly or in part due to conditions unsuitable for work progress. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified under sections 7-1.03 and 7-1.04. Providing the passageway is force account work. The Department makes a time adjustment for the suspension due to a critical delay.

The Engineer may suspend work wholly or in part due to your failure to (1) fulfill the Engineer's orders, (2) fulfill a Contract part, or (3) perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur. The Department may provide for a smooth and unobstructed passageway through the work during the suspension and deduct the cost from payments. The Department does not make a time adjustment for the suspension.

Upon the Engineer's order of suspension, suspend work immediately. Resume work when ordered.

Replace the 1st sentence in the 1st paragraph of section 8-1.07B with:

PART 177 - 10-19-12

For a critical delay, the Department may make a time adjustment.

Add to the end of section 8-1.07C:

PART 178 - 10-30-15

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

Replace the 1st paragraph of section 8-1.07C with:

PART 179 - 10-19-12

For an excusable delay that affects your costs, the Department may make a payment adjustment.

Replace "8-1.08B and 8-1.08C" in the 1st paragraph of section 8-1.10A with:

PART 180 - 08-05-11

8-1.10B and 8-1.10C

PART 181 - 07-15-16

PART 215 - \$25,300

PART 216 - 10-19-12

AA

10-30-15

PART 218 - 07-19-13

- PART 219 - 01-18-13

- PART 220 - 01-23-15

Replace "in" in the 3rd paragraph of section 9-1.04A with:

PART 221 - 10-19-12

for

Add to the end of section 9-1.04A:

PART 222 - 10-19-12

For nonsubcontracted work paid by force account for a contract with a TRO bid item, the markups are those shown in the following table instead of those specified in sections 9-1.04B–D:

Cost	Percent markup
Labor	30
Materials	10
Equipment rental	10

Replace the heading and the 1st paragraph of section 9-1.04D(3) with:

PART 223 - 01-23-15

9-1.04D(3) Equipment Not On the Job Site and Not Required for Original Contract Work

For equipment not on the job site at the time required to perform work paid by force account and not required for original Contract work, the time paid is the time the equipment is operated to perform work paid by force account and the time to return the equipment to its source when the work paid by force account is completed.

Replace item 2 in the 3rd paragraph of section 9-1.04D(3) with:

PART 224 - 01-23-15

2. Operated less than 4 hours is paid as 1/2 day

Replace section 9-1.04D(4) with:

PART 225 - 01-23-15

9-1.04D(4) Equipment Not On the Job Site and Required for Original Contract Work

For equipment not on the job site at the time required to perform work paid by force account and required for original Contract work, the time paid is the time:

1. To move the equipment to the location of work paid by force account plus an equal amount of time to move the equipment to a location on the job site or its source when the work paid by force account is completed
2. Equipment is operated to perform work paid by force account

PART 226 - 04-20-12

Delete ", Huntington Beach," in the 3rd paragraph of section 9-1.07A.

Replace the formula in section 9-1.07B(2) with:

PART 227 - 04-20-12

$$Qh = HMATT \times Xa$$

Replace "weight of dry aggregate" in the definition of the variable *Xa* in section 9-1.07B(2) with:

PART 228 - 04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(3) with:

PART 229 - 04-20-12

$$Q_{rh} = R_{HMATT} \times 0.80 \times X_{arb}$$

Replace "weight of dry aggregate" in the definition of the variable *Xarb* in section 9-1.07B(3) with:

PART 230 - 04-20-12

total weight of rubberized HMA

Replace the heading of section 9-1.07B(4) with:

PART 231 - 04-20-12

Hot Mix Asphalt with Modified Asphalt Binder

Add between "in" and "modified" in the introductory clause of section 9-1.07B(4):

PART 232 - 04-20-12

HMA with

Replace the formula in section 9-1.07B(4) with:

PART 233 - 04-20-12

$$Q_{mh} = M_{HMATT} \times [(100 - X_{am}) / 100] \times X_{mab}$$

Replace "weight of dry aggregate" in the definition of the variable *Xmab* in section 9-1.07B(4) with:

PART 234 - 04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(5) with:

PART 235 - 04-20-12

$$Q_{rap} = H_{MATT} \times X_{aa}$$

Replace "weight of dry aggregate" in the definitions of the variables *Xaa* and *Xta* in section 9-1.07B(5) with:

PART 236 - 04-20-12

total weight of HMA

Add after the variable definitions in section 9-1.07B(9):

PART 237 - 04-20-12

The quantity of extender oil is included in the quantity of asphalt.

Replace the headings and paragraphs in section 9-1.11 with:

PART 238 - 10-19-12

9-1.11A General

Section 9-1.11 applies if a bid item for time-related overhead is included in the Contract. If a bid item for time-related overhead is included, you must exclude the time-related overhead from every other bid item price.

9-1.11B Payment Quantity

The TRO quantity does not include the number of working days to complete plant establishment work.

For a contract with a TRO lump sum quantity on the Bid Item List, the Department pays you based on the following conversions:

1. LS unit of measure is replaced with WDAY
2. Lump sum quantity is replaced with the number of working days bid
3. Lump sum unit price is replaced with the item total divided by the number of working days bid

9-1.11C Payment Inclusions

Payment for the TRO bid item includes payment for time-related field- and home-office overhead for the time required to complete the work.

The field office overhead includes time-related expenses associated with the normal and recurring construction activities not directly attributed to the work, including:

1. Salaries, benefits, and equipment costs of:
 - 1.1. Project managers
 - 1.2. General superintendents
 - 1.3. Field office managers
 - 1.4. Field office staff assigned to the project
2. Rent
3. Utilities
4. Maintenance
5. Security
6. Supplies
7. Office equipment costs for the project's field office

The home-office overhead includes the fixed general and administrative expenses for operating your business, including:

1. General administration
2. Insurance
3. Personnel and subcontract administration
4. Purchasing
5. Accounting
6. Project engineering and estimating

Payment for the TRO bid item does not include payment for:

1. The home-office overhead expenses specifically related to:
 - 1.1. Your other contracts or other businesses
 - 1.2. Equipment coordination
 - 1.3. Material deliveries
 - 1.4. Consultant and legal fees
2. Non-time-related costs and expenses such as mobilization, licenses, permits, and other charges incurred once during the Contract
3. Additional overhead involved in incentive/disincentive provisions to satisfy an internal milestone or multiple calendar requirements
4. Additional overhead involved in performing additional work that is not a controlling activity
5. Overhead costs incurred by your subcontractors of any tier or suppliers

9-1.11D Payment Schedule

For progress payments, the total work completed for the TRO bid item is the number of working days shown for the pay period on the *Weekly Statement of Working Days*.

For progress payments, the Department pays a unit price equal to the lesser of the following amounts:

1. Price per working day as bid or as converted under section 9-1.11B.
2. 20 percent of the total bid divided by the number of original working days

For a contract without plant establishment work, the Department pays you the balance due of the TRO item total as specified in section 9-1.17B.

For a contract with plant establishment work, the Department pays you the balance due of the TRO item total in the 1st progress payment after all non-plant establishment work is completed.

9-1.11E Payment Adjustments

The 3rd paragraph of section 9-1.17C does not apply.

The Department does not adjust the unit price for an increase or decrease in the TRO quantity except as specified in section 9-1.11E.

Section 9-1.17D(2)(b) does not apply except as specified for the audit report below.

If the TRO bid item quantity exceeds 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B, the Engineer may adjust or you may request an adjustment of the unit price for the excess quantity. For the adjustment, submit an audit report within 60 days of the Engineer's request. The report must be prepared as specified for an audit report for an overhead claim in section 9-1.17D(2)(b).

Within 20 days of the Engineer's request, make your financial records available for an audit by the State for the purpose of verifying the actual rate of TRO described in your audit. The actual rate of TRO described is subject to the Engineer's authorization.

The Department pays the authorized actual rate for TRO in excess of 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B.

The Department pays for 1/2 the cost of the report; the Contractor pays for the other 1/2. The cost is determined under section 9-1.05.

Replace the paragraphs of section 9-1.16D with:

PART 239 - 07-19-13

9-1.16D(1) General

Section 9-1.16D applies if a bid item for mobilization is shown on the Bid Item List.

Payments for mobilization made under section 9-1.16D are in addition to the partial payments made under Pub Cont Code § 10261.

Section 9-1.16D(2) applies unless the Contract includes a special provision for section 9-1.16D(1) that specifies section 9-1.16D(3) applies.

PART 240 - 11-15-13

9-1.16D(2) Mobilization for Projects Except for Those Over Water Requiring Marine Access

PART 241 - 07-19-13

The Department makes partial payments for mobilization under Pub Cont Code § 10264(a) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(a)(5).

The Department pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(a)(5) in the 1st payment after Contract acceptance.

9-1.16D(3) Mobilization for Projects Over Water Requiring Marine Access

The Department makes partial payments for mobilization under Pub Cont Code § 10264(b) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(b)(6).

The Department pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(b)(6) in the 1st payment after Contract acceptance.

Add to the end of the 2nd paragraph of section 9-1.16E(1):

PART 242 - 10-30-15

except as specified in section 9-1.16E(3)

PART 243 - 10-19-12

Delete "revised Contract" in item 1 of the 1st paragraph of section 9-1.16E(2).

Add to the end of the 1st sentence of the 1st paragraph of section 9-1.16E(3):

PART 244 - 10-30-15

except as specified below for the failure to submit a document during the last estimate period

Add to the end of section 9-1.16E(3):

PART 245 - 10-30-15

During the last estimate period, if you fail to submit a document as specified, the Department withholds \$10,000 for each document. The Department returns the withhold within 30 days after receipt of the document.

Replace the 1st paragraph of section 9-1.16E(4) with:

PART 246 - 10-30-15

The Department withholds payments to cover claims filed under Civ Code § 9000 et seq.

Replace "2014" in the 1st paragraph of section 9-1.16F with:

PART 247 - 10-19-12

2020

Replace the 2nd paragraph of section 9-1.17C with:

PART 248 - 10-19-12

Submit either a written acceptance of the proposed final estimate or a claim statement postmarked or hand delivered before the 31st day after receiving the proposed final estimate.

Add between "the" and "final estimate" in the 1st sentence in the 3rd paragraph of section 9-1.17C:

PART 249 - 10-19-12

proposed

Replace the 1st sentence in the 6th paragraph of section 9-1.17D(2)(b) with:

PART 250 - 07-19-13

The CPA's audit must be performed as an examination-level engagement under the attestation engagements in the *Government Auditing Standards* published by the Comptroller General of the United States.

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STATE GENERAL PREVAILING WAGE DETERMINATIONS

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GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # BOILERMAKER-BLACKSMITH

DETERMINATION: C-14-X-2-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: September 30, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the State of California

CLASSIFICATION (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension ^d	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday 1 1/2X	Sunday/ Holiday 2X
^a AREA 1 Boilermaker-Blacksmith	\$44.03	\$8.57	^b \$18.14	^b \$7.45	\$3.90	\$0.49	8	\$82.58	^c \$117.39	^c \$117.39	\$152.20
^a AREA 2 Boilermaker-Blacksmith	\$47.00	\$8.57	^b \$21.67	^b \$4.00	\$4.40	\$0.49	8	\$86.13	^c \$122.465	^c \$122.465	\$158.80
^a AREA 3 Boilermaker-Blacksmith	\$43.46	\$8.57	^b \$20.16	^b \$5.50	\$4.40	\$0.49	8	\$82.58	^c \$117.14	^c \$117.14	\$151.70

DETERMINATION: C-14-X-2-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: September 30, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the State of California

^a AREA 1 Boilermaker-Blacksmith Helper ^f	\$24.22	e	^b \$0.72	-	\$3.90	\$0.49	8	\$29.33	^c \$41.800	^c \$41.800	\$54.27
^a AREA 2 Boilermaker-Blacksmith Helper ^f	\$25.85	e	^b \$0.71	-	\$4.40	\$0.49	8	\$31.45	^c \$44.730	^c \$44.730	\$58.01
^a AREA 3 Boilermaker-Blacksmith Helper ^f	\$23.90	e	^b \$0.72	-	\$4.40	\$0.49	8	\$29.51	^c \$41.820	^c \$41.820	\$54.13

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Area 1 - Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, San Luis Obispo (only that portion that is within a 25-mile radius of the city of Santa Maria), and Ventura Counties.

Area 2 - Alameda, Contra Costa, Marin, Monterey, Sacramento, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties.

Area 3 - All other remaining counties.

^b Contribution is factored at the applicable overtime multiplier for each overtime hour worked. Helpers in Area 1 receive \$0.72 after 2,000 hours worked.

^c Rate applies to the first 2 daily overtime hours and the first 10 hours worked on Saturday. All other overtime is paid at the Sunday/Holiday rate.

^d Includes amount for Annuity Trust Fund.

^e Helpers will be eligible for Health & Welfare benefits after completing 2000 hours.

^f One Helper shall be employed on each job of 5 to 10 employees.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # IRON WORKER

DETERMINATION: C-20-X-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the State of California

CLASSIFICATION (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	^c Daily 1 1/2X	^c Saturday 1 1/2X	Sunday/ Holiday
AREA 1^a											
Iron Worker (Ornamental, Reinforcing, Structural)	\$42.50	10.05	13.32	^b 5.30	0.72	4.465	8	76.355	97.605	97.605	118.855
Fence Erector	\$36.08	7.88	8.99	^b 3.92	0.51	3.585	8	60.965	79.005	79.005	97.045
AREA 2^a											
Iron Worker (Ornamental, Reinforcing, Structural)	\$41.00	10.05	13.32	^b 5.30	0.72	4.465	8	74.855	95.355	95.355	115.855
Fence Erector	\$34.58	7.88	8.99	^b 3.92	0.51	3.585	8	59.465	76.755	76.755	94.045

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a **AREA 1** – Alameda, Contra Costa, San Francisco, San Mateo, And Santa Clara Counties.

AREA 2 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Imperial, Inyo, Kern, Kings, Lake, Lassen, Los Angeles, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Mono, Monterey, Napa, Nevada, Orange, Placer, Plumas, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Ventura, Yolo, and Yuba Counties.

^b Includes supplemental dues.

^c Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday. All other overtime is at the Sunday/Holiday rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #ELECTRICAL UTILITY LINEMAN

DETERMINATION: C-61-X-3-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: May 31, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within the State of California, except Del Norte, Modoc, and Siskiyou Counties. (For Del Norte, Modoc and Siskiyou - see page 21)

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Training	Other Payments	Hours	Total Hourly Rate	Daily 2X	Saturday 2X	Sunday and Holiday
# Lineman, Cable Splicer	\$59.14	7.50	^a 11.21	^b 0.30	^c 0.65	8	80.57	142.43	142.43	142.43
Powderman	52.81	7.50	^a 10.47	^b 0.26	^c 0.57	8	73.19	128.41	128.41	128.41
Groundman	36.12	7.50	^a 10.43	^b 0.18	^c 0.40	8	55.71	93.48	93.48	93.48

DETERMINATION: C-61-X-4-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the State of California, except Del Norte, Imperial, Inyo, Kern, Kings, Los Angeles, Modoc, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Siskiyou, Tulare, and Ventura Counties. (For Del Norte, Modoc, and Siskiyou – see page 21. For Imperial, Inyo, Kern, Kings, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Tulare, and Ventura Counties – see page 2A-1.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments			Hours	Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday		Total Hourly Rate		Daily 1½X	Saturday 1½X	Sunday/ Holiday 1½X
Pole Restoration Journeyman	\$30.71	5.75	^a 0.85	0.83	8	39.06	54.88	^c 54.88	54.88	54.88
After 1 year	30.71	5.75	^a 0.85	1.42	8	39.65	55.47	^c 55.47	55.47	55.47
After 3 years	30.71	5.75	^a 0.85	2.01	8	40.24	56.06	^c 56.06	56.06	56.06
After 6 years	30.71	5.75	^a 0.85	2.60	8	40.83	56.65	^c 56.65	56.65	56.65
Senior Technician ^d	19.87	5.75	^a 0.85	0.53	8	27.60	37.84	^c 37.84	37.84	37.84
After 1 year	19.87	5.75	^a 0.85	0.91	8	27.98	38.22	^c 38.22	38.22	38.22
After 3 years	19.87	5.75	^a 0.85	1.29	8	28.36	38.60	^c 38.60	38.60	38.60
After 6 years	19.87	5.75	^a 0.85	1.68	8	28.75	38.99	^c 38.99	38.99	38.99
Pole Treatment Journeyman	27.44	5.75	^a 0.85	0.74	8	35.60	49.73	^c 49.73	49.73	49.73
After 1 year	27.44	5.75	^a 0.85	1.27	8	36.13	50.26	^c 50.26	50.26	50.26
After 3 years	27.44	5.75	^a 0.85	1.80	8	36.66	50.79	^c 50.79	50.79	50.79
After 6 years	27.44	5.75	^a 0.85	2.32	8	37.18	51.31	^c 51.31	51.31	51.31
Pole Restoration and Treatment ^d										
Technician (First 6 months)	15.38	5.75	^a 0.85	0.41	8	22.85	30.77	^c 30.77	30.77	30.77
Technician (After 6 months)	15.75	5.75	^a 0.85	0.42	8	23.24	31.35	^c 31.35	31.35	31.35

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a In addition, an amount equal to 3% of the Basic Hourly Rate is added to the Total Hourly Rate and overtime hourly rates for the National Employees Benefit Board.

^b This amount is factored at the applicable overtime rate.

^c Saturdays may be scheduled as a make-up day at the regular straight time rate.

^d The Ratio of Technicians to Journeymen may not exceed 4 to 1. However, if the Journeyman is assisted by a maximum of two Senior Technicians, three additional Technicians may be added per Senior Technician.

^e Includes \$0.01 to LMCC; the remaining amount is factored at the applicable overtime rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: ELECTRICAL UTILITY LINEMAN

DETERMINATION: C-61-X-5-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: September 30, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within Imperial, Inyo, Kern, Kings, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Tulare, and Ventura Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments			Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday	Hours	Total Hourly Rate	Daily 1½X	Saturday 1½X	Sunday/ Holiday 1½X
Pole Restoration Journeyman	\$26.11	5.00	*0.60	-	8	32.49	45.94	*45.94	45.94
After 6 Months	\$26.11	5.00	*0.60	1.21	8	33.70	47.145	*47.145	47.145
After 3 years	\$26.11	5.00	*0.60	1.86	8	34.35	47.795	*47.795	47.795
After 6 years	\$26.11	5.00	*0.60	2.21	8	34.70	48.145	*48.145	48.145
Senior Technician ^d	16.89	5.00	*0.60	-	8	23.00	31.70	*31.70	31.70
After 6 Months	16.89	5.00	*0.60	0.78	8	23.78	32.48	*32.48	32.48
After 3 years	16.89	5.00	*0.60	1.20	8	24.20	32.90	*32.90	32.90
After 6 years	16.89	5.00	*0.60	1.43	8	24.43	33.13	*33.13	33.13
Pole Treatment Journeyman	23.33	5.00	*0.60	-	8	29.63	41.645	*41.645	41.645
After 6 Months	23.33	5.00	*0.60	1.08	8	30.71	42.725	*42.725	42.725
After 3 years	23.33	5.00	*0.60	1.66	8	31.29	43.305	*43.305	43.305
After 6 years	23.33	5.00	*0.60	1.97	8	31.60	43.615	*43.615	43.615
Pole Restoration and Treatment ^d									
Technician (First 6 months)	13.07	5.00	*0.60	0.60	8	19.66	26.39	*26.39	26.39
Technician (After 6 months)	13.38	5.00	*0.60	0.62	8	20.00	26.89	*26.89	26.89
Technician (After 3 Years)	13.38	5.00	*0.60	0.95	8	20.33	27.22	*27.22	27.22
Technician (After 6 Years)	13.38	5.00	*0.60	1.13	8	20.51	27.40	*27.40	27.40

^a In addition, an amount equal to 3% of the Basic Hourly Rate is added to the Total Hourly Rate and overtime hourly rates for the National Employees Benefit Board.

^b This amount is factored at the applicable overtime rate.

^c Saturdays may be scheduled as a make-up day at the regular straight time rate.

^d The Ratio of Technicians to Journeymen may not exceed 4 to 1. However, if the Journeyman is assisted by a maximum of two Senior Technicians, three additional Technicians may be added per Senior Technician.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TELECOMMUNICATIONS TECHNICIAN

DETERMINATION: C-422-X-1-2003-2

ISSUE DATE: August 22, 2003

EXPIRATION DATE OF DETERMINATION: June 1, 2004* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics & Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within Alameda, Los Angeles, San Francisco, San Mateo, and Santa Clara Counties.

Classification (Journey person)	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime Hourly Rate	
		Health and Welfare	Pension	Vacation and Holidays	Training	Hours	Total Hourly Rate	Holiday	
								1 1/2X ^a	2 1/2X
Telecommunications Technician	28.50	2.79	0.93	3.28	-	8	35.50	49.75	78.25

^a Rate applies to work in excess of eight hours daily and for all hours over 40. Rate applies to all hours worked on Sunday.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TELECOMMUNICATIONS TECHNICIAN

DETERMINATION: C-422-X-1-2003-2A

ISSUE DATE: August 22, 2003

EXPIRATION DATE OF DETERMINATION: June 1, 2004* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics & Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within Contra Costa, Marin, Orange, and San Diego counties.

Classification (Journey person)	Basic Hourly Rate	<u>Employer Payments</u>				<u>Straight-Time</u>		<u>Overtime Hourly Rate</u>	
		Health and Welfare	Pension	Vacation and Holidays	Training	Hours	Total Hourly Rate	Holiday	
								1 1/2X ^a	2 1/2X
Telecommunications Technician	27.93	2.79	0.93	3.21	-	8	34.86	48.825	76.755

^a Rate applies to work in excess of eight hours daily and for all hours over 40. Rate applies to all hours worked on Sunday .

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TELECOMMUNICATIONS TECHNICIAN

DETERMINATION: C-422-X-1-2003-2B

ISSUE DATE: August 22, 2003

EXPIRATION DATE OF DETERMINATION: June 1, 2004* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics & Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Fresno, Glenn, Humboldt, Imperial, Kern, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Ventura, Yolo and Yuba counties.

Classification (Journey person)	Basic Hourly Rate	<u>Employer Payments</u>				<u>Straight-Time</u>		<u>Overtime Hourly Rate</u>	
		Health and Welfare	Pension	Vacation and Holidays	Training	Hours	Total Hourly Rate	Holiday	
								1 1/2X ^a	2 1/2X
Telecommunications Technician	27.18	2.79	0.93	3.13	-	8	34.03	47.62	74.80

^a Rate applies to work in excess of eight hours daily and for all hours over 40. Rate applies to all hours worked on Sunday.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TELEPHONE INSTALLATION WORKER AND RELATED CLASSIFICATIONS

DETERMINATION: C-422-X-10-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within Del Norte, Inyo, Mono and San Bernardino, and Santa Barbara Counties.

Classification (Journey person)	Step ^a	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime Hourly Rate	
			Health and Welfare ^c	Pension	Vacation ^b and Holiday	Training	Hours	Total Hourly Rate	1 1/2X ^c	2X ^d
Telephone Installation Worker	1	13.00	0.07	-	1.08	-	8	14.15	20.65	27.15
	2	14.05	0.08	-	1.19	-	8	15.32	22.345	29.37
	3	15.50	0.09	-	1.31	-	8	16.90	24.65	32.40
	4	17.20	0.10	-	1.46	-	8	18.76	27.36	35.96
	5	19.36	0.11	-	1.64	-	8	21.11	30.79	40.47
	6	22.13	0.13	-	1.87	-	8	24.13	35.195	46.26

^a The time interval between steps is six months.

^b Rates apply to the first eight years of employment only: for employment over eight years, \$2.30 per hour worked; for employment over fifteen years, \$ 2.72 per hour worked; for employment over twenty-five years, \$3.15 per hour worked.

^c Rate applies to work in excess of a regular shift. Rate applies to all hours worked on Sunday, except those hours which exceed 55 hours weekly.

^d Rate applies to all hours which exceed 55 hours weekly.

^e Includes an amount for sick leave. Benefit is paid until 270 sick leave workdays are accumulated.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TREE TRIMMER (HIGH VOLTAGE LINE CLEARANCE)

DETERMINATION: C-TT-61-1245-12-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: May 29, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties. (REF: 61-1245-12)

CRAFT/CLASSIFICATION	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime
		Health and Welfare ^a	Pension ^b	Vacation	Holiday	Hours	Total Hourly Rate	Daily/Saturday/ Sunday 2X
Tree Trimmer	36.05	7.50	9.90	0.75	0.75	8	54.95	92.08
Trimmer Trainee								
Start (0-6 Months)	25.23	7.50	6.49	0.53	0.53	8	40.28	66.27
6-12 Months	28.84	7.50	7.63	0.61	0.61	8	45.19	74.90
After 12 Months	32.44	7.50	8.72	0.68	0.68	8	50.02	83.43
Ground person First 6 Months	21.63	7.50	1.15	0.46	0.46	8	31.20	53.48
Ground person After 6 Months	23.43	7.50	1.80	0.50	0.50	8	33.73	57.86

DETERMINATION: C-TT-61-465-5-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: May 29, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within San Diego County.

CRAFT/CLASSIFICATION	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime
		Health and Welfare ^a	Pension ^b	Vacation	Holiday	Hours	Total Hourly Rate	Daily/Saturday/ Sunday 2X
Tree Trimmer	36.05	7.50	9.90	0.75	0.75	8	54.95	92.08
Trimmer Trainee								
Start (0-6 Months)	25.23	7.50	6.49	0.53	0.53	8	40.28	66.27
6-12 Months	28.84	7.50	7.63	0.61	0.61	8	45.19	74.90
After 12 Months	32.44	7.50	8.72	0.68	0.68	8	50.02	83.43
Ground person First 6 Months	21.63	7.50	1.15	0.46	0.46	8	31.20	53.48
Ground person After 6 Months	23.43	7.50	1.80	0.50	0.50	8	33.73	57.86

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TREE TRIMMER (HIGH VOLTAGE LINE CLEARANCE)

DETERMINATION: C-TT-61-465-5A-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: May 29, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Imperial County

CRAFT/CLASSIFICATION	Basic Hourly Rate	Health and Welfare ^a	Pension ^b	Vacation	Holiday	Hours	Total Hourly Rate	Daily/Saturday/ Sunday 2X
Tree Trimmer	36.05	7.50	9.90	0.75	0.75	8	54.95	92.08
Trimmer Trainee								
Start (0-6 Months)	25.23	7.50	6.49	0.53	0.53	8	40.28	66.27
6-12 Months	28.84	7.50	7.63	0.61	0.61	8	45.19	74.90
After 12 Months	32.44	7.50	8.72	0.68	0.68	8	50.02	83.43
Ground person First 6 Months	21.63	7.50	1.15	0.46	0.46	8	31.20	53.48
Ground person After 6 Months	23.43	7.50	1.80	0.50	0.50	8	33.73	57.86

DETERMINATION: C-TT-61-47-3-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: May 29, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Inyo, Los Angeles, Mono, Orange, Riverside, San Bernardino, Santa Barbara, and Ventura Counties.

CRAFT/CLASSIFICATION	Basic Hourly Rate	Health and Welfare ^a	Pension ^b	Vacation	Holiday	Hours	Total Hourly Rate	Daily/Saturday/ Sunday 2X
Tree Trimmer	36.05	7.50	9.90	0.75	0.75	8	54.95	92.08
Trimmer Trainee								
Start (0-6 Months)	25.23	7.50	6.49	0.53	0.53	8	40.28	66.27
6-12 Months	28.84	7.50	7.63	0.61	0.61	8	45.19	74.90
After 12 Months	32.44	7.50	8.72	0.68	0.68	8	50.02	83.43
Ground person First 6 Months	21.63	7.50	1.15	0.46	0.46	8	31.20	53.48
Ground person After 6 Months	23.43	7.50	1.80	0.50	0.50	8	33.73	57.86

^a Includes an amount for Health Reimbursements Accounts.

^b An amount equal to 3% of the Basic Hourly Rate is added to the total hourly rate and overtime hourly rates for the National Employees Benefit Board and is factored at the applicable overtime multiplier. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages. Includes amount for National Electrical Annuity Plan.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # STATOR REWINDER

DETERMINATION: C-738-1412-7-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director - Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within the State of California.

CLASSIFICATION (Journey person)	<u>Employer Payments</u>						<u>Straight-Time</u>		<u>Overtime Hourly Rate</u>			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation	Holiday	Training	Hours	Total ^e Hourly Rate	Daily ^{bc} 1 1/2X	Saturday ^e 1 1/2X	Sunday ^e 2X	Holiday ^e 2 1/2X
Stator Rewinder	\$15.20	^a 1.36	^a 2.18	^{ac} .29	.58	^a .29	8	19.90	29.56	29.56	39.22	48.88
Stator Rewinder Helper	13.00	^a 1.17	^a 1.87	^{ad} .25	.50	^a .25	8	17.04	25.31	25.31	33.58	41.85

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Contributions are factored at the appropriate overtime multiplier.

^b Rate applies to the first 4 daily overtime hours and the first 12 hours on Saturday. After 12 hours daily, the Sunday double-time rate applies.

^c Rate applies to the first two years of employment only: for employment over two years, \$.58 per hour worked; for employment over five years, \$.73 per hour worked; for employment over seven years, \$.88 per hour worked; for employment over fifteen years, \$1.17 per hour worked; for employment over twenty years, \$1.46 per hour worked; for employment over thirty years, \$1.75 per hour worked.

^d Rates apply to the first two years of employment only: for employment over two years, \$.50 per hour worked; for employment over five years, \$.63 per hour worked; for employment over seven years, \$.75 per hour worked; for employment over fifteen years, \$1.00 per hour worked; for employment over twenty years, \$1.25 per hour worked; for employment over thirty years, \$1.50 per hour worked.

^e Does not include any additional amount that may be required for vacation pay.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # ELECTRICAL UTILITY LINEMAN

DETERMINATION: C-61-X-8-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: January 31, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after ten days after the expiration date if no subsequent determination is issued.

LOCALITY: All localities within Del Norte, Modoc and Siskiyou counties.

CLASSIFICATION (Journey person)	Employer Payments					Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Training	Other Payments	Hours	Total Hourly Rate	Daily 2X	Saturday 2X	Sunday and Holiday 2X
Lineman, Heavy Line Equipment man, Certified Lineman Welder, Pole Sprayer	\$53.82	7.50	^a 13.51	^b 0.81	^c 0.14	8	75.78	132.16	132.16	132.16
Cable Splicer	60.28	7.50	^a 13.71	^b 0.90	^c 0.16	8	82.55	145.69	145.69	145.69
Line Equipment Operator	46.29	7.50	^a 10.09	^b 0.69	^c 0.13	8	64.70	113.19	113.19	113.19
Powderman	40.37	7.40	^a 8.11	^b 0.61	^c 0.11	8	56.60	98.89	98.89	98.89
Groundman										
First 1040 Hours	21.53	7.40	^a 7.55	^b 0.32	^c 0.06	8	36.86	59.41	59.41	59.41
1041-2080 Hours	26.91	7.40	^a 7.71	^b 0.40	^c 0.08	8	42.50	70.69	70.69	70.69
2081+ Hours	33.37	7.40	^a 7.90	^b 0.50	^c 0.09	8	49.26	84.21	84.21	84.21
Pole Sprayer Trainee										
First six months	46.12	7.40	^a 8.28	^b 0.69	^c 0.12	8	62.61	110.91	110.91	110.91
Second six months	48.33	7.40	^a 8.35	^b 0.72	^c 0.13	8	64.93	115.55	115.55	115.55
Third six months	49.94	7.40	^a 8.40	^b 0.75	^c 0.13	8	66.62	118.93	118.93	118.93

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes an amount equal to 3% of the Basic Hourly Rate for the National Employees Benefit Board. This amount is factored at the applicable overtime rate. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^b This amount is factored at the applicable overtime rate.

^c This amount includes \$0.01 for the National Labor-Management Cooperation Committee, and the remainder of the amount is for the Administrative Maintenance Fund. This amount (AMF) is factored at the applicable overtime rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <https://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <https://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-1

Issue Date: August 22, 2020

Expiration date of determination: July 31, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities: All localities within Alameda, Contra Costa, Mendocino, and Solano Counties. (REF: 232-81-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Total Hourly Rate	Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation And Holiday	Training	Other		Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$40.52	\$11.05	\$7.50	\$4.10	\$0.75	\$0.70	8.0 ^a	\$64.62	\$84.88 ^(b)	\$84.88 ^(b) \$105.14

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a In the event that conditions over which the roofing contractor has no control (i.e. adverse weather, project delays, logistical problems, general contractor or building owner requirements, etc.) prevent employees from working on one or more days during the regular work week, work performed on Saturday may be paid at the straight time rates.

^b Rate applies to the first 4 daily overtime hours and first 12 hours worked on Saturday; all other time is paid at the Sunday/Holiday overtime hourly rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-1A

Issue Date: February 22, 2020

Expiration date of determination: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Amador and El Dorado Counties. (REF: 830-232-15)

Classification	Basic Hourly Rate	Employer Payments ^a					Straight-Time Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other		Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
Amador County:										
# Metal Roofing Systems Installer	\$20.41	\$5.79	\$2.80	\$3.74	\$0.20	\$0.05	8.0	\$32.99	\$43.19	\$43.19 ^b \$53.40
El Dorado County:										
# Metal Roofing Systems Installer	\$18.81	\$5.35	\$2.80	\$3.48	\$0.20	-	8.0	\$30.64	\$40.045	\$40.045 ^b \$49.45

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a The credit for employer payments do not have to be computed on an annualized basis where the employer seeks credit for employer payments that are higher for public works projects than private construction performed by the same employer. The director determined that annualization would not serve the purpose of this chapter pursuant to California Labor Code Section 1773.1(d)(4).

^b Saturdays in the same workweek may be worked at straight-time if job is shut down for 2 or more days during the normal workweek due to wind, rain, snow or ice, fog, frost, dew or extreme heat.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2016-1B

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Butte, Lassen, Marin, Placer, Sacramento, San Joaquin, Sonoma, Yolo and Yuba Counties. (REF: 830-232-16)

Classification	Basic Hourly Rate ^a	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health And Welfare ^a	Pension ^a	Vacation And Holiday ^a	Training ^a	Other ^a	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (1½ X)
Butte, Lassen, Placer, Sacramento, Yolo and Yuba Counties:											
# Metal Roofing Systems Installer	\$34.00	\$8.42	\$6.05	^b	\$0.33	-	8.0	\$48.80	\$65.80 ^c	\$65.80 ^c	\$65.80 ^c
San Joaquin County:											
# Metal Roofing Systems Installer	\$32.71	\$8.42	\$5.90	^b	\$0.33	-	8.0	\$47.36	\$63.715 ^c	\$63.715 ^c	\$63.715 ^c
Marin and Sonoma Counties:											
# Metal Roofing Systems Installer	\$36.08	\$8.42	\$5.63	^b	\$0.85	-	8.0	\$50.98	\$69.02 ^c	\$69.02 ^c	\$69.02 ^c

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a Basic Hourly Rate and Employer Payments are based on the Davis-Bacon Wage Determination.

^b Included in straight-time hourly rate.

^c Rate applies to all hours work in excess of 8 hours per day and 40 hours during any one week.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2008-1C

Issue Date: August 22, 2008

Expiration date of determination: September 30, 2008* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Calaveras County. (REF: 830-166-4)

Classification	Basic Hourly Rate	Employer Payments ^a					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$47.59 ^b	-	-	-	\$0.45	-	8.0	\$48.04	\$71.835 ^c	\$71.835 ^c	\$71.835 ^c

Indicates an apprenticeable craft. Effective as of July 1, 2008, the issuance and publication of the prevailing wage apprentice schedules/apprentice wage rates have been reassigned by the Department of Industrial Relations from the Division of Labor Statistics and Research to the Division of Apprenticeship Standards. To obtain any apprentice schedules/apprentice wage rates, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a The credit for employer payments do not have to be computed on an annualized basis where the employer seeks credit for employer payments that are higher for public works projects than private construction performed by the same employer. The director determined that annualization would not serve the purpose of this chapter pursuant to California Labor Code Section 1773.1(d)(4).

^b Includes an amount for Health and Welfare, Pension, Vacation/Holiday, Dues Check Off, and Other Payments.

^c Rate applies to all hours work in excess of 8 hours per day and 40 hours during any one week.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/DLRS/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-1D

Issue Date: February 22, 2020

Expiration date of determination: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Fresno County. (REF: 830-232-18)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
Fresno County: # Metal Roofing Systems Installer	\$23.05	\$3.60	\$3.60	^a	\$0.10	-	8.0	\$30.35	\$41.875	\$41.875	\$53.40

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Included in straight-time hourly rate.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-1E

Issue Date: August 22, 2020

Expiration date of determination: September 30, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Humboldt, Madera, Napa, and Shasta Counties. (REF: 830-232-17)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other			Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (1½ X)
Humboldt County: Metal Roofing Systems Installer	\$16.00	-	-	-	-	\$2.00	8.0	\$18.00	\$26.00 ^a	\$26.00 ^a	\$26.00 ^a
Madera County: Metal Roofing Systems Installer	\$26.75	\$2.00	\$2.00	-	\$0.15	-	8.0	\$30.90	\$44.275 ^a	\$44.275 ^a	\$44.275 ^a
Napa County: Metal Roofing Systems Installer	\$18.00	-	-	\$0.35	-	-	8.0	\$18.35	\$27.35 ^a	\$27.35 ^a	\$27.35 ^a
Shasta County: Metal Roofing Systems Installer	\$19.83	-	-	-	\$0.20	-	8.0	\$20.03	\$29.945 ^a	\$29.945 ^a	\$29.945 ^a

^a Rate applies to all hours work in excess of 8 hours per day and 40 hours during any one week.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

DETERMINATION: C-MR-2020-1F

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITIES: All localities within Los Angeles, Orange, Riverside and San Bernardino Counties. (REF: 166-102-1)

Classification	Basic Hourly Rate ^a	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension ^c	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily ^b (1½ X)	Saturday ^b (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$48.28	\$11.12	\$17.54	-	\$0.82	\$0.68	8.0	\$78.44	\$102.58	\$102.58	\$126.72

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes amount withheld for Working Dues.

^b Rate applies for the first 4 overtime hours Monday through Friday and the first 12 hours worked on Saturday. All other time is paid at the Sunday/Holiday overtime rate. Saturdays in the same workweek may be worked at straight-time if job is shut down during the normal workweek due to inclement weather.

^c Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

DETERMINATION: C-MR-2020-1G

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITIES: All localities within Monterey County^f. (REF: 166-104-10)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$52.90 ^a	\$14.23 ^c	\$20.21 ^b	c	\$1.43	\$0.57	8.0	\$89.34	\$117.18 ^d	\$117.18 ^d	\$145.02

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a Includes amount for Vacation/Holiday and Dues Check Off.

^b Includes an amount for PSP (\$2.78) that is factored at the applicable overtime multiplier. Includes an amount equal to 3% of wages and employee benefits (excluding training and other payment) for National SASMI Fund (Wage Stabilization Plan). Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^c Included in Straight-Time hourly rate.

^d Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only; All other time is paid at the Sunday and Holiday overtime hourly rate.

^e Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^f Rate applies to jobsites under 20 miles from Market and Main Streets in Salinas, CA. For rates outside that zone refer to the Travel and Subsistence provisions applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-11

Issue Date: August 22, 2020

Expiration date of determination: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities: All localities within San Diego County. (REF: 166-206-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation And Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$40.62 ^a	\$10.56 ^b	\$17.93 ^c	-	\$1.02 ^d	\$0.59 ^e	8.0 ^f	\$70.72	\$91.03 ^g	\$91.03 ^g	\$111.34 ^g

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes amount withheld for Working Dues.

^b Includes an amount for the Sheet Metal Occupational Health Institute Trust.

^c Includes amount for 401(a) Plan. PURSUANT TO LABOR CODE SECTIONS 1773.1 AND 1773.8, THE AMOUNT PAID FOR THIS EMPLOYER PAYMENT MAY VARY RESULTING IN A LOWER TAXABLE BASIC HOURLY WAGE RATE, BUT THE TOTAL HOURLY RATES FOR STRAIGHT TIME AND OVERTIME MAY NOT BE LESS THAN THE GENERAL PREVAILING RATE OF PER DIEM WAGES

^d Includes an amount for International Training Institute.

^e Includes amounts for National Energy Management Institute (NEMI) Fund, Sheet Metal Workers' International Scholarship Fund (SMWSF) and Industry Fund.

^f Saturdays in the same work week may be worked at straight-time if job is shut down during the normal workweek due to inclement weather.

^g Rate applies to the first 2 Daily overtime hours and the first 10 hours on Saturday; All other time is paid at the Sunday and Holiday overtime rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

DETERMINATION: C-MR-2020-1K

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITIES: All localities within Santa Barbara County. (REF: 20-X-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$41.00	\$10.05	\$13.32	\$5.30 ^a	\$0.72	\$4.465	8.0	\$74.855	\$95.355 ^b	\$95.355 ^b	\$115.855

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes supplemental dues.

^b Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday. All other time is at the Sunday/Holiday rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**# METAL ROOFING SYSTEMS INSTALLER
(SPECIAL SINGLE SHIFT)**

Determination: C-MR-2020-1JA

Issue Date: August 22, 2020

Expiration date of determination: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities: All localities within San Francisco, San Mateo and Santa Clara Counties (REF: 166-104-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$71.75 ^a	\$14.85 ^c	\$29.74 ^f	^b	\$1.53	\$0.71	8.0 ^c	\$118.58	\$158.01 ^d	\$158.01 ^d	\$197.45

Indicates an apprenticeable craft. The current apprentice wage rates are available on the internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes amount for Vacation/Holiday and Dues Check Off.

^b Included in Straight-Time Hourly Rate.

^c For San Francisco County, the Straight-Time Hours is 7 hours.

^d For San Francisco County: Rate applies to the first 2 daily overtime hours and the first 7 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

For San Mateo and Santa Clara Counties: Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

^e Includes SMOHIT and SHC. Effective 1/1/2013, pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^f Includes an amount for Pension which is factored at the applicable overtime multiplier. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**# METAL ROOFING SYSTEMS INSTALLER
(SECOND SHIFT)**

Determination: C-MR-2020-1JA

Issue Date: August 22, 2020

Expiration date of determination: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities: All localities within San Francisco, San Mateo and Santa Clara Counties (REF: 166-104-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$70.47 ^a	\$14.85 ^c	\$29.74 ^f	^b	\$1.53	\$0.71	7.5 ^c	\$117.30	\$156.10 ^d	\$156.10 ^d	\$194.89

Indicates an apprenticeable craft. The current apprentice wage rates are available on the internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes amount for Vacation/Holiday and Dues Check Off.

^b Included in Straight-Time Hourly Rate.

^c For San Francisco County, the Straight-Time Hours is 7 hours.

^d For San Francisco County: Rate applies to the first 2 daily overtime hours and the first 7 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

For San Mateo and Santa Clara Counties: Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

^e Includes SMOHIT and SHC. Effective 1/1/2013, pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^f Includes an amount for Pension which is factored at the applicable overtime multiplier. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**# METAL ROOFING SYSTEMS INSTALLER
(THIRD SHIFT)**

Determination: C-MR-2020-1JA

Issue Date: August 22, 2020

Expiration date of determination: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities: All localities within San Francisco, San Mateo and Santa Clara Counties (REF: 166-104-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$73.67 ^a	\$14.85 ^d	\$29.74 ^e	^b	\$1.53	\$0.71	7.0	\$120.50	\$160.89 ^c	\$160.89 ^c	\$201.29

Indicates an apprenticeable craft. The current apprentice wage rates are available on the internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>

^a Includes amount for Vacation/Holiday and Dues Check Off.

^b Included in Straight-Time Hourly Rate.

^c For San Francisco County: Rate applies to the first 2 daily overtime hours and the first 7 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

For San Mateo and Santa Clara Counties: Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only. All other time is paid at the Sunday and Holiday overtime hourly rate.

^d Includes SMOHIT and SHC. Effective 1/1/2013, pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^e Includes an amount for Pension which is factored at the applicable overtime multiplier. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

DETERMINATION: C-MR-2020-1K

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITIES: All localities within Santa Barbara County. (REF: 20-X-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$41.00	\$10.05	\$13.32	\$5.30 ^a	\$0.72	\$4.465	8.0	\$74.855	\$95.355 ^b	\$95.355 ^b	\$115.855

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes supplemental dues.

^b Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday. All other time is at the Sunday/Holiday rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-1L

Issue Date: August 22, 2020

Expiration date of determination: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities: All localities within Siskiyou County. (REF: 23-31-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate				
		Health and Welfare	Pension	Vacation And Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	(2 X)	Saturday ^d (1½ X)	(2X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$45.42	\$11.70 ^a	\$10.65	\$5.09 ^a	\$1.03	\$2.64 ^b	8.0	\$76.53	\$99.24 ^c	\$121.95	\$99.24 ^c	\$121.95	\$121.95 ^f

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes an amount per hour worked for Work Fees. The vacation amount is \$2.95 per hour worked.

^b Includes amounts for Annuity Trust Fund, Industry Promotion, Carpenters International Training Fund, Carpenter Employers Contract Administration, Contract Work Preservation, and Vacation/Holiday/Sick Leave Admin.

^c For building construction, rate applies to the first 4 hours daily overtime. All heavy, highway and engineering construction overtime worked, Monday through Friday, rate applies to the first 4 hours daily overtime.

^d Saturdays in the same work week may be worked at straight-time if job is shut down during the normal work week due to inclement weather or major mechanical breakdown.

^e Rate applies to the first 8 hours for building construction and for the first 10 hours worked on heavy, highway and engineering construction.

^f Time and one-half shall be paid for the first eight (8) hours worked on the four (4) days of each year selected by the Union as designated off/holidays listed in the Holiday Provision.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2008-1M

Issue Date: August 22, 2008

Expiration date of determination: September 30, 2008* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Stanislaus County. (REF: 830-166-5)

Classification	Basic Hourly Rate	Employer Payments ^a					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$32.84 ^b	\$7.43	\$7.22	^c	\$0.45	\$0.10	8.0	\$48.04	\$64.46 ^d	\$64.46 ^d	\$80.88

Indicates an apprenticeable craft. Effective as of July 1, 2008, the issuance and publication of the prevailing wage apprentice schedules/apprentice wage rates have been reassigned by the Department of Industrial Relations from the Division of Labor Statistics and Research to the Division of Apprenticeship Standards. To obtain any apprentice schedules/apprentice wage rates, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a The credit for employer payments do not have to be computed on an annualized basis where the employer seeks credit for employer payments that are higher for public works projects than private construction performed by the same employer. The director determined that annualization would not serve the purpose of this chapter pursuant to California Labor Code Section 1773.1(d)(4).

^b Includes amount for Vacation/Holiday and Dues Check Off.

^c Included in straight-time hourly rate.

^d Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only; All other time is paid at the Sunday and Holiday overtime hourly rate.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/DLRS/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-2N

Issue Date: August 22, 2020

Expiration date of determination: December 31, 2020** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities: All localities within Tulare County. (REF: 232-27-1)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other ^c			Daily (1½ X)	Saturday ^d (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$31.11 ^a	\$6.48	\$7.40	^b	\$0.47	\$0.06	8.0	\$45.52	\$61.08	\$61.08	\$76.63

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes amount for Vacation/Holiday and Dues Check Off.

^b Included in Basic Hourly Rate.

^c Amount is for the Roofers and Waterproofers Research and Education Joint Trust Fund.

^d When adverse weather or job scheduling problems exist, causing an employee to work less than forty (40) hours in a week, Saturday may be used as a make-up day at straight time wage rates.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

METAL ROOFING SYSTEMS INSTALLER

Determination: C-MR-2020-10

Issue Date: February 22, 2020

Expiration date of determination: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Ventura County. (REF: 830-166-6)

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
# Metal Roofing Systems Installer	\$30.29 ^a	\$6.60	\$5.75 ^b	^c	\$0.80	\$0.54	8.0	\$43.98	\$59.13 ^d	\$59.13 ^d	\$74.27 ^e

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>

^a Includes amount withheld for Dues Check Off.

^b Includes an amount per hour for COLA Fund.

^c Included in straight-time hourly rate.

^d Rate applies to the first 4 overtime hours Monday through Friday and the first 8 hours on Saturday & Sunday. All other overtime is paid at the Double time and Holiday rate.

^e Rate applies after 4 overtime hours Monday through Friday, after 8 hours Saturday and Sunday and all hours worked on Holidays.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/DLSR/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/DLRS/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-X-265-2018-1

Issue Date: February 22, 2018

Expiration date of determination: June 30, 2018* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Marin, Napa, Solano and Sonoma Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation And Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
Ready Mix Driver	\$25.90	\$14.28	\$6.20	\$2.85	-	-	8.0	\$49.23	\$62.18	\$62.18	\$75.13

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-5-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Alpine, Amador, Calaveras, San Joaquin and Tuolumne Counties

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$20.10	\$3.09 ^a	-	\$1.005 ^b	-	-	8.0	\$24.195	\$34.245 ^c	\$34.245

^a The contribution applies to all hours until \$535.26 is paid for the month.

^b \$1.39 after 3 years of service

\$1.78 after 10 years of service

\$2.16 after 20 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-150-53-2017-2

Issue Date: August 22, 2017

Expiration date of determination: June 30, 2018* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Butte, Colusa, El Dorado, Placer, Sacramento, Sutter, Yolo and Yuba Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
Driver: Mixer Truck	\$27.00	\$13.52 ^a	\$10.12	\$3.37	-	-	8.0	\$54.01	\$67.51	\$67.51	\$81.01

^a Contribution shall be paid for all hours worked up to 173 hours per month.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-624-17-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Del Norte, Humboldt and Mendocino Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$22.50	\$4.81 ^a	\$5.60	\$2.00	-	-	8.0	\$34.91	\$46.16 ^b	\$46.16

^a The contribution applies to all hours until \$833.00 is paid for the month.

^b Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-4-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from expiration date, if no subsequent determination is issued.

Localities: All localities within Fresno, Madera, Mariposa, Merced and Stanislaus Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$18.50	\$5.44 ^a	-	\$0.71 ^b	-	-	8.0	\$24.65	\$33.90 ^c	\$33.90

^a The contribution applies to all hours until \$943.38 is paid for the month.

^b \$1.42 after 1 year of service for the employer
\$1.78 after 5 years of service for the employer
\$2.13 after 15 years of service for the employer

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-2-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$14.80	\$3.46 ^a	-	\$0.68 ^b	-	-	8.0	\$18.94	\$26.34 ^c	\$26.34

^a The contribution applies to all hours until \$600 is paid for the month.

^b \$0.97 after 2 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-36-95-2019-1

Issue Date: February 22, 2019

Expiration date of determination: October 31, 2019* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Imperial and San Diego Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (2 X)
Mixer Driver	\$28.10	\$8.37 ^a	\$5.06	\$1.48 ^b	-	-	8.0	\$43.01	\$57.06 ^c	\$71.11

^a The contribution applies to all hours until \$1,450.00 is paid for the month.

^b \$2.02 after one year of service

\$2.56 after 7 years of service.

\$3.10 after 14 years of service.

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly. All work in excess of 12 hours daily shall be paid the Sunday/Holiday (2X) rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-12-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Inyo, Mono and San Bernardino Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$19.05	\$6.66 ^a	\$1.71	\$1.17 ^b	-	-	8.0	\$28.59	\$38.115 ^c	\$38.115

^a The contribution applies to all hours until \$1155.24 is paid for the month.

^b \$1.54 after 7 years of service

\$1.91 after 14 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-87-119-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Kern, Kings and Tulare Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Saturday/ Holiday (1½ X)	Sunday (2 X)
Driver: Mixer Truck	\$20.11	\$4.89 ^a	\$3.05	\$0.70 ^b	-	-	8.0	\$28.75	\$38.11 ^c	\$38.11 ^c	\$48.16

^a The contribution applies to all hours until \$847.50 is paid for the month.

^b Applies to workers who have been on payroll for thirty (30) days. After 1 year of employment, Vacation and Holiday increases to \$1.08. After 2 years of employment, Vacation and Holiday increases to \$1.47. After 8 years of employment, Vacation and Holiday increases to \$1.86.

^c Overtime is paid at two times (2x) the basic hourly rate for work performed in excess of twelve (12) hours in any work day.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-624-18-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from expiration date, if no subsequent determination is issued.

Localities: All localities within Lake County.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare ^a	Pension	Vacation And Holiday	Training	Other		Daily/ Holiday ^b (1½ X)	Sunday (2X)
Driver: Mixer Truck	\$20.60	\$4.81	\$6.00	\$2.00	-	-	8.0	\$33.41	\$54.01

^a The contribution applies to all hours until \$833.00 is paid for the month.

^b Rate applies to work in excess of eight (8) hours daily, forty (40) hours weekly and all hours worked on holidays.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-X-258-2018-1

Issue Date: August 22, 2018

Expiration date of determination: September 30, 2018* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director - Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Los Angeles, Orange and Ventura Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health And Welfare	Pension	Vacation And Holiday ^d	Training	Other	Hours	Total Hourly Rate	Daily (1½ X)	Saturday/ Holiday (1½ X)	Sunday ^e (2 X)
Ready Mix Driver (After 4 yrs of service)	\$23.60	\$6.00 ^a	\$3.44	\$1.54 ^{bc}	-	-	8.0	\$34.58	\$46.38	\$46.38	\$58.18
Ready Mix Driver (After 3 yrs of service)	\$22.60	\$6.00 ^a	\$3.44	\$1.48 ^d	-	-	8.0	\$33.52	\$44.82	\$44.82	\$56.12
Ready Mix Driver (After 2 yrs of service)	\$21.60	\$6.00 ^a	\$3.44	\$1.41 ^e	-	-	8.0	\$32.45	\$43.25	\$43.25	\$54.05
Ready Mix Driver (After 1 yr of service)	\$20.60	\$6.00 ^a	\$3.44	\$0.95 ^f	-	-	8.0	\$30.99	\$41.29	\$41.29	\$51.59
Ready Mix Driver (1 yr or less of service)	\$19.60	\$6.00 ^a	\$3.44	\$0.00 ^g	-	-	8.0	\$29.04	\$38.84	\$38.84	\$48.64

^a The contribution applies to all hours until \$1040.50 is paid for the month.

^b \$2.00 after 8 years of service

\$2.45 after 15 years of service

^c Includes \$0.64 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^d Includes \$0.61 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^e Includes \$0.58 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^f Includes \$0.55 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^g In addition, \$0.53 for Holidays after four (4) months, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^h Emergency work and breakdown on Sundays shall be paid at time and one-half (1½x) the straight time rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-3-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Monterey, San Benito, San Francisco, San Mateo, Santa Clara, and Santa Cruz Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$21.50	\$9.64	\$1.72 ^a	\$0.99 ^b	-	-	8.0	\$33.85	\$45.46 ^c	\$45.46

^a This amount is factored at the applicable overtime rate.

^b \$1.41 after 2 years of service
\$1.82 after 10 years of service
\$2.23 after 20 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-1-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Nevada and Sierra Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare ^a	Pension	Vacation And Holiday ^b	Training	Other			Daily (1½ X) ^c	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$19.25	\$2.96	-	\$0.22	-	-	8.0	\$22.43	\$32.06	\$32.06

^a The contribution applies to all hours until \$513.04 is paid for the month.

^b \$0.59 after 2 years of service

\$0.96 after 5 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

*There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-11-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Riverside County.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$15.00	\$6.33 ^a	\$1.80	\$1.04 ^b	-	-	8.0	\$24.17	\$31.67 ^c	\$31.67

^a The contribution applies to all hours until \$1097.30 is paid for the month.

^b \$1.33 after 4 years of service
\$1.61 after 14 years of service
\$1.90 after 24 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-830-261-6-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within San Luis Obispo County.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Mixer Truck	\$19.14	\$3.04 ^a	\$3.42	\$1.03 ^b	\$0.64	-	8.0	\$27.27	\$36.84 ^c	\$36.84

^a The contribution applies to all hours until \$526.19 is paid for the month.

^b \$1.40 after 2 years of service,
\$1.70 after 10 years of service.

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-186-15-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Santa Barbara County.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday ^d	Training	Other	Hours	Total Hourly Rate	Daily (1½ X) ^e	Sunday/ Holiday (2 X)
Mixer Driver	\$21.15 ^a	\$4.91 ^b	\$3.44	\$0.41 ^c	-	-	8.0	\$29.91	\$40.485	\$51.06

^aIncludes an amount (\$0.03) for supplemental dues check off.

^bThe contribution applies to all hours until \$850.00 is paid for the month.

^c \$1.06 after 1 month of service

\$1.46 after 1 year of service

\$1.87 after 7 years of service

\$2.28 after 16 years of service.

^d Includes, after one month, \$0.65 for Holidays, which can be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

^eRate applies to work in excess of eight (8) hours daily and forty (40) hours weekly. All work in excess of twelve (12) hours daily shall be paid the Sunday/Holiday (2X) rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-MT-261-X-260-2020-1

Issue Date: February 22, 2020

Expiration date of determination: June 30, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Alameda and Contra Costa Counties.

Classification	Basic Hourly Rate ^h	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate		
		Health and Welfare ^a	Pension	Vacation And Holiday	Training	Other ^g			Daily (1½ X)	Saturday (1½ X)	Sunday/ Holiday (2 X)
Conventional Trucks (3 axles or less, 8 yards or less) ^e	\$39.57	\$12.35	\$11.07	\$2.59 ^b	-	\$1.41	8.0	\$66.99	\$86.78	\$86.78	\$106.56
Booster Trucks (4 axles or more, 10 yards or less) ^f	\$39.83	\$12.35	\$11.07	\$2.60 ^c	-	\$1.42	8.0	\$67.27	\$87.19	\$87.19	\$107.10
Slider (12 yards)	\$40.33	\$12.35	\$11.07	\$2.64 ^d	-	\$1.43	8.0	\$67.82	\$87.99	\$87.99	\$108.15

^a The contribution applies to all hours until \$2,135.00 is paid for the month.

^b \$2.89 after 2 years of service, \$3.20 after 3 years of service, \$3.96 after 5 years of service, \$4.72 after 10 years of service, and \$5.48 after 20 years of service.

^c \$2.91 after 2 years of service, \$3.22 after 3 years of service, \$3.98 after 5 years of service, \$4.75 after 10 years of service, and \$5.51 after 20 years of service.

^d \$2.95 after 2 years of service, \$3.26 after 3 years of service, \$4.03 after 5 years of service, \$4.81 after 10 years of service, and \$5.58 after 20 years of service.

^e Add \$0.07 per hour to the basic hourly rate for each yard or portion of yard hauled over 8 yards.

^f Add \$0.09 per hour to the basic hourly rate for each yard or portion of yard hauled over 10 yards.

^g Includes amounts for sick leave.

^h An amount up to \$34.40 per 8 hour day (\$4.30 per hour) for a maximum of 5 days per week may be deducted for Health and Welfare. The deduction is limited to the first 173.33 hours worked per month. This is in addition to the \$12.35 per hour employer payment for Health and Welfare.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director - Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-7-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for new rates after 10 days from expiration date, if no subsequent determination is issued.

Localities: All localities within Alameda, Contra Costa, Del Norte, Humboldt, Lassen, Modoc, San Francisco, San Mateo, Santa Clara, Shasta, Siskiyou and Trinity Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$22.50	^a	-	\$0.43 ^b	-	-	8.0	\$22.93	\$34.18 ^c	\$34.18

^a Health and Welfare will increase from \$0.00 to \$1.16 after 90 days of service, which will be seen as an increase to the Total Hourly Rate as well.

^b \$0.78 after 90 days of service with the employer
\$1.21 after 5 years of service with the employer
\$1.65 after 10 years of service with the employer

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-5-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Alpine, Amador, Calaveras, El Dorado, Fresno, Kings, Madera, Mariposa, Merced, Nevada, Placer, Sacramento, San Joaquin, Sierra, Stanislaus, Sutter, Tulare, Tuolumne and Yuba Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$17.00	\$3.09 ^a	-	\$0.85 ^b	-	-	8.0	\$20.94	\$29.44 ^c	\$29.44

^a The contribution applies to all hours until \$535.26 is paid for the month.

^b \$1.18 after 3 years of service

\$1.50 after 10 years of service

\$1.83 after 20 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-8-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Butte, Colusa, Glenn, Lake, Mendocino, Plumas and Tehama Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$21.00	\$2.81 ^a	-	\$0.10 ^b	-	-	8.0	\$23.91	\$34.41 ^c	\$34.41

^aThe contribution applies to hours until \$487.07 is paid for the month.

^b\$0.20 after 1 year of service,

\$0.50 after 2 years of service,

Add \$0.10 for every additional year of service to a maximum of \$1.50 per hour for over 13 years of service.

^cRate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-10-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Imperial, Inyo, Los Angeles, Mono, Orange, Riverside, San Bernardino and San Diego Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare ^a	Pension	Vacation And Holiday ^b	Training	Other			Daily (1½ X) ^c	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$17.00	\$2.05	\$0.085	\$0.33	-	-	8.0	\$19.465	\$27.965	\$27.965

^a The contribution applies to all work up to \$355.00 per month.

^b \$0.65 after 2 years of service

\$0.98 after 5 years of service

\$1.31 after 9 years of service

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

*There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-6-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within Kern, Monterey, San Luis Obispo, Santa Barbara, and Ventura Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily (1½ X)	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$16.76	\$3.04 ^a	\$2.75	\$0.90 ^b	\$0.64	-	8.0	\$24.09	\$32.47 ^c	\$32.47

^a The contribution applies to all hours until \$526.19 is paid for the month.

^b \$1.22 after 2 years of service,
\$1.55 after 10 years of service.

^c Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination: C-DT-830-261-9-2016-1

Issue Date: August 22, 2016

Expiration date of determination: September 30, 2016* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities: All localities within San Benito and Santa Cruz Counties.

Classification	Basic Hourly Rate	Employer Payments					Straight-Time Hours	Total Hourly Rate	Overtime Hourly Rate	
		Health And Welfare	Pension	Vacation And Holiday	Training	Other			Daily ^b (1½ X)	Sunday/ Holiday (1½ X)
Driver: Dump Truck	\$16.25	\$9.64	\$5.20	\$0.56 ^a	\$0.70	\$0.48	8.0	\$32.83	\$40.955	\$40.955

^a \$0.875 after 1 year of service

\$1.19 after 7 years of service

\$1.50 after 19 years of service

^b Overtime rate applies to all work exceeding eight (8) hours daily and forty (40) hours weekly.

* There is no predetermined increase applicable to this determination.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence requirements for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PWD>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # ASBESTOS WORKER, HEAT AND FROST INSULATOR

DETERMINATION: NC-3-16-1-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: July 31, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Classification (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate	
		Health and Welfare	Pension	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	1-1/2X	2X
ZONE 1										
Mechanic	\$74.16 ^a	\$14.50	\$7.72 ^b	^c	\$1.35	\$0.34 ^d	8	\$98.07	\$135.15 ^e	\$172.23 ^f
ZONE 2										
Mechanic	\$56.71 ^a	\$14.50	\$7.72 ^b	^c	\$1.35	\$0.34 ^d	8	\$80.62	\$108.98 ^e	\$137.33 ^f

ZONE 1 – Alameda, Contra Costa, Marin, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

ZONE 2 – Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Mono, Monterey, Nevada, Placer, Plumas, Sacramento, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba.

DETERMINATION: NC-3-16-3-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after ten days after the expiration date if no subsequent determination is issued.

LOCALITY: Mono and all Northern California Counties

Hazardous Material Handler Mechanic	37.03 ^g	8.06	2.25	^c	0.30	0.08 ^h	8 ^m	47.72	66.24 ⁱ	84.75 ^j
Hazardous Material Handler Worker ^k	27.31 ^g	8.06	1.50	-	0.30	0.06 ^l	8 ^m	37.23	50.89 ⁱ	64.54 ^j

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes an amount withheld for dues check off and for vacation.

^b Pursuant to Labor Code sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^c Included in the straight-time hourly rate.

^d Includes \$0.30 per hour worked for Industry Promotion, \$0.01 per hour worked for Occupational Health and Research, \$0.02 per hour worked for Vacation/Holiday Administration and \$0.01 per hour worked for Preservation Trust.

^e 1 ½ times the basic straight-time hourly rate for the first 2 hours of overtime, Monday through Friday and for the first 10 hours on Saturdays. All other overtime is paid at the double time rate.

^f \$246.39 (ZONE 1) and \$194.04 (ZONE 2) per hour for work on Labor Day.

^g Includes amount withheld for dues check off.

^h Includes amount for Vacation/Holiday Administration and Industry Promotion.

ⁱ Rate applies to the first 4 overtime hours in any workday or 40 hours in a workweek, and for the first 8 hours worked on the 7th consecutive day of work in a workweek.

^j Rate applies to work on any recognized holiday, all hours worked in excess of 12 hours in any workday, and for all hours worked in excess of 8 hours on the 7th consecutive day of work in a workweek.

^k A maximum of fourteen (14) Hazardous Material Handler Workers is allowed for each Hazardous Material Handler Mechanic.

^l Includes amount for Industry Promotion.

^m The 6th consecutive day in the same work week may be worked at straight-time if job is shut down during the normal work week due to inclement weather, major mechanical breakdown or lack of materials beyond the control of the employer.

NOTE: Asbestos Removal Workers must be trained and the work conducted according to the Code of Federal Regulations 29 CFR 1926.58, the California Labor Code 6501.5 and the California Code of Regulations, Title 8, Section 5208. Contractors must be certified by the Contractors' State License Board and registered with the Division of Occupational Safety and Health (DOSH). For further information, contact the Asbestos Contractors Abatement Registration Unit, DOSH at (510) 286-7362.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #CARPENTER AND RELATED TRADES

DETERMINATION: NC-23-31-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily 1 1/2X ^f	2X	Overtime Hourly Rate ^c		Sunday and Holiday ⁱ
		Health and Welfare	Pension	Vacation/ Holiday ^d	Training	Other Payments ^e	Hours	Total Hourly Rate			Saturday ^a	2X	
^b Area 1													
Carpenter	\$52.65	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$83.76	\$110.085	\$136.41	\$110.085	\$136.41	\$136.41
Hardwood Floorlayer, Power Saw Operator, Saw Filer, Shingler, Steel Scaffold and Steel Shoring Erector	\$52.80	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$83.91	\$110.31	\$136.71	\$110.31	\$136.71	\$136.71
^b Area 2													
Carpenter	\$46.77	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$77.88	\$101.265	\$124.65	\$101.265	\$124.65	\$124.65
Hardwood Floorlayer, Power Saw Operator, Saw Filer, Shingler, Steel Scaffold and Steel Shoring Erector	\$46.92	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$78.03	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^b Area 3^j													
Carpenter	\$46.77	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$77.88	\$101.265	\$124.65	\$101.265	\$124.65	\$124.65
Hardwood Floorlayer, Power Saw Operator, Saw Filer, Shingler, Steel Scaffold and Steel Shoring Erector	\$46.92	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$78.03	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^b Area 4^j													
Carpenter	\$45.42	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$76.53	\$99.24	\$121.95	\$99.24	\$121.95	\$121.95
Hardwood Floorlayer, Power Saw Operator, Saw Filer, Shingler, Steel Scaffold and Steel Shoring Erector	\$45.57	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8	\$76.68	\$99.465	\$122.25	\$99.465	\$122.25	\$122.25

DETERMINATION: NC-23-31-1-2020-1A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily 1 1/2X ^f	2X	Overtime Hourly Rate ^c		Sunday and Holiday ⁱ
		Health and Welfare	Pension	Vacation/ Holiday ^d	Training	Other Payments ^e	Hours	Total Hourly Rate			Saturday ^a	2X	
Bridge Builder/Highway Carpenter	\$52.65	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8.0	\$83.76	\$110.085	\$136.41	\$110.085	\$136.41	\$136.41
Bridge Builder/Highway Carpenter (Special Single Shift)	\$59.23	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	8.0	\$90.34	\$119.955	\$149.57	\$119.955	\$149.57	\$149.57

Footnote and Millwright listed on page 34A

(Recognized Holidays and Subsistence Payment footnotes also listed on page 34A)

DETERMINATION: NC-23-31-1-2020-1B
ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journeyperson)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily 1 1/2X ^f	Overtime Hourly Rate ^c			Sunday and Holiday ^j
		Health and Welfare	Pension	Vacation/ Holiday ^d	Training	Other Payments ^h	Hours	Total Hourly Rate		Saturday ^a			
										2X	1 1/2X ^e	2X	
^b Area 1 Millwright	\$52.75	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	8	\$85.46	\$111.835	\$138.21	\$111.835	\$138.21	\$138.21
^b Area 2 Millwright	\$49.27	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	8	\$81.98	\$106.615	\$131.25	\$106.615	\$131.25	\$131.25
^b Area 3^j Millwright	\$49.27	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	8	\$81.98	\$106.615	\$131.25	\$106.615	\$131.25	\$131.25
^b Area 4ⁱ Millwright	\$47.92	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	8	\$80.63	\$104.59	\$128.55	\$104.59	\$128.55	\$128.55

DETERMINATION: NC-23-31-1-2020-1, NC-23-31-1-2020-1A and NC-23-31-1-2020-1B

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a In the event that work cannot be performed Monday through Friday because of inclement weather or major mechanical breakdown, employees may voluntarily make up such day on Saturday and shall be paid at the applicable straight time rates.

^b **AREA 1** - Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

AREA 2 - Monterey, San Benito, and Santa Cruz Counties.

AREA 3 - El Dorado, Placer, Sacramento, San Joaquin and Yolo Counties.

AREA 4 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, and Yuba Counties.

^c The overtime rates for shift work are based on the non-shift overtime rates.

^d Includes an amount per hour worked for Work Fees. The Vacation amount is \$2.95 per hour worked for Carpenter; \$2.85 per hour worked for Millwright.

^e Includes Annuity Trust Fund, Industry Promotion, Carpenters International Training Fund, Work Preservation, Carpenter Employers Contract Administration, and Vacation/Holiday/Sick Leave Admin.

^f For building construction, rate applies to the first 4 hours daily overtime. For all heavy, highway and engineering construction overtime worked, Monday through Friday, rate applies to the first 4 hours daily overtime.

^g Rate applies to the first 8 hours for building construction and for the first 10 hours worked on heavy, highway and engineering construction.

^h Millwright Annuity Trust Fund, Industry Promotion, Work Preservation, Carpenters International Training Fund, and Vacation/Holiday/Sick Leave Admin.

ⁱ Time and one-half shall be paid for the first eight (8) hours worked on the four (4) days of each year selected by the Union as designated off/holidays listed in the Holiday Provision.

^j Area 3 includes the portion of Placer County west of and including Highway 49 and the portion of El Dorado County west of and including Highway 49 and the territory inside the city limits of Placerville. Area 4 includes the portions of Placer and El Dorado Counties not covered in Area 3.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #CARPENTER AND RELATED TRADES (SECOND SHIFT)*

DETERMINATION: NC-23-31-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journeyperson)				Basic Hourly Rate	Employer Payments					Straight – Time		Daily	Overtime Hourly Rate ^a		
					Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^f	Hours ^g	Total Hourly Rate		1 1/2X ^h	2X	1 1/2X ⁱ
^c Area 1															
Carpenter	Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$56.16	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$87.27	\$110.09	\$136.41	\$110.09	\$136.41	\$136.41
			\$56.32	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$87.43	\$110.31	\$136.71	\$110.31	\$136.71	\$136.71
^c Area 2															
Carpenter	Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$49.89	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$81.00	\$101.27	\$124.65	\$101.27	\$124.65	\$124.65
			\$50.05	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$81.16	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^c Area 3 ¹															
Carpenter	Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$49.89	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$81.00	\$101.27	\$124.65	\$101.27	\$124.65	\$124.65
			\$50.05	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$81.16	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^c Area 4 ¹															
Carpenter	Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$48.45	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$79.56	\$99.24	\$121.95	\$99.24	\$121.95	\$121.95
			\$48.61	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$79.72	\$99.47	\$122.25	\$99.47	\$122.25	\$122.25

DETERMINATION: NC-23-31-1-2020-1A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily	Overtime Hourly Rate ^a			
		Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^f	Hours ^g	Total Hourly Rate		Saturday ^b	Sunday and Holiday ^k	1 1/2X ^h	2X
Bridge Builder/Highway Carpenter	\$56.16	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7.5	\$87.27	\$110.09	\$136.41	\$110.09	\$136.41	\$136.41

Continued on page 34C

(Recognized Holidays and Subsistence Payment footnotes also listed on page 34C)

DETERMINATION: NC-23-31-1-2020-1B
ISSUE DATE: August 22, 2020
EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.
LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments					Straight – Time		Overtime Hourly Rate ^a				
		Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^j	Hours ^g	Total Hourly Rate	Daily 1 1/2X ^h	2X	Saturday ^b 1 1/2X ⁱ	2X	Sunday and Holiday ^k
^c Area 1 Millwright	\$56.27	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7.5	\$88.98	\$111.84	\$138.21	\$111.84	\$138.21	\$138.21
^c Area 2 Millwright	\$52.55	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7.5	\$85.26	\$106.62	\$131.25	\$106.62	\$131.25	\$131.25
^c Area 3^d Millwright	\$52.55	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7.5	\$85.26	\$106.62	\$131.25	\$106.62	\$131.25	\$131.25
^c Area 4^d Millwright	\$51.11	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7.5	\$83.82	\$104.59	\$128.55	\$104.59	\$128.55	\$128.55

DETERMINATION: NC-23-31-1-2020-1, NC-23-31-1-2020-1A and NC-23-31-1-2020-1B (FOR SECOND AND THIRD SHIFTS)

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

* Does not apply to tenant improvement or renovation projects in occupied buildings with a total contract value of \$5 million or less.
^a The overtime rates for shift work are based on the non-shift overtime rates on page 34.
^b In the event that work cannot be performed Monday through Friday because of inclement weather or major mechanical breakdown, employees may voluntarily make up such day on Saturday and shall be paid at the applicable straight time rates.
^c **AREA 1** - Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.
AREA 2 - Monterey, San Benito, and Santa Cruz Counties.
AREA 3 - El Dorado, Placer, Sacramento, San Joaquin and Yolo Counties.
AREA 4 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, and Yuba Counties.
^d Area 3 includes the portion of Placer County west of and including Highway 49 and the portion of El Dorado County west of and including Highway 49 and the territory inside the city limits of Placerville. Area 4 includes the portions of Placer and El Dorado Counties not covered in Area 3.
^e Includes an amount per hour worked for Work Fees. The Vacation amount is \$2.95 per hour worked for Carpenter; \$2.85 per hour worked for Millwright.
^f Annuity Trust Fund, Industry Promotion, Carpenters International Training Fund, Carpenter Employers Contract Administration, and Vacation/Holiday/Sick Leave Admin.
^g Daily overtime applies after 7 ½ hours worked at the straight-time rate for second shift and after 7 hours worked at the straight-time rate for third shift.
^h For building construction, rate applies to the first 2 hours prior to the start of the regular or approved day, or the first 4 hours after the end of the approved or regular work day, not to exceed a total of 4 hours in any 1 work day. For heavy, highway and engineering construction rate applies to the first 4 hours prior to the start of the regular or approved day, or the first 4 hours after the end of the approved or regular work day, not to exceed a total of 4 hours in any 1 work day
ⁱ Rate applies to the first 8 hours for building construction and for the first 10 hours worked on heavy, highway and engineering construction.
^j Millwright Annuity Trust Fund, Industry Promotion, Carpenters International Training Fund, Work Preservation, and Vacation/Holiday/Sick Leave Admin.
^k Time and one-half shall be paid for the first eight (8) hours worked on the four (4) days of each year selected by the Union as designated off/holidays listed in the Holiday Provision.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #CARPENTER AND RELATED TRADES (THIRD SHIFT)*

DETERMINATION: NC-23-31-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journeyperson)				Employer Payments			Straight – Time		Overtime Hourly Rate ^a					
				Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^f	Hours ^g	Total Hourly Rate	Daily 1 1/2X ^h	Saturday ^b 1 1/2X ⁱ 2X	
^c Area 1														
Carpenter														
Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$60.17	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$91.28	\$110.09	\$136.41	\$110.09	\$136.41	\$136.41
		\$60.34	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$91.45	\$110.31	\$136.71	\$110.31	\$136.71	\$136.71
^c Area 2														
Carpenter														
Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$53.45	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$84.56	\$101.27	\$124.65	\$101.27	\$124.65	\$124.65
		\$53.62	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$84.73	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^c Area 3 ^l														
Carpenter														
Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$53.45	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$84.56	\$101.27	\$124.65	\$101.27	\$124.65	\$124.65
		\$53.62	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$84.73	\$101.49	\$124.95	\$101.49	\$124.95	\$124.95
^c Area 4 ^l														
Carpenter														
Hardwood Floorlayer, Power Operator, Saw Filer, Shingler, Scaffold and Steel Shoring Erector	Saw Steel	\$51.91	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$83.02	\$99.24	\$121.95	\$99.24	\$121.95	\$121.95
		\$52.08	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$83.19	\$99.47	\$122.25	\$99.47	\$122.25	\$122.25

Footnotes listed on page 34C

(Recognized Holidays and Subsistence Payment footnotes also listed on page 34C)

DETERMINATION: NC-23-31-1-2020-1A
ISSUE DATE: August 22, 2020
EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.
LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journey person)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily 1 1/2X ^h	Overtime Hourly Rate ^a			Sunday and Holiday ^k
		Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^f	Hours ^g	Total Hourly Rate		2X	Saturday ^b 1 1/2X ⁱ	2X	
Bridge Builder/Highway Carpenter	\$60.17	\$11.70	\$10.65	\$5.09	\$1.03	\$2.64	7	\$91.28	\$110.09	\$136.41	\$110.09	\$136.41	\$136.41

DETERMINATION: NC-23-31-1-2020-1B
ISSUE DATE: August 22, 2020
EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.
LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION (Journeyperson)	Basic Hourly Rate	Employer Payments					Straight – Time		Daily 1 1/2X ^h	Overtime Hourly Rate ^a			Sunday and Holiday ^k
		Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other Payments ^j	Hours ^g	Total Hourly Rate		2X	Saturday ^b 1 1/2X ⁱ	2X	
^c Area 1													
Millwright	\$60.29	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7	\$93.00	\$111.84	\$138.21	\$111.84	\$138.21	\$138.21
^c Area 2													
Millwright	\$56.31	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7	\$89.02	\$106.62	\$131.25	\$106.62	\$131.25	\$131.25
^c Area 3^d													
Millwright	\$56.31	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7	\$89.02	\$106.62	\$131.25	\$106.62	\$131.25	\$131.25
^c Area 4^d													
Millwright	\$54.77	\$11.70	\$10.65	\$5.18	\$1.03	\$4.15	7	\$87.48	\$104.59	\$128.55	\$104.59	\$128.55	\$128.55

Footnotes listed on page 34C

(Recognized Holidays and Subsistence Payment footnotes also listed on page 34C)

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #MODULAR FURNITURE INSTALLER (CARPENTER)

DETERMINATION: NC-23-31-15-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension ^b	Vacation/ Holiday ^c	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^d 1 1/2X	Sunday/ Holiday 2X
* AREA 1											
Master Installer	\$36.43	\$10.55	\$7.80	\$4.33	\$0.25	\$0.42	8	\$59.78	\$77.995	\$77.995	\$96.21
Lead Installer	32.21	10.55	7.80	4.33	0.25	0.42	8	55.56	71.665	71.665	87.77
Installer	28.76	10.55	7.30	4.33	0.25	0.42	8	51.61	65.990	65.990	80.37
* AREA 2											
Master Installer	32.71	10.55	7.80	4.33	0.25	0.42	8	56.06	72.415	72.415	88.77
Lead Installer	29.08	10.55	7.80	4.33	0.25	0.42	8	52.43	66.970	66.970	81.51
Installer	26.11	10.55	7.30	4.33	0.25	0.42	8	48.96	62.015	62.015	75.07
* AREA 3											
Master Installer	31.38	10.55	7.80	4.33	0.25	0.42	8	54.73	70.420	70.420	86.11
Lead Installer	27.96	10.55	7.80	4.33	0.25	0.42	8	51.31	65.290	65.290	79.27
Installer	25.16	10.55	7.30	4.33	0.25	0.42	8	48.01	60.590	60.590	73.17

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

* **AREA 1:** Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

AREA 2: Monterey, San Benito, and Santa Cruz Counties.

AREA 3: Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

^b Includes an amount for Annuity Trust Fund.

^c Includes an amount for Work Fee.

^d Rate applies for the first 10 hours only. All hours worked in excess of ten hours on Saturdays shall be paid at double time (2X).

RATIO: The ratio of employees shall be based on the increments of eight (8) employees. It is understood that the employee ratio shall apply on a company-wide basis. For every eight (8) employees, the employer shall employ one (1) Master Installer, two (2) Lead Installers, and five (5) Installers. For crew size of over eight (8) employees, please contact the Office of the Director – Research Unit at (415) 703-4774.

All drapery installation shall be performed by employees at the Installer level or above.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #DRYWALL INSTALLER/LATHER (CARPENTER)

DETERMINATION: NC-31-X-16-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021**. The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba counties.

CLASSIFICATION (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday ^g	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday 1 1/2X	Sunday and Holiday
^a Area 1											
Drywall Installer/ Lather	\$52.65	\$11.70	^f \$13.40	\$5.09	\$0.97	\$1.11	8	\$84.92	^h \$111.245	^h \$111.245	\$137.57
Stocker, Scrapper ^c	26.33	11.70	^f \$5.91	5.04	-	0.10	8	49.08	^h \$62.245	^h \$62.245	75.41
Stocker, Scrapper	26.33	11.70	1.48	5.04	-	0.10	8	44.65	^h \$57.815	^h \$57.815	70.98
^b Area 2											
Drywall Installer/ Lather	46.77	11.70	^f \$13.40	5.09	0.97	1.11	8	79.04	^h \$102.425	^h \$102.425	125.81
Stocker, Scrapper ^c	23.39	11.70	^f \$5.91	5.04	-	0.10	8	46.14	^h \$57.835	^h \$57.835	69.53
Stocker, Scrapper	23.39	11.70	1.48	5.04	-	0.10	8	41.71	^h \$53.405	^h \$53.405	65.10
^c Area 3											
Drywall Installer/ Lather	47.27	11.70	^f \$13.40	5.09	0.97	1.11	8	79.54	^h \$103.175	^h \$103.175	126.81
Stocker, Scrapper ^c	23.64	11.70	^f \$5.91	5.04	-	0.10	8	46.39	^h \$58.21	^h \$58.21	70.03
Stocker, Scrapper	23.64	11.70	1.48	5.04	-	0.10	8	41.96	^h \$53.78	^h \$53.78	65.60
^d Area 4											
Drywall Installer/ Lather	45.92	11.70	^f \$13.40	5.09	0.97	1.11	8	78.19	^h \$101.150	^h \$101.150	124.11
Stocker, Scrapper ^c	22.97	11.70	^f \$5.91	5.04	-	0.10	8	45.72	^h \$57.205	^h \$57.205	68.69
Stocker, Scrapper	22.97	11.70	1.48	5.04	-	0.10	8	41.29	^h \$52.775	^h \$52.775	64.26

#Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a **Area 1** - Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma counties.

^b **Area 2** - Monterey, San Benito, and Santa Cruz Counties.

^c **Area 3** - El Doradoⁱ, Placerⁱ, Sacramento, San Joaquin, and Yolo Counties.

^d **Area 4** - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Doradoⁱ, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Nevada, Placerⁱ, Plumas, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, and Yuba Counties.

^e Employed by the same contractor for 2000 hours (consecutively or cumulatively).

^f Includes an amount for Annuity Trust Fund.

^g Includes an amount for Work Fees.

^h Rate applies to the first 4 overtime hours Monday through Friday and the first 8 hours on Saturday. All other time is paid at the Sunday and Holiday overtime rate.

Saturdays may be worked at straight time if job is shut down during Monday through Friday due to inclement weather or major mechanical breakdown.

ⁱ Area 3 includes the portion of Placer County west of and including Highway 49 and the portion of El Dorado County west of and including Highway 49 and the territory inside the city limits of Placerville. Area 4 includes the portions of Placer and El Dorado Counties not covered in Area 3.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # PILE DRIVER (CARPENTER)

DETERMINATION: NC-23-31-11-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday 1 1/2X	Sunday and Holiday
Pile Driver, Wharf, and Dock Builder	\$51.90 ^g	11.70	^b 14.85	^c 6.29	1.08	^a 0.35	8	86.17	^d 112.120	^d 112.120	138.070
Diver (wet) up to 50 ft depth ^{e, f}	101.42	11.70	^b 14.85	^c 6.29	1.08	^a 0.35	8	135.69	^d 186.400	^d 186.400	237.110
Diver's Tender ^e	56.88	11.70	^b 14.85	^c 6.29	1.08	^a 0.35	8	91.15	^d 119.590	^d 119.590	148.030
Assistant Tender	51.90	11.70	^b 14.85	^c 6.29	1.08	^a 0.35	8	86.17	^d 112.120	^d 112.120	138.070
Diver (stand-by)	57.88	11.70	^b 14.85	^c 6.29	1.08	^a 0.35	8	92.15	^d 121.090	^d 121.090	150.030

FOR "PILE DRIVER-BRIDGE BUILDER" - SEE NORTHERN CALIFORNIA CARPENTER PAGE 34.

PLEASE NOTE: To obtain wage rate information for Saturation Diver, Manned Submersible, Manifold Operator/Life Support Technician, Remote Controlled/Operated Vehicle (RCV/ROV) Pilot/Technician, Navigator Surveyor, Bell Winch Operator & Diving Equipment Technician, please contact the Office of the Director - Research Unit at (415) 703-4774.

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes Industry Promotion, Carpenters International Training Fund, Pile Drivers Employers Contract Administration, LMCC and Vacation/Holiday/Sick Leave Admin (VHSLA).

^b Includes an amount per hour for Annuity Trust Fund. Pursuant to Labor Code Sections 1773.1 and 1773.8, the amount paid for this employer payment may vary resulting in a lower taxable basic hourly wage rate, but the total hourly rates for straight time and overtime may not be less than the general prevailing rate of per diem wages.

^c Includes an amount per hour for work fees.

^d Rate applies to the first 2 daily overtime hours and the first 8 hours worked on Saturdays. All other time is paid at the Sunday/Holiday overtime rate. For work associated with cast-in-place piles, drill shaft, Tubex piles, Tubex grout injection piles, geo piles, soil improvement piles, sand piles, augured cast in place piles, CISS and CIDH: Rate applies to all hours worked after 8 hours Monday-Friday and all hours worked on Saturday.

^e Shall receive a minimum of 8 hours pay for any day or part thereof worked.

^f For specific rates over 50 ft depth, contact the Office of the Director – Research Unit.

^g On bridges, powerhouses and dams, men working from bosun's chairs or swinging scaffolds or suspended from rope, cable, safety belts, or any device used as a substitute for or in lieu thereof (excluding piledriving rigs) shall receive \$0.15 per hour above this rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <https://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <https://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #ELEVATOR CONSTRUCTOR

DETERMINATION: NC-62-X-1-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: December 31, 2020** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Inyo, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Mono, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.
Portions^a of Kern, San Bernardino and San Luis Obispo are detailed below.

Classification (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension ^e	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X ^d	Saturday 1 1/2X ^d	Sunday and Holiday
Mechanic	\$69.78	15.725	18.41	4.19	0.63	0.48	8	109.215	144.105	144.105	178.995 ^b
Mechanic (Employed in industry more than 5 years)	69.78	15.725	18.41	5.58	0.63	0.48	8	110.605	145.495	145.495	180.385 ^b
Helper ^c	48.85	15.725	18.41	2.93	0.63	0.48	8	87.025	111.450	111.450	135.875 ^b
Helper (Employed in industry more than 5 years)	48.85	15.725	18.41	3.91	0.63	0.48	8	88.005	112.430	112.430	136.855 ^b

#Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @
<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Applies to that portion of these counties north of the Tehachapi Line. For more information contact the Office of the Director - Research Unit.

^b For paid holidays recognized in the collective bargaining agreement employees are paid for 8 hours at straight time in addition to the Holiday rate for all hours worked.

^c Ratio: The total number of Helpers employed shall not exceed the number of Mechanics on any one job. For more information on the use of Helpers contact the Office of the Director - Research Unit.

^d For Contract Service work only. All other overtime is paid at the Sunday/Holiday rate.

^e Includes an amount for Annuity Trust Fund.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # OPERATING ENGINEER (HEAVY AND HIGHWAY WORK)

DETERMINATION: NC-23-63-1-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments							Straight-Time		Overtime Hourly Rate			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^e	Training	Other Payments	Hours ^f	Total Hourly Rate		Daily/ Saturday ^d 1 1/2X	Sunday and Holiday 2X		
Classification Group ^a	Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c
Group 1	\$51.42	\$53.42	\$13.88	\$10.78	\$4.77	\$1.07	8	\$83.05	\$85.05	\$108.76	\$111.76	\$134.47	\$138.47
Group 2	\$49.89	\$51.89	\$13.88	\$10.78	\$4.77	\$1.07	8	\$81.52	\$83.52	\$106.47	\$109.47	\$131.41	\$135.41
Group 3	\$48.41	\$50.41	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.04	\$82.04	\$104.25	\$107.25	\$128.45	\$132.45
Group 4	\$47.03	\$49.03	\$13.88	\$10.78	\$4.77	\$1.07	8	\$78.66	\$80.66	\$102.18	\$105.18	\$125.69	\$129.69
Group 5	\$45.76	\$47.76	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.39	\$79.39	\$100.27	\$103.27	\$123.15	\$127.15
Group 6	\$44.44	\$46.44	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.07	\$78.07	\$98.29	\$101.29	\$120.51	\$124.51
Group 7	\$43.30	\$45.30	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.93	\$76.93	\$96.58	\$99.58	\$118.23	\$122.23
Group 8	\$42.16	\$44.16	\$13.88	\$10.78	\$4.77	\$1.07	8	\$73.79	\$75.79	\$94.87	\$97.87	\$115.95	\$119.95
Group 8-A	\$39.95	\$41.95	\$13.88	\$10.78	\$4.77	\$1.07	8	\$71.58	\$73.58	\$91.56	\$94.56	\$111.53	\$115.53
ALL CRANES AND ATTACHMENTS:													
Group 1	\$53.05	\$55.05	\$13.88	\$10.78	\$4.77	\$1.07	8	\$84.68	\$86.68	\$111.21	\$114.21	\$137.73	\$141.73
Truck Crane Assistant to Engineer	\$46.08	\$48.08	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.71	\$79.71	\$100.75	\$103.75	\$123.79	\$127.79
Assistant to Engineer	\$43.79	\$45.79	\$13.88	\$10.78	\$4.77	\$1.07	8	\$75.42	\$77.42	\$97.32	\$100.32	\$119.21	\$123.21
Group 1-A	\$52.30	\$54.30	\$13.88	\$10.78	\$4.77	\$1.07	8	\$83.93	\$85.93	\$110.08	\$113.08	\$136.23	\$140.23
Truck Crane Assistant to Engineer	\$45.33	\$47.33	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.96	\$78.96	\$99.63	\$102.63	\$122.29	\$126.29
Assistant to Engineer	\$43.04	\$45.04	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.67	\$76.67	\$96.19	\$99.19	\$117.71	\$121.71
Group 2-A	\$50.54	\$52.54	\$13.88	\$10.78	\$4.77	\$1.07	8	\$82.17	\$84.17	\$107.44	\$110.44	\$132.71	\$136.71
Truck Crane Assistant to Engineer	\$45.07	\$47.07	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.70	\$78.70	\$99.24	\$102.24	\$121.77	\$125.77
Assistant to Engineer	\$42.83	\$44.83	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.46	\$76.46	\$95.88	\$98.88	\$117.29	\$121.29
Group 3-A	\$48.80	\$50.80	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.43	\$82.43	\$104.83	\$107.83	\$129.23	\$133.23
Truck Crane Assistant to Engineer	\$44.83	\$46.83	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.46	\$78.46	\$98.88	\$101.88	\$121.29	\$125.29
Hydraulic	\$44.44	\$46.44	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.07	\$78.07	\$98.29	\$101.29	\$120.51	\$124.51
Assistant to Engineer	\$42.55	\$44.55	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.18	\$76.18	\$95.46	\$98.46	\$116.73	\$120.73
Group 4-A	\$45.76	\$47.76	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.39	\$79.39	\$100.27	\$103.27	\$123.15	\$127.15

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see pages 39B-40.

^b **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

^e Includes an amount for supplemental dues.

^f When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

NOTE: For Special Single and Second Shift rates, please see page 39A.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

CLASSIFICATIONS

GROUP 1

Drill Equipment, over 200,000 lbs
Operator of Helicopter (when used in erection work)
Hydraulic Excavator 7 cu yds and over
Power Shovels, over 7 cu yds

GROUP 2

Highline Cableway
Hydraulic Excavator 3 1/2 cu yds up to 7 cu yds
Licensed Construction Work Boat Operator, On Site
Microtunneling Machine
Power Blade Operator (finish)
Power Shovels, (over 1 cu yd and up to and including 7 cu yds m.r.c.)

GROUP 3

Asphalt Milling Machine
Cable Backhoe
Combination Backhoe and Loader over ¾ cu yds
Continuous Flight Tie Back Machine
Crane Mounted Continuous Flight Tie Back Machine, tonnage to apply
Crane Mounted Drill Attachments, Tonnage to apply
Dozer, Slope Board
Drill Equipment, over 100,000 lbs up to and including 200,000 lbs
Gradall
Hydraulic Excavator up to 3 1/2 cu yds
Loader 4 cu yds and over
Long Reach Excavator
Multiple Engine Scrapers (when used as push pull)
Power Shovels, up to and including 1 cu yd
Pre-Stress Wire Wrapping machine
Side Boom Cat, 572 or larger
Track Loader 4 cu yds and over
Wheel Excavator (up to and including 750 cu yds per hour)

GROUP 4

Asphalt Plant Engineer/Boxman
Chicago Boom
Combination Backhoe and Loader up to and including ¾ cu yds
Concrete Batch Plants (wet or dry)
Dozer and/or Push Cat
Drill Equipment, over 50,000 lbs up to and including 100,000 lbs
Pull-Type Elevating Loader
Gradesetter, Grade Checker (GPS, mechanical or otherwise)
Grooving and Grinding Machine
Heading Shield Operator
Heavy Duty Drilling Equipment, Hughes, LDH, Watson 3000 or similar
Heavy Duty Repairman and/or Welder
Lime Spreader
Loader under 4 cu yds
Lubrication and Service Engineer (mobile and grease rack)
Mechanical Finishers or Spreader Machine (asphalt, Barber-Greene and similar)
Miller Formless M-9000 Slope Paver or similar
Portable Crushing and Screening plants
Power Blade Support
Roller Operator, Asphalt
Rubber-Tired Scraper, Self-Loading (paddle-wheels, etc)
Rubber-Tired Earthmoving Equipment (Scrapers)
Slip Form Paver (concrete)
Small Tractor with Drag
Soil Stabilizer (P&H or equal)
Spider Plow and Spider Puller
Timber Skidder
Track Loader up to 4 yards
Tractor Drawn Scraper
Tractor, Compressor Drill Combination
Tubex Pile Rig
Unlicensed Construction Work Boat Operator, On Site
Welder
Woods-Mixer (and other similar Pugmill equipment)

GROUP 5

Cast-In Place Pipe Laying Machine
Combination Slusher and Motor Operator
Concrete Conveyor or Concrete Pump, Truck or Equipment Mounted
Concrete Conveyor, Building Site
Concrete Pump or Pumpcrete Guns
Drilling Equipment, Watson 2000, Texoma 700 or similar
Drilling and Boring Machinery, Horizontal (not to apply to waterlines, wagon drills or jackhammers)
Concrete Mixers/all
Man and/or Material Hoist
Mechanical Finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types)
Mechanical Burn, Curb and/or Curb and Gutter Machine, Concrete or Asphalt
Mine or Shaft Hoist
Portable Crushers
Power Jumbo Operator (setting slip-forms, etc., in tunnels)
Screedman (automatic or manual)
Self Propelled Compactor with Dozer
Tractor with boom, D6 or smaller
Trenching Machine, maximum digging capacity over 5 ft. depth
Vermeer T-600B Rock Cutter or similar

GROUP 6

Armor-Coater (or similar)
Ballast Jack Tamper
Boom-Type Backfilling Machine
Asst. Plant Engineer
Bridge and/or Gantry Crane
Chemical Grouting Machine, truck mounted
Chip Spreading Machine Operator
Concrete Barrier Moving Machine
Concrete Saws (self-propelled unit on streets, highways, airports, and canals)
Deck Engineer
Drill Doctor
Drill Equipment, over 25,000 lbs up to and including 50,000 lbs
Drilling Equipment Texoma 600, Hughes 200 series or similar up to and including 30 ft. m.r.c.
Helicopter Radioman
Hydro-Hammer or similar
Line Master
Skidsteer Loader, Bobcat larger than 743 series or similar (with attachments)
Locomotive
Rotating Extendable Forklift, Lull Hi-Lift or similar
Assistant to Engineer, Truck Mounted Equipment
Pavement Breaker, Truck Mounted, with compressor combination
Paving Fabric Installation and/or Laying Machine
Pipe Bending Machine (pipelines only)
Pipe Wrapping Machine (Tractor propelled and supported)
Screedman, (except asphaltic concrete paving)
Self-Loading Chipper
Self Propelled Pipeline Wrapping Machine
Tractor

GROUP 7

Ballast Regulator
Cary Lift or similar
Combination Slurry Mixer and/or Cleaner
Coolant/Slurry Tanker Operator (hooked to Grooving/Grinding Machine)
Drilling Equipment, 20 ft and under m.r.c.
Drill Equipment, over 1,000 lbs up to and including 25,000 lbs
Fireman Hot Plant

Grouting Machine Operator
Highline Cableway Signalman
Stationary Belt Loader (Kolman or similar)
Lift Slab Machine (Vagtborg and similar types)
Maginnes Internal Full Slab Vibrator
Material Hoist (1 Drum)
Mechanical Trench Shield
Partsman (heavy duty repair shop parts room)
Pavement Breaker with or without Compressor Combination
Pipe Cleaning Machine (tractor propelled and supported)
Post Driver
Roller (except Asphalt), Chip Seal
Self Propelled Automatically Applied Concrete Curing Machine (on streets, highways, airports and canals)
Self Propelled Compactor (without dozer)
Signalman
Slip-Form Pumps (lifting device for concrete forms)
Super Sucker Vacuum Truck
Tie Spacer
Trenching Machine (maximum digging capacity up to and including 5 ft depth)
Truck Type Loader

GROUP 8

Bit Sharpener
Boiler Tender
Box Operator
Brakeman
Combination Mixer and Compressor (shotcrete/gunite)
Compressor Operator
Deckhand
Fireman
Generators
Gunite/Shotcrete Equipment Operator
Heavy Duty Repairman Helper
Hydraulic Monitor
Ken Seal Machine (or similar)
Mast Type Forklift
Mixermobile
Assistant to Engineer
Pump Operator
Refrigerator Plant
Reservoir-Debris Tug (Self-Propelled Floating)
Ross Carrier (Construction site)
Rotomist Operator
Self Propelled Tape Machine
Shuttlecar
Self Propelled Power Sweeper Operator (Includes Vacuum Sweeper)
Slusher Operator
Surface Heater
Switchman
Tar Pot Fireman
Tugger Hoist, Single Drum
Vacuum Cooling Plant
Welding Machine (powered other than by electricity)

GROUP 8-A

Articulated Dump Truck Operator
Elevator Operator
Mini Excavator under 25 H.P. (Backhoe-Trencher)
Skidsteer Loader, Bobcat 743 series or
Smaller and similar (without attachments)

GROUP 2-A

Clamshells and Draglines over 1 cu yds up to and
including 7 cu yds
Cranes over 45 tons up to and including 100 tons
Derrick Barge 100 tons and under
Mobile Self-Erecting Tower Crane (Potain) over 3 stories
Self Propelled Boom Type Lifting Device over 45 tons

GROUP 4-A

Boom Truck or dual-purpose A-Frame Truck,
Non-Rotating over 15 tons.
Truck Mounted Rotating Telescopic Boom
Type Lifting Device, Manitex or similar
(Boom Truck -over 15 tons)
Truck-Mounted Rotating Telescopic Boom Type
Lifting Device, Manitex or Similar (Boom Truck),
under 15 tons

ALL CRANES AND ATTACHMENTS:

GROUP 1

Cranes over 350 tons
Derrick over 250 tons
Self Propelled Boom Type Lifting Device over 250 tons

GROUP 1-A

Clamshells and Draglines over 7 cu yds
Cranes over 100 tons
Derrick, over 100 tons
Derrick Barge Pedestal mounted over 100 tons
Self Propelled Boom Type Lifting Device Over 100 tons
Tower Cranes

GROUP 3-A

Clamshells and Draglines up to and including 1 cu yd
Cranes 45 tons and under
Mobile Self-Erecting Tower Crane (Potain), 3 stories
and under
Self Propelled Boom Type Lifting Device 45 tons
and under

DESCRIPTION FOR AREAS 1 AND 2:

Area 1 is all of Northern California within the following Township, State and/or county Boundaries:

Commencing in the Pacific Ocean on the extension of the Southerly line of Township 19S, of the Mount Diablo Base and Meridian, Thence Easterly along the Southerly line of Township 19S, to the Northwest corner of Township 20S, Range 6E, Thence Southerly to the Southwest corner of Township 20S, Range 6E, Thence Easterly to the Northwest corner of Township 21S, Range 7E Thence Southerly to the Southwest corner of Township 21S, Range 7E Thence Easterly to the Northwest corner of Township 22S, Range 9E, Thence Southerly to the Southwest corner of Township 22S, Range 9E, Thence Easterly to the Northwest corner of Township 23S, Range 10E, Thence Southerly to the Southwest corner of Township 24S, Range 10E, Thence Easterly to the Southwest corner of Township 24S, Range 31E, Thence Northerly to the Northeast corner of Township 20S, Range 31E Thence Westerly to the Southeast corner of Township 19S, Range 29E, Thence Northerly to the Northeast corner of Township 17S, Range 29E, Thence Westerly to the Southeast corner of Township 16S, Range 28E, Thence Northerly to the Northeast corner of Township 13S, Range 28E, Thence Westerly to the Southeast corner Township 12S, Range 27E, Thence Northerly to the Northeast corner of Township 12S, Range 27E, Thence Westerly to the Southeast corner of Township 11S, Range 26E, Thence Northerly to the Northeast corner of Township 11S, Range 26E, Thence Westerly to the Southeast corner of Township 10S, Range 25E, Thence Northerly to the Northeast corner of Township 9S, Range 25E, Thence Westerly to the Southeast corner of Township 8S, Range 24E, Thence Northerly to the Northeast corner of Township 8S, Range 24E, Thence Westerly to the Southeast corner of Township 7S, Range 23E, Thence Northerly to the Northeast corner of Township 6S, Range 23E, Thence Westerly to the Southeast corner of Township 5S, Range 20E, Thence Northerly to the Northeast corner of Township 5S, Range 20E, Thence Westerly to the Southeast corner of Township 4S, Range 19E, Thence Northerly to the Northeast corner of Township 1S, Range 19E, Thence Westerly to the Southeast corner of Township 1N, Range 18E, Thence Northerly to the Northeast corner of Township 3N, Range 18E, Thence Westerly to the Southeast corner of Township 4N, Range 17E, Thence Northerly to the Northeast corner of Township 4N, Range 17E, Thence Westerly to the Southeast corner of Township 5N, Range 15E, Thence Northerly to the Northeast corner of Township 5N, Range 15E, Thence Westerly to the Southeast corner of Township 6N, Range 14E, Thence Northerly to the Northeast corner of Township 10N, Range 14E, Thence Easterly along the Southern line of Township 11N, to the California / Nevada State Border, Thence Northerly along the California / Nevada State Border to the Northerly line of Township 17N, Thence Westerly to the Southeast corner of Township 18N, Range 10E, Thence Northerly to the Northeast corner of Township 20N, Range 10E, Thence Westerly to the Southeast corner of Township 21N, Range 9E, Thence Northerly to the Northeast corner of Township 21N, Range 9E, Thence Westerly to the Southeast corner of Township 22N, Range 8E, Thence Northerly to the Northeast corner of Township 22N, Range 8E, Thence Westerly to the Northwest corner of Township 22N, Range 8E, Thence Northerly to the Southwest corner of Township 27N, Range 8E, Thence Easterly to the Southeast corner of Township 27N, Range 8E, Thence Northerly to the Northeast corner of Township 28N, Range 8E, Thence Westerly to the Southeast corner of Township 29N, Range 6E, Thence Northerly to the Northeast corner of Township 32N, Range 6E, Thence Westerly to the Northwest corner of Township 32 N, Range 6E, Thence Northerly to the Northeast corner of Township 35N, Range 5E, Thence Westerly to the Southeast corner of Township 36N, Range 3E, Thence Northerly to the Northeast corner of township 36N, Range 3E, Thence Westerly to the Southeast corner of Township 37N, Range 1W, Thence Northerly to the Northeast corner of Township 38N, Range 1W, Thence Westerly to the Southeast corner of Township 39N, Range 2W, Thence Northerly to the Northeast corner of Township 40N, Range 2W, Thence Westerly to the Southeast corner of Township 41N, Range 4W, Thence Northerly to the Northeast corner of Township 42N, Range 4W, Thence Westerly to the Southeast corner of Township 43N, Range 5W, Thence Northerly to the California / Oregon State Border,

Thence Westerly along the California / Oregon State Border to the Westerly Boundary of Township Range 8W, Thence Southerly to the Southwest corner of Township 43N, Range 8W, Thence Easterly to the Southeast corner of Township 43N, Range 8W, Thence Southerly to the Southwest corner of Township 42N, Range 7W, Thence Easterly to the Southeast corner of Township 42N, Range 7W, Thence Southerly to the Southwest corner of Township 41N, Range 6W, Thence Easterly to the Northwest corner of Township 40N, Range 5W, Thence Southerly to the Southwest corner of Township 38N, Range 5W, Thence Westerly to the Northwest corner of Township 37N, Range 6W, Thence Southerly to the Southwest corner of Township 35N, Range 6W, Thence Westerly to the Northwest corner of Township 34N, Range 10W, Thence Southerly to the Southwest corner of Township 31N, Range 10W, Thence Easterly to the Northwest corner of Township 30N, Range 9W, Thence Southerly to the Southwest corner of Township 30N, Range 9W, Thence Easterly to the Northwest corner of Township 29N, Range 8W, Thence Southerly to the Southwest corner of Township 23N, Range 8W, Thence Easterly to the Northwest corner of Township 22N, Range 6W, Thence Southerly to the Southwest corner of Township 16N, Range 6W, Thence Westerly to the Southeast corner of Township 16N, Range 9W, Thence Northerly to the Northeast corner of Township 16N, Range 9W, Thence Westerly to the Southeast. corner of Township 17N, Range 12W, Thence Northerly to the Northeast corner of Township 18N, Range 12W, Thence Westerly to the Northwest corner of Township 18N, Range 15W, Thence Southerly to the Southwest corner of Township 14N, Range 15W, Thence Easterly to the Northwest corner of Township 13N, Range 14W, Thence Southerly to the Southwest corner of Township 13N, Range 14W, Thence Easterly to the Northwest corner of Township 12N, Range 13W, Thence Southerly to the Southwest corner of Township 12N, Range 13W, Thence Easterly to the Northwest corner of Township 11N, Range 12W, Thence Southerly into the Pacific Ocean and Commencing in the Pacific Ocean on the extension of the Humboldt Base Line, Thence Easterly to the Northwest corner of Township 1S, Range 2E, Thence Southerly to the Southwest corner of Township 2S, Range 2E, Thence Easterly to the Northwest corner of Township 3S, Range 3E, Thence Southerly to the Southwest corner of Township 5S, Range 3E, Thence Easterly to the Southeast corner of Township 5S, Range 4E, Thence Northerly to the Northeast corner of Township 4S, Range 4E, Thence Westerly to the Southeast corner of Township 3S, Range 3E, Thence Northerly to the Northeast corner of Township 5N, Range 3E, Thence Easterly to the Southeast corner of Township 6N, Range 5E, Thence Northerly to the Northeast corner of Township 7N, Range 5E, Thence Westerly to the Southeast corner of Township 8N, Range 3E, Thence Northerly to the Northeast corner of Township 9N, Range 3E, Thence Westerly to the Southeast corner of Township 10N, Range 1E, Thence Northerly to the Northeast corner of Township 13N, Range 1E, Thence Westerly into the Pacific Ocean, excluding that portion of Northern California contained within the following lines: Commencing at the Southwest corner of Township 12N, Range 11E, of the Mount Diablo Base and Meridian, Thence Easterly to the Southeast corner of Township 12N, Range 16E, Thence Northerly to the Northeast corner of Township 12N, Range 16E, Thence Westerly to the Southeast corner of Township 13N, Range 15E, Thence Northerly to the Northeast corner of Township 13N, Range 15E, Thence Westerly to the Southeast corner of Township 14N, Range 14E, Thence Northerly to the Northeast corner of Township 16N, Range 14E, Thence Westerly to the Northwest corner of Township 16N, Range 12E, Thence Southerly to the Southwest corner of Township 16N, Range 12E, Thence Westerly to the Northwest corner of Township 15N, Range 11E, Thence Southerly to the point of beginning at the Southwest corner of Township 12N, Range 11E,

Area 2 shall be all areas not part of Area 1 described above.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**CRAFT: # OPERATING ENGINEER (HEAVY AND HIGHWAY WORK)
(SPECIAL SINGLE AND SECOND SHIFT)**

DETERMINATION: NC-23-63-1-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journeyperson)	Employer Payments							Hours	Straight-Time		Overtime Hourly Rate			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^a	Training	Other Payments	Total Hourly Rate		Daily/ Saturday ^d 1 1/2X	Sunday and Holiday 2X				
Classification Group ^a	Area 1 ^b	Area 2 ^c							Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c
Group 1	\$56.75	\$58.75	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$88.38	\$90.38	\$116.76	\$119.76	\$145.13	\$149.13
Group 2	\$55.02	\$57.02	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.65	\$88.65	\$114.16	\$117.16	\$141.67	\$145.67
Group 3	\$53.36	\$55.36	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.99	\$86.99	\$111.67	\$114.67	\$138.35	\$142.35
Group 4	\$51.80	\$53.80	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.43	\$85.43	\$109.33	\$112.33	\$135.23	\$139.23
Group 5	\$50.38	\$52.38	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.01	\$84.01	\$107.20	\$110.20	\$132.39	\$136.39
Group 6	\$48.88	\$50.88	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.51	\$82.51	\$104.95	\$107.95	\$129.39	\$133.39
Group 7	\$47.60	\$49.60	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.23	\$81.23	\$103.03	\$106.03	\$126.83	\$130.83
Group 8	\$46.33	\$48.33	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.96	\$79.96	\$101.13	\$104.13	\$124.29	\$128.29
Group 8-A	\$43.82	\$45.82	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.45	\$77.45	\$97.36	\$100.36	\$119.27	\$123.27
ALL CRANES AND ATTACHMENTS:														
Group 1	\$58.48	\$60.48	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$90.11	\$92.11	\$119.35	\$122.35	\$148.59	\$152.59
Truck Crane Assistant to Engineer	\$50.65	\$52.65	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.28	\$84.28	\$107.61	\$110.61	\$132.93	\$136.93
Assistant to Engineer	\$48.06	\$50.06	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.69	\$81.69	\$103.72	\$106.72	\$127.75	\$131.75
Group 1-A	\$57.73	\$59.73	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$89.36	\$91.36	\$118.23	\$121.23	\$147.09	\$151.09
Truck Crane Assistant to Engineer	\$49.90	\$51.90	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.53	\$83.53	\$106.48	\$109.48	\$131.43	\$135.43
Assistant to Engineer	\$47.31	\$49.31	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.94	\$80.94	\$102.60	\$105.60	\$126.25	\$130.25
Group 2-A	\$55.74	\$57.74	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$87.37	\$89.37	\$115.24	\$118.24	\$143.11	\$147.11
Truck Crane Assistant to Engineer	\$49.61	\$51.61	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.24	\$83.24	\$106.05	\$109.05	\$130.85	\$134.85
Assistant to Engineer	\$47.08	\$49.08	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.71	\$80.71	\$102.25	\$105.25	\$125.79	\$129.79
Group 3-A	\$53.78	\$55.78	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$85.41	\$87.41	\$112.30	\$115.30	\$139.19	\$143.19
Truck Crane Assistant to Engineer	\$49.34	\$51.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.97	\$82.97	\$105.64	\$108.64	\$130.31	\$134.31
Hydraulic	\$48.88	\$50.88	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.51	\$82.51	\$104.95	\$107.95	\$129.39	\$133.39
Assistant to Engineer	\$46.77	\$48.77	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.40	\$80.40	\$101.79	\$104.79	\$125.17	\$129.17
Group 4-A	\$50.38	\$52.38	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.01	\$84.01	\$107.20	\$110.20	\$132.39	\$136.39

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see pages 39B-40.

^b **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

^e Includes an amount for supplemental dues.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # OPERATING ENGINEER (BUILDING CONSTRUCTION)^g

DETERMINATION: NC-23-63-1-2020-2A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments							Straight-Time		Overtime Hourly Rate			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^e	Training	Other Payments	Hours ^f	Total Hourly Rate		Daily/ Saturday ^d 1 1/2X	Sunday and Holiday 2X		
Classification Group ^a	Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c
Group 1	\$50.00	\$52.00	\$13.88	\$10.78	\$4.77	\$1.07	8	\$81.63	\$83.63	\$106.63	\$109.63	\$131.63	\$135.63
Group 2	\$48.55	\$50.55	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.18	\$82.18	\$104.46	\$107.46	\$128.73	\$132.73
Group 3	\$47.15	\$49.15	\$13.88	\$10.78	\$4.77	\$1.07	8	\$78.78	\$80.78	\$102.36	\$105.36	\$125.93	\$129.93
Group 4	\$45.82	\$47.82	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.45	\$79.45	\$100.36	\$103.36	\$123.27	\$127.27
Group 5	\$44.61	\$46.61	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.24	\$78.24	\$98.55	\$101.55	\$120.85	\$124.85
Group 6	\$43.34	\$45.34	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.97	\$76.97	\$96.64	\$99.64	\$118.31	\$122.31
Group 7	\$42.25	\$44.25	\$13.88	\$10.78	\$4.77	\$1.07	8	\$73.88	\$75.88	\$95.01	\$98.01	\$116.13	\$120.13
Group 8	\$41.17	\$43.17	\$13.88	\$10.78	\$4.77	\$1.07	8	\$72.80	\$74.80	\$93.39	\$96.39	\$113.97	\$117.97
Group 8-A	\$39.05	\$41.05	\$13.88	\$10.78	\$4.77	\$1.07	8	\$70.68	\$72.68	\$90.21	\$93.21	\$109.73	\$113.73
ALL CRANES AND ATTACHMENTS:													
Group 1	\$51.60	\$53.60	\$13.88	\$10.78	\$4.77	\$1.07	8	\$83.23	\$85.23	\$109.03	\$112.03	\$134.83	\$138.83
Truck Crane Assistant to Engineer	\$44.94	\$46.94	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.57	\$78.57	\$99.04	\$102.04	\$121.51	\$125.51
Assistant to Engineer	\$42.77	\$44.77	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.40	\$76.40	\$95.79	\$98.79	\$117.17	\$121.17
Group 1-A	\$50.85	\$52.85	\$13.88	\$10.78	\$4.77	\$1.07	8	\$82.48	\$84.48	\$107.91	\$110.91	\$133.33	\$137.33
Truck Crane Assistant to Engineer	\$44.19	\$46.19	\$13.88	\$10.78	\$4.77	\$1.07	8	\$75.82	\$77.82	\$97.92	\$100.92	\$120.01	\$124.01
Assistant to Engineer	\$42.02	\$44.02	\$13.88	\$10.78	\$4.77	\$1.07	8	\$73.65	\$75.65	\$94.66	\$97.66	\$115.67	\$119.67
Group 2-A	\$49.16	\$51.16	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.79	\$82.79	\$105.37	\$108.37	\$129.95	\$133.95
Truck Crane Assistant to Engineer	\$43.95	\$45.95	\$13.88	\$10.78	\$4.77	\$1.07	8	\$75.58	\$77.58	\$97.56	\$100.56	\$119.53	\$123.53
Assistant to Engineer	\$41.80	\$43.80	\$13.88	\$10.78	\$4.77	\$1.07	8	\$73.43	\$75.43	\$94.33	\$97.33	\$115.23	\$119.23
Group 3-A	\$47.52	\$49.52	\$13.88	\$10.78	\$4.77	\$1.07	8	\$79.15	\$81.15	\$102.91	\$105.91	\$126.67	\$130.67
Truck Crane Assistant to Engineer	\$43.71	\$45.71	\$13.88	\$10.78	\$4.77	\$1.07	8	\$75.34	\$77.34	\$97.20	\$100.20	\$119.05	\$123.05
Hydraulic	\$43.34	\$45.34	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.97	\$76.97	\$96.64	\$99.64	\$118.31	\$122.31
Assistant to Engineer	\$41.55	\$43.55	\$13.88	\$10.78	\$4.77	\$1.07	8	\$73.18	\$75.18	\$93.96	\$96.96	\$114.73	\$118.73
Group 4-A	\$44.61	\$46.61	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.24	\$78.24	\$98.55	\$101.55	\$120.85	\$124.85

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see pages 39B-40.

^b **AREA 1** - Butte, Kings, Merced, Napa, Sacramento, San Benito, San Joaquin, Santa Cruz, Stanislaus, Sutter, Yolo, and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tuolumne and Trinity counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

^e Includes an amount for supplemental dues.

^f When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

^g For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above. Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

NOTE: For Special Single and Second Shift rates, please see page 40C.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # OPERATING ENGINEER (BUILDING CONSTRUCTION)^f
(SPECIAL SINGLE AND SECOND SHIFT)

DETERMINATION: NC-23-63-1-2020-2A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments							Straight-Time		Overtime Hourly Rate			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^e	Training	Other Payments	Hours	Total Hourly Rate		Daily/ Saturday ^d 1 1/2X		Sunday and Holiday 2X	
Classification Group ^a	Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c
Group 1	\$55.15	\$57.15	\$13.88	\$10.78	\$4.77	\$1.07	8	\$86.78	\$88.78	\$114.36	\$117.36	\$141.93	\$145.93
Group 2	\$53.51	\$55.51	\$13.88	\$10.78	\$4.77	\$1.07	8	\$85.14	\$87.14	\$111.90	\$114.90	\$138.65	\$142.65
Group 3	\$51.95	\$53.95	\$13.88	\$10.78	\$4.77	\$1.07	8	\$83.58	\$85.58	\$109.56	\$112.56	\$135.53	\$139.53
Group 4	\$50.43	\$52.43	\$13.88	\$10.78	\$4.77	\$1.07	8	\$82.06	\$84.06	\$107.28	\$110.28	\$132.49	\$136.49
Group 5	\$49.08	\$51.08	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.71	\$82.71	\$105.25	\$108.25	\$129.79	\$133.79
Group 6	\$47.64	\$49.64	\$13.88	\$10.78	\$4.77	\$1.07	8	\$79.27	\$81.27	\$103.09	\$106.09	\$126.91	\$130.91
Group 7	\$46.43	\$48.43	\$13.88	\$10.78	\$4.77	\$1.07	8	\$78.06	\$80.06	\$101.28	\$104.28	\$124.49	\$128.49
Group 8	\$45.22	\$47.22	\$13.88	\$10.78	\$4.77	\$1.07	8	\$76.85	\$78.85	\$99.46	\$102.46	\$122.07	\$126.07
Group 8-A	\$42.83	\$44.83	\$13.88	\$10.78	\$4.77	\$1.07	8	\$74.46	\$76.46	\$95.88	\$98.88	\$117.29	\$121.29

ALL CRANES AND ATTACHMENTS:

Group 1	\$56.86	\$58.86	\$13.88	\$10.78	\$4.77	\$1.07	8	\$88.49	\$90.49	\$116.92	\$119.92	\$145.35	\$149.35
Truck Crane Assistant to Engineer	\$49.37	\$51.37	\$13.88	\$10.78	\$4.77	\$1.07	8	\$81.00	\$83.00	\$105.69	\$108.69	\$130.37	\$134.37
Assistant to Engineer	\$46.91	\$48.91	\$13.88	\$10.78	\$4.77	\$1.07	8	\$78.54	\$80.54	\$102.00	\$105.00	\$125.45	\$129.45
Group 1-A	\$56.11	\$58.11	\$13.88	\$10.78	\$4.77	\$1.07	8	\$87.74	\$89.74	\$115.80	\$118.80	\$143.85	\$147.85
Truck Crane Assistant to Engineer	\$48.62	\$50.62	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.25	\$82.25	\$104.56	\$107.56	\$128.87	\$132.87
Assistant to Engineer	\$46.16	\$48.16	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.79	\$79.79	\$100.87	\$103.87	\$123.95	\$127.95
Group 2-A	\$54.20	\$56.20	\$13.88	\$10.78	\$4.77	\$1.07	8	\$85.83	\$87.83	\$112.93	\$115.93	\$140.03	\$144.03
Truck Crane Assistant to Engineer	\$48.35	\$50.35	\$13.88	\$10.78	\$4.77	\$1.07	8	\$79.98	\$81.98	\$104.16	\$107.16	\$128.33	\$132.33
Assistant to Engineer	\$45.92	\$47.92	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.55	\$79.55	\$100.51	\$103.51	\$123.47	\$127.47
Group 3-A	\$52.34	\$54.34	\$13.88	\$10.78	\$4.77	\$1.07	8	\$83.97	\$85.97	\$110.14	\$113.14	\$136.31	\$140.31
Truck Crane Assistant to Engineer	\$48.08	\$50.08	\$13.88	\$10.78	\$4.77	\$1.07	8	\$79.71	\$81.71	\$103.75	\$106.75	\$127.79	\$131.79
Hydraulic	\$47.64	\$49.64	\$13.88	\$10.78	\$4.77	\$1.07	8	\$79.27	\$81.27	\$103.09	\$106.09	\$126.91	\$130.91
Assistant to Engineer	\$45.64	\$47.64	\$13.88	\$10.78	\$4.77	\$1.07	8	\$77.27	\$79.27	\$100.09	\$103.09	\$122.91	\$126.91
Group 4-A	\$49.08	\$51.08	\$13.88	\$10.78	\$4.77	\$1.07	8	\$80.71	\$82.71	\$105.25	\$108.25	\$129.79	\$133.79

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see pages 39B-40.

^b **AREA 1** - Butte, Kings, Merced, Napa, Sacramento, San Benito, San Joaquin, Santa Cruz, Stanislaus, Sutter, Yolo, and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

^e Includes an amount for supplemental dues.

^f For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above.

Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #STEEL ERECTOR AND FABRICATOR (OPERATING ENGINEER-BUILDING CONSTRUCTION)^e

DETERMINATION: NC-23-63-1-2020-2D1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification ^b (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments	Hours ^d	Total Hourly Rate	Daily 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$52.54	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.17	\$110.44	\$110.44	\$136.71
Truck Crane Assistant to Engineer	\$45.55	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.18	\$99.96	\$99.96	\$122.73
Assistant to Engineer	\$43.41	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.04	\$96.75	\$96.75	\$118.45
Group 1	\$51.79	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.42	\$109.32	\$109.32	\$135.21
Truck Crane Assistant to Engineer	\$44.80	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.43	\$98.83	\$98.83	\$121.23
Assistant to Engineer	\$42.66	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.29	\$95.62	\$95.62	\$116.95
Group 2	\$50.08	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.71	\$106.75	\$106.75	\$131.79
Truck Crane Assistant to Engineer	\$44.58	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.21	\$98.50	\$98.50	\$120.79
Assistant to Engineer	\$42.41	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.04	\$95.25	\$95.25	\$116.45
Group 3	\$48.69	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.32	\$104.67	\$104.67	\$129.01
Truck Crane Assistant to Engineer	\$44.33	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.96	\$98.13	\$98.13	\$120.29
Hydraulic	\$43.95	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.58	\$97.56	\$97.56	\$119.53
Assistant to Engineer	\$42.18	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$73.81	\$94.90	\$94.90	\$115.99
Group 4	\$46.76	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.39	\$101.77	\$101.77	\$125.15
Group 5	\$45.51	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.14	\$99.90	\$99.90	\$122.65

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b For classifications within each group, see page 45.

^c Includes an amount for supplemental dues.

^d When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

^e For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above. Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

NOTE: For Special Single and Second Shift rates, please see page 40D.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**CRAFT: #STEEL ERECTOR AND FABRICATOR (OPERATING ENGINEER-BUILDING CONSTRUCTION)^d
(SPECIAL SINGLE AND SECOND SHIFT)**

DETERMINATION: NC-23-63-1-2020-2D1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification ^b (Journeyman)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$57.91	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$89.54	\$118.50	\$118.50	\$147.45
Truck Crane Assistant to Engineer	\$50.05	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.68	\$106.71	\$106.71	\$131.73
Assistant to Engineer	\$47.63	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.26	\$103.08	\$103.08	\$126.89
Group 1	\$57.16	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$88.79	\$117.37	\$117.37	\$145.95
Truck Crane Assistant to Engineer	\$49.30	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.93	\$105.58	\$105.58	\$130.23
Assistant to Engineer	\$46.88	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.51	\$101.95	\$101.95	\$125.39
Group 2	\$55.24	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.87	\$114.49	\$114.49	\$142.11
Truck Crane Assistant to Engineer	\$49.04	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.67	\$105.19	\$105.19	\$129.71
Assistant to Engineer	\$46.61	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.24	\$101.55	\$101.55	\$124.85
Group 3	\$53.66	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$85.29	\$112.12	\$112.12	\$138.95
Truck Crane Assistant to Engineer	\$48.76	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.39	\$104.77	\$104.77	\$129.15
Hydraulic	\$48.35	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.98	\$104.16	\$104.16	\$128.33
Assistant to Engineer	\$46.33	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.96	\$101.13	\$101.13	\$124.29
Group 4	\$51.51	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.14	\$108.90	\$108.90	\$134.65
Group 5	\$50.09	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.72	\$106.77	\$106.77	\$131.81

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b For classifications within each group, see page 45.

^c Includes an amount for supplemental dues.

^d For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above. Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR LANDSCAPE CONSTRUCTION PROJECTS

CRAFT: # OPERATING ENGINEER

DETERMINATION: NC-63-3-75-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate	Employer Payments						Straight-Time		Overtime Hourly Rate					
		Health and Welfare	Pension and Holiday ^d	Vacation	Training	Other Payments	Hours	Total Hourly Rate		Daily 1 1/2X	Saturday ^e 1 1/2X	Sunday and Holiday 2X			
Classification Group ^a															
	Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c
Group I	\$40.02	42.02	13.88	10.35	4.34	1.11	1.03	8	70.73	72.73	90.74	93.74	90.74	93.74	110.75
Group II	36.42	38.42	13.88	10.35	4.34	1.11	1.03	8	67.13	69.13	85.34	88.34	85.34	88.34	103.55
Group III	31.81	33.81	13.88	10.35	4.34	1.11	1.03	8	62.52	64.52	78.425	81.425	78.425	81.425	94.33
Group IV	29.10	31.10	13.88	10.35	4.34	1.11	1.03	8	59.81	61.81	74.36	77.36	74.36	77.36	88.91

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see below.

^b **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba Counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed on page 41).

^d Includes an amount for Supplemental Dues.

^e Saturdays in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather, major mechanical breakdown or shortage of materials beyond the control of the Individual Employer.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

CLASSIFICATIONS

Group I

Landscape Finish Grade Operator. All finish grade work regardless of the equipment used, and all equipment with a horsepower rating of more than 65.

Group II

Landscape Operator up to 65 H.P. All equipment with a manufacturer's horsepower rating of 65 or less except equipment covered by Group I or Group III. The following equipment shall be included in Group II except when used for finish work so long as its manufacturer's horsepower rating is 65 or less.

A-Frame and Winch Truck
Backhoe
Forklift (Jobsite)

HDR Welder - Landscape - Operating Engineer's Equipment
Hydro Seeder Machine
Roller
Rubber-Tired and Track Earthmoving Equipment
Skiploader
Straw Blowers
Trencher - 35 Horsepower up to 65 Horsepower

Group III

Landscape Utility Operator
Small Rubber-Tired Tractor
Trencher - Under 35 Horsepower

Group IV

Assistant Landscape Utility Operator

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR LANDSCAPE CONSTRUCTION PROJECTS

CRAFT: # OPERATING ENGINEER (SPECIAL SINGLE AND SECOND SHIFT)

DETERMINATION: NC-63-3-75-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate	Employer Payments				Straight-Time		Overtime Hourly Rate					
		Health and Welfare	Pension and Holiday ^d	Vacation	Training	Other Payments	Hours Total Hourly Rate	Daily 1 1/2X	Saturday ^e 1 1/2X	Sunday & Holiday 2X			
Classification Group ^a	Area 1 ^b Area 2 ^c						Area 1 ^b Area 2 ^c	Area 1 Area 2 ^c	Area 1 ^b Area 2 ^c	Area 1 ^b Area 2 ^c			
Group I	\$44.43 46.43	13.88	10.35	4.34	1.11	1.03	8 75.14 77.14	97.355 100.355	97.355 100.355	119.57 123.57			
Group II	40.38 42.38	13.88	10.35	4.34	1.11	1.03	8 71.09 73.09	91.28 94.28	91.28 94.28	111.47 115.47			
Group III	35.19 37.19	13.88	10.35	4.34	1.11	1.03	8 65.90 67.90	83.495 86.495	83.495 86.495	101.09 105.09			
Group IV	32.29 34.29	13.88	10.35	4.34	1.11	1.03	8 63.00 65.00	79.145 82.145	79.145 82.145	95.29 99.29			

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see below.

^b **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba Counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed on page 41).

^d Includes an amount for Supplemental Dues.

^e Saturdays in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather, major mechanical breakdown or shortage of materials beyond the control of the Individual Employer.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

CLASSIFICATIONS

Group I

Landscape Finish Grade Operator. All finish grade work regardless of the equipment used, and all equipment with a horsepower rating of more than 65.

Group II

Landscape Operator up to 65 H.P. All equipment with a manufacturer's horsepower rating of 65 or less except equipment covered by Group I or Group III. The following equipment shall be included in Group II except when used for finish work so long as its manufacturer's horsepower rating is 65 or less.

A-Frame and Winch Truck
Backhoe
Forklift (Jobsite)

HDR Welder - Landscape - Operating Engineer's Equipment
Hydro Seeder Machine
Roller
Rubber-Tired and Track Earthmoving Equipment
Skiploader
Straw Blowers
Trencher - 35 Horsepower up to 65 Horsepower

Group III

Landscape Utility Operator
Small Rubber-Tired Tractor
Trencher - Under 35 Horsepower

Group IV

Assistant Landscape Utility Operator

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # DREDGER OPERATING ENGINEER

(CLAMSHELL AND DIPPER DREDGING AND HYDRAULIC SUCTION DREDGING)

DETERMINATION: NC-63-3-12-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: July 31, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

		Employer Payments						Straight-Time			Overtime Hourly Rate					
Classification (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension ^e	Vacation and Holiday ^d	Training	Other Payments	Hours	Total Hourly Rate	Daily ^g 1 1/2X	Saturday ^{fg} 1 1/2X	Sunday and Holiday 2X					
Classification Group ^a																
First Shift	Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	
Group 1	\$49.88	51.88	13.88	15.23	6.06	0.49	0.33	8	85.87	87.87	110.81	113.81	110.81	113.81	135.75	139.75
Group 2	44.92	46.92	13.88	15.23	6.06	0.49	0.33	8	80.91	82.91	103.37	106.37	103.07	106.37	125.83	129.83
Group 3	43.80	45.80	13.88	15.23	6.06	0.49	0.33	8	79.79	81.79	101.69	104.69	101.69	104.69	123.59	127.59
Group 4	40.50	42.50	13.88	15.23	6.06	0.49	0.33	8	76.49	78.49	96.74	99.74	96.74	99.74	116.99	120.99
Special Single & Second Shift																
Area 1 ^b	Area 2 ^c						Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c	Area 1 ^b	Area 2 ^c		
Group 1	\$56.12	58.12	13.88	15.23	6.06	0.49	0.33	8	92.11	94.11	120.17	123.17	120.17	123.17	148.23	152.23
Group 2	50.54	52.24	13.88	15.23	6.06	0.49	0.33	8	86.53	88.53	111.80	114.80	111.80	114.80	137.07	141.07
Group 3	49.28	51.28	13.88	15.23	6.06	0.49	0.33	8	85.27	87.27	109.91	112.91	109.91	112.91	134.55	138.55
Group 4	45.56	47.56	13.88	15.23	6.06	0.49	0.33	8	81.55	83.55	104.33	107.33	104.33	107.33	127.11	131.11

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a For classifications within each group, see below.

^b **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, and Tuolumne counties.

^c **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, and Tuolumne counties (Portions of counties falling in each area detailed on page 41).

^d Includes an amount for Supplemental Dues.

^e Includes an amount for Annuity Trust Fund.

^f Saturday in the same workweek may be worked at straight-time if a job is shut down during the normal workweek due to inclement weather.

^g Rate applies to the first 4 daily overtime hours Monday thru Friday and the first 12 hours on Saturday. All other time worked is paid at the Sunday and Holiday overtime rate.

GROUP 1

Chief Engineer
Day Mate (Captain)
Leverman/Operator

GROUP 2

Dredge Dozer
HDR/Welder

GROUP 3

Booster Pump Operator
Deck Engineer
Deck Mate
Dredge Tender
Watch Engineer
Welder
Winch Man

GROUP 4

Bargeman
Deckhand
Fireman
Leveehand
Oiler

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TRAFFIC CONTROL/LANE CLOSURE (LABORER) ^h
AND
PARKING AND HIGHWAY IMPROVEMENT PAINTER (LABORER)

DETERMINATION: NC-23-102-13-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare ^e	Pension ^a	Vacation and Holiday ^b	Training	Other Payments	Hours	Total Hourly Rate	Daily ^f 1 1/2X	Saturday ^{c,f} 1 1/2X	Sunday And Holiday ^g

TRAFFIC CONTROL AND RELATED CLASSIFICATIONS

AREA 1 ^d

Traffic Control Person I	33.24	9.00	12.96	3.05	0.50	0.28	8	59.03	75.650	75.650	92.27
Traffic Control Person II	30.74	9.00	12.96	3.05	0.50	0.28	8	56.53	71.900	71.900	87.27
Construction Zone Traffic Control Pilot Car, Flag Person	32.94	9.00	12.96	3.05	0.50	0.28	8	58.73	75.200	75.200	91.67

AREA 2 ^d

Traffic Control Person I	32.24	9.00	12.96	3.05	0.50	0.28	8	58.03	74.150	74.150	90.27
Traffic Control Person II	29.74	9.00	12.96	3.05	0.50	0.28	8	55.53	70.400	70.400	85.27
Construction Zone Traffic Control Pilot Car, Flag Person	31.94	9.00	12.96	3.05	0.50	0.28	8	57.73	73.700	73.700	89.67

DETERMINATION: NC-23-102-13-2020-2A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, and Yuba Counties.

STRIPER AND RELATED CLASSIFICATIONS

Classification (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health ^e and Welfare	Pension ^a	Vacation and Holiday ^b	Training	Other Payments	Hours	Total Hourly Rate	Daily ^f 1 1/2X	Saturday ^{c,f} 1 1/2X	Sunday and Holiday ^g
Group 1	36.13	9.00	12.35	3.05	0.50	0.25	8	61.28	79.345	79.345	97.41
Group 2	34.63	9.00	12.35	3.05	0.50	0.25	8	59.78	77.095	77.095	94.41
Group 3	32.88	9.00	12.35	3.05	0.50	0.25	8	58.03	74.470	74.470	90.91
Group 4	30.78	9.00	12.35	3.05	0.50	0.25	8	55.93	71.320	71.320	86.71

Group 1

Traffic Striping Applicator

Group 2

Traffic Delineating Device Applicator
Traffic Protective System Installer
Pavement Markings Applicator
Decorative Asphalt Surfacing Applicator

Group 3

Traffic Surface Abrasive Blaster
Pot Tender

Group 4

Parking Lots, Game Courts & Playground
Striping Applicator
Decorative Asphalt Surfacing Laborer

Footnotes are listed on page 44A

Determination: NC-23-102-13-2020-2 and NC-23-102-13-2020-2A

- # Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.
- a Includes an amount for the Annuity Trust Fund.
- b Includes an amount for Supplemental Dues.
- c Saturdays or scheduled sixth (6th) consecutive work day in the same work week may be worked at straight-time if the job is shut down during the normal work week due to inclement weather, major mechanical breakdown or lack of materials beyond the control of the employer.
- d **AREA 1** - Alameda, Contra Costa, Marin, San Francisco, San Mateo and Santa Clara Counties.
AREA 2 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba Counties.
- e Includes an amount for Retiree Health & Welfare
- f One and one-half (1-1/2) the straight time hourly rate of pay shall be paid for all work performed in excess of forty hours (40) a week or eight hours (8) a day and the sixth (6th) consecutive day worked or Saturdays.
- g Two times (2x) the straight time hourly rate of pay shall be paid for all work performed on the seventh (7th) consecutive day worked, or Sundays and holidays.
- h The rates of the Laborer classifications for the craft of Traffic Control/Lane Closure (Laborer) do not apply to traffic control work associated with parking and highway improvement projects in San Joaquin, Tuolumne, and Yolo Counties. For traffic control work associated with parking and highway improvement projects in these three counties, the minimum rate of pay is that of the Painter classifications for the craft of Parking and Highway Improvement Painter (Painter).

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #STEEL ERECTOR AND FABRICATOR (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)^c

DETERMINATION: NC-23-63-1-2020-2D

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^d	Training	Other Payments	Hours ^e	Total Hourly Rate	Daily ^b 1 1/2X	Saturday ^{a&b} 1 1/2X	Sunday and Holiday 2X
Group A-1	\$54.02	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$85.65	\$112.66	\$112.66	\$139.67
Truck Crane Assistant to Engineer	\$46.70	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.33	\$101.68	\$101.68	\$125.03
Assistant to Engineer	\$44.47	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.10	\$98.34	\$98.34	\$120.57
Group 1	\$53.27	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.90	\$111.54	\$111.54	\$138.17
Truck Crane Assistant to Engineer	\$45.95	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.58	\$100.56	\$100.56	\$123.53
Assistant to Engineer	\$43.72	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.35	\$97.21	\$97.21	\$119.07
Group 2	\$51.50	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.13	\$108.88	\$108.88	\$134.63
Truck Crane Assistant to Engineer	\$45.73	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.36	\$100.23	\$100.23	\$123.09
Assistant to Engineer	\$43.45	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.08	\$96.81	\$96.81	\$118.53
Group 3	\$50.02	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.65	\$106.66	\$106.66	\$131.67
Truck Crane Assistant to Engineer	\$45.46	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.09	\$99.82	\$99.82	\$122.55
Hydraulic	\$45.07	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.70	\$99.24	\$99.24	\$121.77
Assistant to Engineer	\$43.23	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.86	\$96.48	\$96.48	\$118.09
Group 4	\$48.00	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.63	\$103.63	\$103.63	\$127.63
Group 5	\$46.70	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.33	\$101.68	\$101.68	\$125.03

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only. All other time is paid at the Sunday/Holiday overtime rate.

^c For Building Construction, see page 40B

^d Includes an amount for supplemental dues.

^e When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

GROUP A-1

Cranes over 350 Tons
Derrick over 250 Tons
Self Propelled Boom Type Lifting Devices over 250 Tons

GROUP 1

Cranes over 100 tons
Derrick over 100 tons
Self Propelled Boom Type Lifting Device over 100 tons
Tower Crane

GROUP 2

Cranes over 45 tons up to and including 100 tons
Derrick, 100 tons and under
Self Propelled Boom Type Lifting Device, over 45 tons

GROUP 3

Cranes, 45 tons and under
Self Propelled Boom Type Lifting Device, 45 tons and under

GROUP 4

Chicago Boom
Forklift, 10 tons and over
Heavy Duty Repairman/Welder

GROUP 5

Boom Cat

NOTE: For Special Single and Second Shift rates, please see page 45A.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #STEEL ERECTOR AND FABRICATOR (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)^c
(SPECIAL SINGLE AND SECOND SHIFT)

DETERMINATION: NC-23-63-1-2020-2D

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^d	Training	Other Payments	Hours	Total Hourly Rate	Daily ^b 1 1/2X	Saturday ^{a&b} 1 1/2X	Sunday and Holiday 2X
Group A-1	\$59.57	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$91.20	\$120.99	\$120.99	\$150.77
Truck Crane Assistant to Engineer	\$51.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.97	\$108.64	\$108.64	\$134.31
Assistant to Engineer	\$48.82	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.45	\$104.86	\$104.86	\$129.27
Group 1	\$58.82	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$90.45	\$119.86	\$119.86	\$149.27
Truck Crane Assistant to Engineer	\$50.59	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.22	\$107.52	\$107.52	\$132.81
Assistant to Engineer	\$48.07	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.70	\$103.74	\$103.74	\$127.77
Group 2	\$56.84	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$88.47	\$116.89	\$116.89	\$145.31
Truck Crane Assistant to Engineer	\$50.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.97	\$107.14	\$107.14	\$132.31
Assistant to Engineer	\$47.79	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.42	\$103.32	\$103.32	\$127.21
Group 3	\$55.16	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.79	\$114.37	\$114.37	\$141.95
Truck Crane Assistant to Engineer	\$50.04	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.67	\$106.69	\$106.69	\$131.71
Hydraulic	\$49.61	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.24	\$106.05	\$106.05	\$130.85
Assistant to Engineer	\$47.53	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.16	\$102.93	\$102.93	\$126.69
Group 4	\$52.90	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.53	\$110.98	\$110.98	\$137.43
Group 5	\$51.43	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.06	\$108.78	\$108.78	\$134.49

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b Rate applies to the first 2 daily overtime hours and the first 8 hours on Saturday only. All other time is paid at the Sunday/Holiday overtime rate.

^c For Building Construction, see page 40B

^d Includes an amount for supplemental dues.

GROUP A-1

Cranes over 350 Tons
Derrick over 250 Tons
Self Propelled Boom Type Lifting Devices over 250 Tons

GROUP 1

Cranes over 100 tons
Derrick over 100 tons
Self Propelled Boom Type Lifting Device over 100 tons
Tower Crane

GROUP 2

Cranes over 45 tons up to and including 100 tons
Derrick, 100 tons and under
Self Propelled Boom Type Lifting Device, over 45 tons

GROUP 3

Cranes, 45 tons and under
Self Propelled Boom Type Lifting Device, 45 tons and under

GROUP 4

Chicago Boom
Forklift, 10 tons and over
Heavy Duty Repairman/Welder

GROUP 5

Boom Cat

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #PILE DRIVER (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)

DETERMINATION: NC-23-63-1-2020-2B

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^b	Training	Other Payments	Hours ^d	Total Hourly Rate	Daily ^c 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$53.39	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$85.02	\$111.72	\$111.72	\$138.41
Truck Crane Assistant to Engineer	\$46.41	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.04	\$101.25	\$101.25	\$124.45
Assistant to Engineer	\$44.13	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.76	\$97.83	\$97.83	\$119.89
Group 1	\$52.64	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.27	\$110.59	\$110.59	\$136.91
Truck Crane Assistant to Engineer	\$45.66	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.29	\$100.12	\$100.12	\$122.95
Assistant to Engineer	\$43.38	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.01	\$96.70	\$96.70	\$118.39
Group 2	\$50.82	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.45	\$107.86	\$107.86	\$133.27
Truck Crane Assistant to Engineer	\$45.41	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.04	\$99.75	\$99.75	\$122.45
Assistant to Engineer	\$43.11	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.74	\$96.30	\$96.30	\$117.85
Group 3	\$49.14	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.77	\$105.34	\$105.34	\$129.91
Truck Crane Assistant to Engineer	\$45.12	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.75	\$99.31	\$99.31	\$121.87
Assistant to Engineer	\$42.89	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.52	\$95.97	\$95.97	\$117.41
Group 4	\$47.37	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.00	\$102.69	\$102.69	\$126.37
Group 6	\$44.73	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.36	\$98.73	\$98.73	\$121.09
Group 8	\$42.50	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.13	\$95.38	\$95.38	\$116.63

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b Includes an amount for supplemental dues.

^c Rate applies to the first 2 daily overtime hours only. All other time is paid at the double time rate.

^d When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

GROUP A-1

Cranes over 350 Tons
Derrick over 250 Tons
Self Propelled Boom Type Lifting Devices over 250 Tons

GROUP 1

Clamshells Over 7 Cu Yds
Derrick Barge Pedestal Mounted Over 100 Tons
Self Propelled Boom Type Lifting Device Over 100 Tons
Truck Crane Or Crawler, Land Or Barge Mounted Over 100 Tons

GROUP 2

Clamshells Up To And Including 7 Cu Yds
Derrick Barge Pedestal Mounted 45 Tons Up To And Including 100 Tons
Fundex F-12 Hydraulic Pile Rig
Self Propelled Boom Type Lifting Device Over 45 Tons
Truck Crane Or Crawler, Land Or Barge Mounted, Over 45 Tons
Up To And Including 100 Tons

GROUP 3

Derrick Barge Pedestal Mounted Under 45 Tons
Self Propelled Boom Type Lifting Device 45 Tons And Under
Shid/Scow Piledriver, Any Tonnage
Truck Crane Or Crawler, Land Or Barge Mounted 45 Tons And Under

GROUP 4

Assistant Operator
Forklift, 10 Tons And Over
Heavy Duty Repairman/Welder

GROUP 6

Deck Engineer

GROUP 8

Deckhand
Fireman

NOTE: For Special Single and Second Shift rates, please see page 47B.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**CRAFT: #PILE DRIVER (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)
(SPECIAL SINGLE AND SECOND SHIFT)**

DETERMINATION: NC-23-63-1-2020-2B

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^b	Training	Other Payments	Hours	Total Hourly Rate	Daily ^c 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$58.86	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$90.49	\$119.92	\$119.92	\$149.35
Truck Crane Assistant to Engineer	\$51.01	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.64	\$108.15	\$108.15	\$133.65
Assistant to Engineer	\$48.44	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.07	\$104.29	\$104.29	\$128.51
Group 1	\$58.11	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$89.74	\$118.80	\$118.80	\$147.85
Truck Crane Assistant to Engineer	\$50.26	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.89	\$107.02	\$107.02	\$132.15
Assistant to Engineer	\$47.69	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.32	\$103.17	\$103.17	\$127.01
Group 2	\$56.06	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$87.69	\$115.72	\$115.72	\$143.75
Truck Crane Assistant to Engineer	\$49.99	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.62	\$106.62	\$106.62	\$131.61
Assistant to Engineer	\$47.39	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.02	\$102.72	\$102.72	\$126.41
Group 3	\$54.18	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$85.81	\$112.90	\$112.90	\$139.99
Truck Crane Assistant to Engineer	\$49.66	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.29	\$106.12	\$106.12	\$130.95
Assistant to Engineer	\$47.15	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.78	\$102.36	\$102.36	\$125.93
Group 4	\$52.18	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.81	\$109.90	\$109.90	\$135.99
Group 6	\$49.21	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.84	\$105.45	\$105.45	\$130.05
Group 8	\$46.71	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.34	\$101.70	\$101.70	\$125.05

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b Includes an amount for supplemental dues.

^c Rate applies to the first 2 daily overtime hours only. All other time is paid at the double time rate.

GROUP A-1

Cranes over 350 Tons
Derrick over 250 Tons
Self Propelled Boom Type Lifting Devices over 250 Tons

GROUP 1

Clamshells Over 7 Cu Yds
Derrick Barge Pedestal Mounted Over 100 Tons
Self Propelled Boom Type Lifting Device Over 100 Tons
Truck Crane Or Crawler, Land Or Barge Mounted Over 100 Tons

GROUP 2

Clamshells Up To And Including 7 Cu Yds
Derrick Barge Pedestal Mounted 45 Tons Up To And Including 100 Tons
Fundex F-12 Hydraulic Pile Rig
Self Propelled Boom Type Lifting Device Over 45 Tons
Truck Crane Or Crawler, Land Or Barge Mounted, Over 45 Tons
Up To And Including 100 Tons

GROUP 3

Derrick Barge Pedestal Mounted Under 45 Tons
Self Propelled Boom Type Lifting Device 45 Tons And Under
Shid/Scow Piledriver, Any Tonnage
Truck Crane Or Crawler, Land Or Barge Mounted 45 Tons And Under

GROUP 4

Assistant Operator
Forklift, 10 Tons And Over
Heavy Duty Repairman/Welder

GROUP 6

Deck Engineer

GROUP 8

Deckhand
Fireman

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #PILE DRIVER (OPERATING ENGINEER-BUILDING CONSTRUCTION)^a

DETERMINATION: NC-23-63-1-2020-2B1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification ^b (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments	Hours ^d	Total Hourly Rate	Daily 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$51.91	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.54	\$109.50	\$109.50	\$135.45
Truck Crane Assistant to Engineer	\$45.26	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.89	\$99.52	\$99.52	\$122.15
Assistant to Engineer	\$43.09	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.72	\$96.27	\$96.27	\$117.81
Group 1	\$51.16	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.79	\$108.37	\$108.37	\$133.95
Truck Crane Assistant to Engineer	\$44.51	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.14	\$98.40	\$98.40	\$120.65
Assistant to Engineer	\$42.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$73.97	\$95.14	\$95.14	\$116.31
Group 2	\$49.45	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.08	\$105.81	\$105.81	\$130.53
Truck Crane Assistant to Engineer	\$44.28	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.91	\$98.05	\$98.05	\$120.19
Assistant to Engineer	\$42.09	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$73.72	\$94.77	\$94.77	\$115.81
Group 3	\$47.84	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.47	\$103.39	\$103.39	\$127.31
Truck Crane Assistant to Engineer	\$44.01	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.64	\$97.65	\$97.65	\$119.65
Assistant to Engineer	\$41.86	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$73.49	\$94.42	\$94.42	\$115.35
Group 4	\$46.14	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.77	\$100.84	\$100.84	\$123.91
Group 6	\$43.64	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.27	\$97.09	\$97.09	\$118.91
Group 8	\$41.50	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$73.13	\$93.88	\$93.88	\$114.63

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b For classifications within each group, see page 47.

^c Includes an amount for supplemental dues.

^d When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

^e For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above. Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

NOTE: For Special Single and Second Shift rates, please see page 47C.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #PILE DRIVER (OPERATING ENGINEER-BUILDING CONSTRUCTION)^d
(SPECIAL SINGLE AND SECOND SHIFT)

DETERMINATION: NC-23-63-1-2020-2B1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification ^b (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate		
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^a 1 1/2X	Sunday and Holiday 2X
Group A-1	\$57.20	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$88.83	\$117.43	\$117.43	\$146.03
Truck Crane Assistant to Engineer	\$49.72	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.35	\$106.21	\$106.21	\$131.07
Assistant to Engineer	\$47.28	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.91	\$102.55	\$102.55	\$126.19
Group 1	\$56.45	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$88.08	\$116.31	\$116.31	\$144.53
Truck Crane Assistant to Engineer	\$48.97	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.60	\$105.09	\$105.09	\$129.57
Assistant to Engineer	\$46.53	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.16	\$101.43	\$101.43	\$124.69
Group 2	\$54.51	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.14	\$113.40	\$113.40	\$140.65
Truck Crane Assistant to Engineer	\$48.72	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.35	\$104.71	\$104.71	\$129.07
Assistant to Engineer	\$46.25	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.88	\$101.01	\$101.01	\$124.13
Group 3	\$52.72	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$84.35	\$110.71	\$110.71	\$137.07
Truck Crane Assistant to Engineer	\$48.41	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.04	\$104.25	\$104.25	\$128.45
Assistant to Engineer	\$45.98	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.61	\$100.60	\$100.60	\$123.59
Group 4	\$50.79	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.42	\$107.82	\$107.82	\$133.21
Group 6	\$47.98	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.61	\$103.60	\$103.60	\$127.59
Group 8	\$45.59	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.22	\$100.02	\$100.02	\$122.81

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Saturday in the same work week may be worked at straight-time rates if a job is shut down during the normal work week due to inclement weather.

^b For classifications within each group, see page 47.

^c Includes an amount for supplemental dues.

^d For total base bid project value of less than \$3,000,000 only. The Operating Engineer (Heavy and Highway Work) determination is applicable for all work \$3,000,000 and above. Where there is a published or advertised estimate of the construction costs of a project, such estimate shall determine the total base bid project value, for the purposes of the three million dollars (\$3,000,000) threshold.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #LABORER AND RELATED CLASSIFICATIONS

DETERMINATION: NC-23-102-1-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Marin, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification ^a (Journey person)	Basic Hourly Rate ^g	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other Payments	Hours ^f	Total Hourly Rate	Daily 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
AREA 1 ^c											
Construction Specialist	33.50	9.00	12.96	3.05	0.50	0.28	8	59.29	76.04	76.04	92.79
Group 1; Group 1(B) ^e	32.80	9.00	12.96	3.05	0.50	0.28	8	58.59	74.99	74.99	91.39
Group 1 (A)	33.02	9.00	12.96	3.05	0.50	0.28	8	58.81	75.32	75.32	91.83
Group 1 (C)	32.85	9.00	12.96	3.05	0.50	0.28	8	58.64	75.07	75.07	91.49
Group 1 (E)	33.35	9.00	12.96	3.05	0.50	0.28	8	59.14	75.82	75.82	92.49
Group 1 (G)	33.00	9.00	12.96	3.05	0.50	0.28	8	58.79	75.29	75.29	91.79
Group 2	32.65	9.00	12.96	3.05	0.50	0.28	8	58.44	74.77	74.77	91.09
Group 3; Group 3(A)	32.55	9.00	12.96	3.05	0.50	0.28	8	58.34	74.62	74.62	90.89
Group 4; Group 6(B)	26.24	9.00	12.96	3.05	0.50	0.28	8	52.03	65.15 ^d	65.15 ^d	78.27 ^d
Group 6	33.76	9.00	12.96	3.05	0.50	0.28	8	59.55	76.43	76.43	93.31
Group 6 (A)	33.26	9.00	12.96	3.05	0.50	0.28	8	59.05	75.68	75.68	92.31
Group 6 (C)	32.67	9.00	12.96	3.05	0.50	0.28	8	58.46	74.80	74.80	91.13
Group 6 (D)	33.38	9.00	12.96	3.05	0.50	0.28	8	59.17	75.86	75.86	92.55
Group 6 (E)	32.40	9.00	12.96	3.05	0.50	0.28	8	58.19	74.39	74.39	90.59
Group 7 – Stage 1 (1 st 6 months)	22.79	9.00	12.96	3.05	0.50	0.28	8	48.58	59.97	59.97	71.37
Stage 2 (2 nd 6 months)	26.04	9.00	12.96	3.05	0.50	0.28	8	51.83	64.85	64.85	77.87
Stage 3 (3 rd 6 months)	29.30	9.00	12.96	3.05	0.50	0.28	8	55.09	69.73	69.73	84.39
AREA 2 ^c											
Construction Specialist	32.50	9.00	12.96	3.05	0.50	0.28	8	58.29	74.54	74.54	90.79
Group 1; Group 1(B) ^e	31.80	9.00	12.96	3.05	0.50	0.28	8	57.59	73.49	73.49	89.39
Group 1 (A)	32.02	9.00	12.96	3.05	0.50	0.28	8	57.81	73.82	73.82	89.83
Group 1 (C)	31.85	9.00	12.96	3.05	0.50	0.28	8	57.64	73.57	73.57	89.49
Group 1 (E)	32.35	9.00	12.96	3.05	0.50	0.28	8	58.14	74.32	74.32	90.49
Group 2	31.65	9.00	12.96	3.05	0.50	0.28	8	57.44	73.27	73.27	89.09
Group 3; Group 3(A)	31.55	9.00	12.96	3.05	0.50	0.28	8	57.34	73.12	73.12	88.89
Group 4; Group 6(B)	25.24	9.00	12.96	3.05	0.50	0.28	8	51.03	63.65 ^d	63.65 ^d	76.27 ^d
Group 6	32.76	9.00	12.96	3.05	0.50	0.28	8	58.55	74.93	74.93	91.31
Group 6 (A)	32.26	9.00	12.96	3.05	0.50	0.28	8	58.05	74.18	74.18	90.31
Group 6 (C)	31.67	9.00	12.96	3.05	0.50	0.28	8	57.46	73.30	73.30	89.13
Group 6 (D)	32.38	9.00	12.96	3.05	0.50	0.28	8	58.17	74.36	74.36	90.55
Group 6 (E)	31.40	9.00	12.96	3.05	0.50	0.28	8	57.19	72.89	72.89	88.59
Group 7 – Stage 1 (1 st 6 months)	22.09	9.00	12.96	3.05	0.50	0.28	8	47.88	58.92	58.92	69.97
Stage 2 (2 nd 6 months)	25.24	9.00	12.96	3.05	0.50	0.28	8	51.03	63.65	63.65	76.27
Stage 3 (3 rd 6 months)	28.40	9.00	12.96	3.05	0.50	0.28	8	54.19	68.38	68.38	82.59

PLEASE GO TO PAGE 50 FOR CLASSIFICATIONS WITHIN EACH GROUP

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

a GROUP 1(D) - MAINTENANCE OR REPAIR TRACKMEN AND ROAD BEDS AND ALL EMPLOYEES PERFORMING WORK COVERED BY THIS CLASSIFICATION SHALL RECEIVE \$0.25 PER HOUR ABOVE THEIR REGULAR RATE FOR ALL WORK PERFORMED ON UNDERGROUND STRUCTURES NOT SPECIFICALLY COVERED HEREIN. THIS SHALL NOT APPLY TO WORK BELOW GROUND LEVEL IN OPEN CUT. THIS SHALL APPLY TO CUT AND COVER WORK OF SUBWAY CONSTRUCTION AFTER TEMPORARY COVER HAS BEEN PLACED.

GROUP 1(H) - ALL LABORERS WORKING OFF OR WITH OR FROM BOS'N CHAIRS, SWINGING SCAFFOLDS, BELTS RECEIVE \$0.50 PER HOUR ABOVE THEIR APPLICABLE WAGE RATE. THIS SHALL NOT APPLY TO LABORERS ENTITLED TO RECEIVE THE WAGE RATE SET FORTH IN GROUP 1(A).

b SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER, MAJOR MECHANICAL BREAKDOWN OR LACK OF MATERIALS BEYOND THE CONTROL OF THE EMPLOYER.

c **AREA 1** - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO, AND SANTA CLARA COUNTIES.

AREA 2 - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES.

d SERVICE LANDSCAPE LABORER ON NEW CONSTRUCTION MAY WORK ANY FIVE (5) DAYS WITHIN A WEEK.

e GROUP 1(B) RECEIVES AN ADDITIONAL AMOUNT EACH DAY. SEE PAGE 50 FOR DETAILS.

f WHEN THREE SHIFTS ARE EMPLOYED FOR FIVE (5) OR MORE CONSECUTIVE DAYS, SEVEN AND ONE-HALF (7 ½) CONSECUTIVE HOURS (EXCLUSIVE OF MEAL PERIOD), SHALL CONSTITUTE A DAY OF WORK, FOR WHICH EIGHT (8) TIMES THE STRAIGHT TIME HOURLY RATE SHALL BE PAID AT THE NON-SHIFT WAGE RATE FOR THE SECOND SHIFT. THE THIRD SHIFT SHALL BE SEVEN (7) HOURS OF WORK FOR EIGHT (8) HOURS PAY AT THE NON-SHIFT WAGE RATE.

g ZONE PAY AT THREE DOLLARS (\$3.00) PER HOUR, FACTORED AT THE APPLICABLE OVERTIME MULTIPLE, WILL BE ADDED TO THE BASE RATE FOR WORK PERFORMED OUTSIDE THE FREE ZONE DESCRIBED BY THE BOUNDARIES ALONG TOWNSHIP AND RANGE LINES. PLEASE SEE TRAVEL AND SUBSISTENCE PROVISION FOR MAP DESCRIPTION AND EXCEPTIONS.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT [HTTP://WWW.DIR.CA.GOV/OPRL/DPREWAGEDETERMINATION.HTM](http://www.dir.ca.gov/OPRL/DPREWAGEDETERMINATION.HTM). HOLIDAY PROVISIONS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT [HTTP://WWW.DIR.CA.GOV/OPRL/DPREWAGEDETERMINATION.HTM](http://www.dir.ca.gov/OPRL/DPREWAGEDETERMINATION.HTM). TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

CONSTRUCTION SPECIALIST

ASPHALT IRONERS AND RAKERS
CHAINS AW
CONCRETE DIAMOND CHAINS AW
LASER BEAM IN CONNECTION WITH LABORER'S WORK
MASONRY AND PLASTER TENDER
MECHANICAL PIPE LAYER-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
CAST IN PLACE MANHOLE FORM SETTERS
PRESSURE PIPELAYERS
DAVIS TRENCHER – 300 OR SIMILAR TYPE (AND ALL SMALL TRENCHERS)
STATE LICENSED BLASTERS AS DESIGNATED
DIAMOND DRILLERS
DIAMOND CORE DRILLER
MULTIPLE UNIT DRILLS
HIGH SCALERS (INCLUDING DRILLING OF SAME)
HYDRAULIC DRILLS
CERTIFIED WELDER

GROUP 1 (FOR CONTRA COSTA COUNTY ONLY, USE GROUP 1 (G) FOR SOME OF THE FOLLOWING CLASSIFICATIONS)

ASPHALT SPREADER BOXES (ALL TYPES)
BARKO, WACKER AND SIMILAR TYPE TAMPERS
BUGGYMOBILE
CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYERS
CERTIFIED ASBESTOS AND MOLD REMOVAL WORKER
CERTIFIED HAZARDOUS WASTE WORKER (INCLUDING LEAD ABATEMENT)
COMPACTORS OF ALL TYPES
CONCRETE AND MAGNESITE MIXER AND ½ YARD
CONCRETE PAN WORK
CONCRETE SANDERS, CONCRETE SAW
CRIBBERS AND/OR SHORING
CUT GRANITE CURB SETTER
DRI PAK-IT MACHINE
FALLER, LOGLOADER AND BUCKER
FORM RAISERS, SLIP FORMS
GREEN CUTTERS
HEADERBOARD MEN, HUBSETTERS, ALIGNERS BY ANY METHOD
HIGH PRESSURE BLOW PIPE (1-1/2" OR OVER, 100 LBS. PRESSURE/OVER)
HYDRO SEEDER AND SIMILAR TYPE
JACKHAMMER OPERATORS
JACKING OF PIPE OVER 12 INCHES
JACKSON AND SIMILAR TYPE COMPACTORS
KETTLEMEN, POTMEN, AND MEN APPLYING ASPHALT, LAY-KOLD, CREOSOTE, LIME, CAUSTIC AND SIMILAR TYPE MATERIALS (APPLYING MEANS APPLYING DIPPING, OR HANDLING OF SUCH MATERIALS)
LAGGING, SHEETING, WHALING, BRACING, TRENCH-JACKING, LAGGING HAMMER
MAGNESITE, EPOXY RESIN, FIBER GLASS AND MASTIC WORKERS (WET/DRY)
NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS
PAVEMENT BREAKERS AND SPADERS, INCLUDING TOOL GRINDER
PERMA CURBS
PRECAST-MANHOLE SETTERS
PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING)
PRESSURE PIPE TESTER
POST HOLE DIGGERS-AIR, GAS, AND ELECTRIC POWER BROOM SWEEPERS
POWER TAMPERS OF ALL TYPES, EXCEPT AS SHOWN IN GROUP 2
RAM SET GUN AND STUD GUN
RIPRAP-STONEPAVER AND ROCK-SLINGER, INCLUDING PLACING OF SACKED CONCRETE AND/OR SAND (WET OR DRY) AND GABIONS AND SIMILAR TYPE
ROTARY SCARIFIER OR MULTIPLE HEAD CONCRETE CHIPPING SCARIFIER
ROTO AND DITCH WITCH
ROTOTILLER
SAND BLASTERS, POTMEN, GUNMEN, AND NOZZLEMEN
SIGNALING AND RIGGING
SKILLED WRECKER (REMOVING AND SALVAGING OF SASH, WINDOWS, DOORS, PLUMBING AND ELECTRIC FIXTURES)
TANK CLEANERS
TREE CLIMBERS
TRENCHLESS TECHNOLOGY LABORER- PIPE INSTALLATION, BURSTING, RELINING, OR SIMILAR
TRENCHLESS LABORER'S WORK, CAMERA CONTROLLER, CCTV
TURBO BLASTER
VIBRA-SCREED-BULL FLOAT IN CONNECTION WITH LABORER'S WORK
VIBRATORS

GROUP 1 (A)

ALL WORK OF LOADING, PLACING AND BLASTING OF ALL POWDER & EXPLOSIVES OF WHATEVER TYPE, REGARDLESS OF METHOD USED FOR LOADING AND PLACING
JOY DRILL MODEL TWM-2A
GARDENER-DENVER MODEL DH 143 AND SIMILAR TYPE DRILLS
TRACK DRILLERS
JACK LEG DRILLERS
WAGON DRILLERS
MECHANICAL DRILLERS-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
BLASTERS AND POWDERMAN
TREE TOPPER
BIT GRINDER

GROUP 1 (B) -- SEE GROUP 1 RATES

SEWER CLEANERS (ANY WORKMEN WHO HANDLE OR COME IN CONTACT WITH RAW SEWAGE IN SMALL DIAMETER SEWERS) SHALL RECEIVE \$4.00 PER DAY ABOVE GROUP 1 WAGE RATES. THOSE WHO WORK INSIDE RECENTLY ACTIVE, LARGE DIAMETER SEWERS, AND ALL RECENTLY ACTIVE SEWER MANHOLES SHALL RECEIVE \$5.00 PER DAY ABOVE GROUP 1 WAGE RATES.

GROUP 1 (C)

BURNING AND WELDING IN CONNECTION WITH LABORER'S WORK
SYNTHETIC THERMOPLASTICS AND SIMILAR TYPE WELDING

GROUP 1 (D)

SEE FOOTNOTE A ON PAGE 49

GROUP 1 (E)

WORK ON AND/OR IN BELL HOLE FOOTINGS AND SHAFTS THEREOF, AND WORK ON AND IN DEEP FOOTINGS (DEEP FOOTINGS IS A HOLE 15 FEET OR MORE IN DEPTH)
SHAFT IS AN EXCAVATION OVER FIFTEEN (15) FEET DEEP OF ANY TYPE

GROUP 1 (G) APPLIES ONLY TO WORK IN CONTRA COSTA COUNTY

PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING), CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYER, PRESSURE PIPE TESTER, NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS, PRECAST MANHOLE SETTERS, CAST IN PLACE MANHOLE FORM SETTERS IN CONTRA COSTA COUNTY ONLY

GROUP 1 (H)

SEE FOOTNOTE A ON PAGE 49

GROUP 2

ASPHALT SHOVELERS
CEMENT DUMPERS AND HANDLING DRY CEMENT OR GYPSUM
CHOKE-SETTER AND RIGGER (CLEARING WORK)
CONCRETE BUCKET DUMPER AND CHUTEMAN
CONCRETE CHIPPING AND GRINDING
CONCRETE LABORERS (WET OR DRY)
DRILLERS HELPER, CHUCK TENDER, NIPPER (ONE CHUCKTENDER ON SINGLE MACHINE OPERATION WITH MINIMUM OF ONE CHUCKTENDER FOR EACH TWO MACHINES ON MULTIPLE MACHINE OPERATION. JACKHAMMERS IN NO WAY INVOLVED IN THIS ITEM.)
GUINEA CHASER (STAKEMAN), GROUT CREW
HIGH PRESSURE NOZZLEMAN, ADDUCTORS
HYDRAULIC MONITOR (OVER 100 LBS. PRESSURE)
LOADING AND UNLOADING, CARRYING AND HANDLING OF ALL RODS AND MATERIALS FOR USE IN REINFORCING CONCRETE CONSTRUCTION
PITTSBURGH CHIPPER, AND SIMILAR TYPE BRUSH SHREDDERS
SEMI-SKILLED WRECKER (SALVAGING OF OTHER BUILDING MATERIALS) -- SEE ALSO SKILLED WRECKER (GROUP 1)
SLOPER
SINGLEFOOT, HAND HELD, PNEUMATIC TAMPER
ALL PNEUMATIC, AIR, GAS AND ELECTRIC TOOLS NOT LISTED IN GROUPS 1 THROUGH 1 (F)
JACKING OF PIPE-UNDER 12 INCHES

GROUP 3

CONSTRUCTION LABORERS INCLUDING BRIDGE LABORERS, GENERAL LABORERS AND CLEANUP LABORERS
DEMOLITION WORKER
DUMPMAN, LOAD SPOTTER
FLAGPERSON/PEDESTRIAN MONITOR
FIRE WATCHER
FENCE ERECTORS, INCLUDING TEMPORARY FENCING
GUARDRAIL ERECTORS
GARDENER, HORTICULTURAL AND LANDSCAPE LABORERS (SEE GROUP 4, FOR LANDSCAPE MAINTENANCE ON NEW CONSTRUCTION DURING PLANT ESTABLISHMENT PERIOD)
JETTING
LIMBERS, BRUSH LOADERS, AND PILERS
PAVEMENT MARKERS (BUTTON SETTERS)
PAVERS/INTERLOCKING PAVERS (ALL TYPES) AND INTERLOCKING PAVER MACHINES
MAINTENANCE, REPAIR TRACKMEN AND ROAD BEDS
STREETCAR AND RAILROAD CONSTRUCTION TRACK LABORERS
TEMPORARY AIR AND WATER LINES, VICTAULIC OR SIMILAR
TOOL ROOM ATTENDANT (JOBSITE ONLY)
TREE REMOVAL
WHEELBARROW, INCLUDING POWER DRIVEN

GROUP 3 (A) -- SEE GROUP 3 RATES

COMPOSITE CREW PERSON (OPERATION OF VEHICLES, WHEN IN CONJUNCTION WITH LABORER'S DUTIES)

GROUP 4

ALL FINAL CLEANUP OF DEBRIS, GROUNDS AND BUILDINGS NEAR THE COMPLETION OF THE PROJECT INCLUDING BUT NOT LIMITED TO STREET CLEANERS (NOT APPLICABLE TO ENGINEERING OR HEAVY HIGHWAY PROJECTS)
CLEANING AND WASHING WINDOWS (NEW CONSTRUCTION ONLY), SERVICE LANDSCAPE LABORERS (SUCH AS GARDENER, HORTICULTURE, MOWING, TRIMMING, REPLANTING, WATERING DURING PLANT ESTABLISHMENT PERIOD) ON NEW CONSTRUCTION
BRICK CLEANERS (JOB SITE ONLY)
MATERIAL CLEANERS (JOB SITE ONLY)

NOTE: AN ADDITIONAL DETERMINATION FOR LANDSCAPE MAINTENANCE WORK AFTER THE PLANT ESTABLISHMENT PERIOD OR WARRANTY PERIOD IS PUBLISHED ON PAGE 57 OF THESE GENERAL DETERMINATIONS.

GROUP 6

STRUCTURAL NOZZLEMAN

GROUP 6 (A)

NOZZLEMAN (INCLUDING GUNMAN, POTMAN)
RODMAN
GROUNDMAN

GROUP 6 (B) -- SEE GROUP 4 RATES

GUNITE TRAINEE (ONE GUNITE LABORER SHALL BE ALLOWED FOR EACH THREE (3) JOURNEYMAN (GROUP 6, 6A, 6C, OR GENERAL LABORER) ON A CREW. IN THE ABSENCE OF THE JOURNEYMAN, THE GUNITE TRAINEE RECEIVES THE JOURNEYMAN SCALE.).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE.

GROUP 6 (C)

REBOUNDMAN

GROUP 6 (D)

ALIGNER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 6 (E)

ALIGNER HELPER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 7

ENTRY LEVEL LANDSCAPE LABORER (RATIO FOR ENTRY LEVEL IS ONE IN THREE. AT LEAST ONE SECOND PERIOD ENTRY LEVEL AND AT LEAST ONE THIRD PERIOD ENTRY LEVEL MUST BE EMPLOYED BEFORE EMPLOYING ANOTHER FIRST PERIOD TRAINEE).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #LABORER AND RELATED CLASSIFICATIONS (Special Single and Second Shift)

DETERMINATION: NC-23-102-1-2020-2A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director-Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Marin, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification ^a (Journey person)	Basic Hourly Rate ^f	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
AREA 1 ^c											
Construction Specialist	36.50	9.00	12.96	3.05	0.50	0.28	8	62.29	80.54	80.54	98.79
Group 1; Group 1(B) ^e	35.80	9.00	12.96	3.05	0.50	0.28	8	61.59	79.49	79.49	97.39
Group 1 (A)	36.02	9.00	12.96	3.05	0.50	0.28	8	61.81	79.82	79.82	97.83
Group 1 (C)	35.85	9.00	12.96	3.05	0.50	0.28	8	61.64	79.57	79.57	97.49
Group 1 (E)	36.35	9.00	12.96	3.05	0.50	0.28	8	62.14	80.32	80.32	98.49
Group 1 (G)	36.00	9.00	12.96	3.05	0.50	0.28	8	61.79	79.79	79.79	97.79
Group 2	35.65	9.00	12.96	3.05	0.50	0.28	8	61.44	79.27	79.27	97.09
Group 3; Group 3(A)	35.55	9.00	12.96	3.05	0.50	0.28	8	61.34	79.12	79.12	96.89
Group 4; Group 6(B)	29.24	9.00	12.96	3.05	0.50	0.28	8	55.03	69.65 ^d	69.65 ^d	84.27 ^d
Group 6	36.76	9.00	12.96	3.05	0.50	0.28	8	62.55	80.93	80.93	99.31
Group 6 (A)	36.26	9.00	12.96	3.05	0.50	0.28	8	62.05	80.18	80.18	98.31
Group 6 (C)	35.67	9.00	12.96	3.05	0.50	0.28	8	61.46	79.30	79.30	97.13
Group 6 (D)	36.38	9.00	12.96	3.05	0.50	0.28	8	62.17	80.36	80.36	98.55
Group 6 (E)	35.40	9.00	12.96	3.05	0.50	0.28	8	61.19	78.89	78.89	96.59
Group 7 – Stage 1 (1 st 6 months)	25.79	9.00	12.96	3.05	0.50	0.28	8	51.58	64.47	64.47	77.37
Stage 2 (2 nd 6 months)	29.04	9.00	12.96	3.05	0.50	0.28	8	54.83	69.35	69.35	83.87
Stage 3 (3 rd 6 months)	32.30	9.00	12.96	3.05	0.50	0.28	8	58.09	74.23	74.23	90.39
AREA 2 ^c											
Construction Specialist	35.50	9.00	12.96	3.05	0.50	0.28	8	61.29	79.04	79.04	96.79
Group 1; Group 1(B) ^e	34.80	9.00	12.96	3.05	0.50	0.28	8	60.59	77.99	77.99	95.39
Group 1 (A)	35.02	9.00	12.96	3.05	0.50	0.28	8	60.81	78.32	78.32	95.83
Group 1 (C)	34.85	9.00	12.96	3.05	0.50	0.28	8	60.64	78.07	78.07	95.49
Group 1 (E)	35.35	9.00	12.96	3.05	0.50	0.28	8	61.14	78.82	78.82	96.49
Group 2	34.65	9.00	12.96	3.05	0.50	0.28	8	60.44	77.77	77.77	95.09
Group 3; Group 3(A)	34.55	9.00	12.96	3.05	0.50	0.28	8	60.34	77.62	77.62	94.89
Group 4; Group 6(B)	28.24	9.00	12.96	3.05	0.50	0.28	8	54.03	68.15 ^d	68.15 ^d	82.27 ^d
Group 6	35.76	9.00	12.96	3.05	0.50	0.28	8	61.55	79.43	79.43	97.31
Group 6 (A)	35.26	9.00	12.96	3.05	0.50	0.28	8	61.05	78.68	78.68	96.31
Group 6 (C)	34.67	9.00	12.96	3.05	0.50	0.28	8	60.46	77.80	77.80	95.13
Group 6 (D)	35.38	9.00	12.96	3.05	0.50	0.28	8	61.17	78.86	78.86	96.55
Group 6 (E)	34.40	9.00	12.96	3.05	0.50	0.28	8	60.19	77.39	77.39	94.59
Group 7 – Stage 1 (1 st 6 months)	25.09	9.00	12.96	3.05	0.50	0.28	8	50.88	63.42	63.42	75.97
Stage 2 (2 nd 6 months)	28.24	9.00	12.96	3.05	0.50	0.28	8	54.03	68.15	68.15	82.27
Stage 3 (3 rd 6 months)	31.40	9.00	12.96	3.05	0.50	0.28	8	57.19	72.88	72.88	88.59

PLEASE GO TO PAGE 50 FOR CLASSIFICATIONS WITHIN EACH GROUP

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

- a GROUP 1(D) - MAINTENANCE OR REPAIR TRACKMEN AND ROAD BEDS AND ALL EMPLOYEES PERFORMING WORK COVERED BY THIS CLASSIFICATION SHALL RECEIVE \$0.25 PER HOUR ABOVE THEIR REGULAR RATE FOR ALL WORK PERFORMED ON UNDERGROUND STRUCTURES NOT SPECIFICALLY COVERED HEREIN. THIS SHALL NOT APPLY TO WORK BELOW GROUND LEVEL IN OPEN CUT. THIS SHALL APPLY TO CUT AND COVER WORK OF SUBWAY CONSTRUCTION AFTER TEMPORARY COVER HAS BEEN PLACED.
- GROUP 1(H) - ALL LABORERS WORKING OFF OR WITH OR FROM BOS'N CHAIRS, SWINGING SCAFFOLDS, BELTS RECEIVE \$0.50 PER HOUR ABOVE THEIR APPLICABLE WAGE RATE. THIS SHALL NOT APPLY TO LABORERS ENTITLED TO RECEIVE THE WAGE RATE SET FORTH IN GROUP 1(A).
- b SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER, MAJOR MECHANICAL BREAKDOWN OR LACK OF MATERIALS BEYOND THE CONTROL OF THE EMPLOYER.
- c **AREA 1** - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO, AND SANTA CLARA COUNTIES.
AREA 2 - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES.
- d SERVICE LANDSCAPE LABORER ON NEW CONSTRUCTION MAY WORK ANY FIVE (5) DAYS WITHIN A WEEK.
- e GROUP 1(B) RECEIVES AN ADDITIONAL AMOUNT EACH DAY. SEE PAGE 50 FOR DETAILS.
- f ZONE PAY AT THREE DOLLARS (\$3.00) PER HOUR, FACTORED AT THE APPLICABLE OVERTIME MULTIPLE, WILL BE ADDED TO THE BASE RATE FOR WORK PERFORMED OUTSIDE THE FREE ZONE DESCRIBED BY THE BOUNDARIES ALONG TOWNSHIP AND RANGE LINES. PLEASE SEE TRAVEL AND SUBSISTENCE PROVISIONS FOR MAP DESCRIPTION AND EXCEPTIONS.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT [HTTP://WWW.DIR.CA.GOV/OPRL/DPREWAGEDETERMINATION.HTM](http://www.dir.ca.gov/OPRL/DPREWAGEDETERMINATION.HTM). HOLIDAY PROVISIONS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT [HTTP://WWW.DIR.CA.GOV/OPRL/DPREWAGEDETERMINATION.HTM](http://www.dir.ca.gov/OPRL/DPREWAGEDETERMINATION.HTM). TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TUNNEL WORKER (LABORER)

DETERMINATION: NC-23-102-11-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday ^a	Training	Other Payments	Hours ^b	Total Hourly Rate	Daily 1 1/2X	Saturday ^c 1 1/2X	Sunday and Holiday
Diamond driller, groundman, gunite or shotcrete nozzleman	\$40.38	9.00	12.96	3.05	0.96	0.28	8	66.63	86.82	86.82	107.01
Rodman, shaft work and raise (below actual or excavated ground level)	\$40.15	9.00	12.96	3.05	0.96	0.28	8	66.40	86.48	86.48	106.55
Bit grinder, blaster, driller, powderman-heading, cherry pickerman-where car is lifted, concrete finisher in tunnel, concrete/screed man, grout pumpman and potman, gunite and shotcrete gunman and potman, headerman, high pressure nozzleman, miner-tunnel, including top and bottom man on shaft and raise work, nipper, nozzleman on slick line, sandblaster-potman (work assignment interchangeable)	\$39.90	9.00	12.96	3.05	0.96	0.28	8	66.15	86.10	86.10	106.05
Steel form raiser and setter, timberman, retimberman (wood or steel or substitute materials), tugger, cabletender, certified welder, chucktender, powderman-primer house	\$39.90	9.00	12.96	3.05	0.96	0.28	8	66.15	86.10	86.10	106.05
Vibratorman, pavement breaker, bull gang-mucker, trackman, concrete crew-including rodding and spreading	\$39.45	9.00	12.96	3.05	0.96	0.28	8	65.70	85.43	85.43	105.15
Dumpman (any method), grout crew, reboundman, swamper/brakeman, watchman	\$38.91	9.00	12.96	3.05	0.96	0.28	8	65.16	84.62	84.62	104.07

When designated by an employer, state licensed blaster receives \$1.00 per hour above miner's rate.

Note: Rates for tunnel workers working in compressed air as well as their support classifications are available by request. Please contact the Office of the Director - Research Unit at (415) 703-4774.

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @ <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes an amount for supplemental dues.

^b Saturdays in the same work week may be worked at straight-time if job is shut down during the normal workweek due to inclement weather. Excludes Alameda, Contra Costa, and San Francisco Counties.

^c All work performed on Saturdays, Sundays and Holidays shall be paid for at double (2x) the regular time hourly rate, except maintenance work, in the counties of Alameda, Contra Costa, and San Francisco.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TUNNEL WORKER (LABORER) (Special Single and Second Shift)

DETERMINATION: NC-23-102-11-2020-1A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate	Health and Welfare	Employer Payments				Other Payments	Straight-Time Hours ^b	Total Hourly Rate	Overtime Hourly Rate		
			Pension	Vacation/ Holiday ^a	Training					Daily 1 1/2X	Saturday ^c 1 1/2X	Sunday and Holiday
Diamond driller, groundman, gunite or shotcrete nozzleman	\$43.38	9.00	12.96	3.05	0.96	0.28	8	69.63	91.32	91.32	113.01	
Rodman, shaft work and raise (below actual or excavated ground level)	\$43.15	9.00	12.96	3.05	0.96	0.28	8	69.40	90.98	90.98	112.55	
Bit grinder, blaster, driller, powderman-heading, cherry pickerman-where car is lifted, concrete finisher in tunnel, concrete/screed man, grout pumpman and potman, gunite and shotcrete gunman and potman, headerman, high pressure nozzleman, miner-tunnel, including top and bottom man on shaft and raise work, nipper, nozzleman on slick line, sandblaster-potman (work assignment interchangeable)	\$42.90	9.00	12.96	3.05	0.96	0.28	8	69.15	90.60	90.60	112.05	
Steel form raiser and setter, timberman, retimberman (wood or steel or substitute materials), tugger, cabletender, certified welder, chucktender, powderman-primer house	\$42.90	9.00	12.96	3.05	0.96	0.28	8	69.15	90.60	90.60	112.05	
Vibratorman, pavement breaker, bull gang-mucker, trackman, concrete crew-including rodding and spreading	\$42.45	9.00	12.96	3.05	0.96	0.28	8	68.70	89.93	89.93	111.15	
Dumpman (any method), grout crew, reboundman, swamper/brakeman, watchman	\$41.91	9.00	12.96	3.05	0.96	0.28	8	68.16	89.12	89.12	110.07	

When designated by an employer, state licensed blaster receives \$1.00 per hour above miner's rate.

Note: Rates for tunnel workers working in compressed air as well as their support classifications are available by request. Please contact the Office of the Director - Research Unit at (415) 703-4774.

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Includes an amount for supplemental dues.

^b Saturdays in the same work week may be worked at straight-time if job is shut down during the normal workweek due to inclement weather. Excludes Alameda, Contra Costa, and San Francisco Counties.

^c All work performed on Saturdays, Sundays and Holidays shall be paid for at double (2x) the regular time hourly rate, except maintenance work, in the counties of Alameda, Contra Costa, and San Francisco.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # PARKING AND HIGHWAY IMPROVEMENT PAINTER (PAINTER) ^a

DETERMINATION: NC-200-X-17-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY: All localities within San Joaquin, Tuolumne, and Yolo counties.

CLASSIFICATION	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday ^c	Training	Other	Hours	Total Hourly Rate	Daily 1 1/2X	2X	Holiday 2X
Striper; Layout and application of painted traffic stripes; hot thermo plastic; tape traffic stripes	^b 38.48	10.45	6.33	-	0.10	-	8	55.36	^d 74.60	93.84	93.84
Parking Lots, Gamecourts, Playgrounds	^b 32.71	10.45	6.33	-	0.10	-	8	49.59	^d 65.945	82.30	82.30
Protective Coating, Resurfacing, Pavement Sealing, Including Repair When Done in Conjunction With Pavement Sealing	^b 33.09	10.45	6.33	-	0.10	-	8	49.97	^d 66.515	83.06	83.06

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a The minimum rate of pay for traffic control work associated with parking and highway improvement projects is that of the Painter classifications for the craft of Parking and Highway Improvement Painter (Painter) in San Joaquin, Tuolumne, and Yolo Counties.

^b Includes an amount withheld for Dues Check-Off.

^c Included in Basic Hourly Rate (\$2.24). Rate applies to the first 9 years of employment only; \$2.63 per hour worked for 10 years or more.

^d Rate applies to first 4 overtime hours in any one day and for work in excess of 40 hours in any one designated work week. All other overtime is paid at the double time rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: SLURRY SEAL WORKER (LABORER)

DETERMINATION: NC-23-102-1B-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: March 31, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after ten days after the expiration date if no subsequent determination is issued.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba Counties.

Classification (Journey person)	Basic Hourly Rate ^b	Employer Payments				Straight-Time		Overtime Hourly Rates		
		Health and Welfare	Pension	Vacation/ Holiday	Training	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^a 1 1/2X	Sunday/ Holiday 2X
Mixer Operator	\$39.02	9.00	10.00	3.05	0.10	8	\$61.17	\$80.68	\$80.68	\$100.19
Shuttle/Line Driver	33.02	9.00	10.00	3.05	0.10	8	55.17	71.68	71.68	88.19
Squeegee/Sealer	31.52	9.00	10.00	3.05	0.10	8	53.67	69.43	69.43	85.19
Utility-Maintenance Man	30.52	9.00	10.00	3.05	0.10	8	52.67	67.93	67.93	83.19

^a Saturdays in the same work week may be worked at straight-time if job is shut down during the normal work week due to inclement weather, major mechanical breakdown or lack of materials beyond the control of the employer.

^b Zone Pay at three dollars (\$3.00) per hour, factored at the applicable overtime multiplier, will be added to the base rate for work performed outside the Free Zone described by the boundaries along township and range lines. Please see travel and subsistence provision for map description and exceptions.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: ASBESTOS REMOVAL WORKER (LABORER)

DETERMINATION: NC-102-67-1-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification (Journey person)	<u>Employer Payments</u>						<u>Straight-Time</u>		<u>Overtime Hourly Rate</u>	
	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday ^a	Training	Other Payments	Hours	Total Hourly Rate	1-1/2X ^b	Holiday ^c 2X
Asbestos Removal Specialist II	29.54	5.84	8.70	3.00	0.46	0.18	8	47.72	62.49	77.26
Asbestos Removal Specialist I	28.16	5.84	3.21	3.00	0.46	0.18	8	40.85	54.93	69.01
Asbestos Removal Worker	25.05	5.84	2.70	3.00	0.46	0.18	8	37.23	49.755	62.28

DETERMINATION: NC-102-67-1-2020-2A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Lead Removal Worker ^d	33.07	9.50	12.40	2.75	0.65	0.22	8	58.59	75.125	91.66
Lead Removal Worker ^e	32.07	9.50	12.40	2.75	0.65	0.22	8	57.59	73.625	89.66

^a Includes an amount for Supplemental Dues.

^b Rate applies to the first 4 overtime hours in any workday or 40 hours in a workweek, and for the first 8 hours worked on the 7th consecutive day of work in a workweek. All work on Saturdays and Sundays shall be paid at the rate of one and one-half (1 1/2) times the regular rate of pay, unless the Saturday and Sunday work is part of an established workweek.

^c Rate applies to Holidays and to all hours worked in excess of 12 hours in any workday and for all hours worked in excess of 8 hours on the 7th consecutive day of work in a workweek.

^d Rate applies to all localities within Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara Counties.

^e Rate applies to all localities within Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba Counties.

(Recognized Holidays and Subsistence Payment footnotes listed on page 52C)

NOTE: Asbestos Removal Workers must be trained and the work conducted according to the Code of Federal Regulations 29 CFR 1926.58, the California Labor Code 6501.5 and the California Code of Regulations, Title 8, Section 5208. Contractors must be certified by the Contractors' State License Board and registered with the Division of Occupational Safety and Health (DOSH). For further information, contact the Asbestos Contractors Abatement Registration Unit, DOSH at (916) 574-2993.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # CEMENT MASON

DETERMINATION: NC-23-203-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

CLASSIFICATION (JOURNEYPERSON)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours ^b	Total Hourly Rate	Daily 1 1/2X	Saturday ^c 1 1/2X	Sunday and Holiday
Cement Mason	\$39.20	8.60	11.41	5.95 ^a	0.60	0.10	8	65.86	85.46	85.46 ^d	105.06
Mastic Magnesite Gypsum, Epoxy, Polyester, Resin and all composition masons, swing or slip form scaffolds	\$40.20	8.60	11.41	5.95 ^a	0.60	0.10	8	66.86	86.96	86.96 ^d	107.06

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a Includes an amount for supplemental dues.

^b Where multiple shifts are worked, the day shift shall work eight (8) hours and for such work they shall be paid the regular straight time rate for eight (8) hours; the second (2nd) shift shall work seven and one-half (7 ½) hours, and for such work they shall be paid the regular straight time rate for eight (8) hours; if a third (3rd) shift is worked, they shall work seven (7) hours and for such work they shall be paid eight (8) hours regular straight time pay. No multiple shift shall be started for less than five (5) consecutive days.

^c Saturdays in the same work week may be worked at straight time if a job is shut down during the normal work week due to inclement weather or major mechanical breakdown (limited to curb and gutter machine, concrete pump, and concrete plant).

^d Rate applies to the first 8 hours of work on Saturday. All other hours worked on Saturday are paid at the Sunday/Holiday rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # CEMENT MASON (SPECIAL SINGLE SHIFT)

DETERMINATION: NC-23-203-1A-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

CLASSIFICATION (JOURNEYPERSON)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^b 1 1/2X	Sunday and Holiday
Cement Mason	\$42.20	8.60	11.41	5.95 ^a	0.60	0.10	8	68.86	89.96	89.96 ^c	111.06
Mastic Magnesite Gypsum, Epoxy, Polyester, Resin and all composition masons, swing or slip form scaffolds	\$43.20	8.60	11.41	5.95 ^a	0.60	0.10	8	69.86	91.46	91.46 ^c	113.06

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at <http://www.dir.ca.gov/das/das.html>.

^a Includes an amount for supplemental dues.

^b Saturdays in the same work week may be worked at straight time if a job is shut down during the normal work week due to inclement weather or major mechanical breakdown (limited to curb and gutter machine, concrete pump, and concrete plant).

^c Rate applies to the first 8 hours of work on Saturday. All other hours worked on Saturday are paid at the Sunday/Holiday rate.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #BUILDING/CONSTRUCTION INSPECTOR AND FIELD SOILS AND MATERIAL TESTER

DETERMINATION: NC-63-3-9-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after ten days after the expiration date if no subsequent determination is issued.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba counties.

CLASSIFICATION (JOURNEYPERSON)	Basic Hourly Rate	Health and Welfare ^a	Employer Payments				Straight-Time		Overtime Hourly Rate		
			Pension	Vacation and Holiday	Training	Other Payment	Hours	Total Hourly Rate	Daily ^b 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
Group 1	\$52.05	13.88	10.82	6.62	1.13	0.24	8	84.74	110.765	110.765	136.79
Group 2	50.05	13.88	10.82	6.62	1.13	0.24	8	82.74	107.765	107.765	132.79
Group 3	42.84	13.88	10.82	6.62	1.13	0.24	8	75.53	96.95	96.95	118.37
Group 4	36.87	13.88	10.82	6.62	1.13	0.24	8	69.56	87.995	87.995	106.43

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Amount shall be paid for all hours worked up to 173 hours per month.

^b Rate applies to the first 4 daily overtime hours, Monday through Friday, and the first 8 hours on Saturday. All other overtime is paid at the Sunday/Holiday overtime rate.

CLASSIFICATIONS:

Group 1	Group 2	Group 3	Group 4
ASNT Level II-III	AWS-CWI	Geotechnical Driller	ACI
DSA Masonry	ICC Certified Structural Inspector	Soils/Asphalt	Drillers Helper
DSA Shotcrete	NICET Level III	Earthwork Grading	ICC Fireproofing
Lead Inspector	Shear Wall/Floor System Inspector	Excavation and Backfill	NICET Level I
NICET Level IV	Building/Construction Inspector	NICET Level II	Proofload Testing
NDT Level Two			Torque Testing
			NACE
			NDT Level One

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at

<http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #BUILDING/CONSTRUCTION INSPECTOR AND FIELD SOILS AND MATERIAL TESTER (SECOND SHIFT)

DETERMINATION: NC-63-3-9-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after ten days after the expiration date if no subsequent determination is issued.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo and Yuba counties.

CLASSIFICATION (JOURNEYPERSON)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare ^a	Pension	Vacation and Holiday	Training	Other Payment	Hours	Total Hourly Rate	Daily ^b 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
Group 1	\$58.56	13.88	10.82	6.62	1.13	0.24	8	91.25	120.53	120.53	149.81
Group 2	56.31	13.88	10.82	6.62	1.13	0.24	8	89.00	117.155	117.155	145.31
Group 3	48.20	13.88	10.82	6.62	1.13	0.24	8	80.89	104.99	104.99	129.09
Group 4	41.48	13.88	10.82	6.62	1.13	0.24	8	74.17	94.91	94.91	115.65

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet @

<http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a Amount shall be paid for all hours worked up to 173 hours per month.

^b Rate applies to the first 4 daily overtime hours, Monday through Friday, and the first 8 hours on Saturday. All other overtime is paid at the Sunday/Holiday overtime rate.

CLASSIFICATIONS:

<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>
ASNT Level II-III	AWS-CWI	Geotechnical Driller	ACI
DSA Masonry	ICC Certified Structural Inspector	Soils/Asphalt	Drillers Helper
DSA Shotcrete	NICET Level III	Earthwork Grading	ICC Fireproofing
Lead Inspector	Shear Wall/Floor System Inspector	Excavation and Backfill	NICET Level I
NICET Level IV	Building/Construction Inspector	NICET Level II	Proofload Testing
NDT Level Two			Torque Testing
			NACE
			NDT Level One

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TEAMSTER (APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

DETERMINATION: NC-23-261-1-2020-1

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification ^g (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
Group 1	\$33.95	\$19.19	\$7.35	\$2.30	\$0.90	^a \$0.63	8	\$64.32	\$81.30	\$81.30	\$98.27
Group 2	34.25	19.19	7.35	2.30	0.90	^a 0.63	8	64.62	81.75	81.75	98.87
Group 3	34.55	19.19	7.35	2.30	0.90	^a 0.63	8	64.92	82.20	82.20	99.47
Group 4	34.90	19.19	7.35	2.30	0.90	^a 0.63	8	65.27	82.72	82.72	100.17
Group 5	35.25	19.19	7.35	2.30	0.90	^a 0.63	8	65.62	83.25	83.25	100.87
Group 6	USE DUMP TRUCK YARDAGE RATE										
Group 7	USE APPROPRIATE RATE FOR THE POWER UNIT OR THE EQUIPMENT UTILIZED										
Group 8 (Trainee) ^c											
^d Step I – 1 st 1000 Hours											
^e Step II – 2 nd 1000 Hours											
^f Step III – 3 rd 1000 Hours											

^a Supplemental Dues and Contract Administration.

^b Saturday in the same work week may be worked at straight-time hourly rate if a job is shut down during the normal work week due to inclement weather or major mechanical breakdown, or lack of materials beyond the control of the Employer.

^c An individual employer may employ one (1) trainee for every four (4) journey level Teamsters actively employed. Individual employers with less than four (4) journey level Teamsters may utilize one (1) trainee; thereafter, one (1) for every four (4) journey level Teamsters.

^d Sixty-five percent (65%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^e Seventy-five percent (75%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^f Eighty-five percent (85%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^g For classifications within each group, see page 56.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

DETERMINATION: NC-23-261-1-2020-1 and NC-23-261-1-2020-1A

CLASSIFICATIONS:

GROUP 1

Dump Trucks under 6 yards
Single Unit Flat Rack (2 axle unit)
Nipper Truck (When Flat Rack Truck is used appropriate Flat Rack shall apply)
Concrete pump truck (When Flat Rack Truck is used appropriate Flat Rack shall apply)
Concrete pump machine
Snow Buggy
Steam Cleaning
Bus or Manhaul Driver
Escort or Pilot Car Driver
Pickup Truck
Teamster Oiler/Greaser/and or Serviceman
Hook Tenders
Team Drivers
Warehouseman
Tool Room Attendant (Refineries)
Fork Lift and Lift Jitneys
Warehouse Clerk/Parts Man
Fuel and/or Grease Truck Driver or Fuelman
Truck Repair Helper
Fuel Island Attendant, or Combination Pit and/or Grease Rack and Fuel Island Attendant

GROUP 2

Dump Trucks 6 yards Under 8 yards
Transit Mixers through 10 yards
Water Trucks Under 7000 gals.
Jetting Trucks Under 7000 gals.
Single Unit flat rack (3 axle unit)
Highbed Heavy Duty Transport
Scissor Truck
Rubber Tired Muck Car (not self-loaded)
Rubber Tired Truck Jumbo
Winch Truck and "A" Frame Drivers
Combination Winch Truck With Hoist
Road Oil Truck or Bootman
Buggymobile
Ross, Hyster and similar Straddle Carrier
Small Rubber Tired Tractor
Truck Dispatcher

GROUP 3

Dump Trucks 8 yards and including 24 yards
Transit Mixers Over 10 yards
Water Trucks 7000 gals and over
Jetting Trucks 7000 gals and over
Vacuum Trucks under 7500 gals
Trucks Towing Tilt Bed or Flat Bed Pull Trailers
Heavy Duty Transport Tiller Man
Tire Repairman

GROUP 3 (continued)

Truck Mounted Self Propelled Street Sweeper with or without Self-Contained Refuse Bin and or Vacuum Unit
Boom Truck - Hydro-Lift or Swedish Type Extension or Retracting Crane
P.B. or Similar Type Self Loading Truck
Combination Bootman and Road Oiler
Dry Distribution Truck (A Bootman when employed on such equipment, shall receive the rate specified for the classification of Road Oil Trucks or Bootman)
Ammonia Nitrate Distributor, Driver and Mixer
Snow Go and/or Plow

GROUP 4

Dump Trucks over 25 yards and under 65 yards
Vacuum Trucks 7500 gals and over.
Truck Repairman
Water Pulls - DW 10s, 20s, 21s and other similar equipment when pulling Aqua/pak or Water Tank Trailers
Helicopter Pilots
Lowbed Heavy Duty Transport (up to and including 7 axles)
DW 10s, 20s, 21s and other similar Cat type, Terra Cobra, LeTourneau Pulls, Tournorocker, Euclid and similar type Equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers

GROUP 5

Dump Truck 65 yards and over
Holland Hauler
Lowbed Heavy Duty Transport (over 7 axles)

GROUP 6 (Use dump truck yardage rate)

Articulated Dump Truck
Bulk Cement Spreader (w/ or w/o Auger)
Dumpcrete Truck
Skid Truck (Debris Box)
Dry Pre-Batch Concrete Mix Trucks
Dumpster or Similar Type
Slurry Truck

GROUP 7 (Use appropriate Rate for the Power Unit or the Equipment Utilized)

Heater Planer
Asphalt Burner
Scarifier Burner
Fire Guard
Industrial Lift Truck (mechanical tailgate)
Utility and Clean-up Truck
Composite Crewman

GROUP 8

Trainee

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TEAMSTER (SPECIAL SINGLE SHIFT RATE)
(APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

DETERMINATION: NC-23-261-1-2020-1A

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All Localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

Classification ^g (Journey person)	Basic Hourly Rate	Employer Payments					Straight-Time		Overtime Hourly Rate		
		Health and Welfare	Pension	Vacation/ Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday ^b 1 1/2X	Sunday/ Holiday 2X
Group 1	\$35.95	\$19.19	\$7.35	\$2.30	\$0.90	^a \$0.63	8	\$66.32	\$84.30	\$84.30	\$102.27
Group 2	36.25	19.19	7.35	2.30	0.90	^a 0.63	8	66.62	84.75	84.75	102.87
Group 3	36.55	19.19	7.35	2.30	0.90	^a 0.63	8	66.92	85.20	85.20	103.47
Group 4	36.90	19.19	7.35	2.30	0.90	^a 0.63	8	67.27	85.72	85.72	104.17
Group 5	37.25	19.19	7.35	2.30	0.90	^a 0.63	8	67.62	86.25	86.25	104.87
Group 6	USE DUMP TRUCK YARDAGE RATE										
Group 7	USE APPROPRIATE RATE FOR THE POWER UNIT OR THE EQUIPMENT UTILIZED										
Group 8 (Trainee) ^c											
^d Step I – 1 st 1000 Hours											
^e Step II – 2 nd 1000 Hours											
^f Step III – 3 rd 1000 Hours											

^a Supplemental Dues and Contract Administration.

^b Saturday in the same work week may be worked at straight-time hourly rate if a job is shut down during the normal work week due to inclement weather or major mechanical breakdown, or lack of materials beyond the control of the Employer.

^c An individual employer may employ one (1) trainee for every four (4) journey level Teamsters actively employed. Individual employers with less than four (4) journey level Teamsters may utilize one (1) trainee; thereafter, one (1) for every four (4) journey level Teamsters.

^d Sixty-five percent (65%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^e Seventy-five percent (75%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^f Eighty-five percent (85%) of the Journey level wage for the type of equipment operated, plus full fringes without Vacation/Holiday.

^g For classifications within each group, see page 56.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/PreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

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GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

CRAFT: LANDSCAPE MAINTENANCE LABORER

(APPLIES ONLY TO ROUTINE LANDSCAPE MAINTENANCE WORK NOT NEW LANDSCAPE CONSTRUCTION)¹

DETERMINATION: NC-LML-2020-1

ISSUE DATE: February 22, 2020

EXPIRATION DATE OF DETERMINATION: March 31, 2020* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

LOCALITY:	Employer Payments						Straight -Time		Overtime
	Basic Hourly Rate	Health and Welfare	Pension	Vacation	Holiday	Training	Hours	Total Hourly Rate	1 1/2x
Alameda.....	13.00	0.43	-	^a 0.14	0.24	-	8	^b 13.81	^b 20.31
Alpine, El Dorado.....	13.00	-	-	0.12	0.14	-	8	13.26	19.76
	13.00	-	-	0.14	0.16	-	8	13.30	19.80
Amador.....	13.00	-	-	0.16	0.06	-	8	13.22	19.72
Butte, Glenn, and Plumas.....	13.00	0.16	-	^c 0.13	0.05	-	8	^b 13.34	^b 19.84
Calaveras.....	13.00	-	-	0.10	0.12	-	8	13.22	19.72
Colusa and Sutter.....	13.00	-	-	0.12	0.14	-	8	13.26	19.76
	13.00	-	-	0.14	0.16	-	8	13.30	19.80
Contra Costa.....	13.00	-	-	-	0.12	-	8	13.12	19.62
Del Norte and Humboldt.....	13.00	-	-	0.25	0.07	-	8	13.32	19.82
Fresno.....	13.00	-	-	0.11	-	-	8	13.11	19.61
	13.00	-	-	^d 0.19	0.19	-	8	^b 13.38	^b 19.88
Kings.....	13.00	-	-	^e 0.25	0.25	-	8	^b 13.50	^b 20.00
Lake and Mendocino.....	13.00	-	-	^f 0.13	0.03	-	8	^b 13.16	^b 19.66
	13.00	-	-	^g 0.14	0.03	-	8	^b 13.17	^b 19.67
Lassen, Modoc, Shasta, Siskiyou and Trinity	13.00	-	-	0.31	0.09	-	8	13.40	19.90
Madera, Mariposa and Merced....	13.00	-	-	0.115	0.115	-	8	13.23	19.73
Marin.....	13.00	-	-	-	0.12	-	8	13.12	19.62
Monterey.....	13.00	-	-	0.14	0.22	-	8	13.36	19.86
	13.00	-	-	0.16	0.25	-	8	13.41	19.91
Napa.....	13.00	-	-	^q 0.11	0.14	-	8	13.25	19.75
Nevada and Sierra.....	13.00	-	-	0.16	0.19	-	8	13.35	19.85
Placer.....	13.00	-	-	0.12	0.14	-	8	13.26	19.76
Sacramento.....	13.00	-	-	0.16	-	-	8	13.16	19.66
	13.00	-	-	0.15	-	-	8	13.15	19.65
San Benito.....	13.00	-	-	^h 0.15	0.18	-	8	^b 13.33	^b 19.83
San Francisco.....	13.00	-	-	0.17	0.17	-	8	13.34	19.84
San Joaquin.....	13.00	0.37	-	ⁱ 0.12	0.12	-	8	^b 13.61	^b 20.11
San Mateo.....	13.00	0.43	-	^j 0.12	0.14	-	8	^b 13.69	^b 20.19
	13.00	-	-	^k 0.13	0.17	-	8	^b 13.30	^b 19.80
Santa Clara.....	13.00	0.03	-	^l 0.13	0.18	-	8	^b 13.34	^b 19.84
Santa Cruz.....	13.00	-	-	0.16	-	-	8	13.16	19.66
	13.00	-	-	0.19	-	-	8	13.19	19.69
Solano.....	13.00	-	-	-	0.07	-	8	13.07	19.57
Sonoma.....	13.00	-	-	^m 0.13	0.16	-	8	^b 13.29	^b 19.79
	13.00	0.38	-	ⁿ 0.15	0.19	-	8	^b 13.72	^b 20.22
Stanislaus and Tuolumne.....	13.00	-	-	0.115	0.14	-	8	13.255	19.755
	13.00	-	-	^o 0.13	0.11	-	8	^b 13.24	^b 19.74
Tehama.....	13.00	-	-	0.12	0.19	-	8	13.31	19.81
Tulare.....	13.00	0.69	-	^p 0.12	-	-	8	^b 13.81	^b 20.31
Yolo.....	13.00	-	-	-	0.14	-	8	13.14	19.64
	13.00	-	-	-	0.19	-	8	13.19	19.69
Yuba.....	13.00	-	-	0.14	0.16	-	8	13.30	19.80

NOTE: If there are two rates, the first rate is for routine work, the second rate is for complex work.

- a. \$0.20 after 3 years of service; \$0.27 after 5 years of service.
- b. Computation is based on first years of employment. This rate should be increased by any applicable vacation increase as stated in other footnotes.
- c. \$0.25 after 7 years of service.
- d. \$0.38 after 3 years of service.
- e. \$0.37 after 5 years of service; \$0.49 after 15 years of service.
- f. \$0.19 after 1 year of service; \$0.25 after 2 years of service.
- g. \$0.22 after 1 year of service; \$0.29 after 2 years of service.
- h. \$0.31 after 5 years of service.
- i. \$0.24 after 5 years of service.
- j. \$0.23 after 2 years of service; \$0.35 after 6 years of service.
- k. \$0.26 after 1 year of service; \$0.39 after 5 years of service.
- l. \$0.27 after 1 year of service; \$0.40 after 5 years of service.
- m. \$0.26 after 7 years of service.
- n. \$0.31 after 3 years of service; \$0.46 after 7 years of service.
- o. \$0.27 after 3 years of service; \$0.40 after 5 years of service.
- p. \$0.23 after 2 years of service.
- q. \$0.23 after 7 years of service.

¹ This determination does not apply to work of a landscape laborer employed on landscape construction (work incidental to construction or post-construction maintenance during the plant installation and establishment period). The following is a description of the landscape work cover under this determination:

ROUTINE – mowing, watering, pruning, trimming, weeding, spraying, occasional planting and replacement of plants and janitorial work incidental to such landscape maintenance.

COMPLEX – servicing of irrigation and sprinkler systems, repairing of equipment use in such landscape maintenance.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

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GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # TUNNEL/UNDERGROUND (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)

DETERMINATION: NC-23-63-1-2020-2C

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journeyperson)	Employer Payments						Hours ^e	Straight-Time		Overtime Hourly Rate			
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments		Total Hourly Rate		Daily/ Saturday ^d 1 1/2X	Sunday and Holiday 2X		
Classification Group	Area 1 ^a	Area 2 ^b						Area 1 ^a	Area 2 ^b	Area 1 ^a	Area 2 ^b	Area 1 ^a	Area 2 ^b
<u>Underground Rate</u>													
Group 1-A	\$49.89	\$51.89	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.52	\$83.52	\$106.47	\$109.47	\$131.41
Group 1	\$47.42	\$49.42	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.05	\$81.05	\$102.76	\$105.76	\$126.47
Group 2	\$46.16	\$48.16	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.79	\$79.79	\$100.87	\$103.87	\$123.95
Group 3	\$44.83	\$46.83	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.46	\$78.46	\$98.88	\$101.88	\$121.29
Group 4	\$43.69	\$45.69	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.32	\$77.32	\$97.17	\$100.17	\$119.01
Group 5	\$42.55	\$44.55	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.18	\$76.18	\$95.46	\$98.46	\$116.73
<u>Shafts Stopes & Raises</u>													
Group 1-A	\$49.99	\$51.99	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.62	\$83.62	\$106.62	\$109.62	\$131.61
Group 1	\$47.52	\$49.52	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.15	\$81.15	\$102.91	\$105.91	\$126.67
Group 2	\$46.26	\$48.26	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$77.89	\$79.89	\$101.02	\$104.02	\$124.15
Group 3	\$44.93	\$46.93	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$76.56	\$78.56	\$99.03	\$102.03	\$121.49
Group 4	\$43.79	\$45.79	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$75.42	\$77.42	\$97.32	\$100.32	\$119.21
Group 5	\$42.65	\$44.65	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$74.28	\$76.28	\$95.61	\$98.61	\$116.93

CLASSIFICATIONS:

GROUP 1-A

Tunnel Bore Machine Operator - 20 feet in diameter or more

GROUP 1

Heading Shield Operator
Heavy Duty Repairman/Welder
Mucking Machine
Raised Bore Operator
Tunnel Mole Bore Operator
Tunnel Boring Machine Operator 10 ft up to 20 ft

GROUP 2

Combination Slusher and Motor Operator
Concrete Pump or Pumpcrete Guns
Power Jumbo Operator

GROUP 3

Drill Doctor
Mine or Shaft Hoist

GROUP 4

Combination Slurry Mixer Cleaner
Grouting Machine Operator
Motorman

GROUP 5

Bit Sharpener
Brakeman
Combination Mixer and Compressor (Gunitite)
Compressor Operator
Assistant to Engineer
Pump Operator
Slusher Operator

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

^b **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^c Includes an amount for supplemental dues.

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

^e When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

NOTE: For Special Single and Second Shift rates, please see page 58A.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

**CRAFT: # TUNNEL/UNDERGROUND (OPERATING ENGINEER-HEAVY AND HIGHWAY WORK)
(SPECIAL SINGLE AND SECOND SHIFT)**

DETERMINATION: NC-23-63-1-2020-2C

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 27, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

Classification (Journeyperson)	Employer Payments							Straight-Time		Overtime Hourly Rate				
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday ^c	Training	Other Payments	Hours	Total Hourly Rate	Daily/ Saturday ^d 1 1/2X	Sunday and Holiday 2X				
Classification Group	Area 1 ^a	Area 2 ^b						Area 1 ^a	Area 2 ^b	Area 1 ^a	Area 2 ^b	Area 1 ^a	Area 2 ^b	
<u>Underground Rate</u>														
Group 1-A	\$55.02	\$57.02	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.65	\$88.65	\$114.16	\$117.16	\$141.67	\$145.67
Group 1	\$52.23	\$54.23	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.86	\$85.86	\$109.98	\$112.98	\$136.09	\$140.09
Group 2	\$50.82	\$52.82	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.45	\$84.45	\$107.86	\$110.86	\$133.27	\$137.27
Group 3	\$49.34	\$51.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$80.97	\$82.97	\$105.64	\$108.64	\$130.31	\$134.31
Group 4	\$48.04	\$50.04	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.67	\$81.67	\$103.69	\$106.69	\$127.71	\$131.71
Group 5	\$46.77	\$48.77	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.40	\$80.40	\$101.79	\$104.79	\$125.17	\$129.17
<u>Shafts Stopes & Raises</u>														
Group 1-A	\$55.13	\$57.13	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$86.76	\$88.76	\$114.33	\$117.33	\$141.89	\$145.89
Group 1	\$52.34	\$54.34	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$83.97	\$85.97	\$110.14	\$113.14	\$136.31	\$140.31
Group 2	\$50.93	\$52.93	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$82.56	\$84.56	\$108.03	\$111.03	\$133.49	\$137.49
Group 3	\$49.45	\$51.45	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$81.08	\$83.08	\$105.81	\$108.81	\$130.53	\$134.53
Group 4	\$48.15	\$50.15	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$79.78	\$81.78	\$103.86	\$106.86	\$127.93	\$131.93
Group 5	\$46.88	\$48.88	\$13.88	\$10.78	\$4.77	\$1.07	\$1.13	8	\$78.51	\$80.51	\$101.95	\$104.95	\$125.39	\$129.39

CLASSIFICATIONS:

GROUP 1-A

Tunnel Bore Machine Operator - 20 feet in diameter or more

GROUP 1

Heading Shield Operator
Heavy Duty Repairman/Welder
Mucking Machine
Raised Bore Operator
Tunnel Mole Bore Operator
Tunnel Boring Machine Operator 10 ft up to 20 ft

GROUP 2

Combination Slusher and Motor Operator
Concrete Pump or Pumpcrete Guns
Power Jumbo Operator

GROUP 3

Drill Doctor
Mine or Shaft Hoist

GROUP 4

Combination Slurry Mixer Cleaner
Grouting Machine Operator
Motorman

GROUP 5

Bit Sharpener
Brakeman
Combination Mixer and Compressor (Gunite)
Compressor Operator
Assistant to Engineer
Pump Operator
Slusher Operator

Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at <http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp>.

^a **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

^b **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

^c Includes an amount for supplemental dues.

^d Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: TREE MAINTENANCE¹ (LABORER)

(APPLIES ONLY TO ROUTINE TREE MAINTENANCE WORK, NOT CONSTRUCTION AND/OR LANDSCAPE CONSTRUCTION²)

DETERMINATION: NC-102-X-21-2020-2

ISSUE DATE: August 22, 2020

EXPIRATION DATE OF DETERMINATION: June 30, 2021** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Locality: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

CLASSIFICATION(s) ^a (Journey person)	Employer Payments						Straight-Time		Overtime Hourly Rate	
	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily 1 1/2X ^b	Sunday/ Holiday 2X
AREA 1^c										
Senior Tree Trimmer	\$26.85	\$6.00	\$1.50	\$2.07	-	\$0.05	8	\$36.47	\$49.89	\$63.32
Tree Trimmer	\$23.85	\$6.00	\$1.50	\$1.87	-	\$0.05	8	\$33.27	\$45.19	\$57.12
Grounds person	\$20.85	\$6.00	\$1.50	\$1.72	-	\$0.05	8	\$30.12	\$40.54	\$50.97
AREA 2^c										
Senior Tree Trimmer	\$22.35	\$6.00	\$1.50	\$2.07	-	\$0.05	8	\$31.97	\$43.14	\$54.32
Tree Trimmer	\$20.85	\$6.00	\$1.50	\$1.87	-	\$0.05	8	\$30.27	\$40.69	\$51.12
Grounds person	\$18.85	\$6.00	\$1.50	\$1.72	-	\$0.05	8	\$28.12	\$37.54	\$46.97

^a There shall be at least one Senior Tree Trimmer on crews of three or more.

^b Monday thru Saturday shall constitute a workweek. Rate applies to first 4 overtime hours Monday thru Saturday, and all time worked in excess of forty (40) hours per workweek. All other time is paid at the Sunday and Holiday double-time rate.

^c **AREA 1** – MARIN, MONTEREY, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, AND SONOMA COUNTIES.

AREA 2 – ALAMEDA, ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, CONTRA COSTA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN JOAQUIN, SHASTA, SIERRA, SISKIYOU, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO, AND YUBA COUNTIES.

¹ This determination does not apply to the work of a landscape laborer employed on landscape construction (work incidental to construction or post-construction maintenance during the plant installation and establishment period) or to tree trimming work involving line clearance.

² This determination does not apply to tree trimming, removal, or planting work performed on construction or landscape construction contracts.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the internet at <http://www.dir.ca.gov/oprl/DPreWageDetermination.htm>. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.4
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

LOCALITY: LASSEN COUNTY

DETERMINATION: LAS-2020-2

DETERMINATION: LAS-2020-2				EMPLOYER PAYMENTS							STRAIGHT-TIME		OVERTIME HOURLY RATE								
CRAFT (JOURNEY LEVEL)		ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	HEALTH AND WELFARE	PENSION	VACATION/ HOLIDAY		TRAINING	OTHER PAYMENTS		HOURS	TOTAL HOURLY RATE	DAILY	SATURDAY	SUNDAY AND HOLIDAY					
#	BRICKLAYER, BLOCKLAYER: BRICKLAYER, BLOCKLAYER, STONEMASON POINTER, CLEANER, CAULKER, WATERPROOFER																				
		8/22/2020	04/30/2021**	A	42.620	10.750	9.320	B	2.500	0.800	C	1.810	D	8.0	67.800	E	90.360	E	90.360	112.920	
		8/22/2020	06/30/2021**	A	46.960	10.750	11.220	F	-	1.510	0.430	D	8.0	70.870	94.350	G	94.350	117.830			
#	BRICK TENDER	8/22/2020	06/30/2021**	H	35.890	9.000	11.210	F	-	0.450	0.300		8.0	56.850	I	74.790	I	74.790	92.740		
#	CARPET, LINOLEUM,																				
J	RESILIENT TILE LAYER	8/22/2020	06/30/2021**	K	30.960	7.010	8.220	L	-	0.250	0.050		8.0	46.490	60.920		60.920		75.340		
M	RESILIENT TILE LAYER	2/22/2020	12/31/2020**	A	39.560	10.450	11.540	L	-	0.600	0.160		8.0	62.310	N	82.090	N	82.090	O	101.870	
#	ELECTRICIAN:																				
	COMM & SYSTEM INSTALLER	2/22/2020	01/31/2021*		30.350	11.300	P	5.950	-	1.100	Q	1.110	8.0	50.870	66.580		66.580		82.280		
	COMM & SYSTEM TECH.	2/22/2020	01/31/2021*		34.900	11.300	P	5.950	-	1.100	Q	1.110	8.0	55.580	73.640		73.640		91.690		
	INSIDE WIREMAN	8/22/2020	01/31/2021**		40.560	12.760	P	8.750	F	-	1.760	R	7.970	8.0	73.670	94.880		94.880		116.090	
	CABLE SPLICER	8/22/2020	01/31/2021**		44.620	12.760	P	8.750	F	-	1.760	R	7.970	8.0	77.910	101.240		101.240		124.580	
	FIELD SURVEYOR:																				
S	CHIEF OF PARTY (018.167-010)	8/22/2015	09/30/2015*	&	17.000	2.200	-	T	0.915	0.250	-		8.0	20.360	28.860		28.860		28.860		
S	INSTRUMENTMAN (018.167-034)	8/22/2020	09/30/2020*	&	13.000	2.200	-	U	0.650	0.250	-		8.0	16.100	22.600		22.600		22.600		
S	CHAINMAN/RODMAN (869.567-010)	8/22/2020	09/30/2020*	&	13.000	2.200	-	V	0.540	0.250	-		8.0	15.990	22.490		22.490		22.490		
# W	GLAZIER	8/22/2020	12/31/2020*	A	40.560	10.450	X	19.220	-	1.090	Y	0.380	8.0	71.700	Z	91.980		112.260		112.260	
# AA	MARBLE FINISHER	8/22/2020	07/31/2021**	AB	36.530	10.750	5.340	L	-	0.450	0.870		8.0	53.940	AC	72.210		90.470		90.470	
# AA	MARBLE MASON	8/22/2020	07/31/2021**	AB	51.300	10.750	16.120	L	-	0.800	1.190		8.0	80.160	AC	105.810		131.460		131.460	
#	PAINTER:																				
AD	BRUSH, SPRAY, PAPERHANGER	2/22/2020	06/30/2020*	H	34.830	10.450	AE	9.460	L	-	0.630		0.360	D	8.0	55.730	73.150	AF	73.150		90.560
AD	METALIZING AND THERMAL SPRAY SANDBLASTER, STEAM CLEANER, WATERBLASTER	2/22/2020	06/30/2020*	H	38.830	10.450	AE	9.460	L	-	0.630		0.360	D	8.0	59.730	79.150	AF	79.150		98.560
AD	EXOTIC MATERIALS, LEAD ABATEMENT	2/22/2020	06/30/2020*	H	35.330	10.450	AE	9.460	L	-	0.630		0.360	D	8.0	56.230	73.900	AF	73.900		91.560
AD	INDUSTRIAL PAINTER	2/22/2020	06/30/2020*	H	36.330	10.450	AE	9.460	L	-	0.630		0.360	D	8.0	57.230	75.400	AF	75.400		93.560
AG	TAPER	2/22/2020	12/31/2020**	AH	47.330	10.450	14.680	L	-	0.860	0.580		8.0	73.900	AI	97.570	AI	97.570	AF	121.230	
AJ	BRUSH & ROLLER	8/22/2020	06/30/2021*	AK	29.800	6.960	6.130	-	0.350	0.100			8.0	43.340	58.240	AL	58.240	AL	73.140		
AJ	SPRAY PAINTER, PAPERHANGER SANDBLASTER, SPECIAL COATING- BRUSH	8/22/2020	06/30/2021*	AK	31.290	6.960	6.130	-	0.350	0.100			8.0	44.830	60.480	AL	60.480	AL	76.120		
AJ	STRUCTURAL STEEL & STEEPLEJACK 40', SPECIAL COATING APPLICATION SPRAY	8/22/2020	06/30/2021*	AK	31.290	6.960	6.130	-	0.350	0.100			8.0	44.830	60.480	AL	60.480	AL	76.120		
AJ	SPECIAL COATING (SPRAY STEEL)	8/22/2020	06/30/2021*	AK	31.290	6.960	6.130	-	0.350	0.100			8.0	44.830	60.480	AL	60.480	AL	76.120		
AJ	SWING STAGE	8/22/2020	06/30/2021*	AK	31.800	6.960	6.130	-	0.350	0.100			8.0	45.340	61.240	AL	61.240	AL	77.140		
AJ	TAPER	8/22/2020	06/30/2021**	AM	35.150	6.960	6.810	L	-	0.250	0.050		8.0	49.220	66.790	AL	66.790	AL	84.370		
AJ	STEEPLEJACK TAPER	8/22/2020	06/30/2021**	AM	36.650	6.960	6.810	L	-	0.250	0.050		8.0	50.720	69.040	AL	69.040	AL	87.370		
#	PLASTERER	8/22/2020	06/30/2021*	AN	37.970	13.780	17.340	3.500	1.230	1.200			8.0	75.020	92.930	AO	92.930		110.850		
#	PLASTER TENDER	8/22/2020	06/30/2021**		34.270	9.000	13.280	3.470	0.500	AP	1.110		8.0	61.630	N	78.760	N	78.760		95.900	
#	PLUMBER:																				
	PLUMBER, STEAMFITTER, REFRIGERATION FITTER (HVAC)	8/22/2020	12/31/2020**		41.500	12.780	17.810	F	-	3.800	4.170		8.0	80.060	E	100.810	E	100.810		121.560	
	UNDERGROUND UTILITY PIPEFITTER	8/22/2020	06/30/2021**		29.900	11.650	AQ	3.000	1.250	0.400	0.800		8.0	47.000	61.950	D	61.950		76.900		
	LANDSCAPE PIPEFITTER	8/22/2020	06/30/2021**		29.900	11.650	AQ	3.000	1.250	0.400	0.800		8.0	47.000	61.950	D	61.950		76.900		
AR	UNDERGROUND UTILITY ASSISTANT JOURNEYMAN	8/22/2020	06/30/2021**		17.900	11.650	AQ	3.000	1.250	0.400	0.800		8.0	35.000	43.950	D	43.950		52.900		
AS	LANDSCAPE ASSISTANT JOURNEYMAN	8/22/2020	06/30/2021**		17.900	11.650	AQ	3.000	1.250	0.400	0.800		8.0	35.000	43.950	D	43.950		52.900		
AT	UNDERGROUND UTILITY TRADESMAN	8/22/2020	06/30/2021**		14.900	11.650	AQ	3.000	1.250	0.400	0.800		8.0	32.000	39.450	D	39.450		46.900		
AU	LANDSCAPE TRADESMAN I	8/22/2020	06/30/2021**		14.900	11.650	AQ	-	1.250	0.400	0.800		8.0	29.000	36.450	D	36.450		43.900		

LOCALITY: LASSEN COUNTY

DETERMINATION: LAS-2020-2

DETERMINATION: LAS-2020-2				EMPLOYER PAYMENTS							STRAIGHT-TIME		OVERTIME HOURLY RATE		
CRAFT (JOURNEY LEVEL)		ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	HEALTH AND WELFARE	PENSION	VACATION/HOLIDAY	TRAINING	OTHER PAYMENTS	HOURS	TOTAL HOURLY RATE	DAILY	SATURDAY	SUNDAY AND HOLIDAY	
AU	LANDSCAPE TRADESMAN II FIKE SPRINKLER FITTER (PROTECTION AND CONTROL SYSTEMS, OVERHEAD AND UNDERGROUND)	8/22/2020	06/30/2021**	14.900	11.650	AQ 3.000	1.250	0.400	0.800	8.0	32.000	39.450	D 39.450	46.900	
		8/22/2020	03/31/2021*	40.870	10.230	AV 15.020	-	0.520	0.250	8.0	66.890	87.320	87.320	107.760	
	ROOFER	2/22/2020	03/31/2020*	& 13.000	10.500	7.500	-	0.560	-	8.0	31.560	38.060	38.060	38.060	
#	SHEET METAL WORKER														
	METAL DECK & SIDING	8/22/2020	06/30/2021**	H 44.450	AQ 14.830	AW 20.400	F -	AX 0.320	-	8.0	80.000	AY 103.230	AY 103.230	126.450	
#	SHEET METAL WORKER	8/22/2020	06/30/2021*	A 46.600	14.750	AZ 24.070	F -	1.340	0.820	8.0	87.580	E 112.880	E 112.880	138.180	
	MECHANICAL JOB WHERE COST OF PROJECT IS \$500,000 OR UNDER	8/22/2020	06/30/2021*	A 35.160	14.750	AZ 20.020	F -	1.060	0.350	8.0	71.340	E 89.850	E 89.850	108.360	
# BA	TERRAZZO FINISHER	8/22/2020	06/30/2021**	BB 38.670	10.750	5.870	F -	0.800	1.000	8.0	57.090	AY 74.090	AY 74.090	91.090	
# BA	TERRAZZO WORKER	8/22/2020	06/30/2021**	BB 50.660	10.750	15.370	F -	0.800	1.220	8.0	78.800	AY 101.050	AY 101.050	123.300	
#	TILE FINISHER	2/22/2020	06/27/2020*	25.900	BC 7.250	0.850	A 0.700	0.300	0.100	8.0	35.100	40.800	40.800	53.750	
#	TILE SETTER	2/22/2020	06/27/2020*	40.350	BC 7.100	BD 12.900	A 1.300	0.300	0.200	8.0	62.150	64.580	64.580	84.750	
	WATER WELL DRILLER	2/22/2020	03/31/2020*	13.000	2.150	1.000	0.480	-	-	8.0	16.630	BE 23.130	BE 23.130	BE 23.130	
	PUMP INSTALLER	2/22/2020	03/31/2020*	13.000	2.150	1.000	0.480	-	-	8.0	16.630	BE 23.130	BE 23.130	BE 23.130	
	HELPER	2/22/2020	03/31/2020*	13.000	2.150	1.000	0.430	-	-	8.0	16.580	BE 23.080	BE 23.080	BE 23.080	
FOOTNOTES															

[FOOTNOTES](#)

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.4
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

LOCALITY: LASSEN COUNTY
DETERMINATION: LAS-2020-2

DETERMINATION: LAS-2020-2				EMPLOYER PAYMENTS						STRAIGHT-TIME		OVERTIME HOURLY RATE		
CRAFT (JOURNEY LEVEL)		ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	HEALTH AND WELFARE	PENSION	VACATION/ HOLIDAY	TRAINING	OTHER PAYMENTS	HOURS	TOTAL HOURLY RATE	DAILY	SATURDAY	SUNDAY AND HOLIDAY
#	BRICKLAYER, BLOCKLAYER, POINTER, CLEANER, CAULKER, WATERPROOFER (2ND SHIFT)	8/22/2020	06/30/2021**	A 54.000	10.750	11.220	B -	1.510	0.430	C 8.0	77.910	104.910	D 104.910	131.910
	POINTER, CLEANER, CAULKER, WATERPROOFER (3RD SHIFT)	8/22/2020	06/30/2021**	A 56.350	10.750	11.220	B -	1.510	0.430	C 8.0	80.260	108.430	D 108.430	136.610
#	BRICKLAYER, BLOCKLAYER: BRICKLAYER, BLOCKLAYER, STONEMASON (2ND SHIFT)	8/22/2020	04/30/2021**	A 47.130	10.750	9.320	E 2.500	0.800	F 1.810	C 8.0	72.310	G 97.130	G 97.130	121.940
	BRICKLAYER, BLOCKLAYER, STONEMASON (3RD SHIFT)	8/22/2020	04/30/2021**	A 49.390	10.750	9.320	E 2.500	0.800	F 1.810	C 8.0	74.570	G 100.510	G 100.510	126.460
#	BRICK TENDER													
	BRICK TENDER (SPECIAL SINGLE SHIFT)	8/22/2020	06/30/2021**	H 38.890	9.000	11.210	B -	0.450	0.300	8.0	59.850	I 79.290	I 79.290	98.740
#	ELECTRICIAN:													
	COMM & SYSTEM INSTALLER, SECOND SHIFT	2/22/2020	01/31/2021*	35.600	11.300	J 5.950	-	1.100	K 1.110	8.0	56.310	74.730	74.730	L 93.160
	COMM & SYSTEM INSTALLER, THIRD SHIFT	2/22/2020	01/31/2021*	39.880	11.300	J 5.950	-	1.100	K 1.110	8.0	60.740	81.370	81.370	L 102.010
	COMM & SYSTEM TECH., SECOND SHIFT	2/22/2020	01/31/2021*	40.940	11.300	J 5.950	-	1.100	K 1.110	8.0	61.830	83.010	83.010	L 104.200
	COMM & SYSTEM TECH., THIRD SHIFT	2/22/2020	01/31/2021*	45.860	11.300	J 5.950	-	1.100	K 1.110	8.0	66.930	90.660	90.660	L 114.390
	INSIDE WIREMAN, 2ND SHIFT	8/22/2020	01/31/2021**	47.580	12.760	J 8.750	B -	1.760	M 7.970	8.0	81.010	105.890	105.890	L 130.770
	INSIDE WIREMAN, 3RD SHIFT	8/22/2020	01/31/2021**	53.300	12.760	J 8.750	B -	1.760	M 7.970	8.0	86.990	114.860	114.860	L 142.740
	CABLE SPLICER, 2ND SHIFT	8/22/2020	01/31/2021**	52.340	12.760	J 8.750	B -	1.760	M 7.970	8.0	85.990	113.370	113.370	L 140.740
	CABLE SPLICER, 3RD SHIFT	8/22/2020	01/31/2021**	58.630	12.760	J 8.750	B -	1.760	M 7.970	8.0	92.570	123.230	123.230	L 153.900
#	MARBLE FINISHER													
N	MARBLE FINISHER (2ND SHIFT)	8/22/2020	07/31/2021**	O 41.530	10.750	5.340	P -	0.450	0.870	8.0	58.940	Q 79.710	100.470	100.470
#	MARBLE MASON													
N	MARBLE MASON (2ND SHIFT)	8/22/2020	07/31/2021**	O 57.300	10.750	16.120	P -	0.800	1.190	8.0	86.160	Q 114.810	143.460	143.460
#	SHEET METAL WORKER													
	SHEET METAL WORKER (2ND SHIFT)	8/22/2020	06/30/2021*	A 51.260	14.750	R 24.070	B -	1.340	0.820	S 7.5	92.240	G 119.870	G 119.870	147.500
	SHEET METAL WORKER (3RD SHIFT)	8/22/2020	06/30/2021*	A 53.590	14.750	R 24.070	B -	1.340	0.820	T 7.0	94.570	G 123.370	G 123.370	152.160
	MECHANICAL JOB WHERE COST OF PROJECT IS \$500,000 OR UNDER (2ND SHIFT)	8/22/2020	06/30/2021*	A 38.680	14.750	R 20.020	B -	1.060	0.350	S 7.5	74.860	G 95.130	G 95.130	115.400
	MECHANICAL JOB WHERE COST OF PROJECT IS \$500,000 OR UNDER (3RD SHIFT)	8/22/2020	06/30/2021*	A 40.430	14.750	R 20.020	B -	1.060	0.350	T 7.0	76.610	G 97.760	G 97.760	118.900
#	TERRAZZO FINISHER													
U	TERRAZZO FINISHER, 2ND SHIFT	8/22/2020	06/30/2021**	V 43.670	10.750	5.870	B -	0.800	1.000	8.0	62.090	W 81.590	W 81.590	101.090
U	TERRAZZO FINISHER, 3RD SHIFT	8/22/2020	06/30/2021**	V 43.670	10.750	5.870	B -	0.800	1.000	8.0	62.090	W 81.590	W 81.590	101.090
#	TERRAZZO WORKER													
U	TERRAZZO WORKER, 2ND SHIFT	8/22/2020	06/30/2021**	V 58.660	10.750	15.370	B -	0.800	1.220	8.0	86.800	W 113.050	W 113.050	139.300
U	TERRAZZO WORKER, 3RD SHIFT	8/22/2020	06/30/2021**	V 58.660	10.750	15.370	B -	0.800	1.220	8.0	86.800	W 113.050	W 113.050	139.300

[FOOTNOTES](#)

SECTION 01 35 91

HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general protection and treatment procedures for designated historic spaces, areas, rooms, and surfaces in the Project including but not limited to the following:
 - 1. Installation of protection at exterior and interior surfaces to prevent damage to all historic elements due to construction activities.
 - 2. Maintain protection as required for the duration of the work and remove protection upon completion of the work.
 - 3. General treatment of historic elements as required during construction.
 - 4. Preconstruction documentation and photographs, Historic Treatment Program and other quality assurance measures and submittals required during construction.
- B. As the project addresses an historic building listed on the National Register of Historic Places, the work is generally guided by the Secretary of the Interior's Standards for Rehabilitation, National Park Service and U.S. Department of the Interior, <http://www.nps.gov/tps/standards/rehabilitation.htm> listed in article 1.4 below. The Standards for Rehabilitation are commonly referenced standards by agencies and practitioners to guide best practices with historic properties. In circumstances when the Contractor has question regarding objectives of the project regarding treatment of historic features, the Contractor shall consult with the Owner.

1.3 REFERENCES

- A. U.S. Department of the Interior, National Park Service: "Preservation Tech Notes" <http://www.nps.gov/tps/how-to-preserve/tech-notes.htm> including, but not limited to the following:
 - 1. Preservation Tech Note. Temporary Protection Number 2, "Specifying Temporary Protection of Historic Interiors During Construction and Repair", National Park Service, Preservation Assistance Division, P.O. Box 37127, Washington, D.C. 20013.
- B. U.S. Department of the Interior, National Park Service: "Preservation Briefs", <http://www.nps.gov/tps/how-to-preserve/briefs.htm>

- C. NFPA 241. Safeguarding Building Construction and Demolition Operations, National Fire Protection Agency, Quincy, MA (800) 344-3555.
- D. U.S. Department of the Interior, National Park Service: "The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, & Reconstructing Historic Buildings"

1.4 THE SECRETARY OF THE INTERIOR'S STANDARDS FOR REHABILITATION

- A. The Standards for Rehabilitation are ten basic principles created to help preserve the distinctive character of a historic building and its site, while allowing for reasonable change to meet new needs.
- B. The Standards (36 CFR Part 67) apply to historic buildings of all periods, styles, types, materials, and sizes. They apply to both the exterior and the interior of historic buildings. The Standards also encompass related landscape features and the building's site and environment as well as attached, adjacent, or related new construction.
- C. The Standards are applied to projects in a reasonable manner, taking into consideration economic and technical feasibility.
- D. The Standards for Rehabilitation:
 - 1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
 - 2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
 - 3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
 - 4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
 - 5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
 - 6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
 - 7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
 - 8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

1.5 DEFINITIONS

- A. Consolidate: To strengthen loose or deteriorated materials in place.
- B. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- C. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, including all associated parts, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged, stored, or reinstalled.
- D. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.
- E. Historic: Spaces, areas, rooms, surfaces, materials, finishes, fixtures, and overall appearance that are important to the historic significance of the building. Designated primary historic spaces are labeled on the drawings.
 1. Primary Significance: Areas of greatest architectural importance, integrity, and visibility; to be maintained and preserved as indicated on Drawings.
- F. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, finish, design, dimensions, and placement; as approved by Architect.
- G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- I. Remove: To take down or detach a historic item, or a nonhistoric item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged, stored, or reinstalled.
- J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

- L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- M. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- O. Retain: To keep existing items that are not to be removed or dismantled.
- P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
- Q. Salvage: To protect removed or dismantled items, inventory, clean, protect and store. Salvaged materials may be reinstalled in the Project. Salvaged materials not to be installed in the Project will be stored in the designated room in the Basement level.
- R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- S. Strip: To remove existing finish down to base material without any damage to base material unless otherwise indicated.

1.6 COORDINATION

- A. Historic Treatment Subschedule: A construction schedule coordinating the sequencing and scheduling of historic treatment work for entire Project, including each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces; and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for historic treatment work.
 - 1. Schedule construction operations in sequence required to obtain best historic treatment results.
 - 2. Coordinate sequence of historic treatment work activities to accommodate the following, as applicable:
 - a. Other known work in progress.
 - b. Tests and inspections.
 - 3. Detail sequence of historic treatment work, with start and end dates.
 - 4. Sequence of required mockups and material testing.
 - 5. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 - 6. Use of elevator and stairs.
 - 7. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

- B. Exterior Public Circulation: Coordinate historic treatment work with public circulation patterns at Project site. Some work is near public circulation patterns and sidewalks/roads. Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Coordinate closure, temporary redirection, and circulation with Owner and Occupant. Plan and execute the Work accordingly.

1.7 PROJECT MEETINGS FOR HISTORIC TREATMENT/PROTECTION

- A. Preliminary Conference: Before starting treatment/protection work, conduct conference at Project site.
1. Attendees: In addition to representatives of the Owner, Architect, and Contractor, testing service representative, and installers whose work interfaces with or affects historic treatment/protection shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of historic treatment/protection work, including review of the following:
 - a. Historic Treatment/Protection Program and Subschedule: Discuss and finalize; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-Prevention Plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection.
 - e. Hauling routes.
 - f. Sequence of historic treatment/protection work operations in relation to the sequence of other work in the Project, including hazardous materials treatment.
 - g. Storage, protection, and accounting for salvaged and specially fabricated items.
 - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - i. Qualifications of personnel assigned to historic treatment work and assigned duties. Qualifications pertain to General Contractor, specialty SubContractors, and specialty tradespersons to be responsible for work relating to historic treatments.
 - j. Requirements for extent and quality of work, tolerances, and required clearances.
 - k. Methods and procedures related to historic treatment/protection, including product manufacturers' written instructions and precautions regarding historic treatment procedures and their effects on materials, components, and vegetation.
 - l. Embedded work such as flashings and lintels, special details, collection of wastes, protection of occupants and the public, and condition of other construction that affect the Work or will affect the work.
 - m. Process to be followed for submittals and RFIs.
 - n. Process to be followed for gaining approval from the Owner and Architect for submittals, mockups, testing, and other required processes specified in Contract Documents.

3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

1.8 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques, items with logos, antiques, original fixtures, equipment, trim pieces, bricks, original flooring and other items of interest or value to the Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property. Refer to drawings for description of historic items for protection.
 1. As indicated on drawings, carefully dismantle and salvage, protect and maintain, preserve, or retain each item or object and protect it from damage.
 2. Coordinate with Owner if Contractor has any question on the nature of the item, and expected procedures for treatment.

1.9 SUBMITTALS

- A. All submittals indicated in this Section are to be submitted according to the procedures outlined in Division 01 General Requirements and highlighted on front page of submittal as "Historic Treatment Submittal".
- B. Field Supervisor Qualifications as listed in Quality Assurance section below.
- C. Historic Treatment Subschedule.
 1. Submit historic treatment subschedule within 30 days of date established for commencement of historic treatment work.
- D. Preconstruction Documentation: Contractor to show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations. Include photographic documentation of all areas and spaces, sufficient to judge pre-existing conditions related to the Work, as described below.
 1. Submit Preconstruction Documentation 10 days prior to commencement of historic treatment work.
 2. Submit one electronic copy and minimum of 3 hard copies of Preconstruction Documentation.
 3. Photographs: Document the condition of all existing historic elements and the adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by historic treatment operations. All preconstruction photographs to be taken before work begins. Submit construction photos at regular intervals throughout the work and when conditions are uncovered during the course of the work.
 - a. All photographs to be taken with one of the following and complying with:

- 1) 35mm SLR camera (for film camera)
 - 2) Minimum Digital Format: 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph.
 - b. As part of the photographic documentation submittal the Contractor has the option to accept the conditions as depicted in the Owners photographic model (Matterport) in lieu of photographing interior spaces and features before the work begins. The Contractor should submit this acceptance in writing and note any exceptions taken with the condition of the spaces and its contents.
- E. Historic Treatment Program: Submit 10 days before work begins as listed in Quality Assurance section below.
- F. Fire-Prevention Plan: Submit 30 days before work begins as listed in Quality Assurance section below.
- G. Off-site Storage Facilities. Submit detailed description of building and/or other areas proposed for storage of removed historic elements. Include location, size, physical attributes, security techniques and procedures and other pertinent information relating to the storage of salvaged elements. Off-site Storage will be utilized for salvaged materials only when approved by the Owner and Preservation Director, and only when on-site storage is not viable.
- H. Mock-up: Prepare on-site mock-up of proposed protection at the following areas for review by the Owner and Architect prior to the commencement of work including support details indicating no direct attachment of protection to building:
1. Protection at interior wall, ceiling and floor surfaces.
 2. Protection at existing window and door openings, including following removal of windows and doors.
 3. Protective barrier between work areas and non-work areas.
 4. Protection of stair and balustrade within primary significant historic area.
- I. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of work, provide a written description including evidence of successful use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this Project.

1.10 QUALITY ASSURANCE

- A. Field Supervisor Qualifications: Full-time supervisors experienced in work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site when historic treatment work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
- B. Historic Treatment Program: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail the materials, methods, and equipment to be used for each phase of work, including removal and salvage of elements, cataloging, and transportation of items to

off-site storage, protection of elements in storage, and protection of elements to remain on site. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project historic treatment program with specific requirements of programs required in other Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
3. Protection: Provide methodology, plans and description for protection of in-situ historic materials, consistent with Construction Documents, including;
 - a. Floors and walkways to remain
 - b. Walls, windows, doors, openings, trim, cabinetry, historic lighting, or other fixed elements to remain attached to structure
 - c. Ceilings to remain, where in primary significant historic area and at risk of damage.
 - d. Stairway and ballustrade
 - e. Signage to properly notify workers, inspectors and the public;
 - 1) Protection Boundary – see Exhibit 1 below.
- C. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's removal and dismantling operations. Submit Preconstruction Documentation 10 days prior to commencement of historic treatment work.
- D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire watch personnel's training, duties, and authority to enforce fire safety.
- E. Contractor is hereby directed to recognize the value and significance of the building and exercise special care during the work to ensure that the existing building, its details, materials and finishes which are to remain are not damaged by the work being performed.
- F. Contractor shall be responsible for protection of all existing materials and components to remain in place throughout the duration of construction. Extent of protection is to cover all historic elements to remain that are in the vicinity of construction activities, or may be harmed by the movement of materials through the building and project site, whether specifically called out on the drawings, or not. It is the Contractor's responsibility to provide any additional protection required to prevent soiling and damage to existing finishes and elements to remain. All questionable protection requirements should be identified for Owner review. In the event of damage, such items shall be repaired or replaced by the contractor at his expense, to the satisfaction of the Owner.
- G. Do not attach protection materials directly to building elements or in a manner that may damage adjoining materials or finishes.

H. Protection is to be secured adequately so as to maintain a safe environment for workers throughout the duration of the project.

I. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.11 STORAGE AND HANDLING OF HISTORIC MATERIALS

A. Category A: Protect in Place:

1. Protect construction indicated to remain against damage and soiling from construction work. Ensure that protection materials and systems can be removed after conclusion of work without damage to materials or adjacent items.

B. Category B: Protect in Place or Salvage and Reinstall at Original Location:

1. Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Owner, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete. If permitted, document salvaged items according to project specifications.

C. Category C: Remove and Dispose: Remove materials as indicated in construction documents and dispose. Comply with applicable laws and regulations for the handling of waste.

1.12 PROJECT SITE CONDITIONS

A. Owner and/or tenant may require access to portions of building during the Project. Coordinate with the Owner to understand access requirements.

B. Coordinate the performance of work of this section with related or adjacent work. Removal and protection of items shall be completed prior to commencement of demolition or new construction activities in each area and along pathways to/from the work area. At a minimum, install protection in its entirety for a given area and along pathways to/from the work area prior to commencement of any demolition activities in that given area.

C. At the end of each working day, or during inclement weather, cover work exposed to weather with waterproof coverings, securely anchored.

D. Protection of historic elements shall remain in place for the duration of the entire project and be removed at the completion of the project.

1. Do not store construction materials on or inside protection.

E. Ensure safe passage of persons around areas of protection. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons.

F. Storage Conditions: Catalog and store historic items within a weathertight enclosure where they are protected from moisture, weather, condensation, freezing temperatures, and any other deterioration-inducing conditions.

1. Secure stored materials to protect from theft.

2. Control humidity and temperature as outlined in Part 3 of this Section so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.
3. Coordinate storage with Salvage and Inventory requirements as defined in Section 02 42 96 "Historic Removal, Inventory and Salvage".

G. Storage Space:

1. Salvaged historic material is to be stored on-site in designated location(s) reviewed with Owner. Coordinate details with Owner.
2. Arrange for off-site locations for storage and protection of historic material that cannot be stored on-site as pre-approved by Owner.

1.13 FIELD CONDITIONS

- A. Size Limitations in Historic Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more and as required to prevent damage.

1.14 REPAIR AND REPLACEMENT OF DAMAGE TO HISTORIC FEATURES TO REMAIN CAUSED BY CONTRACTOR

- A. Contractor shall be responsible for redress of all damage to historic features caused by the Contractor in the course of the work due to actions undertaken that are not in accordance with Contract Documents, methodologies not in accordance with Contract Documents and written direction by the Owner and Architect during construction, unintentional accident by the Contractor, and theft or harmful actions by the Contractor.
- B. The redress of all damage shall either repair the damage to match in-kind the original feature, or replace the damaged feature in-kind where repair is not feasible, to the satisfaction of the Owner.
- C. Contractor is to notify the Owner of known damage within 5 days of the damage becoming known to the Contractor.
- D. The repair methodology, material, and specifications shall be approved by the Owner and Owner's Preservation Director prior to implementation of the repair work. Provide adequate time for review of proposed repairs/replacements by Owner staff, Architect, Preservation Architect, and Engineers as required.
- E. The repair or replacement of damage by the Contractor may include monetary damages to the Owner and/or the hiring of a qualified restoration/conservation firm approved by the Owner to undertake the repairs or the replacement of the damaged feature if the Contractor is unable to complete the repair and replacement to match in-kind.
- F. The in-kind repair and/or replacement of work will follow the Contract Documents and the U.S. Department of the Interior, National Park Service: "The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, & Reconstructing Historic Buildings".

1.15 HISTORIC SIGNIFICANCE AND CHARACTER-DEFINING FEATURES

- A. The Lassen County Courthouse is a structure listed on the National Register of Historic Places.
- B. The Owner has possession of documents which outline the levels of historic significance and the character-defining features of the Lassen County Courthouse.
- C. The performance of work is to protect the building's significant character and maintain its historic integrity.
- D. Contractor to notify Owner or Owner's representative when confirmation of historic materials and treatment of historic materials is needed to properly execute work. Provide adequate time for response and clarification.

PART 2 - PRODUCTS

2.1 PROTECTION MATERIALS

- A. Polyethylene sheets: 4 mil.
- B. Corrugated polyethylene sheet: 3/16" thick.
- C. Lumber: Species to be selected by contractor, sizes to fit field conditions.
- D. Plywood: 1/2 inch, 3/4 inch, or 1-inch, as needed. Use exterior-grade at all exterior locations.
- E. Soft Fiberboard: Homasote Company, 1/2 inch homasote 440.
- F. Heavy-duty reusable floor and wall protection with spill guard: Ram Board, rolls 38in x 100ft, as needed.
- G. Neoprene: 1/4 inch or 1/2 inch strips, stock lengths.
- H. Ethafoam: 1/2 inch thickness with a density of 2.3 to 3.3 pounds/cubic foot.
- I. Semi-rigid polyurethane foam sheets: 2-inch and 4-inch thick, as needed.
- J. Brown paper: Kraft paper, 50lb min.
- K. Non-abrasive glassine paper.
- L. Preservation tape: 3M Scotch brand, number 4811.
- M. Blue painter's tape.
- N. Sealant: Removable acrylic sealant.
- O. Pads: Fabric padding material.
- P. Metal prong mending plates for plywood.

Q. Accessories: Fasteners, nails, screws, bolts, anchors or other devices required to complete installation, sizes as needed.

R. Plastic bollards, cones and other free-standing barrier devices.

PART 3 - EXECUTION

3.1 PROTECTION, GENERAL

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where historic treatment work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during historic treatment work.
5. Contain dust and debris generated by historic treatment work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.
9. Provide signage to inform the public when area is to be avoided and paths of travel altered in zones of the Project normally occupied by the public. Signage to be printed material with contrasting, legible lettering that may be read from a distance of 10 feet. Refer to Exhibit 1 below.
10. Provide temporary lighting to protect the public from temporary barriers that are not visible at night and are in zones of the Project normally occupied by the public.

B. Temporary Protection of Historic Materials:

1. Protect existing historic materials to remain with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Install protection in its entirety before commencement of demolition or other work that may harm historic elements.
3. Do not attach temporary protection to historic surfaces or elements, except as indicated as part of the historic treatment program and approved by Architect.
4. Secure protection adequately so as to maintain a safe environment for workers and other individuals using the building throughout the duration of the project.
5. Remove all protection at the completion of the project.

6. Clean all surfaces that received protection and restore to condition prior to commencement of project.

C. Elements to be Removed for Salvage:

1. Disassemble, label, catalogue, handle, transport and store building elements which have been identified for salvage. Refer to Specification Section 02 42 96 Historic Removal, Inventory and Salvage.

D. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

E. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by historic treatment work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

F. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as stone or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work or other work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PREPARATION

- A. Remove all debris and impediments to allow for full access as required to perform protection of historic elements, and for demolition and construction. Protect all historic elements from damage during the removal procedures as specified.
- B. Verify condition of the off-site facility or other storage location to ensure that there is adequate capacity and access to store and retrieve salvage elements.
- C. Transport items to the off-site facility or other storage location as often as necessary to avoid stockpiling items on site.

3.3 INSTALLATION OF PROTECTION

A. General:

1. Alternative methods to specified protection may be acceptable if equal or greater protection is provided. Submit alternate methods to the Owner for review. Do not proceed with alternate methods until approvals are secured.
 2. Protection is required to remain in place for the duration of the project. Protection may have to be removed during the project for access to protected elements, etc. If protection is temporarily removed, reinstall after work is complete and maintain protection throughout the duration of the project.
 3. Extent of protection covers all historic elements within the primary significant historic area that will remain during construction, whether specifically called out on the drawings or not. Temporary protection may be required in areas to perform specific work activities. All questionable protection requirements should be identified for the Owner's review.
 4. All protection assemblies shall be self-supporting and self-bracing. Do not attach protection directly to historic elements.
- B. Protection at Floor / Staircase / Balustrade: covering materials in primary path of construction travel and one stair in Entrance Lobby. Defined as those areas that will experience a high level of traffic with finish materials that require a high level of protection care.
1. Vacuum floor surface of all loose dust and debris.
 2. Cover entire pathway surface with 1 sheet of polyethylene, 1 layer of 3/16 inch corrugated polyethylene and 1/2 inch plywood. Fasten edges to prevent slippage. Tape all polyethylene edges to create a watertight seal. Stagger edges of materials with joints below to provide a uniform flush surface.
 3. Maintain extra polyethylene sheeting to provide a continuous wrap up the wall base and wall surface where indicated on drawings.
- C. Protection at Threshold: covering marble thresholds in path of construction travel.
1. Cover surface with 1 sheet of polyethylene, 1 layer of 3/16 inch corrugated polyethylene and 1/2 inch plywood. Fasten edges to prevent slippage. Tape all polyethylene edges to create a watertight seal.
- D. Protection at Wall Base: covering wall base and lower 3 feet section in path of construction travel.
1. Cover surface with 1 sheet of polyethylene, 1 layer of 3/16 inch corrugated polyethylene. and 1/2 inch plywood. Fasten edges to prevent slippage. Tape all polyethylene edges to create a watertight seal.
- E. Protection at Jamb / Head Openings: covering door and window jambs and heads where door or window is temporarily removed.
1. Interior and exterior openings at jamb and head to be covered with 1 sheet of polyethylene, 1 layer of 3/16 inch corrugated polyethylene and 1/2 inch plywood. Fasten edges to prevent slippage. Tape all polyethylene edges to create a watertight seal.

2. Exterior openings to be protected with a weatherproof barrier and one that is tamper-resistant to prevent unauthorized entry. At each opening, leave protection in place and maintain weatherproof seal until installation of new window or door or reinstallation of existing window or door removed for Work. Barrier shall be constructed of plywood and lumber, or other material as suggested by Contractor and approved by Owner, and shall not be fastened directly to building.
- F. Other miscellaneous items to be protected in place: including plaster wall details, drinking fountains, plaques, historic light fixtures, decorative ceilings and other features. Defined as those miscellaneous items that require protection care.
1. Cover with 1 sheet of polyethylene. Tape all polyethylene edges to create a watertight seal.
 2. Provide neoprene pads, foam padding or other cushioned material where needed to protect from contact with other elements.
 3. Provide corrugated polyethylene where item is within 8 feet from floor in a circulation path or where added protection is needed.
- G. Exterior masonry in the vicinity of debris chutes or within vicinity of circulation paths:
1. Cover stone, terra cotta, pavers, etc with 1 sheet of polyethylene, 1 layer of 3/16 inch corrugated polyethylene. and 1/2 inch exterior-grade plywood. Fasten edges to prevent slippage. Tape all polyethylene edges to create a watertight seal.
 2. Utilize ethafoam to absorb impact where necessary.

3.4 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
1. Comply with NFPA 241 and California Fire Code requirements unless otherwise indicated.
 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
 3. Prohibit smoking by all persons within Project work and staging areas.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
1. Obtain Owner's approval for operations involving use of open-flame, welding or other high-heat equipment. Notify Owner at least 72 hours before each occurrence, indicating location of such work.

2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
 - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work at each area of Project site to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
 - e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.
- C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is completed.

3.5 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Comply with the chemical cleaner manufacturer's recommendations for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemicals and adhesives.

- C. Cover adjacent surfaces with protective materials that are proved to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials, especially maskings to prevent staining from adhesive.
- D. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- E. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.
- F. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for all persons and vehicles that must remain in operation during course of restoration work.
- G. Comply with requirements in Division 1 "Temporary Facilities and Controls".
- H. Collect and dispose of runoff from chemical operations by legal means and in accordance with all ordinances, and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.6 CATALOGING OF SALVAGE ELEMENTS

- A. General: Label elements in a manner to permit reinstallation in its original location and configuration, or in a new location. Refer to Section 02 42 96 "Historic Removal, Inventory and Salvage".

3.7 REMOVAL OF SALVAGE ELEMENTS

- A. General:
 - 1. Exercise extreme care in removing elements for salvage and materials attached to historic elements that are to remain.
 - 2. Unbolt bolted connections; leave embedded connector undisturbed and in place for later element reinstallation.
 - 3. Unscrew screwed connections; leave embedded connector undisturbed and in place for later element reinstallation.
 - 4. Do not pry apart members whose finishes chipping, crazing or cracking will damage, or whose structural integrity will be compromised.
 - 5. Remove all nails from wood elements from the backside. Drive nails through or pull from the back so that the head does not splinter the finish face.
 - 6. Remove items whole whenever possible. Where cuts are required, make cuts cleanly and with the proper tool at logical break points.

- B. Door Assemblies: Remove doors in whole sections. Remove all hardware. Store door and frame together. Store all hardware components together with elements from which they were removed.
- C. Light Fixtures: Remove light fixtures in whole units. Remove and salvage all fastening and/or mounting hardware. Protect existing wiring if wiring will be reused.

3.8 STORAGE

- A. Transport items to the on-site or off-site storage facility as needed and as designated by Owner or indicated on Drawings. Store elements in their natural configuration, i.e. store doors in an upright position.
- B. Catalog and store historic items within a weathertight enclosure where they are protected from moisture, weather, condensation, freezing temperatures, and any other deterioration-inducing conditions.
- C. Secure stored materials to protect from theft.
- D. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point. Store metals, inlaid wood, textiles, and all climate sensitive materials in clean, secure location with temperature between 65°F and 75°F and relative humidity between 50% and 60%.
- E. Do not cover wood elements entirely; allow air to circulate around wood elements to prevent the growth of mold or mildew.
- F. Record the moisture percentage of the wood elements just prior to removal and immediately upon delivery to the storage facility. Maintain the same moisture level throughout the duration of storage.
- G. Install kraft paper between wood elements if necessary to prevent paint or other coatings from damaging adjacent elements.
- H. Organize elements so that they are readily retrievable. Store like together.

3.9 REINSTALLATION OF SALVAGED ITEMS

- A. Reinstall salvage elements in their original location, or in their new location as indicated on drawings.
- B. Perform reinstallation without damage to the material itself, to adjacent materials, or to the substrate.
- C. Contractor is responsible for proper inventorying and distribution of salvaged material for reinstallation.
- D. Re-use original fastener locations and nail or screw holes. Strengthen or consolidate original holes as needed.

3.10 CLEAN-UP

- A. All residue and debris from protection work is to be removed from existing construction leaving the premises clean and neat.
- B. Clean surfaces that received protection and restore to condition prior to commencement of project.
- C. Review condition of premises with Owner and obtain Owner's acceptance of the condition.

END OF SECTION

EXHIBIT 1: HISTORIC BOUNDARY SIGNAGE

**PRIMARY SIGNIFICANT
HISTORICAL AREA**

STAY CLEAR

**DO NOT STORE OR STACK
ANY MATERIALS
WITHIN THIS BOUNDARY**

SECTION 02 30 00
SUBSURFACE INVESTIGATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Geotechnical Investigation Report:

1. A Geotechnical Investigation Report has been prepared for the site of this Project by Nova Geotechnical and Inspection Services, 695 Edison Way, Reno, Nevada, 89502, Phone: 775-856-5566.
2. The report is titled as: Geotechnical Investigation Report, Lassen County Courthouse, New Detached Elevator, 220 South Lassen Street, Susanville, Lassen County, California.
3. The report number is: RG-20-050, dated August 28, 2020.

B. Use of Data:

1. This report was obtained for use in Project design and is referenced for Contractor's information only.
2. Contents of the report referenced in this Section do not constitute a warranty of subsurface conditions.
3. Copies of this report can be obtained, upon request, at Architect's office.
4. Contractor shall visit the site to verify existing conditions.

1.2 QUALITY ASSURANCE

A. A Geotechnical Engineer/Testing Laboratory will be retained and paid by Owner to observe performance of work in connection with excavating, trenching, placing of compacted fill and backfilling operations and at the conclusion of the excavations to provide the following services:

1. Determine if the soil at the bottom of the excavations is suitable as a base for the structure.
2. Determine if compacted fill, backfill or any other required fill meets the requirements of the Specifications.
3. Determine if imported fill materials comply with the specified requirements.
4. Determine necessary adjustments in moisture content of soil, size of equipment, thickness of layers, and any tests as may be required to ensure a properly placed fill conforming to applicable requirements of Specifications.
5. Observation and testing by Geotechnical Engineer/Testing Laboratory shall be provided during filling and compacting operations. Contractor shall give at least two working days' notice prior to beginning such operations, to allow proper scheduling of observation and testing work.
6. Field density tests shall be performed by Geotechnical Engineer/Testing Laboratory after compaction of each layer of fill. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface. Additional layers of fill shall not be placed until the field density tests indicate that the specified density has been obtained.

- B. If Contractor fails to meet technical or design requirements of the Contract Drawings and requirements/recommendations of Geotechnical Investigation Report, necessary readjustments shall be made until all work is deemed satisfactory by Geotechnical Engineer/Testing Laboratory, and Architect.
 - 1. No deviation from Specifications shall be permitted without written acceptance from Architect.
- C. Differing Site Conditions: Report differences observed between actual conditions at the site and the conditions indicated in Geotechnical Investigation Report immediately upon discovery. Report the nature and extent of differences to Owner and Architect orally to permit early verification of the conditions, and concurrently submit it in writing.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of designated construction.
- B. Identification of utilities.
- C. Demolition requirements.

1.2 RELATED SECTIONS

- A. Division 01 Sections, as applicable.

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 01.
- B. Accurately record actual locations of capped utilities and subsurface obstructions.

1.4 REGULATORY REQUIREMENTS

- A. Perform work of this Section under provisions of CBC Chapter 33, CFC Chapter 33, and NFPA 241 for demolition work, safety of structure, dust control and safety of occupants.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress width to exits.
- D. Do not disable or disrupt building fire or life safety systems without three-day prior written notice to Owner.
- E. Conform to procedures applicable when discovering hazardous or contaminated materials.

1.5 SCHEDULING

- A. Schedule work under the provisions of Division 01.
- B. Describe demolition removal procedures and schedule.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

- A. Provide, erect and maintain temporary barriers as required.

- B. Erect and maintain temporary partitions to prevent spread of dust, odors and noise to adjoining facilities.
- C. Protect existing materials and finishes that are not scheduled or otherwise required to be demolished.
- D. Mark location of utilities.

3.2 DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent and occupied buildings.
- B. Maintain protected egress and access to the Work.

3.3 DEMOLITION

- A. Disconnect, remove, cap and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members and materials.
- C. Except where noted otherwise, remove demolished materials from site. Do not bury or burn materials on site.
- D. Remove demolished materials from site as Work progresses. Upon completion of Work, leave areas in clean condition.
- E. Remove temporary Work.

END OF SECTION

SECTION 03 11 00
CONCRETE FORMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork, shoring, bracing, and anchorage.
- B. Concrete formwork accessories.

1.2 RELATED SECTIONS

- A. Section 03 20 00 – Concrete Reinforcing.
- B. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ACI 301 – Specifications for Structural Concrete.
 - 2. ACI 347 – Guide to Formwork for Concrete.
 - 3. AHA A135.4 – Basic Hardboard.
 - 4. PS 1 – Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

- A. Design, engineer, and construct concrete formwork, shoring, and bracing in accordance with design and code requirements, resulting in cast-in-place concrete conforming to required shape, line, and dimension.

1.5 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature and product specifications for the following:
 - 1. Forms for architectural cast concrete finish.
 - 2. Accessories:
 - a. Chamfer strips.
 - b. Keyed construction joint.
 - c. Form ties.

d. Form release agent.

C. Shop Drawings: Indicate dimensions, materials, bracing, and location of joints and ties.

1.6 QUALITY ASSURANCE

A. Conform to ACI 347 for design, fabrication, erection, and removal of forms.

B. Field Samples: Provide only as requested by Architect.

C. Pre-Installation Meetings:

1. Conduct pre-installation meeting in accordance with Division 01.
2. Convene pre-installation meeting prior to commencing work of this Section.
3. Coordinate work in this Section with work in related Sections.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Architectural Cast Concrete Finish:

1. Phenolic-faced plywood (minimum 167 g/m² on both faces); minimum 5/8 inch thickness; conforming to PS 1 APA HDO Plyform Class II or better; sound, undamaged sheets with clean, true edges, joints taped.

B. Smooth Concrete Concealed from View: Plywood; 5/8 inch minimum thickness; conforming to PS 1 APA B-B Plyform Class II or better.

C. Concrete Concealed from View:

1. 2x lumber, plywood conforming to PS 1 APA Plyform Class II or better, tempered concrete form hardboard conforming to AHA A135.4, or other acceptable material.

2.2 ACCESSORIES

A. Chamfer Strips: Wood, metal, or rubber strips; size as shown on Drawings, minimum 3/4 inch by 3/4 inch.

B. Expansion Joint Filler: Refer to Section 03 30 00.

C. Foam Board Separation: Expanded polystyrene in size and thickness to suit application.

D. Keyed Construction Joint: Minimum 24 gauge galvanized steel; shaped with formed key (minimum 1-1/2 inch) for load transfer; and with knockouts for dowel placement.

1. Basis-of-Design Product: G-33 Screed Key Joint by Dayton/Richmond Concrete Accessories, Miamisburg, OH; 800-745-3700; www.daytonrichmond.com. Provide the named product or accepted equal.

E. Form Ties: Provide as indicated and as required.

1. Galvanized steel; adjustable length; cone type; snap-off type with 1 inch back break dimension; free of defects that could leave holes larger than 1 inch in concrete surface.

2. Substitution: In lieu of galvanized steel ties, Contractor may use stainless steel form ties of equal or higher strength.
 - a. Stainless Steel Form Tie System:
 - 1) Stainless Steel Snap Tie, Product No. A-44 by Dayton Superior, Miamisburg, OH; 800-745-37000; www.daytonsuperior.com.
 - 2) Stainless Steel Snap Ties by Meadow Burke, Tampa, FL; 877-518-7665, www.meadowburke.com.
 - 3) Or accepted equal.
- F. Nails, Spikes, Lag Bolts, Through-Bolts, Anchors: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- G. Spreaders: Metal; use of wood spreaders will not be permitted.
- H. Form Release Agent: Commercially formulated form release agents that will not bond with, stain or adversely affect concrete surface, and will not impair subsequent treatment of concrete surfaces, nor impede the wetting of surfaces to be cured with water or curing compounds. Product shall meet the VOC requirements at the location of use.
 1. Product: Duogard as manufactured by W.R. Meadows or accepted equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions and verify field dimensions.
- B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 EARTH FORMS

- A. Concrete may be placed against cut earth where feasible, conforming to the following criteria:
 1. Earth form trenches shall be able to stand without caving in.
 2. Sluffage will not be permitted.
 3. When, in the opinion of the Building Official and Architect, soil conditions do not require formwork per CBC Section 1808.8.5.
- B. Hand trim sides and bottoms of earth forms. Remove loose soil prior to placing concrete.

3.3 FORMWORK ERECTION

- A. Erect formwork, shoring, and bracing in accordance with ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit ease of dismantling and stripping and prevent damage to concrete during stripping.
- D. Align joints and make watertight. Keep form joints to a minimum.

- E. Obtain approval from Architect before framing openings not specifically indicated on Drawings.
- F. Perform electrical and mechanical work requiring concrete formwork under provisions of this Section.
- G. Stakes (wood and metal) used to support formwork or reinforcement, will not be permitted to occur within finished concrete work.
 - 1. Pulling of stakes and puddling concrete in after concrete placement will not be permitted.
 - 2. Locate non-plastic stakes appropriately to prevent embedment of stakes in the concrete after placement.

3.4 FORM RELEASE AGENT APPLICATION

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent.
- D. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS AND OPENINGS

- A. Locate and set in place items which will be cast directly into concrete.
- B. Coordinate work of other Sections such as but not limited to openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts.
- C. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.
- D. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

3.6 CONSTRUCTION JOINTS

- A. Refer to Section 03 30 00.
- B. Locate construction joints so as not to impair the strength of the structure and only at locations indicated on Drawings and as acceptable to Architect. Form keys in cold joints as shown or required.

3.7 FORMWORK CLEANING AND INSPECTION

- A. Inspect erected formwork, shoring and bracing to ensure that work is in accordance with formwork design and that supports, fastenings, wedges, ties, and embedded items are secure to prevent displacement and distortions.
- B. Clean forms and adjacent surfaces as formwork is erected and prior to concrete placement. Remove wood chips, sawdust, dirt, and other debris.

- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain through cleaning ports.
- D. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.8 ADJUSTMENTS

- A. When a concrete pour has been stopped for a sufficient length of time so that shrinkage or warp has separated the forms and the concrete, provide for form adjustment to draw the forms into firm contact with concrete before placing additional concrete. Take precautions to prevent any shoulder or ledge from being formed at a cold joint.

3.9 FORM REMOVAL

- A. Refer to Section 03 30 00.
- B. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- C. Remove forms progressively and in accordance with ACI 347.

3.10 FORM REUSE

- A. Forms in good condition may be reused.
- B. Clean and inspect forms prior to reuse. Do not re-use split, warped, delaminated, or otherwise damaged forms that will impair surface condition and quality of cast concrete exposed to view.
- C. Do not reuse wood formwork more than two times for architectural finish exposed concrete and three times for concrete surfaces to be exposed to view. Do not patch formwork.

3.11 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 347.
- B. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, at no cost to Owner.
- C. All concrete exposed to view, except as otherwise indicated and specified shall have a smooth finish of uniform texture, free from form marks or other visible irregularities and free from form coating, oils or other matter that will prevent bonding of patching work, painting or other finish materials.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Steel reinforcement and accessories for concrete and concrete unit masonry.

1.2 RELATED SECTIONS

- A. Section 03 11 00 – Concrete Forming.
- B. Section 03 30 00 – Cast-In-Place Concrete.
- C. Section 04 22 00 – Concrete Unit Masonry.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 – Specifications for Structural Concrete.
 - 3. ACI 318/318R – Building Code Requirements for Structural Concrete and Commentary.
 - 4. ACI SP-66 – ACI Detailing Manual.
 - 5. ASTM A615/A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 6. ASTM A706/A706M – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 7. ASTM A1064/A1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - 8. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
 - 9. CRSI Manual of Standard Practice.
 - 10. Wire Reinforcement Institute (WRI) Manual of Standard Practice.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.

- B. Product Data: Submit manufacturer's descriptive literature, installation instructions, and product specification for the following products:
 - 1. Mechanical splicing devices.
 - 2. Bar supports.
- C. Placement Drawings:
 - 1. Prepare in accordance with ACI SP-66.
 - 2. Indicate bar sizes, spacing, locations, and quantities of steel reinforcement and wire fabric, bending and cutting schedules, and supporting and spacing devices.
 - 3. If fusion welding is used, identify which members will utilize fusion welding process for preassembly, including details indicating the size/location of stirrups and holding wires, and welding requirements.
 - 4. Identify placement drawings with reference to sheet and detail numbers from the Contract Documents.
 - 5. Do not use scaled dimensions from Drawings to determine lengths of steel reinforcement.
 - 6. Submit one copy of reproducible placement drawings in addition to those required by Division 01.
 - 7. Contractor shall be responsible for correctness and completeness of steel reinforcing requirements.
 - 8. Begin fabrication only when placement drawings have been accepted.
- D. Samples:
 - 1. Bar supports: One for each type and grade.
 - 2. Mechanical splicing devices: One of each type.
- E. Quality Assurance/Control Submittals:
 - 1. If fusion welding is used, submit complete shop welding program outlining the type of fusion welding machine to be used and periodic inspection of the in-plant welding.
 - 2. Submit certified copies of mill test reports of reinforcing materials analysis to Owner's testing agency.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with CRSI Manual of Standard Practice; ACI 301; and 2019 California Building Code (CBC) Chapter 17 "Special Inspections and Tests", and Chapter 19 "Concrete", and as follows:
 - 1. Steel Reinforcement, Tests and Materials: CBC Section 1903 "Specifications for Tests and Materials".
 - 2. Anchorage: CBC Section 1910.5.
 - 3. Reinforcing Bar Welding: Per Section 1705, Table 1705.3 "Required Special Inspections and Tests of Concrete Construction".
- B. Refer to project Enforcement Agency Structural Tests and Inspection Sheet.

C. Fusion welded reinforcing steel shall have one tensile test taken from one specimen sampled per 2.5 tons or fraction thereof for each size of reinforcing steel fusion welded. No bend test is necessary. The specimen shall have a holding wire attached to it that need not be removed. The elongation requirements shall comply with the ASTM of reinforcing steel specified. Test results shall be submitted to the Engineer of Record and the Authority Having Jurisdiction. Testing and inspection costs for fusion welding shall be paid for by the Contractor.

D. Pre-Installation Meetings:

1. Conduct pre-installation meeting in accordance with Division 01.
2. Convene pre-installation meeting prior to commencing Work of this Section.
3. Coordinate Work in this Section with Work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.
- B. Deliver steel reinforcement in bundles marked with identification tags.
- C. Handle and store materials to prevent damage and contamination, excessive rusting or coating with grease, oil, or other objectionable materials.
- D. Store steel reinforcement, fabricated assemblies, and accessories off the ground on platforms, skids, or other supports.
- E. Deliver and store welding electrodes in accordance with AWS D1.4.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60, low-alloy deformed steel bars.
- B. Reinforcing Steel Indicated to be Welded: ASTM A706/A706M, Grade 60, low-alloy deformed steel bars.
- C. Deformed Steel Wire: ASTM A1064/A1064M.
- D. Holding Wires: ASTM A1064/A1064M.
- E. Welded Wire Fabric: ASTM A1064/1064M; 65 ksi minimum yield strength; fabricated from as-drawn steel wire into flat sheets (rolled fabric not permitted).
 1. Size: As indicated on Drawings.
- F. Tie Wire: Black annealed steel wire; No. 16 gauge.

2.2 ACCESSORIES

- A. Bar Supports (Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place): Provide in accordance with CRSI Manual of Standard Practice from steel wire, plastic, or precast concrete or fiber-reinforced concrete of equal to or greater compressive strength than surrounding concrete. Provide as follows:

1. Footings: Precast concrete blocks with tie wires.
 2. Slab on ground: Precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.
 3. Where legs of wire bar supports contact forms: CRSI Class 1 plastic-protected or CRSI Class 2 stainless steel bar supports.
 4. Where support is no closer to concrete surface than 1/2 inch: CRSI Class 3 wire supports.
 5. Supports placed against ground: Precast concrete blocks not less than 4 inch square with embedded wire.
- B. Welding Materials For Reinforcing Steel:
1. Weld Filler Material: AWS D1.4; low hydrogen, 80 ksi tensile strength.
- C. Mechanical Splices: Splicing devices capable of developing 125 percent of the specified yield strength of the bar in compression and tension.
1. Metal Sleeve with Cast Filler Metal:
 - a. Acceptable Product: Cadweld Rebar by Erico International Corporation, Solon, OH; 800-248-2677; www.erico.com, or accepted equal.
 2. Mechanical Threaded Connections: Provide threaded mechanical connections using a metal coupling sleeve with internal threads.
 - a. Acceptable Product: Lenton Couplers by Erico International Corporation DB-SAE Dowel Bar Splicers by Dayton Concrete Accessories, Miamisburg, OH; 800-745-3700, www.daytonconcreteacc.com, or accepted equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions and verify field dimensions.
- B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Clean steel reinforcement of rust and mill scale, earth, moisture, and other foreign materials before fabrication or placement.

3.3 STEEL REINFORCEMENT FABRICATION

- A. Fabricate to shapes, dimensions, and tolerances in accordance with accepted placement drawings conforming to CRSI Manual of Standard Practice, ACI SP-66, ACI 318/318R, ACI 117, and CBC Chapter 19.
- B. Standard Hooks and Bends: Conform to ACI 318/318R.
- C. Bending: Cold bend steel reinforcement in the field or at the mill. Heating for bending is not permitted unless otherwise specifically allowed by Architect.
- D. Reinforcement must not be straightened or re-bent without approval of Structural Engineer of Record (SEOR) and Authority Having Jurisdiction.

- E. Weld steel reinforcement in accordance with AWS D1.4.
- F. Fusion welding is only permitted for locations identified in this Section:
 - 1. Fusion welding of reinforcing is permitted at holding wires to ties, stirrups, and hoops in beams, columns, and grade beams to preassemble reinforcing steel cages. Fusion welding is not permitted to longitudinal reinforcing steel in any beam, column, or grade beam. The holding wire area shall not exceed 5 percent of the beam, column, or grade beam cross sectional longitudinal steel area.
 - 2. Fusion welding of holding wires to the ends of reinforcing steel placed in mats (spread footings, slab reinforcing, etc.) is permitted provided the fusion weld occurs within 6 bar diameters of the free end of the bar. Fusion welding of holding bars is not permitted at the end of coupled, T-headed, or weld-spliced bars.
 - 3. Fusion welding of holding wires shall not occur on a bent portion of a reinforcing bar. After holding wire has been fusion welded to a reinforcing bar, that reinforcing bar may not be bent where the fusion weld occurs.

3.4 PLACEMENT

- A. Place steel reinforcement in accordance with accepted placement drawings in conformance with tolerances specified in ACI 117.
- B. Install steel reinforcement in largest practical lengths. Accurately position, support, and secure reinforcement against displacement. Locate support reinforcement with bar supports to maintain minimum concrete cover.
- C. Secure reinforcement against displacement within tolerances permitted in ACI 318, Article 7.5.2. Point wire tie ends away from forms.
- D. Concrete Cover: Refer to Drawings. Cover tolerances shall comply with ACI 117.
- E. Laps: Refer to Drawings.
 - 1. Offset laps in adjacent bars.
- F. Splices:
 - 1. Splice reinforcing as shown.
 - 2. Tie lap splices securely to prevent displacement during concrete placement.
 - 3. Install mechanical splice in accordance with manufacturer's written instructions.
 - 4. Locate splices only where shown and accepted by Architect.
- G. Welding:
 - 1. Welding is not permitted unless specifically detailed on Drawings or accepted by Architect.
 - 2. Employ shielded metal-arc method. Comply with AWS D1.4.
 - 3. Welding is not permitted on bars where the carbon content is not known or is determined to exceed 0.75 percent.
 - 4. Welding is not permitted within two bar diameters of any bent portion of a bar which has been bent cold.
 - 5. Welding of crossing bars is not permitted.

- H. Maintain minimum clear distance between parallel bars at not less than 1-1/2 times nominal bar diameter, 1-1/2 times maximum size of coarse aggregate, or 1-1/2 inch.
- I. Dowels: Place where indicated on Drawings. Grease loose end to prevent concrete from bonding to dowel. Sleeves may be used when accepted by Architect.
- J. Dowels for Masonry Reinforcement: Coordinate with masonry work reinforcement requirements. Match masonry reinforcing steel. Refer to Section 04 22 00.
- K. Welded Wire Fabric: Install in longest practical lengths on bar supports to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps to avoid continuous laps in either direction. Tie lap joints at 12 inches on center.
- L. Field Adjustments: Move steel reinforcement as necessary to avoid interference with other reinforcing steel or other embedded items within accepted tolerances.
 - 1. Sleeves and embedded items: Do not cut bars to clear sleeves or slots through slabs or walls. Wrap bars around these openings.
 - 2. Openings: Compensate for steel reinforcement terminated at openings in slabs by placing one half of steel reinforcement terminated on each side of openings for the full span length.
 - 3. Steel reinforcement moved to avoid interference with other reinforcements, conduits, or embedded items, including additional steel reinforcement to meet structural requirements are subject to inspection and approval before concrete placement.

3.5 FIELD QUALITY CONTROL

- A. General: Comply with requirements of Division 01.
- B. Testing Service: Owner will select and pay for independent testing agency, which will perform the following:
 - 1. Inspect shop and field welding per AWS D1.4, including checking materials, equipment, procedures, and welder qualifications.
 - 2. Inspector shall employ non-destructive testing or any other aid to visual inspection deemed necessary to assure adequacy of weld.
 - 3. Additional requirements for testing and inspection: Refer to Structural Drawings.
- C. Placement of steel reinforcement shall be inspected where noted on Structural Drawings.

3.6 PROTECTION

- A. Protect steel reinforcement from damage and displacement.
- B. Protect for potential rust staining of adjacent surfaces. Wrap steel reinforcement with impervious tape or other methods as accepted by Architect. Remove protective cover and clean reinforcement before concrete placement.
- C. Install safety caps on all exposed ends of vertical steel reinforcement that pose a danger to life safety.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete.
 - 1. Architectural concrete at exposed locations.
- B. Concrete admixtures.
- C. Curing and surface slab treatment.
- D. Grouting, bonding, and patching materials.
- E. Accessories:
 - 1. Waterstops.
 - 2. Expansion joints.
- F. Precast concrete wheel stops.

1.2 RELATED SECTIONS

- A. Section 03 11 00 – Concrete Forming.
- B. Section 03 20 00 – Concrete Reinforcing.
- C. Section 04 22 00 – Concrete Unit Masonry.
- D. Section 07 92 00 – Joint Sealants.
- E. Divisions 25-28 – Electrical Sections, as applicable to the Project.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. ACI publications 221R, 302.1R, 302.2R, 303R, 304R, 305R, 306R, and 309R contain recommended practices for concrete work. Submit any proposed deviations from these recommendations to Architect for review prior to commencing concrete work.
- D. Referenced Standards:
 - 1. ACI 117 – Specification for Tolerances for Concrete Construction and Materials.
 - 2. ACI 221R – Guide for Use of Normal Weight and Heavyweight Aggregates in Concrete.

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| 3. ACI 301 | – Specifications for Structural Concrete. |
| 4. ACI 302.1R | – Guide for Concrete Floor and Slab Construction. |
| 5. ACI 302.2R | – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials. |
| 6. ACI 303R | – Guide to Cast-In-Place Architectural Concrete Practice. |
| 7. ACI 303.1 | – Standard Specification for Cast-in-Place Architectural Concrete. |
| 8. ACI 304R | – Guide for Measuring, Mixing, Transporting, and Placing Concrete. |
| 9. ACI 305R | – Guide to Hot Weather Concreting. |
| 10. ACI 305.1 | – Specification for Hot Weather Concreting. |
| 11. ACI 306R | – Guide to Cold Weather Concreting. |
| 12. ACI 306.1 | – Standard Specification for Cold Weather Concreting. |
| 13. ACI 309R | – Guide for Consolidation of Concrete. |
| 14. ACI 318 | – Building Code Requirements for Structural Concrete. |
| 15. ACI SP-15 | – Field Reference Manual: Specifications for Structural Concrete ACI 301-10 with Selected ACI and ASTM References. |
| 16. ASTM C31/C31M | – Standard Practice for Making and Curing Concrete Test Specimens in the Field. |
| 17. ASTM C33 | – Standard Specification for Concrete Aggregates. |
| 18. ASTM C39/C39M | – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. |
| 19. ASTM C94/C94M | – Standard Specification for Ready Mixed Concrete. |
| 20. ASTM C109 | – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens). |
| 21. ASTM C114 | – Standard Test Methods for Chemical Analysis of Hydraulic Cement. |
| 22. ASTM C143/C143M | – Standard Test Method for Slump of Hydraulic Cement Concrete. |
| 23. ASTM C150 | – Standard Specification for Portland Cement. |
| 24. ASTM C157/C157M | – Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar and Concrete. |
| 25. ASTM C171 | – Standard Specification for Sheet Materials for Curing Concrete. |
| 26. ASTM C172 | – Standard Practice for Sampling Freshly Mixed Concrete. |
| 27. ASTM C173/C173M | – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method. |
| 28. ASTM C231 | – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method. |
| 29. ASTM C260 | – Standard Specification for Air Entraining Admixtures for Concrete. |

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| 30. ASTM C309 | – Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete. |
| 31. ASTM C348 | – Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars. |
| 32. ASTM C494/C494M | – Standard Specification for Chemical Admixtures for Concrete. |
| 33. ASTM C595 | – Standard Specification for Blended Hydraulic Cements. |
| 34. ASTM C618 | – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete. |
| 35. ASTM C881/C881M | – Standard Specification for Epoxy Resin Base Bonding Systems for Concrete. |
| 36. ASTM C920 | – Standard Specification for Elastomeric Joint Sealants. |
| 37. ASTM C928 | – Standard Specification for Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs. |
| 38. ASTM C939 | – Standard Test Method for Flow of Grout for Preplaced Aggregate Concrete (Flow Cone Method). |
| 39. ASTM C989 | – Standard Specification for Slag Cement for Use in Concrete and Mortars. |
| 40. ASTM C1028 | – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method. |
| 41. ASTM C1059 | – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete. |
| 42. ASTM C1077 | – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation. |
| 43. ASTM C1107 | – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink). |
| 44. ASTM C1315 | – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete. |
| 45. ASTM C1602/C1602M | – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete. |
| 46. ASTM D882 | – Standard Test Method for Tensile Properties of Thin Plastic Sheeting. |
| 47. ASTM D1709 | – Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method. |
| 48. ASTM D1751 | – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types). |
| 49. ASTM D2240 | – Standard Test Method for Rubber Property – Durometer Hardness. |
| 50. ASTM D4397 | – Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications. |

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| 51. ASTM E329 | – Standard Specification for Agencies Engaged in Construction Inspection and/or Testing. |
| 52. ASTM E1155 | – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers. |
| 53. CE CRD-C 572 | – Corps of Engineers Specifications for Polyvinyl Chloride (PVC) Waterstop. |
| 54. ISO/IEC/EN 17025 | – General Requirements for the Competence of Testing and Calibration Laboratories (formerly ISO/IEC Guide 25-1990 and ASTM E548). |
| 55. NRMCA | – Quality Control Checklist – Section 2. |
| 56. NRMCA | – Plant Certification Checklist – Section 3. |

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature and product specification for each product. Include manufacturer's written instructions and installation procedures.
- C. Drawings: Submit concrete pouring plan showing proposed locations of construction and control joints for review by Architect prior to concrete placement.
- D. Samples: Submit product samples when requested by Architect or testing laboratory.
- E. Quality Assurance/Control Submittals:
 - 1. Certificates:
 - a. Manufacturer's Certification of Compliance that materials (cementitious materials, aggregates, and admixtures) conform to specifications.
 - 2. Reference Documents: Maintain one copy of ACI SP-15 on site.
 - 3. Concrete mixture proportions and characteristics for each class/type of concrete used.
 - 4. Concrete mixture proportion data for each class/type of concrete used:
 - a. Calculation of required average compressive strength and supporting test records.
 - b. Documentation indicating proposed mixture proportions will produce an average compressive strength greater than the required average compressive strength, including field strength test records or trial mixtures.
 - c. Provide documentation in accordance with Concrete Mix Design Submittal Checklist located at the end of this Section.
 - 5. Test Reports.
 - 6. Batch Ticket: Furnish accepted batch tickets at the time of delivery for each concrete load. Indicate on each ticket equipment used for measuring and quantities, by weight, of cement, sand, each class of aggregate, admixtures, and amount of water in the aggregate, water added at the batching plant, and any water withheld at the batch plant. In addition, include mix number, total yield in cubic yards, date and time of day (dispatch time, plant departure time, site arrival time, unloading start and end time).

7. Concrete Placement Record: Keep a record on site including time and date of concrete placing for each portion of the structure for the duration of the project. Record additional information not included in batch ticket such as admixtures added at the job site. Make records available to Architect for review. Submit record to Architect at project completion.
8. Protection of Slabs and Foundations: Submit plans for protection of slabs and foundations, including the following, if applicable:
 - a. Cold Weather Concreting: Comply with submittal requirements of ACI 306.1.
 - b. Hot Weather Concreting: Comply with submittal requirements of ACI 305.1.

F. Closeout Submittals:

1. Concrete placement record.
2. Show location of embedded utilities in record drawings.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Concrete Supplier: Firm specializing in products specified in this Section with a minimum five years documented experience; successfully supplying similar materials (design, content, and performance) as specified in this Section.
2. Concrete Batch Plant: Complies with requirements of ASTM C94 and is currently certified per NRMCA Plant Certification Checklist - Section 3 or other certification acceptable to Architect.
3. Contractor's Design Laboratory: Under the direction of civil engineer licensed by the State of California; conforming to ASTM E329 and ASTM C1077.
4. Independent Testing Laboratory: Conforming to ASTM E329, ASTM C1077, and ISO/IEC/EN 17025, acceptable to Architect.

B. Structural Tests and Inspections: Refer to project Enforcement Agency Structural Tests and Inspection Sheet.

C. Regulatory Requirements: Conform to requirements of 2019 California Building Code (CBC), Chapter 19, "Concrete", Chapter 17 "Special Inspections and Tests", and as follows:

1. Inspection: CBC Chapter 17, Section 1705 "Required Special Inspections and Tests" Article 1705.3 "Concrete Construction", as applicable.

D. Drying Shrinkage Test: Perform per ASTM C157/C157M modified as follows:

1. Prepare 4 inch x 4 inch x 11 inch prisms with an effective gage length of 10 inches fabricated, cured, dried, and measured per ASTM C157/C157M except that specimens shall be removed from molds at an age of 23 hours +/- 1 hour after trial batching, and shall be placed immediately in water at 73 degrees F +/- 3 degrees for at least thirty minutes, and shall be measured within thirty minutes thereafter to determine original length and then submerged in saturated lime water at 73 degrees F +/- 3 degrees.
2. Measurement to determine expansion expressed as a percentage of original length shall be made at seven days. This length at seven days shall be the base length for drying shrinkage calculations. Specimens shall then be stored immediately in a humidity control room, maintained at 73 degrees F +/- three degrees F and fifty percent +/- four percent relative humidity for the remainder of the test.

3. Measurements to determine shrinkage expressed as a percentage of base length shall be made and reported separately for 7, 14, and 21 days of drying after 7 days of moist curing.

E. Quality Control: Comply with NRMCA Quality Control Checklist – Section 2.

F. Materials Quality Assurance: Obtain cement and aggregates from same source for the duration of the work unless specifically accepted by Architect.

G. Pre-Installation Meetings:

1. Conduct pre-installation (pre-pour) meeting in accordance with Division 01.
2. Convene pre-installation (pre-pour) meeting one week prior to commencing work of this Section attended by concrete supplier.
3. Meeting minutes shall be taken and distributed to meeting attendees within three days of meeting.
4. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Store cement and other cementitious materials in weathertight buildings, bins, or silos which exclude moisture and contaminants and keep building materials completely separated.

D. Arrange and use aggregate stockpiles in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Do not store aggregates directly on ground unless a sacrificial layer is left undisturbed.

E. Refer to manufacturers' product data sheets for recommended shelf life and storage conditions for admixtures.

F. Clearly and accurately label materials after containers have been opened.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. BASF Corporation – Admixture Systems, Cleveland, OH; 800-228-3318, www.basf-admixtures.com.
2. BASF Corporation – Building Systems, Shakopee, MN; 800-433-9517, www.buildingsystems.basf.com.
3. Grace Construction Products – W. R. Grace & Co., Cambridge, MA; 877-423-6491, www.na.graceconstruction.com.
4. Greenstreak, Inc., St. Louis, MO; 800-325-9504, www.greenstreak.com.
5. Pecora Corp., Harleysville, PA; 800-523-6688, www.pecora.com.
6. Sika Corp., Lyndhurst, NJ; 800-933-7452, www.usa.sika.com.

7. The Euclid Chemical Co., Cleveland, OH; 800-321-7628, www.euclidchemical.com.
8. Tremco, Beachwood, OH; 800-852-9068, www.tremcosealants.com.
9. US Mix Products Co., Denver, CO; 800-397-9903, www.usspec.com.
10. Vinylex Corp., Knoxville, TN; 800-624-4435, www.vinylex.com.
11. W. R. Meadows, Inc., Hampshire, IL; 800-342-5976, www.wrmeadows.com.

B. Substitutions: Manufacturers and products are listed in this Section to establish minimum requirements as to quality and performance. Comply with requirements of Division 01 for substitutions.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:

1. Cement: ASTM C150, Type II, low alkali (equivalent alkalis ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) no more than 0.6 percent per ASTM C114), gray.
2. Supplementary Cementitious Materials (SCM):
 - a. Fly Ash: ASTM C618, Class F or Class N. Class C is not permitted.
 - b. Slag Cement: ASTM C989, Grade 100 or Grade 120.
 - c. When SCM is unable to be provided by a local ready-mix concrete supplier due to market conditions, they shall submit a letter with their mix design stating that SCM has been removed from the concrete mix design due to market conditions.

B. Aggregates: Aggregates used in concrete shall have a combined aggregate distribution similar to the aggregates used in the concrete represented by field test data or used in trial mixtures. Fine and coarse aggregates: ASTM C33. Low-shrinkage producing coarse aggregates per ACI 221R; and uniformly graded as follows:

Sieve Number or Size in Inches	Percent Retained by Weight		
	1-1/2 inch Max.	1 inch Max.	3/4 inch Max.
2 inch	0-5	—	—
1-1/2 inch	0-8	0-5	—
1 inch	8-18	0-8	0-5
3/4 inch	8-18	8-18	0-8
1/2 inch	8-18	8-18	8-18
3/8 inch	8-18	8-18	8-18
No. 4	8-18	8-18	8-18
No. 8	8-18	8-18	8-18
No. 16	8-18	8-18	8-18
No. 30	8-18	8-18	8-18
No. 50	0-18	0-18	0-18
No. 100	0-8	0-8	0-8
No. 200	0-8	0-8	0-8

1. Maximum Nominal Size of Coarse Aggregate: CBC Section 1903 "Specifications for Tests and Materials", and as follows:
 - a. $\frac{1}{5}$ the narrowest dimension between sides of forms,
 - b. $\frac{1}{3}$ depth of slab, or
 - c. $\frac{3}{4}$ the minimum clear spacing between individual reinforcing bars or bundles of bars.
2. Aggregate sources shall not contain any alkali-silica reactive material in accordance with ASTM C33, Appendix XI.

C. Water: Potable and complying with ASTM C1602/C1602M.

2.3 ADMIXTURES

A. General:

1. Manufacturer certified to contain no more than 0.05 percent water-soluble chloride ions by mass of cementitious material. Admixtures containing calcium chloride or thiocyanates not allowed.
2. Compatible with other admixtures and cementitious materials in the concrete mix.
3. Obtain Architect's written acceptance prior to use of admixtures. Use admixtures according to manufacturer's written instructions.

B. Air Entraining Agents: ASTM C260.

1. Acceptable Products:
 - a. MasterAir-AE90, MasterAir AE 200, or MasterAir VR 20 by BASF Corporation – Admixture Systems.
 - b. Darex AEA by Grace Construction Products.
 - c. Eucon Air Mix or Eucon AEA Series by The Euclid Chemical Co.
 - d. Or accepted equal.

C. Water Reducing:

1. Normal Range: ASTM C494/C494M, Type A.
 - a. Acceptable Products:
 - 1) MasterPozzolith Series by BASF Corporation – Admixture Systems.
 - 2) Eucon Series by The Euclid Chemical Co.
 - 3) WRDA 64 by Grace Construction Products.
 - 4) Plastocrete 161 by Sika Corp.
 - 5) Or accepted equal.
2. Mid Range Water-Reducing: ASTM C494/C494M, Type A or Type F.
 - a. Acceptable Products:
 - 1) MasterPolyheed Series BASF Corporation – Admixture Systems.
 - 2) Eucon Series by The Euclid Chemical Co.
 - 3) Duracem 55 by Grace Construction Products.
 - 4) Or accepted equal.

3. High Range Water-Reducing: ASTM C494/C494M, Type F or G.

a. Acceptable Products:

- 1) MasterRheobuild 1000 or MasterGlenium Series by BASF Corporation – Admixture Systems.
- 2) Eucon Series or Plastol Series by The Euclid Chemical Co.
- 3) Duracem 100 by Grace Construction Products.
- 4) Sikament 10 ESL by Sika Corp.
- 5) Or accepted equal.

D. Shrinkage Reducing: Reduces dry shrinkage up to 80 percent at 28 days, and up to 50 percent at one year and beyond as tested per ASTM C157/C157M.

1. Acceptable Products:

- a. MasterLife SRA 20 by BASF Corporation – Admixture Systems.
- b. Eclipse Floor and Eclipse Plus by Grace Construction Products.
- c. Eucon SRA Series or Conex by The Euclid Chemical Co.
- d. Or accepted equal.

E. Set Retarding: ASTM C494/C494M, Type B or Type D.

1. Acceptable Products:

- a. Pozzolith Series or MasterSet DELVO Series by BASF Corporation – Admixture Systems.
- b. Eucon Retarder Series, Eucon DS, or Eucon Stasis by The Euclid Chemical Co.
- c. Or accepted equal.

F. Set Accelerating: ASTM C494/C494M, Type C or Type E.

1. Acceptable Products:

- a. MasterSet AC 534 or MasterSet FP 20 by BASF Corporation – Admixture Systems.
- b. Accelguard Series by The Euclid Chemical Co.
- c. Or accepted equal.

G. Workability-Retaining: Shall retain concrete workability without affecting time of setting or early-age strength development. ASTM C494/C494M, Type S.

1. Acceptable Products:

- a. MasterSure Z 60 by BASF Corporation – Admixture Systems.
- b. Plastol AMP Series by The Euclid Chemical Co.
- c. Or accepted equal.

2.4 CURING MATERIALS AND SLAB TREATMENT

A. General:

1. Comply with regulations of the California Air Resources Board and the local Air Pollution Control/Air Quality Management District.
 - a. VOC Limit: 350 g/L.

2. Verify compatibility with subsequent adhesives and coatings before application; furnish Manufacturer's certificate of compatibility. Coordinate with related Sections.
- B. Curing Compound: Select as appropriate for compatibility of subsequent adhesives and coatings.
1. Water-emulsion, dissipating resin based; meets or exceeds ASTM C309, Type 1, Class B.
 - a. Acceptable Products:
 - 1) Kurez DR-100 by The Euclid Chemical Co.
 - 2) 1100 by W. R. Meadows, Inc.
 - 3) US SPEC Maxcure Resin Clear by US Mix Products Co.
 - 4) Or accepted equal.
- C. Waterproof Sheet Materials for Curing: ASTM C171 and as follows:
1. Curing paper consisting of two sheets of kraft paper adhered together with a bituminous material with embedded cords or strands of fiber running in both directions not more than 1-1/4 inches apart.
 - a. Tensile strength in machine direction: Thirty foot-pounds per inch of width minimum.
 - b. Tensile strength in cross direction: Fifteen foot-pounds per inch of width minimum.
 2. Polyethylene Film: ASTM D4397; minimum six mil thickness.
 3. White burlap-polyethylene sheeting: Consisting of burlap weighing not less than nine ounces per square yard extrusion coated on one side with at least four mil white opaque polyethylene sheet.
- D. Evaporation Retarder: Water-based polymer concentrate, readily dilutable in water.
1. Acceptable Products:
 - a. MasterKure ER50 by BASF Corporation – Admixture Systems.
 - b. Eucobar by The Euclid Chemical Co.
 - c. US SPEC Monofilm ER by US Mix Products Co.
 - d. Or accepted equal.
- E. Surface Retarder: Water soluble liquid, formulated to retard wet surface of mortar in concrete.
1. Acceptable Products:
 - a. MBT EAC-S Regular or Deep by BASF Corporation – Admixture Systems.
 - b. Sure Etch Series by The Euclid Chemical Co.
 - c. Rugasol-S by Sika Corp.
 - d. Or accepted equal.

2.5 GROUTING, BONDING, AND PATCHING MATERIALS

A. Grout:

1. Non-shrink Grout: ASTM C1107, non-metallic aggregate grout; 7000 psi minimum 28-day compressive strength at fluid water ratio per ASTM C939.
 - a. Acceptable Products:
 - 1) MasterFlow 928 by BASF Corporation – Building Systems.
 - 2) NS Grout, Hi-Flow Grout, or Euco Pre-Cast Grout by The Euclid Chemical Co.
 - 3) US SPEC MP Grout by US Mix Products Co.
 - 4) Or accepted equal.
2. Non-shrink Drypack Grout: Non-shrink, natural aggregates, 7000 psi minimum 28-day compressive strength.
 - a. Acceptable Products:
 - 1) MasterFlow 100 by BASF Corporation – Building Systems.
 - 2) Dry Pack Grout by The Euclid Chemical Co.
 - 3) Sealtight Pac-it by W.R. Meadows, Inc.
 - 4) Or accepted equal.

B. Bonding Materials:

1. Bonding Agent/Admixture:
 - a. Interior or exterior applications: Acrylic or SBR, latex cement bonding agent/admixture; non-re-emulsifiable; meets or exceeds ASTM C1059, Type II.
 - 1) Acceptable Products:
 - a) Akkro-7T, Flex-Con, or SBR Latex by The Euclid Chemical Co.
 - b) US SPEC Acrylcoat by US Mix Products Co.
 - c) Sealtight Acry-Lok by W. R. Meadows, Inc.
 - d) Or accepted equal.
 - b. Interior applications or exterior applications not subject to constant water immersions: Ethyl-vinyl acetate (EVA) copolymer liquid bonding agent and admixture; re-emulsifies once and will not re-wet; meets or exceeds ASTM C1059.
 - 1) Acceptable Products:
 - a) Tammsweld by The Euclid Chemical Co.
 - b) US SPEC Multicoat by US Mix Products Co.
 - c) Or accepted equal.
2. Structural Bonding Epoxy Adhesive: Two component, 100 percent solids, 100 percent reactive; meets or exceeds ASTM C881/C881M, Type II, Grade 2, Class B or C as appropriate.
 - a. Acceptable Products:
 - 1) MasterEmaco ADH 1090RS, MasterEmaco ADH 1420, or MasterEmaco ADH 327RS by BASF Corporation – Building Systems.
 - 2) Dural 452 MV by The Euclid Chemical Co.

- 3) Sealtight Rezi-Weld 1000 by W. R. Meadows, Inc.
 - 4) Or accepted equal.
- C. Self-Leveling Underlayment: Portland cement based, self-leveling 1 inch thick to featheredge. Fast setting – minimum compressive strength 2200 psi after one day; minimum 4000 psi compressive strength at 28 days per ASTM C109.
1. Acceptable Products:
 - a. K-15 Self-Leveling Underlayment Concrete by ARDEX Engineered Cements.
 - b. MasterTop 110 SL by BASF Corporation – Building Systems.
 - c. Flo-Top or EucoFloor SL 160 by The Euclid Chemical Co.
 - d. US SPEC Self-Leveling Underlayment by US Mix Products Co.
 - e. Or accepted equal.
- D. Repair Mortar: Exceeds ASTM C928, R1 and R2; rapid setting – minimum 1300 psi at three hours; 5500 psi at seven days per ASTM C109.
1. Acceptable Products:
 - a. MasterEmaco T 415/430 or MasterEmaco T 1060/1061 Repair Mortars by BASF Corporation – Building Systems.
 - b. Euco-Speed, Versaspeed, or Speedcrete 2028 by The Euclid Chemical Co.
 - c. US SPEC Transpatch by US Mix Products Co.
 - d. Or accepted equal.
- E. Repair Mortar (for patching over steel): Liquid polymer modified, containing an integral corrosion inhibitor, exceeds C928, R2; rapid setting – minimum compressive strength 1500 psi at one day; 3500 psi at seven days; 5000 psi at 28 days per ASTM C109.
1. Acceptable Products:
 - a. MasterEmaco N 350CI with Acrylic Additive or MasterEmaco T 310CI by BASF Corporation – Building Systems.
 - b. Concrete-Top Supreme by The Euclid Chemical Co.
 - c. US SPEC H2 by US Mix Products Co.
 - d. Sikatop 122 Plus by Sika Corp.
 - e. Or accepted equal.
- F. Epoxy Joint Filler: Two component, 100 percent solids, semi-rigid epoxy; hardness: minimum 75 Shore A per ASTM D2240.
1. Acceptable Products:
 - a. MasterSeal CR 190 by BASF Corporation – Building Systems.
 - b. Euco 700 by The Euclid Chemical Co.
 - c. Sikadur 51 NS by Sika Corp.
 - d. Or accepted equal.

2.6 ACCESSORIES

- A. Cone Hole Plugs: Precast high strength cement compound plugs matching size and shape of form tie cone and matching color of poured-in-place concrete as provided by same manufacturer of form ties. Refer to Section 03 11 00.
- B. Waterstops:
 - 1. Flexible PVC Waterstop: CE CRD-C 572; extruded from virgin polyvinyl chloride (PVC); dumbbell profile; 6 inches long by minimum 3/8 inch thick.
 - a. Acceptable Products:
 - 1) Cat. No. 748 by Greenstreak, Inc.
 - 2) VD6-14 by Vinylex Corp.
 - 3) Or accepted equal.
 - 2. Provide the following waterstop accessories:
 - a. Factory fabricated corners, intersections, and directional changes. Thermally field butt splice to maintain continuity.
 - b. Hog rings or grommets spaced at 12 inches on center along length of waterstop.
- C. Capillary Barrier: Clean crushed rock; 3/4 inch nominal maximum size with no material passing a No. 4 sieve.
- D. Expansion Joints:
 - 1. Joint-Filler Strips: ASTM D1751; bituminous type; preformed, resilient, flexible, and non-extruding.
 - a. Acceptable Product:
 - 1) Sealtight Fiber Expansion Joint by W.R. Meadows, Inc.
 - 2) Or accepted equal.
- E. Anchors, Anchor Bolts, Nuts, and Washers: Refer to Section 05 12 00.

2.7 PRECAST CONCRETE WHEEL STOPS

- A. Provide precast concrete wheel stops, size and shape as indicated on Drawings.
- B. Concrete: Precast, air entrained concrete with a minimum compressive strength of 2,500 psi. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
- C. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length. Provide where indicated, or as required by design condition.

2.8 CONCRETE MIX

- A. General:
 - 1. Proportion concrete design mixes per ACI 301 Section 4.2.3 and ACI 318 Section 26.4.3.

2. Proportion concrete design mixes per ACI, prepared and tested by an independent testing laboratory acceptable to Architect prior to design mix approval. For each mix design, prepare and perform tests as follows:
 - a. Drying shrinkage test per modified ASTM C157/C157M as specified in this Section; provide at least three test specimens. Drying shrinkage test not required for below grade concrete.
 3. Proportioning without field experience or trial mixtures may be permitted with written approval from Architect, where concrete manufacturer can establish the uniformity of its production for concrete of similar type and strength based on recent test data in accordance with ACI 318, Chapter 26, Article 26.4.4 "Documentation of Concrete Mixture Characteristics".
 4. Proportion concrete design mix to attain compressive strength as specified below and as needed, with early strength to meet Contractor's work program.
- B. Mix Designs: Refer to Structural Drawings for mix design requirements.
1. Maximum Water Content: 300 pounds per cubic yard.
 2. Maximum Drying Shrinkage: 0.048 percent as tested per modified ASTM C157/C157M as specified in this Section after 7 days moist curing plus 21 days drying. This requirement does not apply to below grade concrete.
 3. For concrete in ACI Exposure Class C2, the maximum water-soluble chloride ion content that is contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall be determined on the concrete mixture by ASTM C1218 at age between 28 days and 42 days, and shall be less than 0.15 percent by weight of cement.
 4. Unless otherwise specified for specific concrete mixes, air entrainment shall be provided for exterior concrete work exposed to freeze-thaw cycles only, such as, site concrete, including pavements, curbs, and gutters.
- C. Admixtures:
1. Use specified admixtures as acceptable to Architect. Verify compatibility of concrete admixtures when using multiple admixtures.

2.9 CONCRETE MIXING

- A. Concrete shall be mixed per ACI 304R.

2.10 SOURCE QUALITY CONTROL

- A. Owner shall employ a testing laboratory accepted by Architect to perform the following:
1. Review mix designs and certificates of compliance for materials Contractor proposes to use.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine and verify the following prior to concrete placement.
1. Forms are erected, adequately braced, sealed, lubricated (if required), and bulkhead provided where placing is to stop.

2. Thoroughly water soak wood forms other than plywood at least twelve hours before concrete placement.
 3. Steel reinforcement are accurately positioned, securely tied and braced. Verify concrete cover requirements.
 4. Coordination with related work is completed.
 5. Anchors and embedded items are in position, securely held and braced.
 6. Construction joints and previously placed concrete are prepared as specified.
 7. Compliance with cold-weather or hot-weather requirements.
 8. Compliance with cleaning and preparation requirements.
- B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.
- C. Concrete formwork, reinforcement, inserts, and embedded items are subject to Architect's acceptance. Notify Architect at least 48 hours prior to concrete placement.

3.2 PREPARATION

- A. Capillary barrier below slabs shall be compacted using one pass of a smooth drum roller, vibratory roller, or vibratory plate. Compaction shall be verified by Geotechnical Engineer.
- B. Cleaning: Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt and other debris before placing concrete.
- C. Refer to Section 03 11 00 for formwork preparation.
- D. Refer to Section 03 20 00 for reinforcing steel preparation.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 and as specified in this Section.
1. Place and finish Architectural Concrete in the locations indicated on Drawings in accordance with ACI 303.1 and 303R.
 2. Concrete construction tolerances shall be per ACI 301 except the top surface of concrete supporting masonry construction shall have a maximum vertical deviation from elevation of +/- 1/2 inch.
- B. Add no water during delivery and at the project site unless specifically accepted by Architect. If water is withheld at batch plant, indicate in delivery ticket the design water for accepted mix, moisture content of aggregates, and free water added at batch plant. If total water added at plant is less than design water to attain slump of accepted mix design, water may be added to concrete at job site, not to exceed the design water content, subject to the limitations specified in ASTM C94/C94M. If additional slump is required, use water reducing admixture.
- C. Discharge mixed concrete within 1-1/2 hours or before mixer has revolved 300 revolutions, whichever comes first, after the introduction of mixing water to the cement and aggregates. Reduce this time to 45 minutes when the concrete temperature exceeds 85 degrees F, unless appropriate measures as specified in ACI 305.1 are taken to maintain slump and temperature of concrete. Slump and concrete temperature can be maintained within limits longer with the use of retarding admixtures or hydration-control admixtures or ice.

- D. Place concrete within fifteen minutes after it has been discharged from the mixer. Handle concrete from mixer to forms in a continuous manner.
- E. Deposit concrete as close as possible to its final position in the forms, with no vertical drop greater than five feet except where suitable equipment is provided to prevent segregation and where specifically authorized.
- F. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If concrete cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- G. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.
- H. Pumping concrete, when specifically accepted, may be conveyed by positive displacement pump such as piston or squeeze pressure type; pneumatic placing equipment is not permitted. Use rigid steel pipe or heavy-duty flexible hose with an inside diameter at least three times the nominal maximum-size coarse aggregate, but not less than 4 inches. Aluminum pipe is not allowed.
- I. Provide adequate scaffolding, ramps and walkways in a manner so that personnel and equipment are not supported by in-place reinforcement.
- J. Consolidation: Consolidate placed concrete with mechanical vibrating equipment per ACI 309R.
 - 1. Consolidate each layer of concrete immediately after placing using internal vibrators, except for slabs 4 inches thick or less.
 - 2. Insert and withdraw vibrators vertically at uniformly spaced location no farther than the visible effectiveness of the vibrator. Hold vibrator stationary and slowly withdraw vertically while operating.
 - 3. Do not use vibrators to transport concrete inside forms.
 - 4. Place vibrator to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers that have begun to lose plasticity. Limit vibration duration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- K. Concrete Floors and Slabs: Deposit and consolidate concrete for floors and slabs in a continuous operation within limits of construction joints until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope exterior surfaces for drainage as directed, unless otherwise shown.

- L. Hot Weather Concreting: Place concrete according to ACI 305.1 and as follows:
1. Cool components before mixing to maintain concrete temperature below 85 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature. Calculate and include water equivalent of ice in designed water cement ratio.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
 4. Protect concrete from surface drying; moisture loss from concrete in plastic state shall be maintained below 0.1 pounds per square foot per hour. Methods may include, but are not limited to: evaporation retardant, sun shades, wind breaks, and fog misting.
- M. Cold Weather Concreting: Place concrete according to ACI 306.1 and as follows:
1. Protect concrete work from physical damage or reduced strength as a result of frost, freezing, or low temperatures.
 2. When ambient temperature is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 75 degrees F.
 3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade.
 4. Do not incorporate calcium chloride, salt or other materials containing antifreeze agents into the concrete mix.
 5. Upon Architect's written acceptance and subject to prior approval of mix design, accelerating admixtures, containing no calcium chloride, as specified in this Section may be used.
- N. Do not allow concrete overpour from formwork where underground products and systems need to be installed at or adjacent to the concrete work. If overpour occurs, remove as necessary to accommodate the installation of such items.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete, unless otherwise indicated on Drawings.
- B. Construction Joints: Locate and install joints as indicated on Drawings or as accepted by Architect, and in a manner that strength and appearance of concrete are not impaired.
1. Comply with ACI 318, Chapter 26, Article 26.5.6.2.
 2. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
 3. Expose concrete aggregates, a minimum of 1/4 inch depth, creating a rough surface using a surface retardant. Within 24 hours after placing concrete, remove retarded surface mortar using either high pressure water jetting or stiff brushing or a combination of both to expose coarse aggregate. A rough surface of exposed aggregate may also be produced by sandblasting followed by high pressure water jetting.

4. Where new concrete joins existing concrete (concrete more than sixty days old), clean and roughen existing concrete to expose coarse aggregate. Coat with epoxy bonding compound prior to placing new concrete.
 5. Install waterstops in the longest lengths practicable where indicated. Use factory fabricated joints; field splices are acceptable in straight sections only.
 6. Horizontal joints: Apply a 1 inch wood grade strip, level and straight, 1/2 inch below the placement lift elevation for a neat joint.
- C. Slab-on-Ground Control Joints: Tool or saw-cut weakened plane joints at a depth of at least 1/4 slab thickness where shown on Drawings. Where not indicated in Drawings, provide at distances (in feet) every two times to three times of slab thickness (in inches).
1. Tooled Joint: Form control joints after initial floating by grooving and finishing each joint edge to a 1/8-inch radius. Repeat grooving after applying surface finish.
 2. Sawed Joint: Saw cut 1/8-inch width as soon as the concrete has hardened sufficiently to prevent raveling (dislodging of the aggregates) of the edges of the saw cut and completed before shrinkage stresses become sufficient to produce cracking.
- D. Slab-on-Ground Expansion Joints and Isolation Joints: Provide expansion joints and isolation joints where shown on Drawings, where slab abuts vertical surfaces such as curbs and sidewalks.
1. Extend joint-filler strips full width and extend to full depth of joint, terminating not less than 1/2 inch and not more than 1 inch from finish surface. Apply a removable capping flush to slab finish.
 2. Install strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
 3. Remove capping when concrete has cured and apply joint sealant.
- E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where shown on Drawings.

3.5 FORMED SURFACES FINISHING

- A. Leave texture imparted on formed concrete surface, unless otherwise specified, except that defective surfaces shall be repaired. Repair defective concrete as specified in this Section.
- B. Maintain uniform color of the concrete, unless painting of surfaces is required, by using only one mixture without changes in material or proportions for any structure or portion of structure exposed to public view.
- C. Repair and patch tie holes. Apply cone hole plugs matching color of cured concrete; and unless otherwise indicated, flush to concrete surface, as provided by form tie manufacturer using waterproof adhesive.

3.6 CONCRETE FLOORS AND SLABS FINISHING

- A. Comply with ACI 302.2R and as specified in this Section. Comply with flatness and levelness tolerance requirements of this Section.

B. Float Finish:

1. Immediately following placing and consolidating concrete, begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface.
2. When concrete has sufficiently stiffened begin floating to a true and even plane free of ridges. Perform floating using power-driven equipment or hand floats if area is small or inaccessible to power-driven floats.
3. If bleedwater is present prior to finishing, carefully drag-off or remove by absorption with porous materials such as burlap. Dusting of surfaces with dry cement or other materials or the addition of any water during finishing is not permitted.
4. Check slab surfaces with a ten-foot straightedge at regular intervals while concrete is still plastic, to detect high or low areas.
5. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighten until surface is left with a uniform, smooth, granular texture.
6. Take extreme care during finishing operations to prevent over finishing or to prevent working water into the surface; this can cause crazing (surface shrinkage cracks which appear after hardening) of the surface. Slabs with surfaces exhibiting significant crazing as determined by Architect shall be removed and replaced.

C. Trowel Finish:

1. After floating is complete and after surface moisture has disappeared, apply trowel finish using a power-driven trowel or hand trowel if area is small or inaccessible to power-driven trowel.
2. Steel trowel to a smooth, even, dense finish, free of blemishes including trowel marks.
3. Apply final steel troweling by hand.
4. Hard troweling (steel troweling) of air entrained concrete will not be permitted, unless otherwise indicated on Drawings or specified in other Sections.

D. Broom Finish:

1. After floating, lightly trowel surface and then carefully score by pulling a broom across the surface. Use appropriate type of broom to achieve texture specified.
2. Broom as indicated or as directed by Architect. Where not specifically indicated, broom transverse to traffic or at right angles to the slope of the slab.
3. Adding water to facilitate brooming is not permitted.
4. Exterior ramps, walks, and slabs: Apply a slip-resistant finish as follows:
 - a. Where slope is six percent or greater: Heavy broom finish with at least 0.8 coefficient of friction per ASTM C1028.
 - b. Where slope is less than six percent: Medium broom finish with a minimum 0.6 coefficient of friction per ASTM C1028.

E. Floor and Slab Flatness and Levelness Tolerance: Determine flatness and levelness of floor slabs using the F-Number System in accordance with ASTM E1155 using the inch-pound system of units. Calculate F-Numbers as follows:

1. Definitions:
 - a. Face Flatness Number (F_F): The maximum slab curvature allowed over 24 inches computed on the basis of successive 12 inch elevation differentials.

- b. Face Levelness Number (F_L): The relative conformity of the slab surface to a horizontal plane as measured over a ten foot distance.
- 2. Sampling Requirements: As described in ACI 117.
- 3. Calculations:

$$F_F = \frac{4.57}{\text{Maximum difference in elevation (in decimals of inches) between successive 12 inch elevation differences.}}$$

$$F_L = \frac{12.5}{\text{Maximum difference in elevation (in decimals of inches) between two points 10 feet apart.}}$$

- 4. Tolerances:
 - a. Trowel finish surfaces on ground: F_F 25; F_L 20 (overall tolerance values).
 - b. Float finish surfaces on ground: F_F 20; F_L 17 (overall tolerance values).
 - c. Minimum local tolerance (1/2 bay or as designated by Architect): 2/3 of specified tolerance values.
- 5. Refer to Article 3.9 of this Section for remedial work required for out-of-tolerance concrete.
- F. Site Concrete Flatness Tolerance: 1/4 inch in 10 feet, non-cumulative; unless more restrictive tolerance is indicated or specified. This tolerance does not allow slopes to exceed the specified maximum slopes.
 - 1. Surface cross slopes shall not exceed one unit vertical in fifty units horizontal (two percent).
 - 2. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Section 11B-302 and Section 11B-403.

3.7 CURING AND PROTECTION

- A. Protect freshly placed concrete from premature drying, rapid temperature change, mechanical injury, and injury from flowing water for a curing period not less than seven days. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during curing.
- B. Curing Methods:
 - 1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. If curing compound is applied using a hand held, pump-up sprayer, it shall be back-rolled using a short nap roller.
 - 2. Moist Curing: Keep surfaces in a moist condition for not less than seven days using water saturated absorptive cover (burlap-polyethylene sheeting) kept wet continuously. Cover concrete completely in widest practicable width, with sides and ends lapped at least 12 inches, and sealed with waterproof tape or adhesive. Immediately repair and maintain rips and tears and keep traffic away from surface during curing period.

3. Ponding or Immersion: Continuously immerse concrete throughout the curing period in water not more than twenty degrees below the temperature of the concrete.
- C. Concrete in Forms: Keep forms and exposed concrete surfaces covered and continuously moist. Provide soaker hoses at top of walls or other accepted means of keeping concrete and forms wet while forms remain in place. If forms are removed before end of curing period, continue curing by methods described in this Section.
- D. Floors and Slabs:
 1. Evaporation Retarder: Apply evaporation retarder to floors and slabs if hot, dry, or windy conditions cause moisture loss of 0.1 pounds per square foot per hour before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
 2. Cure by application of curing and sealing compound or by moist curing. Use appropriate curing method compatible with subsequent floor coatings. Moist cure concrete surfaces to receive penetrating liquid floor treatments.
 3. Begin curing as soon as free water has disappeared from the concrete surface after placing and final finishing.
- E. Protection:
 1. Protect concrete surfaces from damage by tools, equipment, materials, and construction activity.
 2. Traffic, shoring, or loading will not be permitted on concrete surface until it has sufficiently hardened to prevent injury to finish and strength.
 3. Protect all flat work and other surfaces as required with full board of plywood coverings as necessary.

3.8 REMOVAL OF FORMS

- A. Formwork for sides of curbs, beams, walls, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 48 hours after placing concrete provided concrete is hard enough not to be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved the following:
 1. At least one hundred percent of 28-day design compressive strength.
 2. At least seventy percent of 28-day design compressive strength when shores have been arranged to permit removal of forms without loosening or disturbing shores.
 3. Determine compressive strength of in-place concrete by testing representative field or laboratory-cured test specimens according to ACI 301.

3.9 CONCRETE REPAIRS

- A. General: Comply with ACI 301, Article 1.7 as follows:
 1. Completed concrete work shall conform to applicable requirements of this Section and Contract Documents.

2. Concrete work that fails to meet one or more requirements of the Contract Documents but subsequently is repaired to bring the concrete into compliance will be acceptable.
 3. Concrete work that fails to meet one or more requirements of the Contract Documents and cannot be brought into compliance with the Contract Documents is subject to rejection.
 4. Repair rejected concrete work by removing and replacing or by additional construction to strengthen or otherwise satisfy project requirements as directed by Architect. To bring rejected Work into compliance, use repair methods that meet applicable requirements for function, durability, dimensional tolerances, and appearance as determined by Architect.
 5. Submit proposed repair methods, materials, and modifications needed to repair concrete work to meet the requirements of the Contract Documents.
 6. Contractor shall be responsible to bring concrete work into compliance with requirements of Contract Documents.
- B. Defective Concrete: Repair and patch defective concrete work and concrete not conforming to required lines, details, and elevations. Use materials and methods specified in this Section as accepted by Architect. Serious defects, defects affecting structural strength, or unsatisfactory patching may be cause for complete removal and replacement of concrete.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycomb, rock pockets, and voids more than 1/2 inch in any direction in solid concrete. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with drypack grout before bonding agent has dried. Fill form-tie voids with patching mortar or cone hole plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, repair mortar will match surrounding color. Patch a test area at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed, formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness.
1. Repair defective finished surfaces including spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced section regardless of width, and other objectionable conditions.
 2. After concrete has cured fourteen days, correct high spots by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish areas to blend into adjacent concrete.

4. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surface in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete. Place, compact, and finish to blend with adjacent finished concrete.
5. Repair random cracks and single holes 1 inch or less in diameter with drypack grout. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place drypack grout before bonding agent has dried. Compact and finish grouted areas to match adjacent concrete.

E. Moist cure patches and repairs for at least 72 hours.

F. Perform concrete structural repairs subject to Architect's acceptance.

3.10 FIELD QUALITY CONTROL

A. General: Comply with requirements of Division 01.

B. Testing Service: Owner will select and pay for independent testing agency.

C. Strength Test Specimen Cylinders: Conduct sampling, curing, and testing per ASTM C172, ASTM C31/C31M, and ASTM C39/C39M. Contractor shall provide moulds required for strength test cylinders. Test samples shall be taken at the point of concrete placement.

1. Frequency: Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5000 square feet of surface area for slabs or walls.
2. A strength test shall be the average of the strengths of at least two 6 inch by 12 inch cylinders or at least three 4 inch by 8 inch cylinders made from the same sample of concrete and tested at the test age designated for the determination of concrete compressive strength.
3. Cylinder Label and Records: Mark and date each test cylinder. Maintain records of test specimen cylinders and send copies to Contractor, Architect, and Owner. Record the following information:
 - a. Cylinder identification mark.
 - b. Date made.
 - c. Concrete supplier.
 - d. Slump/slump flow.
 - e. Specified concrete design strength.
 - f. Pour location and type of structural member.
 - g. Compressive strength test date and age.
 - h. Admixtures added to concrete mix.
 - i. Air content.
4. Compressive Strength Tests: Test laboratory cured specimens at the following ages and report compressive strengths as follows:
 - a. 7 days where early compressive strength is required.

- b. 28 days.
 - c. 56 days.
 - d. Hold specimens for one strength test in reserve.
- 5. Test Reports: Furnish copies of test reports directly from testing agency to Contractor, Architect, and Owner.
- D. Slump Test: ASTM C143/C143M. Conduct slump testing when test cylinders are made and additionally for every 150 cubic yards of concrete. Perform additional tests when concrete consistency appears to change. Slump not meeting slump indicated in accepted mix design (\pm one inch) will be rejected. Contractor shall provide slump cones.
- E. Air Content Tests: ASTM C231 for normal weight concrete. Where air entrainment is specified, conduct air content tests from the first two batches of concrete mixed each day and when test cylinders are made. Concrete not meeting air entrainment requirements shall be rejected and removed.
- F. In the event the cylinders tested do not meet the required concrete design strength, conduct core tests and additional tests or inspections as may be required by Architect to ascertain strength of placed concrete. Costs for additional tests and inspections shall be borne by Contractor.
- G. Floor Flatness/Levelness: Provide verification of Floor and Slab Flatness and Levelness as indicated in Article 3.6.E of this Section. Furnish copies of report directly from testing agency to Contractor, Architect, and Owner.

END OF SECTION

Concrete Mixture Design Submittal Checklist

- ☐ Specify Use: All mix designs must clearly note the concrete type or use. (i.e. footings, slab on grade, site concrete)
- ☐ Mix Design: Provide concrete mixture designs with proportions and characteristics including all admixtures.
- ☐ Gradation: Provide combined aggregate gradation by weight for all course and fine aggregates.
- ☐ Weight: Provide dry unit weight of mix. Normal weight concrete shall be limited to 145 PCF.
- ☐ Material Certificates: Provide supplier's certification that materials conform to specifications. This includes aggregates, admixtures, and cementitious materials such as cement and fly ash.
- ☐ Product Data: Provide product literature for each product and admixture used. Include manufacturer's specification, written instructions, and installation procedures.
- ☐ Required SCM: Mix design must contain the percentage of supplementary cementitious materials noted in mix design table of the specifications.
- ☐ Admixtures: Where multiple admixtures are used, provide a letter from all manufacturers indicating there are no compatibility problems or adverse effects resulting from combination of products.
- ☐ Shrinkage: Provide shrinkage test per modified ASTM C157/C157M at 21 days. Shrinkage test must be for the same mix specified or a similar mix with the same water cement ratio and aggregate source. (Exception: shrinkage testing is not required for below grade concrete)
- ☐ Testing / Proportion Method: Concrete must be proportioned per the requirements of ACI 301-16. Indicated method used and provide complete test data and documentation for the chosen proportion method.

SECTION 03 37 13

SHOTCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pneumatically applied concrete.

1.2 RELATED SECTIONS

- A. Section 03 11 00 – Concrete Forming.
- B. Section 03 20 00 – Concrete Reinforcing.
- C. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ACI 308R – Guide to Curing Concrete.
 - 2. ACI 506.2 – Specifications for Materials, Proportioning and Application of Shotcrete.
 - 3. ASTM C33 – Standard Specification for Concrete Aggregates.
 - 4. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 5. ASTM C150 – Standard Specification for Portland Cement.
 - 6. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.
 - 7. ASTM C494/C494M – Standard Specification for Chemical Admixtures for Concrete.
 - 8. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 9. ASTM C1140 – Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels.
 - 10. ASTM C1141 – Standard Specification for Admixtures for Shotcrete.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings: Indicate formwork and/or shaped earthwork, dimensions (including thickness), tolerances and contours, reinforcement, accessories and control and expansion joint locations.

C. Product Data: Provide data on admixtures and mix proportions.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 506.2.

B. Maintain a copy of ACI 506.2 on site.

1.6 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this Section. Provide certification that the applicator is approved by manufacturer to install this product.

1.7 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section, under provisions of Division 01.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Ensure materials and surrounding air temperature are a minimum 50 degrees F prior to, during, and seven days after completion of work.

1.9 FIELD MEASUREMENTS

A. Verify by field measurements that dimensions are as shown on Drawings.

1.10 COORDINATION

A. Coordinate Work under provisions of Division 01.

B. Coordinate the Work with associated items that are placed within shotcrete work.

C. Coordinate the application with adjacent materials and surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement: ASTM C150, Type I – Normal gray color.

B. Normal Weight Aggregate: ASTM C33, 3/8 inch maximum size.

C. Admixtures: Chemical types to conform to ASTM C494/C494M. Air entraining type to conform to ASTM C260.

D. Reinforcement: Type as specified in Section 03 20 00.

E. Water: Clean and not detrimental to Shotcrete.

F. Alignment Wire: Small gage, high strength steel wire.

2.2 STRUCTURAL SHOTCRETE MIX

A. Aggregate and Water: Proportioned to achieve mix design.

B. Conform to following requirements:

1. Compressive Strength (28 day minimum): 5,000 psi.
2. Aggregate Size (maximum): 3/8 inch.
3. Air Entrainment: Meet requirements of ASTM C260.
4. Chemical Admixture: Shall meet appropriate ASTM specification. Propose admixtures in mix design.
5. Pozzolanic Mineral Admixture: Meet requirements of ASTM C618.
6. Slump: 1-1/2 inches to 3 inches.

C. Develop mix design to give good compaction and low percentage of rebound; stiff enough not to sag.

D. Thoroughly mix Shotcrete. Apply mix within 45 minutes of adding Portland cement to the mix.

E. Maintain quality control records during production of Shotcrete; make records available.

2.3 EQUIPMENT

A. Contractor's Option No. 1:

1. Mixing Equipment: Capable of thoroughly mixing aggregate, cement and water in sufficient quantity to maintain continuous placement.
2. Delivery Equipment: Capable of discharging wet mix aggregate, cement and water accurately, uniformly and continuously.

B. Contractor's Option No. 2:

1. Mixing Equipment: Capable of thoroughly mixing dry aggregate and cement in sufficient quantity to maintain continuous placement.
2. Delivery Equipment:
 - a. Air Supply: Clean, dry air adequate for maintaining sufficient nozzle velocity, uniformly steady for work while simultaneously operating blow pipe for cleaning away rebound.
 - b. Capable of loading aggregate and cement mixture into delivery hose under full control while maintaining continuous stream of uniformly mixed material at required velocity to discharge nozzle.
 - c. Equip discharge nozzle with water injection system (water ring) for directing even distribution of water to aggregate and cement mixture.

C. Water Supply: Uniform water pressure at discharge nozzle sufficiently greater than operating air pressure to ensure intimate mixing with aggregate-cement mix; provide water pump to system if line water pressure is inadequate.

2.4 SOURCE QUALITY CONTROL (AND TESTS)

A. Provide testing and analysis of Shotcrete under provisions of Division 01.

B. Appointed firm will review mix design and suggest changes where appropriate.

C. Provide inspection and testing for conformance to design mix.

D. Test samples in accordance with ACI 506.2.

- E. Refer to Article 3.5.C of this Sections for field quality control requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of Division 01
- B. Verify that conditions are acceptable and are ready to receive work.
- C. Verify fabricated forms are:
 - 1. True to line and dimension.
 - 2. Adequately braced against vibration during placement.
 - 3. Constructed to permit escape of trapped air during gunning operations.
 - 4. Constructed to minimize rebound during gunning operations.
- D. Ensure correct placement of reinforcement and sufficient clearance exists around reinforcement to permit complete encasement.
- E. Ensure easy access to shotcrete surfaces for screeding and finishing and to permit uninterrupted application.

3.2 PREPARATION

- A. Remove existing unsound concrete and other loose or deleterious materials from substrate surfaces.
- B. Minimize abrupt changes in thickness of repair. Remove square external corners from substrate by radiusing the edges.
- C. Sandblast surfaces to receive shotcrete.
- D. Do not place shotcrete on surfaces that are frozen, spongy or where there is free water.
- E. Determine operating procedures for placement in close quarters, extended distances or around unusual obstructions where placement velocities and mix consistency may be adjusted during application.
- F. Clean and wet cementitious or absorptive substrate surfaces prior to receiving shotcrete. Keep porous surfaces damp for several hours prior to placement of shotcrete.
- G. Protect adjacent surfaces not receiving shotcrete.

3.3 ALIGNMENT CONTROL

- A. Provide alignment wire to establish thickness and plane of required surfaces.
- B. Install alignment wire at corners and offsets (not established by forms).
- C. Tighten alignment wire true to line. Position adjustment devices to permit additional tightening.

3.4 APPLICATION

- A. Place reinforcement in accordance with ACI 506.2.

- B. Direct outlet nozzle perpendicular to surface to ensure maximum compaction with minimum rebound.
- C. Build-up to required thickness in multiple passes of the nozzle to achieve layering. Encase reinforcement with the first pass.
- D. Allow each layer to take initial set before applying succeeding layers.
- E. Do not permit applied shotcrete to sag, slough or displace.
- F. After initial set of final layer, remove excess material outside of forms and alignment lines.
- G. Sandblast to remove laitance. Clean with air/water pressure jet.
- H. Finish surface of final layer with a wood float finish. Apply a steel trowel finish over the wood float finish.
- I. Sound test the applied material with hammer for voids. Expose voids and replace with new shotcrete ensuring full bond with adjacent work.
- J. Remove rebound at construction and expansion joints.
- K. Remove rebound material which does not fall clear of work; discard salvaged rebound.
- L. Maintain surfaces wet for a minimum of seven days. Curing per ACI 308R and ACI 506.2.
- M. Immediately after placement, protect shotcrete from premature drying, excessively hot or cold temperatures and mechanical injury.
- N. Maintain shotcrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of shotcrete.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 01.
- B. Prior to start of work, inspection and testing firm will verify mix proportions, gradation and quality of aggregate.
- C. Testing firm shall test for strength, water absorption, drying and shrinkage and freeze and thaw resistance, and requirements of ACI 506.2 as specified below.
 - 1. Prepare preconstruction test panels for examination by Architect/Engineer prior to job shotcrete placement. Preparation and testing shall comply with ASTM C1140.
 - 2. Produce test panels for each proposed mix proportion, each anticipated shooting orientation, and each proposed nozzleman. Mixes shall meet requirements of ACI 506.2-95, Section 2.7-Proportioning. In half of the test panels provide reinforcement of the same size and spacing required for the work. Obtain six test specimens from each panel, three non-reinforced specimens and three with reinforcing steel.
 - 3. Test the nonreinforced specimens for compliance with the specified physical properties in accordance with ASTM C42.

4. Visually grade the reinforced specimens for compliance with specified core grade.
 - a. Core Grades:
 - 1) Grade 1: Shotcrete specimens are solid; there are no laminations, sandy areas or voids. Small air voids with a maximum diameter of 1/8 inch and maximum length of 1/4 inch are normal and acceptable. Sand pockets, or voids behind continuous reinforcing steel are unacceptable. The surface against the form or bond plane shall be sound, without a sandy texture or voids.
 - 2) Grade 2: Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions not to exceed 1/8 inch thick by 1 inch long. The height, width and depth of voids shall not exceed 3/8 inch. Porous areas behind reinforcing steel shall not exceed 1/2 inch in any direction except along the length of the reinforcing steel. The surface against the form or bond plane shall be sound, without a sandy texture or voids.
 - 3) Grade 3: Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions exceeding 3/16 inch thick by 1-1/4 inch long, or one major void, sand pocket, or lamination containing loosely bonded sand not to exceed 5/8 inch thick and 1-1/4 inch in width. The surface against the form or bond plane may be sandy with voids containing overspray to a depth of 1/16 inch.
 - 4) Grade 4 core: The core shall meet in general the requirements of Grade 3 cores, but may have two major flaws such as described for Grade 3 or may have one flaw with a maximum dimension of 1 inch (25 mm) perpendicular to the face of the core with a maximum width of 1-1/2 inch. The end of the core that was shot against the form may be sandy and with voids containing overspray to a depth of 1/8 inch.
 - 5) Grade 5 core: A core that does not meet the criteria of core grades 1 through 4, by being of poorer quality, shall be classified as Grade 5.
 - 6) Determination of grade shall be by computing the mean of a minimum of three test specimens.
 - 7) A mean grade of 2.5 or less is acceptable unless otherwise specified. Individual shotcrete cores with a grade greater than 3 are unacceptable.
 - 8) The above core grades are based on cores with a surface area of 50 square inches. For cores with greater or lesser area than 50 square inches, adjust allowable flaws relative to 50 square inches.
5. Test admixtures for compatibility with cement in accordance with ASTM C1141.
6. Unless otherwise specified, only nozzlemen with a test panel mean core grade less than or equal to 2.5 shall be allowed to place job shotcrete. When the prequalification test panel is rejected, a second panel may be shot. When the nozzleman's second mean core grade is greater than 2.5, the nozzleman shall not be permitted to shoot on the project.
7. Evaluation of in-place shotcrete:
 - a. Remove and replace shotcrete that is delaminated, exhibits laminations, voids, or sand pockets exceeding the limits for the specified grade or shotcrete. Remove and replace shotcrete that does not comply with the specified material properties.
 - b. Repair core holes in accordance with Chapter 9 of ACI 301. Do not fill core holes by shooting.
- D. Provide additional test panels during the course of the work as may be requested by the testing and inspection firm.

E. Tested panels may not be part of the Work.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 01.

B. Do not permit applied work to damage adjacent surfaces.

3.7 SCHEDULE

A. Locations, thicknesses, and reinforcing as indicated on Drawings.

END OF SECTION

SECTION 03 53 00
CONCRETE TOPPINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Overlay of exterior horizontal surfaces with a polymer-modified, portland cement mortar/concrete.

1.2 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. AASHTO T-277 – Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
 - 2. ASTM C33 – Standard Specification for Concrete Aggregates.
 - 3. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
 - 4. ASTM C293 – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading).
 - 5. ASTM C496 – Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
 - 6. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
 - 7. ASTM G3 – Standard Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing.

1.3 SUBMITTALS

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.4 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of five years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative

- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.6 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 45 degrees F and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

1.7 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one year, beginning with date of substantial completion of the project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Sika Corporation. Product: SikaTop 122 Plus.
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Polymer-modified Portland cement mortar:
 - 1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.
 - a. pH: 4.5 to 6.5.
 - b. Film Forming Temperature: 73 degrees F maximum.
 - c. Tear Strength: 950-psi minimum.
 - d. Elongation at Break: 500 percent minimum.
 - e. Particle Size: Less than 0.1 micron.

2. Component A shall contain an organic, penetrating corrosion inhibitor which has been independently proven to reduce corrosion in concrete via ASTM G3 (half-cell potential tests). The corrosion inhibitor shall not be calcium nitrite, and shall have a minimum of five years of independent field testing to document performance on actual construction projects.
 3. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.
 4. The materials shall be non-combustible, both before and after cure.
 5. The materials shall be supplied in a factory-proportioned unit.
 6. The polymer-modified, portland cement mortar must be placeable from 1/8-inch to 1-inch in depth per lift for horizontal applications.
- B. To prepare a polymer-modified portland cement concrete: aggregate shall conform to ASTM C33. The factory-proportioned unit shall be extended with 42 pounds maximum of a 3/8 inch (No.8 distribution per ASTM C33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption and high density. Aggregate must be accepted for use by Architect.

2.3 PERFORMANCE CRITERIA

- A. Typical Properties of the mixed polymer-modified, portland cement mortar:
1. Working Time: Approximately 30 minutes.
 2. Finishing Time: 50 minutes to 120 minutes.
 3. Color: Concrete gray when mixed.
- B. Typical Properties of the cured polymer-modified, portland cement mortar:
1. Compressive Strength (ASTM C109 Modified):
 - a. 1 day: 3000 psi minimum.
 - b. 7 day: 5500 psi minimum.
 - c. 28 day: 7000 psi minimum.
 2. Flexural Strength: 2000 psi at 28 days per ASTM C293.
 3. Splitting Tensile Strength: 750 psi at 28 days per ASTM C496.
 4. Bond Strength: 2200 psi at 28 days per ASTM C882 Modified.
 5. The portland cement mortar shall not produce a vapor barrier.
 6. Density(wet mix): 136 pounds per cubic foot.
 7. Permeability: Approximately 500 Coulombs at 28 days per AASHTO T-277.

Note: Tests above were performed with the material and curing conditions at 71 degrees F to 75 degrees F and 45 percent to 55 percent relative humidity.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16 inch (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than 1/8 inch in depth.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel with two coats of Sika Armatec 110 EpoCem as directed by manufacturer. See Spec Component SC-201-0699.

3.2 MIXING AND APPLICATION

- A. Mechanically mix in appropriate sized mortar mixer or with a Sika jiffy paddle and low speed (400 rpm to 600 rpm) drill. Pour approximately 4 gallons to 5 gallons Component A into the mixing container. Add Component B while continuing to mix. Mix to a uniform consistency for a maximum of three minutes. Add remaining Component A to mix if a more loose consistency is desired. Should smaller quantities be needed, be sure the components are measured in the correct ratio and that the Component B is uniformly blended before mixing the components together. Mix only that amount of material that can be placed in 30 minutes. Do not retemper material.
- B. Mixing of the polymer-modified portland cement concrete: Pour all (1-gallon) of Component A into the mixing container. Add Component B while continuing to mix. Add correct amount of the pre-approved coarse aggregate, and continue mixing to a uniform consistency. Mixing time should be three minutes maximum.
- C. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the scrub coat is still plastic, force material against edge of repair, working toward center. If repair area is too large to fill while scrub coat is still wet use Sika Armatec 110 EpoCem in lieu of scrub coat. See Spec Component SC-200. After filling, consolidate, then screed. Allow mortar or concrete to set to desired stiffness, then finish with trowel, manual or power, for smooth surface. Broom or burlap drag for rough surface. Areas where the depth of the repair is less than 1-inch shall be repaired with polymer-modified portland cement mortar. In areas where the depth of the repair is greater than one inch, the repair shall be made with polymer-modified portland cement concrete.
- D. As per ACI recommendations for portland cement concrete, curing is required. Pretesting of curing compound is recommended. Moist cure with wet burlap and polyethylene, a fine mist of water or a water-based compatible curing compound. Moist curing should commence immediately after finishing and continue for 48 hours. Protect newly applied material from rain, sun, and wind until compressive strength is 70 percent of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.

- E. Adhere to all procedures, limitations and cautions for the polymer-modified portland cement mortar in the manufacturers current printed technical data sheet and literature.

3.3 CLEANING

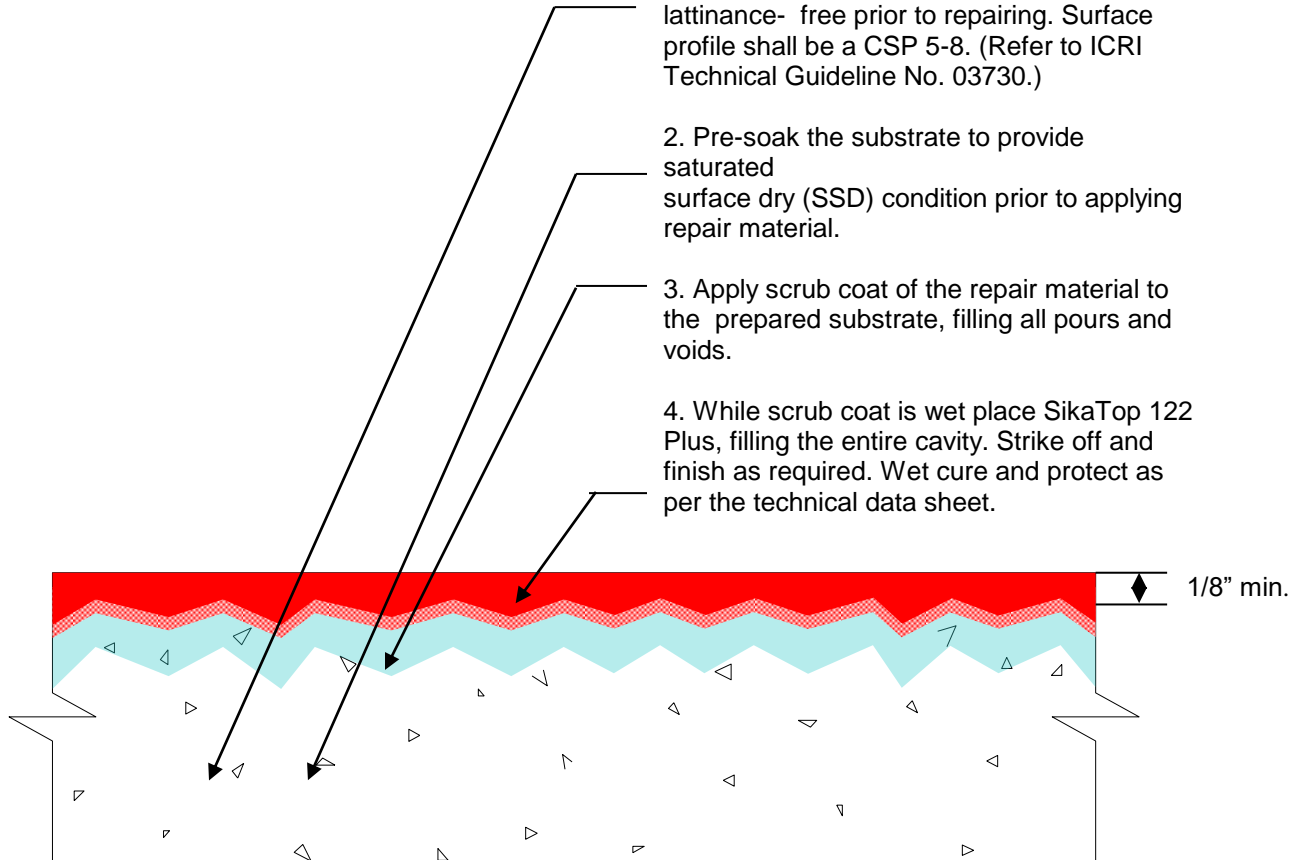
- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer-modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION

SC-025

SikaTop® 122 Plus Overlay

1. Substrate shall be clean, sound and lamination- free prior to repairing. Surface profile shall be a CSP 5-8. (Refer to ICRI Technical Guideline No. 03730.)
2. Pre-soak the substrate to provide saturated surface dry (SSD) condition prior to applying repair material.
3. Apply scrub coat of the repair material to the prepared substrate, filling all pores and voids.
4. While scrub coat is wet place SikaTop 122 Plus, filling the entire cavity. Strike off and finish as required. Wet cure and protect as per the technical data sheet.



Note:

1. If repair area is too large to fill while scrub coat is still wet, use Sika Armatec 110 EpoCem in lieu of the scrub coat. (See Spec Component SC-200)
2. If reinforcing steel is located within the repair location refer to Spec Component SC-201
3. For applications greater than 1" in depth, add 3/8" coarse aggregate in accordance to the technical data sheet.

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units (CMU).
- B. Reinforcement.
- C. Accessory items.

1.2 RELATED SECTIONS

- A. Section 03 20 00 – Concrete Reinforcing.
- B. Section 03 30 00 – Cast-In-Place Concrete.
- C. Divisions 21–23 – Mechanical.
- D. Divisions 25–28 – Electrical.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ACI 315 – Details and Detailing of Concrete Reinforcement.
 - 2. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
 - 3. ASTM C5 – Standard Specification for Quicklime for Structural Purposes.
 - 4. ASTM C90 – Standard Specification for Loadbearing Concrete Masonry Units.
 - 5. ASTM C94/C94M – Standard Specification for Ready Mixed Concrete.
 - 6. ASTM C140 – Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 7. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar.
 - 8. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes.
 - 9. ASTM C270 – Standard Specification for Mortar for Unit Masonry.
 - 10. ASTM C404 – Standard Specification for Aggregates for Masonry Grout.

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|----------------|---|
| 11. ASTM C476 | – Standard Specification for Grout for Masonry. |
| 12. ASTM C881 | – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete. |
| 13. ASTM C1019 | – Standard Test Method for Sampling and Testing Grout. |
| 14. ASTM D1056 | – Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber. |
| 15. TMS 402 | – Building Code Requirements for Masonry Structures. |
| 16. TMS 602 | – Specification for Masonry Structures. |

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings indicating bar sizes, spacings and locations of reinforcing steel, including reinforcing steel at door, window, and utility openings, bending and cutting schedules, supporting and spacing devices, and location/layout and details of each joint type.
- C. Certified Mix Design for block, grout, and mortar with integral water repellent: Include results of testing or test data when used to establish mix proportions for grout.
- D. Certificate of conformance stating that masonry units meet or exceed applicable ASTM specifications referenced in this Section.
- E. Two full size samples of each type of masonry unit specified, in selected colors.

1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: The masonry work shall comply with the requirements of this Section and, in addition, shall conform to the applicable requirements of TMS 402 and TMS 602, 2019 California Building Code (CBC), Chapter 17 "Special Inspections and Tests", Chapter 19 "Concrete", and Chapter 21 "Masonry".
 - 1. Inspection:
 - a. Masonry Construction: Per Section 1705 "Required Special Inspections and Tests", Article 1705.4 "Masonry Construction".
 - b. Reinforcing Bar Welding: Per Section 1705, Table 1705.3 "Required Special Inspections and Tests of Concrete Construction".
- B. Single Source Responsibility for Masonry Units: Obtain masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality including color[s] for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate. One cement type shall be used for all mortar throughout the project.
- D. Pre-Installation Meetings:
 - 1. Conduct pre-installation meeting in accordance with provisions of Division 01.
 - 2. Convene pre-installation meeting prior to commencing work of this Section.

3. Take minutes of meeting. Distribute to all attendees and concerned parties within five days.

1.6 DEFINITIONS

- A. Grout Lift: The increment of height to which grout is placed into masonry in one continuous operation within a total grout pour.
- B. Grout Pour: The total height of masonry to be grouted prior to the erection of additional masonry. A grout pour consists of one or more grout lifts.
- C. High-Lift Grouting: Grout pour full height of construction between horizontal cold joints using multiple grout lifts.
- D. Low-Lift Grouting: Units laid and grouted to a maximum height of five feet-four inches prior to the erection of additional masonry.

1.7 TESTS AND INSPECTIONS

- A. Tests requested by Architect shall be made by a testing laboratory selected and paid for by Owner. Any masonry work failing to meet required design stresses as specified hereinafter shall be dismantled and replaced at no cost to Owner.
 1. Tests requested by Contractor to establish design stresses when tests made by the Testing Laboratory indicate defective masonry shall be paid for by Contractor.
- B. Inspection: Approval of the reinforcing steel after installation must be received from Architect and Special Inspector. Architect and Special Inspector shall be notified at least 48 hours in advance of the beginning of grouting operations.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Unload masonry units carefully and store on raised platform. Masonry units shall be maintained under waterproof cover protected from weather.
- C. Protect cementitious materials against exposure to moisture. Store cementitious materials off the ground, under cover, and in a dry location. Use of cementitious or other materials that have become caked and hardened from absorption of moisture will not be permitted.
- D. Store and protect aggregates where grading and other required characteristics can be maintained.
- E. Store and protect masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.9 JOB AND ENVIRONMENTAL CONDITIONS

- A. Environmental:
 1. Cold Weather Conditions: Do not place unit masonry when temperature is below 40 degrees F unless Architect accepts and Contractor provides means for preventing damage from freezing before and after placement.

2. Hot Weather Conditions: Protect masonry construction from direct exposure to wind and sun when erected; with an ambient air temperature of 99 degrees F in the shade with relative humidity less than fifty percent.
- B. Do not apply uniform structural loads on CMU construction for at least 12 hours after constructing masonry walls or columns.
- C. Do not apply concentrated structural loads on CMU construction for at least 3 days after constructing masonry walls or columns.
- D. Protect all construction from droppings of mortar.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers, Concrete Masonry Units (CMU):
 1. Basalite Block Company, Inc., Dixon, CA; 800-776-6690, 707-678-1901, www.basalite.com.
 2. Calstone Company, Sunnyvale, CA; 408-984-8800, www.calstone.com.
 3. Angelus Block Co., Inc., Sun Valley, CA; 818-767-8576, www.angelusblock.com.
- B. Acceptable Manufacturers and Products, Integral Water Repellent for CMU and Mortar:
 1. Grace Construction Products, W. R. Grace & Co. - Conn.; "Dry-Block Block Admixture" for CMU; "Dry-Block Mortar Admixture" for mortar.
 2. ACM Chemistries, Inc.; "RainBloc" for CMU, and "RainBloc for Mortar" for mortar.
 3. BASF Aktiengesellschaft; Rheopel Plus for CMU; Rheopel Mortar Admixture for mortar and grout.
- C. Substitutions: Under provisions of Division 01.

2.2 CONCRETE MASONRY UNITS

- A. Hollow Load Bearing Units: ASTM C90, maximum oven dry density of 135 pounds per cubic foot, 2000 pounds per square inch minimum compressive strength. Provide open and closed-end units, bond beams, U beams, half units and any additional special shapes and sizes as required to complete the Work. Units shall be of the following types:
 1. Smooth finish precision, sizes as indicated on Drawings; colors as selected by Architect.
 2. Split-face texture one side and exposed ends, sizes as indicated on Drawings; colors as selected by Architect.
- B. Provide integral water repellent admixture in concrete mix during manufacture of concrete masonry units. Mixing and proportions shall be in strict accordance with water repellent manufacturer's printed instructions.

2.3 MORTAR AND GROUT

- A. Portland Cement: ASTM C150, Type I, except use Type III for construction below 40 degrees F. Provide natural color or white cement as required to produce required mortar color. Masonry cement will not be permitted.

- B. Aggregate:
 - 1. For Mortar: ASTM C144.
 - 2. For Grout: ASTM C404.
- C. Hydrated Lime: Type S, ASTM C207.
- D. Quick Lime: ASTM C5.
- E. Water: Clean and potable, free from impurities detrimental to mortar and grout.
- F. Admixtures:
 - 1. Unless otherwise specified, use admixtures only with Architect's acceptance and without adversely affecting bond or compressive strength.
 - 2. Grout Additive: Grout pours greater than five feet-four inches shall contain "Grout Aid" by Sika Chemical Corporation or "Pre-Mix Products Grout Additive" by Valley Abrasive Shot, Inc.
 - a. Mix grout additive as recommended by manufacturer.
- G. Provide integral water repellent admixture in mortar mix. Mixing and proportions shall be in strict accordance with water repellent manufacturer's printed instructions.
- H. Color of mortar as selected by Architect.

2.4 REINFORCEMENT, ACCESSORIES, AND RELATED ITEMS

- A. Steel reinforcement including anchors, ties and accessories: shall conform to CBC Section 2103.4 "Metal Reinforcement and Accessories."
- B. Reinforcing Steel: Same type and quality specified for concrete reinforcing, Section 03 20 00.
- C. Wire Ties: No. 16 annealed wire for tying reinforcing steel.
- D. Wire Joint Reinforcement: 220 Ladder-Mesh joint reinforcement as manufactured by Hohmann & Barnard, Inc. or accepted equal, with the following characteristics:
 - 1. Joint reinforcement shall conform to ASTM A951/A951M.
 - 2. Wire Size: 9 gauge side rods x 9 gauge cross rods, cross welded at 16 inches on center.
 - 3. First cross rods shall be welded 12 inches from each end to allow lap splices.
 - 4. Ladder shall be hot-dip galvanized after fabrication in conformance with ASTM A153/ASTM 153M. Coating shall be applied at a rate of 1.5 ounces per square foot.
- E. Bonding Agent: MasterEmaco ADH 326 two-component 100 percent solids liquid epoxy bonding adhesive in compliance with ASTM C881, Type II, Grade 2, Class C as manufactured by Master Builders Solutions/BASF, or accepted equal.
- F. Control Joints: Closed cell neoprene rubber conforming to ASTM D1056, Grade 2A1. 3/8 inch thick by 3 inches wide. Product: Rapid Expansion Joint DA2015 as manufactured by Dur-O-Wal, a Hohmann & Barnard Company, Hauppauge, NY; 800.645.0616, www.dur-o-wal.com, or accepted equal.
- G. Weep Holes: Where weep holes are required, provide medium density polyethylene plastic tubing in lengths and diameter as indicated on Drawings.

2.5 MIXES AND MIXING

A. Mortar:

1. Meet the requirements of CBC Section 2103.2 and ASTM C270 Type S.
 - a. Proportions by volume: One part Portland cement, 2.25 parts to 3 parts sand based on damp loose volume, and not less than a quarter and not more than half part lime.
2. Mortar shall be mixed as follows, with a total mixing time not less than ten minutes.
 - a. Place approximately half of required water and sand into mixer while running.
 - b. Add cement and remainder of sand and water into mixer in that order and mix for a period of at least two minutes.
 - c. Add lime and continue mixing as long as needed to secure a uniform mass.
3. Use and place mortar in final position within 2-1/2 hours after mixing. Mortars that have stiffened due to evaporation of water may be re-tempered with water as necessary to restore required consistency during that time period.

B. Grout:

1. Grout shall conform to the requirements of TMS 602 and shall be a coarse grout designed to attain a compressive strength of not less than 2,000 psi at 28 days.
2. Proportions: Grout shall be proportioned as specified by one of the following methods:
 - a. Based on proportions specified in ASTM C476.
 - b. Based on laboratory or field experience with the grout ingredients and the masonry units to be used.
 - 1) For coarse grout, the coarse and fine aggregates shall be combined such that the fine aggregate part is not greater than 80 percent of the total aggregate weight (mass). Coarse grout proportioned by weight shall contain not less than 564 pounds of cementitious material per cubic yard.
 - 2) If this method is selected, Contractor shall submit documented history of grout mix design and results of test data used to establish mix proportions from no less than ten different recent projects.
 - 3) Compressive strength shall be determined in accordance with ASTM C1019.
3. Aggregate for grout shall conform to the requirements set forth in ASTM C404, Aggregates for Grout. Coarse grout shall be used in grout spaces 2 inches or more in width and in all filled-cell masonry construction.
4. Materials for grout shall be measured in suitable calibrated devices. After the addition of water, all materials shall be mixed for at least three minutes in a drum type batch mixer. Mixing equipment and procedures shall produce grout with the uniformity required for concrete by ASTM C94.
5. Grout consistency at time of placement shall enable full grouting of all spaces scheduled to receive grout.

2.6 SOURCE QUALITY CONTROL

A. Where required by governing code, Owner's Testing Agency will:

1. Select masonry units by random sampling at the plant and test units for strength, absorption, and moisture content in accordance with ASTM C140; report strengths based on net area.

2. Review mix designs for mortar and grout.
3. Review certificates of compliance for materials. Sample and test where non-conformance is suspected.
4. Perform masonry and grout tests.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive masonry and verify following:
 1. That foundation surface is level to permit bed joint with range of 1/4 inch to 1-1/4 inch.
 2. That edge is true to line to permit protection of masonry to less than 1/4 inch.
 3. That projecting dowels are free from loose scale, dirt, concrete, or other bond-inhibiting substances and properly located.
- B. Do not begin work before unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean concrete surfaces to receive masonry. Remove laitance or other foreign material lodged in surfaces by sandblasting or other means as required.
- B. Ensure masonry units are clean and free from dust, dirt or other foreign materials before laying the units.
- C. Establish lines, levels and coursing. Protect from disturbances.
- D. Provide temporary bracing during erection of masonry work. Maintain in place until masonry has set to provide permanent bracing.

3.3 COURSING

- A. Install unit masonry work in accordance with CBC Chapter 21.
- B. Place unit masonry to lines and levels indicated to the following tolerances, as well as tolerances indicated in TMS 602:
 1. Variation from unit to adjacent unit: 3/16 inch maximum.
 2. Variation from plane to wall: $\pm 1/4$ inch in 10 feet; $\pm 3/8$ inch in 20 feet; $\pm 1/2$ inch maximum.
 3. Variation from plumb: $\pm 1/4$ inch in 10 feet; $\pm 3/8$ inch in 20 feet; $\pm 1/2$ inch maximum.
 4. Variation of level coursing: 1/4 inch in 10 feet; 1/2 inch maximum.
 5. Variation of joint thickness: $\pm 1/8$ inch.
- C. Bond: Use running bond typical unless otherwise noted. Lay concrete masonry units with vertical joints located at center of unit in course below.
- D. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- E. Preserve the vertical continuity of cells in concrete unit masonry. The minimum clear horizontal dimensions of vertical cores shall be 3 inches by 3 inches for an 8-inch wide block.

3.4 PLACING AND BONDING

- A. Do not install concrete masonry units which are wet, cracked, broken or chipped beyond ASTM C90 finish and appearance tolerances.
- B. Lay only dry concrete masonry units.
- C. Perform jobsite cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges.
- D. Lay units with bed and head joints filled from the faces of the units to a distance in not less than the thickness of the face shell.
 - 1. Webs shall be fully mortared in all courses of piers, columns, and pilasters, and when necessary to confine grout or insulation.
 - 2. Vertical cells to be grouted shall be aligned and have unobstructed openings for grout.
 - 3. Buttering of joint corners and deep or excessive furrowing of mortar joints is not permitted.
- E. Keep cavity airspace and weep holes clean of mortar. Clean out promptly if mortar falls into cavity airspace or plugs weep holes.
- F. In-Progress Cleaning:
 - 1. Remove excess mortar.
 - 2. Dry brush exposed masonry prior to the end of each workday.
 - 3. Protect wall from mud splatter and mortar droppings.
 - a. Set scaffolds and scaffold boards so that mortar is not deflected onto masonry.
 - b. At the end of each workday, turn scaffold boards so that rainwater is not deflected onto masonry.
 - 4. Place concrete masonry units such that mortar does not run down the face of the wall or smear the masonry face.
- G. Adjustments:
 - 1. Do not shift or tap concrete masonry units after mortar has taken initial set.
 - 2. If adjustment is required, remove unit and mortar in its entirety and replace.
- H. After joints are tooled, cut off mortar tailings with trowel and dry brush excess mortar burrs and dust from the face of the masonry.
- I. Fully bond interior and exterior corners and properly anchor intersecting walls.

3.5 JOINTS

- A. Horizontal and vertical joints at masonry units shall be as specified herein and concrete unit masonry joints shall be 3/8-inch wide and as follows:
 - 1. Point joint tight in masonry below ground.
 - 2. All end joints shall be fully filled with mortar and joints squeezed tight. Slushing of mortar into joints shall not be permitted. Mortar in bed joints shall be held back approximately 1/2 inch from cell to provide positive bond with grout.

3. Exposed Joints:

- a. Unless noted otherwise, all interior and exterior exposed surfaces of concrete masonry units, vertical and horizontal joints shall be concave.

- 1) At all exterior surfaces to receive adhered roofing membrane, vertical and horizontal joints shall be flush.

4. Tool vertical joints first.

5. Concave joints shall be formed by striking the mortar flush, and after partial set tooled with a tool of sufficient length to provide a uniform joint, free of waves. Tool shall be of a diameter to provide a joint that is as close to flush as possible. Use tool with large enough radius that joint is not raked free of mortar.

3.6 MASONRY REINFORCEMENT

- A. Place reinforcement in accordance with ACI 315, to the tolerance specified in Drawings.

- B. Reinforcing steel shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the plans shall not be used. Heating of bars for bending will not be permitted.

- 1. Bars shall conform accurately to the sizes, shapes, lines and dimensions shown on Drawings and with hooks and bends made as detailed. Bars shall be placed as indicated on Drawings and centered on grout space.
- 2. At the time grout is placed around it, reinforcing steel shall be clean of mill scale or other coatings that will destroy or reduce bond.
- 3. All vertical reinforcing steel shall be installed in one piece, full height of wall, and braced throughout its height in a manner that will retain the steel in proper position and provide the proper clearance.

3.7 GROUTING

- A. General Requirements:

- 1. All cells shall be grouted solid.
- 2. Use grout pump, hopper or bucket to place grout.
- 3. Place grout in final position within 1-1/2 hours after introduction of mixing water.
 - a. Place grout and rod with a 3/4-inch flexible cable vibrator sufficiently to cause it to flow into all voids between the cells and around the reinforcing steel. Slushing with mortar will not be permitted.
 - b. Do not insert vibrators into lower pours that are in a semi-solidified state.
- 4. Stop grout approximately 1-1/2 inches below top of last course; except at top course bring grout to top of wall. Where bond beams occur, stop grout pour a minimum of 1/2 inch below the top of the masonry.
- 5. Prior to grouting, the grout space shall be cleaned so that all spaces to be filled with grout do not contain mortar projections greater than 1/2 inch, mortar droppings or other foreign material.
- 6. The grouting of any section of wall shall be completed in one day with no interruptions greater than one hour.

B. High-Lift Grouting:

1. Where high lift grouting is used, the method shall be approved by the Authority Having Jurisdiction.
2. Maximum grout pour height, comprised of multiple five feet-four inch maximum grout lifts:
 - a. 12 feet-8 inches for 8 inch wide CMU.
3. Cleanouts are required when high-lift grouting method is used. Cleanouts shall be provided in the bottom course at every vertical rebar. Cleanouts shall be located on concealed faces of wall and shall be sealed after inspection and before grouting. Cleanouts will not be allowed on exposed faces of wall.

C. Low-Lift Grouting:

1. Units shall be laid to a maximum height of five feet-four inches before grouting, and all over-hanging mortar and mortar droppings shall be removed.
2. Grouting shall follow each five feet-four inches height of construction laid, and shall be consolidated so as to completely fill all voids and embed all reinforcing steel.

3.8 CONTROL JOINTS

- A. Install control joints in continuous lengths as shown on Drawings.
- B. Size joints in accordance with manufacturer's recommendations for sealant performance.
- C. Install backer rod and sealant under provisions of Section 07 92 00.
- D. Install preformed control joint filler at locations indicated on drawings.
- E. Use proper size material to create sealant joint specs.

3.9 EXPANSION JOINTS

- A. Install expansion joint filler material on centerline of wall at locations indicated on Drawings.
- B. Install backer rod and sealant under provisions of Section 07 92 00.

3.10 BOND BEAMS

- A. Bond beams shall be located where shown and detailed on Drawings, and shall be reinforced as indicated and as hereinafter specified.

3.11 BUILT-IN WORK

- A. Miscellaneous Embedded Items: All items indicated to be embedded in masonry shall be carefully located and anchored to prevent movement during grouting operations. Avoid cutting and patching.
 1. Install all anchor bolts and anchors furnished under other Sections.
- B. Pipes and Conduits: Horizontal and vertical pipes and conduits embedded in walls shall not exceed the limitations indicated on the Structural Drawings.

3.12 CUTTING AND FITTING

- A. Cutting: Make all unit cuts, including those for bonding, holes, boxes, etc., with motor-driven masonry saws, using either an abrasive or diamond blade. Cut neatly and locate for best appearance. Cut with proper tools to provide straight, unchipped edges and take care to prevent raking masonry unit corners or edges.
- B. Cut and fit for weep holes pipes and miscellaneous penetrations. Cooperate with other sections' work to provide correct size, shape and location.
- C. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.13 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units.
- B. Pointing: During the tooling of joints, enlarge any voids or holes and completely fill with mortar.
- C. Dry brush masonry surface after mortar has set, at end of each day's work and after final pointing.
- D. Leave work and surrounding surface clean and free of mortar spots and droppings.
- E. Cleaning:
 - 1. Keep walls clean daily during installation using brushes, rags, and burlap squares. Do not allow excess mortar lumps or smears to harden on the finished surfaces. Remove green mortar with burlap or a dry cloth.
 - 2. Upon completion of masonry installation, repair all holes. Mortar joints that are not properly tooled or that show cracks shall be cut out, removed, and repointed at no cost to the Owner.
- F. Final Cleaning:
 - 1. Just prior to project substantial completion, clean masonry surfaces.
 - a. Cleaning Product: PROSOCO Sure Klean line of cleaners, product appropriate to installed concrete units, or accepted equal.
 - 1) Run-off from cleaning operations shall be contained, neutralized, and disposed of per State and local regulations. Obtain necessary permits for disposal of run-off.
 - b. Sandblasting is an acceptable alternative means of cleaning, provided that no silica particulates are used.
 - 1) Sandblasting operations shall not generate large quantities of dust. Employ wet sandblasting methods to control dust.
 - 2. Final cleaning shall not be scheduled until walls have thoroughly dried out and sealants have been installed and cured.

3.14 FIELD QUALITY CONTROL

- A. Owner's Inspector and/or Testing Agency will:
 - 1. Provide the following checks as a minimum:
 - a. Measurement and mixing of field mixed mortar and grout.

- b. Moisture conditions of masonry units at time of laying.
 - c. Inspection of laying of units with special attention to joints and bonding of units at corners.
 - d. Proper placement of reinforcement including splices, clearances and supports.
 - e. Observation of placement of pipes, conduits, or other weakening elements.
 - f. Inspection of grout spaces immediately prior to grouting for removal of mortar fins, dirt and debris.
 - g. Continuous inspection of grout placement with attention to procedures to avoid segregation and achieve proper consolidation.
 - h. Perform or supervise sampling for testing.
- B. Contractor shall be responsible for repair of any damage to work caused by testing.
- C. Contractor shall pay Owner's Testing Agency for all additional testing required, including masonry cores, when laboratory tests of specimens show compressive strengths below specified minimum and judged to be inadequate by Architect.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing and support members.
- B. Base plates and bearing plates.
- C. Grouting under base plates.

1.2 RELATED SECTIONS

- A. Section 03 20 00 – Concrete Reinforcing.
- B. Section 03 30 00 – Cast-In-Place Concrete.
- C. Section 05 31 00 – Steel Decking.
- D. Section 05 50 00 – Metal Fabrications.
- E. Section 09 91 00 – Painting: Paint finish.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. AISC 303-05 – Code of Standard Practice for Steel Buildings and Bridges.
 - 2. ANSI B18.22.1 – Plain Washers.
 - 3. ANSI B18.23.1 – Beveled Washers.
 - 4. ASTM A6/A6M – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - 5. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
 - 6. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 7. ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - 8. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 9. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

- 10. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- 11. ASTM A572/A572M – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- 12. ASTM A780/A780M – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- 13. ASTM A992 – Standard Specification for Structural Steel Shapes.
- 14. ASTM F844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
- 15. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- 16. AWS A2.4 – Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- 17. AWS D1.1 – Structural Welding Code – Steel.
- 18. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
- 19. AWS D1.8 – Structural Welding Code – Seismic Supplement.
- 20. AWS D2.0 – Specifications for Welded Highway and Railway Bridges.
- 21. SSPC – Steel Structures Painting Manual, Volumes 1 and 2.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, and locations of structural members, attachments, fasteners, and required connections, including connections not detailed on Drawings.
 - 2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 3. Clearly distinguish between shop and field bolts and welds.
- C. Manufacturer's Mill Certificate: Submit Manufacturer's Certificates under provisions of Division 01, certifying that steel, fasteners and welding electrodes meet or exceed specified requirements.
- D. Mill Test Reports: Submit Manufacturer's Reports under provisions of Division 01, indicating structural strength, destructive and non-destructive test analysis and ladle analysis.
- E. Submit product data for type of metal primer proposed for use.
- F. Welders' Certificates: Submit certificates under provisions of Division 01, certifying welders employed on the Work, verifying AWS qualifications within the previous twelve months.
 - 1. Welders who have not performed welding for period of three or more months shall be requalified.
 - 2. Welders whose work fails to pass inspection shall be requalified before performing further welding.
 - 3. Contractor shall pay costs of certifying qualifications.

G. Welding Procedures: Submit proposed Welding Procedure Specifications (WPS). Where WPS is not prequalified by AWS D1.1, submit supporting Performance Qualification Records (PQR).

H. Qualification Data: For qualified Fabricator and Installer.

1.5 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303-05, Code of Standard Practice for Steel Buildings and Bridges.

1.6 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with the AISC Specification for Structural Steel Buildings, Code of Standard Practice for Steel Buildings and Bridges and Quality Criteria and Inspection Standards.

B. Fabricator Qualifications: Company specializing in performing the work of this Section with sufficient documented experience.

C. Installer (Erector) Qualifications: Company specializing in performing the work of this Section.

1.7 REGULATORY REQUIREMENTS

A. Conform to 2019 California Building Code (CBC), Chapter 16 "Structural Design", Chapter 22 "Steel", and Chapter 17 "Special Inspections and Tests".

B. Structural Tests and Inspections: Refer to project Enforcement Agency Structural Tests and Inspection Sheet.

C. Materials:

1. Material identification per CBC Chapter 22, Section 2202.1.
2. Protection of structural steel per CBC Chapter 22, Section 2203.1.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on shop drawings.

B. Coordinate fabrication and delivery of structural steel items with concrete work and with all other trades to permit such items to be built into the structure without delay.

1.9 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials to be Installed Under Other Sections: Anchor bolts and other anchorage devices which are embedded in cast-in-place concrete construction shall be delivered to the project site in time to be installed before start of cast-in-place concrete operations.

B. Storage of Materials:

1. Structural steel members to be stored at the Project site shall be placed above ground, on platforms, skids or other supports.
2. Steel shall be protected from corrosion.

3. Other materials shall be stored in a watertight, dry place until ready for installation in the Work.
4. Packaged materials shall be stored in their original package or container.
5. Do not store materials on the structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structure as directed by Architect.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural Steel Members:

1. ASTM A992 Grade 50 for wide flange and WT shapes.
2. ASTM A36/A36M or A572 Grade 50 for plates, as noted on Drawings.
3. ASTM A36/A36M for channels, angles and all other shapes.

B. HSS:

1. Tubing: ASTM A500, Grade C.
2. Round: ASTM A500, Grade C.

C. Pipe: ASTM A53/A53M, Type E or S, Grade B.

D. Bolts and Nuts: ASTM A307, Grade A, with ASTM A563, Grade A, hex nuts; ASTM F3125, Grade A325N, Type 1, with ASTM A563, Grade C, heavy hex nuts; anchor bolts, ASTM F1554, grade as indicated on Drawings.

E. Welding Materials:

1. Typical Weld Locations: AWS D1.1; type required for materials being welded.
2. SFRS and Demand Critical Welds: AWS D1.8; filler metal shall be classified as low hydrogen and shall have a minimum Charpy V-notch toughness of twenty foot-pounds at -25 degrees F for SFRS welds and forty foot-pounds at 45 degrees F for Demand Critical Welds as determined by AWS classification or manufacturer certification. Demand critical weld material shall also meet heat input testing requirements of AWS D1.8, Clause 6.3.

F. Circular washers for common bolts: ASTM F844, Type A, and ANSI B18.22.1.

G. Beveled washers for common bolts: ANSI B18.23.1.

H. Post-Installed Concrete Anchors: ICBO approved, as indicated and manufactured by Hilti or accepted equal.

I. Welded Headed Stud Anchors: ASTM A108. Welding, testing and inspection shall be in accordance with AWS D1.1.

J. Steel Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal.

K. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galviline Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Phone: (800) 831-3275, or accepted equal.

- L. Weld filler material: All weld filler material shall have a minimum tensile strength of 70 KSI per AWS D1.1, latest edition approved by code enforcement agency.
- M. Drypack: Refer to Section 03 30 00.
- N. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 8,000 psi at 28 days.
- O. Reinforcing Steel: Refer to Section 03 20 00.

2.2 FABRICATION

- A. General: Fabricate items of structural steel in accordance with AISC specifications and as indicated on Drawings. Properly mark and match-mark all materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling.
 - 1. Welded splicing of structural members may be done only upon written acceptance by Architect, unless otherwise indicated on Drawings. Splicing shall be thoroughly examined by a nondestructive means at Contractor's expense. Inspection shall be made by a recognized and approved testing laboratory; procedure, technique and standards of acceptance shall conform to Appendix E of AWS Standard D2.0-69. Correct faulty welds and re-examine in a manner specified for original welds.
- B. Welded Construction:
 - 1. Weld in accordance with AISC using manual shielded arc method or flux cored arc method in accordance with AWS D1.1 and AWS D1.8. Groove welds shall be complete joint penetration welds, unless specifically designated otherwise on Drawings.
 - 2. Remove back-up plates for complete joint penetration welds when specifically requested by testing laboratory to perform non-destructive testing. Remove at no cost to Owner.
 - 3. Weld reinforcing steel in accordance with AWS D1.4 and using prequalified procedures.
- C. Connections:
 - 1. Weld or bolt shop connections as indicated.
 - 2. Bolt field connections except where welded or other connections are indicated. Provide unfinished threaded fasteners only where noted on Drawings and for temporary bracing to facilitate erections.
- D. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for the passage of work through steel framing members as indicated. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work. Cut, drill or punch holes perpendicular to metal surfaces. Thermally cut holes are only permitted at anchor rod holes.

2.3 FINISHES

- A. Prepare structural component surfaces in accordance with SSPC SP-2 at concealed locations and SSPC SP-6 at exposed locations.
- B. Do not prime surfaces in direct contact with concrete, where field welding is required, or contact surfaces of steel-to-steel connections.

- C. All exposed interior steel shall be primed with shop primer unless otherwise noted.
 - 1. Primer shall be applied in one coat, to meet or exceed the minimum mil thickness required by the primer manufacturer.
- D. All un-exposed, concealed or enclosed interior or exterior steel requires no finish.
- E. All exposed exterior steel shall be galvanized unless otherwise noted.
 - 1. Galvanize in accordance with ASTM A123/A123M, designated steel items. Provide minimum 1.25 ounce per square foot galvanized coating.
 - 2. At galvanized members, touch-up all welds with zinc-rich primer.
- F. Column Bases: Column bases and base plates shall be finished in accordance with the following requirements:
 - 1. Steel bearing plates 2 inches or less in thickness are permitted without milling provided a smooth and notch-free contact bearing surface is obtained. Steel bearing plates over 2 inches but not over 4 inches in thickness are permitted to be straightened by pressing or, if presses are not available, by milling for bearing surfaces, except as stipulated in subparagraphs (2) and (3) below, to obtain a smooth and notch-free contact bearing surface. Steel bearing plates over 4 inches in thickness shall be milled for bearing surfaces, except as stipulated in subparagraphs (2) and (3) below.
 - 2. Bottom surfaces of bearing plates and column bases that are grouted to ensure full bearing contact on foundations need not be milled.
 - 3. Top surfaces of bearing plates need not be milled when complete-joint-penetration groove welds are provided between the column and the bearing plate.

2.4 TESTING AND INSPECTION

- A. General: Owner will engage and pay a testing agency to perform the following services:
 - 1. Review manufacturer's certificates and check heat numbers and that the steel is properly identified in accordance with CBC Section 2202 "Identification of Steel for Structural Purposes".
 - 2. Testing of unidentified materials or as directed by Owner.
 - 3. Provide inspection per CBC Sections 1705.2 and 1705.12.
 - 4. Provide testing per CBC Section 1705.13.
 - 5. In the event an examination discloses faulty welds and additional tests are required to fully examine the welds, the cost of the additional tests shall be paid for by Owner and back-charged to Contractor.
 - 6. All defective welds shall be repaired and tested at no expense to Owner.
 - 7. Perform any physical tests of structural steel as required by Architect. Perform ultrasonic tests on members as determined by Architect to determine if delamination defects in steel members are evident.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

- B. Beginning of installation means erector accepts existing conditions.
- C. Bolts shall be clean and free of grease, oil and all other deleterious substances.

3.2 ERECTION

- A. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.
- B. Field weld components indicated on shop drawings.
- C. Do not field cut or alter structural members without acceptance of Architect.
- D. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.
- E. Setting Base Plates:
 - 1. Clean concrete bearing surfaces and roughen to improve bond. Clean the bottom surface of base plates.
 - 2. Set loose and attached base plates for structural members on adjusting nuts at anchor bolts. All anchor bolts shall have double nuts for adjusting.
 - 3. Tighten anchor bolts after the supported members have been positioned and plumbed. Do not remove adjusting nuts.
 - 4. Place non-shrink grout solidly between surfaces as shown to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow non-shrink grout to cure.
- F. Structural steel work shall be set accurately at established lines and levels. Steel shall be plumb and level before final bolting or welding is commenced and after complete erection. All cutting, notching, coping, etc., required for proper assembly and fitting of parts and members, shall be done by the steel fabricator. Such workmanship shall be equal in quality to shop work.
 - 1. Coordinate the erection of structural steel with other trades and locate temporary guys, braces, falsework and cribbing as may be necessary for erection so as not to interfere with the progress of other work.
 - 2. Rolled sections, except for minor details, shall not be heated except for welding operations.
 - 3. Upon acceptance by Architect, gas cutting may be permitted if the metal being cut is not highly stressed during the operation. Stresses shall not be transmitted through a flame cut surface unless such surfaces are cut by a mechanically guided torch. The radius of re-entrant flame cut fillets shall be as large as possible, but not less than 1 inch. To determine the net area of members so cut, 1/8 inch shall be deducted from the flame cut edges not made by a mechanically guided torch. Gas cuts shall be smooth and regular. Holes for bolts shall not be cut with a torch.
 - 4. All contact surfaces shall be cleaned before assembly.
 - 5. Provide setting diagrams and templates as required. Placement of beam connectors shall be the responsibility of structural steel fabricator.
 - 6. Splice members only where indicated.

- G. Connections shall be as specified hereinbefore under "Fabrication." In addition, bolted connections shall conform to the following requirements:
1. Beveled washers shall be used under all bolt heads and nuts where they rest on beveled surfaces.
 2. Connectors shall have hexagon heads and nuts.
 3. Nuts shall be drawn up tight. Check threads of unfinished bolts with chisel or approved self-locking nuts.
 4. Bolts that have been completely tightened shall be marked with identifying symbol.
- H. Framing shall be carried up true and plumb. Temporary bracing shall be introduced wherever necessary to take care of all loads to which structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety. It shall finally be removed by Contractor as part of his equipment. As erection progresses, the work shall be securely connected to take care of all dead load, lateral loads and erection stresses. No final bolting or welding shall be done until the structure has been properly aligned.

3.3 ERECTION TOLERANCES

- A. Level and plumb steel within the tolerances defined in the AISC Code of Standard Practice, latest edition.

3.4 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint as specified or according to ASTM A780, and manufacturer's written instructions.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or re-prime field connections, rust spots, abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

3.5 CLEAN-UP

- A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from premises.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Steel decking and accessories:
- B. Framing for openings up to and including 24 inches.

1.2 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel Framing.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Steel Members.
 - 2. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
 - 4. AWS D1.1 – Structural Welding Code – Steel.
 - 5. AWS D1.3 – Standard Welding Code – Sheet Steel.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings: Indicate decking plan, dimensions, sizes, support locations, projections, openings and reinforcement, pertinent anchoring details and accessories. Coordinate with other trades in accurately locating and detailing openings and penetrations.
- C. Product Data: Provide deck profile characteristics and dimensions, structural properties, finishes and accessories.
- D. Manufacturer's Installation Instructions: Indicate specific installation sequence and special instructions.
- E. Certificates:
 - 1. The manufacturer's certification and fire test reports to document that deck assemblies comply with requirements of this Section.

2. Furnish certification by approved testing agency for each welder employed.

1.5 PERFORMANCE REQUIREMENTS

- A. Steel decking and section properties shall comply with AISI S100.
- B. Profile and design of deck units and accessories shall conform to the details shown on Drawings. Units shall be one piece, unless indicated otherwise.
- C. Steel decking and its installation shall meet the requirements of 2019 California Building Code (CBC).

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on shop drawings.

1.7 TESTS AND INSPECTIONS

- A. Furnish test specimens of materials when they are requested. Welded decking in place is subject to inspection and testing per CBC Chapter 17 "Special Inspections and Tests", Section 1705 "Required Special Inspections and Tests".
 1. Expense of removing and replacing any portion of decking for testing purposes will be borne by Owner if installation is found to be satisfactory. All portions of the work found to be defective and not in conformity with contract requirements shall be removed and replaced at no cost to Owner.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 for testing indicated.
- B. Welding: Qualify procedures and personnel according to AWS D1.3.
- C. Installer: Company specializing in performing work of this Section.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Store decking on dry wood sleepers; slope for positive drainage. Work showing creases, burrs in cells, deformation, weathering, or other defects affecting its use or appearance in exposed locations will not be accepted.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 1. Basis-of-Design: ASC Steel Deck, West Sacramento, CA; 916-372-6851, www.ascsd.com. Product: NN-32 Roof Deck.
 - a. IAPMO Evaluation Report No. ER-0161 for bare steel deck.

- B. Substitutions: Under provisions of Division 01 with valid Evaluation Agency Report.
 - 1. Substitution requests for steel decking shall consider the vertical and lateral load capacities of final system, including attachments. Provide a comparison summary of proposed and specified deck systems showing that the proposed system has equal or greater vertical and lateral load capacities for all conditions shown on Drawings. Systems with lower load capacities will not be acceptable.
 - 2. Substitution requests will require review by the Structural Engineer of Record and Authority Having Jurisdiction (AHJ). Cost for such reviews shall be borne by Contractor.
 - 3. Do not submit shop drawings with substituted decking manufacturer until decking manufacturer has been accepted via substitution request process.

2.2 MATERIALS

- A. Sheet Steel for Bare Deck: ASTM A653/A653M, SS designation, Grade 40 (minimum yield 38 KSI); zinc coated conforming to ASTM A653/A653M, G120, unless noted otherwise. Refer to Drawings for types and sizes of steel decking.
- B. Welding Materials: Conform to AWS D1.1 and D1.3, with a minimum 60 KSI filler metal yield strength.
- C. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galviline Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Marshfield, MA; 800-831-3275, www.zrcworldwide.com, or accepted equal.
- D. Steel Decking and Design: Steel decking shall be metallic coated with interlocking side lap. Deck types and minimum structural properties shall be as indicated on Drawings. Submit Evaluation Agency Reports that demonstrate compliance with design requirements.
 - 1. Provide non-vented decking.

2.3 FABRICATION

- A. Fabrication: All steel decking units shall be roll-formed to assure uniformity and strength.
- B. Allowable Tolerances: Maximum variation in unit alignment 1/4 inch in 40 feet (1/1920).
- C. Workmanship: All work shall be neat, trim, true to line and upon completion shall present a true finished surface of specified deck profile, free of dents, deformations, creases, weld spatter or other noticeable defects. Steel deck permanently exposed to view shall be manufactured, handled, and transported for "exposed" installation.
- D. Reinforcement: Provide reinforcement for openings, cutouts and free edges of decking as required for strength and stiffness. Provide reinforcement where a cell is cut parallel to rib as necessary to make a tight fit along the cut cell. Such reinforcement shall be in addition to structural supports shown on Drawings and specified in Section 05 12 00.
- E. Miscellaneous Work: Provide all other transition pieces, reinforcement and miscellaneous decking items as detailed and required to provide a complete installation.
- F. Where steel decking is scheduled to receive a paint finish, it shall be provided free of lubricants, oils, passivators, and other substances which would impair the adhesion of the paint system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work. Check supporting members for correct layout and alignment. Should layout and alignment be such as to prevent proper bearing of the deck units on supporting members, the deck installer shall bring it to the attention of structural steel installer in writing, with a copy to Architect, for corrective measures and action. Steel decking units shall not be placed until necessary corrections are made.
- B. Beginning of installation means installer accepts existing conditions.

3.2 INSTALLATION

- A. Erect steel decking in accordance with Evaluation Agency Report, manufacturer's instructions and final shop drawings.
- B. Placing and Fastening Deck Units: Place decking in a permanent position with all panels aligned end-to-end so that the fluted portions of the panels align accurately. Panels shall be placed on supporting framework and adjusted in final position before being permanently fastened. Ends shall be over structural supports with positive, complete bearing over full width of panels. Installation shall be accomplished without deformation of units. Decking layout shall be as indicated on Drawings.
 - 1. Carefully check control points, as indicated, for layout of deck flutes. Where required, deck module shall be adjusted to conform to layout indicated.
 - 2. Fasten deck units to structure and to each other as indicated.
 - 3. At galvanized steel decks, deslag, clean, and touch-up all welds with zinc-rich primer, including those at the underside of deck.
 - 4. Complete installation shall conform to manufacturer's specifications and as detailed.
- C. Openings Through Decking: Steel decking fabricator shall cut and reinforce all openings in the metal deck, including framed openings indicated on Drawings. Small miscellaneous openings shall be field-cut by the trade requiring the opening.
 - 1. All cutting of exposed edges shall be square, trim and equal to factory cutting.
 - 2. Steel deck panels and accessories shall be cut and neatly fit around openings and other work projecting through the deck.
 - 3. Openings shall be reinforced as indicated or required to provide a rigid installation.
- D. Steel decking installation shall proceed in accordance with current Cal/OSHA and OSHA regulations including guidelines with respect to fall protection.
- E. Steel decking shall be spread for safety and working platforms.
- F. All steel decking sheets shall be wind tacked and loose bundles of deck shall be wired at the end of each shift.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Field welds will be subject to inspection.
- C. Remove and replace work that does not comply with specified requirements.
 - 1. Additional inspection, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.4 PROTECTION

- A. Do not use steel decking for storage or working platforms until it has been permanently fastened. Storage loads must be supported on wood blocking in the flutes of the deck.
 - 1. Any damaged deck unit shall be repaired or replaced as directed by Architect and at no cost to Owner.
- B. Assure that construction loads do not exceed the carrying capacity of the deck.

3.5 CLEAN-UP

- A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from premises.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal fabrications as follows:
 - 1. Gates.
 - 2. Railing assemblies.
 - 3. Wire mesh.
 - 4. Metal panels.
 - 5. Stair safety nosings.
 - 6. Miscellaneous metal fabrications.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete.
- B. Section 05 12 00 – Structural Steel Framing.
- C. Section 05 51 00 – Metal Stairs.
- D. Section 08 71 00 – Door Hardware.
- E. Section 09 91 00 – Painting.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASME A17.1 – Safety Code for Elevators and Escalators.
 - 2. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
 - 3. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 4. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. ASTM A283/A283M – Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 6. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

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| 7. ASTM A500 | – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes. |
| 8. ASTM A513 | – Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing. |
| 9. ASTM A653/A653M | – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. |
| 10. ASTM D1187 | – Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal. |
| 11. ASTM E488 | – Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements. |
| 12. AWS A2.4 | – Standard Symbols for Welding, Brazing, Nondestructive Examination. |
| 13. AWS D1.1 | – Structural Welding Code – Steel. |
| 14. AWS D1.3 | – Structural Welding Code – Sheet Steel. |
| 15. SSPC-Paint 20 | – Zinc-Rich Coating, Type I-Inorganic and Type II-Organic. |
| 16. SSPC-Paint 29 | – Zinc Dust Sacrificial Primer, Performance-Based. |
| 17. SSPC SP-2 | – Hand Tool Cleaning. |
| 18. SSPC SP-6 | – Commercial Blast Cleaning. |

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings: For each item specified, indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Include erection drawings, elevations and details where applicable.
- C. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Submit product data for type of metal primer proposed for use.
- E. Samples: Submit two full width x 12 inch high samples of metal panels in the MP-1.B configuration indicated on Drawings. One side of the panel shall be painted with the PT-2 paint color in semi-gloss sheen and the other side of the panel shall be painted with the PT-2 paint color in eggshell sheen.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code – Steel."
 - 2. AWS D1.3, "Structural Welding Code – Sheet Steel."

- B. Conform to 2019 California Building Code (CBC), Chapter 17 "Special Inspections and Tests" and Chapter 22 "Steel".
 - 1. Materials:
 - a. Material Identification per CBC Chapter 22, Section 2202 "Identification of Steel for Structural Purposes".
 - 2. Inspection and Tests:
 - a. Welding Inspection per CBC Chapter 17, Section 1705, Paragraph 1705.2 "Steel Construction".
 - b. Non-Destructive Weld Testing per CBC Chapter 17, Section 1705, Paragraph 1705.12.1 "Structural Steel".
- C. Painting: Refer to Section 09 91 00 for field painting.
 - 1. Do not paint galvanized surfaces that are indicated to remain galvanized.

1.6 QUALIFICATIONS

- A. Welders' Certificates: Submit certificates under provisions of Division 01, certifying welders employed on the Work, verifying AWS qualification within the previous twelve months.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel: Unless otherwise noted, provide steel materials as follows:
 - 1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 - 2. Plates: ASTM A283/A283M.
 - 3. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation, structural quality.
 - 4. Pipe: ASTM A53/A53M, Type E or S, Grade B.
 - 5. HSS:
 - a. Tubing: ASTM A500, Grade B.
 - b. Round: ASTM A500, Grade B.
 - 6. Bolts, Nuts and Washers: ASTM A307.
- B. Anchorage:
 - 1. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.
 - 2. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.

C. Welding Materials:

1. Steel: AWS D1.1; type as required for materials being welded.
2. Sheet Steel: AWS D1.3; type as required for materials being welded.

D. Weld filler material: All weld filler material shall have a minimum tensile strength of 70 ksi per AWS D1.1, latest edition approved by code enforcement agency.

E. Steel Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal.

F. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galviline Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Phone: (800) 831-3275, or accepted equal

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.2 GATES

A. Components:

1. Frame: HSS tubing, ASTM A500, Grade B.
2. Steel Plates: ASTM A36/A36M.
3. Metal Panel: ASTM A653/A653M, G90; 16 gauge core steel.

B. Size and Configuration: As indicated on Drawings.

C. Hardware: Refer to Section 08 71 00.

D. Finishes:

1. After fabrication, hot-dip galvanize all components in accordance with ASTM A123/A123M, minimum 1.25 ounces per square foot.
2. Paint Finish: Site paint finish under provisions of Section 09 91 00.

2.3 RAILING ASSEMBLIES

A. Steel Railing Assemblies: Fabricated from steel pipe, steel plates and sections; sizes and configurations as shown on Drawings. At exterior locations, hot-dip galvanize all components in accordance with ASTM A123/A123M, minimum 1.25 ounces per square foot.

1. Steel Pipe: ASTM A53/A53M, Grade A, Schedule 40.
2. Handrail Brackets: ASTM A36 steel bar, as indicated on Drawings.
3. Galvanize exterior handrail and guardrail assemblies after fabrication. After assembly has been galvanized, fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
4. Finish: Field painted in accordance with Section 09 91 00; color as selected by Architect.

B. Fabrication:

1. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.
2. Handrails shall not rotate in their fittings.

2.4 WIRE MESH

- A. Item No. 3293920148 wire mesh as manufactured by McNichols or accepted equal, with the following characteristics:
1. Mesh Type: Square.
 2. Construction Type: Woven.
 3. Primary Material: Galvanized steel.
 4. Material Finish: Mill finish.
 5. Weave Type: Lock crimp weave.
 6. Opening Size: 2 inches x 2 inches.
 7. Wire Diameter: 0.250 inch.
 8. Open Area: 79 percent.
 9. Weight: 1.80 pounds per square foot.
 10. Product Form: Sheet.
 11. Sheet Size: 48 inches x 96 inches.
- B. Finish: Site paint finish under provisions of Section 09 91 00. Color as selected by Architect.

2.5 METAL PANELS

- A. Material: Galvanized Steel: ASTM A653/A653M, G90; 16 gauge core steel.
- B. Sizes, Profiles, and Configurations: As indicated on Drawings.
- C. Finish: Site paint finish under provisions of Section 09 91 00.
- D. Fasteners: #14 self-drilling, self-tapping stainless steel sheet metal screws.

2.6 STAIR SAFETY NOSINGS

- A. Safety Nosing: Provide aluminum safety nosing with anti-slip abrasive finish.
1. Basis-of-Design Product: Supergrit® Safety Nosing, Type 231-BF with Sure-hold anchors by Wooster Products Inc., Wooster, OH; 800-321-4936, www.wooster-products.com; or accepted equal.
 2. Nosing Materials:
 - a. Type 6063-T5 extruded aluminum, with anti-slip abrasive filler containing approximately 65 percent virgin grain aluminum oxide (Al₂O₃) and silicon carbide abrasive.
 - b. Width: 3 inches.
 - c. Thickness: 1/4 inch [with 1/8 inch recessed back to receive resilient tile].
 - d. Length: Provide nosing for full width of treads less 1/8 inch on either side for clearance.
 - e. The radius of curvature at the leading edge of the nosing shall be no greater than 1/2 inch.
 3. Anchorage: Provide integral anchorage in nosing, as standard with manufacturer and acceptable to Architect.

4. Abrasive Filler Color: As selected by Architect from manufacturer's full range of standard colors.

2.7 MISCELLANEOUS METAL FABRICATIONS

- A. Provide miscellaneous metal fabrications as required to complete work under other Sections, but not specified in those Sections.
- B. Miscellaneous metal work, including, but not limited to, the following items:
 1. Support angles for elevator door sills.
 2. Elevator hoistway and lifeline beams.
 3. Loose bearing and leveling plates.
 4. Steel weld plates and angles for casting into concrete not specified in other Sections.

2.8 SHOP FABRICATION

- A. Fit and shop assemble in largest practical sections, for delivery to site.
 1. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Fabricate panels and gates as shown on Drawings and accepted shop drawings.
- C. Fabricate items with joints tightly fitted and secured.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Cut, drill, and punch metals cleanly and accurately. De-burr rough edges and holes.
- F. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- G. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- H. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication except where specifically noted otherwise.
- I. Miter and weld members, welds ground smooth.
- J. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.9 FINISHES

- A. Prepare structural component surfaces in accordance with SSPC SP-2 at concealed locations and SSPC SP-6 at exposed locations.
- B. Do not prime surfaces in direct contact with concrete, where field welding is required, or contact surfaces of steel-to-steel connections.

- C. All unexposed, concealed, or enclosed interior or exterior steel requires no finish.
- D. All exposed exterior steel shall be galvanized after fabrication unless otherwise noted.
 - 1. Galvanizing shall be in accordance with ASTM A123/A123M, on designated steel items. Provide minimum 1.25 ounces per square foot galvanized coating.
 - 2. At galvanized members, touch-up all welds with zinc-rich primer.
- E. Painting shall conform to applicable requirements of Section 09 91 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions and verify field dimensions.
- B. Verify structure or substrate is plumb, level, and ready to receive work.
- C. Verify that appropriate backing, blocking, or structural reinforcing is provided at walls.
- D. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Install manufactured items in accordance with manufacturer's printed instructions.
- C. Allow for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field weld components indicated on shop drawings.
- E. Perform field welding in accordance with AWS D1.1 for steel and AWS D1.3 for sheet steel.
- F. Obtain Architect's acceptance prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.
- H. Install stair safety nosings on treads in accordance with manufacturer's printed instructions and as indicated on Drawings. Accurately position and hold securely during placement of concrete. Terminate safety nosing as recommended by manufacturer.

- I. Post Setting in Concrete: Install support posts as indicated on Drawings.
 1. Cast-In Posts: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
 2. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than outside diameter of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions. In exterior locations top shall be smoothed and shaped to shed water.
 3. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions. In exterior locations, top shall be smoothed and shaped to shed water.

3.4 CLEANING

- A. Inspect components after completing installation. Remove dirt and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION

SECTION 05 51 00

METAL STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Steel stair frame of structural sections.
- B. Treads, landings, and closed risers.
- C. Railing assemblies.

1.2 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel Framing.
- B. Section 05 50 00 – Metal Fabrications: Railing assemblies.
- C. Section 09 91 00 – Painting.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 4. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 5. ASTM A1011/A1011M – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - 6. AWS A2.0 – Standard Welding Symbols.
 - 7. AWS D1.1 – Structural Welding Code – Steel.
 - 8. SSPC-Paint 20 – Zinc-Rich Coating, Type I-Inorganic and Type II-Organic.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.

- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, accessories, and interfaces with adjacent building elements.
 - 1. Include erection drawings, elevations and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld length.
 - 3. Stair fabricator shall not add any structural elements to the stair that would affect the design of adjacent building elements.
- C. Templates: Furnish templates and other devices as necessary for presetting bolts and anchors to accurate conditions.
- D. Descriptive Data: Submit complete data for manufactured items.

1.5 QUALITY ASSURANCE

- A. Conform to CBC Chapters 17 and 22.
 - 1. Materials:
 - a. Structural Steel, Cold Formed Steel as per CBC Section 2205.
 - b. Material Identification as per CBC Section 2202.
 - 2. Inspection and Tests:
 - a. Test of High Strength Bolts, Nuts, Washers as per CBC Section 2212.6.1.
 - b. Welding Inspection as per CBC Section 1705.2.5.
 - c. Inspect bolted joints per RCSC Section 9 and CBC Section 1705.2.1.
 - d. Non-Destructive Weld Testing as per CBC Section 1705.12.1.

1.6 QUALIFICATIONS

- A. Fabricator/Installer: For the fabrication and installation of steel stairs, use only personnel who are trained and experienced in the products involved and in the recommended methods for their installation.
- B. Welders' Certificates: Submit under provisions of Division 01, certifying welders employed on the Work, verifying AWS qualification within the previous twelve months.

1.7 FIELD MEASUREMENTS

- A. Take field measurements prior to the preparation of shop drawings and fabrication where possible.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Coordinate all fabrication and delivery of steel stairs with all related trades to permit stair installation into the structure without delay.
- B. Deliver all parts ready for erection; store on clean concrete surface or raised platforms under cover.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces: For fabrication of steel stair work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove blemishes by grinding and/or welding and grinding prior to cleaning, treating and application of surface finish.
 - 1. All exterior steel components shall be hot-dip galvanized in accordance with ASTM A123/A123M, minimum 1.25 ounces per square foot.
- B. Structural Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Hot-Rolled Carbon Steel Sheets and Strips: ASTM A1011/A1011M.
- D. Sheet Steel: ASTM A1011/A1011M, Grade B Structural Quality.
- E. Hollow Structural Sections: ASTM A500 Grade B.
- F. Treads and Landings: Traction Tread Plank Grating as manufactured by McNichols or accepted equal, with the following characteristics:
 - 1. Construction: Plank.
 - 2. Primary Material: Galvanized Steel.
 - 3. Surface Profile: 10-row for 7 inch width.
 - 4. Thickness: 11 gauge.
 - 5. Surface Width: 7 inches.
 - 6. Channel Depth: 1-1/2 inch.
 - 7. Channel Flange Width: 1-3/8 inch.
 - 8. Hole Diameter: 9/64 inch.
 - 9. Hole Rise: 3/32 inch.
 - 10. Hole Spacing: 5/8 inch.
 - 11. Hole Stagger: 15/32 inch.
 - 12. Open Area: 3 percent
- G. Welding Materials: AWS D1.1, type required for materials being welded.
- H. Bolts, Nuts and Washers: Manufacturer's standard.
- I. Steel Shop and Touch-Up Primer: TNEMEC Series 115 Uni-Bond DF or accepted equal.
- J. Shop and Touch-Up Zinc Rich Primer for Galvanized Surfaces: ZRC Galviline Galvanizing Repair Compound as manufactured by ZRC Worldwide Company, Phone: (800) 831-3275, or accepted equal.

2.2 FABRICATION

- A. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

- B. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- C. Accurately form components required for anchorage of stairs and landings and railings to each other and to building structure.
- D. All stair fasteners shall be provided and installed by stair fabricator.
- E. Form work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to radius of approximately 1/32 inch. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Weld corners and seams in accordance with recommendations of AWS. Grind these exposed welds to match and blend with adjoining surfaces.
- G. Join rails and corners by mitered and welded joints made by fitting top rail and intermediate rails in a unit and bracketed, or weld to posts as indicated. Butt railing splices and reinforce by a tight fitting interior sleeve. Plumb posts in each direction. Secure posts by welding direct to stair stringers.
- H. Remove scale, rust and other deleterious materials before applying shop primer. Apply one shop coat of metal primer to all fabricated metal items.
- I. Clean surfaces of rust, scale, grease and foreign matter prior to finishing.
- J. Do not prime surfaces in direct contact with concrete or where field welding is required.
- K. Prime paint items with one coat of metal primer.
- L. Clean and strip primed steel items to bare metal where site welding is required.
- M. Fit and shop-assemble in largest practical sections, for delivery to site.
- N. Fabricate components with joints tightly fitted and secured.
- O. Continuously seal jointed pieces by continuous welds.
- P. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small uniform radius.

2.3 RAILING ASSEMBLIES

- A. Refer to Section 05 50 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.
- C. Verify alignment with adjacent construction. Coordinate related work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete with setting templates, to appropriate Sections.

3.3 INSTALLATION

- A. Erect stairs, landings and railings as shown on approved shop drawings, level and plumb, accurately fitted, free from distortion or defects detrimental to appearance or performance.
- B. Provide anchors, plates, angles, hangers and struts required for connecting stairs to structure.
- C. Allow for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field-weld components indicated on shop drawings. Perform field welding in accordance with AWS D1.1.
- E. Field-bolt and weld to match shop bolting and welding. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- F. Mechanically fasten joints butted tight, flush and hairline. Grind welds smooth and flush.
- G. Obtain Architect acceptance prior to site cutting or making adjustments not scheduled.
- H. After erection, prime welds, abrasions and surfaces not shop primed, except surfaces to be in contact with concrete and surfaces damaged during construction. Touch-up shall be with same paint as prime coat.
- I. Railings:
 - 1. Standing Railing: Position standing rail on stringers as indicated on Drawings and clamp in desired alignment. Finish weld railing posts and railing ends in place.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.

END OF SECTION

SECTION 07 54 23
THERMOPLASTIC-POLYOLEFIN ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanically fastened thermoplastic polyolefin (TPO) roofing membrane system.
- B. Gypsum roof cover board.
- C. Cickets.
- D. Roofing accessories.

1.2 RELATED SECTIONS

- A. Section 04 22 00 – Concrete Unit Masonry.
- B. Section 05 31 00 – Steel Decking.
- C. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards and Manuals:
 - 1. ASTM C1177/C1177M – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - 2. ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulation Board.
 - 3. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 4. ASTM C1371 – Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
 - 5. ASTM C1549 – Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - 6. ASTM D471 – Standard Test Method for Rubber Property – Effects of Liquids.
 - 7. ASTM D751 – Standard Test Methods for Coated Fabrics.

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| 8. ASTM D1204 | – Standard Test Method for Linear Dimensional Changes of Non-Rigid Thermoplastic Sheathing or Film at Elevated Temperature. |
| 9. ASTM D1621 | – Standard Test Method for Compressive Properties of Rigid Cellular Plastics. |
| 10. ASTM D1622 | – Standard Test Method for Apparent Density of Rigid Cellular Plastics. |
| 11. ASTM D2126 | – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging. |
| 12. ASTM D5884 | – Standard Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes. |
| 13. ASTM D6878 | - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing. |
| 14. ASTM E84 | – Standard Test Method for Surface Burning Characteristics of Building Materials. |
| 15. ASTM E96 | – Standard Test Method for Water Vapor Transmission of Materials. |
| 16. ASTM E108 | – Standard Test Methods for Fire Tests of Roof Coverings. |
| 17. ASTM E408 | – Standard Test Method for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques. |
| 18. ASTM E1980 | – Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces. |
| 19. Factory Mutual Global (FMG) Approval Guide. | |
| 20. NRCA | – National Roofing Contractors Association. |
| 21. UL 790 | – Standard Test Methods for Fire Tests of Roof Coverings. |

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01.

B. Product Data:

1. Submit manufacturer's descriptive literature, product specification, and installation instructions for each product.
2. Material Safety and Data Sheet (MSDS) for each product.

C. Shop Drawings:

1. For mechanically fastened single-ply membrane system, provide fastener type, size, and spacing to meet wind uplift requirements.
2. Single-Ply Roofing Membrane Setting Plan: Include layout of membrane, location of flashings and accessories.
3. Detail Drawings: Include joint or termination detail conditions, such as junction at deck and wall, curb flashing, roof drain, pre-molded pipe flashing, field fabricated pipe flashing, field fabricated hot pipe flashing, parapet flashing, inside corner and outside corner flashing, sealant pockets, and scuppers.

D. Samples:

1. 24 inch by 24 inch roofing assembly illustrating roofing membrane, cover board, roof deck substrate, and fastening system.
2. Walkway pads.

E. Quality Assurance Submittals:

1. ICC ES Report.
2. Manufacturer's Field Reports: Submit under provisions of Division 01.
3. Manufacturer Certifications.
4. Installer Certifications.

F. Closeout Submittals:

1. Warranty certificate.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide insulation, cover board, membrane, and accessory materials from a single manufacturer to ensure system compatibility and quality, and to comply with manufacturer's warranty requirements.

B. Qualifications:

1. Manufacturer Qualifications:

- a. Firm specializing in roofing systems specified in this Section with a minimum ten years documented experience.
- b. Furnish qualification documentation including a complete list of all projects (minimum of ten) within a 100-mile radius from project site, with the same climate zone, using the same roofing system, and single-ply membrane formulation/ingredients. Include information on project location, size (square feet), date of installation, and contact information.
- c. Private-labeled single-ply membrane products are not acceptable.

2. Installer Qualifications:

- a. Firm specializing and certified by roofing system manufacturer. Submit manufacturer's certification at time of bid.
- b. Minimum of three years' experience in single-ply roofing installation.
- c. State Contractor's License: Class C-39.

C. Regulatory Requirements:

1. Conform to the 2019 CBC, Section 1505 for roof assembly fire classification requirements.
2. Roof Assembly Fire Hazard Classification: UL Class A per ASTM E108 or UL 790.
3. All roof surfaces shall have positive roof drainage per definition in CBC Section 1502 and shall meet or exceed the minimum slope of 1/4 inch per foot as described in CBC Section 1507.13.1. Refer to Drawings for roof slopes and drainage patterns.
4. Thermoplastic single-ply roof covering shall comply with ASTM D6878 per CBC Section 1507.13.2.

D. Certifications:

1. Manufacturer Certification: Certify that the specified or proposed roofing system including type of deck, gypsum roof cover board, membrane type, attachment or adherence of components, perimeter attachment details, and all system component details are acceptable to meet warranty requirements and, when installed as per FMG Approval Guide, it will meet or exceed Factory Mutual System Approval and UL Classification Requirements as per UL RMSD.
2. Manufacturer's Acceptance of Roofing Installer: Certify that the roofing installer's qualifications have been reviewed, meet requirements of this Section, and is accepted by the roofing manufacturer.

E. Pre-Installation Meetings:

1. Conduct pre-installation meeting in accordance with Division 01.
2. Convene pre-installation meeting at the site at least one week prior to commencing work on this Section.
 - a. Attendees:
 - 1) Owner's representative, preferably including Owner's Facilities Manager and Maintenance Foreman.
 - 2) Architect.
 - 3) Contractor.
 - 4) Roofing installer.
 - 5) Related trades sub-contractors.
 - 6) Manufacturer Technical Representative/Inspector.
 - b. Agenda:
 - 1) Review roof design (roof substrate, roofing system, flashings, etc.), shop drawings, and submittals.
 - 2) Review manufacturer's installation and technical information and provisions of this Section.
 - 3) Review substrate requirements including substrate preparation and procedures for inspection and handover to roofing installer.
 - 4) Review and coordinate schedule and site conditions related to project and work of this Section.
 - 5) Conduct a roofing substrate walk-through.
3. Contractor shall give a minimum one-week notice to pre-installation meeting participants.

F. Coordination: Coordinate the work in this Section with work in related Sections particularly roof substrate work. Convene a coordination meeting at least one week before roof substrate work with roof system manufacturer's representative attending and in accordance with Division 01.

1.6 SUSTAINABLE BUILDING DESIGN REQUIREMENTS

- A. Provide highly reflective Energy Star® compliant roofing system with emissivity of at least 0.9 when tested in accordance with ASTM E408 for a minimum of 75 percent of the roof surface.
 - 1. Thermal Emissivity shall be measured in accordance with ASTM C1371.
 - 2. Solar Reflectivity shall be measured in accordance with ASTM C1549.
 - 3. Solar Reflectance Index shall be measured in accordance with ASTM E1980.
- B. Provide insulation products manufactured free from environment-harmful blowing agents chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.
- B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- C. Store products in weather protected environment, clear of ground and moisture.
- D. Store insulation and cover board dry and protected from the elements. Store insulation on pallets and completely cover with a breathable material such as tarp or canvas. Remove or slit temporary factory-applied packaging to prevent accumulation of condensation. Do not use wet or damaged insulation.
- E. Store roofing membrane in the original undisturbed plastic wrap.
- F. Store adhesives, sealants, and other curable materials in cool and dry location with temperatures between 60 degrees F and 90 degrees F. Do not store adhesive containers with opened lids due to the loss of solvent which occur from flash off.

1.8 PROJECT/SITE CONDITIONS

- A. Do not apply roofing system during inclement weather.
- B. Do not apply roofing system to damp or frozen substrate.
- C. Take precautions to prevent wind blow-off or wind damage during the course of the roofing application.
- D. Substrates to receive roofing system shall be thoroughly dry. Provide drying equipment should moisture occur.

1.9 WARRANTY

- A. Comply with provisions of Division 01.
- B. Warranty installed membrane roofing system including labor and materials for loss of watertightness caused by defective materials (including accessories) or workmanship, with no dollar limit, for twenty years. Effective warranty start date shall be at the time of final acceptance by Owner.

- C. Warranty shall provide for the removal, replacement, repair, and making good without cost to Owner, of defects due to defective materials or workmanship.
- D. Repairs under warranty shall be made within three days after receiving notice of need for repairs from Owner, weather permitting.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers and Products:

1. TPO Roofing Membrane System:

- a. Carlisle Syntec Inc. Product: Sure-Weld 60.
 - 1) CAV-GRIP III Low-VOC Adhesive/Primer for use on roofing membrane.
- b. Firestone Building Products Co. Product: UltraPly TPO 60.
- c. GAF Materials Corp. Product: EverGuard TPO 60.
- d. Johns Manville. Product: JM TPO Roofing Membrane - 60 mil.

2. Gypsum Cover Board: Provided by roof system manufacturer.

3. Roof Insulation: Provided by roof system manufacturer.

B. Substitutions: Under provisions of Division 01.

2.2 TPO ROOFING MEMBRANE

A. Ultraviolet resistant thermoplastic polyolefin membrane reinforced with polyester fabric.

B. Properties:

- 1. Thickness (ASTM D751): 60 mils nominal.
- 2. Thickness over scrim: 15 mils nominal.
- 3. Tolerance on nominal thickness: ± 10 percent.
- 4. Minimum breaking strength (ASTM D751): 320 lbf/in.
- 5. Elongation at break of fabric (ASTM D751): 28 percent.
- 6. Tearing strength (ASTM D5884): 86 lbf.
- 7. Dimensional stability (ASTM D1204): ± 1 percent.
- 8. Water absorption (ASTM D471): ± 1 percent.
- 9. Color: White.
 - a. Initial Solar Reflectance: 0.79.
 - b. Initial Thermal Emittance: 0.90.
 - c. Solar Reflectance Index: 99.

2.3 GYPSUM ROOF COVER BOARD

- A. Glass mat-faced, noncombustible, moisture-resistant treated gypsum core panel specifically designed for roofing applications, 5/8 inch thick, square edges, conforming to ASTM C1177, Type X.

2.4 CRICKETS

- A. Rigid, tapered, closed-cell polyisocyanurate foam core integrally laminated to heavy black (non-asphaltic), fiber-reinforced felt facers; square edges. Comply with ASTM C1289, Type II, Class 1, Grade 2; ICC ES Listed; UL Listed.
 - 1. Properties:
 - a. Compressive strength (ASTM D1621): 20 psi minimum.
 - b. Product density (ASTM D1621): 2.0 pounds per cubic foot minimum.
 - c. Water absorption (ASTM C209): Less than 1 percent by volume.
 - d. Surface burning characteristics (ASTM E84):
 - 1) Flame spread: Less than 75.
 - 2) Smoke developed: Less than 450.
 - e. Long-term thermal resistance (LTTR) value (CAN/ULC-S770): Minimum 6.0 F·hr·SqFt / Btu / inch at 75 degrees F.
 - f. Water vapor permeance (ASTM E96): 1.0 perms maximum.
 - g. Dimensional stability (ASTM D2126): 2.0 percent linear change maximum.

2.5 ACCESSORIES

- A. Non-Reinforced or Reinforced TPO Flashing, Pipe Boot and Flashings, Clamping Rings: Use roofing membrane provided and recommended by manufacturer.
- B. Flashing Metal: 0.023 inch thick galvanized steel laminated to 0.020 inch thick roofing membrane in white color used for flashing and edge metal detailing as furnished by the membrane manufacturer.
- C. Membrane Fasteners and Disks: Use mechanical fasteners and disks approved by roofing system manufacturer and cover board and insulation manufacturers.
- D. Membrane Bonding Adhesive at Vertical Surfaces: Manufacturer approved two-component, low-rise, low VOC bonding adhesive to meet California Air Resources Board or local Air Pollution Control/Air Quality Management District regulations.
- E. Termination Bar: Extruded aluminum bar 0.08 inch thick by 1 inch wide.
- F. Membrane Cleaning Solution: Manufacturer approved or recommended.
- G. Sealants: Refer to Section 07 92 00. Solvent-based ethylene propylene seam caulk approved by roofing system manufacturer.
- H. All-Purpose Sealant: Single component, high-solids content, and gun grade, approved by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected and only when substrate is inspected and accepted by roofing installer and roofing system manufacturer.

- B. Verify that surfaces and site conditions are ready to receive work.
- C. Verify that deck is structurally sound to secure mechanical fastened single ply roofing system. Inspect roof deck for corrosion, rotting, warping, concrete spalling, etc. Repair or replace defective roof deck prior to installing the roofing system.
- D. Verify that deck surfaces are dry to the touch and free of snow or ice.
- E. Verify that deck is clean and smooth, free of noticeable high spots or depressions, and has a positive slope to drains.
- F. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, etc. through roof are solidly set. Verify and ensure that all roof drain lines are clear.

3.2 PREPARATION - GENERAL

- A. Protection: Protect roofing surface and adjacent work against damage to roofing work.
- B. Review Material Safety Data Sheet and safety regulations recommended by OSHA.
- C. Preparation Of Substrate:
 - 1. General: To prevent delays or interruptions, coordinate with other work to ensure that components to be incorporated into the roofing system are available as the work progresses. Examine substrates to which the roofing materials are to be applied to ensure that their condition is satisfactory for the roofing systems application. Do not permit voids greater than 1/4 inch width in the substrate. Substrates for roofing materials shall be dry and free of oil, dirt, grease, sharp edges and debris. Inspect substrates and correct defects before application of roofing membrane.
 - 2. Determine the condition of the structural substrate. Areas with deteriorated or damaged decking or other materials shall have those affected materials removed and replaced.
 - 3. Provide temporary water cut-offs at the end of each day. Maintain watertight condition of roof to prevent water intrusion. Install only that amount of roofing and flashing that can be made watertight with new materials in a one-day period or prior to the onset of inclement weather. Remove cut-off before resuming roofing.
 - 4. Cover decking and crickets with cover board, applied in accordance with manufacturer's instructions and as required resulting in a UL Class A roof system.

3.3 CRICKET INSTALLATION

- A. Place insulation over clean roof deck where indicated on Drawings in accordance with manufacturer's instructions.
- B. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- C. Apply no more insulation than can be covered with cover board and membrane in same day.
- D. Tape joints of insulation in accordance with insulation manufacturer's instructions.
- E. Stagger all joints when multiple layers of insulation are being installed.
- F. Fasten with disk-type fasteners as recommended by insulation manufacturer.

3.4 GYPSUM ROOF COVER BOARD INSTALLATION

- A. Place cover board over clean decking and crickets.
- B. Stagger all joints a minimum of 6 inches from underlying insulation joints.
- C. Fasten with disk-type fasteners as recommended by cover board manufacturer.

3.5 ROOFING MEMBRANE PLACEMENT, ATTACHMENT, AND HOT AIR WELDING

- A. General: Install membrane in accordance with manufacturer's instructions.
- B. Sweep substrate of all loose debris before laying membrane.
- C. Mechanically-Fastened Single-Ply Roofing System:
 - 1. Roll out membrane free from wrinkles or tears. Place sheet into place without stretching. Allow the membrane to relax at least fifteen minutes when the temperature is above 60 degrees F or 40 minutes when the temperature is below 60 degrees F prior to installation. Inspect for damage. Remove sections of membrane that are creased or damaged. Lap sheets as recommended by manufacturer.
 - 2. Perimeter: When installing roofing, where walls do not exceed or equal 24 inches in height, install a minimum of one sheet parallel with the perimeter and fasten with fastening system at the predetermined spacing in the lap area in a line centered approximately 1-1/2 inches from the edge of the sheet leaving 1/2 inch of membrane outside the disc. Weld lap area to metal base flashing continuously a minimum of 1-1/2 inches weld width.
 - 3. Field Areas: Run membrane perpendicular to roof slope. Install membrane overlaps to facilitate the flow of water. Overlap membrane sheets as recommended by manufacturer to provide space for fastener and disc placement for a continuous 1-1/2 inch width weld.
 - 4. Seal membrane continuous around all roof penetrations.
- D. Adhered Single-Ply Roofing System at Vertical Surfaces:
 - a. Field: Continuous beads at 6 inches on center.
 - b. Perimeters and Corners: Continuous beads at 4 inches on center.
- 2. Position membrane over the substrate.
- 3. Fold membrane sheet back so half the underside is exposed.
- 4. Stir bonding adhesive thoroughly scraping the sides and the bottom of the can (5 minutes minimum). Bonding surfaces must be dry and clean.
- 5. Apply bonding adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply adhesive along the splice edge of the membrane to be hot air welded over adjoining sheet.
- 6. Apply adhesive evenly, without puddles using a plastic core medium nap roller to achieve continuous coating of both surfaces at a coverage rate recommended by adhesive manufacturer.
- 7. Due to solvent flash-off, condensation may form on freshly applied bonding adhesive when the ambient temperature is near the dew point. If condensation develops, possible surface contamination may occur and the application of bonding adhesive must be discontinued. Allow the surface to dry and apply a thin freshener coat to the previously coated surface when conditions allow for continuing.

8. Allow adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
9. Roll the coated membrane into the coated substrate while avoiding wrinkles.
10. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
11. Fold back the unbonded half of the sheet in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum of 1-1/2 inch hot air weld.
12. Install adjoining membrane sheets in the same manner, overlapping a minimum of 2 inches to provide a minimum of 1-1/2 inch hot air weld.
13. Protect completed sections of the roof so bonding adhesive will not discolor the membrane surface. Do not place bonding adhesive containers or their lids directly on the surface of the membrane.
14. Install additional membrane securement at the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, etc. at any inside angle change where slope exceeds 2 inches in one horizontal foot. Use manufacturer approved fasteners and standard seam fastening plates installed horizontally or vertically at the base of the walls, curbs, etc., spaced a minimum of 12 inches on center and flashed as recommended by roofing system manufacturer.

E. Welding of Laps:

1. General:
 - a. Roofing membrane connection shall be hot air welded only.
 - b. Surfaces to be welded shall be clean and dry.
2. Hot Air Welding:
 - a. Hot air weld the membrane sheets with an automatic hot air welding machine. Follow hot air welding machine manufacturer's instructions for use.
 - b. Where use of automatic hot air welding machines is not practical, use a hand-held hot air welding machine. Preheat the nozzle tip and apply over the overlap area until the material reaches required temperature, immediately follow with a hand roller to press the heated membrane surfaces together with slow, even movements. Keep the roller within one inch of the nozzle tip. Seam strength may be tested when cool. For best results, test seams 8 hours after hot air welding.
3. Quality Control of Seams: After seaming, check welded seams for continuity and integrity. Repair openings or "fishmouths" with a hand-held hot air tool fitted with a narrow nozzle tip and with a roller.
4. Membrane lap edges that have been exposed to the elements for approximately seven days or longer must be prepared with manufacturer-approved membrane cleaner. Prepare the surface where the cleaner has been applied as per manufacturer's instructions prior to hot air welding.

3.6 MEMBRANE FLASHING

- A. Flash all vertical surfaces with reinforced membrane. Use non-reinforced membrane only at inside and outside corners, field fabricated pipe seals, scuppers, and sealant pockets where the use of premolded accessories are not practical. Terminate the flashing in accordance with manufacturer-approved detail.

- B. Use bonding adhesive on vertical surfaces more than 12 inches high such as walls, curbs, and pipes. Bonding adhesive is not required for vertical surfaces terminated under a metal counter flashing less than 12 inches high. Bonding adhesive may be eliminated for flashing heights 18 inches or less when a coping or termination bar is used for vertical terminations.

3.7 OTHER RELATED WORK

- A. Copings, Counterflashing, and Other Metal Work: Refer to Section 07 62 00. Fasten flashing to prevent metal from pulling free or buckling. Seal to prevent moisture from entering the roofing system or building.

3.8 FIELD QUALITY CONTROL

- A. General: Comply with requirements of Division 01.
- B. The manufacturer's representative shall observe, conduct tests, and prepare test reports in accordance with the provisions of this Section at predetermined periods before, during, and after installation of the work – specifically at critical periods identified by roofing system manufacturer to ensure a completely warranted system.
- C. The manufacturer's representative and the testing agency shall conduct final roof inspection on completion of the work in this Section and submit report to Architect and Owner. Notify Architect and Owner 48 hours in advance of date and time of inspection.

3.9 CLEANING

- A. Clean roof surfaces as recommended by manufacturer. Do not use materials or methods which may damage surface or surrounding construction.
- B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior wall flashings.
- B. Roof flashings.
- C. Scuppers.
- D. Perimeter metal blocking system.
- E. Pre-manufactured copings.
- F. Pre-manufactured edge fascia.

1.2 RELATED SECTIONS

- A. Section 07 54 23 – Thermoplastic-Polyolefin Roofing.
- B. Section 07 92 00 – Joint Sealants.
- C. Section 09 91 00 – Painting.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ANSI/SPRI/FM4435/ES-1 – Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
 - 2. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM B32 – Standard Specification for Solder Metal.
 - 4. ASTM D1187 – Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
 - 5. ASTM D4586 – Standard Specification for Asphalt Roof Cement, Asbestos Free.
 - 6. NRCA Roofing Manual.
 - 7. SMACNA Architectural Sheet Metal Manual.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Division 01.

- B. Describe material profile, jointing pattern, jointing details, fastening methods and installation details.
- C. Samples: Provide three-12 inch long samples of premanufactured coping and fascia in selected color.

1.5 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with sufficient documented experience.

1.6 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect roofing and exterior from damage that would permit water leakage to building interior.

1.7 PERFORMANCE

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Store products under provisions of Division 01.
- B. Stack preformed material to prevent twisting, bending or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage that may cause discoloration, staining or damage.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, G90; 24 gauge core steel, unless noted otherwise on Drawings.

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel or stainless steel with soft neoprene washers. Finish exposed fasteners same as flashing metal.
- B. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187.

- C. Touch-up Paint: "Galvalloy" or "Galvweldalloy."
- D. Sealant: Type specified in Section 07 92 00.
- E. Bedding Compound: Rubber-asphalt type.
- F. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
- G. Solder:
 - 1. Galvanized Steel: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead with maximum lead content of 0.2 percent.
- H. Flux: Type as recommended by sheet metal manufacturer.

2.3 PERIMETER METAL BLOCKING SYSTEM

- A. Manufacturers:
 - 1. OMG Roofing Products. Product: EdgeBox RI.
 - 2. Substitutions: Under provisions of Division 01.
- B. Perimeter Blocking System:
 - 1. The two-piece assembly consisting of top sections and bottom sections shall be fabricated from 20 gauge galvanized steel with pre-punched fastener holes. The bottom section shall be attached to the substrate corrosion-resistant fasteners provided by the system manufacturer. Fasteners shall be suitable for use with substrate encountered.
 - a. Box Height: 1-1/4 inches minimum to 16 inches maximum.
 - b. Box Width: 3-1/2 inches minimum to 16 inches maximum.
 - 2. Accessories:
 - a. End cap inserts.
 - b. Spines where vertical face dimension is greater than 6 inches
 - 3. Finish: Natural mill galvanized steel.
 - 4. System shall comply with ANSI/SPRI/FM4435/ES-1 design criteria.

2.4 PREMANUFACTURED COPINGS

- A. Manufacturers:
 - 1. OMG Roofing Products. Product: PermaSnap Premier Plus Coping.
 - 2. Tremco.
 - 3. Metal Era.
 - 4. Permatite.
 - 5. Substitutions: Under provisions of Division 01.
- B. Copings: Modular Coping System.
 - 1. System shall comply with ANSI/SPRI/FM4435/ES-1 design criteria.
 - 2. Coping shall be 0.050 inch thick aluminum with smooth surface.
 - 3. Sizes as required to accommodate varying wall thicknesses.

4. Splice joints shall have 6 inch long concealed splice plates at 12 feet on center. Allow 1/4 inch at all butt joints per 12 foot length.
5. Provide prefabricated corners; shop welded.
 - a. Corners shall be shop mitered.
6. All fasteners shall be concealed.
7. Finish: Pre-finished with Kynar 500 three coat paint system in conformance with AAMA 2605, color as selected by Architect.

2.5 PREMANUFACTURED EDGE FASCIA

A. Manufacturers:

1. OMG Roofing Products. Product: Roofers Edge Snap-On Fascia.
2. Substitutions: Under provisions of Division 01.

B. Edge Fascia:

1. System shall comply with ANSI/SPRI/FM4435/ES-1 design criteria.
2. Snap-on fascia cleat in ten foot lengths.
3. Snap-on 0.040 inch aluminum fascia cap. Face size as indicated on Drawings.
4. Finish: Pre-finished with Kynar 500 three coat paint system in conformance with AAMA 2605, color as selected by Architect.

2.6 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seam.
- F. Solder and seal non-moving metal joints watertight. After soldering, remove flux. Wipe and wash solder joints clean.
- G. Fabricate one piece corners with minimum 18 inch long legs; seam for rigidity, solder joint watertight.
- H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- I. Expansion-contraction of sheet metal runs: Provide flat, 4 inch lap joints, sealed watertight with sealant, at maximum of 40 foot intervals.

2.7 FINISHES

- A. Back-paint concealed metal surfaces with bituminous paint to a minimum dry film thickness of 15 mils.
- B. Site paint finish under provisions of Section 09 91 00.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify shapes and dimensions of surfaces to be covered.
- B. Verify substrates are clean, dry, smooth and free of defects to the extent needed for sheet metal work.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations acceptable to Architect.
- D. Lock and seal all joints.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Apply bituminous coating between dissimilar metals.
- G. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- H. Solder non-moving metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- I. Seal metal joints watertight.
- J. Single-Ply Roofing:
 - 1. Do not use petroleum-based products in conjunction with single-ply roofing.
 - 2. All sealants used in conjunction with single-ply roofing shall be approved by roof membrane manufacturer.

3.3 INSTALLATION

- A. Fabricate and install items in conformance with drawing details and SMACNA and NRCA manuals.
 - 1. Install premanufactured items in accordance with manufacturer's recommendations.
- B. Ensure that items are installed in true and accurate alignment with other items and related work; that joints are accurately fitted; that exposed surfaces are free from dents; that corners are reinforced; that seams are watertight.
- C. All work shall be left free of passivators, oil, grease, or acid residue, ready to receive paint finish.
- D. Wherever possible, all fasteners shall be concealed. All exposed fasteners shall have neoprene gaskets and be capped with a bead of sealant.

3.4 TOUCH-UP

- A. Where galvanized finish is damaged by fabrication or installation, repair with specified touch-up material, applying in accordance with manufacturer's printed instructions.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mineral wool safing insulation in wall and floor/ceiling construction.
- B. Firestop sealants and caulks.
- C. Elastomeric firestop sealants.
- D. Firestop putty.
- E. Intumescent putty pads.
- F. Flexible firestop spray.
- G. Head-of-wall gasket.
- H. Firestop collars.
- I. Firestopping for large openings.
- J. Cast-in-place firestop devices.
- K. Intumescent wrap.
- L. Firestop mortar.
- M. Fire-rated cable pathway.
- N. Fire-rated HVAC retaining angles.
- O. Firestop plugs.
- P. Fire-rated T collar devices.
- Q. Fire-rated grommets.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete.
- B. Section 07 92 00 – Joint Sealants.
- C. Section 09 29 00 – Gypsum Board.
- D. Divisions 21 – 23 Sections, as applicable to mechanical work.
- E. Divisions 25 – 28 Sections, as applicable to electrical work.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASTM C679 – Standard test Method for Tack-Free Time of Elastomeric Sealants.
 - 2. ASTM D6904 – Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry.
 - 3. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 4. ASTM E814 – Standard Test Method for Fire Tests of Penetration Firestop Systems.
 - 5. ASTM E1399 – Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
 - 6. ASTM E1966 – Standard Test Method for Fire-Resistive Joint Systems.
 - 7. ASTM E2174 – Standard Practice for On Site Inspection of Installed Fire Stops.
 - 8. ASTM E2307 – Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus
 - 9. ASTM E2393 – Standard Practice for On Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
 - 10. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 - 11. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.
 - 12. UL Fire Resistance Directory.
 - 13. UL 263 – Fire Tests of Building Construction and Materials.
 - 14. UL 723 – Test for Surface Burning Characteristics of Building Materials.
 - 15. UL 1479 – Standard for Fire Tests of Through-Penetration Firestops.
 - 16. UL 2079 – Tests for Fire Resistance of Building Joint Systems.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Provide manufacturer's brochures describing firestop materials and insulation proposed for use, and types of mechanical fasteners to be used in the installation of the firestopping materials.
- C. Certificates of Compliance: Before installation of products specified in this Section, Contractor shall furnish to Architect a certificate certifying that materials to be incorporated in the work conform to specified requirements.

- D. Submit certification that the installers of products specified in this Section meet the qualification requirements described in Article 1.6 of this Section.
- E. Submit manufacturer's product literature and installation procedures for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria, and test data. Submit cured samples of firestop materials.
- F. Submit material safety data sheets for each product at the time firestopping products are delivered to the job site.
- G. Shop drawings: Show typical installation details for the methods of installation. Indicate which firestop materials will be used where and application requirements to meet specific jobsite conditions.
- H. Provide manufacturer's Engineering Judgment (EJ) identification number and drawing details when no UL system is available for an application. Engineering Judgment shall be developed in accordance with the latest California Fire Code requirements. Engineering Judgment shall include both project name, and name of contractor who will install the firestop system in accordance with EJ drawing. Submit Engineering Judgment to Authority Having Jurisdiction (AHJ) for review and approval prior to installation.

1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Materials and installation shall comply with requirements of governing regulations and authorities.
 - 1. Comply with requirements of 2019 California Building Code, Chapter 7, "Fire and Smoke Protection Features".
- B. Firestopping systems (materials and design) shall be F-rated to meet the hourly rating of the wall or floor as tested by nationally accepted test agencies per ASTM E814, UL 1479, or UL 2079 in a configuration representative of field conditions. T-ratings for floors shall be as required in the 2019 CBC Chapter 7 "Fire and Smoke Protection Features", as applicable to design conditions. L-ratings shall be tested in accordance with ANSI/UL 1479 (smoke barriers) and ANSI/UL 2079 (joints), such that for each 100 square feet of area, the total cumulative leakage of each firestop assembly shall not exceed 50 cubic feet per minute.
- C. W Ratings (Water Resistance): On every other floor, provide all through penetration firestop assemblies passing through the fire-rated floor with silicone firestopping materials to ensure a water tight barrier. All perimeter fire containment/curtain wall applications shall be sealed with a silicone copolymer spray-applied coating capable of providing a durable, flexible water resistant shield against the propagation of fire, smoke and combustion byproducts.
- D. Unless specified and approved, no pipe insulation shall be removed; all insulation shall remain intact, continuous and undamaged when firestopped.
- E. A manufacturer's direct representative (not distributor or agent) shall be on-site prior to the initial installation of firestop systems to train appropriate Contractor personnel in proper selection and installation procedures. This shall be done per manufacturer's written recommendations published in their literature and drawing details.
- F. Firestop systems do not reestablish the structural integrity of load-bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load-bearing or shear wall assembly.

- G. Firestop applications for which no UL tested system is available through an acceptable manufacturer, submit acceptable manufacturer's Engineering Judgment derived from similar UL design systems or other acceptable tests, to local authorities having jurisdiction, for review and approval prior to installation. Engineering Judgment drawings shall meet the requirements set forth by the International Firestop Council (September 7, 1994).

1.6 INSTALLER QUALIFICATIONS

- A. Engage an experienced installer who is certified, licensed, and FM Approved in accordance with FM 4991, certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its firestopping products to Contractor or to an Installer engaged by Contractor does not confer qualification on the buyer.
- B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems to a single sole source firestop specialty contractor.
- C. The work shall be installed by a contractor with at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor.
 - 2. UL Approved Contractor.
- D. The installer shall have no less than three years of experience with fire stop installation.

1.7 DEFINITION

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, water and hot gases through penetrations in fire-rated wall and floor assemblies.

1.8 SYSTEM DESCRIPTION

- A. Firestopping materials shall comply with ASTM E119, ASTM E814, ASTM E1399, ASTM E1966, ASTM E2307, UL 263, UL 1479 and UL 2079 to achieve a fire rating as noted on Drawings.
- B. Firestop all interruptions to fire rated assemblies, materials, and components.

1.9 PERFORMANCE REQUIREMENTS

- A. Provide and install firestopping materials to meet applicable codes and installation requirements for each firestopping application. Products using caulking, putty, wrap strips, mortar, composite boards and/or mechanical devices shall be used as appropriate for the specific condition.
- B. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- C. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

- D. When caulking is used, provide and install flexible caulking materials. Cured firestop materials 1/8 inch thick shall be able to bend around a 1 inch mandrel without breaking.
- E. Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction. Latex sealants containing sodium silicate or other water soluble intumescent ingredients are not permitted.
- F. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
- G. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
- H. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.
- I. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- J. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall. Systems within the UL Fire Resistance Directory that meet this criterion are identified with the words "Chase Wall Optional".
- K. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
- L. Provide fire-resistive joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in UL 2079.
- M. Provide penetration firestop systems subjected to an air leakage test conducted in accordance with Standard, UL 1479 for penetrations with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.
- N. Provide firestopping composed of components that are listed as compatible with each other, the substrates forming openings and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- O. Provide components for each firestopping system that is needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance rated systems.
- P. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E814.
 - 1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

- Q. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E814.
 - 1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
 - 3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
- R. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E814.
 - 1. L-Rating: Not exceeding 5.0 cubic feet per minute per square foot of penetration opening at both ambient and elevated temperatures.
- S. At fire rated assemblies, provide a firestop system with an Assembly Rating as determined by UL 2079 that is equal to the time rating of construction assembly.
- T. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of one or less as tested per ASTM G21.
- U. Rain and water resistance: Provide perimeter joint sealant tested in accordance with ASTM D6904 with less than one hour tack free time as tested in accordance with ASTM C679.
- V. To the greatest extent possible, provide cast-in-place firestop devices prior to concrete placement.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in the manufacturer's original packaging. Clearly identify manufacturer, contents, brand name, applicable standard, lot number, UL label and mixing and installation instructions.
- B. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions. Immediately remove damaged or deteriorated materials from the job site.
- C. Comply with recommended procedures, precautions, or remedies described in material safety data sheets as applicable.
- D. All firestop materials shall be installed prior to expiration of shelf life.
- E. Do not install damaged or expired materials.

1.11 SCHEDULING

- A. Coordinate installation with other trades whose work may be affected or have effect.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

1.12 PROJECT CONDITIONS

- A. Conform to manufacturer's printed instructions for installation and, when applicable, curing in accordance with temperature and humidity. Conform to ventilation and safety requirements.

- B. Do not use materials that contain flammable solvents.
- C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- D. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- E. Weather conditions:
 - 1. Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
 - 2. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- F. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable firestopping manufacturers, unless noted otherwise:
 - 1. Hilti, Tulsa, OK; 866-445-8827, www.us.hilti.com.
 - 2. Specified Technologies Inc. (STI), Somerville, NJ; 800-992-1180, www.stifirestop.com.
 - 3. 3M, St. Paul, MN; 800-328-1687, www.solutions.3m.com.
 - 4. Substitutions: Under provisions of Division 01.

2.2 MINERAL WOOL INSULATION

- A. Acceptable Manufacturers and Products:
 - 1. Owens Corning Thermafiber, Inc., Wabash, IN; 888-834-2371, www.thermafiber.com.
 - 2. Johns Manville, Denver, CO; 800-654-3103, www.jm.com.
 - 3. Rockwool, Milton, Ontario, Canada; 800-265-6878, www.rockwool.com.
 - 4. Substitutions: Under provisions of Division 01.
- B. At through penetrations, head of wall construction gaps, and perimeter safing slots, provide required density mineral wool per tested system, installed with correct orientation for joint movement and properly compressed per tested system.
- C. Accessories: Provide all accessories and anchors for installation as recommended by the manufacturer.

2.3 FIRESTOP SEALANTS

- A. Sealant for penetrations by noncombustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT).

B. Silicone Sealants:

1. Acceptable Manufacturers and Products:
 - a. Hilti. Product: CFS-S SIL Silicone Sealant.
 - b. Specified Technologies Inc. Product: SpecSeal SIL Silicone Firestop Sealant.
 - c. 3M. Products:
 - 1) Fire Barrier Water Tight Sealant 1003 SL.
 - 2) Fire Barrier Silicone Sealant 2000+.
 - d. Substitutions: Under provisions of Division 01.
2. Sealant shall be a one-part silicone compound, non-sag for vertical applications and self-leveling for horizontal applications. Sealant shall be UL Classified (UL 1479) and tested in accordance with ASTM E814 requirements. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7 requirements.

C. Intumescent Latex Sealants:

1. Acceptable Manufacturers and Products:
 - a. Hilti. Product: FS-One Max.
 - b. Specified Technologies Inc. (STI). Products:
 - 1) SpecSeal Series SSS Sealant.
 - 2) SpecSeal LCI Sealant.
 - 3) LC Sealant.
 - c. Substitutions: Under provisions of Division 01.
2. Sealant shall be a one-part intumescent latex compound. When exposed to high heat or flame, sealant shall be capable of expanding to seal off the annular spaces and voids at the joint. Expansion shall continue at temperatures greater than 230 degrees F. Sealant shall be thixotropic and suitable for caulking or troweling onto vertical and overhead surfaces. Sealant shall be UL Classified (UL 1479) and tested in accordance with ASTM E814 requirements. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7 requirements.

2.4 ELASTOMERIC FIRESTOP SEALANT

A. Sealant for penetrations and joints between structurally separate sections of walls and floors at top-of-walls.

B. Acceptable Manufacturers and Products:

1. Hilti. Products:
 - a. CFS-S SIL GG.
 - b. CFS-S SIL SL.
2. STI. Product: SpecSeal Series ES100 Elastomeric Sealant.
3. 3M. Products: Fire Barrier Sealants 1000, 1003, 2000, 2000+, 2001, and 2003.
4. Substitutions: Under provisions of Division 01.

- C. Elastomeric sealant shall be a non-halogenated, latex-based or silicone-based, highly flexible caulk. The sealant shall be thixotropic for high-build application using standard caulking equipment or by troweling onto vertical surfaces or overhead. Self-leveling sealants are acceptable for horizontal applications. The sealant shall be UL Classified (UL 2079) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.5 FIRESTOP PUTTY

- A. Putty for penetrations by combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed flexible cable, or cable bundles and plastic pipe (closed piping systems). Clay-based products will not be allowed.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CP 618 Putty Stick.
 - 2. STI. Product: SpecSeal SSP Putty.
 - 3. Substitutions: Under provisions of Division 01.
- C. Putty shall be a one-part intumescent, non-hardening compound. The putty, when exposed to high heat or flame shall be capable of expanding to seal off annular spaces created. Range of continuing expansion shall be from 230 degrees F to greater than 1,000 degrees F. The putty shall be soft and pliable with aggressive adhesion. The putty shall be UL Classified (UL 1479) and tested to the requirements of ASTM E814. Penetrations in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.6 INTUMESCENT PUTTY PAD

- A. Firestop Putty Pads for Electrical Boxes: Intumescent moldable butyl-based firestop putty pad. Clay-based products will not be allowed.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Products:
 - a. CFS-P PA Putty Pad.
 - b. CP 617 Putty Pad.
 - 2. STI. Products:
 - a. SpecSeal SSP4S 7.25 inches by 7.25 inches.
 - b. SpecSeal SSP9S 9 inches by 9 inches.
 - 3. Substitutions: Under provisions of Division 01.

2.7 FLEXIBLE FIRESTOP SPRAY

- A. Firestop spray for perimeter fire barrier system, fire-rated construction joints, and other gaps.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CFS-SP WB.
 - 2. STI. Products:
 - a. SpecSeal AS200 Elastomeric Firestop Spray
 - b. SpecSeal Fast Tack Elastomeric Silicone/Urethane Hybrid Firestop Spray.

3. 3M. Products: Firedam Spray and Fire Barrier Spray.
4. Substitutions: Under provisions of Division 01.

C. Spray shall be flexible, sprayable water-based coating that dries in ambient conditions to form a flexible seal that will compress/extend with the intended range of the joint. The spray shall be UL classified (UL 2079) and tested to the requirements of ASTM E1966. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7. Provide silicone-based firestopping products where building perimeter fire barrier systems are required.

2.8 HEAD-OF-WALL GASKET

A. Intumescent cover for head-of-wall track providing fire, smoke, and acoustic ratings.

B. Acceptable Manufacturers and Products:

1. Hilti. Product: CFS-TTS Top Track System.
2. STI. Product: SpecSeal Series TTG SpeedFlexTrack Top Gasket.
3. Substitutions: Under provisions of Division 01.

C. Preformed gasket shall be UL classified (UL 2079) and tested to the requirements of ASTM E1966. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.9 FIRESTOP COLLARS

A. Collars for penetrations by combustible plastic pipe (opening piping systems).

B. Acceptable Manufacturers and Products:

1. Hilti. Products:
 - a. CP643N Firestop Collar.
 - b. CP644 Firestop Collar.
2. STI. Products:
 - a. SpecSeal SSC.
 - b. SpecSeal LLC Firestop Collar.
3. 3M. Products:
 - a. Fire Barrier PPD Plastic Pipe Device.
 - b. Ultra Plastic Pipe Device.
4. Substitutions: Under provisions of Division 01.

C. Firestop collar shall be made of a galvanized steel housing and shall contain a section of intumescent material. The material shall be designed to expand when exposed to fire. The collars shall be UL classified (UL 1479) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.10 FIRESTOPPING FOR LARGE OPENINGS

- A. Firestopping for large size, complex penetrations made to accommodate cable trays, multiple steel and copper pipes and electrical busways in raceways. Products may be used in conjunction with other firestopping products, systems, and devices.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CFS-BL Firestop Block.
 - 2. STI. Products:
 - a. SpecSeal SSB Firestop Pillows.
 - b. SpecSeal CS Composite Sheet.
 - c. SpecSeal SSM Mortar.
 - 3. 3M. Product: Fire Barrier Pillows or Fire Barrier CS-195+ Composite Sheet and Fire Barrier Mortar.
 - 4. Substitutions: Under provisions of Division 01.
- C. For large openings, install intumescent compound or mortar. Intumescent compounds, when exposed to high heat or flame, shall be capable of expanding to seal off annular spaces created. Product shall be UL classified (UL 1479) and tested to the requirements of ASTM E814. Closures in fire rated assemblies shall be protected and sealed in accordance with CBC Chapter 7.

2.11 CAST-IN-PLACE FIRESTOP DEVICES

- A. Devices for use with non-combustible and combustible pipes (closed and open piping systems), conduit, and cable bundles penetrating concrete floors and framed gypsum board wall assemblies.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Products:
 - a. CP 680-P Cast-in-Place Firestop Device.
 - 1) Add Aerator Adapter when used in conjunction with aerator (Sovent) system.
 - b. CP 680-M Cast-in-Place Firestop Device for use with non-combustible penetrants.
 - c. CP 653 Firestop Speed Sleeve.
 - 2. STI. Product: SpecSeal CD Cast-In Firestop Device.
 - a. Accessories:
 - 1) Add Aerator Adapter when used in conjunction with aerator (Sovent) system.
 - 2) Metal Deck Adapters on corrugated metal decks.
 - 3) Extension Tubes where required for thick concrete floors.
 - 3. Substitutions: Under provisions of Division 01.
- C. Acceptable Penetrations: Sealing pipes and cables up to 6 inches in diameter in penetration through fire-rated floors, suitable for: vented or closed plastic pipes, PVC, CPVC, ABS, innerduct, FRPP, steel, cast-iron, copper pipes, insulated steel and copper pipes, EMT and ENT electrical conduits, bundled cables, and blank openings.

2.12 INTUMESCENT WRAP

- A. Intumescent Wrap: Precut wrap strips for plastic and insulated pipe penetration through rated assemblies.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CP 648, Firestop Wrap Strip.
 - 2. STI. Products:
 - a. SpecSeal RED2.
 - b. SpecSeal BLU2 Wrap Strip.
 - 3. Substitutions: Under provisions of Division 01.

2.13 FIRESTOP MORTAR

- A. Fire-resistant, cement-based mortar for firestop-sealing medium-sized to large openings with non-combustible pipes or cable trays, and permanent fire seal for cables, cable trays and non-combustible pipes. For use with concrete and masonry assemblies, and for walls and floors rated up to three hours.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CP 637 Firestop Mortar.
 - 2. STI. Product: SpecSeal SSM Firestop Mortar.
 - 3. Substitutions: Under provisions of Division 01.

2.14 FIRE-RATED CABLE PATHWAY

- A. Gangable fire-rated device modules capable of retrofit, comprised of steel raceway with intumescent foam pads allowing 0 percent to 100 percent cable fill for cable penetrations through gypsum or CMU walls, concrete floors and concrete walls.
- B. Acceptable Manufacturers and Products:
 - 1. STI. Product: SpecSeal EZ Path Pathway Device Series 22, 33 or 44.
 - 2. Substitutions: Under provisions of Division 01.

2.15 FIRE-RATED HVAC RETAINING ANGLES

- A. Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts.
- B. Acceptable Manufacturers and Products:
 - 1. STI. Product: SpecSeal Fyre-Flange Steel Firestop Retaining Angle.
 - 2. Substitutions: Under provisions of Division 01.

2.16 FIRESTOP PLUGS

- A. Re-enterable, foam rubber plug impregnated with intumescent material for use in blank openings and cable sleeves.
- B. Acceptable Manufacturers and Products:
 - 1. Hilti. Product: CFS-PL Firestop Plug.
 - 2. STI. Product: SpecSeal FP Intumescent Firestop Plug.

3. Substitutions: Under provisions of Division 01.

2.17 FIRE-RATED T COLLAR DEVICES

- A. Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements.
- B. Acceptable Manufacturers and Products:
 - 1. STI. Product: SpecSeal T-Collar Device.
 - 2. Substitutions: Under provisions of Division 01.

2.18 FIRE-RATED GROMMETS

- A. Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing individual cable penetrations up to 0.27 inch diameter.
- B. Acceptable Manufacturers and Products:
 - 1. STI. Product: EZ-Firestop Grommet.
 - 2. Substitutions: Under provisions of Division 01.

2.19 ACCESSORIES

- A. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 CONDITIONS REQUIRING FIRESTOPPING

- A. General: Provide firestopping for conditions specified whether or not firestopping is indicated and, if indicated, whether such material is designed as insulation, safing or otherwise.
- B. Penetrations:
 - 1. Penetrations include conduit, cable wire, pipe, duct or other elements that pass through one or both outer surfaces of a fire-rated floor, wall or partition.
 - 2. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall opening.
- C. Provide firestopping to fill miscellaneous voids and openings in fire-rated construction as specified herein.
- D. Provide intumescent moldable pads over backs and sides of all electrical junction and utility boxes at fire rated walls.

3.2 EXAMINATION

- A. Verify site conditions under provisions of Division 01.
- B. Verify openings are ready to receive the work of this Section.

3.3 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material or other matter that may affect bond of firestopping material.
- B. Remove incompatible materials that may affect bond.
- C. Install noncombustible backing materials to arrest liquid material leakage.
- D. Examine the areas and conditions where firestops are to be installed and notify Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected by Contractor in a manner acceptable to Architect.
- E. Verify penetrations are properly sized and in suitable condition for application of materials.
- F. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- G. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

3.4 INSTALLATION

- A. General:
 - 1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures. Written verification of the manufacturer's training shall be submitted to Architect.
 - 2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, and listing descriptions.
 - 3. Provide sprinkler piping with NFPA 13 required annular space using firestop to allow movement.
 - 4. Coordinate with plumbing, mechanical, electrical and other trades to assure that all pipe, conduit, cable and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.
 - 5. All penetrations for pipes, conduits, tubing or other building service elements shall be installed below the head-of-wall joint such that the distance between the top of the wall and the top of the penetrant is a minimum of 3 inches, no exceptions.
- B. Regulatory Requirements: Install firestop materials in accordance with published "Through-Penetration Firestop Systems" in UL's Fire Resistance Directory.
- C. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
 - 1. Seal all holes or voids made by penetrations to ensure an air- and water-resistant seal.
 - 2. Protect materials from damage on surfaces subjected to traffic.
- D. Field Quality Control:
 - 1. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.

2. Follow safety procedures recommended in the Material Safety Data sheets.
3. Finish surfaces of firestopping which are to remain exposed in the completed work to a uniform and level condition.
4. All areas of work must be accessible until inspection by the applicable Code authorities.
5. Correct unacceptable firestop installations and provide additional inspection to verify compliance with this Section at no additional cost.
6. All firestop assemblies shall be identified with a permanently affixed ID label as follows:
 - a. Firestop System Warning Label: Minimum 3 inch by 5 inch label, red color or with red colored type and "WARNING: THROUGH PENETRATION FIRESTOP SYSTEM – DO NOT DISTURB. NOTIFY BUILDING MANAGEMENT OF ANY DAMAGE" written in bold type. Label shall be adhesive backed or provide other means of permanent attachment. Identified or included spaces for the following information:
 - 1) Name of manufacturer.
 - 2) Name of Installer.
 - 3) Date firestop system was installed.
 - 4) Firestop System UL number or manufacturer's engineered design number.
 - 5) F Rating and/or T Rating, as applicable.
7. All fire-rated wall assemblies shall be identified with signs or by stenciling in accessible concealed floor, floor-ceiling, or attic spaces at intervals not exceeding 30 feet and within 15 feet of the end of each wall per CBC Section 703.7. Lettering shall be not less than 3 inches in height with a minimum 3/8 inch stroke in contrasting color, incorporating the appropriate wording such as: "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS", with the relevant hourly fire resistance rating clearly stated.
8. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
9. Keep areas of work accessible until inspection by applicable code authorities.
10. Perform under this Section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- E. Installation shall be completed in a neat, workmanlike manner according to manufacturer's recommendations. Securely fasten and anchor insulation in place to prevent displacement or sagging of material. Safing insulation shall be adequately lapped.
- F. Install material at fire rated horizontal to vertical assembly closures and at fire rated walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
- G. Apply primer and materials in accordance with manufacturer's instructions.
- H. Apply firestopping material in sufficient thickness to achieve rating.
- I. Compress fibered material to achieve a density of forty percent of its uncompressed density.
- J. Dam material to remain.

3.5 INSPECTIONS

- A. Firestopping inspections shall meet the requirements of CBC Section 1705.17.

- B. Inspection of completed work shall be performed by Authority Having Jurisdiction (AHJ) and/or the building underwriter's designee. If required by Authority Having Jurisdiction (AHJ) or underwriter, inspections may be performed by an independent, third-party construction inspection and testing service provided that:
 - 1. Inspections are performed to the requirements of the following standards as applicable:
 - a. Construction Joints: ASTM E2393.
 - b. Service Penetrations: ASTM E2174.
 - 2. Individual(s) performing inspection shall provide evidence of valid Errors and Omissions Insurance coverage for this service.
 - 3. Individual(s) performing inspection shall not have any financial connection to installer, firestop manufacturer, distributor or supplier.

3.6 CLEANING

- A. Clean Work under provisions of Division 01.
- B. Clean adjacent surfaces of firestopping materials.
- C. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.
- D. Leave finished work in a neat and clean condition with no evidence of spillovers or damage to adjacent surfaces.

3.7 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Division 01.
- B. Protect adjacent surfaces from damage by material installation.
- C. Where firestopping is installed at locations which will remain exposed in the completed work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as necessary against damage from other construction activities.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sealants.
- B. Sealant accessories.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete.
- B. Section 07 62 00 – Sheet Metal Flashing and Trim.
- C. Section 07 84 00 – Firestopping.
- D. Section 08 11 13 – Hollow Metal Doors and Frames.
- E. Section 08 81 00 – Glass Glazing.
- F. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASTM C510 – Standard Test Method for Staining and Color Change of Single or Multicomponent Joint Sealants.
 - 2. ASTM C719 – Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 - 3. ASTM C794 – Standard Test Method for Adhesion in Peel of Elastomeric Joint Sealants.
 - 4. ASTM C834 – Standard Specification for Latex Sealants.
 - 5. ASTM C881 – Standard Specification for Epoxy Resin Base Bonding Systems for Concrete.
 - 6. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications.
 - 7. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
 - 8. ASTM C1087 – Standard Test Method for Determining Compatibility of Liquid Applied Sealants with Accessories Used in Structural Glazing Systems.
 - 9. ASTM C1193 – Standard Guide for Use of Joint Sealants.

10. ASTM C1248 – Standard Test Method for Staining of Porous Substrate by Joint Sealants.
11. ASTM C1311 – Standard Specification for Solvent Release Sealants.
12. ASTM C1521 – Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
13. ASTM D2203 – Standard Test Method for Staining from Sealants.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature and product specification for each product, including primers and sealing compounds.
- C. Samples: Submit cured samples of exposed sealants for each color to be installed.
- D. Quality Assurance/Control Submittals:
 1. Product validation/assurance submittals.
 2. Manufacturer's laboratory adhesion and stain testing results.
 3. Joint sealants field adhesion to joint substrates test results.
 4. Installer qualifications.
 5. Written certification from the subcontractor that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vapor tight seals (as applicable), and that materials supplied meet specified performance requirements.
- E. Sample Manufacturer's Warranty.
- F. Closeout Submittals: Cleaning and maintenance data.

1.5 DEFINITIONS

- A. Sealant Types:
 1. S: Single component sealant, cures by moisture reaction.
 2. M: Multiple component sealant; cures by chemical reaction.
- B. Sealant Grades:
 1. NS: Non-sag or gunnable sealant that permits application in joints on vertical surfaces without sagging or slumping.
 2. P: Pourable sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
 3. SL: Self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
- C. Sealant Classes:
 1. 12.5: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 12.5 percent of the joint width as measured at the time of application.

2. 25: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 25 percent of the joint width as measured at the time of application.
3. 35: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 35 percent of the joint width as measured at the time of application.
4. 50: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase and decrease of at least 50 percent of the joint width as measured at the time of application.
5. 100/50: A sealant that when tested for adhesion and cohesion under cyclic movement shall withstand an increase of at least 100 percent and a decrease of at least 50 percent of the joint width as measured at the time of application.

D. Sealant Uses:

1. A: Sealant acceptable for use on an aluminum substrate.
2. G: Sealant acceptable for use on a glass substrate.
3. I: Sealant designed for use in joints which are submerged continuously in a liquid.
 - a. Immersion rated sealant applications require primer.
4. M: Sealant acceptable for use on a mortar substrate.
5. NT: Sealant designed for use in joints in non-traffic areas.
6. T: Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks, and parking garages.
7. O: Sealant acceptable for use on substrates other than those listed above including, but not limited to, color anodized aluminum, metals other than aluminum, painted surfaces, brick, stone, tile, and wood.

E. Miscellaneous:

1. FC: Fast cure sealants; provides lesser cure times than corresponding standard cure sealants.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

- A. Meet VOC requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168. Information is available at www.aqmd.gov. VOC limit expressed in grams per liter as follows:

Sealant	VOC Limit
Architectural	250
Single Ply Roof Material Installation/Repair	450
Nonmembrane Roof Installation/Repair	300
Other	420

Sealant Primer	VOC Limit
Architectural – Nonporous	250
Architectural - Porous	775
Other	750

- B. Provide sealants with no carcinogen or reproductive toxicant components at more than one percent of total mass of product as defined in the following lists:
 - 1. California OEHHA, Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Information is available at www.oehha.ca.gov/prop65.html.
 - 2. California Air Resources Board (CARB), list of Toxic Air Contaminants (California Air Toxics). Information is available at www.arb.ca.gov/toxics.

1.7 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section.
 - 2. Applicator Qualifications: Firm specializing in installing work specified in this Section with experience on at least five projects of similar nature in past three years.
- B. Product Validation/Assurance: Provide products with current SWRI Validation or provide independent third-party laboratory test results showing product meets performance requirements in accordance with ASTM C920 and as specified in this Section.
- C. Compatibility: Materials forming joints and adjacent materials shall not adversely affect sealant materials or sealant color per ASTM C1087.
- D. Staining: Sealants shall not stain joint substrates per ASTM C510, ASTM C1248, and ASTM D2203.
- E. Manufacturer Adhesion, Cohesion, and Stain Testing: Provide manufacturer's laboratory adhesion and cohesion testing per ASTM C719 and ASTM C794, and stain testing per ASTM C510, using specimens of actual substrates to ensure sealant compatibility with substrate before product acceptance.
- F. Joint Sealants Field Test for Adhesion and Cohesion to Joint Substrates: Perform field tests for each elastomeric joint sealant in accordance with ASTM C1521, with the manufacturer's representative present prior to installation as follows:
 - 1. Install joint sealants in five foot joint lengths. Allow sealant to fully cure before testing.
 - 2. Make a knife cut of the sealant across the joint and along each side of the joint approximately 3 inches long.
 - 3. Place a mark on the sealant tab, 1 inch from the adhered joint to the tab's free end.
 - 4. Grasp a 2 inch piece of sealant firmly just beyond the 1 inch mark and pull at a 90 degree angle.
 - 5. Record whether or not sealant in joint maintained adhesion to substrate.
 - 6. Record percentage length of sealant elongation.
 - 7. Sealant product acceptance shall be based on pass/fail adhesion performance.
- G. Coordination: Coordinate work in this Section with work in related Sections.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.

- B. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, color, expiration period, curing time and mixing instructions for multi-component materials.
- C. Storage and Protection: Store materials in a dry secure location with ambient temperature range of 60 degrees F to 80 degrees F.
- D. Carefully handle and store to prevent inclusion of foreign materials.

1.9 PROJECT/SITE CONDITIONS

A. Environmental Limitations:

- 1. Do not proceed with installation of primers and joint sealants under the following conditions:
 - a. When ambient and substrate temperature conditions are less than 40 degrees F, or as otherwise recommended by manufacturer.
 - b. When joint substrates are wet.

B. Joint-Width Conditions:

- 1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.10 SEQUENCING

- A. Apply waterproofing, water repellents, and preservative finishes after sealants have fully cured.

1.11 WARRANTY

- A. Comply with provisions of Division 01.
- B. Provide manufacturer's warranty against material defects, air and water tightness, loss of adhesion, cohesion, and staining as follows:
 - 1. Silicone sealants – Twenty years.
 - 2. Urethane sealants – Five years.
 - 3. Other sealants – Two years.
- C. Provide installer's two year workmanship warranty.

1.12 MAINTENANCE DATA

- A. Submit in accordance with Division 01.
- B. Provide cleaning and maintenance information, recommended inspection intervals, and instructions for repairing and replacing failed sealant joints.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. BASF Corporation – Building Systems, Shakopee, MN; 800-433-9517 www.buildingsystems.basf.com.
2. GE Silicones, Huntersville, NC; 951-201-2000, www.gesilicones.com.
3. Pecora Corporation, Harleysville, PA; 800-523-6688, www.pecora.com.
4. Sika Corporation, Lyndhurst, NJ; 800-933-7452, www.usa.sika.com.
5. The Dow Chemical Company, Midland, MI; 800-331-6451, www.consumer.dow.com.
6. The Euclid Chemical Company, Cleveland, OH; 800-321-7628, www.euclidchemical.com.
7. Tremco Sealant Weatherproofing Division of RPM International, Inc., Beachwood, OH; 800-321-7906, www.tremcosealants.com.

B. Substitutions: Under provisions of Division 01.

2.2 SEALANTS

A. General:

1. Provide sealants that have been tested and found suitable for the substrates to which they will be applied.
2. Color: As selected by Architect from manufacturer's full range of colors.

B. Exterior Sealants:

1. Exterior Perimeter Sealant: Polyurethane sealant; ASTM C920; Type M; Grade NS; Class 50; uses: A, I, M, NT, O, T.
 - a. Products:
 - 1) Tremco Dymeric 240FC.
 - 2) BASF MasterSeal NP2.
 - 3) Sika Sikaflex-2c NS.
 - 4) or accepted equal.
 - b. Use at exterior vertical joints bordered on one or both sides by:
 - 1) Porous materials such as concrete or masonry.
 - 2) Non-porous materials such as painted metal, anodized or mill finish aluminum.
2. Exterior Perimeter Sealant: Ultra-low modulus moisture curing, non-staining, non-bleeding silicone sealant; ASTM C920; Type S; Grade NS; Class 50/50; uses: A, G, M, NT, O.
 - a. Products:
 - 1) The Dow Chemical Company Dowsil 795 Silicone Building Sealant.
 - 2) Tremco Spectrum 2.
 - 3) Sika Sikasil WS-295.
 - 4) or accepted equal.

- b. Use at:
 - 1) Exterior vertical joints bordered on one or both sides by concrete, metal, and/or window perimeters, threshold bedding, and/or sheet metal flashing lap joints.
 - 2) Porous materials such as concrete or masonry.
 - 3) Non-porous materials such as painted metal, anodized or mill finish aluminum.
- 3. Glazing Sealant: Medium modulus, neutral curing, non-staining, non-bleeding silicone sealant; ASTM C920; Type S; Grade NS; Class 50; uses: A, G, M, NT, O.
 - a. Products:
 - 1) Tremco Spectrem 2.
 - 2) The Dow Chemical Company Dowsil 795 Silicone Building Sealant.
 - 3) GE Silicones SilPruf SCS2000.
 - 4) Pecora 895NST.
 - 5) Sika Sikasil WS-295.
 - 6) or accepted equal.
 - b. Use at exterior joints in window wall systems such as glass to glass, glass to metal, and metal to metal joints.
- 4. Traffic Sealant: Self leveling, chemical curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type M; Grade NS or Grade P; Class 25; uses: M, O, T.
 - a. Products:
 - 1) Tremco THC900.
 - 2) Pecora Corp. Urexpan NR-200.
 - 3) BASF MasterSeal SL 2.
 - 4) Sika Sikaflex-2c SL.
 - 5) or accepted equal.
 - b. Use at:
 - 1) Exterior horizontal traffic expansion joints in concrete with slopes less than five percent.
 - 2) Interior horizontal traffic joints in low-slope concrete with slopes less than five percent.
- 5. Traffic Sealant: Slope grade chemical curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type M; Grade P; Class 25; use: T.
 - a. Products:
 - 1) Tremco THC 901.
 - 2) Pecora Corp. DynaTrol II-SG.
 - 3) BASF MasterSeal SL 2 Slope Grade.
 - 4) Sika Sikaflex 2c NS TG.
 - 5) or accepted equal.
 - b. Use at:
 - 1) Exterior horizontal traffic expansion joints in concrete with slopes between five percent and ten percent.

6. Metal Lap and Bedding Sealant (non-soldered flashings): Non-drying, non-skinning, non-curing flexible butyl rubber sealant; ASTM C1311; Type S; Grade NS; Class 10; uses: G, M, O.
 - a. Products:
 - 1) Tremco Butyl Sealant.
 - 2) Pecora Corp. BA-98 Butyl Rubber Sealant.
 - 3) or accepted equal.
 - b. Use for bedding thresholds, glazing secondary seals, and sheet metal flashing and trim not exposed to ultraviolet (UV) light.
7. Metal Lap and Bedding Sealant (non-soldered flashings): High performance, moisture curing, gun grade polyurethane sealant; ASTM C920; Type S; Grade NS; Class 25; use: A, I, M, NT, O, T.
 - a. Products:
 - 1) Tremco Vulkem 116.
 - 2) BASF MasterSeal TX1.
 - 3) Sika Sikaflex Textured Sealant.
 - 4) or accepted equal.
 - b. Use for bedding thresholds, glazing secondary seals, and sheet metal flashing and trim exposed to ultraviolet (UV) light.

C. Interior Sealants:

1. Interior Sealant: Nonoxidizing, skinnable, paintable, gunnable, non-staining, non-bleeding acrylic latex sealant; ASTM C834; Type S; Grade NS; Class 12.5; use: O.
 - a. Products:
 - 1) Tremco Tremflex 834.
 - 2) Pecora Corp. AC-20 + Silicone.
 - 3) or accepted equal.
 - b. Use at interior trim and finish joints expecting minimal movement.
2. Interior Sealant: Low modulus, moisture curing, non-staining, non-bleeding polyurethane sealant; ASTM C920; Type S; Grade NS; Class 35; uses: A, M, NT, O.
 - a. Products:
 - 1) Tremco Dymonic FC.
 - 2) Euclid Chemical Company Eucolastic 1NS.
 - 3) Sika Sikaflex 1a.
 - 4) or accepted equal.
 - b. Use at interior vertical expansion, control, and air seal joints.

2.3 ACCESSORIES

- A. Joint Cleaner: Non-corrosive and non-staining type as recommended by sealant manufacturer; compatible with joint forming materials.

- B. Primers: Non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.
- C. Joint Backing: Non-adhering backing to sealant; non-staining, compatible with sealant and primer such as round, closed cell or bi-cell polyethylene foam rod; oversized 25 percent to 50 percent larger than joint width. Materials impregnated with oil, bitumen or similar materials are not permitted.
- D. Bond Breakers: Type and consistency recommended by the sealant manufacturer to suit the particular application.
- E. Bond Breaker Tape: Self-adhesive, pressure sensitive polyethylene tape.
- F. Masking Tape: Non-staining, non-absorbent tape compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions; verify substrate, surfaces, and joint openings are ready to receive work and field measurements are as shown on drawings, as specified in this Section, and as recommended by manufacturer.
- B. Report unacceptable conditions to Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and prime joints in accordance with ASTM C1193 and manufacturer's written instructions.
- B. Remove loose materials and foreign matter that might impair sealant adhesion. Clean porous materials such as concrete or masonry by grinding, sand or water blast cleaning, mechanical abrading, acid washing or a combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
 - 1. Remove laitance by acid washing, grinding or mechanical abrading.
 - 2. Remove form oils, release agents, chemical retardants, by sand or water blast cleaning.
 - 3. Blow from joints with oil-free compressed air loose particles resulting from grinding, abrading, or blast cleaning prior to sealant application.
- C. Mechanically or chemically clean nonporous surfaces such as metal and glass. Remove temporary protective coatings on metallic surfaces using solvents that leave no residue as recommended by metal surface manufacturer. When masking tape or strippable films are used, remove the tape or film and clean any residual adhesive. Apply and wipe-dry cleaning solvents using clean, lint-free cloths or paper towels, do not allow solvent to air dry without wiping.
- D. Protect elements surrounding the work of this Section from damage or disfiguration. Apply masking tape to adjacent surfaces to prevent damage to finishes from sealant installation.

3.3 APPLICATION

- A. Apply sealants in accordance with ASTM C1193, manufacturer's written instructions, and accepted shop drawings.
- B. Apply acoustical sealants in accordance with ASTM C919, manufacturer's written instructions, except where more stringent requirements are specified herein, and accepted shop drawings.
- C. Apply sealant where indicated on the Drawings and at all exterior joints and openings in the building envelope that are observable sources of air or water infiltration.
- D. Measure joint dimensions and size materials to achieve required width-to-depth ratios. Acceptable joint width-to-depth ratios:

Material	Joint Width	Joint Depth	
		Minimum	Maximum
Metal or other nonporous surfaces.	1/4 inch (minimum)	1/4 inch	1/4 inch
	Over 1/4 inch	1/2 of width	Equal to width
Concrete, or other porous surfaces.	1/4 inch (minimum)	1/4 inch	1/4 inch
	Over 1/4 inch	1/2 of width	Equal to width
	Over 1/2 to 2 inches	1/2 inch	1/2 inch
	Over 2 inches	As recommended by sealant manufacturer.	

- E. Install joint backing to achieve desired joint width-to-depth ratio. Roll the material into the joint to avoid lengthwise stretching. Do not twist or braid rod stock.
- F. Install bond breaker where joint backing is not used to prevent three-sided adhesion.
- G. Apply primer where required and where recommended by sealant manufacturer for sealant adhesion.
- H. Install sealants within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- I. Install sealants immediately after joint preparation.
- J. Install sealants free of air pockets, foreign embedded matter, ridges, and sags.
- K. Produce uniform, cross sectional shapes and depths relative to joint width that allow optimum sealant movement capability.
- L. Tool joints concave. Use dry tooling method.
- M. Cure sealants in compliance with their manufacturer's instructions to obtain high early bond strength, internal cohesive strength, and durability. Do not disturb seals until completely cured.

3.4 CLEANING AND REPAIRING

- A. Immediately clean work under provisions of Division 01.

B. Clean adjacent soiled surfaces. Use a cleaning agent as recommended in writing by the sealant manufacturer. Remove any masking tape immediately after tooling joints, leaving finished work in neat and clean condition.

C. Repair or replace defaced or disfigured caused by work of this Section.

3.5 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Division 01.

B. Protect sealant until cured.

C. Do not paint sealants until sealant is fully cured.

D. Do not paint silicone sealant.

E. Protect joint sealants from contact with contaminating substances and from damage. Cut out, remove and replace contaminated or damaged sealants, immediately, so that they are without contamination or damage at time of Project Completion.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Standard hollow metal doors and frames.
 - 1. Hollow metal doors, rated and non-rated.
 - 2. Hollow metal frames, rated and non-rated.
- B. Sidelights.
- C. Finish: Field-painted, color as indicated on Drawings; if not indicated, to be selected by Architect. Provide exterior paint system on both interior and exterior faces, four edges, and frames of exterior doors.

1.2 RELATED SECTIONS

- A. Section 04 22 00 – Concrete Unit Masonry.
- B. Section 07 92 00 – Joint Sealants.
- C. Section 08 71 00 – Door Hardware.
- D. Section 08 81 00 – Glass Glazing.
- E. Section 09 22 16 – Non-Structural Metal Framing.
- F. Section 09 29 00 – Gypsum Board.
- G. Section 09 91 00 – Painting.
- H. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ANSI/SDI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
 - 2. ANSI/SDI A250.8 – Standard Steel Doors and Frames.

- | | |
|-------------------------------------|---|
| 3. ASTM A653/A653M | – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. |
| 4. ASTM A1008/A1008M | – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable. |
| 5. ASTM A1011/A1011M | – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength. |
| 6. ASTM C578 | – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation. |
| 7. ASTM E283 | – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen. |
| 8. ANSI/NAAMM HMMA 861 | – Guide Specifications for Commercial Hollow Metal Doors and Frames. |
| 9. California Building Code, | Section 716 “Opening Protectives,” Paragraph 716.5 “Fire Door and Shutter Assemblies”. |
| 10. California Code of Regulations, | Title 24, Part 12, 2019 California Referenced Standards Code – Chapter 12-7-4, Fire-Resistive Standards. |
| 11. NAAMM HMMA 840 | – Guide Specification for Installation and Storage of Hollow Metal Doors and Frames. |
| 12. NFPA 80 | – Standard for Fire Doors and Other Opening Protectives. |
| 13. NFPA 105 | – Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives. |
| 14. NFPA 252 | – Standard Methods of Fire Tests of Door Assemblies. |
| 15. NFRC 400 | – Procedure for Determining Fenestration Product Air Leakage. |
| 16. UL 10B | – Fire Tests of Door Assemblies. |
| 17. UL 10C | – Positive Pressure Fire Tests of Door Assemblies. |
| 18. UL 1784 | – Air Leakage Tests for Door Assemblies. |

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings: Include illustrations and schedule of finish hardware, door and frame size, type, material, fire ratings, construction, finishing, anchoring, glazing, accessories, and preparation for installing hardware.
 - 1. Method of attachment of frames to structure shall be reviewed by Architect for acceptance or rejection.
 - 2. Details of conduit and preparations for power, signal, and control systems.

- C. Templates: Furnish hardware templates to fabricator of frames to be factory prepared for installation of hardware. Refer to Section 08 71 00 for hardware requirements.
- D. Submit product data for type of metal primer proposed for use.

1.5 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.6 QUALITY ASSURANCE

- A. Steel door and frame manufacturer shall be SDI certified.
- B. Provide doors and frames complying with ANSI A250.8, ANSI/NAAMM-HMMA 861, and as specified herein.

1.7 REGULATORY REQUIREMENTS

- A. Fire-Rated Doors and Frames: Provide doors and frames complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F above ambient after thirty minutes of standard fire-test exposure.
- B. Testing of Fire-Rated Door and Frame Assembly: Conform to applicable requirements of NFPA 252 or UL 10C and State Fire Marshal Standard 12-7-4, "Fire Door Assembly Tests," as referenced in 2019 California Referenced Standards Code, Chapter 12-7-4, "Fire-Resistive Standards".
- C. Doors and Frames for Smoke-Control Door Assemblies: Comply with applicable requirements of NFPA 105 or UL 1784.
- D. Fire-Rated Door and Frame Labels: All fire rated doors and frames shall have metal labels (including "S" labels) permanently fastened to the jamb indicating the fire rating and Testing Agency name.
 - 1. Do not apply primer or paint over fire rating labels.
- E. Door assemblies shall meet air infiltration requirements of California Energy Code, California Code of Regulations, Title 24, Part 6, Section 110.6, as referenced in California Building Code, Chapter 13, "Energy Efficiency".
 - 1. Air Leakage Limits: Manufactured exterior door assemblies shall have air infiltration rates not exceeding 0.3 cubic feet per minute per square foot of door area for nonresidential single doors (swinging and sliding), and 1.0 cubic feet per minute per square foot for nonresidential double doors (swinging), when tested according to NFRC 400 or ASTM E283 at a pressure differential of 75 pascals or 1.57 pounds per square foot.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials under protective cover and store in upright position within a dry enclosed space in a manner that will prevent rust and damage. Do not create a humidity chamber by using a plastic or canvas shelter that is not adequately vented.
- B. Deliver fully-welded frames with two removable spreader bars across bottom of door frames, tack welded to jambs and mullions.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.10 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers, Hollow Metal Doors and Frames:
 - 1. Ceco Door Products, Milan, TN; 888-232-6366, www.cecodoor.com.
 - 2. Curries Company, Mason City, IA; 800-377-3948, www.curries.com.
 - 3. Steelcraft, Cincinnati, OH; 877-671-7011, www.steelcraft.com.
 - 4. Door Components Inc., Fontana, CA; 866-989-3667, www.doorcomponents.com.
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheets for Doors and Frames: Commercial Steel (CS), Type B, complying with ASTM A1008/A1008M.
 - 1. Use cold-rolled steel for door frames and exposed-to-view surfaces.
- B. Hot-Rolled Steel Sheets and Strip for use at Door Frames: Commercial Steel (CS), Type B; complying with ASTM A1011/A1011M.
 - 1. Steel shall be free of mill scales, pitting, or surface defects; pickled and oiled.
 - 2. Use hot-rolled steel for reinforcement and concealed components only.
- C. Factory-Applied Primer: Manufacturer's standard primer, thickness: two mils minimum, and compatible with ferrous and galvanized metal primers specified in Section 09 91 00.
- D. Refer to Section 08 81 00 for glass glazing requirements.
- E. Refer to Section 08 71 00 for hardware requirements.

2.3 STANDARD HOLLOW METAL DOOR FABRICATION

- A. General: Fabricate to sizes shown, providing necessary clearances and bevels to permit operation without binding. Doors shall be free from warp, wave, buckle or other defect. Doors shall be 1-3/4 inches thick, unless otherwise indicated on Drawings.
- B. Flush Door Construction: Door shall be Grade III, Model 2, fabricated with face sheets of 16 gauge steel in accordance with ANSI/SDI A250.8 and galvanized to ASTM A653/A653M A60 at exterior locations. Door shall be flush with edge seams, weld filled and ground smooth. Bevel lock edge 1/8 inch in 2 inches. Door shall be provided with 16 gauge steel top flush cap welded and ground smooth, and bottom inverted 14 gauge steel channels welded within the door. Door shall be reinforced, stiffened and sound deadened with impregnated kraft honeycomb core completely filling door cavity, and laminated to the inside faces of panels.
 - 1. Exterior doors shall be insulated with an expanded polystyrene or polyurethane core, or as standard with manufacturer. Completely fill door cavity with insulation. Expanded polystyrene to be ASTM C578, Type 1 or Type 2, with minimum one pound per cubic foot density.
- C. Preparation of Hardware: Per ANSI/SDI A250.6, door shall be mortised, reinforced, drilled and tapped at the factory from templates for all mortise hardware listed in the Hardware Schedule. Door shall be reinforced for surface applied hardware such as closers, checks, escutcheons and kick plates; drilling and tapping to be done in the field by door installer. Reinforcement to be 12 gauge for locksets and latchsets, and 14 gauge for surface applied hardware, except use 3/16-inch thick plate for butt hinges. Door shall be provided with reinforcing unit as recommended by lock manufacturer.
- D. Hardware Mounting Heights and Door Clearances: In accordance with California Building Code and applicable requirements of Section 08 71 00.

2.4 STANDARD HOLLOW METAL FRAME FABRICATION

- A. General:
 - 1. Provide fully-welded frames.
 - 2. Hollow metal frames shall be formed to shapes and sizes shown.
- B. Full Profile Welded Frames: Head and jamb splices shall be fabricated with mitered, coped and continuously welded inside and outside corners and be finished on the outside face to present a smooth surface for painting.
- C. Frames shall be fabricated from 16 gauge steel, and shall be designed with integral stop and trim. All corners shall be reinforced with 18 gauge "L" shaped reinforcements welded on the inside face of the frame.
- D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- E. Frames shall be galvanized to ASTM A653/A653M A60 at exterior locations.
- F. Where the solid grouting of frames is required, provide top openings and jamb to mullion openings to facilitate the solid grouting of frames.

- G. Preparation for Hardware: Per ANSI/SDI A250.6, frame shall be prepared at the factory for all hardware using templates furnished by hardware supplier. Locations of miscellaneous hardware shall conform to the recommendations for the Door and Hardware Institute. Mortise, reinforce, drill and tap for mortise type hardware. Reinforce frames for surface applied hardware; drilling and tapping to be done in the field by door installer.
1. Hardware cutouts shall have steel plate reinforcements with tapped holes fillet welded to frame on all four sides of the plate. Fillet welds shall be minimum 1 inch long. Reinforcement shall include 3/16 inch butt reinforcement; 12 gauge lock strike; 14 gauge for surface applied items.
 2. Provide strike stops at frames to receive hollow metal doors with holes for three rubber door silencers. On double door frames, provide for two silencers per door at head. Omit holes at frames to receive unitized gasketing; refer to Section 08 71 00.

2.5 ANCHORS

- A. Frame shall be anchored to structure with anchors appropriate for use with type of adjacent construction. Anchorage shall securely fasten frames to wall construction involved. Provide a minimum three anchors, including one adjustable floor anchor, at each door jamb. Frames taller than eight feet in height will require additional anchors at each jamb. Anchors shall be minimum 16 gauge steel and shall provide stiffness and rigidity to keep frames square, in accurate position without twisting, buckling or warping. Fasteners to framing substrate shall be the following minimums; greater as required by the frame manufacturer or as conditions warrant:
1. Metal Framing: Two #10 self-tapping sheet metal screws per anchor, length as required; fastener to penetrate a minimum of 1/4 inch into framing member.
 2. Masonry: 3/8 inch diameter loop anchors welded to the 10 gauge steel plates. Refer to Drawings for size, location, and quantity.
 3. Concrete/Masonry: 1/4 inch diameter stainless steel wedge anchors, three per jamb, with 1-1/2 inches minimum embedment into substrate and 2 inches minimum edge distance to face of substrate. *Masonry tee anchors?*

2.6 PRIMING

- A. Doors and frames shall be leveled and welds ground smooth. Apply mineral filler to eliminate weld scars and other blemishes.
- B. Shop Priming: All surfaces shall be cleaned, phosphatized, and given one coat of baked-on rust-inhibiting primer in accordance with the Steel Door Institute Specification "Test Procedure and Acceptance Criteria for Primer Painted Steel Doors and Frames".
1. Do not prime paint over fire-rated door and frame labels.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install doors and frames in accordance with ANSI A250.8, ANSI/NAAMM-HMMA 861, and UL 752, as applicable.

- B. Set frames level and plumb, and brace adequately to prevent damage or distortion. Secure to structure with minimum of three anchors at each jamb. Field joints shall be welded, body puttied and ground smooth.
 - 1. Removable Spreaders: Wherever possible, leave frame spreaders intact until frames are set perfectly square and plumb, and anchors are securely attached.
- C. Door Installation in Hollow Metal Frames: Fit hollow metal doors accurately in frames.
- D. Coordinate installation of doors and frames with installation of doors specified in Section 08 14 00, hardware specified in Section 08 71 00, and glazing as specified in Section 08 81 00.

3.3 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUST AND CLEAN

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth all rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer. Touch-up shall not be obvious.
- B. Cleaning and Finishing: Upon completion of the work, clean all exposed surfaces, removing any discoloration or foreign matter, and touch up all abraded or cut areas and exposed edges with finishing material recommended by the manufacturer. Touch-up of finish shall not be obvious.
- C. Final Adjustments: Adjust door for smooth and balanced door movement. Check and readjust operating finish hardware in hollow metal work immediately prior to final inspection. Leave work in complete and proper operating condition.
- D. Defective Work: Remove and replace defective work, including doors and frames which are warped, bowed or otherwise damaged, as directed by Architect, at no cost to Owner.
- E. Protection: Protect installed hollow metal work against damage from other construction work.

3.5 CLEAN-UP

- A. Upon completion of the work of this Section, remove all excess materials, rubbish, and debris from the premises.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. BHMA finish door hardware for gates and hollow metal.
- B. Accessories including but not limited to door stops, kickplates.
- C. Weatherstripping, seals, and thresholds.

1.2 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. Hardware templates for gates, doors, and frames.

1.3 RELATED SECTIONS

- A. Section 04 22 00 – Concrete Unit Masonry.
- B. Section 05 50 00 – Metal Fabrications: Gates.
- C. Section 07 92 00 – Joint Sealants.
- D. Section 08 11 13 – Hollow Metal Doors and Frames.

1.4 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. Refer to Division 01 for definitions, acronyms, and abbreviations.
 - 2. Unless otherwise noted; standards, manuals, and codes refer to the latest edition as of the issue date of this Project Manual.
- B. Conform to the following Referenced Standards and Requirements:
 - 1. CBC – 2019 California Building Code.
 - 2. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
 - 3. NFPA 80 – Standard for Fire Doors and other Opening Protectives.
 - 4. NFPA 101 – Life Safety Code.
 - 5. ANSI A156 Series – Builders Hardware Manufacturers Association (BHMA) Standards Set.
 - 6. AAADM – American Association of Automatic Door Manufacturers.
 - 7. California State Fire Marshal Fire Door Assembly Tests Standard 12-7-4:
 - a. Smoke-rated and fire-rated doors and frames shall meet UL rated assembly requirements.
 - b. Manufacturers of UL rated assemblies and devices shall provide documentation that assemblies have been tested and comply with California State Fire Marshall, Fire

1.5 QUALITY ASSURANCE

A. Supplier Qualifications and Documentation:

1. Hardware Supplier Qualifications: Firm specializing in the supply and servicing of institutional and commercial door hardware; accredited by manufacturers; and having a minimum of three years documented experience. Hardware supplier to furnish list of at least ten past, finished projects. Include date completed, project location, and references. At least one member of the firm's staff shall be a member of DHI in good standing and is a DHI certified consultant having earned the title Architectural Hardware Consultant (AHC).

B. Manufacturer of Submitted Devices - Qualifications and Documentation:

1. Manufacturer Qualifications: Manufacturer specializing in manufacturing institutional and commercial door hardware with a minimum five years with the following documented experience. Furnish list of at least ten past, finished projects. Include date completed, project location, and references. Past project contact information will determine if Builders Hardware is acceptable.

C. Installer of Submitted Devices - Qualifications and Documentation:

1. Installer of assembly shall be trained in the trade of hanging commercial doors on commercial frames with commercial hardware. Supplier and Installer of door assemblies shall be authorized representative of manufacturers and have minimum of five years successful experience in detailing, supplying, and installing door assemblies specified on projects of similar size, complexity, and type to this Project. Provide written documentation to show closers will be installed by an individual with successful experience installing closers to meet 5-pound opening force for non-rated door complexity.

1.6 SUBMITTALS

- A. The hardware groups/sets specified in Section 08 71 00 - Part 3 are intended to establish type and design standard when used together with the requirements of this Section, Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections. Examine Contract Documents and furnish proper hardware for door openings. Refer to specifications for clarification and detailed requirements and provide products and services in specifications even if not written in hardware groups/sets in Section 08 71 00 - Part 3.
- B. For each opening submit coordinated (means and methods) requirements in accordance with Division 01 and a detailed door, frame and hardware schedule. See pre-hardware and hardware scheduling requirements below. Submittals that do not meet means and methods, including missing related doors/frames submittal/shop drawings, will be returned for correction before checking.
- C. Pre-Hardware Scheduling Tasks:
 1. Coordinate work of this Section with other directly affected Sections and scope.
 2. Provide required Division 08, means and method type work in accordance with Contract Documents at no additional cost to project, including Division 01 and language below. This Section supplier shall be provided with full documents, not just Section 08 71 00 Part 3 hardware group/sets as that process does not meet Contract requirements.

3. Means and method type work includes, but is not limited to, coordination with plans and other specifications, templating, Section 08 71 00, and other Division 08 Section engineering and coordination. Starting submittal work or labor before means and method type work is completed does not constitute change orders.
 4. Provide RFIs (request for information) for clarification items before submittals. This Section is not to be a stand-alone submittal but requires multiple Sections and Drawings coordination before submittals will be reviewed.
 - a. Coordinate length and sizes for hardware devices before submittals, Verify the door hardware is compatible for use with the doors and door/frames.
 - b. Report all prevailing conditions that will adversely affect satisfactory execution of work before submittals.
 - 1) Example 1: If door stiles would inhibit the use of specified hardware, provide RFIs before starting detailed hardware headings or group submittal process.
 - 2) Example 2: Coordinate length and sizes for hardware devices before ordering materials (verify the door hardware is compatible for use with the doors and/or door/frames) included, but not limited to special templates and sizes of devices.
 - c. This Section clarification items (RFIs) shall be reviewed by a non-design team coordinator before sending to design team for review.
 - 1) For clarification items that are means and methods (directed to or from one vendor to another vendor, framer/installer), Contractor shall coordinate and answer or list questions that are not design scope.
 5. Coordinate with door/frame internal reinforcement for door hardware. In particular, coordinate door preparation in accordance with applicable regulatory and trade standards specified.
 6. Coordinate keying requirements with all openings with one Vendor. For keying scope, even if different Section door/frame/gate scope packages are submitted with different hardware schedule submittals, only one Section 08 71 00 supplier is to oversee, coordinate, submit, furnish, and install keying. Coordinate per Section 08 71 00 and per means and methods before submits begin.
- D. Hardware Schedule:
1. Submit required vendor qualification letters and documentation (see above "QUALITY ASSURANCE").
 2. Non-design team coordination and requirements:
 - a. Submittals for coordinated door/frame/hardware items, shall be submitted at the same time for review of total opening requirements. Do not submit Section 08 71 00 scope without coordinated door and frame packages and above RFI/clarification process tasks completed. Submittals that do not include related doors/frames will be returned for correction before checking.
 - b. Section submittals and/or shop drawings to be reviewed and have comments by non-design team (Contractor) before sending to design team. If submittals do not meet Contract requirements, return to hardware vendor for re-submittal. In many cases, unacceptable submittals are passed though without non-design team (Contractor) comments (coordinate per Contract).

3. Submit hard copies of hardware schedule (number of copies per Division 01) as well as submit editable, PDF files via electronic email of ftp site process in Vertical Format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Horizontal-type schedules will be returned for correction before reviewing.
 - a. Shop drawings / hardware schedule shall clearly indicate each hardware group specified and manufacturer of each item proposed as well as each door number that the hardware is assigned to.
 - b. Vertical schedule format sample:

Heading Number 1 (Door Schedule or Architectural Assigned Hardware Group/Set number from part 3 = HW #__)				
1 Single Door #1 - Exterior from Corridor 101		Opening Size	90°	RH
Quantity	Device Description	Device # (include specification language)	Finish	Manu- facturer
4	Hinges	4.5 x 4.5 NRP x fasteners	630	
1				
1	Lockset		630	SC
1	I/C or Non-IC Cylinders	Rim or Mortise x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)	626	SC
1	Permanent Core	20-740	626	SC
1	Stop and Holder	1261	626	TR
1	Door Silencers	SR64 or SR65 (as required)	GR	IV

4. Illustrations from manufacturer's catalogs and product data:
 - a. Provide cut sheets and product data with vertical format hardware submittal (same timeframe) as well as door and frame information to be reviewed as one submittal package. Manufacturer's hard copy as well as PDF catalog cut sheets and product data shall not be submitted before editable, PDF files vertical format hardware submittal. See above Sequence of Format requirement. Catalog cut sheets and product data sent as submittals before the typed out nomenclature of hardware part numbers (vertical format hardware submittal) will be returned without review.
5. Provide hardware schedule and hardware templates to door and frame manufacturer. Provide two templates to those manufacturers who are not currently registered template book holders.

E. Vendor meetings or coordination prior to purchasing materials:

1. Convene coordination meeting between all opening vendors and installers at least two weeks prior to purchasing doors, frames, door hardware, and electrical devices required for complete systems. Attendance includes but is not limited to hardware supplier and/or installer, door supplier and/or installer, frame supplier and/or installer. If hardware changes are required due to these meetings, communicate changes to design team before ordering materials.

F. Templates:

1. Provide listing of manufacturer's template numbers for each item of hardware in hardware schedule.
2. Submit templates and "Reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

G. Installation Instructions:

1. Provide manufacturer's written installation and adjustment instructions for finish hardware.
2. Send installation instructions to site with hardware.

H. Contract Closeout Submittals: Include specific requirements indicated below.

1. Operating and maintenance manuals: Submit three sets containing the following:
 - a. Complete information in care, maintenance, and adjustment, data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 - e. Copy of final accepted hardware schedule, edited to reflect "As installed".
 - f. Copy of final keying schedule.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.
- B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- C. Storage: Store materials in a cool and dry location, elevated from the ground and protected from the elements, and secured from theft or pilferage.

1.8 WARRANTY

- A. Comply with provisions of Division 01.
- B. Warranty installed units shall be free from defects in material and workmanship as follows:
 1. Hinges: Lifetime Warranty (Life of Building).
 2. Locksets and Exit Devices: Three years.
 3. All other hardware: Two years.

1.9 MAINTENANCE

- A. Provide special wrenches and tools applicable to each special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware manufacturer.

PART 2 PRODUCTS

2.1 FINISHES

- A. Typical BHMA finish designation references:
 - 1. Typical BHMA finish designation references:
 - a. BHMA 630– Satin stainless steel.
 - b. BHMA 626– Satin chromium plated brass or bronze.
 - c. BHMA 628– Satin or dull aluminum, clear anodized (uncoated).
 - 2. Closers:
 - a. BHMA 689 - Sprayed aluminum paint finish (back of house where specified).

2.2 HARDWARE TEMPLATE

- A. Make templates for hardware to be applied to metal doors or pre-finished doors.
- B. Hinge templates shall conform to ANSI A156.7.
- C. Promptly furnish template information or templates to door and frame manufacturers.
- D. Coordinate hardware items to prevent interference with each other.

2.3 FIRE RATED DOORS AND EXIT DOORS

- A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on drawings and detailed requirements for each type of device. Provide all specifications even if not written in hardware sets/groups.
- B. Provide all hardware necessary to meet the requirements of CBC for fire doors and exit doors, as well as to other requirements specified, even if such hardware is not specifically mentioned under Article “Hardware Schedule” of this Section.

2.4 SCREWS, BOLTS, AND FASTENING DEVICES

- A. All exposed fasteners to be dark to match hardware and zinc plated.
- B. Exposed head oval phillips type screws in countersunk holes unless otherwise specified. Use screws, bolts, washers, grommets, nuts, and other fastening devices of appropriate length, type, head, metal, and finish as necessary for proper match and application of hardware.
- C. Threshold anchors shall be Flat Sleeve Anchors cadmium plated expansion anchor screw in one unit.

2.5 SUBSTITUTIONS

- A. Products referenced by specific brand names and model numbers have been identified by Owner to match other products in use either completed or in the course of completion. No substitutions permitted per Public Contract Code Section 3400.

1. Otherwise refer to Division 01 for substitutions.

2.6 HANGING HARDWARE

- A. Gate Hanging Devices:

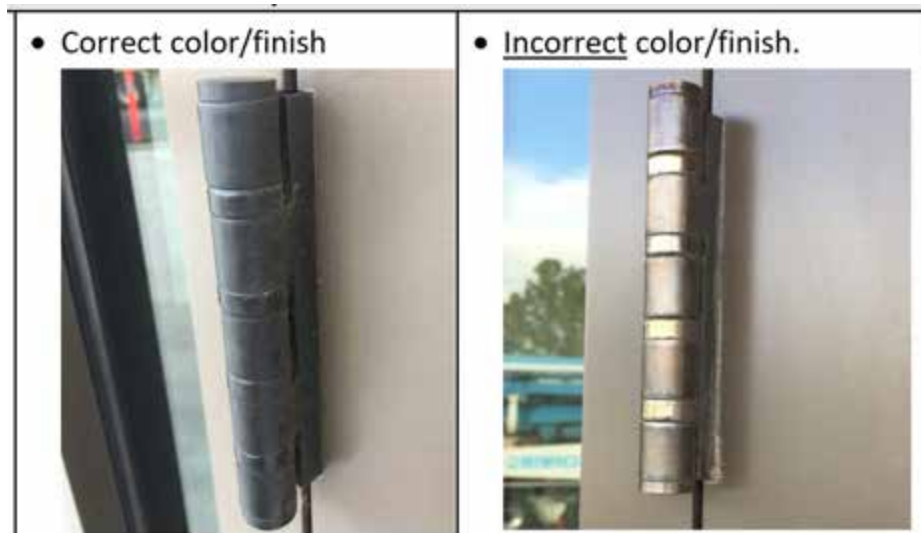
1. Ornamental and Steel Gate Self-Closing Hinges:

- a. Acceptable Manufacturers:
 - 1) Locinox Manufacturing (no known equal).
- b. Mammoth 180-Degree Hydraulic Closers/Hinges Set.
- c. Heavy duty full surface mounted hinge and vertical built-in closer not exceed 5 pounds opening force.

- B. Butt Hinges and Self-Closing Hinges:

1. Approved Manufacturer and Device:

- a. Ball-Tip Type (at all doors) by Hager Manufacturing.
- b. Products by the following manufacturers will be considered for approval providing hinges are dark in color (provide samples to match dark hinges at all locations, lighter hinges pictures below are not acceptable).
 - 1) Bommer Manufacturing.



2. Where hardware groups/sets have different information (number of hinges and sizing), refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device.
 - a. Butt hinges shall be manufactured in accordance with ANSI/BHMA A156.1.
 - b. Self-closing hinges and pivots shall be manufactured in accordance with ANSI/BHMA A156.17.

- c. Provide wide throw hinges where required:
 - 1) Submit and provide hinge widths sufficient to clear trim projection when door swings 180 degrees. All doors shall swing 180 degrees if wall allows.
 - 2) Utilize wide throw type hinges to clear frame or wall obstructions/cladding in order for doors to completely open. See 180-degree language above.
 - 3) Where a door closer device is specified and will be installed on pull side/hinged side of doors (i.e. closers will hit walls or other surfaces when door is completely open), provide wide throw type hinges to give sufficient pocket depth to hide closer behind door. Do not pinch or crush closer between the door and wall surface.
 - 4) Confirm hinge sizing with frame and wall details.
- d. Provide "weight/strength" as specified in hardware groups/sets in Part 3 (hinge nomenclature basis-of-design weight/strength).
- e. For doors 1-3/4 inches thick and up to 36 inches wide, provide hinge height of 4-1/2 inches.
- f. For doors 1-3/4 inches thick and 37 inches to 48 inches wide, provide heavy duty, four ball bearing hinges and height of 5 inches.
- g. If hardware sets specify height (example: 5 inches tall at 36 inch wide door), provide height as specified for project standards at these locations.
- h. Provide two butts for doors up to 60 inches high and one additional butt for each 30 inches of height or fraction thereof.
- i. Provide non-removable pins at exterior doors.
- j. Provide ball-bearing hinges.
 - 1) Non-ball-bearing hinges are not acceptable.

2.7 SECURING DEVICES (LATCHING SYSTEMS)

- 1. Acceptable Manufacturers:
 - a. Schlage Lock Co. L9000 Series.
 - b. Owner's standard, no substitutions permitted.
- 2. Levers:
 - a. Provide levers to return to door within 1/2 inch.
- 3. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
 - a. Locksets shall meet the requirements of ANSI/BHMA A156.13-1994, Operational Grade 1.
 - b. Backset: 2-3/4 inches. Provide minimum 1 inch throw stainless steel deadbolt. Provide minimum 3/4 inch throw for latch bolt.
 - c. Strikes:
 - 1) Provide ANSI 4-7/8 inch standard strike.
 - 2) Provide curved lip-type strike at all locations if possible to prevent catching clothing or other objects on strike. Where required, provide detail and flat strike.

- 3) Where required, provide extended lip strike so that the lock or latchset latch will not come in contact with frame or added trim on or adjacent to the frame. Example: Don Jo device #MEST-104, but provide submitted manufacturer equivalent extended lip strike.

B. Exit Devices:

1. Acceptable Manufacturers:

- a. Von Duprin.
- b. Owner's standard, no substitutions permitted.

2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:

- a. The unlatching force of panic hardware shall not exceed 5 pounds, applied in the direction of travel, certified by UL to meet requirements of CBC Section 11B-309.4 (Von Duprin nomenclature "AX").
- b. Exit devices shall be ANSI A156.3, Grade 1; UL Listed.
- c. All exit devices shall be UL listed for panic. Exit devices for labeled doors shall be UL listed as "Fire Exit Hardware".
- d. Provide cylinders for exit devices with locking trim and cylinder dogging. Provide cylinder dogging feature for non-rated exit devices.
- e. Whether or not specified throughout project, verify if Electrical, IDF, and other rooms with electrical coordination have 800 amps or more than 800 amps housed within the rooms. At these rooms, if lever locksets are specified, credit the locking device and provide the Von Duprin mortise-type panic device #9975NL-F x 996L-M x key override.
- f. Trim:
 - 1) Where lever trim is specified, provide lever design to match lockset levers.
 - 2) Provide exit device lever trim with vandal resistant feature (heavy duty lever trim designed to with stand abuse and vandalism):
 - a) Von Duprin 996 R/V.

2.8 KEY SYSTEMS (CYLINDERS, CORES, AND KEYS)

- A. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on drawings and detailed requirements for each type of device. Keying specifications below override hardware set/group nomenclature.
- B. For all locking or dogging devices, provide complete cylinder system and coordination whether or not specified in Section 08 71 00, Part 3 hardware sets as required by locking device.
 1. Different locking devices require a set of different requirements including, but not limited to, appropriate cams for mortise-type cylinders, appropriate tail pieces and size for rim-type cylinders, blocking rings as required for locking and cylinder devices to not rattle and meet manufacturers' warranties, as well as cylinders that are to be coordinated with construction cores/cylinders and final pinned cores/cylinders shipped to Owner by Registered Mail per below to meet system requirements.

2. Scope is means and method type work by a certified locksmith and/or DHI individual to engineer rim or mortise cylinders and blocking rings or tail-piece components as required for submitted locking devices. Since there could be as many as 500 options for rim or mortise cylinders with the locking devices and different manufactures that may be submitted, this means/methods-type work is required (similar to templating doors and frames to accept hardware). Coordinate as required.

C. Key Systems (Cylinders, Cores, and Keys):

1. Manufacturers:
 - a. Schlage Lock Co.
 - b. Owner's standard, no substitutions permitted.
2. For all locking or dogging devices, provide complete keying system whether or not specified in Section 08 71 00, Part 3 hardware sets including lock cores, mortise cylinders, and rim cylinders keyed as directed by Owner in submittal process. Key System shall be:
 - a. Patented Schlage Lock Co. Everest Primus Level 3.
3. Keyway: Provide as instructed by Owner during submittal process.

D. Keying Requirements:

1. Provide keyed, construction cores and keys during the construction period.
 - a. Provide full sized cylinders or brass construction cores and brass keys at all interior and exterior doors. Plastic cores are not permitted.
 - b. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway or key section as the Owner's permanent keying system. Permanent cores and keys prepared according to the accepted keying schedule shall be furnished to the Owner.
2. Keying Meeting and Programming Schedule:
 - a. Do not provide keying matrix in original hardware submittals. After hardware has been submitted and reviewed in accordance with Division 01 and Section 08 71 00 requirements, arrange a keying matrix/programming meeting with Owner Representative and various hardware suppliers/vendors representing both the cylinders/keying system and different, reviewed submittals (design team not required).
 - 1) Copies of the reviewed door and frame submittals shall be brought to the meeting with #01keyed doors highlighted for review.
 - 2) Follow procedures for keying meeting and programming schedule as outlined by the Door Hardware Institute. DHI procedures are based on Door Hardware Institute core class entitled Masterkeying class #AHC200.
 - b. Keying meeting to produce a programming schedule/matrix based on the following:
 - 1) Furnish keys in the following quantities (total quantity of keys part of bid package):
 - a) 6 each Masterkeys per set.
 - b) 3 each Change keys each lock, core or cylinder.
 - c) 5 each Permanent Extractor keys.
 - d) 9 each Construction masterkeys.
 - e) 2 each Construction Core Extractor keys.

- 2) Provide keying system expansion parameters.
 - a) Plan twenty changes directly under the grand.
 - b) Plan ten master keys.
 - c) Plan fifty changes each for each master.
- 3) Permanent keys and cores shall be stamped with the applicable key mark for identification. The visual key control marks or codes shall not include the actual key cuts.
- 4) Permanent keys shall be stamped "Do Not Duplicate".
- c. Furnish typed programming meeting matrix and notes in PDF, editable electronic format as well as mailed, hard copy to Owner Representative for final review.
- d. Furnish keying and programming schedule to key/core/cylinder manufacturing factory for production of key/core/cylinder devices.
- e. Transmit pinned cores/cylinders as well as cut grand masterkeys, masterkeys, change keys and other security keys to Owner Representative by Registered Mail, return receipt requested. All permanent cores and keys shall be sent directly from the factory to the Owner Representative for ID and verification.
 - 1) Accompany Owner Representative to install permanent cylinders and/or cores in permanent locking or keying housings (responsible to prepare locking systems, installation ready for final cylinders and/or cores, free from dirt, debris or overtightening of locking devices that may cause binding of keyed devices).
 - 2) Provide instructions for adjustments and maintenance of hardware and hardware finishes.

E. Fire Control Key Boxes/Product: Rapid Entry System:

1. Manufacturer and Product:
 - a. Knox Box 3200 Series x The Knox Co.
 - b. Or accepted equal.
2. Recessed mount, UL-listed, heavy-duty unit; fabricate from 1/4-inch-thick steel plate.

2.9 CLOSING DEVICES

A. Surface Mounted Closers:

1. Rack and Pinion Manufacturers:
 - a. LCN Manufacturing: 4040XP as scheduled.
 - b. Owner's standard, no substitutions permitted.

B. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:

1. ANSI A156.4, Grade 1; UL Listed; meets UL 10C and SFM Standard 12-7-4 for positive pressure fire test. Whether or not specified in hardware groups/sets, submit 4040XP or approved equal closer at all openings that are smoke-rated or fire-rated even if closer is omitted from groups/sets.

2. Closers shall have multi-size spring power adjustment to permit setting of spring from 1 through 6 with additional spring power available. Provide ADA compliant setting nomenclature during submittals as recommended by closer manufacturer.
3. Submit correct closer type as to be able to install closers on non-public side of doors (examples include but are not limited to 1) interior side of storage/electrical type rooms; 2) not in corridors/public areas 3) stair side of stairway doors; and at exterior locations, install closers inside of building (in conditioned spaces)).
4. Installation Plates, Brackets, and Miscellaneous Adapters:
 - a. Provide drop plates, brackets, or adapters for arms as required to suit details and install as directed by manufacturer's templates.
 - 1) Furnish and install drop plates at reverse bevel doors and at doors with 170 degrees to 180 degrees swing.
 - 2) Furnish and install blade, angle or applied stops as required where frame does not permit installation of the standard soffit plate (see example LCN #419 Flush Panel Adapter to be shown in submittals below). If LCN or equal manufacturer #419 Flush Panel Adapter is not in submittals as required for transom panel applications or if other drop plates, blade, angle or applied stops are not in submittals the submittal will be marked revise and resubmit. After doors are installed, hardware Vendor to field verify additional brackets and shims required before installing closers. Provide written language in submittals for how areas requiring special applications will be installed.

2.10 STOPS AND HOLDERS

A. Floor and Wall Door Stops:

1. Acceptable Manufacturers:
 - a. Ives Manufacturing.
 - b. Triangle Brass Manufacturing Company, Inc. (Trimco).
 - c. Rockwood.
 - d. Hager Manufacturing.
2. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device:
 - a. Stops, Bumpers and/or Holders shall meet the requirements of BHMA A156.16, Grade 1.
 - b. Coordinate with specifications in Section 09 22 16 for required wall backing.

2.11 ACCESSORIES

A. Kick/Mop Plates:

1. Acceptable Manufacturers:
 - a. Triangle Brass Manufacturing Company, Inc. (Trimco).
 - b. Ives Manufacturing.
 - c. Rockwood.
 - d. Hager Manufacturing.

B. Where hardware groups/sets have different information, refer to the following for clarification. Provide hardware groups/sets devices along with added devices as indicated on Drawings and detailed requirements for each type of device

1. Coordinate length and sizes for hardware devices before ordering materials (verify the door hardware is compatible for use with the doors and door/frames). Protection plate example: LDW nomenclature in Part 3 means "less door width". A 48 inch wide door would have a 46 inch wide protection plate. Width shall be one inch less than door width unless doors have protective edge guards or center mullions. Coordinate before submittals.
2. At rated doors (UL smoke or fire), furnish protection plates with engraved UL listing information. Example: Trimco added part #ULS added to all kickplates specified below that are on UL or rated doors/openings.

C. Smoke Seals, Sound Seals, and/or Weatherstripping.

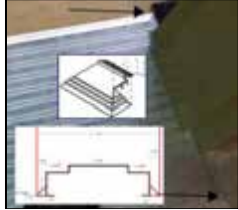
1. Acceptable Manufacturers:
 - a. Pemko Manufacturing, Inc.
 - b. National Guard Products (NGP).
 - c. Zero International.

D. Door Bottoms, and Thresholds:

1. Acceptable Manufacturers:
 - a. Pemko Manufacturing, Inc.
 - b. National Guard Products (NGP).
 - c. Zero International.
2. Thresholds shall comply with CBC 2019 and shall not exceed 1/2 inch in height.
3. Whether or not specified below in hardware sets, thresholds shall be detailed as part of engineering/shop drawings/means and methods before submittals.
 - a. Where thresholds occur at openings with floor closers, provide compliant device
Example: Pemko Type 13 Series or Type 15 Series pivot/floor closer devices shall not exceed 1/2 inch in height. Refer to Drawings for details.
 - b. Thresholds that extend past door frame shall wrap frame stops. Cut around stops, then continue into rabbits, face of frame and wall conditions if wall conditions are in same application (see example of where threshold meet adjacent walls in snippet below):



- c. Whether or not specified below, where thresholds are larger than frames and/or extend past frames thresholds to have beveled miter ends. 45-degree miter cut and a closed end, welded with returns to door/frame. Example: NGP manufacturing nomenclature RCE throughout (see example snippet below):

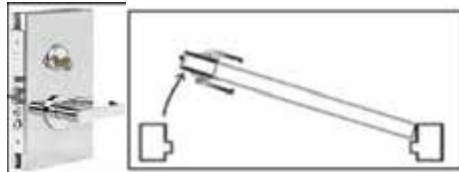


E. Drip Guard:

1. Provide at exterior doors exposed to rain.
2. Size: Full Frame Width (FFW).
3. Provide devices painted to match adjacent frame. See Section 09 91 00 – Painting for paint and primer requirements.

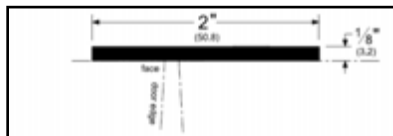
F. Gates and Gate Hardware Accessories:

1. Provide welded astragals, lock patches (templates), and/or welded mounting devices required for a complete installation of specified hardware, whether or not shown on Drawings and details. Weld in accordance with manufacturer's recommendations. Provide devices ground smooth and paint to match gate/fence system. See Section 09 91 00 for paint and primer requirements. Inserted pictures below are examples of lock patches and/or welded mounting devices. Template gates for each type of hardware device.



2. Gate Astragal:

- a. Provide fully welded astragal full height of gate to overlap either adjacent fence post or the adjacent gate at pair of gates.
 - 1) Provide full height astragal in width indicated on Drawings. If not indicated, provide astragal width no less than 2 inches wide. See inserted picture below.
 - 2) Provide full height astragal overlap width per details. If not indicated, provide overlap of astragal no less than 3/4 inch wide.
 - 3) Provide 1/8 inch astragal thickness. See inserted picture below.
 - 4) Where Pemko Manufacturing 357 Series astragal is utilized by gate manufacturer, do not use screws or order with screw holes. Nomenclature: ND prefix or suffix required by Pemko on 357 Series astragal.



- b. Provide devices ground smooth and painted to match gate/fence system. See Section 09 91 00 for paint and primer requirements.

2.12 ELECTRIFIED HARDWARE

A. Door Position Switches

1. Acceptable Manufacturers:

- a. #679-05-WD or #679-05-HM (as required per door material) by Schlage manufacturing.
- b. Magnasphere Corporation UL-634 listed door contact #L2C-A-FIRE (up to 3-hour fire UL listing required)
- c. Securitron.



2. Where hardware groups/sets have different information, refer to the following specifications for clarification and submit according to complete and intended electrified system per Contract Documents. See Architectural and Security drawings and specifications.
 - a. Coordinate door and frame preparations with door and frame suppliers.
 - b. Switches shall be installed in frame head approximately 4 inches from latching door edge. See security drawings for additional coordination.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames and verify mounting locations as indicated on shop drawings.
- B. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions and accepted shop drawings.
- B. Door-Floor Clearances:
 1. Unless otherwise shown, provide the following door-floor clearances:
 - a. Maximum 3/8 inch.
 2. Undercut doors so that the sweeps still fit tight against the sill or threshold condition, but as the door opens and sweeps away from sill or threshold, the door bottoms do not rub on the floor. Metal installation parts of door bottoms are typically part of the door assembly and only the gap between the metal part and sill/threshold are seen as the undercut. Means and methods: coordinate as required for door and hardware with finish floors, toppings, thresholds, and performance ratings.
- C. Hardware Placement:
 1. Unless otherwise shown or required by CBC 2019, ADA Act - 2010 Standards for Accessible Design and/or Title 24, place hardware at the following heights:
 - a. Hinges: Door and frame manufacturer's standard scope per additional specifications and plans.
 - b. Lever handles for latchsets, lockset and panic/exit device pull, lever trim:
 - 1) 38 inches above finish floor/surface.

- 2) Verify manufacturer's template with door design.
 - c. Panic devices push bar:
 - 1) Panic hardware shall be so mounted / centered between 36 inches and 44 inches above finished floor or ground.
 - 2) Verify manufacturer's template with door design to meet CBC 2019 exterior, pull side trim.
 - d. Closers:
 - 1) Shall meet opening force requirements.
 - 2) See installation below.
 2. Hardware for door handles, pulls, latches, locks, and other operating devices for use on means of egress doors shall comply with SFM Standard 12-10-2, Section 12-10-202 as contained in CCR Title 24, Part 12.
- D. Installation:
1. Except for hinges, do not install hardware until painting and finishing work is completed.
 2. Pre-drill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal.
 3. Hinges: Set hinges snug and flat in mortises. Hand turn screws to flat seat – do not drive.
 4. Locksets: Install locks with keyways in proper position. Install levers, roses, and escutcheons firmly affixed.
 5. Closers:
 - a. To open and latch smoke or fire rated doors correctly (positive latch at all times for rated doors when door is not in use), install closer units per factory templates to meet manufacturer requirements.
 - b. To meet non-rated opening/exterior opening force requirements as well as close and latch non-smoke non-fire rated doors:
 - 1) Closers are to be installed as close to the hinge side of door as possible by a trained installer per this Section, Part 1 "Quality Assurance, Installer Qualifications", installer an authorized representative of manufacturers, minimum of five years successful experience installing closers to meet 5-pound opening force for non-rated door complexity".
 - 2) For non-smoke or non-fire rated doors, before installation of closers install one mockup door for each kind of closer application. Example: parallel, regular arm, stop arm and/or top-jamb arm application if specified. Confirm doors meet 5-pound opening force and still close door. This will ensure proper installation for doors to open at 5 pounds opening force before remaining non-rated opening closers are installed. The closer the closer is installed to the hinge, the better performance for 5 pound opening force, but still close and latch door.
 - c. Mount door closers for maximum swing but at non-rated doors to meet 5-pound opening force. At all possible openings, mount door closers for maximum swing of door before setting stops.

- d. Mount door closers for maximum swing, but at non-rated doors to meet 5-pound opening force. Drawings may show doors open to only 90 degrees (Revit or CAD system set up), but unless noted or specified with limiter (stop arm devices below), all doors to open for maximum swing against adjacent wall if nothing inhibits door from doing so. Include wide-throw hinges per specs and installation for 170 degree to 180 degree or maximum swing of door before installing stops.
- 6. Floor Stops: See notes on closers and hinges above. After closer devices are installed, and door is opened as far as possible without #1) occupant excessive force on closer; and #2) door does not hit adjacent wall or other surfaces, stops shall be installed at substantial completion a maximum of 4 inches from adjacent walls and as far away from the hinge point as possible. Preference is to have stops installed just below lever or pull locations.
- 7. Auto Door Bottom to not be adjusted until substantial completion. Door bottoms are to be raised to highest position while construction occurs so to not have rubber seal torn or damaged by debris under the door. At substantial completion, adjust door bottom to fully engage and touch the floor for proper sound dampening.
- 8. Thresholds and Raindrips: Set in waterproof sealant and fasten anchors in pre-drilled countersunk holes 18 inch on center maximum spacing and within 3 inches of each end. Minimum three anchors per threshold.
- 9. Gates:
 - a. Gates and doors shall be equipped with self-closing and self-latching devices. The self-latching device shall keep the gate or door securely closed. Gates and doors shall open outwardly away from the pool except where otherwise prohibited by law. Hand activated door or gate opening hardware shall be located at a height no lower than 42 inches but no higher than 44 inches above the deck or walkway.
 - b. Gate hardware observed between 33 inches to 38 inches on exterior. All hand activated hardware on exterior of gates is required to be between 42 inches to 44 inches from deck/path per CBC Title 24. Section 3119B.2. Correct so all exterior gate/door hand activated hardware is within approved range. Note: Public gates are required to be latched between uses. If current hardware at front gates does not allow for this, correct will need to be made prior to final approval.

3.3 PAINT OR FIELD FINISHES

- A. Coordinate with Contact Documents including, but not limited to, Section 09 91 00 for paint and primer requirements.
- B. Fire rated labels on doors and frames shall not be painted.

3.4 ADJUSTING

- A. Adjust parts for smooth, uniform operation.
- B. Lubricate moving parts with manufacturer recommended lubricant.
- C. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application.
- D. Adjust door closer devices:
 - 1. Adjust closer operating.
 - a. Interior and Exterior Doors: Not to exceed 5.0 pounds force.

- b. When fire doors are required, the maximum effort to operate the door may be increased to the minimum allowed by the appropriate administrative authority, not to exceed 15 pounds opening force.
 2. Adjust closer delay and operating speeds to comply with requirements of 2019 CBC Section 11B-404.2.8.1 and ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
 - a. Doors/gates closers, when provided, shall have sweep period adjusted: minimum of 5 seconds for a door/gate to close from the 90 degree position to the 12 degree position.
 - b. Doors/gates with spring hinges require a minimum of 1.5 seconds to close from the 70 degree to the closed position.

3.5 CLEANING

- A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.

3.6 HARDWARE SCHEDULE

- A. Manufacturers Legend:

<u>Code</u>	<u>Name</u>
HA	Hager Manufacturing
SC	Schlage Manufacturing
VO	Von Duprin Manufacturing
LC	LCN Closers
NG	NGP Manufacturing
TR	Trimco Manufacturing
LO	Locinox Manufacturing

- B. Hardware Columns - Example (Legend):

Qty	Device Description	Device # (include specification language)	Finish	Manu
1	-----	-----	--	--

- C. The following hardware sets are intended to establish type and standard of quality when used together with the requirements of this Section (see above Section and related Sections including Division 01).
 1. Examine Contract Documents and furnish proper hardware for door openings.
 2. Refer to Door Schedule on the Drawings for Hardware Group/Set assignments for each opening.

Hardware Group/Set #101

1	Set	Hydraulic Closers / Hinges Sets	Mammoth 180 Hydraulic Closers/Hinges Set: Ultra heavy duty 180° hydraulic gate closer and hinge for gates up to 440 pounds x Black Finish. If round post similar to chain-link, provide additional Locinox brackets part #CLB Mammoth.		
1	Ea.	Rim-Type Exit/Panic Device – NL	LD-WH-99NL-OP x 110NL-MD. Coordinate with Z-Pull Z100-20500	613	VO
1	Ea.	Z-Pull	Z100-20500 (older Trimco #1822) series installed face down and templated center hole for final cylinder and rings to be installed over #Z100-20500. Coordinate with 110NL and cylinder.	605 E	TR
1	Ea.	Primus I/C Cylinders (Rim or Mortise)	20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)	613	SC
1	Ea.	Permanent Cores	20-740	606	SC
1	Ea.	Floor Stops	1209	630	TR
1	Ea.	Full Height Astragal	Per specifications (utilized as a positive stop – when gate closes against the astragals the opening cannot swing back in toward the egress side)		
1	Ea.	Bottom of doors to be greater than 10" Clear, Unobstructed and Smooth Surface	Push sides of gates by gate manufacturer (ground smooth, primed and painted to match gate).		
1	Ea.	Surface Door Position Switch (also known as Alarm Contacts)	#7766 single pole, double throw x by Schlage manufacturing (coordinate with Divisions 25-28 and applicable drawings).		
Note: Furnish all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices requirements in the above specification language, architectural plans and full specification documents).					

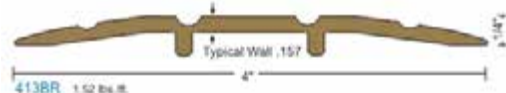
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Hardware Group/Set #102

—	Ea.	Hinge	#BB1199 US10B by Hager manufacturing. See 087100 for required #1) width/height sizes; #2) quantity of hinges; #3) dark US10B finish		
1	Ea.	Rim-Type Exit/Panic Device – NL	LD-99NL-OP x 110NL-MD. Coordinate with Z-Pull Z100-20500	613	VO
1	Ea.	Z-Pull	Z100-20500 (older Trimco #1822) series installed face down and templated center hole for final cylinder and rings to be installed over #Z100-20500. Coordinate with 110NL and cylinder.	613	TR
1	Ea.	I/C Cylinders (Rim or Mortise)	20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)	613	SC
1	Ea.	Permanent Core	20-740	606	SC
1	Ea.	Closer	4040XP CUSH	693	LC
1	Ea.	Kick Plate	KO050 10" tall x 2" LDW (less door width) x B4E (beveled edges) x counter sunk where door allows	613	TR
1	Ea.	Stop (installed only after punch walk/substantial completion)	Auxiliary Stop 1209. After CUSH arm closer is opened as far as possible (without occupant excessive force), install stop no more than 4" from frame/hinge, quarter inch past the most open position).	630	TR
1	Ea.	Seal	5050B seals (head and jambs) by NGP or approved seal manufacturer.		
1	Ea.	Seal	152SDKB seals (head and jambs) by NGP or approved seal manufacturer.		
1	Ea.	Door Bottom	200NDKB by NGP or approved seal manufacturer		
1	Ea.	Threshold with thermal break	8430BR-DKB(722/DKB) x wrap frame stops x beveled miter ends x mastic x by NGP or approved equal		
1	Ea.	Overhead Rain Drip	Provide #17DKB x FFW (fill frame width) by NGP or approved equal		
1	Ea.	Door Position Switch (also known as Alarm Contact, Door Contacts)	#679-05-WD or #679-05-HM (as required per door material) by Schlage manufacturing (coordinate with Divisions 25-28 and applicable drawings).		
Note: Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).					

Blank space below and after a Group/Set is intentional to avoid, if possible, splitting a Hardware Group/Set onto two pages

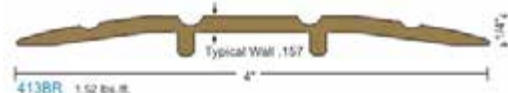
Hardware Group/Set #103

—	Ea.	Hinge	#BB1191 US10B by Hager manufacturing. See 087100 for required #1) width/height sizes; #2) quantity of hinges; #3) dark US10B finish; #4) only fire/smoke-rated doors = 640 steel base (all others non-ferrous 613)		
1	Ea.	Rated Rim-Type Exit/Panic Device with Lever	99NL-NL-F x 996L-NL-R/V	613	VO
1	Ea.	I/C Cylinders (Rim or Mortise)	20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)	613	SC
1	Ea.	Permanent Core	20-740	606	SC
1	Ea.	Closer	4040XP CUSH	693	LC
1	Ea.	Kick Plate	KO050 10" tall x 2" LDW (less door width) x B4E (beveled edges) x counter sunk where door allows	613	TR
1	Ea.	Seal	5050B seals (head and jambs) by NGP or approved seal manufacturer.		
1	Ea.	Auto Door Bottom (sound dampening)	423N (or 320N application if required per door material) by NGP or approved manufacturer.		
1	Ea.	Threshold (sound dampening / quarter inch bronze)	413BR-DKB(722/DKB) x wrap frame stops x beveled miter ends x mastic x by NGP or approved equal 		

Note: Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).

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Hardware Group/Set #104

—	Ea.	Hinge	#BB1191 US10B by Hager manufacturing. See 087100 for required #1) width/height sizes; #2) quantity of hinges; #3) dark US10B finish; #4) only fire/smoke-rated doors = 640 steel base (all others non-ferrous 613)		
1	Ea.	Storeroom Lockset - meeting ADA requirements	L9081T x 06 Lever x A rose x XL13-324	613	SC
1	Ea.	I/C Cylinders (Rim or Mortise)	20-757 or 20-763 x appropriate cam x blocking rings as required (rim or mortise type and quantity as required by locking device)	613	SC
1	Ea.	Permanent Core	20-740	606	SC
1	Ea.	Closer	4040XP CUSH	693	LC
1	Ea.	Kick Plate	KO050 10" tall x 2" LDW (less door width) x B4E (beveled edges) x counter sunk where door allows	613	TR
1	Ea.	Seal	5050B seals (head and jambs) by NGP or approved seal manufacturer.		
1	Ea.	Auto Door Bottom (sound dampening)	423N (or 320N application if required per door material) by NGP or approved manufacturer.		
1	Ea.	Threshold (sound dampening / quarter inch bronze)	413BR-DKB(722/DKB) x wrap frame stops x beveled miter ends x mastic x by NGP or approved equal 		
Note: Furnish and install all devices and components for hardware groups/set above in accordance with Contract Documents (including but not limited to additional hardware devices required in specifications language above, architectural plans and full specification documents).					

END OF SECTION

SECTION 08 81 00

GLASS GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for windows.

1.2 RELATED SECTIONS

- A. Section 07 92 00 – Joint Sealants: Sealant and back-up material.
- B. Section 08 11 13 – Hollow Metal Doors and Frames: Glazed sidelights.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. American National Standards Institute (ANSI) – ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings.
 - 2. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
 - 3. ASTM C1036 – Standard Specification for Flat Glass.
 - 4. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.
 - 5. ASTM C1376 – Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
 - 6. ASTM E546 – Standard Test Method for Frost Point of Sealed Insulating Glass Units.
 - 7. ASTM E576 – Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position.
 - 8. ASTM E1300 – Standard Practice for Determining Load Resistance of Glass in Buildings.
 - 9. ASTM E2190 – Standard Specification for Insulating Glass Unit Performance and Evaluation.
 - 10. Consumer Product Safety Commission (CPSC) – CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.
 - 11. GANA Glazing Manual.
 - 12. GANA Sealant Manual.
 - 13. IGMA North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.

- 14. NFRC 100 – Procedure for Determining Fenestration Product U-Factors.
- 15. NFRC 200 – Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
- 16. NFRC 300 – Standard Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.
- 17. SGCC – Safety Glazing Certification Council – Certified Products Directory.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, and special handling or installation requirements. Identify available colors.
- D. Submit documentation indicating that all tempered glazing to be installed on this project is certified by the Safety Glazing Certification Council.
- E. Samples:
 - 1. Glass: Submit two samples, 12 inches x 12 inches in size, illustrating each type of glazing.
 - 2. Glazing Sealant: Submit 3 inch long bead of glazing sealant, color as selected by Architect.

1.5 PERFORMANCE / DESIGN CRITERIA

- A. Glass Strength: Analysis shall comply with ASTM E1300, Determining Load Resistance of Glass in Buildings. Provide glass products in the thickness and strengths (annealed or heat treated) required to meet or exceed the following criteria based on project loads and in-service conditions.
 - 1. Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:
 - a. Eight breaks per thousand for glass installed vertically or not fifteen degrees or more from the vertical plane and under wind action.
 - b. One break per thousand for glass installed fifteen degrees or more from the vertical plane and under action of wind and/or snow.
 - 2. Deflection must be limited to prevent disengagement from the frame and be less than or equal to 3/4 inch or L/175.
- B. Thermal and Optical Performance: Provide glass products with performance properties specified in this Section. Performance properties shall be manufacturer's published data as determined according to the following procedures:
 - 1. Center of glass U-Value: NFRC 100 methodology using LBNL WINDOW 5.2 computer program.
 - 2. Center of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 5.2 computer program.

3. Solar optical properties: NFRC 300.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual, IGMA North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use, and GANA Sealant Manual for glazing installation methods.
- B. Installer's Qualifications: The installation shall be performed only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics that specialize in glazing and glass installation.
- C. Safety glazing shall meet the requirements of 2019 CBC Section 2406 and shall be identified in accordance with 2019 CBC Sections 2403.1 and 2406.3, with identification etched in glass.
- D. Glass installation in frames shall comply with the Minimum Glazing Requirements in CBC Table 2403.2.1.

1.7 JOB AND ENVIRONMENTAL CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 48 hours after installation of glazing compounds.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop Drawings.

1.9 COORDINATION

- A. Coordinate Work with glazing frames, wall openings, and adjacent Work.

1.10 WARRANTY

- A. Provide five year limited warranty from date of manufacture for insulating units that are glazed in accordance with manufacturer's glazing instructions.

PART 2 PRODUCTS

2.1 GENERAL

- A. All glass shall be graded and meet requirements of ASTM C1036 and ASTM C1048, Type 1, quality q3. Each light of glass delivered and installed shall have affixed thereto the manufacturer's grade label.
- B. All Low-E coated glass shall have a permanent marking affixed at the spacer identifying the coated surface.
- C. Glazing material installed in Hazardous Locations subject to human impact shall be certified and permanently labeled as meeting applicable requirements referenced in NFPA 80 and 2019 CBC Section 2406.
 - 1. CPSC 16 CFR 1201, Category I and II.

2.2 GLASS TYPES

A. Low-E Insulating Glass:

1. Acceptable Manufacturers:

- a. Vitro Architectural Glass. Product: Solarban 70XL (2) + Clear.
- b. Oldcastle Glass.
- c. Viracon.
- d. Guardian.
- e. Substitutions: Under provisions of Division 01.

2. Material: 1 inch thick hermetically sealed assembly consisting of 1/4 inch thick Low-E clear glass on the outboard surface (coating on the #2 surface), 1/2 inch air space and 1/4 inch thick clear glass on the inboard surface with a Winter Daytime U-value of 0.28 or less, Solar Heat Gain Coefficient (SHGC) of 0.27 or less, and Visible Light Transmittance of 64 percent. Glass shall be heat strengthened; tempered where required by CBC and where indicated on Drawings.

2.3 GLAZING SEALANT

- ### A. Glazing Sealants: ASTM C920, Type S, Grade NS, Uses "G" and "A". Dow Corning 795, Tremco "Proglaze" or GE Silicone Sealants; Tremco "Mono" acrylic sealant or accepted equal. All sealants shall be compatible with the type of glazing and window frame to which they are applied.

2.4 GLAZING ACCESSORIES

- ### A. Setting Blocks: Neoprene EPDM blocks with a Shore A durometer hardness of 85, ± 5 percent, chemically compatible with sealant used.
- ### B. Spacer Shims: Neoprene, 50-60 Shore A durometer hardness, minimum 3 inches long by one half the height of the glazing stop by thickness to suit application.
- ### C. Glazing Tape: 100 percent solids by weight, highly adhesive and elastic, cross-linked butyl rubber preformed tape with a continuous integral EPDM shim; 57 Shore 00 durometer hardness; black color; Tremco POLYshim II Tape or accepted equal.
- ### D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; black color.
- ### E. Miscellaneous: Furnish all primers-sealers, setting blocks, shims, spacers, compression seals, etc., as required for a first class workmanlike job.

2.5 FABRICATION

A. Flat Glass:

1. Comply with ASTM C1036 Standard Specification for Flat Glass, Type 1, Class 1 (clear) or Class 2 (tinted, heat-absorbing and light reducing) and Quality q3.
2. ASTM C1048 Heat Treated Flat Glass, Kind HS or FT, Condition A (uncoated), or C (other coated glass).
 - a. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.

- b. Maximum peak to valley rollerwave 0.003 inch in the central area and 0.008 inch within 10.5 inches of the leading and trailing edge.
- c. Maximum bow and warp 1/32 inch per lineal foot.
- d. All tempered architectural safety glass shall conform to ANSI Z97.1 and CPSC 16 CFR 1201.
- e. For all fully tempered glass, provide heat soak testing conforming to EN14179 which includes a two hour dwell at 290 degrees C, ± 10 degrees C.

B. Insulating Glass:

- 1. Comply with ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.
 - a. Units shall be certified for compliance by the IGCC in accordance with the above ASTM test method.
- 2. The unit overall thickness tolerance shall be -1/16 inch / +1/32 inch. Unit constructed with patterned glass shall be $\pm 1/16$ inch.
- 3. Comply with ASTM E546 Standard Test Method for Frost Point of Sealed Insulating Glass Units.
- 4. Comply with ASTM E576 Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position.
- 5. Sealed Insulating Glass Units to be double sealed with a primary seal of polyisobutylene and a secondary seal of silicone.
 - a. The minimum thickness of the secondary seal shall be 1/16 inch.
 - b. The target width of the primary seal shall be 5/32 inch.
 - c. There shall be no voids or skips in the primary seal.
 - d. Up to a maximum of 3/32 inch of the airspacer may be visible above the primary polyisobutylene sealant.
 - e. Gaps or skips between primary and secondary sealant are permitted to a maximum width of 1/16 inch by maximum length of 2 inches with gaps separated by at least 18 inches. Continuous contact between the primary seal and the secondary seal is desired.
- 6. Provide a hermetically sealed and dehydrated space. Lites shall be separated by an aluminum spacer with three bent corners and one keyed-soldered corner or four bent corners and one straight butyl injected zinc plated steel straight key joint.

C. Coated Vision Glass:

- 1. Comply with ASTM C1376 Standard for Pyrolytic and Vacuum Deposition Coatings on Glass.
- 2. Coated products shall be magnetically sputtered vacuum deposition (MSVD).
- 3. Edge Deletion: When Low-E coatings are used within an insulating unit, coating shall be edge deleted to completely seal the coating within the unit.
 - a. The edge deletion should be uniform in appearance (visually straight) and remove at least 95 percent of the coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify prepared openings for adequacy to receive glass.
- B. Verify that openings for glazing are correctly sized and within tolerance.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
- D. Report in writing any conditions that may be detrimental to the Work.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Check that glass is free of edge damage or face imperfections.

3.3 INSTALLATION

- A. General: Install glazing types at locations indicated on Drawings, according to glazing manufacturer's recommendations and as specified herein.
- B. Glass Glazing:
 - 1. Positioning Glass: Orient pattern and draw of glass pieces in same direction. Set all sheet glass so that any waves, etc. are horizontal.
 - 2. Do not cut, nip or abrade tempered glass.
 - 3. Watershed: Gunnable sealants, when applied as a cap head, shall form a bevel or watershed away from the glass. When tape is used to the sightline, it shall form a watershed when compressed. Do not undercut a sealant, compound, or tape below the sightline. Tool and finish sealant as required. Used tooling solution recommended by the sealant manufacturer.
 - 4. Positive Contact:
 - a. When applying a heel bead, lap onto the glass a minimum of 3/16 inch.
 - b. When applying a toe bead, whether continuous or a corner seal, make certain it is large enough to contact both the glass and sash. Install the sealant prior to glass placement.
 - 5. Setting blocks shall be 1/16 inch less than the full rabbet width, minimum length of 4 inches and high enough to provide the recommended minimum bite and edge clearance for the glass. Center blocks at 1/4 points unless otherwise recommended by the glass manufacturer.
 - 6. Provide spacer-shims at a maximum of 24 inches on center.
 - 7. Clearances: Observe minimum face clearances, edge clearance and glass bite as recommended by the glass and sealant manufacturers.

8. Tape Installation: Do not install glazing tapes more than one day ahead of glass placement. Remove the paper backing from the tape only when the lite is ready to be installed. Do not stretch the tape to make it fit. Do not overlap the ends of the tape. Instead, butt ends together, and when corners are butted together, daub with sealant to assure a positive seal.
9. Glazing tapes must be kept under proper compression.
10. Glazing stops shall be installed so that stop or frame does not bear directly against glass.

3.4 CLEANING

- A. Clean work under provisions of Division 01.
- B. Remove glazing materials from finish surfaces.
- C. Remove temporary labels after work is complete.
- D. Clean glass.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Division 01.
- B. Replacement: At completion of building construction and prior to its acceptance, all broken, cracked, excessively scratched, or otherwise imperfect glazing materials included under this Section shall be replaced with new glazing materials of the type specified, as directed by the Architect, and at no additional cost to the Owner.

END OF SECTION

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal stud and joist framing and accessories at interior locations.

1.2 RELATED SECTIONS

- A. Section 07 84 00 – Firestopping.
- B. Section 07 92 00 – Joint Sealants.
- C. Section 08 11 13 – Hollow Metal Doors and Frames.
- D. Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A924/A924M – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - 3. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members.
 - 4. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 5. ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
 - 6. SFIA – Steel Framing Industry Association.
 - 7. SSMA – Steel Stud Manufacturers Association.
 - 8. SSPC Paint 20 – Zinc Rich Primers.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01.

B. Shop Drawings:

1. Indicate component details, stud layout, framed openings, anchorage to structure, type and location of fasteners and accessories or items required of other related work.
2. Describe method for securing studs to tracks, splicing and for blocking and reinforcement to framing connections.

C. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts and limitations.

D. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

E. Evaluation Reports: For products not covered in SSMA or SFIA standards, submit manufacturer's current ICC report reviewed per the applicable building code.

1.5 SYSTEM DESCRIPTION

A. Interior Walls and Ceilings: Metal stud and joist framing system with interior gypsum board specified in Section 09 29 00.

B. Maximum Allowable Deflection:

1. 1:120 span at gypsum board finish.

C. Wall and Ceiling Systems:

1. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

1.6 QUALITY ASSURANCE

A. Framing members shall be provided by a member of the Steel Stud Manufacturer's Association (SSMA) or Steel Framing Industry Association (SFIA).

B. Perform Work in accordance with ASTM C754.

C. Comply with 2019 CBC, Chapter 22, Section 2211.

D. Form, fabricate, install, and connect components in accordance with ML/SFA 540.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section.

B. Installer: Company specializing in performing Work of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received. Do not install damaged materials.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing products from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

1.9 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this Section under provisions of Division 01.

1.10 COORDINATION

- A. Coordinate placement of components within stud framing system.

PART 2 PRODUCTS

2.1 METAL FRAMING SYSTEM

- A. Acceptable Manufacturers:

1. ClarkDietrich Building Systems, West Chester, OH; 513-870-1100, www.clarkdietrich.com.
2. MarinoWARE, South Plainfield, NJ; 800-627-4661, www.marinoware.com.
3. CEMCO, Pittsburg, CA; 925-473-9340, www.cemcosteel.com.
4. SCAFCO Steel Stud Company, Spokane, WA; 509-343-9000, www.scafco.com.

- B. Substitutions: Under provisions of Division 01.

2.2 COMPONENTS

- A. Framing System Components:

1. 20 Gauge and Thinner: Manufactured per ASTM C645 with material meeting the requirements of ASTM A1003, Non-structural Grade 33 (NS33).
2. 18 Gauge: Manufactured with material meeting the requirements of ASTM A1003, Structural Grade 33, Type H (ST33H).
3. 16 Gauge and Thicker: Manufactured with material meeting the requirements of ASTM A1003, Structural Grade 50, Type H (ST50H).

- B. Studs and Joists: ASTM A653/A653M non-load bearing rolled steel, channel shaped, punched for utility access, depths, gauges, and spacing as indicated on the Drawings.

- C. Tracks and Headers: Same material and thickness as studs.

- D. Slotted Track: Slotted track system for positive attachment of metal studs to track, for Head of Wall expansion joint movement (cyclic) and static Joint System in fire-rated construction, as detailed and required on Drawings, in compliance with UL 2079 cyclical movement $\pm 1/2$ inch overall 1 inch movement. Products: BlazeFrame DSL at rated assemblies and MaxTrak at non-rated assemblies as manufactured by ClarkDietrich Building Systems or accepted equal.

1. Forming steel shall conform to ASTM A1003, Structural Grade 33, Type H (ST33H).
2. Formed steel shall be galvanized in accordance with ASTM A653 for a Class G-40 by the hot dip process.
3. Slotted track shall be provided in standard widths and gauges, as required and indicated on Drawings. Down standing legs shall be nominally 2-1/2 inches and shall be provided with 1-1/2 inch slots at 1 inch on center.

4. Fasteners:

- a. For attachment of studs to slotted track, minimum No. 8 corrosion resistant by 1/2 inch waferhead screws.
- b. For attachment of slotted track to overhead structural element, as provided for the structural details affecting the work.

E. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.

F. Sheet Metal Backing: 16 gauge, unless noted otherwise on Drawings.

G. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.

H. Fasteners: ASTM C1513, self-drilling, self-tapping corrosion resistant screws.

I. Anchorage Devices: As indicated on Drawings.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type II organic zinc rich.

2.3 FINISH

A. Framing Members and Connections:

1. Provide galvanized finish per ASTM A653 with G-40 minimum coating weight. No equivalent coatings allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough-in utilities are in proper location.

3.2 INSTALLATION

A. Install metal framing per ASTM C754 and as indicated on Drawings.

B. Align and secure top and bottom runners as indicated on Drawings.

C. Place two beads of acoustic sealant between tracks and substrate, studs and adjacent construction, to achieve acoustic seal.

D. Place two beads of acoustic sealant between studs and adjacent vertical surfaces to achieve acoustic seal.

E. Framing at openings shall be as shown on Drawings. Install intermediate studs at same spacing as wall studs.

F. Install studs vertically at 16 inches on center unless otherwise noted on Drawings.

G. Install joists horizontally at 16 inches on center unless otherwise noted on Drawings.

H. Align stud web openings horizontally.

I. Secure studs to tracks as indicated on Drawings.

J. Stud splicing not permissible.

- K. Fabricate corners using minimum of three studs.
- L. Double stud at wall openings and door and window jambs, not more than 2 inches from each side of openings.
- M. Brace stud framing system rigid.
- N. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
- O. Backing/Blocking: Shall be provided for all wall and ceiling finishes and for the supporting and anchorage of products, fixtures and equipment for all trades. Coordinate size, type, and location of backing and supports with manufacturer or supplier of items requiring backing/blocking.
- P. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Install extended leg top track for slip connection.
- Q. Refer to Drawings for indication of partitions through ceiling, but not to structure above. Install diagonal stud bracing staggered at 48 inches on center to structure above. Stud bracing width and gauge shall match that of the stud framing below.
- R. Coordinate placement of insulation in stud spaces after stud frame erection.

3.3 ERECTION TOLERANCES

- A. Maximum Variation From Indicated Position: 1/8 inch in 10 feet (non-cumulative).
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet (non-cumulative).

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum board:
 - 1. Type X gypsum board.
- B. Accessories.

1.2 RELATED SECTIONS

- A. Section 07 84 00 – Firestopping.
- B. Section 07 92 00 – Joint Sealants.
- C. Section 08 11 13 – Hollow Metal Doors and Frames.
- D. Section 09 22 16 – Non-Structural Metal Framing.
- E. Section 09 91 00 – Painting.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM C473 – Standard Test Method for Physical Testing of Gypsum Panel Products.
 - 3. ASTM C475/C475M – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 4. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.
 - 5. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - 6. ASTM C1002 – Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

7. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
8. ASTM C1396/C1396M – Standard Specification for Gypsum Board.
9. GA-214 – Recommended Levels of Gypsum Board Finish.
10. GA-216 – Application and Finishing of Gypsum Board.
11. GA-600 – Fire Resistance Design Manual.
12. UL Fire Resistance Directory.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature and product specification for each product.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 1. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years' experience.
 2. Installer Qualifications: Firm specializing in installing work specified in this Section acceptable to manufacturer with experience on at least five projects of similar nature in past three years.
- B. Regulatory Requirements: Comply with requirements of CBC Chapter 25.
- C. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 01.
- B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- C. Storage and Protection: Store materials in a dry secure place; neatly stacked to prevent sagging or damage to edges, ends, and surfaces. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Interior Environmental Requirements:
 1. Maintain room temperature at not less than 40 degrees F during application of gypsum board. Maintain room temperature at not less than 50 degrees F for joint treatment, and decoration for 48 hours prior to and continuously thereafter until completely dry.
 2. Provide adequate ventilation during installation and curing period.
 3. Prevent exposure to excessive or continuous moisture before, during, and continuously after installation. Eliminate sources of moisture immediately.
 4. Protect gypsum board from direct exposure to rain, snow, sunlight, or excessive weather conditions.

PART 2 PRODUCTS

2.1 SUSTAINABLE BUILDING DESIGN REQUIREMENTS

- A. Provide sealants that meet VOC requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168. Information is available at www.aqmd.gov.

2.2 MANUFACTURERS

A. Acceptable Manufacturers:

1. USG – United States Gypsum Company, Chicago, IL 60606; toll free: 800-874-4968, phone: 312-606-4000, fax: 312-606-5566, www.usg.com.
2. National Gypsum Co., Charlotte, NC 28211; phone: 704-365-7300, fax: 800-329-6421, www.nationalgypsum.com.
3. GP-Gypsum – Georgia-Pacific Corp., Atlanta, GA 30303; toll free: 800-824-7503, phone: 404-652-4000, fax: 404-230-5624, www.gp.com.
4. CertainTeed Corporation, Malvern, PA; toll free: 800-233-8990, www.certainteed.com.
5. PABCO Gypsum, Newark, CA 94560; phone: 510-792-9555, fax: 510-794-8725, www.pabco gypsum.paccoast.com.

- B. Substitutions: Under provisions of Division 01.

2.3 GYPSUM BOARD

- A. Type X Gypsum Board: ASTM C1396/1396M; 5/8-inch thick; 2.2 pounds per square foot; fire resistant core; maximum permissible length; ends square cut, tapered edges.

1. Acceptable Products:

- a. Sheetrock Brand Firecode X manufactured by USG,
- b. Gold Bond Brand XP Fire-Shield Gypsum Board manufactured by National Gypsum,
- c. ToughRock Fireguard manufactured by G-P Gypsum,
- d. CertainTeed Type X manufactured by CertainTeed Corporation,
- e. FLAME CURB Type X Gypsum Board manufactured by PABCO Gypsum,
- f. or accepted equal.

2.4 ACCESSORIES

- A. Corner Bead, Edge Trim, and Decorative Dividers: ASTM C1047; zinc-coated sheet steel.

- B. Control Joints: ASTM C1047; roll-formed zinc joint with removable protected opening; provided in accordance with UL fire rated assemblies. Acceptable product: Zinc Control Joint No. 093 manufactured by Clark Dietrich, or accepted equal.

C. Screws:

1. ASTM C1002, Type S or Type A; bugle head; self-drilling and self-tapping screws for light gauge steel framing (less than 0.033 inch thick).
2. ASTM C954; bugle head; self-drilling and self-tapping screws for heavy gauge steel framing (0.033 inch to 0.112 inch thick).

- D. Jointing Tape: ASTM C475/C475M; 2 inch wide heavy duty paper joint tape.

- E. Joint Compound: ASTM C475/C475M.
- F. Primer-Surfacer (used in lieu of skim coat in a Level 5 finish): High-build interior coating finish applied with an airless sprayer. Products: Sheetrock Brand Primer-Surfacer Tuff-Hide manufactured by USG, ProForm Brand Surfacer/Primer manufactured by National Gypsum, or accepted equal. Note: Walls applied with primer-surfacer do not require drywall paint primer prior to application of finish coats.
- G. Acoustical Sealant: Refer to Section 07 92 00.
- H. Firestop Putty Pads for Electrical Boxes: Intumescent moldable firestop putty pad. Acceptable products: SSP4S 7.25 inches by 7.25 inches or SSP9S 9 inches by 9 inches manufactured by Specified Technologies Inc. (STI), Somerville, NJ; 800-992-1180, www.stifiirestop.com, or accepted equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine job site conditions and verify field dimensions.
- B. Verify framing for acceptable placement, spacing, and tolerance (alignment and plumb).
- C. Verify that framing and furring are securely attached.
- D. Verify that all blocking, headers, and supports are in place.
- E. Verify that insulation is secured.
- F. Verify firestopping work, refer to Section 07 84 00.
- G. Report unacceptable conditions to the Architect. Begin installation only when unacceptable conditions have been corrected.

3.2 FIRESTOPPING AND SEALANTS

- A. Install intumescent moldable pads over backs and sides of all electrical junction and utility boxes at fire rated walls.
- B. Apply acoustical sealant at partitions per sealant manufacturer's instructions. Refer to Section 07 92 00.

3.3 GYPSUM BOARD INSTALLATION

- A. Install gypsum board to framing and furring members in accordance with manufacturer's recommendations, GA-216 or ASTM C840, and as specified in this Section.
- B. Install gypsum board with separate panels in moderate contact, do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints.
- C. Install gypsum board in most economical direction, using maximum practical lengths, with edges occurring over firm bearing. Install 1/4 inch (nominal) above rough floor or curb. Cut out gypsum board as required to make neat close joints around openings.
- D. In vertical applications, provide lengths required to reach full height of vertical surfaces in one continuous piece.

- E. Where gypsum board is carried full height to structure above, provide for deflection of structure by undercutting board 3/8 inch (nominal) and sealing top edge of board to substrate with a continuous bead of sealant to form an elastic closure.
- F. Use screws to fasten gypsum board to framing.
- G. Treat cut edges and holes in moisture resistant gypsum board per manufacturer's recommendations.
- H. Place corner beads at all exterior corners. Use longest practical length. Place edge trims where gypsum board abuts dissimilar materials.
- I. Control Joints: Install control joints where indicated on the Drawings. Where not specifically indicated, install consistent with lines of building spaces as directed by Architect; and as a minimum, install as follows:
 - 1. Where a partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 - 2. Where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet.
 - 3. In interior ceilings without perimeter relief so that linear dimensions between control joints do not exceed 30 feet and total area between control joints does not exceed 900 square feet.
 - 4. Where ceiling framing members change direction.
 - 5. Where a partition transitions from floor-supported framing to overhead hung framing.
- J. Attach metal corner beads, edge trim, decorative dividers, and control joints to the supporting construction at 9 inches on center maximum spacing using same fasteners used to attach gypsum board panels.

3.4 FIRE-RESISTANT ASSEMBLIES

- A. Install fire rated assemblies using materials, application methods including gypsum panel orientation, types and spacing of fasteners, and framing in accordance with the specified UL Fire Resistive Design Number, GA-600 File Number, or CBC Table 721.1.
- B. Completely seal joints of fire-rated gypsum board enclosures in accordance with UL or GA listed assembly requirements. Seal penetrations through rated partitions and ceilings in accordance with tested systems. Refer to Section 07 84 00.

3.5 JOINT TREATMENT AND FINISH

- A. Finish gypsum board surfaces in accordance with ASTM C840, GA-214, and GA-216.
- B. Remove dirt, oil, and other materials that may cause lack of bond from all surfaces to receive joint compound.
- C. Set mechanical fasteners below the plane of the board.
- D. Tape, fill, and sand all joints, edges and corners to produce smooth surface ready to receive finishes. Fill all dents, gouges, recesses, or other depressions with joint compound to produce a monolithic surface.
- E. Feather coats onto adjoining surfaces so that camber is maximum 1/32-inch.

F. Levels of Finish: Finish gypsum board surfaces in accordance with GA-214 as follows:

Area	Finish
Plenum areas above ceilings.	Level 1 finish, no texture.
Smooth finish; satin/eggshell paint finish.	Level 4 finish.

3.6 TOLERANCES

A. Maximum variation from true flatness: 1/4 inch in 10 feet in any direction.

3.7 CLEANING AND PROTECTION

- A. Cleaning and Repair: Clean surfaces that have been spotted or soiled during wallboard application.
- B. Defective Work: Remove and replace defective work that cannot be satisfactorily repaired, at the direction of the Architect, with no additional cost to the Owner.
- C. Protection: Protect installed work against damage from other construction work.
- D. Upon completion of the work under this Section, remove all surplus material, rubbish and debris from the premises and leave floors broom clean.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Painting schedules, including painting of exposed surfaces, interior and exterior, except as otherwise specified or indicated.

1.2 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel Framing.
- B. Section 05 50 00 – Metal Fabrications.
- C. Section 07 62 00 – Sheet Metal Flashing and Trim.
- D. Section 08 11 13 – Hollow Metal Doors and Frames.
- E. Section 09 29 00 – Gypsum Board.
- F. Divisions 25 – 28 – Electrical.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards, Manuals and Codes:
 - 1. ASTM D523 – Standard Test Method for Specular Gloss.
 - 2. The Master Painters Institute, MPI Gloss and Sheen Levels.
 - 3. The Master Painters Institute, MPI Maintenance Repainting Manual.

1.4 SUBMITTALS

- A. Submit product data under provisions of Division 01.
- B. Provide product data on all painting products and accessories.
- C. Submit four brush-out samples 8 inches by 10 inches in size illustrating color selected for each surface finishing product scheduled.

- D. During the Contract Closeout period, provide two copies of coating maintenance manual including, but not limited to, location of manufacturer's paint store closest to the project site, area summary with finish schedule, area detail designating where each product, color, and finish was used, product data sheets and material safety data sheets for each product used, color formulations for each color used, cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with sufficient documented experience.
- B. Applicator: Company specializing in commercial painting and finishing with sufficient documented experience.
- C. Gloss Levels: Per Master Painters Institute (MPI) gloss standards "MPI Gloss and Sheen Levels," measured in accordance with ASTM D523.

GLOSS LEVEL	DESCRIPTION	GLOSS AT 60 DEGREES ASTM D523	SHEEN AT 85 DEGREES ASTM D523
G1	A traditional matte finish – flat.	5 units, maximum	and 10 units, maximum
G2	A high side sheen flat - "a velvet-like" finish.	10 units, maximum	and 10 - 35 units
G3	A traditional "eggshell-like" finish.	10 - 25 units	and 10 - 35 units
G4	A "satin-like" finish.	20 - 35 units	and 35 units, minimum
G5	A traditional semi-gloss.	35 - 70 units	-
G6	A traditional gloss.	70 - 85 units	-
G7	A high gloss.	More than 85 units	-

- D. Previously Painted Surfaces Requiring Repainting: Surface preparation, priming, and paint application shall conform to applicable requirements of MPI Maintenance Repainting Manual.

1.6 REGULATORY REQUIREMENTS

- A. Conform to California Building Code for flame spread and smoke density requirements for finishes.
- B. Furnish certification that all paint coatings furnished for the location of the project comply with the EPA clean air act for permissible levels of volatile organic content for architectural coatings applied in California as designated by California Air Resources Board (CARB).

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site in manufacturer's original unopened, labeled containers; inspect to verify acceptance.
- B. Store and protect products from abuse and contamination.
- C. Container labeling is to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 50 degrees F and a maximum of 90 degrees F, in well-ventilated area, unless required otherwise by manufacturer's instructions.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees F for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above fifty percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Paints: 50 degrees F for interior work and exterior work, unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 foot candles measured mid-height at substrate surface.

1.9 EXTRA STOCK

A. Provide a new and unopened one-gallon container of each type, color, and sheen to Owner.

B. Label each container with color, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 PAINT SYSTEMS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.2 SUSTAINABLE DESIGN REQUIREMENTS

A. VOC Content of Field-Applied Paints and Coatings: Provide products that comply with the SCAQMD rule 1113 limits for VOC content.

2.3 ACCEPTABLE MANUFACTURERS – PAINT

A. Refer to Table at the end of this Section.

B. Substitutions: Under provisions of Division 01.

2.4 ACCEPTABLE MANUFACTURERS – PRIMER SEALERS

A. Refer to Table at the end of this Section.

B. Substitutions: Under provisions of Division 01.

2.5 MATERIALS

- A. All paint materials shall be provided from a single manufacturer unless noted otherwise in this Section.
- B. Coatings:
 - 1. Ready mixed. Process pigments to a soft paste consistency capable of being readily and uniformly dispersed to a homogeneous coating.
 - 2. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. All field-applied interior paints shall use zero VOC colorants.
- D. Accessory Materials: All other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.6 FINISHES

- A. Refer to schedule at end of Section for surface finish schedule. Refer to Drawings for color schedule.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 18 percent.
- D. Beginning of application constitutes acceptance of existing surfaces.

3.2 PREPARATION

- A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces for painting.
- B. Correct minor defects and clean surfaces that affect work of this Section.
- C. Seal marks that may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Gypsum Board Surfaces: Latex fill minor defects. Spot-prime defects after repair.
- F. Galvanized Surfaces: Remove passivators, oil, grease, acid residue, and surface contamination; wash with solvent. Apply coat of etching primer, unless otherwise recommended by finish coating system manufacturer.

- G. Shop-Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces as recommended by primer manufacturer. Prime shop-primed steel items with steel primers specified in this Section.
- H. Previously Painted Surfaces: Existing conditions vary. Evaluate degree of surface degradation. Surface preparation methods shall conform to applicable requirements of MPI Maintenance Repainting Manual.

3.3 PROTECTION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.4 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
 - 1. Paint mil thicknesses shall not be less than the minimums recommended by the paint manufacturers.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.
- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand lightly between coats to achieve required finish.
- F. Allow applied coat to dry before next coat is applied.
- G. All shop-primed items shall be fully re-primed in the field.

3.5 FINISHING ELECTRICAL EQUIPMENT

- A. See Divisions 25 – 28 for other items requiring painting.
- B. Paint all new conduit, pipes, and conduit/pipe supports in exposed interior and exterior locations.
- C. Reinstall electrical plates, hardware, light fixture trim, and fittings removed for surface preparation or painting.
- D. Do not paint factory-finished mechanical and electrical equipment.

3.6 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials and debris.

- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove from site daily.

3.7 PAINTING SCHEDULE – EXTERIOR SURFACES

- A. Ferrous Metal:
 - 1. 1st coat – Acrylic Flat Primer
 - 2. 2nd and 3rd coats – 100 percent Acrylic Low Sheen
- B. Ferrous Metal:
 - 1. 1st coat – Acrylic Flat Primer
 - 2. 2nd and 3rd coats – 100 percent Acrylic Semi-Gloss
- C. Ferrous Metal (Industrial) – For use at exterior metal architectural features/exposed structure:
 - 1. 1st coat – Epoxy Flat Primer
 - 2. 2nd and 3rd coats – Aliphatic Urethane Gloss Enamel
- D. Galvanized Metal (Handrail and Guardrail Assemblies only):
 - 1. 1st coat – Etch Prep
 - 2. 2nd coat – Epoxy Flat Primer
 - 3. 3rd and 4th coats – High Dispersion Pure Acrylic Polymer Semi-Gloss
- E. Galvanized Metal and Aluminum (Except Handrail and Guardrail Assemblies):
 - 1. 1st coat – Etch Prep
 - 2. 2nd coat – Acrylic Flat Primer
 - 3. 3rd and 4th coats – 100 percent Acrylic Low Sheen
- F. Galvanized Metal and Aluminum (Except Handrail and Guardrail Assemblies):
 - 1. 1st coat – Etch Prep
 - 2. 2nd coat – Acrylic Flat Primer
 - 3. 3rd and 4th coats – 100 percent Acrylic Semi-Gloss

3.8 PAINTING SCHEDULE – INTERIOR SURFACES: Descriptions in schedule apply to new and previously painted surfaces, except surface preparation and priming of previously painted surfaces shall be in accordance with applicable requirements of MPI maintenance repainting manual.

- A. Gypsum Board:
 - 1. 1st coat – PVA Flat Primer Sealer
 - 2. 2nd and 3rd coats – Acrylic Semi-Gloss Enamel
- B. Gypsum Board:
 - 1. 1st coat – PVA Flat Primer Sealer
 - 2. 2nd and 3rd coats – Acrylic Eggshell Enamel

C. Ferrous Metal:

1. 1st coat – Acrylic Flat Primer
2. 2nd and 3rd coats – Acrylic Eggshell Enamel

D. Ferrous Metal:

1. 1st coat – Acrylic Flat Primer
2. 2nd and 3rd coats – Acrylic Semi-Gloss Enamel

			MANUFACTURERS				
APPLICATION	TYPE	MPI Gloss Level	Dunn Edwards/US Coatings	PPG Paints	Sherwin Williams	Kelly Moore/Devoe	Vista
PRIMERS							
Exterior Ferrous Metal	Acrylic	G1	BRPR00-1	4020	B66W01310	5725	9600
Exterior Ferrous Metal (Industrial)	Epoxy	G1	EG2000	Amerlock 2 VOC	B58W00620	Amerlock 2 VOC	Carboline Rustbond
Exterior Galvanized Metal and Aluminum (Except Handrail and Guardrail Assemblies)	Acrylic	G1	ULGM00	4020	B66W01310	5725	4800
Exterior Galvanized Metal (Handrail and Guardrail Assemblies Only)	Epoxy	G1	ULGM00	98-46	B58 646-100	PPG 98-46	4800
Zero VOC Interior Gypsum Board	Acrylic	G1	VNSL00	9-900	B28 2600	971/973	5001
Interior Gypsum Board	PVA	G1	VNSL00	1030	B28 2600	971	5001
Interior Ferrous Metal	Acrylic	G1	BRPR00	4020	B66W01310	5725	9600
FINISHES							
Exterior Ferrous Metal and Galvanized Metal, Aluminum (Except Handrail and Guardrail Assemblies)	100 percent Acrylic	G2	EVSH40-2	2402V	A75W51 Solo	1245	7500
Exterior Ferrous Metal and Galvanized Metal, Aluminum (Except Handrail and Guardrail Assemblies)	100 percent Acrylic	G5	SSHL50	2406V	A76W51 Solo	1250	7000
Exterior Ferrous Metal (Industrial)	Aliphatic Urethane Enamel	G6	UG3000 VOC	Amershield	Acrolon 100	Amershield	Carbothane 134VOC
Exterior Galvanized Metal (Handrail and Guardrail Assemblies Only)	High Dispersion Pure Acrylic	G5	ASHL50	4216	B66W0600	2888 Dura-Poxy HP	8400
Zero VOC Interior Gypsum Board	100 percent Acrylic	G3	SWLL30	9-300	B09W01051	1610	7500
Zero VOC Interior Gypsum Board	100 percent Acrylic	G5	SWLL50	9-500	B10W01051	1650	7000
Interior Gypsum Board	100 percent Acrylic	G3	SWLL30	1402N	B20W01960	1610	7500
Interior Gypsum Board	100 percent Acrylic	G5	SWLL50	6-8510	A76W53 Solo	1650	7000
Interior Ferrous Metal	100 percent High Performance Acrylic	G3	EVSH30	90-474	A75 Solo	1686	8300
Interior Ferrous Metal	100 percent High Performance Acrylic	G5	EVSH50	4216	B66W00651 HP Acrylic	5885	8400
MISCELLANEOUS							
Exterior Heavy Duty Cleaner	Water-Based	N/A	Krud Kutter Gloss-Off	88		Devprep 88	Krud Kutter Gloss-Off
Exterior Galvanized Metal Etch Prep.	N/A	N/A	Krud Kutter Metal Clean and Etch, Dissco Eco-Prime 100, or Jasco Prep & Prime				

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior Signages:
 - 1. Accessibility Signage.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. ADA – Americans with Disabilities Act - 2010 Standards for Accessible Design.
 - 2. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 4. ASTM A283/A283M – Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 5. ASTM A500/A500M – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 6. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 7. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 8. ASTM F593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 9. AWS D1.1 – Structural Welding Code – Steel.
 - 10. AWS D1.2 – Structural Welding Code – Aluminum.
 - 11. 2019 California Building Code (CBC).
 - 12. NFPA 101 – Life Safety Code.
 - 13. UL 924 – Emergency Lighting and Power Equipment.
 - 14. UL Building Materials Directory.

1.4 SUBMITTALS

- A. General: Submit in accordance with Division 01.
- B. Product Data: Submit manufacturer's descriptive literature and product specification for each product.
- C. Shop Drawings: Submit shop drawing for each sign and plaque to show construction, sections, text, character spacing, and mounting details.
- D. Samples: Submit sign and plaque colors, finishes, designs, and sizes as specified in this Section and as shown on the Drawings for review.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years' experience.
- B. Regulatory Requirements:
 - 1. Accessibility Signage, General: Provide signage in accordance with California Code of Regulations, Title 24, Part 2, Chapter 11B, Sections 11B-216 and 11B-703, 2019 California Building Code.
 - a. Finish, Color, and Contrast: Characters, pictograms, symbols and their backgrounds shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.
 - b. Depth: Raised characters shall be 1/32 inch minimum above their background.
 - c. Case:
 - 1) Raised Characters: Characters shall be uppercase.
 - 2) Visual Characters: Characters shall be uppercase or lowercase or a combination of both.
 - d. Style: Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms. Raised characters shall be sans serif.
 - e. Proportions: Visual characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.
 - f. Character Height:
 - 1) Raised Characters: Character height measured vertically from the baseline of the character shall be 5/8 inch minimum and 2 inches maximum based on the height of the uppercase letter "I". Stroke thickness of tactile characters shall be 15 percent maximum of the height of the character.
 - 2) Visual Characters: Minimum character height shall comply with CBC Table 11B-703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I".

g. Character Spacing:

- 1) Raised Characters: Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch minimum and four times the raised character stroke width maximum, Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and four times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch minimum and four times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum. Spacing between individual tactile characters shall comply with CBC Section 11B-703.2.7 and Section 11B-703.2.8.
- 2) Visual Characters: Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

h. Line Spacing: Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.

i. Format: Text shall be in horizontal format.

j. Braille: Comply with CBC Section 11B-703.3, contracted Grade 2 Braille.

- 1) Dimensions and Capitalization: Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.
- 2) Position: Braille shall be positioned below the corresponding text in a horizontal format, centered under text. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8 inch minimum and 1/2 inch maximum from any other tactile characters and 3/8 inch minimum from raised borders and decorative elements.

k. Pictograms: Comply with CBC Section 11B-703.6.

- 1) Pictogram Field: Pictograms shall have a field height of six inches minimum. Characters and Braille shall not be located in the pictogram field.
- 2) Text Descriptors; Pictograms shall have text descriptors located directly below the pictogram field. Text descriptors shall comply with CBC Sections 11B-703.2, 11B-703.3, and 11B-703.4.

l. Symbols of Accessibility: Symbols of accessibility shall comply with CBC Section 11B-703.7.

m. Edges and verticals on geometric symbols shall comply with CBC Section 11B-703.7.2.6.4.

2. Accessibility Signage:

a. Accessible Signage: CBC Chapter 11B, "Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing."

1) Elevator Signage: CBC Section 11B-407, "Elevators" and CBC Section 11B-407.2.3, "Hoistway Signs".

2) Detailed Requirements for Accessible Signage: CBC Chapter 11B, Division 7, Section 11B-703, "Signs".

a) Sign Mounting Heights and Locations: CBC Sections 11B-703.4, 11B-703.5.6, and 11B-703.7.2.6.

b) Symbols of Accessibility: CBC Section 11B-703.7, "Symbols of Accessibility".

c) International Symbol of Accessibility: CBC Section 11B-703.7.2.1, "International Symbol of Accessibility".

d) Entrance Signs: CBC Section 11B-216.6, "Entrances".

3) Stairway Accessibility Signage:

a) Tactile Floor Level Designation Signage: CBC Section 11B-504.8 "Floor Identification".

4) Site Accessibility Signage: CBC Sections 11B-216, "Signs", 11B-502.6, "Identification", 11B-502.8, "Additional Signs", and 11B-703, "Signs".

5) Accessible Parking Signage: CBC Section 11B-502.6 "Identification".

6) Post or Pylon Mounted Signs: CBC Section 11B-307.3 "Post-Mounted Objects".

b. Field Inspection: Signs and identification shall be field inspected after installation and approved by the enforcing agency, in accordance with CBC Section 11B-703.1.1, "Plan Review and Inspection".

3. Wind Load Requirements: Exterior signages shall be designed to resist wind loads in accordance with CBC.

C. Pre-Installation Meetings:

1. Conduct pre-installation meeting in accordance with provisions of Division 01.

2. Convene pre-installation meeting one week prior to commencing work of this Section.

3. Coordinate work in this Section with work in related Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 01.

B. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. WeidnerCA, Sacramento, CA; phone: 916-452-8000, URL: www.weidnerca.com.
2. ASI-Modulx, Dallas, TX; phone: 800-274-7732, URL: www.asisign.com.
3. In Pro Corporation, Muskego, WI; phone: 800-222-5556, URL: www.inprocorp.com.
4. Mohawk Sign Systems, Inc., Schenectady, NY; phone: 518-842-5303, URL: www.mohawksign.com.
5. APCO, Atlanta, GA; phone: 404-688-9000, URL: www.apcosigns.com.
6. Diverse ID, Tampa, FL; phone: 877-446-2374, URL: www.diverseid.com.

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- #### A. Aluminum: ASTM B209 for sheet or plate. Aluminum extrusions shall be 1/8 inch thick minimum. Wall and post mounted panels shall be 0.080 inch thick minimum. Aluminum panels shall have a non-glare acrylic polyurethane paint finish.
- #### B. Steel Posts: ASTM A53/A53M, Type E or S, Grade B; galvanized 1-1/2 inch nominal pipe size (NPS), Schedule 40. Provide 1/8 inch thick steel cap (ASTM A283/A283M) welded to top of post. Galvanize post and cap to minimum G50 in accordance with ASTM A123/A123M.
- #### C. Anchors and Fasteners: Stainless steel conforming to ASTM F593.

2.3 EXTERIOR SIGNAGE

- #### A. Accessible Signage: Provide the following signages in accordance with 2010 ADA Standards for Accessible Design and 2019 CBC where indicated on the Drawings.
- #### B. Accessible Signage: Provide the following signages in accordance with 2010 ADA Standards for Accessible Design and 2016 CBC where indicated on the Drawings.
1. Entrance to Parking Lot Sign: 17 inches wide by 22 inches high (minimum) metal panel, reflectorized sign mounted on a single post with text "UNAUTHORIZED VEHICLES PARKED IN DESIGNATED ACCESSIBLE SPACES NOT DISPLAYING DISTINGUISHING PLACARDS OR SPECIAL LICENSE PLATES ISSUED FOR PERSONS WITH DISABILITIES WILL BE TOWED AWAY AT OWNERS EXPENSE. TOWED VEHICLES MAY BE RECLAIMED AT _____ OR BY TELEPHONING _____."
 - a. Blank Space Text: Coordinate text requirement for blank spaces with Owner.
 2. Accessible Parking Stall Sign: Provide a 12 inch wide by 18 inch high metal panel, reflectorized International Symbol of Accessibility sign, mounted on a single post, at every accessible parking stall indicated on the Drawings. Text shall occur below the symbol and read "PARKING ONLY".

3. Van Accessible Parking Stall Sign: Provide a 12 inches wide by 18 inches high metal panel, reflectorized International Symbol of Accessibility sign, mounted on a single post for each van accessible parking stall as indicated on the Drawings. Text shall occur below the symbol and read "PARKING ONLY". Mounted on the same post, below this sign, a sign of the same width and required height shall display the text "VAN ACCESSIBLE". Refer to Drawings for additional sign information.
4. Sign for Parking Violation Fine: An additional sign or additional language below the symbol of accessibility shall state "Minimum Fine \$250".

2.4 FABRICATION

- A. Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled be trial fit in the shop to ensure proper field assembly.
- B. Drill or punch holes for bolts and screws; produce clean, true lines and surfaces.
- C. Aluminum welding shall be in accordance with AWS D1.2. Steel welding shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Grind smooth exposed welds.
- D. Galvanized items shall be hot-dip process after fabrication if practical in accordance with ASTM A123/A123M.
- E. Exposed work surfaces shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical.
- F. Joints exposed to the weather shall be formed to exclude water. Provide drainage and weep holes to prevent condensation buildup.

2.5 SHOP FINISHING

- A. Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, shall be given one coat of zinc-molybdate primer or an accepted rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice.
- B. Surfaces to be embedded in concrete shall not be painted.
- C. Upon completion of work, damaged surfaces shall be recoated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install signs and plaques level and plumb.
- B. Accessible Sign Mounting Heights and Locations:
 1. Site Signage:
 - a. Parking Signage: Per CBC Section 11B-502.6, signs not located within a circulation path shall be 60 inches minimum above the finish floor or ground surface measured to the bottom of the sign.
 - b. Accessible Route Signage: Per CBC Section 11B-502.6 (Exception), signs located within a circulation path shall be a minimum of 80 inches above the finish floor or ground surface measured to the bottom of the sign.

2. Mounting Height With Tactile Characters: Per CBC Section 11B-703.4.1, tactile characters on signs shall be located 48 inches minimum above the finished floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finished floor or ground surface, measured from the baseline of the highest line of raised characters.
3. Mounting Location with Tactile Characters: Per CBC Section 11B-703.4.2 as follows:
 - a. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
 - b. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf.
 - c. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door.
 - d. Where there is no space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.
 - e. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
 - f. Where permanent identification signage is provided for rooms and spaces, they shall be located on the approach side of the door as one enters the room or space. Signs that identify exits shall be located on the approach side of the door as one exits the room or space.
4. Mounting Height With Visual Characters: Per CBC Section 11B-703.5.6, visual characters shall be 40 inches minimum above the finished floor or ground.

3.2 ADJUST AND CLEAN

- A. Clean and Touch-up: Remove all packing and protection blemishes and thoroughly clean and polish all finish surfaces. Restore any marred or abraded surfaces to their original condition by touching up in accordance with the manufacturer's recommendations. Touch-up shall not be obvious.
- B. Defective Work: Remove and replace all defective work that cannot be properly repaired, cleaned or touched-up, as directed by the Architect, with no additional cost to the Owner.
- C. Protect installed work during the construction period to prevent abuse and damage.

3.3 CLEAN-UP

- A. Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises.

END OF SECTION

SECTION 14 23 50

LIMITED USE/LIMITED APPLICATION ELEVATOR

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. Respondent must clearly identify any and all exceptions, clarifications or other variations from contract documents, citing the affected requirement by version date, sheet or section, paragraph or detail and page, providing the proposed substitution, alternative or economic credit represented in their response, prominently and conspicuously displayed with underline or highlight, adjacent to or referenced in their offer pricing.
- C. Error in or conflict among requirements not specifically identified in the response shall be resolved by application of the most stringent and / or beneficial to the owner, at the sole determination of the Architect.

1.2 DESCRIPTION

- A. Work Included: Provide materials, labor, and services necessary for the safe, orderly, professional, and complete installation, including operational verification, of one (1) roped hydraulic Limited-Use / Limited-Application elevator as shown and specified.
- B. Where a component, device, system, or part of the equipment is referred to in the singular, such reference shall not limit the quantity furnished and shall apply to any and all such devices or parts as may be required for a complete installation.
- C. RELATED WORK SPECIFIED ELSEWHERE:
 - 1. Proper construction and code compliant hoistway, pit and machine room.
 - 2. Ventilation of hoistway (if required) and machine room.
 - 3. Lighting of pit, hoistway, and machine room.
 - 4. 120-volt G.F.C.I convenience outlets in machine room and pit.
 - 5. Supports for guide rail brackets, buffers, and entrance installation.
 - 6. Electric feeders to disconnect switches or circuit breakers to elevator starter or control panels.
 - 7. 120-volt 15-amp disconnect switch or circuit breaker for elevator including feeder wiring to control panels for car lights.
 - 8. Conduit to remote locations for elevator alarm systems.
 - 9. Indicated or required chases and openings.
 - 10. Finish painting except as noted.
 - 11. Guarding and protecting hoistway during construction.
 - 12. Storage space for tools and materials.
 - 13. Electric power for testing and adjusting equipment.
 - 14. Telephone wiring to control panels.

1.3 REFERENCES

A. Applicable Codes (Latest Edition):

1. California Code of Regulations, Title 8 and 24.
2. American Society of Mechanical Engineers, Safety Code for Elevators and Escalators (ASME A17.1).
3. California Building Code (CBC)
4. American Disabilities Act – ADA Standards for Accessible Design 28 CFR Part
5. National Electrical Code - NFPA 70.
6. National Fire Protection Association - NFPA 72.
7. Fire Test of Door Assemblies - NFPA 252.
8. American Welding Society (AWS) D1.1 - Structured Welding Code Steel.
9. American National Standard Accessible and Usable Buildings and Facilities (ANSI A117.1).

1.4 DEFINITIONS

A. The following definitions apply to work of this Section:

1. "Owner": as used herein, refers to Lassen County Courthouse.
2. "General Contractor": refers to the single point of contractual responsibility with the Owner to furnish labor and materials for the execution of work as specified herein.
3. "Consultant": refers to the Syska Hennessy Group.
4. "Provide": to furnish and install, complete for safe operation, unless specifically indicated otherwise.
5. "Install": to erect, mount and connect complete with related accessories.
6. "Supply": to purchase, procure, acquire, and deliver complete with related accessories.
7. "Work": labor and materials required for proper and complete installation.
8. "Wiring": raceway, fittings, wire, boxes, and related items.
9. "Concealed": embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.
10. "Exposed": not installed underground or "concealed" as defined above.
11. "Indicated", "shown", or "noted": as indicated, shown, or noted on Drawings or as specified.
12. "Similar" or "equal": of base bid manufacturer, equal in materials, weight, size, design, and efficiency of specified product, conforming to "Acceptable manufacturers."
13. "Reviewed", "satisfactory", "accepted", or "directed": as reviewed, satisfactory, accepted or directed, by or to Owner.
14. Where a device or a part of equipment is referred to in the singular number, it is intended that such reference shall apply to as many such devices as are required to complete the installation.

1.5 OPERATION PERFORMANCE

- A. The control system shall provide smooth acceleration and deceleration with 1/4-inch leveling accuracy at all landings, from no load to full rated load in the elevator, under normal or unloading conditions. The self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for overtravel and undertravel. The car shall remain at the landing irrespective of load. Clearance between the car sill and the hoistway landing shall not exceed 1 1/4-inch.
- B. The speed of the elevator shall not vary plus or minus 10-percent under loading conditions.
- C. Ride Quality: Provide smooth and quiet ride, free of rumbles, bumps, vibrations, jerk, and sway.
- D. Prior to final acceptance, the elevator shall be adjusted as required to meet these performance requirements.

1.6 SUBMITTALS

- A. Shop Drawings and Samples:
 - 1. Shop Drawings: Provide complete shop drawings, to scale. Include layouts of pits, overhead requirements, power and heat data for all equipment, static and impact loads, seismic loads, reaction points and required clearances.
 - 2. Samples: Materials and finishes exposed to public view, 6-inch by 6-inch panels or 12-inch lengths as applicable.
- B. Equipment Brochure and Service Manuals:
 - 1. Before acceptance of work, furnish three sets of job specific manufacturer's equipment brochures and service manuals.
 - 2. Manuals shall be job specific. Assemble manuals in chronological order according to the specification alphanumeric system. Provide in manufacturers standard binders consisting of:
 - a. Equipment and components, descriptive literature.
 - b. Performance data, model number.
 - c. Installation instructions.
 - d. Operating instructions.
 - e. Maintenance and repair instructions.
 - f. Spare parts lists.
 - g. Lubrication instructions.
 - h. Detailed, record layout drawings.
 - i. Detailed, simplified, one line, wiring diagrams. Provide one complete set per manual.
 - j. Field test reports.
- C. Machine Room Prints. Provide one (1) complete set of "record" field wiring and straight-line wiring diagrams showing all electrical circuits. These diagrams shall be laminated and bound in an 8 1/2-inch by 11-inch binder and located in the Limited-Use / Limited-Application elevator machine room as directed.

1.7 QUALITY ASSURANCE

A. Quality and gauges of materials:

1. New, best of their respective kinds free from defects.
2. Materials, equipment of similar application; same manufacturer, except as noted.
3. Gauges as noted.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Ship in original crated sections of a size to permit passage through available space.
- B. Obtain approval and schedule delivery of material to meet Owner's requirements.
- C. Storage of equipment and materials shall be coordinated with Owner.

1.9 WARRANTY

- A. The LULA elevator and associated equipment shall be free of defective material, imperfect work, and faulty operation not due to ordinary wear and tear or improper use or care, for a period of one (1) year from final acceptance of all work. Defective work shall be repaired or replaced at no additional cost to the Owner.

1.10 MAINTENANCE SERVICE

- A. Provide twelve (12) month warranty maintenance service during warranty period, with service performed by licensed and trained mechanics. Also provide pricing for five (5) years of continuing maintenance upon the completion of the warranty maintenance period. Warranty maintenance shall commence upon Substantial Completion and acceptance of all elevator work and shall include examination, adjustment, lubrication, parts replacement, tests, and emergency service.
 1. Regular maintenance is to be performed during regular working hours of regular working days. Examinations shall be performed on a regularly scheduled maintenance program. All preventative maintenance visits shall be scheduled with Owner (or, at their request, building occupant) in advance.
 2. A log of all site visits, whether for preventive maintenance or resulting from trouble reports and call backs, shall include the date, arrival time, technicians' names, designation of elevator(s) worked on, nature and scope of work performed. Log(s) to be maintained in respective machine/control rooms (or, at owner's request, security check-in station) from Final Acceptance until expiration of warranty maintenance or any subsequent contractual maintenance period.
 3. The Elevator Contractor shall not be responsible for repairs to finish materials such as front rear panels, entrance columns, strike jambs, transoms, wall panels, reveals, ceilings, lighting fixtures, handrails, flooring, entrances, doors, and thresholds.
 4. The Elevator Contractor shall not be required to make renewals or repairs necessitated by reason of negligence or misuse of the equipment or by reason of any other cause beyond the Elevator Contractor's control except ordinary wear and tear unless the Elevator Contractor receives just compensation.

1.11 TOOL CABINET

- A. Provide metal tool cabinet. Cabinet shall have two shelves and a hinged door. Locate in the elevator machine room.

1.12 ELECTRIC SERVICE

- A. Power: 480-volts, 3-phase, 60-hertz. Elevator contractor to verify.

1.13 PERMITS AND INSPECTION FEES

- A. The Elevator Contractor shall obtain without cost to the Owner, all permits, and certificates as required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Product of individuals, firms or corporations regularly engaged in complete, safe installation of Limited-Use / Limited-Application elevators comparable with this contract and in satisfactory operation.
- B. Qualified Manufacturers (in alphabetical order).
1. Custom Elevator
 2. Garaventa Lift
 3. Nationwide Lifts
 4. Approved Equal

2.2 OUTLINE OF EQUIPMENT

- A. Elevator Number:
- | | |
|------------------------------|--|
| 1. Capacity, in pounds: | 1400 |
| 2. Contract speed, in FPM: | 30 |
| 3. Travel distance: | 11'-8" |
| 4. Serves: | 1-2 |
| 5. Number of Stops: | Two (2) |
| 6. Number of Openings | Two (2) in-line |
| 7. Machine Location: | Lower landing / remote |
| 8. Machine Type: | Roped Hydraulic type with automatic two way leveling |
| 9. Operation: | Two Stop Collective |
| 10. Car Dimensions: | 4'-0" wide by 4'-6" deep |
| 11. Door Opening: | 3'-0" wide by 6'-8" high |
| 12. Hoistway Door type: | Two speed side opening |
| 13. Cab Enclosure: | Manufacturer standard |
| 14. Car Operating Panel | Single |
| 15. Self-leveling | Required |
| 16. Car Direction Lantern | In Car |
| 17. Hoistway Door Interlocks | As specified |
| 18. Communication | "Hands Free" telephone |
| 19. Hall Call Station | Single rise |

2.3 MACHINE ROOM EQUIPMENT

- A. Provide equipment to fit space conditions shown.
- B. Tank: Provide welded reinforced steel structure designed to support the tank. Tank shall have surge control to prevent oil from leaving the tank when elevator descends, protective vent opening and overflow connection. Provide oil heater in tank and oil cooling system to ensure constant oil temperature and operation of elevator. Capacity of tank shall be sufficient to lift elevator to top landing plus minimum of 10-gallons.
- C. Pump: Provide submersible positive displacement pump designed to give smooth and quiet operation. Mount pump and motor on common bedplate with sound and vibration absorbing devices. Pump shall provide 400 PSI maximum working pressure.
- D. Motor: Provide submersible alternate current induction type motor designed for hydraulic elevator starting and running requirements.
- E. Motor Starter: Provide soft start starter.
- F. Control Valves: Provide variable two speed proportional type valve. Control valves shall be designed to open and close gradually to give smooth control. Manual shut off valve shall be in line adjacent to pump unit.
- G. Piping: Provide approved steel or wrought iron schedule 80 piping designed for a maximum 400 PSI working pressure.
- H. A minimum of two (2) shut off valves, one (1) in the pit and one (1) in the machine room with oil pressure gauge.
- I. Hydraulic Fluid: Provide low fire potential hydraulic fluid of proper fluid viscosity and stability for equipment and operation.
- J. Sleeves, when passing through walls, shall have a minimum 1-inch clearance between piping and sleeve. Fill with fiberglass packing and seal both ends with fireproof non-hardening mastic, 1/4-inch minimum thickness. The elevator installer shall provide sleeves. Elevator Installer to coordinate the installation of sleeves at all wall penetrations.
- K. Provide a rubber isolation gasket between oil line and any pipe hangers or unistrut of suspended oil lines. Isolate hangers from building structure.
- L. Controller: Provide a solid-state control system. The system shall utilize isolated solid-state input/output interface for the majority of signals. It is understood, where required by code, relays contacts are to be utilized for safety and power control considerations. The use of relays as input or output devices are not acceptable.
- M. Provide automatic two-way leveling and releveled to maintain the leveling of the car within plus or minus 1/4-inch of floor.
- N. Provide permanently marked symbols or letters identical to those on wiring diagrams adjacent to each component.

2.4 OPERATING SYSTEM

A. Two Stop Collective:

1. With car idle, pressure of a hall button at terminal opposite from car location shall call car to that terminal. Pressure on a hall button at terminal where car is standing shall open car and hoistway doors.
2. Pressure on a car button for opposite terminal shall dispatch car to that terminal.
3. Car and hoistway doors shall open automatically when car stops in response to a car or hall call.
4. Doors shall close after a predetermined interval after opening unless closing is interrupted by car door reversal device or door open button in car.
5. Fan and Light Output Timer: Provide an adjustable timer (range 1 to 10-minutes) that when activated will turn off the fan and light within the car. The time will start when the car becomes inactive.
6. Emergency Rescue Unit: When loss of power occurs, elevator shall descend to lowest landing and open doors automatically. After a predetermined time, the doors shall close, and the elevator shall remain inoperative until normal power is restored. The door open button shall operate under battery power. The stand-by power source shall be 12-volt DC battery units installed in the control room; including solid state charger, inverter, fail-safe controls, and testing means in a metal container. Batteries to be rechargeable lead acid or nickel cadmium with a 10-year life expectancy.

2.5 HOISTWAY EQUIPMENT

- A. Cylinder: Provide equipment as applicable for roped hydraulic type elevator. Cylinder shall be closed bottom seamless steel pipe with sufficient thickness to sustain 400-PSI test. Provide cylinder head with adjustable packing gland that shall prevent excessive oil leakage. The cylinder head shall be provided with means to release air from cylinder and be easily repackable.
- B. Plunger: Polished selected steel tubing of proper diameter turned true and smooth. Join multiple section plungers by means of internal couplings. The top of each plunger shall be drilled and tapped for mounting of header sheave assembly. Secure to car frame with suitable isolated platen plates. Provide stop ring to prevent plunger from leaving cylinder.
- C. Sheaves: Provide cast iron machined and grooved for diameter of ropes. Provide cable guards designed to withstand shock and prevent ropes from leaving their proper grooves. All bearings are to be shielded or sealed.
- D. Guide Rails: Planed steel, standard T-sections. Extend rails from pit floor to underside of overhead at top of hoistway.
 1. Provide necessary car rail brackets of sufficient size and design to secure substantial rigidity to prevent spreading or distortion of rails under any condition.
 2. Provide individual brackets of sufficient length to span between the guide rail assembly and the building structure. Provide any additional bracing required.
 3. Guide rail loads shall be shown on Elevator Installer's drawings. Include safety application and seismic loads.
- E. Buffer: Provide buffer striking member on the bottom of the car to stop the elevator before the plunger reaches its down limit of travel.

- F. Hoist and Governor Ropes: Provide type as required for duty.
- G. Governor: Overhead centrifugal type, car driven. Provide self-resetting type without electrical shutdown switches.
- H. Safety: Provide instantaneous type car safety. Safety shall be released only by moving the car in the up direction.
- I. Automatic Terminal Stopping Device: Per Code.
- J. Wiring:
 - 1. Conductors: Provide copper insulated wiring with flame retarding and moisture resisting outer cover. Flexible conduit may be used for short connections. Provide 10 percent spare conductors throughout.
 - 2. Trail Cables: UL labeled fire and moisture resistant outer braid and steel supporting strand. Provide shielded communication wires and car lighting circuits. Prevent cables from rubbing or chafing against hoistway or car items.
 - 3. Remote Wiring: Provide wiring between machine room and hoistway.
- K. Stop Switches. Provide Code required stop switches in the pit.
- L. Earthquake Protective Features: Provide per the Code requirements.

2.6 DOOR AND ENTRANCE EQUIPMENT

- A. General: Provide entrance assembly with UL 1 1/2-hour rating.
 - 1. Frames: Fabricate from manufacturers standard thickness sheet steel; bolted construction to form a one-piece unit. Finish shall be baked enamel finish as selected by Architect.
 - a. Provide designations at a height of 5'-0" above the floor. The plaques shall have a white character on a black background. Grade or main egress level shall be indicated by a 2-inch diameter star to the left of the character.
- B. Sills: Provide aluminum sills with a non-slip surface. Furnish with manufacturer's standard integrated sill support angle.
- C. Struts: Formed steel angle with secure fastening to sill and floor beam above.
- D. Headers: Steel designed to support hangers. Header shall be bolted to supporting struts.
- E. Fascia: Manufacturer's standard gauge steel plates extending from top of header to sill of door above.
- F. Doors: Two speed Horizontal sliding equipped with full height photo electric door sensors. Finish shall be stainless steel No. 4 brushed at all openings. There shall be no visible exposed or protruding fasteners.
- G. Floor Numbers: Elevator hoistways shall have a floor number not less than 4-inches in height, placed on the hoistway doors at intervals such that a person in a stalled elevator, upon opening the car door, can determine the floor position.
- H. Hangers: Provide two-point suspension sheave type with provisions for vertical and lateral adjustments.

- I. Tracks: Cold drawn steel shaped and finished to permit free movement of sheaves.
- J. Closers: Sash, spring or spirator as recommended for opening type.
- K. Interlocks: Electrical contacts shall prevent the operation of the elevator by normal operating devices unless hoistway doors are closed or within tolerances allowed by Code.

2.7 CAR EQUIPMENT

- A. Car Frame: Bolted steel channel construction.
- B. Platform: Isolated type, 1 1/4-inch plywood subfloor.
- C. Guide Shoes: Sliding guides - solid or swivel type with replaceable gibs that assure that lateral motion is minimized while maintaining rail contact.
- D. Sills: Match hoistway sill.
- E. Hangers and Tracks: Same as hoistway entrance doors hangers and tracks.
- F. Door Protection: Provide an infrared door edge that projects an infrared curtain of light guarding the door opening. Arrange to reopen doors if one beam of the curtain is penetrated. Unit shall have Transmitters and Receivers spaced at a minimum distance to provide the maximum amount of protection within the height of the doorway.
- G. Door Operator: Provide power door operator to automatically open and close the car and hoistway doors. The doors shall be capable of smooth and quiet operation without slam or shock.
- H. Floor Covering: Flooring: Burke Tile.
- I. Car Door Contacts: Electrical contacts shall prevent the operation of the elevator by normal operating devices unless car doors are closed or within tolerances allowed by Code.
- J. Door Restrictors: Provide door-restricting devices to prohibit the opening of car doors by more than 4-inches when outside of the unlocking zone.
- K. Car door panels shall be the same construction as hoistway door panel. Finish shall be baked enamel, color as selected by the Architect.
- L. Car Enclosure: Provide manufacturers standard car enclosure with finishes approved by the Architect.
 - 1. General: The enclosure shall be adequately reinforced and ventilated to meet all the Code requirements
 - 2. Shell and Canopy:
 - a. Sides and back shall be 5/8-inch particleboard laminated with plastic laminate. Plastic laminate finish as selected by the Architect. Provide mounting method that prevents rattling or vibration.
 - b. Provide 6'-8" clear height under canopy. Underside painted reflective white. Provide four low voltage energy efficient lighting fixtures that uniformly distributes the light at handrail height as required by Code. The failure of one lamp shall not cause the other lamps to extinguish. The lighting shall be automatic and shall turn ON automatically when the elevator door is opened and stay ON while the elevator is in use. The lights shall turn OFF by a timer when the elevator is not in use.

3. Handrail: Provide a 1/4-inch thick by 2-inch high stainless-steel No. 4 brushed finish flat bar handrail located on the rear wall of the cab. Return ends. Provide adequate mounting. Centerline to be 2'-8" above the finished floor.
4. Ventilation: Single-speed exhaust fan.
5. Emergency Car Lighting and Alarm System: Unit shall provide emergency light in car upon failure or interruption of normal car lighting. Emergency lighting unit shall provide a minimum illumination of 0.2 foot-candle at 4-feet above car floor approximately 1-foot in front of car operating panel for not less than 4-hours. Battery shall be 6-volt minimum, sealed rechargeable lead acid or equal. Battery charger shall be capable of restoring battery to full charge within 16-hours after resumption of normal power. Provide an external means for testing battery, lamps, and alarm bell. When multiple units are provided in a car all units shall illuminate.

2.8 SIGNALS AND FIXTURES

A. Car Operating Panels:

1. Provide one applied type car operating panel mounted with spanner type security fasteners. Panels shall have illuminating pushbuttons numbered to conform to floors served. Buttons shall light to show registration and extinguish when car stops in response to a call. Buttons shall have a minimum dimension of 3/4-inch, be raised 1/8-inch plus or minus 1/32-inch above the surrounding surface, be of square shouldered design, and have a detectable mechanical motion. A minimum clear space of 3/8-inch of other suitable means of separation shall be provided. Each panel shall include an alarm bell button, DOOR OPEN and DOOR CLOSE button. All operating controls shall be located no higher than 4'-0" above the car floor, the keyed in car stop switch and alarm button shall be located no lower than 2'-11" above finished floor height. Provide flush mounted speaker grill for the "Hands Free" telephone. Panel shall also contain keyed light, fan, and inspection switches.
 - a. Braille/Arabic designations shall be identified by a minimum of 5/8-inch Arabic numeral, standard alphabet character, or standard symbol immediately to the left of the control button. Braille shall be located immediately below the numeral, character, or symbol. Controls and emergency equipment shall be identified by raised symbols, including but not limited to, door open, door close, alarm bell, emergency stop and telephone. The call button for the main entry floor shall be designated by a raised star at the left of the floor designations. The plaques shall have raised white colored numerals on a black background.
2. Hall Buttons: Provide a single riser of hall pushbuttons. Station shall include surface mounted faceplate. Centerline of riser to be at 3'-6" above the finished floor. Buttons shall have a minimum dimension of 3/4-inch, be raised 1/8-inch plus or minus 1/32-inch above the surrounding surface, be of square shouldered design, and have a detectable mechanical motion. A minimum clear space of 3/8-inch or other suitable means of separation shall be provided. Button design shall match those used on the car operating panel.

2.9 COMMUNICATION SYSTEM:

- A. Emergency Communication System: Provide automatic dial "Hands-Free" voice, video and text communication system located in the main swing panels. A video display shall suitably identify activation of auto dialer for the visually and hearing impaired. Speaker shall be mounted without faceplate or visible fasteners and located behind the control station. A camera shall be mounted in the front return to establish a visual link between the cab interior and remote communication center. Voice and video communication shall be capable of being heard and viewed from any location within the car enclosure.
1. Communication system shall be monitored on a 24/7/365 basis.
 2. A push button to actuate the communication means shall be provided in car operating panel. The push button shall be visible and permanently identified as "HELP". The identification shall be on or adjacent to the "HELP" button. When the button is actuated, the emergency communication means shall initiate a call for help and establish audio and visual communications.
 3. A video screen shall be provided within the cab, that is activated by authorized personnel, to acknowledge that a communications link has been established. The visual indication shall allow text messaging to be initiated from the communication center. A means shall be provided in the elevator cab to allow acknowledgement of receiving the text message. A video screen shall provide indication that chat, and video connection has been initiated.
 4. Provide engraved emergency instructions above the activation button. Instructions shall read: "To use emergency telephone, press button below. Dialing will occur automatically."
 5. Provide a visual indication, approximately 3/4-inch in diameter, or a jewel that illuminates once a call has been received by the master station. Instructions under the visual indicator or within the lighted jewel shall read: "Assistance is on the way".
 6. Ensure the auto dialer is properly programmed to call an outside telephone number.
- B. Provide wiring from car to telephone terminal box at the elevator controller.

PART 3 EXECUTION

3.1 EXAMINATION OF BUILDING AND CONTRACT DOCUMENTS

- A. The Elevator Contractor shall examine the supporting structure and the conditions under which the work shall be installed and notify the Contractor of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected and are acceptable.
- B. Verify dimensions of supporting structure at the site by accurate field measurements. The work shall be accurately fabricated and fitted to the structure. The Elevator Contractor shall be satisfied by review of the working drawings and field observation that the clearances and the alignments are proper for the installation of this work.
- C. Coordinate works with the work of other trades and provide items to be placed during the installation at the proper time to avoid delays in the overall work. Use Contractor's benchmarks where necessary.

- D. The Elevator Contractor shall review the electrical drawings and verify all conditions for proper installation of this work. Verify the size of all feeders and related equipment and furnish all equipment for proper operation. The Limited-Use / Limited-Application elevator installer shall be responsible for furnishing any electrical changes or upgrades required.

3.2 FIELD QUALITY CONTROL

A. Tests:

1. Perform as required by code, and authorities having jurisdiction.
2. Provide labor, material, equipment, and connections.
3. Repair or replace defective work as required.
4. Pay for restoring or replacing damaged work due to tests.

- B. Final Inspection: When all work is completed, and tested, notify the Owner in writing that the Limited-Use / Limited-Application elevator is ready for final inspection and acceptance test. A testing and inspection date shall then be arranged. The proper operation of every part of the Limited-Use / Limited-Application elevator and compliance with contract requirements of the Code shall be demonstrated to the Owner. Furnish all test instruments, weights, and materials, required at the time of final inspection.

1. Reinspection: If any equipment is found to be damaged or defective, or if the performance of the Limited-Use / Limited-Application elevator does not conform to the requirements of the contract specifications or the Safety Code, no approval or acceptance of the Limited-Use / Limited-Application elevator shall be issued until all defects have been corrected. When the repairs and adjustments have been completed and the discrepancies corrected. The Owner shall be notified, and the Limited-Use / Limited-Application elevator shall be reinspected. The rejected Limited-Use / Limited-Application elevator shall not be used until it has been re-inspected and approved.

3.3 ADJUSTING AND CLEANING

- A. All equipment shall be adjusted prior to final testing and acceptance.
- B. Paint exposed work soiled or damaged during installation. Repair to match adjoining work prior to final acceptance.

3.4 INSTRUCTIONS

- A. Upon completion of all work, the Elevator Contractor shall provide an instruction period. Instructions shall be given by competent supervisory personnel and shall apply to actual field conditions. The instructions shall cover, but shall not be limited to the following:
1. Operation of Limited-Use / Limited-Application elevator maintenance, adjustment, troubleshooting and diagnostic procedures.

END OF SECTION

SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Basic electrical requirements for all Division 26 Sections.

1.2 RELATED WORK

- A. General requirements specifically applicable to Division 26 in addition to the provisions of Division 1.
- B. Work specified in other Divisions and Division 26: (See Appendix A - Table of Contents)

1.3 QUALITY ASSURANCE

- A. Provide equipment and materials which conform to the standards effective as of the date of the Contract Documents as promulgated by the following bodies:
 - 1. National Electrical Manufacturers' Association (NEMA).
 - 2. Electrical Testing Laboratories (ETL).
 - 3. American National Standards Institute (ANSI).
 - 4. Insulated Cable Engineers Association (ICEA).

1.4 SUBMITTALS

- A. Submit electronic copies of manufacturer's submittal sheets or shop drawings for major items of electrical equipment and for any items specifically requested by the Electrical Engineer. When possible, make all electrical submittals at the same time.

1.5 INSTALLATION DRAWINGS

- A. Prepare dimensionally accurate floor plans of each electrical and signal room and/or closet, fire control room and the like, drawn to 1/4" scale minimum. Submit electronic copies for review with two prints for Architect's record. Indicate all equipment within the rooms to scale based on shop drawing data, include structural support for suspended equipment and description of seismic bracing and fastening. Indicate system and equipment grounding details as applicable. Review elevator machine room shop drawings and coordinate location of electrical gear to maintain clearances. Submit with shop drawings.
- B. Where conduit runs, 2" trade size and larger, are run in exposed locations, prepare dimensionally accurate floor plans indicating routing, coordinated with work of other trades and the structure. Submit legible reproducible transparencies with two prints for review.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain Record Documents which clearly indicate variances from the specified systems and which accurately locate all underground electrical conduits and structures.

1.7 EXAMINATION OF DOCUMENTS

- A. Before submitting a bid, visit the Project Site and become familiar with conditions which may be pertinent to, or affect the cost of, the electrical installation.
- B. Become acquainted with the Work of other installers whose activities will adjoin or be affected by the electrical Work. Consult with these other installers and study all pertinent Drawings in order to coordinate the Work and to avoid conflicts, omissions and delays.

1.8 PERMITS AND FEES

- A. Obtain and pay for all necessary electrical permits and fees.

1.9 SUBSTITUTIONS

- A. Refer to other Sections of these Specifications for substitution requirements.

1.10 DRAWINGS

- A. For purposes of clarity and legibility, the electrical Drawings are essentially diagrammatic. although the size and location of electrical equipment is drawn to scale wherever possible, make use of all data in all of the Contract Documents, and verify this at the Project Site. Determine the exact location of conduits, outlets and equipment by the study of details, shop drawings and/or the Architect's directions.
- B. The electrical Drawings show the required size and points of termination of the conduits and the quantity and size of the conductors within. However, the Drawings do not show all of the necessary conduit bends. Install conduits in such a manner as to conform to structure, avoid obstruction, preserve headroom and keep passageways and openings clear.
- C. Locate outlets symmetrically with architectural elements, notwithstanding the fact that the locations shown of the electrical drawings may be distorted for clarity of representation.
- D. The architectural Drawings take precedence over the electrical Drawings. Study the reflected ceiling plans and interior elevations to determine the exact location of lighting fixtures, wall-mounted devices and fixtures, etc. The Architect has taken a very active role in the placement of these items. Should there be a conflict between locations shown on the architectural and electrical drawings, contact the Engineer for clarification prior to rough-in.
- E. Before submitting a bid, examine all pertinent Contract Documents for electrical requirements which are not necessarily indicated on the electrical Drawings and include in the bid a sum which is sufficient to cover the costs of these other requirements.
- F. Should it be perceived that the Contract Documents do not sufficiently define the required electrical work, contact the Architect for clarification or further description. Failure to do this will be construed as evidence of an understanding of the required electrical systems and their installation.

1.11 REQUESTS FOR INFORMATION (RFI'S)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified (refer to Division 1).
 - 1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work

- or work of subcontractors.
 - 2. RFIs shall address single questions and related issues only.
 - 3. All RFIs shall be thoroughly reviewed and approved by the General Contractor and/or Construction Manager for accuracy and need for information required before submittal to Owner's Design Representative.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
- 1. Project name.
 - 2. Project number.
 - 3. Date.
 - 4. Name of Contractor.
 - 5. Name of Architect.
 - 6. RFI number, numbered sequentially and unique.
 - 7. RFI subject.
 - 8. Specification Section number and title and related paragraphs, as appropriate.
 - 9. Drawing number and detail references, as appropriate.
 - 10. Field dimensions and conditions, as appropriate.
 - 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 12. Contractor's signature.
 - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow a minimum three business days for Engineer's response for each RFI, plus additional time for Architect and General Contractor to review and forward. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
- 1. The following Contractor-generated RFIs will be returned without action:
 - a. Incomplete RFIs or inaccurately prepared RFIs.
 - b. RFIs submitted without indication of review and approval for submission by General Contractor.
 - c. RFIs addressing multiple unrelated issues.
 - d. Requests for approval of submittals.
 - e. Requests for approval of substitutions.
 - f. Requests for approval of Contractor's means and methods.
 - g. Requests for information already indicated in the Contract Documents.
 - h. Requests for adjustments in the Contract Time or the Contract Sum.
 - i. Requests for interpretation of Engineer's actions on submittals.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.

1.12 VERIFICATION OF AVAILABLE SPACE

- A. Throughout the course of construction, verify that sufficient space will be available for the equipment to be installed.

1.13 IDENTIFICATION MARKINGS

- A. Switchboards, distribution and branch panelboards, terminal cabinets and other miscellaneous electrical equipment shall be identified with laminated black and white engraved plastic nameplates which properly identify each item. Nameplates shall be attached with steel rivets or bolts and nuts.

1.14 WATERPROOFING

- A. Wherever electrical Work pierces waterproofing or waterproofing membranes, install it in an approved watertight manner.

1.15 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect electrical equipment and materials during transit, storage and handling to prevent damage, soiling and deterioration.
- B. Provide new electrical materials and deliver them to the Project Site in unbroken packages.

1.16 CUTTING AND PATCHING

- A. Provide core drilling, cutting and patching of existing construction and surfaces for the installation of electrical systems. Concrete, asphalt or plaster surfaces which have been damaged by such drilling or cutting shall be patched and repaired to match the surrounding surface.

1.17 ADJUST AND CLEAN

- A. Keep the Project Site free from accumulations of electrical rubbish and debris. Remove such accumulations from the Project Site.
- B. Thoroughly clean electrical equipment and materials of plaster, cement and other foreign materials and leave smooth, clean and dry.

1.18 FIELD QUALITY CONTROL

- A. At project Completion or upon request of the Architect anytime, make necessary tests under the observation of the Architect which will ensure that electrical equipment, materials and installation methods are as specified.
- B. At Project Completion, test electrical loads and controls under full operating conditions and immediately replace, at no cost to the Owner, defective electrical equipment, devices and workmanship. Make standard electrical equipment, materials and performance tests and also tests as may be required by the Architect, such as electrical insulation and ground resistance, or temperature rise.

- C. Closing-in of Work: Do not allow Electrical Work to be covered or enclosed until it has been observed by the Architect's Representative. Should unobserved Electrical Work be covered or enclosed, uncover it for observation and then make repairs as necessary to restore the Electrical Work and the Work of other affected installers to its original and proper condition, at no cost to the Owner.

PART 2 PRODUCTS

- 2.1 NOT USED.

PART 3 EXECUTION

- 3.1 NOT USED.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 1. Connectors, splices, and terminations rated 600 V and less.
- B. Related Sections include the following:
 - 1. Division 27 Section "Communications Horizontal Cabling" for cabling used for voice and data circuits.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control test reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with the California Electrical Code.

PART 2 PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, XHHW.

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. O-Z/Gedney; EGS Electrical Group LLC.
 - 4. 3M; Electrical Products Division.
 - 5. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.

- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
 - a. Feeders to all panels
 - b. Feeders to all motors over 1 HP
 - c. Feeders and branch circuits to all Mechanical Equipment
 - d. Feeders and branch circuits to all elevators.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Grounding systems and equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Ground rings.
 - 4. Grounding arrangements and connections for separately derived systems.
- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Minimum length shall be 18 inches or as shown on drawings. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar. Provide exothermic where shown on drawings and where extending main service ground

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch in diameter by 10 feet.

PART 3 EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus on insulated spacers 2 inches minimum from wall, 18 inches above finished floor unless otherwise indicated.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or hand-hole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, non-shrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or hand-hole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation. Provide No. 6 AWG minimum copper ground conductor from ground rod to meter conduit, per utility standards.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Signal and Communication Equipment: In addition to grounding and bonding required by the California Electrical Code, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
 - 1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location. Refer to drawings for additional requirements.
 - 2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-18-inch grounding bus. Refer to drawings for additional requirements.
 - 3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
 - 4. Provide one #6 AWG ground conductor from ladder rack, telecommunications post rack, or telecommunications ground bus bar and bond.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole.
 - 1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange.
2. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.

1. Install tinned-copper conductor not less than No. 3/0 AWG for ground ring and for taps to building steel. Refer to drawings for additional information.
2. Bury ground ring not less than 24 inches from building's foundation.
3. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
4. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
5. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.5 LABELING

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seep-

age and without chemical treatment or other artificial means of reducing natural ground resistance.

- b. Perform tests by fall-of-potential method according to IEEE 81.
- 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 2. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
 - 3. Manhole Grounds: 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
 - 1. Division 26 Section "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.

1.6 QUALITY ASSURANCE

- A. Comply with the California Electrical Code.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07.

PART 2 PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. Thomas & Betts Corporation.
 - e. Unistrut; Tyco International, Ltd.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication, applied according to MFMA-4.
 - 3. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

- 3) MKT Fastening, LLC.
- 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Hilti Inc.
 - 3) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 4) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with single-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified herein.

- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in the California Electrical Code.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Bolt to concrete inserts.
 - 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 3. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts or Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 4. To Light Steel: Sheet metal screws.
 - 5. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 2500 psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Surface raceways.
5. Boxes, enclosures, and cabinets.
6. Handholes and boxes for exterior underground cabling.

- B. Related Requirements:

1. Division 27 Section "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.
2. Division 28 Section "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical non-metallic tubing.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquid-tight flexible metal conduit.
- F. LFNC: Liquid-tight flexible nonmetallic conduit.
- G. RNC: Rigid nonmetallic conduit
- H. GRC: Galvanized rigid steel conduit.
- I. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Source quality-control reports.

PART 2 PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 3. Anamet Electrical, Inc.
 - 4. Electri-Flex Company.
 - 5. O-Z/Gedney; a brand of EGS Electrical Group.
 - 6. Republic Conduit.
 - 7. Robroy Industries.
 - 8. Southwire Company.
 - 9. Thomas & Betts Corporation.
 - 10. Western Tube and Conduit Corporation.
 - 11. Wheatland Tube Company; a division of John Maneely Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- F. EMT: Comply with ANSI C80.3 and UL 797.
- G. FMC: Comply with UL 1; zinc-coated steel or aluminum.

- H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and the California Electrical Code.
 - 2. Fittings for EMT:
 - a. Material: Steel
 - 3. Type: Setscrew.
 - 4. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- J. Joint Compound for IMC or GRC: Approved, as defined in the California Electrical Code, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 PVC-COATED STEEL CONDUIT

- A. Manufacturers: Subject to compliance with requirements manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Kor Kap
 - 2. Perma-Cote
 - 3. Plasti Bond
 - 4. Thomas & Betts
- B. Description: PVC-coated rigid steel conduit.
 - 1. ETL Verified and must bear the ETL PVC-001 label.
 - 2. Hot dip galvanized inside and out.
 - 3. Comply with NEMA RN 1.
 - 4. PVC Coating Thickness: 0.040 inch (1 mm), minimum.
 - 5. Conduit must have a urethane coating on the interior of all conduit and fittings
 - a. Urethane coating thickness: .002 inch (.05 mm), minimum.
- C. Fittings for Conduit; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Condulets ½" through 2" diameter shall have tongue-in-groove gasket.
 - 2. Condulets be supplied with plastic encapsulated stainless steel cover screws.

2.3 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.
 - 3. Arnco Corporation.
 - 4. CANTEX Inc.

5. CertainTeed Corp.
 6. Condux International, Inc.
 7. Electri-Flex Company.
 8. Kraloy.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Niedax-Kleinhuis USA, Inc.
 11. RACO; a Hubbell company.
 12. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- C. ENT: Comply with NEMA TC 13 and UL 1653.
- D. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- E. LFNC: Comply with UL 1660.
- F. Rigid HDPE: Comply with UL 651A.
- G. Continuous HDPE: Comply with UL 651B.
- H. RTRC: Comply with UL 1684A and NEMA TC 14.
- I. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- J. Fittings for LFNC: Comply with UL 514B.
- K. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line, Inc.
 2. Hoffman; a Pentair company.
 3. Mono-Systems, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1, Type 3R, Type 4, or Type 12 as shown on drawings, unless otherwise indicated, and sized according to the California Electrical Code.
1. Metal wireways installed outdoors shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.

- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.5 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Mono-Systems, Inc.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.
- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems Division.
 - b. Mono-Systems, Inc.
 - c. Panduit Corp.
 - d. Wiremold / Legrand.

2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Adalet.
 - 2. Cooper Technologies Company; Cooper Crouse-Hinds.
 - 3. EGS/Appleton Electric.
 - 4. Erickson Electrical Equipment Company.
 - 5. FSR Inc.
 - 6. Hoffman; a Pentair company.
 - 7. Hubbell Incorporated; Killark Division.
 - 8. Kraloy.

9. Milbank Manufacturing Co.
 10. Mono-Systems, Inc.
 11. O-Z/Gedney; a brand of EGS Electrical Group.
 12. RACO; a Hubbell Company.
 13. Robroy Industries.
 14. Spring City Electrical Manufacturing Company.
 15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
 16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Metal Floor Boxes:
1. Material: Cast metal
 2. Type: Fully adjustable.
 3. Shape: Rectangular.
 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- J. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- K. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- L. Gangable boxes are prohibited.
- M. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1, Type 3R, Type 4, or Type 12 as shown on drawings with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures: Plastic.

3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

N. Cabinets:

1. NEMA 250, Type 1, Type 3R, or Type 12 as shown on drawings, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in the California Electrical Code, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. CDR Systems Corporation; Hubbell Power Systems.
 - d. NewBasis.
 - e. Oldcastle Precast, Inc.; Christy Concrete Products.
 - f. Synertech Moulded Products; a division of Oldcastle Precast, Inc.
2. Standard: Comply with SCTE 77.
3. Configuration: Designed for flush burial with openbottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC."
7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.8 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - 1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
 - 2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC or IMC.
 - 2. Concealed Conduit, Aboveground: GRC, IMC, or EMT.
 - 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried or concrete encased where shown.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 4. Exposed and Subject to Severe Physical Damage: GRC or IMC. Raceway locations include the following:
 - a. Mechanical rooms.
 - b. Electrical rooms.
 - c. Outdoors
 - d. On roofs
 - 5. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 7. Damp or Wet Locations: GRC or IMC.
 - 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel or nonmetallic in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch. 1-inch minimum trade size for ENT underground outdoor use.

- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
 - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface raceways only where indicated on Drawings.
- G. Do not install non-metallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with the Electrical Code limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of four 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. A. Support conduit within 12 inches of enclosures to which attached.
- I. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches Insert dimension of concrete cover in all directions.

4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- J. Stub-ups to Above Recessed Ceilings:
 1. Use EMT, IMC, or RMC for raceways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
 3. Stub underground telecommunications conduits into telecom rooms with PVC coated, Rigid conduit elbows with large radius (10 times the diameter of the conduit)
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Surface Raceways:
 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- T. Install raceway sealing fittings at accessible locations according to the California Electrical Code and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to the California Electrical Code.

- U. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by the California Electrical Code.
- V. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- W. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- X. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- Y. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- Z. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

- AA. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- BB. Locate boxes so that cover or plate will not span different building finishes.
- CC. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- DD. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- EE. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
5. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems."
6. Mandrel clean conduits 2" and larger. In spare conduits, provide pull rope and jackmoon expandable plugs to secure water-tight. Tie pull rope to interior eyelid at both ends. Provide 1 #10 tracer wire.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes with bottom below frost line, 18 inches below grade.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 44

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Round sleeves.
- 2. Rectangular sleeves.
- 3. Sleeve seal systems.
- 4. Grout.
- 5. Pourable sealants.
- 6. Foam sealants.

- B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

2.1 ROUND SLEEVES

- A. Wall Sleeves, Steel:

- 1. Description: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

- B. Wall Sleeves, Cast Iron:

- 1. Description: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop.

- C. Pipe Sleeves, PVC:

- 1. Description: ASTM D1785, Schedule 40.

- D. Molded Sleeves, PVC:

- 1. Description: With nailing flange for attaching to wooden forms.

- E. Molded Sleeves, PE or PP:

1. Description: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sheet Metal Sleeves, Galvanized Steel, Round:

1. Description: Galvanized-steel sheet; thickness not less than 0.0239-inch (0.6-mm); round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 RECTANGULAR SLEEVES

A. Sheet Metal Sleeves, Galvanized Steel, Rectangular:

1. Description:
 - a. Material: Galvanized sheet steel.
 - b. Minimum Metal Thickness:
 - 1) For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness must be 0.052 inch (1.3 mm).
 - 2) For sleeve cross-section rectangle perimeter not less than 50 inches (1270 mm) or with one or more sides larger than 16 inches (400 mm), thickness must be 0.138 inch (3.5 mm).

2.3 SLEEVE SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.
1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 2. Pressure Plates: Stainless steel.
 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 GROUT

- A. Description: Non-shrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

2.5 POURABLE SEALANTS

- A. Description: Single-component, neutral-curing elastomeric sealants of grade indicated below.
1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2.6 FOAM SEALANTS

- A. Description: Multicomponent, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam. Foam expansion must not damage cables or crack penetrated structure.

PART 3 EXECUTION

3.1 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless sleeve seal system is to be installed or seismic criteria require different clearance.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- C. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for wall assemblies.
- D. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seal systems. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- F. Underground, Exterior-Wall and Floor Penetrations:
 - 1. Install cast-iron pipe sleeves with integral water-stops. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve seal system. Install sleeve during construction of floor or wall.
 - 2. Install steel pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve seal system. Grout sleeve into wall or floor opening.

3.2 INSTALLATION OF RECTANGULAR SLEEVES AND SLEEVE SEALS

- A. Install sleeves in existing walls without compromising structural integrity of walls. Do not cut structural elements without reinforcing the wall to maintain the designed weight bearing and wall stiffness.
- B. Install conduits and cable with no crossings within the sleeve.
- C. Fill opening around conduits and cables with expanding foam without leaving voids.
- D. Provide metal sheet covering at both wall surfaces and finish to match surrounding surfaces. Metal sheet must be same material as sleeve.

3.3 INSTALLATION OF SLEEVE SEAL SYSTEMS

- A. Install sleeve seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Labels.
 - 2. Bands and tubes.
 - 3. Tapes and stencils.
 - 4. Tags.
 - 5. Signs.
 - 6. Cable ties.
 - 7. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.
- B. Comply with the California Electrical Code.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.

- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces] <Insert temperature change>.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder conductors.
 - 1. Color shall be factory applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 5. Color for Neutral: White.
 - 6. Color for Equipment Grounds: Green.
 - 7. Colors for Isolated Grounds: Green with two or more yellow stripes.
- C. Raceways and Cables Carrying Circuits at More Than 600 V:
 - 1. Black letters on an orange field.
 - 2. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."
- D. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- E. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

F. Equipment Identification Labels:

1. Black letters on a white field.
2. Red letters on a white field or white letters on red field (laminated cored labels). For Emergency branches, fire alarm system.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
- C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
 1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 2. Marker for Labels:
 - a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - b. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
 - b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F (93 deg C). Comply with UL 224.

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide; compounded for outdoor use.

- C. Tape and Stencil: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers placed diagonally over orange background and are 12 inches (300 mm) wide. Stop stripes at leg-ends.
- D. Floor Marking Tape: 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
- E. Underground-Line Detectable Warning Tape:
 - 1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 - d. Non-detectable tape not allowed.
 - 2. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".
 - 3. Tape Type I:
 - a. Pigmented polyolefin, bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches (75 mm).
 - c. Thickness: 4 mils (0.1 mm).
 - d. Weight: 18.5 lb/1000 sq. ft. (9.0 kg/100 sq. m).
 - e. Tensile according to ASTM D882: 30 lbf (133.4 N) and 2500 psi (17.2 MPa).
 - 4. Tape Type II:
 - a. Multilayer laminate, consisting of high-density polyethylene scrim coated with pigmented polyolefin; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches (75 mm).
 - c. Thickness: 12 mils (0.3 mm).
 - d. Weight: 36.1 lb/1000 sq. ft. (17.6 kg/100 sq. m).
 - e. Tensile according to ASTM D882: 400 lbf (1780 N) and 11,500 psi (79.2 MPa).
 - 5. Tape Type ID:
 - a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches (75 mm).
 - c. Overall Thickness: 5 mils (0.125 mm).

- d. Foil Core Thickness: 0.35 mil (0.00889 mm).
 - e. Weight: 28 lb/1000 sq. ft. (13.7 kg/100 sq. m).
 - f. Tensile according to ASTM D882: 70 lbf (311.3 N) and 4600 psi (31.7 MPa).
6. Tape Type IID:
- a. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches (75 mm).
 - c. Overall Thickness: 8 mils (0.2 mm).
 - d. Foil Core Thickness: 0.35 mil (0.00889 mm).
 - e. Weight: 34 lb/1000 sq. ft. (16.6 kg/100 sq. m).
 - f. Tensile according to ASTM D882: 300 lbf (1334 N) and 12,500 psi (86.1 MPa).
- F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.6 TAGS

- A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
- B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch (0.38 mm) min. thick, color-coded for phase and voltage level, with factory [screened] [printed] permanent designations; punched for use with self-locking cable tie fastener.
- C. Write-on Tags:
- 1. Polyester Tags: 0.010 inch (0.25 mm) min. thick, with corrosion-resistant grommet and cable tie for attachment.
 - 2. Marker for Tags:
 - a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - b. Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.7 SIGNS

- A. Baked-Enamel Signs:
- 1. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 2. 1/4-inch (6.4-mm) grommets in corners for mounting.
 - 3. Nominal Size: 7 by 10 inches (180 by 250 mm).
- B. Metal-Backed Butyrate Signs:
- 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch (1-mm) galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
 - 2. 1/4-inch (6.4-mm) grommets in corners for mounting.

3. Nominal Size: 10 by 14 inches (250 by 360 mm).

C. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
 - a. For signs up to 20 sq. in. (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
 - b. For signs larger than 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick.
 - c. Engraved legend with black letters on white face; white letters on red face for emergency or fire alarm.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch (6.4-mm) grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch (5 mm).
 2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D638: 12,000 psi (82.7 MPa).
 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 4. Color: Black, except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch (5 mm).
 2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D638: 12,000 psi (82.7 MPa).
 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
1. Minimum Width: 3/16 inch (5 mm).
 2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D638: 7000 psi (48.2 MPa).
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."

2. "POWER."
3. "UPS."
4. "Fire Alarm".

M. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

N. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.

O. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

P. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

R. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.

S. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

T. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

U. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

V. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.

W. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.
2. Limit use of underground-line warning tape to direct-buried cables.
3. Install underground-line warning tape for direct-buried cables and cables in raceways.

X. Metal Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using general-purpose cable ties.

Y. Nonmetallic Preprinted Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using general-purpose cable ties.

Z. Write-on Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using general-purpose cable ties.

AA.Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on minimum 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use signs minimum 2 inches (50 mm) high.

BB.Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

CC. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.

DD. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil. Stencil legend "DANGER - CONCEALED HIGH-VOLTAGE WIRING" with 3-inch- (75-mm-) high, black letters on 20-inch (500-mm) centers.

1. Locate identification at changes in direction, at penetrations of walls and floors, and at 10-foot (3-m) maximum intervals.
- D. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Vinyl wrap-around labels.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- E. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120V to Ground: Identify with self-adhesive vinyl tape applied in bands.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- F. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
 4. "FIRE ALARM".
- G. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use self-adhesive wraparound labels or self-adhesive vinyl tape to identify the phase.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- H. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.
- I. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- J. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.
- K. Conductors to Be Extended in the Future: Attach write-on tags and/or marker tape to conductors and list source.
- L. Auxiliary Electrical Systems Conductor Identification: Marker tape or Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

- M. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- N. Concealed Raceways and Duct Banks, More Than 600 V, within Buildings: Apply floor marking tape to the following finished surfaces:
 - 1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
 - 2. Wall surfaces directly external to raceways concealed within wall.
 - 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- O. Workspace Indication: Apply floor marking tape or tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with the California Electrical Code and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- P. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- Q. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive laminated acrylic or melamine plastic labels.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- R. Arc Flash Warning Labeling: Self-adhesive labels.
- S. Operating Instruction Signs: Laminated acrylic or melamine plastic signs.
- T. Emergency Operating Instruction Signs: Laminated a Acrylic or melamine plastic signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.
- U. Equipment Identification Labels:
 - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign 4 inches (100 mm) high].
 - 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive indoors, screwed on outdoors, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchgear.
 - e. Switchboards.
 - f. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.

- g. Emergency system boxes and enclosures.
- h. Motor-control centers.
- i. Enclosed switches.
- j. Enclosed circuit breakers.
- k. Enclosed controllers.
- l. Variable-speed controllers.
- m. Push-button stations.
- n. Power-transfer equipment.
- o. Contactors.
- p. Remote-controlled switches, dimmer modules, and control devices.
- q. Battery-inverter units.
- r. Battery racks.
- s. Power-generating units.
- t. Monitoring and control equipment.
- u. UPS equipment, battery cabinets and bypass units.
- v. Telecommunications equipment racks and telecommunications equipment cabinets, floor and wall types
- w. Fire alarm panels, power supplies, cabinets and dialer cabinets
- x. Nurses call cabinets and power supplies
- y. Security cabinets, door controllers, card readers and power supplies. Coordinate with owner labeling protocol.
- z. Low voltage cabinets and corresponding power supplies.

END OF SECTION

SECTION 26 05 73.13
SHORT-CIRCUIT STUDIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.
- B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.
- C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.
- F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.
- G. SCCR: Short-circuit current rating.
- H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. For computer software program to be used for studies.
 - 2. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form (PDF).
 - a. Short-circuit study input data, including completed computer program input data sheets.

- b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
 - 1) Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.
 - 2) Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

- 1. For Power Systems Analysis Software Developer.
- 2. For Power System Analysis Specialist.
- 3. For Field Adjusting Agency.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

- 1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
- 2. The following are from the Short-Circuit Study Report:
 - a. Final one-line diagram.
 - b. Final Short-Circuit Study Report.
 - c. Short-circuit study data files.
 - d. Power system data.

1.7 QUALITY ASSURANCE

- A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.
- B. Software algorithms shall comply with requirements of standards and guides specified in this Section.
- C. Manual calculations are unacceptable.
 - 1. Power System Analysis Software Qualifications: Computer program shall be designed to perform short-circuit studies or have a function, component, or add-on module designed to perform short-circuit studies.
 - 2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

- E. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.
- F. Field Adjusting Agency Qualifications:
 - 1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.
 - 2. A member company of NETA.
 - 3. Acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

- A. Comply with IEEE 399 and IEEE 551.
 - 1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- B. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram of modeled power system, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Conductor types, sizes, and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations and ratings.
 - 6. Derating factors and environmental conditions.
 - 7. Any revisions to electrical equipment required by the study.
- D. Comments and recommendations for system improvements or revisions in a written document, separate from one-line diagram.
- E. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.
 - 2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
 - 3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 - 4. For devices and equipment rated for asymmetrical fault current, apply multiplication

- factors listed in standards to 1/2-cycle symmetrical fault current.
5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
- F. Short-Circuit Study Input Data:
1. One-line diagram of system being studied.
 2. Power sources available.
 3. Manufacturer, model, and interrupting rating of protective devices.
 4. Conductors.
 5. Transformer data.
- G. Short-Circuit Study Output Reports:
1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Equivalent impedance.
 2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Calculated asymmetrical fault currents:
 - 1) Based on fault-point X/R ratio.
 - 2) Based on calculated symmetrical value multiplied by 1.6.
 - 3) Based on calculated symmetrical value multiplied by 2.7.
 3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

3.1 POWER SYSTEM DATA

- A. Obtain all data necessary for conduct of the study.
 - 1. Verify completeness of data supplied on one-line diagram. Call any discrepancies to Architect's attention.
 - 2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
 - 3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.
- B. Gather and tabulate the required input data to support the short-circuit study. Comply with requirements in Section 017839 "Project Record Documents" for recording circuit protective device characteristics. Record data on a Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:
 - 1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Obtain electrical power utility impedance at the service.
 - 3. Power sources and ties.
 - 4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 - 5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
 - 6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
 - 7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 - 8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
 - 9. Motor horsepower and NEMA MG 1 code letter designation.
 - 10. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
 - 11. Derating factors.

3.2 SHORT-CIRCUIT STUDY

- A. Perform study following the general study procedures contained in IEEE 399.
- B. Calculate short-circuit currents according to IEEE 551.
- C. Base study on device characteristics supplied by device manufacturer.

- D. Extent of electrical power system to be studied is indicated on Drawings.
- E. Begin short-circuit current analysis at the service, extending down to system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240 V ac or less when supplied by a single transformer rated less than 125 kVA.
 - 3. Emergency system.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for the fault-current dc decrement to address asymmetrical requirements of interrupting equipment.
- H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- I. Include in the report identification of any protective device applied outside its capacity.

END OF SECTION

SECTION 26 05 73.16
COORDINATION STUDIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.
 - 1. Study results shall be used to determine coordination of series-rated devices.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.
- B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.
- C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power System Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.
- F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.
- G. SCCR: Short-circuit current rating.
- H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. For computer software program to be used for studies.
 - 2. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form (PDF).

- a. Coordination-study input data, including completed computer program input data sheets.
 - b. Study and equipment evaluation reports.
3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Power System Analysis Software Developer.
2. For Power Systems Analysis Specialist.
3. For Field Adjusting Agency.

B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. The following are from the Coordination Study Report:
 - a. Final one-line diagram.
 - b. Final protective device coordination study.
 - c. Coordination study data files.
 - d. List of all protective device settings.
 - e. Time-current coordination curves.
 - f. Power system data.

1.7 QUALITY ASSURANCE

A. Studies shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power System Analysis Software Qualifications:

1. Computer program shall be designed to perform coordination studies or have a function, component, or add-on module designed to perform coordination studies.
2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

- E. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- F. Field Adjusting Agency Qualifications:
 - 1. Employer of a NETA ETT-Certified Technician Level III responsible for all field adjusting of the Work.
 - 2. A member company of NETA.
 - 3. Acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

- A. Comply with IEEE 242 and IEEE 399.
- B. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.
 - 1. Optional Features:
 - a. Arcing faults.
 - b. Simultaneous faults.
 - c. Explicit negative sequence.
 - d. Mutual coupling in zero sequence.

2.2 COORDINATION STUDY REPORT CONTENTS

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram of modeled power system, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Conductor types, sizes, and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
 - 6. Any revisions to electrical equipment required by the study.
 - 7. Study Input Data: As described in "Power System Data" Article.

- a. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
- D. Protective Device Coordination Study:
- 1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.
 - a. Phase and Ground Relays:
 - 1) Device tag.
 - 2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
 - 3) Recommendations on improved relaying systems, if applicable.
 - b. Circuit Breakers:
 - 1) Adjustable pickups and time delays (long time, short time, and ground).
 - 2) Adjustable time-current characteristic.
 - 3) Adjustable instantaneous pickup.
 - 4) Recommendations on improved trip systems, if applicable.
 - c. Fuses: Show current rating, voltage, and class.
- E. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
- 1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
 - 2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
 - 3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
 - 4. Plot the following listed characteristic curves, as applicable:
 - a. Power utility's overcurrent protective device.
 - b. Medium-voltage equipment overcurrent relays.
 - c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
 - d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
 - e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
 - f. Cables and conductors damage curves.
 - g. Ground-fault protective devices.
 - h. Motor-starting characteristics and motor damage points.

- i. Generator short-circuit decrement curve and generator damage point.
- j. The largest feeder circuit breaker in each motor-control center and panelboard.
- 5. Maintain selectivity for tripping currents caused by overloads.
- 6. Maintain maximum achievable selectivity for tripping currents caused by overloads on series-rated devices.
- 7. Provide adequate time margins between device characteristics such that selective operation is achieved.
- 8. Comments and recommendations for system improvements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance of the Work. Devices to be coordinated are indicated on Drawings.
 - 1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

- A. Obtain all data necessary for conduct of the overcurrent protective device study.
 - 1. Verify completeness of data supplied in one-line diagram on Drawings. Call any discrepancies to Architect's attention.
 - 2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
 - 3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.
- B. Gather and tabulate all required input data to support the coordination study. List below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:
 - 1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Electrical power utility impedance at the service.
 - 3. Power sources and ties.
 - 4. Short-circuit current at each system bus (three phase and line to ground).
 - 5. Full-load current of all loads.
 - 6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Maximum demands from service meters.
13. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.
14. Motor horsepower and NEMA MG 1 code letter designation.
15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
16. Medium-voltage cable sizes, lengths, conductor material, cable construction, metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).
17. Data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, showing the following:
 - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
 - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
 - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
 - d. Generator thermal-damage curve.
 - e. Ratings, types, and settings of utility company's overcurrent protective devices.
 - f. Special overcurrent protective device settings or types stipulated by utility company.
 - g. Time-current-characteristic curves of devices indicated to be coordinated.
 - h. Manufacturer, frame size, interrupting rating in amperes root mean square (rms) symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
 - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for over-current relays.
 - j. Switchgear, switchboards, motor-control centers, and panelboards ampacity, and SCCR in amperes rms symmetrical.
 - k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.3 COORDINATION STUDY

- A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.
- B. Comply with IEEE 399 for general study procedures.
- C. Base study on device characteristics supplied by device manufacturer.
- D. Extent of electrical power system to be studied is indicated on Drawings.
- E. Begin analysis at the service, extending down to system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240 V ac or less when supplied by a single transformer rated less than 125 kVA.
 - 3. Emergency system.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. Transformer Primary Overcurrent Protective Devices:
 - 1. Device shall not operate in response to the following:
 - a. Inrush current when first energized.
 - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
 - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
 - 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- H. Motor Protection:
 - 1. Select protection for low-voltage motors according to IEEE 242 and the California Electrical Code.
 - 2. Select protection for motors served at voltages more than 600 V according to IEEE 620.
- I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- J. Generator Protection: Select protection according to manufacturer's written instructions and to IEEE 242.
- K. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low-voltage, three-phase ac systems. Also account for fault-current dc decrement, to address asymmetrical requirements of interrupting equipment.

- L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- M. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to short-circuit ratings.
 - 2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.
 - 3. Any application of series-rated devices shall be recertified, complying with requirements in the California Electrical Code.
 - 4. Include in the report identification of any protective device applied outside its capacity.

3.4 LOAD-FLOW AND VOLTAGE-DROP STUDY

- A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:
 - 1. Determine load flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
 - 2. Determine load flow and voltage drop based on 80 percent of the design capacity of load buses.
 - 3. Prepare load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by the California Electrical Code.

3.5 MOTOR-STARTING STUDY

- A. Perform a motor-starting study to analyze the transient effect of system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of motor starting on the power system stability.
- B. Prepare the motor-starting study report, noting light flicker for limits proposed by IEEE 141, and voltage sags so as not to affect operation of other utilization equipment on system supplying the motor.

3.6 FIELD ADJUSTING

- A. Adjust relay and protective device settings according to recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of equipment manufacturer under the "Startup and Acceptance Testing" contract portion.
- B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.
- C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification.
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.7 DEMONSTRATION

- A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in the following:
 - 1. Acquaint personnel in fundamentals of operating the power system in normal and emergency modes.
 - 2. Hand-out and explain the coordination study objectives, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting time-current coordination curves.
 - 3. For Owner's maintenance staff certified as NETA ETT-Certified Technicians Level III or NICET Electrical Power Testing Level III Technicians, teach how to adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 260573.16

SECTION 26 05 73.19
ARC-FLASH HAZARD ANALYSIS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.
- C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.
- F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- G. SCCR: Short-circuit current rating.
- H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Study Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form (PDF):
 - 1. Arc-flash study input data, including completed computer program input data sheets.
 - 2. Arc-flash study report; signed, dated, and sealed by Power Systems Analysis Specialist.

3. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Power Systems Analysis Software Developer.
2. For Power System Analysis Specialist.
3. For Field Adjusting Agency.

B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Provide maintenance procedures in equipment manuals according to requirements in NFPA 70E.
2. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

- A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.
- B. Software algorithms shall comply with requirements of standards and guides specified in this Section.
- C. Manual calculations are unacceptable.
- D. Power System Analysis Software Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 1. Computer program shall be designed to perform arc-flash analysis or have a function, component, or add-on module designed to perform arc-flash analysis.
 2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- E. Power Systems Analysis Specialist Qualifications: Professional engineer in charge of performing the arc-flash study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- F. Arc-Flash Study Certification: Arc-Flash Study Report shall be signed and sealed by Power Systems Analysis Specialist.

G. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.
2. A member company of NETA.
3. Acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Comply with IEEE 1584 and NFPA 70E.
- B. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram, showing the following:
 1. Protective device designations and ampere ratings.
 2. Conductor types, sizes, and lengths.
 3. Transformer kilovolt ampere (kVA) and voltage ratings, including derating factors and environmental conditions.
 4. Motor and generator designations and kVA ratings.
 5. Switchgear, switchboard, motor-control center, panelboard designations, and ratings.
- D. Study Input Data: As described in "Power System Data" Article.
- E. Short-Circuit Study Output Data: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
- F. Protective Device Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."
- G. Arc-Flash Study Output Reports:
 1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each equipment location included in the report:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.

- f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.
- H. Incident Energy and Flash Protection Boundary Calculations:
 - 1. Arcing fault magnitude.
 - 2. Protective device clearing time.
 - 3. Duration of arc.
 - 4. Arc-flash boundary.
 - 5. Restricted approach boundary.
 - 6. Limited approach boundary.
 - 7. Working distance.
 - 8. Incident energy.
 - 9. Hazard risk category.
 - 10. Recommendations for arc-flash energy reduction.
- I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of computer printout.

2.3 ARC-FLASH WARNING LABELS

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for self-adhesive equipment labels. Produce a 3.5-by-5-inch (76-by-127-mm) self-adhesive equipment label for each work location included in the analysis.
- B. Label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:
 - 1. Location designation.
 - 2. Nominal voltage.
 - 3. Protection boundaries.
 - a. Arc-flash boundary.
 - b. Restricted approach boundary.
 - c. Limited approach boundary.
 - 4. Arc flash PPE category.
 - 5. Required minimum arc rating of PPE in Cal/cm squared.
 - 6. Available incident energy.
 - 7. Working distance.
 - 8. Engineering report number, revision number, and issue date.
- C. Labels shall be machine printed, with no field-applied markings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

- A. Comply with NFPA 70E and its Annex D for hazard analysis study.
- B. Preparatory Studies: Perform the Short-Circuit and Protective Device Coordination studies prior to starting the Arc-Flash Hazard Analysis.
 - 1. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
 - 2. Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."
- C. Calculate maximum and minimum contributions of fault-current size.
 - 1. Maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.
 - 2. Calculate arc-flash energy at 85 percent of maximum short-circuit current according to IEEE 1584 recommendations.
 - 3. Calculate arc-flash energy at 38 percent of maximum short-circuit current according to NFPA 70E recommendations.
 - 4. Calculate arc-flash energy with the utility contribution at a minimum and assume no motor contribution.
- D. Calculate the arc-flash protection boundary and incident energy at locations in electrical distribution system where personnel could perform work on energized parts.
- E. Include medium- and low-voltage equipment locations, except equipment rated 240 V ac or less fed from transformers less than 125 kVA.
- F. Calculate the limited, restricted, and prohibited approach boundaries for each location.
- G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:
 - 1. Fault contribution from induction motors shall not be considered beyond three to five cycles.
 - 2. Fault contribution from synchronous motors and generators shall be decayed to match the actual decrement of each as closely as possible (for example, contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).
- H. Arc-flash energy shall generally be reported for the maximum of line or load side of a circuit breaker. However, arc-flash computation shall be performed and reported for both line and load side of a circuit breaker as follows:

1. When the circuit breaker is in a separate enclosure.
 2. When the line terminals of the circuit breaker are separate from the work location.
- I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

- A. Obtain all data necessary for conduct of the arc-flash hazard analysis.
1. Verify completeness of data supplied on one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to Architect's attention.
 2. For new equipment, use characteristics from approved submittals under provisions of action submittals and information submittals for this Project.
 3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys conducted by qualified technicians and engineers.
- B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:
1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 2. Obtain electrical power utility impedance or available short circuit current at the service.
 3. Power sources and ties.
 4. Short-circuit current at each system bus (three phase and line to ground).
 5. Full-load current of all loads.
 6. Voltage level at each bus.
 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 8. For reactors, provide manufacturer and model designation, voltage rating and impedance.
 9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
 10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
 12. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.

13. Motor horsepower and NEMA MG 1 code letter designation.
14. Low-voltage conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
15. Medium-voltage conductor sizes, lengths, conductor material, conductor construction and metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).

3.4 LABELING

- A. Apply one arc-flash label on the front cover of each section of the equipment and on side or rear covers with accessible live parts and hinged doors or removable plates for each equipment included in the study. Base arc-flash label data on highest values calculated at each location.
- B. Each piece of equipment listed below shall have an arc-flash label applied to it:
 1. Motor-control center.
 2. Low-voltage switchboard.
 3. Switchgear.
 4. Low voltage transformers.
 5. Panelboard and safety switch over 250 V.
 6. Applicable panelboard and safety switch under 250 V.
 7. Control panel.
 8. Emergency Equipment.
- C. Note on record Drawings the location of equipment where the personnel could be exposed to arc-flash hazard during their work.
 1. Indicate arc-flash energy.
 2. Indicate protection level required.

3.5 APPLICATION OF WARNING LABELS

- A. Install arc-flash warning labels under the direct supervision and control of Power System Analysis Specialist.

3.6 DEMONSTRATION

- A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in potential arc-flash hazards associated with working on energized equipment and the significance of arc-flash warning labels.

END OF SECTION

SECTION 26 22 13
LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Comply with the California Electrical Code, and list and label as complying with UL 1561.
- C. Comply with the California Energy Code.

1.2 SUMMARY

- A. Section includes distribution, dry-type transformers with a nominal primary and secondary rating of 600 V and less, with capacities up to 1500 kVA.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
 - 2. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.
- B. Shop Drawings:
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Seismic Qualification Data: Certificates, for transformers, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Certification: Indicate that equipment meets Project location seismic requirements.
- C. Source quality-control reports.

D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

B. Energy-Efficient Transformers Rated 15 kVA and Larger: Certified as meeting DOE 2016 energy efficiency standards as codified by 10 CFR Part 431 (2016).

1.

kVA	Single Phase <u>Efficiency</u>	kVA	Three Phase <u>Efficiency</u>
15	97.70%	15	97.89%
25	98.00%	30	98.23%
37.5	98.20%	45	98.40%
50	98.30%	75	98.60%
75	98.50%	112.5	98.74%
		150	98.83%
		225	98.94%
		300	99.02%
		500	99.14%

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inspection: On receipt, inspect for and note any shipping damage to packaging and transformer.

1. If manufacturer packaging is removed for inspection, and transformer will be stored after inspection, re-package transformer using original or new packaging materials that provide protection equivalent to manufacturer's packaging.

B. Storage: Store in a warm, dry, and temperature-stable location in original shipping packaging.

C. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

D. Handling: Follow manufacturer's instructions for lifting and transporting transformers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ACME Electric Corporation; Power Distribution Products Division.
 - 2. Eaton Electrical Inc.; Cutler-Hammer Products.
 - 3. Federal Pacific Transformer Company; Division of Electro-Mechanical Corp.
 - 4. General Electric Company.
 - 5. Hammond Co.; Matra Electric, Inc.
 - 6. Magnetek Power Electronics Group.
 - 7. Sola/Hevi-Duty.
 - 8. Square D; Schneider Electric.
- B. Source Limitations: Obtain each transformer type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Transformers shall withstand the effects of earthquake motions determined according to [ASCE/SEI 7] <Insert requirement>.
 - 1. The term "withstand" means "the transformer will remain in place without separation of any parts when subjected to the seismic forces specified[and the transformer will be fully operational after the seismic event]."

2.3 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Comply with the California Electrical Code.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and use.
- C. Transformers Rated 15 kVA and Larger:
 - 1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
 - 2. Marked as compliant with DOE 2016 efficiency levels by an NRTL.
- D. Shipping Restraints: Paint or otherwise color-code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside the transformer enclosure.

2.4 DISTRIBUTION TRANSFORMERS

- A. Comply with the California Electrical Code, and list and label as complying with UL 1561.
- B. Comply with the California Energy Code.
- C. Provide transformers that are constructed to withstand seismic forces specified in Section 260548.16 "Seismic Controls for Electrical Systems."

- D. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
 - 1. One leg per phase.
 - 2. Core volume shall allow efficient transformer operation at 10 percent above the nominal tap voltage.
 - 3. Grounded to enclosure.
- E. Coils: Continuous windings without splices except for taps.
 - 1. Coil Material: [Aluminum] [Copper].
 - 2. Internal Coil Connections: Brazed or pressure type.
 - 3. Terminal Connections: [Welded] [Bolted].
- F. Encapsulation: Transformers smaller than 30 kVA shall have core and coils completely resin encapsulated.
- G. Enclosure (indoors): Ventilated .
 - 1. NEMA 250, Type 2 : Core and coil shall be encapsulated within resin compound to seal out moisture and air.
 - 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
- H. Enclosure (outdoor): Totally enclosed, nonventilated.
 - 1. NEMA 250, Type 3R: Core and coil shall be encapsulated within resin compound using a vacuum-pressure impregnation process to seal out moisture and air.
 - 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
 - 3. Wiring Compartment: Sized for conduit entry and wiring installation.
 - 4. Finish: Comply with NEMA 250.
 - a. Finish Color: Gray weather-resistant enamel.
- I. Enclosure (outdoor): Totally enclosed, nonventilated.
 - 1. NEMA 250, Type 4X, Stainless Steel: Core and coil shall be encapsulated within resin compound using a vacuum-pressure impregnation process to seal out moisture and air.
 - 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
 - 3. Wiring Compartment: Sized for conduit entry and wiring installation.
- J. Taps for Transformers 3 kVA and Smaller: None.
- K. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.
- L. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- M. Insulation Class, Smaller Than 30 kVA: 180 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.
- N. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.

- O. Grounding: Provide ground-bar kit or a ground bar installed on the inside of the transformer enclosure.
- P. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for non-sinusoidal load current-handling capability to the degree defined by designated K-factor.
 - 1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor, without exceeding the indicated insulation class in a 40 deg C maximum ambient and a 24-hour average ambient of 30 deg C.
 - 2. Indicate value of K-factor on transformer nameplate.
 - 3. Unit shall comply with requirements of DOE 2016 efficiency levels when tested according to NEMA TP 2 with a K-factor equal to one.
- Q. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.
 - 1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
 - 2. Include special terminal for grounding the shield.
- R. Neutral: Rated 200 percent of full load current for K-factor-rated transformers.
- S. Wall Brackets: Manufacturer's standard brackets.
- T. Low-Sound-Level Requirements: Maximum sound levels when factory tested according to IEEE C57.12.91, as follows:
 - 1. 9 kVA and Less: 40 dBA.
 - 2. 30 to 50 kVA: 45 dBA.
 - 3. 51 to 150 kVA: 50 dBA.
 - 4. 151 to 300 kVA: 60 dBA.
 - 5. 301 to 500 kVA: 63 dBA.

2.5 IDENTIFICATION

- A. Nameplates: Engraved, laminated-acrylic or melamine plastic signs for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."
- B. Nameplates: Self-adhesive label for each distribution transformer. Self-adhesive labels are specified in Section 260553 "Identification for Electrical Systems."

2.6 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.01 and IEEE C57.12.91.
 - 1. Resistance measurements of all windings at rated voltage connections and at all tap connections.
 - 2. Ratio tests at rated voltage connections and at all tap connections.
 - 3. Phase relation and polarity tests at rated voltage connections.
 - 4. No load losses, and excitation current and rated voltage at rated voltage connections.

5. Impedance and load losses at rated current and rated frequency at rated voltage connections.
 6. Applied and induced tensile tests.
 7. Regulation and efficiency at rated load and voltage.
 8. Insulation-Resistance Tests:
 - a. High-voltage to ground.
 - b. Low-voltage to ground.
 - c. High-voltage to low-voltage.
 9. Temperature tests.
- B. Factory Sound-Level Tests: Conduct prototype sound-level tests on production-line products.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by the California Electrical Code and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.
- E. Environment: Enclosures shall be rated for the environment in which they are located. Covers for NEMA 250, Type 4X enclosures shall not cause accessibility problems.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall-mounted transformers level and plumb with wall brackets fabricated by transformer manufacturer.
 1. Coordinate installation of wall-mounted and structure-hanging supports with actual transformer provided.
 2. Brace wall-mounted transformers as specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- B. Install transformers level and plumb on a concrete base with vibration-dampening supports. Locate transformers away from corners and not parallel to adjacent wall surface.
- C. Construct concrete bases according to Section 033000 "Cast-in-Place Concrete" and anchor floor-mounted transformers according to manufacturer's written instructions, seismic codes applicable to Project site location, and requirements in Section 260529 "Hangers and Supports for Electrical Systems."

1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- D. Secure transformer to concrete base according to manufacturer's written instructions.
- E. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.
- F. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

- A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- D. Provide flexible connections at all conduit and conductor terminations and supports to eliminate sound and vibration transmission to the building structure.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections per manufacturer's installation instructions and specifications.
- E. Small (Up to 167-kVA Single-Phase or 500-kVA Three-Phase) Dry-Type Transformer Field Tests:
 1. Visual and Mechanical Inspection.
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, and grounding.
 - c. Verify that resilient mounts are free and that any shipping brackets have been removed.
 - d. Verify the unit is clean.
 - e. Perform specific inspections and mechanical tests recommended by manufacturer.
 - f. Verify that as-left tap connections are as specified.
 - g. Verify the presence of surge arresters and that their ratings are as specified.
 2. Electrical Tests:
 - a. Measure resistance at each winding, tap, and bolted connection.

- b. Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index: the value of the index shall not be less than 1.0.
 - c. Perform turns-ratio tests at all tap positions. Test results shall not deviate by more than one-half percent from either the adjacent coils or the calculated ratio. If test fails, replace the transformer.
 - d. Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.
- F. Large (Larger Than 167-kVA Single Phase or 500-kVA Three Phase) Dry-Type Transformer Field Tests:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, and grounding.
 - c. Verify that resilient mounts are free and that any shipping brackets have been removed.
 - d. Verify the unit is clean.
 - e. Perform specific inspections and mechanical tests recommended by manufacturer.
 - f. Verify that as-left tap connections are as specified.
 - g. Verify the presence of surge arresters and that their ratings are as specified.
 - 2. Electrical Tests:
 - a. Measure resistance at each winding, tap, and bolted connection.
 - b. Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage according to manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index: the value of the index shall not be less than 1.0.
 - c. Perform power-factor or dissipation-factor tests on all windings.
 - d. Perform turns-ratio tests at all tap positions. Test results shall not deviate by more than one-half percent from either the adjacent coils or the calculated ratio. If test fails, replace the transformer.
 - e. Perform an excitation-current test on each phase.
 - f. Perform an applied voltage test on all high- and low-voltage windings to ground. See IEEE C57.12.91, Sections 10.2 and 10.9.
 - g. Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.
- G. Remove and replace units that do not pass tests or inspections and retest as specified above.
- H. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.
 - 1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
 - 2. Perform two follow-up infrared scans of transformers, one at four months and the other

- at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.
- I. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION

SECTION 26 24 13
SWITCHBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Surge protection devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.
7. Identification.
8. Mimic bus.

B. Related Requirements

1. Section 260573.19 "Arc-Flash Hazard Analysis" for arc-flash analysis and arc-flash label requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each switchboard, overcurrent protective device, surge protection device, ground-fault protector, accessory, and component.

1. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail utility company's metering provisions with indication of approval by utility company.
7. Include evidence of NRTL listing for series rating of installed devices.

8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 9. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
 10. Include diagram and details of proposed mimic bus.
 11. Include schematic and wiring diagrams for power, signal, and control wiring.
- C. Samples: Representative portion of mimic bus with specified material and finish, for color selection.
- D. Delegated Design Submittal:
1. For arc-flash hazard analysis.
 2. For arc-flash labels.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Data: Certificates, for switchboards, overcurrent protective devices, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field Quality-Control Reports:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Routine maintenance requirements for switchboards and all installed components.
 - b. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - c. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type but no fewer than two of each size and type.
 - 2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
 - 3. Fuses and Fusible Devices for Fused Circuit Breakers: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
 - 4. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
 - 5. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
 - 6. Indicating Lights: Equal to 10 percent of quantity installed for each size and type but no less than one of each size and type.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.
- B. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.
- B. Remove loose packing and flammable materials from inside switchboards and connect factory-installed space heaters to temporary electrical service to prevent condensation.
- C. Handle and prepare switchboards for installation according to NECA 400.

1.9 FIELD CONDITIONS

- A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.
- B. Environmental Limitations:
 - 1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).
- C. Unusual Service Conditions: NEMA PB 2, as follows:
 - 1. Ambient temperatures within limits specified.

2. Altitude not exceeding 6600 feet (2000 m).

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect, Construction Manager, and Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Construction Manager's and Owner's written permission.
4. Comply with NFPA 70E.

1.10 COORDINATION

- A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace switchboard enclosures, buswork, overcurrent protective devices, accessories, and factory installed interconnection wiring that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Warranty: Manufacturer's agrees to repair or replace surge protection devices that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation. Shake-table testing shall comply with ICC-ES AC156.
 2. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 SWITCHBOARDS

- A. Manufacturers (in no specific order):

1. Square D.
 2. General Electric.
 3. Siemens.
 4. EATON.
- B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NEMA PB 2.
- F. Comply with the California Electrical Code.
- G. Comply with UL 891.
- H. Front-Connected, Front-Accessible Switchboards:
1. Main Devices: Fixed, individually mounted.
 2. Branch Devices: Panel mounted.
 3. Sections front and rear aligned.
- I. Front- and Side-Accessible Switchboards:
1. Main Devices: Fixed, individually mounted.
 2. Branch Devices: Panel mounted.
 3. Section Alignment: Front and Rear aligned.
- J. Front- and Rear-Accessible Switchboards:
1. Main Devices: Fixed, individually mounted.
 2. Branch Devices: Fixed, individually mounted.
 3. Sections front and rear aligned.
- K. Nominal System Voltage: 480Y/277 V.
- L. Main-Bus Continuous: 600 A.
- M. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation. Shake-table testing shall comply with ICC-ES AC156.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

- b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- N. Indoor Enclosures: Steel, NEMA 250, Type 1.
- O. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
- P. Barriers: Between adjacent switchboard sections.
- Q. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.
- R. Service Entrance Rating: Switchboards intended for use as service entrance equipment shall contain from one to six service disconnecting means with overcurrent protection, a neutral bus with disconnecting link, a grounding electrode conductor terminal, and a main bonding jumper.
- S. Utility Metering Compartment: Barrier compartment and section complying with utility company's requirements; hinged sealable door; buses provisioned for mounting utility company's current transformers and potential transformers or potential taps as required by utility company. If separate vertical section is required for utility metering, match and align with basic switchboard. Provide service entrance label and necessary applicable service entrance features.
- T. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, and section with front hinged door, for indicated metering, and current transformers for each meter. Current transformer secondary wiring shall be terminated on shorting-type terminal blocks. Include potential transformers having primary and secondary fuses with disconnecting means and secondary wiring terminated on terminal blocks.
- U. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.
- V. Removable, Hinged Rear Doors and Compartment Covers: Secured by captive thumb screws, for access to rear interior of switchboard.
- W. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- X. Pull Box on Top of Switchboard:
 - 1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
 - 2. Set back from front to clear circuit-breaker removal mechanism.
 - 3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
 - 4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
 - 5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.
- Y. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from the front of the switchboard.
 2. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity.
 3. Phase- and Neutral-Bus Material: Tin-plated, high-strength, electrical-grade aluminum alloy with tin-plated aluminum circuit-breaker line connections.
 4. Copper feeder circuit-breaker line connections.
 5. Tin-plated aluminum feeder circuit-breaker line connections.
 6. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
 7. Ground Bus: 1/4-by-2-inch- (6-by-50-mm-) or Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors.
 8. Main-Phase Buses and Equipment-Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
 9. Disconnect Links:
 - a. Isolate neutral bus from incoming neutral conductors.
 - b. Bond neutral bus to equipment-ground bus for switchboards utilized as service equipment or separately derived systems.
 10. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
 11. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
- Z. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.
- AA. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.
- BB. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

2.3 SURGE PROTECTION DEVICES

- A. SPDs: Comply with UL 1449, Type 1.
- B. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 1.
- C. Features and Accessories:
 1. Integral disconnect switch.
 2. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 3. Indicator light display for protection status.

4. Form-C contacts rated at 5 A and 250-V ac and 2 A and 24-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
5. Surge counter.
- D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 250kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.
- E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V, three-phase, four-wire circuits shall not exceed the following:
 1. Line to Neutral: 1200 V for 480Y/277 V.
 2. Line to Ground: 1200 V for 480Y/277 V.
 3. Line to Line: 2000 V for 480Y/277 V.
- F. SCCR: Equal or exceed 100 kA.
- G. Nominal Rating: 20 kA.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replaceable electronic trip; and the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long and short time adjustments.
 - d. Ground-fault pickup level, time delay, and $I^2 t$ response.
 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
 6. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
 7. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 8. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.

- b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
 - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
 - d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
 - f. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system specified in Section 260913 "Electrical Power Monitoring and Control."
 - g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 - h. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 - i. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 - j. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
- B. Insulated-Case Circuit Breaker (ICCB): [80] [100] percent rated, sealed, insulated-case power circuit breaker with interrupting capacity rating to meet available fault current.
- 1. Fixed circuit-breaker mounting.
 - 2. Two-step, stored-energy closing.
 - 3. Standard-function, microprocessor-based trip units with interchangeable rating plug, trip indicators, and the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Time adjustments for long- and short-time pickup.
 - c. Ground-fault pickup level, time delay, and I^2t response.
 - 4. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
 - 5. Remote trip indication and control.
 - 6. Communication Capability: Web enabled integral Ethernet communication module and embedded Web server with factory-configured Web pages (HTML file format). Provide functions and features compatible with power monitoring and control system specified in Section 260913 "Electrical Power Monitoring and Control."
 - 7. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 - 8. Control Voltage: 120-V ac.
- C. Bolted-Pressure Contact Switch: Operating mechanism uses rotary-mechanical-bolting action to produce and maintain high clamping pressure on the switch blade after it engages the stationary contacts.
- 1. Main-Contact Interrupting Capability: Minimum of 12 times the switch current rating.

2. Operating Mechanism: Manual handle operation to close switch; stores energy in mechanism for opening and closing.
 - a. Electrical Trip: Operation of lever or push-button trip switch, or trip signal from ground-fault relay or remote-control device, causes switch to open.
 - b. Mechanical Trip: Operation of mechanical lever, push button, or other device causes switch to open.
 3. Auxiliary Switches: Factory installed, SPDT, with leads connected to terminal block, and including one set more than quantity required for functional performance indicated.
 4. Service-Rated Switches: Labeled for use as service equipment.
 5. Ground-Fault Relay: Comply with UL 1053; self-powered type with mechanical ground-fault indicator, test function, tripping relay with internal memory, and three-phase current transformer/sensor.
 - a. Configuration: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - b. Internal Memory: Integrates the cumulative value of intermittent arcing ground-fault currents and uses the effect to initiate tripping.
 - c. No-Trip Relay Test: Permits ground-fault simulation test without tripping switch.
 - d. Test Control: Simulates ground fault to test relay and switch (or relay only if "no-trip" mode is selected).
 6. Open-Fuse Trip Device: Arranged to trip switch open if a phase fuse opens.
- D. High-Pressure, Butt-Type Contact Switch: Operating mechanism uses butt-type contacts and a spring-charged mechanism to produce and maintain high-pressure contact when switch is closed.
1. Main-Contact Interrupting Capability: Minimum of 12 times the switch current rating.
 2. Operating Mechanism: Manual handle operation to close switch; stores energy in mechanism for opening and closing.
 - a. Electrical Trip: Operation of lever or push-button trip switch, or trip signal from ground-fault relay or remote-control device, causes switch to open.
 - b. Mechanical Trip: Operation of mechanical lever, push button, or other device causes switch to open.
 3. Auxiliary Switches: Factory installed, SPDT, with leads connected to terminal block, and including one set more than quantity required for functional performance indicated.
 4. Service-Rated Switches: Labeled for use as service equipment.
 5. Ground-Fault Relay: Comply with UL 1053; self-powered type with mechanical ground-fault indicator, test function, tripping relay with internal memory, and three-phase current transformer/sensor.
 - a. Configuration: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - b. Internal Memory: Integrates the cumulative value of intermittent arcing ground-fault currents and uses the effect to initiate tripping.
 - c. No-Trip Relay Test: Permits ground-fault simulation test without tripping switch.
 - d. Test Control: Simulates ground fault to test relay and switch (or relay only if "no-trip" mode is selected).

- 6. Open-Fuse Trip Device: Arranged to trip switch open if a phase fuse opens.
- E. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- F. Fuses are specified in Section 262813 "Fuses."

2.5 INSTRUMENTATION

- A. Instrument Transformers: NEMA EI 21.1, and the following:
 - 1. Potential Transformers: NEMA EI 21.1; 120 V, 60 Hz, single secondary; disconnecting type with integral fuse mountings. Burden and accuracy shall be consistent with connected metering and relay devices.
 - 2. Current Transformers: NEMA EI 21.1; 5 A, 60 Hz, secondary; wound type; single secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.
 - 3. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA.
 - 4. Current Transformers for Neutral and Ground-Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shorting terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit-breaker, ground-fault protection.
- B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:
 - 1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
 - a. Phase Currents, Each Phase: Plus or minus 0.5 percent.
 - b. Phase-to-Phase Voltages, Three Phase: Plus or minus 0.5 percent.
 - c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 0.5 percent.
 - d. Megawatts: Plus or minus 1 percent.
 - e. Megavars: Plus or minus 1 percent.
 - f. Power Factor: Plus or minus 1 percent.
 - g. Frequency: Plus or minus 0.1 percent.
 - h. Accumulated Energy, Megawatt Hours: Plus or minus 1 percent; accumulated values unaffected by power outages up to 72 hours.
 - i. Megawatt Demand: Plus or minus 1 percent; demand interval programmable from five to 60 minutes.
 - j. Contact devices to operate remote impulse-totalizing demand meter.
 - 2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.
- C. Analog Meters:
 - 1. Meters: 4-inch (100-mm) diameter or 6 inches (150 mm) square, flush or semiflush, with anti-parallax 250-degree scales and external zero adjustment.
- D. Voltmeters: Cover an expanded-scale range of nominal voltage plus 10 percent.

- E. Instrument Switches: Rotary type with off position.
 - 1. Voltmeter Switches: Permit reading of all phase-to-phase voltages and, where a neutral is indicated, phase-to-neutral voltages.
 - 2. Ammeter Switches: Permit reading of current in each phase and maintain current-transformer secondaries in a closed-circuit condition at all times.
- F. Ammeters: 2-1/2-inch (64-mm) minimum size with 90- or 120-degree scale. Meter and transfer device with off position, located on overcurrent device door for indicated feeder circuits only.
- G. Watt-Hour Meters and Wattmeters:
 - 1. Comply with ANSI C12.1.
 - 2. Three-phase induction type with two stators, each with current and potential coil, rated 5 A, 120 V, 60 Hz.
 - 3. Suitable for connection to three- and four-wire circuits.
 - 4. Potential indicating lamps.
 - 5. Adjustments for light and full load, phase balance, and power factor.
 - 6. Four-dial clock register.
 - 7. Integral demand indicator.
 - 8. Contact devices to operate remote impulse-totalizing demand meter.
 - 9. Ratchets to prevent reverse rotation.
 - 10. Removable meter with drawout test plug.
 - 11. Semiflush mounted case with matching cover.
 - 12. Appropriate multiplier tag.
- H. Impulse-Totalizing Demand Meter:
 - 1. Comply with ANSI C12.1.
 - 2. Suitable for use with switchboard watt-hour meter, including two-circuit totalizing relay.
 - 3. Cyclometer.
 - 4. Four-dial, totalizing kilowatt-hour register.
 - 5. Positive chart drive mechanism.
 - 6. Capillary pen holding a minimum of one month's ink supply.
 - 7. Roll chart with minimum 31-day capacity; appropriate multiplier tag.
 - 8. Capable of indicating and recording 15-minute integrated demand of totalized system.

2.6 CONTROL POWER

- A. Control Circuits: 120-V ac, supplied through secondary disconnecting devices from control-power transformer.
- B. Control Circuits: 120-V ac, supplied from remote branch circuit.
- C. Electrically Interlocked Main and Tie Circuit Breakers: Two control-power transformers in separate compartments, with interlocking relays, connected to the primary side of each control-power transformer at the line side of the associated main circuit breaker. 120-V second-

aries connected through automatic transfer relays to ensure a fail-safe automatic transfer scheme.

- D. Control-Power Fuses: Primary and secondary fuses for current-limiting and overload protection of transformer and fuses for protection of control circuits.
- E. Control Wiring: Factory installed, with bundling, lacing, and protection included. Provide flexible conductors for No. 8 AWG and smaller, for conductors across hinges, and for conductors for interconnections between shipping units.

2.7 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.
- C. Spare-Fuse Cabinet: Suitably identified, wall-mounted, lockable, compartmented steel box or cabinet. Arrange for wall mounting.
- D. Mounting Accessories: For anchors, mounting channels, bolts, washers, and other mounting accessories, comply with requirements in Section 260548.16 "Seismic Controls for Electrical Systems" or manufacturer's instructions.

2.8 IDENTIFICATION

- A. Mimic Bus: Entire single-line switchboard bus work, as depicted on factory record drawing, on a photoengraved nameplate.
 - 1. Nameplate: At least 0.032-inch- (0.813-mm-) thick anodized aluminum, located at eye level on front cover of the switchboard incoming service section.
- B. Mimic Bus: Entire single-line switchboard bus work, as depicted on factory record drawing, on an engraved laminated-plastic (Gravoply) nameplate.
 - 1. Nameplate: At least 0.0625-inch- (1.588 mm-) thick laminated plastic (Gravoply), located at eye level on front cover of the switchboard incoming service section.
- C. Mimic Bus: Continuously integrated mimic bus factory applied to front of switchboard. Arrange in single-line diagram format, using symbols and letter designations consistent with final mimic-bus diagram.
- D. Coordinate mimic-bus segments with devices in switchboard sections to which they are applied. Produce a concise visual presentation of principal switchboard components and connections.
- E. Presentation Media: Painted graphics in color contrasting with background color to represent bus and components, complete with lettered designations.
- F. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store switchboards according to NECA 400.
 - 1. Lift or move panelboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's instructions.
 - 2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
 - 3. Protect from moisture, dust, dirt, and debris during storage and installation.
 - 4. Install temporary heating during storage per manufacturer's instructions.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect the performance of the equipment.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install switchboards and accessories according to NECA 400.
- B. Equipment Mounting: Install switchboards on concrete base, 4-inch (100-mm) nominal thickness.
 - 1. Install conduits entering underneath the switchboard, entering under the vertical section where the conductors will terminate. Install with couplings flush with the concrete base. Extend 2 inches (50-mm) above concrete base after switchboard is anchored in place.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to switchboards.
 - 6. Anchor switchboard to building structure at the top of the switchboard if required or recommended by the manufacturer.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.
- D. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
- F. Install filler plates in unused spaces of panel-mounted sections.

G. Install overcurrent protective devices, surge protection devices, and instrumentation.

1. Set field-adjustable switches and circuit-breaker trip ranges.

H. Install spare-fuse cabinet.

I. Comply with NECA 1.

3.3 CONNECTIONS

A. Comply with requirements for terminating feeder bus specified in Section 262500 "Enclosed Bus Assemblies." Drawings indicate general arrangement of bus, fittings, and specialties.

B. Bond conduits entering underneath the switchboard to the equipment ground bus with a bonding conductor sized per the California Electrical Code.

C. Support and secure conductors within the switchboard according to the California Electrical Code.

D. Extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform tests and inspections.

E. Tests and Inspections:

1. Acceptance Testing:

a. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit. Open control and metering circuits within the switchboard and remove neutral connection to surge protection and other electronic devices prior to insulation test. Reconnect after test.

- b. Test continuity of each circuit.
- 2. Test ground-fault protection of equipment for service equipment per the California Electrical Code.
- 3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- 4. Correct malfunctioning units on-site where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- 5. Perform the following infrared scan tests and inspections, and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
 - c. Instruments and Equipment:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- 6. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Switchboard will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.7 PROTECTION

- A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain switchboards, over-current protective devices, instrumentation, and accessories.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
 - 3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 - 4. Detail bus configuration, current, and voltage ratings.
 - 5. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 6. Include evidence of NRTL listing for series rating of installed devices.
 - 7. Include evidence of NRTL listing for SPD as installed in panelboard.

8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include wiring diagrams for power, signal, and control wiring.
10. Key interlock scheme drawing and sequence of operations.
11. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device. Include an Internet link for electronic access to downloadable PDF of the coordination curves.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Panelboard Schedules: For installation in panelboards.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Keys: Two spares for each type of panelboard cabinet lock.
 2. Circuit Breakers. Ten 20/1 spares. The remainder of spaces for the maximum allowed for the panel. Provisions for future breaker, without having to extend busses for each panelboard.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.10 FIELD CONDITIONS

- A. Environmental Limitations:
 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
 1. Ambient temperatures within limits specified.
 2. Altitude not exceeding 6600 feet (2000 m).
- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 1. Notify the Owner no fewer than seven days in advance of proposed interruption of electric service.
 2. Do not proceed with interruption of electric service without Owner's written permission.
 3. Comply with NFPA 70E.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
 1. Panelboard Warranty Period: 18 months from date of Substantial Completion.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
 1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NEMA PB 1.
- E. Comply with the California Electrical Code.
- F. Enclosures: Flush and Surface-mounted, dead-front cabinets and suitable doors.
 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

- b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 2. Height: 84 inches (2.13 m) maximum.
 - 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
 - 4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 - 5. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 - 6. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
 - 7. Finishes:
 - a. Panels and Trim: galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Standard Grey
 - b. Back Boxes: Galvanized steel. Same finish as panels and trim.
 - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
 - 8. Doors: Door-in-door construction with Secured with vault-type latch with tumbler lock; keyed alike. door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. EZ door trim not allowed.
- G. Incoming Mains:
- 1. Location: To be coordinated by Contractor, see drawings and schedules for requirements.
 - 2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.
- H. Phase, Neutral, and Ground Buses:
- 1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Bus shall run entire length of breaker capacity of panel.
 - b. Bus shall be fully rated the entire length.
 - 2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
 - 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
 - 4. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
 - 5. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

6. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and listed and labeled by an NRTL acceptable to authority having jurisdiction, as suitable for nonlinear loads in electronic-grade panelboards and others designated on Drawings. Connectors shall be sized for double-sized or parallel conductors as indicated on Drawings. Do not mount neutral bus in gutter.
7. Split Bus: Vertical buses divided into individual vertical sections.
- I. Conductor Connectors: Suitable for use with conductor material and sizes.
 1. Material: Hard-drawn copper, 98 percent conductivity.
 2. Terminations shall allow use of 75 deg C rated conductors without derating.
 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
 4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
 6. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 7. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 8. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material and with matching insulating covers. Locate at same end of bus as incoming lugs or main device.
 9. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
- J. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- K. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
 1. Percentage of Future Space Capacity: 10 percent.
- L. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.
 1. Panelboards rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
 2. Panelboards rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.
- M. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
 1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-

circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.

2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
- B. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Eaton Electrical Sector; Eaton Corporation.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.
 - 5.
- B. Panelboards: NEMA PB 1, distribution type.
- C. Doors: Door-in-door construction with Secured with vault-type latch with tumbler lock; keyed alike. door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. EZ door trim not allowed.
- D. Secured with vault-type latch with tumbler lock; keyed alike.
 1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.
- E. Mains: Circuit breaker or Lugs only. See drawings and schedules for requirements.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- G. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.
- H. Branch Overcurrent Protective Devices: Fused switches.
- I. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Sector; Eaton Corporation.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker or Lugs only. See drawings and schedules for requirements.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - 1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
- F. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. EZ door trim not allowed.

2.5 ELECTRONIC-GRADE PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Sector; Eaton Corporation.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1; with factory-installed, integral SPD; labeled by an NRTL for compliance with UL 67 and UL 1449 after installing SPD.
- C. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed. EZ door trim not allowed.
- D. Main Overcurrent Protective Devices: Bolt-on thermal-magnetic circuit breakers.
- E. Branch Overcurrent Protective Devices: Bolt-on thermal-magnetic circuit breakers.
- F. SPD.
 - 1. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 100 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

2. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V or 208Y/120 V, three-phase, four-wire circuits shall not exceed the following:
 - a. Line to Neutral: 1200 V for 480Y/277 V and 700 V for 208Y/120 V.
 - b. Line to Ground: 1200 V for 480Y/277 V and 700 V for 208Y/120 V.
 - c. Neutral to Ground: 1200 V for 480Y/277 V and 700 V for 208Y/120 V.
 - d. Line to Line: 2000 V for 480Y/277 V and 1200 V for 208Y/120 V.
3. Protection modes and UL 1449 VPR for 240/120-V, single-phase, three-wire circuits shall not exceed the following:
 - a. Line to Neutral: 700 V.
 - b. Line to Ground: 700 V.
 - c. Neutral to Ground: 700 V.
 - d. Line to Line: 1200 V.
4. SCCR: Equal to the SCCR of the panelboard in which installed or exceed 100 kA .
5. Nominal Rating: 20 kA.

G. Buses:

1. Copper phase and neutral buses; 200 percent capacity neutral bus and lugs.
2. Copper equipment and isolated ground buses.

2.6 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Electronic Trip Circuit Breakers:
 - a. RMS sensing.
 - b. Field-replaceable rating plug or electronic trip.
 - c. Digital display of settings, trip targets, and indicated metering displays.
 - d. Multi-button keypad to access programmable functions and monitored data.
 - e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
 - f. Integral test jack for connection to portable test set or laptop computer.
 - g. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.

- 3) Long and short time adjustments.
- 4) Ground-fault pickup level, time delay, and I squared T response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip). See Drawings and schedules for where required.
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip). See Drawings and schedules for where required.
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration. See Drawings and schedules for where required.
8. Subfeed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
 - f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - g. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system specified in Section 260913 "Electrical Power Monitoring and Control."
 - h. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 - i. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 - j. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.
 - k. Auxiliary Contacts: Two, SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
 - l. Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.
 - m. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 - n. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
 - o. Multipole units enclosed in a single housing with a single handle or factory assembled to operate as a single unit.
 - p. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off position.

- q. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.
- C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
 - 1. Fuses and Spare-Fuse Cabinet: Comply with requirements specified in Section 262813 "Fuses."
 - 2. Fused Switch Features and Accessories:
 - a. Standard ampere ratings and number of poles.
 - b. Mechanical cover interlock with a manual interlock override, to prevent the opening of the cover when the switch is in the on position. The interlock shall prevent the switch from being turned on with the cover open. The operating handle shall have lock-off means with provisions for three padlocks.
 - c. Auxiliary Contacts: One normally open and normally closed contact(s) that operate with switch handle operation.

2.7 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.
- D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.8 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407.
- D. Equipment Mounting:
 - 1. Install panelboards on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
 - 2. Attach panelboard to the vertical finished or structural surface behind the panelboard.
 - 3. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- F. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- G. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated. In addition to breaker shall be installed to a maximum of 6'-7" to the center of the handle.
- H. Mount panelboard cabinet plumb and rigid without distortion of box.
- I. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- J. Mount surface-mounted panelboards to steel slotted supports 5/8 inch (16 mm) deep, 1-1/4 inch (32 mm) wide with stud spring channel nuts. Orient steel slotted supports vertically.
- K. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- L. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

- M. Install filler plates in unused spaces.
- N. Stub four 1-inch (25 mm) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (25 mm) empty conduits into raised floor space or below slab not on grade.
- O. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- P. Mount spare fuse cabinet in accessible location.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- D. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors] stated in NETA ATS, Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Do not perform optional tests. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - c. Instruments and Equipment:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

E. Panelboards will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform Architect of effect on phase color coding.
 1. Measure loads during period of normal facility operations.
 2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the Architect. Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
 4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.6 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.
- B. Protect during construction of construction dust by maintaining paneldoors closed as much as possible. Vacuum interior, prior to energizing. Do not use compressed air.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, combination receptacles with USB ports, and associated device plates.
 - 2. Twist-locking receptacles.
 - 3. Snap switches.
 - 4. Pendant cord-connector devices.
 - 5. Cord and plug sets.
 - 6. Floor service outlets, poke-through assemblies, and multioutlet assemblies.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.
- F. UTP: Unshielded twisted pair.
- G. USB: Universal serial bus

1.4 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
- B. Cord and Plug Sets: Match equipment requirements.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.8 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand (Pass & Seymour).
 - a. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- B. Comply with the California Electrical Code.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Prewired pigtail connectors that accommodate Fed Spec receptacles are approved.
- B. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cooper; 5351 (single), CR5362 (duplex) 6362 (decora).
 - 2. Hubbell; HBL5351 (single), HBL5352 (duplex) HBL2162 (decora).
 - 3. Leviton; 5891 (single), 5352 (duplex) 16362 (decora).

4. Pass & Seymour; 5361 (single), 5362 (duplex) 26352 (decora).
 - a. Controlled Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, UL 498 and Federal Specification W-C-596. Marking permanently printed, molded, or stamped on the face of the receptacle and in compliance with Controlled Receptacle Marking requirements stated in Article 406.3(E) of the 2019 California Electrical Code.
5. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pass & Seymour; 26352CD, 26352CH (half-controlled for split circuit installations)

2.4 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type.
 1. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
 2. Include indicator light that shows when the GFCI has malfunctioned or tripped and no longer provides proper GFCI protection.
 3. End of life function by rendering itself incapable of delivering power when the test fails or indicating visually/audibly that the device must be replaced.
 4. Reverse line-load miswiring function by denying power to the receptacle face if it is miswired
 - a. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 5. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; VGF20.
 - b. Hubbell; GFR5352L.
 - c. Pass & Seymour; 2095 or 2096.
 - d. Leviton; 7590.

2.5 TWIST-LOCKING RECEPTACLES

- A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration L5-20R, and UL 498.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; CWL520R.
 - b. Hubbell; HBL2310.
 - c. Leviton; 2310.
 - d. Pass & Seymour; L520-R.

2.6 CORD AND PLUG SETS

- A. Description:
 1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the

equipment rating.

3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.7 SNAP SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Single Pole:
 - 1) Cooper; AH1221.
 - 2) Hubbell; HBL1221.
 - 3) Leviton; 1221-2.
 - 4) Pass & Seymour; CSB20AC1.
 - b. Three Way:
 - 1) Cooper; AH1223.
 - 2) Hubbell; HBL1223.
 - 3) Leviton; 1223-2.
 - 4) Pass & Seymour; CSB20AC3.

2.8 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermoplastic
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
 - a. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant thermoplastic with lockable cover.

2.9 FLOOR SERVICE FITTINGS

- a. Type: Modular, flush-type, dual-service units suitable for wiring method used.
- b. Compartments: Barrier separates power from voice and data communication cabling.
- c. Service Plate: Rectangular solid brass with satin finish.
- d. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.
- e. Voice and Data Communication Outlet: Blank cover with bushed cable opening.

2.10 POKE-THROUGH ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Hubbell Incorporated; Wiring Device-Kellems.
 2. Pass & Seymour/Legrand.
 3. Square D/Schneider Electric.
 4. Thomas & Betts Corporation.
 5. Wiremold/Legrand.
 - a. Description:
 6. Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
 7. Comply with UL 514 scrub water exclusion requirements.
 8. Service-Outlet Assembly: Flush type with devices as indicated on drawings.
 9. Size: Selected to fit cored holes in floor (as noted on drawings) and matched to floor thickness.
 10. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
 11. Closure Plug: Arranged to close unused cored openings and reestablish floor fire rating.
 12. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of four, four-pair cables that comply with requirements in Division 27 Section "Communications Horizontal Cabling."

2.11 PREFABRICATED MULTIOUTLET ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Hubbell Incorporated; Wiring Device-Kellems.
 2. Wiremold/Legrand.
 - a. Description:
 3. Two-piece surface metal raceway, with factory-wired multioutlet harness.
 4. Components shall be products from single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
 - a. Raceway Material: Metal, with manufacturer's standard finish.
 - b. Multioutlet Harness:
 5. Receptacles: 15-A, 125-V, NEMA WD 6 Configuration 5-15R receptacles complying with NEMA WD 1, UL 498, and FS W-C-596.
 6. Receptacle Spacing: 6 inches.
 7. Wiring: No. 12 AWG solid, Type THHN copper, two circuit, connecting alternating receptacles.

2.12 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: White.
2. Wiring Devices Connected to Emergency Power System: Red.
3. TVSS Devices: Blue.
 - a. Wall Plate Color: For plastic covers, match device color.

PART 3 EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.
 - a. Conductors:
5. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
6. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
7. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - a. Device Installation:
8. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
9. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
10. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
11. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
12. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
13. Use a torque screwdriver when a torque is recommended or required by manufacturer.
14. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

15. Tighten unused terminal screws on the device.
16. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
 - a. Receptacle Orientation:
17. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
 - a. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
 - b. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
 - c. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
- C. Outdoors use engraved labels.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Test Instruments: Use instruments that comply with UL 1436.
 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
 1. Line Voltage: Acceptable range is 105 to 132 V.
 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
 - a. Wiring device will be considered defective if it does not pass tests and inspections.

- b. Prepare test and inspection reports.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Control circuits.
 - b. Motor-control centers.
 - c. Panelboards.
 - d. Switchboards.
 - e. Enclosed controllers.
 - f. Enclosed switches.
2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 3. Current-limitation curves for fuses with current-limiting characteristics.
 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit [in electronic format suitable for use in coordination software and in PDF format.
 5. Coordination charts and tables and related data.
 6. Fuse sizes for elevator feeders and elevator disconnect switches.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017700 "Closeout Procedures," Section 017823 "Operation and Maintenance Data," include the following:
1. Ambient temperature adjustment information.
 2. Current-limitation curves for fuses with current-limiting characteristics.
 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in electronic format suitable for use in coordination software and in PDF format.
 4. Coordination charts and tables and related data.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses: Equal to 5 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.6 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide fuses of one of the following:
1. Bussmann.
 2. Ferraz/Shawmut
 3. or equal.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 2. Type RK-5: 600-V, zero- to 600-A rating, 200 kAIC.
 3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, fast acting.
 4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC[, fast acting.
 5. Type J: 600-V, zero- to 600-A rating, 200 kAIC..

6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC.
7. Type T: 600-V, zero- to 800-A rating, 200 kAIC, very fast acting.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with the California Electrical Code.
- E. Coordinate fuse type, ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 1. Size: Adequate for storage of spare fuses specified with 5 percent spare capacity minimum.
 2. Finish: Gray, baked enamel.
 3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 1. Service Entrance: Class L, fast acting. Or type as indicated by the equipment manufacturer.
 2. Feeders: Class L, fast acting. Or type as indicated by the equipment manufacturer
 3. Motor Branch Circuits: Class RK1, Class CC, motor duty, time delay. Or type as indicated by the equipment manufacturer
 4. Large Motor Branch (601-4000 A): Class L, time delay. Or type as indicated by the

equipment manufacturer

5. Power Electronics Circuits: Class T, fast acting]. Or type as indicated by the equipment manufacturer
6. Other Branch Circuits: Class RK5, fast acting. Or type as indicated by the equipment manufacturer
7. Control Transformer Circuits: Class CC, time delay, control transformer duty.
8. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Owner.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Non-fusible switches.
 - 3. Receptacle switches.
 - 4. Shunt trip switches.
 - 5. Molded-case circuit breakers (MCCBs).
 - 6. Molded-case switches.
 - 7. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.

2. Include wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Data: Certificates, for enclosed switches and circuit breakers, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses: Equal to 5 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 2. Fuse Pullers: one for each size and type.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 2. Altitude: Not exceeding 6600 feet (2010 m).

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 GENERAL REQUIREMENTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Sector; Eaton Corporation.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, by an NRTL, and marked for intended location and application.
- E. Comply with the California Electrical Code.
- F. Coordinate with equipment labels and elevator equipment supplier for specific requirements and accessories required.

2.3 FUSIBLE SWITCHES

- A. Type HD, Heavy Duty:
 - 1. Single throw.
 - 2. Three pole.
 - 3. 240 or 600-V ac.
 - 4. 1200 A and smaller.
 - 5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses.

6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Coordinate with equipment and elevator equipment supplier.
6. Lugs: Mechanical type, suitable for number, size, and conductor material.
7. Service-Rated Switches: Labeled for use as service equipment.

2.4 NONFUSIBLE SWITCHES

- A. Type HD, Heavy Duty, Three Pole, Single Throw, 240 and 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- B. Type HD, Heavy Duty, Three Pole, Double Throw, 240 and 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating to match equipment label
6. Lugs: Mechanical type, suitable for number, size, and conductor material.
7. Service-Rated Switches: Labeled for use as service equipment.

2.5 RECEPTACLE SWITCHES

- A. Type HD, Heavy-Duty, Three Pole, Single-Throw Fusible Switch: 240-V ac, 30 A; UL 98 and NEMA KS 1; horsepower rated, with clips or bolt pads to accommodate fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

- B. Type HD, Heavy-Duty, Three Pole, Single-Throw Non-fusible Switch: 240-V ac, 30 A; UL 98 and NEMA KS 1; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- C. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.
- D. Receptacle: Polarized, three-phase, four-wire receptacle (fourth wire connected to enclosure ground lug).
- E. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
 - 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 5. Lugs: Mechanical type, suitable for number, size, and conductor material.
 - 6. Service-Rated Switches: Labeled for use as service equipment.

2.6 SHUNT TRIP SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Sector; Eaton Corporation.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. General Requirements: Comply with ASME A17.1, UL 50, and UL 98, with Class J fuse block and 200-kA interrupting and short-circuit current rating. Coordinate with equipment and elevator equipment supplier.
- C. Type HD, Heavy-Duty, Three Pole, Single-Throw Fusible Switch: 240 and 600-V ac, A; UL 98 and NEMA KS 1; integral shunt trip mechanism; horsepower rated, with clips or bolt pads to accommodate fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position. Coordinate with equipment and elevator equipment supplier.
- D. Type HD, Heavy-Duty, Three Pole, Single-Throw Non-fusible Switch: 240 and 600-V ac, A; UL 98 and NEMA KS 1; integral shunt trip mechanism; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- E. Control Circuit: 120-V ac; obtained from integral control power transformer, with primary and secondary fuses, with a control power transformer of enough capacity to operate shunt trip, pilot, indicating and control devices.

F. Accessories:

1. Oiltight key switch for key-to-test function.
2. Oiltight green ON pilot light.
3. Isolated neutral lug; 200 percent rating.
4. Mechanically interlocked auxiliary contacts that change state when switch is opened and closed.
5. Form C alarm contacts that change state when switch is tripped.
6. Three-pole, double-throw, fire-safety and alarm relay; 24-V dc coil voltage. Coordinate with Fire alarm drawings
7. Three-pole, double-throw, fire-alarm voltage monitoring relay complying with NFPA 72.
8. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
9. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
10. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
11. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Coordinate with equipment contact rating.
12. Hookstick Handle: Allows use of a hookstick to operate the handle.
13. Lugs: Mechanical type, suitable for number, size, and conductor material.
14. Service-Rated Switches: Labeled for use as service equipment.

2.7 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Sector; Eaton Corporation.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.
- B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
- D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated or as indicated on the Drawings.

combinations for series connected interrupting ratings shall be listed by UL as recognized component combinations. Any series rated combination used shall be marked on the end-use equipment along with the statement "Caution - Series Rated System. _____ Amps Available. Identical Replacement Component Required."

- E. MCCBs shall be equipped with a device for locking in the isolated position.
- F. Lugs shall be suitable for 194 deg F (90 deg C) rated wire, sized according to the 167 deg F (75 deg C) temperature rating in the California Electrical Code.
- G. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.
- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- I. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- J. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Instantaneous trip.
 - 2. Long- and short-time pickup levels.
 - 3. Long- and short-time time adjustments.
 - 4. Ground-fault pickup level, time delay, and I-squared t response.
- K. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- L. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
- M. Ground-Fault Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- N. Ground-Fault Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- O. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
 - 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 - 5. Communication Capability: Circuit-breaker-mounted communication module with

- functions and features compatible with power monitoring and control system, specified in Section 260913 "Electrical Power Monitoring and Control."
6. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 7. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 8. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 9. Alarm Switch: One contact that operates only when circuit breaker has tripped.
 10. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 11. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
 12. Electrical Operator: Provide remote control for on, off, and reset operations.
 13. Accessory Control Power Voltage: Integrally mounted, self-powered.

2.8 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized steel NEMA 250 Type 1
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.
- D. Operating Mechanism: The circuit-breaker operating handle shall be directly operable through the front cover of the enclosure (NEMA 250 Type 1. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
- E. Enclosures designated as NEMA 250 Type 4, 4X stainless steel, 12, or 12K shall have a dual cover interlock mechanism to prevent unintentional opening of the enclosure cover when the circuit breaker is ON and to prevent turning the circuit breaker ON when the enclosure cover is open.
- F. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Owner's written permission.
 4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R [Kitchen] [Wash-Down] Areas: NEMA 250.
 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

3.4 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with the California Electrical Code and NECA 1.

3.5 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections.
- E. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - i. Verify correct phase barrier installation.
 - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
 - 2. Electrical Tests:
 - a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in ac-

cordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
- e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

F. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
- b. Inspect physical and mechanical condition.
- c. Inspect anchorage, alignment, grounding, and clearances.
- d. Verify that the unit is clean.
- e. Operate the circuit breaker to ensure smooth operation.
- f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
- g. Inspect operating mechanism, contacts, and chutes in unsealed units.
- h. Perform adjustments for final protective device settings in accordance with the coordination study.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not availa-

- ble, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.
 - e. Determine the following by primary current injection:
 - 1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
 - f. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.
 - g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
 - h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
 - i. Verify operation of charging mechanism. Investigate units that do not function as designed.
3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 4. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
 - c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 5. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

- G. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- H. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."

END OF SECTION

SECTION 26 36 00
TRANSFER SWITCHES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Contactor-type automatic transfer switches.
 - 2. Molded-case-type automatic transfer switches.
 - 3. Transfer switch accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
 - 2. Include material lists for each switch specified.
 - 3. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.
 - 4. Riser Diagram: Show interconnection wiring between transfer switches, bypass/isolation switches, annunciators, and control panels.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer-authorized service representative or testing agency.
- B. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Features and operating sequences, both automatic and manual.
 - b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Member company of NETA.
 - a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.7 FIELD CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Architect and Owner] no fewer than seven days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Emergency Service: Manufacturer maintains a service center capable of providing emergency maintenance and repairs at the Project site with an 8-hour maximum response time.

C. Single Source Responsibility: Obtain ATSS and all associated monitoring and controls from a single manufacturer that assumes responsibility for all system components furnished.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Automatic Switch Co. (ASCO) (preferred)
2. Caterpillar, Inc.
3. Cummins Corp.
4. Kohler Co.

5. Russelectric, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the California Electrical Code, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 99.
- D. Comply with NFPA 110.
- E. Comply with UL 1008 unless requirements of these Specifications are stricter.
- F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 - 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
 - 2. Short-time withstand capability for three cycles.
- H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- J. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- K. Service-Rated Transfer Switch:
 - 1. Comply with UL 869A and UL 489.
 - 2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.
 - 3. In systems with a neutral, the bonding connection shall be on the neutral bus.
 - 4. Provide removable link for temporary separation of the service and load grounded conductors.
 - 5. Surge Protective Device: Service rated.
 - 6. Ground-Fault Protection: Comply with UL 1008 for normal and alternative buses.
 - 7. Service Disconnecting Means: Externally operated, manual mechanically actuated.

- L. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.
- M. Neutral Terminal: Solid and fully rated unless otherwise indicated.
- N. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.
- O. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
- P. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."
 - 1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
 - 2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
 - 3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
 - 4. Accessible via front access.
- Q. Enclosures: General-purpose NEMA 250, Type 1 for indoor, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
 - 2. Switch Action: Double throw; mechanically held in both directions.
 - 3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
 - 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 5. Material: Hard-drawn copper, 98 percent conductivity.
 - 6. Main and Neutral Lugs: Mechanical type.
 - 7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
 - 8. Ground bar.
 - 9. Connectors shall be marked for conductor size and type according to UL 1008.
 - 10. Remote monitoring via BMS.
- C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.

1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
- D. Automatic Closed-Transition Transfer Switches: Connect both sources to load momentarily. Transition is controlled by programming in the automatic transfer-switch controller.
1. Fully automatic make-before-break operation when transferring between two available power sources.
 2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.
 3. Initiation of No-Interruption Transfer: Controlled by in-phase monitor and sensors confirming both sources are present and acceptable.
 - a. Initiation occurs without active control of generator.
 - b. Automatic transfer-switch controller takes active control of generator to match frequency, phase angle, and voltage.
 - c. Controls ensure that closed-transition load transfer closure occurs only when the two sources are within plus or minus 5 electrical degrees maximum, and plus or minus 5 percent maximum voltage difference.
 4. Failure of power source serving load initiates automatic break-before-make transfer.
- E. Manual Switch Operation, Load-Breaking: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- F. Manual Switch Operation, Non-Load-Breaking: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
- G. Electric Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- H. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- I. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- J. Automatic Transfer-Switch Controller Features:
1. Controller operates through a period of loss of control power.
 2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or

- sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
 6. Switch-Position Pilot Lights: Indicate source to which load is connected.
 7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
 8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
 9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
 11. Engine Shutdown Contacts:
 - a. Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
 - b. Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
 12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is unavailable.
- K. Large-Motor-Load Power Transfer:
1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
 2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay

between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.

3. Programmed Neutral Switch Position: Switch operator with programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Adjustable pause from 0.5 to 30 seconds minimum, and factory set for 0.5 second unless otherwise indicated. Time delay occurs for both transfer directions. Disable pause unless both sources are live.

2.4 MOLDED-CASE-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 1. Limitation: Switches using contactor-based components are unacceptable.
 2. Switch Action: Double throw; mechanically held in both directions.
 3. Contacts: Silver composition or silver alloy for load-current switching.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 5. Material: Hard-drawn copper, 98 percent conductivity.
 6. Main and Neutral Lugs: Mechanical type.
 7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
 8. Ground bar.
 9. Connectors shall be marked for conductor size and type according to UL 1008.
 10. Remote monitoring via BMS.
- C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
 1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
- D. Automatic Closed-Transition Transfer Switches: Connect both sources to load momentarily. Transition is controlled by programming in the automatic transfer-switch controller.
 1. Fully automatic make-before-break operation when transferring between two available power sources.
 2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.
 3. Initiation of No-Interruption Transfer: Controlled by in-phase monitor and sensors confirming both sources are present and acceptable.
 - a. Initiation occurs without active control of generator.
 - b. Automatic transfer-switch controller takes active control of generator to match frequency, phase angle, and voltage.
 - c. Controls ensure that closed-transition load transfer closure occurs only when the two sources are within plus or minus 5 electrical degrees maximum, and plus or minus 5 percent maximum voltage difference.
 4. Failure of power source serving load initiates automatic break-before-make transfer.

- E. Manual Switch Operation, Load-Breaking: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.
- F. Manual Switch Operation, Non-Load-Breaking: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
- G. Electric Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- H. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- I. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- J. Transfer Switches Based on Molded-Case-Switch Components: Comply with UL 489 and UL 869A.
- K. Automatic Transfer-Switch Controller Features:
 - 1. Controller operates through a period of loss of control power.
 - 2. Undervoltage Sensing for Each Phase of Normal and Alternative Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 - 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 - 4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
 - 5. Test Switch: Simulate normal-source failure.
 - 6. Switch-Position Pilot Lights: Indicate source to which load is connected.
 - 7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
 - 8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
 - 9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 - 10. Engine Starting Contacts: One isolated and normally closed, and one isolated and

normally open; rated 10 A at 32-V dc minimum.

11. Engine Shutdown Contacts:

- a. Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
- b. Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.

12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

- a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
- b. Push-button programming control with digital display of settings.
- c. Integral battery operation of time switch when normal control power is unavailable.

L. Large-Motor-Load Power Transfer:

1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.
3. Programmed Neutral Switch Position: Switch operator with programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Adjustable pause from 0.5 to 30 seconds minimum, and factory set for 0.5 second unless otherwise indicated. Time delay occurs for both transfer directions. Disable pause unless both sources are live.

2.5 TRANSFER SWITCH ACCESSORIES

A. Bypass/Isolation Switches:

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Comply with requirements for Level 1 equipment according to NFPA 110.
3. Description: Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:

- a. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. Interlocks shall prevent transfer-switch operation, except for testing or maintenance, while automatic transfer switch is isolated.
 - b. Provide means to make power available to transfer-switch control circuit for testing and maintenance purposes.
 - c. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations. Transfer switch and bypass/isolation switch shall be in isolated compartments.
 - d. Transition:
 - 1) Provide closed-transition operation when transferring between power sources.
 - e. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
 - f. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
 - g. Manual Control: Constructed so load bypass and transfer-switch isolation can be performed by one person in no more than two operations in 15 seconds or less. Operating handles shall be externally operated.
 - h. Automatic and Nonautomatic Control: Automatic transfer-switch controller shall also control the bypass/isolation switch.
 - i. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
 - j. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.
- B. Remote Annunciator System:
- 1. Source Limitations: Same manufacturer as transfer switch in which installed.
 - 2. Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches.
 - 3. Annunciation panel display shall include the following indicators:
 - a. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
 - b. Switch position.
 - c. Switch in test mode.
 - d. Failure of communication link.
 - 4. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
 - a. Indicating Lights: Grouped for each transfer switch monitored.
 - b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
 - c. Mounting: Flush, modular, steel cabinet unless otherwise indicated.
 - d. Lamp Test: Push-to-test or lamp-test switch on front panel.

- A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
- B. Prepare test and inspection reports.
 - 1. For each of the tests required by UL 1008, performed on representative devices, for legally required systems. Include results of test for the following conditions:
 - a. Overvoltage.
 - b. Undervoltage.
 - c. Loss of supply voltage.
 - d. Reduction of supply voltage.
 - e. Alternative supply voltage or frequency is at minimum acceptable values.
 - f. Temperature rise.
 - g. Dielectric voltage-withstand; before and after short-circuit test.
 - h. Overload.
 - i. Contact opening.
 - j. Endurance.
 - k. Short circuit.
 - l. Short-time current capability.
 - m. Receptacle withstand capability.
 - n. Insulating base and supports damage.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Floor-Mounting Switch: Anchor to floor by bolting.
 - 1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
 - 2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
 - 3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
 - 4. Provide workspace and clearances required by NFPA 70.
- B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
- C. Identify components according to Section 260553 "Identification for Electrical Systems."
- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- E. Comply with NECA 1.

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets. Control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
 - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- F. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."
- G. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.
- H. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."
- I. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 FIELD QUALITY CONTROL

- A. Administrant for Tests and Inspections:
 - 1. Engage qualified testing agency to administer and perform tests and inspections.
 - 2. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
 - 3. Administer and perform tests and inspections with assistance of factory-authorized service representative.
 - 4. Give 7-day advance notice of the tests and perform tests in presence of owner's representative.
- B. Tests and Inspections:
 - 1. After installing equipment, test for compliance with requirements according to NETA ATS.
 - 2. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with Drawings and Specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and required clearances.

- d. Verify that the unit is clean.
 - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - f. Verify that manual transfer warnings are attached and visible.
 - g. Verify tightness of all control connections.
 - h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
 - 1) Use of low-resistance ohmmeter.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
 - i. Perform manual transfer operation.
 - j. Verify positive mechanical interlocking between normal and alternate sources.
 - k. Perform visual and mechanical inspection of surge arresters.
 - l. Inspect control power transformers.
 - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
 - 2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
 - 3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
3. Electrical Tests:
- a. Perform insulation-resistance tests on all control wiring with respect to ground.
 - b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
 - c. Verify settings and operation of control devices.
 - d. Calibrate and set all relays and timers.
 - e. Verify phase rotation, phasing, and synchronized operation.
 - f. Perform automatic transfer tests.
 - g. Verify correct operation and timing of the following functions:
 - 1) Normal source voltage-sensing and frequency-sensing relays.
 - 2) Engine start sequence.
 - 3) Time delay on transfer.
 - 4) Alternative source voltage-sensing and frequency-sensing relays.
 - 5) Automatic transfer operation.
 - 6) Interlocks and limit switch function.
 - 7) Time delay and retransfer on normal power restoration.
 - 8) Engine cool-down and shutdown feature.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

- a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
 - f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for one pole deviating by more than 50 percent from other poles.
 - g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Transfer switches will be considered defective if they do not pass tests and inspections.
- F. Remove and replace malfunctioning units and retest as specified above.
- G. Prepare test and inspection reports.
- H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.
- C. Coordinate this training with that for generator equipment.

END OF SECTION

SECTION 26 43 13

SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Type 1 surge protective devices.
 - 2. Type 2 surge protective devices.
 - 3. Enclosures.
 - 4. Conductors and cables.
- B. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment. Required for Emergency switchboards, and distribution panelboards.
- C. Related Requirements:
 - 1. Section 262413 "Switchboards" for integral SPDs installed by switchboard manufacturer.
 - 2. Section 262416 "Panelboards" for integral SPDs installed by panelboard manufacturer.
 - 3. Section 262726 "Wiring Devices" for integral SPDs installed by receptacle manufacturer.

1.3 DEFINITIONS

- A. In = Inominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: air of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. NRTL: Nationally recognized testing laboratory.
- F. OCPD: Overcurrent protective device.
- G. SCCR: Short-circuit current rating.
- H. SPD: Surge protective device.
- I. Type 1 SPDs: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device.
- J. Type 2 SPDs: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel.
- K. Type 3 SPDs: Point of utilization SPDs.

- L. Type 4 SPDs: Component SPDs, including discrete components, as well as assemblies.
- M. Type 5 SPDs: Discrete component surge suppressors, such as MOVs that may be mounted on a printed wiring board, connected by its leads or provided within an enclosure with mounting means and wiring terminations.
- N. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include electrical characteristics, specialties, and accessories for SPDs.
 - 2. NRTL certification of compliance with UL 1449.
 - a. Tested values for VPRs.
 - b. Inominal ratings.
 - c. MCOV, type designations.
 - d. OCPD requirements.
 - e. Manufacturer's model number.
 - f. System voltage.
 - g. Modes of protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For SPDs to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace SPDs that fail in materials or workmanship within five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 TYPE 1 SURGE PROTECTIVE DEVICES (SPDS)

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ABB USA
 - 2. Eaton/Cutler Hammer Products
 - 3. General Electric Company
 - 4. Schneider Electric USA
 - 5. Siemens Industry Inc.
- B. Source Limitations: Obtain devices from single source from single manufacturer.

C. Standards:

1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 1.

D. Product Options:

1. Include integral disconnect switch.
2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
3. Include indicator light display for protection status.
4. Include audible alarm.
5. Include NEMA ICS 5, dry Form C contacts rated at 2 A and 24 V ac for remote monitoring of protection status.
6. Include surge counter.

E. Performance Criteria:

1. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems, and not less than 115 percent of nominal system voltage for 480Y/277 V power systems.
2. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than 240 kA. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
3. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V or 208Y/120 V, three-phase, four-wire circuits must not exceed the following:
 - a. Line to Neutral: 1200 V for 480Y/277 V and 700 V for 208Y/120 V.
 - b. Line to Line: 2000 V for 480Y/277 V and 1200 V for 208Y/120 V.
 - c. Line to Ground: 1200 V for 480Y/277 V and 700 V for 208Y/120 V.
4. SCCR: Not less than 100 kA.
5. Inominal Rating: 20 kA.

2.2 TYPE 2 SURGE PROTECTIVE DEVICES (SPDS)

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB USA
2. Eaton/Cutler Hammer Products
3. General Electric Company
4. Schneider Electric USA
5. Siemens Industry Inc.

B. Source Limitations: Obtain devices from single source from single manufacturer.

C. Standards:

1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.
2. Comply with UL 1283.

D. Product Options:

1. Include LED indicator lights for power and protection status.
2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
3. Include NEMA ICS 5, dry Form C contacts rated at [2 A and 24 V ac] <Insert values> for remote monitoring of protection status.
4. Include surge counter.

E. Performance Criteria:

1. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems, and not less than 115 percent of nominal system voltage for 480Y/277 V power systems.
2. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than 100 kA. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
3. Protection modes and UL 1449 VPR for grounded wye circuits with [480Y/277 V] [208Y/120 V], three-phase, four-wire circuits must not exceed the following:
 - a. Line to Neutral: 1200 V for 480Y/277 V; 700 V for 208Y/120 V.
 - b. Line to Ground: 1200 V for 480Y/277 V; 700 V for 208Y/120 V.
 - c. Neutral to Ground: 1200 V for 480Y/277 V; 700 V for 208Y/120 V.
 - d. Line to Line: 2000 V for 480Y/277 V; 1200 V for 208Y/120 V.
4. SCCR: Equal or exceed 100 kA.
5. Inominal Rating: 20 kA.

2.3 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.
- B. Outdoor Enclosures: NEMA 250, Type 3R.

2.4 CONDUCTORS AND CABLES

- A. Power Wiring: Same size as SPD leads, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Provide OCPD and disconnect for installation of SPD in accordance with UL 1449 and manufacturer's written instructions.
- C. Install leads between disconnects and SPDs short, straight, twisted, and in accordance with manufacturer's written instructions. Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 1. Do not splice and extend SPD leads unless specifically permitted by manufacturer.

2. Do not exceed manufacturer's recommended lead length.
3. Do not bond neutral and ground.

D. Use crimped connectors and splices only. Wire nuts are unacceptable.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 1. Compare equipment nameplate data for compliance with Drawings and the Specifications.
 2. Inspect anchorage, alignment, grounding, and clearances.
 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. SPDs that do not pass tests and inspections will be considered defective.
- C. Prepare test and inspection reports.

3.3 STARTUP SERVICE

- A. Complete startup checks in accordance with manufacturer's written instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests; reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION 264313

SECTION 26 51 19
LED INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. LED luminaire requirements.

B. Related Requirements:

- 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
- 2. Section 260926 "Lighting Control Panelboards" for panelboards used for lighting control.
- 3. Section 260936 "Modular Dimming Controls" for architectural dimming systems and for fluorescent dimming controls with dimming ballasts specified in interior lighting Sections.
- 4. Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

6. Photometric data and adjustment factors based on laboratory tests, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for LED luminaires and accessories identical to those indicated for the luminaire schedule as applied in this Project.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
 1. Include plans, elevations, sections, and mounting and attachment details.
 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.
- C. Samples: For each alternate luminaire and for each color and texture with standard factory-applied finish.
- D. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Luminaires.
 2. Suspended ceiling components.
 3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches (300 mm) of the plane of the luminaires.
 4. Structural members to which equipment or luminaires will be attached.
 5. Initial access modules for acoustical tile, including size and locations.
 6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Ceiling-mounted projectors.
 7. Moldings.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.

- C. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Product Certificates: For each type of luminaire.
- E. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all LED modules printed with types used on Project; use ANSI and manufacturers' codes.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications:
 - 1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
 - 2. Compliant with the California Electrical Code and California Electrical Code
 - 3. In accordance IES testing standards.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- D. Mockups: For interior luminaires in room or module mockups, complete with power and control connections. Only where specifically indicated to be mocked up.
 - 1. Obtain Architect's approval of luminaires in mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance:
 - 1. Luminaires shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
- B. Ambient Temperature: [41 to 104 deg F (5 to 40 deg C)] [5 to 104 deg F (Minus 15 to plus 40 deg C)].
 - 1. Relative Humidity: Zero to 95 percent.
- C. Altitude: Sea level to 4000 feet.

2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in , by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.
- D. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- E. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- F. California Title 24 compliant.

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Steel:
 - 1. ASTM A36/A36M for carbon structural steel.

2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:

1. Manufacturer's standard grade.
2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.4 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaires:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaires:
 - 1. Attached to structural members in walls. Attached to a minimum 20 gauge backing plate attached to wall structural members.
 - 2. Do not attach luminaires directly to gypsum board.
- G. Suspended Luminaires:
 - 1. Ceiling Mount:
 - a. Two 5/32-inch- (4-mm-) diameter aircraft cable supports adjustable to 10 feet (3 m) in length.
 - 2. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 - 3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and for suspension for each unit length of luminaire chassis, including one at each end.
 - 5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- H. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 STARTUP SERVICE

- A. Comply with requirements for startup specified in Section 260943.16 "Addressable-Luminaire Lighting Controls."
- B. Comply with requirements for startup specified in Section 260943.23 "Relay-Based Lighting Controls."

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pavement marking paint.

1.2 SUBMITTALS

- A. Submit product data under provisions of Division 01.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle packaged products in original containers with seals unbroken and labels intact until time of installation.
- B. Store delivered products in clean, safe, dry, well ventilated area.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Sherwin-Williams. Product: Set Fast Acrylic Traffic Marking Paint.
- B. PPG Paints. Product: Zoneline Traffic and Zone Marking Paint.
- C. Dunn-Edwards Corp. Product: Vin-L-Stripe VSZM10 waterborne acrylic traffic paint.
- D. Substitutions: Under provisions of Division 01.

2.2 PAVEMENT MARKING PAINT

- A. Colors:
 - 1. Striping and Lettering: White.
 - 2. Disabled Access: Blue. Blue paint shall match Color No. 15090 of Federal Standard 595B.
 - a. Access aisle at accessible parking shall have a blue border.

PART 3 EXECUTION

3.1 APPLICATION

- A. Clean surfaces to be painted with traffic paint of dust, dirt, grime, oil, rust or other contaminants that will impair the quality of work or interfere with proper bond of paint coats. Surfaces shall be cleaned to the extent and by whatever means that will satisfactorily accomplish the purpose without damage to asphalt concrete.
- B. Provide measured layouts, temporary markings, templates and other means necessary to provide required marking.

- C. Prepare and apply paint in accordance with manufacturer's instructions; paint shall be applied by spray and shall achieve complete coverage free from voids and thin spots.
- D. Where indicated on the Drawings, paint parking stall strips, lettering, arrows, accessibility symbols and striping, etc. on asphalt concrete paving. Paint strips shall be 3 inches wide (except otherwise indicated) and applied in two coats; Colors: As indicated on Drawings.
 - 1. International Accessibility Symbol: Symbol shall be white figures on a blue background. Blue shall be equal to color No. 15090 in Federal Standard 595B.
- E. Lines and symbols shall be accurately formed and true to line and form; lines shall be straight and uniform in width.
- F. Painted edges shall be clean cut and free from raggedness and corners shall be cut sharp and square.
- G. Tolerances: Apply striping within a tolerance of 1/2 inch in 50 feet. Apply markings and striping to widths indicated with a tolerance of 1/4 inch on straight sections and 1/2 inch on curved sections.

END OF SECTION

SECTION 32 17 26
TACTILE WARNING SURFACING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Embedded tactile warning surface tile, with an inline dome pattern, for application on ramps and level walking surfaces.
- B. Tactile Tile Installation Methods: As indicated on Drawings, and as follows:
 - 1. New Concrete: Installation in cast-in-place uncured (wet) concrete.
 - 2. Existing Concrete: Installation over existing concrete.

1.2 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.
- B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- C. Referenced Standards:
 - 1. AASHTO HB-17 – Standard Specifications for Highway Bridges.
 - 2. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 3. ASTM C293 – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading).
 - 4. ASTM C1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 - 5. ASTM D543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
 - 6. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
 - 7. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
 - 8. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics.
 - 9. ASTM D1037 – Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
 - 10. ASTM D2486 – Standard Test Methods for Scrub Resistance of Wall Paints.
 - 11. ASTM D5420 – Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
 - 12. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

- 13. ASTM G155 – Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

1.3 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Shop Drawings: Show detailed plans of tile profile, fastener locations, and installation methods.
- C. Samples: Furnish two tile samples, minimum 8 inches by 8 inches in size, of the type and color specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum five years experience.

1.5 REGULATORY REQUIREMENTS

- A. General: Provide detectable (tactile) warning products in accordance with California Code of Regulations (CCR). Title 24, Part 1, 2016 California Administrative Code, Chapter 5 “Access to Public Buildings by Persons with Disabilities”.
 - 1. Article 3 “Acceptance of Detectable Warning and Directional Surface Products for Manufacturers and Design Professionals”.
 - 2. Article 4 “Application for Independent Entity Evaluation Approval (IEEA)”.
- B. Definition of Detectable Warning: Conform to 2016 California Building Code, Chapter 2 “Definitions”, Section 202, “Definitions”.
 - 1. Chapter 11B “Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing,” Section 11B-106.5 “Defined Terms” for detectable warning.
- C. Detectable Warnings for Site Accessibility: Provide detectable warning system in accordance with 2016 California Building Code, Chapter 11B, “Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing”, Section 11B-705.1, Section 11B-705.1.1.4, and the following:
 - 1. Detectable Warnings at Curb Ramps: Chapter 11B, Section 11B-206 “Accessible Routes”, Section 11B-406.5.12, “Detectable Warnings”, and Section 11B-705.1.2.2, “Curb Ramps”.
 - 2. Detectable Warnings at Hazardous Vehicular Areas: Chapter 11B, Section 11B-206, “Accessible Routes”, Section 11B-406.5.12, “Detectable Warnings”, and Section 11B-705.1.2.5, “Hazardous Vehicular Areas”.
 - 3. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact per Section 11B-705.1.1.4.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle packaged products in original containers with seals unbroken and labels intact until the time of installation.
- B. Store delivered products in a clean, safe, dry area.

1.7 WARRANTY

- A. Five years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of Design Product: Armor-tile by Engineered Plastics Inc., Williamsville, NY; 800-682-2525, <http://www.armor-tile.com>. Products:
 - 1. Provide Cast-In-Place Type Armor-Tile for embedding in cast-in-place uncured (wet) concrete.
 - 2. Surface-Applied Type Armor-Tile for application over existing concrete.
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

- A. Tactile Warning Tiles: An epoxy polymer composite with an ultraviolet stabilized coating containing aluminum oxide particles in the truncated domes.
 - 1. Cast-In-Place Type Tile for Embedding in Cast-In-Place Uncured (Wet) Concrete:
 - a. Tile thickness to be 0.3875 inch at domes and 0.1875 inch in flat areas between domes. Total thickness at perimeter to be 1.375 inches; dome height to be 0.20 inch.
 - b. Tile underside to have embedment flanges with 0.625-inch diameter holes; long sides to have 0.1875-inch diameter vent holes.
 - c. Tile to have sound amplifying plastic plates attached between flanges, with an air space between tile bottom surface and sound amplifying plastic plates.
 - d. Tile face to have non-slip texture.
 - 2. Surface-Applied Type Tile for Application over Existing Concrete:
 - a. Tile thickness to be 0.3875 inch at domes and 0.1875 inch in flat areas between domes. Total thickness at perimeter to be 0.2175 inch, with 0.50 inch bevel around perimeter and 0.0845 inch thickness at beveled edge; dome height to be 0.20 inch.
 - b. Tile underside to be flat (without flanges), with countersunk holes in domes for fastener application.
 - c. Tile underside to have sound-on-cane amplifying system.
 - d. Tile face to have non-slip texture.
- B. Color and Size:
 - 1. Safety Yellow, (Federal Color #33538 of Federal Standard 595C) colorfast, UV stabilized coating. Color shall be uniform throughout the tile.
 - 2. Sizes: As indicated on Drawings.
- C. Performance Requirements: Tactile warning tiles shall meet or exceed the following criteria:
 - 1. Water Absorption: 0.05 percent, maximum, when tested in accordance with ASTM D570.
 - 2. Slip Resistance: 0.80, minimum combined wet/dry static coefficient of friction on top of domes and field area, when tested in accordance with ASTM C1028.

3. Compressive Strength: 28,000 psi, minimum, when tested in accordance with ASTM D695.
4. Tensile Strength: 19,000 psi, minimum, when tested in accordance with ASTM D638.
5. Flexural Strength: 25,000 psi, minimum, when tested in accordance with ASTM C293.
6. Gardner Impact: 550 inch-pounds per inch minimum, when tested in accordance with ASTM D5420.
7. Chemical Stain Resistance: No discoloration or staining when exposed to ten percent hydrochloric acid, urine, saturated calcium chloride, black stamp pad ink, chewing gum, red aerosol paint, ten percent ammonium hydroxide, one percent soap solution, turpentine, five percent Urea, diesel fuel, motor oil, and tested in accordance with ASTM D543.
8. Wear Depth: 0.06 inch, maximum, after 1000 abrasion cycles of 40 grit Norton Metallite sandpaper, tested in accordance with ASTM D2486.
9. Flame Spread: 15 maximum, when tested in accordance with ASTM E84.
10. Accelerated Weathering: No deterioration, fading or chalking, when tested for 3,000 hours in accordance with ASTM G155.
11. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System: No cracking, delamination, warping, checking, blistering, color change, loosening of tiles, or other detrimental defects, when tested in accordance with ASTM D1037.
12. Salt and Spray Performance: No evidence of deterioration or defects after 200 hours of exposure, when tested in accordance with ASTM B117.
13. AASHTO HB-17 Single Wheel HS20-44 Loading Test for Cast-In-Place Type Tile: Mounted on concrete platform with 1/2 inch air space at the underside of tile and subjected to a maximum load of 10,400 pounds, corresponding to 8000 pound individual wheel load and thirty percent impact factor; no visible damage at maximum loading.

2.3 ACCESSORIES FOR SURFACE-APPLIED CONDITION

- A. Fasteners: Color matched, corrosion resistant, flat head drive anchor, 1/4 inch diameter, 1-3/4 inches long. Armor-Drive fasteners by Engineered Plastics, Inc., or accepted equal.
- B. Adhesive: Urethane elastomeric adhesive by Sika Corp., Mapei or Bostik.
- C. Sealants: Two-component epoxy sealant by Powers, Simpson or Hilti.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install tactile warning surface tiles in accordance with manufacturer's printed instructions.
- B. Where indicated on drawings, install Cast-In-Place Type tiles over cast-in-place, uncured (wet) concrete.
- C. Where indicated on Drawings, install Surface-Applied Type tiles over existing concrete as indicated on Drawings or as required by existing condition.
- D. Ensure that the surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation.

- E. Installation in Cast-In-Place Uncured (Wet) Concrete: Maintain concrete in 4 inch to 7 inch slump range. Lay tactile warning surface tiles (without removing protective plastic wrap) in uncured (wet) concrete and tamp each tile in place. Place weights over tiles to prevent floating, as recommended by the manufacturer. After curing, remove protective plastic wrap, and clean tile surfaces.
- F. Installation over Existing Concrete: When required by site conditions or construction sequence, allow new concrete to cure for a minimum of 30 days, and install Surface-Applied Type tiles as previously specified. Existing concrete surfaces to receive tiles shall be mechanically cleaned with a diamond cup grinder or shot blaster to remove any dirt or foreign materials.
 - 1. Immediately prior to installing tactile warning surface tiles, concrete surfaces shall be inspected to ensure that they are structurally sound, clean, dry, free of voids, sealers, curing compounds, projections, loose material, dust, oil, and grease.
 - 2. Apply adhesive on the backside of the tile following the perimeter and internal cross pattern established by the tile manufacturer. Sufficient adhesive must be placed on the prescribed areas to have full coverage across the 2-inch width of the adhesive locator.
 - 3. Set tiles true and square to the curb ramp area as detailed.
 - 4. Drill holes through countersunk holes located in the molded recess of tile. Drill holes true and straight to a depth of 3-1/2 inches, using the recommended bit.
 - 5. Mechanically fasten tiles to concrete substrate using a punch pin and hammer to set the drive anchors. Ensure the fastener has been set to full depth, straight and true. Care shall be taken when setting the fastener to avoid any blows with the hammer to the tile surface.
 - 6. Following installation of tiles, apply epoxy sealant system to the perimeter edge. Tape all perimeter edges of the tiles and adjoining substrate 1/2 inch apart to allow for tooling the sealant. Follow manufacturer's recommendations when applying sealant in a coved profile to blend and seal the tile edge with adjoining surfaces.
 - 7. Do not allow foot traffic on installed tiles until the perimeter edge sealant has cured sufficiently to avoid tracking.

END OF SECTION