

SPECIFICATIONS

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

BUDGET / ACCOUNT: 9360 / 8400 / 91938



Department of Public Works and Planning

CONTRACT NUMBER 24-23-C



County of Fresno

DEPARTMENT OF PUBLIC WORKS AND PLANNING
STEVEN E. WHITE, DIRECTOR

March 13, 2025

Contract No. 24-23-C

ADDENDUM NO. 1 to WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION, revising the Bidding and Contract Documents as follows:

TABLE OF CONTENTS

No changes

NOTICE TO BIDDERS

No changes

SPECIAL PROVISIONS

No changes

TECHNICAL SPECIFICATIONS

SECTION 01 22 00 EXPLANATION OF BID ITEMS

DELETE:

Bid Item No. 21 - Fracture Fracture Water Quality Sampling

This bid item is a unit price bid for furnishing and installing packer and pump to facilitate water quality testing of an upper fracture or set of fractures, using a single inflatable packer, and shall be full compensation for furnishing all labor, equipment and materials to allow for complete water quality testing, including four hours of pumping, as described herein. The bid item will be paid for on a per each basis.

REPLACE with:

Bid Item No. 21 - Fracture Water Quality Sampling

This bid item is a unit price bid for furnishing and installing packer(s) and pump to facilitate water quality testing of an upper, middle, and lower fracture or set of fractures, using an inflatable packer(s), and shall be full compensation for furnishing all labor, equipment and materials to allow for complete water quality testing, including four hours of pumping, as described herein. The bid item will be paid for on a per each basis.

DELETE:

Bid Item No. 26 - Mobilization/Demobilization, Insurance and Bonds

This bid item is a lump sum bid for mobilization, all necessary bonds, insurance, permits, licenses, fees required during the performance of the work, potholing, and demobilization and shall conform to the provisions of these Specifications. Bid Item No. 1 is intended to cover all of the base "Mobilization" costs for WWD 40.

Payment for this item shall include full compensation for all labor, materials, tools, equipment, construction funding sign and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the bid item amount. Payment for demobilization shall be made with the last progress payment and shall not be less than 20 percent of the bid item amount.

REPLACE with:

Bid Item No. 26 - Mobilization/Demobilization, Insurance and Bonds

This bid item is a lump sum bid for mobilization, all necessary bonds, insurance, permits, licenses, fees required during the performance of the work, potholing, and demobilization and shall conform to the provisions of these Specifications. Bid Item No. 26 is intended to cover all of the additive alternate "Mobilization" costs for WWD 40.

Payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the bid item amount. Payment for demobilization shall be made with the last progress payment and shall not be less than 20 percent of the bid item amount.

SECTION 31 05 00 COMMON WORK RESULTS FOR EARTHWORK

DELETE:

- 1.11 A. Expected material that will be excavated at this site has been identified in the Geotechnical Report.

DELETE:

- 3.5 J. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be

carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.

SECTION 31 23 17 TRENCHING, BACKFILLING AND COMPACTING

DELETE:

- 2.1 B. Backfill: Soil fill that the Contractor places and compacts in trenches over granular backfill and aggregates and that meets material property requirements of the geotechnical engineering report and the Contract Documents. Backfill may consist of existing ground or imported earth material. The Engineer shall approve backfill before it is imported to the site and placed.

REPLACE with:

- 2.1 B. Backfill: Soil fill that the Contractor places and compacts in trenches over granular backfill and aggregates. Backfill may consist of existing ground or imported earth material. The Engineer shall approve backfill before it is imported to the site and placed.

SECTION 33 11 14 TEST HOLE DRILLING AND WATER WELL CONSTRUCTION

DELETE:

- 3.1 B. Installation of Conductor Casing – A borehole shall be drilled and appropriate size conductor casing shall be installed and cemented in place, in accordance with SWRCB standards, if determined to be necessary by the Contractor. The driller will not be compensated for installation of a conductor casing.

REPLACE with:

- 3.1 B. Installation of Conductor Casing – A borehole shall be drilled and appropriate size conductor casing shall be installed and cemented in place, in accordance with SWRCB standards, if determined to be necessary by the Contractor.

PROJECT DETAILS / DRAWINGS

No changes

PROPOSAL/BID BOOK: PAPER

No changes

PROPOSAL/BID BOOK: BID EXPRESS

No changes

AGREEMENT

No changes

PLANS

DELETE: Plan Sheet No. 3

REPLACE with: Plan Sheet No. 3-1

END OF ADDENDUM NO. 1

Please attach this Addendum to the inside cover of the Specifications booklet. If you have given the Bidding and Contract Documents to someone else, please forward this Addendum.



Mar 13, 2025

Date Signed

A handwritten signature in blue ink, appearing to read "Mohammad H. Alimi".

Design Engineer: _____

Mohammad Alimi, PE C67156

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



3/11/2025

Date Signed

Consultant Engineer:

A handwritten signature in blue ink that reads "Matthew W. Kemp". The signature is written over a horizontal line.

Matthew Kemp, PE 66088

Provost & Pritchard
455 W Fire Avenue
Clovis, CA 93611

In responsible charge of the Technical Specifications and Civil Plans

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AGREEMENT

Agreement

PLANS

COUNTY ADOPTION AND ACKNOWLEDGEMENT
PROJECT: WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION
CONTRACT NUMBER: 24-23-C

Ernest "Buddy" Mendes, Chairman	4th District
Garry Bredefeld, Vice Chairman	2nd District
Brain Pacheco	1st District
Luis Chavez	3rd District
Nathan Magsig	5th District

Paul Nerland, County Administrative Officer



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



Date

Date Signed: 2/18/25



Supervising Engineer: _____



Sebastian Artal, PE 76724

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

In responsible charge of the Special Provisions Sections 1 through 14

COUNTY ADOPTION AND ACKNOWLEDGEMENT
PROJECT: WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION
CONTRACT NUMBER: 24-23-C



Date Signed: 2/18/2025

Consultant Engineer: _____

Matthew W. Kemp

Matthew Kemp, PE 66088

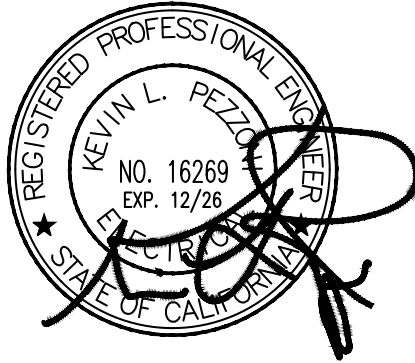
Provost & Pritchard
455 W Fire Avenue
Clovis, CA 93611

In responsible charge of the Technical Specifications and Civil Plans

COUNTY ADOPTION AND ACKNOWLEDGEMENT

PROJECT: WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

CONTRACT NUMBER: 24-23-C



Date Signed: 2/18/2025

Consultant Engineer: _____ Kevin Pezzoni, PE 16269

Pezzoni Engineering, Inc.
1150 9th Street Suite #1415
Modesto, CA 95354

In responsible charge of the Electrical Plans

NOTICE TO BIDDERS

Contract Name: **WATERWORKS DISTRICT 40 – WATER
SUPPLY WELL(S) CONSTRUCTION**

Contract Number: **24-23-C**

Bid Opening Date & Time: Thursday, March 20, 2025
2:00 P.M., (1400 hours and 00 seconds)

Sealed Proposals / Bids Received at EITHER (choose ONE):
<https://www.bidexpress.com/businesses/36473/home>
or
Department of Public Works and Planning
Office of the Design Engineer
2220 Tulare St., 7th Floor
Fresno, CA 93721

The work to be done consists, in general, of the construction of up to two new wells with necessary appurtenances and installation of necessary piping to the existing distribution system within the community of Shaver Springs, approximately 40 miles northeast of the City of Fresno.

Pre-bid Conference: Not Mandatory
1:00 P.M. on Tuesday, March 4, 2025 On
Tocaloma Road at Shaver Springs Road

Planholders Website: “Contractor Bidding Opportunities”
<http://www.fresnocountyca.gov/planholders>

Requests for Clarification (RFC) Deadline & Form:
<https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/24-23-C-Waterworks-District-40---Water-Supply-Wells-Construction/Request-for-Clarification-Form>
No later than 2:00 P.M. on the seventh (7th) calendar day before bid opening

Bid Submission Questions: DesignServices@fresnocountyca.gov
(559) 353-4919 or (559) 600-4543

Request to be Added to Planholders Form: <https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/Request-to-Be-Added-to-the-Planholders-List-Form>

Engineer’s Estimate Range: \$940,000.00 to 1,040,000

Working Days (Subsection 8-1.04): All work within Eighty (80) working days
(Specifications Special Provisions Section 8-1.04B)
If additive bid awarded, an additional Sixty (60) working days

Required Valid California Contractor's License:

Class A (General Engineering)

or

Class C-57 (Well Drilling Contractor)

Basis of Bid: Bids are required for the entire work described herein, including a bid for the base bid and a bid for each of the additive bids. The total amount of the base bid and additive bid is the cumulative sum of the bid amounts listed for the individual line items. Bids will be compared, for purposes of identifying the apparent low bidder for proposed award of the project, on the basis of the total of the base bid plus the total of all additive bids; provided however, that the ultimate scope of the project, as subsequently determined by the Board of Supervisors at the time of award, may or may not include all or any of the additive bids.

Project Details:

Electronic copies, in ".pdf" file format, of the official project plans and specifications, bid books and proposal sheets, and such additional supplemental project information as may be provided, are available to view, download, and print on the Planholders website.

Bid Opening: Promptly following the closing of the bidding all timely submitted bids will be publicly opened and viewable via a livestream (the link for which will be posted at) for construction in accordance with the project specifications therefor. A bid summary of the bids received will be posted to the project's website, generally within twenty-four (24) hours of the bid opening.

Planholders: Bidders may fill out a Request to be Added to Planholders list at the link listed above. Requesters will then be listed as a planholder for the project on the website and receive notifications and addenda issued for the project. Prospective bidders may also select the project on www.BidExpress.com. Those that demonstrate interest in the project will be added to the planholders list, and receive notifications and addenda issued for the project. Planholder and exchange/publication names may be obtained from the County of Fresno Planholders website listed above.

Requests for Clarification (RFC) & Addenda: All questions regarding this project shall be in writing and shall be received by the Department of Public Works and Planning (Department), no later than the deadline listed above and shall be submitted on the "Request for Clarification Form" provided on our website above. Any questions received after this deadline may not receive a response. In the event that the bid opening date is revised, the deadline for questions will be extended to no later than 2:00 P.M. on the calendar days listed above before the revised bid opening date. Questions and their responses will be posted on our website under "Request for Clarification Responses."

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

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

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

Electronic bids shall be submitted via the Bid Express website.

Hardcopy bids shall be submitted in a sealed envelope addressed to the “Department of Public Works and Planning, Office of the Design Engineer” and labeled with the name of the bidder, contract number, name of the project, and the statement “Do Not Open Until The Time Of Bid Opening.”

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

Hardcopy bid bonds shall be submitted in a sealed envelope addressed to “Department of Public Works and Planning, Office of the Design Engineer” and labeled with the name of the bidder, contract number, name of the project, and the statement “Do Not Open Until The Time Of Bid Opening – BID BOND.”

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

Additional Information and Requirements:

No contract will be awarded to a contractor who has not been licensed in accordance with the provisions of the Contractors State License Law, California Business and Professions Code, Division 3, Chapter 9, as amended, or whose bid is not on the proposal form included in the contract document.

This project is subject to the contracting requirements and implementing regulations as amended in Title 13, Section 2449 General Requirements for In-Use Off-Road Diesel-Fueled Fleets, of the California Code of Regulations (13 CCR § 2449(i)). Bidders must submit a valid Certificate of Reported Compliance (CRC) issued by the California Air Resources Control Board at the time of bidding. Bidders are responsible for submitting their listed subcontractors' CRCs and any supporting documentation within five (5) calendar days of the bid opening. Failure to submit the required CRCs may render a bid non-responsive.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at County of Fresno, Department of Public Works and Planning, 2220 Tulare Street, Sixth (6th) Floor, Fresno CA 93721-2104 and available from the California Department of Industrial Relations' Internet web site at <http://www.dir.ca.gov/DLSR/PWD>. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

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

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

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

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

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

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

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

Board of Supervisors, County of Fresno

Paul Nerland, County Administrative Officer

Bernice E. Seidel, Clerk of the Board

Issue Date: February 18, 2025

Special Provisions

DIVISION I GENERAL PROVISIONS

1 GENERAL

1-1.01 GENERAL

Add to the beginning of Section 1:

The work is done in accordance with the 2023 *Standard Specifications*, 2023 *Standard Plans* and the following special provisions.

Where these special provisions indicate to replace, add to, delete, delete from, or otherwise modify a "section," or a portion thereof, the section or portion thereof to which such modification is to be applied is the section or portion thereof with the corresponding numbering in the 2023 *Standard Specifications*.

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

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

Add to the end of Section 1-1.01:

Refer to Section 01 22 00 EXPLANATION OF BID ITEMS of the Technical Specifications

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

SJVAPCD	San Joaquin Valley air pollution control district
METS	Caltrans Material Engineering and Testing Services

Add to section 1-1.06:

Abbreviations in the Bid Items and Applicable Sections are also used in the Bid Item List - Proposal 2.

Add or Replace items in Section 1-1.07 with:

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

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

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

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

Caltrans: State of California Department of Transportation

County: The County of Fresno

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

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

Director: Department's Chairman

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

Contract Number 24-23-C

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

holiday: Holiday shown in the following table:

Holidays	
Holiday	Date observed
Every Sunday	Every Sunday
New Year's Day	January 1 st
Birthday of Martin Luther King, Jr.	3rd Monday in January
Presidents' Day	3rd Monday in February
Cesar Chavez Day	March 31 st
Memorial Day	Last Monday in May
Juneteenth	June 19 th
Independence Day	July 4 th
Labor Day	1st Monday in September
Veterans Day	November 11 th
Thanksgiving Day	4th Thursday in November
Day after Thanksgiving Day	Day after Thanksgiving Day
Christmas Day	December 25 th

If January 1st, March 31st, June 19th, July 4th, November 11th, or December 25th fall on a Sunday, the Monday following is a holiday. If January 1st, March 31st, July 4th, November 11th, or December 25th fall on a Saturday, the preceding Friday is a holiday.

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

permanent erosion control establishment period: Number of working days shown in Section 8-1.04 for permanent erosion control establishment work.

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

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

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

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

Replace Section 1-1.08 with:

1-1.08 DISTRICTS

Not Used

Add to the end of Section 1-1.09

This project is in a freeze-thaw area.

Replace Section 1-1.10 with:

1-1.10 PAVEMENT CLIMATE REGIONS

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

Contract Number 24-23-C

Replace Section 1-1.11 with:

1-1.11 WEBSITES, ADDRESSES, AND TELEPHONE NUMBERS

Websites, Addresses, and Telephone Numbers

Reference or agency or department unit	Website	Address	Telephone no.
Authorized Material Lists Authorized Material Source Lists	https://dot.ca.gov/programs/engineering-services/authorized-materials-lists	--	--
CA Unified Certification Program's list of certified DBEs	https://californiaucp.dbesystem.com/	--	--
<i>California MUTCD</i>	https://dot.ca.gov/programs/safety-programs/camutcd	--	--
Department	https://www.fresnocountyca.gov/	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	(559) 600-9908
Department of Conservation, Office of Mine Reclamation	http://www.conservation.ca.gov/dmr/	--	--
Department of Industrial Relations	http://www.dir.ca.gov	455 Golden Gate Ave San Francisco CA 94102	--
Design Services - Contract Administration, Planholders, Bid Results	https://www.fresnocountyca.gov/planholders	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	Tel: (559) 353-4919 Fax: (559) 455-4609 Email: DesignServices@fresnocountyca.gov
Division of Accounting, Office of External Accounts Payable	https://dot.ca.gov/programs/accounting	Major Construction Payment and Information Unit Office of External Accounts Payable Division of Accounting Department of Transportation P.O. Box 168043 Sacramento, CA 95816-8043	(916) 227-9013
Division of Construction	http://www.dot.ca.gov/hq/construc/	--	--
Geotechnical Services	https://dot.ca.gov/programs/engineering-services	Geotechnical Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
METS	https://dot.ca.gov/programs/engineering-services	Materials Engineering and Testing Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
<i>MPQP</i>	https://dot.ca.gov/programs/construction/material-plant-quality-program	--	--

Office Engineer	--	Director of Public Works & Planning Fresno County 2220 Tulare St, 8 th Floor Fresno, CA 93721	(559) 600-4078
Office of Electrical Systems Regional Transportation Management Center	--	Office of Electrical Systems Regional Transportation Management Center 3165 Gold Valley Dr Rancho Cordova, CA 95742	
Offices of Structure Design, Documents Unit	--	MSC 9-4/4I Documents Unit Offices of Structure Design Department of Transportation 1801 30th St Sacramento, CA 95816-7006	(916) 227-0716
Publication Distribution Unit	--	Publication Unit Department of Transportation 1900 Royal Oaks Dr Sacramento, CA 95815-3800	--

Replace Section 1-1.12 with:

1-1.12 MISCELLANY

Make checks and bonds payable to the County of Fresno.

2 BIDDING

Replace Section 2-1.04 with:

2-1.04 PREBID OUTREACH MEETING

Section 2-1.04 applies if a mandatory pre-bid meeting is shown on the Notice to Bidders.

The Department may conduct a meeting to provide access to the site and/or discuss the project in the presence of County staff.

Each bidder must attend the meeting. The bidder's representative must be a company officer, project superintendent, or project estimator. For a joint venture, one of the parties must attend the mandatory pre-bid meeting.

The Department does not accept a bid from a bidder who did not attend the meeting.

A sign-in will be used to identify the attendees. Each bidder must include the name and title of the company representative attending the meeting.

The Department may hold a single pre-bid meeting for more than one contract. Sign in for the contract you intend to bid on. If you are bidding on multiple contracts, sign-in for each contract you intend to bid on. The sign-in lists, with the names of all companies in attendance at each pre-bid meeting, will be made available at the website shown on the Notice to Bidders for bidder inquiries.

Replace Section 2-1.06 with:

2-1.06 BID DOCUMENTS

2-1.06A General

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

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

The *Specifications*, project plans, and any addenda to these documents may be accessed at the planholders website at <https://www.fresnocountyca.gov/planholders>.

The *Standard Specifications* and *Standard Plans* may be accessed online at [2015 Caltrans Standard Specifications](#) and [2023 Caltrans Standard Specifications](#)

2-1.06B Supplemental Project Information

No supplemental project information is available for this project.

The Department makes the following supplemental project information available:

Supplemental Project Information

Where Available	Description
Included in Project Details	<ul style="list-style-type: none">• Location Map
Included with the project plans	<ul style="list-style-type: none">• N/A
Available on Design Services webpage	<ul style="list-style-type: none">• N/A

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

Replace Section 2-1.12 with:

2-1.12 RESERVED

Replace Section 2-1.15 with:

2-1.15 RESERVED

Replace Section 2-1.18 with:

2-1.18 RESERVED

Replace Section 2-1.27 with:

2-1.27 RESERVED

Replace Section 2-1.33 with:

2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

2-1.33A General

Complete forms in the *Bid* book.

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

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

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

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

Electronic Bids: Complete and submit the bid online at <http://www.BidExpress.com> (Section 2-1.33). Your electronic signature is your confirmation of an agreement to all certifications and statements contained in the Bid book. 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.

Hardcopy Bid: Submit a hardcopy bid:

1. Under sealed cover
2. Marked as a bid
3. Identifying the contract number and the bid opening date
4. Use ink or typewriter

2-1.33B Bid Item List and Bid Comparison

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

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

2-1.33C Bid Document Completion

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

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

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

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

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

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

Use ink or typewriter for paper bids.

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

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

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

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

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

Indicate type of bid security provided.

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

Bonding companies may provide their own bid bond forms. Bid Security and Signature sections must be completed by the bidder and submitted with their bid.

Provide contractor's license information.

State business name and if business is a:

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

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

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

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

Business Address - Firm's Street Address

Mailing Address - P.O. Box or Street Address

Complete, sign, and return with bid.

2-1.33C(5) Proposal 5 - Non-Collusion Declaration

Must be completed, signed, and returned with bid.

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

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

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

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

2-1.33C(8) Proposal 8 - Subcontractors

Sheet(s) or spaces where bidders list subcontractors. List each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid (Pub Cont Code § 4100 et seq.).

The *Subcontractor List* submitted with the bid must show the name, location of business, work portions to be performed, Department of Industrial Relations registration number, and the contractor's license number for each subcontractor listed.

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

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

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

2-1.33C(9) Proposal 9 -Title 13, California Code of Regulations § 2449(i) General Requirements for In-Use Off-Road Diesel-Fueled Fleets

Contractors, if applicable, must submit valid Certificates of Reported Compliance with their bid. Subcontractor certificates will be due no later than 4:00 p.m. on the fifth (5th) calendar day after the bid opening if not submitted with the bid.

Proposal 10 - Proposal 18 – Not Used

2-1.33C(19) Guaranty – Proposal 19

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

2-1.33D Electronic Bid Document Completion

Electronic versions of the bid book documents are available online at <http://www.BidExpress.com>, and may be submitted through that website.

You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening.

Bidders submitting online may use one of the accepted electronic sureties (SurePath or Tinubu) to submit their bid bond; or may submit cash, cashier's check, certified check, or a bidder bond to Design Services at 2220 Tulare St., Seventh Floor, Fresno, CA 93721. Those submitting bid bonds directly to Design Services must submit their bid bond:

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

Replace Section 2-1.34 with:

2-1.34 BIDDER'S SECURITY

You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening.

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

An electronic bid bond may be submitted either:

1. As an electronic bidder's bond by an admitted surety insurer submitted using an electronic registry service approved by the Department (SurePath or Tinubu).
2. As a scanned attachment of a notarized paper bid with the original paper notarized bidder's bond by the admitted surety insurer so that it is received by Design Services no later than 4:00 PM on the fifth (5th) calendar day after the bid opening.

Cash, a cashier's check, a certified check, or a paper bidder's bond should be sent in a sealed envelope in accordance with the labeling and address instructions listed on the Notice to Bidders.

Replace Section 2-1.40 with:

2-1.40 BID WITHDRAWAL

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

2-1.46 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

Replace Section 2-1.47 with:

2-1.47 BID RELIEF

The Department may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief via email to Design Services at the address listed in the table in Section 1-1.11.

Add Section 2-1.51:

2-1.51 DISCLOSURE OF SELF-DEALING TRANSACTIONS

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

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

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

3 CONTRACT AWARD AND EXECUTION

Replace Section 3 with:

3-1.01 GENERAL

Section 3 includes specifications related to contract award and execution.

3-1.02 CONSIDERATION OF BIDS

3-1.02A General

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

3-1.02B Tied Bids

The Department breaks a tied bid with a coin toss.

3-1.03 CONTRACTOR REGISTRATION

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

3-1.04 CONTRACT AWARD

3-1.04A BID PROTEST PROCEDURES

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

The bid protest must be received no later than 5:00 p.m. of the seventh (7th) calendar day following the bid opening for any issues found within the bid itself, or 5:00 p.m. of the third (3rd) calendar day following the deadline for submittal of the specific bid document(s) placed at issue by the protest.

Any Bidder filing a protest is encouraged to submit the bid protest via e-mail, because the deadline is based on the Department's receipt of the bid protest. A bid protest accordingly may be rejected as untimely if it is not received by the deadline, regardless of the date on which it was postmarked. The Bidder's compliance with the following additional procedures also is mandatory:

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

3-1.04B AWARD PERIOD

If the Department awards the contract, the award is made to the lowest responsible bidder within 80 calendar days after bid opening.

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

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

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

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

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

3-1.06 CONTRACTOR LICENSE

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

For a non-federal-aid contract:

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

3-1.07 INSURANCE POLICIES

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

3-1.08 –3-1.10 RESERVED

3-1.11 PAYEE DATA RECORD

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

3-1.12 RESERVED

3-1.13 FORM FHWA-1273

For a federal-aid contract, form FHWA-1273 is included with the Contract form in the documents sent to the successful bidder for execution. Comply with its provisions. Interpret the training and promotion section as specified in Section 7-1.11A.

3-1.14–3-1.17 RESERVED

3-1.18 CONTRACT EXECUTION

The successful bidder must sign the *Agreement*.

Deliver to Design Services:

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

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

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

3-1.19 BIDDERS' SECURITIES

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

4 SCOPE OF WORK

Replace Section 4-1.02 with:

4-1.02 INTENT

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

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

Replace Section 4-1.07D with:

4-1.07D Reserved

Replace the last paragraph of Section 4-1.13 with:

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

5 CONTROL OF WORK

Delete the last paragraph of Section 5-1.01

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

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

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

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

Replace Section 5-1.09 with:

5-1.09 RESERVED

Replace Section 5-1.12 with:

5-1.12 ASSIGNMENT

The performance of the Contractor or any Contract part may be assigned only with prior written consent from the Department. To request consent, submit a Contractor Action Request – Assignment of Contract Performance form. The Department does not consent to any requested assignment that would relieve you of your surety of the responsibility to complete the work or any part of the work. No third-party agreement relieves you or your surety of the responsibility to complete the work. Do not sell, transfer, or otherwise dispose of any Contract part without prior written consent from the Department.

If you assign the right to receive Contract payments, the Engineer accepts the assignment upon the Engineer's receipt of a Contractor Action Request – Assignment of Contract Monies, Assignee Change of

Name/Address form. Assigned payments remain subject to deductions and withholds described in the Contract. The Department may use withheld payments for work completion whether payments are assigned or not.

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

Replace Section 5-1.13C with:

5-1.13C RESERVED

Replace Section 5-1.13D with:

5-1.13D RESERVED

Add the following paragraph to the end of Section 5-1.16:

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

Replace Section 5-1.20B(4) with:

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

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

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

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

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

Replace Section 5-1.20C with:

5-1.20C Railroad Relations

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

Replace Section 5-1.23A with:

5-1.23A General

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

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

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

Each submittal must have a cover sheet that must include:

1. Contract number
2. Project Name

Contract Number 24-23-C

3. Date
4. Submittals (and resubmittals if applicable) must be numbered sequentially
5. Structure number if applicable
6. Contractor
7. Person responsible for submitting the submittal
8. Signature of Contractor's representative sending submittal
9. Section number and/or item submittal is referencing
10. Pages of submittal, excluding cover sheet

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

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

Documents must be submitted in the English language.

Convert documents to US customary units.

Replace the first paragraph of Section 5-1.23B(2)(b) with:

If specified, email electronic shop drawing and calculation sheet submittals to the Engineer.

Replace Section 5-1.24 with:

5-1.24 CONSTRUCTION SURVEYS

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

Submit your request for Engineer-furnished stakes:

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

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

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

Replace Section 5-1.27E with:

5-1.27E CHANGE ORDER BILLS

Maintain separate records for change order work costs.

Replace Section 5-1.32 with:

5-1.32 AREAS FOR USE

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

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

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

Replace Section 5-1.43A with:

5-1.43A General

Minimize and mitigate the impacts of work or events for which you will make a potential claim.

For each potential claim assign an identification number determined by chronological sequencing and the 1st date of the potential claim.

Use the identification number for each potential claim on the:

1. Initial Potential Claim Record form
2. Supplemental Potential Claim Record form
3. Full and Final Potential Claim Record form

Failure to comply with this procedure is:

1. Waiver of the potential claim and a waiver of the right to a corresponding claim for the disputed work in the administrative claim procedure
2. Bar to arbitration (Pub Cont Code § 10240.2)

Replace the word “State” with “Department” in the 3rd paragraph of Section 5-1.43D.

Replace the word “Department’s” with “Caltrans” in the 6th paragraph of Section 5-1.43E(1)(a).

Replace the word “Department” with “Caltrans” where it appears in Section 5-1.43E(2)(a).

Replace the word “Department” with “Caltrans” where it appears in Section 5-1.43E(3)(a).

6 CONTROL OF MATERIALS

Replace Section 6-1.05 with:

6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

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

Submit a substitution request with a time period that:

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

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

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

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

Replace Section 6-1.06 with:

6-1.06 RESERVED

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Add after the last paragraph of Section 7-1.02C:

The following information is provided for the Contractor’s information, and nothing herein or elsewhere within these special provisions shall be construed as limiting the Contractor’s responsibility for complying with all applicable rules and regulations. In conformance with Title 13 § 2449(i), between March 1 and June 1 of each year, new valid Certificates of Reported Compliance for the current compliance year, as

defined in section 2449(n) for the Contractor and all applicable subcontractors must be submitted. Submit new valid Certificates of Reported Compliance to the Engineer at least one week prior to the expiration date of the current certificate.

Replace the 2nd Paragraph of Section 7-1.02K(2) with:

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

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

Add to the list in the second paragraph of Section 7-1.02K(3) with:

1.10. Fringe Benefits

Replace Section 7-1.02K(4)(a) with:

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

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

Replace the 4th paragraph of Section 7-1.02K(6)(j)(ii) with:

Submit the lead compliance plan as an informational submittal.

Unregulated earth material exists throughout the job site.

Add to the end of Section 7-1.02M(2):

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

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

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

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

Furnish the following fire tools:

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

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

1. 10 shovels, 5 axes, 2 backpack 5-gallon water-filled tanks with pumps
2. 100-gallon tank of water with a gasoline motor powered pump and 100 feet of 3/4-inch hose on a reel.

The pickup truck and operator must patrol the area of construction for at least 1/2 hour after job site activities have ended.

Cal Fire, USFS, and BLM have established the following adjective class ratings for 5 levels of fire danger for use in public information releases and fire protection signing: low, moderate, high, very high, extreme. Obtain the fire danger rating daily for the project area from the nearest Cal Fire unit headquarters, USFS ranger district office, or BLM field office.

Arrangements have been made with Cal Fire, USFS, and BLM to notify the Department when the fire danger rating is very high or extreme. This information will be furnished to the Engineer who will notify you for dissemination and action in the area affected. If a discrepancy between this notice and the fire danger rating obtained from the nearest office of either Cal Fire or USFS exists, you must conduct operations according to the higher of the two fire danger ratings.

If the fire danger rating reaches very high:

1. Falling of dead trees or snags must be discontinued.
2. No open burning is permitted and fires must be extinguished.
3. Welding must be discontinued except in an enclosed building or within an area cleared of flammable material for a radius of 15 feet.
4. Blasting must be discontinued.
5. Smoking is allowed only in automobiles and cabs of trucks equipped with an ashtray or in cleared areas immediately surrounded by a fire break unless prohibited by other authority.
6. Vehicular travel is restricted to cleared areas except in case of emergency.

If the fire danger rating reaches extreme, take the precautions specified for a very high fire danger rating except smoking is not allowed in an area immediately surrounded by a firebreak and work of a nature that could start a fire requires that properly equipped fire guards be assigned to such operation for the duration of the work.

The Engineer may suspend work wholly or in part due to hazardous fire conditions. The days during this suspension are non-working days.

If field and weather conditions become such that the determination of the fire danger rating is suspended, Section 7-1.02M(2) will not be enforced for the period of the suspension of the determination of the fire danger rating. The Engineer will notify you of the dates of the suspension and resumption of the determination of the fire danger rating.

Place the contents of Section 7-1.04 under the heading:

7-1.04 PUBLIC SAFETY

7-1.04A General

Replace the 7th paragraph in Section 7-1.04A with:

Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone.

Replace the 11th paragraph in Section 7-1.04A with:

Cover signs that direct traffic to a closed area.

Add to the end of Section 7-1.04A:

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

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

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

1. Working behind a barrier
2. Paving, grinding, or grooving
3. Installing, maintaining, or removing traffic control devices except Type K temporary railing

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

Add the following to the end of Section 7-1.04:

7-1.04B WORK ZONE SAFETY AND MOBILITY

7-1.04B(1) POLICY

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

7-1.04B(2)TRAFFIC MANAGEMENT PLAN

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

7-1.04B(3)TEMPORARY TRAFFIC CONTROL PLAN

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

7-1.04B(4)PUBLIC INFORMATION

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

Replace the word "State" with "County" where it occurs in Section 7-1.05C.

Replace the word "State" with "Department" in the 1st paragraph of Section 7-1.06B.

Replace the word "State" with "County" in the 5th paragraph of Section 7-1.06C.

Replace the word "State" with "the Department" in Section 7-1.06D(1).

Replace Section 7-1.06D(2) with:

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

Refer to the *Agreement* of these special provisions

Additional insured coverage must be provided by a policy provision or by an endorsement providing coverage at least as broad as *Additional Insured* (Form B) endorsement form CG 2010 and CG 2037 (for completed operations), as published by the Insurance Services Office (ISO), or equivalent form as approved by the Department.

Replace the word "State" with "County" in Section 7-1.06D(3).

Replace the word "State" with "County" in Section 7-1.06D(4).

Replace Section 7-1.06E with:

7-1.06E Automobile Liability Insurance

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

Replace Section 7-1.06G with:

7-1.06G NOT USED

Replace Section 7-1.06H with:

7-1.06H Enforcement

The Department may assure your compliance with your insurance obligations. 30 days before an insurance policy lapses, expires, or is canceled during the Contract period you must submit to the Department evidence of renewal or replacement of the policy.

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

Any failure to comply with the reporting provisions of your policy shall not affect coverage provided to the Department, including its officers, directors, agents (excluding agents who are design professionals), and employees.

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

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

Replace Section 7-1.06I with:

7-1.06I Self-Insurance

Comply with the *Agreement* of these special provisions.

Add to the beginning of Section 7-1.07B:

This section applies to seal coat projects.

Add Section 7-1.07C:

7-1.07C Claims

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

1. 10 percent of the total bid

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

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

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

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

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

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

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

8 PROSECUTION AND PROGRESS

Replace Section 8-1.01 with:

8-1.01 GENERAL

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

8-1.01A Work Hours

Perform all work on working days during daytime.

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

Do not perform work during nighttime unless approved by the Engineer.

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

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

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

Replace the 1st paragraph of Section 8-1.02B(1) with:

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

Add to the end of the list in the 4th paragraph of Section 8-1.02B(3) with:

3. Time Impact Analysis (Refer to Section 8-1.02C(8)(b) for description)

Replace Section 8-1.02C with:

8-1.02C Reserved except for 8-1.02C(8)(b)

Replace Section 8-1.04 with:

8-1.04 START OF JOB SITE ACTIVITIES

8-1.04A General

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

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

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

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

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

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

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

8-1.04B Standard Start

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

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

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

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

A notice of commencement of contract time does not authorize you to start work on the project site, but contract time begins to elapse on the date shown in the notice of commencement of contract time.

Complete all work within the number of working days specified in the Notice to Bidders. Start the work from the date shown in said Notice to Proceed, or in the Notice of Commencement of Contract Time, whichever comes first.

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

In the event that additive bid(s) are awarded, additional working days will be granted in accordance with the number of days indicated in the Notice to Bidders.

**Pay to the County of Fresno the sum of
ONE THOUSAND (\$1,000.00)**

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

Replace the 1st paragraph in Section 8-1.05 with:

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

Replace the 3rd and 4th paragraph including the table in Section 8-1.10A with:

Liquidated damages are specified in section 8-1.04.

Replace the word "State's" with "County's" in Section 8-1.14A.

9 PAYMENT

Add Section 9-1.01A:

9-1.01A COMPENSATION

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

Delete paragraphs 11-14 of Section 9-1.03.

Add after the 6th paragraph of Section 9-1.03:

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

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

Replace the last paragraph of Section 9-1.03 with:

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

Replace the word “Department’s” with “Caltrans” in the 5th paragraph of Section 9-1.07A.

Replace Section 9-1.16F with:

9-1.16F Retentions

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

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

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

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

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

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

Add Section 9-1.23:

9-1.23 RESOLUTION OF CONTRACT CLAIMS

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

California Public Contract Code Section 9204

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3)(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

- (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
- (v) The Military Department as to any project under the jurisdiction of that department.
- (vi) The Department of General Services as to all other projects.
- (vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by

issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

California Public Contract Code Sections 20104 – 20104.6

Section 20104

(a)(1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b)(1) "Public work" means "public works contract" as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

(c) The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.

(d) This article applies only to contracts entered into on or after January 1, 1991.

Section 20104.2

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

(a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

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

Section 20104.4

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

(a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 (commencing with Section 2016.010) of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but

does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

(c) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

Section 20104.6

(a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

(b) In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

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

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

Replace *Reserved* in Section 10-1.02C(3) with:

Transplant any plant to be transplanted before performing any other construction activity in the area.

12 TEMPORARY TRAFFIC CONTROL

Replace Section 12-2 with:

12-2 CONSTRUCTION PROJECT FUNDING INFORMATION SIGNS

12-2.01 GENERAL

Details for construction project information signs are in *Section 01 58 00 of the Technical Specifications*

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

12-2.02 MATERIALS

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

Construction project information signs must be wood post signs complying with Section 01 58 00 and Section 82-3 of the Standard Specifications. Each sign shall be supported by two 16-foot tall 4x4 smooth wood posts, painted white.

Sign panels for construction project information signs must be 4 feet tall by 8 feet wide and made of 3/4 inch thick exterior grade plywood.

The background on construction project information signs must be painted white.

Text shall be black on a white background.

The size of the text and logos on construction project information signs must be as described in Section 01 58 00. Do not add any additional information unless authorized.

12-2.03 CONSTRUCTION

Provide and install a total of 1 construction project information signs at the location designated by the Engineer before starting major work activities visible to highway users.

The Contractor shall construct and maintain signage meeting the guidelines specified in the Project Details insert. The sign shall be prominently displayed in a location visible to the public.

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

Replace the 3rd paragraph of Section 12-3.01C with:

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

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

Replace the last paragraph of Section 12-3.03C with:

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

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

Replace the last paragraph of Section 12-3.10C with:

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

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

Replace Section 12-3.11B(5)(b) with:

12-3.11B(5)(b) Construction Project Funding Identification Signs

Reserved

Replace the word “Department’s” with the word “Caltrans” in the 1st paragraph of Section 12-3.20A(4)(a).

Replace the last paragraph of Section 12-3.20C(1) with:

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

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

Replace the 2nd paragraph of Section 12-3.20C(2)(c) with:

Install K rail as shown in the project plans.

Replace the last paragraph of Section 12-3.31C with:

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

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

Replace the 2nd paragraph of Section 12-3.35B(6) with:

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

Add before the 1st paragraph of Section 12-3.41A(1):

Section 12-3.41 is used when shown in the Bid Item List.

Replace Section 12-4.02A(3)(a) with:

12-4.02A(3)(a) General

The Contractor shall prepare and submit to the County Construction Engineer for approval, a traffic control system plan indicating the means and methods he will employ to institute and maintain traffic control for all phases of the work within the project. The traffic control system plan shall be submitted to the County Construction Engineer as early as possible, preferably **five (5) working days** prior to pre-construction meeting. The Engineer will require five (5) working days to review the initial submittal of the traffic control system plan and an additional five (5) working days for each successive review.

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

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

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

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

Replace Section 12-4.02A(3)(b) with:

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

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

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

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

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

Submit a closure schedule request 5 days before the anticipated start of any job site activity that reduces:

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

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

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

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

Replace Section 12-4.02A(3)(d) with:

12-4.02A(3)(d) Traffic Break Schedule

Not Used.

Replace Section 12-4.02C(1) with:

12-4.02C(1) General

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

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

Discuss the contingency plan for any activity that could affect the closure schedule with the Engineer at least 5 business days before starting the activity requiring the plan.

The Engineer may reschedule a closure that was canceled due to unsuitable weather.

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

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

You may use automated flagger assistance devices to enhance the traffic control system for a lane closure on a two-lane convention highway, except if a bid item for automated flagger assistance devices is shown in the Bid Item List, the use of AFADs is required.

Do not use automated flagger assistance devices:

1. On multi-lane highways
2. As a substitute or a replacement for a temporary traffic control signal
3. If the devices impair access for pedestrians and bicycles, unless alternate access is provided
4. If the usable shoulder area is not wide enough to place a trailer mounted device
5. If the distance between the devices is more than 800 feet, except when each device is controlled by a separate operator and radio communication is available between the AFAD operators

Replace Section 12-4.02C(2) with:

12-4.02C(2) Not Used

Replace Section 12-4.02C(3) with:

12-4.02C(3) Closure Requirements and Charts

12-4.02C(3)(a) General

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

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

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

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

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

Reserved

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

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

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

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

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

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

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

No work that would require a lane closure shall be performed.

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

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

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

Keep driveways and access roads accessible at all times.

Maintain vehicular access to the channel bank access roads at all times.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including sections closed to public traffic.

When work vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed as shown on standard plan T-11.

The Contractor's equipment and materials shall not remain in a lane except when such lane is closed to traffic and the lane is being used for contract operations.

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

12-4.02C(3)(p)–12-4.02C(3)(s) Reserved

Replace Section 12-4.02C(7)(d) with:

12-4.02C(7)(d) Reserved

Replace the word “Department’s” with “Caltrans” in Section 12-4.02C(9)(a)(iv).

Replace section 12-4.02C(9)(d) with:

12-4.02C(9)(d) Payment

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

Add before the 1st paragraph of Section 12-4.02C(10):

Section 12-4.02C(10) is used when Pickup Truck Mounted Changeable Message Sign is shown in the Bid Item List.

Replace item 3.6.1 in the list in Section 12-4.02C(11)(a)(iii)(B) with:

Not Used

Replace item 5 in the list in Section 12-4.02C(11)(a)(iv)(C) with:

Not Used

Replace Section 12-4.02C(11)(d) with:

12-4.02C(11)(d) Payment

Full payment for conforming to the requirements of this section shall be considered to be included in the Traffic Control Plan item on the Bid Items List.

Replace Section 12-4.02C(14) with:

12-4.02C(14) Failure to Provide Traffic Control.

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

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

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

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

Replace Section 12-4.02D with:

12-4.02D Payment

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

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

The requirements in section 4-1.05 for payment adjustment do not apply to traffic control system.

Adjustments in compensation for traffic control system will be made for an increase or decrease in traffic control work if ordered.

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

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

13 WATER POLLUTION CONTROL

Replace the word “Department” with “Caltrans” where it occurs in Section 13-1.01A.

Replace the 1st paragraph of Section 13-1.01D(2) with:

13-1.01D(2) Regulatory Requirements

Comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities; Order No. 2009-000 9-DWQ, CAS000002 (Construction General Permit) and any amendments thereto issued by the SWRCB. The Construction General Permit may be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Add to the end of Section 13-1.01D(2):

This Project disturbs 0.11 acres of soil. A WPCP is required for this project

Replace Section 13-1.01D(4)(b) with:

13-1.01D(4)(b) Qualifications

The WPC manager must:

1. Comply with the requirements provided in the Construction General Permit for:
 - 1.1. QSP if the project requires a WPCP
 - 1.2. QSD if the project requires a SWPPP
2. Complete the stormwater management training described at the Stormwater and Water Pollution Control Information link at the Caltrans Division of Construction website

Replace Section 13-2.04:

13-2.04 PAYMENT

The Department pays for prepare water pollution control program as follows:

1. Total of 50 percent of the item total upon authorization of the WPCP
2. Total of 90 percent of the item total upon work completion
3. Total of 100 percent of the item total upon Contract acceptance

Replace the 1st paragraph of Section 13-3.01C(2)(b)(iv) with:

If a sampling and analysis plan is required, submit a sampling and analysis plan that complies with the *Caltrans Construction Site Monitoring Program Guidance Manual*.

Add Section 13-3.01C(5):

13-3.01C(5) Annual Certification

Submit an annual certification of compliance as described in the Caltrans *Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* before July 15th of each year.

Replace Section 13-4.03G with:

13-4.03G Dewatering

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

If dewatering is required, perform dewatering work as specified for the work items involved, such as a temporary ATS or dewatering and discharge.

If dewatering and discharging activities are not specified for a work item and you perform dewatering activities:

1. Conduct dewatering activities under the Caltrans *Field Guide for Construction Site Dewatering*.
2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
3. Discharge the water within the project limits. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
4. Do not discharge stormwater or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

Replace the 2nd paragraph of Section 13-5.04 with:

If there is no bid item for temporary soil stabilization measures, payment therefor is considered to be included in the bid item for prepare and implement water pollution control program or in the bid item for prepare and implement stormwater pollution prevention plan, as applicable.

Replace Section 13-6.04 with:

13-6.04 PAYMENT

The payment quantity for temporary sediment control bid items paid for by the length is the length measured along the centerline of the installed material.

The payment quantity, if any, for temporary fiber roll does not include the additional quantity used for overlaps.

The Department does not pay for the relocation of temporary drainage inlet protection during work progress.

If there are no bid items for installing or maintaining temporary sediment control measures, payment therefor is considered to be included in the bid item for prepare and implement water pollution control program or in the bid item for prepare and implement stormwater pollution prevention plan, as applicable.

Replace Section 13-7.03D with:

13-7.03D Payment

The Department does not pay for the relocation of temporary construction entrances or roadways during work progress.

If there are no bid items for installing or maintaining temporary construction entrances or roadways, payment therefor is considered to be included in the bid item for prepare and implement water pollution control program or in the bid item for prepare and implement stormwater pollution prevention plan, as applicable.

Replace the 1st paragraph and the 1st line of the 2nd paragraph of Section 13-8.01C(2) with:
Within 20 days of Contract approval, submit 3 copies of the ATS plan if an ATS plan is required for the project.

The plan, if required, must include:

Replace the word “Department’s” with “Caltrans” in items 3 and 4 of the list in Section 13-8.01C(2).

14 ENVIRONMENTAL STEWARDSHIP

Add after the 3rd paragraph of Section 14-10.01:

Food scraps, paper wrappers, food containers, cans, bottles and all food related trash and litter must be removed from the project site at the end of each working day.

Replace the 8th paragraph of Section 14-10.01 with:

Furnish and use closed-lid trash containers in the job-site yard, field trailers, and locations where workers gather for lunch and breaks.

Replace Section 14-12.04 with:

14-12.04 RELATIONS WITH SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD)

You are responsible for compliance with all applicable SJVAPCD regulations and requirements. This section is provided for your information, and nothing herein or elsewhere within these special provisions shall be construed as limiting your responsibility for complying with all applicable rules and regulations.

In accordance with SJVAPCD Regulation VIII – Fugitive PM10 Prohibitions: Rule 8021, implementation of an SJVAPCD-approved dust control plan is not required prior to commencement of any dust generating activities. You must file Construction Notification with SJVAPCD 48 hours prior to starting work.

Pursuant to section 6.4 of District Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities, the owner or operator of a construction project of at least 1.0 acre in size shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities. Use the first two pages of this form to submit a written Construction Notification. There are no fees for filing a construction notification.

It is your responsibility to be fully informed of the requirements of all rules, regulations, plans and conditions that may govern your operations and to conduct the work accordingly.

Replace Section 14-12.05–14.12.08 With:

14-12.05–14.12.08 RESERVED

Technical Specifications

FRESNO COUNTY
CONTRACT DOCUMENTS
AND
TECHNICAL SPECIFICATIONS
FOR THE
WATER WORKS DISTRICT 40
SHAVER SPRINGS
WATER SUPPLY WELL CONSTRUCTION

FEBRUARY 2025

Prepared for:



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Date
Signed 2/13/2025

SECTION 00 01 10

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SECTION 01 00 05

SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL

- A. The Contractor shall keep on the job a copy of the Plans and Specifications and shall at all times give the Owner and Engineer access thereto.
- B. Anything mentioned in the Specifications and not shown on the Plans or shown on the Plans and not mentioned in the Specifications shall be of like effect as if shown or mentioned in both.
- C. The Contractor shall not take advantage of any errors, discrepancies or omissions which may exist in the Plans and Specifications but shall immediately call them to the attention of the Engineer whose interpretation or correction thereof shall be conclusive.
- D. In case of conflict between portions of the Contract Documents, the order of precedence of Contract Documents shall be:
 - First: Permits from other agencies as may be required by law.
 - Second: Addenda
 - Third: Bid Documents, Division 0
 - Fourth: Technical Specifications, Division 2 through Division 43
 - Fifth: Plans
 - Sixth: General Requirements, Division 1
 - Seventh: State Standard Specifications
 - Eighth: Reference Documents
- E. Change Orders, supplemental agreements and approved revisions to Plans and Specifications will take precedence over documents listed above. Detailed Plans shall have precedence over general Plans.
- F. Whenever any conflict appears in any portions of the Contract Documents, it shall be resolved by application of the order of precedence.

1.2 GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS

- A. For definitions of the Specifications categorized as General Requirements (Division 1) and Technical Specifications (Division 2 through Division 43) refer to Section 01 42 13 – Definitions and Abbreviations.

1.3 REFERENCE DOCUMENTS

- A. For a definition of Reference Documents and State Standard Specifications refer to Section 01 42 13 – Definitions and Abbreviations.

- B. Throughout the following Specification sections, references are made to various widely published, standard and commercial specifications, manuals, or codes of technical societies, organizations, or associations. These specifications are intended to amplify the descriptions of materials, equipment, and construction systems. The Contractor shall caution each of his Subcontractors to become familiar with the contents of the pertinent portions of these Reference Documents. The following Reference Documents are the most widely used, and are cited or referred to in each of the following sections of these Specifications:
1. American Society of Testing Materials (ASTM)
 2. American National Standards Institute (ANSI)
 3. American Standards Associations (ASA)
 4. American Concrete Institute (ACI)
 5. Federal Specifications, as applicable.
 6. California Building Code
 7. California Plumbing Code
 8. Caltrans State Standard Specifications
 9. National Electric Code
 10. Construction Safety Orders of the Division of Industrial Relations latest edition.
- C. Each citation of a Reference Document shall be construed to refer to the latest published revision of such specification as of the date of the invitation for bids and to such portions of it that relate and apply directly to the material or installation called for on this job. The Engineer will give no consideration to any claimed ignorance as to what a cited Reference Document contains, since such Subcontractor on a project of this scope is deemed to be experienced and familiar with his own trade to be experienced and familiar with his own trade's generally accepted, published standards of quality.
- D. Whenever references are made to any of the above-mentioned Reference Documents or testing methods in the governing Building Codes, the requirements of those Reference Documents shall govern, insofar as they are not in contravention with maxima or minima prescribed by documents designated in the Building Code.

1.4 LIST OF DRAWINGS

- A. The Work shall conform to the following Drawings:

TITLE	SHEET NUMBERS
GENERAL	
COVER SHEET	1
LEGEND AND ABBREVIATIONS	2
PROCESS FLOW DIAGRAM	3
CIVIL	
OVERALL SITE PLAN	4
WELL 9 SITE PLAN	5
WELL 8 SITE PLAN	6
WELL 9 GRADING PLAN	7
WELL 8 GRADING PLAN	8
DETAILS	
WELL EQUIPMENT DETAILS	9
WELL DRILLING DETAILS 1 OF 2	10
WELL DRILLING DETAILS 2 OF 2	11
STRUCTURAL DETAILS	12
CIVIL DETAILS	13
ELECTRICAL	
ELECTRICAL COVER SHEET	14
(E) OVERALL SITE & (N) ELECTRICAL	15
TYPICAL WELL BLDG ELECTRICAL PLAN	16
SINGLE LINE DIAGRAM AND SCHEDULE	
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PART 2 OCCUPATIONAL SAFETY AND HEALTH ACT

- A. The applicable standards of the American National Standards Institute and the National Fire Protection Association that have been adopted are hereby made a part of these Specifications as a whole and as mentioned in the various sections.
- B. Any errors, ambiguities, or inconsistencies of these standards with either the local codes, the Specifications, or the Drawings shall be brought to the attention of the Engineer.

2.2 COMPLIANCE WITH ALL LAWS AND CODES

- A. Contractor shall conform to and abide by all local city, county, state and federal laws, rules, regulations, including industrial safety laws. Such laws shall be considered as essential parts of these Specifications and, in the absence of definite requirements herein, the provisions of such rules and regulations shall be observed by the Contractor. If the Drawings and/or Specifications are at variance therewith, Contractor shall so notify Engineer promptly. Should the Contractor perform any

work contrary to such laws, ordinances, rules and regulations he shall bear all costs arising therefrom.

- B. Where these Specifications, however, call for or describe materials workmanship or construction of a better quality, higher standard, or larger size than is required by said rules and regulations, the provisions of these Specifications shall take precedence over said rules and regulations. Contractor shall furnish, without any extra charge, all additional labor or materials, or both, when required for compliance with these rules and regulations.

END SECTION

SECTION 01 11 00

DESCRIPTION OF WORK AND SCHEDULE CONSTRAINTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The Work consists of furnishing all labor, materials, tools and equipment necessary to construct a minimum of one (1) and maximum of two (2) test holes to approximately 800 to 1,200 feet in depth using the air rotary drilling method in hard rock, and subsequently either developing into a water well or destroying each test hole. If water well(s) are developed, the work will include well equipping, site work, electrical, and appurtenant facilities.
- B. The project is located in Fresno County, in the area between Tocaloma Road and Shaver Springs Road
 - 1. Test Hole Construction Plans are located in the Appendix
 - 2. The test hole locations shown on the Plans are preliminary and the locations could change throughout the duration of the project.
- C. The primary components are generally described as follows:
 - 1. Construction of test hole(s), including but not limited to drilling the test hole(s) by air rotary method and installing the casing, air lifting and water pumping for water sampling, fracture isolation and fracture sealing, and, as directed by the Geologist, either developing the test hole into a production well or destroying the test hole.
 - 2. Production well(s) will include well equipping, site work, electrical, and appurtenances.
 - 3. Incidental items necessary to complete the work including mobilization, project closeout, temporary facilities, quality control and similar construction activities; bonds, insurance, permits, licenses and fees required to complete the project.
- D. The Owner reserves the right to increase or decrease the quantity of any item or portion of the work or to omit portions of the work as may be deemed necessary or advisable by the Engineer; also, to make such alterations or deviations, additions to, or omissions from, the Specifications, as may be determined during the progress of the work to be necessary and advisable for the completion thereof.
- E. Other items or details not mentioned herein that are required by the Special Provisions or these General Requirements shall be performed, constructed, furnished or installed, as designated.

DESCRIPTION OF WORK AND SCHEDULE CONSTRAINTS

01 11 00-1

1.2 *RESPONSIBILITY OF CONTRACTOR*

- A. If any part of the Work depends on proper execution or results upon the work of others, the Contractor shall inspect and promptly report to the Engineer or Geologist any apparent discrepancies or defects in such work of others that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the work of others as fit and proper except as to defects which may develop in the work of others after execution of the Work by the Contractor.

1.3 *SCHEDULE OF WORK*

- A. The Contractor shall submit a schedule of work and request permission of the Owner before starting work. The Contractor shall not begin work until permission has been granted by the Owner.
- B. Existing materials and equipment removed during demolition and designated by Owner as "scrap" shall be disposed of properly by the Contractor. Removed materials and equipment designated by Owner as "salvage" shall be delivered to Owner at a site to be determined.

1.4 *COORDINATION OF WORK*

- A. The Contractor shall maintain overall coordination for the execution of the Work. Based on the Construction Schedule prepared in accordance with these Specifications, the Contractor shall obtain from each of its subcontractors a similar schedule and shall be responsible for all parties maintaining these schedules.

END SECTION

SECTION 01 20 00

MEASUREMENT & PAYMENT

PART 1 GENERAL

1.1 MEASUREMENT

- A. Unless otherwise specified in the Contract Documents, quantities of work shall be determined from measurements or dimensions in a horizontal plane. All measurements shall be made in accordance with United States Standard Measures and shall be measured on the basis of "in-place" quantities.
- B. After the work has been completed, the Engineer will make field measurements of unit price items in order to determine the quantities of the various items as a basis for payment. On all unit price items, the contractor will be paid for the actual amount of the work performed in accordance with the contract documents, as computed from field measurements.
- C. Work or quantities not listed in the description of bid items are considered incidental to other construction and will not be measured. Compensation for such incidental work is considered to be included in the various items of work bid.

1.2 PARTIAL PAYMENT

- A. Attention is directed to Section 9-1.16 of the State Standard Specifications which, except as modified herein, shall apply in its entirety.
 - 1. The department shall withhold not less than 5 percent of the contract price until final completion and acceptance of the project.
 - 2. Partial payments for materials on hand shall not exceed one hundred percent (100%) of the value of material delivered on site, properly stored in a secured fenced area subject to, or under the control of, the owner and local agency, and unused. Contractor shall submit copies of invoices of materials to support values. Materials stored shall be installed within 60 days of delivery for payment eligibility.
- B. Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed as acceptance of any of the Work. Payment shall not be construed as transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall be obligated to protect any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work.

1.3 FINAL PAYMENT

- A. Refer to State Standard Specifications Section 9-1.17.

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between _____
_____ whose address is _____
_____ herein after called "Owner," _____
_____ whose address is _____
_____ hereinafter called "Contractor" and _____
_____ whose address is _____
_____ hereinafter called "Escrow Agent."

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the escrow agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of _____, and shall designate the Contractor as the beneficial owner.

(2) The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

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(7) The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

(8) Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

(9) Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

(10) The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Owner:

On behalf of Contractor:

On behalf of Escrow Agent:

Title

Title

Title

Name

Name

Name

Signature

Signature

Signature

Address

Address

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

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Owner

Contractor

Title

Title

Name

Name

Signature

Signature

END SECTION

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SECTION 01 22 00 EXPLANATION OF BID ITEMS

PART 1 GENERAL

The Contract payment for the specified items of work as set forth in the Bid Schedule shall be full compensation for furnishing all labor, materials, methods or processes, implements, tools, equipment and incidentals and for doing all work involved as required by the provisions of the Contract Documents for a complete in place and operational system.

- A. Unless otherwise specified in the Specifications, quantities of work shall be determined per each, or from measurements or dimensions in a horizontal plane. All materials shall be measured on the basis of "in place" quantities and paid for using the units listed in the bid schedule.
- B. Except as noted, the Engineer will make field measurements of unit price items in order to determine the quantities of the various items as a basis for payment. On all unit price items, the contractor will be paid for the actual amount of the work performed in accordance with the contract documents, as computed from field measurements.
- C. Work or quantities not listed in the description of bid items are considered incidental to other construction and will not be separately measured or paid for. Compensation for such work and/or material shall be included in the prices paid for other items of work.

1.2 BASE BID ITEMS – WELL NO. 8

Bid Item No. 1 - Mobilization/Demobilization, Insurance and Bonds

This bid item is a lump sum bid for mobilization, all necessary bonds, insurance, permits, licenses, fees required during the performance of the work, potholing, and demobilization and shall conform to the provisions of these Specifications. Bid Item No. 1 is intended to cover all of the base "Mobilization" costs for WWD 40.

Payment for this item shall include full compensation for all labor, materials, tools, equipment, construction funding sign and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the bid item amount. Payment for demobilization shall be made with the last progress payment and shall not be less than 20 percent of the bid item amount.

Bid Item No. 2 - Obtain Fresno County Well Drilling Permit

This bid item is a lump sum bid item for the cost of all work involved in obtaining the Fresno County Well Drilling Permit and paying all permit fees. This bid item shall be paid at the lump sum price bid.

Bid Item No. 3 - Clearing and Grubbing

This bid item is a lump sum bid for the cost of all work involved in clearing and grubbing the project site. Areas shall be stripped of surface vegetation, including clearing and grubbing of all trees, vines, stumps, roots, concrete, removing and replacing fencing for site access, debris and unsuitable material, within the project site area including fill slopes, temporarily stockpiling unsuitable material during construction and related work. This bid item shall be paid at the lump sum price bid.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 4 - Water Pollution Control

This bid item is a lump sum bid for all materials, labor and appurtenances required to prepare and implement a Water Pollution Control Program ("WPCP"), including preparing the WPCP, testing, monitoring and all other work associated with implementing the WPCP and complying with State and Federal permit requirements. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 5 - Dust Control

This bid item is a lump sum bid for all materials, labor and appurtenances required to perform dust control measures for the project limits in accordance with conditions of these Specifications. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 6 - Job Site Management

This bid item is a lump sum bid item for the cost of all work involved with job site management and includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in spill prevention and control, material management, waste management, non-stormwater management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste resulting from your activities, as specified in the Standard Specifications and these Special Provisions, and as ordered by the Engineer.

This bid item is intended to cover all of the base "Job Site Management" costs.

The Contractor shall abide by all federal and state regulations regarding removal and disposal of hazardous waste materials.

This item also includes providing worker protection from trench failures and other hazards that may occur during construction. The Contractor shall comply with the provisions of the Construction Safety Orders, Tunnel Safety Orders, and General Safety Orders issued by the State of California Division of Industrial Safety, as well as all other applicable laws, ordinances and regulations, as they pertain to the protection of workers from the hazard of caving ground.

The Contractor shall obtain a permit from the Division of Industrial Safety of the State of California prior to commencement of construction. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 7 - Well Pad Rough Grading

This bid item is a lump sum bid for the cost of all earthwork associated with rough grading, including but not limited to, excavation, importing borrow (if required) and exporting and disposing of excess and unsuitable material, over excavation and subgrade preparation and compaction, grading drainage swales, placing and compacting engineered fill to the lines and grades shown on the Plan.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for by a lump sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 8 - Furnish and Install Conductor Casing

This bid item is a unit price bid for furnishing and installing a 3/8-inch thick, minimum, mild steel conductor casing and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including cement seal, as described herein and as indicated on the Plans. The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

This item may be deleted entirely by Owner if the Contractor determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the conductor casing be eliminated.

Bid Item No. 9 - Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Mild Steel Casing

This bid item is a unit price bid for furnishing and installing an 6-inch nominal mild steel casing and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including cement seal outside of casing, as described herein and as indicated on the Plans. The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

Bid Item No. 10 - Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development

This bid item is a unit price bid for drilling an 6" diameter the test hole from below the annular seal and shall be per lineal foot completed, and shall be full compensation for furnishing all labor, equipment and materials to complete the drilling as described herein. This bid item shall also include airlifting for estimating well production, facilitating collection of water samples during and upon completion of drilling, and developing the well. The Contractor shall be responsible for managing spoils and drilling fluid such that it does not cause damage to adjacent properties. The

quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

Bid Item No. 11 - Furnish and Install Pump, Discharge Pipe, Valve and Sampling Port, Etc. to Facilitate 3-Day Pump Test

This bid item is a lump sum bid for furnishing and installing a pump, discharge pipe, valve, flow meter, sampling port, and necessary appurtenances to facilitate performance of the 3-day pump test, plus two hours of pumping 12 hours prior to the 3-day pump test, and shall be full compensation for furnishing all labor, equipment and materials to allow test pumping as described herein. The bid item will be paid for by lump sum, and is part of the base bid. This item may be deleted entirely by Owner, with no change to the total contract price.

Bid Item No. 12 - Submersible Pump and Motor

This bid item includes furnishing and installing the pump, motor, and well head facilities and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid for by Lump Sum.

Bid Item No. 13 - Column Pipe and Conductor

This bid item includes furnishing and installing the pump column pipe, sounding tube, and electrical conductor and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid at the unit price bid per lineal foot.

Bid Item No. 14 - Discharge Piping and Valves

This bid item is a lump sum bid for installing all onsite below ground piping and fittings, including trenching, bedding, shading and compaction, backfill and compaction, water pipe, tracer wire, caution tape, fittings, valves and valve boxes, above-ground pipes, fittings and valves, pressure gauge, meter, pressure switch, testing, as shown on the Plans. Completed item shall provide a complete and fully operational on-site system. This bid item shall include all piping from the above ground well head to the buried transition coupling with polyethylene pipe outside the building footprint.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for by Lump Sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 15 - Well Equipment Enclosure

This bid item includes furnishing and installing the well pump house and concrete foundation and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid for by Lump Sum.

Bid Item No. 16 - 2" Polyethylene Water Pipe

This bid item is a unit price bid per lineal foot for installing all piping and valves, including water

pipe fittings, valves and all appurtenances outside the well pump house footprint as detailed on the Plans and Specifications. This item shall include trenching, bedding, backfill and compaction, tracer wire, caution tap, fittings, valves and valve boxes, restoring surface to original condition, and testing, as shown on the Plans. Completed item shall provide a complete and fully operational system.

The bid item price shall include full compensation for furnishing all labor, tools ,equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for per lineal foot installed.

Bid Item No. 17 - Finish Grading

This bid item includes finish grading, import material (if required) and all labor and equipment required to complete the grading of the site including over excavation under all concrete slabs and compaction of fill material, fill areas and spreading unsuitable material at the end of the job at the direction of the Owner. This bid item will be paid for by Lump Sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 18 - Electrical

This bid item is a lump sum bid for all work associated with all electrical equipment required for well site, including, but not limited to modification at the existing electrical facilities, pump starter, pump house heater, lighting, site electrical, trenching, conduit and conductors for all work, and all electrical connections.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, coordination with Building Department inspector, along with all associated appurtenances required to complete electrical and controls in conformance with the Plans and Specifications and as directed by the Engineer. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of work completed under this bid item.

Bid Item No. 19 - Additional Day of Pump Testing

This bid item is a unit price bid per day for additional pump testing and shall be full compensation for furnishing all labor, equipment and materials to allow test pumping as described herein. The bid item will be paid for per day of additional pump testing.

The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price. This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize additional days of pump testing.

Bid Item No. 20 - Perform Camera Survey

This bid item is a lump sum bid for performing a camera survey, and shall be full compensation for furnishing all labor, equipment and materials to complete the surveys as described herein. The bid item will be paid for by lump sum, and is part of the base bid.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any camera survey.

Bid Item No. 21 - Fracture Fracture Water Quality Sampling

This bid item is a unit price bid for furnishing and installing packer and pump to facilitate water quality testing of an upper fracture or set of fractures, using a single inflatable packer, and shall be full compensation for furnishing all labor, equipment and materials to allow for complete water quality testing, including four hours of pumping, as described herein. The bid item will be paid for on a per each basis.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any upper fracture water quality sampling.

Bid Item No. 22 - Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing

This bid item is a unit price bid for furnishing and installing rock or gravel approved by the Geologist/Engineer for use as borehole fill, and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including bentonite seal above rock, as described herein and as indicated on the Plans.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any rock/gravel for borehole fill.

Bid Item No. 23 - Pressure Pump Fast Setting Cement for Fracture Sealing

This bid item is a unit price bid for furnishing and pumping fast setting cement slurry and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the cement slurry injection, as described herein and as indicated on the Plans.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any pressure pump fast setting cement.

Bid Item No. 24 - Re-Drill Hole for Fracture Sealing

This bid item is a unit price bid for re-drilling the test hole, removing the cement and rock/gravel fill as determined by the Engineer or Geologist, and shall be per lineal foot completed, and shall be full compensation for furnishing all labor, equipment and materials to complete the drilling as described herein.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any re-drilling hole.

Bid Item No. 25 - Destroy Test Hole

This bid item includes furnishing all labor, equipment and materials to complete the destruction of the test hole, as described herein, and as directed by the Engineer or Geologist. Also, included in this bid item is the preparation and filing of a complete Well Destruction Report with the California Department of Water Resources. This bid item will be paid for on a lump sum basis.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize destroying test hole.

1.3 ADD ALTERNATE NO. 1 BID ITEMS – WELL NO. 9

Bid Item No. 26 - Mobilization/Demobilization, Insurance and Bonds

This bid item is a lump sum bid for mobilization, all necessary bonds, insurance, permits, licenses, fees required during the performance of the work, potholing, and demobilization and shall conform to the provisions of these Specifications. Bid Item No. 1 is intended to cover all of the base "Mobilization" costs for WWD 40.

Payment for this item shall include full compensation for all labor, materials, tools, equipment, construction funding sign and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the bid item amount. Payment for demobilization shall be made with the last progress payment and shall not be less than 20 percent of the bid item amount.

Bid Item No. 27 - Obtain Fresno County Well Drilling Permit

This bid item is a lump sum bid item for the cost of all work involved in obtaining the Fresno County Well Drilling Permit and paying all permit fees. This bid item shall be paid at the lump sum price bid.

Bid Item No. 28 - Clearing and Grubbing

This bid item is a lump sum bid for the cost of all work involved in clearing and grubbing the project site. Areas shall be stripped of surface vegetation, including clearing and grubbing of all trees, vines, stumps, roots, concrete, removing and replacing fencing for site access, debris and unsuitable material, within the project site area including fill slopes, temporarily stockpiling unsuitable material during construction and related work. This bid item shall be paid at the lump sum price bid.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 29 - Water Pollution Control

This bid item is a lump sum bid for all materials, labor and appurtenances required to prepare and implement a Water Pollution Control Program ("WPCP"), including preparing the WPCP, testing, monitoring and all other work associated with implementing the WPCP and complying with State and Federal permit requirements. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 30 - Dust Control

This bid item is a lump sum bid for all materials, labor and appurtenances required to perform dust control measures for the project limits in accordance with conditions of these Specifications. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 31 - Job Site Management

This bid item is a lump sum bid item for the cost of all work involved with job site management and includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in spill prevention and control, material management, waste management, non-stormwater management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste resulting from your activities, as specified in the Standard Specifications and these Special Provisions, and as ordered by the Engineer.

This bid item is intended to cover all of the base "Job Site Management" costs.

The Contractor shall abide by all federal and state regulations regarding removal and disposal of hazardous waste materials.

This item also includes providing worker protection from trench failures and other hazards that may occur during construction. The Contractor shall comply with the provisions of the Construction Safety Orders, Tunnel Safety Orders, and General Safety Orders issued by the State of California Division of Industrial Safety, as well as all other applicable laws, ordinances and regulations, as they pertain to the protection of workers from the hazard of caving ground.

The Contractor shall obtain a permit from the Division of Industrial Safety of the State of California prior to commencement of construction. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of contract work completed.

Bid Item No. 32 - Well Pad Rough Grading

This bid item is a lump sum bid for the cost of all earthwork associated with rough grading, including but not limited to, excavation, importing borrow (if required) and exporting and disposing of excess and unsuitable material, over excavation and subgrade preparation and compaction, grading drainage swales, placing and compacting engineered fill to the lines and grades shown on the Plan.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for by a lump sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 33 - Furnish and Install Conductor Casing

This bid item is a unit price bid for furnishing and installing a 3/8-inch thick, minimum, mild steel conductor casing and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including cement seal, as described herein and as indicated on the Plans. The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

This item may be deleted entirely by Owner if the Contractor determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the conductor casing be eliminated.

Bid Item No. 34 - Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Mild Steel Casing

This bid item is a unit price bid for furnishing and installing an 6-inch nominal mild steel casing and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including cement seal outside of casing, as described herein and as indicated on the Plans. The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

Bid Item No. 35 - Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development

This bid item is a unit price bid for drilling an 6" diameter the test hole from below the annular seal and shall be per lineal foot completed, and shall be full compensation for furnishing all labor, equipment and materials to complete the drilling as described herein. This bid item shall also include airlifting for estimating well production, facilitating collection of water samples during and upon completion of drilling, and developing the well. The Contractor shall be responsible for managing spoils and drilling fluid such that it does not cause damage to adjacent properties. The

quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price.

Bid Item No. 36 - Furnish and Install Pump, Discharge Pipe, Valve and Sampling Port, Etc. to Facilitate 3-Day Pump Test

This bid item is a lump sum bid for furnishing and installing a pump, discharge pipe, valve, flow meter, sampling port, and necessary appurtenances to facilitate performance of the 3-day pump test, plus two hours of pumping 12 hours prior to the 3-day pump test, and shall be full compensation for furnishing all labor, equipment and materials to allow test pumping as described herein. The bid item will be paid for by lump sum, and is part of the base bid. This item may be deleted entirely by Owner, with no change to the total contract price.

Bid Item No. 37 - Submersible Pump and Motor

This bid item includes furnishing and installing the pump, motor, and well head facilities and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid for by Lump Sum.

Bid Item No. 38 - Column Pipe and Conductor

This bid item includes furnishing and installing the pump column pipe, sounding tube, and electrical conductor and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid at the unit price bid per lineal foot.

Bid Item No. 39 - Discharge Piping and Valves

This bid item is a lump sum bid for installing all onsite below ground piping and fittings, including trenching, bedding, shading and compaction, backfill and compaction, water pipe, tracer wire, caution tape, fittings, valves and valve boxes, above-ground pipes, fittings and valves, pressure gauge, meter, pressure switch, testing, as shown on the Plans. Completed item shall provide a complete and fully operational on-site system. This bid item shall include all piping from the above ground well head to the buried transition coupling with polyethylene pipe outside the building footprint.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for by Lump Sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 40 - Well Equipment Enclosure

This bid item includes furnishing and installing the well pump house and concrete foundation and shall be full compensation for furnishing all labor, equipment and materials to complete the work as described herein. The item will be paid for by Lump Sum.

Bid Item No. 41 - 2" Polyethylene Water Pipe

This bid item is a unit price bid per lineal foot for installing all piping and valves, including water

pipe fittings, valves and all appurtenances outside the well pump house footprint as detailed on the Plans and Specifications. This item shall include trenching, bedding, backfill and compaction, tracer wire, caution tap, fittings, valves and valve boxes, restoring surface to original condition, and testing, as shown on the Plans. Completed item shall provide a complete and fully operational system.

The bid item price shall include full compensation for furnishing all labor, tools ,equipment and materials, along with all associated appurtenances required to complete the work under this bid item, in conformance with the plans and specifications, and as directed by the Engineer. This bid item will be paid for per lineal foot installed.

Bid Item No. 42 - Finish Grading

This bid item includes finish grading, import material (if required) and all labor and equipment required to complete the grading of the site including over excavation under all concrete slabs and compaction of fill material, fill areas and spreading unsuitable material at the end of the job at the direction of the Owner. This bid item will be paid for by Lump Sum on a prorated basis based on the percentage of work completed under this bid item.

Bid Item No. 43 - Electrical

This bid item is a lump sum bid for all work associated with all electrical equipment required for well site, including, but not limited to modification at the existing electrical facilities, pump starter, pump house heater, lighting, site electrical, trenching, conduit and conductors for all work, and all electrical connections.

The bid item price shall include full compensation for furnishing all labor, tools, equipment and materials, coordination with Building Department inspector, along with all associated appurtenances required to complete electrical and controls in conformance with the Plans and Specifications and as directed by the Engineer. This bid item shall be paid at the lump sum price bid. Payment will be prorated based on the percentage of work completed under this bid item.

Bid Item No. 44 - Additional Day of Pump Testing

This bid item is a unit price bid per day for additional pump testing and shall be full compensation for furnishing all labor, equipment and materials to allow test pumping as described herein. The bid item will be paid for per day of additional pump testing.

The quantities may be increased, decreased, or deleted entirely by Owner, with no change in unit price. This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize additional days of pump testing.

Bid Item No. 45 - Perform Camera Survey

This bid item is a lump sum bid for performing a camera survey, and shall be full compensation for furnishing all labor, equipment and materials to complete the surveys as described herein. The bid item will be paid for by lump sum, and is part of the base bid.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any camera survey.

Bid Item No. 46 - Fracture Fracture Water Quality Sampling

This bid item is a unit price bid for furnishing and installing packer and pump to facilitate water quality testing of an upper fracture or set of fractures, using a single inflatable packer, and shall be full compensation for furnishing all labor, equipment and materials to allow for complete water quality testing, including four hours of pumping, as described herein. The bid item will be paid for on a per each basis.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any upper fracture water quality sampling.

Bid Item No. 47 - Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing

This bid item is a unit price bid for furnishing and installing rock or gravel approved by the Geologist/Engineer for use as borehole fill, and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the installation, including bentonite seal above rock, as described herein and as indicated on the Plans.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any rock/gravel for borehole fill.

Bid Item No. 48 - Pressure Pump Fast Setting Cement for Fracture Sealing

This bid item is a unit price bid for furnishing and pumping fast setting cement slurry and shall be per lineal foot complete in place, and shall be full compensation for furnishing all labor, equipment and materials to complete the cement slurry injection, as described herein and as indicated on the Plans.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any pressure pump fast setting cement.

Bid Item No. 49 - Re-Drill Hole for Fracture Sealing

This bid item is a unit price bid for re-drilling the test hole, removing the cement and rock/gravel fill as determined by the Engineer or Geologist, and shall be per lineal foot completed, and shall be full compensation for furnishing all labor, equipment and materials to complete the drilling as described herein.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any re-drilling hole.

Bid Item No. 50 - Destroy Test Hole

This bid item includes furnishing all labor, equipment and materials to complete the destruction of the test hole, as described herein, and as directed by the Engineer or Geologist. Also, included in this bid item is the preparation and filing of a complete Well Destruction Report with the California Department of Water Resources. This bid item will be paid for on a lump sum basis.

This item may be deleted entirely by Owner if the Engineer determines that it is unnecessary. If the item is deleted, no compensation will be made therefor. No costs shall be incurred pertaining to this item unless directed by the Engineer. This item is excluded from the adjustment of changed quantities as specified in Standard Specifications Section 9-1.06 "Changed Quantity Payment Adjustments". The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize destroying test hole.

END SECTION

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EXPLANATION OF BID ITEMS
01 22 00-14

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work described in this section includes general requirements and procedures related to the preparation and transmission of submittals to include Shop Drawings, Product Information, Calculations, Test Reports, Certificates, Samples, Manuals, and Record Drawings.

1.2 RELATED WORK

- A. General Conditions
- B. Section 01 77 00 – Contract Closeout
- C. Individual equipment specifications

1.3 GENERAL

- A. Contractor shall have completed the following work tasks before a submittal:
 - 1. Reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - 2. Determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - 3. Determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 4. Determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

1.4 TRANSMITTAL INFORMATION

- A. Each submittal document shall have a separate cover or transmittal. Transmittals shall include the following identification data, as applicable:
 - 1. Submittal number
 - 2. Contract number

3. Project name and location
4. Product identification
5. Applicable contract drawing number, specification section, and paragraph number
6. Stamp Space: Blank space of approximately 2-1/2 inches high by 4 inches wide adjacent to the identification data to receive Engineer's status stamp.
7. Contractor's certification statement as described below:
 - a. "Certification Statement: By this submittal, we hereby represent that we have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and we have checked and coordinated each item with other applicable approved drawings and all Contract requirements."
- B. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review of each such variation.
- C. Furnish neat, legible, and sufficiently explicit detail to enable proper review for Contract compliance.
- D. Contractor assumes all risks of error and omission.
- E. Work performed before acceptance, or not conforming to accepted submittals, shall be at Contractor's risk.
- F. Submittal requirements contained in this specification are in addition to specific submittal requirements contained in individual equipment specification sections.

1.5 LIMITATIONS OF ENGINEER'S REVIEW

- A. Engineer's review is only for the purposes of determining if the items covered by the submittals will conform to the requirements in the Contract Documents.
- B. Engineer's review will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
- C. Engineer's review of a separate item will not indicate acceptance of the assembly in which the item functions.
- D. Engineer's review of a Submittal shall not relieve Contractor from responsibility for any deviation from the requirements of the Contract Documents unless Contractor has given Engineer specific written notice of any deviation per the requirements of this Section. Engineer will document any such accepted variation from the requirements of the Contract Documents in a Field Order.

SUBMITTAL PROCEDURES
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- E. Engineer's review of a Submittal, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

1.6 SUBMITTAL PROCESS

- A. Submittals shall be sent to the Engineer electronically through email or a file transfer system agreed upon by the Owner, Engineer, and Contractor during the Preconstruction Conference.
- B. Engineer will provide timely review of Submittals in accordance with the Schedule of Submittals agreed upon by the Owner, Engineer, and Contractor during the Preconstruction Conference.
- C. Submittals will be returned, marked with one of the following classifications:
 - 1. NO EXCEPTION TAKEN: Requires no corrections, no marks.
 - 2. MAKE CORRECTIONS NOTED: Requires minor corrections. Items may be fabricated as marked without further resubmission. Resubmit 2 corrected copies to the Engineer.
 - 3. REVISE AND RESUBMIT: Requires corrections. Resubmit entire submittal following original submission with corrections noted. Allow time for checking and Engineer's appropriate action.
 - 4. REJECTED: Submitted information does not comply with the Contract Documents. No items shall be fabricated. Resubmit entire submittal following original submission with corrections noted.
 - 5. INFORMATION ONLY: Items in the submittal are saved in the project file for information only but were not reviewed by the Engineer.

PART 2 SUBMITTAL DOCUMENTS

2.1 SHOP DRAWINGS

- A. When requested submit, submit two (2) sets of shop drawings.

2.2 SAMPLES

- A. When requested or required by individual specification sections, submit one (1) sample of each item.
- B. Samples shall be representative of the actual material proposed for use in the project and of sufficient size to demonstrate design, color, texture, and finish.
- C. Permanently attach to each sample
 - 1. The submittal number

2. The contract number
 3. Project name and location
 4. Product identification
 5. Applicable contract drawing and specification section number
 6. Subcontractor's, vendor's and/or manufacturer's name, address, and telephone number.
- D. Certain samples may be tested for specific requirements by the Owner and/or Engineer prior to acceptance. Failure of sample to pass tests will be sufficient cause for refusal to consider further samples of the same brand and make.
- E. Rejected samples will be returned upon request, and resubmittals shall consist of new samples.

2.3 RECORD DRAWINGS

- A. Maintain 1 record copy of Contract Documents at site in good order and annotated to show revisions made during construction. Keep annotations current for possible inspection.
1. Make record drawings available to Engineer at all times during life of Contract.
 2. Drawings: Made part of record drawings and to include:
 - a. Contract Drawings: Annotate or redraft, as required, to show revisions, substitutions, variations, omissions, and discrepancies made or discovered during construction concerning location and depth of utilities, piping, ductbanks, conduits, manholes, pumps, valves, vaults, and other equipment. Make revisions and show on all drawing views with actual dimensions established to permanent points.
 - b. Working/Layout Drawings: When required as submittals, record actual layouts of conduit runs between various items of electrical equipment for power, control, and instrumentation; wire sizes, numbers, and functions; configuration of conduits; piping layouts; and duct layouts.
 3. Before preliminary inspection, furnish reproducible of record drawings. At completion of Contract and before final payment is made, furnish Engineer 1 set of reproducibles of finally accepted record drawings reflecting revisions herein described.

2.4 OPERATION AND MAINTENANCE MANUALS

- A. Furnish Operation and Maintenance Manuals for various types of equipment and systems, as required by Contract Documents. Operation and Maintenance Manuals shall be provided for all mechanical and electrical equipment. Unless otherwise indicated, furnish separate manual for each piece of equipment and system. If manual contains other items or equipment, indicate where specified items are

SUBMITTAL PROCEDURES
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located in manual. Include in manual complete information necessary to operate, maintain, and repair specific equipment and system furnished under this Contract, and include the following specific requirements;

1. Contents.

- a. Table of Contents and Index.
- b. Brief description of equipment/system and principal components.
- c. Starting and stopping procedures, both normal and emergency.
- d. Installation, maintenance, and overhaul instructions including detailed assembly drawings with parts list and numbers, and recommended spare parts list with recommended quantity, manufacturer's price, supplier's address, and telephone number.
- e. Recommended schedule for servicing, including technical data sheets that indicate weights and types of oil, grease, or other lubricants recommended for use and their application procedures.
- f. One copy of each component wiring diagram and system wiring diagram showing wire size and identification.
- g. One accepted copy of each submittal with changes made during construction properly noted, including test certificates, characteristic curves, factory and field test results.
- h. For electrical systems, include dimensioned installation drawings, single line diagrams, control diagrams, wiring and connection diagrams, list of material for contactors, relays and controls, outline drawings showing relays, meters, controls and indication equipment mounted on equipment or inside cubicles, control and protective schematics, and recommended relay settings.

2. Material:

- a. Preliminary
 - 1) Submit one (1) electronic copy of the preliminary O&M manuals in searchable PDF format.
- b. Final
 - 1) Submit one (1) electronic copy of the final O&M manuals in searchable PDF format.
 - 2) Submit two (2) hard copies of the final O&M Manual as described below:
 - a) Covers: Oil, moisture, and wear resistant 9 inches by 11-1/2 inches size.

- b) Pages: 60 pound paper 8-1/2 inches by 11 inches size with minimum of 2 punched holes 8-1/2 inches apart reinforced with plastic, cloth, or metal.
- c) Fasteners: Metal screw post or Acco metal strap type.
- d) Diagrams and Illustrations: Attach foldouts, as required.

PART 3 EXECUTION

NOT USED

END SECTION

SECTION 01 35 00

MATERIAL SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 GENERAL

- A. The materials furnished and used shall be new, except as may be provided elsewhere in these Specifications, or on the Plans.
- B. All materials required to complete the work under this contract shall be furnished by the Contractor, unless otherwise stated.
- C. It shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instruction before proceeding with the Work. The Engineer may, by appropriate instructions, correct said apparent errors and omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

1.2 DEFINITIONS

- A. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor.
- B. Revisions: Changes to Contract Documents requested by Owner or Engineer.
- C. Options: Specified options of products and construction methods included in Contract Documents.

1.3 TRADE NAMES AND ALTERNATIVES

- A. Wherever an article, or any class of materials, is specified by the trade name or by the name of any particular patentee, manufacturer or dealer, or by reference to the catalog of any such manufacturer or dealer, it shall be taken as intending to mean and specify the article or material described or any other equal thereto in quality, finish and durability, and equally as serviceable for the purpose for which it is or they are intended. The intent of the Plans and Specifications is to specify highest grade standard equipment, and it is not the intent of these Plans and Specifications to exclude or omit the products of any responsible manufacturer, if such products are equal in every practical respect to those mentioned herein, as determined by the Engineer.

1.4 SAMPLES

- A. At the option of the Engineer, the source of supply of materials for the Work shall be subject to tests and inspection before the delivery is started and before such materials are used in the Work. Samples representative of the character and quality

of materials shall be submitted by the Contractor. Samples shall be of sufficient quantities or amounts for testing or examination.

- B. All tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests as are prescribed in the Contract Documents.
- C. The Contractor shall furnish such samples of materials as are requested by the Engineer, without charge. No material shall be used until the Engineer has had the opportunity to test or examine such materials. Samples will be secured and tested whenever necessary to determine the quality of the material. Samples and test specimens prepared at the jobsite, such as concrete test cylinders, shall be taken or prepared by the Engineer, or his designated representative, in the presence and with the assistance of the Contractor.

1.5 SUBMITTALS

- A. Material Submittals shall be made in accordance with Section 01 33 00 – Submittals.

1.6 INSPECTION OF MATERIALS BY THE CONTRACTOR

- A. Contractor shall make a close inspection of all materials as delivered, and shall promptly return all defective materials without waiting for their rejection by the Engineer.

1.7 CERTIFICATES OF COMPLIANCE

- A. A Certificate of Compliance may be required for certain materials and equipment that become final products of the completed Work. Certificates of Compliance shall be furnished prior to the use of any materials for which these Specifications require that such a certificate be furnished. In addition, when so authorized in these Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance.
- B. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Specifications.
- C. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the certificate.
- D. All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Plans and Specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.
- E. The County reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

1. The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

1.8 MANUFACTURER TESTING

- A. At the option of the Engineer, materials and equipment to be supplied under this Contract will be tested and inspected either at their place of origin or at the site of the Work. The Contractor shall give the Engineer written notification well in advance of actual readiness of materials and equipment to be tested and inspected at point of origin.
 1. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or re-inspection at the site of the Work.
 2. Materials and equipment which will require testing and inspection at the place of origin shall not be shipped prior to such testing and inspection.

1.9 MANUFACTURERS' RECOMMENDATIONS

- A. All equipment specified and used in the project shall be installed in accordance with the approved manufacturer's current written recommendations.
- B. All such equipment, material, etc., shall be of the manufacturer's latest system or line.

1.10 SUBSTITUTIONS

- A. Conditions: Contractor's substitutions shall be considered when one or more conditions are satisfied, as determined by the Engineer. (The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.)
 1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 3. Request is timely, fully documented and properly submitted.
 4. Request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Time. The request shall not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by governing authority, and the requested substitution can.

MATERIAL SUBSTITUTION PROCEDURES
01 35 00-3

7. Substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear.
 - a. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 - b. Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.
8. Specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
9. Specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
10. Specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

1.11 SUBSTITUTION REQUEST FORM

- A. Use Substitution Request Form in on page 01 35 00-5.
- B. Submit one form (4 copies) for each request.

END SECTION

SUBSTITUTION REQUEST FORM

Page 1 of 2

TO: _____

PROJECT: _____

We hereby submit for your consideration the following product instead of the specified item for the above project:

SECTION:	PARAGRAPH:	SPECIFIED ITEM:
_____	_____	_____
_____	_____	_____

Proposed Substitution: _____

Attach: 1) Complete technical data, including laboratory tests, if applicable.

2) Complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

A. Does the substitution affect dimensions on Drawings?

B. Will the undersigned pay for changes to the project design, including engineering and detailing costs caused by the requested substitution?

C. What affect does substitution have on other trades?

D. Differences between proposed substitution and specified item?

E. Manufacturer's guarantees of the proposed and specified items are:

____ Same _____ Different (explain on attached sheet)

MATERIAL SUBSTITUTION PROCEDURES
01 35 00-5

SUBSTITUTION REQUEST FORM

Page 2 of 2

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Submitted By:

Signature _____

Firm _____

Address _____

Date _____

Telephone _____

For Use by Design Consultant
Accepted Accepted as Noted Not Accepted Received Late By _____ _____ Date _____ Remarks _____

MATERIAL SUBSTITUTION PROCEDURES
01 35 00-6

SECTION 01 42 13

DEFINITIONS AND ABBREVIATIONS

PART 1 GENERAL

1.1 DEFINITIONS AND TERMS

- A. Whenever in these Specifications, or in other Contract Documents, the following terms are used, the intent and meaning shall be interpreted as follows:
1. Board: Fresno County Board of Supervisors.
 2. Calendar Day: Every day shown on the calendar.
 3. Contractor: The word "Contractor" means the person, firm or corporation to whom the award is made. Subcontractors as such will not be recognized.
 - a. Where pronouns "he", "his", or "him" are used in reference to the Contractor, it shall be inferred to be inclusive of all genders.
 4. Contract Price: The total amount of money for which the Contract is awarded.
 5. Contract Unit Price: The Contractor's original bid for a single unit of an item of work in the Proposal.
 6. Contract Time: The number of calendar days for completion of the Work, including authorized time extensions. In the event a calendar date is specified for Project completion in lieu of a number of calendar days, the Work shall be completed by that calendar date. The Contract Time shall be computed by excluding the first and including the last day; and if the last day be Sunday or a legal holiday, that shall be excluded.
 7. Design Engineer: Provost & Pritchard Consulting Group.
 8. Engineer: County of Fresno Director of Public Works and Planning, and/or his designee.
 9. Equipment: (Construction) - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of work. (Installed) - All material or articles used in equipping a facility as furnishings or apparatus to fulfill a functional design.
 10. General Conditions: As specified in Section 00 72 00 – General Conditions.
 11. General Requirements: All specifications contained in Division 1.
 12. Notice: Any notice allowed or required to be given by the Owner may be given by the Engineer.

13. Owner: Fresno County.
14. Person: Any individual, association, partnership, corporation, trust, joint venture or other legal entity.
15. Plans: The drawings, profiles, cross-sections, working drawings and supplemental drawings, or reproduction thereof, approved by the Engineer, which show the location, character, dimensions or details of the work.
16. Proposal: The offer of a Bidder when submitted on the Proposal form; properly signed and guaranteed.
17. Reference Documents: Bulletins, Rules, Methods of Analysis or Test, Codes, Standards, and Specifications of public or private agencies, Engineer Societies, or Industrial Associations. Reference shall be to the latest edition thereof, including Amendments, which are in effect and published at the time the Request for Bids is issued, unless a specific edition is identified, in which case reference shall be to such specific edition. Reference Documents are intended to amplify the descriptions of materials, equipment, and construction systems and are to be considered a part of the Contract Documents insofar as the various sections thereof are referred to hereinafter. Examples of Reference Documents are Federal Specifications, State Standard Specifications, and those of American Society of Testing Materials (ASTM), American National Standards Institute (ANSI), American Standards Associations (ASA), and American Concrete Institute (ACI).
18. Salvage: The protection storage, and/or removal of specified existing equipment, parts or materials during the work for retention and later use by the Owner.
19. Sanitary Sewer: Any conduit and appurtenances intended for the reception and transfer of sewage.
20. State: The State of California.
21. State Standard Plans: State of California, Business and Transportation Agency, Department of Transportation, Caltrans, Standard Plans, latest revision.
22. State Standard Specifications: Standard Specifications for the project are those entitled "Standard Specifications, State of California, Business and Transportation Agency, Department of Transportation", current version, hereinafter referred to as the State Standard Specifications. These Specifications are to be considered a part of the Contract Documents insofar as they are not superseded by other provisions contained in Divisions 0 through 43 of these Specifications.
23. Storm Sewer: Any conduit and appurtenances intended for the reception and transfer of storm water.

- 24. Street: Any public road, highway, parkway, freeway, alley, walk or right-of-way.
- 25. Surety: Any individual, firm or corporation bound with and for the Contractor for the acceptable performance, execution and completion of the Work, and for the satisfaction of all obligations incurred.
- 26. Utility: Tracks, overhead or underground wires, pipelines, conduits, ducts or structures, sewers or storm drains owned, operated or maintained in or across a public right-of-way or private easement.
- 27. Water Main: Any conduit and appurtenances intended for the distribution of water.

1.2 REFERENCED STANDARDS

- A. The standards referred to, except as modified, shall have full force and effect as though printed in this Specification, and shall be the latest edition or revision thereof in effect on the bid opening date, unless a particular edition or issue is indicated. Copies of these standards are not available from the Owner. The Engineer will furnish, upon request, information as to how copies may be obtained.

1.3 LIST OF ABBREVIATIONS

- A. Abbreviations and terms, or pronouns in place of them, shall be interpreted as follows:

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AEIC	Association of Edison Illuminating Companies
AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARI	American Refrigeration Institute
ASA	(now U.S.A.S.I., USA Standards Institute) Association & its Standard Specifications
ASAHC	American Society of Architectural Hardware Consultants

DEFINITIONS AND ABBREVIATIONS

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Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America (formerly SCPI)
CAL/OSHA	California Occupational Safety and Health Administration
CALTRANS	California Department of Transportation
CBC	California Building Code
CCR	California Codes of Regulations
CDA	Copper Development Association
CEC	California Electrical Code
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CMC	California Mechanical Code
CPC	California Plumbing Code
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard (U.S. Department of Commerce)
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
EEI	Edison Electric Institute
EJCDC	Engineers' Joint Contract Documents Committee
EPA	Environmental Protection Agency
FED SPEC	Federal Specification
FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual
FSA	Fluid Sealing Association
FTI	Facing Tile Institute
HEI	Heat Exchange Institute
HMI	Hoist Manufacturers Institute
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
ICBO	International Conference of Building Officials
I-B-R	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IFI	Industrial Fasteners Institute
IPCEA	Insulated Power Cable Engineers Association

DEFINITIONS AND ABBREVIATIONS

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Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

ISA	Instrument Society of America
JIC	Joint International Conference (Hydraulic Institute)
MHI	Materials Handling Institute
MIL	Military Specification
MMA	Monorail Manufacturers Association
MSS	Manufacturers' Standardization Society
NAAMM	National Association of Architectural Metals Manufacturers
NACE	National Association of Corrosion Engineers.
MBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NBHA	National Builders Hardware Association
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NEMI	National Elevator Manufacturing Industry
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NLA	National Lime Association
NPC	National Plumbing Code
NPT	National Pipe Thread
NRCA	National Roofing Contractors' Association
NRMCA	National Ready Mixed Concrete Association
NSC	National Safety Council
NSF	National Sanitation Foundation
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PFI	Pipe Fabrication Institute
PS	Product Standard
RTI	Resilient Tile Institute (formerly AVATI)
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SI	International Systems of Units (Metric)
SIGMA	Sealed Insulating Glass Manufacturers Association
SFPA	Southern Forest Products Association
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPFA	Steel Plate Fabricators Association
SPI	Society of the Plastics Industry
SPTA	Southern Pressure Treaters Association
SSI	Scaffolding and Shoring Institute
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction (Greenbook)
UL	Underwriters' Laboratories

DEFINITIONS AND ABBREVIATIONS

01 42 13-5

Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

UPC	Uniform Plumbing Code
USBR	U.S. Bureau of Reclamation
USGS	United States Geological Survey
WCLA	West Coast Lumbermen's Association (Standard Grading and Dressing Rule)
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

END SECTION

DEFINITIONS AND ABBREVIATIONS
01 42 13-6

SECTION 01 43 00

QUALITY CONTROL AND TESTING

PART 1 GENERAL

1.1 NOTICE OF DEFECTS

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- B. All defective Work may be rejected, ordered to be corrected, or accepted, at the discretion of the Owner and Engineer.

1.2 ACCESS TO WORK

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests shall have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith.

1.3 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be subject to the requirements of Section 01 35 00 – Material Substitution Procedures.

1.4 PROJECT SITE TESTING

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Except for specified material suitability tests, all initial routine field tests of materials shall be at the expense of the Owner and shall be performed by an independent certified laboratory designated by the Owner. Whenever a specified percent relative compaction test is required and the material or portion thereof so tested fails to meet or exceed the relative compaction specified, all subsequent retesting shall be performed at the expense of the Contractor.

1.5 TEST STANDARDS

- A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.
- B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the ASTM, where applicable.

1.6 UNCOVERING WORK

- A. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without concurrence of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and recovered at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be re-observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall promptly correct said defects, including all work involved in uncovering and recovering the work, at no cost to the Owner.
 - 2. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

1.7 CORRECTION OR REMOVAL OF DEFECTIVE OR REJECTED WORK

- A. Upon receipt of notice, Contractor shall correct all defective or rejected Work and replace it with Work that is not defective, at no cost to the Owner.

1.8 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so.
 - 1. If any such acceptance occurs, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted.
 - 2. Engineer shall determine the reasonableness of the diminished value of Work so accepted and Contractor shall pay all costs involved in making such determination.

END SECTION

SECTION 01 50 00

TEMPORARY FACILITIES

PART 1 GENERAL

1.1 GENERAL

- A. The Contractor shall provide all temporary facilities and utilities required for completion of the Work as well as safety precautions and programs. No attempt is made to set out in detail the Contractor's means or methods necessary to accomplish the tasks involved.

1.2 TEMPORARY UTILITIES

- A. Water
 - 1. The Contractor may make arrangements with the Owner to use municipal water where appropriate during construction. See Section 01 51 36 – Watering of these specifications for details.
 - 2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.
- B. Sanitary Facilities
 - 1. The Contractor shall provide suitable and adequate sanitary conveniences for the use his staff at the site of the Work. Such conveniences shall include chemical toilets or water closets and shall be located at appropriate locations at the site of the Work. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the Work, all such sanitary conveniences shall be removed, and the site left in a sanitary condition.
 - 2. With respect to sanitation facilities, the Contractor shall cooperate with and follow directions of representatives of the Public Health Service and the State. State and County Public Health Service representatives shall have access to the Work, whether it is in preparation or progress, and the Contractor shall provide facilities for such access and inspection.

1.3 TEMPORARY CONSTRUCTION FACILITIES

- A. Construction hoists, shoring, and similar temporary facilities shall be of ample size and capacity to adequately support and move the loads to which they will be subjected. Railings, enclosures, safety devices, and controls required by law or for adequate protection of life and property shall be provided.
- B. Temporary supports shall be designed with an adequate safety factor to assure adequate load bearing capability. The Contractor shall submit design calculations

TEMPORARY FACILITIES
01 50 00-1

prepared by a professional registered engineer for staging and shoring prior to application of loads.

- C. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations from one hour before sunset each day to one hour after sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded in such a manner as to prevent persons from falling, walking, or otherwise entering any excavation in any street, roadway, parking lot, treatment plant, or any other area, public or private.
- D. The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, as a minimum, conform to the requirements of Cal/OSHA.
- E. At such time or times any temporary construction facilities and utilities are no longer required for the work, the Contractor shall notify the Engineer of his intent and schedule for removal of the temporary facilities and utilities and obtain the Engineer's approval before removing the same. As approved, the Contractor shall remove the temporary facilities and utilities from the site as his property and leave the site in such condition as specified, as directed by the Engineer, and/or as indicated on the Plans.

1.4 ACCESS ROADS AND STAGING AREA

- A. Adequate access shall be maintained to all storage areas and other areas to which frequent access is required. The Contractor shall limit the location of his storage of equipment and materials to the location indicated on the plans. The Contractor shall provide any temporary storage required for the protection of equipment and materials as recommended by manufacturers of such materials.
- B. Storage and protection:
 - 1. Materials and equipment shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Exposed metal surfaces of valves, fittings and similar materials shall be coated in accordance with manufacturer's recommendations to prevent corrosion.
 - 2. Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure materials and equipment are undamaged and are maintained under required conditions.

END SECTION

SECTION 01 51 36

WATERING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing, hauling, and applying water required for compaction of embankments, backfills, subgrade, and base course, and for landscaping, and other construction operation.

1.2 RELATED WORK

- A. Section 01 50 00 – Temporary Facilities
- B. Section 01 57 27 – Dust Control

1.3 REFERENCES

- A. State Standard Specifications Section 10-6, Watering

PART 2 PRODUCTS

2.1 WATER

- A. Free of debris, organic matter, and other objectionable substances.

PART 3 EXECUTION

3.1 WATER TRUCK

- A. At least 1,000-gallon capacity.
- B. Keep at least one water truck on site at all times, unless Engineer approves removal of the truck from the site before final completion.

3.2 APPLICATION

- A. Use pressure type distributors or a pipeline equipped with sprinkler system. Provide approved meter devices near points of discharge.
- B. Ensure a uniform application of water for optimum moisture content. Avoid excessive runoff and minimize water waste.
- C. The Contractor may water excavation areas before excavating. Drill full depth of excavation to make moisture determinations.
- D. If over watering occurs, de-water at no additional expense to the Owner.

WATERING
01 51 36-1

3.3 SPECIAL CONTROLS

The Contractor shall take all reasonable means to minimize inconvenience and injury to the public by dust, noise, diversion of storm water, or other agencies under his control.

A. Dust Control

1. As specified in Section 01 57 27, Dust Control

B. Water

1. The Contractor is responsible for supplying a full water truck of potable water for drilling fluid. Additional water for drilling and other construction water can be pulled from a hydrant on the WWD 40 potable water system only after the initial water truck supply is exhausted. If more than 20,000 gallons per week are needed from the WWD 40 system the Contractor shall make arrangements to procure any additional drilling water from another potable source and pay all costs.
 - a. Contractor is responsible for supplying and disinfecting all valves and appurtenances required to connect to the system.
2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.
3. Full compensation for furnishing all labor, materials, tools and equipment and for doing all work involved in furnishing and applying water as required by the Contract Documents and Specifications, State Standard Specifications, shall be considered as included in the contract unit prices paid for other items of work and no additional allowance will be made therefore.

END SECTION

SECTION 01 57 13

EROSION CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of protecting from erosion all areas disturbed by new construction and construction operations, including areas disturbed by demolition, earthwork, and fence, piping and equipment installation.

1.2 RELATED WORK

- A. Section 01 57 27 – Dust Control

1.3 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures.
- B. One-bale of proposed straw.

PART 2 PRODUCTS

2.1 RICE STRAW

- A. Sterile rice straw.

PART 3 EXECUTION

3.1 PREPARATION

- A. Loosen areas to be protected by raking or other approved method before application. Maintain grading and drainage patterns.

3.2 PLACING STRAW

- A. Exercise particular care to ensure application is made uniformly.
- B. The Contractor shall install and maintain protected areas as required by the Storm Water Pollution Prevention Plan.

3.3 ACCEPTANCE

- A. Application will be considered complete when all soil disturbing activities are completed and all unpaved disturbed areas have an even application of straw. No gaps (larger than 6 inches x 6 inches) will be permitted.

END SECTION

EROSION CONTROL
01 57 13-2

SECTION 01 57 27

DUST CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of implementing measures to prevent air pollution during construction activities, in accordance with Federal, State, and local regulations. It is assumed that the Project will have a total disturbed area less than 5 acres.

1.2 RELATED WORK

- A. Section 01 50 00 – Temporary Facilities
- B. Section 01 51 36 – Watering
- C. Division 2 – Existing Conditions
- D. Division 31 – Earthwork

1.3 REFERENCES

- A. San Joaquin Air Pollution Control District (SJVAPCD) Regulation VIII.

1.4 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures.
- B. Submittals under this section shall be completed and submitted at least 48 hours prior to beginning work.
- C. Proof of submittal of San Joaquin Air Pollution Control District (SJVAPCD) Construction Notification Form.

1.5 QUALITY ASSURANCE

- A. Control the rate and effect of watering in such a manner as to avoid all objectionable settlement and subsidence as approved by the Engineer and to assure the integrity of the finished work.
- B. Clearly mark and delineate the work limits activities.

1.6 REGULATORY REQUIREMENTS

- A. Contractor shall comply with all provisions of the SJVAPCD regulations, as well as Federal and State regulations.

DUST CONTROL
01 57 27-1

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Before the work begins, sufficient equipment and resources shall be available on the site to assure that the operation and adequacy of the dust control measures can be continuously maintained.

2.2 DUST CONTROL MEASURES

- A. Water shall be available to the contractor for dust control as specified in section 01 50 00 – Temporary Facilities.

PART 3 EXECUTION

3.1 GENERAL DESCRIPTION

- A. Dust control measures shall include, but may not be limited to: Water application, physical barriers limiting site access, reduction of vehicle speed on site, utilization of gravel pads, and utilization of grizzlies. If physical barriers are utilized, the Engineer shall approve the location, size, and type. Physical barriers shall be removed upon project completion.
- B. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent dust. Temporary measures shall be to Contractor's own design and Contractor shall be solely responsible for risks related to the management of dust control during construction.

3.2 DUST CONTROL

- A. The Contractor shall take whatever steps, procedures, or means as are required to limit dust generated by his operations during the Work, including Saturdays, Sundays, and Holidays. Dust shall be controlled to the standards of the local governing agency or, in the absence of local standards, to the satisfaction of the Engineer. Dust control shall extend to any unpaved road which the Contractor or any of his subcontractors are using, to excavation or fill areas, to demolition operations, and to other activities. Control shall be by sprinkling, use of dust palliatives, modification of operations, or any other means acceptable to the local governing agency or, in the absence of same, the Engineer.
- B. If the dust control is not adequate in the opinion of the Engineer, this work may be done by others, and the cost shall be deducted from the total payment due the Contractor.

END SECTION

SECTION 01 57 50

CONSTRUCTION STAKES, LINES, AND GRADES

PART 1 GENERAL

1.1 LINES AND GRADE

- A. The Work shall be executed in accordance with the lines and grades indicated in the Contract Documents. Distances and measurements, except elevations and structural dimensions, shall be made on horizontal planes.

1.2 CONSTRUCTION STAKING

- A. Engineer or Engineer's representative will provide project control monuments as shown on the Plans (vertical and horizontal) at the Owner's expense. The Engineer will provide one set of grade control stakes.
- B. All other construction staking necessary for the work shall be done by Contractor with compensation included in bid item(s), as deemed appropriate by the Contractor.
- C. The Contractor shall be responsible for preserving construction survey stakes, permanent survey monuments and benchmarks for the duration of their usefulness. If any construction survey stakes permanent survey monuments or benchmarks are lost or disturbed and need to be replaced, such replacement shall be made by the Engineer at the expense of the Contractor.
- D. The Contractor shall notify the Engineer at least three (3) working days before he will require survey services in connection with laying out of any portion of the Work. The Contractor at his own expense shall dig all holes necessary for line and grade stakes prior to requesting survey services that depend on such digging.

END SECTION

CONSTRUCTION STAKES, LINES, AND GRADES
01 57 50-1

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SECTION 01 58 00

PROJECT IDENTIFICATION SIGN

PART 1 GENERAL

1.1 GENERAL

- A. Provide and maintain a Project identification sign as described in this Section.

PART 2 MATERIALS

2.1 STRUCTURE AND FRAMING

- A. Structurally sound, new or used wood or metal; wood shall be nominal 2" x 4" minimum size.

2.2 SIGN SURFACE

- A. Minimum ¾-inch thick exterior grade plywood.

2.3 ROUGH HARDWARE

- A. Galvanized Steel.

2.4 PAINT

- A. Exterior quality.

PART 3 EXECUTION

3.1 FABRICATION

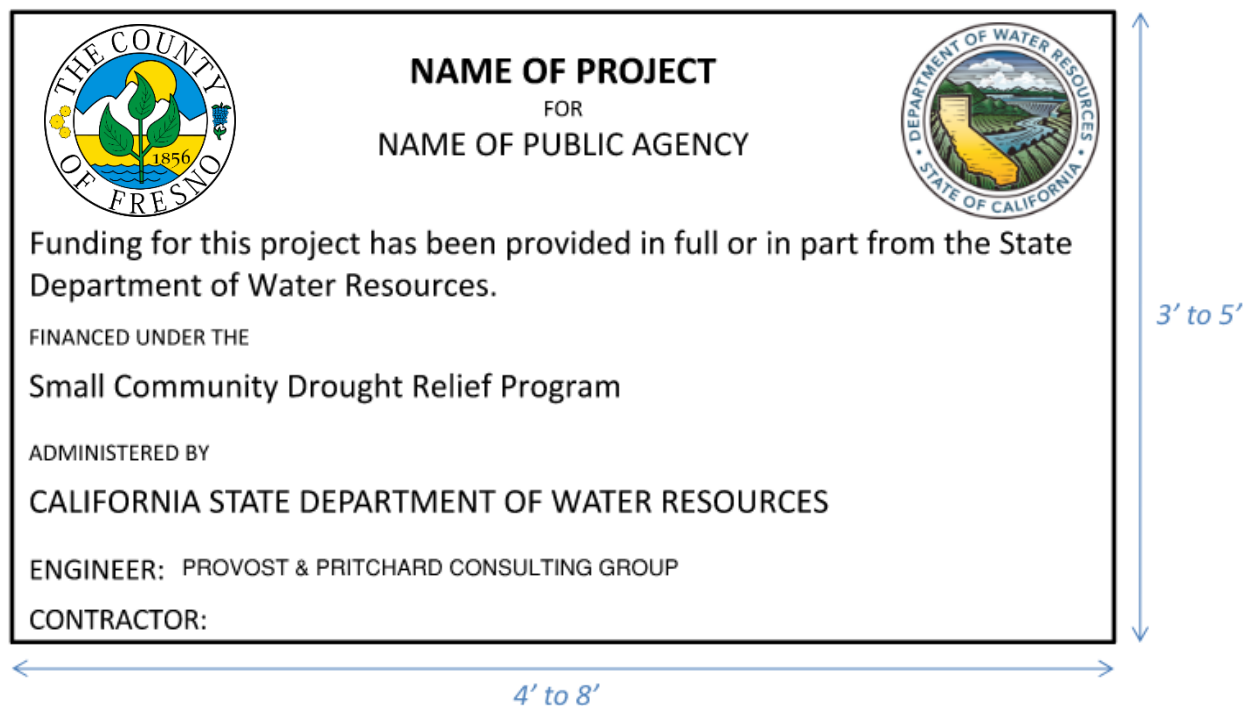
- A. Fabricate to provide smooth, even surface for painting.
- B. Size: 4 feet tall by 8 feet wide.
- C. Paint exposed surfaces of supports, framing, and surface material with one coat of primer and one coat of finish paint.
- D. The sign shall include the following information:
 - 1. County of Fresno - Waterworks District 40 Shaver Springs
 - 2. Water Supply Well Project
 - 3. "Funding for this project has been provided in full or in part from the Department of Water Resources, financed under the Small Community Drought Relief Program."

Project Identification Sign
01 58 00-1

Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

4. Administered by California State Department of Water Resources.
5. Engineer: Provost & Pritchard Consulting Group
6. Seville Emergency Water Supply Well Project, DWR Funding Agreement No. 4600015157 Contractor: [Contractor's Name]
7. Color logos as shown in the layout below, provided by the Engineer.

3.2 LAYOUT



3.3 INSTALLATION

- A. Provide adequate structural supports for sign as site conditions may require.
- B. Keep sign a proper distance above prevailing grade to permit public viewing.
- C. Size DWR logo to permit public viewing.
- D. DWR Logo



Project Identification Sign
01 58 00-2

- E. Paint Letters blue (Blue No. 15102 in federal color standard No. 595.

3.4 *INSTALLATION*

- A. The Project identification sign shall be installed in a prominent location on the Project site, and must be maintained in good condition for the duration of the Project implementation.

END SECTION

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SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The provisions of this Section apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of \$200,000 or above (for occupancies within the authority of California Building Standards Commission)
- B. This section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- C. Related Requirements
 - 1. Comply with local regulations for disposal of waste resulting from site clearing and removal of above- and below-grade improvements.
 - 2. Comply with the local codes and requirements governing construction waste management for municipal construction waste management requirements.

1.2 RELATED WORK

- A. Section 02 41 00 - Demolition

1.3 REFERENCES

- A. California Green Building Standards Code, latest revision.

1.4 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations, including packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition or construction waste and subsequent recycling, salvage, reuse, or disposal, as acceptable to authorities having jurisdiction.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 74 19-1

- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility, or delivery to the Owner as specified in Section 02 41 00 Demolition.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.5 PERFORMANCE REQUIREMENTS

- A. Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste, in accordance with the 'Guide to the 2016 California Green Building Standards Code, Nonresidential', Section 5.408.1.1, 5.408.1.2, or 5.408.1.3; or meet the local construction and demolition waste management ordinance, whichever is more stringent.

1.6 SUBMITTALS

A. Waste Management Plan

- 1. Submit Waste Management Plan within 7 days of date established for the Notice to Proceed.
- 2. The Waste Management Plan shall be prepared in accordance with the California Green Building Standards Code, latest revision, and shall include the following:
 - a. Identify the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale.
 - b. Indicate if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
 - c. Identify diversion facilities where construction and demolition waste material collected will be taken.
 - d. Specify that the amount of construction waste and demolition materials diverted shall be calculated by weight or volume, but not by both.
 - e. Construction Waste Management Acknowledgement Form. The Acknowledgement Form shall be signed by all subcontractors, to acknowledge that they have read the Waste Management Plan for the project, they understand the goals of the plan, and agree to follow the procedures described in the plan.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 74 19-2

B. Waste Reduction Progress Reports

1. Documentation shall be provided to the Owner, which demonstrates compliance with Sections 5.408.1.1 through 5.408.1.3 of the 'Guide to the 2016 California Green Building Standards Code, Nonresidential'. The Waste Management Plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.
2. Concurrent with each Application for Payment, submit report. Include the following information, as applicable:
 - a. Material type.
 - b. Total quantity of waste in tons.
 - c. Quantity of waste salvaged, both estimated and actual in tons.
 - d. Quantity of waste recycled, both estimated and actual in tons.
 - e. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - f. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Construction Waste Management Final Report

1. A construction waste management final report containing information and supporting documentation that demonstrates compliance with the Waste Management Plan, shall be provided to the enforcing agency before the final inspection. The required documentation shall include, but is not necessarily limited to, the following:
 - a. Documentation of the quantity by weight of each material type diverted or disposed, consistent with the requirements of the approved Waste Management Plan, and receipts or written certification from all facilities and waste management companies utilized to divert or dispose waste generated by the project to substantiate the amounts specified on the construction waste management final report.
 - b. For projects that satisfy the waste stream reduction alternative specified in Section 5.408.1.3, documentation of the quantity by weight of each material type disposed and the total combined weight of construction and demolition waste disposed in landfills as a result of the project, the corresponding pounds disposed per square foot of the building area, and receipts or written certification from all facilities and waste management companies utilized to dispose waste generated by the project that substantiate the amounts specified on the construction waste management final report.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

01 74 19-3

1.7 QUALITY ASSURANCE

- A. Waste Management Conference: Contractor will conduct regular meetings at Project site to review methods and procedures related to waste management. Meetings shall be conducted as needed, but not less than one time per month, and shall include, but not be limited to, the following:
1. Review and discuss Waste Management Plan including responsibilities of Contractor and subcontractors.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved Waste Management Plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract, or contract with an acceptable Waste Management firm to pick up and sort construction waste materials for recycling and disposal.
- B. Contractor shall be responsible for implementing, monitoring, and reporting status of Waste Management Plan.
1. At the Contractor's option, they may contract with a qualified Waste Management firm to manage and process the construction waste.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to all subcontractors.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 74 19-4

- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 *RECYCLING DEMOLITION AND CONSTRUCTION WASTE*

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures for On-Site Separation: Unless Waste Management firm is coordinating all construction waste recycling and disposal, comply with requirements for separating recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 *RECYCLING CONSTRUCTION WASTE*

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
1. Clean Cut-Offs of Lumber: Recycle.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Landscaping Specification Sections for use of clean sawdust as organic mulch.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from project property and dispose in a legal manner.

3.5 PAYMENT

- A. The work under this section will be paid under the various items of work included in the Bid Schedule. Not additional payment shall be made thereto.

END SECTION

Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 74 19-7

SECTION 01 77 00

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 GENERAL

- A. It is the intent of these Contract Documents that the Contractor shall deliver a complete and operable facility capable of performing its intended functions and ready for use.

1.2 CLEANING

- A. Throughout the period of construction, the Contractor shall keep the Work site free and clean of all rubbish and debris, and shall promptly remove from the site, or from property adjacent to the site of the Work, all unused and rejected materials, surplus earth, concrete, plaster, and debris, excepting select material which may be required for refilling or grading.

1.3 FINAL SITE CLEAN-UP

- A. Upon completion of the Work, and prior to final acceptance, the Contractor shall remove from the vicinity of the Work all paint, surplus material, and equipment belonging to him or used under his direction during construction.
- B. The Contractor shall restore to original condition all property not designated for alteration by these Contract Documents.

1.4 WASTE DISPOSAL

- A. The Contractor shall dispose of surplus materials, waste products, demolition materials, and debris. The Contractor shall transport and dispose of waste materials in accordance with applicable laws and regulations.

1.5 PROJECT RECORD DOCUMENTS

- A. The Contractor shall maintain at the site, available to the Owner and Engineer, one copy of the Contract Documents, Drawings, Shop Drawings, Change Orders, and other modifications in good order and annotated to show all changes made during construction. These Documents shall be delivered to the Engineer for the Owner upon completion of the Work.
- B. Record documents shall be reviewed during progress meetings to ascertain that all changes have been recorded.
- C. Store Record Documents separate from documents used for construction.

1.6 TOUCH-UP AND REPAIR

- A. The Contractor shall touch-up or repair finished surfaces on structures, equipment, fixtures, or installations that have been damaged prior to final acceptance. Surfaces on which such touch-up or repair cannot be successfully accomplished shall be completely refinished or in the case of hardware and similar small items, the item shall be replaced. Such items shall include, but not be limited to, the following:
 - 1. Exposed structure surfaces
 - 2. Exposed equipment surfaces
 - 3. Exposed piping surfaces

1.7 EQUIPMENT START-UP

- A. After all acceptance tests have been completed by the Contractor and Owner but prior to final acceptance, the Contractor shall recheck all equipment for proper alignment and adjustment, check oil levels, re-lubricate all bearings and wearing points, and in general assure that all equipment is in proper condition for continuous operation.

1.8 OPERATION AND MAINTENANCE (O&M) MANUALS

- A. See Section 01 33 00 – Submittal Procedures.

1.9 FINAL EQUIPMENT CHECK

- A. After testing and before acceptance, all equipment shall be test run by the Owner for a minimum of 7 days to ensure proper operation. At the end of the test run each piece of machinery shall be lubricated and all components and couplings checked for proper alignment and adjustment.
- B. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- C. Provide submittals to the Owner required by other governing authorities.

1.10 MANUFACTURER'S CERTIFICATES OF PROPER INSTALLATION

- 1. The Contractor shall submit manufacturers' certificates of proper installation for all items of equipment.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

CONTRACT CLOSEOUT
01 77 00-2

END SECTION

CONTRACT CLOSEOUT
01 77 00-3

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CONTRACT CLOSEOUT
01 77 00-4

SECTION 02 01 20
PROTECTION OF UNDERGROUND
FACILITIES AND SURVEY MONUMENTS

PART 1 GENERAL

1.1 UNDERGROUND FACILITIES

- A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing underground facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such underground facilities, including Owner, or by others.
1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and
 2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. Reviewing and checking all such information and data,
 - b. Locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. Coordination of the Work with the owners of such underground facilities, including Owner, during construction, and
 - d. The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.
- B. Not Shown or Indicated: If an underground facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated with reasonable accuracy in the Contract Documents, the following shall apply.
1. Contractor shall develop and execute a work-plan, subject to Engineer's approval to protect underground facilities.
 2. The Contractor shall expose, prior to staking and trenching, all existing utilities and existing facilities which may control proposed facility grades, and alignment. Two working days notice shall be given to the Engineer prior to commencing this work.
 3. Full compensation for all costs involved in locating, verifying, protecting, exposing, and otherwise providing for utilities shall be included in the amounts bid for the various items of work, and no separate payment shall be made therefore.

1.2 *PROTECTION*

- A. The Contractor shall not interrupt the service function or disturb the supporting base of any Utility by disrupting any facility identified in the Plans and Specifications without authority from the Owner or order from the Engineer. Where protection of such facilities is required to ensure support of utilities, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at the Contractor's expense.
- B. The Contractor shall be prepared at all times with labor, equipment and materials to make repair on damaged mains or Utility facilities. The Contractor shall immediately notify the Engineer and the Utility owner if he disturbs, disconnects or damages any Utility. The Contractor shall bear the costs of repair or replacement of any Utility facility described with reasonable accuracy in the Plans and Specifications that is damaged by the Contractor. No extra compensation will be made for the repair of any services or mains damaged by the Contractor, nor for any damage incurred if the neglect or failure of providing protective barriers, lights and other devices or means required to protect such existing utilities or facilities described with reasonable accuracy in the Plans and Specifications.

1.3 *SURVEY MARKERS AND PERMANENT REFERENCE POINTS*

A. Surveying and Permanent Survey Markers

The Engineer will take measurements to assure the preservation of survey markers (monuments and bench marks). The Contractor shall not disturb permanent survey markers without the consent of Engineer and shall bear the expense of replacing any that may be disturbed without permission.

- 1. Replacement of survey markers shall be done only by the Engineer.
- 2. If disturbing of markers cannot be avoided, the Owner shall pay the cost of replacing said markers.

B. Lot Corner Monuments

The Contractor shall preserve property line and corner survey markers except where their destruction is unavoidable and the Contractor is proceeding in accordance with accepted practice. Markers that are lost or disturbed by his operations shall be replaced at the Contractor's expense by the Engineer.

END SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work of this section consists of demolition and removal of concrete curb, fencing, miscellaneous debris, and salvaged items.
- B. This work may also include all operations associated with crushing of Portland cement concrete for aggregate base.
- C. Definitions:
 - 1. Portland Cement Concrete: A mixture of Portland cement, fine aggregate, coarse aggregate, admixtures (if used) and water, proportioned and mixed. Also, included is rebar.

1.2 WORK INCLUDED

- A. Repair and restoration of areas damaged due to demolition work.
- B. Salvaging of equipment for Owner.
- C. Removal of demolished materials from site.
- D. Remove existing fencing and other existing structures as shown on the Plans to be removed.
- E. Properly dispose of all removed materials.
- F. Dewatering as needed in order to complete the proposed demolition.

1.3 RELATED WORK

- A. Section 01 57 27 – Dust Control
- B. Section 03 33 00 – Cast-In-Place Concrete
- C. Section 31 11 00 – Clearing and Grubbing
- D. Section 31 23 35 – Disposal of Materials

1.4 SEQUENCING

- A. Sequence work to minimize interference with water distribution facilities operation. The existing water well must remain in operation throughout construction with only temporary shut-downs allowed with storage tank full.

DEMOLITION
02 41 00-1

1.5 REGULATORY REQUIREMENTS

- A. Obtain all required permits.
- B. Dispose of removed materials in an approved disposal or salvage facility.

1.6 REFERENCES

- A. Section 17-2 – Clearing and Grubbing, State Standard Specifications
- B. Section 19 – Earthwork, State Standard Specifications

1.7 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures
- B. Demolition plan including sequence of operations. The plan shall specifically address methods of demolition, schedule, sequence of demolition, and procedures for archeological monitoring. Demolition shall not proceed until the plan has been approved.

1.8 QUALITY ASSURANCE

- A. General: Take all necessary precautions with regard to safety in carrying out the demolition and site work. Erect suitable barriers around open excavations and fulfill all appropriate requirements of CAL/OSHA. Comply with safety requirements for demolition, ANSI A10.6-90.

1.9 PROJECT CONDITIONS

- A. Underground utilities exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- B. Keep dust to a minimum at removal site and on haul roads. Use sprinklers or water trucks as necessary or as directed by the Engineer.
- C. Ensure safety of persons in demolition area. Provide temporary barricades as required.
- D. Excavations may encounter groundwater and require dewatering depending on the time of year and amount of seasonal run-off. Loose sands exposed in excavation sidewalls may be unstable and require shoring or lying back in accordance with OSHA requirements. Flowing sands may also be encountered in excavations below groundwater levels.

1.10 CLOSEOUT SUBMITTALS

- A. As specified in Section 01 77 00 – Contract Closeout.
- B. Show all capped and abandoned utility terminations and location of remaining facilities on project Record Drawings.

DEMOLITION
02 41 00-2

PART 2 PRODUCTS

2.1 REPAIR AND RESTORATION MATERIALS

- A. Concrete shall be as specified in Section 03 33 00 – Cast-in-Place Concrete.
- B. Backfill materials shall be as required by Section 19 – Earthwork, State Standard Specifications.
- C. Concrete shall match existing materials and conditions.
- D. Concrete shall be replaced in conformance with governing authority standards.

2.2 TOPSOIL

- A. Not used.

2.3 MATERIALS

- A. Salvaged Materials: No materials shall be salvaged.
- B. Materials and items demolished and not designated for reuse, salvage or transfer to the Owner, as well as all debris, rubbish and other materials resulting from the demolition operations, shall become the property of the Contractor and shall be removed from the site within 48 hours of demolition.
- C. Storage or sale of the removed items will not be permitted at the site.

PART 3 EXECUTION

3.1 INSPECTION

- A. Prior to demolition, inspect the site conditions, verifying all governing dimensions, notes and specification. Notify the Engineer of any errors or omissions in the contract documents.
- B. Make such explorations and probes as are necessary to ascertain any required protection measures before proceeding with the demolition and removal work.

3.2 PREPARATION

- A. Protect existing, appurtenances, structures, which are not to be demolished.

3.3 DEMOLITION REQUIREMENTS

- A. Conduct demolition to protect and minimize damage to structures and existing improvements.
- B. Conduct salvaging to protect and minimize damage to salvaged equipment.

- C. All work within a Caltrans right of way shall conform to Section 15 of the State Standard Specifications.
- D. Execute the work in a careful, orderly and safe manner, with the least possible disturbance to the public. Cease operations immediately if adjacent work appears to be endangered. Do not resume operations until corrective measures have been taken.
- E. Pavement and Slabs:
 - 1. Remove completely all Portland cement concrete slabs-on-grade including, but not limited to, curbs and footings. If approved by the Engineer, the Contractor may crush Portland concrete for use as aggregate base.
 - 2. Saw cut existing concrete curbs cleanly in straight continuous lines. Remove concrete as shown on the drawings.

3.4 ORDER OF WORK

- A. Existing facilities shall remain in operation until the new well is in operation. Coordination will be required with the Owner for temporary shut-off of existing well for connection of new pipeline to existing pipelines and new chlorination connection. Contractor shall submit plans to Owner for approval for shut-off duration at least 10 days prior to shut-off.
 - 1. Hours and duration of shut-off will be limited to a maximum of 4 hours in any single day.

3.5 PRESERVATION

- A. If indicated or required, preserve trees, plants, rock outcroppings, or other features designated to remain. Protect trees and plants from damage; fell trees in a manner which shall not injure standing trees, plants and improvements which are to be preserved.

3.6 RESTORATION

- A. All demolition areas, staging/stockpiling, and open excavations shall be filled in accordance with the Earthwork Sections. Fill all open excavations deeper than one foot to an elevation to match the surrounding topography.
 - 1. New Construction Areas: As shown on drawings.

3.7 DISPOSAL

- A. As specified in Section 01 50 00 – Temporary Facilities.

END SECTION

DEMOLITION
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Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

DEMOLITION
02 41 00-5

SECTION 03 15 20

ANCHOR BOLTS AND POST-INSTALLED ANCHORS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing and installing all materials and equipment and providing all labor necessary to complete the work shown on the drawings and/or listed below and all other work and miscellaneous items not specifically mentioned but reasonably inferred for a complete installation, including all accessories and appurtenances required for a completed system.
- B. Cast-in-Place anchor bolts, anchor bolts and threaded rod anchors for epoxy grouting.
- C. Expansion anchors to be installed in hardened concrete.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 03 60 00 - Grout
- C. Section 05 12 00 – Structural Steel & Misc. Metals

1.3 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures.

1.4 GENERAL

- A. Unless otherwise specified or indicated on the drawings, all anchor bolts shall be cast-in-place bolts, shall have a diameter of at least 3/4 inch, and shall be headed and shall include a square washer a minimum of 1/4 inch thick and 2 inches square.
- B. Expansion anchors and threaded rod anchors indicated or accepted in lieu of cast-in-place anchor bolts for equipment or structural framing shall have a diameter of at least 3/4 inch and shall be ICC Evaluation Service Report listed.
 - 1. Unless otherwise specified or indicated on the drawings, or approved by the Engineer, all other expansion anchors shall have a diameter of at least 1/2 inch.

PART 2 MATERIALS

2.1 MATERIALS

- A. Nuts and washers for anchor bolts and expansion anchors shall be the same material as the bolts or anchors they are used with.

ANCHOR BOLTS AND POST-INSTALLED ANCHORS
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Application	Reference
A. Anchor Bolts and Nuts	
1. Carbon Steel	ASTM A307
2. Stainless Steel	IFI-104, Grade 304 or 316
3. Galvanized Steel	Carbon steel bolts and nuts; hot-dip galvanized, ASTM A153 and A385.
B. Threaded Rod Anchors and Nuts	
1. Carbon Steel	ASTM F1554, Grade 55 with ASTM A563 nuts
2. Stainless Steel	ASTM 593 with ASTM F594 nuts
3. Galvanized Steel	Carbon steel bolts and nuts; hot-dip galvanized, ASTM A153 and A385
C. Flat Washers	ANSI B18.22.1; of the same material as anchor bolts and nuts.
D. Expansion Anchors	
1. For Concrete	Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Hilti Kwik Bolt TZ ICC ESR-1917, Simpson Strong-Bolt 2 ICC ESR 3037, or ICC approved equivalent.
E. Adhesive Anchors	Hilti HIT RE-500 V3 ICC ESR 3814, ITW Red Head A7+ICC ESR 3903 or ICC approved equivalent.

- A. Anchor bolts, threaded rod anchors, expansion bolts and adhesive anchors for buried service, splash zones, and immersion service shall be stainless steel. Anchor bolts, threaded rods and adhesive anchors for exterior use shall be hot dipped galvanized. Zinc coated expansion anchors shall not be used for buried, splash zone, immersion or exterior service.

PART 3 EXECUTION

3.1 ANCHOR BOLTS

- A. Anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Anchor bolts which are cast in place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.
- B. Anchor bolts and threaded rod anchors which are to be epoxy grouted shall be clean and free of coatings that would weaken the bond with epoxy.
- C. Two nuts, a jam nut, and a washer shall be furnished for anchor bolts and threaded rod anchors indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for all other anchor bolts.
- D. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchor bolts and threaded rod anchors immediately before final installation and tightening of the nuts.

ANCHOR BOLTS AND POST-INSTALLED ANCHORS
03 15 20-2

3.2 *EXPANSION ANCHORS*

- A. Expansion anchors shall be installed in conformity with the manufacturer's instructions and ICC Evaluation Service Report recommendations for maximum holding power, but in no case shall the depth of hold be less than four (4) bolt-hole diameters. The minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall be at least four and one half (4-1/2) times the diameter of the hole in which the anchor is installed. Unless otherwise indicated on the Plans, the minimum distance between the centers of the expansion anchors shall be at least eight (8) times the diameter of the hole in which the anchors are installed.
- B. Anti-seize thread lubricant shall be liberally applied to threaded stainless steel components immediately before assembly.

3.3 *ADHESIVE ANCHORS*

- A. Adhesive anchors shall be installed in conformity with the manufacturer's instructions and ICC Evaluation Service Report recommendations. Anchors must be installed in holes drilled using carbide-tipped drill bits or diamond core drill bits. Should diamond core drill bits be used, the manufacturer's roughening tool must be used in conjunction with the bit.

END SECTION

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SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete work as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom, except as hereinafter specifically excluded. The work shall include, but is not necessarily limited to:
 - 1. All form work including special forms as required for any special construction and/or to accommodate the work of others and removal of forms.
 - 2. All concrete reinforcement, placement, bending and forming thereof.
 - 3. All concrete and cement finishing, all surface treatment and curing including non-slip finishes.
- B. Where prior inspection and test of materials are required, documentary evidence, in the form of test reports, shall be furnished prior to the time the material is incorporated into the work. All rejected material shall be promptly removed from the premises.

1.2 RELATED WORK

- A. Division 3 – Concrete
- B. Section 05 05 20 – Bolts, Washers, Anchors and Eyebolts
- C. Section 09 90 00 – Painting and Coating
- D. Division 31 – Earthwork
- E. Division 32 – Exterior Improvements
- F. Division 33 – Utilities

1.3 REFERENCES

- A. American Concrete Institute (ACI)
- B. American Society for Testing and Materials (ASTM)
- C. State Standard Specifications
- D. California Building Code (CBC)

CAST-IN-PLACE CONCRETE
03 30 00-1

1.4 DEFECTIVE WORK

- A. Work considered to be defective may be ordered by the Engineer to be replaced in which case the Contractor shall remove and replace the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:
 - 1. Concrete incorrectly formed, or not conforming to details and dimensions on the Plans or with the intent of these documents or concrete the surfaces of which are out of plumb or level.
 - 2. Concrete in which defective or inadequate reinforcing steel has been placed.
 - 3. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the Plans.
 - 4. Concrete below specified strength.

1.5 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 of these Specifications.
- B. Provide material certificates, mix designs including laboratory testing, shop fabrication and placement drawings, and schedule for all reinforcing steel, embedded items, form release and curing compounds.
- C. The Contractor shall provide a proposed concrete placement plan (to minimize the effects of cracking and differential settlement) to the Engineer, and gain approval of said plan, prior to ordering of reinforcing steel. As a minimum this plan shall contain the layout of horizontal and vertical construction joints, spaced no greater than 50 feet apart (unless specifically approved otherwise by the Engineer), and a pour schedule for the individual slab and wall pours. All construction joints shall be sized in conformance with the Typical Longitudinal Keys Detail and shall contain water stops as shown on the Construction Joint with Waterstop Detail.

PART 2 PRODUCTS

2.1 CONCRETE

- A. Concrete shall conform to Section 90 of the State Standard Specifications. Unless otherwise shown on the concrete note sheet or specified in other sections, all concrete shall conform to the following table of Portland cement mix requirements and minimum 28-day compressive strength. Portland cement shall be Type II.

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Location	Mix Requirements
Paving, Exterior Slabs, and Sidewalks Exposed to Freezing	3,500 PSI, F1, S0, W1, C1 (W/C Max 0.55)
All Other Structural Concrete	4,000 PSI, F1, S0, W1, C1

1. Water/cement ratio shall not exceed 0.45 (by weight) unless noted otherwise in table above.
 2. Slump at placement shall be 4 inches +/- 1 inch.
- B. Concrete used for thrust blocks or for pipe encasement shall contain not less than 517 pounds of Type II Portland Cement per cubic yard of concrete (5 1/2 sack) with a slump of 4 inches +/- 1 inch.
- C. Slurry cement backfill used in lieu of compacted soil shall contain not less than 188-pounds of Type II Portland Cement per cubic yard of concrete (2 sack) and shall comply with Section 19-3.02E of the State Standard Specifications.

2.2 AGGREGATE

- A. Aggregate for normal weight concrete shall conform to Section 90-1.02C, "Aggregates" of the State Standard Specifications. Aggregates shall be free of dirt, clay balls, roots, bark and other deleterious substances and shall be thoroughly washed before use.
- B. The combined aggregates for concrete shall conform to the grading limits for the one-inch, maximum size specified in Section 90-1.02C(4)(d), "Aggregate Gradation" of the State Standard Specifications, Combined Aggregate Gradings.

2.3 WATER

- A. Water shall comply with Section 90-1.02D, "Water" of the State Standard Specifications, and shall be clean and free from injurious amounts of acids, alkalis, salts, oils, organic materials or other deleterious substances.

2.4 FLYASH

- A. Fly Ash: Shall comply with SSS Section 90-1.02B(3), "Supplementary Cementitious Materials", and shall comply with AASHTO M 295, Class F or N.
1. Type of fly ash shall be compatible with the type of cement and the intended use of the concrete.
- B. The combined weight of fly ash conforming to AASHTO M 295, Class F or N shall not exceed the amount provided for in Section 90-1.02B(3), "Supplementary Cementitious Materials" of the State Standard Specifications.

2.5 *ADMIXTURES*

- A. Admixtures shall comply with Section 90-1.02E, "Admixtures", of the State Standard Specifications
- B. Air Entraining: ASTM C260
- C. Water Reducing: ASTM C494, Type A, D or F
- D. Accelerating: ASTM C494, Type C or E
 - 1. No admixture containing any chloride ions is acceptable.
- E. Retarding: ASTM C494, Type B, D or G

2.6 *REINFORCING STEEL*

- A. Rebar shall be ASTM A615, Grade 60.
- B. Welded wire fabric shall conform to ASTM A1064.

2.7 *EXPOSED-TO-VIEW CONCRETE*

- A. For exposed-to-view concrete, where legs of metal supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I).
- B. Metal bar supports in slab covers for sewage-containing structures shall also be provided with plastic coated legs.

2.8 *FORM MATERIALS*

- A. Exposed Concrete: Plywood complying with U.S. Plywood Standard PS-1 "BB (Concrete Form) Plywood" Class I, or better.
- B. Textured Finish Concrete: Units of face design, size arrangement and configuration to match control sample.
- C. Cylindrical Columns and Supports: Metal, fiberglass or waxed paper tubes of sufficient wall thickness to resist imposed loads without deformation.
- D. Form Release Agent shall leave behind a paintable concrete surface.
 - 1. Release #1, The Burke Co., or Engineer approved equivalent.

2.9 *CURING MATERIALS*

- A. Polyethylene film
- B. Reinforced waterproof paper
 - 1. Sisal Kraft, Orange Label, or approved equal.

- C. Liquid-membrane curing compound
 - 1. Curing compound shall comply with ASTM C309, Type 2.
 - a. White pigmented material
 - b. Clear pigment may be used for concrete that will be exposed to public view.

2.10 WATERSTOP

- A. Comply with the provisions of Section 03 15 00 – Concrete Accessories.

PART 3 EXECUTION

3.1 REINFORCING STEEL

- A. Comply with CRSI, “Placing Reinforcing Bars” and as specified herein.
- B. Place reinforcing steel and embedded items in accordance with approved shop drawings.
- C. Splicing of bars shall be by lapping. Lapped splices shall be 50 bar diameters for bar size through #6 and 62 bar diameters for larger bars, unless otherwise shown on the Plans.
- D. Splicing of the wire fabric shall be by lapping. Lapped splices shall be two full mesh, minimum.
- E. All rebar in vertical walls shall be supported by concrete block spacers or metal chairs.
- F. Prior to placement of the concrete, reinforcing steel shall be cleaned and free of all concrete, dirt, oil, mill scale, rust or other coatings that would reduce or destroy the bond.
- G. All reinforcing steel and embedded items shall be reviewed and approved by the Engineer prior to concrete placement.

3.2 FORMS

- A. All forms shall be cleaned and an approved agent applied each time they are used and shall be so constructed and set as to resist, without springing or settlement, the pressure of the concrete and the placing operations.
- B. In designing forms and falsework, the concrete shall be treated as a liquid weighing at least 150 lbs. per cubic foot for vertical loads and not less than 85 lbs. per cubic foot for horizontal pressure. The design of the forms and falsework system shall include allowances for temporary construction loads. The rate of placement of concrete shall be so regulated that the pressures caused by the wet concrete will not exceed the designed form pressure. The unsupported length of wooden

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columns and compression members shall not exceed 30 times the width of the least side.

- C. All forms shall be set and maintained in true alignment, grade and section until the concrete has sufficiently set. The interior surfaces of forms shall be adequately treated with an acceptable material to insure non-adhesion of mortar. All forms shall be mortar-tight. When forms appear to be unsatisfactory in any way, concrete placement shall be stopped until the defects have been corrected.
- D. All exposed outside corners, including the top edges of all walls, machinery bases and curbs shall have a 3/4-inch chamfer.
- E. Metal tie rods or anchorages within the forms shall be fitted with suitable cones or comparable devices. Metal tie rods or anchorages shall be removed to a depth of 1" from the surface without injury to the concrete. All fittings for metal ties shall be of such design that upon their removal, the cavities which are left will be of the smallest possible size, but of sufficient diameter to allow the cavity to be "dry packed" with cement mortar. The cavities shall be filled with cement mortar and the surface left sound, smooth and even.
- F. Form release agent shall be applied to the form so that no agent comes in contact with reinforcing steel.

3.3 PLACING

- A. All concrete shall be placed before it has taken its initial set and shall be placed in horizontal layers and in such a manner as to avoid segregation. The concrete adjacent to the forms and joints shall be thoroughly consolidated with a vibrator operating at not less than 4,500 vibrations per minute.
 - 1. Pumping equipment shall be of suitable type, without Y-sections, and with adequate pumping capacity.
 - 2. Loss of slump in pumping shall not exceed 1 1/2 ".
 - 3. Concrete shall not be placed through reinforcing that may cause separation of aggregates.
- B. The concrete shall be deposited as nearly as possible in its final position. Drop chutes and elephant trunks shall be used on drops greater than 5 feet. Concrete shall be placed at such a rate that all concrete in the same lift will be deposited on plastic concrete. The concrete comprising each unit of work shall be placed in a continuous lift.
- C. The Contractor shall notify the Engineer 24 hours (1 working day) prior to concrete placement.
 - 1. The form work and reinforcing steel placement shall be approved by the Engineer prior to ordering concrete.
- D. Form Removal. Minimum times for removal after concrete placement are as follows:

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Beam sides but not shoring	3 days
Column forms and wall forms	2 days
Forms for supported slabs but not shoring	14 days

E. Construction Joints

1. At ends of the first concrete pour, provide forms that positively locate any waterstop. Ensure the end forms of walls are removable without releasing the side forms. Provide seals around reinforcement and water stop to prevent mortar leaks.
2. Overlap the hardened concrete of the first pour with forms for the second pour. Brace the ends of the forms against the hardened concrete to prevent joint offsets and mortar leakage. Align any exterior features required on the finished surface.

3.4 CONCRETE JOINTS

A. General

1. Provide joints:
 - a. As shown on the Drawings and as noted below in these Specifications.
 - b. As required for constructability
 - c. After favorable review of layout, sequence and concrete placement program.
2. Provide minimum curing times before the second placement:
 - a. 2 days after the first concrete placement at the joint.
 - b. 10 days after each adjacent concrete placement, for infill pours or checkerboard placement pattern.

B. Control Joints:

1. Space typical control joints in slabs on grade or suspended slabs not exceeding 10 feet, or as shown on the Drawings. Control joints shall not be provided in water containment structures.
2. If cast-in with the concrete, positively locate the preformed joint filler and hold rigidly in place during concreting.
3. If saw-cut, use a wheeled power saw as soon as the concrete surface is firm enough. Saw-cut control joints must be constructed within 8-hours after concrete placement. Fill the groove with sealant over a backer rod.

C. Construction Joints:

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1. Produce quality concrete, with full continuity of reinforcing and water tightness across the joints.
2. Space typical slab joints not exceeding 20 feet in the direction of the transverse or secondary reinforcing, typically the smaller reinforcing nearer to the center of the slab thickness. Space typical vertical wall joints no more than 30 feet apart.
3. Provide all joints in walls and slabs, retaining liquids, or earth with 6-inch waterstops. Continue all reinforcing through the joint unless otherwise noted.
4. After the first concrete placement at the joint, do not walk on or disturb any reinforcing extending into the second placement area for at least 48 hours.
5. Before depositing new concrete on or against concrete that has hardened, clean and roughen the entire surface of the joint exposing clean coarse aggregate solidly embedded in mortar matrix. Provide typically 1/4-inch roughness or amplitude of the concrete surface measured from the top of the exposed aggregate to the bottom of pockets between stones.
6. Drench the prepared joint with clean water and remove prior to the concrete pour.
7. Cover horizontal wall joints and wall-to-slab joints with a minimum thickness of 2 inches and a maximum of 6 inches of the modified concrete mix, consisting of the designated concrete mix with one-half of the coarse aggregate removed.
8. Use special care in vibrating adjacent to construction joints to ensure thorough consolidation of the concrete around the waterstops and against the hardened portion of the joint. Additional hand tamping may be required.
9. For joints that are shown on architectural drawings as having a continuous reveal or recess, leave the wood form or pour strip used to create the reveal or recess in place or re-insert before roughening. Prevent the next concrete placement from filling the reveal or recess.

D. Expansion Joints

1. Stop all steel reinforcing clear of the joint at each side.
2. Provide 9-inch center bulb waterstop continuously around the joint in walls and slabs retaining liquids.
3. Prepare a smooth first concrete surface with all voids filled.
4. Provide preformed joint filler, securely fastened to the existing concrete as directed by the Manufacturer.
5. Install bond breaker and sealant after curing is completed and when directed.

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- E. Bonding to Pre-existing Concrete: Mechanically roughen the old surface to a 1/4-inch amplitude, as defined in construction joint paragraph above. Apply epoxy bonding material prior to concreting, as recommended by the manufacturer.
- F. Waterstop
 - 1. Restrict field splices to butt joints in straight runs. For PVC type, make by heat welding, using a splicing iron. For rubber, provide sleeve joints and glue. Follow the manufacturer's specifications.
 - 2. Positively locate and support in the forms so that concrete may be placed, consolidated, and vibrated on both sides of the embedded portion without displacement of the waterstop and without causing voids in the concrete. Protect the outstanding portion from damage during the first concrete pour and clean and positively support prior to the second pour. Place, consolidate and vibrate the second pour without displacement of the waterstop and without causing voids in the concrete.

3.5 CONCRETE CURING

- A. Exposed concrete surfaces shall be protected from premature drying by covering as soon as possible with canvas, plastic sheets with sealed joints, burlap, sand or other satisfactory materials and kept continuously moist; or, if the surfaces are not covered, they shall be kept continuously moist by flushing or sprinkling.
 - 1. Curing shall continue for a period of not less than 7 days after placing the concrete. If curing compound is used, two (2) applications will be made for even coverage. Curing methods must be approved by the Engineer.

3.6 FINISHING

- A. Defective and honeycombed surfaces shall be chipped back to such a depth to expose solid concrete. The surface shall be dampened and coated with a bonding agent and packed with mortar.
- B. Concrete Finishes for Vertical Wall Surfaces:
 - 1. Form facing material shall produce a smooth, hard, uniform texture.
 - a. Use forms specified for surfaces exposed to view in accordance with the Plans and other Specification Sections.
 - 2. At a minimum, repair the following surface defects:
 - a. Tie holes
 - b. Honeycombs deeper than 1/4"
 - c. Air pockets deeper than 1/4"
 - d. Rock holes deeper than 1/4"

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- e. Scabbing
- 3. Chip or rub off fins exceeding 1/8" in height.
- 4. Provide SF/ESF 3.0 finish and a smooth-rubbed finish for:
 - a. Walls being waterproofed, painted, coated with some other material.
 - b. Use at all exposed surfaces not specified to receive another finish.
- C. Related Uniform Surfaces (Except Slabs):
 - 1. Strike smooth tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.
 - 2. Float surface to a texture consistent with that of formed surfaces.
 - 3. Continue treatment uniformly across unformed surfaces.
- D. Concrete Finishes for Horizontal Slab Surfaces:
 - 1. General: Tamp concrete to force coarse aggregate down from surface. Screed with straightedge, eliminate high and low places, bring surface to required finish elevations; slope uniformly to drains. Dusting of surface with dry cement or sand during finishing processes not permitted.
 - 2. Slab Finish shall be as follows:
 - a. Surfaces intended to receive damp proofing or water proofing membranes: Float finish.
 - b. Floors intended to receive floor coverings and MCC rooms: Trowel finish.
 - c. Sidewalks, garage floors, drive-throughs and ramps: Broom finish.
 - d. Exterior slabs, platforms, steps and landings, exterior and interior pedestrian ramps and interior stairs and all process equipment areas, not covered by other finish materials: Broom finish.
 - 3. Deviation in finish surface shall not exceed 1/4" in 10 ft.
 - 4. No tolerance will be allowed that will result in the maximum running, or cross, slope exceeding the requirements of the Americans with Disabilities Act.

3.7 TESTING

- A. Testing of concrete shall be as required by the Engineer and in accordance with ACI 301, Chapter 1.6.
 - 1. All costs of initial testing will be paid by the Owner unless otherwise noted.

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2. All costs involved, including those required by the Engineer, in retesting of concrete required because of a failure to meet these Specifications shall be at the expense of the Contractor.

3.8 *WATERTIGHTNESS OF CONCRETE WORK*

- A. It is the intent of this Specification to obtain concrete and grout with homogenous structure, which when hardened will have the required strength, is watertight, and resistance to weathering.

3.9 *HYDRAULIC TESTING OF STRUCTURES*

- A. It is the intent of this Specification to obtain concrete and grout with homogenous structure, which when hardened will have the required strength, watertightness, and resistance to weathering.
- B. General: Test all concrete tanks, hydraulic channels, sumps, basins and other structures designed to contain water, after concrete has reached the design strength, prior to backfilling, and application of any coating system. Test shall be performed by filling the structure with water.
- C. Preparation: Provide the following.
 1. All water necessary for testing shall be of acceptable Quality.
 2. All evaporation and level measuring devices required.
 3. All pumps, power, piping and any other equipment required. Make all hook-ups necessary to fill tanks for testing.
 4. The water disposal method after testing is complete, including pumping if necessary.
 5. Fill the structure with water to the extreme high operating surface level or to overflow weir level. Furnish and install temporary bulkheads, if required.
 6. Maintain full for 48 hours before beginning the test period to permit concrete absorption and adjustment of valves, slide gates, or temporary bulkheads.
 7. At completion of tests remove all temporary piping and connections. Dispose of wastewater without creating a nuisance or damage to adjacent property.
- D. Test Period: Five consecutive 24-hour periods totaling 5 consecutive days. Take daily measurements of air and water temperature, rainfall and water level.
- E. Test Procedure
 1. After test period, measure water level at each side of the tank to determine leakage and loss from evaporation.
 2. Determine evaporation loss, using a standard 48-inch evaporation pan and level measuring device located adjacent to the tank.

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3. Mark all observed damp areas, running or dripping leaks on exposed surfaces that have not healed autogenously during the test. Damp areas include areas if moisture can be transferred from the exterior surface to a dry hand. Repair all those areas.
4. If leakage from the structure exceeds that permitted for the types of mechanical equipment providing closure plus 0.075% of the storage capacity, in each 24-hour period over a period of five consecutive days, perform a retest after completing repairs.
5. Provide acceptable procedures prior to repairs. Repairs by painting or surface treatment will not be acceptable.
6. Continue the test and repair procedure until the structure satisfies both the leakage calculation requirement and the visible leakage requirement.

F. Test for Manholes

1. Furnish and dispose of water used for testing.
2. Hydraulically test all manholes installed.
3. After all pipe has been laid, backfilling has been completed, and after the testing of the pipes, plug the end of the pipe stubs in each manhole with flexible-joint caps, or acceptable alternate, securely fastened.
4. Fill the manhole with water and measure leakage over a period of not less than one hour.
5. Allowable Leakage: less than one (1) gallon per hour per 10-foot depth of manhole.
6. When leakage from the manhole exceeds the above amount, determine the source or sources of the leakage, and repair or replace defective materials and workmanship.
7. Repair all visible leaks even if manhole passes the leakage test.

END SECTION

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Water Supply Well Construction

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SECTION 03 60 00 GROUT

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Epoxy grouting of anchor bolts and reinforcing bars to be installed in hardened concrete.
- B. Adhesive bonding of fresh concrete to existing hardened concrete surfaces.
- C. Installation of pipe and sleeve into existing concrete.
- D. Structure and Equipment leveling pads.

1.2 RELATED WORK

- A. Section 03 15 20 - Anchor Bolts and Expansion Anchors
- B. Section 03 30 00 - Cast-in-Place Concrete

1.3 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures.

PART 2 PRODUCTS

Material Type	Approved Product
1. Non-shrinking Grout	L&M Chemical "Crystex", Gifford-Hill "Supreme", Master Builders "Masterflow 713 Grout" Sauereisen Cements "F-100 Level Fill Grout", U.S. Grout "Five Star Grout", UPCO "Upcon High Flow" or "Upcon Super Flow", or equal.
2. Epoxy Grout	
a. Adhesive, Moisture insensitive	
For floors and horizontal surfaces	Adhesive Engineering "Concresive 1539", Rescon "Concrete Bonder R616", or equal
For vertical walls or overhead applications, non-sagging consistency	Adhesive engineering "Concresive 1440" Rescon "Concrete Bonder R616" or equal
b. Aggregate	As recommended by the epoxy grout manufacturer
3. Epoxy Bonding Adhesive	Sikadur 32, Hi-Mod Master Builders Concresive Standard Liquid or equal.
4. Water	Clean and free from deleterious substances.

- A. Non-shrinking grout shall be furnished factory premixed, so only water is added at jobsite. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout.

- 1. Cured grout shall have a minimum compressive strength of 3500 psi.

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- B. Epoxy grout shall consist of a two component liquid epoxy adhesive of appropriate viscosity for the application and location and an inert aggregate filler component. Components shall be packaged separately at the factory and field mixed. All proportioning and mixing of the components shall be in accordance with the manufacturer's recommendations.

- 1. Cured grout shall have a minimum compressive strength of 3500 psi.

PART 3 EXECUTION

3.1 PREPARATION

- A. The concrete surface to receive non-shrinking grout shall be saturated with water for 24 hours prior to grouting.
- B. Where indicated on the drawings, dowels shall be epoxy grouted in holes drilled into hardened concrete. Hole diameter shall be as recommended by the manufacturer. The embedment depth for epoxy grouted dowels shall be as indicated on the Plans.
- C. Holes shall be prepared for grouting as recommended by the grout manufacturer.
- D. The existing concrete surface to receive fresh concrete shall be clean and sound. The existing surface may be dry or damp, but free of standing water, free of dust, laitance, grease, airing compounds, and disintegrated materials. The existing concrete surface and rebar shall be sand blasted or cleaned by approved mechanical methods.

3.2 INSTALLATION

- A. Non-shrinking Grout
 - 1. Placement - Unless otherwise specified or indicated on the Plans, the thickness of grout shall be 1-1/2 inches. Grout shall be placed in strict accordance with the directions of the manufacturer.
 - 2. Edge Finishing - The grout shall be finished smooth in all locations where the edge of the grout will be exposed to view after it has reached its initial set. Except where indicated to be finished on a slope, the edges of grout shall be cut off flush at the base plate, bedplate, member, or piece of equipment.
 - 3. Curing – Non-shrinking grout shall be protected against rapid loss of moisture by covering with wet rags or polyethylene sheets. After edge finishing is complete, the grout shall be wet cured for at least 7 days.
 - 4. Epoxy Grout - Dowels shall be clean, dry, and free of grease and other foreign matter at time of installation. The bars shall be set and positioned and the epoxy grout shall be placed and finished in accordance with the recommendations of the grout manufacturer. Particular care shall be taken to ensure that all spaces and cavities are filled with epoxy grout, without voids.

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- B. Epoxy Bonding Adhesive: Pre-mix each component as specified by manufacturer. Mix only that quantity that can be applied within its pot life. Apply as specified by manufacturer.

END SECTION

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SECTION 05 05 20

BOLTS, WASHERS, ANCHORS AND EYEBOLTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section describes materials and installation of anchor bolts, connecting bolts, washers, drilled anchors, epoxy anchors, screw anchors, eyebolts, and stainless steel fasteners.

1.2 DESIGN CRITERIA

- A. Structural Connections: AISC Specification for Structural Steel Buildings (June 22, 2010), except connection details are shown in the Drawings.

1.3 REFERENCES

- A. American Institute of Steel Construction (AISC)
- B. American Society for Testing and Materials (ASTM)
- C. Research Council on Structural Connections (RCSC)

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01 33 00 – Submittals.
- B. Submit manufacturer's catalog data and ICC Evaluation Service Reports for bolts, washers, and concrete anchors. Show dimensions and reference materials of construction by ASTM designation and grade.
- C. Submit anchor bolt layout drawings.

PART 2 PRODUCTS

2.1 GENERAL

- A. Anchor bolts, drilled anchors, and epoxy anchors for buried service, immersion service and in splash zones shall be stainless steel. All other anchor bolts, drilled anchors and epoxy anchors shall be galvanized steel unless otherwise specified on the Plans.

2.2 ANCHOR BOLTS

- A. Steel anchor bolts shall conform to ASTM F1554, Grade 36, Class 1A or 2A unless otherwise indicated. Size, length and thread length shall be as shown on the Drawings.

BOLTS, WASHERS, ANCHORS AND EYEBOLTS
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- B. Bolts shall be provided with a head and two washers of a minimum of ¼ inch thick and 2 inches square. One washer shall be embedded in the concrete at the head of the bolt.
- C. Anchor bolts, nuts and washers shall be galvanized per ASTM F2329.

2.3 CONNECTION BOLTS

- A. Steel connection bolts shall conform to ASTM A325, Type 1 with the threads included in the shear plane.
- B. Provide galvanized bolts where shown in Drawings. Galvanizing of bolts, nuts, and washers shall be in accordance with ASTM F2329.

2.4 STAINLESS STEEL BOLTS

- A. Stainless steel bolts shall be ASTM A193, Grade B8 or ASTM F593, Type 316. Nuts shall be ASTM A194, Grade 316 or ASTM F594, Type 316. Use ASTM A194 nuts with ASTM A193 bolts; use ASTM F594 nuts with ASTM F593 bolts. Provide washer for each nut and bolthead. Washers shall be of the same material as the nuts.

2.5 LUBRICANT FOR STAINLESS STEEL BOLTS AND NUTS

- A. Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Huskey™ Lube-O-Seal by HUSK-ITT Corporation, or equal.

2.6 WASHERS

- A. Washers for bolts conforming to ASTM F1554 shall conform to ASTM F436, Type 1.
- B. Washers for bolts conforming to ASTM A307 shall conform to ASTM F844.
- C. Washers for bolts conforming to ASTM A325 shall be square or rectangular, tapered in thickness, smooth, hot-dipped galvanized, conforming to ASTM F436.
- D. Stainless steel washers shall be Type 316.

2.7 DRILLED ANCHORS

- A. Unless otherwise indicated in the Drawings, drilled anchors shall be 316 stainless steel wedge anchors as manufactured by ITW Red Head Trubolt+, Kwik Bolt TZ by Hilti, or equal. Anchors shall have ICC-approved testing.

2.8 EPOXY ANCHORS

- A. Epoxy anchors in concrete shall be 316 stainless steel threaded rod adhesive anchors. Adhesive shall be ITW Red Head Epcon S7, Hilti HIT RE 500-SD, or equal. Epoxy anchor assemblies shall be ICC approved.
- B. Epoxy anchors in grouted concrete masonry walls shall be 316 stainless threaded rods. Epoxy adhesive shall be Hilti HIT HY 70, Simpson ET-HP, or equal.

BOLTS, WASHERS, ANCHORS AND EYEBOLTS
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PART 3 EXECUTION

3.1 STORAGE OF MATERIALS

- A. Store material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.2 GALVANIZING

- A. Zinc coating for bolts, anchor bolts, and threaded parts shall be in accordance with ASTM F2329.

3.3 INSTALLING CONNECTION BOLTS

- A. Use steel bolts to connect structural steel members. Use stainless steel bolts to connect structural aluminum members.
- B. Install ASTM A325 bolts and washers per the RCSC "Specification for Structural Joints Using High Strength Bolts".
- C. Bolt holes in structural members shall be 1/16 inch in diameter larger than bolt size. Measure cast-in-place bolt locations in the field before drilling companion holes in structural steel beam or assembly.
- D. Slotted holes, if required in the Drawings, shall conform to AISC 360-10, Chapter J, Section J3, Table J3.3.
- E. Drive bolts accurately into the holes without damaging the thread. Protect boltheads from damage during driving. Boltheads and nuts or washers shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, provide beveled washers to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.
- F. Bolts shall be of the length that will extend entirely through but not more than 1/4 inch beyond the nuts. Draw boltheads and nuts tight against the work.

3.4 INSTALLATION OF STAINLESS STEEL BOLTS AND NUTS

- A. Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

3.5 INSTALLING ANCHOR BOLTS

- A. Anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Anchor bolts which are cast in place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.
- B. Preset bolts and anchors by the use of templates. Do not use concrete anchors set in holes drilled in the concrete after the concrete is placed for mechanical equipment.

BOLTS, WASHERS, ANCHORS AND EYEBOLTS
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Anchor bolts and threaded rod anchors which are to be epoxy grouted shall be clean and free of coatings that would weaken the bond with epoxy.

- C. Two nuts, a jam nut, and a washer shall be furnished for anchor bolts and threaded rod anchors indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for all other anchor bolts.
- D. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchor bolts and threaded rod anchors immediately before final installation and tightening of the nuts.
- E. For static items such as storage tanks, use preset anchor bolts or drilled anchors with ICC report data.
- F. After anchor bolts have been embedded, protect projecting threads by applying grease and having the nuts installed until the time of installation of the equipment or metalwork.

3.6 *INSTALLING DRILLED ANCHORS*

- A. Minimum depth of embedment of drilled mechanical anchors shall be as recommended by the manufacturer, but no less than that shown in the Drawings.
- B. Prepare holes for drilled anchors in accordance with the anchor manufacturer's recommendations prior to installation.

3.7 *INSTALLING EXPOXY ANCHORS*

- A. Epoxy anchors shall be clean and free of coatings that would weaken the bond with epoxy.
- B. Minimum depth of embedment of epoxy anchors shall be as recommended by the manufacturer, but no less than that shown in the Drawings.
- C. Prepare holes for epoxy anchors in accordance with the anchor manufacturer's recommendations prior to installation.

END SECTION

SECTION 09 90 00

PAINTING AND COATING (SITE)

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Field painting including surface preparation, surface protection, clean up, and/or other appurtenant work.
- B. All labor, materials, tools and equipment, and incidentals necessary and required for their completion.
- C. All pipe, fittings, equipment, and structures are to be field coated except for those specific exceptions contained in this specification or identified on the drawings. The painting schedule included at the end of this specification summarizes the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the drawings are used to show exceptions to the schedules, to extend the limits of coating systems, or to clarify or show details for application of the coating systems.
- D. All coatings for potable water service shall be ANSI-NSF Standard 61 certified.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place concrete

1.3 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 – Submittals.
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Performance criteria as required by the Engineer to determine quality.
 - c. Manufacturer's installation instructions and environmental parameters.
 - d. Material Safety Data Sheets.
 - e. Color samples.

1.4 AIR QUALITY REGULATORY COMPLIANCE

- A. All paint shall conform to the applicable air quality regulations at the point of application. Any paint material which cannot be guaranteed by the manufacturer to comply, whether specified by product designation or not, shall not be used.

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- B. The volatile organic compound (VOC) of coatings materials limits set forth in Rule 460.1 of the San Joaquin Valley Unified Air Pollution Control District shall apply to this project. The manufacturers' products listed in paragraphs 09900-3.01 and 3.02 have been selected on the basis of their apparent compliance with Rule 460.1; however, it shall remain the Contractor's responsibility to ensure that all coatings materials furnished are in compliance with all regulatory agencies.
- C. The product listed may meet the VOC requirement in the unthinned (as shipped) condition, but may exceed the VOC requirement if thinned to the manufacturer's allowable recommendations. In this situation, the product is not to be thinned beyond the limit indicated in Rule 460.1, and if the product cannot be suitably thinned for the intended application method or temperature requirements, it will be necessary to use another manufacturer's product subject to acceptance by the Engineer.
- D. It shall be the responsibility of the Contractor to ensure the compatibility of the field painting products which will be in contact with each other or which will be applied over shop painted or previously painted surfaces. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop or field primed surfaces, or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.
- E. All paint used for intermediate and finish coats shall be guaranteed by the paint manufacturer to be fumeproof. Paint shall be lead-free and mercury-free.

1.5 QUALITY OF WORK

- A. All finishes shall be applied by skilled workmen in accordance with the best practices and standards of the painting trade. Brushes, rollers, all equipment, and the techniques used in applying finishes shall be of sufficient quality to assure the specified results. Work not conforming to this Specification shall be corrected by touching up or refinishing as directed by the Engineer.
- B. It is the purpose and intent of this Specification to cover the complete paint finishing of all exterior and interior surfaces as scheduled or specified and all surfaces which normally require a paint finish for corrosion resistance, weather protection, finished appearance or utility. Finished surfaces shall be of the type of finish, color sheen film thickness and quality specified.

1.6 DELIVERY AND STORAGE

- A. Painting materials shall be delivered to site in manufacturer's original containers with labels intact and seals unbroken. Painting materials and equipment shall be stored and protected against freezing and mixed in rooms assigned for that purpose. No chemicals, unauthorized thinners, or other materials, not included in the paint formulation shall be added to the paint for any purpose. All necessary precautions shall be taken to prevent fire. Rags or waste soiled with paint shall be removed from premises at end of each day's work, or shall be stored in covered metal containers.

1.7 EQUIVALENT PRODUCTS

- A. Whenever a coating is specified using the name of a proprietary product or the name of a particular manufacturer or vendor, the specified coating shall be understood as establishing the type and quality of coating desired.
- B. Other manufacturers' products will be accepted provided sufficient information is submitted to allow the Engineer to determine that the coatings proposed are equivalent to those named. Proposed coatings shall be submitted for review in accordance with the Section 01 33 00 - Submittals.
- C. Requests for review of equivalency will not be accepted from anyone except the Contractor, and such requests will not be considered until after the contract has been awarded.
- D. Specific products for various applications shall be as specified in Part 2. In addition to the products named in Part 2, equivalent products of the following manufacturers will also be acceptable:

Ameron
Carboline
Devoe
PPG (Pittsburgh)
Sherwin Williams Co.
Sinclair
Tnemec
Valspar

- E. Contractor shall provide verification that equivalent products are acceptable for the desired application.

1.8 REFERENCE STANDARDS

- A. SSPC – Society of Protective Coatings, Pittsburgh, PA
- B. ASTM – American Society For Testing And Materials, West Conshohocken, PA

PART 2 PRODUCTS

2.1 GENERAL

- A. All paint shall be the product of a recognized manufacturer exclusively engaged in the manufacture of painting material. All paints for wood and metal surfaces shall be well-ground and shall not skin, liver, curdle, or body excessively in the containers.
- B. The paint shall not show laps or unevenness of color or texture. When applied to vertical surfaces, it shall not sag.

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- C. All exposed surfaces, including sides and edges, shall be painted. Hangers, brackets, fastenings and other miscellaneous items shall be painted with the same system as the adjacent material. Paint systems shall be in addition to shop primers.
- D. Paint shall be stored inside and shall be protected against freezing. No adulterant, unauthorized thinner, or other material not included in the paint formation shall be added to the paint for any purpose.
- E. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint. Any paint system shall be the product of a single manufacturer.
- F. All paint used for intermediate and finish coats shall be guaranteed by the paint manufacturer to be lead-free, mercury-free, and fumeproof. Where paint materials are referenced to Federal or military specifications, the reference shall define general type and quality required but is not intended to limit acceptable materials to an exact formulation.
- G. For each paint, the Contractor shall follow the paint manufacturer's specific application instructions. Upon the Engineer's request, the Contractor shall furnish the following application instructions.
 - 1. Surface preparation recommendations.
 - 2. Type of primer to be used.
 - 3. Maximum dry and wet mil thickness per coat.
 - 4. Minimum and maximum curing times between coats.
 - 5. Thinner to be used with each paint.
 - 6. Ventilation requirements.
 - 7. Atmospheric conditions during which the paint shall not be applied.
 - 8. Allowable methods of application.
 - 9. Maximum allowable moisture content and minimum age of plaster, concrete and wood surfaces at time of paint application.
 - 10. Curing time before submergence in water.
- H. The minimum number of coats and minimum total dry mil thickness of the system for each surface shall be as specified in the paint schedule.

2.2 PAINTING SCHEDULE

- A. A schedule is appended to this section listing the surface preparation, primer, finish and dry mil thickness to be used on each surface to be coated.

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2.3 PRIMERS AND PRETREATMENT

- A. P-1 Epoxy Primer - Minimum dry thickness 4 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600", or Tnemec 69-1211 "Hi-Build Expoxoline."
- B. P-2 Rust Inhibitive, non-submerged - Minimum dry thickness 3 mils. Devoe "Devran 203 Waterborne Epoxy Primer", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600" or Tnemec 135 "Chem Build."
- C. P-3 Rust inhibitive, submerged - Minimum dry thickness 4.0 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600" or Tnemec 136 "Chem Build."
- D. P-4 Primer for Wood – Maximum of 400 sq. ft/gal. Devoe 2010-1200 "Ultra- Hide Durus Exterior Acrylic Primecoat", Sherwin Williams "A-100 Wood Primer B42W41" or Tnemec 151 "Elaso-Grip."
- E. P-5 Wallboard Primer – Maximum of 400 sq. ft/gal. Devoe 1060-1200 "Ultra- Hide Latex Primer- Sealer", Sherwin Williams "Preprite 200 Interior Latex Primer B28W200", or Tnemec 51-792 "PVA Sealer."
- F. P-6 High Build Acrylic – Maximum of 100 sq. ft/gal., Tnemec 180 WB Tneme-Crete, Sherwin Williams "Heavy Duty Block Filler B42W46".

2.4 INTERMEDIATE AND FINISH PAINTS

- A. F-1 Epoxy Resin - Minimum dry thickness 5 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600", or Tnemec 69 "Hi-Build" epoxy.
- B. F-2 Gloss Acrylic Emulsion - Minimum dry thickness 2.0 mils Devoe " Devflex 4208 Waterbone Acrylic Enamel", Sherwin Williams "Shercryl Hi Performance Acrylic Gloss B66-300", or Tnemec 1028.
- C. F-3 Semi-gloss Acrylic Emulsion - Minimum dry thickness 2.5 mils Devoe "Devvflex 4216 HP Waterborne", Sherwin Williams "Shercryl Hi Performance Acrylic Semi-Gloss B66-350", or Tnemec 1029 "Tuf Cryl".
- D. F-4 High Build Epoxy (Substitute for Coal Tar) - Minimum dry thickness 6 mils. Devoe "Devtar 5A HS", Sherwin Williams "Targuard Coal Tar Epoxy B69B60", or Tnemec "V69F Black"
- E. F-5 Polyurethane O - Minimum dry thickness 2 mils. Devoe "Devthane 379H Aliphatic Urethane Gloss Enamel", Sherwin Williams "Hi Solids Polyurethane CA B65j-300", or Tnemec 1075 "Endurasheild."
- F. F-6 Acrylic Epoxy – Minimum dry film thickness 4 mils. Tnemec 113 Tneme-Tufcoat, Sherwin Williams " Waterbased Tile Clad Epoxy B73-100".
- G. F-7 High Build Acrylic – Maximum of 100 sq. ft./gal. Tnemec 180 WB Tneme-Crete, Sherwin Williams "Heavy Duty Block Filler B42W46".

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2.5 FUSION BONDED EPOXY LINING AND COATING

- A. Lining and coating shall be a 100% solids, thermosetting, fusion-bonded, dry powder epoxy resin. Provide Scotchkote 134 or 206N, Lilly Powder Coatings "Pipeclad 1500 Red", or equal. Epoxy lining and coating shall meet or exceed the following requirements:

Hardness (Minimum):	Barcol 17 (ASTM D2583) Rockwell 50 ("M" Scale)
Abrasion Resistance (Minimum)	1,000 cycles: 0.05 gram removed 5,000 cycles: 0.115 gram removed ASTM D1044, Tabor CS 17 wheel 1,000 gram weight
Adhesion (Minimum)	3,000 psi (Elcometer)
Tensile Strength	7,300 psi (ASTM D2370)

2.6 ALUMINUM SURFACES

- A. All aluminum in contact with steel or concrete: Sherwin Williams "Macropoxy 646 FC Epoxy B58-600 series or approved equivalent.

2.7 SHOP COATINGS

- A. Shop coatings shall be applied as indicated in the individual equipment and component specifications.
- B. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high grade, oil resistant enamel suitable for top coating in the field with an alkyd enamel.
- C. All shop coatings shall be compatible with the paint system specified in the Painting Schedule contained at the end of this specification.

2.8 SURFACES NOT TO BE PAINTED

- A. Except as otherwise required or directed, the following surfaces are to be left unpainted:
1. Exposed surfaces of aluminum (aluminum in contact with concrete is to be coated).
 2. Polished or finished stainless steel. Unfinished stainless steel shall be painted.
 3. Nickel or chromium.
 4. Galvanized surfaces, except piping, conduit, electrical conduit, pipe supports, fasteners, hangers, bracing, brackets, and accessories.

5. Rubber and plastics, including fiberglass reinforced plastics.
6. Precast concrete.

2.9 SYSTEM IDENTIFICATION

- A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by preprinted marker or stenciled marking, and include arrows to show the direction of flow. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floor, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portion of lines. Marking of short branches and repetitive branches for equipment connections is not required.
- B. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-4). Provide 1/2" high lettering, white on black background. Nameplates shall be permanently secured to the unit.
- C. Valves: Provide valve tags on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Provide brass tags or plastic laminate tags. Prepare and submit a tagged valve schedule, listing each valve by tag number, location and piping service. Mount in glazed frame where directed.

2.10 COLORS

- A. All colors and shades of colors shall be as specifically indicated in the specifications or plans, or, where not specifically indicated, selected from the manufacturer's standard color samples by the Owner.
- B. Electrical conduit shall be painted to match adjacent ceiling or wall surfaces as directed by the Engineer.

PART 3 EXECUTION

3.1 PRELIMINARY EXAMINATION

- A. Notify the Engineer in writing of any uncorrected defects in surfaces to be painted. Do not proceed with the finishing of surfaces in question until any discrepancies are corrected. No work on any surface shall be started, unless the surface has been inspected and approved for painting by the Engineer.

3.2 SURFACE PREPARATION

- A. The Contractor shall prepare the surfaces to be coated as specified under the paint schedule. Any surfaces to be coated which are not listed under the paint schedule

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shall be prepared in accordance with the manufacturer's instructions for the material to be applied.

- B. All grease, oil, dirt, and other contaminants which may affect the bond between the coating and the surface shall be removed by a cleaning agent which will leave the surface clean and dry.
- C. Cleaning and painting operations shall be performed in a manner which will prevent dust or other contaminants from getting on freshly painted surfaces.
- D. Surfaces shall be free of cracks, pits, projections, or other imperfections which would prevent the formation of smooth, unbroken paint film, except for concrete block construction where a rough surface is an inherent characteristic.
- E. When applying touch-up paint, or repairing previously painted surfaces, the surfaces to be painted shall be cleaned and sanded or wire brushed in such a manner that the edges of adjacent paint are feathered or otherwise smoothed so that they will not be noticeable when painted. All paint made brittle or otherwise damaged by heat or welding shall be completely removed.
- F. Hardware items such as bolts, screws, washers, springs, and grease fittings need not be cleaned prior to painting if there is no evidence of dirt, corrosion, or foreign material.
- G. All galvanized surfaces shall have a metal conditioner applied prior to the first prime coat.
- H. All surfaces to be finished shall be clean and dry before any materials are applied. Use a moisture meter to determine moisture content as follows. The moisture content shall be less than 18% for wood; 8% for concrete or plaster.
 - 1. Metal Surfaces - Where noted, the surface preparation for steel and other metals refer to the specifications for surface preparation by the latest revision of the Steel Structures Painting Council. All metal work shall be cleaned of grease, oil and dirt by solvent cleaning (SSPC-SP1). Do not use hydrocarbon based solvents for cleaning prior to use of acrylic materials.
 - a. Method SP-2: Surface shall be wire brushed where required to remove loose rust and dirt, etc. (SSPC-SP2)
 - b. Method SP-3: Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders. (SSPC-SP3)
 - c. Method SP-6: Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues. (SSPC-SP6)
 - d. Method SP-10: Sandblast to near white condition. This method shall remove all rust and scale, but streaks and shadows in the metal will be acceptable. (SSPC-SP10)

2. Wood Surfaces

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- a. Method W-1: All unprimed millwork delivered to the jobsite shall be given the specified first coat on all surfaces immediately upon arrival. Give all unprimed woodwork the specified first coat as soon as possible following installation. Prime any wood surface that is to be in contact with concrete, or a caulking material, with the specified first coat material before installation. Unless specified otherwise, all casings and trim, and all woodwork shall be free of oil, dirt, loose fibers, etc., sealed with a sanding sealer recommended by the coating manufacturer, and sanded smooth and dusted thoroughly before application of the priming coat. Give all knots, pitch pockets and sappy areas a preliminary coat of Dutch Boy Knot Sealer, or approved equivalent, prior to application of the prime coat.
3. Galvanized Surfaces
 - a. Method G-1: All galvanized surfaces shall be prepared for painting in strict conformity with the instructions of the manufacturer. All galvanized shall be cleaned per SSPC-SP7.
4. PVC Pipe
 - a. Method V-1: All wax and oil shall be removed from PVC plastic surfaces by wiping with a solvent of the type used for the specified primer.

3.3 PAINT APPLICATION

- A. Apply all finishes evenly, free from sags, runs, crawls, brush marks, skips or other defects. Apply products at the proper consistency and do not thin or otherwise alter them except in accordance with the manufacturer's printed directions. All coats shall be applied in such manner as to produce an even film of uniform thickness completely coating all corners and crevices. All painting shall be done by thoroughly experienced workmen.
- B. Care shall be exercised during spraying to hold the nozzle sufficiently close to the surfaces being painted to avoid excessive evaporation of the volatile constituents and loss of material into the air, or the bridging over of crevices and corners. Spray equipment shall be equipped with mechanical agitators, pressure gauges, and pressure regulators. Nozzles shall be of proper size. Floors, roofs, and other adjacent areas and installations shall be satisfactorily protected by drop cloths or other precautionary measures. All over-spray shall be removed by approved methods or the affected surface repainted. Care shall be exercised to avoid lapping of paint on hardware of other unscheduled surfaces.
- C. Each coat of material shall be thoroughly dry before the application of a succeeding coat. In no case shall paint be applied at a rate of coverage per gallon which is greater than the maximum rate recommended by the manufacturer. Paint films showing sags, checks, blisters, teardrops, or fat edges will not be accepted. Paint containing any of these defects shall be entirely removed and the surface repainted.

- D. Sandpaper enamels and varnishes lightly between coats and dust thoroughly before the application of a succeeding coat.
- E. If the finish coat is to be colored, the prime coat and the intermediate coat shall be tinted to have a slight variation in color from each other and from the finish coat.

3.4 PRIMING

- A. Edges, corners, crevices, welds, and bolts shall be given a brush coat of primer before the specified spot or touch-up painting of metal surfaces. Special attention shall be given to filling all crevices with paint.
- B. Abraded and otherwise damaged portions of shop applied paint shall be repainted. Welded seams and other uncoated surfaces, heads and nuts of field installed bolts, and surfaces where paint has been damaged by heat, shall be given a coat of the specified primer. This patch, spot, or touch-up painting shall be completed, and shall be dry and hard, before additional paint is applied.

3.5 LATEX PAINT

- A. Latex paint shall be applied by brushing or rolling; spraying is not permitted. Latex paint shall not be thinned excessively.

3.6 MIXING AND THINNING

- A. Paint shall be thoroughly mixed each time any is withdrawn from the container. Paint containers shall be kept tightly closed except while paint is being withdrawn.
- B. Unless otherwise authorized, all paint shall be factory mixed to proper consistency and viscosity for hot weather application without thinning. Thinning will be permitted only as necessary to obtain recommended coverage at lower application temperatures. In no case shall the wet film thickness of applied paint be reduced, by addition of paint thinner or otherwise, below that represented by the recommended coverage rate.

3.7 FILM THICKNESS FOR FERROUS METALS

- A. It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual field check by the Engineer. Dry film thickness shall be measured by the Contractor, using an approved Thickness Gauge, at locations selected by Engineer. Testing equipment provided shall be provided by Contractor and kept on site.
- B. Measurement of Dry Coating Thickness shall conform with paint application Standard SSPC-PA2
- C. Thickness and Holiday Checking - Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge.
- D. Holiday Checking of all interior coated surfaces shall be tested with an approved holiday detection device. Non-destructive holiday detectors shall not exceed 100 volts nor shall destructive holiday detectors exceed the voltage recommended by

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the manufacturer of the coating system. For thicknesses between 10 and 20 mils (0.25mm and 0.50mm) a non-sudsing type wetting agent such as Kodak Photo-Flo, shall be added to the water prior to wetting the detector sponge. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations and re-tested. No pinholes or other irregularities will be permitted in the final coating. Holiday detection devices shall be operated in the presence of the Engineer.

- E. Continuity shall be tested by a low voltage-wet sponge per RPO 188. Contractor shall perform continuity tests as required by the Engineer on surfaces that will be submerged.

3.8 *ATMOSPHERIC CONDITIONS*

- A. Apply all material to dry and properly prepared surfaces when weather conditions are favorable for painting. No materials shall be applied when the temperature of the materials is below 50 degrees F, or when the temperature of the air, surface to be painted or substrate, is below (or likely to fall below) 50 degrees F. Final ruling on the favorability of weather conditions shall be in accordance with the recommendations of the manufacturer and/or the Engineer.
- B. No coating or paint shall be applied to wet or damp surfaces, in rain, snow, fog, or mist, when the steel temperature or surrounding air temperature is less than 5 degrees above the dew point, nor in conditions not recommended by the manufacturer

3.9 *REPAIRING DAMAGED PAINT ON EQUIPMENT*

- A. Painted surfaces on equipment, which have become damaged prior to acceptance by the Owner, shall be repainted with the same or equivalent paint used in the original application.

3.10 *PROTECTION OF SURFACES*

- A. Throughout the work the Contractor shall use drop cloths, masking tapes, and other suitable measures to protect all surfaces from accidental spraying, splattering, or spilling of paint. Contractor shall be liable for and shall correct and repair any damaged condition resulting from its operations or from the operations of all those who are responsible to the Contractor during the time its work is in progress and until the work is accepted. In case bituminous paints are spilled or dropped on any material except metals, the spots shall, after surface cleaning, be spot painted with aluminum paint prior to applying the specified paint. Any exposed concrete or masonry not specified to be painted which is damaged by paint shall be either removed and rebuilt or, where so authorized by the Owner, painted with two coats of masonry paint.

3.11 *CLEANUP*

- A. All cloths and cotton waste which might constitute a fire hazard shall be placed in metal containers or destroyed at the end of each work day. Upon completion of the

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work all staging, scaffolding and containers shall be removed from the site or destroyed in a manner approved by the Engineer.

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3.12 PAINTING SCHEDULE

<u>SYSTEM</u>	<u>SURFACE</u>	<u>FINISH</u>			
		<u>SURF. PREP.</u>	<u>PRIME COAT</u>	<u>2ND COAT</u>	<u>3RD COAT</u>
1.	New ferrous metal in submerged or damp environment including all submerged mechanical components.	SP-10	P-1	F-1	F-1
2.	All exterior exposed new structural and miscellaneous steel. All exterior exposed surfaces of new piping, pumps, motors, electrical equipment and other unsubmerged mechanical and structural items.	SP-2 or 3	P-2	F-2	F-2
3.	All surfaces of new structural and miscellaneous steel pipe, pumps, motors and electrical equipment panels exposed inside building.	SP-6	P-2	F-3	F-3
4.	All interior exposed new galvanized metalwork including electrical conduit inside buildings, including fittings, boxes, supports and accessories.	G-1	P-3	F-3	F-3
5.	All exterior exposed new galvanized metalwork including roof flashings and other architectural items.	G-1	P-3	F-2	F-2
6.	Exposed new PVC piping	V-1	F-5	F-5	

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7.	All new buried valves and flanged joints and other buried miscellaneous ferrous piping and metal surfaces (excluding cast iron pipe). All exterior surfaces of new cast iron and steel piping exposed in manholes, wet wells and similar locations, including valves, fittings, flanges, bolts, supports, and accessories. Miscellaneous new castings, including manhole rings and covers and manhole steps. (One coat, if not foundry dipped.)	SP-10	F-4	F-4
8.	Interior wood	P-4	F-2	F-2
9.	Exterior wood	P-4	F-3	F-3
10.	Interior dry wall	P-5	F-6	
11.	Exterior concrete block	P-6	F-7	
12.	Concrete	P-6	F-7	

3.13 When conflicting painting specifications or requirements are encountered in the contract documents, the more restrictive specifications or requirements shall be required.

END SECTION

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SECTION 26 05 00

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under Division 26.

B. Related work under this section

1. Labor and materials required to furnish and install the electrical systems in a complete and operational fashion.
2. Carpentry, masonry, steel and concrete materials and labor required for construction of proper stands, bases and supports for electrical materials and equipment.
3. Cutting and patching of holes required by installation including flashing and counter-flashing of roof and exterior wall penetrations.
4. Excavating, pumping and backfilling required for installation.
5. Repair of damage to the premises resulting from construction activities under this Section to Owner's satisfaction.
6. Removal of work debris from construction activities to Owner's satisfaction.
7. Testing and cleaning of equipment installed.

C. Work not under this section

1. Furnishing of motors, pumps, fans, compressors, water heaters, thermostats and motor starters included under Divisions 23 and 40, or as noted otherwise.
2. Finish painting of exposed metal surfaces included under Division 09, or as otherwise noted.
3. Electrical Contractor shall provide connections to mechanical equipment where voltage exceeds 50 V and all necessary raceways for low voltage controls.

D. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
2. The requirements of this Section apply to all Division 26 work, as applicable.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations
 - a. Title 8 –Industrial Relations; Section 1 –Department of Industrial Relations

- 1) Chapter 3.2 -California Occupational Safety and Health Regulations (CAL/OSHA)
 - 2) Chapter 4 –Section of Industrial Safety
 - a) Subchapter 4 -Construction Safety Orders (CSO)
 - b) Subchapter 5 -Electrical Safety Orders (ESO)
 - b. Title 24 –California Building Standards
 - 1) Part 1 -Building Standards Administrative Code
 - 2) Part 2 -California Building Code (CBC); International Building Code (IBC) with California amendments
 - 3) Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
 - 4) Part 4 -California Mechanical Code (MEC); IAPMO Uniform Mechanical Code (UMC) with California amendments
 - 5) Part 5 -California Plumbing Code; IAPMO Uniform Plumbing Code (UPC) with California amendments
 - 6) Part 6 -California Energy Code
 - 7) Part 7 -California Elevator Safety Construction Code
 - 8) Part 9 -California Fire Code; International Fire Code (IFC) with California amendments
 - 9) Part 12 -California Reference Standards Code
2. CPUC –California Public Utilities Commission
 - a. GO-95; Rules for Overhead Electric Line Construction
 - b. GO-128; Rules for Construction of Underground Electric Supply and Communication Systems
3. IEEE –Institute of Electrical and Electronic Engineers
 - a. C2; National Electrical Safety Code (NESC)
4. NECA –National Electrical Contractors Association
 - a. 1; Standard Practices for Good Workmanship in Electrical Contracting
 - b. 4090; Manual of Labor Units
5. All applicable local municipal codes and ordinances.
6. Applicable rules and regulations of local utility companies.

1.03 SUBMITTALS

A. Product Data

1. Refer to Section 01 33 00 “Submittals.”

B. Closeout Submittal

1. Furnish three complete sets of maintenance and operating instructions bound in a binder and indexed to Owner. Start compiling data upon approval of materials and equipment.

Final inspection will not be made until Engineer approves binders. Refer also to Division 1 for additional requirements.

2. Provide one of each manufacturer proprietary tool required for proper equipment operation and maintenance provided under this Division. All tools shall be delivered to the Owner at project completion.
3. Provide two keys to Owner for each lock furnished under Division 26.
4. As-Built Drawings
 - a. Refer to Section 01 70 00 "Contract Closeout."

1.04 SUBSTITUTIONS

- A. Refer to Division 00.

1.05 CHANGE ORDER PROPOSALS

- A. Refer to Division 00.
- B. All change order proposals and requests, both additive and deductive, shall be accompanied by a detailed materials and labor breakdown for each specific task and/or item.

1.06 QUALITY ASSURANCE

- A. References to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to bid submittal. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. Work and materials shall be in full accordance with the latest rules and regulations of applicable state or local laws or regulations and standards of following:
 1. National Fire Protection Association (NFPA)
 2. California Electrical Code (CEC)
 3. California Occupational Safety Health Act (Cal-OSHA)
 4. California State Fire Marshall (CSFM)
 5. California Code of Regulations (CCR)
 6. Electrical Safety Orders, CAC Title 8 (ESO)
 7. California Public Utilities Commissions, General Order 95 (GO-95)
 8. Applicable rules and regulations of local utility companies.
 9. NECA 1-2006, Standard Practices for Good Workmanship in Electrical Contracting
- C. All electrical equipment and material furnished under Division 16 shall conform to all CEC requirements and bear the Underwriters' Laboratories (UL) label where applicable.
- D. Nothing in the Construction Documents shall be construed to permit work not conforming to these Codes. Whenever the indicated material, workmanship, arrangement or construction is of high quality or capacity than that required by the above rules and regulations, the

Construction Documents shall take precedence. Should there be any direct conflict between the rules and regulations and Construction Documents, the rules shall govern.

- E. All electrical equipment and material furnished under this Division shall conform to NEMA and ASTM standards, CEC and bear the Underwriters' Laboratories (UL) label where such label is applicable.
- F. All electrical work shall conform to manufacturer's written instruction, and the NECA Standard Practices for Good Workmanship in Electrical Contracting and all published recommended practices at the time of project. The Contractor shall use the requirements within the Specifications whenever they exceed NECA guidelines.
- G. Follow manufacturer's direction where these direction cover points not included with the Construction Documents.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Packing, shipping, handling and unloading
 - 1. Damage to the equipment delivered to the site or in transit to the job shall be the responsibility of the Electrical Contractor.
 - 2. Equipment and material delivery of shall be scheduled as required for timely, expeditious progress of work.
- B. Storage and protection of job equipment is the responsibility Contractor.
- C. Comply with Division 01 requirements with regards to waste management and disposal.

1.08 PROJECT CONDITIONS

- A. Discrepancies
 - 1. In the event of discrepancies with the Contract Documents, Engineer shall be notified with sufficient time as stated within Division 1 to allow the issuing of an addendum prior to the bid opening.
 - 2. If, in the event that time does not permit notification of clarification of discrepancies prior to the bid opening, the following shall apply:
 - a. The drawings govern in matters of quantity and specifications govern in matters of quality.
 - b. In the event of conflict within the drawings and specifications involving quantities or quality, the greater quantity or higher quality shall apply. Such discrepancies shall be noted and clarified within the contractor's bid. No additional allowances will be made because of errors, ambiguities or omissions which reasonably should have been discovered during the bid preparation.
- B. Verify all power and communication utilities' requirements prior to commencement of any utility work. Make proper adjustments to the construction to satisfy the serving utility.
- C. Information shown relative to services is based upon available records and data, but shall be regarded as approximate only. Make minor deviations found necessary to conform to actual locations and conditions without extra cost. Verify locations and elevations of utilities prior to commencement of excavation for new underground installation.

- D. Exercise extreme care in excavating near existing utilities to avoid any damage thereto; be responsible for any damage caused by such operations. Contact all utility companies to obtain exact locations prior to commencement of construction.
- E. The electrical plans indicate the general layout and arrangement; the field conditions shall determine exact locations. Field verify all conditions and modify as required to satisfy design intent. Maintain all required working clearances.
- F. Fees, permits and utility services
 - 1. Obtain and pay for all permits and service charges required for the installation of this work. Arrange for required inspections and secure approvals from authorities having jurisdiction. Arrange for all utility connections and pay charges incurred including excess service charges if any.
 - 2. Extra charges imposed by the electrical and communication utility companies shall be included in the bid, if available. Unless otherwise stated, these charges will be assumed to include in the bid.
- G. Provide and maintain temporary construction power. The General Contractor will pay for electric energy charges. Should the Electrical Contractor be the prime contractor, the Electrical Contractor shall pay for energy charges unless negotiated with Owner.

1.09 SEQUENCING

- A. Coordinate work within phasing plans as provided by the Owner.

1.10 WARRANTY

- 1. Refer to Division 00.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials mentioned herein or on Drawings require that the items be provided and of quality noted or an approved equal. All materials shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of the same brand or manufacturer throughout for each class of material or equipment.
- B. Trade names or catalog numbers stated herein indicates grade or quality of material desired. Materials, where applicable, shall be UL labeled and in accordance with NEMA standards.
- C. Dimensions, sizes and capacities shown are a minimum. Do not make changes without written permission of Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine Construction Documents and Site; be familiar with types of construction where electrical installation is involved. Note carefully other sections of Specifications with their individual cross-references, standard details, etc.
- B. Any electrical work or materials shown either in Construction Documents, but not mentioned herein, or vice versa, shall be executed the same as if mentioned herein, in a workmanlike manner in accordance with all published NECA Standards of Installation.
- C. Coordinate work with other crafts to avoid conflicts, and check all outlet locations with drawings and specifications. Make minor adjustments without additional cost to Owner.
- D. Engineer will make clarifications and rulings concerning any obvious discrepancies or omissions in work prior and after bidding. Perform all work involved in correcting obvious errors or omissions after award of contract as directed by Engineer at Contractor's expense.
- E. Examine site dimensions and locations against Drawings and become informed of all conditions under which work is to be done before submitting proposals. No allowance will be made for extra expense due to error.
- F. Layouts of equipment, accessories and wiring systems are diagrammatic (not pictorial), but shall be followed as closely as possible. Construction Documents are for assistance and guidance, and exact locations, distance, levels, etc., will be governed by construction; accept same with this under standing.
- G. Horsepower of motors or wattage of equipment indicated in Construction Documents is estimated horsepower or wattage requirement of equipment furnished under other sections of Specifications. Size all feeders (conduit and wiring), motor starters, overload protection and circuit breakers to suit horsepower of motors or wattage of equipment actually furnished under various sections of specifications. However, in no case shall feeders and branch circuits (conduit and wiring) and circuit breakers be of smaller capacities or sizes than those indicated on Drawings or specified, unless approved in writing by Engineer.

3.02 PREPARATION

- A. Seal all exterior wall penetrations in an approved watertight manner and to the satisfaction of Engineer and Owner.
- B. Channels, joiners, hangers, caps, nuts and bolts and associated parts shall be plated electrolytically with zinc followed immediately thereafter by treating freshly deposited zinc surfaces with chromic acid to obtain a surface which will not form a white deposit on surface for an average of 120 hours when subjected to a standard salt spray cabinet test, or shall be hot dipped galvanized

3.03 INSTALLATION

- A. Equipment identification
 - 1. Properly identify panelboards, remote control switches, push buttons, terminal boxes, etc. with a descriptive nameplate. Make nameplate with 3/32" laminated plastic with black background and white letters. Machine engraved letters 1/8" high for equipment in device box(es) and 1/4" high for panelboards, terminal cabinets or larger items. Punched strip type nameplates and cardholders in any form are not acceptable. Fasten nameplates with oval head machine screws, tapped into front cover/panel.

B. Working spaces

1. Provide adequate working space around electrical equipment in compliance with Article 4 of Electrical Safety Orders and CEC 110.26. In general provide 78" of headroom and 30" wide minimum clear workspace in front of panelboards and controls. In addition to the above, provide the following minimum working clearances:
 - a. 0V – 150V (line-to-ground) provide 36" minimum clear distance.
 - b. 151V – 600V (line-to-ground) provide 42" minimum clear distance.

C. Equipment supports

1. Anchor all electrical equipment to structure. Support systems shall be adequate to withstand seismic forces per CBC.

D. Excavating and backfilling

1. Excavate and backfill as required for installation of Work. Restore all surfaces, roadways, walks, curbs, walls existing underground installations, etc., cut by installations to original condition in an acceptable manner. Maintain all warning signs, barricades, flares and lanterns as required by ESO and local ordinances.
2. Dig trenches straight and true to line and grade, with bottom clear of any rock points. Support conduit for entire length on undisturbed original earth. Minimum conduit depth of pipe crown shall be 24" below finished or natural grade, unless otherwise noted.

E. Forming, cutting and patching

1. In new construction, General Contractor shall provide any special forming, recesses, chased, etc., and provide wood blocking, backing and grounds as necessary for the proper installation of electrical work. Be responsible for notifying General Contractor that such provision is necessary; layout work and check to see that it suits his requirements.
 - a. Provide metal backing plates, anchor plates and such that are required for anchorage of electrical work under Division 26; securely weld or bolt to metal framing. Wood blocking or backing will not be permitted in combination with metal framing.
2. Be responsible for proper placement of pipe sleeves, hangers, inserts and supports for this Work.

F. Concrete work

1. Provide concrete work related solely to electrical work. Concrete work, including forming and reinforcing steel installed for all electrical work, shall comply with all applicable requirements of Division 03, or in accordance with the State of California Standard Specifications issued by the Department of Transportation (CALTRANS).

3.04 REPAIR/RESTORATION

- A. Cutting, patching and repairing of existing construction to permit installation of work under Division 26 is the responsibility of Contractor. Repair or replace all damage to existing work in kind to Owner's satisfaction.
- B. Obtain Engineer's approval prior to performing any cutting or patching of concrete, masonry, wood or steel structure within building.

3.05 *FIELD QUALITY CONTROL*

A. Inspection of work

1. Working parts shall be readily accessible for inspection, repair and renewal. The right is reserved to make reasonable changes in equipment location shown on Drawings prior to rough in without additional costs to the Owner.
2. During construction all work will be subject to observation by the Engineer and his representatives. Assist in ascertaining any information that maybe required.
3. Do not allow or cause any work installed hereunder to be covered up or enclosed before it has been inspected and approved. Should any work be enclosed or covered prior to approval, uncover work, and after it has been inspected and approved, restore work of all others to the condition in which it was found at the time of cutting, all without additional costs to Owner.

B. Furnish all testing equipment as maybe required.

C. Test all wiring and connections for continuity and grounds; where such tests indicate faulty insulation or other defects, locate, repair and re-test.

D. Check rotation of all motors and correct if necessary.

3.06 *CLEANING*

A. Repair or replace all broken, damaged or otherwise defective parts without additional cost to Owner, and leave entire work in a condition satisfactory to Engineer. At completion, carefully clean and adjust all equipment, fixtures and trim installed as part of this work; leave systems and equipment in satisfactory operating condition.

B. Clean out and remove from the site all surplus materials and debris resulting from this work; this includes surplus excavated materials.

3.07 *DEMONSTRATION*

A. At project completion, Contractor shall allot a period of not less than 8 hours per well site for instruction of operating and maintenance personnel in the use of all systems installed under this Division. This time is in addition to any instruction time stated in the Specifications of other sections for other equipment (i.e., fire alarm, security, intercom, etc.). All personnel shall be instructed at one time, the Contractor shall make all necessary arrangements with manufacturer's representatives as may be required. Contractor, if any, for the above services shall pay all costs.

3.08 *PROTECTION*

A. In performance of work, protect work of other trades as well as work under this Division from damage.

B. Protect electrical equipment, stored and installed, from dust, water or other damage.

END OF SECTION

SECTION 26 05 19

CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary for the installation of all conductors and cables under this Section related to lighting, power, mechanical, control and signal systems.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. ASTM -American Society for Testing and Materials
 - a. B3; Standard Specification for Soft or Annealed Copper Wire
 - b. B8; Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - c. B787/B787M; Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation
 - d. D1000; Standard Test Method for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications
2. CCR –California Code of Regulations, Title 24
 - a. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
3. UL -Underwriters Laboratories, Inc.
 - a. UL 83; Thermoplastic-Insulated Wire and Cables

- b. UL 486A 486B; Wire Connectors
 - c. UL 486C; Splicing Wire Connectors
 - d. UL 486D; Standard for Insulated Wire Connector Systems For Underground Use Or In Damp Or Wet Locations
 - e. UL 486E; Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
 - f. UL 493; Thermoplastic-Insulated Underground Feeders and Branch Circuit Cables
 - g. UL 510; Standard for Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
 - h. UL 854; Service-Entrance Cables
4. NEMA –National Electrical Manufacturer’s Association
- a. WC 70-1999; Nonshielded Power Cables Rated 2000 Volts or less for the Distribution of Electrical Energy
5. IEEE –Institute of Electrical and Electronic Engineers
- a. 82; Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors

1.3 DELIVERY

- A. Wire shall be in original unbroken package. Obtain approval of Inspector or Engineer before installation of wires.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Conductor material

- 1. Provide annealed copper for all wire, conductor and cable of not less than 98% conductivity.
- 2. Wire #8 AWG and larger shall be stranded.
- 3. Wire #10 AWG and smaller shall be solid.

B. Insulation material

- 1. All insulated wire, conductor and cable shall be 600 Vac rated.

2. Feeder and branch circuits larger than #6 AWG shall be type THW, XHHW or THHN/THWN.
3. Feeder and branch circuits #6 AWG and smaller shall be type TW, THW, XHHW or THHN/THWN.
4. Control circuits shall be type THW or THHN/THWN.
5. Wires shall bear the UL label, be color-coded and marked with gauge, type and manufacturer's name on 24" centers.

2.2 FLEXIBLE CORDS AND CABLES

- A. Provide flexible cords and cables of size, type and arrangement as indicated on Drawings.
- B. Type S flexible cords and cable shall be manufactured in accordance with CEC Article 400 and composed of two or more conductors and a full sized green insulated grounding conductor with an outer rubber or neoprene jacket.
- C. Flexible cords and cables shall be fitted with wire mesh strain relief grips either as a integral connector component or an independently supported unit.
- D. Suspended flexible cords and cables shall incorporate safety spring(s).

2.3 WIRE CONNECTIONS AND TERMINATIONS

- A. Electrical spring wire connectors
 1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-sectional steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
 2. Self-striping pigtail and tap U-contact connectors are not acceptable.
- B. Compression type terminating lugs
 1. Provide tin-plated copper high compression type lugs for installation with hand or hydraulic crimping tools as directed by manufacturer. Notch or single point type crimps are not acceptable.
 2. Two hole, long barrel lugs shall be provided for size #4/O AWG and larger wire where terminated to bus bars. Use minimum of three crimps per lug where possible.
- C. Splicing and insulating tape
 1. Provide black, UV resistant, self extinguishing, 7 mil thick vinyl general purpose electrical tape per UL 510 and ASTM D1000. 3M Scotch 33 or equal.
- D. Insulating putty

1. Provide pads or rolls of non-corrosive, self-fusing, 125 mil thick rubber putty with PVC backing sheet per UL 510 and ASTM D1000. 3M Scotchfil or equal.

E. Insulating resin

1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. 3M Scotchcast 4 or equal.
2. Use resin with thermal and dielectric properties equal to the cable's insulating properties.

F. Terminal strips

1. Provide box type terminal strips in the required quantities plus 25% spare. Install in continuous rows.
2. Use the box type terminal strips with barrier open backs and with ampere ratings as required.
3. Identify all terminal strips and circuits.

G. Crimp type connectors

1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel with funnel wire entry and insulation support.
2. Fasten crimp type connectors or terminals using a crimping tool recommended by the manufacturer.
3. Provide insulated overlap splices with tinned seamless electrolytic copper-brazed barrel with funnel wire entry and insulation support.
4. Provide insulated butt splices with tinned seamless electrolytic copper-brazed barrel with center stop, funnel wire entry and insulation support.

H. Cable ties

1. Provide harnessing and point-to-point wire bundling with nylon cable ties. Install using tool supplied by manufacturer as required.

I. Wire lubricating compound

1. UL listed for the wire insulation and conduit type, and shall not harden or become adhesive.
2. Shall not be used on wire for isolated type electrical power systems.

J. Bolt termination hardware

1. Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE Grade 5; or silicon bronze alloy ASTM B-9954 Type B.

2. Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
3. Flat washers shall be steel or silicon bronze, Type A plain standard wide series, conforming to ANSI B27.2. SAE or narrow series shall be used.
4. Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.
5. Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following values:
 - a. 1/4" bolt – 125 A
 - b. 5/16" bolt – 175 A
 - c. 3/8" bolt – 225 A
 - d. 1/2" bolt – 300 A
 - e. 5/8" bolt – 375 A
 - f. 3/4" bolt – 450 A

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine site conditions for acceptance of wire and cable installation to verify conformance with manufacturer and specification tolerances. Do not commence with work until all conditions are made satisfactory.

3.2 INSTALLATION

- A. All wire, conductor, and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient conditions.
- B. Feeders and branch circuits in wet locations shall be rated 75°C minimum.
- C. Feeders and branch circuits in dry locations shall be rated 90°C minimum.
- D. Minimum conductor size
 1. #12 AWG copper for all power and lighting branch circuits.
 2. #14 AWG copper for all line voltage signal and control wiring, unless otherwise indicated.
- E. Remove and replace conductors under the following conditions at no additional costs to the Owner:

1. Installed within wrong specified conduit or raceway.
2. Damaged during installation.
3. Of insufficient length to facilitate proper splice of conductors

3.3 *WIRING METHODS*

- A. Install wires and cable in accordance with manufacturer's written instructions, as shown on Drawings and as specified herein.
- B. Install all single conductors within raceway system, unless otherwise indicated.
- C. Parallel circuit conductors and terminations shall be equal in length and identical in all aspects.
- D. Provide adequate length of conductors within electrical enclosures and neatly train to termination points with no excess. Terminate such that there is no bare conductor at the terminal.
- E. Splice cables and wires only in junction boxes, outlet boxes, pull boxes, manholes or handholes.
- F. Group and bundle with tie wrap each neutral with its associated phase conductors where more than one neutral conductor is present within a conduit.
- G. Install cable supports for all vertical feeders in accordance with CEC Article 300. Provide split wedge type fittings, which firmly clamp each individual cable and tighten due to cable weight.
- H. Seal cable where exiting a conduit from an exterior underground raceway with a non-hardening compound (i.e., duct seal or equal).
- I. Provide UL listed factory fabricated, solder-less metal connectors of size, ampacity rating, material, type and class for applications and for services indicated. Use connectors with temperature ratings equal or greater than the conductor or cable being terminated.
- J. Stranded wire shall be terminated using fittings, lugs or devices listed for the application. Under no circumstances shall stranded wire be terminated solely by wrapping it around a screw or bolt.
- K. Flexible cords and cables supplied as part of a pre-manufactured assembly shall be installed according to manufacturer's published instructions.

3.4 *WIRING INSTALLATION IN RACEWAYS*

- A. Install wire in raceway after interior of building has been physically protected from weather, and all mechanical work likely to injure conductors has been completed.
- B. Pull all conductors into raceway at the same time.

- C. Use UL listed, non-petroleum base and insulating type pulling compound as needed.
- D. Completely mandrel all underground or concrete encased conduits prior to installation.
- E. Completely and thoroughly swab raceway system prior to installation
- F. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors smaller than #1 AWG.
- G. Wire pulling
 - 1. Provide installation equipment that will prevent cutting or abrasion of insulation during installation.
 - 2. Maximum pull tension shall not exceed manufacturer's recommended value during installation for cable being measured with tension dynamometer.
 - 3. Use rope made of non-metallic material for pulling.
 - 4. Attach pulling lines by means of either woven basket grips or pulling eyes attached directly to the conductors.
 - 5. Pull multiple conductors simultaneously within same conduit.

3.5 *WIRE SPLICES, JOINTS AND TERMINATIONS*

- A. Join and terminate wire, conductors and cables in accordance with UL 486, CEC and manufacturer's instructions.
- B. Thoroughly clean wires before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full conductor ampacity without perceptible temperature rise, and shall be made mechanically and electrically secure.
- D. Terminate wires in terminal cabinets using terminal strips, unless otherwise indicated.
- E. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere within panel or cabinet.
- F. Encapsulate splices in wet locations using specified insulating resin kits.
- G. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as feed conductor with at least 6 inches of tail, all neatly packed within box.
- H. Where conductors are to be connected to metallic surfaces, coated surfaces shall be cleaned to base metal surface before installing connector. Remove lacquer coating of conduits where ground clamps are to be installed.

- I. Branch circuits (#10 AWG and smaller) connectors shall comply with 2.03.A and 2.03.B above.
- J. Branch circuits (#8 AWG and larger)
 - 1. Join or tap conductors using insulated mechanical compression taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over-wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of joint.
 - 2. Terminate conductors using mechanical compression lugs in accordance with manufacturer's recommendation or as specified elsewhere.
 - 3. Field installed compression connectors for 250 MCM and larger shall have not less than two clamping elements or compression indents per wire.
 - 4. Insulate splices and joints with materials approved for the particular use, location, voltage and temperature.
- K. Termination hardware assemblies
 - 1. Al/Cu lugs connected to aluminum plated or copper bus shall be secured with steel bolt, flat washer (two per bolt), Belleville washer and nut.
 - 2. Copper lugs connected to copper buss shall bus shall be secured using silicon bronze alloy bolt, flat washer (two per bolt), Belleville washer and nut.
 - 3. The crown of Belleville washers shall be under the nut.
 - 4. Bolt assemblies shall be torque to manufacturer's recommendations. Where manufacturer recommendation is not obtainable, the following shall be used:
 - a. 1/4" -20 bolt at 80 inch-pound torque
 - b. 5/16" -18 bolt at 180 inch-pound torque
 - c. 3/8" -20 bolt at 20 inch-pound torque
 - d. 1/2" -20 bolt at 40 inch-pound torque
 - e. 5/8" -20 bolt at 55 inch-pound torque
 - f. 3/4" -20 bolt at 158 inch-pound torque

3.6 IDENTIFICATION

- A. Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.
- B. Provide all terminal strips with each individual terminal identified using specified vinyl markers.

- C. In manholes, pullboxes and handholes provide tags of embossed brass type with cable type and voltage rating. Attach tags to cable with slip-free plastic cable lacing units.
- D. Color coding
 - 1. For 120/208 Volt (or 120/240 Volt), 1 phase, 3 wire systems:
 - a. Phase A – Black
 - b. Phase B – Red
 - c. Neutral – White
 - d. Ground – Green
 - 2. For 120/208 Volt, 3 phase, 4 wire systems:
 - a. Phase A – Black
 - b. Phase B – Red
 - c. Phase C – Blue
 - d. Neutral – White
 - e. Ground – Green
 - 3. For 277/480 Volt, 3 phase, 4 wire systems:
 - a. Phase A – Brown
 - b. Phase B – Orange
 - c. Phase C – Yellow
 - d. Neutral – Gray
 - e. Ground – Green
 - 4. Switch leg individually installed shall be the same color as the branch circuit to which they originate, unless otherwise indicated.
 - 5. Travelers for 3-way and 4-way switches shall be a distinct color and pulled with the circuit switch leg or neutral.

3.7 *FIELD QUALITY CONTROL*

- A. Supply labor, materials and test equipment required to perform continuity and ground tests.
- B. Electrical testing

1. Perform feeder and branch circuit insulation test after installation and prior to connection to device.
2. Tests shall be performed by 600 Vdc megger for a continuous 10 seconds from phase-to-phase and phase-to-ground.
3. Torque test conductor connections and terminations for conformance to Specifications.
4. If any failure is detected, locate failure, determine cause and replace or repair cable to Engineer's satisfaction at no additional costs.
5. Furnish test results in type written report form for review by Engineer.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the item specified under this Section, including but not limited to power system grounding

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations, Title 24
 - a. Part 3 -California Electrical Code (CEC); NFPA 70 National Electrical Code (NEC) with California amendments
2. IEEE –Institute of Electrical and Electronic Engineers
 - a. 142; Recommend Practices for Grounding of Industrial and Commercial Power Systems
3. NFPA –National Fire Protection Association
 - a. 780; Lightning Protection Code
4. UL –Underwriters Laboratories, Inc.
 - a. 467; Grounding and Bonding Equipment

1.3 SYSTEM DESCRIPTION

- ###### **A. This Section provides for the grounding and bonding of all electrical and communication apparatus, machinery, appliances, components, fittings and**

accessories where required to provide a permanent, continuous, low impedance, grounded electrical system.

- B. Ground the electrical service system neutral at service entrance equipment as shown on the Drawings.
- C. Ground each separately derived system, as defined in CEC 250.5 (D) and on the Drawings, unless specifically noted otherwise.
- D. Except as otherwise indicated, the complete electrical installation including the neutral conductor, equipment and metallic raceways, boxes and cabinets shall be completely and effectively grounded in accordance with all CEC requirements, whether or not such connections are specifically shown or specified.

1.4 SUBMITTALS

- A. Submit manufacturer's data for equipment and materials specified within this Section in accordance to Section 26 05 00.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.

PART 2 - PRODUCTS

2.1 CONCRETE ENCASED GROUNDING ELECTRODE (UFER GROUND)

- A. #3/O AWG minimum bare stranded copper conductor.

2.2 DRIVEN (GROUND) RODS

- A. Copper clad steel, minimum $\frac{3}{4}$ " diameter by 10'-0" length, sectional type with copper alloy couplings and carbon steel driving stud; Weaver, Cadweld or equal.

2.3 INSULATED GROUNDING BUSHINGS

- A. Plated malleable iron body with 150°C molded plastic insulated throat and lay-in ground lug; OZ/Gedney BLG, Thomas & Betts #TIGB series or equal.

2.4 CONNECTION TO PIPE

- A. Cable to pipe connections; OZ/Gedney G-100B series, Thomas & Betts #290X series or equal.

2.5 CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS OR SPICES

- A. Where required by the Drawings, grounding conductors shall be spliced together, connected to ground rods or connected to structural steel using exothermic welds, Cadweld or equal, or high pressure compression type connectors, Cadweld, Thomas & Betts or equal.

2.6 BONDING JUMPERS

- A. OZ/Gedney Type BJ, Thomas & Betts #3840 series or equal.

2.7 GROUND CONDUCTOR

- A. Ground conductor shall be code size UL labeled, Type THWN insulated copper wire, green in color.

2.8 MAIN BUILDING REFERENCE GROUND BUS (BGB)

- A. Provide 1 24"x4"x1/4" TK copper bus bar mounted on wall with insulating stand-offs at +18" AFF. Furnish complete with cast copper alloy body Thomas Betts Series 310 or equal lugs for connecting grounding conductors. Attach lugs to bus with appropriate size bronze bolt, flat washer and Belleville washer. All connections shall be torque, and all holes shall be drilled and tapped for single hole lugs. Provide 4 spare lugs with respective spaces.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Grounding electrodes

- 1. Concrete encased grounding electrode (Ufer ground)

- a. Provide a #3/O AWG minimum bare copper conductor encased along the bottom of concrete foundation, footing or trench which is in direct contact with the earth and where there is no impervious waterproofing membrane between the footing and soil. The electrode shall extend through a horizontal length of 30' minimum and shall be encased in not less than 2" or more than 5" of concrete separating it from surrounding soil. The electrode shall emerge from the concrete slab through a protective non-metallic sleeve and shall be extended to BGB or as shown on Drawings.

- 2. Supplementary grounding electrode (ground ring, grid and driven rod)

- a. Provide as shown driven ground rod(s). Interconnect ground rod with structural steel and adjacent rods with code size bare copper conductor. Ground rods shall be space no less than 6'-0" on centers from any other electrode or electrodes of another electrical system.

- 3. Separately derived electrical system grounding electrode

- a. Ground each separately derived system per CEC 250-26 or as shown on Drawings, whichever is greater.

- 4. Metal underground water pipe

- a. Contractor shall install an accessible grounding electrode conductor from the main incoming cold water line to BGB. The electrode conductor shall be sized per CEC Table 250-94 or as shown on Drawings, whichever is greater.

B. Grounding electrode conductor

1. Provide grounding electrode conductors per CEC Table 250-94 or as shown on Drawings, whichever is greater.

C. Power system grounding

1. Connect the following items using code size copper grounding conductors to BGB or as shown on Drawings:
 - a. Concrete encased electrode (Ufer ground)
 - b. Ground rod(s)
 - c. Incoming cold and fire water pipes
 - d. Gas pipe
 - e. Structural steel
 - f. Distribution transformer secondary

D. Equipment Bonding/Grounding

1. Provide a code sized copper ground conductor, whether indicated or noted on the drawings, in each of the following:
 - a. All power distribution conduits and ducts
 - b. Distribution feeders
 - c. Motor and equipment branch circuits
 - d. Device branch circuits
2. Provide a separate grounding bus at distribution panelboards, loadcenters, switchboards and motor control centers. Connect all metallic enclosed equipment so that with maximum fault current flowing, shall be maintained at not more than 35V above ground.
3. Metallic conduits terminating in concentric, eccentric or oversized knockouts at panelboards, cabinets, gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.
4. Provide bonding jumpers across expansion and deflection coupling in conduit runs, pipe connections to water meters and metallic cold water dielectric couplings.

5. Provide ground wire in flexible conduit connected at each end via grounding bushing.
6. Provide bonding jumpers across all cable tray joints.
7. Bond each end of metallic conduit longer than 36" in length to grounding conductor using a #6 AWG pigtail.

3.2 *FIELD QUALITY CONTROL*

- A. Contractor using test equipment expressly designed for that purpose shall perform all ground resistance tests in conformance with IEEE guidelines. Contractor shall submit typewritten records of measured resistance values to Engineer for review and approval prior to energizing the system.
- B. Obtain and record ground resistance measurements both from electrical equipment ground bus to the ground electrode and from the ground electrode to earth. Furnish and install additional bonding and add grounding electrodes as required to comply with the following resistance limits:
 1. Resistance from ground bus to ground electrode and to earth shall not exceed 5 ohms unless otherwise noted.
 2. Resistance from the farthest panelboard, loadcenter, switchboard or motor control center ground bus to the ground electrode and to earth shall not exceed 20 ohms maximum.
- C. Inspection
 1. The Engineer or Inspector prior to encasement, burial or concealment thereto shall review the grounding electrode and connections.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to electrical conduits; outlet, junction and pull boxes; and related supports.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
 - a. 26 05 26 – Grounding and Bonding for Electrical Systems
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. ANSI –American National Standards Institute
 - a. C33.91; Specification for Rigid PVC Conduit
 - b. C80.1; Specification Rigid Steel Conduit, Zinc-Coated
 - c. C80.3; Specification for Electrical Metallic Tubing, Zinc-Coated
 - d. C80.6; Intermediate Metal Conduit (IMC), Zinc-Coated
2. CCR –California Code of Regulations, Title 24
 - a. Part 2 -California Building Code (CBC); International Building Code (IBC) with California amendments
 - b. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
3. NECA –National Electrical Contractors Association

- a. 101, Standard for Installing Steel Conduit (Rigid, IMC, EMT)
 - b. 111, Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) (ANSI)
4. NEMA –National Electrical Manufacturer’s Association
- a. FB 1; Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
 - b. FB 2.10; Selection and Installation Guidelines for Fittings for Use with Non-flexible Electrical Metal Conduit or Tubing (Rigid Metal Conduit, Intermediate Metal Conduit, and Electrical Metallic Tubing)
 - c. FB 2.20; Selection and Installation Guidelines For Fittings for Use With Flexible Electrical Conduit and Cable
 - d. OS 1; Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
 - e. OS 3; Selection and Installation Guidelines for Electrical Outlet Boxes
 - f. RN 1; Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing
 - g. TC 2; Electrical Plastic Tubing and Conduit
 - h. TC 3; PVC Fittings for Use with Rigid PVC Conduit and Tubing
 - i. TC 14; Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
5. OSHPD Anchorage Pre-approvals
- a. OPA-0003; Superstrut Seismic Restraint System
 - b. OPA-0114; B-Line Seismic Restraints
 - c. OPA-0120; Unistrut Seismic Bracing System
 - d. OPA-0242; Power-Strut Seismic Bracing System
6. UL –Underwriter’s Laboratories, Inc.
- a. 1; Standard for Flexible Metal Conduit
 - b. 6; Rigid Metal Electrical Conduit
 - c. 360; Standard for Liquid-Tight Flexible Steel Conduit
 - d. 514A; Metallic Outlet Boxes, Electrical
 - e. 514B; Fittings for Conduit and Outlet Boxes

- f. 651; Schedule 40 & 80 PVC Conduit
- g. 797; Electrical Metallic Tubing
- h. 1242; Intermediate Metal Conduit
- i. 1684; Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

1.3 SYSTEM DESCRIPTION

- A. Furnish, assemble, erect, install, connect and test all electrical conduits and related raceway apparatus required and specified to form a complete installation.

1.4 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 26 05 00.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.
- B. Installation shall conform to the NECA installation guidelines unless otherwise indicated within this Section

PART 2 - PRODUCTS

2.1 MATERIALS

A. Conduits and Fittings

1. Rigid steel conduit (RMC)

- a. Conduit: Standard weight, mild steel pipe, and zinc coated on both inside and outside by a hot dipping or shearardizing process manufactured in accordance with UL 6 and ANSI C80.1 specifications.
- b. Fittings (couplings, elbows, bends, etc.)
 - 1) Shall be steel or malleable iron.
 - 2) Coupling and unions shall be threaded type, assembled with anti-corrosion, conductive and anti-seize compound at joints made absolutely tight to exclude water.

c. Bushings

- 1) Insulating bushings: Threaded polypropylene or thermosetting phenolic rated at 150°C minimum.

- 2) Insulating grounding bushing: Threaded cast body with insulating throat and steel "lay-in" ground lug.
 - 3) Insulating metallic bushing: Threaded cast body with plastic insulated throat rated at 150°C minimum.
2. Stainless steel conduit (SSC)
 - a. Conduit: Same as rigid steel conduit except Type 304 stainless steel.
 - b. Fittings (couplings, elbows, bends, etc.): Same as rigid steel conduit except Type 304 stainless steel.
 - c. Bushings: Same as rigid steel conduit except Type 304 stainless steel.
3. Coated rigid steel conduit (CRMC)
 - a. Conduit: Equivalent to RMC with a Polyvinyl chloride (PVC) coated bonded to the galvanized outer surface of the conduit. The bonding between the PVC coating and conduit surface shall be ETL PVC-001 compliant. The coating thickness shall be a minimum of 40mil.
 - b. Fittings (couplings, elbows, bends, etc.)
 - 1) Equivalent to RMC above with bonded coating same as conduit.
 - 2) The PVC sleeve over fittings shall extend beyond hub or coupling approximately one diameter or 1 1/2" whichever is smaller.
 - c. Bushing equivalent to RMC above.
4. Intermediate metallic conduit(IMC)
 - a. Conduit: Intermediate weight, mild steel pipe, meeting the same requirements for finish and material as rigid steel conduit manufactured in accordance with UL 1242 and ANSI C80.6 specifications.
 - b. Fittings (couplings, elbows, bends, etc.) equivalent to RMC above.
 - c. Bushing equivalent to RMC above.
5. Electrical metallic tubing (EMT)
 - a. Conduit: Cold rolled steel tubing with zinc coating on outside and protective enamel on inside manufactured in accordance with UL 797 and ANSI C80.3 specifications.
 - b. Couplings: Steel or malleable iron with compression type fastener via a nut.
 - c. Connectors: Steel or malleable iron with compression type fastener via a nut with plastic insulated throat rated at 150°C minimum.

6. Rigid non-metallic conduit (PVC)
 - a. Conduit: PVC composed Schedule 40, 90°C manufactured in accordance with NEMA TC 2 and UL 651 specifications.
 - b. Fittings: Molded PVC, slip on solvent welded type in accordance to NEMA TC 3.
7. Reinforced thermosetting resin conduit (RTRC)
 - a. Conduit: Fiber impregnated with a cured thermosetting resin compound in accordance with NEMA TC 14 and UL1684.
 - b. Fittings: Molded resin with glass reinforcement manufactured in the same process as the conduit bonded with an epoxy adhesive.
8. Flexible metallic conduit (FMC)
 - a. Conduit: Continuous, flexible steel spirally wound with zinc coating on both inside and outside in accordance with UL 1.
 - b. Connectors: Steel or malleable iron with compression type fastener via a nut with plastic insulated throat rated at 150°C minimum.
9. Liquidtight flexible metallic conduit (LFMC)
 - a. Conduit: PVC coated, continuous, flexible steel spirally wound with zinc coating on both inside and outside in accordance with UL 360.
 - b. Connectors: Steel or malleable iron with compression type fastener via a nut with plastic insulated throat rated at 150°C minimum.
10. Miscellaneous Fittings and Products
 - a. Conduit sealing bushings: Steel or cast malleable iron body and pressure clamps with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Supplied with neoprene sealing rings between body and PVC sleeve.
 - b. Watertight cable terminators: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel screws and zinc plated cast iron locking collar.
 - c. Watertight cable/cord connectors: Liquidtight steel or cast malleable iron body with sealing neoprene bushing and stainless steel retaining ring.
 - d. Expansion fittings: Multi-piece unit of hot dip galvanized malleable iron or steel body and outside pressure bussing design to allow a maximum of 4" movement (2" in either direction). Furnish with external braid tinned copper bonding jumper. UL listed for both wet and dry locations.

- e. Expansion/deflection couplings: Multi-piece unit comprised of a neoprene sleeve, internal flexible tinned copper braid attached to bronze end couplings with stainless steel bands. Coupling to provide minimum of 3/4" movement and 30 degrees deflection from normal. UL listed for both wet and dry locations.
- f. Conduit bodies: Raintight, malleable iron, hot-dip galvanized body with threaded hubs, stamped steel cover, stainless steel screws and neoprene gasket.
- g. Other couplings, connectors and fittings shall be equal in quality, material and construction to items specified herein.

B. Boxes

1. Outlet boxes

- a. Standard: Galvanized one-piece of welded pressed steel type in accordance with NEMA OS 1 and UL 514. Boxes shall not be less than 4" square and at least 1 1/2" deep.
- b. Concrete: Galvanized steel, 4" octagon ring with mounting lug, backplate and adapter ring type in accordance with NEMA OS 1 and UL 514. Depth as required by application.
- c. Masonry: Galvanized steel, 3.75" high gang box in accordance with NEMA OS 1 and UL 514.
- d. Surface cast metal: Cast malleable iron body, surface mounted box with threaded hubs and mounting lugs as required in accordance with NEMA OS 1 and UL 514. Furnish with ground flange, steel cover and neoprene gasket.

2. Pull and junction boxes

- a. Sheet metal boxes: Standard or concrete outlet box wherever possible; otherwise use 16 gauge galvanized sheet metal, NEMA 1 box sized per CEC with machine screwed cover.
- b. Cast metal boxes: Install standard cast malleable iron outlet or device box when possible.
- c. Flush mounted boxes: Install overlapping cover with flush head screws.
- d. In-ground mounted pull holes/boxes: Install pre-cast concrete box, sized per Drawing or CEC with pre-cast or traffic rated lid.

3. Floor boxes

- a. Floor boxes shall be adjustable, cast metal body with threaded conduit openings, adjustable rings, brass flange or Lexan ring and cover plate with threaded plug. Include provisions to accommodate surface mounted

telephone or receptacle outlet, or flush floor mounted telephone or receptacle outlet where shown on Drawings.

C. Pull line/cord

1. Polypropylene braided line or Let-line #232 or equal of 1/8" diameter with a minimum break strength of 200 pounds.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine site conditions for acceptance of wire and cable installation to verify conformance with manufacturer and specification tolerances. Do not commence with work until all conditions are made satisfactory.

3.2 PREPARATION

A. Conduit

1. Provide all necessary conduit fittings, connectors, bushings, etc. required to complete conduit installation to meet the CEC and intended application whether noted, shown or specified within.
2. Location of conduit runs shall be planned in advance of the installation and coordinated with other trades.
3. Where practical, install conduits in groups in parallel vertical or horizontal runs that avoid unnecessary offsets.
4. All conduits shall be parallel or at right angles to columns, beams and walls whether exposed or concealed.
5. Conduits shall not be placed closer than 12" to a flue, parallel to hot water, steam line or other heat sources; or 3" when crossing perpendicular to the above said lines when possible.
6. Install exposed conduit as high as practical to maintain adequate headroom. Notify Engineer if headroom will be less than 102".
7. Do not obstruct spaces required by Code in front of electrical equipment, access doors, etc.
8. The largest trade size conduit in concrete floors and walls shall not exceed 1/3 thickness or be spaced a less than three conduit diameters apart unless permitted by Engineer. All conduits shall be installed in the center of slab or wall, and never between reinforcing steel and bottom of floor slab.
9. Install additional pull boxes, not shown on Drawings, in sufficient quantities to facilitate pulling of conductors and cables such that total spacing does not

exceed 150 feet or 270 degrees, total; and maximum pulling tension will not be exceeded.

10. When installing underground conduits to specified depth; depth shall be taken from finished grade as it will be at project completion. Should finish grade be above existing grade by an amount equal to or greater than specified depth, conduit shall be installed not less than 6" below existing grade.
11. Verify that information concerning finish grade is accurate, for should the underground run be less than the specified depth, Contractor may be required to re-install conduit to meet the required depth.
12. Unless otherwise specified, underground conduits shall be installed with top side not less than 24" below finished grade; this depth applies to all conduits outside of building foundations including those under walks, open corridors or paved areas.
13. Utility company service conduits installation depth shall be as directed by their respective specifications and requirements.

B. Boxes

1. Before locating outlet boxes, check Construction Documents for type of construction and make sure that there is no conflict with other equipment. Locate outlet boxes as shown and locate so as not to interfere with other Work or equipment.
2. Install all outlet boxes flush within walls, ceiling and floors except where installed within non-finished rooms, cabinetry, attic spaces or as indicated on Drawings.
3. Locate pull boxes and junction boxes within concealed, accessible locations where possible.
4. Do not install outlet boxes back-to-back with same stud space. Where shown back-to-back, offset as required, and fill void with sound dampening material where requested by Owner.
5. In fire rated walls separate boxes by 24" minimum and with stud member.
6. Adjust position of outlet boxes within masonry wall to accommodate course lines.

3.3 *INSTALLATION*

A. Conduit

1. Minimum conduit size shall be 3/4" unless otherwise indicated.
2. All conduit work shall be concealed unless otherwise indicated. Exposed conduits shall be permitted within unfinished rooms/spaces to facilitate installation.
3. Install conduit in complete runs prior to installing conductors or cables.

4. Make long radius conduits bends free from kink, indentations or flattened surfaces. Make bends carefully to avoid injury or flattening. Bends 1 1/4" size and larger shall be factory made ells or be made with a manufactured mechanical bender. Heating of steel conduit to facilitate bending or that damage galvanized coating will not be permitted.
5. Remove burrs and sharp edges at end of conduit with tapered reamer.
6. Protect and cover conduits during construction with metallic bushings and bushing "pennies" to seal exposed openings.
7. Assemble conduit threads with anti-corrosion, conductive, anti-seize compound and tighten securely.
8. Install conduits shall that no traps to collect condensation exist.
9. Fasten conduit securely to boxes with locknuts and bushings to provide good grounding continuity.
10. Install pull cords/line within any spare or unused conduits of sufficient length to facilitate future cable installation.

11. Penetrations

- a. Locate penetrations within structural members as shown on Drawings and as directed by Engineer. Should it be necessary to notch any framing member, make such notching only at locations and in a manner as approved by Engineer.
- b. Do not chase concrete or masonry to install conduit unless specifically approved by Engineer.
- c. Cutting or holes
 - 1) Install sleeves for cast-in-place concrete floors and walls. After installing conduit through penetration, seal using dry-pack grouting compound (non-iron bearing, chloride free and non-shrinking) or fire rated assembly if rated floor or wall. Use escutcheon plate on floor underside to contain compound as necessary.
 - 2) Cut holes with a hole saw for penetrations through non-concrete or non-masonry members.
 - 3) Provide chrome plated escutcheon plates at all publicly exposed wall, ceiling and floor penetrations.
- d. Sealing
 - 1) Non-rated penetration openings shall be packed with non-flammable insulating material and sealed with gypsum wallboard taping compound.

- 2) Fire rated penetration shall be sealed using a UL classified fire stop assembly suitable to maintain the equivalent fire rating prior to the penetration.
- 3) Use escutcheon plates to hold sealing or fire rated compound as necessary.

e. Waterproofing

- 1) Make penetrations through any damp-proofed/waterproofed surfaces within damp/wet locations as such as to maintain integrity of surface.
- 2) Install specified watertight conduit entrance seals at all below grade wall and floor penetrations.
- 3) At roof penetrations furnish roof flashing, counter flashing and pitch-pockets compatible to roof assembly.
- 4) Where possible conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration's exterior side.
- 5) Make penetrations through floors watertight with mastic, even when concealed within walls or furred spaces.

12. Supports

- a. Conduits shall be support and braced per OSHPD pre-approved anchorage systems when those methods are implemented and installed.
- b. Sizes of rods and cross channels shall be capable of supporting 4 times and 5 times actual load, respectively. Anchorage shall support the combined weight of conduit, hanger and conductors.
- c. Support individual horizontal conduit 1 1/2" and smaller by means of 2 hole straps or individual hangers.
- d. Galvanized iron hanger rods sizes 1/4" diameter and larger with spring steel fasteners, clips or clamps specifically design for that purpose for 1 1/2" conduits and larger.
- e. Support multi-parallel horizontal conduits runs with trapeze type hangers consisting of 2 or more steel hanger rods, preformed cross channels, 'J' bolts, clamps, etc.
- f. Support conduit to wood structures by means of bolts or lag screws in shear, to concrete by means of insert or expansion bolts and to brickwork by means of expansion bolts.
- g. Support multi-parallel vertical conduits runs with galvanized Unistrut, Power-Strut or approved equal type supports anchored to wall. Where multi-floored conduits pass through floors, install riser clamps at each floor.

- h. Maximum conduit support spacing shall be in accordance with NECA Standard of Installation:
 - 1) Horizontal runs:
 - a) 3/4" and smaller at 60" on centers, unless building construction prohibits otherwise, then 84" on centers.
 - b) 1" and larger at 72" on centers, unless building construction prohibits otherwise or any other condition, then 120" on centers.
 - 2) Vertical runs:
 - a) 3/4" and smaller @ 84" on centers.
 - b) 1" and 1 1/4" @ 96" on centers.
 - c) 1 1/2" and larger @ 120" on centers.
 - d) Any vertical condition such as shaftways and concealed locations for any sized conduit, 120" on centers.
- i. Anchorage for RMC/IMC supports unless otherwise specified:
 - 1) < 1" IMC/RMC = #10 bolt/screw.
 - 2) 1" IMC/RMC = 1/4" bolt/screw.
 - 3) 1 1/2" and 2" IMC/RMC = 3/8" bolt/screw.
 - 4) 3" IMC/RMC, 4" EMT = 1/2" bolt/screw.
 - 5) > 3"IMC/RMC = 5/8" bolt/screw.
- j. Anchorage for EMT supports unless otherwise specified:
 - 1) < 1 1/2" EMT = #10 bolt/screw.
 - 2) 1 1/2" EMT = 1/4" bolt/screw.
 - 3) 2, 2 1/2" and 3" EMT = 3/8" bolt/screw.
 - 4) 4" EMT = 1/2" bolt/screw.
 - 5) > 4"EMT = 5/8" bolt/screw.

B. Boxes

- 1. Install boxes as shown on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.

2. Install additional pull boxes, not shown on Drawings, in sufficient quantities to facilitate pulling of conductors and cables such that total spacing does not exceed 150 feet or 270 degrees, total; and maximum pulling tension will not be exceeded.
3. Install plaster rings on all outlet boxes in stud walls or in furred, suspended or exposed ceilings. Covers shall be of a depth suited for installation.
4. Provide gasketed cast metal cover plates where boxes are exposed in damp or wet locations
5. Install access door for boxes installed within concealed locations without access.
6. Install approved factory made knockout seal where knockouts are not present.
7. Refer to Architectural interior elevations and details shown for exact mounting heights of all electrical outlets. In general, locate outlets as shown or specific and complies with Americans with Disabilities Act:
 - a. Convenience outlets: +18"AFF or +6" above counter or splash.
 - b. Local switches: +48"AFF or +6" above counter or splash.
 - c. Telecommunication outlets: +18"AFF or +48"AFF for wall telephone or intercom device.
 - d. Verify all mounting heights with Drawings, and where heights are not suited for construction or finish please consult Engineer.
8. Use conduit bodies to facilitate pulling of conductor or cables or change conduit direction. Do not splice within conduit bodies.
9. Enclose pull box with additional rated gypsum board as necessary to maintain wall's original fire rating.
10. Install galvanized steel coverplates on all open boxes within dry listed areas.
11. Install in-ground pull holes/boxes flush to grade finish at finished areas or 1" above finished landscaped grade. Seal all conduits terminating in pull hole/box watertight. Install and grout around bell ends where shown. Cover and lids shall be removable without damage to adjacent finish surfaces.
12. Support
 - a. Accurately place boxes for finish, independently and securely supported by adequate blocking or manufacturer channel type heavy-duty box hangers for stud walls. Do not use nails to support boxes.
 - b. Support boxes independent of conduit system.
 - c. Mount boxes installed within ceilings to 16 gauge metal channel bars attached to main runners or joists.

- d. Support boxes within suspended acoustical tile ceilings directly from structure above when light fixture are to be installed from box.
- e. Use auxiliary plates, bar or clips and grouted in place for masonry, block or pour-in-place concrete construction.

3.4 APPLICATION

A. Conduit

- 1. RMC/IMC suitable for all damp, dry and wet locations except when in contact with earth. IMC not suitable for hazardous locations as stated within CEC.
- 2. CRMC suitable for damp or wet locations, concealed within concrete or in contact with earth.
- 3. EMT suitable for exposed or concealed dry, interior locations.
- 4. PVC/RTRC suitable for beneath ground floor slab, except when penetrating, and direct earth burial. Do not run exposed within concrete walls or in floor slab unless indicated on Drawings or per Engineer's permission.
- 5. FMC suitable for dry locations only for connections to motors, transformers, vibrating equipment/machinery, controllers, valves, switches and light fixtures in less than 6 foot lengths.
- 6. LFMC application same as FMC above but for damp or wet locations.

B. Termination and joints

- 1. Use raceway fittings compatible with associated raceway and suitable for the location.
- 2. Raceways shall be joined using specified couplings or transitions where dissimilar raceway systems are joined.
- 3. Conduits shall be securely fastened to cabinets, boxes and gutters using (2) two locknuts and insulating bushing or specified insulated connector. Where joints cannot be made tight and terminations are subject to vibration, use bonding jumpers, bonding bushings or wedges to provide electrical continuity of the raceway system. Use insulating bushings to protect conductors where subjected to vibration or dampness. Install grounding bushings or bonding jumpers on all conduits terminating at concentric or eccentric knockouts.
- 4. Terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.
- 5. Stub freestanding equipment conduits through concrete floors for connections with top of coupling set flush with finished floor. Install plugs to protect threads and entrance of debris.

6. Install specified cable sealing bushings on all conduits originating outside the building walls and terminating within interior switchboard, panel, cabinet or gutters. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction or outlet boxes.
7. Where conduits enter building from below grade inject into filled raceways pre-formulated rigid 2 lbs. density polyurethane foam suitable for sealing against water, moisture, insects and rodents.
8. Install expansion fitting or expansion/deflection couplings per manufacturer's recommendations where:
 - a. Any conduit that crosses a building structure expansion joint; secure conduit on both sides to building structure and install expansion fitting at joint.
 - b. Any conduit that crosses a concrete expansion joint; install expansion/deflection at joint.
 - c. Any conduit greater than 1-1/4" is routed along roof top in runs greater than 100 feet; install expansion fittings every 100 feet.
 - d. Engineer may allow FMC or LFMC in lieu of expansion fitting or expansion/deflection couplings on conduits 2" and smaller within accessible locations upon further review and written consent.

C. Boxes

1. Standard type suitable for all flush installations and all dry concealed locations.
2. Concrete type suitable for all flush concrete installations.
3. Masonry type suitable for all flush concrete and block installations.
4. Surface cast meta type suitable for all exposed damp and wet surface mounted locations, and dry surface mounted locations less than 96" from finished floor

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes requirements for:

1. Identifying electrical, instrumentation, and process equipment and components.
2. Material, manufacturing, and installation requirements for identification devices.

B. Related Sections:

1. Contract Documents are a single integrated document, and as such all Divisions and Sections apply. It is the responsibility of the CONTRACTOR and its subcontractors to review all sections to ensure a complete and coordinated project.

1.2 REFERENCES

- A. Refer to Section 26 05 00.

1.3 DEFINITIONS

- A. Refer to Section 26 05 00.

1.4 SYSTEM DESCRIPTION

A. Nameplates:

1. Provide a nameplate for each control device or major item of electrical equipment, either located in the field or within panels.
2. Provide all nameplates of identical style, color, and material throughout the facility.
3. Device nameplates information:
 - a. Designations as indicated on the Drawings and identified on the Process and Instrumentation Drawings.
 - b. Device tag and loop number ID (e.g. EDV-60.0101.01).
 - c. Circuit ID (e.g. LPA-11).
 - d. Area served (e.g. Lighting Chemical Building).

B. Wire Numbers:

1. Coordinate the wire numbering system with all vendors of equipment so that every field wire has a unique number associated with it for the entire system:
 - a. Wire numbers shall correspond to the wire numbers on the control drawings or the panel and circuit numbers for receptacles and lighting.
 - b. Wire numbers shall correspond to the terminal block number to which they are attached in the control panel.
 - c. Internal panel wires on a common terminal shall have the same wire number.
 - d. All instrumentation cables shall be identified at pull points as described above.
2. Provide the following wiring numbering schemes throughout the project for field wires between Process Control Module, (PCM), Vendor Control Panels, (VCP), Motor Control Centers, (MCC), field starters, field instruments, etc.

(ORIGIN LOC.)-(ORIGIN TERM.)/(DEST. LOC.)-(DEST. TERM.)

OR

(ORIGIN LOC.)-(ORIGIN TERM.)
(DEST. LOC.)-(DEST. TERM.)

Where:

ORIGIN LOC. = Designation for originating panel or device
ORIGIN TERM. = Terminal designation at originating panel or device
DEST. LOC. = Designation for destination panel or device
DEST. TERM. = Terminal designation at destination panel or device or PLC
I/O address at destination panel

- a. Identify equipment and field instruments as the origin.
- b. PCM's are always identified as the destination.
- c. Location is the panel designation for VCP, LCP, or PCM. For connections to MCC's, location is the specific starter tag and loop number. Location is the tag and loop number for motor starters, field instruments and equipment. Any hyphen in the panel designation or

tag and loop number shall be omitted.

- d. Terminal designation is the actual number on the terminal block where the conductor terminates at field devices and vendor control panels. For multiconductor cables, all terminal numbers shall be shown, separated by commas.
- e. Terminal designations at motor leads shall be the motor manufacturer's standard terminal designation (e.g. T1, T2, T3, etc.).
- f. Terminal designations at PCM's where the field conductor connects to a PLC input or output shall be the PLC address (Note: the following PLC I/O numbering scheme is typical for Allen Bradley, the numbering scheme should be modified to match that of the actual PLC manufacturer used for the project):

1) Discrete Point: W:X:Y/Z

Analog Point: W:X:Y.Z

Where:

W = I for input, O for output

X = PLC number (1, 2, 3...)

Y = Slot number (01, 02, 03...)

Z = Terminal number (00,01,02...) for a discrete point
or a word number for an analog point (1,2,3...)

- g. Terminal designations at PCM's where the conductor does not connect to a PLC I/O point shall be the terminal number with a "C" prefix (e.g. 010). For common power after a fuse or neutrals after a switch, the subsequent points shall have and capital letter suffix starting with "A" (e.g.. C0010A).

3. **Case 1:** Vendor Control Panel (VCP) to Process Control Module (PCM):

Field Wire Number/Label: A-B/C-D

A = Vendor Control Panel number without hyphen (VCP60.0101.01)

B = Terminal number within VCP (manufacturer's or vendor's standard terminal number)

C = Process Control Module number without hyphen (PCM60.0101)

D = Either the PLC address if the field terminal is connected directly to a PLC input or output point or the terminal number with a "C" prefix if not connected directly to a PLC I/O point (C0010)

Examples: VCP60.0101.01-10/PCM60.0101-I:1:01/01
VCP60.0101.01-10/PCM60.0101-O:1:10/07
VCP60.0101.01-10/PCM60.0101-C0100

4. **Case 2:** Field Instrument to Process Control Module
(PCM): Field Wire Number/Label: E-F/C-D

C = Process Control Module number without hyphen (PCM60.0101)

D = Either the PLC address if the field terminal is connected directly to a PLC input or output point or the terminal number with a "C" prefix if not connected directly to a PLC I/O point (C0010)

E = Field mounted instrument tag and loop numbers without hyphen
(EDV60.0101.01)

F = Manufacturer's standard terminal number within instrument. Use both terminal numbers for analog points separated by a comma

Examples: TIT60.0101.01-2,3/PCM60.0101-I:1:01.1
TSH60.0101-1/PCM60.0101-I:2:01/00

5. **Case 3:** Motor Control Center (MCC) to Process Control Module
(PCM): Field Wire Number/Label: G-B/C-D

B = Terminal number within Motor Control Center (manufacturer's or vendor's standard terminal number)

C = Process Control Module without hyphen (PCM60.0101)

D = Either the PLC address if the field terminal is connected directly to a PLC input or output point or the terminal number with a "C" prefix if not connected directly to a PLC I/O point (C0010)

G = Actual starter designation in the Motor Control Center without hyphen
(MMS60.0101)

Examples: MMS60.0101-10/PCM60.0101-I:1:01/01
MMS60.0101-10/PCM60.0101-O:1:10/07
MMS60.0101-10/PCM60.0101-C0100

6. **Case 4:** Motor Control Center (MCC) to Vendor Control Panel
(VCP): Field Wire Number/Label: G-B/A-B

A = Vendor Control Panel number without hyphen (VCP60.0101.01)

B = Terminal number within motor control center or vendor control panel
(manufacturer's or vendors standard terminal number)

G = Actual starter designation in the Motor Control Center without hyphen
(MMS60.0101)

Example: MMS60.0101-X2/VCP60.0101.01-10

7. **Case 5:** Motor leads to a Motor Control Center (MCC): Field Wire Number/Label: H-I/G-B

B = Terminal number within motor control center (manufacturer's standard terminal number)

G = Actual starter designation in the Motor Control Center without hyphen (MMS60.0101)

H = Equipment tag and loop number without hyphen (PMP60.0101.01)

I = Motor manufacturer's standard motor lead identification (e.g.T1, T2, T3, etc.)

Example: PMP-60.0101.01-T3/MMS60.0101.01-T3

8. **Case 6:** Remote or separately mounted starter or Variable Frequency Drive (VFD) to Process Control Module (PCM): Field Wire Number/Label: J-B/C-D

B = Terminal number within starter or Variable Frequency Drive (manufacturer's standard terminal number)

C = Process Control Module number without hyphen (VCP60.0101.01)

D = Either the PLC address if the field terminal is connected directly to a PLC input or output point or the terminal number with a "C" prefix if not connected directly to a PLC I/O point (C0010)

J = Starter or Variable Frequency Drive tag and loop number without hyphen (MMS60.0101)

Examples: MMS60.0101-10/PCM60.0101.01-I:1:01/01

MMS60.0101-10/PCM60.0101.01-O:2:10/07

MMS60.0101-10/PCM60.0101.01-C0010

9. Terminate all spare conductors on terminal blocks and identify as required for other field wires with an "S" prefix:

Example: S MMS60.0101-10/PCM60.0101.01-C011

1.5 SUBMITTALS

- A. Furnish submittals in accordance with Section 26 05 00.

- B. Product Data:

1. Nameplates:

- a. Color.

- b. Size:

- 1) Outside dimensions.

- 2) Lettering.

- c. Material.

- d. Mounting means.

2. Nameplate Schedule:

- a. Show exact wording for each nameplate.

- b. Include nameplate and letter sizes.

3. Wire Numbers:

- a. Manufacturer's catalog data for wire labels and label printer.

- C. Record Documents:

1. Update the conduit schedule to reflect the exact quantity of wire numbers including spares and destination points for all wires.

1.6 QUALITY ASSURANCE

- A. Schedule a pre-installation conference in accordance with Section 26 05 00 in order to clearly define the requirements specified for equipment identification:

1. Representatives of the CONTRACTOR, OWNER, and ENGINEER shall convene before any major purchases of cable or conductors and before the installation or termination of any cables or conductors.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Section 26 05 00.

1.8 *WARRANT*

- A. Refer to Section 26 05 00.

1.9 *SYSTEM START UP*

- A. Refer to Section 26 05 00.

PART 2 PRODUCTS

2.1 *MANUFACTURERS*

- A. Nameplates and Signs:
 - 1. One of the following or equal:
 - a. Brady.
 - b. Seton.
- B. Conductor and Cable Markers:
 - 1. Heat-shrinkable tubing:
 - a. One of the following or equal:
 - 1) Raychem.
 - 2) Brady.
 - 3) Thomas & Betts.
 - 4) Kroy.
- C. Conduit and Raceway Markers:
 - 1. One of the following or equal:
 - a. Almetek: Almetek type mini-tag.
 - b. Lapp Group: Maxi System
- D. Medium Voltage Raceway Voltage Labels:
 - 1. One of the following or equal:
 - a. Brady.

- b. Seton.

2.2 MATERIALS

A. Nameplates:

1. Fabricated from white-center and red or black face laminated plastic engraving stock:
 - a. 3/32-inch thick material.
 - b. Two-ply.
 - c. With chamfered edges.
 - d. Block style engraved characters of adequate size to be read easily from a distance of 6 feet:
 - 1) No characters smaller than 1/8-inch in height.

B. Signs:

1. Automatic equipment and high voltage signs:
 - a. Suitable for exterior use.
 - b. In accordance with OSHA regulations.

C. Conductor and Cable Markers:

1. Machine printed black characters on white tubing.
2. Ten point type or larger.

D. Conduit and Raceway Markers:

1. UV resistant holder and letters.
2. Black letters on yellow background.
3. Minimum 1/2-inch high letters.

E. Medium Voltage Circuit Raceway Labels:

1. Vinyl plastic.
2. Minimum 1-inch high letters.

2.3 SOURCE QUALITY CONTROL

A. Nameplates:

1. Provide all nameplates for control panel operator devices (e.g. pushbuttons, selector switches, pilot lights, etc.):
 - a. Same material and same color and appearance as the device nameplates, in order to achieve an aesthetically consistent and coordinated system.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Refer to Section 26 05 00.
- B. Nameplates:
 1. Attach nameplates to equipment with rivets, bolts or sheet metal screws, approved waterproof epoxy-based cement or install in metal holders welded to the equipment.
 2. On NEMA 4 or NEMA 4X enclosures, use epoxy-based cement to attach nameplates.
 3. Nameplates shall be aligned and level or plumb to within 1/64 inch over the entire length:
 - a. Misaligned or crooked nameplates shall be remounted, or provide new enclosures at the discretion of the ENGINEER.
- C. Conductor and Cable Markers:
 1. Apply all conductor and cable markers before termination.
 2. Heat-shrinkable tubing:
 - a. Tubing shall be shrunk using a heat gun that produces low temperature heated air.
 - b. Tubing shall be tight on the wire after it has been heated.
 - c. Characters shall face the open panel and shall read from left to right or top to bottom.
 - d. Marker shall start within 1/32 inch of the end of the stripped insulation point.
- D. Conduit Markers:
 1. Furnish and install conduit markers for every conduit in the electrical system

that is identified in the conduit schedule or part of the process system:

- a. Conduit markings shall match the conduit schedule; refer to Section 26 05 53.
2. Mark conduits at the following locations:
 - a. Each end of conduits that are greater than 10 feet in length.
 - b. Where the conduit penetrates a wall or structure.
 - c. Where the conduit emerges from the ground, slab, etc.
 - d. The middle of conduits that are 10 feet or less in length.
3. Mark conduits after the conduits have been fully painted.
4. Position conduit markers so that they are easily read from the floor.
5. Secure all conduit markers with nylon cable ties:
 - a. Provide with ultraviolet resistant cable ties for conduit markers exposed to direct sunlight.
 - b. Adhesive labels are not acceptable.
6. Mark conduits before construction review by ENGINEER for punch list purposes.

E. Medium Voltage Raceway Labels:

1. Apply at 50 foot intervals stating the voltage level contained within the raceway.

F. Signs and Labeling:

1. Furnish and install permanent warning signs at mechanical equipment that may be started automatically or from remote locations:
 - a. Fasten warning signs with round head stainless steel screws or bolts.
 - b. Locate and mount in a manner to be clearly legible to operations personnel.
2. Furnish and install permanent and conspicuous warning signs on equipment (front and back), doorways to equipment rooms, pull boxes, manholes, etc. where the voltage exceeds 600 volts.
3. Furnish and install warning signs on equipment that has more than one

source of power.

- a. Warning signs to identify every panel and circuit number of the
disconnecting means of all external power sources.

- 4. Place warning signs on equipment that has 120 VAC control voltage source
used for interlocking.

- a. Identify panel and circuit number or conductor tag for control voltage
source disconnecting means.

3.2 *FIELD QUALITY CONTROL*

- A. Replace any nameplates, signs, conductor markers, cable markers, or raceway
labels that in the sole opinion of the ENGINEER do not meet the ENGINEER's
aesthetic requirements.

END OF SECTION

SECTION 26 18 11

OVERCURRENT PROTECTION DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to overcurrent protection devices.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations, Title 24
 - a. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
2. Federal Specification
 - a. W-C-375; Circuit Breakers, Molded Case, Branch Circuit And Service
3. NEMA –National Electrical Manufacturer’s Association
 - a. AB 1; Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures
 - b. PB 2.2; Application Guide for Ground Fault Protective Devices for Equipment
4. UL -Underwriters Laboratories, Inc.
 - a. 248; Low Voltage Fuses
 - b. 468; Wire Connectors

- c. 508E; IEC Type "2" Coordination Short Circuit Tests
- d. 489; Molded-Case Circuit Breakers and Circuit Breaker Enclosures
- e. 943; Standard for Ground-Fault Circuit-Interrupters

1.3 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 26 05 00.
- B. Production test of circuit breakers upon request of Engineer.
- C. Submittal shall show the following information: circuit breaker numbering, circuit breaker type and short circuit rating, provisions for future circuit breakers, bussing, including neutral and ground, ratings and enclosure dimensions and trims.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.
- B. The manufacturing facility shall be registered by Underwriters Laboratories Inc. to the International Organization for Standardization ISO 9002 Series Standards for quality.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Handle carefully to avoid damage to internal components, enclosure and finish.
- B. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional cover to protect enclosure in harsh environments.

PART 2 - PRODUCTS

2.1 FUSES

- A. All power distribution fuses shall be time-delay, high interrupting (200kAIC minimum) and current limiting type, unless otherwise indicated. All fuses shall be of same manufacturer and model.
 - 1. Motor branch circuit fuses (0 – 600A): UL Class RK5 dual element, time delay type shall be size for UL 508E "Type 2" coordination for the motor controller. Coordinate fuse selection with motor starter overload relay heaters as required.
 - 2. General purpose feeder fuses (0 – 600A): UL Class RK1 dual element, time delay type shall be size per Drawings.
- B. Control and instrumentation fuses shall be of type and rating as recommended by equipment manufacturer, suitable for fuse blocks or holders installation.

2.2 MOLDED CASE CIRCUIT BREAKERS

A. General

1. 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.
2. Circuit breakers shall have an over center, trip free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.
3. The circuit breaker handle shall reside in a tripped position between ON and OFF to provide local trip indication.
4. 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 after installation.
5. Circuit breakers shall have an RMS interrupting capacity not less than shown on Drawings, or if not shown shall not be less than:
 - a. 25kA for 480V systems
 - b. 22kA for 240V (or less) systems
6. Each circuit breaker shall be equipped 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.
7. Circuit breakers shall be equipped with UL Listed electrical accessories as noted on Drawing. Circuit breaker handle accessories shall provide provisions for locking handle in the ON and OFF position.
8. All circuit breakers shall be UL Listed for reverse connection without restrictive line and load markings and be suitable for mounting in any position.
9. Circuit breakers shall be constructed with factory installed mechanical lugs. All circuit breakers shall be UL Listed to accept field installable/removable mechanical type lugs. Lug body shall be bolted in place; snap in design not acceptable. All lugs shall be UL Listed to accept solid (not larger than #8 AWG) and/or stranded copper and aluminum conductors. Lugs shall be suitable for 90°C rated wire, sized according to the 75°C temperature rating in the CEC.
10. All circuit breakers shall be capable of accepting bus connections.

B. Thermal-Magnetic Circuit Breakers

1. Circuit breakers shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.

2. Thermal trip elements shall be factory preset and sealed. Circuit breakers shall be true RMS sensing and thermally responsive to protect circuit conductor(s) in a 40°C ambient temperature.
3. Circuit breaker frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the circuit breaker.
4. Provide equipment ground fault protection where shown on Drawing with the following features.
 - a. Ground fault sensing system shall be modified zero sequence sensing type and not require any external power to trip the circuit breaker.
 - b. The ground fault sensing system shall be suitable for use on grounded systems. The ground fault sensing system shall be suitable for use on three-phase, three-wire circuits where the system neutral is grounded but not carried through the system or on three-phase, four-wire systems.
 - c. Ground fault pickup current setting and time delay shall be field adjustable. A switch shall be provided for setting ground fault pickup point. A means to seal the pickup and delay adjustments shall be provided.
 - d. The ground fault sensing system shall include a ground fault memory circuit to sum the time increments of intermittent arcing ground faults above the pickup point.
 - e. A means of testing the ground fault system to meet the on-site testing requirements of CEC 230.95 (C) shall be provided.
 - f. Local visual ground fault trip indication shall be provided.
 - g. The ground fault sensing system shall be provided with Zone Selective Interlocking (ZSI) communication capabilities compatible with other thermal magnetic circuit breakers equipped with ground fault sensing, electronic trip circuit breakers with integral ground fault sensing and external ground fault sensing systems as noted on Drawings.

C. Electronic Trip Circuit Breakers

1. Circuit breaker trip system shall be a microprocessor-based true RMS sensing design with sensing accuracy through the thirteenth (13th) harmonic. Sensor ampere ratings shall be as indicated on Drawings.
2. The integral trip system shall be independent of any external power source and shall contain no less than industrial grade electronic components.
3. The ampere rating of the circuit breaker shall be determined by the combination of an interchangeable rating plug, the sensor size and the long-time pickup adjustment on the circuit breaker. The sensor size, rating plug and adjustment positions shall be clearly marked on the face of the circuit breaker. Circuit

breakers shall be UL Listed to carry 80% (or 100% where noted on Drawings) of their ampere rating continuously.

4. The following time/current response adjustments shall be provided. Each adjustment shall have discrete settings and shall be independent of all other adjustments.
 - a. Instantaneous Pickup
 - b. Long Time Pickup
 - c. Long Time Delay
 - d. Short Time Pickup
 - e. Short Time Delay
 - f. Ground Fault Pickup (when specified with ground fault protection)
 - g. Ground Fault Delay (when specified with ground fault protection)
5. A means to seal the trip unit adjustments in accordance with CEC 240.6 (B) shall be provided.
6. Local visual trip indication for overload, short circuit and ground fault trip occurrences shall be provided.
7. An ammeter to individually display all phase currents flowing through the circuit breaker shall be provided. All current values shall be displayed in true RMS with 2% accuracy.
8. Long Time Pickup indication to signal when loading approaches or exceeds the adjusted ampere rating of the circuit breaker shall be provided.
9. The trip system shall include a Long Time memory circuit to sum the time increments of intermittent overcurrent conditions above the pickup point. Means shall be provided to reset Long Time memory circuit during primary injection testing.
10. An ammeter to individually display all phase currents flowing through the circuit breaker shall be provided. Indication of inherent ground fault current flowing in the system shall be provided on circuit breakers with integral ground fault protection. All current values shall be displayed in true RMS with 2% accuracy.
11. Circuit breakers shall be equipped with back-up thermal and magnetic trip system.
12. Equipment Ground Fault Protection shall be provided where noted on Drawings.
 - a. Circuit breakers shall be provided with integral equipment ground fault protection for grounded systems. The circuit breaker shall be suitable for use

- on three-phase, three-wire circuits where the system neutral is grounded but not carried through the system or on three-phase, four-wire systems.
- b. A separate neutral current transformer shall be provided for three-phase, four-wire systems.
 - c. Ground fault sensing system shall be residual sensing type.
 - d. The trip system shall include a ground fault memory circuit to sum the time increments of intermittent ground faults above the pickup point.
 - e. A means of testing the ground fault system to meet the on-site testing requirements of CEC 230.95 (C) shall be provided.
 - f. Local visual trip indication for a ground fault trip occurrence shall be provided.
 - g. The ground fault sensing system shall be provided with Zone Selective Interlocking (ZSI) communication capabilities compatible with other thermal magnetic circuit breakers equipped with ground fault sensing, electronic trip circuit breakers with integral ground fault sensing and external ground fault sensing systems as noted on Drawings.
13. Circuit breaker trip system shall be equipped with an externally accessible test port. Disassembly of the circuit breaker shall not be required for testing. Test set shall be capable of verifying the operation of all trip functions with or without tripping the circuit breaker.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Notify Engineer no later than 10 working days for adjustable circuit breaker settings not shown within Drawings. Submit to Engineer the following information:
 - 1. Panel, switchboard name/ID
 - 2. Circuit breaker identifier (i.e., main circuit breaker, load served, etc.)
 - 3. List of necessary settings (i.e., trip settings, time delays, etc.)

3.2 INSTALLATION

- A. Install equipment and their accessories in to manufacturer's instructions, pertinent Codes, and with recognized industry practices to insure device operates properly.
- B. Tighten electrical connectors and terminals in accordance to manufacturer's requirements. Where the manufacturer does not have published torque tightening values, comply with the requirements of UL 468.

3.3 *FIELD QUALITY CONTROL*

- A. Check tightness of circuit breaker connections using a calibrated torque wrench or torque screwdriver per manufacturer's written specifications.
- B. Contractor to obtain the services of an independent testing company who shall provide quality control and adjustments as well as tests for
 - 1. Check each circuit breaker above 100A on a 225A frame for long-time and short-time delay pickup and instantaneous pickup.
 - a. Instantaneous pickup current shall be determined by 4 cycles or less.
 - b. b. Perform timing test with 300% of breaker trip unit rated current.
 - c. Adjust unit if required, so that the tripping characteristics are within the limits of the published time-current characteristic curves for that particular trip unit.
 - 2. Test and calibrate ground fault protection trip and pickup time on 225A frame breakers and larger.
- C. Physically test key interlock systems to check for proper functionality.
- D. Check and set where required all protective device settings in accordance with approved coordination study settings and conduct ground fault acceptance tests.

3.4 *ADJUSTING*

- A. Adjust all operating mechanisms for free mechanical movement per manufacturer's specifications.
- B. Adjust circuit breaker trip and time delay settings to values indicated as instructed by Engineer.
 - 1. Check each circuit breaker above 100A, long-time and short-time delay pickup and instantaneous pickup. Instantaneous pickup current shall be determined by 4 cycles or less. Perform timing test with 300% of breaker trip unit rated current. Adjust unit if required, so that the tripping characteristics are within the limits of the published time-current characteristic curves for that particular trip unit.
 - 2. Main circuit breaker ground fault setting shall be per CEC 230.95 (A) or as directed by Engineer.

3.5 *PROTECTION*

- A. When directed by Engineer provide physical means to "permanently fix" settings for rotary and DIP type switches with a thin coat of clear lacquer.

3.6 *CLEANING*

- A. Remove marks, dirt and debris from installed equipment surfaces for “new like” appearance.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to panelboards.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
 - a. 26 05 26 – Grounding and Bonding for Electrical Systems
 - b. 26 18 11 – Overcurrent Protection Devices
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations, Title 24
 - a. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
2. Federal Specification
 - a. W-C-375; Circuit Breakers, Molded Case, Branch Circuit And Service
3. NECA –National Electrical Contractors Association
 - a. 407, Recommended Practice for Installing and Maintaining Panelboards
4. NEMA –National Electrical Manufacturer's Association
 - a. AB 1; Molded Case Circuit Breakers
 - b. PB 1; Panelboards
 - c. PB 1.1; Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less
5. UL -Underwriters Laboratories, Inc.
 - a. 50; Cabinets and Boxes
 - b. 67; Panelboards

- c. 98; Enclosed and Dead Front Switches
- d. 489; Molded-Case Circuit Breakers and Circuit Breaker Enclosures
- e. 891; Dead-Front Switchboards
- f. 943; Ground Fault Circuit Interrupters
- g. 977; Fused Power Circuit Devices50; Enclosures for Electrical Equipment

1.03 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 26 05 00.
- B. Submittal shall show the following information: circuit breaker numbering, circuit breaker type and short circuit rating, provisions for future circuit breakers, bussing, including neutral and ground, ratings and enclosure dimensions and trims.

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Handle carefully to avoid damage to internal components, enclosure and finish.
- B. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional cover to protect enclosure in harsh environments.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Square D, Cutler-Hammer or approved equal.

2.02 MATERIALS

- A. Panelboards
 - 1. Interior
 - a. Shall be factory-assembled with voltage, ampacity, and short circuit rating as shown in Drawings.
 - b. Provide 1 continuous copper bus bar per phase. Each bus bar shall have sequentially phase branch circuit connectors suitable for plug-on or bolt-on branch circuit breakers. The bussing shall be fully rated. Panelboard bus current rating shall be determined by heat-rise tests conducted in accordance with UL 67. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and CEC 230.F and 230.G.
 - c. All current-carrying parts shall be insulated from ground and phase-to-phase by high dielectric strength material.

- d. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trims shall have pre-formed twist-out covering unused mounting spaces.
 - e. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label and short circuit current rating shall be displayed on the interior.
 - f. Main and sub-feed circuit breakers shall be vertical mounted. Interior leveling provisions shall be provided for flush mounted applications.
2. Main Circuit Breaker
- a. Circuit breaker shall be of type, rating and poles shown on Drawings per Section 26 18 11 – Overcurrent Protection Devices.
3. Branch Circuit Breakers
- a. Circuit breakers shall be of type, rating and poles shown on Drawings per Section 26 18 11 – Overcurrent Protection Devices.
4. Enclosures
- a. Type NEMA 1 Boxes
 - 1) Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Galvanealed steel will not be acceptable.
 - 2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
 - 3) Box width shall be 20 in wide.
 - b. Type NEMA 1 Fronts
 - 1) Front shall meet strength and rigidity requirements per UL 50 standards. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
 - 2) Fronts shall be hinged 1-piece with door. Mounting shall be as indicated in Drawings.
 - 3) Panelboards rated 225 amperes and below shall flat fronts with concealed door hinges and trim screws. Front shall not be removable with the door locked. Panelboards rated above 225 amperes shall have fronts with trim clamps and concealed door hinges. Front doors shall have rounded corners and edges shall be free of burrs.
 - 4) Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.
 - c. Type NEMA 3R, 5, and 12
 - 1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

- 2) All doors shall be gasketed and equipped with a tumbler type vault lock. All lock assemblies shall be keyed alike. 2 keys shall be provided with each lock. A clear plastic directory cardholder shall be mounted on the inside of door.
- 3) Maximum enclosure dimensions shall not exceed 20 in wide and 6.5 in deep.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's written instructions and NEMA PB 1.1.
- B. Installation shall conform to NECA 407 where not specified under this Section.
- C. Anchor panelboards to structural members and as shown on Drawings. Provide additional support as required. Anchor freestanding distribution panels to concrete pad.
- D. Mount panelboards level and plumb.
- E. Install flush mounted panel backbox front edges flush with finished wall. Where flush panel backbox is deeper than wall depth, install closing trim of wood or metal to provide a finished trim.
- F. Where panelboard is flush in wall, provide one $\frac{3}{4}$ " conduit stub into accessible ceiling above for every 5 spare circuit breaker or available space.
- G. After installation, make all feeder connections to circuit breaker load side lugs and incoming secondary feeders.

3.02 FIELD QUALITY CONTROL

- A. Inspect complete installation prior to energizing for physical damage, proper alignment, anchorage and grounding.
- B. Check tightness of bolted connections and circuit breaker connections using a calibrated torque wrench or torque screwdriver per manufacturer's written specifications.

3.03 ADJUSTING

- A. Measure steady state load line currents at each panelboard feeder; rearrange panelboard circuits to balance the phase loads with 20% of each other. Maintain proper phasing for multi-wire branch circuits.
- B. Fill out panelboard circuit identification card, typewritten, with list of circuits in use. Identification shall be specific with room designation and other information as necessary. For distribution panels, use engraved laminated phenolic plates showing load served.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to wiring devices.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
 - a. 26 05 26 – Grounding and Bonding for Electrical Systems
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. Federal Specification

- a. W-C-596; Connector, Electrical, Power, General Specification for
- b. W-S-896; Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification)

2. NEMA –National Electrical Manufacturer's Association

- a. WD 1; General Color Requirements for Wiring Devices
- b. WD 6; Wiring Devices-Dimensional Requirements

3. UL -Underwriters Laboratories, Inc.

- a. 20; General-Use Snap Switches
- b. 498; Standard for Attachment Plugs and Receptacles
- c. 943; Standard for Ground-Fault Circuit-Interrupters

- d. 1449; Standard for Transient Voltage Surge Suppressors

1.3 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 26 05 00.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.

PART 2 - PRODUCTS

2.1 SWITCHES

A. Wall switches

1. Specification grade, quiet, AC rated, mechanical, snap type with silver alloy contacts, and shall comply with NEMA WD-1 and Fed. Spec W-S-896.
2. Rating shall be 20A at 120/277Vac, unless otherwise shown.
3. Handles shall be nylon; color shall be compatible with adjacent wall finish.
4. Manufacturers and types
 - a. Single pole, single throw
 - 1) Cooper Wiring Devices #CSB120, Hubbell #CSB120, or equal.
 - b. Double pole, single throw
 - 1) Cooper Wiring Devices #CSB220, Hubbell #CSB220, or equal.
 - c. Three way
 - 1) Cooper Wiring Devices #CSB320, Hubbell #CSB320, or equal.

2.2 RECEPTACLES

A. Standards

1. Specification grade, NEMA 5-15R configuration grounding type, rated 15A at 125/250Vac that conform to NEMA WD-6 and Fed. Spec W-C-596.
2. At dedicated receptacle locations and as otherwise noted, use specification grade, NEMA 5-20R configuration grounding type, rated 20A at 125/250Vac that conform to NEMA WD-6 and when possible Fed. Spec W-C-596.
3. Specialty receptacles shall conform to NEMA WD-6 and UL standards as applicable.

B. Color

1. General purpose receptacle face shall be nylon; color shall be compatible with adjacent wall finish, unless otherwise indicated.

C. Receptacle types

1. General purpose single

- a. Provide self-grounding back and side wired with binding head staked terminal screw.
- b. Use Cooper Wiring Devices #5261, Hubbell #5261, or equal for NEMA 5-15R.
- c. Use Cooper Wiring Devices #5361, Hubbell #5361, or equal for NEMA 5-20R.

2. General purpose duplex

- a. Provide self-grounding back and side wired with binding head staked terminal screws and break-off strip for two circuit wiring.
- b. Use Cooper Wiring Devices #5262, Hubbell #5262, or equal for NEMA 5-15R.
- c. Use Cooper Wiring Devices #5362, Hubbell #5362, or equal for NEMA 5-20R.

3. Transient voltage surge suppressor (TVSS) duplex

- a. Provide 20A, 125Vac receptacle consisting of NEMA 5-20R duplex device with integral TVSS protection circuit.
- b. Provide LED indicator to verify surge protection and ground, and audible alarm to notify bad ground connection or surge protection expiration.
- c. TVSS characteristics:
 - 1) 400V clamping voltage.
 - 2) 280J energy rating.
 - 3) 150Vac RMS MOV rating
 - 4) 18kA maximum surge current in all modes (L-N, L-G and N-G)

- d. Use Cooper Wiring Devices #5362_S, no known equal.

4. Isolated ground

- a. Provide receptacle specified within this Section with equipment grounding contacts connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap.
- 5. Ground fault circuit interrupter (GFCI) duplex
 - a. Provide 20A, 125Vac receptacle consisting of NEMA 5-20R duplex device with integral solid state sensing and signaling circuitry capable of detecting and interrupting a maximum 5mA line-to-ground fault current in approximately 1/40th of a second per UL 943.
 - b. Provide visual device with trip indication, manual reset and test mechanisms per UL 943.
 - c. Device shall be capable of point of use and multi-outlet protection.
 - d. Use Cooper Wiring Devices #XGF20, Hubbell #GF53, or equal.
- 6. Hospital grade and tamper resistant
 - a. Provide receptacle specified within this Section that conforms to UL 498 "Hospital Grade" requirements.
 - b. Tamper resistance receptacle shall have integral protection mechanism to prevent accidental shock from foreign object contacting energized blades.
- 7. Special purpose
 - a. Provide specification grade devices with NEMA configuration, voltage, ampacity, poles and ground provisions as noted on Drawings.

2.3 WALL PLATES

A. Interior locations

- 1. Finished Areas: 0.032" stainless steel, brushed or satin finish with required number of openings for location.
- 2. Exposed Areas: galvanized, raised type.

B. Exterior: die-cast copper-free aluminum, gasketed, raintight cover UL listed for exterior and wet locations while in use. Use Hubbell #WP8M (duplex), #WP26M (GFCI) or equal.

C. Screws shall match plate.

D. Tamper resistance receptacles shall have exposed screws of tamper-resistant type.

E. Individual, gangable wall plates are not acceptable where two or more devices are installed at one location.

PART 3 - EXECUTION

3.1 *PREPARATION*

- A. Coordinate device heights with drawings and details.
- B. Locate switches on latch side of door, unless otherwise indicated.

3.2 *INSTALLATION*

- A. Mount and align device and wall plates level and plumb. Insure wall plates fit flat against wall and tight against device without strain on plate.
- B. Comply with manufacturer's instructions regarding termination of conductors to wiring device.
- C. Provide wall plates for all outlet boxes with devices.
- D. Install blank wall plates on all outlet boxes in which no device is present or installed.

END OF SECTION

SECTION 26 28 16

SAFETY SWITCHES AND INDIVIDUAL MOUNTED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to heavy duty fusible, non-fusible and double throw safety switches.

B. Related sections

1. Where items specified in other Division 26 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
 - a. 26 05 26 – Grounding and Bonding for Electrical Systems
 - b. 26 18 11 – Overcurrent Protection Devices
2. The requirements of this Section apply to all Division 26 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations, Title 24
 - a. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
2. NEMA –National Electrical Manufacturer's Association
 - a. KS 1; Enclosed Switches
 - b. 250; Enclosures for Electrical Equipment
3. UL -Underwriters Laboratories, Inc.
 - a. 98; Enclosed and Dead Front Switches
 - b. 489; Molded-Case Circuit Breakers and Circuit Breaker Enclosures

1.3 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 26 05 00.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Handle carefully to avoid damage to internal components, enclosure and finish.
- B. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional cover to protect enclosure in harsh environments.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D, Cutler Hammer or approved equal.

2.2 MATERIALS

- A. Heavy-duty safety switches

1. Switch interior

- a. All switches shall have switch blades which are visible when the switch is OFF and the cover is open.
- b. Lugs shall be front removable and UL Listed for 75°C conductors, aluminum or copper.
- c. 30A through 100A switches shall be equipped with factory or field installed fuse pullers.
- d. Switches required for Type 12, 12K or Type 4-4X-5 stainless steel applications shall have all copper current carrying parts.
- e. All current carrying parts shall be plated to resist corrosion.
- f. Switches shall have removable arc suppressors to facilitate easy access to line side lugs.
- g. Switches shall have provisions for a field installable electrical interlock.

2. Switch mechanism

- a. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.
 - b. The operating handle shall be an integral part of the box, not the cover.
 - c. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.
 - d. The handle position shall travel at least 90° between OFF and ON positions to clearly distinguish and indicate handle.
 - e. All switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have an externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
3. Switch enclosures
- a. All enclosures shall be NEMA 1 general purpose unless otherwise noted.
 - b. Switch covers shall be attached:
 - 1) with welded pin-type hinges (Type 1, 12, 12K, 4-4X-5 stainless steel).
 - 2) top hinged, attached with removable screws and securable in the open position (Type 3R).
 - 3) by molded hinges and type 316 stainless steel hinge pins (Type 4X polyester).
 - 4) by type 316 stainless steel bolts (Type 7/9).
 - c. The enclosure shall be finished with:
 - 1) gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated steel (Type 1).
 - 2) gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvanized steel (Type 3R, 12, 12K).
 - 3) a brush finish on type 304 stainless steel (Type 4-4X-5 stainless steel).
 - 4) Gray baked enamel on copper free cast aluminum alloy (Type 7/9).
 - d. The enclosure shall have ON and OFF markings:
 - 1) stamped into the cover (Type 1, 3R, 4-4X-5 stainless steel, 12, 12K).

- 2) cast into the cover (Type 7/9).
 - 3) inked on a adhesive label (Type 4X polyester).
 - e. The operating handle shall be provided with a dual colored, red/black position indication.
 - f. All switches shall have provisions to accept up to three 3/8" hasp padlocks to lock the operating handle in the OFF position.
4. Switch ratings
 - a. Switches shall be horsepower rated for ac and/or dc as indicated on Drawings.
 - b. The UL Listed short circuit current rating of the switches shall be:
 - 1) 10,000 rms symmetrical amperes when used with or protected by Class H or K fuses (30-600A).
 - 2) 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses (30-600A switches employing appropriate fuse rejection schemes).
 - 3) 200,000 rms symmetrical amperes when used with or protected by Class L fuses (800-1200A)
- B. Double throw switches
 1. Shall have the same characteristics as heavy-duty safety switches above for switch interior, mechanism, enclosure and rating.
 2. Additional switch operating mechanism characteristics shall be:
 - a. quick-make, quick-break for 60A through 200A, 2 pole and 3 pole devices.
 - b. Slow-make, slow-break for
 - 1) 30A and greater than 200A, 2 pole and 3 pole devices.
 - 2) 60A through 200A, 4 pole devices.
- C. Individual Mounted Circuit Breakers
 1. Circuit Breaker
 - a. Circuit breakers shall be of type, rating and poles shown on Drawings per Section 26 18 11 – Overcurrent Protection Devices.
 2. Enclosure

- a. Enclosure shall be galvanized steel constructed in accordance with UL 50 requirements, and be NEMA 1, unless specifically shown or specified otherwise.

PART 3 - EXECUTION

3.1 *INSTALLATION*

- A. The equipment shall be installed per the manufacturer's recommendations.
- B. Anchor safety switches to structural members and as shown on Drawings. Provide additional support as required.
- C. Mount safety switches level and plumb.

3.2 *FIELD QUALITY CONTROL*

- A. Inspect complete installation prior to energizing for physical damage, proper alignment, anchorage and grounding.
- B. Check tightness of bolted connections per manufacturer's written specifications.

END OF SECTION

SECTION 31 05 00 COMMON WORK RESULTS FOR EARTHWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Excavate earth and rock as necessary to allow the installation or construction of various items of work regardless of character and subsurface conditions.
- B. Furnish all equipment, labor, and materials required for removal of rock from excavations. At the Contractor's option, rock removal may be done by mechanical equipment (hydraulic or pneumatic breakers), by explosives, or a combination of both.
- C. Haul, place, rough grade, compact, and finish grade imported and/or excavated on-site material (including recycled materials) on those portions of the project site where it is necessary to construct the facilities other than utilities indicated on the Plans. This includes under structures and preparation of subgrade for concrete, roadway, parking area, and embankments.
- D. Haul and dispose of excess and unsuitable material off-site or in designated areas, as directed by the Engineer.

1.2 RELATED WORK

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 43 00 – Quality Control and Testing
- C. Section 01 51 36– Watering
- D. Section 01 57 27 – Dust Control
- E. Section 02 41 00 – Demolition
- F. Section 03 30 00 – Cast-In-Place Concrete
- G. Section 31 11 00 – Clearing and Grubbing
- H. Section 31 23 17 – Trenching, Backfilling, and Compacting
- I. Section 31 23 35 – Disposal of Materials

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. C136 – Sieve Analysis of Fine and Coarse Aggregates.
 - 2. D75 Standard Practice for Sampling Aggregates

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3. D1556 – Density of Soil and base rock in Place by Sand-Cone Method
 4. D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lbf/ft³ (2,700kN-m/m³)
 5. D6938 – Density of soil and base rock in place by Nuclear method.
 6. D2937 – Density of soil and in place by Tube method.
- B. California Department of Transportation
1. State Standard Specifications
 - a. Section 10-6 Watering
 - b. Section 15 Existing Facilities
 - c. Section 17-2 Clearing and Grubbing
 - d. Section 18 Dust Palliatives
 - e. Section 19 Earthwork
 - f. Section 26 Aggregate Bases
- C. Code of Federal Regulations
1. 29CFR1926, Subpart P – Excavations

1.4 SUBMITTALS

- A. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with Section 01 33 00.
- B. Description of methods and equipment to be used for rock removal (if applicable).

1.5 SAMPLES

- A. Submit samples under provisions of Section 01 33 00.

1.6 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
 1. Trenches shall have sloping, sheeting, shoring, and bracing conforming with Subpart P, CAL/OSHA requirements, and the Contract Documents.
- B. Notify Engineer of unexpected subsurface conditions.

- C. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- E. Grade excavation top perimeter to prevent surface water run-off into excavation.

1.7 CONTROL AND DIVERSION OF WATER

- A. The Contractor shall control and divert water as specified.
- B. The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.
- C. Prior to beginning any work on the removal of water from foundations, the Contractor shall submit for the Engineer's approval a water control plan showing his proposed method for the removal of water from foundations and other parts of the work.
- D. Devices to control and divert water shall be adequately filtered to prevent the removal of fines from the soil.
- E. Repair any damage caused by the failure of any part of equipment to control and divert water. Remove temporary equipment to control and divert water when no longer needed for dewatering purposes.
- F. Provision of equipment to control and divert water shall be considered part of the project with no additional compensation allowed.
- G. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Compaction Testing:
 - 1. All compaction testing and reports shall be in accordance with Section 01 43 00 and submitted in conformance with Section 01 33 00.
 - 2. Compaction tests will be performed for each lift or layer.
 - 3. Tests for compaction shall conform to ASTM D1557.
 - 4. Sample aggregates to be used for backfill materials per ASTM D75 and test them per ASTM C136.

1.9 DEFINITION

- A. Unsuitable Material – Unsuitable material is material determined to be:
1. Impossible to compact to specified density using ordinary methods at optimum moisture content.
 2. Material containing trash, debris, oversized material or other foreign and objectionable materials.
 3. Too wet to be properly compacted if circumstances prevent satisfactory in-place drying prior to incorporation into the work.
 4. Non-native material containing a significant amount of permeable materials, such as sand or rock, that cannot be blended with other material and requires to be off hauled.
 5. Expansive clays that cannot be mixed or treated and requires to be off hauled.
 6. Otherwise unsuitable for the planned use.

1.10 PROJECT CONDITIONS

- A. Arrange construction sequences to provide the shortest practical time that excavations will be open to avoid hazard to the public, and to minimize the possibility of excavation collapse.

1.11 CLASSIFICATION

- A. Expected material that will be excavated at this site has been identified in the Geotechnical Report.
- B. Regardless of the nature of material excavated, all excavation will be considered unclassified.

PART 2 PRODUCTS

2.1 SOIL

- A. Native Soil: Original surface soil typical of the area.
- B. Topsoil: Capable of supporting native and specified plant growth.
- C. Backfill: All backfill material shall be approved before use and be free of cinders, ashes, ice, frozen soil, large hard clods, organic debris, or other deleterious items.
- D. Engineered Fill: If imported borrow material will be required, the Contractor is responsible for identifying a source for suitable imported fill material and paying all costs associated with purchasing and transporting fill to the project site. Imported fill material shall be free from organic materials and deleterious substances. Imported fill soils must be non-hazardous and derived from a single, consistent soil type source conforming to the following requirements:

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Plasticity Index	< 12
Expansion Index	< 20 (Very Low Expansion Potential)
Maximum Particle Size	3 inches
Percent Passing #4 Sieve	65 – 100
Percent Passing #200 Sieve	20 – 45
Low Corrosion Potential	
- Soluble Sulfates	< 1,500 ppm
- Soluble Chlorides	< 150 ppm
- Minimum Resistivity	> 3,000 ohm-cm
R-Value (Upper 2 feet in pavement areas)	≥ 50

2.2 GRANULAR BACKFILL AND AGGREGATES

- A. Granular Backfill: material meeting the requirements of State Standard Specifications Section 19-3.02C.
- B. Class 2 Aggregate Base: material as specified for ¾" maximum grading in the State Standard Specifications, Section 26-1.02B.
- C. Material from concrete crushing operations may be used as granular backfill provided it meets the above requirements.
- D. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1½" x ¾" aggregate grading in Section 90-1.02C, State Standard Specifications.
- E. Pipe Bedding Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; No. 8 minimum to 3/8" maximum size per State Standard Specifications Section 90-1.02C(4)(a).
- F. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with State Standard Specifications Section 90-1.02C(4)(c):

2.3 CONCRETE SLURRY

- A. Concrete slurry mix shall be as specified in Section 03 30 00, Cast in Place Concrete.

2.4 ENGINEERED FILL MATERIAL UNDER STRUCTURES

- A. Pulverized asphalt concrete may not be incorporated into engineered fill under structures
- B. Portland cement concrete may be incorporated into engineered fill provided no rock pockets or voids are produced. Particles larger than three inches shall be removed from engineered fill.

- C. All imported fill material placed in structural areas shall consist of predominantly granular soil that is non-expansive and shall be approved by the Engineer prior to use.
- D. The R-value of the imported fill material shall be at least 50.

2.5 WATER

- A. As specified in Section 01 51 36, Watering.

2.6 ROLLERS

- A. Rollers used for compacting earth materials shall have staggered and uniformly spaced tamping feet and be of sufficient weight for proper compaction.
- B. The tamping heads and cleaner bars shall be properly maintained, and the spaces between the tamping feet shall be kept clear of materials which impair the effectiveness of the tamping rollers.

2.7 TAMPERS

- A. Where hand or power tampers are used to compact soils in confined areas such as under pipe, they shall be equipped with suitably shaped heads to obtain the required density.

2.8 EMBANKMENT MATERIALS/ON-SITE MATERIAL FOR CONSTRUCTION

- A. Material for embankment construction shall be able to be compacted to specified density using ordinary methods at optimum moisture. The presence of excessive moisture in otherwise suitable material is not, by itself, sufficient cause for determining that the material is unsuitable. The Contractor shall be responsible for aeration of excavation or embankment to satisfactory moisture content for compaction.
- B. All embankment and backfill material will be subject to approval by the Engineer.

PART 3 EXECUTION

3.1 GROUND SURFACE PREPARATION

- A. Complete demolition, clearing and grubbing as specified in Sections 02 41 00 and 31 11 00 including removal of any curbs, slabs, paving, trees, bushes, shrubs, stumps, roots, buried existing utilities or other objects, or any objects that interfere with construction, or as required by the Engineer.
- B. Complete stripping of the top 4 inches of topsoil to remove all roots and organic material. Stripping material shall be properly disposed offsite at the expense of the Contractor.
- C. The proposed areas to support foundations and receive engineered fill shall be over-excavated to a minimum of 12 inches below the bottom of the proposed foundations

or site grade, whichever is deeper. The over-excavation should extend a minimum of 3 feet from the edge of the foundation or areas to receive fill. The bottom of the over-excavation must be scarified 8 inches, brought to at or above optimum moisture content and compacted to 92 percent of ASTM D1557.

- D. After stripping and over-excavation is complete, the exposed ground surface shall be inspected by the geotechnical engineer to evaluate if loose or soft zones are present that will require over excavation.

3.2 INSPECTION

- A. Verify any stockpiled fill to be reused is approved. Provide samples for testing, if required.
- B. Imported Borrow Material: The Contractor shall contact the Engineer to arrange for the geotechnical engineer to review the proposed import fill materials for conformance with these specifications at least one week prior to importing material to the site. Import material properties will be verified by laboratory testing for conformance with the requirements of these specifications.

3.3 GENERAL

- A. Identify required lines, levels, contours, and datum.
 - 1. Stake and identify the extent of all earthwork operations prior to starting work.
- B. Provide required shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of excavation depth.
- C. Use suitable material removed from excavation before importing fill. Imported soil or native, non-expansive, excavated soils, free of organic materials or deleterious substances, may be placed as compacted engineered fill. The material must be free of oversized fragments greater than 3 inches in greatest dimension.
- D. Upon completion of excavation and before placing forms or structures, notify the Engineer who will inspect the excavation and may take tests to determine relative compaction.
- E. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.
- F. All engineered fill should be placed in uniform layers not exceeding 8 inches in loose thickness, moisture conditioned to at or above optimum moisture content. Engineered fill to support structures should be compacted to at least 95 percent. Engineered fill in other areas should be compacted to at least 92 percent, with material beneath roadways or pavement compacted to at least 95 percent in the upper 1 foot. Where fill is placed on existing slopes that are steeper than 3H:1V, horizontal benches at least 4 feet wide and minimum height of 2 feet should be cut

into the face of existing slopes prior to placing the fill. Fill should not be placed during rain, and slopes should be protected from erosion.

- G. If possible, earthwork operations should be scheduled during a dry, warm period of the year. Should these operations be performed during or shortly following periods of inclement weather, unstable soil conditions may result in the soils exhibiting a "pumping" condition. This condition is caused by excess moisture in combination with moving construction equipment, resulting in saturation and zero air voids in the soils. If this condition occurs, the adverse soils shall be over-excavated to a depth at which stable soils are encountered and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing an approved method to stabilize the soil subgrade, which should be subject to review and approval by the geotechnical engineer prior to implementation.

3.4 *MOISTURE CONTROL*

- A. Water development, hauling, and application shall be in accordance with Section 01 51 36, Watering.

3.5 *EXCAVATION*

- A. Excavate the specified areas to lines and grades as shown on the Plans or as directed by the Engineer.
- B. Stockpile as directed excavated material to be used as fill material.
- C. Carefully excavate to the established lines and grades shown on the drawings, or as revised and approved by the engineer, to provide a firm, uniform, and unyielding foundation for the proposed structures.
- D. If the Plans require placement of fill prior to pipe or structure excavation, the fill shall first be constructed to the design grade shown for a distance each side of the pipe or structure of not less than five times the diameter of the pipe or the width of the structure, after which the trench shall be excavated, and the pipe or structure installed.
- E. Paved Areas: Sawcut existing pavement to full depth to a clean, straight line before excavation and maintain the edge suitable for repaving. Pavement removed may be used as fill, as approved by Engineer.
- F. Excavate for all foundations, slabs, curbs, walks and/or similar work.
- G. Excavations for all footings, piers, finished walls and grade beams shall be sufficiently large so that forms for concrete may be properly placed, removed, and inspected.
 - 1. Excavation for footings may be made to the net footing size plus two inches if the side walls of the excavation are sufficiently stable to remain in position until the concrete is in place and if approved by the Engineer.

- H. Where over excavation is not required, the exposed surface under flatwork, pavement and structures shall be scarified to a depth of twelve inches, conditioned to optimum moisture content and compacted to at least 95 percent of the maximum dry density.
- I. If any existing foundations, roots, stumps, debris, waste materials, pipes, or similar items have been removed, the Contractor shall excavate below these portions to solid undisturbed earth and foundations in these areas shall be built to necessary levels.
- J. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.

3.6 *UTILITY INSTALLATION*

- A. Install utility marking as specified in section 33 05 26 - Utility Line Marking.
- B. Utility Installation shall be according the Division 33 Utilities. If not otherwise specified shape the trench bottom to ensure uniform contact with the full length of the installed line and remove any sharp-edged materials that might damage the line. Compaction shall be maintained beneath the line.

3.7 *SAND CEMENT SLURRY, CONCRETE ENCASEMENT AND THRUST BLOCKS*

- A. Concrete
 - 1. Place as shown on the Plans and in accordance with Sections 03 30 00 - Cast-In-Place Concrete and 03 30 31 Cast-In-Place Concrete (Site Concrete).
- B. Slurry Cement
 - 1. Slurry Cement is also referred to as Controlled Low Strength Material (CLSM).
 - 2. Place as shown on the plans and in accordance with State Standard Specifications, Section 19-3.03F.

3.8 *CONTROL OF WATER*

- A. The contractor shall keep all excavation free from water. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering of excavations. The contractor shall at all times have on the project sufficient pumping equipment for immediate use, including stand by pumps for use in case other pumps become inoperable.
- B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction, until backfill has been placed to a sufficient height to anchor the work against possible floatation.

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- C. Dewatering devices shall be adequately filtered to prevent the removal of fines from the soil.
- D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.
- E. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the owner.
- F. Provision of dewatering and dewatering equipment shall be considered part of the project with no additional compensation allowed.

3.9 *SURPLUS MATERIAL*

- A. Unless otherwise specified, surplus suitable excavated material shall be used to widen embankments uniformly or to flatten slopes, or it shall be disposed of in a uniform manner in designated surplus material areas.
- B. Unless otherwise specified, surplus suitable excavated material shall be used as fill for other areas requiring fill as shown on the Plans. Excess material that is not needed for engineered fill may be disposed of at an off-site spoil area. The location of the off-site spoil area, the limits of the fill area, the depths of fill, and the manner of work shall be as directed by the Engineer.
- C. Stockpile all suitable surplus material as shown on the plans and/or as directed by the Engineer. Leave topsoil stockpiles in a level graded surface. All remaining native material stockpiles with unsuitable soils shall be disposed of offsite.
- D. Surplus native and other backfill materials may remain on site in a manner and location approved by the Owner.
- E. All surplus material shall be exported from the site.

3.10 *OFF-SITE BORROW AREAS*

- A. Engineered fill material may be obtained from off-site borrow areas if on-site sources prove to be insufficient.
 - 1. The location of borrow areas shall be determined by the Contractor and materials shall be subject to approval by the Engineer.

3.11 *SHORING AND SHEETING*

- A. Construct and maintain all shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of excavation depth.

3.12 UNSUITABLE MATERIAL

- A. Unsuitable material shall be excavated and disposed of in a lawful manner off the project site in accordance with Section 31 23 35 - Disposal of Materials. All disposal shall be approved by the Engineer prior to initiating the work.
- B. Unsuitable material shall be excavated and deposited in the location designated on the Plans.

3.13 IN-PLACE DENSITY TESTING:

- A. Compacted backfill for structures and structure foundations: At least one test per lift per 1,000 sf of surface area or per 500 cubic yards placed, whichever is more frequent.
- B. Subgrade preparation including scarification and re-compaction of native soils: At least 1 test per lift per 1,000 sf of surface area or 500 cubic yards of fill placed, whichever is more frequent.
- C. Embankments and building pads: At least 1 test per lift per 1,000 sf of surface area or every 200 lineal foot of embankment, or 2,000 cubic yards of fill placed, whichever is more frequent.
- D. A greater frequency of testing may be required at the start of work or when new materials, crews, or equipment are introduced to the site. A lesser frequency can be utilized if approved by the Owner's Representative.
- E. LABORATORY INDEX TESTING:
 - 1. Compacted backfill for structures, structure foundations: Maximum dry density and optimum moisture content, Plasticity Index, and Gradation (when applicable) shall be confirmed at least once for every structure and every 2,500 cubic yards of fill placed.
 - 2. In addition, at least one set of applicable index tests shall be performed for each distinct material type used as compacted fill at the site.
 - 3. Additional tests may be performed, as directed by the Owner's Representative, whenever deviations in material properties or quality of workmanship are suspected.
 - 4. Where compaction tests indicate failure to meet the specified compaction, the Contractor will rework the entire failed area until the specified compaction has been achieved at no cost to the owner.

3.14 SURFACE FINISH WORK

- A. Open Areas: Grade all disturbed areas, blending with adjacent terrain without a noticeable break. Bring all sub-grades to specified contours, even and properly compacted.
- B. Paved Areas: Grade subgrade to produce a reasonably uniform surface.

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- C. Drainage Ditches: Restore drainage ditches to appropriate line and grade, using approved surface erosion prevention techniques.
- D. Clean Up: Remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

3.15 TOLERANCES

- A. Tolerances are defined as allowable variations from specified lines, grades, and dimensions. The intent of this paragraph is to establish tolerances that are consistent with modern construction practice yet are governed by the effect that permissible variations may have upon the construction.
- B. Variations from specified lines, grades, and dimensions:

Finish Grading Tolerance:	±0.10 foot
When flatwork, pavement or structures are to be placed directly on compacted subgrade, or with only a sand leveling course, the grading plane of the subgrade at any point shall not vary more than	±0.05 foot
When aggregate base material is to be placed on the subgrade, the grading plane of the subgrade at any point shall not vary more than	±0.05 foot
Variation from specified width of section at any height	±0.25 foot

Plus or minus variations indicate an allowable actual position up or down and in or out from the specified position in the drawings. Variations not designated as plus or minus indicate the maximum deviation permitted between designated successive points on the completed element of construction.

END SECTION

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of clearing, grubbing, grinding, tree removal, transporting, removing and disposing of unsuitable material, trees, stumps, roots, vegetation debris, and existing improvements, including curb, landscaping, fencing, and other protruding obstructions within the clearing limits.
- B. Protect trees, landscaping and shrubs that are not designated to be removed or near construction site that may be harmed by construction activities.

1.2 RELATED WORK

- A. Section 01 01 20 Protection of Underground Facilities & Monuments
- B. Section 01 56 16 – Dust Control
- C. Section 01 57 13 – Erosion Control
- D. Section 01 74 19 – Construction Waste Management and Disposal
- E. Section 02 41 00 – Demolition

1.3 REGULATORY REQUIREMENTS

- A. Obtain all required permits.
- B. Dispose of removed materials in a legal manner at an approved disposal facility.
- C. One hundred percent of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled.

1.4 REFERENCES

- A. Section 15 – Existing Facilities, State Standard Specifications
- B. Section 19 – Earthwork, State Standard Specifications

1.5 DEFINITION

- A. Unsuitable Material: Unsuitable material is material determined to be:
 - 1. Material containing trash, debris, oversized material or other foreign and objectionable materials.
 - 2. Incapable of being compacted to Specified density using ordinary methods at optimum moisture content.

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3. Too wet to be properly compacted if circumstances prevent satisfactory in-place drying prior to incorporation into the work.
4. Non-native material containing a significant amount of permeable materials, such as sand or rock, that cannot be blended with other material and requires to be off hauled.
5. Expansive clays that cannot be mixed or treated and requires to be off hauled.
6. Otherwise, unsuitable for planned use.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. Clear the specified areas by removing, above the natural ground surface, all existing improvements including curbs, gutters, catch basins, storm drains, landscaping fencing and utilities; vegetable growth such as trees, shrubs, logs, upturned stumps, roots of down trees, brush, and similar material.
 1. Trees of 4-inch diameter and larger shall not be removed without Owner's authorization.
- B. Grub the specified areas below the natural ground surface, except in embankment areas where the grading plane is two feet or more above the natural ground, to a depth necessary to remove all boulders, stumps, roots, buried logs, and other objectionable material including rock and concrete. Remove and stock pile the top 4 inches of topsoil in any area which is to receive structural fill.

3.2 PRESERVATION

- A. If indicated or required, preserve trees, plants, rock outcroppings, or other features designated to remain. Protect trees and plants from damage; fell trees in a manner which shall not injure standing trees, plants and improvements which are to be preserved.

END SECTION

SECTION 31 23 17

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes material, testing, installation, and other requirements for trench excavation, bedding, backfilling and compacting for underground pipelines and utilities. Requirements in this section do not apply to underground landscape irrigation pipes. The words pipe, utility, and pipelines are interchangeable in this Section and apply to that which is being installed in the trench.

1.2 RELATED WORK

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 43 00 – Quality Control and Testing
- C. Section 03 30 01 – Cast-in-Place Concrete
- D. Section 31 11 00 – Clearing and Grubbing
- E. Division 33 - Utilities
- F. Section 40 05 00 – Pipe and Fittings
- G. Section 40 20 10 – Pipe Supports

1.3 REFERENCES

- A. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³).
- C. ASTM D1556 – Density of Soil and Base Rock in Place by Sand-Cone Method.
- D. ASTM D6938 – Density of Soil and Base Rock in Place by Nuclear method.
- E. ASTM D2937 – Density of Soil In Place by Tube method
- F. Cal/OSHA Construction Safety Orders, California Code of Regulations, Chapter 4, Subchapter 4.
- G. State Standard Specifications, Section 19 – Earthwork
- H. State Standard Specifications, Section 26 – Aggregate Bases
- I. ASTM D2321 Installation of Underground Thermoplastic Gravity Pipelines

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- J. AWWA Manual M23 PVC Pipe Design and Installation
- K. AWWA Manual M55 PE Pipe Design and Installation
- L. AWWA Manual M11 Steel Pipe: A Guide for Design and Installation
- M. American Concrete Pipe Association Concrete Pipe & Box Culvert Installation Guide
- N. Ductile Iron Pipe Research Association Installation Guide for Ductile Iron Pipe
- O. PVC Pipe Association Installation Guide for Gasket-Joint PVC Pressure Pipe
- P. National Resource Conservation Service (NRCS) Construction Specification 430 Irrigation Pipeline
- Q. NRCS Construction Specification Plastic (PVC,PE) Pipe
- R. U.S. Bureau of Reclamation Method for Prediction of Flexible Pipe Deflection M-25
- S. U.S Department of Labor, 29 CFR, 1926, Subpart P
- T. National Corrugated Steel Pipe Association (NCSPA) Corrugated Steel Pipe Design Manual
- U. NCSPA Installation Manual for Corrugated Steel Pipe and Structural Plate
- V. Advanced Drainage Systems Corrugated Plastic Pipe Storm Installation Guide

1.4 SUBMITTALS

- A. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- B. Submit material classification and geotechnical test results on proposed imported fill.

1.5 SAMPLES

- A. Submit samples under provisions of Section 01 43 00 – Quality Control and Testing.

1.6 PROTECTION

- A. Prevent trench cave-in by sloping and/or shoring according to requirements of Cal/OSHA, the U.S. Department of Labor, and the Contract Documents.
- B. Notify Engineer of unexpected subsurface conditions.
- C. Protect bottom of trench from frost.
- D. When pipe laying is not in progress, close the open ends of pipe. Do not allow trench water, animals or foreign material to enter the pipe.

1.7 QUALITY ASSURANCE

A. Compaction Testing:

1. All compaction testing shall be in accordance with Section 01 43 00 – Quality Control and Testing.

1.8 CONTROL AND DIVERSION OF WATER

- A. General – The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the trenches and other parts of the work free from water. The Contractor shall at all times have on the project sufficient pumping equipment for immediate use, including stand-by pumps for use in case other pumps become inoperable.
- B. Plan – Prior to beginning any work on the removal of water from trenches, the Contractor shall submit for the Engineer's approval a water control plan showing the proposed method for the removal of water from trenches and other parts of the work.
- C. Dispose of the water in a manner that will prevent damage to the adjacent property and in accordance with regulatory requirements.
- D. Provide separate pipelines to drain trench water during construction.
- E. Provide filters on devices to control and divert water to prevent the removal of fines from the soil.
- F. Repair any damage caused by the failure of any part of equipment to control and divert water. Remove temporary equipment to control and divert water when no longer needed for dewatering purposes.
- G. Provision of equipment to control and divert water shall be considered part of the project with no additional compensation allowed.
- H. Unless otherwise specified in the Measurement and Payment section, any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.

1.9 PROJECT CONDITIONS

- A. Existing underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- B. Obtain all required permits and licenses before installing utilities and follow the rules and requirements of authorities having jurisdiction.

- C. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to the public, and to reduce the possibility of trench collapse.

1.10 DEFINITION

- A. Percent Compaction: The ratio of the field-tested dry density of earthfill to the maximum dry density determined in the laboratory according to the above-referenced Laboratory compaction test method – expressed as a percentage
- B. Unsuitable Material – Unsuitable material is material determined to be:
 - 1. Material containing trash, debris, oversized material or other foreign and objectionable materials.
- C. Deflection is the decrease of the vertical diameter of the pipe (and corresponding increase in horizontal diameter) due to load on the pipe. Deflection is expressed in terms of percentage as follows: $\text{change in diameter} / \text{diameter} \times 100$.
- D. $\text{Ovality}\% = 2 \times [(D_{\text{max}} - D_{\text{min}}) / (D_{\text{max}} + D_{\text{min}})] \times 100$ where D_{max} and D_{min} are maximum and minimum pipe diameters in any direction.

1.11 CLASSIFICATION AND CHARACTERIZATION OF EXCAVATED MATERIAL

- A. The Contractor shall consider all trenched material as being unclassified.

1.12 HAND EXCAVATION

- A. Hand excavation will be required within 12 inches of the existing water distribution main identified in the drawings, if necessary.

PART 2 PRODUCTS

2.1 EXISTING GROUND AND BACKFILL

- A. Existing Ground: In-situ soil or bedrock that the Contractor excavates for trenches. The Contractor may use this excavated material as backfill if it meets backfill material property requirements and/or if the Contractor processes it so that it meets those requirements.
- B. Backfill: Soil fill that the Contractor places and compacts in trenches over granular backfill and aggregates and that meets material property requirements of the geotechnical engineering report and the Contract Documents. Backfill may consist of existing ground or imported earth material. The Engineer shall approve backfill before it is imported to the site and placed.

2.2 AGGREGATES

- A. Granular Backfill: material meeting the requirements of State Standard Specifications Section 19-3.02C.

- B. Gravel: Natural rock; free of shale, clay, friable materials and debris; graded in accordance with 1½" x ¾" aggregate grading in Section 90-1.02C, State Standard Specifications.
- C. Pea Gravel: Natural rock aggregate; washed, free of clay, shale, organic matter; No. 8 minimum to 3/8" maximum size per State Standard Specifications Section 90-102C(4)(a).
- D. Sand: Natural sand; free of friable or soluble materials, less than 2 percent organics by dry weight, and graded in accordance with State Standard Specifications Section 90-1.02C(4)(c):

2.3 CONCRETE SLURRY

- A. Concrete slurry mix shall be as specified in Section 03 30 00 - Cast-in-Place Concrete.

2.4 MATERIALS FOR TRENCH BACKFILLING

- A. Furnish required bedding, select backfill, and backfill materials shown on the Plans and that meets requirements in this section depending on the trench type.
- B. The Engineer shall approve all trench-backfill material prior to the Contractor's import and placement.
- C. Materials used in backfill, as shown in trench details, are defined as follows:

- 1. Bedding: Where trench bottoms expose bedrock and/or soil with hard gravel/cobble particles that protrude up into the excavation, and when trench subgrades consist of soft and unstable soil, then sand bedding is required. Sand to be used shall meet the requirements listed above under Aggregates.
- 2. Select Backfill: Select Backfill may be required as shown on the Plans. Select backfill shall meet the material property requirements that follow:
 - a. Select backfill material shall have a sand equivalent of 30 per ASTM D2419.
 - b. Plasticity index of less than 6
 - c. The following particle size distribution:

<u>Sieve Size</u>	<u>Percent Passing by Dry Weight</u>
½ inch	100
No. 4	50-80
No. 200	10-25

- 3. Backfill: Soils that contain no rock larger than 3 inches at greatest dimension. If expansive clays are present, such content shall not exceed one-third of the material by volume and shall be well mixed with non-cohesive soils.
- 4. Gravel: Gravel shall meet the requirements listed above under Aggregates.

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5. Pea Gravel: Pea gravel shall meet the requirements listed above under Aggregates
6. Sand: Sand shall meet the requirements listed above under Aggregates.

2.5 SAND-CEMENT SLURRY

- A. Sand-cement slurry backfill shall be as specified in Section 03 30 00 – Cast-in-Place Concrete.

2.6 WATER FOR FILL MOISTURE CONDITIONING AND COMPACTION

- A. Water shall be free of organic materials injurious to the pipe coatings, have a pH of 7.0 to 9.3, maximum chloride concentration of 500 mg/l, and a maximum sulfate concentration of 500 mg/l.

PART 3 EXECUTION

3.1 GENERAL

- A. Excavation shall be by open cut except that short sections of a trench may be tunneled if the utilities can be safely and properly installed and backfill can be properly compacted in such tunnel sections.

3.2 INSPECTIONS

- A. The contractor must verify that the engineer has approved stockpiled material for reuse as backfill material (for each backfill zone for intended use).
- B. The contractor shall verify that trenches that they will backfill are free of debris, snow, ice, or water, and that ground surfaces that backfill will cover are not frozen.

3.3 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.4 AC PAVEMENT AND CONCRETE REMOVAL

- A. Cut bituminous and concrete pavements, regardless of the thickness, curbs, gutters and sidewalks prior to excavation of trenches.
 1. The contractor shall saw cut existing pavement at least one lateral foot beyond (outside of) the trench edges or further out as shown on the Plans.
 2. The contractor shall remove all pavement and aggregate within the saw cuts.
 3. AC pavement and concrete rubble shall not be used for trench backfill.
 4. The contractor shall replace aggregate and pavement surfaces according to Specification Section 32 12 16 Asphalt Concrete Paving.

3.5 TRENCH EXCAVATION

- A. Excavate the trench to the lines and grades shown on the Plans with allowance for pipe thickness, sheeting, shoring, and bedding.
- B. Trenching Guidelines: Excavate the trench to the approximate level of the grade of the utility line to be installed, using adequate trench width and side slopes to safely accommodate worker access.
 - 1. Rocky Trench Bottom: Where ledge rock, hard pan, boulders, or sharp-edged materials are encountered, over excavate trenches at least 12 inches below and beyond the planned excavation lines. The installed utility shall have at least 12 inches of clearance from any rock protrusion.
 - 2. Unstable Trench Bottom: Secure the Engineer's approval of over-excavation depth and stabilization method. The Contractor must seek the Engineer's approval of overexcavation bottoms and subgrades before the Contractor backfills and places utility pipes/conduits.
 - 3. Wet Trench Construction: use approved method of dewatering through diversion, damming and pumping, well points, or underdrain systems. Dispose removed fluidized materials as approved. Use bedding material to build a suitable foundation to within 6 inches of finished utility grade, prior to bedding with the specified material. Place and compact backfill as specified. The Contractor must seek the Engineer's approval of overexcavation bottoms and subgrades before the Contractor backfills and places utility pipes/conduits.
- C. Correct unauthorized excavation at no cost to Owner.
 - 1. If the trench is excavated below the required grade, backfill over-excavations with compacted engineered backfill as specified.
- D. Trench widths shall be as shown on the Plans. If no details are shown, then the maximum width in the pipe zone shall be 24 inches greater than the pipe outside diameter.
- E. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such case, width of trench shall be such that there is at least two feet between the top edge of the trench and the structure or footing.
- F. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- G. Hand trim for bell and spigot pipe joints.
- H. During trench excavation, place the excavated material only within the working area. Do not obstruct roadways or streets. Follow Caltrans guidelines for excavation safety for conditions of surcharge from stockpiled material.

3.6 *UNSUITABLE MATERIAL*

- A. Unsuitable material shall be excavated and disposed of in a lawful manner off the project site, all disposal shall be approved by the Engineer prior to initiating the work.
- B. Unsuitable material shall be excavated and deposited in the location designated on the Plans.

3.7 *CONTROL OF WATER*

- A. The Contractor shall keep trenches free from water, maintain and operate all necessary pumping and other equipment for dewatering of excavations.
- B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction.
- C. Do not drain trench water through pipeline under construction but use separately provided pipeline.
- D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.
- E. Use of any drain rock in the trench bottom to convey water or stabilize wet soil shall only be done if approved by the Engineer.

3.8 *TRENCH BACKFILLING*

- A. Support pipe during placement and compaction of bedding fill.
- B. Backfilling and cleanup work shall be accomplished as sections of pipe or conduit are tested and approved.
- C. Compaction: The contractor shall choose means and methods for achieving compaction. Generally, vibratory compactors tend to work better for sands and gravels (non-cohesive soils) and mechanical tampers work better for sand and gravel containing a significant portion of fine-grained materials, such as silt and clay (cohesive soils).
- D. Hand tamp around pipe or cable to protect the lines until adequate cushion is attained. Puddling or water flooding for consolidation of backfill or compaction by wheel rolling will not be permitted.
- E. Bedding: Unless otherwise specified, compact the specified material to 95 percent of maximum density to the finished utility grade.
- F. Embedment: Fill by hand placement around the utility to just over half depth, and compact in a manner to ensure against lateral or vertical displacement. Place select backfill to 12 inches above the utility line by hand placement in not more than 6-inch layers.

- G. Backfill: Soil backfill shall be placed and backfilled in lifts, with each lift compacted to the project requirements prior to addition of the next layer. Unless otherwise specified, place and compact the specified material as follows:
 - 1. Vehicular Traffic Areas: Fill and compact in 8-inch maximum loose lifts as follows:
 - a. From top of select backfill to two feet below top of road subgrade, compact to 90 percent compaction.
 - b. From two feet below top of subgrade to top of subgrade, compact to 95 percent compaction.
 - 2. Non-traffic Areas: Fill and compact in 8-inch maximum layers to 90 percent compaction.
- H. Employ a placement method that will not disturb or damage pipes or utilities.
- I. Maintain moisture content of backfill materials to attain required compaction density.
- J. Compact trench-backfill to the specified percent compaction. Compact by using mechanical compaction or hand tamping. Do not use high impact hammer type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe. Do not use water flooding or jetting for backfill compaction.
- K. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.
 - 1. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe.
 - 2. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.
- L. After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe, in maximum 8-inch lifts, keeping the level of backfill the same on each side.
- M. Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, and other structures.
- N. Do not permit free fall of the material until at least two feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or on the surface of compacted backfill around the pipe. Do not operate heavy equipment over the pipe until at least 3 feet of backfill has been placed and compacted over the pipe.
- O. Remove surplus backfill materials from site.
- P. Leave stockpile areas completely free of excess fill materials.

3.9 TESTING FREQUENCY

A. Backfill Compaction:

Pipeline Trenches: At least 1 test per lift per every 200 feet of trench backfill placed or every 500 cubic yards placed, whichever is more frequent.

A greater frequency of testing may be required at the start of work or when new materials, crews, or equipment are introduced to the site. A lesser frequency can be utilized if approved by the Engineer and the Owner's Representative.

B. Laboratory Index Testing:

In addition, at least one set of index tests shall be performed for each distinct material type used as compacted fill at the site.

Additional tests may be performed, as directed by the Owner's Representative, whenever deviations in material properties or quality of workmanship are suspected.

3.10 TOLERANCES

A. Top Surface of trench backfill: ± 0.1 foot.

3.11 SAND CEMENT SLURRY, CONCRETE ENCASEMENT AND THRUST BLOCKS

A. Place in accordance with the Contract drawings.

3.12 PIPE DEFLECTION AND OVALITY CONTROL

- A. Pipe installation and backfill process shall be done in a manner that does not overly deflect pipe or make it overly oval in any direction so that deflection or ovality limits in pipe specifications or installation guidelines are exceeded. The following table has common deflection and ovality limits for flexible pipes but pipe specifications and installation guidelines shall govern over this table. Owner has the option to hire a third-party testing firm to conduct pipe mandrel testing to verify the pipe installation is within the following requirements or as stated in the individual pipe specification sections.

Pipe Type	Deflection and Ovality Limit
PVC Pressure, Sewer, or Gravity Pipe	7.5%
Steel with Flexible Coating	5%
Cement Mortar Lined Steel with flexible coating	3%
Cement Mortar Coated Steel	2%
Cement Mortar Lined and Coated Steel	2%

END SECTION

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SECTION 31 23 35

DISPOSAL OF MATERIALS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Disposal of unsuitable material, concrete, asphalt concrete, rubbish, and other debris, as described below.

1.2 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 - Submittal Procedures.

1.3 GENERAL

- A. The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, State, and local laws and regulations, and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.
- B. The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the jobsite.
- C. The cost of disposing of waste materials other than unsuitable materials shall be included in the prices bid in the schedule for other items of work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 DISPOSAL OF EXCAVATED MATERIAL

- A. All unsuitable material that is hauled off-site shall be properly disposed.

3.2 DISPOSAL OF CONCRETE AND A.C. SURFACING

- A. All concrete and pavement removed from the project site shall be disposed of at a site obtained by the Contractor and approved by the Owner's Representative. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. Payment for disposal, including all costs of hauling, shall be as specified in the Technical Specifications or Explanation of Bid Items. The Contractor shall report quantities of disposed material in a manner that enables the Owner to utilize diverted quantities as diversion credits pursuant to California Integrated Waste Management Act of 1989 (Public Resources Code Sections 40000 et seq.)

3.3 DISPOSAL OF OTHER DEBRIS

- A. All oil cake, wood debris, structure demolition, vegetation and any other debris removed from the project site shall be legally disposed of at a site(s) obtained by the Contractor with prior written permission of the Owner's Representative. Contractor shall identify the proposed Disposal Site(s) at the pre-construction conference. Such Disposal Site(s) shall be a properly licensed and permitted facility pursuant to state and local regulations for purposes of accepting delivery of the respective materials. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. In addition to the following, a certificate of compliance stating disposal location and manner of disposal of recyclable materials shall be submitted to the Owner's Representative.
1. Disposal of combustible materials shall be by removal from the construction area. Disposal of combustible materials by burning will not be permitted. Disposal of waste materials by burying will not be permitted.
 2. Waste materials shall be disposed of or recycled at a State approved disposal or recycle facility. The Contractor shall make any necessary arrangements with private parties, and State and county officials pertinent to locations and regulations of such disposal or recycle facilities and shall pay any fees or charges required for such disposition.

3.4 CONTRACTOR'S DISPOSAL SITES

- A. Contractor shall make arrangements for disposing of the materials at the Disposal Site(s) and pay all costs involved. Arrangements shall include, but not be limited to, obtaining written authorization from the property owner of the Disposal Site(s) and before disposing of any material off the project site, Contractor shall furnish to the Owner's Representative the authorization or a certified copy thereof together with a written release from the property owner absolving the Owner from any and all responsibility in connection with the disposal of material on the property of the Disposal Site(s). Before any material is disposed of on the Disposal Site(s), the Contractor shall obtain written permission from the Owner's Representative to dispose of the material at the location designated in the authorization.
- B. It is expressly understood and agreed that the Owner assumes no responsibility to the Contractor whatsoever by the granting of such permission and Contractor shall assume all risks in connection with the use of the Disposal Site(s). The Contractor is cautioned to make such independent investigation and examination as the Contractor deems necessary to be satisfied as to the quantity and types of materials which may be disposed of on the Disposal Site(s) and the status of any permits or licenses in connection therewith.
- C. Within 24 hours of removing the respective material from the project site for disposal, Contractor shall provide Owner's Representative with a certified copy of the weight slip from the Disposal Site obtained by Contractor upon delivery of such debris, and a certified statement from Contractor identifying the material constituting the debris and that it was disposed of at the Disposal Site (identifying the and name of the

owner) in accordance with all laws and applicable regulations promulgated by Federal, State, regional, or local administrative and regulatory agencies.

3.5 DISPOSAL OF HAZARDOUS WASTE AND MATERIALS

- A. Materials or wastes, defined as hazardous by 40 CFR 261.3, or by other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Unknown waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Owner's Representative for review.
- B. Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of all hazardous waste manifest shall be sent to the Owner's Representative.
- C. Waste materials discovered at the construction site shall immediately be reported to the Owner's Representative. If the waste may be hazardous, the Owner's Representative may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.
- D. If necessary, the Contractor will be required to conduct an environmental site assessment at the following Contractor use locations:
 - 1. All hazardous waste accumulation areas;
 - 2. All hazardous material and petroleum dispensing and storage areas where the aggregate storage of hazardous materials or petroleum at the site is or has been over 110 gallons.
 - 3. This site assessment shall be performed by a qualified environmental consultant or equivalent and shall document through appropriate analytical sampling that the site is free of the effects of contamination (i.e., contaminant concentrations less than State action cleanup levels).

3.6 CLEANUP

- A. The Contractor shall keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.
- B. Upon completion of the work, and following removal of construction facilities and required cleanup, work areas shall be regraded and left in a neat manner conforming to the natural appearance of the landscape.

END SECTION

DISPOSAL OF MATERIALS
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SECTION 32 11 23

AGGREGATE BASE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnish, spread, and compact aggregate base in roadways, driveways and other paved areas as shown on the Plans.
- B. The work of this section consists of furnishing and placing aggregate base material and/or lean concrete base materials, and filler if required, on the prepared subgrade.

1.2 RELATED WORK

- A. Section 31 05 00 – Common Work Results for Earthwork

1.3 REFERENCES

- A. Section 10-6 – Watering, State Standard Specifications.
- B. Section 26 – Aggregate Bases, State Standard Specifications.
- C. Section 28-2 - Lean Concrete Base, State Standard Specifications.
- D. ANSI/ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.
- E. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
- F. ANSI/ASTM D1556 – Density of Soil and Base Rock in Place by Sand-Cone Method.
- G. ASTM D6938 – Density of Soil and Base Rock in Place by Nuclear Method.

1.4 SUBMITTALS

- A. As specified in Section 01 33 00 – Submittal Procedures.
- B. If materials are obtained from a commercial source, submit certification from the supplier certifying that aggregate base course meets the requirements of this section.
- C. Copies of certified weight tickets for each load of aggregate delivered to the project site.

1.5 QUALITY ASSURANCE

- A. Relative Compaction:

AGGREGATE BASE
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1. All costs for initial compaction tests shall be borne by the Owner. All areas that fail to meet the minimum compaction requirements shall be reworked as required by the Engineer and retested until minimum compaction requirements are obtained.
 2. All compaction testing, curves and gradation analysis will be scheduled and paid for by the Contractor at no additional cost to the Owner. Testing shall be performed by an independent Certified Geotechnical Engineering Lab, licensed in the State of California, selected by the Contractor and approved by the Owner.
 3. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project. Testing will be required as directed by the Engineer. Test locations shall be determined by the Engineer upon notification from the Contractor that the grade is ready for tests. Contractor shall be present when samples of bedding, select backfill, and backfill materials are gathered for analysis or testing.
- B. Compaction tests will be performed for each lift or layer.
- C. Tests for compaction shall conform to references listed in Part 1.3 of this section.
- D. Sample backfill materials per ASTM D75.
- E. Compaction testing will be performed in accordance with Section 19-5 of the State Standard Specifications.
1. Compaction testing of areas to be saw cut and replaced shall be one for every 300-LF of adjacent curb and gutter but not less than one for each curb cut area.
 2. The Contractor shall not proceed with work over the area being tested until results have been verified by the Engineer. Immediately upon completion of each compaction test, a copy of the results shall be given by the testing laboratory to the Engineer.
- F. The percentage composition by weight shall conform to Class 2 aggregate base determined by Test Method No. Calif. 202, modified by Test Method No. Calif. 905 if there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.
- G. Aggregate base shall also conform to the following quality requirements:

<u>Tests</u>	<u>Test Method Calif. No</u>
R-Value	301
Sand Equivalent	217
Durability Index	229

- H. Quality Control shall be under the provisions of Section 01 43 00 – Quality Control.

AGGREGATE BASE
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PART 2 PRODUCTS

2.1 MATERIALS

A. AGGREGATE BASE

1. Class 2 Aggregate Base, $\frac{3}{4}$ -inch maximum; as per Section 26-1.02B, State Standard Specifications.
2. Crushed Portland cement concrete which meets the gradation requirements of State Standard Specification Section 26, Class 2 Aggregate Base, $\frac{3}{4}$ -inch maximum, may be used as aggregate base course under new pavements.
3. Aggregate for Class 2 aggregate base shall be free from organic material and other deleterious substances.

B. RECYCLED AGGREGATE BASE COURSE

1. Recycled aggregate base course material must meet the requirements of State Standard Specifications, Section 26-1.02B, for Class 2, $\frac{3}{4}$ -inch maximum. This material shall not contain any metal rebar. Testing required to determine compliance of material shall be at the expense of the Contractor.
2. Recycled aggregate base may be made from Portland cement concrete or asphalt concrete, or a mix of the two.
3. No organic or other deleterious materials may be present in the material.

C. AGGREGATE SUBBASE

1. Class 2 Aggregate Subbases; as per Section 25-1.02B, State Standard Specifications.
2. Crushed Portland cement concrete which meets the gradation requirements of State Standard Specification Section 25, Class 2 Aggregate Subbase may be used as aggregate subbase course under new pavements.
3. Aggregate for Class 2 aggregate subbase shall be free from organic material and other deleterious substances.

D. LEAN CONCRETE BASE

1. Lean Concrete Base shall conform to the State Standard Specifications, Section 28-4, Lean Concrete Base Rapid Setting.
2. State Standard Specifications Section 28-4.04 shall not apply.

E. WATER

1. As specified in Section 01 51 36, Watering.

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2. At the time aggregate base is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the materials.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

- A. As specified in Sections 31 05 00, Common Work Results for Earthwork and 01 51 36, Watering.

3.2 SPREADING

- A. The aggregate base course material shall be deposited and spread to the required compacted thickness by means that will maintain the uniformity of the mixture. The aggregate base course shall be free from pockets of coarse or fine material.
- B. Deliver aggregate base to the area to be paved as a uniform mixture and spread each layer in one operation.
- C. Aggregate base placed at locations which are inaccessible to the spreading equipment shall be spread in two layers by any means to obtain the specified results.
- D. The aggregate shall not be treated with lime, cement or other chemical materials before the Durability Index test has been performed.
- E. The surface of the finished aggregate base at any point shall not vary more than ± 0.05 -foot from the grade shown.

3.3 PLACING

- A. If the required compacted depth of the aggregate base course exceeds 6 inches, place course in two or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

3.4 MIXING

- A. Mixing shall be in accordance with one of the methods set forth in State Standard Specifications, Section 28-4.03B "Proportioning, Mixing, and Transporting".

3.5 MOISTURE CONTROL

- A. When spread, aggregate base shall have a moisture content sufficient to obtain the specified compaction.

3.6 SURFACE FINISHING

- A. Use a smooth steel wheel roller for the final rolling of top surface base course. Water surface and evenly spread loose stones before final rolling. Make minimum of two

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complete passes over area to embed stones. Correct soft spots developed during rolling.

- B. Compacted aggregate base course surface shall be smooth and free from waves and other irregularities. Unsatisfactory portions of base course shall be corrected, at no additional expense to the Owner.

3.7 MATERIAL ACCEPTANCE REQUIREMENTS

- A. Acceptance will be based on periodic samples and tests taken following mixing and before placing.

3.8 TOLERANCES

- A. Surface: The finished surface of the base course will be tested with a 10-foot straightedge or other device. The variation between any two contacts with the surface shall not exceed ± 0.05 feet.
- B. Width: Plan dimension, ± 0.10 feet.
- C. Thickness: Plan dimension, ± 0.05 feet.
- D. Any areas not complying with these tolerances shall be reworked to obtain conformity, at no additional expense to the Owner.

3.9 MAINTENANCE

- A. Maintain base course in a satisfactory condition until surfaced or until final acceptance.

END SECTION

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SECTION 33 05 26 UTILITY LINE MARKING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing and installing utility line marking tape in the trench above newly constructed utility lines.

1.2 SUBMITTALS

- A. Samples: 24-inch strips of tape and two markers.
- B. Certification that the materials used in the tape fabrication meet the requirements of this section.
- C. Installation procedure if the cable is installed by plowing.

PART 2 PRODUCTS

2.1 MARKING TAPE

- A. Capable of being inductively detected electronically.
- B. Construction: Metallic foil laminated between two layers of impervious plastic film not less than 3 inches wide. Total thickness of tape shall not be less than 0.005 inch (5 mil), ± 10 percent manufacturing tolerances.
 - 1. Film: Inert plastic. Each film layer shall be not less than 0.001 inch (1.0 mil) thick.
 - 2. Foil: Not less than 0.001 inch (1.0 mil) thick.
 - 3. Adhesive: Compatible with foil and film.
- C. Imprint: 3/4-inch or larger bold black letters.
- D. Legend: Identify buried utility line tape with imprint such as "Caution: Water Main Below". Repeat identification at approximately 24 inch intervals.
- E. Background Color: APWA color code and as specified in the following table.

Color	Utility
Safety Precaution Blue	Water System, Irrigation

- F. Manufacturer: Lineguard, Inc., Wheaton, Illinois; Reef Industries, Inc., Houston, Texas; Thor Enterprises, Inc., Sun Prairie, Wisconsin; or Engineer-approved equivalent.

2.2 *SURFACE MARKERS*

- A. All markers shall have an identifying letter either cast or routed into marker. The Contractor has the option of any of the following. However, only one type shall be used on any one project:
- B. Cast-In-Place Concrete.
 - 1. Concrete: As specified in Section 03 33 00 – Cast in Place Concrete.
 - 2. Reinforcement: One No. 5 bar in the centre of the marker.
- C. Precast Concrete: Commercially fabricated concrete marker meeting design dimensions and concrete reinforcing requirements.
- D. Timber Posts: Any softwood lumber species meeting PS 20-70. Grade No. 1 or better, free of heart center, S4S as shown. Pressure treat timber posts for soil contact with waterborne preservative in accordance with AWPA C2-90.

2.3 *TRACER WIRE*

- A. Minimum: No.10, solid, 12 AWG copper wire with Type TW insulation. Join so as to form a mechanically and electrically continuous line throughout the length of the marked pipe.

PART 3 EXECUTION

3.1 *MARKING TAPE*

- A. Install tape in backfill directly over each buried utility line as shown on the detailed drawings.
- B. Unless otherwise shown, tape shall be installed a minimum 1.5 feet below finish grade. However, in no case shall tape be placed closer than two feet above the top of the pipe.
- C. Where utilities are buried in a common trench, identify each line by a separate warning tape. Bury tapes side by side directly over the applicable line.

3.2 *TRACER WIRE*

- A. Wherever PVC or Polyethylene pipe is installed in the ground, a tracer wire shall be installed. Conductors shall be spliced in accordance with Division 26, Electrical.
 - 1. Tracer wire shall be brought to the surface at all gate and butterfly valves, air valves, blow-offs, Fire Hydrants, Water Services, and other pipeline appurtenances

UTILITY LINE MARKING
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- B. Tracer Wire: Attachment of the wire to the pipe shall be made with plastic tie-wraps or other approved method.
- C. Contractor shall conduct a satisfactory continuity test prior to Owner acceptance.

3.3 *SURFACE MARKERS*

- A. In addition to marking tape, install surface markers at all changes in horizontal direction and at intervals not exceeding 400 feet.
- B. Tracer wire shall be wrapped around cast iron valve boxes; while ensuring wire conductors are making contact with valve box.
 - 1. Tracer wires shall be tied together to a No. 5 rebar cast in a concrete utility line marker and terminate above grade. Allow sufficient slack in tracer wire along pipe to allow for pipe shrinkage and expansion.

END SECTION

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SECTION 33 11 14
TEST HOLE DRILLING AND
WATER WELL CONSTRUCTION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work consists of constructing one or two new wells. Well 8 is included in the base bid and Well 9 is an add alternate bid that will be awarded at the discretion of the County. The work on the well(s) will consist initially of drilling a test hole to a depth ranging from 800 to 1,200 feet using the air-rotary method of drilling in hard rock and collecting composite and/or depth specific water samples, as specified. Upon completion of the test hole(s) and associated sampling, fracture sealing and pump testing may be required, as authorized by the Geologist.
- B. The work includes the labor, equipment, materials, transportation, permitting, and appurtenances necessary for the drilling, and casing installation, of one (1) or two (2) test holes for a future production well including following major components:
 - 1. Drilling of 1 to 2 test holes, each at 6-inch minimum diameter.
 - 2. Installation of 6-inch casing and annular seal to a depth of 100 ft as directed by the Geologist, and as per borehole conditions.
 - 3. Destruction of test holes and or completion of production well(s) as directed by the Geologist, based on findings during drilling.
- C. The production well construction will be dependent on the results of the test hole(s) water quality sampling, and may include sealing of fractures and re-drilling as shown on the Plans.
- D. Upon completion of construction of the test hole(s), the Contractor shall air lift the test hole(s) as described in these Specifications.
- E. The Contractor shall supply equipment and labor including submersible pump, generator, valves, discharge piping, and flow meter to facilitate a continuous 3-day pumping test with additional pumping days for up to a total of 10 pumping days as directed by the Geologist. The County in consultation with the Geologist will determine the duration of the pump test after initial drilling and final design is complete. The Contractor shall be paid at the lump sum bid price for a 3-day pumping test and a daily rate thereafter, for up to a 10-day pumping test, whichever is selected by the County. Pump test equipment operation and

TEST HOLE DRILLING AND WATER WELL CONSTRUCTION

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maintenance will be performed by the Contractor. The Owner's Representative will collect samples and record appropriate data.

F. Related Specification Sections

1. Section 33 11 15 – Test Hole Water Quality Sampling
2. Section 33 11 16 – Camera Survey, and Alignment

1.2 SUBMITTALS

A. The Contractor shall prepare a final written report. Three copies of the written report shall be submitted to the Geologist/Engineer prior to acceptance, containing, as a minimum, the following information for the well:

1. The Contractor shall submit a drilling equipment schedule listing proposed equipment type with sizes and rated capacities.
2. Well Completion Report submitted to the State showing annular seal, casing diameter and wall thickness, depth of annular seal and casing, lengths and location of casing installed, depths of sealed fractures (if any fractures are sealed), and bore hole diameter.
 - a. Drillers log
 - b. DWR Well Completion Report
 - c. DWR Well Destruction Report (if test hole(s) destruction is required)
 - d. Depth of water samples
 - e. Static groundwater levels
 - f. Drilling Fluid (water) disposal plan and permit if necessary
3. Construction records showing location or quantity of borehole fill gravel initially installed, air lift development time, and all other pertinent information.
4. Air lift records showing production rate, static water level, pumping water level (if possible), drawdown, production of sand, and all other pertinent information.
5. Manufacturer's or supplier's standard literature and certification that the following materials for the production well comply with this specification:
 - a. Well casing
 - b. Borehole Fill Gravel

- c. Cement Seal
 - d. Cement Grout/Sand Cement Grout
6. A drilling fluids/water disposal plan shall be submitted with each test hole.

1.3 STANDARDS, PERMITS AND LICENSE

A. Referenced Standards

- 1. American Society for Testing and Materials (ASTM)
 - a. ASTM C150 - Portland Cement
 - b. ASTM C33 - Concrete Aggregates
 - c. ASTM D1557 - Laboratory Compaction of Soil
- 2. American Water Works Association (AWWA)
 - a. AWWA A-100 - Standard for Water Wells
 - b. AWWA C-654 - Disinfection of Wells
- 3. State of California
 - a. Bulletin 74-81 and 74-90 - Water Well Standards
- 4. Environmental Protection Agency (EPA)
 - a. Manual of Water Well Construction Standards

B. Permits

- 1. The well shall be constructed in accordance with the Fresno County Water Well Ordinance, the California Water Well Standards, and as described in these Specifications. The Contractor shall obtain, and pay for, a well drilling permit from Fresno County, and shall report the results of the drilling to the California Department of Water Resources.
- 2. The well driller shall notify the Owner and Engineer as soon as possible if development water may enter a surface water feature. If so, a low threat discharge permit will be required and obtained by the Contractor

- C. Well driller must possess a C-57 Well Drillers License, valid in the State of California.

1.4 ORDER OF WORK

- A. Upon completion of a test hole, Contractor shall furnish copies of the drilling log with depth of fractures and estimated discharge from fractures, for review of the Geologist.
- B. Geologist and Owner shall be allowed up to twenty-four (24) calendar days to review the test hole data and to determine final well design.
- C. Construction of a production well shall not proceed until Geologist has made final recommendation of construction details.
- D. Upon completion of a production well and air lift development, Contractor shall furnish 3 copies to the Geologist.

1.5 WORK TO BE PERFORMED BY THE CONTRACTOR

- A. All drilling, casing, sealing, developing, pumping for water quality testing and test pumping, and other work incidental to the well shall be performed by the Contractor. The Contractor shall drill the hole in accordance with these Specifications, and shall provide all necessary equipment for test pumping and water quality testing of the well.
- B. The Contractor will prepare and maintain access to the work area as well as provide sufficient room for the efficient operation of his equipment. The Contractor shall build temporary pad as required for well drilling equipment. The Contractor shall provide temporary fencing to enclose the work area and all stored equipment, and disposal of water generated during the drilling, pump testing and sampling processes in an appropriate manner that does not impact tributaries or cause damage to existing property. The Contractor will be held as having examined the drilling site and access roads in order to acquaint himself with local conditions, as no allowance will be made after the bid has been accepted for any errors or omissions made by the Contractor due to site conditions.
- C. The Contractor shall diligently pursue all work to completion. Upon completion of the well, the Contractor shall level the drill site, complete finish grading as shown on the grading plans and remove all materials incidental to the drilling operations.
- D. The Contractor shall, at his own expense, furnish all equipment, material (including lost drilling materials), supplies, and personnel necessary to perform the work (including, but not limited to, drilling rig, water truck, a crew comprised of experienced drillers and supporting personnel).
- E. The Contractor shall pay any federal, local, or state taxes assessed or levied on account thereof, in accordance with the practices generally acceptable for the nature of work to be performed under this Contract.
- F. The entire cost of furnishing, transporting, unloading, hauling, handling, sorting, and caring for all equipment, materials, tools, and supplies, and of removing same

from the site of the work as hereinafter specified, shall be included in prices bid in the proposal for the work for which the materials are required. All materials that will become a part of the completed work shall be new. All equipment, materials, tools, and supplies not a part of the completed well shall remain the property of the Contractor and shall be removed from the site upon completion of the work. All materials to be stored shall be stored at the drilling site within a fenced enclosure.

1.6 NOTIFICATION

- A. The Contractor shall give notice to the Engineer/Geologist and the Fresno County Environmental Health Division as required of specific operations as follows:
1. At least 72 hours advance notice of start of drilling operations at the well site.
 2. At least forty-eight (48) hours advance notice of installation of casing and annular seal.
 3. At least twenty-four (24) hours advance notice of installation of fracture seals.
 4. At least twenty-four (24) hours advance notice of commencement of construction of the production well.
 5. At least two (2) weeks advance notice of the pumping test.
 6. At least twenty-four (24) hours advance notice of camera survey.

1.7 TEST HOLE DESTRUCTION

- A. In the event the Contractor shall abandon a test hole or well because of loss of tools or other causes which are their responsibility, or if the well fails to conform to these Specifications and the Contractor is unable to correct the condition at his own expense, it shall be destroyed at the expense of the Contractor. The Contractor shall immediately start a new well at a nearby location designated by the Geologist. The Contractor may salvage as much undamaged materials from the initial well as possible to be used in the new well. The Contractor shall destroy the old hole by filling with sand-cement grout completely from bottom to top and in conformance with regulations of the Fresno County Water Well Ordinance. Contractor shall notify Fresno County Health Department and arrange for Health Department inspector to witness destruction.

PART 2 PRODUCTS

2.1 DELIVERY AND STORAGE

- A. Delivery of products shall be scheduled for timely installation.

- B. Products shall be delivered in manufacturer's original, unbroken containers, clearly and fully marked and identified as to the manufacturer, item, installation, location and instructions for assembly, use, and storage.
- C. Products shall be stored in a location to avoid physical damage. Protect and handle all materials in accordance with manufacturer's recommendations and written instructions.
- D. All equipment shall be disinfected on site prior to use.

2.2 WELL CASING

- A. No chemical or product shall be added to or come in contact with drinking water or the wells unless it is certified to meet NSF 60 for direct additives or NSF 61 for indirect additives.
- B. Casing
 - 1. The steel plate used in the fabrication of the casing shall be new and have a thickness capable of withstanding the anticipated formation and hydrostatic pressures and mechanical forces imposed on the casing during installation, well construction, and use. The casing material and fabrication shall be in accordance with Fresno County and State of California standards, and shall meet the requirements of ASTM A53 Grade B, or ASTM A139, Grade B.
 - 2. The steel casing shall have a minimum inside diameter (I.D.) of 6-5/16 inches. The casing shall be in 10 ft lengths, at minimum, except where a short piece is required to achieve the specified casing length.
 - 3. The 6-inch diameter casing shall protrude 24 to 36 inches above ground, and shall be capped to prevent entrance of unwanted materials when not in use.

2.3 ROCK/GRAVEL FOR BOREHOLE FILL

- A. The gravel shall consist of sound, durable, well-rounded, naturally stream worn particles, containing no silt, clay, organic matter, or deleterious materials. Crushed rock may be accepted if approved by the Geologist.
- B. Rock/gravel sample shall be submitted to the Geologist for approval prior to use for borehole fill.

2.4 NEAT CEMENT OR SAND CEMENT GROUT

- A. Sand cement grout used for the annular seal shall be equivalent to a 10.3 sack or a sand cement mixture as approved by the Fresno County D.P.H that meets the California Water Well Standards (including Department of Water Resources Bulletins 74-81 and 74-90).

- B. Cement used for fracture sealing shall be fast setting sand cement grout, equivalent to a 11.3 sack or as approved by Fresno County D.P.H that meets the California Water Well Standards (including Department of Water Resources Bulletins 74-81 and 94-90).

2.5 *TEMPORARY BENTONITE SEALS*

- A. Temporary bentonite seals shall be 3/8 inch, coarse grade, sodium bentonite chips and shall be NSF/ANSI Standard 60 certified.

2.6 *DRILLING FLUID*

- A. Water alone shall be employed as a drilling fluid in the production well unless prior approval is given by the Geologist.
- B. The Contractor shall prepare a disposal plan for surplus drilling fluid to be approved by the Owner and Geologist.
 - 1. If a drilling fluid capture pit is proposed, the Contractor shall include in the disposal plan the pit dimensions and location for approval by the Geologist. All Underground Service Alert requirements are the responsibility of the Contractor.
 - 2. Pumping of drilling fluid to the ball field adjacent to the well site(s) is anticipated and shall be described in the fluid disposal plan. The Contractor shall furnish and install temporary sprinkler system for disposal of drilling fluid to prevent erosion.
- C. The Contractor is fully responsible for implementing the fluid disposal plan, permitting and existing and surrounding property protection.
- D. The Contractor is responsible for supplying a full water truck of potable water for drilling fluid. Additional water for drilling can be pulled from the WWD 40 potable water system only after the initial water truck supply is exhausted. If more than 20,000 gallons per week are needed from the WWD 40 system the contractor shall make arrangements to procure any additional drilling water from another potable source. If water source is not from fractures encountered during drilling it shall be from a potable source. The Contractor shall only be allowed to use water from the WWD 40 water system, as described above, due to insufficient supply. The Contractor will be responsible for purchasing, transporting and storing water at the site, as required, for drilling activities and no additional payment shall be made.

2.7 *EQUIPMENT FOR 3- UP TO 10-DAY PUMPING TEST*

- A. The Contractor shall furnish and install a 3-inch or larger submersible pump and appurtenances including adjustable valve, totalizing flow meter, and discharge piping, as approved by the Geologist. The pump discharge shall be capable of

maintaining the desired pumping rate, up to 50 gallons per minute, within plus or minus five (5) percent by means of an adjustable gate valve supplied by the Contractor and approved by the Geologist.

1. The Contractor shall anticipate pumping test water 100 feet to the ball field for each test hole site. The discharge pipe and sprinkler system shall be placed to minimize erosion and shall not block vehicle access.
- B. Prior to the start of the test, the pump shall be adjusted to each of the prescribed pumping rates in order to determine the appropriate motor speeds (rpm) and discharge valve positions to facilitate rapid adjustment of the pump at the commencement of testing.
- C. At least 12 hours before conducting the pump test, in cooperation with the geologists the Contractor shall pump the well for no more than two hours and then discontinue pumping.
- D. The pump test will be conducted continuously for a period of 3 (or up to 10) days as determined by the Geologist and approved by the County. The Contractor is responsible to keep all equipment operating for 3 (up to 10) continuous days, 24 hours per day. If the equipment fails to operate consecutively for the specified days, 24 hours per day, the Contractor will be required to restart the test at the Contractors own expense, with no additional expense to the Owner.
- E. The Contractor shall be available as needed during the pumping test to monitor water flow, make adjustments if directed by the Geologist, control water disposal, maintain equipment, etc.
- F. Upon completion of the pump test the well shall remain undisturbed for an undetermined period of time to allow water recovery rates to be measured. Once recovery rates have been measured, and as directed by the Geologist, the Contractor shall remove the pump and appurtenances from the well.

PART 3 EXECUTION

3.1 SITE PREPARATION, CASING INSTALLATION, AND DRILLING

- A. Test hole locations are selected for one to two test holes. Site accessibility is the responsibility of the Contractor. Preparation and grading shall be similar to existing conditions.
- B. Installation of Conductor Casing – A borehole shall be drilled and appropriate size conductor casing shall be installed and cemented in place, in accordance with SWRCB standards, if determined to be necessary by the Contractor. The driller will not be compensated for installation of a conductor casing.

- C. Installation of Casing – A 12-inch minimum nominal diameter borehole will be drilled to depth of 100 feet. This borehole will be used to lower the 6-5/16-inch steel casing for placement and sealing.
- D. Test Hole Completion – A 6-inch diameter test hole shall be drilled to a depth of 800 to 1,200 feet as directed by the Geologist. Measurement and payment will be based on vertical footage complete.

3.2 TEST HOLE DRILLING

- A. Drill 6-inch diameter test hole from bottom of the annular seal casing to a depth of up to 1,200 feet below ground surface using the air-rotary method.
- B. Drilled cuttings removed during advancement of the borehole are to be contained within a segregated area of the site as approved by the Owner.
- C. The Geologist and County will determine if a camera survey will be performed. If authorized, a camera survey shall be performed in accordance with Section 33 11 16 – Camera Survey and Alignment and will be paid at the lump sum bid amount. It is the Contractor's responsibility to prepare the test hole for a camera service.
- D. Following completion of the test hole, airlifting and groundwater sampling shall be conducted in accordance with Section 33 11 15 – Test Hole Water Quality Sampling.

3.3 WELL DESTRUCTION

- A. If upon completion of the test hole and sampling the Geologist determines the test hole to be inadequate, the hole shall be destroyed as directed by the Geologist. The Contractor shall destroy the test hole in conformance with the specifications of Fresno County, the California Water Well Standards (including Department of Water Resources Bulletins 74-81 and 74-90), and local and State permits and ordinances for abandonment of test wells.
- B. The Contractor shall restore the site to original condition to those prior to drilling.

3.4 FRACTURE SEALING

- A. As determined by the Geologist based on test hole composite and/or fracture water quality sampling, production well construction may include sealing of fractures. Fracture(s) to be sealed may be in one of three different zones, generally referred to as the upper, middle, and lower fracture zones.
- B. Lower Zone Fracture Sealing: If the chemical data indicates that water of poor quality is being produced from the bottom of the well, then the bottom fractures will be sealed by using a tremmie line to place a cement slurry seal from the bottom of boring to 10 feet above the top of the fracture(s).

- C. Middle Zone Fracture Sealing: If a fracture with poor water quality is encountered that has fractures of good chemical quality above it and below it, then the fracture will be sealed using the following method. First the test hole will be backfilled with approved gravel or well abandonment rock to approximately 10 feet below the fracture to be sealed. Approximately 5 feet of bentonite in 3/8 inch chips will be placed above the approved gravel or well abandonment rock. This will allow quick setting cement slurry to be placed under pressure using a tremmie line in the test hole across the fracture, while leaving the preferred fractures open. The sand cement slurry will continue to be placed until it is approximately 10 feet above the fracture(s) to be sealed in order to ensure the fracture(s) are completely sealed. A minimum of 24 hours after the cement slurry has been placed, the “plug” of sand cement, bentonite chips, and gravel shall be re-drilled allowing access to the water of good chemical quality below.
- D. Upper Zone Fracture Sealing: If an upper fracture has poor quality water it can be sealed using two methods.
 - 1. If the fracture is close to the bottom of the annular seal, the annular seal and casing can be pulled and the 12-inch boring and annular seal extended to below it.
 - 2. If it is not viable to extend the annular seal to below the fracture, the hole will be backfilled with approved gravel or well abandonment rock to approximately 10 feet below the fracture. Approximately 5 feet of bentonite in 3/8 inch chips will be placed above the approved gravel or well abandonment rock. This will allow quick setting sand cement slurry to be placed under pressure using a tremmie line in the test hole across the fracture, while leaving the preferred fractures open. The sand cement slurry will continue to be placed until it is approximately 10 feet above the fracture(s) to be sealed. A minimum of 24 hours after the cement slurry has been placed, the “plug” of sand cement, bentonite chips and abandonment rock shall be re-drilled allowing access to the water of good chemical quality below. The borehole fill material will be removed to allow access for a pump.

3.5 RE-DRILLING HOLE

- A. If gravel is used to protect lower fracture zones while upper or middle fracture zones are sealed, the test hole shall be re-drilled to a depth as determined by the Geologist. Continuous 24/7 drilling is not permitted unless otherwise approved by the County of Fresno. The exact depth of drilling shall be determined by the Geologist after the test hole is completed and all information interpreted.
- B. Once the re-drill is complete, the bore hole shall be airlifted for a minimum of four (4) hours to remove the drilling fluid and any cuttings caked to the side of the drilled hole.
- C. If additional casing is installed, the casing installation shall be by methods that will ensure no damage to the casing or the hole.

- D. Except when drilling is in progress, casing is being installed, or gravel is being placed, the top of the well shall be kept securely capped, both day and night, to effectively prevent tampering or entrance. Upon completion of well construction and testing, a steel top plate shall be installed on the top of the well casing. The plate shall be welded around the full circumference.

3.6 WELL WATER SAMPLES

- A. Water samples may be collected during drilling and at the conclusion of the pump test. The Contractor shall cooperate with the Geologist who will collect the samples.

3.7 CASING CLOSURE

- A. Upon completion of work on the well, the production well shall be capped by welding a 1/4-inch steel plate over the top of the well casing, until such time the Contractor is ready to install the pump.

3.8 CLEANUP

- A. Material created during drilling operations shall be stockpiled within the well sites. At the completion of work, the stockpiled material shall be removed or graded in accordance with Madera County standards. All temporary fencing shall be removed.

END OF SECTION

SECTION 33 11 15

TEST HOLE WATER QUALITY SAMPLING

PART 1 GENERAL

1.1 SUMMARY

- A. The work of this section includes the labor, equipment, materials, and appurtenances necessary to facilitate water quality sampling for one to two (1 to 2) test holes. The work includes furnishing and installing pump and appurtenances to facilitate pumped composite groundwater sampling, as well as furnishing and installing packer assemblies, pump, and appurtenances for discrete groundwater fracture sampling, as authorized by the Geologist.

PART 2 PRODUCTS

2.1 MATERIALS

- A. No chemical or product shall be added to or come in contact with drinking water unless it is certified to meet NSF 60 for direct additives or NSF 61 for indirect additives.

2.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery of products shall be scheduled for timely installation.
- B. Products shall be delivered in manufacturer's original, unbroken containers, clearly and fully marked and identified as to the manufacturer, item, installation, location and instructions for assembly, use, and storage.
- C. Products shall be stored in a location to avoid physical damage. Protect and handle all materials in accordance with manufacturer's recommendations and written instructions.
- D. All equipment shall be disinfected on site prior to use.

2.3 EQUIPMENT FOR COMPOSITE GROUNDWATER SAMPLING

- A. The Contractor shall furnish and install airlift equipment or submersible pump, discharge piping, and appurtenances, as approved by the Geologist.
- B. Upon completion of the composite groundwater sampling, the Contractor shall remove the airlift equipment or pump, and appurtenances, as directed by the Geologist.

2.4 EQUIPMENT FOR DISCRETE GROUNDWATER SAMPLING

- A. The Contractor shall furnish and install packer assembly, submersible pump, discharge piping, and appurtenances, as approved by the Geologist.

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- B. Packer assembly shall be properly inflated to minimize intrusion of groundwater from fractures not within the discrete zone to be sampled.
- C. Discrete sampling may be repeated for up to three zones within each test hole.
- D. Upon completion of the discrete groundwater sampling, the Contractor shall deflate and remove the packer assembly, and remove the pump and appurtenances, as directed by the Geologist.

PART 3 EXECUTION

3.1 GROUNDWATER SAMPLING

- A. Following completion of the test hole to its total depth, and prior to groundwater sampling, the borehole shall be developed by airlift method until the water being produced from the borehole is relatively free of fine materials (approximately four hours). The Contractor shall estimate the total volume of groundwater being produced from the borehole on gallon per minute basis.
- B. Groundwater samples may be collected from the test hole in two phases as explained below.
- C. Composite Groundwater Sampling
 - 1. A composite groundwater sample shall be collected upon completion of drilling. The test hole shall be airlifted until water being produced is relatively clean. The Contractor shall provide a safe location or sampling port from which groundwater samples will be collected. The Geologist shall collect groundwater samples and place them in appropriate sampling bottles.
- D. Discrete Groundwater Fracture Sampling
 - 1. After the test hole has been drilled to its maximum depth and has been airlifted until relatively clean water is being produced, depending on results of composite water quality sampling, depth-discrete groundwater samples may be collected. Up to three (3) depth-discrete groundwater samples may be collected from each test hole, with the use of a packer system (straddle-packer or single packer), from fractures zones previously identified during the drilling process. Packer placement shall be determined by the Geologist based on review of the camera survey.
 - 2. Groundwater samples will be collected and placed in appropriate sampling bottles by the Geologist. The Contractor will be responsible for providing a safe location or sampling port, from which the depth-discrete groundwater samples will be collected.
 - 3. The Contractor must consider the ambient resistance pressure required to inflate the packers to the diameter of the test hole, and must calculate the hydrostatic pressure being placed on the packer assembly at the depth being sampled so that proper sealing of the test hole will take place. When

TEST HOLE WATER QUALITY SAMPLING

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the depth-discrete sampling is completed, at a particular depth, the Contractor should insure that the packer assembly is fully deflated before attempting to move the packer assembly to the next sampling interval. To minimize the risk of leakage in the pressurizing-tube for the inflatable packers the tube should be continuous from ground-surface to the bottom of the test hole without any spliced joints.

3.2 *CLEANUP*

- A. Pumps, packer assemblies, and discharge piping used for groundwater sampling shall be removed from the site upon completion of sampling.

END OF SECTION

SECTION 33 11 16

CAMERA SURVEY AND ALIGNMENT

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes equipment, materials, and procedures required to perform camera surveys and ensure the borehole is aligned. The Contractor shall secure the services of a firm, approved by the Geologist, to conduct the camera survey(s).
- B. Related Specification Sections
 - 1. Section 33 11 14 – Test Hole Drilling and Water Well Construction

1.2 QUALITY ASSURANCE

- A. Referenced Standards
 - 1. State of California
 - a. Bulletin 74-81 and 74-90 Water Well Standards
 - 2. American Petroleum Institute (API) standards
 - a. Standards for calibration of equipment
 - 3. ANSI/AWWA A100-06, Standard for Water Wells

1.3 SUBMITTALS

- A. The Contractor shall provide a Subcontractor list including the name and qualifications of the firm retained to perform the camera survey, if not performed by the driller.
- B. Two copies of the completed video camera survey on USB drives shall be provided to the Geologist within 48 hours after the survey is complete.
- C. Upon review of the video of the camera survey, if the Geologist determines that any portion of the video record is incomplete or of inadequate quality or clarity to allow visual inspection of the inside of the test hole, the Contractor shall perform the camera survey again, at his expense. Clarity should be of sufficient quality to evaluate the integrity of all joints and fractures as well as changes in the boring rock type.
- D. Borehole alignment shall be confirmed when the 3 or 4 inch pump with a 5 inch diameter centralizer is ran into the borehole for water quality testing. A 5-inch diameter centralizer shall be affixed to the pump drop pipe immediately above the pump. The pump and centralizer assembly shall then be lowered to the required

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depth, possibly the bottom of the borehole, and shall be able to pass cleanly, without obstruction or undue contact the borehole wall to a depth specified by the Geologist. The contractor shall arrange with the Geologist to witness this process.

1.4 PRODUCT DELIVERY

- A. Products shall be delivered in manufacturer's original, unbroken containers, clearly and fully marked and identified as to the manufacturer, item, installation, location and instructions for assembly, use, and storage.
- B. Products shall be stored in a location to avoid physical damage. Protect and handle all materials in accordance with manufacturer's recommendations and written instructions.

1.5 NOTIFICATION

- A. The Contractor shall give notice to the Geologist of specific operations as follows:
 - 1. At least twenty-four (24) hours advance notice of camera survey.
 - 2. At least twenty-four (24) hours advance notice of running the pump and centralizer assembly.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Video Camera Survey
 - 1. The camera used for the survey shall be equipped with centralizers. The equipment used for the camera survey shall produce a video with an automatic depth indication.
 - 2. The video camera survey shall be in color and provide for the use of a focusing side scan lens as well as a down view mode
- B. Alignment
 - 1. The Contractor shall test the test well for alignment as described above by running a 3 or 4 inch pump with a 5-inch centralizer affixed immediately above the pump to the lowest water bearing fracture which may be to the total depth of the borehole.
 - 2. If the pump and centralizer assembly should fail to move freely throughout the length of the test hole, the test hole shall be subject to rejection by the Geologist.

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PART 3 EXECUTION

3.1 VIDEO CAMERA SURVEY

- A. During the downward pass, the entire depth of the test hole shall be surveyed using the down view mode. The maximum speed of the camera survey shall not exceed 30 feet per minute. Any fractures, changes in rock type, or anomalies encountered shall be thoroughly viewed in the downward position and be noted for detailed inspection on the upward pass.
- B. On the upward pass, the entire depth of test hole shall be surveyed using the side scan mode. At the depth of any fractures, changes in rock type, or anomalies noted in the downward pass, upward motion of the camera shall be stopped and the area shall be inspected.
- C. The video camera survey will be run in the presence of the Geologist.

3.2 ALIGNMENT

- A. The test hole shall be constructed plumb and true allowing for the installation of a four-inch (4") motor and pump and 5 inch centralizer, as described above.
- B. Alignment must be satisfactory for successful operation of permanent pumping equipment.
- C. Should the pump, motor and centralizer assembly fail to move freely, the test hole shall be subject to rejection by the Geologist, or the Contractor shall undertake corrective measures.
- D. Should the test hole fail to meet alignment requirements, the Geologist will designate a location for a new hole. The new test hole shall be drilled at expense of the Contractor.

END OF SECTION

SECTION 33 13 00

DISINFECTION OF WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Disinfection of all new potable piping, components, and appurtenances.
- B. This shall include disinfection of all potable water piping, well, hydropneumatic tank, finished water storage tank, and pumps.
- C. New facilities shall be kept isolated from the active distribution system using a backflow, double check valve device per ANSI/AWWA C651 - Disinfecting Water Mains.
- D. Before allowing water from the municipal supply system to enter the new potable water system, all its components shall be cleaned and disinfected.
- E. Test and report results. Cost of all testing shall be borne by the Contractor.
- F. Connect new system and existing water distribution mains, after all required test are satisfactory and approved by the Engineer.

1.2 RELATED WORK

- A. Section 40 05 00 – Pipe and Fittings

1.3 REFERENCE

- A. ANSI/AWWA C651 – Disinfecting Water Mains
- B. ANSI/AWWA C652 – Disinfection of Water Storage Facilities
- C. ANSI/AWWA C654 – Disinfection of Wells

1.4 SUBMITTALS

- A. Submit five copies of each compliance report to Engineer. Reports shall include the following information:
 - 1. Disinfection report; accurately record:
 - a. Type and form of disinfectant used.
 - b. Date and time of disinfectant injection start and time of completion.
 - c. Test locations.
 - d. Initial and 24-hour disinfectant residuals in parts per million (ppm) for each location tested.

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- e. Date and time of flushing start and completion.
 - f. Disinfectant residual after flushing in ppm for each location tested.
 - g. Persons present during the disinfection operation.
2. Bacteriological report; accurately record:
- a. Date issued, project name, and testing laboratory name, address, and telephone number.
 - b. Time and date of water sample collection.
 - c. Name of person collecting samples.
 - d. Test locations.
 - e. Initial and 24-hour disinfectant residuals in ppm for each location tested.
 - f. Coliform bacteria test results for each location tested.
 - g. Certification that water conforms, or fails to conform, to bacterial standards of the California State Water Resources Control Board.
 - h. Bacteriologist's signature.
- B. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

1.5 *QUALITY ASSURANCE*

- A. Testing laboratory certified with the State of California for examination of drinking water.
- 1. Testing laboratory shall be selected by the Contractor and approved by the Owner.
 - 2. All samples shall be gathered and tested by said Laboratory.
 - 3. Contractor shall instruct the testing laboratory to provide the test results to the Engineer immediately upon results and a copy of the written report sent directly to the Engineer.

PART 2 PRODUCTS

2.1 *CHLORINE*

- A. All disinfectant chemicals shall be certified to ANSI/NSF Standard 60
- B. Chlorine-bearing compounds:

1. Calcium hypochlorite (comparable to commercial products known for example as HTH, Perchloron, and Pittchlor, sold for swimming pool chlorination).
2. Sodium hypochlorite (liquid bleach, sodium hypochlorite in powder or tablet form for pool chlorination).

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that system has been cleaned, inspected, and pressure tested.
- B. If a chlorine-bearing compound is to be used, the calcium hypochlorite or sodium hypochlorite shall be prepared as a water mixture before introduction into the potable water piping system. The powder shall first be made into a paste and then thinned to approximately a 1- percent chlorine solution (10,000 ppm). The preparation of 1- percent chlorine stock solution requires the following proportions of powder to water:

<u>Product</u>	<u>Amount of Compound</u>	<u>Quantity of Water (Gals)</u>
High-test Calcium Hypochlorite (65 to 70 percent Cl)	1 lb.	7.50
Sodium Hypochlorite liquid (5.25 percent Cl)	1 gal.	4.25

3.2 APPLICATION

- A. Provide and attach equipment required to execute work of this Section. This may include:
 1. A solution-feed chlorination device.
 2. A device to regulate rate of flow and provide effective diffusion of the gas into the water within the pipe being tested. Chlorinating devices for feeding solutions of the chlorine gas or the gas itself into the water shall provide means for preventing the backflow of water into the chlorine cylinder.
- B. Preliminary Flushing: Before disinfection, the system with outlets open shall be flushed thoroughly with water. Flushing shall be done after the pressure test has been made. Flushing shall develop a velocity in pipes of at least 2.5 feet per second (fps).
- C. Point of Application: The preferred point of application of the chlorinating agent is at the beginning of the pipeline extension of any valved section, and through a corporation stop inserted by the Contractor (except in new distribution systems) in the top of the newly laid pipe. The water injector for delivering the chlorine-bearing

water into the pipe shall be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension.

- D. Retention Period: Treated water shall be retained for at least 24 hours.
- E. Chlorinating Valves and Hydrants: In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.
- F. Chlorinating water services: Water meters and services lines can be sprayed or swabbed with chlorine per AWWA C651, Section 4.11.3.1.
- G. Circulate and flush repeatedly until specified cleanliness is achieved. Before being placed in service, all new mains and repaired portions of, or extensions to, existing mains shall be chlorinated so that a chlorine residual of not less than 25 mg/l free available chlorine remains in the water after 24 hours standing in the pipe.
- H. Disposal of flushed chlorinated water shall be at the responsibility of the Contractor. If Contractor chooses to flush water in the local storm drain system, water shall be dechlorinated as described in AWWA C655.

3.3 TESTS

- A. Samples shall be tested in accordance with ANSI/AWWA C651 for water mains, C652 for bolted steel storage tanks and hydropneumatic tanks, and C654 for wells.
- B. Test shall be taken no more than 10 days prior to the system being placed into service.
- C. If disinfection fails to produce satisfactory test results, the new pipes and facilities may be re-flushed and retested. If samples taken after re-flushing also fail to produce satisfactory results, sections represented by those results shall again be disinfected and retested. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

END SECTION

SECTION 40 05 00

PIPE AND FITTINGS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnish, install, and test all water, utility, pipe, fittings, and appurtenances as indicated and as specified.

1.2 RELATED WORK

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 09 90 00 - Painting and Coating
- C. Section 31 05 00 – Common Work Results for Earthwork
- D. Section 31 23 17 – Trenching, Backfilling, and Compacting
- E. Section 40 05 23 – Valves and Appurtenances
- F. Section 40 20 10 – Pipe Supports

1.3 REFERENCES

- A. California Plumbing Code
- B. American Water Works Association Standards

1.4 SUBMITTAL REQUIREMENTS

- A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's catalog data. Show manufacturer's model number.
- C. Submit dimensions including wall thickness and materials of construction by reference standard and grade. Submit information on interior and exterior coatings as applicable.

1.5 QUALITY ASSURANCE

- A. All work performed under this section shall meet all recommendations and requirements of AWWA, California Plumbing Code, NFPA 24, ASTM D2774, and all other applicable national, state, local, standards and regulations.

1.6 MATERIALS

- A. All materials in contact with potable water shall be certified to ANSI/NSF Standard 61.

PART 2 PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. Pipe shall be high molecular weight, high-density polyethylene pipe. The material shall conform to AWWA C901, PPI designation PE 4710 in conformance with ASTM D 3350 for pipe ¾-inch to 3-inch in diameter. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of same specification from the same raw material pipe.
- B. Pipe shall be rated for 200 PSI working pressure
- C. The pipe inside diameter shall not be less than the nominal diameter specified or shown. Pipe shall be iron pipe size (IPS) or copper tubing size (CTS) as specified on the plans.
- D. Unless shown otherwise on the Plans, the pipe dimension ratio shall be SDR 11 for pipes 10 inches and less.
- E. All joints for the buried polyethylene pipe shall be of the thermal fusion type.
- F. Polyethylene fittings shall conform to ASTM D-3261. Each fitting shall be clearly labeled to identify its size and dimension ratio.

2.2 STEEL PIPE

- A. General: Steel pipe 12-inches in diameter and smaller shall conform to the requirements of the "Specifications for Black and Hot-Dipped Zinc-Plated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses (ASTM A53), and shall be "Standard Weight" Steel Pipe larger than 12 inches in diameter shall be ASTM A139, AWWA C200, wall thickness not less than 0.18 inches.
- B. Joints: Pipe 4-inches in diameter and larger shall be flanged or shall have grooved ends for Victaulic-type couplings. Where shown on the Plans, the pipe shall be flanged or plain end for flanged coupling adapters. Flanges shall be standard 150 psi flanges meeting the requirements of ANSI B16.1. Flanges shall be furnished with flat faces. Pipe smaller than 4 inches shall have screwed or grooved joints unless shown otherwise on the Plans.
- C. Fittings: All fittings shall be flanged cast or ductile iron, screwed malleable iron, or Victaulic-type fittings. The Contractor may substitute Victaulic-type fittings for flanged fittings or screwed fittings unless the particular joint requires a specific end for compatibility with a valve or special fitting. All Victaulic-type fittings shall be of strength equal to the pipes with lining and coatings equivalent to that specified for the pipe.
- D. Unless otherwise specified or noted in the Plans, all steel pipe 2-1/2 inch and smaller shall be Hot-Dipped galvanized, and pipes larger than 2-1/2 inch shall be black steel with epoxy or lining with minimum 10 mil dry thickness. Exterior surfaces of all pipe shall be shop primed. Finish coatings shall be as specified in Section 09 90 00 - Painting.

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2.3 POLYVINYL CHLORIDE SCHEDULE PIPE

- A. The material used in the manufacture of the pipe shall be domestically produced rigid polyvinyl chloride (PVC) compound, Type I Grade I, with a Cell Classification of 12454 as defined in ASTM D1784, trade name designation H707 PVC. This compound shall be gray in color as specified, and shall be approved by ANSI/NSF International for use with potable water (NSF Std 61).
- B. PVC pipe shall be manufactured in strict accordance to the requirements of ASTM D1785 for physical dimensions and tolerances. Each production run of pipe manufactured in compliance to this standard, shall also meet or exceed the test requirements for materials, workmanship, burst pressure, flattening, and extrusion quality defined in ASTM D1785. All belled-end pipe shall have tapered sockets to create an interference-type fit, which meet or exceed the dimensional requirements and the minimum socket length for pressure-type sockets as defined in ASTM D2672. All PVC Schedule 80 pipe must also meet the requirements of NSF Standard 14 and CSA Standard B137.3 rigid PVC pipe for pressure applications, and shall bear the mark of these Listing agencies. This pipe shall have a flame spread rating of 0-25 when tested for surface burning characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.
- C. Product marking shall meet the requirements of ASTM D1785 and shall include: the manufacturer's name (or the manufacturer's trademark when privately labeled); the nominal pipe size; the material designation code; the pipe schedule and pressure rating in psi for water @ 73°F; the ASTM D1785; the independent laboratory's seal of approval for potable water usage; and the date and time of manufacture.

2.4 STAINLESS STEEL TUBING

- A. Stainless steel tubing shall be made of Type 316 L stainless steel to the requirements of ASTM A269, of minimum 1/4-inch inside diameter, or as indicated, for the test pressure required. The fittings shall be swage ferrule design of Type 316 L stainless steel, of the double acting ferrule design, providing both a primary seal and a secondary bearing force. Flare bite or compression type fittings are not acceptable.

2.5 CHEMICAL PIPING AND TUBING

- A. Unless otherwise noted on the drawings, chemical piping shall be Schedule 80 PVC or CPVC in accordance with Section 40 20 90. Piping called out as secondary containment piping shall conform to Section 40 24 68.
- B. Where tubing inside of EPVC is called out on the drawings, chemical tubing and conduit shall be as follows:
 - 1. EPVC shall consist of Schedule 80 PVC conduit or pipe utilizing long radius sweep elbows.
 - 2. Chemical dosing tubing shall consist of FDA compliant PTFE tubing with a minimum working pressure of 90 psi at 150°F. HDPE, PVC, or PVDF tubing may be substituted provided that they meet the minimum working pressure

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requirement and are certified by the manufacturer to be suitable for the chemical service with an “excellent” chemical compatibility rating.

3. Sample tubing shall consist of odorless, tasteless, flexible black polyethylene tubing. Minimum operating pressure shall be 125 psi up to ½-inch in size and shall be ¼ of the burst pressure of the tubing. Tubing shall comply with ASTM D1248, Type I, Class A, Category 4, Grade E and shall be certified to ANSI/NSF Standard 61.
4. Fittings for tubing shall be compression type fittings rated at 150 psi minimum and constructed of a material compatible with the chemical service.

2.6 FLANGED JOINTS

- A. Flange shall conform to ANSI B16.5, Class 150.
- B. All steel hardware installed underground shall be coated with a rust preventative, wrapped with 8 mil polyethylene sheeting, and secured with PVC tape.
- C. Gaskets shall meet the pressure requirements of the adjoining flanges and shall conform to AWWA C-207. Gaskets for flat faced flanges shall be 1/8-inch thick.
- D. Gaskets for metallic pipe and non-potable 150 psi or less services shall be acrylic or aramid fiber bound with nitrile; Garlock Blue-Gard 3000 or equal. EPDM rubber gaskets, Garlock 98206 or equal, are also acceptable.
- E. Gaskets for metallic pipe and potable water service shall be NSF/ANSI-61 certified EPDM rubber, Garlock 98206 or equal.
- F. Gaskets for non-metallic flat faced flanges shall be constructed of a fluoroelastomeric material with a hardness of 70 durometer designed specifically for lower seating stress. Gaskets shall be certified to NSF/ANSI-61 for potable water service. Gaskets shall be Garlock Style XP or equal.

2.7 TRACER WIRE

- A. Install No. 10 solid-core copper tracer wire.

2.8 CONCRETE FOR THRUST BLOCKS

- A. As specified in Section 03 30 00 – Cast-In-Place Concrete. Thrust blocks shall be used only where specifically permitted on the drawings or with pre-approval from the Engineer.

2.9 JOINT RESTRAINT COUPLINGS

- A. Mechanical joint restraint coupling shall be of the type that utilizes the follower gland, and shall consist of several individual lug bolts with gripping mechanism that prevents the joints from pulling apart. Glands shall be ductile iron conforming to ASTM A536, and dimensions shall be compatible to be used with standard mechanical joint fittings for ductile rim pipe. The mechanical restraint joint shall have a minimum working pressure rating equal to that of the pipe with a safety factor of

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not less than 2. Restrained joints shall have twist off nuts to insure proper installation of restraining grip mechanism. Mechanical joint restrained coupling shall be EBAA, Iron, Inc. MEGALUG; with Mega-Bond coating; or approved equal. Coating of gland follower body shall be electrostatically applied and heat cured polyester based powder. Wedge assemblies and bolts shall be coated with heat cured fluoropolymer coatings. Restraints shall be designed for the specific type of pipe to be restrained.

- B. Restrained joint fittings shall meet Uni-B-13 for PVC and be FM and UL approved through 12-inch for both ductile iron and PVC.
- C. Restrained joint fittings for high density polyethylene pipe shall be Victaulic 995 or 997 style coupling.

2.10 FASTENERS

- A. All fasteners shall include washers under both bolt head and nut unless the use of washers is incompatible with the fitting design.
- B. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located underground or submerged in liquid shall be Type 304 or 316 stainless steel per ASTM A320 or ASTM A193. Nuts shall be 304 or 316 stainless steel per ASTM A194 and washers shall be ASTM F436 Type 3.
- C. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located indoors, above grade, and in vaults shall be carbon steel conforming to ASTM A307, Grade B with ASTM A563, Grade A nuts and ASTM F436 washers. Bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM F2329. Stainless steel meeting the requirements of Paragraph B shall also be acceptable.

PART 3 EXECUTION

3.1 HANDLING AND DISTRIBUTION OF MATERIALS

- A. Delivery: Handle pipe carefully to ensure delivery at the project site in sound, undamaged condition. Contractor shall replace damaged pipe at no additional expense to the Owner.
- B. Storage: Do not store materials directly on the ground. Adequately support piping to prevent warping. Use protective covers where pipe may be damaged by direct sunlight.
- C. No more than one week's supply of material shall be distributed in advance of pipe laying operations, unless otherwise approved or required.
- D. Before laying, pipe shall be inspected for cracked, broken, or defective pieces. Such pieces shall be rejected. Pipe shall be carefully lowered into the trench to prevent damage. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench.

3.2 COATING

- A. Unless otherwise indicated in Part 2, all pipe and fittings shall be coated in accordance with specification 09 90 00.

3.3 INSTALLATION OF BURIED PRESSURE PIPING

- A. General: Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and in accordance with the following references as appropriate:
 - 1. Ductile Iron Pipe - AWWA C600
 - 2. Polyvinyl Chloride Pipe and HDPE pipe - AWWA C605
 - 3. Steel Pipe – AWWA C604
- B. Handling: The pipe shall be protected to prevent entrance of foreign materials during laying operations. When laying is not in progress, open pipe ends shall be protected with a watertight plug or other approved means to exclude water or foreign material.
- C. Alignment:
 - 1. Mains shall be installed to the grades and elevations indicated and shall have a minimum cover of 30-inches from the top of the pipe to existing ground or paved surface unless otherwise indicated.
 - 2. The allowable angle of deflection at any joint shall not exceed the amount recommended by the pipe manufacturer for the particular pipe size used. Deviation of any pipe section from the line and grade indicated shall not exceed 1/2-inch.
- D. Joints:
 - 1. Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are assembled. The ends of each pipe shall abut against the next pipe section in such a manner that there shall be no unevenness of any kind along the bottom half of the interior of the pipe. Where mechanical joints are used, the pipe shall be marked in such a manner that it can be determined after installation that the pipe is properly seated.
 - 2. Where flexible couplings are used as expansion joints, the ends of the pipes shall be separated 1-inch to allow for expansion. The welded seam at the end of each coupled steel pipe shall be ground smooth for approximately 12-inches. Couplings shall be centered on pipe ends. Runs of pipe containing flexible couplings shall be properly blocked, anchored or tied to the structure to prevent joints from separating.

3. Mechanical restrained joints shall be installed in accordance with joint manufacturer's instructions and recommendation.
- E. Installation of Marker Tape: Install tape in backfill directly over each pipeline, 24 inches over top of pipe, unless shown otherwise on the Plans. Where utilities are buried in a common trench, identify each line by a separate marker tape. Place tapes directly over the applicable line.

3.4 *THRUST BLOCKS OR MECHANICAL RESTRAINED JOINTS*

- A. Thrust blocks shall be used only where specifically allowed on the drawings or with prior approval by the Engineer.
- B. When it is necessary to restrain push-on joints adjacent to restrained fittings, a harness restraint device shall be used. All harnesses shall have a pressure rating equal to that of the pipe on which it is used. Harness assemblies including tie bolts conform to ASTM A536.

3.5 *INSTALLATION OF EXPOSED PIPING*

- A. General - Pipe shall be installed as specified, as indicated on the Plans or, in the absence of detail piping arrangement, in a manner acceptable to the Engineer.
- B. Pipe shall be cut from measurements taken at the site and not from the Plans. All necessary provisions shall be taken in laying out piping to provide throughout for expansion and contraction. Piping shall not obstruct openings or passageways. Pipes shall be held free of contact with building construction so as not to transmit noise resulting from expansion.
- C. The inside of all pipe, valves, and fittings shall be smooth, clean, and free from blisters, loose mill scale, sand, dirt, and other foreign matter when erected. The interior of all lines shall be thoroughly cleaned, to the satisfaction of the Engineer, before being placed in service.
- D. Stuffing box leakage from water sealed pumps shall be contained and not allowed to into storm drains.
- E. Taps for pressure gauge connections on piping and equipment shall be provided with a nipple and a ball type shutoff valve. Drilling and tapping of pipe walls for installation of pressure gauges or switches will not be permitted.
- F. A union shall be provided within 2 feet of each end of threaded end valves unless there are other connections that facilitate easy removal of the valve. Unions shall also be provided in piping at locations adjacent to devices or equipment that may require removal in the future and at locations required by the Plans or other sections of the Specifications.
- G. Provide unions on exposed piping and tubing 3-inches and smaller as follows:
 1. At every change in direction (horizontal and vertical).
 2. Downstream of valves, 6 to 12 inches.

3. As shown on plans.
- H. In all piping except air piping, insulating fittings shall be provided to prevent contact of dissimilar metals.
- I. Pipe Joints - Pipe joints shall be carefully and neatly made in accordance with the requirements that follow.
 1. Threaded - Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be full and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed, after threading and before assembly, to remove all burrs.

Threaded joints in plastic piping shall be made up with Teflon thread tape applied to all male threads. Threaded joints in stainless steel piping shall be made up with Teflon thread sealer and Teflon thread tape applied to all male threads. At the option of the Contractor, threaded joints in other piping may be made up with Teflon thread tape, thread sealer, or a suitable joint compound. Thread tape and joint compound or sealers shall not be used in threaded joints that are to be seal welded.

Threaded joints in steel piping for chlorine service shall be made up with Teflon thread tape or paste applied to all male threads.

2. Compression - Ends of tubing shall be cut square and all burrs shall be removed. The tubing end shall be fully inserted into the compression fitting and the nut shall be tightened not less than 1-1/4 turns and not more than 1-1/2 turns past finger tight, or as recommended by the fitting manufacturer, to produce a leak tight, torque-free connection.
3. Flared - Ends of annealed copper tubing shall be cut square and all burrs shall be removed prior to flaring. Ends shall be uniformly flared without scratches or grooves. Fittings shall be tightened as required to produce leak tight connections.
4. Soldered and Brazed - Where solder fittings are specified for lines smaller than 2 inches, joints may be soldered or brazed at the option of the Contractor. Joints in 2 inch and larger copper tubing shall be brazed.
5. Flanged - Flange bolts shall be tightened sufficiently to slightly compress the gasket and effect a seal, but not so tight as to fracture or distort the flanges. A plain washer shall be installed under the head and nut of bolts connecting plastic pipe flanges. Anti-seize thread lubricant shall be applied to the threaded portion of all stainless steel bolts during assembly. Connecting flanges shall have similar facings, i.e., flat or raised face.
6. Welded - Welding shall conform to the specifications and recommendations contained in the "Code for Pressure Piping", ANSI B31.1.
7. Grooved Couplings - Grooves for grooved couplings shall be cut with a specially designed grooving tool. Grooves cut in steel pipe shall conform to

flexible grooving dimensions as set forth in AWWA C606 and shall be clean and sharp without burrs or check marks.

3.6 ACCEPTANCE TESTS FOR BURIED PRESSURE PIPING

A. General

1. All testing and inspection shall be performed after final backfill and compaction operations are complete. If the Contractor so desires, he may pretest the lines at his own expense, but final testing must be performed after compaction requirements have been approved.

B. In general, tests shall be conducted in accordance with AWWA C600 and C651 except as otherwise herein specified.

C. All newly installed sections of buried pressure piping shall be pressure and leakage tested as described herein.

1. For buried pressure pipelines, tests shall be made on two or more valved sections not to exceed 2,500 feet in length. The Contractor shall furnish all necessary equipment, material and labor required.
2. Tests shall be made after the trench has been backfilled and compacted, but not until at least 5 days have elapsed since any thrust blocks in the section have been poured.
3. The pipe shall be slowly filled with water and ensuring all air expelled from section being tested. The line shall stand full of water for at least twenty-four hours prior to testing to allow all air to escape. A test pressure equal to 1.5 times the design pressure, of the pipe measured at the point of lowest elevation pressure, or 100 psi, whichever is greater, shall be applied.
4. The test pressure in the line shall be maintained for a period of 2 hours. Test pressure shall be maintained within 5 psi during the test period. Conduct a leakage test concurrently with the pressure test. Leakage is defined as the volume of water that must be supplied into the newly laid pipeline to maintain pressure within +/- 5 psi of the test pressure after it is filled and purged of air. The water required to maintain test pressure shall be measured by means of a graduated barrel, drum, or similar device at the pump suction or through a meter.

Allowable leakage at the specified test pressure shall not exceed the amounts allowed by AWWA C600, $L = \frac{SD\sqrt{P}}{148,000}$

Where:

L = Allowable fluid loss, in gallon per hour.

S = Length of pipe tested, in feet.

D = Nominal diameter of the pipe, in inches.

P = Average test pressure during the hydrostatic test, in pounds per square inch (psi).

Hydrostatic testing allowance per 1,000 ft. of pipeline in gph.

PSI	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
200	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29
175	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15
150	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99
125	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81
100	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62

5. Should testing disclose any visible leaks or leakage greater than that allowed, the defective joints or pipe shall be located, repaired, and re-tested until satisfactory. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

3.7 ACCEPTANCE TEST FOR EXPOSED PIPING

- A. Pipe to be Tested - All new installed piping sections shall be pressure and leakage tested as specified herein.
- B. Pressure Testing - After the section of line to be tested has been filled with water or other test media, the test pressure shall be applied and maintained without interruption for 2 hours plus any additional time required for the Engineer to examine all piping undergoing the test and for the Contractor to locate all defective joints and materials.
 1. Test medium shall be potable water for potable water piping; all other piping may be tested using plant water subject to Engineer's approval.
 2. Pipe system shall be tested at 1-1/2 times the operating pressure, or 100 psi, whichever is greater, using the appropriate test fluid medium.
 3. All piping shall be tight and free from leaks. All pipe, fittings, valves, pipe joints, and other materials that are found to be defective shall be removed and repaired or replaced with new and acceptable material, and the affected portion of the piping be retested until satisfactory. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

Compressed air or gas under pressure shall not be used to test plastic piping unless specifically recommended by the pipe manufacturer.

Leakage may be determined by loss of pressure, soap solution, chemical indicator, or other positive and accurate method acceptable to the Engineer. All fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the specified test pressure shall be disconnected and ends of the branch lines plugged or capped as required during the testing procedures.

END SECTION

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SECTION 40 05 23

VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes materials, testing, and installation of manually operated valves and check valves including gate, butterfly, ball, hose bibbs, globe, check, solenoid, vacuum breakers and flap valves.

1.2 RELATED WORK

- A. Section 05 05 20 – Bolts, Washers, Anchors, and Eyebolts
- B. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. American Water Works Association (AWWA)

1.4 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's catalog data and detail construction sheets showing all valve parts. Describe each part by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type.
- C. Show valve dimensions including laying lengths. Show port sizes. Show dimensions and orientation of valve actuators, as installed on the valves. Show location of internal stops for gear actuators. State differential pressure and fluid velocity used to size actuators. For worm-gear actuators, state the radius of the gear sector in contact with the worm and state the handwheel diameter.
- D. Show valve linings and coatings. Submit manufacturer's catalog data and descriptive literature.
- E. Submit six copies of a report verifying that the valve interior linings and exterior coatings have been tested for holidays and lining thickness. Describe test results and repair procedures for each valve. Do not ship valves to project site until the reports have been returned by the Owner's Representative and marked "Resubmittal not required."
- F. For butterfly valves, show the clear diameter or size of the port. Show the actual area of the port as a percentage of the area as calculated for the nominal valve size.

1.5 MATERIALS

- A. All materials in contact with potable water shall be certified to ANSI/NSF Standard 61.

PART 2 PRODUCTS

2.1 GENERAL

- A. Valves are identified in the drawings by size, category and type number. For example, a callout in the drawings of 6" Type-1 butterfly valve refers to Type-1 valve in the butterfly valve category in these specifications, which is a Class 125 rubber seated butterfly valve.
- B. All valves installed in potable water applications shall conform to California AB 1953 no-lead regulations and ANSI/NSF Standard 61.
- C. Install valves complete with operating handwheels or levers, chainwheels, extension stems, floor stands, gear actuators, operating nuts, chains, and wrenches required for operation.
- D. Valves shall have the name of the manufacturer and the size of the valve cast or molded onto the valve body or bonnet or shown on a permanently attached plate.

2.2 VALVE ACTUATORS

- A. Provide lever or wrench actuators for exposed valves 6 inches and smaller. For larger valves, provide handwheels.
- B. Where manually operated valves (size 4 inches and larger) are installed with their centerlines more than 6 feet 9 inches above the floor, provide chainwheel and guide actuators.
- C. Provide 2-inch AWWA operating nuts for buried and submerged valves.
- D. Provide enclosed gear actuators on butterfly valves 8 inches and larger, unless electric motorized valve actuators are shown in the drawings. Gear actuators for valves 8 through 20 inches shall be of the worm and gear, or of the traveling nut type. Gear actuators for valves 24 inches and larger shall be of the worm and gear types. Gear actuators for motorized valves shall be of the worm and gear type, regardless of size.
- E. Provide gear actuators on gate valves 14 inches and larger, unless electric motorized valve actuators are shown in the drawings. Gear actuators shall be of the bevel or spur gear type. Provide grease case. Gearing shall comply with AWWA C500.
- F. Design gear actuators assuming that the differential pressure across the plug, gate, or disc is equal to the test pressure of the connecting piping and assuming a fluid velocity of 16 fps for valves in liquid service and 80 fps for valves in air or gas service and a line fluid temperature range of 33°F to 125°F unless otherwise

VALVES AND APPURTENANCES
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required in the detailed valve specifications. Size actuators using a minimum safety factor of 1.5 for valves in open/close service and 2.0 in modulating service.

- G. Gear actuators shall be enclosed, oil lubricated, with seals provided on shafts to prevent entry of dirt and water into the actuator. Gear actuators for valves located above ground or in vaults and structures shall have handwheels. The actuators for valves in exposed service shall contain a dial indicating the position of the valve disc or plug. Gear actuators for buried or submerged valves shall have 2-inch-square AWWA operating nuts.
- H. For buried or submerged service or valves installed in buried vaults, provide watertight shaft seals and watertight valve and actuator cover gaskets. Provide totally enclosed actuators designed for buried or submerged service.
- I. Traveling nut and worm and gear actuators shall be of the totally enclosed design so proportioned as to permit operation of the valve under full differential pressure rating of the valve with a maximum pull of 40 pounds on the handwheel or crank. Provide stop limiting devices in the actuators in the open and closed positions. Actuators shall be of the self-locking type to prevent the disc or plug from creeping. Design actuator components between the input and the stop-limiting devices to withstand without damage a pull of 200 pounds for handwheel or chainwheel actuators and an input torque of 300 foot-pounds for operating nuts when operating against the stop.
- J. Handwheel diameters for traveling nut actuators shall not exceed 8 inches for valves 12 inches and smaller and shall not exceed 12 inches for valves 20 inches and smaller.
- K. Design actuators on buried valves to produce the required torque on the operating nut with a maximum input of 150 foot-pounds.
- L. Valve actuators, handwheels, or levers shall open by turning counterclockwise.

2.3 CAST IRON VALVE BOXES AND RISERS

- A. Valve boxes shall be Christy G5 with Christy Iron Covers or equal unless otherwise shown on the Drawings.
- B. Risers shall be 8-inch nominal diameter PVC pipe conforming to AWWA C900.

2.4 INDICATOR POSTS

- A. Indicator posts for buried gate valves in fire protection service shall be UL listed, FM approved for use on valves of sizes 4 through 12 inches. Provide a target or sign visible through a window on both sides of the post that indicates the open or shut position of the gate valve. Working parts shall be fully enclosed for weather protection. Body shall be cast or ductile iron. Provide post extension if trench is deeper than can be served by manufacturer's standard post. Coat buried portion of indicator posts per Section 09 90 00, System No. 21. Products: Nibco NIP-1, Stockham Figure G-951, or equal.

2.5 EXTENSION STEMS FOR BURIED AND SUBMERGED VALVE ACTUATORS

- A. Where the depth of the valve is such that its centerline is more than 4 feet below grade, provide operating extension stems to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover. Where the valve is submerged, provide operating extension stems to bring the operating nut to 6 inches above the water surface. Extension stems shall be Type 316 stainless steel, solid core, and shall be complete with 2-inch-square operating nut. The connections of the extension stems to the operating nuts and to the valves shall withstand without damage a pull of 300 foot-pounds.
- B. Extension stem diameters shall be as tabulated below:

Valve Size (inches)	Minimum Extension Stem Diameter (inches)
2	3/4
3, 4	7/8
6	1
8	1 1/8
10, 12	1 1/4
14	1 3/8
16, 18	1 1/2
20, 24, 30, 36	1 3/4
42, 48, 54	2

2.6 FLOOR STANDS, EXTENSION STEMS, AND EXTENSION STEM SUPPORT BRACKETS

- A. When required by the installations, provide floor stands and extension stems for operation of valves. Floor stands shall be of the nonrising stem, indicating type, complete with steel extension stems, couplings, handwheels, stem guide brackets, and special yoke attachments as required by the valves and recommended and supplied by the stand manufacturer. Floor stands shall be cast-iron base type: Clow, Figure F-5515; Bingham and Taylor; Stockham; or equal. Handwheels shall turn counterclockwise to open the valves.
- B. Provide Type 316 stainless steel anchor bolts.
- C. Provide steel extension stems for valves in exposed service. Provide Type 316 stainless steel stems for valves in submerged service.
- D. Provide adjustable stem guide brackets for extension stems. The bracket shall allow valve stems to be set over a range of 2 to 36 inches from walls. Provide bushings drilled to accept up to 2-inch-diameter stems. Base, arm, and clamp shall be ductile iron. Coat ductile iron components with fusion-bonded epoxy. Bushing shall be bronze (ASTM B584, Alloy C86400 or C83600). Bolts, nuts, screws, and

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washers (including wall anchor bolts) shall be Type 316 stainless steel. Provide slots in the bracket to accept 3/4-inch bolts for mounting the bracket to the wall. Products: Trumbull Industries, Inc., Adjustable Stem Guide or equal.

2.7 CHAINWHEELS AND GUIDES

- A. Chainwheels and guides shall be Clow Figure F-5680, DeZurik Series W or LWG, Stockham, or equal. Chainwheels and guides shall be galvanized iron or steel. Chains shall extend to within 4 feet of the operating floor. Chains shall be galvanized steel.

2.8 BOLTS AND NUTS FOR FLANGED VALVES

- A. Bolts and nuts for flanged valves shall be as described in Section 40 05 00.

2.9 GASKETS FOR FLANGES

- A. Gaskets for flanged end valves shall be as described in Section 40 05 00.

2.10 PAINTING AND COATING

- A. Coat metal valves located above ground or in vaults and structures the same as the adjacent piping. If the adjacent piping is not coated, then coat valves per Section 09 90 00. Apply the specified prime coat at the place of manufacture. Apply intermediate and finish coats in field.
- B. Coat buried metal valves at the place of manufacture per Section 09 90 00, System No. 7.
- C. Coat submerged metal valves, stem guides, extension stems, and bonnets at the place of manufacture per Section 09 90 00, System No. 1.
- D. Line the interior metal parts of metal valves 4 inches and larger, excluding seating areas and bronze and stainless-steel pieces. Lining shall be epoxy similar to Section 09 90 00, System No. 1. Apply lining at the place of manufacture.
- E. Alternatively, line and coat valves with fusion-bonded epoxy..
- F. Coat floor stands per Section 09 90 00.
- G. Test the valve interior linings and exterior coatings at the factory with a low-voltage (22.5 to 80 volts, with approximately 80,000-ohm resistance) holiday detector, using a sponge saturated with a 0.5% sodium chloride solution. The lining shall be holiday free.
- H. Measure the thickness of the valve interior linings per Section 09 90 00. Repair areas having insufficient film thickness per Section 09 90 00

2.11 PACKING, O-RINGS AND GASKETS

- A. Unless otherwise stated in the detailed valve specifications, packing, O-rings, and gaskets shall be one of the following non-asbestos materials:

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1. Teflon.
2. Kevlar aramid fiber.
3. Acrylic or aramid fiber bound by nitrile. Products: Garlock "Bluegard," Klinger "Klingersil C4400," or equal.
4. Buna-N (nitrile).

2.12 RUBBER SEATS

- A. Rubber seats shall be made of a rubber compound that is resistant to free chlorine and monochloramine concentrations up to 10 mg/L in the fluid conveyed.

2.13 VALVES

- A. Gate Valves:

1. Type 1 – Aboveground Bronze Gate Valves 3 Inches and Smaller:

Aboveground gate valves, 1/4 through 3 inches, for water and air service shall be rising stem, solid wedge disc type. Materials of construction shall be as follows:

Component	Material	Specification
Body and bonnet	Bronze	ASTM B61 or B62
Disc or wedge	Bronze	ASTM B61, B62, or B584 (Alloy C97600)
Stem	Bronze or copper silicon	ASTM B99 (Alloy 651), B584 (Alloy C87600), B371 (Alloy C69400)
Seat rings (Classes 200 and 300 only)	Stainless steel	AISI Type 410

Handwheels shall be aluminum, brass, or malleable iron. Packing shall be Teflon or Kevlar aramid fiber.

2. Type 2 – Aboveground Bronze Gate Valves 3 Inches and Smaller (Low Lead)

Aboveground gate valves, 1/4 through 3 inches, for water service shall be rising stem, screwed bonnet, solid wedge disc type, Class 200, having a minimum working pressure of 200 psi CWP at a temperature of 150°F and conforming to MSS SP-80. Materials of construction shall be as follows:

Component	Material	Specification
Body and bonnet, wedge	Bronze	ASTM B584, Alloy C87850, C89833, or C89836
Stem	Bronze or copper silicon	ASTM B99 (Alloy 651), B584 (Alloy C87600), B371 (Alloy C69400 or C69700)

Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above.

Handwheels shall be aluminum, brass, or malleable iron. Packing shall be Teflon or Kevlar aramid fiber. Valves shall be Nibco 113-LF or equal.

3. Type 3 - 2- and 3-Inch Cast-Iron Buried Gate Valves:

Buried gate valves of sizes 2 through 3 inches for water service shall be iron body, bronze mounted, nonrising stem type, double disc, parallel seat, and shall have a working pressure of at least 200 psi. Valves shall have flanged, PVC, or threaded ends to match the pipe ends. Valves shall have a 2-inch AWWA operating nut. Materials of construction shall be as follows:

Component	Material	Specification
Body, bonnet, operating nut, and stuffing box	Cast iron	ASTM A126, Class B or C
Bonnet bolts and stuffing box bolts	Stainless steel	ASTM A193, Grade B8M
Discs, disc nut, disc ring, and seat ring	Bronze	ASTM B62
O-ring	Synthetic rubber	
Stem	Copper silicon or manganese bronze	ASTM B584, Alloy C87600

Valves shall be Kennedy Figure 597X or 561X, Mueller Gate Valves, Clow F-5070 or F-5085, or equal

4. Type 4—Ductile-Iron Resilient Wedge Tapping Gate Valves 4 Through 16 Inches (AWWA C515):

Valves shall comply with AWWA C515 and the following. Valves shall be of the bolted bonnet type with nonrising stems. Valve stems shall be Type 304 or 316 stainless steel or cast, forged, or rolled bronze. Stem nuts shall be

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made of solid bronze. Bronze for internal working parts, including stems, shall not contain more than 2% aluminum or more than 7% zinc. Bronze shall conform to ASTM B62 or ASTM B584 (Alloy C83600), except the stem bronze shall have a minimum tensile strength of 60,000 psi, a minimum yield strength of 30,000 psi, and a minimum of 10% elongation in 2 inches (ASTM B584 or B763, Alloy C87600 or C99500). Body bolts shall be Type 316 stainless steel. Ends shall be flanged, Class 125, ASME B16.1. One end shall have slotted bolt holes per AWWA C515, paragraph 4.4.1.3.4 to fit tapping machines.

Provide reduction thrust bearings above the stem collar. Stuffing boxes shall be O-ring seal type with two rings located in stem above thrust collar. Each valve shall have a smooth unobstructed waterway free from any sediment pockets.

Valves shall be lined and coated at the place of manufacture with either fusion-bonded epoxy or heat-cured liquid epoxy. Minimum epoxy thickness shall be 8 mils.

Manufacturers: Clow, AVK, American Flow Control, Mueller, Waterous, Kennedy, or equal.

5. Type 5—Ductile-Iron Resilient Wedge Gate Valves 4 Through 36 Inches (AWWA C515):

Valves shall comply with AWWA C515 and the following. Valves shall be of the bolted-bonnet type with nonrising stems. Valve stems shall be Type 304 or 316 stainless steel or cast, forged, or rolled bronze. Provide operating nut for buried valves. Provide handwheel for exposed valves. Stem nuts shall be made of solid bronze. Bronze for internal working parts, including stems, shall not contain more than 2% aluminum or more than 7% zinc. Bronze shall conform to ASTM B62 or ASTM B584 (Alloy C83600), except the stem bronze shall have a minimum tensile strength of 60,000 psi, a minimum yield strength of 30,000 psi, and a minimum of 10% elongation in 2 inches (ASTM B584 or B763, Alloy C87600 or C99500). Body bolts shall be Type 316 stainless steel. End connections for exposed valves shall be flanged. End connections for buried valves shall be mechanical joint type.

Provide reduction thrust bearings above the stem collar. Stuffing boxes shall be O-ring seal type with two rings located in stem above thrust collar. Each valve shall have a smooth unobstructed waterway free from any sediment pockets.

Valves shall be lined and coated at the place of manufacture with either fusion-bonded epoxy or heat-cured liquid epoxy. Minimum epoxy thickness shall be 8 mils.

Manufacturers: Clow, AVK, American Flow Control, Waterous, Kennedy, or equal.

B. Butterfly Valves:

1. Thrust Bearings for Butterfly Valves:

Provide thrust bearings to hold the valve disc in the center of the valve seat. No bearings shall be mounted inside the valve body within the waterway. Do not use thrust bearings in which a metal bearing surface on the disc rubs in contact with an opposing metal surface on the inside of the body.

2. Bronze Components in Butterfly Valves:

Bronze components in contact with water shall comply with the following requirements:

Constituent	Content
Zinc	7% maximum
Aluminum	2% maximum
Lead	8% maximum 0.25% (potable use)
Copper + Nickel + Silicon	83% minimum

3. Port Sizes for Butterfly Valves:

For valves 24 inches and smaller, the actual port diameter shall be at least 93% of the nominal valve size. For valves larger than 24 inches, the port diameter shall not be more than 1.25 inches smaller than the nominal valve size. The dimension of the port diameter shall be the clear waterway diameter plus the thickness of the rubber seat.

4. Corrosion-Resistant Materials in Butterfly Valves:

Where AWWA C504 requires "corrosion resistant" material, such material shall be one of the following:

- Bronze as described above.
- Type 304 or 316 stainless steel.
- Monel (UNS N04400).
- Synthetic nonmetallic material.

5. Seating Surfaces in Butterfly Valves:

Seating surfaces in valves having motorized actuators shall be stainless steel or nickel-copper per AWWA C504 or nickel-chromium alloy containing a minimum of 72% nickel and a minimum of 14% chromium.

6. Factory Leakage Testing:

Perform factory leakage tests per AWWA C504 on both sides of the seat.

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7. Type 1—Flanged, Rubber-Seated Butterfly Valves 4 Through 72 Inches, Class 150B:

Butterfly valves shall be short body, flanged type for exposed valves and valves in vaults or structures, and either flanged or mechanical joint for buried valves. Valve shall conform to AWWA C504, Class 150B. Minimum working differential pressure across the valve disc shall be 150 psi. Flanged ends shall be Class 125, ASME B16.1. Valve shafts shall be stub shaft or one-piece units extending completely through the valve disc. Materials of construction shall be as follows:

Component	Material	Specification
Body	Cast iron or ductile iron	AWWA C504
Exposed body cap screws and bolts and nuts	Stainless steel	ASTM A276, Type 304 or 316
Discs	Cast iron, ductile iron, or Ni-Resist	AWWA C504
Shafts, disc fasteners, seat retention segments, and seat fastening devices	Stainless steel	ASTM A276, Type 304 or 316
Seat material	Buna-N	—

Where the rubber seat is applied to the disc, it shall be bonded to a stainless steel seat retaining ring which is clamped to the disc by Type 304 or 316 stainless steel screw fasteners or secured to a stainless steel seat by a combination of cap screws, a serrated disc retaining ring, and molded shoulders in the seat mating with machined registers in the disc. Valves shall be Pratt, DeZurik Series BAW, M&H, Val-Matic, or equal.

8. Type 2—Not Used.

9. Type 3—Flanged, Rubber-Seated Butterfly Valves 4 Through 48 Inches, Class 250:

Butterfly valves shall be short body, flanged type for exposed valves and valves in vaults or structures, and either flanged or mechanical joint for buried valves. Valve shall conform to AWWA C504, Class 250. Minimum working pressure across the valve disc shall be 250 psi. Flanged ends shall be Class 250, ASME B16.1, with bolt hole drilling and bolt circle to match AWWA C207. Mechanical joint ends shall comply with AWWA C111. Provide the specified end connections on each end of the valve. Minimum working differential pressure across the valve disc shall be 250 psi in either direction. Valve shafts shall be stub shaft or one-piece units extending completely through the valve disc. Where the rubber seat is applied to the disc, it shall be bonded to a stainless steel seat retaining ring which is clamped to the disc by Type 304 or 316 stainless steel screw fasteners or secured to a stainless steel seat by a combination of cap screws, a serrated

disc retaining ring, and molded shoulders in the seat mating with machined registers in the disc. Materials of construction shall be as follows:

Component	Material	Specification
Body	Cast iron or Ductile iron	AWWA C504
Exposed body cap screws and bolts and nuts	Stainless steel	ASTM A276, Type 304 or 316
Shaft	Stainless steel	ASTM A564, Grade S17400
Disc	Cast iron or ductile iron	AWWA C504
Disc fasteners, seat retainer segments, and seat fasteners	Stainless steel	ASTM A276, Type 304 or 316
Seat material	Buna-N	—

Valves shall be Pratt, DeZurik, M&H, Val-Matic, or equal.

10. Type 4—Wafer Style, Rubber-Seated Butterfly Valves 2 Through 3 Inches, Class 200:

Valves of sizes 2, 2 1/2, and 3 inches shall have a resilient seat mounted in the body with replaceable O-ring flange seals. The seat lining shall extend across the entire length of the body. Body design shall be of the wafer type for installation between two ASME B16.5, Class 150 weldneck flanges or two ASME B16.1, Class 125 cast-iron flanges. Materials of construction shall be as follows:

Component	Material	Specification
Body		
	Ductile iron	ASTM A395, Grade 60-40-18
	Ductile iron	ASTM A395, Grade 60-40-18
Shaft	Alloy steel	ASTM A564, Alloy S17400
	Stainless steel	ASTM A276, Type 316
Seat	Buna-N	—
O-rings	Buna-N	—

Pressure rating shall be at least 200 psi at a temperature of -30°F to +250°F. Valves shall be Norris R-200 or equal.

C. Ball Valves:

1. Type 1—Full Port Threaded Bronze Ball Valves 2 Inches and Smaller (Non-Potable Service):

Ball valves, 2 inches and smaller, for air or water service shall have a pressure rating of at least 600 psi WOG at a temperature of 100°F. Provide full port ball and body design. Valves shall comply with MSS SP-110. Provide bronze (ASTM B62 or ASTM B584, Alloy C83600 or C84400) body and plug ball retainer. Ball and stem shall be Type 316 stainless steel. Valves shall have threaded ends (ASME B1.20.1), nonblowout stems, reinforced Teflon seats, and have plastic-coated lever actuators. Valves shall be Stockham T-285 Series, Apollo 77C-140 Series, or equal.

2. Type 2—Full Port Threaded Bronze Ball Valves 2 Inches and Smaller (Low Lead):

Ball valves, 2 inches and smaller, for water service shall have a pressure rating of at least 600 psi WOG at a temperature of 100°F. Provide full port ball and body design. Valves shall comply with MSS SP-110. Materials of construction shall be as follows:

Component	Material	Specification
Body	Bronze	ASTM B584, Alloy C89836
Ball	Bronze	ASTM B584, Alloy C89836 or Alloy C27450, chromium plated
Ball retainer	Bronze	ASTM B584, Alloy C89836 or ASTM B371, Alloy C69430
Stem	Bronze	Alloy C27450
Seats	Reinforced Teflon	—

Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above. Valves shall have threaded ends (ASME B1.20.1), nonblowout stems, and have plastic-coated lever actuators.

Valves shall be Apollo 77CLF Series or equal.

3. Type 3—Bronze Ball Valve Curb Stops, 2 Inches and Smaller, for Water Service:

Ball valve curb stops shall be bronze with male inlet iron pipe threads and female outlet iron pipe threads and shall conform to AWWA C800. Components in contact with water shall be bronze (ASTM B584, Alloys C89833 or C89836). Components not in contact with water shall be bronze (ASTM B62 or ASTM B584, Alloys C83600, C89833, or C89836). Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above. Minimum pressure rating shall be 300 psi.

Stops shall be Ford Ball Valve Curb Stop B81-777 with straight lever handle or equal.

4. Type 4—Bronze Ball/Corporation Stops, 2 Inches and Smaller, for Water Service:

Corporation stops shall be bronze with male inlet iron pipe threads and female outlet iron pipe threads and shall conform to AWWA C800. Components in contact with water shall be bronze (ASTM B584, Alloys C89833 or C89836). Components not in contact with water shall be bronze (ASTM B62 or ASTM B584, Alloys C83600, C89833, or C89836). Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above. Minimum pressure rating shall be 300 psi. Stops shall be Ford Ballcorp Type FB 1700, James Jones J-1931, or equal.

5. Type 5—Bronze Angle Meter Stops for Water Service:

Angle meter stops shall be bronze. Components in contact with water shall be bronze (ASTM B584, Alloys C89833 or C89836). Components not in contact with water shall be bronze (ASTM B62 or ASTM B584, Alloys C83600, C89833, or C89836). Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above. Minimum pressure rating shall be 150 psi.

For 1-inch service and smaller, use Ford Ball Meter Valve No. BA13-444W, James Jones J-1966W, or equal. Provide valve with inlet iron pipe threads and meter saddle nut outlet.

For larger than 1- through 2-inch service, use Ford Ball Meter Valve No. BFA13-666W or BFA13-777W or equal. Provide valve with inlet iron pipe threads and meter flange outlet.

6. Type 6—True Union CPVC Ball Valves:

Ball valves, 2 inches and smaller, for chemical or water service shall be Schedule 80 full bore design, true union type. Where used in potable water service, the valve shall be ANSI/NSF-61 certified. Valves shall be constructed from CPVC Type IV, ASTM D1784 Cell Classification 23447 and rated for a pressure of 150 psi at a temperature of 105°F and 235 psi at a temperature of 73°F. All O-rings shall be EPDM or FKM as required for the compatibility with the chemical service and seats shall be constructed of PTFE. All valve components shall be replaceable. Valves for sodium hypochlorite and hydrogen peroxide service shall include vented balls. Valves shall be manufactured by Spears Manufacturing, Asahi, Plast-O-Matic, Harrington or equal.

7. Type 7—True Union PVC Ball Valves:

Ball valves, 3 inches and smaller, for chemical or water service shall be Schedule 80 full bore design, true union type. Where used in potable water service, the valve shall be ANSI/NSF-61 certified. Valves shall be constructed from PVC Type I, ASTM D1784 Cell Classification 12454 and rated for a pressure of 150 psi at a temperature of 105°F and 235 psi at a temperature of 73°F. All O-rings shall be EPDM or FKM as required for the compatibility with the chemical service and seats shall be constructed of PTFE. All valve components shall be replaceable. Valves for sodium hypochlorite and hydrogen peroxide service shall include vented balls. Valves shall be manufactured by Spears Manufacturing, Asahi, Plast-O-Matic, Harrington or equal.

D. Globe Valves, Angle Valves, Hose Valves, Hose Bibbs, and Fire Hydrants:

1. Type 1—Bronze Globe Valves 2 Inches and Smaller:

Globe valves, 2 inches and smaller, shall be all bronze (ASTM B62 or ASTM B584, Alloy C83600) with screwed ends, union bonnet, inside screw, rising stem, and composition or PTFE disc. Valves shall have a pressure rating of at least 300 psi at a temperature of 150°F. Stem shall be bronze: ASTM B371 (Alloy C69400), ASTM B99 (Alloy C65100), or ASTM B584 (Alloy C87600). Valves shall be Crane No. 7TF, Walworth Figure 3095, Stockham B-22T, or equal.

2. Type 2—Bronze Angle Hose Valves (1 1/2 and 2 1/2 inches):

Angle-type hose valves of sizes 1 1/2 and 2 1/2 inches shall be brass or bronze (ASTM B62 or ASTM B584, Alloy C83600) body with rising or nonrising stem, composition disc, and bronze or malleable iron handwheel. Stem shall be bronze, ASTM B62, ASTM B584 (Alloy C83600), or ASTM B198 (Alloy C87600). Valves shall have a cold-water service pressure rating of at least 150 psi. Provide cap and chain with valve. Threads on the valve outlet shall be American National Standard fire hose coupling screw thread. Valves shall be Powell Figure 151 with Figure 527 nipple adapter, Crane 17TF with hose nipple adapter, or equal.

3. Type 3—Brass or Bronze Angle Hose Valves 1 1/2 and 2 1/2 Inches (UL Listed):

Angle-type hose valves of sizes 1 1/2 and 2 1/2 inches shall be UL approved complying with UL 668, cast or forged brass or bronze, with handwheel. Inlet threads shall be female NPT. Outlet hose threads shall be male national standard fire hose (MNST). Minimum pressure rating shall be 300 psi. Provide caps with chains for the outlet. Products: Fire Protection Products, Inc. Series 07, National Fire Equipment, Guardian Fire Equipment Model 5000, NIBCO T-331-HC, American Fire Hose and Cabinet Series 400, or equal.

4. Type 4—Bronze Hose Bibbs:

Hose bibbs of size 1/2 inch, 3/4 inch, and 1 inch shall be all bronze (ASTM B62 or ASTM B584, Alloy C83600) with rising or non-rising stem, composition disc, bronze or malleable iron handwheel, and bronze stem (ASTM B99, Alloy C65100; ASTM B371, Alloy C69400; or ASTM B584, Alloy C87600). Packing shall be Teflon or graphite. Valves shall have a pressure rating of at least 125 psi for cold-water service. Threads on valve outlet shall be American National Standard fire hose coupling screw thread (ASME B1.20.7). Provide atmospheric vacuum breaker conforming to ASSE Standard 1011 and IAPMO code.

E. Plug Valves:

1. Type 1 – Eccentric Plug Valves 2-1/2 through 20 inches:

Eccentric plug valves shall be of the non-lubricated eccentric type with cast iron bodies, resilient faced plugs, or shall include replaceable, resilient seat in the body. Except as otherwise indicated, all valves for sizes 4-inch and larger shall have worm gear operators, nickel or stainless steel seats, and ANSI 125 psi flanged or grooved ends. Valves 2-1/2 inches and smaller shall have operating levers, nickel or stainless steel seats, and threaded ends with resilient facing suitable for the intended service. Submerged and buried valves shall be equipped with worm-gear operators, lubricated and sealed to prevent entry of dirt and water into the operator. Shaft bearings shall be stainless steel furnished with permanently-lubricated bearing surfaces. Operators shall clearly indicate valve position. Valves up to and including 20 inches in size shall have an unobstructed port area of not less than 80 percent of full pipe area, and not less than 70 percent for larger valves. Eccentric plug valves shall have a pressure rating of not less than 150 psi water, oil, or gas (WOG) service and bubble-tight shut-off. Valves shall be coated per Section 09 90 00 System 7 or with fusion bonded epoxy per Specification Section 09 97 61.

F. Check Valves:

1. Type 1—Bronze Check Valves 3 Inches and Smaller:

Check valves 3 inches and smaller shall be wye pattern, bronze, ASTM B61, B62, or B584 (Alloy C83600). Ends shall be female threaded, ASME B1.20.1. Disc shall be bronze, swing type.

Check valves 3 inches and smaller shall be Class 125, wye pattern, horizontal swing, conforming to MSS SP-80. Ends shall be female threaded, ASME B1.20.1. Minimum working pressure shall be 200 psi CWP at a temperature of 150°F. Materials of construction shall be as follows:

Component	Material	Specification
Body, bonnet, disc hanger	Bronze	ASTM B584, Alloy C87850
Hinge pin, hanger nut, seat disc nut, seat disc washer	Stainless steel	Type 304 or 316
Disc holder	Bronze	UNS C69300 or C87850
Seat disc	PTFE	—

Bronze alloys having a maximum lead content of 0.25%, a maximum zinc content of 7.0%, and a minimum copper content of 80% may be substituted for the bronze alloys specified above. Valves shall be Nibco T-413-Y-LF or equal.

2. Type 2—Ductile Iron Check Valves for Submersible Pump Applications:

Check valves shall be epoxy coated ductile iron body, ASTM 65-45-12. Ends shall be female threaded ASME B1.20.1. Check valve shall be poppet style suitable for horizontal and vertical installation. Minimum pressure rating shall be 600 psi at 180°F. Materials of construction shall be as follows:

Component	Material	Specification
Body	Ductile Iron	ASTM 65-45-12
Spring, stem, poppet	Stainless steel	Type 316
Retaining ring	Stainless steel	Type 302
Stem guide	Noryl	GFN2-780S
Disc	Buna-N	AN-5007

Valves shall be Flomatic Model 80DI-VFD or equal.

3. Type 3—Bronze Check Valves 2 Inches and Smaller for Reciprocating Air Compressors:

Check valves 2 inches and smaller shall be Class 300, bronze, ASTM B61. Ends shall be female threaded ASME B1.20.1. Disc shall be Type 420 stainless steel or bronze (ASTM B61). Minimum pressure rating shall be 250 psi at 150°F. The disc shall provide air cushioning action of the compressor. Provide a disc guide to prevent cocking of the disc. The caps shall anchor the disc guide in alignment with disc travel. The bodies shall have pipe threads and clearances at ends of threads sufficient to permit tight pipe connections, precluding the possibility of pipe ends jamming against diaphragms, distorting seats, or choking the flow. Valves shall be Midwest Control Devices Series MCCB, Lunkenheimer Figure 1616, or equal.

4. Type 4—Cast-Iron Swing Check Valves 3 Inches and Larger, Class 125:

Swing check valves, 3 inches and larger, shall be iron body, bronze mounted complying with AWWA C508 with the following materials of construction.

Description	Material	Specification
Disc or clapper seat ring and valve body seat ring	Bronze or brass	ASTM B62 or B584 (Alloy C84400 or C87600)
Body and cap (bonnet)	Cast iron	ASTM A126, Class B
Disc and hinge or arm (valves 4 inches and smaller)	Bronze	ASTM B62 or ASTM B584 (Alloy C84400)
Disc and hinge or arm (valves larger than 4 inches)	Cast iron or bronze	ASTM A126, Class B; ASTM B62.
Hinge pin	Stainless steel	Type 303, 304, or 410 stainless
Cover bolts and nuts	Stainless steel	ASTM A193, Grade B8M; ASTM A194, Grade 8M
Internal fasteners and accessories	Bronze or Type 304 or 316 stainless steel	

Bronze or brass components in contact with water shall comply with the following requirements:

Constituent	Content
Zinc	7% maximum
Aluminum	2% maximum
Lead	8% maximum 0.25% (potable use)
Copper + Nickel + Silicon	83% minimum

Ends shall be flanged, Class 125, ASME B16.1. Minimum valve working pressure shall be 150 psi. Provide check valves with outside lever.

The shop drawing submittal shall include a detail showing how the hinge pin extends through the valve body. Show packing gland, hinge pin gland, cap, and other pieces utilized.

Valves shall be M&H Style, Clow or equal.

5. Type 7—Cast-Iron Ball Check Valves, 3 Through 14 Inches, Class 125:

Valve shall consist of a body with a sinking-type hollow steel ball and flanged access port. Design shall be such that the fluid flow forces the ball into a receiving cavity in the valve. When the fluid flow stops, the ball shall fall out of the cavity into a rubber seat in the body to shut off flow. Valve shall be suitable for vertical upward or horizontal flow conditions. Body material shall be cast iron (ASTM A48 or A126) with 15-mil fusion bonded epoxy lining and coating per AWWA C550. Provide nitrile coating on ball. Provide Type 316 stainless steel fasteners. Flanges shall be Class 125 per ASME B16.1. Products: Flygt Corporation ball check valve, Flomatic Corporation Model 408, or equal.

6. Type 8—Slanting Disc Check Valves With Controlled Opening and Closing, Class 125:

Slanting disc check valves of sizes 6 through 60 inches shall have materials of construction as described below:

Component	Material	Specification
Body	Cast or ductile iron	ASTM A126, Class B or ASTM A536, Grade 65-45-12
Seat ring and disc ring	Bronze	See paragraph below
Pivot pins	Stainless steel	ASTM A582, Type 303 or 304
Bushings	Stainless steel	ASTM A269, Type 304 or 316
Oil reservoirs	Stainless steel	AISI Type 316

Bronze shall have the following chemical characteristics:

Constituent	Content
Zinc	7% maximum
Aluminum	2% maximum
Lead	8% maximum 0.25% (potable use)
Copper + Nickel + Silicon	83% minimum

Ends shall be flanged, ASME B16.1, Class 125. The body shall be of two-piece construction, bolted at the center to hold the seat at angle of 55 degrees. The area throughout the valve body shall equal the full pipe area.

Provide top-mounted hydraulic dashpot to control valve opening and closing. Dashpot shall have a control valve to adjust the speed of the opening and closing cycles. Time spreads shall be adjustable 5 to 30

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seconds. Provide oil-filled dashpots to operate the opening and closing arrangement. The reservoir for the opening cycle shall contain pressurized air and shall have a 3-inch pressure gauge and pneumatic fill valve.

Provide oil-fitted bottom buffer to control valve closing (adjustable one to five seconds) over the last 10% of the closing range.

Valve shall be APCO Series 800, Val-Matic Series 9600 or 9800 or equal.

7. Type 9—Rubber Flapper Swing Check Valves (3 Through 24 Inches):

Valves shall consist of body, flapper, and bolted cover. Operating pressure shall be at least 175 psi at a temperature of 212°F. Valve seat shall be set at an angle of 35 to 45 degrees to the centerline of the pipe. Ends shall be flanged, ASME B16.1, Class 125. Body and cover shall be cast iron (ASTM A48, Class 30, or ASTM A126, Class B). Flapper shall consist of a steel disk insert and a steel bar hinge bonded to the metal pieces. Provide O-ring seal bonded onto the disk. Lining shall have a hardness of 50 to 60 durometer, Shore A. Cover bolts shall be Type 316 stainless steel.

Products: APCO Series 100R, Val-Matic Series 500, or equal.

8. Type 10—Duckbill-Shaped Check Valves, 1 Through 54 Inches, Class 125:

Valve shall consist of a contoured rubber body with a duckbill sleeve-type exit. The body entrance shall be round, with a connecting Class 125 ASME B16.1 rubber flange to match the connecting pipe.. Provide synthetic fabric reinforcement. Provide stainless steel backing rings on the rubber body flanges. The valve shall open at a differential pressure of 2 inches of water column and shall close under a no-flow condition. Minimum body pressure rating shall be 50 psi. Maximum backpressure: 10 psi. Products: Red Valve Company "Tideflex" Model 35 or equal.

9. Type 11—Silent Check Valve 3 Inches and Larger:

Silent check valves, 3 inches and larger, shall be bronze mounted globe style. The seat and plug shall be hand replaceable in the field. Provide resilient seat. Flow area through valve shall be equal to or greater than the cross sectional area of the equivalent pipe size. Valve plug shall be center guided with a through integral shaft and spring loaded for silent shutoff operation. Ends shall be flanged Materials of construction shall be as follows:

Component	Material	Specification
Body	Cast Iron	ASTM A48, Class 30, or ASTM A126, Class B
	Ductile Iron	ASTM A536, Grade 60-45-10
Plug and seal	Bronze	ASTM B62 or B584 (Alloys C83600 or C87600)
Spring	Stainless steel	Type 316 stainless

Valve shall be APCO Series 600 or equal.

10. Type 12 – CPVC Ball Check Valves

Valve bodies and balls shall be fabricated with chlorinated polyvinyl chloride (CPVC), or polyvinylidene fluoride (PVDF), as recommended by the manufacturer for the service indicated. Valves shall include unions with socket connections. Seals shall have Viton O-rings and valve design shall minimize possibility of the balls sticking or chattering. Valves shall be suitable for a maximum working non-shock pressure of 150 psi at 73 degrees F. Valves shall be manufactured by Spears Manufacturing, Asahi, Plast-O-Matic, Harrington or equal.

11. Type 13 – PVC Ball Check Valves

Valve bodies and balls shall be fabricated with polyvinyl chloride (PVC), or polyvinylidene fluoride (PVDF), as recommended by the manufacturer for the service indicated. Valves shall include unions with socket connections. Seals shall have Viton O-rings and valve design shall minimize possibility of the balls sticking or chattering. Valves shall be suitable for a maximum working non-shock pressure of 150 psi at 73 degrees F. Valves shall be manufactured by Spears Manufacturing, Asahi, Plast-O-Matic, Harrington or equal.

G. Solenoid Valves:

- Design and construct solenoid valves such that they can be used in both horizontal and vertical piping.
- Type 1—Metallic Solenoid Valves 1 1/2 Inches and Smaller:

Solenoid valves of sizes 1/4 through 1 1/2 inches for water and air service shall have forged brass (Alloy C23000) or bronze (ASTM B62) bodies with Teflon main seats. Internal plunger, core tube, plunger spring, and cage assembly shall be stainless steel (Types 302, 304, or 305). Valve actuators shall be 120-volt a-c. Seals shall be Teflon. Valves shall have a maximum operating pressure and a maximum differential pressure of 125 psi. Valves shall be ASCO "Redhat", Parker Hannifin "Skinner" or equal.

H. Flap Valves

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1. Type 1—Flap Valves:

Flap valves shall have cast-iron body (ASTM A48 or A126) with bronze (ASTM B62) hinge pin, flap ring, and seat. Ends shall be flanged, spigot end, or hub to match the connecting pipe. Products: Clow F-3012, F-3014, F-3016; Waterous Flap Valves; Waterman Industries; or equal.

PART 3 EXECUTION

3.1 VALVE SHIPMENT AND STORAGE

- A. Provide flanged openings with metal closures at least 3/16-inch thick, with elastomer gaskets and at least four full-diameter bolts. Install closures at the place of valve manufacture prior to shipping. For studded openings, use all the nuts needed for the intended service to secure closures. Alternatively, ship flanged valves 3 inches and smaller in separate sealed cartons or boxes.
- B. Provide threaded openings with steel caps or solid-shank steel plugs. Do not use nonmetallic (such as plastic) plugs or caps. Install caps or plugs at the place of valve manufacture prior to shipping. Alternatively, ship valves having threaded openings or end connections in separate sealed cartons or boxes.
- C. Store resilient seated valves in sealed polyethylene plastic enclosures with a minimum of one package of desiccant inside. Store resilient seated valves in the open or unseated position. Valves with adjustable packing glands shall have the packing gland loosened prior to storage. Inspect valves at least once per week, replace desiccant if required and repair damaged storage enclosures. Do not store valves with resilient seats near electric motors or other electrical equipment.
- D. Inspect valves on receipt for damage in shipment and conformance with quantity and description on the shipping notice and order. Unload valves carefully to the ground without dropping. Use forklifts or slings under skids. Do not lift valves with slings or chain around operating shaft, actuator, or through waterway. Lift valves with eyebolts or rods through flange holes or chain hooks at ends of valve parts.
- E. Protect the valve and actuators from weather and the accumulation of dirt, rocks, and debris. Do not expose rubber seats to sunlight or ozone for more than 30 days. Also, see the manufacturer's specific storage instructions.
- F. Make sure flange faces, joint sealing surfaces, body seats, and disc seats are clean. Check the bolting attaching the actuator to the valve for loosening in transit and handling. If loose, tighten firmly. Open and close valves having manual or power actuators to make sure the valve operates properly and that stops or limit switches are correctly set so that the valve seats fully. Close valve before installing.

3.2 FACTORY PRESSURE TESTING

- A. Hydrostatically test the valve pressure-containing parts at the factory per the valve specification or per the referenced standard. If no testing requirement is otherwise

specified or described in the referenced standards, then test with water for 30 minutes minimum at a pressure of 1.5 times the rated pressure but not less than 20 psig. Test shall show zero leakage. If leaks are observed, repair the valve and retest. If dismantling is necessary to correct valve deficiencies, then provide an additional operational test and verify that the valve components function.

3.3 *INSTALLING VALVES - GENERAL*

- A. Remove covers over flanged openings and plugs from threaded openings, after valves have been placed at the point to which the valves will be connected to the adjacent piping. Do not remove valves from storage cartons or boxes until they are ready to be installed.
- B. Handle valves carefully when positioning, avoiding contact or impact with other equipment, vault or building walls, or trench walls.
- C. Clean valve interiors and adjacent piping of foreign material prior to making up valve to pipe joint connection. Prepare pipe ends and install valves in accordance with the pipe manufacturer's instructions for the joint used. Do not deflect pipe-valve joint. Do not use a valve as a jack to pull pipe into alignment. The installation procedure shall not result in bending of the valve/pipe connection with pipe loading.
- D. Make sure valve ends and seats are clean. Check exposed bolting for loosening in transit and handling and tighten to manufacturer's recommendations. Open and close the valve to make sure it operates properly and that stops or limit switches are correctly set so that the vane, ball, gate, needle, diaphragm, disc, plug, or other seating element seats fully. Close the valve before installing. Check coatings for damage and repair. Handle valves carefully when positioning, avoiding contact or impact with other equipment or structures
- E. Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

3.4 *INSTALLING EXPOSED VALVES*

- A. Unless otherwise indicated in the drawings, install valves in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above the floor with their operating stems vertical. Install valves in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above the floor with their operating stems horizontal.
- B. Install valves on vertical runs of pipe that are next to walls with their stems horizontal, away from the wall. Valves on vertical runs of pipe that are not located next to walls shall be installed with their stems horizontal, oriented to facilitate valve operation.

3.5 *INSTALLING BURIED VALVES*

- A. Connect the valve, coat the flanges and place and compact the backfill to the height of the valve stem.

- B. Connect the valve, coat the flanges, apply polyethylene encasement, and place and compact the backfill to the height of the valve stem.
- C. Place block pads under the riser pipe to maintain the valve box vertical during backfilling and repaving and to prevent the riser pipe from contacting the valve bonnet.
- D. Secure the riser pipe with backfill and compact. Install the valve box and pour the concrete collar. In pavement areas pour the collar to 2 inches below the finished pavement grade to allow asphalt concrete to be placed over the collar. In non-paved areas, place the collar to the top of the valve box.

3.6 *FIELD COATING BURIED VALVES*

- A. Coat flanges of buried valves and the flanges of the adjacent piping, and the bolts and nuts of flanges and mechanical joints, per Section 09 90 00, System No. 07.

3.7 *ASSEMBLING JOINTS*

- A. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Clean flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil and graphite, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseal or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.
- B. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.

3.8 *INSTALLING EXTENSION STEM GUIDE BRACKETS*

- A. Install at 6 to 8-foot centers. Provide at least two support brackets for stems longer than 10 feet, with one support near the bottom of the stem and one near the top.

3.9 *MOUNTING GEAR ACTUATORS*

- A. The valve manufacturer shall select and mount the gear actuator and accessories on each valve and stroke the valve from fully open to fully closed prior to shipment.

3.10 *FIELD INSTALLATION OF GEAR ACTUATOR*

- A. Provide the actuator manufacturer's recommended lubricating oil in each actuator before commencing the field testing.

3.11 *VALVE FIELD TESTING*

- A. Test valves for leakage at the same time that the connecting pipelines are hydrostatically tested. See Section 40 05 00 for pressure testing requirements. Protect or isolate any parts of valves, actuators, or control and instrumentation

systems whose pressure rating is less than the pressure test. Valves shall show zero leakage. Repair or replace any leaking valves and retest.

- B. Operate manual valves through three full cycles of opening and closing. Valves shall operate from full open to full close without sticking or binding. Do not backfill buried valves until after verifying that valves operate from full open to full closed. If valves stick or bind, or do not operate from full open to full closed, repair or replace the valve and repeat the tests.
- C. Gear actuators shall operate valves from full open to full close through three cycles without binding or sticking. The pull required to operate handwheel- or chainwheel-operated valves shall not exceed 40 pounds. The torque required to operate valves having 2-inch AWWA nuts shall not exceed 150 ft-lbs. If actuators stick or bind or if pulling forces and torques exceed the values stated previously, repair or replace the actuators and repeat the tests. Operators shall be fully lubricated in accordance with the manufacturer's recommendations prior to operating.

END SECTION

SECTION 40 05 60

AIR-RELEASE AND VACUUM-RELIEF VALVES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes materials and installation of air and vacuum valves, air-release valves, combination air-release valves, slow-closing air and vacuum valves, vacuum-relief valves, and slow-closing combination air-release valves for water and sewage service.

1.2 RELATED WORK

- A. Section 09 90 00 – Painting and Coating
- B. Section 40 05 00 – Piping and Fittings
- C. Section 33 13 00 – Disinfection of Water System

1.3 REFERENCES

- A. American Society of Mechanical Engineers (ASME)
- B. American Society for Testing and Materials (ASTM)
- C. American Water Works Association (AWWA)
- D. Food and Drug Administration (FDA)
- E. National Electrical Manufacturers Association (NEMA)
- F. Occupational Safety & Health Administration (OSHA)

1.4 SUBMITTALS

- A. Submittals shall be in accordance with the General Conditions and Section 01 33 00.
- B. Submit manufacturer's catalog data and detail drawings showing all valve parts and described by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show linings and coatings.

1.5 MATERIALS

- A. All materials in contact with potable water shall be certified to ANSI/NSF Standard 61.

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PART 2 PRODUCTS

2.1 VALVE IDENTIFICATION

Valves are identified in the drawings by size, category and type number. For example, a callout in the drawings of a 3/4" Type 1 Air Release Valve refers to a Type 1 Air Release Valve in these specifications, which is a 150-psi 3/4" or smaller air-release valve.

2.2 BOLTS, NUTS, AND GASKETS FOR FLANGED VALVES

- A. See Section 40 05 00 – Pipes and Fittings.

2.3 VALVE DESIGN-AND OPERATION

- A. Valve design shall comply with AWWA C512, except as modified herein. Class 150 valves shall have a maximum working pressure of at least 150 psi.
- B. Air-Release Valves for Water Service:
1. Air-release valves for water service 3/4 inch and smaller shall be of the direct-acting type or lever type. Valves larger than 3/4 inch shall have a float-actuated compound lever with linkage mechanism to release air.
 2. Air-release valves of sizes 1 and 2 inches shall incorporate a body with flanged top cover and replaceable orifice and a synthetic rubber needle or disc actuated by the float and linkage mechanism. Top cover shall include a 1/2-inch threaded port with bronze plug. Body shall include a 1/2-inch threaded drain port near the bottom with a bronze plug.
- C. Air and Vacuum Valves for Water Service:
1. Air and vacuum valves for water service shall have a body with a flanged top containing the air-release orifice. The float shall rise with the water level in the valve body to close the orifice by sealing against a synthetic rubber seat.
 2. Air and vacuum valves 3 inches and smaller shall have 1/2-inch threaded ports with bronze plugs in the top cover and near the bottom of the valve body. Air and vacuum valves larger than 3 inches shall have a 1-inch threaded drain outlet with bronze plug near the bottom of the valve body and a 1-inch threaded port with bronze plug on the side of the valve body above the minimum water level in the valve which forces the float against the valve seat.
- D. Combination air valves 3 inches and smaller shall have a float with lever arm to actuate a poppet valve. A needle shall be attached to the float arm. The poppet valve shall serve to admit large quantities of air when the pipeline drains. The needle shall serve to release small quantities of air as the pipeline fills or as air accumulates in the pipeline.

Combination air valves 4 inches and larger for water service shall consist of an air and vacuum valve with an air-release valve attached to it or integral with it. Connect the attached air-release valve to the air and vacuum valve with standard weight steel piping (ASME B36.10) and an isolation valve if required.

- E. Slow-closing air and vacuum valves for water service shall have a float assembly and large venting orifice to exhaust large quantities of air from pipelines when being filled and to admit large quantities of air when pipelines are being drained. Valve assembly shall incorporate a perforated water diffuser or surge check valve on the inlet to prevent the water column entering the valve from slamming the float shut.
- F. Slow-closing combination air valves for water service shall consist of an air and vacuum valve with an air-release valve integral or attached to it. The air and vacuum valve shall incorporate a perforated water diffuser or surge check valve on the inlet to prevent the water column from slamming the float shut. Connect the attached air-release valve to the air and vacuum valve with standard weight steel piping (ASME B36.10) and an isolation valve if required.
- G. Air and Vacuum Valves for Vertical Turbine Pump Service:
 - 1. Air and vacuum valves for vertical turbine pump service (3 inches and smaller) shall have a float assembly. The discharge orifice shall have a double-acting throttling device to restrict air venting; it shall fully open to allow unrestricted air entry when the pump is shut down. Valve shall have a body with flanged top containing the air-release orifice. The float shall rise with the water level in the valve body to close the orifice by sealing against a synthetic rubber seat.
 - 2. Valves 3 inches and smaller shall include the following features:
 - a. Water diffuser around the float to break up the incoming water column before contacting the float.
 - b. Double-acting throttling device that restricts airflow when the pump is started and opens fully when the pump is stopped.
- H. Air-release valves and air and vacuum valves for sewage service shall have elongated cylindrical chambers designed to release entrained air and sewage gases through an air-release orifice. The valve body and float shall withstand a 500 psig shell pressure. Provide:
 - 1. 1/2-inch clearance around the float in the chamber.
 - 2. Minimum size 1/2-inch isolation valve, quick disconnect coupling, and backflushing hose.
 - 3. Blowoff port and valve at the bottom of the chamber.
- I. Combination Sewage Air Valves: Combination sewage air valves shall vent accumulating gases during system operation through one orifice and shall allow large volumes of air to enter or escape the pipeline during filling operations through

a second orifice. Valves shall have elongated cylindrical chambers designed to release entrained air and sewage gases through two air-release orifices. The valve body and float shall withstand a 500 psig shell pressure. The same general requirements shall apply as specified for air and vacuum valves. Provide:

1. 1/2-inch clearance around the float in the chamber.
2. Minimum size 1/2-inch isolation valve, quick disconnect coupling, and backflushing hose.
3. Blowoff port and valve at the bottom of the chamber.
4. Each sewage air valve shall be furnished with the following backwash accessories, fully assembled on the valve:
 - a. Inlet shutoff valve.
 - b. Flush valve.
 - c. Clear water inlet valve.
 - d. Rubber supply hose.
 - e. Quick disconnect couplings.

2.4 MATERIALS OF CONSTRUCTION

- A. Materials of construction for air-release, air and vacuum, and combination air valves for water service shall be as follows:

Item	Material	Specification
Body and cover	Cast iron	ASTM A48, Class 35; or ASTM A126, Class B
Float, lever or linkage, air-release mechanism, poppet, guide rod, guide bushings, fasteners, other internal metal parts	Stainless steel	AISI Type 304
Plugs	Bronze	See paragraph E below
Seat, plunger, needle	Buna-N	—

- B. Materials of construction for diffusers or surge check valves for slow-closing air and vacuum valves shall be as follows:

Item	Material	Specification
Body	Cast iron	ASTM A48, Class 30 or ASTM A126, Class B
Seat, plug, bushing	Bronze	See paragraph E below
Spring, retaining ring, seat retaining ball, fasteners, other internal metal parts	Stainless steel	AISI Type 304
Gasket between diffuser or surge check valve and valve	Cloth-inserted rubber, 1/8 inch thick	Crane Co., Style 777 or equal

- C. Materials of construction for air-release, air and vacuum valves, and combination air valves for sewage service shall be as follows:

Item	Material	Specification
Body, cover, baffle	Cast iron	ASTM A48, Class 35 or ASTM A126, Class B
	Stainless steel	AISI Type 316
Float plug, float guide, stems, fasteners, internal parts	Stainless steel	AISI Type 316
Seat, plunger, needle	Buna-N	—

- D. Materials of construction for vacuum-relief valves for pipes and tanks shall be as follows:

Item	Material	Specification
Body	Cast iron	ASTM A126, Class B
Plug	Bronze	ASTM B584, Alloy C83600
Hood	Steel	AISI 1020
Seat	Buna-N	—
Spring	Stainless steel	ASTM A313, Type 302
Seat retaining screws, ring plate bolts and nuts, hood retaining screws, hood washers, other internal metal parts	Stainless steel	AISI Type 304

- E. Rubber seats shall be made of a rubber compound that is resistant to free chlorine and monochloramine concentrations up to 10 mg/L in the fluid conveyed.

- F. Body and cover bolts, nuts, and cap screws shall be carbon steel, ASTM A307.

2.5 VALVE END CONNECTIONS

- A. Valves 3 inches and smaller shall have threaded ends. Valves 4 inches and larger shall have flanged ends.
- B. Flanges for Class 150 valves shall comply with ASME B16.1, Class 125. Threaded ends shall comply with ASME B1.20.1.

2.6 VALVES

A. Air Release Valves

1. Type 1--Air-Release Valves, 3/4 Inch and Smaller: Valves shall have an operating pressure of 150 psi. Unless otherwise noted on the plans, the orifice sizes shall be 3/32 or 1/8 inch for 1/2-inch valves and 1/8 inch for 3/4-inch valves. Valves shall be APCO Series 50; Val-Matic Model 15A Series or equal.
2. Type 2--Air-Release Valves, 1 and 2 Inches, Class 150: Valves shall have a maximum working pressure of 150 psi. Unless otherwise noted on the plans, the orifice size shall be 3/16 or 1/4 inch. Valves shall be APCO Series 50, Val-Matic Model 15A Series or equal.
3. Type 3--Sewage Air-Release Valves, 2 Through 4 Inches, Class 150: After entraining air escapes through the orifice, the orifice shall be closed by a needle on a compound lever mechanism to prevent the escape of sewage. The orifice shall remain closed until more gas accumulates and the cycle automatically repeats. Valve shall seat to prevent sewage from leaking through the valve at any pressure. Valves shall have an operating pressure of at least 150 psi. Valves shall be APCO Model 400, Val-Matic Model 48 and 49 Series, or equal.

B. Air and Vacuum Valves

1. Type 1--Air and Vacuum Valves, 1/2" Through 4 Inches, Class 150: Valves shall be APCO Series 141, Val-Matic Model 100S Series or equal.
2. Type 2--Air and Vacuum Valves for Vertical Turbine Pump Service, 6 Inches and Smaller: Valves shall be APCO Series 140DAT or Series 1900, Val-Matic Model 100ST and 106 SS Series or equal. Valve shall incorporate an air-release valve, Type 1.
3. Type 3--Slow-Closing Air and Vacuum Valves, 4 Through 16 Inches, Class 150: Valves shall be APCO Series 1900, Val-Matic Surge Suppression Air Valves, or equal.
4. Type 4--Sewage Air/Vacuum Valves, 2 Through 12 Inches, Class 150: Valve shall allow unrestricted venting or reentry of air during filling or draining of pipelines. Valve shall incorporate two floats, or a float and a plug connected

AIR-RELEASE AND VACUUM-RELIEF VALVES
40 05 60-6

by a common float guide, to maintain an air gap between the two. Top float or plug shall rest against the orifice seat while the valve chamber contains liquid. Valve shall seat to prevent sewage from leaking through the valve at any pressure. Valves shall be APCO Series 401, Val-Matic Model 301 Series, or equal.

C. Combination Air Valves

1. Type 1--Combination Air Valves, 1 Through 4 Inches, Class 150: Unless otherwise noted on the plans, the minimum orifice size for the air-release valve shall be 3/16 inch. Combination air-release valves shall be APCO Series 143C, Val-Matic Model 201C Series or equal.
2. Type 2--Slow-Closing Combination Air Valves, 4 Through 16 Inches, Class 150: Unless otherwise noted on the plans, the minimum orifice size for air-release valve shall be 1/4 or 3/16 inch. Combination air-release valves shall be APCO Series 1700, Val-Matic Surge Suppression Dual Body Air Valves, or equal.
3. Type 3--Sewage Combination Air Valves, 1 Through 4 Inches, Class 150: Valve system shall allow unrestricted venting or reentry of air during filling or draining of pipelines and to vent small pockets of air which collect in the pipeline. Valve shall seat to prevent sewage from leaking through the valve at any pressure. Valves shall be APCO Series 440 or equal.

D. Vacuum-Relief Valves

1. Type 1--Vacuum-Relief Valves for Pipes and Tanks, 3 Through 12 Inches, Class 150: Vacuum-relief valves shall be capable of allowing air into pipes and tanks while they are being drained. Valve shall be globe-body style with flanged end per ASME B16.1, Class 125. Pressure rating shall be at least 150 psi. Provide a spring-loaded plug which is normally closed and which opens to allow air to enter. Plug shall be center-guided at both ends and shall be normally closed by means of a spring and shall open when the vacuum or differential pressure exceeds 0.25 psi. Valves shall be APCO Model S1500, Val-Matic Model 1800VB Series or equal.

PART 3 EXECUTION

3.1 SERVICE CONDITIONS

- A. Valves shall seat driptight at the specified seating pressure.

3.2 FACTORY TESTING

- A. Test each valve per AWWA C512, Section 5 and the following.
- B. Hydrostatically test the pressure-containing parts at the factory with water for 30 minutes minimum at a pressure of 1.5 times the rated pressure but not less than 20 psig. Test shall show zero leakage. If leaks are observed, repair the valve and retest.

If dismantling is necessary to correct valve deficiencies, provide an additional operational test per AWWA C512, Section 5 for each affected valve.

- C. The chloride content of liquids used to test austenitic stainless steel materials shall not exceed 50 ppm. To prevent deposition of chlorides as a result of evaporative drying, remove residual liquid from tested parts at the conclusion of the test.

3.3 PAINTING AND COATING

- A. Coat cast-iron valves the same as the adjacent piping. If the adjacent piping is not coated, then coat per Section 09 90 00. Apply the specified prime and intermediate coats at the place of manufacture. Finish coat shall match the color of the adjacent piping.
- B. Coat interior surfaces of cast-iron valves at the place of manufacture per Section 09 90 00. Do not coat seating areas and plastic, bronze, stainless steel, or other high alloy parts.
- C. Alternatively, line and coat valves with fusion-bonded epoxy. Do not coat seating areas and plastic, bronze, stainless steel, or other high alloy parts.

3.4 SHIPMENT AND STORAGE

- A. Identify the equipment with item and serial numbers and pipeline station. Material shipped separately shall be identified with securely affixed, corrosion-resistant metal tags indicating the item and serial number and project equipment pipeline station or the equipment for which it is intended. In addition, ship crated equipment with duplicate packing lists, one inside and one on the outside of the shipping container.
- B. Pack and ship one copy of the manufacturer's standard installation instructions with the equipment. Provide the instructions necessary to preserve the integrity of the storage preparation after the equipment arrives at the jobsite and before start-up.
- C. Provide flanged openings with metal closures at least 3/16-inch thick, with elastomer gaskets and at least four full-diameter bolts. Provide closures at the place of pump manufacture prior to shipping. For studed openings, use all the nuts needed for the intended service to secure closures.
- D. Provide threaded openings with steel caps or solid-shank steel plugs. Do not use nonmetallic (such as plastic) plugs or caps. Provide caps or plugs at the place of pump manufacture prior to shipping.
- E. Clearly identify lifting points and lifting lugs on the valves. Identify the recommended lifting arrangement on boxed equipment.

3.5 INSTALLATION

- A. Clean flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil and graphite, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove

the nuts and bolts, reseal or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

- B. Clean threaded joints by wire brushing or swabbing. Apply Teflon® joint compound or Teflon® tape to pipe threads before installing threaded valves. Joints shall be watertight.
- C. Do not use duct tape and plastic for covering the ends of pipe flanges. Use a solid metal cover with rubber gasket to cover flange openings during installation. These metal covers shall remain in place until the piping is connected to the valves.
- D. Do not spring flanges of connecting piping into position. Separately work connecting piping systems into position to bring the piping flanges into alignment with the matching valve flanges. Do not move valves to achieve piping alignment. Do not use electrical heating stress relieving to achieve piping alignment.
- E. Line up pipe flange bolt holes with valve nozzle bolt holes within 1/16 inch maximum offset from the center of the bolt hole to permit insertion of bolts without applying any external force to the piping.
- F. Flange face separation shall be within the gasket spacing $\pm 1/16$ inch. Use only one gasket per flanged connection.

3.6 VALVE FIELD PRESSURE TESTING

- A. Test valves at the same time that the connecting pipelines are pressure tested. See Section 33 01 00 for pressure testing requirements. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the test pressure.

END SECTION

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AIR-RELEASE AND VACUUM-RELIEF VALVES
40 05 60-10

SECTION 40 20 10

PIPE SUPPORTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. All pipe hangers, brackets, supports and accessories for newly installed piping as specified and indicated in the Contract Documents.
- B. All labor, materials, equipment and incidentals necessary and required for their completion.
- C. Concrete and fabricated steel supports shall be as indicated or specified in other sections or, in the absence of such requirements, as permitted by the Engineer.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 09 90 00 – Paintings and Coatings
- C. Section 40 05 00 – Pipe and Fittings
- D. Section 40 05 23 – Valves and Appurtenances

1.3 REFERENCES

- A. Seismic design requirements in applicable codes and regulations.

1.4 QUALITY ASSURANCE

- A. Except as modified or supplemented herein, all pipe supports shall comply with the applicable provisions of ANSI/MSS SP-58 AND MSS SP-69.
- B. In certain locations, pipe supports, anchors, and expansion joints have been indicated on the drawings, but no attempt has been made to indicate every pipe support, anchor, and expansion joint. It shall be the Contractor's responsibility to provide a complete system of pipe supports, to provide expansion joints, and to anchor all piping, in accordance with the requirements set forth herein. Additional pipe supports may be required adjacent to expansion joints, couplings, or valves.

1.5 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- B. Data shall include a listing of the intended use and general location of each item submitted.

1.6 DELIVERY, STORAGE AND HANDLING

- A. All pipe support materials shall be packaged as necessary to ensure delivery in satisfactory condition.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Unless otherwise specified or indicated on the drawings, pipe supports shall be fabricated of manufacturer's standard materials and provided with manufacturer's standard finish.
- B. Pipe support types and application shall comply with Schedule I in paragraph 3.2.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Design Criteria
 - 1. Pipe supports shall be manufactured for the size and type of pipe to which they are applied. Strap hangers will not be acceptable. Threaded rods shall have sufficient threading to permit the maximum adjustment available in the support item.
 - 2. All piping shall be rigidly supported and anchored so that there is no movement or visible sagging between supports.
 - 3. Anchorage shall be as shown on the bid documents.

2.3 DIMENSIONS

- A. Unless closer spacing is indicated on the drawings, the maximum spacing for pipe supports and expansion joints shall be as scheduled in Schedule II at the end of this section.

2.4 STRUCTURAL DESIGN

- A. Design loads for inserts, brackets, clamps, and other support items shall not exceed the manufacturer's recommended loads.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Approved anchors shall be used to fasten supports to concrete or masonry. Unless otherwise indicated on the drawings or permitted by the Engineer, piping shall be supported so that the closest distance from pipe wall or insulation covering is at least 1-1/2 inches from the face of walls and at least 3 inches below ceilings.

- B. Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Those portions of pipe supports which contact dissimilar metals shall be rubber or vinyl coated.

3.2 SCHEDULES

- A. SCHEDULE I: Pipe Support Types and Application Schedule:

<u>Description or Location</u>	<u>MSS SP-69</u> (Note 1)	<u>Other</u>
<u>Floor Supports</u> , steel or cast iron:		
prefabricated channels	---	12 ga galv., 1-5/8" x 1-5/8", with suitable brackets and pipe clamps.

- B. SCHEDULE II: Spacing Schedule

- Distance between supports shall not be more than that recommended by the pipe manufacturer.
- Distance between supports shall not be more than that shown on the drawings.
- Additional supports shall be added as required to prevent visible bowing of pipe.
- In addition to the spacing requirements listed above, the distance between supports shall not be more than listed in the following schedule.

Type of Pipe	Pipe Support Max Spacing, ft	Max Run Without Expansion Joint, Loop. or Bend, ft	Expansion Joint Max Spacing, ft	Type of Expansion Joint
Ductile Iron, 4" and larger	15	80	80	Note 1
Steel for all services:				
1-1/2 to 4 inch	10	30	100	Note 1

Notes:

- Expansion joint not required in straight run of pipe if overall length does not exceed the maximum run specified in schedule.

PIPE SUPPORTS
40 20 10-3

END SECTION

SECTION 40 91 30

PROCESS PRESSURE AND LEVEL INSTRUMENTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section describes requirements for pressure gauges; pressure switches, pressure transmitters, and ultrasonic level transmitters.

1.2 RELATED WORK

- A. Section 26 05 00– Basic Electrical Materials and Methods
- B. Section 26 05 26 – Grounding and Bonding for Electrical Systems
- C. Section 26 05 53 – Electrical Identification

1.3 REFERENCES

- A. International Society of Automation (ISA)

1.4 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 and the General Conditions.
- B. Submit manufacturer's catalog data and detail drawings showing dimensions, materials of construction, measurement range, electrical interfaces and protocols, and mounting requirements.

1.5 MATERIALS

- A. All materials in contact with potable water shall be certified to ANSI/NSF Standard 61.

PART 2 PRODUCTS

2.1 GENERAL

- A. Unless otherwise noted transmission analog signals shall be 4 mA to 20 mA.
- B. Unless otherwise noted the combined power supply and transmitter loops shall present a voltage signal of 1- to 5-volt DC.
- C. Signal isolators shall be provided where required.
- D. All products shall be UL listed.

2.2 PRESSURE GAUGES

- A. Pressure gauges shall be ASME B40.1 Grade 2A bourdon tube type with an accuracy of ½% of full scale. Gauges shall be non-liquid filled unless liquid filled is specifically called out on the drawings.
- B. Dial size shall be 4-1/2" unless otherwise noted on the drawings. Case and ring shall be constructed of fiberglass reinforced thermoplastic. Window shall be glass. Dial shall be aluminum with a white background and black pressure scale. Bourdon tube and movement shall be 300-series stainless steel.
- C. Weather protection of dry cases shall conform to IP54; liquid filled cases shall conform to IP 65.
- D. Process connection size shall be ½ inch NPT.
- E. Liquid filled gauges shall be filled with glycerin.
- F. Pressure gauge ranges shall be identified on the drawings directly or by Type Number as listed below.

Type Number	Pressure Range
1	0 – 15 psig
2	0 - 30 psig
3	0 – 60 psig
4	0 – 100 psig
5	0 – 160 psig

- G. Pressure gauges shall be Ashcroft 1259 or equal.

2.3 PRESSURE SWITCHES

- A. Pressure switches shall be electronic pressure control type suitable for operation up to the maximum pressure of 100 psi. Pressure controller shall be Mercoid Series EDA as specified on the plans, or approved equal.

PART 3 EXECUTION

- A. Instruments shall be installed in easily accessible locations and oriented for ease of reading and maintenance.
- B. All instrumentation shall be calibrated and tested after installation. The Contractor shall provide all necessary labor, tools, and equipment to calibrate and test each instrument in accordance with the manufacturer's instructions. Each instrument shall be calibrated at a minimum of three points using test equipment to simulate inputs and read outputs. All test equipment and all instruments used to simulate inputs and read outputs shall be suitable for the purpose intended and shall have an accuracy

better than the required accuracy of the instrument being calibrated. Test equipment shall have accuracies traceable to the NIST as applicable.

- C. Instruments shall be prepared for use in accordance with manufacturer's instructions after field calibration.
- D. All instruments of a given type shall be supplied the same manufacturer.

END SECTION

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SECTION 43 21 52

WELL PUMPING FACILITIES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall be responsible for the following:
 - 1. Furnish and install well pumps and column pipe.
 - 2. Furnish and install above ground pump manifold
 - 3. Furnish and install pump controls.
 - 4. All components that may come in contact with the potable water must be ANSI-NSF Standard 61 certified.

1.2 RELATED WORK

- A. Section 09 90 00 – Painting and Coating
- B. Section 33 01 00 – Piping and Fittings
- C. Section 40 05 23 – Valves and Appurtenances

1.3 REFERENCES

- A. American Water Works Association (AWWA)
- B. Hydraulic Institute (HI)
- C. American Society for Testing and Materials (ASTM)
- D. American National Standards Institute (ASNSI)
- E. National Electrical Manufacturers Association (NEMA)

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the General Provisions.
- C. As specified in Section 01 33 00 – Submittal Procedures
- D. Submit manufacturer's catalog data and detail drawings showing all pump parts and described by material of construction, specification (such as AISI, ASTM, etc.), and grade or type. Show linings and coatings. Include total pump weight.
- E. Submit pump manufacturer ISO-9001 certification.

- F. Show shaft diameter and bearing spacing. Submit calculations showing shaft critical frequency and determination of bearing spacings.
- G. Submit catalog pump curves on which the specified operating points are marked. Show efficiency and brake horsepower for the selected pump curve. Show required submergence and NPSH.
- H. Submit manufacturer's sample form for reporting performance test results at least two weeks before the tests. The test form should contain the data presented in the sample form in Section 6 of the ASME PTC 8.2.
- I. Submit manufacturer's certified performance curves for review at least two weeks prior to shipping the units from the factory. Show pump total head, brake horsepower, pump efficiency, required submergence, and required NPSH. Provide copies of the data recorded during the test and methods of data reduction for determining certified test results.
- J. Submit motor data.
- K. Submit manufacturer's installation instructions.
- L. Submit Operations and Maintenance Manual

1.5 QUALITY ASSURANCE

- A. All components must be supplied by the same pump manufacturer including bowls, impellers, column, shafting, heads, coupling, sleeves, seals, and motors. The pump manufacturer shall have complete unit responsibility for meeting the requirements of this specification.
- B. Pump manufacturer shall have ISO-9001 certification. As an alternative, provide a letter from the pump manufacturer accepting warranty responsibility for the entire pump, motor, and baseplate unit.
- C. Except as modified or supplemented herein, all submersible pumps shall conform to the applicable requirements of ANSI/AWWA E102 and the Hydraulic Institute Standards.
- D. Welding shall comply with the ASME Boiler and Pressure Vessel code, Section IX. Provide full penetration welds.
- E. All materials and coatings in contact with potable water shall be ANSI/NSF-61 certified and comply with California AB 1953.

PART 2 PRODUCTS

2.1 WELL PUMP AND COLUMN PIPE

- A. Pump shall be of the submersible type including motor and power cable, discharge column, and well cap.

Fresno County WWD 40 Shaver Springs
Water Supply Well Construction

- B. Pump manufacturer shall supply five (5) complete set of shop drawings, pump curves, installation and operating instructions, and parts list with the pump assembly and with compliance with Section 1.3, Submittals. These documents shall become the property of the Owner and shall be delivered to the Owner by Supplier upon completion of pump installation.
- C. Pump shall conform with all local and state sanitary and safety regulations. Pump and motor shall be capable of continuous operation. Pump and motor shall meet the following conditions (to be verified after well construction is complete):

Pump Type	WWD 40 Shaver Springs
	Well 8 and 9
	Franklin Electric, Grundfos, Goulds or Engineer approved equal
Maximum Speed (rpm)	3450
Design Flow (gpm)	10
Design Head (ft)	1055
Minimum Bowl Efficiency at Design Capacity	70%
Maximum Motor HP	15

- D. The electric motor shall be a 3-phase, 60 Hz, 230 volt, water filled squirrel cage induction type suitable for "across the line" starting, shall be capable of reduced voltage starting. It shall be capable of continuous operation at nameplate rating, submerged underwater, at a maximum water temperature of 86°F (30°C). Its maximum operating horsepower shall not exceed the nameplate horsepower plus the allowable service factor and at no place on the pump curve shall the loading exceed the service factor. The motor mounting dimensions shall comply with NEMA interchangeability standards, where applicable. The motor rotor assembly shall be dynamically balanced. The rotor shall be made of stainless steel..
- E. To protect against motor overheating due to insufficient flow moving past the motor, each well pump shall include a flow inducer sleeve or pump shroud. The flow inducer sleeve shall be made of PVC or stainless steel and shall be fastened to the wet end of the pump and extend all the way down past the end of the motor to ensure water flows past the motor to reduce heat generated by the motor.
- F. Thrust bearing shall be chosen to handle the continuous down thrust as specified by the pump manufacturer with an AFBMA B-10 one year minimum or five-year average life under design conditions. Provisions shall be made for momentary up thrust equal to 30% of rated down thrust.
- G. Interconnector made of closed grained cast iron or stainless steel, shall couple the bowl unit to the motor. The interconnector shall include a bronze sleeve bearing with a length to shaft diameter ratio of at least 3:1 to protect the motor from radial loads. This bearing shall be protected from sand and grit by a labyrinth-type sand slinger. The interconnector shall include a suction screen, which has a net open area at least four times the area of the eye of the impeller. The screen shall be made of corrosion resistant material.
- H. The total length of the discharge column shall be pending until pilot hole investigation has been completed. The column pipe shall be 4-inch. The pipe shall be furnished in interchangeable sections not over 20 feet in length, and shall be connected with threaded, sleeve-type couplings, and shall conform to American Standard tapered pipe thread specification. The joints are to be butted to insure perfect alignment after assembly.
- I. The column check valve shall be expressly designed for submersible pump installation and installed in the column pipe within 20 feet of the pump discharge connection.
- J. The column pipe shall be of ASTM A53 grade B steel pipe or ASTM A120 in interchangeable sections not greater than 20 feet in length, with ends of each section faced parallel and machined with 8 straight threads per inch permitting the ends to butt and ensuring alignment when connected by standard mill steel

couplings. The weight on the column pipe shall be no less than that stated in ANSI Specification E102, Section 4.10 "Discharge Pipe."

- K. The power cable shall be sized such that the voltage drop will not exceed 3 percent at the motor rated full load current and voltage. Cables shall be designed specifically for submersible pump service and shall consist of three copper conductors and ground individually insulated and the whole covered with an outer jacket. The length of submersible cable shall be long enough to reach the well head junction box, with an additional 5 feet of spare cable.
- L. Controls shall be mounted in an outdoor (NEMA 3R) cabinet shall include: Hand-off-automatic selector switch, start-stop push button, standard magnetic contactor and three adjustable ambient compensated quick-trip overload relays suitable for submersible pump motor service. Settings for control shall be coordinated with pump supplier.

2.2 WELL SEAL

- A. A standard well seal plate designed for submersible installation shall be provided at the top of the pump pedestal as shown on the Plans. The seal plate shall consist of a compressible gasket between two steel plates with at least four bolts to provide compression of the gasket. Well cap shall rigidly support the total weight of the motor, bowl assembly, column pipe, cable and column of water. The cable outlet shall be designed to prevent entry of foreign matter into the well and shall be equipped with a cable seal.
- B. When the bolts are tightened, the gasket shall be compressed sufficiently to seal against the well casing and around all pipes and cables that pass through the cap.
- C. All un-used openings in the cap shall be sealed to prevent the entry of water.

2.3 LEVEL PROBES

- A. Level probes and cables shall be installed to allow stopping of the pump if the well water level reaches a depth of 50 ft above pump bowls and to allow re-start of the pump when water level is at an operational depth.
- B. Level probe cables shall be suitably attached to column pipe per manufacturer's recommendations and shall be of sufficient length to reach the well head junction box with an additional 5 feet of spare cable. Individual conductor and ground shall be suitable marked to ensure correct connection to motor controller.

PART 3 EXECUTION

3.1 INSTALLATION

- A. An experienced, competent, and authorized representative of the manufacturer shall visit the site of the Work and Inspect, check, adjust if necessary, and approve the equipment installation. The representative shall be present when the equipment is

placed in operation and shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of ENGINEER.

- B. The manufacturer's representative shall furnish a written report certifying that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.
- C. All costs of these services shall be included in the contract price for the number of days and round trips to the site as required.

3.2 *FIELD QUALITY CONTROL*

- A. Bump motor to ensure proper rotational direction before coupling the motor to the pump.
- B. Perform field vibration measurements during normal operation. Vibration levels shall be within HI limits. Repair or replace pumps not meeting the HI vibration limits.
- C. Collect flow and discharge pressure data from at least three different flow rates, including the design flow rate. Compare the data with the factory performance curve and notify the Engineer if the data varies by more than 5%.

3.3 *DISINFECTION AND TEST OF WELL*

- A. After installation of well pumping facilities, well shall be pumped a minimum of 15 minutes. Water shall be discharged and conducted away from the well site to a drainage way through suitable temporary hose.
- B. After flushing, well shall be disinfected as specified in AWWA C 654.
- C. After disinfection and flushing of chlorinated water, the water shall be tested for coliform bacteria as specified in AWWA C 547.

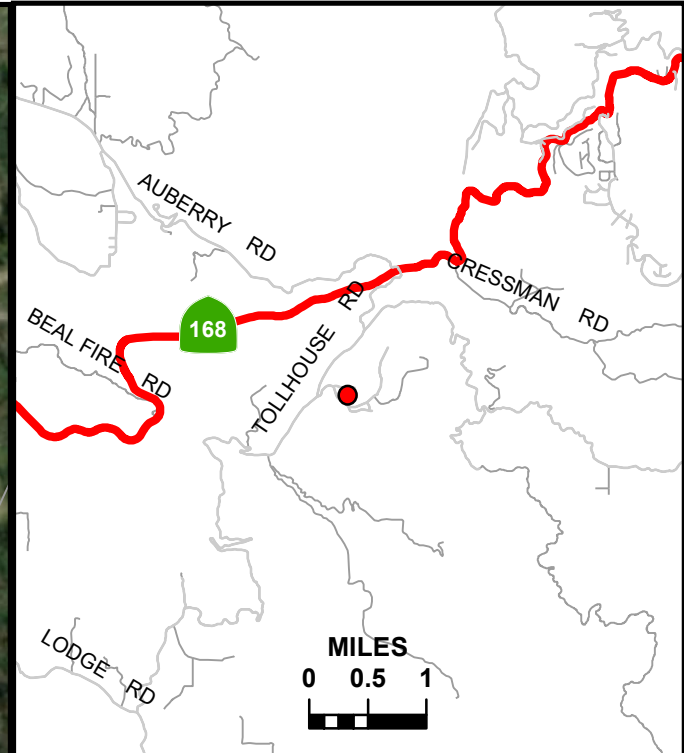
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Project Details

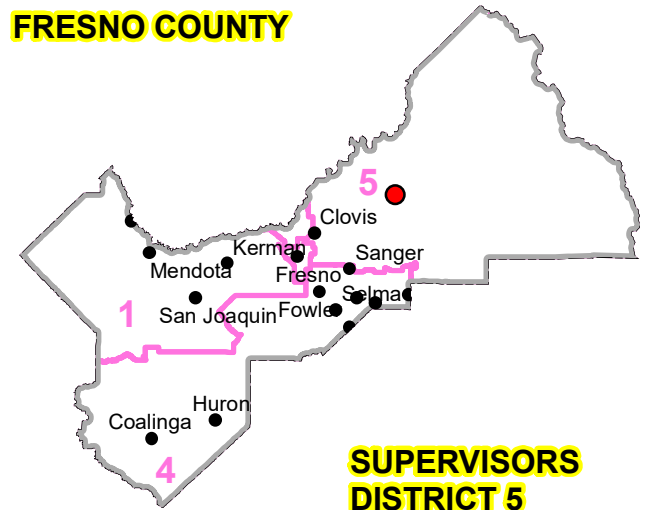
LOCATION DETAIL



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



FRESNO COUNTY



**SUPERVISORS
DISTRICT 5**

	DATE:	SCALE IN FEET		<i>DEPARTMENT OF PUBLIC WORKS & PLANNING</i>
DESIGNED: G.H.	10/03/23	<div>FEET</div> <div>0200400</div> 		WATER WORKS DISTRICT 40 SHAVER SPRINGS
DRAWN: G.H.	10/03/23			

SELF-DEALING TRANSACTION DISCLOSURE FORM

(1) Company Board Member Information:

Name: _____ Date: _____

Job Title: _____

(2) Company/Agency Name and Address:

(3) Disclosure (Please describe the nature of the self-dealing transaction you are a party to)

(4) Explain why this self-dealing transaction is consistent with the requirements of Corporations Code 5233 (a)

(5) Authorized Signature

Signature: _____ Date: _____

SELF-DEALING TRANSACTION DISCLOSURE FORM INSTRUCTIONS

In order to conduct business with the County of Fresno (hereinafter referred to as "County"), members of a contractor's board of directors (hereinafter referred to as "County Contractor"), must disclose any self-dealing transactions that they are a party to while providing goods, performing services, or both for the County. A self-dealing transaction is defined below:

"A self-dealing transaction means a transaction to which the corporation is a party and which one or more of its directors has a material financial interest."

The definition above will be utilized for purposes of completing the disclosure form.

- (1) Enter board member's name, job title (if applicable), and date this disclosure is being made.
- (2) Enter the board member's company/agency name and address.
- (3) Describe in detail the nature of the self-dealing transaction that is being disclosed to the County. At a minimum, include a description of the following:
 - a. The name of the agency/company with which the corporation has the transaction; and
 - b. The nature of the material financial interest in the Corporation's transaction that the board member has.
- (4) Describe in detail why the self-dealing transaction is appropriate based on applicable provisions of the Corporations Codes.
- (5) Form must be signed by the board member that is involved in the self-dealing transaction described in Sections (3) and (4).

BID BOOK

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

BUDGET / ACCOUNT: 9360 / 8400 / 91938



Department of Public Works and Planning

CONTRACT NUMBER 24-23-C

BID BOOK TABLE OF CONTENTS

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

CONTRACT NUMBER 24-23-C

PROPOSAL NUMBER(S)	TITLE
NOT APPLICABLE	INSTRUCTIONS FOR COMPLETING THE BID BOOK
1	PROPOSAL TO THE COUNTY OF FRESNO
2	BID ITEM LIST
3	EVALUATION OF BID ITEM LIST
4	BID SECURITY
5	NON-COLLUSION DECLARATION
6	PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT
7	PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE AND PUBLIC CONTRACT CODE 10232 STATEMENT
8	SUBCONTRACTORS
9	TITLE 13, CALIFORNIA CODE OF REGULATIONS § 2449(I) GENERAL REQUIREMENTS FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS
10 - 18	NOT USED
19	GUARANTY

INSTRUCTIONS FOR COMPLETING THE BID BOOK

General

Complete forms in the Bid book.

Submit an electronic bid online at <http://www.BidExpress.com> or submit a hardcopy bid:

1. Under sealed cover addressed to the Department and labeled with the name of the bidder, contract number, the name of the project and the statement 'Do Not Open Until The Time Of Bid Opening.'
2. Marked as a bid
3. Identifying the contract number and the bid opening date

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

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

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

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

For more information regarding bidding, refer to Section 2 Bidding in the Special Provisions and Standard Specifications.

Bid Item List and Bid Comparison

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

Bid Document Completion

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

Proposal to the Board of Supervisors of Fresno County – Proposal 1

Provided for information.

Bid Item List – Proposal 2

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

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

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

Use ink or typewriter for paper bids.

Evaluation of Bid Item List – Proposal 3

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

Bid Security and Signature – Proposal 4

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

- Cash
- Cashier's check

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

Indicate type of bid security provided.

- Cash – Acceptable but not recommended. Cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.
- Cashier's or Certified Checks. This type of security is held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract is fully executed by the bidder and bonds and insurance have been approved.
- Bid Bonds - Must be signed by the bidder and by the attorney-in-fact for the bonding company. Provide notarized signature of attorney-in-fact accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection. If providing electronically, the bid must either be verified via Tinubu or Surety2000 through BidExpress, or a scanned copy must be attached to the electronic bid with an original notarized hardcopy and received by Design Services before 4:00 PM on the fifth (5) calendar days after the bid opening.

Bonding companies may provide their own bid bond forms. The Bid Security and Signature sections must be completed by the bidder and submitted with their bid.

Electronic bids, if not accompanied by an electronic bid bond, may provide one of the listed bidder's security in a sealed envelope in accordance with the labeling and address instructions listed in the Notice to Bidders prior to the bid opening.

Acknowledge Addenda

Provide contractor's license information.

State business name and if business is a:

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

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

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

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

- Business Address - Firm's Street Address
- Mailing Address - P.O. Box or Street Address
- Complete, sign, and return with bid.

Non-Collusion Declaration – Proposal 5

Must be completed, signed, and returned with bid.

Public Contract Code Section 10285.1 Statement – Proposal 6

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

Public Contract Code Section 10162 Questionnaire And Public Contract Code 10232 Statement – Proposal 7

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

Subcontractors – Proposal 8

Sheet(s) or spaces where bidders list subcontractors. List each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub. Contract Code § 4100 et seq.).

The *Subcontractor List* submitted with the bid must show the name, location of business, work portions to be performed, Department of Industrial Relations registration number, and the contractor’s license number for each subcontractor listed.

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

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

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

Title 13, California Code of Regulations § 2449(i) General Requirements for In-Use Off-Road Diesel-Fueled Fleets – Proposal 9

Contractors, if applicable, must submit valid Certificates of Reported Compliance with their bid. Subcontractor certificates will be due no later than 4:00 PM on the fifth (5th) calendar day after the bid opening if not submitted with the bid.

Proposal 10 - Proposal 18 – Not Used

Guaranty – Proposal 19

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

General Info
Alt Total: \$584,760.00
Total:
\$1,280,147.00

Number	Description
24-23-C	Waterworks District 40 – Water Supply Well(s) Construction
Deadline 03/20/2025 02:00 PM PDT	The work to be done consists, in general, of the construction of up to two new wells with necessary appurtenances and installation of necessary piping to the existing distribution system within the community of Shaver Springs, approximately 40 miles northeast of the City of Fresno.
Vendor Shaver Lake Construction Inc.	Allows zero unit prices and labor
Submitted 03/20/2025 10:47 AM PDT	Yes
Signed by Bill Blair Account Holder Bill Blair	Allows negative unit prices and labor
Opened 03/20/2025 02:01 PM PDT By jwongsing@fresnocountyca.gov	Yes

Attachment List

Project Website
RFC form, bid opening details, any Supplemental Information
including RFC responses, prebid conference information, etc.

Specifications (7.3 MB)
Specifications (7.3 MB)

Plans (21.8 MB)
Plans (21.8 MB)

Instructions for Bidders
Link to Instructions for Bidders in the Specifications (7.3 MB)

Addendum 1 (1 MB)
Addendum 1 (1 MB)

Addendum 1 - Plan Sheet No. 3-1 (387KB)
Addendum 1 - Plan Sheet No. 3-1 (387KB)

Proposal to the County of Fresno - Proposal 1

Proposal to the County of Fresno

hereinafter called the Owner

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

The work embraced herein shall be done in accordance with the 2023 Standard Specifications and with the 2023 Standard Plans, of the State of California, Department of Transportation insofar as the same may apply and in accordance with these special provisions.

Except to the extent that they may conflict with these special provisions, revised Standard Specifications apply to the extent included in the section entitled "Project Details" of the book entitled "Specifications."

The work to be done is shown on a set of Plans, Department File No.11342, entitled: "WATERWORKS DISTRICT 40 SHAVER SPRINGS WATER SUPPLY WELL CONSTRUCTION".

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that they have carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and they propose and agree if this proposal is accepted, that they will contract with the Owner to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that they will take in full payment therefor the following unit prices, to-wit:

Bid Item List - Base Bid - Well No. 8 - Proposal 2

\$695,387.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
1	1		LS	Mobilization/ Demobilization, Insurance and Bonds	\$87,520.00	\$87,520.00
2	1		LS	Obtain Fresno County Well Drilling Permit	\$2,500.00	\$2,500.00
3	1		LS	Clearing and Grubbing	\$5,828.00	\$5,828.00
4	1		LS	Water Pollution Control	\$14,200.00	\$14,200.00
5	1		LS	Dust Control	\$11,600.00	\$11,600.00
6	1		LS	Job Site Management	\$29,424.00	\$29,424.00
7	1		LS	Well Pad Rough Grading	\$4,428.00	\$4,428.00
8	10		LF	Furnish and Install Conductor Casing	\$550.00	\$5,500.00
9	100		LF	Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$425.00	\$42,500.00
10	1,200		LF	Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$85.00	\$102,000.00
11	1		LS	Furnish and Install Pump Discharge Pipe, Valve and Sampling Port,	\$35,000.00	\$35,000.00
						Total: \$695,387.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
				Etc. to Facilitate 3-Day Pump Test		
12	1	LS		Submersible Pump and Motor with 5-inch Centralizer	\$4,924.00	\$4,924.00
13	965	LF		Column Pipe and Conductor	\$110.00	\$106,150.00
14	1	LS		Discharge Piping and Valves	\$7,153.00	\$7,153.00
15	1	LS		Well Equipment Enclosure and Concrete Slab	\$25,894.00	\$25,894.00
16	265	LF		2" Polyethylene Water Pipe	\$2.00	\$530.00
17	1	LS		Finish Grading	\$3,744.00	\$3,744.00
18	1	LS		Electrical	\$139,992.00	\$139,992.00
19	1	DAY		Additional Day of Test Pumping	\$2,500.00	\$2,500.00
20	1	LS		Perform Camera Survey	\$3,000.00	\$3,000.00
21	1	EA		Fracture Water Quality Sampling	\$15,000.00	\$15,000.00
22	100	LF		Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$100.00	\$10,000.00
23	20	LF		Pressure Pump Fast Setting Cement for Fracture Sealing	\$450.00	\$9,000.00
24	500	LF		Re-Drill Hole after Fracture Sealing	\$30.00	\$15,000.00
25	1	LS		Destroy Test Hole	\$12,000.00	\$12,000.00
						Total: \$695,387.00

Bid Item List - Additive 1 - Well No. 9 - Proposal 2

\$584,760.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
Alternate: Owner-agency may award independently from entire bid.						
26	1	LS		Mobilization/ Demobilization, Insurance and Bonds	\$17,078.00	\$17,078.00
27	1	LS		Obtain Fresno County Well Drilling Permit	\$2,500.00	\$2,500.00
28	1	LS		Clearing and Grubbing	\$0.00	\$0.00
29	1	LS		Water Pollution Control	\$5,500.00	\$5,500.00
30	1	LS		Dust Control	\$8,700.00	\$8,700.00
31	1	LS		Job Site Management	\$22,324.00	\$22,324.00
32	1	LS		Well Pad Rough Grading	\$4,428.00	\$4,428.00
33	10	LF		Furnish and Install Conductor Casing	\$550.00	\$5,500.00
34	100	LF		Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$425.00	\$42,500.00
35	1,200	LF		Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$85.00	\$102,000.00
36	1	LS		Furnish and Install Pump Discharge Pipe, Valve and	\$35,000.00	\$35,000.00
					Alternate Total: \$584,760.00	Total: \$584,760.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
				Sampling Port, Etc. to Facilitate 3-Day Pump Test		
37	1	LS		Submersible Pump and Motor with 5-inch Centralizer	\$4,924.00	\$4,924.00
38	965	LF		Column Pipe and Conductor	\$110.00	\$106,150.00
39	1	LS		Discharge Piping and Valves	\$7,153.00	\$7,153.00
40	1	LS		Well Equipment Enclosure and Concrete Slab	\$25,894.00	\$25,894.00
41	40	LF		2" Polyethylene Water Pipe	\$2.00	\$80.00
42	1	LS		Finish Grading	\$3,744.00	\$3,744.00
43	1	LS		Electrical	\$124,785.00	\$124,785.00
44	1	DAY		Additional Day of Test Pumping	\$2,500.00	\$2,500.00
45	1	LS		Perform Camera Survey	\$3,000.00	\$3,000.00
46	1	EA		Fracture Water Quality Sampling	\$15,000.00	\$15,000.00
47	100	LF		Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$100.00	\$10,000.00
48	20	LF		Pressure Pump Fast Setting Cement for Fracture Sealing	\$450.00	\$9,000.00
49	500	LF		Re-Drill Hole after Fracture Sealing	\$30.00	\$15,000.00
					Alternate Total: \$584,760.00	Total: \$584,760.00

Item No.	Quantity	Unit	Item Description	Item Price	Extension
50	1	LS	Destroy Test Hole	\$12,000.00	\$12,000.00
				Alternate Total: \$584,760.00	
				Total: \$584,760.00	

Evaluation of Bid Item List - Proposal 3

Abbreviations used in the bid proposal sheet are identified in Section 1-1.06, "Abbreviations," of these special provisions.

Bids are required for the entire work. Bids will be compared on the basis indicated in the Notice to Bidders. The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

(a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;

(b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the Owner's Final Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise, if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the Owner, and that discretion will be exercised in the manner deemed by the Owner to best protect the public interest in the prompt and economical completion of the work. The decision of the Owner respecting the amount of a bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Owner, within eight (8) days not including Saturdays, Sundays and legal holidays, after the bidder has received notice of award of the contract, the Owner, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

Bid Security - Proposal 4

Bond Percentage

10.00%

Guarantee Method *

Cash, Cashier's Check,
Certified Check, Paper Bid
Bond, Scan of Paper Bid
Bond

Cash, Cashier's Check, Certified Check, Paper Bid Bond, Scan of Paper Bid Bond

Confirmation *

I have provided an Scan of a Paper Bid Bond for 10.00% of the bid total amount attached below.

You must either attach an electronic bid bond here or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)) to the office location according to the instructions in the Notice to Bidders ***prior to*** the bid opening.

Addendum Acknowledgement - Proposal 4

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA**:

(Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging)

Type N/A if no addenda were issued. Click "+" to add additional fields.

Addendum No. *

1

Dated *

03/13/25

Type N/A if no addenda were issued. Click "+" to add additional fields. 1

Addendum No. *

1 Plan Sheet No.3-1

Dated *

03/13/25

Bidder Signature - Proposal 4

Business Name *

Shaver Lake Construction Inc.

Note: If bidder or other interested person is a corporation, state legal name of corporation. If bidder is a co-partnership, state true name of firm.

Type of Business *

Corporation - list Officers

Business Owners and Officers Names *

Bill Blair
Wendy Blair

Note: If bidder or other interested person is:

- *a corporation, list names of the president, secretary, treasurer and manager thereof*
- *a partnership, list names of all individual co-partners composing firm.*
- *an individual, state first and last name in full.*

Names of Owners and Key Employees *

Bill Blair
Wendy Blair
Sammy Purdy

Note: List majority owners of your firm. If multiple owners, list all. Also include anyone, including key employees, who are actively promoting the contract. (SB1439)

Licensed in accordance with an act providing for the registration of Contractors:

Class *

A

Contractor License No. * Expires *

1078861 07/31/2025

DIR Registration Number *

1000740027

Business Address *

41681 Tollhouse Rd PO Box 247, Shaver Lake, CA 93664-9650

Zip Code *

93664

Mailing Address *

Post Office Box 247

Zip Code *

96664

Business Phone *

(559) 841-3747

Fax Number**E-mail Address ***

Wendy@shaverlakeconstruction.com

Signature of Bidder *

Bill Blair

Dated *

03/20/2025

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, bidder signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Non-Collusion Declaration - Proposal 5

To the County of Fresno:

NON-COLLUSION DECLARATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID*

The undersigned declares:

I am the (Choose one of the following options): *

Owner

If Corporate Officer please list Title:

of (Business Name): *

Shaver Lake Construction

the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, and has not paid, and will not pay, any person or entity for that purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

Date: *

03/20/2025

at City, State: *

Shaver Lake, California

Signature: *

Bill Blair

(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code - Proposal 6-7

Public Contract Code Section 10285.1 Statement - Proposal 6

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder

Choose an option: *

Has not been convicted

within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

The above Statement is part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code Section 10162 Questionnaire - Proposal 7

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Choose an option: *

No

If the answer is No, please type N/A. If the answer is Yes, explain the circumstances in the following space. *

N/A

Public Contract Code Section 10232 Statement - Proposal 7

In conformance with Public Contract Code Section 10232, the Contractor hereby states under penalty of perjury, that no more than

one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-years period because of the Contractor's failure to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Subcontractors - Proposal 8(a)

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith. Each listed subcontractor's name, location of business and description of work, and both their contractor's license number and public works contractor registration number, issued pursuant to Section 1725.5 of the Labor Code, are REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *
Walt Bannon Drilling, Inc.

Business Address *
40487 HWY 4 1 Oakhurst, California 93644

Class

License No. *
606385

DIR Registration No. *
1000022037

Item No. or Description of Work *
1, 2, 8, 9, 10, 11, 19, 20, 21, 22, 23, 24, 25, 27, 33, 34, 35, 36, 44, 45, 46, 47, 48, 49, and 50

Dollar Amount:

OR

Percentage of Total Bid:
44%

Email Address:

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

BMF Electric

Business Address *

Post Office Box 70 Tollhouse, California 93667

Class

License No. *

890461

DIR Registration No. *

1000797676

Item No. or Description of Work *

18 and 43

Dollar Amount:

OR

Percentage of Total Bid:

21%

Email Address:

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

DKMLR Enterprises Inc. dba Russell Construction

Business Address *

7948 North Maple Avenue Suite 112 Fresno California 93720

Class

License No. *

1065710

DIR Registration No. *

2000007880

Item No. or Description of Work *

15 and 40

Dollar Amount:

OR

Percentage of Total Bid:

2%

Email Address:

California Code of Regulations: General Requirements for In-Use Off-Road Diesel-Fueled Fleets - Proposal 9

In conformance with Title 13 § 2449(i), bidders will be required to attach copies of valid Certificates of Reported Compliance for the fleet selected for the contract and their listed subcontractors.

Before May 15th of each year, the prime contractor must collect a new valid Certificate of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement. Annual renewals must be provided to the Resident Engineer at least one week prior to the expiration date of the current certificate.

<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements>

Choose all that apply:

☒ Bidder's Certificate of Reported Compliance has been attached to the bid.

☐ Bidder does not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4).

☒ Listed subcontractors' certificates have been attached or will be submitted within five (5) calendar days of the bid opening.

☒ The following subcontractors do not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4):

BMF Electric

DKMLR Enterprises Inc. dba Russell Construction

FAILURE TO PROVIDE THE CERTIFICATES OF REPORTED COMPLIANCE AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE.

Proposal 10-18

NOT USED

Guaranty - Proposal 19

Optional: Vendor is not required to complete.

(This guaranty shall be executed by the successful bidder in accordance with instructions in the special provisions. The bidder may execute the guaranty on this page at the time of submitting their bid.)

G U A R A N T Y

To the Owner: County of Fresno

CONTRACT NUMBER 24-23-C

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner.

Date: *

03/20/2025

Name (Printed): *

Bill Blair

Signature: *

Bill Blair

Title: *

Owner

Contractor: *

Shaver Lake Construction

Required Documents

Name	Omission Terms	Submitted File
Electronic Bid Bond - Scan of Bid Bond Scan of Notarized Paper Bid Bond with original due by 4pm on the 5th calendar day after the bid opening.	I have already provided a bid bond, i.e. through an electronic Surety above or to the public works office prior to the deadline.	I am not enclosing this document because the omission terms have been met.
CARB Certification of Reported Compliance - Bidder Valid CARB Certification of Reported Compliance - Bidder	Does not have a fleet subject to this regulation.	SLC Certification.JPG
CARB Certification(s) of Reported Compliance - Subcontractors Valid CARB Certification(s) of Reported Compliance - Subcontractors	Due by 4pm on the 5th calendar day after bid opening or no listed subcontractors have a fleet subject to this regulation.	Bannon Certificate.pdf
3 Required Documents		

Additional Documents (Use if needed)

Name	Omission Terms	Submitted File
Optional: Vendor is not required to complete.		
Not Required Extra Space if needed	Extra space not needed	No bid
Not Required Extra Space if needed	Extra space not needed	No bid
Not Required Extra Space if needed	Extra space not needed	No bid
3 Required Documents		

AGREEMENT

THIS AGREEMENT made at Fresno, in Fresno County, California, by and between **Shaver Lake Construction, Inc.** hereinafter called the Contractor, and the **County of Fresno** hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, but excluding such materials as are mentioned in the specifications to be furnished by the Owner, and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, materialmen, teamsters, subcontractors, artisans, machinists, and laborers required for:

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

CONTRACT NUMBER: 24-23-C

All in strict compliance with the plans, drawings and specifications therefor prepared by the Owner, and other contract documents relating thereto.

ARTICLE II. The Contractor and the Owner agree that the Notice to Bidders and Special Provisions, the Wage Scale (Prevailing Wages), the Plans and Drawings, Addenda and Bulletins thereto, and the Proposal (Bid Book) hereto attached, together with this Agreement, form the contract, and they are as fully a part of the contract as if hereto attached or herein repeated.

All portions of the Standard Specifications of the State of California, Department of Transportation, dated 2015, which are not in conflict with this contract shall be deemed a part of the specifications as though fully therein set forth; provided, however, that revisions to the said Standard Specifications shall apply only to the extent, if any, included in the Project Details of these specifications or as otherwise incorporated directly herein. No part of said specifications which is in conflict with any portion of this agreement, or which is not actually descriptive of the work to be done thereunder, or of the manner in which said work is to be executed, shall be considered as any part of this agreement, but shall be utterly null and void.

ARTICLE III. The Owner agrees to pay the Contractor in current funds for the performance of the contract the sum of **SIX HUNDRED NINETY-FIVE THOUSAND THREE HUNDRED EIGHTY-SEVEN DOLLARS AND 00/100 (\$695,387.00)** it being understood that said price is based upon the estimated quantities of materials to be used as set forth in the Proposal, except where provisions are made in the contract documents whereby the estimated quantities shall constitute the final quantity; that upon completion of the project the final contract prices shall be revised by change order, if necessary, to reflect the true quantities used at the stated unit price thereof as contained in the Contractor's Proposal hereto attached. Payments on account thereof will be made as set forth in the special provisions.

ARTICLE IV. If the Contractor should be adjudged a bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed on account of his or her insolvency, or if he or she or any of his or her subcontractors should persistently violate any of the provisions of the contract, or if he or she should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or

proper materials, or if he or she should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Engineer, then the Owner may, upon certificate of the Engineer when sufficient cause exists to justify such action, serve written notice upon the Contractor and his surety of its intention to terminate the contract, and unless within five days after the serving of such notice, such violations shall cease and satisfactory arrangements for correction thereof be made, the contract shall, upon the expiration of said five days, cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the contract, provided, however, that if the surety within ten (10) days after the serving upon it of notice of termination does not give the Owner written notice of its intention to take over and perform the contract or does not commence performance thereof within the ten (10) days stated above from the date of the serving of such notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plant and other property belonging to the Contractor as may be on the site of the work and necessary therefor. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expenses of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided and damage incurred through the Contractor's default, shall be certified by the Engineer.

ARTICLE V. To the fullest extent permitted by law with respect to any work required to be done under this contract, the Contractor will indemnify and hold harmless the COUNTY OF FRESNO, STATE OF CALIFORNIA, PROVOST & PRITCHARD, PEZZONI ENGINEERING, INC. and all other participating public agencies, whether or not said agencies are named herein, who have jurisdiction within the areas in which the work is to be performed, and all officers and employees of the Owner, the County, the State, the United States and said other participating agencies, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents or employees under this Agreement. In addition, CONTRACTOR agrees to indemnify COUNTY for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of CONTRACTOR.

CONTRACTOR agrees to indemnify, save, hold harmless, and at COUNTY'S request, defend the COUNTY, its officers, agents, and employees from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents, or employees under this Agreement, and from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to any person, firm, or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents, or employees under this Agreement.

The Certificate of Insurance shall be issued in duplicate, to the COUNTY OF FRESNO and all other participating agencies, whether or not said agencies are named herein, who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

In the event CONTRACTOR fails to keep in effect at all times insurance coverage as herein provided, the COUNTY may, in addition to other remedies it may have, suspend or terminate this Agreement upon the occurrence of such event.

All policies shall be with admitted insurers licensed to do business in the State of California. Insurance purchased shall be purchased from companies possessing a current A.M Best Company rating of A FSC VII or better.

Without limiting the COUNTY'S right to obtain indemnification from CONTRACTOR or any third parties, CONTRACTOR, at its sole expense, shall maintain in full force and effect, the following insurance policies or a program of self-insurance, including but not limited to, an insurance pooling arrangement or Joint Powers Agreement (JPA) throughout the term of the Agreement:

A. Commercial General Liability

Commercial General Liability Insurance with limits not less than those shown in the following table:

Liability Insurance Requirements

Total bid	For each occurrence ^a	Aggregate for products/completed operation	General aggregate ^b	Umbrella or excess liability ^c
≤ \$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
> \$1,000,000 ≤ \$10,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
> \$10,000,000 ≤ \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
> \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

^aCombined single limit for bodily injury and property damage.

^bThis limit must apply separately to your work under this Contract.

^cThe umbrella or excess policy must contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

This policy shall be issued on a per occurrence basis. COUNTY may require specific coverages including completed operations, products liability, contractual liability, Explosion-Collapse-Underground, fire legal liability, or any other liability insurance deemed necessary because of the of the nature of this contract.

Such Commercial General Liability insurance shall name the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents and employees shall be excess only and not contributing with insurance provided under CONTRACTOR's policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to COUNTY. CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance policy naming COUNTY as an additional insured and providing for a thirty (30) day prior written notice of cancellation or change in terms or coverage.

Within eight (8) days from date CONTRACTOR executes this Agreement, CONTRACTOR shall provide certificates of insurance and endorsement as stated above for all of the foregoing policies, as required herein, to the County of Fresno, or to designservices@fresnocountyca.gov, stating that such insurance coverages have been obtained and are in full force; that the County of Fresno, its officers, agents and employees will not be responsible for an premiums on the policies; that such Commercial General Liability insurance names the County of Fresno, its officers, agents, and employees, individually and

collectively, as additional insured, but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance shall not be cancelled or changed without a minimum of thirty (30) days advance, written notice given to COUNTY.

CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance naming the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents, and employees shall be excess only and not contributing with insurance provided under CONTRACTOR'S policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to COUNTY.

B. Automobile Liability

Comprehensive Automobile Liability Insurance with limits of not less than One Million Dollars (\$1,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

C. Professional Liability

If CONTRACTOR is a licensed professional or employs professional staff, (e.g., Architect, Engineer, Surveyor, etc.) in providing services, Professional Liability Insurance with limits of not less than One Million Dollars (\$1,000,000.00) per occurrence, Three Million Dollars (\$3,000,000.00) annual aggregate with a provision for 3 year tail coverage.

D. Worker's Compensation

A policy of Worker's Compensation insurance as may be required by the California Labor Code.

ARTICLE VI. Contractor represents that he has secured the payment of Worker's Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. Contractor shall supply the Owner with certificates of insurance, in duplicate, evidencing that Worker's Compensation Insurance is in effect and providing that the Owner will receive ten days' notice of cancellation. If Contractor self-insures Worker's Compensation, Certificate of Consent to Self-insure should be provided the Owner.

ARTICLE VII. The Contractor shall forthwith furnish in duplicate, a faithful performance bond in an amount equal to 100% of the contract price and a payment bond in an amount equal to 100% of the contract price, both bonds to be written by a surety company acceptable to the Owner and in the form prescribed by law.

The payment bond shall contain provisions such that if the Contractor or their subcontractors shall fail to pay (a) amounts due under the Unemployment Insurance Code with respect to work performed under the contract, or (b) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from the wages of the employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then the surety will pay these amounts. In case suit is brought upon the payment bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

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

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

Except as provided in Labor Code section 1725.5(f), no contractor or subcontractor may be awarded a contract for public work on a public works project or engage in the performance of work on any public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

Contractor shall comply with all applicable laws and regulations relating to wages and employment, including all requirements imposed by the California Department of Industrial Relations (DIR). Contractor shall cooperate with County to furnish timely all information necessary for County's completion of the form required to be submitted by County when registering the Project on the DIR website; and County thereafter shall provide to Contractor the "Project ID Number" assigned by DIR in order to facilitate Contractor's submission to DIR of its certified payrolls for the Project, in the manner required and using such form as may be prescribed by DIR, in accordance with the provisions of Labor Code section 1771.4(a)(3).

ARTICLE IX: Governing Law – Venue for any action arising out of or relating to this Agreement shall be in Fresno County, California. This Agreement shall be governed by the laws of the State of California.

ARTICLE X: EXECUTIVE ORDER N-6-22: Under Executive Order N-6-22 as a contractor, subcontractor, or grantee, compliance with the economic sanctions imposed in response to Russia's actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website (<https://ofac.treasury.gov/sanctions-programs-and-country-information/russia-related-sanctions>). Failure to comply may result in the termination of contracts or grants, as applicable. Specially Designated Nationals and Blocked Persons List (SDN) (<https://sanctionslist.ofac.treas.gov/Home/SdnList>).

This Contract, **24-23-C**, was awarded by the Board of Supervisors on **May 6, 2025**. It has been reviewed by the Department of Public Works and Planning and is in proper order for signature of the Chairman of the Board of Supervisors.

IN WITNESS WHEREOF, they have executed this Agreement this 28th day of

May, 2025.

Shaver Rock Construction
(CONTRACTOR)

COUNTY OF FRESNO
(OWNER)

By D. B. C.

Title CFO

By Ernest "Buddy" Mendes
Ernest "Buddy" Mendes, Chairman
of the Board of Supervisors of the
County of Fresno

ATTEST:
Bernice E. Seidel
Clerk of the Board of Supervisors
County of Fresno, State of California

By Hanana
Deputy

Bid Summary
Fresno County Department of Public Works and Planning

Project: Waterworks District 40 – Water Supply Well(s) Construction
Contract No.: 24-23-C

Bid Opening: 3/20/2025
Scheduled Award Date: 5/20/2025

Bidders

1 Shaver Lake Construction Inc., 41681 Tollhouse Rd, Shaver Lake, CA 93664-9650

Shaver Lake Construction Inc.

Subcontractors
Walt Bannon Drilling, Inc.
BMF Electric
DKMLR Enterprises Inc. dba
Russell Construction

BASE BID ITEMS				Engineer's Estimate		1	
ITEM NO.	QUANTITY	UNIT OF MEASURE	ITEM DESCRIPTION	ITEM PRICE (IN FIGURES)	TOTAL PRICE (IN FIGURES)	ITEM PRICE (IN FIGURES)	TOTAL PRICE (IN FIGURES)
1	1	LS	Mobilization/Demobilization, Insurance and Bonds	\$ 25,000.00	\$25,000.00	\$87,520.00	\$87,520.00
2	1	LS	Obtain Fresno County Well Drilling Permit	\$ 500.00	\$500.00	\$2,500.00	\$2,500.00
3	1	LS	Clearing and Grubbing	\$ 4,500.00	\$4,500.00	\$5,828.00	\$5,828.00
4	1	LS	Water Pollution Control	\$ 3,000.00	\$3,000.00	\$14,200.00	\$14,200.00
5	1	LS	Dust Control	\$ 2,000.00	\$2,000.00	\$11,600.00	\$11,600.00
6	1	LS	Job Site Management	\$ 3,000.00	\$3,000.00	\$29,424.00	\$29,424.00
7	1	LS	Well Pad Rough Grading	\$ 15,000.00	\$15,000.00	\$4,428.00	\$4,428.00
8	10	LF	Furnish and Install Conductor Casing	\$ 135.00	\$1,350.00	\$550.00	\$5,500.00
9	100	LF	Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$ 290.00	\$29,000.00	\$425.00	\$42,500.00
10	1,200	LF	Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$ 75.00	\$90,000.00	\$85.00	\$102,000.00
11	1	LS	Furnish and Install Pump Discharge Pipe, Valve and Sampling Port, Etc. to Facilitate 3-Day Pump Test	\$ 45,000.00	\$45,000.00	\$35,000.00	\$35,000.00
12	1	LS	Submersible Pump and Motor with 5-inch Centralizer	\$ 25,000.00	\$25,000.00	\$4,924.00	\$4,924.00
13	965	LF	Column Pipe and Conductor	\$ 30.00	\$28,950.00	\$110.00	\$106,150.00
14	1	LS	Discharge Piping and Valves	\$ 45,000.00	\$45,000.00	\$7,153.00	\$7,153.00
15	1	LS	Well Equipment Enclosure and Concrete Slab	\$ 30,000.00	\$30,000.00	\$25,894.00	\$25,894.00
16	265	LF	2" Polyethylene Water Pipe	\$ 65.00	\$17,225.00	\$2.00	\$530.00
17	1	LS	Finish Grading	\$ 5,000.00	\$5,000.00	\$3,744.00	\$3,744.00
18	1	LS	Electrical	\$ 126,000.00	\$126,000.00	\$139,992.00	\$139,992.00
19	1	DAY	Additional Day of Test Pumping	\$ 6,500.00	\$6,500.00	\$2,500.00	\$2,500.00
20	1	LS	Perform Camera Survey	\$ 3,900.00	\$3,900.00	\$3,000.00	\$3,000.00
21	1	EA	Fracture Water Quality Sampling	\$ 5,500.00	\$5,500.00	\$15,000.00	\$15,000.00
22	100	LF	Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$ 61.00	\$6,100.00	\$100.00	\$10,000.00
23	20	LF	Pressure Pump Fast Setting Cement for Fracture Sealing	\$ 72.00	\$1,440.00	\$450.00	\$9,000.00
24	500	LF	Re-Drill Hole after Fracture Sealing	\$ 19.00	\$9,500.00	\$30.00	\$15,000.00
25	1	LS	Destroy Test Hole	\$ 10,000.00	\$10,000.00	\$12,000.00	\$12,000.00
TOTAL BASE BID ITEMS (ITEMS 1-25)				\$538,465.00		\$695,387.00	

Additive 1				Engineer's Estimate		1	
ITEM NO.	ESTIMATED QUANTITY	UNIT OF MEASURE	ITEM DESCRIPTION	ITEM PRICE (IN FIGURES)	TOTAL PRICE (IN FIGURES)	ITEM PRICE (IN FIGURES)	TOTAL PRICE (IN FIGURES)
26	1	LS	Mobilization/Demobilization, Insurance and Bonds	\$ 21,500.00	\$21,500.00	\$17,078.00	\$17,078.00
27	1	LS	Obtain Fresno County Well Drilling Permit	\$ 500.00	\$500.00	\$2,500.00	\$2,500.00
28	1	LS	Clearing and Grubbing	\$ 5,000.00	\$5,000.00	\$0.00	\$0.00
29	1	LS	Water Pollution Control	\$ 3,000.00	\$3,000.00	\$5,500.00	\$5,500.00
30	1	LS	Dust Control	\$ 2,000.00	\$2,000.00	\$8,700.00	\$8,700.00
31	1	LS	Job Site Management	\$ 3,000.00	\$3,000.00	\$22,324.00	\$22,324.00
32	1	LS	Well Pad Rough Grading	\$ 7,500.00	\$7,500.00	\$4,428.00	\$4,428.00
33	10	LF	Furnish and Install Conductor Casing	\$ 135.00	\$1,350.00	\$550.00	\$5,500.00
34	100	LF	Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$ 290.00	\$29,000.00	\$425.00	\$42,500.00
35	1,200	LF	Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$ 75.00	\$90,000.00	\$85.00	\$102,000.00
36	1	LS	Furnish and Install Pump Discharge Pipe, Valve and Sampling Port, Etc. to Facilitate 3-Day Pump Test	\$ 45,000.00	\$45,000.00	\$35,000.00	\$35,000.00
37	1	LS	Submersible Pump and Motor with 5-inch Centralizer	\$ 25,000.00	\$25,000.00	\$4,924.00	\$4,924.00
38	965	LF	Column Pipe and Conductor	\$ 30.00	\$28,950.00	\$110.00	\$106,150.00
39	1	LS	Discharge Piping and Valves	\$ 45,000.00	\$45,000.00	\$7,153.00	\$7,153.00
40	1	LS	Well Equipment Enclosure and Concrete Slab	\$ 30,000.00	\$30,000.00	\$25,894.00	\$25,894.00
41	40	LF	2" Polyethylene Water Pipe	\$ 60.00	\$2,400.00	\$2.00	\$80.00
42	1	LS	Finish Grading	\$ 2,500.00	\$2,500.00	\$3,744.00	\$3,744.00
43	1	LS	Electrical	\$ 66,000.00	\$66,000.00	\$124,785.00	\$124,785.00
44	1	DAY	Additional Day of Test Pumping	\$ 6,500.00	\$6,500.00	\$2,500.00	\$2,500.00
45	1	LS	Perform Camera Survey	\$ 3,900.00	\$3,900.00	\$3,000.00	\$3,000.00
46	1	EA	Fracture Water Quality Sampling	\$ 5,500.00	\$5,500.00	\$15,000.00	\$15,000.00
47	100	LF	Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$ 61.00	\$6,100.00	\$100.00	\$10,000.00
48	20	LF	Pressure Pump Fast Setting Cement for Fracture Sealing	\$ 72.00	\$1,440.00	\$450.00	\$9,000.00
49	500	LF	Re-Drill Hole after Fracture Sealing	\$ 19.00	\$9,500.00	\$30.00	\$15,000.00
50	1	LS	Destroy Test Hole	\$ 10,000.00	\$10,000.00	\$12,000.00	\$12,000.00
TOTAL ADDITIVE 1 (ITEMS 26-50)				\$450,640.00		\$584,760.00	

TOTAL BASE BID + ADDITIVES 1 (BID ITEMS 1 THROUGH 50)				\$989,105.00		\$1,280,147.00	
--	--	--	--	---------------------	--	-----------------------	--

General Info
Alt Total: \$584,760.00
Total:
\$1,280,147.00

Number	Description
24-23-C	Waterworks District 40 – Water Supply Well(s) Construction
Deadline 03/20/2025 02:00 PM PDT	The work to be done consists, in general, of the construction of up to two new wells with necessary appurtenances and installation of necessary piping to the existing distribution system within the community of Shaver Springs, approximately 40 miles northeast of the City of Fresno.
Vendor Shaver Lake Construction Inc.	Allows zero unit prices and labor
Submitted 03/20/2025 10:47 AM PDT	Yes
Signed by Bill Blair Account Holder Bill Blair	Allows negative unit prices and labor
Opened 03/20/2025 02:01 PM PDT By jwongsing@fresnocountyca.gov	Yes

Attachment List

Project Website
RFC form, bid opening details, any Supplemental Information
including RFC responses, prebid conference information, etc.

Specifications (7.3 MB)
Specifications (7.3 MB)

Plans (21.8 MB)
Plans (21.8 MB)

Instructions for Bidders
Link to Instructions for Bidders in the Specifications (7.3 MB)

Addendum 1 (1 MB)
Addendum 1 (1 MB)

Addendum 1 - Plan Sheet No. 3-1 (387KB)
Addendum 1 - Plan Sheet No. 3-1 (387KB)

Proposal to the County of Fresno - Proposal 1

Proposal to the County of Fresno

hereinafter called the Owner

WATERWORKS DISTRICT 40 – WATER SUPPLY WELL(S) CONSTRUCTION

The work embraced herein shall be done in accordance with the 2023 Standard Specifications and with the 2023 Standard Plans, of the State of California, Department of Transportation insofar as the same may apply and in accordance with these special provisions.

Except to the extent that they may conflict with these special provisions, revised Standard Specifications apply to the extent included in the section entitled "Project Details" of the book entitled "Specifications."

The work to be done is shown on a set of Plans, Department File No.11342, entitled: "WATERWORKS DISTRICT 40 SHAVER SPRINGS WATER SUPPLY WELL CONSTRUCTION".

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that they have carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and they propose and agree if this proposal is accepted, that they will contract with the Owner to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that they will take in full payment therefor the following unit prices, to-wit:

Bid Item List - Base Bid - Well No. 8 - Proposal 2

\$695,387.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
1	1		LS	Mobilization/ Demobilization, Insurance and Bonds	\$87,520.00	\$87,520.00
2	1		LS	Obtain Fresno County Well Drilling Permit	\$2,500.00	\$2,500.00
3	1		LS	Clearing and Grubbing	\$5,828.00	\$5,828.00
4	1		LS	Water Pollution Control	\$14,200.00	\$14,200.00
5	1		LS	Dust Control	\$11,600.00	\$11,600.00
6	1		LS	Job Site Management	\$29,424.00	\$29,424.00
7	1		LS	Well Pad Rough Grading	\$4,428.00	\$4,428.00
8	10		LF	Furnish and Install Conductor Casing	\$550.00	\$5,500.00
9	100		LF	Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$425.00	\$42,500.00
10	1,200		LF	Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$85.00	\$102,000.00
11	1		LS	Furnish and Install Pump Discharge Pipe, Valve and Sampling Port,	\$35,000.00	\$35,000.00
						Total: \$695,387.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
				Etc. to Facilitate 3-Day Pump Test		
12	1	LS		Submersible Pump and Motor with 5-inch Centralizer	\$4,924.00	\$4,924.00
13	965	LF		Column Pipe and Conductor	\$110.00	\$106,150.00
14	1	LS		Discharge Piping and Valves	\$7,153.00	\$7,153.00
15	1	LS		Well Equipment Enclosure and Concrete Slab	\$25,894.00	\$25,894.00
16	265	LF		2" Polyethylene Water Pipe	\$2.00	\$530.00
17	1	LS		Finish Grading	\$3,744.00	\$3,744.00
18	1	LS		Electrical	\$139,992.00	\$139,992.00
19	1	DAY		Additional Day of Test Pumping	\$2,500.00	\$2,500.00
20	1	LS		Perform Camera Survey	\$3,000.00	\$3,000.00
21	1	EA		Fracture Water Quality Sampling	\$15,000.00	\$15,000.00
22	100	LF		Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$100.00	\$10,000.00
23	20	LF		Pressure Pump Fast Setting Cement for Fracture Sealing	\$450.00	\$9,000.00
24	500	LF		Re-Drill Hole after Fracture Sealing	\$30.00	\$15,000.00
25	1	LS		Destroy Test Hole	\$12,000.00	\$12,000.00
						Total: \$695,387.00

Bid Item List - Additive 1 - Well No. 9 - Proposal 2

\$584,760.00

Item No.	Quantity		Unit	Item Description	Item Price	Extension
Alternate: Owner-agency may award independently from entire bid.						
26	1	LS		Mobilization/ Demobilization, Insurance and Bonds	\$17,078.00	\$17,078.00
27	1	LS		Obtain Fresno County Well Drilling Permit	\$2,500.00	\$2,500.00
28	1	LS		Clearing and Grubbing	\$0.00	\$0.00
29	1	LS		Water Pollution Control	\$5,500.00	\$5,500.00
30	1	LS		Dust Control	\$8,700.00	\$8,700.00
31	1	LS		Job Site Management	\$22,324.00	\$22,324.00
32	1	LS		Well Pad Rough Grading	\$4,428.00	\$4,428.00
33	10	LF		Furnish and Install Conductor Casing	\$550.00	\$5,500.00
34	100	LF		Drill 12" Borehole, Install 3" Thick Annular Seal, and Furnish and Install 6" Diameter Casing	\$425.00	\$42,500.00
35	1,200	LF		Drill 6" Diameter Test Hole (to Estimated 1,200 Feet Total Depth), Airlift for Water Sampling and Well Development	\$85.00	\$102,000.00
36	1	LS		Furnish and Install Pump Discharge Pipe, Valve and	\$35,000.00	\$35,000.00
					Alternate Total: \$584,760.00	
					Total: \$584,760.00	

Item No.	Quantity		Unit	Item Description	Item Price	Extension
				Sampling Port, Etc. to Facilitate 3-Day Pump Test		
37	1	LS		Submersible Pump and Motor with 5-inch Centralizer	\$4,924.00	\$4,924.00
38	965	LF		Column Pipe and Conductor	\$110.00	\$106,150.00
39	1	LS		Discharge Piping and Valves	\$7,153.00	\$7,153.00
40	1	LS		Well Equipment Enclosure and Concrete Slab	\$25,894.00	\$25,894.00
41	40	LF		2" Polyethylene Water Pipe	\$2.00	\$80.00
42	1	LS		Finish Grading	\$3,744.00	\$3,744.00
43	1	LS		Electrical	\$124,785.00	\$124,785.00
44	1	DAY		Additional Day of Test Pumping	\$2,500.00	\$2,500.00
45	1	LS		Perform Camera Survey	\$3,000.00	\$3,000.00
46	1	EA		Fracture Water Quality Sampling	\$15,000.00	\$15,000.00
47	100	LF		Furnish and Install Approved Rock/Gravel and Bentonite for Borehole Fill for Fracture Sealing	\$100.00	\$10,000.00
48	20	LF		Pressure Pump Fast Setting Cement for Fracture Sealing	\$450.00	\$9,000.00
49	500	LF		Re-Drill Hole after Fracture Sealing	\$30.00	\$15,000.00
					Alternate Total: \$584,760.00	Total: \$584,760.00

Item No.	Quantity	Unit	Item Description	Item Price	Extension
50	1	LS	Destroy Test Hole	\$12,000.00	\$12,000.00
				Alternate Total: \$584,760.00	
				Total: \$584,760.00	

Evaluation of Bid Item List - Proposal 3

Abbreviations used in the bid proposal sheet are identified in Section 1-1.06, "Abbreviations," of these special provisions.

Bids are required for the entire work. Bids will be compared on the basis indicated in the Notice to Bidders. The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

(a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;

(b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the Owner's Final Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise, if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the Owner, and that discretion will be exercised in the manner deemed by the Owner to best protect the public interest in the prompt and economical completion of the work. The decision of the Owner respecting the amount of a bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Owner, within eight (8) days not including Saturdays, Sundays and legal holidays, after the bidder has received notice of award of the contract, the Owner, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

Bid Security - Proposal 4

Bond Percentage

10.00%

Guarantee Method *

Cash, Cashier's Check,
Certified Check, Paper Bid
Bond, Scan of Paper Bid
Bond

Cash, Cashier's Check, Certified Check, Paper Bid Bond, Scan of Paper Bid Bond

Confirmation *

I have provided an Scan of a Paper Bid Bond for 10.00% of the bid total amount attached below.

You must either attach an electronic bid bond here or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)) to the office location according to the instructions in the Notice to Bidders ***prior to*** the bid opening.

Addendum Acknowledgement - Proposal 4

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA**:

(Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging)

Type N/A if no addenda were issued. Click "+" to add additional fields.

Addendum No. *

1

Dated *

03/13/25

Type N/A if no addenda were issued. Click "+" to add additional fields. 1

Addendum No. *

1 Plan Sheet No.3-1

Dated *

03/13/25

Bidder Signature - Proposal 4

Business Name *

Shaver Lake Construction Inc.

Note: If bidder or other interested person is a corporation, state legal name of corporation. If bidder is a co-partnership, state true name of firm.

Type of Business *

Corporation - list Officers

Business Owners and Officers Names *

Bill Blair
Wendy Blair

Note: If bidder or other interested person is:

- *a corporation, list names of the president, secretary, treasurer and manager thereof*
- *a partnership, list names of all individual co-partners composing firm.*
- *an individual, state first and last name in full.*

Names of Owners and Key Employees *

Bill Blair
Wendy Blair
Sammy Purdy

Note: List majority owners of your firm. If multiple owners, list all. Also include anyone, including key employees, who are actively promoting the contract. (SB1439)

Licensed in accordance with an act providing for the registration of Contractors:

Class *

A

Contractor License No. * Expires *

1078861 07/31/2025

DIR Registration Number *

1000740027

Business Address *

41681 Tollhouse Rd PO Box 247, Shaver Lake, CA 93664-9650

Zip Code *

93664

Mailing Address *

Post Office Box 247

Zip Code *

96664

Business Phone *

(559) 841-3747

Fax Number**E-mail Address ***

Wendy@shaverlakeconstruction.com

Signature of Bidder *

Bill Blair

Dated *

03/20/2025

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, bidder signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Non-Collusion Declaration - Proposal 5

To the County of Fresno:

NON-COLLUSION DECLARATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID*

The undersigned declares:

I am the (Choose one of the following options): *

Owner

If Corporate Officer please list Title:

of (Business Name): *

Shaver Lake Construction

the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, and has not paid, and will not pay, any person or entity for that purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

Date: *

03/20/2025

at City, State: *

Shaver Lake, California

Signature: *

Bill Blair

(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code - Proposal 6-7

Public Contract Code Section 10285.1 Statement - Proposal 6

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder

Choose an option: *

Has not been convicted

within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

The above Statement is part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code Section 10162 Questionnaire - Proposal 7

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Choose an option: *

No

If the answer is No, please type N/A. If the answer is Yes, explain the circumstances in the following space. *

N/A

Public Contract Code Section 10232 Statement - Proposal 7

In conformance with Public Contract Code Section 10232, the Contractor hereby states under penalty of perjury, that no more than

one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-years period because of the Contractor's failure to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Subcontractors - Proposal 8(a)

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith. Each listed subcontractor's name, location of business and description of work, and both their contractor's license number and public works contractor registration number, issued pursuant to Section 1725.5 of the Labor Code, are REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields.

Subcontractor: *

Walt Bannon Drilling, Inc.

Business Address *

40487 HWY 4 1 Oakhurst, California 93644

Class

License No. *

606385

DIR Registration No. *

1000022037

Item No. or Description of Work *

1, 2, 8, 9, 10, 11, 19, 20, 21, 22, 23, 24, 25, 27, 33, 34, 35, 36, 44, 45, 46, 47, 48, 49, and 50

Dollar Amount:

OR

Percentage of Total Bid:

44%

Email Address:

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 1

Subcontractor: *

BMF Electric

Business Address *

Post Office Box 70 Tollhouse, California 93667

Class

License No. *

890461

DIR Registration No. *

1000797676

Item No. or Description of Work *

18 and 43

Dollar Amount:

OR

Percentage of Total Bid:

21%

Email Address:

Subcontractor: To add more subcontractor listings, click the "+" to add additional fields. 2

Subcontractor: *

DKMLR Enterprises Inc. dba Russell Construction

Business Address *

7948 North Maple Avenue Suite 112 Fresno California 93720

Class

License No. *

1065710

DIR Registration No. *

2000007880

Item No. or Description of Work *

15 and 40

Dollar Amount:

OR

Percentage of Total Bid:

2%

Email Address:

California Code of Regulations: General Requirements for In-Use Off-Road Diesel-Fueled Fleets - Proposal 9

In conformance with Title 13 § 2449(i), bidders will be required to attach copies of valid Certificates of Reported Compliance for the fleet selected for the contract and their listed subcontractors.

Before May 15th of each year, the prime contractor must collect a new valid Certificate of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement. Annual renewals must be provided to the Resident Engineer at least one week prior to the expiration date of the current certificate.

<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements>

Choose all that apply:

☒ Bidder's Certificate of Reported Compliance has been attached to the bid.

☐ Bidder does not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4).

☒ Listed subcontractors' certificates have been attached or will be submitted within five (5) calendar days of the bid opening.

☒ The following subcontractors do not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4):

BMF Electric

DKMLR Enterprises Inc. dba Russell Construction

FAILURE TO PROVIDE THE CERTIFICATES OF REPORTED COMPLIANCE AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE.

Proposal 10-18

NOT USED

Guaranty - Proposal 19

Optional: Vendor is not required to complete.

(This guaranty shall be executed by the successful bidder in accordance with instructions in the special provisions. The bidder may execute the guaranty on this page at the time of submitting their bid.)

G U A R A N T Y

To the Owner: County of Fresno

CONTRACT NUMBER 24-23-C

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner.

Date: *

03/20/2025

Name (Printed): *

Bill Blair

Signature: *

Bill Blair

Title: *

Owner

Contractor: *

Shaver Lake Construction

Required Documents

Name	Omission Terms	Submitted File
Electronic Bid Bond - Scan of Bid Bond Scan of Notarized Paper Bid Bond with original due by 4pm on the 5th calendar day after the bid opening.	I have already provided a bid bond, i.e. through an electronic Surety above or to the public works office prior to the deadline.	I am not enclosing this document because the omission terms have been met.
CARB Certification of Reported Compliance - Bidder Valid CARB Certification of Reported Compliance - Bidder	Does not have a fleet subject to this regulation.	SLC Certification.JPG
CARB Certification(s) of Reported Compliance - Subcontractors Valid CARB Certification(s) of Reported Compliance - Subcontractors	Due by 4pm on the 5th calendar day after bid opening or no listed subcontractors have a fleet subject to this regulation.	Bannon Certificate.pdf
3 Required Documents		

Additional Documents (Use if needed)

Name	Omission Terms	Submitted File
Optional: Vendor is not required to complete.		
Not Required Extra Space if needed	Extra space not needed	No bid
Not Required Extra Space if needed	Extra space not needed	No bid
Not Required Extra Space if needed	Extra space not needed	No bid
3 Required Documents		



California Environmental Protection Agency
Air Resources Board

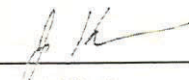
January 1, 2025

**CERTIFICATE OF REPORTED COMPLIANCE
OFF-ROAD DIESEL VEHICLE REGULATION**

is issued to

WALT BANNON DRILLING INC

This certificate indicates that the fleet listed above has reported off-road diesel vehicles to the California Air Resources Board and has certified they are in compliance with title 13 CCR, section 2449. All applicable vehicles owned by the individual, company, or agency must be reported and labeled, as specified in Section 2449, with all possible completeness, else this certificate is null and void. **Certificate expires 2/28/2026**


Jack Kitowski
Chief, Mobile Source Control Division
California Air Resources Board

Off-road Diesel Fleet Identification

87622

To verify the authenticity of this certificate enter this number at
http://www.arb.ca.gov/doors/compliance_cert1.html



County of Fresno

DEPARTMENT OF PUBLIC WORKS AND PLANNING
STEVEN E. WHITE, DIRECTOR

May 28, 2025

Bill Blair, President
Shaver Lake Construction Inc.
41681 Tollhouse Rd PO Box 247
Shaver Lake, CA 93664

Transmitted by email to: Wendy@shaverlakeconstruction.com

**Subject: Notice of Approval, Waterworks District 40 – Water Supply Well(S) Construction
Contract No. 24-23-C**

Dear Bill:

The contract between your firm and the County of Fresno for the referenced project became operative on Date of Signature. A copy of the executed contract is enclosed.

DIR Project ID **20250577716** is assigned to Contract No. **24-23-C**

The enclosed copy of Section 41 of the Charter of the County of Fresno is for your reference and compliance. If you have any questions, contact Jennica Geddert at jgeddert@fresnocountyca.gov or (559) 353-4919.

Sincerely,

Mohammad Alimi, Ph.D., P.E.
Design Division Engineer

Jennica
Geddert

Digitally signed by
Jennica Geddert
Date: 2025.05.28
13:24:44 -07'00'

Jennica Geddert
Senior Staff Analyst

Enclosures

cc: Board of Supervisors
Auditor – Controller
Financial Services
Construction Management
Design Division – Design Services

Bond No. 4482675
Premium - \$10,454.00
Original (1)

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Performance Bond

CONTRACTOR:

(Name, legal status and address)

Shaver Lake Construction, Inc.
41681 Tollhouse Road, P.O. Box 247,
Shaver Lake, CA 93664

SURETY:

(Name, legal status and principal place of business)

SureTec Insurance Company
3111 Camino Del Rio N, Suite 900,
San Diego, CA 92108

Mailing Address for Notices

SureTec Insurance Company
3111 Camino Del Rio N, Suite 900,
San Diego, CA 92108

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:

(Name, legal status and address)

County of Fresno
2220 Tulare Street, 6th Floor,
Fresno, CA 93721

CONSTRUCTION CONTRACT

Date:

Amount: \$ 695,387.00 (six hundred ninety-five thousand three hundred eighty-seven and 00/100 DOLLARS)

Description:

(Name and location)

Waterworks District 40 - Water Supply Well(s) Construction
Contract No. 24-23-C

BOND 4482675

Date: May 15, 2025

(Not earlier than Construction Contract Date)

Amount: \$695,387.00 (six hundred ninety-five thousand three hundred eighty-seven and 00/100 DOLLARS)

Modifications to this Bond:

☒ None

☐ See Section 16

CONTRACTOR AS PRINCIPAL

Company:

(Corporate Seal)

Shaver Lake Construction, Inc.

SURETY

Company:

(Corporate Seal)

SureTec Insurance Company

Signature:

Name

and Title: Wendy Blair
CFO

Signature:

Name

David Melman
and Title: Attorney-in-Fact

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

Scott Held Insurance Agency Inc.
5855 Avenida Encinas Ste. 145
Carlsbad, CA 92008

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____
(Corporate Seal)

SURETY

Company: _____
(Corporate Seal)

Signature: _____

Name and Title: _____

Address _____

W. Blair
Wendy Blair
EFO

PO Box 247

Shaver Lake 93644

Signature: _____

Name and Title: _____

Address _____

JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Gloria S. Becerra, Dave B. Roalkvam, David Melman, Amanda Harvey, Evan M. DeBow, Eric Taylor,
Maria Melendez, Rene Brandt, Deanna Fonseca, Albert Espino, Sergio Rynard, Ruth Alonso

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Fifty Million and 00/100 Dollars (\$50,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 6th day of January, 2025.

SureTec Insurance Company

By:

Michael C. Keimig, President



Markel Insurance Company

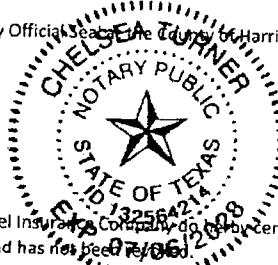
By:

Undey Jennings, Vice President

State of Texas
County of Harris:

On this 6th day of January, 2025 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal to the County of Harris, the day and year first above written.



By:

Chelsea Turner, Notary Public
My commission expires 7/6/2028

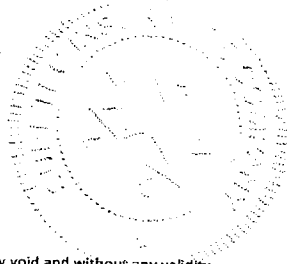
We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company, do hereby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 15th day of May, 2025.

SureTec Insurance Company

By:

M. Brent Beaty, Assistant Secretary



Markel Insurance Company

By:

Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity.
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of San Diego

On May 15, 2025 before me, Ruth Alonso, Notary Public

personally appeared David Melman

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Ruth Alonso
Signature of Notary

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

- ☐ INDIVIDUAL
☐ CORPORATE OFFICER

- ☐ PARTNER(S)
☐ MEMBER of LLC
☒ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR

OTHER: _____

DESCRIPTION OF ATTACHED DOCUMENT

Bond 4482675

Title or Type of Document

Number of Pages

May 15, 2025

Date of Document

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

SureTec Insurance Company

Signer(s) other than named above

PAYMENT BOND - PUBLIC WORK
SECTIONS 3247 - 3252, CIVIL CODE
(CALIFORNIA)

SureTec Insurance Company SURETY COMPANY

Bond No. 4482675
Premium: Amount Included with
performance bond
Original (1)

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, The County of Fresno has awarded to Shaver Lake Construction, Inc.

as Contractor, a contract for the work described as follows: Waterworks District 40 - Water Supply Well(s) Construction.

AND WHEREAS, Said Contractor is required to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, materialmen, and other persons as provided by law.

NOW, THEREFORE, We the undersigned Contractor and Surety are held and firmly bound unto the County of Fresno in the amount required by law, the sum of \$ **, for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.
**\$695,387.00 (six hundred ninety-five thousand three hundred eighty-seven and 00/100 DOLLARS)
THE CONDITION OF THIS OBLIGATION IS SUCH,

That if said Contractors shall fail to pay (1) Any of the persons named in Civil Code Section 3181, (2) amounts due under the Unemployment Insurance Code for work or labor performed in connection with said contract by any such claimant, or (3) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from wages of the employees of Contractor and his sub-contractors with respect to such work and labor, pursuant to Section 13020 of the Unemployment Insurance Code, then the Surety or Sureties herein will pay for the same in an aggregate amount not exceeding the sum specified in this bond, and also in case suit is brought upon the bond, a reasonable attorney's fee, to be fixed by the court, otherwise the above obligation shall be void.

This bond shall inure to the benefit of any of the persons named in Civil Code Section 3181 so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

This bond is executed and filed to comply with the provisions of the act of Legislature of the State of California as designated in Civil Code, Sections 3247 - 3252 inclusive, and all amendments thereto.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this 15th day of May, 2025.

Shaver Lake Construction, Inc.

[Signature]
Contractor

SureTec Insurance Company SURETY COMPANY

By [Signature]
David Melman, Attorney-in-Fact

JOINT LIMITED POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That SureTec Insurance Company, a Corporation duly organized and existing under the laws of the State of Texas and having its principal office in the County of Harris, Texas and Markel Insurance Company (the "Company"), a corporation duly organized and existing under the laws of the state of Illinois, and having its principal administrative office in Glen Allen, Virginia, does by these presents make, constitute and appoint:

Gloria S. Becerra, Dave B. Roalkvam, David Melman, Amanda Harvey, Evan M. DeBow, Eric Taylor,
Maria Melendez, Rene Brandt, Deanna Fonseca, Albert Espino, Sergio Rynard, Ruth Alonso

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on their own behalf, individually as a surety or jointly, as co-sureties, and as their act and deed any and all bonds and other undertaking in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

Fifty Million and 00/100 Dollars (\$50,000,000.00)

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolutions adopted by the Board of Directors of SureTec Insurance Company and Markel Insurance Company:

"RESOLVED, That the President, any Senior Vice President, Vice President, Assistant Vice President, Secretary, Assistant Secretary, Treasurer or Assistant Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the SureTec Insurance Company and Markel Insurance Company, as the case may be, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Markel Insurance Company and SureTec Insurance Company have caused their official seal to be hereunto affixed and these presents to be signed by their duly authorized officers on the 6th day of January, 2025.

SureTec Insurance Company

By:

Michael C. Keimig, President



Markel Insurance Company

By:

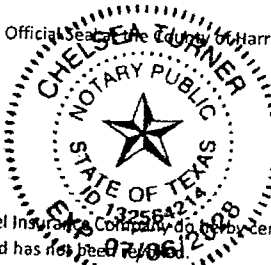
Lindey Jennings, Vice President

State of Texas

County of Harris:

On this 6th day of January, 2025 A. D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICERS OF THE COMPANIES, to me personally known to be the individuals and officers described in, who executed the preceding instrument, and they acknowledged the execution of same, and being by me duly sworn, disposed and said that they are the officers of the said companies aforesaid, and that the seals affixed to the proceeding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and their signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of the said companies, and that Resolutions adopted by the Board of Directors of said Companies referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal of the County of Harris, the day and year first above written.



By:

Chelsea Turner

Chelsea Turner, Notary Public
My commission expires 7/6/2028

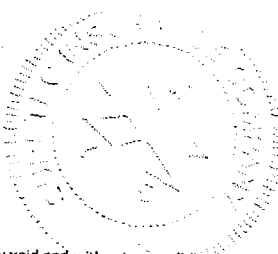
We, the undersigned Officers of SureTec Insurance Company and Markel Insurance Company, do hereby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, we have hereunto set our hands, and affixed the Seals of said Companies, on the 15th day of May, 2025.

SureTec Insurance Company

By:

M. Brent Beaty, Assistant Secretary



Markel Insurance Company

By:

Andrew Marquis, Assistant Secretary

Any Instrument Issued in excess of the penalty stated above is totally void and without any validity.
For verification of the authority of this Power you may call (713)812-0800 on any business day between 8:30 AM and 5:00 PM CST.

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of San Diego

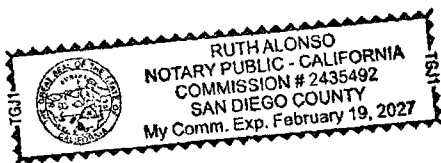
On May 15, 2025 before me, Ruth Alonso, Notary Public

personally appeared David Melman

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Ruth Alonso
Signature of Notary

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

- ☐ INDIVIDUAL
☐ CORPORATE OFFICER

☐ PARTNER(S)
☐ MEMBER of LLC
☒ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR

OTHER: _____

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

SureTec Insurance Company

DESCRIPTION OF ATTACHED DOCUMENT

Bond 4482675

Title or Type of Document

Number of Pages

May 15, 2025

Date of Document

Signer(s) other than named above



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

12/2/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Scott Held Insurance Agency 5855 Avenida Encinas, Suite 145 Carlsbad CA 92008	CONTACT NAME: Bethany Zehner PHONE (A/C, No, Ext): 858-332-2220 E-MAIL: bethany@srhinsurance.com ADDRESS: INSURER(S) AFFORDING COVERAGE INSURER A: Associated Industries Insurance Co., Inc INSURER B: Security National Insurance Co. INSURER C: Benchmark Insurance Company INSURER D: AGCS Marine Insurance Co. INSURER E: Richmond National Insurance Company A- VII INSURER F:	FAX (A/C, No): NAIC # 23140 19879 41394 22837 17103
INSURED Shaver Lake Construction Inc. PO Box 247 Shaver Lake CA 93664		

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	Y		AES1236414 01	06/30/2024	06/30/2025	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
B	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> NON-OWNED AUTOS ONLY			SPP181328701	06/30/2024	06/30/2025	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
E	UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$			RN-7-0505876	06/30/2024	6/30/2025	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N Y	N/A	99 WC-00003683-00	12/01/2024	12/01/2025	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
D	Logger's Broad Form Property Damage			MXI93018457	06/30/2024	06/30/2025	Aggregate \$ 1,000,000 Any One Loss \$ 1,000,000 Retention \$ 25,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Fresno County Dept of Public Works & Planning Resources Div Special District is included as Additional Insured with regards to General Liability where required by written contract. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to the County of Fresno.

CERTIFICATE HOLDER**CANCELLATION**

Fresno County Dept of Public Works & Planning

2220 Tulare St. 6th Floor
Fresno CA 93721

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Bethany Zehner

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