EXHIBIT 2

PLANS AND SPECIFICATIONS
FOR

Zone II Booster Pump Station Upgrade

SPECIFICATION NO. WW21-01(M)

PROJECT NO. 38892

PUBLIC WORKS
VENTURA COUNTY

county of ventura
WATERWORKS DISTRICT NO. 38

COUNTY OF VENTURA
PUBLIC WORKS AGENCY

NOTICE INVITING BIDS, PROPOSAL FORM, & SPECIFICATIONS

FOR

PROJECT NAME: **ZONE II BOOSTER PUMP STATION UPGRADE**

LOCATION: **Ventura County, California**

SPEC. NO.: **WW21-01(M)** **COST ACCOUNTING PROJECT NO.** **38892**

DESIGNED BY: MSO Technologies **CHECKED BY:** Jeewoong Kim

REVIEWED BY: Lloyd Trick

PROJECT MANAGER: Marco Segui

REGISTERED PROFESSIONAL ENGINEER
MARCO UMBLAS SEGUI
No. C63633
Exp. 9/30/ 2020
CIVIL
STATE OF CALIFORNIA

RECOMMENDED BY:

Project Manager

APPROVED BY:

Deputy Director of Public Works Agency

APPROVED BY: 8/27/20

Director of Public Works Agency

BIDS WILL BE RECEIVED UNTIL 2:00 P.M.
October 1, 2020
at County Surveyor's Public Counter
Third floor, Hall of Administration,
800 South Victoria Avenue,
Ventura, California 93009-1670

Construction bidding documents, including plans, specifications, addenda and any supplementary documents are only available on the Ventura County Public Works Agency Web Site.

NOTICE TO BIDDERS, SUBCONTRACTORS AND SUPPLIERS
SOURCES OF INFORMATION

DURING BIDDING PERIOD

PLAN HOLDERS LIST & OTHER INFORMATION IS AVAILABLE ON THE INTERNET AT:
http://vcpublicworks.org/es/

PROJECT DOCUMENTS ON EBIDBOARD AT:

http://www.ebidboard.com/public/projects/index.asp?mbrguid=2B485702-FFAE-4327-A8B7-F1C22BE001D2

TECHNICAL QUESTIONS on plans and specifications Please **EMAIL questions** early in the bidding period as an addendum may be required.	**FOR BID QUESTIONS, or to confirm number of Addenda issued,** **EMAIL TO**: **PWA.Bidquestions@ventura.org** **Spec Number must be referenced on all bid questions**

Please do not call other staff members or consultant.
Note that our consultants are directed to refer all calls to the Project Managers.

DIRECTIONS TO VENTURA COUNTY GOVERNMENT CENTER

Ventura County Government Center is currently closed to the public due to COVID-19

From US101 (Ventura Freeway), take Victoria Ave off ramp, north (towards mountains) about one mile to Telephone Road, then right on Telephone Road one block and turn left at Lark St. into the Government center parking lot.

From CA126 (Santa Paula Freeway), take Victoria Ave off ramp, south (away from mountains) about one mile to Telephone Road, then left on Telephone Road 1 block and turn left at Lark St. into the Government center parking lot.

ONLY AFTER BID OPENING

BID RESULTS: are available on the internet site shown above, usually within **24 hours after** bids are opened and Include abstracts of unit prices, totals of all bids & subcontractor's list for low & 2nd bidder. Click on “BIDS & SUBS”.

LOW BIDDER - ONLY AFTER AWARD OF CONTRACT

ALL QUESTIONS concerning project AFTER AWARD should be directed to the Project Manager named in the Notice of Award

Any other information can be requested at (805) 654-2039

Ventura County Waterworks District 38
Zone II Pump Station Upgrade

CONTENTS

PART 3 DRAWINGS

VENTURA COUNTY WATERWORKS DISTRICT NO. 38
NOTICE INVITING FORMAL BIDS

Sealed bids will be received at the County Surveyor's Public Counter, 3rd Floor, Administration Building, 800 South Victoria Avenue, Ventura, California 93009-1670, until **2:00 p.m.** on **October 1, 2020 ,** and afterwards opened, for **Zone II Booster Pump Station Upgrade** , for Specification No. **WW21-01(M)**, which consists of Installation of motor control center, panel board, panel board transformer, power monitoring equipment, lighting and plc control center. Furnish and install all conduits, conduit fittings, pull boxes, junction boxes, wires, and cables as shown on the drawings and conduit schedule. All conduits below grade shall be PVC conduits and conduits above grade shall be Rigid Galvanized Steel or Aluminum conduits with appropriate conduit fittings. Furnish and install new supply and exhaust fans. Furnish and install new astronomical timer lighting control panel with photo electric sensor wired to existing lighting.

The estimated cost of construction is $ **225,001.**

The plans, specifications and proposal forms for this project are filed in the office of the Ventura County Surveyor and are, by reference, made a part of this Notice. Construction bidding documents, including plans, specifications, addenda and any supplementary documents are now available on the Ventura County Web Site at: https://www.vcpublicworks.org/es/contracting/

then

click on "Contract Bidding Opportunities" and then "eBidBoard Website" where the documents may be viewed, downloaded and printed.

Printed copies of the document can be purchased at most commercial printing companies that have internet access.

A **List of Plan Holders** is available on the **Website** shown above.
An abstract of bids received will be available at the same web site under **Bids & Subs**.
When projects are awarded, the award notification to the State will be posted under **Awarded Contracts.**

Bids must be submitted **by mail** on the proposal form furnished with said documents. Subcontractor list must include a valid Contractor's License Number. Contractor and any subcontractors must be registered with the Department of Industrial Relations prior to bid time and shall be verified during bid verification processes.

Each bid must be accompanied by a bid guarantee in the amount of not less than 10% of the amount bid, **PAYABLE TO THE VENTURA COUNTY WATERWORKS DISTRICT NO. 38** and guaranteeing that the bidder will enter into a contract in accordance with the terms of the bidding documents if award is made. The bid guarantee shall be in one of the following forms: a bid bond written by an admitted surety insurer on the form included with the Proposal form, a cashier's check drawn by a National bank, a check certified by a National bank or cash. An electronically transmitted copy of the bid bond form, included in the Proposal form, may be used but the form must have the original signatures of the principal and surety. Copies of the completed bond will not be accepted.

Bidders must have a Class **A** California Contractors license, and will be required to furnish a Performance Bond and a Payment Bond, each in the amount of 100% of the contract price.

In accordance with Section 22300 of the Public Contract Code, securities may be substituted for funds withheld.

Bidders, contractors, and other interested parties can obtain wage rates pertaining to Ventura County projects at the link provided below.

California general prevailing wage rates for construction can be obtained from the following Web site: http://www.dir.ca.gov/DLSR/PWD/index.htm.

The awarded contractor must post copies of the prevailing wage determinations at each job site.

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PROPOSAL
FOR

ZONE II BOOSTER PUMP STATION UPGRADE

LOCATED IN
VENTURA COUNTY, CALIFORNIA

MAKE BID GUARANTEE TO **VENTURA COUNTY WATERWORKS DISTRICT NO. 38**
USE FORM PROVIDED (SEE PARAGRAPH 9, INSTRUCTION TO BIDDERS).

SPECIFICATION NO. **WW21-01(M)** INCLUDING **14** SHEETS OF PLANS

BIDS WILL BE RECEIVED BY MAIL ONLY ON _October 1, 2020___AT **2:00 P.M.**
(SEE SECTION 13 OF THE PR0POSAL FOR MAILED BID INSTRUCTIONS)

AGENCY IS ALLOWED **60** DAYS TO AWARD A CONTRACT (SEE SECTION 2-1.1).

THE STARTING DATE OF CONTRACT WILL BE **28** CALENDAR DAYS AFTER AWARD OF CONTRACT (SEE SECTION 6-7.4).

COMPLETION TIME IS **180** WORKING DAYS (SEE SECTION 6-7).

LIQUIDATED DAMAGES ARE **$ 1,660** PER CALENDAR DAY (SEE SECTION 6-9).

CONTRACTOR'S LICENSE CLASSIFICATION REQUIRED IS **CLASS A.**

LIABILITY INSURANCE CLASS REQUIRED PER SECTION 7-4 IS **L-B.**

FEDERAL-AID CONTRACT PROVISIONS ARE **NOT** INCLUDED IN THESE SPECIFICATIONS.

NON-MANDATORY PREBID MEETING: 10:00 A.M. on _**September 23,2020**_ at Ventura County Waterworks District Office – 6767 Spring Road, Moorpark, CA 93021. (General Conditions)

THE NUMBER OF PAGES IN THIS PROPOSAL IS 8.

BIDDER SHALL COMPLETE

NAME: _____

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

DELIVERY ADDRESS (CONTRACT RELATED DOCS), IF DIFFERENT FROM MAILING ADDRESS:

_____

TELEPHONE NUMBER: (_____)_____-_____ FAX No. (_____)_____-_____

eMAIL ADDRESS: _____

PROPOSAL
Instruction to Bidders

1. LICENSING OF BIDDER. Before submitting bids, bidders shall be licensed in accordance with the provisions of Sections 7000 through 7145 of the Business and Professions Code of the State of California in the classification required for the work bid on. The bidder's license number, classification, and expiration date shall be inserted on page 7 of the proposal form. The bidder's name shall correspond in all respects with the name shown on the license. License numbers and names are checked with the State.

2. **SITE INSPECTION**. Personally visit the worksite before submitting your bid to ascertain the existence of any surface or subsurface conditions affecting the cost of the work.

3. **INTERPRETATION AND QUESTIONS**. Carefully review the plans and specifications for any errors, omissions, or ambiguities. If you discover any or have specific questions, notify the Agency far enough in advance of the bid opening to allow time for the issuance of appropriate written addenda, if necessary. Send the notification about any errors, omissions, ambiguities or questions to PWA.Bidquestions@ventura.org. Written addenda shall be the sole means for modifying the plans and/or specifications prior to the bid opening. The Agency shall not be bound by oral communications purportedly modifying or interpreting the plans and/or specifications regardless of when or by whom such oral communications are made and you should not rely upon such oral communications in preparing your bid.

4. **BID ITEMS**. State in figures the unit prices, lump sum prices and extensions as indicated which shall be the prices for which you propose to supply all materials and services and perform all work required by the plans and specifications. All items described are to be construed as complete and in place. Include in the bid amount for items listed on the proposal form the cost of performing all work shown on the plans or required by the specifications for which a specific bid item is not provided. Bid on all items listed under Schedule of Work and Prices unless otherwise indicated in the proposal form.

5. **SIGNING OF BID**. Fill in all indicated blanks in this proposal using typewriter or ink and sign with ink. Proposals signed by an agent other than an owner, partner or corporate officer shall be accompanied by a power-of-attorney. Proposal form must be dated.

6. **NON-COLLUSION AFFIDAVIT**. The non-collusion affidavit required by Public Contract Code 7106 is included on page 5 of this Proposal.

7. **BID FORM NOT TO BE ALTERED**. Do not change the wording of this proposal. Any additions, deletions, conditions, limitations or provisions by the bidder will render the proposal irregular and may cause its rejection.

8. **CORRECTING BID**. Explain over your signature any erasures or deletions of information entered by the bidder in this proposal. Modifications submitted separately from this form will not be accepted

9. **BID GUARANTEE**. Each bid must be accompanied by a bid guarantee in the amount of not less than 10% of the amount bid and guaranteeing that the bidder will enter into a contract in accordance with the terms of the bidding documents if award is made to him. The bid guarantee shall be in one of the following forms: A bid bond written by an admitted surety insurer on the form included with the proposal form, a cashier's check drawn by a national bank, a check certified by a national bank or cash. An electronically transmitted copy (FAX) of the bid bond form included in the proposal form may be used, but the form must have the original signatures of the principal and surety. A FAX of the completed bond will not be accepted. Note: Performance and Payment Bonds are required from the bidder to whom a contract is awarded. See specifications Subsection 2-4 for contract bond requirements including limitations on the sureties that may issue the bonds.

10. **SUBMITTING BID**. Submit your bid **by mail** on one copy only of this proposal form, with addenda acknowledged by inserting the addenda numbers on page 7 of this proposal and with bid guarantee attached, in a sealed envelope addressed to:

Public Works Agency, County of Ventura, County Surveyor's Public Counter,
3rd Floor - Hall of Administration, 800 South Victoria Ave., Ventura, California 93009-1670.

For proper handling, mark outside of envelope as “SEALED BID”, and show the project title and the bidder's name and address. Do not enclose other documents in the bid envelope.

IMPORTANT: Proposals received that are not signed will not be considered.
Late bids will not be opened or considered.
Bids must be on this form. Electronically transmitted bids, bid modifications or bid withdrawals will not be considered.

Notwithstanding anything stated, directed or indicated in the other bidding documents, the only items to be included with this proposal are:

1. This proposal form, signed and dated with addenda acknowledged.
2. The bid bond with original signatures of surety representative and contractor, or other bid guarantee as specified in 9 above.
3. Subcontractors and off-job fabricators list completed in accordance with Public Contract Code Section 4104.

11. **TIME OF BID CLOSURE**. The bid box will be closed promptly at the time specified on the first sheet of the proposal form. Time can be obtained from http://www.time.gov/timezone.cgi?Pacific/d/-8 (local standard time).

12. **DELIVERY OF BID**.

Due to the COVID-19 crisis, **in-person delivery** of bids has been suspended. In person delivery will **not** be accepted; only **bids received by mail** shall be accepted.

13. **MAILED BIDS (Including Express Delivery)**. Bids received in the County's Mail Room by 8 a.m. **on, or before**, the bid opening date will be considered to have been placed in the bid box on time, whether or not actually delivered to the bid box on time. U. S. Postal Service Special delivery, Registered and Certified mail may slow actual receipt of bids. **Bidder is solely responsible for sending bid early enough to insure delivery to the County on time.**

For mailed bids, mark "**SEALED BID**" in large letters on the outside of the delivery envelope and clearly show the **Spec No**.

Electronically transmitted bids or modifications will **not** be considered.

14. **WITHDRAWAL OF PROPOSAL**. Proposals may be withdrawn by the bidder prior to the time stated for opening bids upon written request, signed by the bidder or his authorized agent and submitted in the same manner as a bid. To retrieve a bid from the bid box may take 10 or more minutes as it requires a written request to withdraw the bid, the positive identification of the person requesting the withdrawal, and the opening of the bid box.

15. **ERRORS**. Bidder will not be released on account of errors. Where a discrepancy occurs between unit prices and totals, the unit price shall govern in computing the total. If a unit price is omitted, it will be determined from the item total, if entered. If both the unit price and line total for any item are omitted, the bid will be considered non-responsive in accordance with Paragraph 4 above. If the total Bid Price is not equal to the sum of the Item Totals (as corrected) the Total Bid Price will be corrected. If no monetary symbol ($ or ¢) is entered with a unit price, lump sum or extension, a dollar sign will be assumed to be the bidder's intent.

16. **SUBCONTRACTOR LICENSE NUMBERS.** License numbers for subcontractors must be provided at the time the bid is received.

17. **PUBLIC WORKS CONTRACTOR REGISTRATION PROGRAM.** 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

18. **LABOR COMPLIANCE MONITORING.** This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

The Prime Contractor shall post job site notices prescribed by regulation.

(See Chapter 8, California Code Regulation section 16451(d) for notice that previously was required for projects monitored by the Compliance Monitoring Unit.)

PROPOSAL

I, the person whose signature is affixed to page 7 of this proposal, submit this proposal to the Board of Supervisors of the County of Ventura and hereby declare:

1. That the bidder has read this proposal and has abided by and agrees to the conditions herein and has carefully examined the project plans and read the specifications and does hereby propose to furnish all materials and do all the work required to complete the work in accordance with the plans and specifications for the unit prices or lump sums named in the Schedule of Work and Prices.

2. That the addenda indicated on page 7 of this proposal are acknowledged.

3. That the bidder, as Principal, acknowledges himself as being bound by the attached bond or other acceptable bid guarantee.

4. NONCOLLUSION DECLARATION

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

Signature of Officer _____

Printed Name of officer:_____

PROPOSAL

Contractor's Name _____

List of Subcontractors

Listing shall comply with the provisions of California Public Contract Code, Section 4104.

Name of Subcontractor	Contractor's License Number	Business Address	Items of Work

If more space is needed, attach additional sheets.

Public Contract Code Section 4104 provides that bidders must list:

(a)(1) The name, the location of the place of business, and the California contractor license number of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater.

(b) The portion of the work that will be done by each subcontractor under this act. The prime contractor shall list only one subcontractor for each portion as is defined by the prime contractor in his or her bid.

PROPOSAL

Schedule of work and prices for: **ZONE II BOOSTER PUMP STATION UPGRADE**

Item No.	**Units**	Approx Quantity	Item Description	Payment Reference	Unit-Prices (In Figures)	Item Total (In Figures)
1	LS	1	Mobilization/Demobilization	9-3		
2	LS	1	Installation of Housekeeping pad	01011-4.2		
3	LS	1	Installation of Motor Control Center	01011-4.3		
4	LS	1	Installation of Wires, Cables, Conduits and junction Boxes	01011-4.4		
5	LS	1	Installation of Supply and Exhaust fans	01011-4.5		
6	LS	1	Installation of Sump Pump	01011-4.6		
7	LS	1	Installation of Ceiling Lights and Timers	01011-4.7		
8	LS	1	Demolition	01011-4.8		
9	LS	1	Furnish Spare parts of PLC and Instrument	01011-4.9		
10	LS	1	Release on Contract	9-4		$1.00
			Total Amount Bid			

The following addenda are acknowledged:
(Bidder must fill in number and date of each addenda or may enter the word "None " if appropriate)
Call (805) 654-2068 to determine addenda that have been issued.

Number	**Dated**

I make the above proposal and certify or declare under penalty of perjury under the laws of the State of California that the statements made on Page 5 of this Proposal, and below my signature, are true and correct.

Dated _____

At _____
(City and State)

Signature:_____

Printed Name:_____

Position: _____
(Sole Owner, Partner, President, etc.)

License No._____

License Classification_____

License Expiration Date_____

Company Name _____

Type of Organization _____
(Individual, Partnership, Corp.)

Enter }
Name & }
Address }
of Bonding }
Company }

BID BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____, Principal,

and_____

_____, Surety, are held and firmly bound unto

VENTURA COUNTY WATERWORKS DISTRICT NO. 38 Obligee,

in the sum of Ten Percent of the total amount of the Bid for the payment of which we bind ourselves, our legal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has submitted or is about to submit a bid or proposal to Obligee on a contract for

ZONE II BOOSTER PUMP STATION UPGRADE

NOW, THEREFORE, if that contract be awarded to principal and principal shall, within such time as specified, duly execute the contract in the prescribed form and deliver the same to obligee with all required bonds/performance securities, certificates of insurance and such other items as required in the bidding or contract documents then this obligation shall be null and void; otherwise to remain in full force and effect, and if the contract is awarded to principal and principal fails, within the time specified, to duly execute the contract in the prescribed form and deliver the same to obligee with all said required items, then surety shall pay obligee the full sum of this bond.

Surety, for value received, hereby agrees that no extension of time, change, alteration, modification, or addition to the bidding or contract documents, or of the work required thereunder, shall release or exonerate surety on this bond or in any way affect the obligation of this bond; and surety does hereby waive notice of same.

Signed, sealed and dated

_____
(Principal)

by_____(Seal)

_____
(Surety)

by_____
Attorney-in-Fact

INDICATE COMPLETE ADDRESS OF SURETY TO WHICH CORRESPONDENCE CONCERNING THIS BOND SHOULD BE DIRECTED.

Telephone No._____

Form PW-B-1

COUNTY OF VENTURA
PUBLIC WORKS AGENCY

PREVAILING RATES OF WAGES

As provided in Subsection 7-2.2 of these specifications, and in accordance with Section 1770 *(Amended by Stats. 2017, Ch. 28, Sec. 17. (SB 96) Effective June 27, 2017),* et. seq. of the California Labor Code, determinations of the generally prevailing wages for various classes of workers in Ventura County have been made by the California Director of Industrial Relations as required by the California Labor Code.

As required by California Labor Code Section 1777.5, properly indentured apprentices shall be employed on the work in the minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification. Travel and subsistence shall be paid in accordance with California Labor Code Section 1773.8.
The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section. The stipulations shall fix the responsibility of compliance with this section for all apprenticeable occupations with the prime contractor.

The determinations made by the State are available on the Internet at
http://www.dir.ca.gov/DLSR/PWD/Index.htm
and are on file in the office of the Public Works Agency
The rate fixed for each craft, classification, or type of work shall be not less than the prevailing rate paid in the craft, classification, or type of work.

The Contractor shall post a copy of the wage rates at each jobsite at a location readily available to the workers.

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Excerpts from the California Labor Code

AS of January 1, 2018.

These excerpts from the Labor Code include the sections listed in specification Section 7.2.2.2 that are required by Labor Code 1775(b)(1) to be included in all subcontracts. These excerpts also include sections recommended by the CA Department of Industrial Relations that contain information on the contractor registration requirements. These sections are furnished for the convenience of the contractor and in no way limit the required compliance with all laws.

1725.5. A contractor shall be registered pursuant to this section to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract that is subject to the requirements of this chapter. For the purposes of this section, "contractor" includes a subcontractor as defined by Section 1722.1.

(a) To qualify for registration under this section, a contractor shall do all of the following:

(1) (A) Register with the Department of Industrial Relations in the manner prescribed by the department and pay an initial nonrefundable application fee of four hundred dollars ($400) to qualify for registration under this section and an annual renewal fee on or before July 1 of each year thereafter. The annual renewal fee shall be in a uniform amount set by the Director of Industrial Relations, and the initial registration and renewal fees may be adjusted no more than annually by the director to support the costs specified in Section 1771.3.

(B) Beginning June 1, 2019, a contractor may register or renew according to this subdivision in annual increments up to three years from the date of registration. Contractors who wish to do so will be required to prepay the applicable nonrefundable application or renewal fees to qualify for the number of years for which they wish to preregister.

(2) Provide evidence, disclosures, or releases as are necessary to establish all of the following:

(A) Workers' compensation coverage that meets the requirements of Division 4 (commencing with Section 3200) and includes sufficient coverage for any worker whom the contractor employs to perform work that is subject to prevailing wage requirements other than a contractor who is separately registered under this section. Coverage may be evidenced by a current and valid certificate of workers' compensation insurance or certification of self-insurance required under Section 7125 of the Business and Professions Code.

(B) If applicable, the contractor is licensed in accordance with Chapter 9 (commencing with Section 7000) of the Business and Professions Code.

(C) The contractor does not have any delinquent liability to an employee or the state for any assessment of back wages or related damages, interest, fines, or penalties pursuant to any final judgment, order, or determination by a court or any federal, state, or local administrative agency, including a confirmed arbitration award. However, for purposes of this paragraph, the contractor shall not be disqualified for any judgment, order, or determination that is under appeal, provided that the contractor has secured the payment of any amount eventually found due through a bond or other appropriate means.

(D) The contractor is not currently debarred under Section 1777.1 or under any other federal or state law providing for the debarment of contractors from public works.
(E) The contractor has not bid on a public works contract, been listed in a bid proposal, or engaged in the performance of a contract for public works without being lawfully registered in accordance with this section, within the preceding 12 months or since the effective date of the requirements set forth in subdivision (e), whichever is earlier. If a contractor is found to be in violation of the requirements of this paragraph, the period of disqualification shall be waived if both of the following are true:
(i) The contractor has not previously been found to be in violation of the requirements of this paragraph within the preceding 12 months.
(ii) The contractor pays an additional nonrefundable penalty registration fee of two thousand dollars ($2,000).
(b) Fees received pursuant to this section shall be deposited in the State Public Works Enforcement Fund established by Section 1771.3 and shall be used only for the purposes specified in that section.
(c) A contractor who fails to pay the renewal fee required under paragraph (1) of subdivision (a) on or before the expiration of any prior period of registration shall be prohibited from bidding on or engaging in the performance of any contract for public work until once again registered pursuant to this section. If the failure to pay the renewal fee was inadvertent, the contractor may renew its registration retroactively by paying an additional nonrefundable penalty renewal fee equal to the amount of the renewal fee within 90 days of the due date of the renewal fee.
(d) If, after a body awarding a contract accepts the contractor’s bid or awards the contract, the work covered by the bid or contract is determined to be a public work to which Section 1771 applies, either as the result of a determination by the director pursuant to Section 1773.5 or a court decision, the requirements of this section shall not apply, subject to the following requirements:
(1) The body that awarded the contract failed, in the bid specification or in the contract documents, to identify as a public work that portion of the work that the determination or decision subsequently classifies as a public work.
(2) Within 20 days following service of notice on the awarding body of a determination by the Director of Industrial Relations pursuant to Section 1773.5 or a decision by a court that the contract was for public work as defined in this chapter, the contractor and any subcontractors are registered under this section or are replaced by a contractor or subcontractors who are registered under this section.
(3) The requirements of this section shall apply prospectively only to any subsequent bid, bid proposal, contract, or work performed after the awarding body is served with notice of the determination or decision referred to in paragraph (2).
(e) The requirements of this section shall apply to any bid proposal submitted on or after March 1, 2015, to any contract for public work, as defined in this chapter, executed on or after April 1, 2015, and to any work performed under a contract for public work on or after January 1, 2018, regardless of when the contract for public work was executed.
(f) This section does not apply to work performed on a public works project of twenty-five thousand dollars ($25,000) or less when the project is for construction, alteration, demolition, installation, or repair work or to work performed on a public works project of fifteen thousand dollars ($15,000) or less when the project is for maintenance work.

1771. Except for public works projects of one thousand dollars ($1,000) or less, not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the public work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in this chapter, shall be paid to all workers employed on public works.
This section is applicable only to work performed under contract, and is not applicable to work carried out by a public agency with its own forces. This section is applicable to contracts let for maintenance work.

1771.1. (a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
(b) Notice of the requirement described in subdivision (a) shall be included in all bid invitations and public works contracts, and a bid shall not be accepted nor any contract or subcontract entered into without proof of the contractor or subcontractor's current registration to perform public work pursuant to Section 1725.5.
(c) An inadvertent error in listing a subcontractor who is not registered pursuant to Section 1725.5 in a bid proposal shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that any of the following apply:
(1) The subcontractor is registered prior to the bid opening.
(2) Within 24 hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in subparagraph (E) of paragraph (2) of subdivision (a) of Section 1725.5.
(3) The subcontractor is replaced by another registered subcontractor pursuant to Section 4107 of the Public Contract Code.
(d) Failure by a subcontractor to be registered to perform public work as required by subdivision (a) shall be grounds under Section 4107 of the Public Contract Code for the contractor, with the consent of the awarding authority, to substitute a subcontractor who is registered to perform public work pursuant to Section 1725.5 in place of the unregistered subcontractor.
(e) The department shall maintain on its Internet Web site a list of contractors who are currently registered to perform public work pursuant to Section 1725.5.
(f) A contract entered into with any contractor or subcontractor in violation of subdivision (a) shall be subject to cancellation, provided that a contract for public work shall not be unlawful, void, or voidable solely due to the failure of the awarding body, contractor, or any subcontractor to comply with the requirements of Section 1725.5 or this section.
(g) If the Labor Commissioner or his or her designee determines that a contractor or subcontractor engaged in the performance of any public work contract without having been registered in accordance with this section, the contractor or subcontractor shall forfeit, as a civil penalty to the state, one hundred dollars ($100) for each day of work performed in violation of the registration requirement, not to exceed an aggregate penalty of eight thousand dollars ($8,000) in addition to any penalty registration fee assessed pursuant to clause (ii) of subparagraph (E) of paragraph (2) of subdivision (a) of Section 1725.5.

(h) (1) In addition to, or in lieu of, any other penalty or sanction authorized pursuant to this chapter, a higher tiered public works contractor or subcontractor who is found to have entered into a subcontract with an unregistered lower tier subcontractor to perform any public work in violation of the requirements of Section 1725.5 or this section shall be subject to forfeiture, as a civil penalty to the state, of one hundred dollars ($100) for each day the unregistered lower tier subcontractor performs work in violation of the registration requirement, not to exceed an aggregate penalty of ten thousand dollars ($10,000).
(2) The Labor Commissioner shall use the same standards specified in subparagraph (A) of paragraph (2) of subdivision (a) of Section 1775 when determining the severity of the violation and what penalty to assess, and may waive the penalty for a first time violation that was unintentional and did not hinder the Labor Commissioner's ability to monitor and enforce compliance with the requirements of this chapter.
(3) A higher tiered public works contractor or subcontractor shall not be liable for penalties assessed pursuant to paragraph (1) if the lower tier subcontractor's performance is in violation of the requirements of Section 1725.5 due to the revocation of a previously approved registration.
(4) A subcontractor shall not be liable for any penalties assessed against a higher tiered public works contractor or subcontractor pursuant to paragraph (1). A higher tiered public works contractor or subcontractor may not require a lower tiered subcontractor to indemnify or otherwise be liable for any penalties pursuant to paragraph (1).
(i) The Labor Commissioner or his or her designee shall issue a civil wage and penalty assessment, in accordance with the provisions of Section 1741, upon determination of penalties pursuant to subdivision (g) and subparagraph (B) of paragraph (1) of subdivision (h). Review of a civil wage and penalty assessment issued under this subdivision may be requested in accordance with the provisions of Section 1742. The regulations of the Director of Industrial Relations, which govern proceedings for review of civil wage and penalty assessments and the withholding of contract payments under Article 1 (commencing with Section 1720) and Article 2 (commencing with Section 1770), shall apply.
(j) (1) Where a contractor or subcontractor engages in the performance of any public work contract without having been registered in violation of the requirements of Section 1725.5 or this section, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractor or the unregistered subcontractor on all public works until the unregistered contractor or unregistered subcontractor is registered. The stop order shall not apply to work by registered contractors or subcontractors on the public work.
(2) A stop order may be personally served upon the contractor or subcontractor by either of the following methods:
(A) Manual delivery of the order to the contractor or subcontractor personally.
(B) Leaving signed copies of the order with the person who is apparently in charge at the site of the public work and by thereafter mailing copies of the order by first class mail, postage prepaid to the contractor or subcontractor at the address on file with either of the following:
(i) The Contractors' State License Board.
(ii) The Secretary of State.
(3) The stop order shall be effective immediately upon service and shall be subject to appeal by the party contracting with the unregistered contractor or subcontractor, by the unregistered contractor or subcontractor, or both. The appeal, hearing, and any further review of the hearing decision shall be

governed by the procedures, time limits, and other requirements specified in subdivision (a) of Section 238.1.
(k) Failure of a contractor or subcontractor, owner, director, officer, or managing agent of the contractor or subcontractor to observe a stop order issued and served upon him or her pursuant to subdivision (j) is guilty of a misdemeanor punishable by imprisonment in county jail not exceeding 60 days or by a fine not exceeding ten thousand dollars ($10,000), or both.
(l) This section shall apply to any bid proposal submitted on or after March 1, 2015, and any contract for public work entered into on or after April 1, 2015. This section shall also apply to the performance of any public work, as defined in this chapter, on or after January 1, 2018, regardless of when the contract for public work was entered.
(m) Penalties received pursuant to this section shall be deposited in the State Public Works Enforcement Fund established by Section 1771.3 and shall be used only for the purposes specified in that section.
(n) This section shall not apply to work performed on a public works project of twenty-five thousand dollars ($25,000) or less when the project is for construction, alteration, demolition, installation, or repair work or to work performed on a public works project of fifteen thousand dollars ($15,000) or less when the project is for maintenance work.

1775. (a) (1) The contractor and any subcontractor under the contractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit not more than two hundred dollars ($200) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates as determined by the director for the work or craft in which the worker is employed for any public work done under the contract by the contractor or, except as provided in subdivision (b), by any subcontractor under the contractor.

(2)(A) The amount of the penalty shall be determined by the Labor Commissioner based on consideration of both of the following:
(i) Whether the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor.
(ii) Whether the contractor or subcontractor has a prior record of failing to meet its prevailing wage obligations.
(B) (i) The penalty may not be less than forty dollars ($40) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, unless the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor.
(ii) The penalty may not be less than eighty dollars ($80) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the contractor or subcontractor has been assessed penalties within the previous three years for failing to meet its prevailing wage obligations on a separate contract, unless those penalties were subsequently withdrawn or overturned.
(iii) The penalty may not be less than one hundred twenty dollars ($120) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Labor Commissioner determines that the violation was willful, as defined in subdivision (c) of Section 1777.1.
(C) If the amount due under this section is collected from the contractor or subcontractor, any outstanding wage claim under Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 against that contractor or

subcontractor shall be satisfied before applying that amount to the penalty imposed on that contractor or subcontractor pursuant to this section.
(D) The determination of the Labor Commissioner as to the amount of the penalty shall be reviewable only for abuse of discretion.
(E) The difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the contractor or subcontractor, and the body awarding the contract shall cause to be inserted in the contract a stipulation that this section will be complied with.
(b) If a worker employed by a subcontractor on a public works project is not paid the general prevailing rate of per diem wages by the subcontractor, the prime contractor of the project is not liable for any penalties under subdivision (a) unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:
(1) The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of this section and Sections **1771, 1776, 1777.5, 1813, and 1815.**
(2) The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
(3) Upon becoming aware of the failure of the subcontractor to pay his or her workers the specified prevailing rate of wages, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
(4) Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to his or her employees on the public works project and any amounts due pursuant to Section 1813.
(c) The Division of Labor Standards Enforcement shall notify the contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages.

1776.
(a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.
(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract and the Division of Labor Standards Enforcement of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public may not be given access to the records at the principal office of the contractor.

(C) Unless required to be furnished directly to the Labor Commissioner in accordance with paragraph (3) of subdivision (a) of Section 1771.4, the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division. The payroll records may consist of printouts of payroll data that are maintained as computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in subdivision (a).

(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

(e) Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multiemployer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5)) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual's full social security number, but shall provide the last four digits of the social security number. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual's social security number.

(f) (1) Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided nonredacted copies of certified payroll records. Any copies of records or certified payroll made available for inspection and

furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or redacted to prevent disclosure of an individual's name, address, and social security number.

(2) An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subdivision.

(g) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city, and county, and shall, within five working days, provide a notice of a change of location and address.

(h) The contractor or subcontractor has 10 days in which to comply, subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit one hundred dollars ($100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

(i) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section.

(j) The director shall adopt rules consistent with the California Public Records Act (Chapter 3.5 (commencing with Section 6250) of Division 7 of Title 1 of the Government Code) and the Information Practices Act of 1977 (Title 1.8 (commencing with Section 1798) of Part 4 of Division 3 of the Civil Code) governing the release of these records, including the establishment of reasonable fees to be charged for reproducing copies of records required by this section.

1777.5.

(a) This chapter does not prevent the employment of properly registered apprentices upon public works.

(b) (1) Every apprentice employed upon public works shall be paid the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered and shall be employed only at the work of the craft or trade to which he or she is registered.

(2) Unless otherwise provided by a collective bargaining agreement, when a contractor requests the dispatch of an apprentice pursuant to this section to perform work on a public works project and requires the apprentice to fill out an application or undergo testing, training, an examination, or other preemployment process as a condition of employment, the apprentice shall be paid for the time spent on the required preemployment activity, including travel time to and from the required activity, if any, at the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered. Unless otherwise provided by a collective bargaining agreement, a contractor is not required to compensate an apprentice for the time spent on preemployment activities if the apprentice is required to take a preemployment drug or alcohol test and he or she fails to pass that test.

(c) Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprentice agreements under Chapter 4 (commencing with Section 3070) of Division 3 are eligible to be employed at the apprentice wage rate on public works. The employment and training of each apprentice shall be in accordance with either of the following:

(1) The apprenticeship standards and apprentice agreements under which he or she is training.

(2) The rules and regulations of the California Apprenticeship Council.

(d) If the contractor to whom the contract is awarded by the state or any political subdivision, in performing any of the work under the contract, employs workers in any apprenticeable craft or trade, the contractor shall employ apprentices in at least the ratio set forth in this section and may apply to any apprenticeship program in the craft or trade that can provide apprentices to the site of the public work for a certificate approving the contractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the contractor, shall arrange for the dispatch of apprentices to the contractor. A contractor covered by an apprenticeship program's standards shall not be required to submit any additional application in order to include additional public works contracts under that program. "Apprenticeable craft or trade," as used in this section, means a craft or trade determined as an apprenticeable occupation in accordance with rules and regulations prescribed by the California Apprenticeship Council. As used in this section, "contractor" includes any subcontractor under a contractor who performs any public works not excluded by subdivision (o).

(e) Before commencing work on a contract for public works, every contractor shall submit contract award information to an applicable apprenticeship program that can supply apprentices to the site of the public work. The information submitted shall include an estimate of journeyman hours to be performed under the contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the awarding body, if requested by the awarding body. Within 60 days after concluding work on the contract, each contractor and subcontractor shall submit to the awarding body, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the contract. The information under this subdivision shall be public. The apprenticeship programs shall retain this information for 12 months.

(f) The apprenticeship program supplying apprentices to the area of the site of the public work shall ensure equal employment and affirmative action in apprenticeship for women and minorities.

(g) The ratio of work performed by apprentices to journeymen employed in a particular craft or trade on the public work may be no higher than the ratio stipulated in the apprenticeship standards under which the apprenticeship program operates if the contractor agrees to be bound by those standards. However, except as otherwise provided in this section, in no case shall the ratio be less than one hour of apprentice work for every five hours of journeyman work.

(h) This ratio of apprentice work to journeyman work shall apply during any day or portion of a day when any journeyman is employed at the jobsite and shall be computed on the basis of the hours worked during the day by journeymen so employed. Any work performed by a journeyman in excess of eight hours per day or 40 hours per week shall not be used to calculate the ratio. The contractor shall employ apprentices for the number of hours computed as above before the end of the contract or, in the case of a subcontractor, before the end of the subcontract. However, the contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the jobsite. When an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Administrator of Apprenticeship, upon application of an apprenticeship program, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification.

(i) A contractor covered by this section who has agreed to be covered by an apprenticeship program's standards upon the issuance of the approval certificate, or who has been previously approved for an apprenticeship program in the craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the applicable apprenticeship standards, but in no event less than the 1-to-5 ratio required by subdivision (g).

(j) Upon proper showing by a contractor that he or she employs apprentices in a particular craft or trade in the state on all of his or her contracts on an annual average of not less than one hour of apprentice work for every five hours of labor performed by journeymen, the Administrator of Apprenticeship may grant a certificate exempting the contractor from the 1-to-5 hourly ratio, as set forth in this section for that craft or trade.

(k) An apprenticeship program has the discretion to grant to a participating contractor or contractor association a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting the contractor from the 1-to-5 ratio set forth in this section when it finds that any one of the following conditions is met:

(1) Unemployment for the previous three-month period in the area exceeds an average of 15 percent.

(2) The number of apprentices in training in the area exceeds a ratio of 1 to 5.

(3) There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth of its journeymen annually through apprenticeship training, either on a statewide basis or on a local basis.

(4) Assignment of an apprentice to any work performed under a public works contract would create a condition that would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large, or the specific task to which the apprentice is to be assigned is of a nature that training cannot be provided by a journeyman.

(l) If an exemption is granted pursuant to subdivision (k) to an organization that represents contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member contractors shall not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

(m)
(1) A contractor to whom a contract is awarded, who, in performing any of the work under the contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the director determines is the prevailing amount of apprenticeship training contributions in the area of the public works site. A contractor may take as a credit for payments to the council any amounts paid by the contractor to an approved apprenticeship program that can supply apprentices to the site of the public works project. The contractor may add the amount of the contributions in computing his or her bid for the contract.
(2) (A) At the conclusion of the 2002-03 fiscal year and each fiscal year thereafter, the California Apprenticeship Council shall distribute training contributions received by the council under this subdivision, less the expenses of the Department of Industrial Relations for administering this subdivision, by making grants to approved apprenticeship programs for the purpose of training apprentices. The grant funds shall be distributed as follows:
(i) If there is an approved multiemployer apprenticeship program serving the same craft or trade and geographic area for which the training contributions were made to the council, a grant to that program shall be made.
(ii) If there are two or more approved multiemployer apprenticeship programs serving the same craft or trade and county for which the training contributions were made to the council, the grant shall be divided among those programs based on the number of apprentices from that county registered in each program.
(iii) All training contributions not distributed under clauses (i) and (ii) shall be used to defray the future expenses of the Department of Industrial Relations for the administration and enforcement of apprenticeship standards and requirements under this code.

(B) An apprenticeship program shall only be eligible to receive grant funds pursuant to this subdivision if the apprenticeship program agrees, prior to the receipt of any grant funds, to keep adequate records that document the expenditure of grant funds and to make all records available to the Department of Industrial Relations so that the Department of Industrial Relations is able to verify that grant funds were used solely for training apprentices. For purposes of this subparagraph, adequate records include, but are not limited to, invoices, receipts, and canceled checks that account for the expenditure of grant funds. This subparagraph shall not be deemed to require an apprenticeship program to provide the Department of Industrial Relations with more documentation than is necessary to verify the appropriate expenditure of grant funds made pursuant to this subdivision.

(C) The Department of Industrial Relations shall verify that grants made pursuant to this subdivision are used solely to fund training apprentices. If an apprenticeship program is unable to demonstrate how grant funds are expended or if an apprenticeship program is found to be using grant funds for purposes other than training apprentices, then the apprenticeship program shall not be eligible to receive any future grant pursuant to this subdivision and the Department of Industrial Relations may initiate the process to rescind the registration of the apprenticeship program.

(3) All training contributions received pursuant to this subdivision shall be deposited in the Apprenticeship Training Contribution Fund, which is hereby created in the State Treasury. Upon appropriation by the Legislature, all moneys in the Apprenticeship Training Contribution Fund shall be used for the

purpose of carrying out this subdivision and to pay the expenses of the Department of Industrial Relations.

(n) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section. The stipulations shall fix the responsibility of compliance with this section for all apprenticeable occupations with the prime contractor.

(o) This section does not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor when the contracts of general contractors or those specialty contractors involve less than thirty thousand dollars ($30,000).

(p) An awarding body that implements an approved labor compliance program in accordance with subdivision (b) of Section 1771.5 may, with the approval of the director, assist in the enforcement of this section under the terms and conditions prescribed by the director.

1813. The contractor or subcontractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars ($25) for each worker employed in the execution of the contract by the respective contractor or subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of this article. In awarding any contract for public work, the awarding body shall cause to be inserted in the contract a stipulation to this effect. The awarding body shall take cognizance of all violations of this article committed in the course of the execution of the contract, and shall report them to the Division of Labor Standards Enforcement.

1815. Notwithstanding the provisions of Sections 1810 to 1814, inclusive, of this code, and notwithstanding any stipulation inserted in any contract pursuant to the requirements of said sections, work performed by employees of contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon public work upon compensation for all hours worked in excess of 8 hours per day at not less than $1^1/_2$ times the basic rate of pay.

EXCERPTS FROM PUBLIC CONTRACT CODE 9204

EFFECTIVE DATE JANUARY 1, 2017

Please note section 9204 of the Public Contract Code, set forth in full below. Contractor must follow the contractual dispute resolution process specified in the Ventura County Standard Specifications, which is consistent with 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.

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SECTION 0 - SSPWC ADOPTION AND MODIFICATIONS

0-1 STANDARD SPECIFICATIONS

Except as hereinafter provided or as modified by the Special Provisions, the provisions of Parts 2 through 5 of the 2015 edition of the Standard Specifications for Public Works Construction (referred to as SSPWC), published by BNi Building News, Los Angeles, are part of these Standard Specifications.

0-2 DELETIONS

The following portions of SSPWC are hereby deleted: Part 1 and Sections 200-1.6.2, and 301-1.4.

0-3 NUMBERING OF SECTIONS

The numbering in these modifications is compatible with the numbering in SSPWC. References to whole sections of SSPWC and these modifications are preceded by the word "Section", references to parts of sections show numbers only, such as "211-5", except at the beginning of a sentence, the word "Section" precedes the number. Standard Special Provisions, if included, are numbered as Sections 901 through 999. The Special Provisions are numbered starting with Section 1000 or higher.

Cross-references contained in SSPWC to sections deleted by 0-2 hereof shall be references to the sections of like number contained herein.

0-4 ADDITIONS

The sections that follow, either, replace sections of like number in SSPWC which were deleted in 0-2 above, modify sections of SSPWC, or add material not in SSPWC.

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

1-1 GENERAL Unless otherwise stated, the words directed, required, permitted, ordered, instructed, designated, considered necessary, prescribed, approved, acceptable, satisfactory, or words of like meaning, refer to actions, expressions, and prerogatives of the Engineer.

1-2 TERMS AND DEFINITIONS

Acceptance--The formal written acceptance by the Agency of the Work which has been completed in all respects in accordance with the Plans and Specifications and any Modifications thereof.

Addendum--Written or graphic instrument issued prior to the opening of Bids which clarifies, corrects or changes the bidding or Contract Documents. The term "Addendum" shall include bulletins and all other types of written notices issued to potential bidders prior to opening of Bids.

Agency--The legal entity for which the Work is being performed.

Agreement--See Contract.

Base--A layer of specified material of planned thickness placed immediately below the pavement or surfacing.

Bid--The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work.

Bidder--Any individual, firm, partnership, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

Board--The officer or body constituting the awarding authority of the Agency.

Bond--Bid, performance and payment bond or other instrument of security.

Cash Contract--A contract financed by means other than special assessments.

Certificate of Compliance—A written document signed and submitted by a supplier or manufacturer that certifies that the material or assembled material supplied to the Work site conforms to the requirements of the Contract Documents.

Change Order--A written order to the Contractor signed by the Agency directing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract time issued after the effective date of the Contract. A Change Order may or may not also be signed by the Contractor.

Code--The terms Government Code, Labor Code, etc. refer to codes of the State of California.

Consultant--A professional engineer, architect, landscape architect or other professional who designed the project or performed other services for the Agency on the project.

Contract--The written agreement between the Agency and the Contractor covering the Work.

Contract Documents--The Contract, Addenda, notice inviting bids, instruction to bidders; Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Contract, the Bonds, permits from jurisdictional regulatory agencies, Special Provisions, Plans, Standard Plans, Standard Specifications, Reference Specifications, Change Orders and Supplemental Agreements.

Contractor--The individual, partnership, corporation, joint venture, or other legal entity having a Contract with the Agency to perform the Work. In the case of work being done under permit issued by the Agency, the Permittee shall be construed to be the Contractor. The term "prime contractor" shall mean Contractor.

Contract Price--The total amount of money for which the Contract is awarded.

Contract Unit Price--The amount shown in the Bid for a single unit of an item of work.

County Sealer--The Sealer of Weights and Measures of the county in which the Contract is let.

Days--Days shall mean consecutive calendar days unless otherwise specified.

Daily Extra Work Reports--Reports on Agency furnished forms as required by 3-3.

Disputed Work--Work in which Agency and Contractor are in disagreement.

Due Notice--A written notification, given in due time, of a proposed action where such notification is required by the Contract to be given a specified interval of time (usually 48 hours or two Working Days) prior to the commencement of the contemplated action. Notification may be from Engineer to Contractor or from Contractor to Engineer.

Electrolier--Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

Engineer--The Director of Public Works Agency acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

Field Directive--A written communication from the Engineer to the Contractor that does not make any Modification to the Contract Documents. It is used only to answer Contractor's questions and to provide decisions as specified in the Contract Documents.

Geotextile--Synthetic fiber used in civil engineering applications, serving the primary function of separation and filtration.

House Connection Sewer--A sewer, within a public street or right of way, proposed to connect any parcel, lot, or part of a lot with a main line sewer.

House Sewer--A sewer, wholly within private property, proposed to connect any building to a house connection sewer.

Luminaire--The lamp housing including the optical and socket assemblies (and ballast if so specified).

Major Bid Item--A single Contract item constituting 10% or more of the original Contract Price.

Mast Arm--The structural member or bracket, which, when mounted on a Standard, supports the luminaire.

Modification--Includes Change Orders and Supplemental Agreements. A Modification may only be issued after the effective date of the Contract.

Notice of Award--The written notice by the Agency to the successful Bidder stating that upon compliance by it with the required conditions, the Agency will execute the Contract.

Notice to Proceed--A written notice given by the Agency to the Contractor fixing the date on which the Contract time will start.

Owner--Same meaning as Agency.

Person--Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

Plans--The drawings, profiles, cross sections, Standard Plans, working drawings, shop drawings, and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, or details of the Work.

Private Contract--Work subject to Agency inspection, control, and approval, involving private funds, not administered by the Agency.

Prompt--The briefest interval of time required for a considered reply, including time required for approval by a governing body.

Proposal--See Bid.

Reference Specifications--Those bulletins, standards, rules, methods of analysis or testing, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date.

Roadway--The portion of a street reserved for vehicular use.

Service Connection-All or any portion of the conduit cable or duct including meter, between a utility distribution line and an individual consumer

Service Lateral Connection-The interface of the House Connection Sewer with the host pipe.

Sewer--Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

Shop Drawings—Drawings showing details of manufactured or assembled products proposed to be incorporated in the Work.

Special Provisions--Any provisions which supplement or modify the Standard Specifications.

Specifications--Standard Specifications, Reference Specifications, Standard Special Provisions, Special Provisions, and specifications in Change Orders or Supplemental Agreements between the Contractor and the Board.

Standard—The shaft or pole used to support street lighting luminaire, traffic signal heads, mast arms, etc.

Standard Plans--Details of standard structures, devices, or instructions referred to on the Plans or in the Specifications by title or number.

Standard Special Provisions-- Special Provisions prepared in standardized form numbered in the series 401 through 499.

1-2 DEFINITIONS (Continued)

Standard Specifications--Parts 1 through 6 of this document. See Section 0. References to whole sections will be preceded by the word "Section", references to parts of sections will show numbers only, such as "3-2", except at the beginning of a sentence, the word "Section" precedes the number.

State--The State of California.

State Standard Plans--Standard Plans prepared by State of California, Business and Transportation Agency, Department of Transportation.

Stipulated Unit Price--Unit prices established by Agency in the Contract Documents.

Storm Drain--Any conduit and appurtenances intended for the reception and transfer of storm water.

Street--Any road, highway, parkway, freeway, alley, walk or way.

Subbase--A layer of specified material of planned thickness between a base and the subgrade.

Subcontractor--An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work.

Subgrade--For roadways, that portion of the roadbed on which pavement, surfacing, base, subbase, or a layer of other material is placed. For structures, the soil prepared to support a structure.

Supervision--Supervision, where used to indicate supervision by the Engineer, shall mean the performance of obligations, and the exercise of rights, specifically imposed upon and granted to the Agency in becoming a party to the Contract. Except as specifically stated herein, supervision by the Agency shall not mean active and direct superintendence of details of the Work.

Supplemental Agreement--A written amendment of the Contract Documents signed by both parties.

Surety--See 2-4.

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.

Work--That which is proposed to be constructed or done under the Contract or permit, including the furnishing of all labor, materials, equipment, and services.

Working Day--See 6-7.2 and 6.7.2.1.

Working Drawings—Drawings showing details not shown on the Plans which are required to designed by the Contractor

1-3 ABBREVIATIONS

1-3.1 General. The abbreviations herein, together with others in general use, are applicable to these Standard Specifications and to all other Contract Documents.

All abbreviations and symbols used on Plans for structural steel construction shall conform to those given by the "Manual of Steel Construction" published by the American Institute of Steel Construction, Inc.

1-3.2 Common Usage

Abbreviation	Word or Words	Abbreviation	Word or Words
Aban	Abandon	l	Liters
Aband	Abandoned	Lab	Laboratory
ABS	Acrylonitrile-butadiene-styrene	Lat	Lateral
AC	Asphalt Concrete	LD	Local depression
ACP	Asbestos cement pipe	LED	Light Emitting Diode
ADA	Americans with Disabilities Act of 1990 (Public Law 101-336, 104 Sat. 1990,42 USC 12101-12213 (as amended))	LH	Lamp hole
Alt	Alternate	LL	Live load
AmerStd	American Standard	LOL	Layout line
APC	Air Placed Concrete	Long	Longitudinal
ARAM	Asphalt Rubber Aggregate Membrane	LP	Lamp post
ARHM	Asphalt Rubber Hot Mix	LPS	Low pressure sodium (Light)
AWG	American Wire Gage (non-ferrous wire)	LS	Lump sum
B/W	Back of wall	LTS	Lime treated soil
BC	Beginning of curve	m	Meters
BCR	Beginning of curb return	Maint	Maintenance
Bdry	Boundary	Max	Maximum
BF	Bottom of footing	MC	Medium curing
BM	Bench mark	MCR	Middle of curb return
BMPs	Best Management Practices	Meas	Measure
BVC	Beginning of vertical curve	MH	Manhole, maintenance hole
C&G	Curb & Gutter	Mil Spec	Military specification
C&G	Curb and gutter	Min	Minimum
CAB	Crushed aggregate base	Misc	Miscellaneous

Abbreviation	Word or Words
CALOSHA	California Occupational Safety and Health Administration
CALTRANS	California Department of Transportation
CAP	Corrugated aluminum pipe
CB	Catch Basin
Cb	Curb
CBP	Catch Basin Connection Pipe
CBR	California Bearing Ratio
C-C	Center to center
CCFRPM	Centrifugally Cast Fiberglass Reinforced Plastic Mortar
CCR	California Code of Regulations
CCTV	Closed Circuit TV
CF	Cubic foot
CF	Curb face
CFR	Code of Federal Regulations
CFS	Cubic feet per second
CHDPE	Corrugated High Density Polyethylene
CIP	Cast iron pipe
CIPP	Cast-in-place pipe
CIPPC	Cast-in-place Concrete Pipe
CL	Clearance, center line
CLF	Chain link fence
CLSM	Controlled Low Strength Material
CMB	Crushed miscellaneous base
CMC	Cement mortar-coated
CML	Cement mortar-lined
cms	Cubic meters per second
CO	Cleanout (Sewer)
Col	Column
Conc	Concrete
Conn	Connection
Const	Construct, Construction
Coord	Coordinate
CQS	Cationic Quick-Setting
CRM	Crumb Rubber Modifier
CRS	Cationic Rapid-Setting
CSEP	Confined Space Entry Plan
CSP	Corrugated steel pipe
CSPA	Corrugated steel pipe arch
CSS	Cationic Slow-Setting
CT	California Test
CTB	Cement treated base
CV	Check valve
CY	Cubic yard
D	Depth, Load of pipe
db	Decibels
Dbl	Double
DF	Douglas Fir
Dia	Diameter
DIP	Ductile iron pipe
DL	Dead load
DT	Drain tile
Dwg	Drawing
Dwy Appr	Driveway approach
Dwy	Driveway
Ea	Each
EC	End of curve
ECR	End of curb return
EF	Each face
EG	Edge of gutter
EGL	Energy grade line
El	Elevation
ELC	Electrolier lighting conduit
ELT	Extra long ton of slurry
Eng	Engineer, Engineering
EP	Edge of pavement
Esmt	Easement
ETB	Emulsion treated base

Abbreviation	Word or Words
Mon	Monument
MSDS	Material Safety Data Sheet
Mult	Multiple
MUTCD	Manual on Uniform Traffic Control Devices
MVL	Mercury vapor light
N/A	No applicable
NRCP	Nonreinforced concrete pipe
Obs	Obsolete
oc	On center
OD	Outside diameter
OE	Outer edge
Opp	Opposite
Orig	Original
PAV	Pressure Aging Vessel
PB	Pull box
PC	Point of curvature
PCC	Point of compound curvature
PCC	Portland cement concrete
PCVC	Point of compound vertical curve
PE	Polyethylene
PG	Performance Graded
PI	Point of intersection
PL	Property line
PLI	Pounds per linear inch
PMB	Processed miscellaneous base
POC	Point on curve
POT	Point on tangent
PP	Power pole
PRC	Point of reverse curve
PRCB	Precast Reinforced Concrete Box
PRVC	Point of reverse vertical curve
PSI	Pounds per square inch
PT	Point of tangency
PVC	Polyvinyl chloride
Pvmt	Pavement
Pvt R/W	Private right of way
Q	Rate of flow in cms (CFS)
Quad	Quadrangle, Quadrant
R	Radius or Resistance value
R&O	Rock and Oil
R/W	Right of way
RA	Reclaimed Asphalt or Recycling agent
RAC	Recycled asphalt concrete
RAP	Reclaimed asphalt pavement
RBAC	Rubberized asphalt concrete
RC	Reinforced concrete or Rapid Curing
RCB	Reinforced concrete box
RCE	Registered civil engineer
RCP	Reinforced concrete pipe
RCV	Remote control valve
Ref	Reference
Reinf	Reinforced or reinforcement
Res	Reservoir
RGE	Registered geotechnical engineer
RPPCC	Reclaimed Plastic Portland Cement Concrete
RR	Railroad
RSE	Registered structural engineer
RTE	Registered traffic engineer
RTFO	Rolling Thin Film Oven
RW	Reclaimed Water
S	Slope
S/W	Sidewalk
SC	Slow curing
SCCP	Steel cylinder concrete pipe
SCNs	Supplementary Cementitious Materials
SD	Storm drain
SDR	Standard dimension ratio

Abbreviation	Word or Words
EVC	End of vertical curve
Exc	Excavation
Exist or Ex	Existing
Exp Jt	Expansion joint
F & C	Frame and cover
F & I	Furnish and install
F/W	Face of wall
Fab	Fabricate
FAS	Flashing arrow sign
FD	Floor drain
Fdn	Foundation
Fed Spec	Federal Specification
FG	Finished grade
FL	Flow line
FS	Finished surface
ft - lb	foot – pound
Ftg	footing
FW	Face of wall
Ga	Gauge
Galv	Galvanized
GG	Gap graded
GIP	Galvanized iron pipe
GL	Ground line or grade line
GM	Gas meter
GP	Guy pole
Gr	Grade
Grtg	Grating
GSP	Galvanized steel pipe
H	High or height
HB	Hose bib
HC	House connection
HDPE	High density Polyethylene
HDWL	Headwall
HGL	Hydraulic grade line
Hor, Horiz	Horizontal
Hp	Horsepower
HPG	High pressure gas
HPS	High pressure sodium (Light)
HRWRA	High Range Water Reducing Admixture
Hyd, Hydr	Hydraulic
ID	Inside diameter
Incl	Include, Including
Insp	Inspection
Inv	Invert
IP	Iron pipe
J	Joules
JC	Junction chamber
Jct	Junction
JS	Junction structure
Jt	Joint
kg	Kilograms
kPa	KiloPascals
L	Length

Abbreviation	Word or Words
SE	Sand Equivalent
Sec	Section
SF	Square foot
SG	Specific gravity
SI	International System of Units (Metric)
SLC	Service Lateral Connection
Spec	Specifications
SR	Standard ratio
SS	Sanitary sewer
SSB	Select sub-base
SSP	Structural steel plate pipe
SSPA	Structural steel plate pipe arch
St Hwy	State highway
Sta	Station
Std	Standard
Str Gr	Straight grade
Str	Straight
Struc	Structural/Structure
SW	Sidewalk
SWD	Sidewalk drain
SWPPP	Storm Water Pollution Prevention Plan
SY	Square Yard
T/W	Top of wall
Tan	Tangent
TC	Top of curb
TCP	Traffic control plan
Tel	Telephone
TF	Top of footing
Topo	Topography
Tr	Tract
Trans	Transition
TRMAC	Tire rubber modified asphalt concrete
TS	Traffic signal or transition structure
TSC	Traffic signal conduit
TSS	Traffic signal standard
TTC	Temporary traffic control
TW	Top of wall
Typ	Typical
U.S.	United States
U.S.C.	United States Code
USA	Underground Service Alert
Var	Varies, Variable
VB	Valve box
VC	Vertical curve
VCP	Vitrified clay pipe
Vert	Vertical
Vol	Volume
VTCSH	Vehicle Traffic Controls Signal Heads
W	Width or Wider
WATCH	Work Area Traffic Control Handbook
WI	Wrought iron
WM	Water meter
WPJ	Weakened plane joint
WTAT	Wet Track Abrasion Test
X Conn	Cross connection
x (as in 2x4)	by
X-Sec	Cross section

1-3.3 Institutions.

Abbreviation	Word or Words
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGC	Associated General Contractors of America
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preserver's Association
AWS	American Welding Society
AWWA	American Water Works Association
CBSC	California Building Standards Commission
CRSI	Concrete Reinforcing Steel Institute
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
ETL	Electrical Testing Laboratories
FCC	Federal Communications Commission
IAPMO	International Association of Plumbing and Mechanical Officials
ICC	International Code Council
IEEE	Institute of Electrical and Electronics Engineers
IMSA	International Municipal Signal Association
ITE	Institute of Traffic Engineers
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration (Department of Commerce)
RUS	Rural Utility Service
UL	Underwriters' Laboratories, Inc.
USGS	United State Geological Survey
WFCA	Western Fire Chiefs Association

1-3.4 Building Codes. The Ventura County Building Code (VCBC) and Ventura County Fire Code (VCFC) are applicable to the Work. VCBC and VCFC adopt by reference a number of uniform and national codes. Where such codes are referenced directly in the Specifications, such references shall be to the VCBC or VCFC which adopt and modify certain provisions in the referenced codes.

Abbreviation	Code	Publisher
CBC	California Building Code	CBSC
DBC	Uniform Code for Abatement of Dangerous Building	ICC
UBC	Uniform Building Code	ICC
UFC	Uniform Fire Code	ICC and WFCA
UHC	Uniform Housing Code	ICC
UMC	Uniform Mechanical Code	IAPMO
UPC	Uniform Plumbing Code	IAPMO
NEC	National Electrical Code	NFPA

1-3.5 Reference Documents.

Abbreviation	Document
HDM	Highway Design Manual, State of California, Department of Transportation, Latest Edition
MUTCD	Manual on Uniform Traffic Control Devices
SSP	Standard Plans, State of California, Department of Transportation, latest edition
SPPWC	Standard Plans for Public Works Construction, Latest edition, published by BNi Building News, Los Angeles,
SSPWC	Standard Specifications for Public Works Construction, (See Section 0-1)
SSS	Standard Specifications, State of California, Department of Transportation, latest edition
VCSS	Ventura County Standard Specifications (Division 1, Sections 0 through 10, of which this section is a part)

1-4 UNITS OF MEASURE

1-4.1 General. The International System of Units, also referred to as SI or the metric system, is the principal measurement system in these Specifications and shall be used for construction, unless otherwise stated in the Contract Documents. U. S. Standard Measure, also called U. S. Customary System, are included in parenthesis. SI units and U. S. Standard Measure in parenthesis may or may not be exactly equivalent. If U. S. Standard Measures are specified for use in the Contract Documents, then all values used for construction shall be U. S. Standard Measures shown in parentheses. However, certain material Specifications and test requirements contained herein use SI units specifically and conversions to U. S. Measures have not been included in these circumstances. When U. S. Standard Measures are not included in parentheses, the SI units shall control.

Reference is also made to ASTM E 380 for definitions of various units of the SI system and a more extensive set of conversion factors.

1-4.1.1 Units for Work. Where U. S. Standard Measure units are shown on the Plans or are specified, U. S. Standard Measure shall be used for the Work.

1-4.2 Units of Measure, Equivalents and Abbreviations

One U.S. Customary Unit	(abbreviation)	Is Equal To	#	SI Unit
mil (=0.001 in)		25.4	micrometers	(µm)
inch	(in)	25.4	millimeter	(mm)
inch	(in)	2.54	centimeter	(cm)
foot	(ft)	0.3048	meter	(m)
yard	(yd)	0.9144	meter	(m)
mile		1.6093	kilometer	(km)
square foot	(ft^2)	0.0929	square meter	(m^2)
square yard	(yd^2)	0.8361	square meter	(m^2)
cubic foot	(ft^3)	0.0283	cubic meter	(m^3)
cubic yard	(yd^3)	0.7646	cubic meter	(m^3)
acre (=43,560 ft^2)		0.4047	hectare (1ha=10,000m^2)	(ha)
gallon	(gal)	3.7854	Liter	(L)
fluid ounce	(fl. oz.)	29.5735	milliliter	(mL)
pound mass (avoirdupois)	(lbs)	0.4536	kilogram	(kg)
ounce mass	(oz)	0.02835	kilogram	(kg)
ounce mass	(oz)	28.35	grams	(g)
Ton (=2000 lb avoirdupois)		0.9072	Tonne (1 Tonne = 1000 kg)	
Poise		0.10	Pascal-second	(Pa-s)
centistoke	(cs)	1.00	square millimeter/sec.	(mm^2/s)
pound force	(lbf)	4.4482	Newton	(N)
pound per square inch	(psi)	6.8948	Kilopascal	(kPa)
pound force per foot	(lbf/ft)	14.594	Newton per meter	(N/M)
foot-pound force	(ft-lbf)	1.3558	Joules	(J)
foot-pound force per second	([ft-lbf]/s)	1.3558	Watt	(W)
part per million	(ppm)	1.00	milligram/liter	(mg/L)
Degree Fahrenheit	(°F)	0.5555	Degree Celsius	(°C)

Temperature: Celsius to Fahrenheit	Temperature: Fahrenheit to Celsius
Temperature °F = (1.8 x °C) + 32	Temperature °C = (°F - 32) / 1.8

SI Units Used in Both Systems		
Ampere (A)	second (s)	Candela (cd)
Volt (V)	decibel (db)	Lumen (lm)

Common Metric Prefixes					
kilo (k)	10^3	milli (m)	10^{-3}	nano (n)	10^{-9}
centi (c)	10^{-2}	micro (µ)	10^{-6}	pico (p)	10^{-12}

1-5 SYMBOLS

°	Degree	PL	Property line	%	Percent
'	Feet or minutes	SL	Survey line or station line	#	Number
"	Inches or seconds	CL	Center line	/	per or of (between words)
Δ	Delta, the central angle or angle between tangents			∠	Angle

SECTION 2 - SCOPE AND CONTROL OF WORK

2-1 AWARD AND EXECUTION OF CONTRACT

2-1.1 Award of Contract. The right is reserved to waive minor irregularities in the proposals and to reject any or all proposals. The award of the Contract, if it be awarded, will be to the lowest responsive, responsible Bidder, determined as provided on the Proposal Form, whose Proposal complies with all the requirements prescribed. Such award, if made, will be made within the number of Days stated in the Proposal form. If the lowest responsible Bidder refuses or fails to execute the Contract, the Agency may, within 45 additional Days, consider the next lowest Bidder to be the lowest responsive, responsible Bidder. The periods of time specified above within which the award of Contract may be made shall be subject to extension for such further period as may be agreed upon in writing by the Bidder concerned. If the Bidder's bid guarantee was in the form of a bid bond, the Bidder shall also submit a statement from the Surety that the bond has been extended for the same period.

Proposals not accompanied by a properly executed Noncollusion Affidavit required by Public Contract Code Section 7106 will be considered nonresponsive and will not be considered for award.

All bids will be compared on the basis of the quantities, amounts and unit prices, or lump sums, as shown on the Bid Proposal.

Before award, the Bidder may be required to furnish acceptable evidence of adequate capability, equipment and financial resources to adequately perform the Work. Bidders found not to be so qualified may have their bids rejected. If reasonable cause exists to believe collusion exists among Bidders, or that prices Bid are unbalanced between Bid items, any or all proposals may be rejected.

Award will not be made to a Bidder who is listed by the State Labor Commissioner as ineligible to bid, work on, or be awarded public works projects.

2-1.2 Notice of Award. Within one Day after award of Contract by the Board, the Bidder to whom Contract is awarded will be notified of award by email and telephone, or if no contact is made by telephone, then by mail. Within three business days after award of Contract, a Notice of Award will be sent, transmitting the Contract Documents to such Bidder for execution. If telephone contact is made, the Bidder may request that the Contract Documents be held in Agency's office to be picked up.

2-1.3 Execution of Contract Documents. On receipt of the Contract Documents, the Bidder shall promptly obtain the required insurance coverage, certificates of insurance, power-of-attorney and Contract bonds, execute the Contract, and transmit all required documents to the Agency.

2-1.4 Failure to Execute Documents. Should the Bidder fail to furnish Agency all required documents, properly executed, prior to the starting day of the Contract time computed as provided in 6-7.4 and stated in the Notice of Award, Agency may thereafter declare the Bidder to be in default and its Proposal guarantee forfeited.

2-1.5 Return of Proposal Guarantees. Within 10 Days after the award of the Contract, Agency will return the Proposal guarantees, other than Bidder's bonds, accompanying such of the proposals as are not to be further considered in making the award. The low and second Bidder's Proposal guarantee will be held until the Contract has been executed, after which all Proposal guarantees, except Bidders' bonds and any guarantees which have been forfeited, will be returned to the respective Bidders whose proposals they accompany.

2-2 ASSIGNMENT. No Contract or portion thereof may be assigned without consent of the Board except that the Contractor may assign money due or which will accrue to it under the Contract. If given written notice, such assignment will be recognized by the Board to the extent permitted by law, but any assignment of money shall be subject to all proper withholdings in favor of the Agency and to all deductions provided for in the Contract. All money withheld, whether assigned or not, shall be subject to being used by the Agency for completion of the Work, should the Contractor be in default.

2-3 SUBCONTRACTS.

2-3.1 General. Each Bidder shall comply with the Chapter of the Public Contract Code including Sections 4100 through 4113. The following excerpts or summaries of some of the requirements of that Chapter are included below for information.

The Bidder shall set forth in the Bid, as provided in 4104:

"(a) (1) The name, the location of the place of business, and the California contractor license number of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater.

(2) An inadvertent error in listing the California contractor license number provided pursuant to paragraph (1) shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening and provided the corrected contractor's license number corresponds to the submitted name and location for that subcontractor."

If the Contractor fails to specify a Subcontractor, or specifies more than one Subcontractor for the same portion of the Work to be performed under the Contract (in excess of one-half of 1 percent of the Contractor's total bid), the Contractor shall be qualified to perform that portion itself, and shall perform that portion itself except as otherwise provided in the Code.

Except as provided in Section 4107, no prime contractor, whose Bid is accepted, shall substitute any person or Subcontractor in place of the Subcontractor listed in the original bid other than for causes and by procedures established in Section 4107.5 which provides procedures to correct a clerical error in the listing of a Subcontractor.

Section 4110 provides that a Contractor violating any of the provisions of the Chapter violates the Contract and the Board may exercise the option either to cancel the Contract or assess the Contractor a penalty in an amount of not more than 10 percent of the subcontract involved, after a public hearing.

2-3.1.1 Use of Debarred Subcontractors Prohibited. The Contractor is prohibited from performing work using a Subcontractor who is listed by the State Labor Commissioner as ineligible to work on public works projects.

2-3.2 Additional Responsibilities. The Contractor shall give personal attention to the fulfillment of the Contract and shall keep the Work under its control.

Except where the required Contractor's License Class is "B", the Contractor shall perform, with its own organization, Contract work amounting to at least 50 percent of the Contract Price except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the Contract Price before computing the amount required to be performed by the Contractor with its own organization. "Specialty Items" will be identified by the Agency in the Bid or Proposal with an "[S]". Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. This will be determined from information submitted by the Contractor, and subject to approval by the Engineer.

Before the work of any Subcontractor is started, the Contractor shall submit to the Engineer for approval a written statement showing the work to be subcontracted giving the name, contractor license number, registration with the Department of Industrial Relations, and business of each Subcontractor and description and value of each portion of work to be subcontracted.

2-3.3 Status of Subcontractors. Subcontractors shall be considered employees of the Contractor, and the Contractor shall be responsible for their work.

2-3.3.1 Subcontracts. The Contractor shall incorporate into all subcontracts, and the Subcontractor shall incorporate into all lower tier subcontracts, all of the Plans and Specifications which are part of the Contract between the Contractor and the Agency.

2-3.3.2 Contractor Responsible. The Contractor is responsible for properly performing and completing all Work required by the Contract whether or not it employs subcontractors for certain portions of the Work. It shall coordinate the sequence and timing of its efforts and that of its subcontractors to insure the proper and timely completion of the Work.

2-3.3.3 Specialty Contractors. Where a specialty Contractor's license is required by law or by the Specifications in order to perform certain portions of the Work, the Contractor may perform such portion with its own forces if it holds the proper license. Otherwise, it shall employ a properly licensed subcontractor to perform that portion of the Work. Such requirement to employ a subcontractor does not modify the other requirements of 2-3.

2-4 CONTRACT BONDS. Before execution of the Contract by the Agency, the Bidder shall file surety bonds with the Agency to be approved by the Board in the amounts and for the purposes noted below. Bonds issued by a Surety who is listed in the latest version of U.S. Department of Treasury Circular 570, who is authorized to issue bonds in California, and whose bonding limitation shown in said circular is sufficient to provide bonds in the amount required by the Contract shall be deemed to be approved unless specifically rejected by the Agency. Bonds from all other sureties shall be accompanied by all of the documents enumerated in Code of Civil Procedure 995.660(a). The Bidder shall pay all bond premiums, costs, and incidentals.

Each bond shall incorporate, by reference, the Contract and be signed by both the Bidder and Surety and the signature of the authorized agent of the Surety shall be notarized.

The Bidder shall provide two good and sufficient surety bonds. The "Payment Bond" (Material and Labor Bond) shall be for not less than 100 percent of the Contract Price, to satisfy claims of material suppliers and mechanics and laborers employed by it on the Work. The bond shall be maintained by the Contractor in full force and effect until the Work is accepted by the Agency, and until all claims for materials and labor are paid, and shall otherwise comply with the Civil Code.

The "Performance Bond" shall be for 100 percent of the Contract Price to guaranty faithful performance of all Work, within the time prescribed, in a manner satisfactory to the Agency, and that all materials and workmanship will be free from original or developed defects. The bond must remain in effect until the end of the warranty period set forth in 6.8-2.

Should any bond become insufficient, the Contractor shall renew the bond within 10 Days after receiving notice from the Agency.

Should any Surety at any time be unsatisfactory to the Board, notice will be given the Contractor to that effect. No further payments shall be deemed due or will be made under the Contract until a new Surety shall qualify and be accepted by the Board.

Changes in the Work, or extensions of time, made pursuant to the Contract, shall in no way release the Contractor or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

2-4.1 Bond Forms. Bonds shall be on forms furnished by Agency.

2-5 PLANS AND SPECIFICATIONS

2-5.1 General. The Contractor shall keep at the work site a copy of the Plans and Specifications, to which the Engineer shall have access at all times.

The Plans, Specifications, and other Contract Documents shall govern the Work. The Contract Documents are intended to be complementary and cooperative. Anything specified in the Specifications and not shown on the Plans, or shown on the Plans and not specified in the Specifications, shall be as though shown or specified in both.

The Plans shall be supplemented by such working drawings and shop drawings as are necessary to adequately control the Work.

The Contractor shall ascertain the existence of any conditions affecting the cost of the Work through reasonable examination of the work site prior to submitting the Bid..

Existing improvements visible at the work site, for which no specific disposition is made on the Plans, but which interfere with the completion of the Work, shall be removed and disposed of by the Contractor.

The Contractor shall, upon discovering any error or omission in the Plans or Specifications, immediately call it to the attention of the Engineer.

2-5.1.1 Specifications Captions. Captions accompanying specification parts, sections and paragraphs are for convenience of reference only and do not limit the content of such part, section or paragraph.

The division of the Plans into parts and the division of the Specifications into divisions and sections are for the ease of reference only and does not imply the division of work between trades or subcontractors.

2-5.2 Precedence of Contract Documents. If there is a conflict between any of the Contract Documents, the document highest in precedence shall control. The precedence shall be as follows:

1) Permits issued by jurisdictional regulatory agencies.
2) Change Orders and Supplemental Agreements; whichever occurs last.
3) Contract/Agreement.
4) Addenda.
5) Bid/Proposal.
6) Special Provisions.
7) Plans.
8) Standard Plans.
9) Standard Specifications.
10) Reference Specifications.

Detail drawings shall take precedence over general drawings.

2-5.3 Shop Drawings, Working Drawings, and Submittals.

2-5.3.1 General. Submittals shall be provided, at the Contractor's expense, as required in 2-5.3.2, 2-5.3.3 and 2-5.3.4, when required by the Plans or Special Provisions, or when requested by the Engineer.

Materials shall neither be furnished nor fabricated, nor shall any work for which submittals are required be performed, before the required submittals have been reviewed and accepted by the Engineer. Neither review nor acceptance of submittals by the Engineer shall relieve the Contractor from responsibility for errors, omissions, or deviations from the Contract Documents, unless such deviations were specifically called to the attention of the Engineer in the letter of transmittal. The Contractor shall be responsible for the correctness of the submittals.

The Contractor shall allow a minimum of 20 working days for review of submittals unless otherwise specified in the Special Provisions. Each submittal shall be accompanied by a letter of transmittal.

2-5.3.2 Working Drawings. Working drawings shall be of a size and scale to clearly show all necessary details.

Six copies and one reproducible shall be submitted. If no revisions are required, 3 of the copies will be returned to the Contractor. If revisions are required, the Engineer will return one copy along with the reproducible for resubmission. Upon acceptance, the Engineer will return 2 of the copies to the Contractor and retain the remaining copies and the reproducible.

Working drawings are required in the following subsections:

TABLE 2-5.3.2 (A)

Item	Section Number	Title	Subject
1	7-8.5.2	Sanitary Sewers	Sewage Bypass and Pumping
2	7.8.6.3	Water Pollution Control	Storm Water Pollution Prevention Plan
3	7-8.6.6	Water Pollution Control	Dewatering Plan
4	7-10.2.2	Work Area Traffic Control	Traffic Control Plan
5	7-10.4..2.2	Safety	Trench Shoring
6	207-8.4	Joints	Vitrified Clay Pipe
7	207-10.2.1	General	Fabricated Steel Pipe
8	300-3.2	Cofferdams	Structure Excavation & Backfill
9	303-1.6.1	General	Falsework
10	303-1.7.1	General	Placing Reinforcement
11	303-3.1	General	Prestressed Concrete Construction
12	304-1.1.1	Shop Drawings	Structural Steel
13	304-1.1.2	Falsework Plans	Structural Steel
14	304-2.1	General	Metal Hand Railings
15	306-2.1	General	Jacking Operations
16	306-3.1	General	Tunneling Operations
17	306-3.4	Tunnel Supports	Tunneling Operations
18	306-6	Remodeling Existing Sewer Facilities	Polyethylene Liner Installation
19	306-8	Microtunneling	Microtunneling Operations

Working drawings listed above as Items 4, 5, 8, 9, 11, 12, 13, 15 and 18 shall be prepared by a Civil or Structural Engineer registered by the State of California.

2-5.3.3 Shop Drawings. Shop drawings are drawings showing details of manufactured or assembled products proposed to be incorporated into the Work. Shop drawings required shall be as specified in the Special Provisions.

2-5.3.4 Supporting Information. Supporting information is information required by the Specifications for the purposes of administration of the Contract, analysis for verification of conformance with the Specifications, the operation and maintenance of a manufactured product or system to be constructed as part of the Work, and other information as may be required by the Engineer. Six copies of the supporting information shall be submitted to the Engineer prior to the start of the Work unless otherwise specified in the Special Provisions or directed by the Engineer. Supporting information for systems shall be bound together and include all manufactured items for the system. If resubmittal is not required, three copies will be returned to the Contractor. Supporting information shall consist of the following and is required unless otherwise specified in the Special Provisions:

1) List of Subcontractors per 2-3.2.
2) List of Materials per 4-1.4.
3) Certificates of Compliance per 4-1.5.
4) Construction Schedule per 6-1.
5) Spill Prevention and Emergency Response Plan per 7-8.5.3
6) Confined Space Entry Program per 7-10.4.5.1
7) Lean concrete base mix designs per 200-4
8) Concrete mix designs per 201-1.1.
9) Asphalt concrete mix designs per 203-6.1.
10) Pipeline layout diagrams per 207-2.1
11) Equipment and materials list per 307-1
12) Controller cabinet wiring diagrams per 307-17.2.2
13) Data, including, but not limited to, catalog sheets, manufacturer's brochures, technical bulletins, specifications, diagrams, product samples, and other information necessary to describe a system, product or item. This information is required for irrigation systems, street lighting systems, and traffic signals, and may also be required for any product, manufactured item, or system.

2-5.4 Record Drawings. The Contractor shall prepare and maintain a set of prints in the Engineer's Field Office on which the locations and description of all plumbing, mechanical, and electrical facilities, which were not detailed fully on the Plans, are marked in colored pencil. Such prints shall also indicate any authorized changes from the original Plans. Such prints shall be furnished to the Engineer before final Acceptance of the Work.

2-6 WORK TO BE DONE. The Contractor shall perform all work necessary to complete the Contract in a satisfactory manner. Unless otherwise provided, it shall furnish all materials, equipment, tools, labor and incidentals necessary to complete the Work.

All work under the Contract shall be performed in accordance with the highest standards prevailing in the trades unless otherwise specified on the Plans or in the Special Provisions. Unless otherwise specified, it is the intent that the Contractor will construct a complete facility ready for use.

2-6.1 Manufacturer's Recommendations. Where the manufacturer of any materials or equipment provides written recommendations or instructions for its use or method of installation (including labels, tags, manuals, or trade literature), such recommendations or instructions shall be complied with except where the Contract Documents specifically require deviations.

2-6.2 Testing of Installed Components. Where the specifications provide that any component of the Work is to be tested, calibrated or adjusted during or after installation, such testing shall be performed by a qualified firm, approved by the Engineer. The firm performing the testing or calibration shall be employed by and paid for by the Contractor.

2-6.3 Training of Agency Personnel. Where the specifications provide for training of Agency personnel in the use or maintenance of any component of the Work, the Contractor shall arrange for and pay for competent personnel to perform the training. Contractor shall schedule the training with the Engineer.

2-7 SUBSURFACE DATA. All soil and test hole data, groundwater elevations, and soil analyses shown on the Plans or included in the Specifications apply only at the location of the test holes and to the depths shown. Soil test reports for test holes which have been drilled are available for inspection at the office of the Engineer. Additional subsurface exploration may be performed by Bidders or the Contractor at their own expense.

The indicated groundwater elevation is that existing at the date specified in the data. It is the Contractor's responsibility to determine and allow for the groundwater elevation on the date the Work is performed. A difference in groundwater elevation between what is shown in soil boring logs and what is actually encountered during construction will not be considered as a basis for Extra Work per 3-3.

Opinions, recommendations or conclusions contained in any soils report, soil boring logs, subsurface materials investigation, geological report or other similar studies, tests or reports, prepared for the Agency, are not a part of the Contract. Contractor shall be responsible for forming its own opinions and conclusions from the facts set forth in such reports.

2-8 RIGHTS-OF-WAY. Rights-of-way, easements or rights-of-entry for the Work will be provided by the Agency. Unless otherwise provided, the Contractor shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required. The Contractor shall indemnify and hold the Agency harmless from all claims for damages caused by such actions.

2-9 SURVEYING

2-9.1 Permanent Survey Markers. The Contractor shall notify the Engineer at least 7 Days before starting work to allow for the preservation of survey monuments, lot stakes (tagged), and bench marks. The Engineer, or the owner at its cost, shall file a Corner Record Form referencing survey monuments subject to disturbance in the Office of the County Surveyor prior to the start of construction and also prior to the completion of construction for the replacement of survey monuments. The Contractor shall not disturb survey monuments, lot stakes (tagged), or bench marks without the consent of the Engineer or the owner on Private Contracts. The Contractor shall bear the expense of replacing any that may be disturbed without permission. Replacement shall be done only under the direction of the Engineer by a Licensed Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the Contractor shall adjust the monument cover to the new grade within 7 Days of finished paving unless otherwise specified.

2-9.2 Survey Service. The Engineer will set only the horizontal and vertical control survey points shown on the Plans. These will be set prior to the commencement of construction. The Contractor shall preserve these points as well as any other surveys established by the Engineer for use by the Contractor for the duration of their usefulness. If any survey points established by Engineer are lost or disturbed and need to be replaced, such replacement shall be by the Engineer at the expense of the Contractor. The Contractor shall employ engineers or surveyors to perform adequate surveys and staking necessary to construct the Work to the lines, elevations and grades shown on the Plans and for the Engineer's use in checking such work. Copies of the field notes or diagrams used in setting stakes shall be promptly furnished to the Engineer.

2-9.2.1 Open Areas. Where dimensions are not given on the Plans for parking lots, landscaped areas or graded areas, distances shall be scaled. Unless otherwise indicated, straight grades and smooth vertical curves shall be set between indicated elevations. Finished surfaces shall be sloped to drain in order to eliminate ponding of water.

2-9.2.2 Utilities. Section 5-5.1 requires the Contractor's cooperation during the relocation of utilities, which may require the setting of lines and grades when needed by utility owners performing relocations.

2-9.3 Contractor's Surveys. Surveying by private engineers and surveyors on the Work shall conform to the quality and practice required by the Engineer.

2-9.3.1 Errors in Surveys. The Contractor is responsible for the accuracy of all surveys except those performed by the Engineer. To assure that a survey point set by the Engineer has not been disturbed since it was set and that it was accurately set, all surveys by the Contractor shall be based on at least two survey points set by the Engineer or by other governmental surveys, in accordance with good survey practice. Should discrepancies be found between such points, the Engineer shall be notified and construction shall not proceed until the discrepancy has been resolved.

2-9.4 Line and Grade. All Work upon completion shall conform to the lines, elevations, and grades shown on the Plans.

2-9.5 Quantity Surveys. The Engineer will perform all quantity surveys for payment purposes, however, in performing such quantity surveys, it may make use of surveys performed by the Contractor.

2-9.6 Payment for Surveys. Payment for performing all of the surveying and staking as required by the Specifications and such additional surveying and staking as required by the Contractor will be made at the lump sum price set forth in the Proposal and shall be full compensation for furnishing all labor, equipment, instruments and materials necessary to perform the Work. If no bid item for surveying is included in the Proposal, the cost of surveying shall be included in the prices bid for other applicable items of work.

2-10 AUTHORITY OF BOARD AND ENGINEER. The Board has the final authority in all matters affecting the Work. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Plans and Specifications. The Contractor shall promptly comply with instructions from the Engineer or its authorized representative.

On all questions relating to quantities, the acceptability of material, equipment, or work, the execution, progress or sequence of work, and the interpretation of Specifications or drawings, the decision of the Engineer is final and binding, and shall be precedent to any payment under the Contract, unless otherwise ordered by the Board.

2-10.1 Decisions in Writing. Any and all decisions of the Engineer interpreting Specifications or drawings shall be in writing. Any purported "interpretation" which is not in writing shall not be binding upon the Agency and should not be relied upon by the Contractor.

2-11 INSPECTION

The Work is subject to inspection and approval of the Engineer. The Contractor shall notify the Engineer before noon of the working day before inspection is required. Work shall be done only in the presence of the Engineer, unless otherwise authorized. Any work done without proper inspection will be subject to rejection. The Engineer and any authorized representatives shall at all times have access to the Work during its construction at shops and yards as well as the Work site. The Contractor shall provide every reasonable facility for ascertaining that the materials and workmanship are in accordance with these specifications. Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

2-11.1 Permit Inspections. The Contractor shall arrange for code compliance inspections by all agencies issuing permits for the Work. The Work shall not continue beyond mandatory inspection points without clearance from the controlling agency. Each agency involved shall be notified in accordance with the code they enforce or in accordance with their standard operating procedures. No extensions of time will be granted for delays occasioned by such inspections except where, through no fault of the Contractor, the inspection is delayed more than one Day beyond normal response time after proper notification has been given.
It shall be the Contractor's responsibility to see that any required inspection record card is signed off before proceeding with the next phase of the Work and completely signed off on completion of the Work.

2-11.2 Structural Observation. When the plans indicate that "Structural Observation" of specific work is required prior to Permit Inspection, Contractor shall notify Engineer, in writing, at least five working days prior to the date Contractor plans to have the work ready for structural observation. If the work is not ready for structural observation on the date indicated, Contractor shall reimburse Agency the cost of structural observer's visit to the Work site. If the work to be observed is substantially complete but is found to need correction before approval by the structural observer, Contractor shall give notice of a new date, as required above.

2-12 SPECIAL NOTICES. When specified in the Specifications or as directed by the Engineer, any notice required to be given in accordance with this subsection shall be in writing, dated, and signed by the Contractor or the Engineer. Such notices shall be served by any of the following methods:

a) Personal delivery with proof of delivery which may be made by declaration under penalty of perjury by any person over the age of 18 years. The proof of delivery shall show that delivery was performed in accordance with these provisions. Service shall be effective on the date of delivery. Notices given to the Contractor by personal delivery may be made to the Contractor's authorized representative at the Work site; or

b) Certified mail addressed to the mailing address of the recipient postage prepaid; return receipt requested. Service shall be effective on the date of the receipt of the mailing.

Simultaneously, the Agency may send the same notice by regular mail. If a notice that is sent by certified mail is returned unsigned, then delivery shall be effective pursuant to regular mail, provided the notice that was sent by regular mail is not returned.

2-13 AGENCY PERSONNEL AND AUTHORITY

2-13.1 General. The Board has complete authority for the project within the limits prescribed by law. Pursuant to resolutions duly adopted by the Board, the authority to perform certain functions has been delegated to the Director of Public Works. Agency staff personnel and Consultants delegated thereto by the Director are authorized to perform functions limited as set forth in the following list of personnel and designated duties.

2-13.2 Engineer. The Director of the Public Works Agency of the County of Ventura is the Engineer and has general authority to administer the Contract. The Engineer has the following specific authority:

(a) To issue Contract Change Orders (CCO) and to settle claims subsequent to Acceptance as follows:

Original Contract Amount	Maximum Amount of any Change Order or Claim Settlement
$50,000 or less	$5,000
greater than $50,000 and not over $250,000	10% of the original Contract amount
greater than $250,000 and not over $3,950,000	$25,000 plus 5% of the original Contract cost in excess of $250,000.
greater than $3,950,000	$210,000

CCOs and claim settlements exceeding the amounts set forth above require Board approval.

(b) To make final adjustments of quantities (FAQ) on unit price items.

(c) To accept the Work when the Contractor has completed all obligations of the Contract, in accordance with the Plans, Specifications and other Contract Documents. The Engineer also has authority to make and record the Notice of Completion.

(d) To approve progress and final payments under the Contract, including the provisions for withholding funds.

(e) To determine whether performance on the Work is satisfactory. Satisfactory performance includes compliance with all contract requirements.

(f) To approve the substitution of a Subcontractor, where allowed by law, if the listed Subcontractor does not object when notified.

(g) To suspend the Work for the benefit of the Agency.

(h) In the absence of the Agency Director, a Public Works Agency Department Director, as Deputy Director of Public Works, may exercise the Engineer's authority. Such action will be indicated by "Acting" with the Department Director's signature.

2-13.3 Department Director (Public Works Agency). The Department Director responsible for the project is designated in the Notice to Proceed. The Department Director has the following authority:

(a) To issue Contract Change Orders (CCO) as follows:

Original Contract Amount	Maximum Amount of any Change Order
Less than $500,000	$5,000
$500,000 to $1,000,000	1% of Bid Price
Greater than $1,000,000	$10,000

(b) To issue extensions of Contract time in accordance with the Contract Documents.

(c) To make final adjustment of quantities where the total does not exceed the amounts listed in (a) above.

(d) To approve the substitution of subcontractors, where allowed by law, if the listed Subcontractor does not object when notified.

(e) To determine when the Work has been completed and acknowledge in writing the completion of the Work.

2-13.4 Project manager. The Project manager responsible for the project is designated in the Notice to Proceed. This person may also be referred to as Project Engineer. The Project manager has the following authority:

(a) To interpret the Plans and Specifications.

(b) To make minor changes in the location or features of the Work where no change in cost is involved. Such changes in cost may not be the net of multiple changes.

(c) To approve substitutes for material and equipment specified by proprietary names when such material and equipment meet the Contract requirements.

(d) To approve shop drawings and submittals.

(e) To issue stop work orders when necessary to enforce the provisions of the Contract.

(f) To make determinations of each Working Day to be charged against the Contract time in accordance with 6-7.3.

(g) To take over a portion of the Work for Agency's use in accordance with 6-10.

(h) To receive all correspondence and other documents from the Contractor.

(i) To inspect the Work and perform Final Inspection subject to review by the Department Director and the Engineer.

2-13.5 Inspector. One or more inspectors will be assigned to the project by the Project manager. Substitutes may be used during absence of the assigned inspector. The Inspector has the following authority subject to review by the Project manager, Department Director and the Engineer:

(a) To view and inspect the Work, sample and test components (at the Work site and at offsite manufacturing locations), and to discuss the Work with the Contractor's field representative.

(b) To determine compliance with the Plans, Specifications and other Contract Documents and to issue warnings of noncompliance.

(c) To issue stop work notices in the following two instances only:

1) Where a safety hazard exists that has an immediate potential for serious injury or death.

2) Where the operation in progress, if continued for even a short period of time, could be adverse to the Agency's interests.

2-13.6 Other Agency Personnel and Consultants.

2-13.6.1 Materials Engineer. The Materials Engineer is designated in the Notice to Proceed. The Materials Engineer may assign one or more Materials Inspectors to the project.

Materials Inspectors have authority to sample and test material at the Work site and at offsite manufacturing or storage locations. They may furnish available written test results to the Contractor's field representative. At batch plants, they may issue warnings of noncompliance, but stop notices require the signature of the Materials Engineer or Project manager.

2-13.6.2 Surveyors & Technicians. Surveyors and technicians shall have free access to the site to perform their duties but have no authority related to Contract administration.

2-13.6.3 Other Persons. Other Agency personnel who are not involved in construction administration and the general public may be present at the site because it is their present place of work, as client/customers, as visitors, as future users of the facility, or as persons who will maintain the completed facility. Where the facility is to continue in use during construction, work access for Agency workers and client/customers shall be maintained as provided in the Special Provisions. Where the facility (or portion where construction is being performed) is not in use during construction, admittance to the Work site by Agency personnel not involved in construction administration and visitors may be allowed by the Contractor or by the inspector, subject to compliance with safety regulations. Such persons have no authority under the Contract and the Agency is not responsible for their comments, suggestions or directions.

2-13.6.4 Consultants. Consultants hired by the Agency shall have free access to the site to perform their duties but have no authority related to Contract administration, unless such duties are specifically identified in writing to the Contractor. When so identified, Consultant may perform the duties of certain Agency personnel described above.

SECTION 3 - CHANGES IN WORK

3-1 CHANGES REQUESTED BY THE CONTRACTOR

3-1.1 General. Changes in specified methods of construction may be made at the Contractor's request when approved in writing by the Engineer. Changes in the Plans and Specifications, requested in writing by the Contractor, which do not materially affect the Work and which are not detrimental to the Work or to the interests of the Agency, may be granted by the Board to facilitate the Work, when approved in writing by the Engineer. Nothing herein shall be construed as granting a right to the Contractor to demand acceptance of such changes.

3-1.2 Payment for Changes Requested by the Contractor. If such changes are granted, they shall be made at a reduction in cost or at no additional cost to the Agency. All costs to the Agency in reviewing the proposed change, or testing materials involved therein, shall be paid for by the Contractor, whether or not the change is approved.

3-2 CHANGES INITIATED BY THE AGENCY

3-2.1 General. The Agency may change the Plans, Specifications, character of the Work, or quantity of work, provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed 25 percent of the Contract Price. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the Contractor and Agency, unless both parties agree to proceed with the change by Change Order.

Change orders shall be in writing and state the dollar value of the change or establish method of payment, any adjustment in Contract time, and, when negotiated prices are involved, shall provide for the Contractor's signature indicating its acceptance.

3-2.2 Payment for Changes Initiated by the Agency.

3-2.2.1 Contract Unit Prices. If a change is ordered in an item of work covered by a Contract unit price, and such change does not involve a substantial change in the character of the Work from that shown on the Plans or included in the Specifications, an adjustment in payment will be made based upon the increase or decrease in quantity and the Contract unit price. In the case of such an increase or decrease in a Major Bid Item, the use of this basis for the adjustment of payment will be limited to that portion of the change which, together with all previous changes to that item, is not in excess of 25% of the total cost of such item based on the original quantity and Contract unit price.

If a change is ordered in an item of work covered by a Contract unit price, and such change does involve a substantial change in the character of the Work from that shown on the Plans or included in the Specifications, an adjustment in payment will be made in accordance with 3-2.2.3.

Should any Contract item be deleted in its entirety, payment will be made only for actual costs incurred prior to notification of such deletion.

3-2.2.2 Stipulated Unit Prices. Stipulated unit prices are those established by the Agency in the Contract Documents, as distinguished from Contract unit prices submitted by the Contractor. Stipulated unit prices may be used for the adjustment of Contract changes.

3-2.2.3 Pricing. Adjustments in payments for changes other than those set forth in 3-2.2.1 and 3-2.2.2 will be determined by agreement between Contractor and Agency. If unable to reach agreement, the Agency may direct the Contractor to proceed on the basis of Extra Work in accordance with 3-3 or as set forth in 3-2.2.4.

3-2.2.4 Non-Agreed Prices. Agency may issue a change order directing the Contractor to proceed at a price set by the Agency or on the basis of Extra Work. If the Agency sets a price for the work covered by the change order, Contractor is entitled to payment for such work in accordance with 3-3 to the extent payment in accordance with 3-3 exceeds the price set by the Agency.

3-3 EXTRA WORK

3-3.1 General. New or unforeseen work will be classed as "Extra Work" when the Engineer determines that it is not covered by Contract Unit Prices or Stipulated Unit Prices.

3-3.2 Payment.

3-3.2.1 General. When the price for the Extra Work cannot be agreed upon, the Agency will pay for the Extra Work based on the accumulation of costs as provided herein.

3-3.2.2 Basis for Establishing Costs

(a) Labor. The cost of labor will be the current cost for wages prevailing for each craft or type of workers performing the Extra Work at the time the Extra Work is done, plus payment of health and welfare, pension, vacation, apprenticeship funds, and other direct costs included in the prevailing rates applicable to the project, as well as assessments or benefits required by lawful collective bargaining agreements. To the total of these labor costs, the labor surcharge set forth in the current CALTRANS Labor Surcharge and Equipment Rental Rates publication shall be applied.

The use of a labor classification which would increase the Extra Work cost will not be permitted unless the Contractor establishes the necessity for such additional costs.

Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for the equipment rental. The labor cost for foremen shall be proportioned to all of their assigned work and only that applicable to Extra Work shall be paid. A foreman is defined as a lead working journeyman.

Nondirect labor costs including superintendence, payroll taxes, all types of insurance, and all other labor costs, not specifically provided for, shall be considered to be paid for as part of the markup of 3-3.2.3(a)(1).

(b) Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the Work site in the quantities involved, plus sales tax, freight and delivery.

The Agency reserves the right to approve materials and sources of supply, or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Agency.

(c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $200 or less.

Regardless of ownership, the rates to be used for determining equipment rental costs shall not exceed the following:

(1) For equipment that is listed in the current CALTRANS Labor Surcharge and Equipment Rental Rates publication, the rates shown therein. The right of way delay and overtime/multiple shift factors contained therein shall be used as applicable.

(2) For equipment not listed in said CALTRANS publication, the listed rates prevailing locally at equipment rental agencies, or distributors, at the time the work is performed.

(3) For equipment rental that includes operators and helpers, the applicable cost from (1) or (2) above, plus the applicable labor costs as determined in accordance with (a) above.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the Extra Work shall be added to the other costs.

If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Agency than holding it at the work site, it shall be returned, unless the Contractor elects to keep it at the work site at no expense to the Agency.

All equipment shall be acceptable to the Engineer, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

The reported rental rates for equipment already at the work site shall be for the duration of its use on the Extra Work, commencing at the time it is first put into actual operation on the Extra Work, plus the time required to move it from its previous site, and move it back to its previous site or to a closer site of next use.

3-3.2.2 Basis for Establishing Costs (Continued)

(d) Other Items. The Agency may authorize other items which may be required on the Extra Work. Such items include labor, service, material and equipment which are different in their nature from those required for the Work specified in the Contract and which are of a type not ordinarily available from the Contractor or any of its subcontractors.

Invoices covering all such items in detail shall be submitted with the request for payment.

(e) Invoices. Vendors' invoices for material, equipment rental, and other expenditures, shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the Agency may establish the cost of the item involved at the lowest price which was current at the time of the report.

3-3.2.3 Markup

(a) Work by Contractor. The following percentage shall be added to the Contractor's costs and shall constitute the markup for all overhead and profits, and all other cost not specifically provided for:

(1) Labor 33%
(2) Materials..... 15%
(3) Equipment Rental 15%
(4) Other Items and Expenditures ... 15%

To the sum of the cost and markups provided for in this section, 1 percent shall be added as compensation for bonding.

(b) Work by Subcontractor. When all or any part of the Extra Work is performed by a Subcontractor, the markup established in 3-3.2.3(a) shall be applied to the Subcontractor's actual cost of such work. A markup of 10% on the first $5,000 of the subcontracted portion of the Extra Work and a markup of 5% on work in excess of $5,000 of the subcontracted portion of the Extra Work may be added by the Contractor.

3-3.3 Daily Extra Work Reports by Contractor. When the price for the Extra Work cannot be agreed upon, the Contractor shall submit a Daily Extra Work Report to the Engineer on forms furnished by the Agency, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and for other services and expenditures when authorized. Failure to submit the Daily Extra Work Report, showing the labor and equipment hours and the quantity of materials used, by the close of the next Working Day may waive any rights for that day. Failure to submit fully completed Daily Extra Work Reports, with the required supporting documentation, within ten calendar days after the Engineer makes a written request for the such reports shall waive all rights for the work covered by the requested reports. An attempt shall be made to reconcile the Daily Extra Work Report daily, and it shall be signed by the Engineer and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the Daily Extra Work Report. Daily Extra Work Reports by Subcontractors or others shall be submitted through the Contractor.

The Daily Extra Work Report shall:

1) Show names of workers, classifications, and hours worked.
2) Describe and list quantities of materials used.
3) Show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable.
4) Describe other services and expenditures in such detail as the Agency may require.

In addition to the Daily Extra Work Reports, the Contractor shall furnish Certified Payroll Records for the labor included in the reports before payment will be made.

3-4 CHANGED CONDITIONS. The Contractor shall notify the Engineer in writing of the following work site conditions, hereinafter called changed conditions, promptly upon their discovery and before they are disturbed:

1) Subsurface or latent physical conditions differing materially from those represented in the Contract;
2) Unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character being performed; and
3) Material differing from that represented in the Contract which the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, Class II or Class III disposal site in accordance with provisions of existing law.

The Engineer will promptly investigate conditions which appear to be changed conditions. If the Engineer determines that the conditions are changed conditions and that they will materially increase or decrease the costs of any portion of the Work, a Change Order will be issued adjusting the compensation for such portion of the Work in accordance with 3-2.2. If the Engineer determines that conditions are changed conditions and that they will materially affect the performance time, the Contractor, upon submitting a written request, will be granted an extension of time subject to the provisions of 6-6.

If the Engineer determines that the conditions of which it has been notified by the Contractor do not justify an adjustment in compensation, the Contractor will be so notified in writing. This notice will also advise the Contractor of its obligation to notify the Engineer, in writing, if the Contractor disagrees.

Should the Contractor disagree with such determination, it may submit a written notice of potential claim to the Engineer before commencing the disputed work. In the event of such a disagreement, the Contractor shall not be excused on account of that disagreement from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. However, the Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties. The Contractor shall proceed as provided in 3-5.

The Contractor's failure to give notice of changed conditions promptly upon their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith.

3-5 DISPUTED WORK. If the Contractor and the Agency are unable to reach agreement on disputed work, the Agency may direct the Contractor to proceed with the Work. Payment shall be as later determined by mediation or arbitration, if the Agency and the Contractor agree thereto, or as fixed in a court of law.

Although not to be construed as proceeding under Extra Work provisions, the Contractor shall keep and furnish records of disputed work in accordance with 3-3.

SECTION 4 - CONTROL OF MATERIALS

4-1 MATERIALS AND WORKMANSHIP

4-1.1 General. All materials, parts, and equipment furnished by the Contractor in the Work shall be new, high grade, and free from defects. Quality of work shall be in accordance with the generally accepted standards. Material and work quality shall be subject to the Engineer's approval.

Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the Contractor, at its expense, when so directed by the Engineer.

If the Contractor fails to replace any defective or damaged work or material after reasonable notice, the Engineer may cause such work or materials to be replaced. The replacement expense will be deducted from the amount to be paid to the Contractor.

Used or secondhand materials, parts, and equipment may be used only if permitted by the Specifications.

4-1.1.1 Materials Furnished by Agency. Materials furnished by the Agency will be available at locations designated in the Special Provisions or if not designated in the Special Provisions, they will be delivered to a single location of Agency's choice within the project area. They shall be hauled to the site of installation by the Contractor at its expense, including any necessary loading and unloading that may be involved. The cost of handling and placing materials furnished by the Agency shall be considered as included in the price paid for the Contract item involving such furnished materials.

The Contractor will be held responsible for all materials furnished to it, and it shall pay all demurrage and storage charges. Furnished materials, after delivery to Contractor, lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the Agency for the cost of replacing lost or damaged furnished material and such costs may be deducted from any monies due or to become due the Contractor.

4-1.2 Protection of Work and Materials. The Contractor shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the Work. Stored materials shall be reasonably accessible for inspection. The Contractor shall also adequately protect new and existing work and all items of equipment for the duration of the Contract.

The Contractor shall not, without the Agency's consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the Contract.

4-1.3 Inspection Requirements

4-1.3.1 General. Unless otherwise specified, inspection is required at the source for asphalt concrete pavement mixtures, structural concrete, metal fabrication, metal casting, welding, concrete pipe manufacture, protective coating application, and similar shop or plant operations. Steel pipe in sizes less than 450 mm (18 inches), vitrified clay and cast iron pipe in all sizes are acceptable upon certification as to compliance with the Specifications, subject to sampling and testing by the Agency. Standard items of equipment such as electric motors, conveyors, elevators, plumbing fixtures, etc., are subject to inspection at the Work site only. Special items of equipment such as designed electrical panel boards, large pumps, sewage plant equipment, etc., are subject to inspection at the source, normally only for performance testing. The Specifications may require inspection at the source for other items not typical of those listed in this section.

4-1.3.2 Inspection of Materials Not Locally Produced. When the Contractor intends to purchase materials, fabricated products, or equipment from sources located more than 80 km (50 miles) outside the geographical limits of the Agency, an inspector or accredited testing laboratory (approved by the Engineer), shall be engaged by the Contractor at its expense, to inspect the materials, equipment or process. This approval shall be obtained before producing any material or equipment. The inspector or representative of the testing laboratory shall evaluate the materials for conformance with the Plans and Specifications. The Contractor shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by the approved agent. Approval by said agent shall not relieve the Contractor of responsibility for complying with the Contract requirements.

4-1.3.3 Inspection by the Agency. The Agency will provide all inspection and testing laboratory services within 80 km (50 miles) of the geographical limits of the Agency.

4-1.3.4 Certificates of Compliance. The Engineer may require certificates of compliance with the Specifications for materials or manufactured items produced outside of the Work site. Such certificates will not relieve the Contractor from the requirements of providing material and manufactured items complying with the Specifications even though they have been incorporated into the Work.

4-1.4 Tests of Materials. Before incorporation in the Work, the Contractor shall submit samples of materials, as the Engineer may require, at no cost to the Agency. The Contractor, at its own expense, shall deliver the materials for testing to the place and at the time designated by the Engineer. Unless otherwise provided, all initial testing and a reasonable amount of retesting shall be performed under the direction of the Engineer, and at no expense to the Contractor. If the Contractor is to provide and pay for testing, the Specifications will so state.

The Contractor shall notify the Engineer in writing, at least 15 Days in advance, of its intention to use materials for which tests are specified, to allow sufficient time to perform the tests. The notice shall name the proposed supplier and source of material.

If the notice of intent to use is sent before the materials are available for testing or inspection, or is sent so far in advance that the materials on hand at the time will not last but will be replaced by a new lot prior to use on the Work, it will be the Contractor's responsibility to re-notify the Engineer when samples which are representative may be obtained.

4-1.5 Certification. The Engineer may waive materials testing requirements of the Specifications and accept the manufacturer's written certification that the materials to be supplied meet those requirements. Materials test data may be required as part of the certification.

4-1.6 Trade Names or Equals. The Contractor may supply any of the materials specified or offer an equivalent. The Engineer shall determine whether the material offered is equivalent to that specified. Adequate time shall be allowed for the Engineer to make this determination.

Whenever any particular material, process, or equipment is indicated by patent, proprietary or brand name, or by name of manufacturer, such wording is used for the purpose of facilitating its description and shall be deemed to be followed by the words **or equal**. A listing of materials is not intended to be comprehensive, or in order of preference. The Contractor may offer any material, process, or equipment considered to be equivalent to that indicated. The substantiation of offers shall be submitted as provided in the Contract Documents.

The Contractor shall, at its expense, furnish data concerning items offered by it as equivalent to those specified. The Contractor shall have the material tested as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the item will fulfill its intended function.

Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results and determine if the substitute item is equivalent. The Engineer’s findings shall be final. Installation and use of a substitute item shall not be made until approved by the Engineer.

If a substitute offered by the Contractor is not found to be equal to the specified material, the Contractor shall furnish and install the specified material.

The specified Contract completion time shall not be affected by any circumstance developing from the provisions of this section.

4-1.6.1 Compatibility with Design. Where the size, configuration, weight, fastening locations, fastening strength, utility rough-in locations, and utility capacities of equipment or devices offered by the Contractor as equivalents do not conform to those provided for in the Contract Documents or those which are necessary for equipment or devices indicated by brand names, the Contractor shall bear all costs of redesign and changes in construction necessary to adapt the offered equipment or device to the Work.

Equipment or devices will not be considered "equal" where the life cycle cost of operation, utilities and maintenance of the offered alternate is greater than those listed by brand names. Life cycle costs shall mean utility charges (demand and usage charges), maintenance, operating personnel and replacement (equipment, installation and down time expenses) all reduced to an average annual rate using the current interest rate earned on funds invested by the County Treasurer.

4-1.6.2 Trade Names Listed. Where the Agency has listed products by brand or trade name on the Plans or in the Specifications, or both, this shall not be construed as meaning every product may be used without furnishing shop drawings, without redesign of the facility or without a change in utility rough-in requirements.

Where use of products listed on the Plans or in the Specifications, or both, or where use of a substitute proposed as an "equal" product requires shop drawings, redesign of the facility, or revisions in the size and location of rough-in utility connections, or in connecting work, the Contractor shall provide any necessary shop drawings, or shall cause the preparation of any necessary redesign or revisions to the Plans at its own expense and shall bear the full cost of any necessary additional construction or reconstruction work. No work described in shop drawings, a redesign, or a revision to the Plans shall be undertaken until such shop drawings, redesign, or revisions have been approved by the Engineer. Any proposed redesign or revision to the Plans shall be accompanied by complete computations and details prepared by an appropriate licensed design professional.

4-1.7 Weighing Equipment. All scales used for proportioning materials shall be inspected for accuracy and certified within the past 12 months by the State of California Bureau of Weights and Measures, by the County Director or Sealer of Weights and Measures, or by a scale mechanic registered with or licensed by the County.

The accuracy of the work of a scale service agency, except as stated herein, shall meet the standards of the California Business and Professions Code and the California Code of Regulations pertaining to weighing devices. A certificate of compliance shall be presented, prior to operation, to the Engineer for approval and shall be renewed whenever required by the Engineer at no cost to the Agency.

All scales shall be arranged so they may be read easily from the operator's platform or area. They shall indicate the true net weight without the application of any factor. The figures of the scales shall be clearly legible. Scales shall be accurate to within 1 percent when tested with the plant shut down. Weighing equipment shall be so insulated against vibration or moving of other operating equipment in the plant area that the error in weighing with the entire plant running will not exceed 2 percent for any setting nor 1.5 percent for any batch.

4-1.8 Calibration of Testing Equipment. Testing equipment, such as, but not limited to, pressure gages, metering devices, hydraulic systems, force (load) measuring instruments, and strain-measuring devices shall be calibrated by a testing agency acceptable to the Engineer at intervals not to exceed 12 months and following repairs, modification, or relocation of the equipment. Calibration certificates shall be provided when requested by the Engineer.

SECTION 5 - UTILITIES

5-1 LOCATION. The Permittee (in the case of Private Contracts) and the Agency (in the case of Cash or Assessment Act Contracts), will search known substructure records and furnish the Contractor with copies of documents which describe the location of utility substructures, or will indicate on the Plans for the project those substructures (except for service connections) which may affect the Work. Information regarding removal, relocation, abandonment, or installation of new utilities will be furnished to prospective bidders.

Where underground main distribution conduits such as water, gas, sewer, electric power, telephone, or cable television are shown on the Plans, the Contractor shall assume that every property parcel will be served by a service connection for each type of utility.

As provided in Section 4216 of the California Government Code, at least 2 working days prior to commencing any excavation, the Contractor shall contact the regional notification center (Underground Service Alert of Southern California) and obtain an inquiry identification number.

The California Department of Transportation is not required by Section 4216 to become a member of the regional notification center. The Contractor shall contact it for location of its subsurface installations.

The Contractor shall determine the location and depth of all utilities, including service connections, which have been marked by the respective owners and which may affect or be affected by its operations. If no pay item is provided in the Contract for this work, full compensation for such work shall be considered as included in the prices bid for other items of work.

5-2 PROTECTION. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the owner or order from the Agency. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Where protection is required to ensure support of utilities located as shown on the Plans or in accordance with 5-1, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.

Upon learning of the existence and location of any utility omitted from or shown incorrectly on the Plans, the Contractor shall immediately notify the Engineer in writing. When authorized by the Engineer, support or protection of the utility will be paid for as provided in 3-2.2.3 or 3-3.

The Contractor shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged. The Contractor shall bear the costs of repair or replacement of any utility damaged if located as noted in 5-1.

When placing concrete around or contiguous to any non-metallic utility installation, the Contractor shall at its expense:

1. Furnish and install a 50 mm (2 inch) cushion of expansion joint material or other similar resilient material; or
2. Provide a sleeve or other opening which will result in a 50 mm (2 inch) minimum-clear annular space between the concrete and the utility; or
3. Provide other acceptable means to prevent embedment in or bonding to the concrete.

Where concrete is used for backfill or for structures which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the Contractor's operations, the Contractor shall notify the Engineer and arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of the system.

5-3 REMOVAL. Unless otherwise specified, the Contractor shall remove all interfering portions of utilities shown on the Plans or indicated in the Bid documents as "abandoned" or "to be abandoned in place". Before starting removal operations, the Contractor shall ascertain from the Agency whether the abandonment is complete, and the costs involved in the removal and disposal shall be included in the Bid for the items of work necessitating such removals.

5-4 RELOCATION. When feasible, the owners responsible for utilities within the area affected by the Work will complete their necessary installations, relocations, repairs, or replacements before commencement of work by the Contractor. When the Plans or Specifications indicate that a utility installation is to be relocated, altered, or constructed by others, the Agency will conduct all negotiations with the owners and work will be done at no cost to the Contractor, except as provided in 301-1.6. Utilities which are relocated in order to avoid interference shall be protected in their position and the cost of such protection shall be included in the Bid for the items of work necessitating such relocation.

After award of the Contract, portions of utilities which are found to interfere with the Work will be relocated, altered or reconstructed by the owners, or the Engineer may order changes in the Work to avoid interference. Such changes will be paid for in accordance with 3-2.

When the Plans or Specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such work shall be included in the Bid for the items of work necessitating such work. Temporary or permanent relocation or alteration of utilities requested by the Contractor for its convenience shall be its responsibility and it shall make all arrangements and bear all costs.

The utility owner will relocate service connections as necessary within the limits of the Work or within temporary construction or slope easements. When directed by the Engineer, the Contractor shall arrange for the relocation of service connections as necessary between the meter and property line, or between a meter and the limits of temporary construction or slope easements. The relocation of such service connections will be paid for in accordance with provisions of 3-3. Payment will include the restoration of all existing improvements which may be affected thereby. The Contractor may agree with the owner of any utility to disconnect and reconnect interfering service connections. The Agency will not be involved in any such agreement.

5-5 DELAYS. The Contractor shall notify the Engineer of its construction schedule insofar as it affects the protection, removal, or relocation of utilities. Said notification shall be included as a part of the construction schedule required in 6-1. The Contractor shall notify the Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or relocation of utilities.

The Contractor will not be entitled to damages or additional payment for delays attributable to utility relocations or alterations if correctly located, noted, and completed in accordance with 5-1.

The Contractor may be given an extension of time for unforeseen delays attributable to unreasonably protracted interference by utilities in performing work correctly shown on the Plans.

The Agency will assume responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities within the area affected by the Work if such utilities are not identified in the Contract Documents. The Contractor will not be assessed liquidated damages for any delay caused by failure of Agency to provide for the timely removal, relocation, or protection of such existing facilities.

If the Contractor sustains loss due to delays attributable to interferences, relocations, or alterations not covered by 5-1, which could not have been avoided by the judicious handling of forces, equipment, or plant, there shall be paid to the Contractor such amount as the Engineer may find to be fair and reasonable compensation for such part of the Contractor's actual loss as was unavoidable and the Contractor may be granted an extension of time.

5-5.1 Cooperation During Utility Relocation. When utilities are to be relocated during construction, the Contractor shall cooperate and coordinate with the respective utility owners so they may relocate their facilities to clear the Work. Delays in relocation of utilities which result from failure to cooperate and coordinate will not be a cause for an extension of time or Non-Working Days.

5-6 COOPERATION. When necessary, the Contractor shall so conduct its operations as to permit access to the Work site and provide time for utility work to be accomplished during the progress of the Work.

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK. The requirements of this section concerning submission of construction schedules shall not apply to projects where the time allowed to complete the Work is less than 25 Working Days or the total Contract Price bid is less than $75,000 unless required by the special provisions.

The Contractor shall submit a construction schedule concurrently with the submittal of signed Contract, Contract bonds, and certificate of insurance. The Notice to Proceed will be delayed until the schedule is received. See 6-7.4, Starting of Contract Time.

When required by the Special Provisions, a revised schedule shall be submitted monthly prior to each progress payment closure date. Processing of the progress payment will be delayed until such revised schedule complying with this section is received.

The construction schedule shall be in the form of a Construction Element vs. Time Chart as shown in Appendix B-1and a Work Complete vs. Time Chart as shown in Appendix B-2.

The B-1 Chart shall be in sufficient detail to show the chronological relationship of all activities of the project including, but not limited to, estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, procurement of materials, and scheduling of equipment. The B-1 Chart shall recognize the requirements of 5-5. The B-1 Chart shall reflect obtaining all materials and completing all Work under the Contract within the specified time and in accordance with these Specifications. If the Contractor intends to complete the Work prior to the time for completion, the intended date of completion shall be set forth in the B-1 Chart and the Contractor shall execute a Contract Change Order that changes the number of Working Days allowed for completion to conform with such intended completion date. The Change Order shall not change the Contract Price.

The Contractor may submit a computer generated schedule in lieu of the form in Appendix B-1 and B-2, provided all of the elements shown on that form or specified herein are included.

An updated construction schedule shall be submitted prior to the next progress payment closure date whenever the actual percent Work complete versus percent time elapsed curve falls below and to the right of the dotted line shown on Appendix B-2.

If the Contractor desires to make a major change in its method of operations after commencing construction, or if its schedule fails to reflect the actual progress, it shall submit to the Agency a revised construction schedule in advance of beginning revised operations.

Revised and updated schedules shall show actual completion to the date of the revision in the lower segmented bar for each item.

The construction schedule shall be prepared as follows (see examples in Appendices C-1 and C-2):

1. On theB-1 Chart:
   - a Enter the project name and Specification No. as shown on the notice inviting bids and the Contractors name.
   - b. List the items of Work either individually or combined where items are part of the same element of the Work.
   - c. Assign a value for each horizontal space plotting interval in Working Days as follows: 1 working day for total Contract time of less than 100 working days, 2 for 100 to 200 working days and 5 for longer projects. Enter the value used in the space provided in the lower part of the form.
   - d. At the end of performance time and draw a vertical line and label it "End Performance Time". Enter numbers at 10 times the plotting interval at the top of intermediate vertical lines.
   - e. Shade in a bar in the upper segmented section for each work item to indicate the period during which Work will be performed. Move-in time and delivery time for materials shall be shown if significant to the schedule.

2. On the B-2 Chart:
   a. Enter the project name and Specification No. as shown on the notice inviting bids.
   b. At time intervals of 10 or 20 working days:
      (1) Compute the cumulative dollar value of Work which is expected to be completed for each item of Work, including the value of the completed portion of lump-sum items.
      (2) Divide the values computed in "b(1)" by the Total Contract Price to determine the percentage of the entire Contract planned for completion at the end of each time interval.
      (3) Divide the days of performance time at the end of each time interval by the total Contract performance time to obtain the percentage of elapsed performance time.
   c. Plot each percentage of completion value figure computed in "b(2)" against the corresponding percentage of completion time computed in "b(3)" using scales on the bottom and left side of chart.
   d. Connect points plotted in "c" with a line which will show the planned progress for the entire job.

If the proposed percent Work complete versus percent time elapsed line falls below and to the right of the dotted line drawn on the B-2 Chart, the Contractor shall provide sufficient information and backup to show that the Work can be completed on time.

6-1.1 Beginning of Work. The issuance of Notice to Proceed by Agency shall constitute the Contractor's authority to enter upon the site of the Work and to begin operations provided it has also notified Engineer at least 24 hours in advance. Entry upon the site without authority will be treated as trespassing.

6-1.2 Starting Work. The Contractor may start work at any time after the Notice to Proceed is issued but work shall begin within 15 Days after the starting date for the Contract, or at such other time as may be indicated in the Special Provisions. The actual date on which the Contractor starts work will not affect the required time for completion as provided for in 6-7 and 6-7.1.

6-1.3 Work Sequence. If required by the Special Provisions, the Contractor shall start construction operations on that part of the Work designated by the Engineer.

6-1.4 Resources Required. The Work shall be conducted in such a manner and with sufficient materials, equipment, and labor to insure its completion in accordance with the Plans and Specifications within the time set forth in the Contract.

6-2 PROSECUTION OF WORK. To minimize public inconvenience and possible hazard and to restore streets and other Work areas to their original condition and former state of usefulness as soon as practicable, the Contractor shall diligently prosecute the Work to completion. If, in the Engineer's opinion, the Contractor fails to prosecute the Work to the extent that the above purposes are not being accomplished, the Contractor shall, upon orders from the Engineer, immediately take the steps necessary to fully accomplish said purposes. All costs of prosecuting the Work as described herein shall be absorbed in the Contractor's bid. Should the Contractor fail to take the necessary steps to fully accomplish said purposes, after orders of the Engineer to do so, the Engineer may suspend the Work in whole or in part, until the Contractor takes said steps.

As soon as possible under the provisions of these Specifications, the Contractor shall backfill all excavations and restore to usefulness all improvements existing prior to the start of the Work.

If Work is suspended through no fault of the Agency, all expenses and losses incurred by the Contractor during such suspensions shall be borne by the Contractor. If the Contractor fails to properly provide for public safety, traffic, and protection of the Work during periods of suspension, the Agency may elect to do so, and deduct the cost thereof from monies due the Contractor. Such action will not relieve the Contractor from liability.

6-3 SUSPENSION OF WORK

6-3.1 General. The Work may be suspended in whole or in part when determined by the Engineer that the suspension is necessary in the interest of the Agency. The Contractor shall comply immediately with any written order of the Engineer. Such suspension shall be without liability to the Contractor on the part of the Agency except as otherwise specified in 6-6.3.

6-3.2 Archaeological and Paleontological Discoveries. If discovery is made of items of archaeological or paleontological interest, the Contractor shall immediately cease excavation in the area of discovery and shall not continue until ordered by the Engineer. When resumed, excavation operations within the area of discovery shall be as directed by the Engineer.

Discoveries which may be encountered may include, but not be limited to, dwelling sites, stone implements or other artifacts, animal bones, human bones and fossils.

The Contractor shall be entitled to an extension of time and compensation in accordance with the provisions of 6-6.

6-3.3 Temporary Suspension of Work. Should suspension of Work be ordered by reason of the failure of the Contractor to carry out orders or to perform any provisions of the Contract; or by reason of weather conditions being unsuitable for performing any item or items of Work; the Contractor, at its expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of such suspension. In the event that the Contractor fails to perform the work above specified, the Agency may perform such work and the cost thereof will be deducted from monies due or to become due the Contractor.

If the Engineer orders a suspension of all of the Work, or a portion of the Work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the Work, the days on which the suspension is in effect shall not be considered Working Days.

If a portion of Work at the time of such suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of Working Days will be made on the basis of the then current controlling operation or operations.

If a suspension of Work is ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the Contract, the Days on which the suspension order is in effect shall be considered Working Days if such days are Working Days as defined.

6-4 TERMINATION OF THE CONTRACT FOR DEFAULT..

6.4.1 General. If, prior to the acceptance of the Work, the Contractor:

a) becomes insolvent, assigns its assets for the benefit of its creditors, is unable to pay its debts as they become due, or is otherwise financially unable to complete the Work,

b) abandons the Work by failing to report to the Work site and diligently prosecute the Work to completion,

c) disregards written instructions from the Agency or materially violates provisions of the Contract Documents,

d) fails to prosecute the Work according to the schedule approved by the Engineer,

e) disregards laws or regulations of any public body having jurisdiction, or

f) commits continuous or repeated violations of regulatory or statutory safety requirements, then the Agency will consider the Contractor in default of the Contract.

Notices, and other written communications regarding default between the Contractor, the Agency, and the Surety shall be transmitted in accordance with 2-12.

6-4.2 Notice to Cure. The Agency will issue a written notice to cure the default to the Contractor and its Surety. The Contractor shall commence satisfactory corrective actions within 5 Working Days after receipt.

6-4.3 Notice of Termination for Default. If the Contractor fails to commence satisfactory corrective action within 5 Working Days after receipt of the notice to cure, or to diligently continue satisfactory and timely correction of the default thereafter, then the Agency will consider the Contractor in default of the Contract and:

a) will terminate the Contractor's right to perform under the Contract by issuing a written notice of termination for default to the Contractor and its Surety,

b) may use any materials, equipment, tools or other facilities furnished by the Contractor to secure and maintain the Work site, and

c) may furnish labor, equipment, and materials the Agency deems necessary to secure and maintain the Work site. The provisions of this subsection shall be in addition to all other legal rights and remedies available to the Agency.

6-4.4 Responsibilities of the Surety. Upon receipt of the written notice of termination for default, the Surety shall immediately assume all rights, obligations and liabilities of the Contractor under the Contract. If the Surety fails to protect and maintain the Work site, the Agency may do so, and may recover all costs incurred. The Surety shall notify the Agency that it is assuming all rights, obligations and liabilities of the Contractor under the Contract and all money that is due, or would become due, to the Contractor shall be payable to the Surety as the Work progresses, subject to the terms of the Contract.

Within 15 Working Days of receipt of the written notice of termination for default, the Surety shall submit to the Agency a written plan detailing the course of action it intends to take to remedy the default. The Agency will review the plan and notify the Surety if the plan is satisfactory. If the Surety fails to submit a satisfactory plan, or if the Surety fails to maintain progress according to the plan accepted by the Agency, the Agency may, upon 48 hours written notice, exclude the Surety from the premises, take possession of all material and equipment, and complete the Work in any way the Agency deems to be expedient. The cost of completing the Work by the Agency shall be charged against the Surety and may be deducted from any monies due, or which would become due, the Surety. If the amounts due under the Contract are insufficient for completion, the Surety shall pay to the Agency, within 30 days after the Agency submits an invoice, all costs in excess of the remaining Contract Price.

6-4.5 Payment. The Surety will be paid for completion of the Work in accordance with 9-3 less the value of damages caused to the Agency by acts of the Contractor.

6-5 TERMINATION OF CONTRACT. The Board may terminate the Contract at its own discretion or when conditions encountered during the Work make it impossible or impracticable to proceed, or when the Agency is prevented from proceeding with the Contract by act of God, by law, or by official action of a public authority.

The Agency will issue a written notice of termination for convenience in accordance with 2-12. Upon receipt, the Contractor shall immediately cease work, except work the Contractor is directed to complete by the Engineer or required to complete for public safety and convenience. The Contractor shall immediately notify Subcontractors and suppliers to immediately cease their work.

The Contractor will be paid without duplication for:

a) work completed in accordance with the Contract Documents prior to the effective date of termination for convenience;

b) reasonable costs incurred in settlement of terminated contracts with Subcontractors, suppliers and others; and

c) reasonable expenses directly attributable to termination.

The Contractor shall submit a final termination settlement proposal to the Agency no later than 90 days from the effective date of termination, unless extended, in writing, by the Agency upon written request by the Contractor.

If the Contractor fails to submit a proposal, the Agency may determine the amount, if any, due the Contractor as a result of the termination. The Agency will pay the Contractor the amount it determines to be reasonable. If the Contractor disagrees with the amount determined by the Agency as being reasonable, the Contractor shall provide notice to the Agency within 30 days of receipt of payment. Any amount due shall be as later determined by arbitration, if the Agency and the Contractor agree thereto, or as fixed in a court of law.

6-6 DELAYS AND EXTENSIONS OF TIME

6-6.1 General. If delays are caused by unforeseen events beyond the control of the Contractor, such delays will entitle the Contractor to an extension of time as provided herein, but the Contractor will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3. Such unforeseen events may include war, government regulations, labor disputes, strikes, fires, floods, adverse weather necessitating cessation of work, other similar action of the elements, inability to obtain materials, equipment or labor, required Extra Work, or other specific events as may be further described in the Specifications.

No extension of time will be granted for a delay caused by the Contractor's inability to obtain materials unless the Contractor furnishes to the Engineer documentary proof of the inability to obtain such materials in a timely manner in accordance with the sequence of the Contractor's operations and the approved construction schedule.

If delays beyond the Contractor's control are caused by events other than those mentioned above, but substantially equal in gravity to those enumerated, and an extension of time is deemed by the Engineer to be in the best interests of the Agency, an extension of time may be granted, but the Contractor will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3.

If delays beyond the Contractor's control are caused solely by action or inaction by the Agency, such delays will entitle the Contractor to an extension of time as provided in 6-6.2.

6-6.2 Extensions of Time. Extensions of time, when granted, will be based upon the effect of delays to the Work as a whole and will not be granted for noncontrolling delays to minor included portions of Work unless it can be shown that such delays did, in fact, delay the progress of the Work as a whole.

6-6.3 Payment for Delays to Contractor. The Contractor will be compensated for damages incurred due to delays for which the Agency is responsible if such delays are unreasonable in the circumstances involved and were not within the contemplation of the parties when the Contract was awarded to the Contractor and delay the Work as a whole. Such actual costs will be determined by the Engineer. The Agency will not be liable for, and in making this determination the Engineer will exclude, all damages which the Engineer determines the Contractor could have avoided by any reasonable means including, without limitation, the judicious handling of forces, equipment, or plant.

6-6.4 Written Notice and Report. If the Contractor desires payment for a delay as specified in 6-6.3 or an extension of time, it shall, within 30 Days after the beginning of the delay, file with the Agency a written request and report as to the cause and extent of the delay. The request for payment or extension must be made at least 15 Days before the specified completion date. Failure by the Contractor to file these items within the time specified will be considered grounds for refusal by the Agency to consider such request.

6-6.4.1 Documentation of Delays. When the Contractor requests an extension of time for delay due to inability to obtain materials or equipment, the documentary proof required by 6-6.1 shall include the following:

1. Date Engineer was notified of delay.
2. Date the delay began.
3. Exact description of material or equipment causing delay.
4. Documentation showing when and from whom ordered.
5. Documentation of promise to deliver.
6. Documentation of actual delivery date.
7. Description of how late delivery caused delay (include construction schedule).
8. Documentation of measures taken to get prompt delivery.
9. Documentation of attempts to get delivery from other sources.
10. Description of steps taken in project scheduling to minimize effects of late delivery.
11. Description of steps taken to get project back on schedule after actual delivery.
12. Statement of actual time lost as a result of late delivery.

6-7 TIME OF COMPLETION

6-7.1 General. The Contractor shall complete the Work within the time set forth in the Contract. The Contractor shall complete each portion of the Work within such time as set forth in the Contract for such portion. Unless otherwise specified, the time of completion of the Contract shall be expressed in Working Day

6-7.2 Working Day. A Working Day is any day within the period between the start of the Contract time as defined in 6-1 and the date provided in the Contract for completion or upon field acceptance by the Engineer of all Work provided for in the Contract, whichever occurs first, other than:

(1) Saturday,
(2) Sunday,
(3) any day designated as a holiday by the Agency,
(4) any other day designated as a holiday in a Master Labor Agreement entered into by the Contractor or on behalf of the Contractor as an eligible member of a Contractor Association,
(5) any day the Contractor is prevented from working at the beginning of the workday for cause as defined in 6-6.1,
(6) any day the Contractor is prevented from working during the first 5 hours of the workday with at least 60 percent of the normal work force for cause as defined in 6-6.1.

6-7.2.1 Holidays. Solely for the purposes of paragraph (3) of 6-7.2, the following days are designated as holidays by the Agency.

MONTH	A AGENCY EMPLOYEE HOLIDAYS	B OTHER DESIGNATED HOLIDAYS
January	1st day; 3rd Monday	None
February	3rd Monday	12th day
March	None	31st day
March-April	None	One Friday between March 21 and April 23 designated as Good Friday
May	Last Monday	None
June	None	None
July	4th day	None
August	None	None
September	1st Monday	9th day
October	None	2nd Monday
November	11th day; 4th Thursday	the Friday following the 4th Thursday
December	25th	23rd day, only if Thursday or Friday; 24th day; 31st day

If any day listed above falls on Saturday, the preceding Friday is the holiday. If any day listed above falls on Sunday, the succeeding Monday is the holiday.

No extra holiday shall result when such Friday or Monday is already designated as a holiday.
A copy of a Working Day calendar incorporating the above-listed holidays and used by the Agency for Contract time accounting purpose will be furnished to the Contractor upon request.

The term "holiday" as used in this section shall not be construed as being the same as "holiday" within the meaning of 7-2.2.

The Contractor may perform work on the holidays designated in Column A above provided it has obtained prior written approval of the Engineer at least two Days in advance of performing the work. The Contractor may perform work on the holidays designated in Column B above provided the Contractor notifies the Engineer two Days in advance of the holiday.

6-7.2.2 Landscape Maintenance Period. Where a landscape maintenance period is specified, the portion of the time in such period that follows the completion of all other Work required by the Contract shall not be Working Days for Contract time accounting.

6-7.3 Contract Time Accounting. The Engineer will make a daily determination of each Working Day to be charged against the Contract time. These determinations will be discussed and the Contractor will be furnished a periodic statement showing the allowable number of Working Days of Contract time, as adjusted, at the beginning of the reporting period. The statement will also indicate the number of Working Days charged during the reporting period and the number of Working Days of Contract time remaining. If the Contractor does not agree with the statement, the Contractor must file a written protest within 15 Days after receipt, setting forth the facts of the protest. Otherwise, the statement will be deemed to have been accepted.

6-7.4 Starting Date for Contract Time and Notice to Proceed. The starting date for Contract time accounting will be determined by adding the number of Days indicated on the Proposal form to the date the Contract is awarded, however the Agency may, at its option, delay the starting date by not more than 60 calendar Days if necessary to obtain permits, rights-of-way, or approval of federal or State authorities, or when prevented from starting the project due to causes beyond its control. Notice to Proceed will be issued within 7 calendar Days after the Contract, bonds, certificates of insurance and other documents have been returned, properly completed by the Contractor, unless the starting date is delayed as herein provided. If the Agency delays the Contract starting date, Notice to Proceed will be issued at least 7 calendar Days prior to the new starting date. Any delay caused by failure of the Contractor to properly complete or timely return the Contract Documents shall not change the Contract starting date and shall not be a cause for extending the Contract time. The Notice of Award will indicate a probable Contract starting date. The Notice to Proceed will indicate the actual Contract starting date, computed as herein described.

6-8 COMPLETION, ACCEPTANCE AND WARRANTY.

6-8.1 Completion and Acceptance. Acknowledgment of completion of the Work will occur prior to Acceptance by the Agency. Acceptance will only occur after all Contract requirements have been fulfilled, such as training, submission of warranties, maintenance manuals, record drawings, Release on Contract and the like. Acceptance by the Agency will occur when the Engineer signs the Notice of Completion.
The Work will be inspected by the Engineer promptly upon receipt of the Contractor's written assertion that the Work has been completed. If, in the Engineer's judgment, the Work has been completed in accordance with the Plans and Specifications, the Engineer will acknowledge completion of the Work. Completion of the Work, as used above, shall include the Contractor showing evidence of having received an occupancy clearance from Building and Safety, or other permit issuing agency, when a building, plumbing electrical, grading, or other permit is required for the Work. The Engineer will, in acknowledging completion of the Work, set forth in writing the date when the Work was completed. This will be the date when the Contractor is relieved from responsibility to protect the Work. This will also be the date to which liquidated damages will be computed.

6-8.2 Warranty and Correction

6-8.2.1 Warranty The Contractor warrants to the Agency that materials and equipment furnished under the Contract will be new, unless otherwise specified in the Contract Documents, and of good quality, that the Work will be free from defects in materials and workmanship and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective by the Agency. This warranty excludes damage or defect caused by abuse (other than by the Contractor or those under the control of the Contractor), modifications not executed by the Contractor, or improper or insufficient maintenance. This warranty excludes normal wear and tear. Nothing in this warranty is intended to limit any manufacturer's warranty which provides the Agency with greater warranty rights.

6-8.2.2 Correction Period For a period of one (1) year from the date of acceptance of the Work by the Agency, the Contractor shall repair or replace any defective workmanship or materials or Work not in conformance with the Contract Documents after notice to do so from the Engineer, and within the time specified in the notice. If the Contractor fails to make such repair or replacement within the time specified in the notice, the Agency may perform the repair or replacement and the Contractor and the Contractor's sureties shall be liable for the cost thereof. The one (1) year period referenced in this section 6-8.2.2 applies only to the Contractor's obligation to repair or replace defective workmanship or materials or Work not in conformance with the Contract Documents and is not intended to constitute a period of limitations for any other rights or remedies the Agency may have regarding the Contractor's other obligations under the Contract Documents.

6-8.3 No Waiver of Legal Rights. The Agency shall not be precluded or estopped by any measurement, estimate, or certificate made either before or after the completion and Acceptance of the Work and payment therefor from showing the true amount and character of the Work performed and materials furnished by the Contractor, nor from showing that any such measurement, estimate, or certificate is untrue or is incorrectly made, nor that the Work or materials do not in fact conform to the Contract.

The Agency shall not be precluded or estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the Contractor or its sureties, or both, such damages as it may sustain by reason of the Contractor's failure to comply with the terms of the Contract.

Neither the Acceptance by the Engineer or by its representative, nor any payment for or Acceptance of the whole or any part of the Work, nor any extension of time, nor any possession taken by the Engineer shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages.

A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

6-8.4 Landscape Maintenance Period. Final Acceptance of the Contract shall follow the satisfactory completion of all Contract Work, including the landscape maintenance period if one is specified.

6-8.5 Non-complying Work. Neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Agency, shall constitute an Acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

6-8.6 Written Warranties. The Contractor shall obtain and deliver to the Engineer all written warranties required to be furnished by the Specifications. Each of such warranty shall be underwritten by the Contractor for the full period prescribed therein, and shall bear its endorsement to such effect.

6-9 LIQUIDATED DAMAGES. Failure of the Contractor to complete the Work within the time allowed will result in damages being sustained by the Agency. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For each consecutive calendar day in excess of the time specified, as adjusted in accordance with 6-6, for completion of the Work the Contractor shall pay to the Agency, or have withheld from monies due it, the sum of $250, unless otherwise provided in the Contract Documents.

Execution of the Contract under these Specifications shall constitute agreement by the Agency and Contractor that $250 per day is the minimum value of the costs and actual damage caused by failure of the Contractor to complete the Work within the allotted time, that such sum is liquidated damages and shall not be construed as a penalty, and that such sum may be deducted from payments due the Contractor if such delay occurs.

6-10 USE OF IMPROVEMENT DURING CONSTRUCTION. The Agency reserves the right to take over and utilize all or part of any completed facility or appurtenance. The Contractor will be notified in writing in advance of such action. Such action by the Agency will relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use by public traffic or from the action of the elements or from any other cause, except injury or damage resulting from the Contractor's operations or negligence. The Contractor will not be required to reclean such portions of the improvement before field completion, except for cleanup made necessary by its operations. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials.

In the event the Agency exercises its right to place into service and utilize all or part of any completed facility or appurtenance, the Agency shall assume the responsibility and liability for injury to persons or property arising out of or resulting from the utilization of the facility or appurtenance so placed into service, except for any willful or negligent act or omission by the Contractor, Subcontractor, their officers, employees or agents.

6-10.1 Use of Improvements - Exceptions. The provisions of 6-10 shall not apply to projects for the repair, modification, enlargement or improvement of existing facilities that are to remain in use during construction except where a portion of the project which is completely independent from the rest of the Work can be completed and put into use by the Agency.

On projects on public roads, after satisfactory completion of an isolated section of the Work involving roadway improvements or repairs, when all temporary signs and other temporary Contractor facilities have been removed, the section is not being used as a detour, the section is no longer under the Contractor's control, and the section is opened to public traffic through the end of the Contract period, that section of the Work shall be taken over by the Agency as provided in 6-10. The Contractor shall indicate to the Engineer in writing when the conditions of this paragraph have been complied with and shall specify the limits of the section involved. Any taking over of the Work by the Agency shall be effective only when formal written notification is issued by the Agency.

6-11 NOTICE OF POTENTIAL CLAIM FOR ADDITIONAL COMPENSATION. Procedures for notice of claims in specific situations and circumstances are provided in the following sections:

3-4 ....Changed Conditions
6-6.4 ....Delay and Extensions of Time
6-7.3 ....Contract Time Accounting

Compliance with this section is not prerequisite to assertion of a claim involving those sections or based on differences in measurements or errors of computation as to Contract quantities.

Compliance with the provisions of this section is required in all other situations and circumstances.

It is the intention of this section that differences arising between the parties under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action taken to resolve such differences.

The Contractor shall give the Engineer written notice of a potential claim, setting forth: (1) the reasons for which the Contractor believes additional compensation will or may be due; (2) the nature of the costs involved; and (3) insofar as possible, the amount of the potential claim.

If the claim is based upon an act or failure to act by the Engineer, the said notice must be given to the Engineer prior to the date when the work giving rise to the potential claim is commenced; in all other cases the said notice must be given to the Engineer within 15 Days after the happening of the event, thing or occurrence giving rise to the potential claim.

The Contractor shall not be entitled to the payment of any additional compensation where the written notice of potential claim has not been given to the Engineer in the manner required by and within the time limitations of this section.

6-12 DISPUTES AND CLAIMS; PROCEDURE.

6-12.1 GENERAL. Any and all decisions made on appeal pursuant to this section shall be in writing. Any "decision" purportedly made pursuant to this section which is not in writing shall not be binding upon the Agency and should not be relied upon by the Contractor.

Filing or giving the notices required under 3-4, 6-6.4, 6-7.3 and 6-11 is prerequisite to recovery under a Contractor's claim for additional compensation; nothing in this section shall excuse the Contractor from its duty to file or give the required notices, or from performing other duties required by the Contract Documents.

6-12.2 ADMINISTRATIVE REVIEW. Prior to proceeding under 6-12.3 or filing a Complaint in Arbitration, the Contractor shall exhaust its administrative remedies by submitting its claim for review and decision by the following Agency staff in the following sequence:

Project Manager, responsible for the project
Department Director (Public Works Agency), responsible for the project.
Director of the Public Works Agency (the Engineer)

If the Contractor disputes the Project Manager's decision on its claim, the Contractor shall submit the claim to the Department Director. If the Contractor disputes the Department Director's decision on its claim, the Contractor shall submit the claim to the Engineer. Agency staff decisions shall state the portion of the claim that is undisputed if any.

The Project Manager may elect to forward a claim submitted by the Contractor directly to the Department Director. The Project Manager must give the Contractor notice of that election and the Contractor may supplement its claim within 7 Days of such notice (unless the parties agree in writing to a different time) and its claim will be deemed submitted on the earlier of the day it supplements its claim, the day it states in writing that it will not supplement its claim or the day time to supplement expires. The Department Director may forward a claim timely submitted by the Contractor directly to the Engineer instead of making a decision on the claim, in which case no notice or opportunity to supplement the claim is required, and the claim shall be deemed timely submitted to the Engineer.

The Engineer's decision on the claim shall be the Agency's final decision.

Claims submitted to the Department Director and the Engineer shall be submitted in writing and shall include:

a. A copy of the disputed decision.
b. A statement as to why the Contractor believes the decision is in error.
c. All information, argument, documents and evidence (collectively, materials) that the Contractor wishes to have considered in the review. Where the request for review is made to the Engineer, in lieu of resubmitting materials which have already been submitted to the Department Director, the Contractor may include with the request a list of the materials the Contractor wants the Engineer to consider. Any additional materials and evidence not previously submitted to the Department Director shall be included with the request to the Engineer, if the Contractor wishes them to be considered. If relevant evidence is not available at the time the request is made to the Department Director or the Engineer, the Contractor shall identify such evidence and include a statement as to when such evidence will be submitted.

The Project Manager shall issue a decision on a claim within 10 Days of receipt; if the Project Manager does not do so, then the Project manager will be deemed to have decided to reject the claim in its entirety as of the conclusion of the 10th Day after receipt. The Contractor shall submit a claim to the Department Director for review and decision within 7 Days of receipt of the Project Manager's decision or of the time the Project Manager is deemed to have decided to reject the claim, whichever is applicable. The Department Director shall issue a decision on a claim within 10 Days of the timely submission of the claim; if the Department Director does not do so, then the Department Director will be deemed to have decided to reject the claim in its entirety as of the conclusion of the 10th Day after timely submission. The Contractor shall submit a claim to the Engineer for review and decision within 7 Days of receipt of the Department Director's decision or of the time the Department Director is deemed to have decided to reject the claim, whichever is applicable. If a claim is timely submitted to the Engineer and the Engineer fails to issue a decision on that claim within the time limits prescribed for issuing a written statement under Public Contract Code, section 9204, subdivision (d)(1), the Engineer shall be deemed to have decided to reject the claim in its entirety. At any time after the Project Manager receives a claim, the Agency and Contractor may agree in writing to different time limits than those set forth in this paragraph.

6-12.3 MEET AND CONFER; MEDIATION If the Contractor disputes the Agency's final decision, the Contractor 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 Agency shall schedule a meet and confer conference within 30 Days for settlement of the dispute.

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 Agency shall provide the Contractor 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 Agency 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 Agency and the Contractor sharing the associated costs equally. The Agency

and Contractor shall agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the Agency and Contractor 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.

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.

Failure by the Agency to meet the time requirements of this section shall result in the portion of the claim that remains in dispute being deemed rejected in its entirety.

The parties may agree to waive, in writing, mediation under this section.

6-12.4 ARBITRATION. Claims and disputes arising under or related to the performance of the Contract, for which mediation under 6-12.3 was waived or unsuccessful except for claims which have been released by execution of the "Release on Contract" as provided in 9-4, shall be resolved by arbitration unless the Agency and the Contractor agree in writing, after the claim or dispute has arisen, to waive arbitration and to have the claim or dispute litigated in a court of competent jurisdiction. Arbitration shall be pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2 of the Public Contract Code and the regulations promulgated thereto, Chapter 4 (commencing with Section 1300) of Division 2 of Title 1 of the California Code of Regulations. The arbitration decision shall be decided under and in accordance with California law, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law.

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of said Chapter 4. A Complaint in Arbitration by the Contractor shall be filed not later than 90 calendar Days after receipt of the final written decision of the Agency on the claim or dispute or within 300 Days after Acceptance of the Work by the Agency if no written decision has been issued. For the purposes of this section, "Acceptance of the Work by the Agency" shall be defined as the date the Notice of Completion is filed.

Where an election is made by either party to use the Simplified Claims Procedure provided under Sections 1340-1346 of said Chapter 4, the parties may mutually agree to waive representation by counsel.

All contracts valued at more than $25,000 between the Contractor and its subcontractors and suppliers shall include a provision that the subcontractors and suppliers shall be bound to the Contractor to the same extent that the Contractor is bound to the Agency by all terms and provisions of the Contract, including this arbitration provision.

6-13 CONTRACTOR'S WORK HOURS

6-13.1 Working Hours Limitations. Except as otherwise specified, no work shall be performed by the Contractor at the Work site between the hours of 7:00 p.m. and 7:00 a.m. the following day, nor shall work be performed on Saturdays, Sundays or holidays listed in 6-7.2.1.

6-13.2 Regular Work Schedule. The Contractor shall furnish a work schedule with the Construction Schedule required by 6-1 and inform the Engineer at least two Days in advance of changing the schedule. The schedule shall include the times for starting and ending work on each day. Such starting and ending times shall not be more than 10 1/2 hours apart.

6-13.3 Exceptions. The limitations on working hours and days shall not apply to emergency work made necessary by unusual conditions where such work is necessary to protect the Work, to protect the property of others, to protect life, or to ensure the orderly flow of traffic.

The limitations of this section shall not apply where work at times other than allowed by 6-13.1 and 6-13.2 is necessary in order to make utility connections or is required by other provisions contained in these Specifications in order to perform the work in the manner specified. In these cases, the Contractor shall obtain prior written approval of the Engineer at least two Days in advance of performing the work.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-1 THE CONTRACTOR'S EQUIPMENT AND FACILITIES.

7-1.1 General. The Contractor shall furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work.

The Contractor shall provide and maintain enclosed toilets for the use of employees engaged in the Work. These accommodations shall be maintained in a neat and sanitary condition, and regularly pumped out.

7-1.2 Temporary Utility Services. The Contractor shall, at its own expense, make all arrangements necessary for the provision of temporary utility services necessary for its own use during performance of the Work.

The Contractor shall not draw water from any fire hydrant (except to extinguish a fire), without obtaining permission from the water utility owner.

7-1.3 Crushing and Screening Operations. Unless otherwise specified in the Special Provisions, the establishment and operation of portable screens and crushers will not be allowed on or adjacent to the Work site.

7-2 LABOR

7-2.1 General. The Contractor, its agents, and employees shall be bound by and comply with applicable provisions of the Labor Code and Federal, State, and local laws related to labor.

Any worker found by the Engineer to be incompetent, intemperate, troublesome, disorderly, or otherwise objectionable, or who fails to perform the Work properly and acceptably, shall be immediately removed from the Work site by the Contractor and shall not be reemployed in the performance on the Work.

7-2.1.1 Special Qualifications. Where the Engineer determines certain portions of the Work require experience, training, certification or other special qualifications that may not be possessed by the average journeyperson, such portions of the Work will be specifically identified in the Special Provisions and the special qualifications identified.

When work requiring special qualifications is being performed, a person with such qualifications must be in immediate charge of the work. The person may be a lead journeyperson, foreperson or trade superintendent. The general superintendent or a foreperson who is not specifically assigned to the area where the identified work is being performed will not be considered to be in immediate charge of the work.

Written certification of the required qualifications shall be furnished to the Engineer at least one week prior to the time work is commenced on the work requiring such qualifications. Such certification is subject to review and acceptance by the Engineer. If, during performance of work requiring special qualifications, the qualified person becomes temporarily or permanently unavailable to the Contractor, work shall not proceed until a qualified replacement has been accepted by the Engineer. The Engineer will promptly consider the certification of the replacement.

If identified work is performed without a person having the special qualifications in charge, the Engineer may, at its sole discretion, order such work removed and replaced at the Contractor's expense.

If, after certification is accepted, the Engineer finds that the certification was inaccurate, or work on the project indicates a lack of the knowledge and experience to supervise the work, the Engineer may order the work stopped until an acceptable replacement has been certified, accepted and is in charge.

7-2.2 Prevailing Wages. Pursuant to Section 1773.2 of the Labor Code, the current prevailing rate of per diem wages at the time of the Bid as determined by the Director of the Department of Industrial Relations (DIR) are on file at the office of the Engineer. The Contractor shall post a copy of these rates at the Work site. Pursuant to Section 1774 of the Labor Code, the Contractor and any Subcontractors shall pay not less than the specified prevailing rates of wages to workers employed on the Contract. If the Contract is Federally-funded, the Contractor and any Subcontractors shall not pay less than the higher of these rates or the rates determined by the United States Department of Labor. Pursuant to Section 1775 of the Labor Code, the Contractor and any Subcontractors, shall, as a penalty to the Agency, forfeit the prescribed amounts per calendar day, or portion thereof, for each worker paid less than the prevailing wage rates. The project is subject to the compliance monitoring and enforcement by the California Department of Industrial Relations (DIR). The contractor is responsible for posting job site notices as prescribed by regulation pursuant to Labor Code section 1771.4, subdivision (a)(2). The Contractor and each Subcontractor, if any, must be registered with the DIR pursuant to Labor Code section 1725.5 and section 1771.1. The Contractor and each Subcontractor, if any, must submit certified payrolls to the Labor Commissioner pursuant to Labor Code 1771.4.

7-2.2.1 Apprentices. Apprentices shall be employed on the Work in accordance with Labor Code Section 1777.5. The Contractor is responsible for compliance with Labor Code Section 1777.5 for all apprenticeable occupations whether employed directly or through subcontractors.

7-2.2.2 Contractors' Duties Concerning Labor Code Compliance. As required by Labor Code 1775(b)(1), Labor Code Sections 1771, 1775, 1776, 1777.5, 1813 and 1815 are required to be included in the contract between the Contractor and subcontractors. The Contractor agrees to comply with these sections and all remaining provisions of the Labor Code.

7-2.3 Payroll Records. Pursuant to Section 1776 of the Labor Code the Contractor and each Subcontractor, if any, shall keep, make available, and submit to the Engineer within ten (10) days of receipt of a written request,

certified payroll records. Pursuant to Labor Code section 1776, subsection (h), the Contractor and each Subcontractor, if any, shall, as a penalty to the Agency, forfeit the prescribed amount for each calendar day, or portion thereof, for each worker, the Contractor and each Subcontractor, if any, fails to comply with that subsection until strict compliance is effectuated. The Contractor and each Subcontractor, if any, waives any right to any notice or hearing on the forfeiture of such penalties pursuant to Labor Code sections 1726 or 1771.6. The contractor shall include the in its subcontracts as required to make this paragraph effective as to each Subcontractor. Upon written request, the Contractor shall withhold penalties forfeited by a Subcontractor pursuant to Labor Code section 1776,l subsection (h), and this paragraph from payment due to such Subcontractor and remit such penalties withheld to the Agency.

7-2.4 Hours of Labor. Pursuant to Section 1810 of the Labor Code, 8 hours of labor shall constitute a legal day's work. Pursuant to Section 1813 of the Labor Code, the Contractor and any Subcontractors, shall, as a penalty to the Agency, forfeit the prescribed amount per calendar day for each worker required or permitted to work more than 8 hours in any 1 calendar day and 40 hours in any 1 calendar week without being compensated in accordance with Section 1815.

Pursuant to Section 1810 of the Labor Code, 8 hours of labor shall constitute a legal day's work. Pursuant to Section 1813 of the Labor Code, the Contractor and each Subcontractor, if any, shall, as a penalty to the Agency, forfeit the prescribed amount per calendar day for each worker required or permitted to work more than 8 hours in any 1 calendar day and 40 hours in any 1 calendar week without being compensated in accordance with Section 1815. Contractor and each Subcontractor, if any, waives any right to any notice or hearing on the forfeiture of such penalties pursuant to Labor Code sections 1726 and 1771.6. Contractor shall include terms in its subcontracts as required to make this paragraph effective as to each Subcontractor. Upon written request, Contractor shall withhold penalties forfeited by a Subcontractor pursuant to Labor Code section 1813 and this paragraph from payments due to such Subcontractor and remit such penalties withheld to the Agency

7-3 INDEPENDENCE OF CONTRACTOR, INDEMNIFICATION AND POLLUTION

7-3.1 Independence of Contractor. It is understood and agreed that Contractor is at all times an independent contractor and that no relationship of employer-employee exists between the parties hereto. Contractor will not be entitled to any benefits payable to employees of County, including but not limited to overtime, retirement benefits, workers' compensation benefits, injury leave or other leave benefits. County is not required to make any tax or benefit deductions from the compensation payable to Contractor under the provisions of this Agreement. As an independent contractor, Contractor hereby holds County harmless from any and all claims that may be made against County based upon any contention by any third party that an employer-employee relationship exists by reason of the Agreement.

If, in the performance of this Agreement, any third persons are employed by Contractor, such persons will be entirely and exclusively under the direction, supervision and control of Contractor. All terms of employment, including hours, wages, working conditions, discipline, hiring and discharging or any other terms of employment or requirements of law, will be determined by Contractor. County will have no right or authority over such persons or the terms of such employment, except as provided in this Agreement.

7-3.2 Indemnification and Hold Harmless Clause. All activities arising out of or relating to the performance of the Work covered by this Contract shall be at the risk of Contractor. To the fullest extent permitted by law, Contractor shall defend (at Agency's request), indemnify and hold harmless Agency, and the County of Ventura if the County of Ventura is not the entity defined as Agency under this Contract, including all of their boards, agencies, departments, officers, employees, agents and volunteers (collectively, "Indemnitee"), against any and all claims, suits, actions, legal or administrative proceedings, judgments, debts, demands, damages, including injury or death to any person or persons, and damage to any property including loss of use resulting therefrom, incidental and consequential damages, liabilities, interest, costs, attorneys' fees and expenses of whatsoever kind of nature, whether arising before, during or after commencement or completion of this Contract, whether against Contractor and Indemnitee or which are in any manner, directly, indirectly, in whole or in part, arising from any act, omission, fault or negligence, whether active or passive, of Contractor, a Subcontractor or anyone directly or indirectly employed by them or anyone for whose acts they may be liable in connection with or incident to the Contract, even though the same may have resulted from the joint, concurring or contributory negligence, or from the passive negligence, of Indemnitee or any other person or persons, unless the same be caused by the sole negligence of Indemnitee, or except to the extent caused by the active negligence or willful misconduct of Indemnitee.

The Agency will notify the Contractor of the receipt of any third party claims.

7-3.3 Contamination and Pollution. Contractor, solely at its own cost and expense, will provide clean up of any premises, property or natural resources contaminated or polluted due to Contractor activities. Any fines, penalties, punitive or exemplary damages assigned due to contaminating or polluting activities of the Contractor will be borne entirely by the Contractor.

7-4 INSURANCE REQUIREMENTS

Contractor, at its sole cost and expense, shall obtain and maintain in full force during the term of this Contract the following types of insurance:

7-4.1 Workers' Compensation Insurance.

7-4.1.1 Coverage. Workers' Compensation coverage, in full compliance with Labor Code 3700, for all employees of Contractor and Employer's Liability in the minimum amount of $1,000,000. The Agency, the County of Ventura, its officers, employees or Consultants, will not be responsible for any claims in law or equity occasioned by failure of Contractor to comply with this paragraph.

7-4.1.2 Certification. Before execution of the Contract by Agency, Contractor shall file with the Engineer the following signed certification:

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

7-4.2 Commercial General Liability Insurance

7-4.2.1 Minimum Limits and Scope; Insurance Classes. "Occurrence" coverage in the minimum amount of:

Coverage Class	Coverage
L-A	$ 1,000,000 combined single limit (CSL) bodily injury and property damage each occurence and $1,000,000 aggregate
L-B	$ 1,000,000 CSL bodily injury and property damage each occurrence and $2,000,000 aggregate
L-C	$ 5,000,000 CSL bodily injury and property damage each occurrence and $5,000,000 aggregate
L-D	$ 10,000,000 CSL bodily injury and property damage each occurrence and $10,000,000 aggregate

If no coverage class is specified in "Proposal", coverage class L-B shall apply.

If Contractor maintains higher limits than the minimums shown above, the Agency requires and shall be entitled to coverage for the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Agency.

Coverages shall include premises/operations; products/completed operations; independent contractors; underground, explosion and collapse hazards; personal and advertising injury; broad form property damage; and broad form blanket contractual.

7-4.2.2 Coverage Exceptions. On projects where no explosives will be used and no demolition is involved, the coverage for explosion may be omitted. On projects where no excavation is involved, the coverage for underground hazard may be omitted. The omission of said coverages is at Agency's option, and shall not abrogate Contractor's responsibilities for indemnification as set forth in these Specifications.

7-4.2.3 Excess Liability Policies. All Excess Liability policies, if used, shall be on an "umbrella" or following form of the primary layer of coverage.

7-4.3 Commercial Automobile Liability Insurance

Coverage in the minimum amount of $1,000,000 CSL bodily injury and property damage, including automobile liability, any auto.

7-4.4 Property Insurance

Contractor shall arrange for its own "Course of Construction" insurance on the project to protect its interests, as Agency does not have this coverage.

Contractor is responsible for delivering to Agency Work completed in accordance with the Contract except as provided in 7-18 (Acts of God). Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced by Contractor in accordance with the requirements of the Plans and Specifications without additional expense to Agency.

7-4.5 Other Insurance Provisions.

7-4.5.1 Insurance Company Qualifications. All insurance required shall be issued by (a) an admitted company or admitted companies authorized to transact business in the State of California which have a BEST rating of B+ or higher and a Financial Size Category (FSC) of VII or larger or (b) a California approved Surplus Line carrier or carriers which have a BEST rating of A or higher and a Financial Size Category (FSC) of VII or larger.

Workers compensation insurance not meeting the above requirements but meeting all other requirements of the specifications, will be accepted.

7-4.5.2 Primary Coverage. All insurance required shall be primary coverage as respects Agency and any insurance or self-insurance maintained by Agency or the County of Ventura shall be in excess of Contractor's insurance coverage and shall not contribute to it.

7-4.5.3 Aggregate Limits Exceeded. Agency shall not be notified immediately if any aggregate insurance limit is exceeded. Contractor shall purchase additional coverage to meet requirements.

7-4.5.4 Liability in Excess of Limits. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve Contractor for liability in excess of such coverage, nor shall it preclude Agency or the County of Ventura from taking such other actions as is available to it under any other provisions of this Contract or otherwise in law.

7-4.5.5 Additional Insured Endorsements. The Agency, the County of Ventura (if not defined as Agency) and all special Districts governed by the County of Ventura Board of Supervisors, and their officials, employees, and volunteers shall be named as Additional Insured as respects Work done by or on behalf of Contractor under the Contract on all policies required (except workers' compensation). With respect to Contractor's commercial general Liability insurance, Additional Insured coverage shall include both ongoing and completed operations.

7-4.5.6 Waiver of Subrogation Rights. Contractor agrees to waive all rights of subrogation against the Agency, the County of Ventura, including its boards, and all special Districts governed by the Board of Supervisors, for losses arising directly or indirectly from the activities or Work performed by Contractor under the Contract (applies only to Workers' Compensation and Commercial General Liability).

7-4.5.7 Cancellation Notice Required. In the case of policy cancellation, Agency shall be notified by the insurance company or companies as provided for in the policy. Contractor shall notify Agency of any and all policy cancellations within three working days of the cancellation.

7-4.5.8 Documentation Required. Prior to execution of the Contract by Agency, Contractor shall provide Agency with Certificates of Insurance for all required coverages (see Appendix A for example), all required endorsement(s) and a copy of its course of insurance policy.

It is the responsibility of Contractor to confirm that all terms and conditions of Section 7-4 Insurance Requirements are complied with by any and all subcontractors that Contractor may use in the completion of the Contract.

7-5 PERMITS. The Agency will obtain, at no cost to the Contractor, all encroachment and building permits necessary to perform Contract Work in streets, highways, railways or other rights of way, unless the necessity for such permit(s) is created by a method of operation chosen by the Contractor. The Contractor shall obtain and pay for all costs incurred for permits necessitated by its operations such as, but not limited to, those permits required for night Work, overload, blasting and demolition.

The Contractor shall pay all business taxes or license fees that are required for the Work.

7-5.1 Highway and Railroad Permits. The Engineer will obtain the basic State highway and railroad encroachment permits which will include checking of plans. However, the Contractor must also obtain permits from these agencies. Inspection fees charged by these agencies must be paid by the Contractor.

7-5.2 Grading Ordinance

7-5.2.1 General. All excavation, filling and grading operations in Ventura County are governed by the Ventura County Grading Ordinance or City Ordinances, except within the project right of way shown on the Plans.

7-5.2.2 Permits Required. Work outside the project right of way which involves excavation or filling of soils is subject to all requirements of the applicable grading ordinance. The requirements may include, but are not limited to, submitting of a grading plan prepared by a Civil Engineer, obtaining a grading permit, paying the permit fee, posting a grading bond, hiring professionals for engineering and testing services, compacting fills, constructing drainage facilities and providing erosion protection.

7-5.2.3 Imported and Exported Material. To insure that neither the Agency nor the Contractor is a party to aiding or abetting any property owner (who is ultimately responsible) to violate the applicable grading ordinance, no material shall be imported from or exported or wasted outside the project right of way until the Contractor has furnished the Engineer a copy of the grading permit covering such operation on land where material is to be deposited or excavated, unless exempt.

7-5.2.4 Exemptions from Permit. No grading permit is required of the Contractor for Work performed within the project right of way shown on the Plans or on borrow or disposal areas shown on the Plans or described in the Special Provisions and which are specifically designated as being exempt from such permit requirements.

7-5.3 Building Permit.

7-5.3.1 Agency Furnished Permits. Except as provided in **7-5.3.2**, Agency will submit the plans for the Work to Department of Building and Safety, and other building related permit issuing agencies, for plan check and make the corrections necessary for the issuance of building and related permits. Agency will Pay plan check and permit fees for the Work. The Contractor may be required to furnish information to the permit issuing agencies, as required for the issuance of permits, and sign the permit.

7-5.3.2 Contractor Furnished Permits. Components or systems, required by the Contract, may require the preparation of plans and calculations to obtain approvals or permits from state or local building, fire prevention, public health, safety, environmental protection and other agencies in addition to the basic permits arranged for by the Agency as provided in **7-5.3.1**. Contractor shall take all actions in a timely manner to obtain such approvals or permits so as not to delay completion of the Work beyond the time provided in **6-7**. Contractor shall include all costs and consider the time required to obtain approvals or permits in the Contract price bid.

7-5.4 Coastal Zone Permits

7-5.4.1 Agency Furnished Permits. Permits required for Work on the project within rights of way furnished by the Agency within the Coastal Zone will be obtained by the Agency.

7-5.4.2 Contractor Furnished Permits. Permits required for the Contractor's operations outside of rights of way furnished by the Agency must be obtained by the Contractor. Such permits are required for brush removal, grading, dredging, disposal of material and many other operations within the Coastal Zone.

7-6 THE CONTRACTOR'S REPRESENTATIVE. Before starting work, the Contractor shall designate in writing a representative who shall have complete authority to act for it. An alternative representative may be designated as well. The representative or alternate shall be present at the Work site whenever work is in progress or whenever actions of the elements necessitate its presence to take measures necessary to protect the Work, persons, or property. Any order or communication given to this representative shall be deemed delivered to the Contractor. A joint venture shall designate only one representative and alternate. In the absence of the Contractor or its representative, instructions or directions may be given by the Engineer to the superintendent or person in charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or its representative.

In order to communicate with the Agency, the Contractor's representative, superintendent, or person in charge of specific work shall be able to speak, read, and write the English language.

7-7 COOPERATION AND COLLATERAL WORK. The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral, and essential work by others. The Agency, its workers and contractors and others, shall have the right to operate within or adjacent to the Work site during the performance of such work.

The Agency, the Contractor, and each of such workers, contractors and others, shall coordinate their operations and cooperate to minimize interference.

The Contractor shall include in its Bid all costs involved as a result of coordinating its work with others. The Contractor will not be entitled to additional compensation from the Agency for damages resulting from such simultaneous, collateral, and essential work. If necessary to avoid or minimize such damage or delay, the Contractor shall redeploy its work force to other parts of the Work.

Should the Contractor be delayed by the Agency, and such delay could not have been reasonably foreseen or prevented by the Contractor, the Engineer will determine the extent of the delay, the effect on the Work, and any extension of time.

7-8 WORK SITE MAINTENANCE

7-8.1 General Throughout all phases of construction, including suspension of the Work, and until acceptance per 6-8, the Contractor shall keep the Work site clean and free from rubbish and debris. Rubbish and debris collected on the Work site shall only be stored in roll-off, enclosed containers prior to disposal. Stockpiles of such will not be allowed.

When required by the Special Provisions, the Contractor shall provide a self-loading motorized street sweeper equipped with a functional water spray system. The sweeper shall clean all paved areas within the Work site and all paved haul routes at least once each working day.

The Contractor shall ensure there is no spillage along haul routes. Any such spillage shall be removed immediately and the area cleaned.

Should the Contractor fail to keep the Work site free from rubbish and debris, the Engineer may suspend the Work per 6-3 until the condition is corrected.

7-8.2 Air Pollution Control The Contractor shall not discharge smoke, dust, equipment exhaust, or any other air contaminants into the atmosphere in such quantity as will violate any Federal, State, or local regulations.

The Contractor shall also abate dust nuisance by cleaning, sweeping and spraying with water, or other means as necessary. The use of water shall conform to 7-8.6.

7-8.3 Noise Control. Noise generated from the Contractor's operations shall be controlled as specified in the Special Provisions.

7-8.4 Storage of Equipment and Materials.

7-8.4.1 General Materials and equipment shall be removed from the Work site as soon as they are no longer necessary. Before inspection by the Engineer for acceptance, the Work site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance.

Excess excavated material shall be removed from the Work site immediately unless otherwise specified in the Special Provisions.

Forms and form lumber shall be removed from the Work site as soon as practicable after stripping.

7-8.4.2 Storage in Public Streets. Construction materials and equipment shall not be stored in streets, roads, or highways for more than 5 days after unloading unless otherwise specified in the Special Provisions or approved by the Engineer. All materials or equipment not installed or used in construction within 5 days after unloading shall be stored at a location approved by the Engineer.

Excavated material, except that which is to be used as backfill in the adjacent trench, shall not be stored in public streets unless otherwise specified in the Special Provisions or approved by the Engineer. Immediately after placing backfill, all excess material shall be removed from the Work site.

7-8.5 Sanitary Sewers.

7-8.5.1 General. The flow of sewage shall not be interrupted. Should the Contractor disrupt the operation of existing sanitary sewer facilities, or should disruption be necessary for performance of the Work, the Contractor shall bypass the sewage flow around the Work. Sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches nor be covered by backfill.

Whenever sewage bypass and pumping is required by the Plans or Specifications, or the Contractor so elects to perform, the Contractor shall submit per 2-5.3 a working drawing conforming to 7-8.5.2 detailing its proposed plan of sewage bypass and pumping.

7-8.5.2 Sewage Bypass and Pumping Plan. The plan shall indicate the locations and capacities of all pumps, sumps, suction and discharge lines. Equipment and piping shall be sized to handle the peak flow of the section of sewer line to be bypassed and pumped. Equipment and piping shall conform to 7-10, the Plans, and the Special Provisions. Bypass piping, when crossing areas subject to traffic loads, shall be constructed in trenches with adequate cover and otherwise protected from damage due to traffic. Lay-flat hose or aluminum piping with an adequate casing and/or traffic plates may be allowed if so approved by the Engineer. Bypass pump suction and

discharge lines that extend into manholes shall be rigid hose or hard pipe. Lay flat hose will not be allowed to extend into manholes. The Contractor shall provide a backup bypass pumping system in case of malfunction. The backup bypass system shall provide 100 percent standby capability, and be in place and ready for immediate use.

Each standby pump shall be a complete unit with its own suction and discharge piping. In addition to the backup system, the Contractor shall furnish and operate vacuum trucks when required by the Plans or Special Provisions.

7-8.5.3 Spill Prevention and Emergency Response Plan. The Contractor shall prepare and submit per 2-5.3 a spill prevention and emergency response plan. The plan shall address implementation of measures to prevent sewage spills, procedures for spill control and containment, notifications, emergency response, cleanup, and spill and damage reporting.

The plan shall account for all storm drain systems and water courses within the vicinity of the Work which could be affected by a sewage spill. Catch basins that could receive spilled sewage shall be identified Unless otherwise specified in the Special Provisions, these catch basins shall be sealed prior to operating the bypass and pumping system. The Contractor shall remove all material used to seal the catch basins when the bypass and pumping system operations are complete.

The Contractor shall be fully responsible for containing any sewage spillage, preventing any sewage from reaching a watercourse, recovery and legal disposal of any spilled sewage, any fines or penalties associated with the sewage spill imposed upon by the Agency and/or the Contractor by jurisdictional regulatory agencies, and any other expenses or liabilities related to the sewage spill.

7-8.6 Water Pollution Control The Contractor shall prevent, control, and abate discharges of pollutants from the construction site in order to protect the storm drain system, which includes pipes, channels, streams, waterways, and other bodies of water, by the construction, installation or performance of water pollution control measures as shown on the Stormwater Pollution Control Plan (SWPCP) or Stormwater Pollution Prevention Plan (SWPPP) depending on the land area affected by the construction activity. The Contractor shall ensure compliance with the current State NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activity (General Construction Permit), NPDES No. CAS000002 and current Ventura County NPDES Municipal Separate Storm Sewer System (MS4) Permit No. CAS004002.

7-8.6.1 Compliance with NPDES General Construction Permit

7-8.6.1.1 Construction Sites

If the Work involves construction activity that results in soil disturbance of one acre or more of total land area, or results in soil disturbances of less than one acre but is a part of a work area larger than one acre, the Contractor shall comply with the requirements of the General Construction Permit NPDES No. CAS000002. Construction activity includes clearing, grading, excavation, stockpiling, and reconstruction of existing facilities involving removal and replacement. Construction activity does not include routine maintenance such as, maintenance of original line and grade, hydraulic capacity, or original purpose of the facility.

The Contractor shall comply with requirements of the General Construction Permit (NPDES No. CAS000002), obtained by the Agency, including a site-specific Storm Water Pollution Prevention Plan (SWPPP) for the Work to be developed by Qualified SWPPP Developer (QSD) and implemented by the Qualified SWPPP Practitioner (QSP). After July 1, 2010, the Agency will electronically file all required Permit Registration Documents (PRDs) through the State Water Board's Stormwater Multi-Application and Report Tracking System (SMARTS) website, as required prior to the commencement of construction activity. PRDs consist of the Notice of Intent (NOI), Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the Legally Responsible Party (LRP), and the first annual fee. For the Permit application, the Contractor shall submit to Project Manager the following:

- The completed site-specific Risk Assessment
- Post-construction calculations if applicable for the project, and
- Site-specific SWPPP developed in accordance with applicable Permits.

7-8.6.1.2 Linear Utility Projects; Contractor shall comply with the requirements of the General Construction Permit NPDES No. CAS000002 for Linear Underground/Overhead projects (LUPs) one acre or greater.

7-8.6.2 Compliance with NPDES MS4 Permit

7-8.6.2.1 Construction Sites Less Than One Acre The Contractor shall ensure implementation of an effective combination of erosion and sediment control Best Management Practices (BMPs) listed in **Table 6** of the Ventura County NPDES MS4 Permit. The Contractor shall develop and implement a Storm Water Pollution Control Plan (SWPCP).

7-8.6.2.2 Construction Sites One Acre but Less Than 5 Acres The Contractor shall ensure implementation of an effective combination of appropriate erosion and sediment control BMPs from **Table 7** (BMPs at Construction sites 1 acre or greater but less than 5 acres) of the Ventura County NPDES MS4 Permit in addition to the ones identified in **Table 6** (BMPs at Construction sites less than 1 acre) to prevent erosion and sediment loss, and the discharge of construction wastes. For all construction sites one acre or greater, the Contractor shall submit the SWPPP to the Agency for review and certification as the Local SWPPP.

7-8.6.2.3 Construction Sites 5 Acres and Greater The Contractor shall ensure implementation of an effective combination of the following BMPs in **Tables 8** (BMPs at Construction sites 5 acres or greater) in addition to the ones identified in **Table 6** (BMPs at Construction sites less than 1 acre) and **Table 7** (BMPs at Construction sites 1 acre or greater but less than 5 acres) at all construction sites 5 acres and greater to prevent erosion and sediment loss, and the discharge of construction wastes. For all construction sites one acre or greater, the Contractor shall submit the SWPPP to the Agency for review and certification as the Local SWPPP.

7-8.6.2.4 Enhanced Construction BMP Implementation

Construction sites located on hillsides, adjacent or directly discharging to CWA 303(d) listed waters for siltation or sediment, and directly adjacent to Environmentally Sensitive Areas are termed "high risk sites." Contractor shall implement enhanced practices that preclude impacts to water quality posed by the high risk sites.

Contractor shall ensure that high risk sites are inspected by the Qualified SWPPP Developer, Qualified SWPPP Practitioner, or Certified Professionals in Erosion and Sediment Control (CPESC) at the time of BMP installation, at least weekly during the wet season, and at least once each 24 hour period during a storm event that generates runoff from the site, to identify BMPs that need maintenance to operate effectively, that have failed or could fail to operate as intended.

During the wet season, the area of disturbance shall be limited to the area that can be controlled with an effective combination of erosion and sediment control BMPs. Enhanced sediment controls should be used in combination with erosion controls and should target portions of the site that cannot be effectively controlled by standard erosion controls described above. Effective sediment and erosion control BMPs proposed by the Contractor shall include the BMPs listed in Table 9 (Enhanced Construction BMP Implementation) of the NPDES MS4 Permit. The Contractor shall implement the BMPs listed in Table 9 unless shown unnecessary. Also, the Contractor shall retain records of the inspection and a determination and rationale of the BMPs selected to control runoff.

7-8.6.3 Plan.

7-8.6.3.1 The SWPCP, required for construction projects less than one acre, shall be prepared in accordance with the requirements of current Ventura County NPDES MS4 Permit No. CAS004002 and County Ordinance No. 4142.

7-8.6.3.2 The SWPPP, required for construction projects one acre or greater, shall be prepared in accordance with the requirements of the state's General Construction Permit NPDES Permit CAS000002, Ventura Countywide Stormwater Quality Management Program, NPDES MS4 Permit No. CAS004002, and County Ordinance No. 4142.

7-8.6.3.3 The SWPCP/SWPPP shall identify potential pollutant sources on the construction site that may affect the quality of discharges, whether non-stormwater or stormwater, from the site and design the use and placement of water pollution control measures, BMPs, to effectively prohibit the entry of pollutants from the site into the storm drain system during construction. At a minimum, and depending on the size of the project area, the SWPCP/SWPPP will include all appropriate minimum BMPs as required by the Ventura Countywide Stormwater Quality Management Program, NPDES MS4 Permit No. CAS004002 (Tables 6 through 9). The SWPCP/SWPPP must utilize the measures recommended in the California Stormwater Quality Association (CASQA) Stormwater BMPs Handbook for Construction (January 2003 version until July 1, 2010 and 2009 version after July 1, 2010). Starting July 1, 2010 SWPPP shall be prepared by QSD as defined in the NPDES Permit CAS000002. The Contractor shall complete, sign and submit the SWPCP/SWPPP for review and final approval by the Project Engineer, prior to issuance of the Notice to Proceed as provided in 6-7.4.

7-8.6.3.4 For all construction projects one acre and greater, the Contractor shall submit the SWPPP to the Agency for review and certification as Local SWPPP in accordance with NPDES MS4 Permit No. CAS004002 prior to the Notice to Proceed as provided in 6-7.4.

7-8.6.4 Measures. All water pollution control measures shall conform to the requirements of the submitted SWPCP/SWPPP. If circumstances during the course of construction require changes to the original SWPCP/SWPPP, a revised SWPCP/SWPPP shall be promptly submitted to the Project Manager in each instance. The SWPPP shall be amended or revised by QSD. A copy of the current SWPCP/SWPPP including revisions and amendments shall be kept at the site to ensure that field personnel has access to the current document at all times. If measures being taken are inadequate to control water pollution effectively, the Project Manager may direct the Contractor to revise the operations and no further work shall be performed until adequate water pollution control measures are implemented. Effective September 2, 2011, implementation of the SWPPP shall be overseen by the Contractor's QSP as defined in the General Construction Permit NPDES No. CAS000002. All work installed by the Contractor in connection with the SWPCP/SWPPP but not specified to become a permanent part of the Work shall be removed and the site restored in so far as practical to its original condition prior to completion of the Work.

7-8.6.4.1 Post-Construction Standards; Contractor shall ensure that applicable post-construction standards are implemented to meet applicable project requirements of the Ventura County NPDES MS4 Permit and General Construction Permit NPDES No. CAS000002 (effective September 2, 2012).

7-8.6.4.2 Active Treatment Systems; Contractor shall comply with requirements of the General Construction Permit NPDES No. CAS000002 for active treatment systems as applicable.

7-8.6.5 Monitoring and Reporting

7-8.6.5.1 Monitoring; In accordance with the General Construction Permit NPDES No. CAS000002, the Contractor shall develop and implement monitoring program for Risk Level 2 and 3 sites. In addition at Risk Level 3 sites, contractor shall perform receiving water monitoring to meet Permit requirements.

7-8.6.5.2 Reporting; the Contractor shall ensure that all submittals and reports are prepared and submitted to the RWQCB in accordance with the applicable Permits. At minimum the reports will include Annual Report (for applicable projects due September 1st), Rain Event Action Plan (due 48 hrs prior to the rain event for the applicable projects), Numeric Action Levels (NAL) Exceedance Report (as required), Numeric Effluent Limitations (NELs) Violation Report (within 24 hours after NEL exceedance is identified). Contractor shall submit required reports to the Project Manager for review and approval prior to submittal to the RWQCB.

7-8.6.6 Dewatering Activities. All dewatering activities shall be performed in accordance with applicable regulatory requirements issued by the Los Angeles Regional Water Quality Control Board, including specific requirements contained in the Waste Discharge Requirements (WDR) when issued for the Work.

7-8.6.7 Payment. The Contract lump sum price for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment, services and incidentals and for doing all work involved in water pollution control as specified herein. Payment for water pollution control will be made as the Work proceeds, and is in compliance with the approved Water Pollution Control Plan, on the following basis.

Partial payment estimate (excluding mobilization & water pollution control payments) as a percentage of the original Contract price (excluding the mobilization & water pollution control Bid items).		Cumulative amount of water pollution control pay item earned is the lesser of the amounts as computed by these two columns.	
Equal to or greater than	Less than	Percentage of water pollution control pay item	Percentage of the original Contract total.
5	10	10	1
10	20	20	2
20	50	50	3
50	Completion of Work	75	5
Completion of Work		100	

Where no Bid item is provided for water pollution control, payment for water pollution control shall be considered to be included in the other Bid items.

7-8.7 Drainage Control. The Contractor shall maintain drainage within and through the Work areas. Earth dams will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete or other acceptable material will be permitted when necessary to protect the Work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

7-8.8 Final Cleaning. At the completion of the Work, the Contractor shall remove all waste materials and rubbish from and about the project, as well as all tools, construction equipment, temporary facilities, machinery, and surplus materials.

At completion of construction and just prior to final inspection, the Contractor shall thoroughly clean the interior and exterior of the buildings, including hardware, floors, roofs, sills, ledges, glass, or other surfaces where debris, plaster, paint, spots, and dirt or dust may have collected. All glass shall be washed clean and polished. Remove all grease, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces. Repair, patch, and touch up marred surfaces to match adjacent finishes.

The Contractor shall use only experienced workmen or professional cleaners for final cleaning. It shall use only cleaning materials recommended by the manufacturer of the surface to be cleaned, and use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

It shall broom-clean all paved surfaces and rake-clean other surfaces of grounds.

The Contractor shall replace air conditioning filters if units were operated during construction, and clean all ducts, blowers, and coils if air conditioning units were operated without filters during construction.

After cleaning, the Contractor shall maintain the building in a clean condition until it is accepted by the Agency.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. The Contractor shall be responsible for the protection of public and private property adjacent to the Work and shall exercise due caution to avoid damage to such property.

The Contractor shall repair or replace all existing improvements within the right-of-way which are not designated for removal (e.g., curbs, sidewalks, driveways, fences, walls, signs, utility installations, pavement, structures, etc.) which are damaged or removed as a result of its operations. When a portion of a sprinkler system within the right-of-way must be removed, the remaining lines shall be capped. Repairs and replacements shall be at least equal to existing improvements and shall match them in finish and dimension.

Maintenance of street and traffic signal systems that are damaged, temporarily removed or relocated shall be done in conformance with 307-1.5.

Trees, lawns, and shrubbery that are not designated to be removed shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch.

The Contractor shall give reasonable notice to occupants or owners of adjacent property to permit them to salvage or relocate plants, trees, fences, sprinklers and other improvements which are designated for removal and would be destroyed because of the Work.

All costs to the Contractor for protecting, removing, and restoring existing improvements shall be absorbed in its bid.

In existing buildings, all surfaces, equipment, furniture and other property shall be protected from loss or damage by or as result of the Contractor's operations. The Contractor shall replace damaged property or shall repair and restore it to its previous condition. Patching, painting, replacement of wall, ceiling and floor covering and similar Work shall be done in such a manner that the repaired Work will not be readily noticeable.

7-10 PUBLIC CONVENIENCE AND SAFETY

7-10.1 Access.

7-10.1.1 General. The Contractor's operations shall cause no unnecessary inconvenience to the public or businesses in the vicinity of the Work. The Contractor shall have no greater length or quantity of Work under construction than can be properly prosecuted with a minimum of inconvenience to the public and other contractors engaged in adjacent or related work.

The Contractor shall provide continuous and unobstructed access to the adjacent properties unless otherwise specified in the Special Provisions or approved by Engineer. Work requiring traffic lane closures shall only be performed between the hours specified in the Special Provisions or shown on the TCP. Traffic shall be permitted to pass through the Work site, unless otherwise specified in the Special Provisions or shown on the TCP.

7-10.1.1.1 Vehicular Access. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access. If backfill has been completed to the extent that safe access may be provided and the street is opened to local traffic, the Contractor shall immediately clear the street and driveways and provide and maintain access.

7-10.1.1.2 Pedestrian Access. Safe, adequate, and ADA compliant pedestrian access shall be maintained unless otherwise approved by the Engineer. 7-10.2 Work Area Traffic Control.

7-10.2 Traffic Control

7-10.2.1 General. Work area traffic control shall conform to the California MUTCD, WATCH, or as specified in the Special Provisions. The total length of the traffic control zone shall include a buffer space, advance signing, striping transitions in advance of the Work site, existing striping, signing, and raised medians.

7-10.2.2 Traffic Control Plan.

7-10.2.2.1 General. If so specified in the Special Provisions or on the permit, the Contractor shall submit a TCP in accordance with 2-5.3. The sheets of the TCP shall display the title, phase identification, name of the firm preparing the TCP, name and stamp of the Registered Traffic or Civil Engineer, approval block for each jurisdictional agency, north arrow, sheet number, and number of sheets comprising the TCP. General notes and symbol definitions shall be included when required. Adequate dimensioning shall be provided to allow for proper field installation. The TCP shall be drawn to a 1 inch = 40 feet scale on common size sheets, either 8-1/2 inches x 11 inches, 8-112 inches x 14 inches, 11 inches x 17 inches, or 2-foot x 3-foot plan sheets as dictated by the length of the Work.

The requirements in the Special Provisions shall govern the design of the proposed TCP.

7-10.2.2.2 Payment. Payment for preparation of the TCP shall be included in the appropriate lump sum Bid items. If no Bid items have been provided, payment shall be included in the various Bid items unless otherwise specified in the Special Provisions.

7-10.3 Haul Routes. Unless otherwise specified in the Special Provisions, the haul route(s) shall be determined by the Contractor.

7-10.4 Safety.

7-10.4.1 Work Site Safety.

7-10.4.1.1 General. The Contractor shall provide safety measures as necessary to protect the public and workers within, or in the vicinity of, the Work site. The Contractor shall ensure that its operations will not create safety hazards. The Contractor shall provide safety equipment, material, and assistance to Agency personnel so that they may properly inspect all phases of the Work. When asbestos is being removed, the requirements of the CCR Title 8, Div. 1, Chapter 4, Subchapter 4 and Subchapter 7 shall be implemented.

7-10.4.1.2 Work Site Safety Official. The Contractor shall designate in writing a "Project Safety Official" who shall be at the Work site at all times, and who shall be thoroughly familiar with the Contractor's Injury and Illness Prevention Program (IIPP) and Code of Safe Practices (CSP). The Project Safety Official shall be available at all times to abate any potential safety hazards and shall have the authority and responsibility to shut down an unsafe operation, if necessary.

7-10.4.2 Safety Orders.

7-10.4.2.1 General. The Contractor shall have at the Work site, copies or suitable extracts of Construction Safety Orders, Tunnel Safety Orders, and General Industry Safety Orders issued by the State Division of Industrial Safety. Prior to beginning any excavation 5 feet in depth or greater, the Contractor shall submit to the Engineer, the name of the "Competent Person" as defined in CCR, Title 8, Section 1504, in accordance with 2-5.3. The "Competent Person" shall be present at the Work site as required by Cal-OSHA.

7-10.4.2.2 Shoring Plan. Before excavating any trench 5 feet (105m) or more in depth, the Contractor shall submit in accordance with 2-5.3 a detailed working drawing (shoring plan) showing the design of the shoring, bracing, sloping, or other provisions used for the workers' protection. If the shoring plan varies from the shoring system standards, the shoring plan shall be prepared by a registered Structural or Civil Engineer. The shoring plan shall accommodate existing underground utilities. No excavation shall start until the Engineer has accepted the shoring plan and the Contractor has obtained a permit from the State Division of Industrial Safety. A copy of the permit shall be submitted to the Engineer in accordance with 2-5.3. If the Contractor fails to submit a shoring plan or fails to comply with an accepted shoring plan, the Contractor shall suspend work at the affected location(s) when directed to do so by the Engineer. Such a directive shall not be the basis of a claim for Extra Work and the Contractor shall not receive additional compensation or Contract time due to the suspension.

7-10.4.2.3 Payment. Payment for shoring shall be included in the Bid item provided therefor. Payment for compliance with the provisions of the safety orders and all other laws, ordinances, and regulations shall be included in the various Bid items.

7-10.4.3 Use of Explosives. Explosives may be used only when authorized in writing by the Engineer, or as otherwise specified in the Special Provisions.

Explosives shall be handled, used, and stored in accordance with all applicable regulations.

Prior to blasting, the Contactor shall comply with the following requirements:

a) The jurisdictional law enforcement agency shall be notified 24 hours in advance of blasting.

b) The jurisdictional fire department shall be notified 24 hours in advance of blasting.

c) Blasting activities and schedule milestones shall be included in the Contractor's construction schedule per 6-1.

For a Private Contract, specific permission shall be obtained from the Agency in writing, prior to any blasting operations in addition to the above requirements.

The Engineer's approval of the use of explosives shall not relieve the Contractor from liability for claims caused by blasting operations.

7-10.4.4 Hazardous Substances. An MSDS as described in CCR, Title 8, Section 5194, shall be maintained at the Work site for all hazardous material used by the Contractor. Material usage shall be accomplished with strict adherence to California Division of Industrial Safety requirements and all manufacturer warnings and application instructions listed on the MSDS and on the product container label. The Contractor shall notify the Engineer if a specified product cannot be used under safe conditions. 7-10.4.5 Confined Spaces. 7-10.4.5.1 Confined Space Entry Program (CSEP). The Contractor shall be responsible for implementing, administering and maintaining a CSEP in accordance with CCR, Title 8, Sections 5156, 5157 and 5158.

Prior to the start of the Work, the Contractor shall prepare and submit a CSEP in accordance with 2-5.3. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces such as the following:

a) Training of personnel

b) Purging and cleaning the space of materials and residue

c) Potential isolation and control of energy and material inflow

d) Controlled access to the space

e) Atmospheric testing of the space

f) Ventilation of the space

g) Special hazards consideration

h) Personal protective equipment

i) Rescue plan provisions

The submittal shall include the names of the Contractor's personnel, including each Subcontractor's personnel, assigned to the Work that will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

7-10.4.5 Confined Spaces.

7-10.4.5.1 Confined Space Entry Program (CSEP). The Contractor shall be responsible for implementing, administering and maintaining a CSEP in accordance with CCR, Title 8, Sections 5156, 5157 and 5158.

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a) Training of personnel.

b) Purging and cleaning the space of materials and residue.

c) Potential isolation and control of energy and material inflow.

d) Controlled access to the space.

e) Atmospheric testing of the space.

f) Ventilation of the space.

g) Special hazards consideration.

h) Personal protective equipment.

i) Rescue plan provisions.

The submittal shall include the names of the Contractor's personnel, including each Subcontractor's personnel, assigned to the Work that will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

7-10.4.5.2 Permit-Required Confined Spaces. Entry into permit-required confined spaces as defined in CCR, Title 8, Section 5157 may be required as a part of the Work. Manholes, tanks, vaults, pipelines, excavations, or other enclosed or partially enclosed spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Contractor shall implement a permit-required CSEP prior to performing any work in a permit-required confined space. A copy of the permit shall be available at all times for review by the Contractor and the Engineer at the Work site.

7-10.4.5.3 Payment. Payment for the CSEP shall be included in the Bid items for which the CSEP is required.

7-10.5 Security and Protective Devices.

7-10.5.1 General. Security and protective devices shall consist of fencing, steel plates, or other devices as specified in the Special Provisions to protect open excavations

7-10.5.2 Security Fencing. The Contractor shall completely fence open excavations. Security fencing shall conform to 304-3.5. Security fencing shall remain in place unless workers are present and construction operations are in progress during which time the Contractor shall provide equivalent security..

7-10.5.3 Steel Plate Covers. The Contractor shall provide steel plate covers as necessary to protect from accidental entry into openings, trenches, and excavations.

7-11 PATENT FEES OR ROYALTIES. The Contractor shall absorb in its Bid, the patent fees or royalties on any patented article or process which may be furnished or used in the Work. The Contractor shall indemnify and hold the Agency harmless from any legal action that may be brought for infringement of patents.

7-12 ADVERTISING. The names of contractors, subcontractors, architects, or engineers, with their addresses and the designation of their particular specialties, may be displayed on removable signs. The size and location of such signs shall be subject to the Engineer's approval.

Commercial advertising matter shall not be attached or painted on the surfaces of buildings, fences, canopies, or barricades.

7-13 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of State and National laws and County and Municipal ordinances and regulations which in any manner affect those employed in the Work or the materials used in the Work or in any way affect the conduct of the Work. It shall at all times observe and comply with all such laws, ordinances and regulations.

7-13.1 Mined Materials. Mined material from California surface mines, used on the Work, shall be from a mine identified in the list published by the California Department of Conservation (referred to as 3098 List), as required by Public Contract Code 20676. This list is available on the Internet at www.conservation.ca.gov/OMR/ab_3098_list/index.htm.

7-14 ANTITRUST CLAIMS. Section 7103.5 of the Public Contract Code provides:

> "In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgement by the parties."

7-15 RECYCLABLE CONSTRUCTION & DEMOLITION WASTES. Ventura County Ordinance Code Section, 4421 et seq, requires that if any recyclable solid wastes or marketable reusable materials will be generated on the site of the Work within the unincorporated areas of Ventura County, the Contractor shall prepare a Construction & Demolition Debris Waste Diversion Plan and submit it to the Ventura County Public Works Agency, Water & Sanitation Department - Integrated Waste Management Division (IWMD). The Contractor shall prepare and file Construction & Demolition Debris Waste Diversion Reporting Forms as required by the IWMD.

For projects within the unincorporated areas of Ventura County, the Contractor shall submit an IWMD Form B-Recycling Plan approved by IWMD prior to issuance of the Notice to Proceed as provided in 6-7.4.

For projects within the unincorporated areas of Ventura County, the Contractor shall submit an IWMD Form C-Reporting Form approved by IWMD prior to the Engineer preparing the final estimate as provided in 9-3.2.

If the site of the Work is within an incorporated city, the Contractor shall comply with all the recycling, solid waste diversion, and hauling requirements of that incorporated city.

7-16 BLANK

7-17 LOSS OR DAMAGE TO THE WORK. The Contractor is responsible for delivering to the Agency Work completed in accordance with the Contract except as provided in 7-18. Should the Work being constructed be damaged by fire or other causes before Acceptance by the Agency, it shall be replaced in accordance with the requirements of the Plans and Specifications without additional expense to the Agency. The Agency does not carry "Course of Construction" insurance on the Work. Contractor should arrange for its own insurance to protect its interests.

7-18 ACTS OF GOD. As provided in Section 7105 of the California Public Contract Code, the Contractor shall not be responsible for the cost of repairing or restoring damaged portions of the Work determined to have been proximately caused by an act of God in excess of 5 percent of the contracted amount, provided that the Work damaged was built in accordance with accepted and applicable building standards and the Specifications and Drawings. The Contractor shall obtain insurance to indemnify the Agency for any damage to the Work caused by an act of God if the premium of said insurance coverage is called for as a separate bid item in the bidding schedule for the Work. For purposes of this section, the term "acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale, and tidal waves.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-1 GENERAL. A field office shall be provided when required by the Plans or Special Provisions. The field office shall be at a suitable location approved by the Engineer.

A field office shall be a weather-tight building of suitable proportions with 16 m^2 (120 sq. ft.) of floor area, at least one door, and a window area of 2 m^2 (22 Sq. Ft.). A field office may be a building or a separate room in a building the Contractor may be required to provide or that it may desire to provide for its own use. In either case, the room shall have a separate exterior door. All doors shall be provided with hasps for padlocks.

The office shall be convenient to the Work. It shall be adequately heated, ventilated, electrically lighted, and provided with telephone service, all at the expense of the Contractor or plant owner. Offices are for the exclusive use of Agency personnel, unless otherwise provided herein.

Field offices at the worksite shall be removed upon completion of the Work.

All costs incurred in furnishing, maintaining, servicing, and removing a field office required at the Work site shall be included in the price bid for such item. If such item is required by the Plans or Specifications and no bid item is provided in the Proposal, the costs shall be absorbed in the other items for which bids are entered. Buildings and equipment furnished by the Contractor at the Work site under the provisions of this section are the property of the Contractor.

The first progress payment will not be approved until all facilities are in place and fully comply with the Specifications.

8-2 EQUIPMENT FOR FIELD OFFICES. Unless otherwise specified, a field office shall be equipped with:

Plan table, 0.75 m x 1.5 m (2 1/2 ft. x 5 ft.) or larger
Plan rack, capacity to hold two sets of project Plans plus all shop drawings
Desk and chair
Two lockers with hasps for padlocks

SECTION 9 - MEASUREMENT AND PAYMENT

9-1 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK

9-1.1 General. Unless otherwise specified, quantities of work shall be determined from measurements or dimensions in horizontal planes. However, linear quantities of pipe, piling, fencing, and timber shall be considered as being the true length measured along longitudinal axis.

Unless otherwise provided in Specifications, volumetric quantities shall be the product of the mean area of vertical or horizontal sections and the intervening horizontal or vertical dimension. The planimeter shall be considered an instrument of precision adapted to measurement of all areas.

9-1.2 Methods of Measurement. Materials and items of Work which are to be paid for on the basis of measurement shall be measured in accordance with the methods stipulated in the particular sections involved.

9-1.3 Certified Weights. When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales or, when approved by the Engineer, on a completely automated weighing and recording system. The Contractor shall furnish the Engineer with duplicate licensed weighmaster's certificates showing actual net weights. The Agency will accept the certificate as evidence of weights delivered.

9-1.4 Units of Measurement. Measurements shall be in accordance with 1-4.1 and 1-4.2. A metric ton or “tonne” is equal to 1000 kilograms and the unit of liquid measure is a Liter (in U.S. Standard Measures, a pound is an avoirdupois pound; a ton is 2000 pounds avoirdupois; and the unit of liquid measure is a gallon).

9-2 LUMP SUM BID ITEMS. Items for which quantities are indicated as "Lump Sum", "L.S." or "Job" shall be paid for at the price indicated in the Proposal. Such payment shall be full compensation for the items of Work and all Work appurtenant thereto.

When required by the Specifications or requested by the Engineer, the Contractor shall submit to the Engineer within 15 Days after award of Contract, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or any designated lump sum bid item. This schedule should equal in total the lump sum bid and shall be in such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum. If Mobilization or Water Pollution Control are included in the detailed schedule, those items will be paid for as provided in 9-3.4.2 and 7-8.6.4, receptively.

9-3 PAYMENT

9-3.1 General. The quantities listed in the Bid schedule will not govern final payment unless identified by Agency on the Proposal as [F]. The symbol "[F]" indicates that the quantities shown on the Proposal form are the final pay quantities. Payment to the Contractor (except those items identified as [F]) will be made only for the actual quantities of Contract items constructed in accordance with the Plans and Specifications. Upon completion of construction, if the actual quantities show either an increase or decrease from the quantities given in the Bid schedule, the Contract Unit Prices will prevail subject to the provisions of 3-2.2.1. Payment for those items identified as [F] will be based on the quantities shown on the Proposal unless changed as provided in 3-2.2.1.

The unit and lump sum prices to be paid shall be full compensation for the items of work and all appurtenant work, including furnishing all materials, labor, equipment, tools and incidentals.

Payment for items shown on the Plans or required by the Specifications, for which no pay item is provided, shall be considered included in the prices named for the other items shown on the Proposal.

Payment will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected material not unloaded from vehicles, material rejected after it has been placed and material placed outside of the Plan lines. No compensation will be allowed for disposing of rejected or excess material.

Whenever any portion of the Work is performed by the Agency at the Contractor's request, the cost thereof shall be charged against the Contractor, and may be deducted from any amount due or becoming due from the Agency.

Whenever immediate action is required to prevent injury, death, or property damage, and precautions which are the Contractor's responsibility have not been taken and are not reasonably expected to be taken, the Agency may, after reasonable attempt to notify the Contractor, cause such precautions to be taken and shall charge the cost thereof against the Contractor, or may deduct such cost from any amount due or becoming due from the Agency. Agency action or inaction under such circumstances shall not be construed as relieving the Contractor or its Surety from liability.

9-3.1 General. (Continued)

Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed to be Acceptance of any of the Work. Payment shall not be construed as the transfer of ownership of any equipment or materials to the Agency. Responsibility of ownership shall remain with the Contractor who shall be obligated to store, protect, repair, replace, rebuild, or otherwise restore any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment required to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to completion of the Work under the Contract, except as provided in 6-10.

Warranty periods shall not be affected by any payment but shall commence on the date equipment or material is placed into service at the written direction of the Engineer. In the event such items are not placed into service prior to partial or final completion of the Work, the warranty periods will commence on the date set forth as the date of field completion in the Engineer's acknowledgement of completion.

If, within the time fixed by law, a properly executed notice to stop payment is filed with the Agency, due to the Contractor's failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment to the Contractor in accordance with applicable laws.

At the expiration of 35 Days from the date of recording of the Notice of Completion, or as prescribed by law, the amount deducted from the final estimate and retained by the Agency will be paid to the Contractor except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.

9-3.2 Partial and Final Payment. The Engineer will, after award of Contract, establish a closure date for the purpose of making monthly progress payments. The Contractor may request in writing that such monthly closure date be changed. The Engineer may approve such request when it is compatible with the Agency's payment procedure.

Each month, the Engineer will make an approximate measurement of the Work performed to the closure date and, as a basis for making monthly payments, estimate its value based on the Contract Unit Prices or as provided for in 9-2. When the Work has been satisfactorily completed, the Engineer will determine the quantity of Work performed and prepare the final estimate.

Work not conforming to the Contract Documents shall not be measured for payment.

Conformance with the Contract Documents shall be, in addition to constructing the Work in accordance with the Contract Documents, the Contractor's compliance with those portions of the Contract Documents not directly related to the completed Work, including but not limited to: construction and maintenance of detours; diversion and control of water; protection and repair of existing facilities of the Agency and adjacent owners; site maintenance; coordination with utilities and other contractors on the site; proper survey procedures and records; obtaining required permits and inspections; complying with working hour limitations; providing a Contractor's representative while Work is being performed; complying with environmental requirements; maintaining access and safety for users of facilities that are to remain in service during construction; and obeying all laws affecting the Work.

Payment for Extra Work will be made only on approved Daily Extra Work Reports with supporting documentation as required in 3-3.

From each progress estimate, 5 percent will be deducted and retained by the Agency, and the remainder less the amount of all previous payment will be paid to the Contractor.

No progress payment made to the Contractor or its sureties will constitute a waiver of the liquidated damages under 6-9.

9-3.2 Partial and Final Payment. (Continued)

As provided for in Sections 22300 of the California Public Contract Code, the Contractor may substitute securities for any monies withheld by the Agency to ensure performance under the Contract. In substituting securities, the Contractor may either:

a. Deposit qualifying securities already owned by the Contractor with the Escrow prior to the Contract payment date, or

b. Direct the Agency to send retained funds to the Escrow to be invested by the Escrow in qualifying securities as directed by the Contractor.

9-3.2.1 Release of Withheld Contract Funds. Pursuant to Public Contract Code Section 22300, Contractor has the option to deposit securities with an Escrow Agent as a substitute for retention earnings required to be withheld by Agency pursuant to the construction Contract between the Agency and the Contractor. A form of Escrow Agreement for Security Deposits in Lieu of Retention has been adopted by the Agency as one of the Contract Documents; procedures for implementing the provisions of the Escrow Agreement are contained in Escrow Instructions which shall become effective upon exercise of the option by the Contractor.

The Contractor shall take the following steps if it desires to substitute securities:

a. Execute the Escrow Agreement for Security Deposits in Lieu of Retention.
b. Furnish to the Escrow Agent a power of attorney and other forms necessary to empower the Escrow Agent to convert the securities to cash.
c. Furnish to the Escrow Agent the securities described.
d. Pay the Escrow Agent's fees and costs.

When the Contractor deposits with the Escrow Agent securities in lieu of money required to be withheld from progress payments, a sum of money equivalent to the current cash value of the securities as determined by the Escrow Agent shall be released to the Contractor by, or upon the direction of, the Agency.

If the total of the money plus the current cash conversion value of securities on deposit should fall below the aggregate amount of the sums required to be withheld from progress payments pursuant to 9-3.1 and 9-3.2, an amount equal to the difference shall be withheld from the next regular progress payment in addition to the amount which would ordinarily be withheld pursuant to 9-3.1 and 9-3.2. If the next regular progress payment is less than the total of the amounts to be withheld therefrom, the Contractor shall immediately either deposit with the Agency cash in the amount of the difference or deposit with the Escrow Agent additional securities having a current cash conversion value equal to or greater than the difference.

The Contractor shall be the beneficial owner of any such securities on deposit with the Escrow Agency and shall be entitled to any interest earned thereon prior to conversion. The Agency may direct the Escrow Agency to convert securities with the Escrow Agency into cash, and to deliver the cash to the Agency, in any case where the Contractor is in default, including the following:

a. where the Agency would be entitled to use funds withheld pursuant to 9-3.1 and 9-3.2 to satisfy claims of workers, materials suppliers or subcontractors, or to complete or correct work which the Contractor has failed or refused to complete or correct, or

b. where the Contractor has failed to comply with the requirements of this section respecting the deposit of additional cash or securities to make up for a fall in the value of securities already on deposit with the Escrow Agency.

The Agency may hold and use cash resulting from such a conversion of securities in the same manner as it would be entitled to hold and use funds withheld pursuant to 9-3.1 and 9-3.2.

9-3.2.2 Timely Progress Payments. As required by Public Contract Code Section 20104.50, the Contractor is informed that should a progress payment not be made within 30 Days after receipt of an undisputed and properly submitted payment request from the Contractor, the Agency shall pay interest to the Contractor on the unpaid amount at the rate set forth in the Code of Civil Procedures, Section 685.010(a). Agency shall promptly review payment requests, and if not determined to be proper, document to the Contractor, within 7 Days, the reasons why the request is not proper.

Contractor should refer to the code sections cited for further information.

9-3.3 Delivered Materials. Payment for the cost of materials and equipment delivered to the Work site but not incorporated in the Work will be included in the progress estimate if, prior to the closure date for the monthly progress payment, the material or equipment is listed by the Contractor on the Agency's form together with date of delivery, vendor's or Subcontractor's name and cost; is accompanied by a copy of an invoice showing the cost thereof; has an aggregate cost in excess of $5,000 for each progress payment; is currently on the Work site at an approved location and in good condition; and is one of the following:

1. Precast concrete units weighing more than 100 kilograms (200 pounds) each.
2. Structural steel members weighing more than 100 kilograms (200 pounds) each.
3. Individual pieces of electrical equipment costing over $1,000 each.
4. Individual pieces of mechanical equipment costing over $1,000 each.
5. Reinforced concrete pipe of any size.
6. Storm drainage pipe 900 mm (36") in diameter and larger.
7. Water and sewer pipe 300 mm (12") in diameter and larger.
8. Finish hardware for doors.
9. Other individual items of equipment costing over $1,000 each
10. Materials where the aggregate value of a single type of material exceeds $1,000 and is either:
    a) Fabricated or cut to fit the Work before delivery, or
    b) Of a size or type not available from any manufacturer without a special production run.

On unit price Bid items, the amount paid for materials or equipment delivered but not incorporated in the Work shall not exceed 75% of the amount of the Bid item which includes such material or equipment.

On lump sum Bid items, the amount paid for materials and equipment delivered and not incorporated in the Work shall not exceed 75% of the item in the approved schedule submitted in accordance with 9-2 of which such materials or equipment is a part.

Should materials or equipment previously paid for be damaged, destroyed, stolen or removed from the Work site, the payment previously made therefor will be deducted from the next progress payment, unless such materials or equipment are replaced prior thereto.

On the closure date for progress payments, as provided in 9-3.2, the Contractor shall certify that all materials and equipment not incorporated into the Work, for which payment has previously been made or is being requested, is still at the Work site and in good condition. Failure to provide such certification will be cause for deducting previous payments for materials not incorporated in the Work from the amount due the Contractor in the progress payment.

Payment for materials or equipment, as provided herein, shall not constitute approval or acceptance thereof nor shall such payment modify or abridge any of the rights the Agency has under the Specifications or at law nor relieve the Surety of any of its obligations under the bonds.

9-3.4 Mobilization

9-3.4.1 Scope. Mobilization includes preliminary services, work and operations, including but not limited to, furnishing required bonds, obtaining necessary permits and work areas, providing a specified field office, the movement of labor, supplies, equipment and incidentals to the Work site, and for all other work, services and operations which must be performed or for which costs are incurred prior to performing work of the other Contract items.

9-3.4.2 Payment. The Contract lump sum price bid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, services and incidentals and for doing all work involved in mobilization as specified herein. Payment for mobilization will be made as the Work proceeds on the following basis except that where a field office is required by the Specifications, no payment for mobilization will be made until the specified field office has been provided:

Partial payment estimate (excluding mobilization & water pollution control payments) as a percentage of the original Contract price (excluding the mobilization & water pollution control Bid items).		Cumulative amount of mobilization pay item earned is the lesser of the amounts as computed by these two columns.	
Equal to or greater than	Less than	Percentage of mobilization pay item	Percentage of the original Contract total.
5	10	50	5
10	20	75	7.5
20	50	95	9.5
50	Completion of Work	100	10
Completion of Work		100	

Where no Bid item is provided for mobilization, payment for mobilization shall be considered to be included in the other Bid items.

9-4 TERMINATION OF AGENCY LIABILITY. After completion of all work required by the contract, Agency will furnish Contractor a Release on Contract form stating the amount of total authorized payments for the project. Contractor shall execute and return said form within 21 days of receipt. Said form shall release and discharge the Agency from all claims of and liability to the Contractor for all manner of debts, demands, accounts, claims, and causes of action under or by virtue of said Contract except:

a. The claim against the Agency for the remainder, if any, of the amounts retained as provided in 9-3.2, and any amounts retained as required by Stop Notices or Labor Code provisions.

b. Any unsettled claims or disputes listed on the Release on Contract form which has been processed in compliance with the requirements for making claims under the Contract, including given timely notice pursuant to the applicable provisions of the Contract and following the procedure set forth in 6-12.

Acceptance of the Release on Contract by the Agency shall not be deemed a waiver or release of the Agency's right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

When executing the Release on Contract, the Contractor shall certify that each unsettled claim or dispute listed thereon has been processed in compliance with the requirements for making claims under the Contract, including giving timely notice pursuant to the applicable provisions of the Contract and following the procedures for resolution of disputes or claims set forth in 6-12 and that acceptance of the Release on Contract by the Agency shall not be deemed a waiver or release of the Agency's right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

If Contractor fails to execute and submit a Release on Contract within the 21 day time period set forth above, the Release on Contract shall be deemed to have been submitted with no unsettled claims or disputes listed on the Release on Contract. A payment of $1.00 will be made to the Contractor for such Release on Contract and waiver.

SECTION 10 - DIVERSION, CONTROL AND REMOVAL OF WATER

10-1 DESCRIPTION. This section covers the diversion, control and removal of all water entering into the construction area or otherwise affecting construction activities.

10-2 REQUIREMENTS. All permanent construction shall be performed in a site free from water unless otherwise provided for in the Special Provisions. The Contractor shall construct, maintain, and operate all necessary cofferdams, pumps, channels, flumes, drains, well points and/or other temporary diversion, protective, and water removal works required for diversion, control and removal of all water, whether surface or groundwater, whatever its source, during construction.

Inundation of partially completed Work due to lack of control during non-working periods will not be permitted, and may be cause for requiring removal and replacement of Work already completed.

The Contractor shall be responsible for obtaining the use of any property in addition to that provided for in the Plans and Specifications, which may be required for the diversion, protective, and water removal works so as not to create a hazard to persons or property or to interfere with the water rights of others.

It shall be understood and agreed that the Contractor shall hold the Agency and the Engineer harmless from legal action taken by any third party with respect to construction and operations of the diversion and protective works.

10-3 DIVERSION AND CONTROL WORKS.

Prior to beginning of work involving diversion, control and removal of water, the Contractor shall submit a water control plan to the Engineer. In the event circumstances during the course of construction require changes to the original water control plan, a revised water control plan shall be promptly submitted to the Engineer in each instance. No responsibility shall accrue to the Engineer or the Agency as a result of the plan or as a result of knowledge of the plan.

Construction and operation of the diversion, control and removal works shall be in accordance with the water control plan submitted, except deviations therefrom may be specifically approved by the Engineer.

All works installed by the Contractor in connection with dewatering, control, and diversion of water but not specified to become a permanent part of the Work, shall be removed and the site restored, insofar as practical, to its original condition prior to completion of construction or when directed by the Engineer.

10-4 PAYMENT. No separate Bid item is included. Payment for this item of Work will be considered to be included in the payments made for other items of Contract Work to which water control is incidental.

200-1 ROCK PRODUCTS

200-1.6 Stone for Riprap

200-1.6.1A Alternate Stone for Riprap. As an alternate to the requirements of Subsection 200-1.6, the sample may be subject to the following tests:

TESTS	TEST METHOD NO.	REQUIREMENTS
Apparent Specific Gravity	ASTM C 127	2.40 Min.
Resistance to Abrasion	ASTM C 535, Grading 1	35% Max.
Soundness	Section 211-8	10% Max.
Wet and Dry Loss	Section 211-9	5% Max.
Solubility	Section 211-10	No Loss

All rock shall be angular or subangular in shape. Angular shall be defined as having sharp corners and straight planes on all faces, with no evidence of wear caused by wind, water or abrasion. Subangular shall be defined the same as angular except that evidence of wear by wind, water or abrasion may be allowed. Determination of angularity will be made by the Engineer.

200-1.6.2 Riprap Size

The individual classes of rock used for riprap shall conform to the following:

Rock Sizes	RIPRAP CLASSES					
	1-Tonne (1-Ton)	½-Tonne (½-Ton)	¼-Tonne (¼-Ton)	Light	Facing	Cobble
	PERCENTAGE LARGER THAN					
2-Tonne (2-Ton)	0-5					
1-Tonne (1-Ton)	50-100	0-5				
½-Tonne (½-Ton)		50-100	0-5			
¼-Tonne (¼-Ton)	90-100		50-100	0-5		
100-kg (200-lb)		90-100		50-100	0-5	
35-kg (75-lb)			90-100	90-100	50-100	0-5
10-kg (25-lb)					90-100	95-100
0.5-kg (1-lb)	100	100	100	100	100	100

The amount of material smaller than the smallest size listed in the table for any class of riprap shall not exceed the percentage limit listed in the table determined on a weight basis.

Compliance with the percentage limit shown in the table for all other sizes of the individual pieces of any class of riprap shall be determined by the ratio of the number of individual pieces larger than the specified size compared to the total number of individual pieces larger than the smallest size listed in the table for that class.

Flat or needle shapes will not be accepted unless the thickness of individual pieces is greater than 1/3 the length.

Before placing in final location, depositing, or stockpiling within the project limits, each individual load of riprap must meet the size requirements of the class specified.

SECTION 206 - MISCELLANEOUS METAL ITEMS

206-3 GRAY IRON AND DUCTILE IRON CASTINGS

206-3.3.2A Manhole Frame and Cover Sets

Unless otherwise specified, manhole frames and covers shall be in accordance with the following Standard Plans contained in the SPPWC:

Clear Opening Diameter mm (Inches)	SPPWC Plan No.	Catalog Numbers	
		Alhambra Foundry	Long Beach Iron Works
600 (24)	630-1	A-1495	X-162
675 (27)	631-1	A-1496	X-164
750 (30)	632-1	A-1497	X-163
900 (36)	633-1	A-1498	X-106A

206-5 METAL RAILINGS.

206-5.2 Flexible Metal Guard Rail Materials.

206-5.2A Flexible Metal Guard Rail Materials; Modification. The "Construction" grade Douglas Fir for "posts, including blocks" does not have to be "free of heart center".

SECTION 210 - PAINT AND PROTECTIVE COATINGS

210-6 STORM DRAIN HARDWARE. All storm drain hardware, including manhole frames and covers, grates, protection bars, steps, etc., shall be protected from corrosion.

Storm drain hardware made of cast iron shall be protected by painting with, or dipping in, a commercial grade asphalt paint. Storm drain hardware made of steel shall be galvanized.

211-6 SIEVE ANALYSIS. Sieve analysis shall be performed in accordance with ASTM C136.

211-7 Sand Equivalent Test. This test is intended to serve as a field test to indicate the presence or absence of plastic fine material. The test shall be run in accordance with Calif. test 217 or ASTM D2419. When testing material containing asphalt, this test method shall be modified by drying the sample at a temperature not exceeding 38°C (100°F).

211-8 R-VALUE. Resistance (R-value) shall be determined by California Test 301.

211-9 SPECIFIC GRAVITY AND ABSORPTION. Apparent specific gravity, bulk specific gravity and absorption shall be determined by California Test 206, 207, 208, 209, 224, 225, or 308, Method C where zinc stearate may be substituted for paraffin.

211-10 LOS ANGELES RATTLER TEST. Loss in Los Angeles Rattler shall be determined by California Test 211.

211-11 SOUNDNESS. For riprap, the soundness shall be determined in accordance with Calif. Test 214, excluding sections D, E, G.2.b, and H, and adding the following:

a. The test sample shall be prepared by breaking or sawing a representative sampling of riprap into particles passing the 75 mm (three inch) and retained on the 50 mm (two inch) sieve. If there are a variety of rock types or degrees of weathering within a rock type, each unique type or condition must meet the loss requirement.

b. The test sample size shall be 25,000 grams (55 lbs.) ± 1 percent.

c. All particles of test sample which break into three or more pieces during testing shall be discarded. The remaining sample shall be washed on a 4.75 mm (#4) sieve and all particles retained shall be oven dried.

d. The loss in weight shall be determined by subtracting from the original weight of the test sample the final weight of all particles retained on the 4.75 mm (#4) sieve. Divide the loss in weight by the original weight and multiply by 100 to determine the percent loss.

e. Report the following:

   (1) The percent loss.

   (2) The number of pieces affected, classified as to number disintegrating, splitting, crumbling, cracking, flaking, etc.

211-12 WET AND DRY LOSS. Wet and dry loss shall be determined as follows:

A sample of rock shall be crushed, screened, oven dried, and 1,000 g (2.2 lbs.) to 1,500 g (3.3 lbs.) of the 19 mm (3/4 inch) to 9.5 mm (3/8 inch) fraction shall be taken for the test.

The crushed and graded sample shall be submerged in tap water for 8 hours at room temperature, after which the sample shall be drained and oven dried at 78°C (140°F). When dry, the sample shall be cooled to room temperature. This completes one cycle.

After 10 cycles, the percent loss shall be computed as follows:

$$\% \text{ Loss} = \frac{100 \times \text{Weight of Material Passing 4.75 mm (No. 4) Sieve}}{\text{Total Weight of Sample}}$$

211-13 SOLUBILITY. Approximately 0.5 kg (one pound), air dried samples shall be immersed in local tap water and in Pacific Ocean water (or a 3.5% sodium chloride solution) for 8 hours each at 78°C (140°F). After immersion, the samples shall be washed with tap water, air dried and reweighed.

211-14 Permeability Test. Permeability tests for granular soils shall be performed in accordance with ASTM D2434, using samples compacted to the specified field density.

PART 3 CONSTRUCTION METHODS

SECTION 301 - TREATED SOILS, SUBGRADE PREPARATION AND PLACEMENT OF BASE MATERIALS

301-1 SUBGRADE PREPARATION

301-1.3 Relative Compaction

301-1.3.1 Firm, Hard and Unyielding. The term "firm, hard and unyielding" as used in 301-1.3 shall mean that when the heaviest construction and hauling equipment used on the Work drives over the subgrade, no permanent deformation shall occur either before or during pavement construction.

301-1.4 Subgrade Tolerances. Subgrade for pavement, sidewalk, curb and gutter, driveways, or other roadway structures shall not vary more than 15 mm (0.05 feet) from the specified grade and cross section. Subgrade for subbase or base material shall not vary more than 15 mm (0.05 feet) from the specified grade and cross section.

Variations within the above specified tolerances shall be compensating so that the average grade and cross section specified are met.

301-2 UNTREATED BASE

301-2.3 Compacting

301-2.3.1 Tolerances. The tolerance requirement in 301-2.3 is modified from 6 mm (0.02 foot) to 15 mm (0.05 foot).

SECTION 302 - ROADWAY SURFACING

302-5 ASPHALT CONCRETE PAVEMENT

302-5.1 General

302-5.1.1 Asphalt Concrete Berms. Asphalt concrete berms shall be constructed of Class III-D-PG70-10 asphalt concrete by mechanical means to conform to the details and location as shown on the Plans.

A tack coat, as provided in 302-5.4, shall be applied to the existing or new pavement preceding the placement of the asphalt concrete berms.

302-5.4 Tack Coat

302-5.4.1 Fog Seal. When specified, a fog seal consisting of material meeting the requirements of 203-3 shall be applied to the surfaces of all completed asphalt concrete at the rate of 0.36 liter per square meter (0.08 gallon per square yard) of the combined emulsion or such lesser rate ordered by the Engineer. Surface to be sealed shall be free from dust, dirt, and other foreign material. Surface shall be sealed within 7 Days after paving.

302-5.9 Measurement and Payment

302-5.9.1 Measurement and Payment for Asphalt Berm. Asphalt concrete berms will be paid for at the Contract Unit Price per linear meter (feet) of berm in place. No separate measurement or payment will be made for asphalt, aggregate, or tack coat.

302-5.9.2 Measurement and Payment for Fog Seal, Tack Coat, and Prime Coat. Measurement and payment for the specified material shall be by the tonne (ton) in place. Emulsions shall be measured after the specified dilution has been made.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS AND DRIVEWAYS

303-5.1 Requirements

303-5.1.4 Concrete Substitution. Class 280-C-14 (470-C-2000) may be used in lieu of Class 310-C-17 (520-C-2500) and Class 280-D-14 (470-D-2000) in lieu of Class 310-D-17 (520-D-2500) as specified in 201-1.1.2 for street surface improvements, excluding concrete pavement, when no class is specified on the Plans or in the Special Provisions.

SECTION 306 - UNDERGROUND CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS

306-1.2 Installation of Pipe

306-1.2.1 Bedding

306-1.2.1.1 Bedding Material. When native material is allowed for backfill in the bedding zone, no rocks larger than 40 mm (1½") in maximum dimensions shall be included. Material containing ashes, cinders, and types of refuse or other deleterious material shall not be used as bedding.

306-1.2.1.2 Sewer Pipe Bedding. Bedding for sewer pipe from 100 mm (4") below the pipe to the spring line (horizontal diameter) of the pipe shall be free draining, granular material with a maximum size of 15 mm (1/2 inch), unless another bedding method is shown on the Plans.

Densification of the bedding material may be by the application of water or by mechanical means. Unless otherwise specified, all bedding material shall be densified to a relative density of 90%. Acceptability of densification in the bedding zone will be determined by visual inspection and probing to determine that no voids exist in the backfill material. In this paragraph, the word "voids" does not include intergranular voids in the soil structure.

306-1.2.1.3 Flexible Pipe Bedding. Bedding for flexible drainage and sewer pipe shall be granular material having a sand equivalent of at least 50. The bedding material shall be placed and compacted from 150 mm (six inches) below the pipe to the top of the bedding as defined in 306-1.2.1. A 1 m (three foot) long section of low permeability material (50% passing 75 μm (200) sieve) shall be installed and mechanically compacted in lieu of the above specified bedding material at intervals of 60 m (200 feet) or as otherwise indicated on the Plans.

306-9 DISINFECTION. All water mains and appurtenances shall be disinfected before being placed in service in accordance with AWWA C651 except as specified herein:

a. The water mains shall be chlorinated so that a chlorine residual of not less than 20 ppm remains in the water after standing in the pipe for 24 hours.

b. The Agency will perform sampling and testing of bacteriologic samples. Disinfection shall be repeated until two or more consecutive samples are negative for coliform organisms.

The pressure in the line being chlorinated shall be maintained at least 35 kPa (5 psi) lower than that existing in any Agency line to which it is connected.

306-10 WATERWORKS APPURTENANCES

306-10.1 Valves. Valves shall be located as shown on the drawings.

Each valve shall be operated prior to its installation to assure proper functioning. Valves shall be installed plumb and in alignment with the water main. Valves shall be anchored by metal ties to a concrete base. Line valves may be moved to the closest joint upon approval of the Engineer.

306-10.2 Valve Boxes. Each underground valve shall be provided with a valve box. The valve boxes shall be installed plumb and centered over the operating nut of the valve. Valve boxes shall be installed with concrete collars.

Where valve boxes are to be placed in asphaltic type pavement, they shall not be set to grade until after paving has been completed.

Where valve boxes are to be placed in concrete pavement, they shall be set to grade prior to paving operations.

306-10.3 Thrust Devices. A reaction or thrust device shall be provided on all dead ends, tees, elbows, and bends with more than 5 degrees deflection on pressure pipe lines.

Thrust devices shall be cast-in-place concrete, poured against undisturbed or compacted earth. Thrust devices shall be sized and constructed in accordance with the Plans.

Thrust devices and anchor blocks shall be constructed of Class 280-C-14 (420-C-2000) concrete. Thrust devices and anchor blocks shall be cured at least 7 Days where Type IP or II cement is used or at least 48 hours where Type III cement is used.

Metal tie-rods or clamps shall be of adequate strength to prevent movement of pipe. All metal shall be coated in accordance with AWWA C110.

306-10.4 Fire Hydrants. Fire Hydrants shall be installed as shown on the Plans.

All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the curb, with the pumper nozzle facing the curb, except that hydrants having only two hose nozzles 90 degrees apart shall be set with each nozzle facing the curb at an angle of 45 degrees.

In uncurbed public road rights of way, fire hydrants shall be located as far as possible from the traveled way while providing a 1 m (3-foot) wide clear space between the fire hydrant and the right of way line. In curbed public road rights of way, fire hydrants shall be installed so that there is 300 mm (12 inches) clear between the face of curb and the fire hydrant.

306-10.5 Fire Hydrant Barricades. Fire hydrant barricades shall consist of 100 mm (4-inch) standard steel pipe, schedule 40, filled with concrete, and having a total length of 2 m (72 inches). They shall be embedded in concrete blocks 300 mm (12 inches) in diameter and 1000 mm (40 inches) deep below ground surface with the barricade pipe embedded to 100 mm (4 inches) above the bottom of the concrete so 1 m (36 inches) extends above ground surface. The steel pipe above ground shall be painted chrome yellow in accordance with AWWA C503.

Barricades shall be installed between the fire hydrant and vehicle traffic paths at locations indicated on the Plans or where required by the water purveyor or Fire Department. Barricades shall not be installed within public road rights of way.

Fire hydrant barricades shall not obstruct the hydrant outlets.

310-5 Painting Various Surfaces

310-5.6 Painting Traffic Striping, Pavement Markings, and Curb Markings.

310-5.6.8A Application of Paint - Two Coats All painted traffic striping and markings shall be applied in two coats. The price named in any Bid item for painting traffic striping and markings shall include all costs for both applications, including any delays entailed for the required drying time between applications. If bleeding, curling or discoloration occurs following application of the second coat, unsatisfactory areas shall be given an additional coat, or coats, of paint. No additional payment will be made for work necessary to correct bleeding, curling or discoloration.

PART 4

SECTION 400 - ALTERNATE ROCK PRODUCTS, ASPHALT CONCRETE, PORTLAND CEMENT CONCRETE AND UNTREATED BASE MATERIAL

400-1 Rock Products

400-1.1 Requirements

400-1.1.1 General

Alternate rock material, Type S, as specified in Section 400 may be used on the Work.

400-3 Portland Cement Concrete

Suppliers of portland cement concrete shall file mix designs as required by 400-1.1.2

400-4 Asphalt Concrete

Suppliers of asphaltic cement concrete shall file mix designs as required by 400-1.1.2

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

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 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	CONTACT NAME:	
	PHONE (A/C, No, Ext): / FAX (A/C, No):	
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

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 INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$ See VCSS 7-4.2
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$ See VCSS 7-4.2
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	X POLICY PRO-JECT LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ 1,000,000
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ 1,000,000
								$
	UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						WC STATU-TORY LIMITS / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? (Mandatory in NH)	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

(Agency) - (Project Name) (Project Specification number)

The Agency and the County of Ventura, including its boards, all special Districts governed by the Board of Supervisors, agencies, departments, officers, consultants, employees, agents and volunteers, is named as Additional Insured as respects work done by Contractor under the terms of the contract on General Liability and Auto Liability Policies. Waiver of Subrogation is applicable to the Agency and the County of Ventura, its boards, districts, agencies, departments, officers, employees, agents and volunteers for Work Comp and General Liability. Endorsements required for referenced contract will be issued by the Insurance Company.

CERTIFICATE HOLDER

County of Ventura
Public Works Agency L-1670
800 S. Victoria Avenue
Ventura, CA 93009-1670

CANCELLATION

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

ACORD 25 (2010/05) **The ACORD name and logo are registered marks of ACORD**

Project: **Contractor:** **Specification No:**

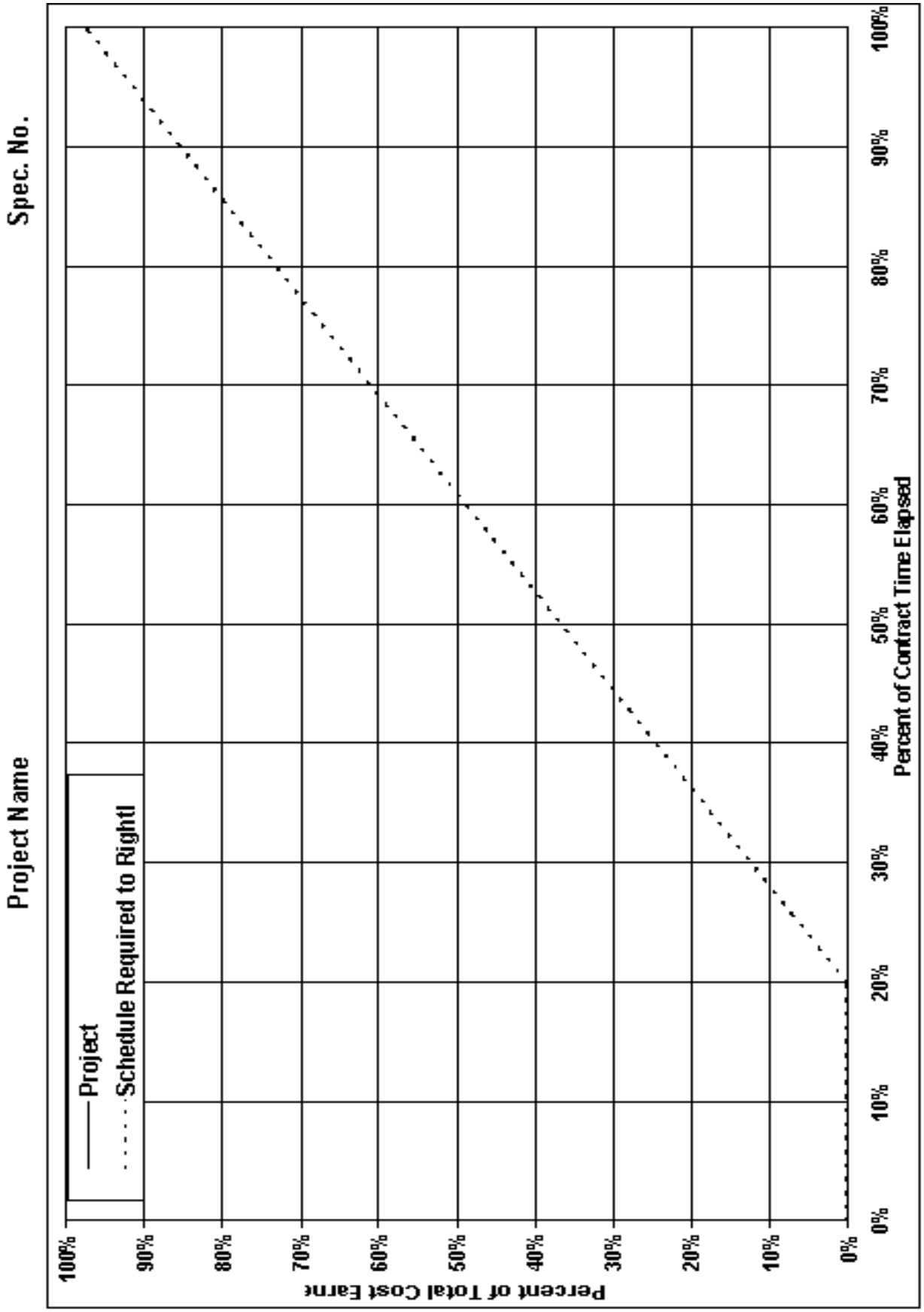
Item No.	Work or Material	WORKING DAYS OF CONSTRUCTION CONTRACT TIME																					
		BEGINNING OF CONTRACT TIME																					

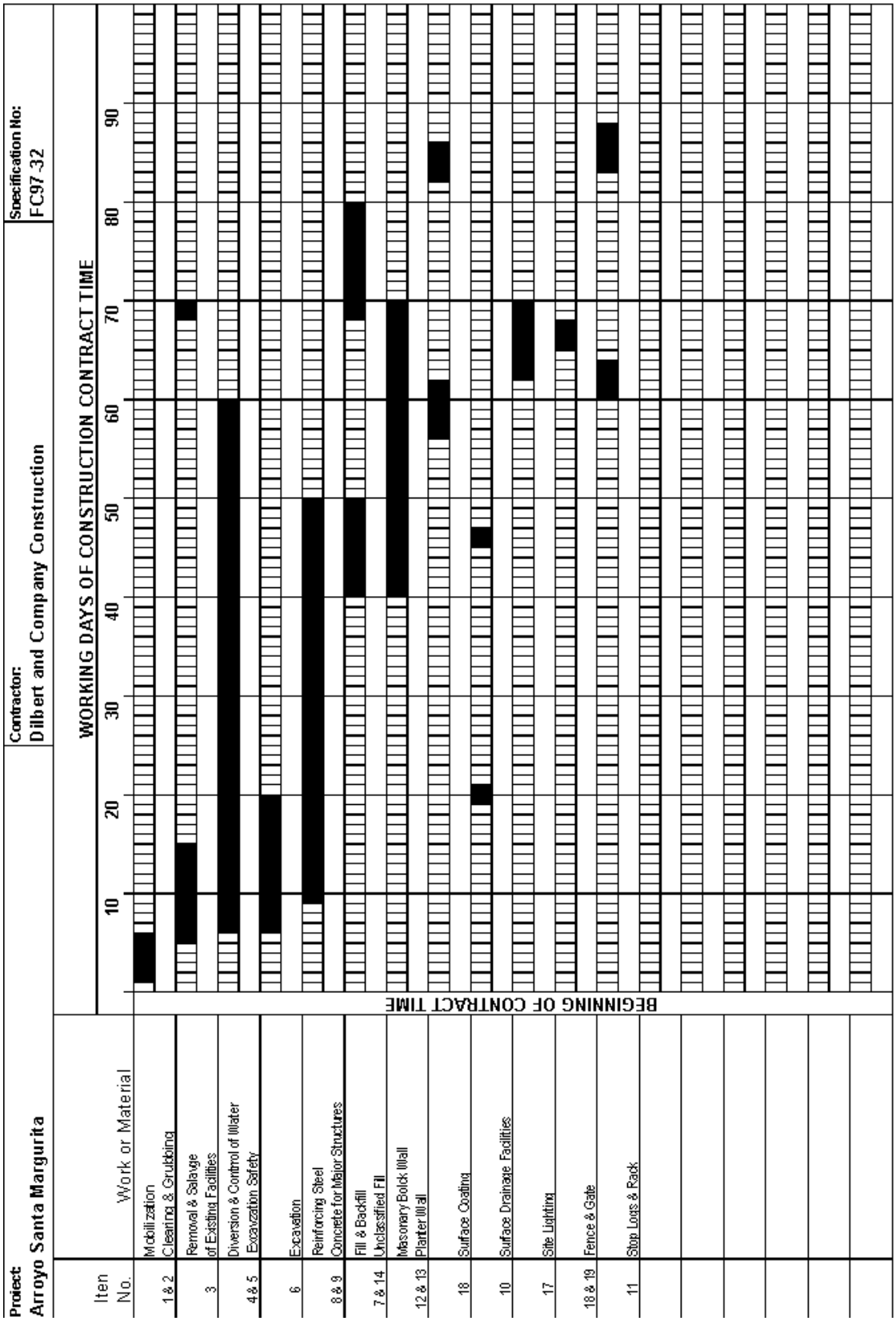
EACH HORIZONITAL INTERVAL EQUALS ____ WORKING DAYS OF CONTRACT TIME

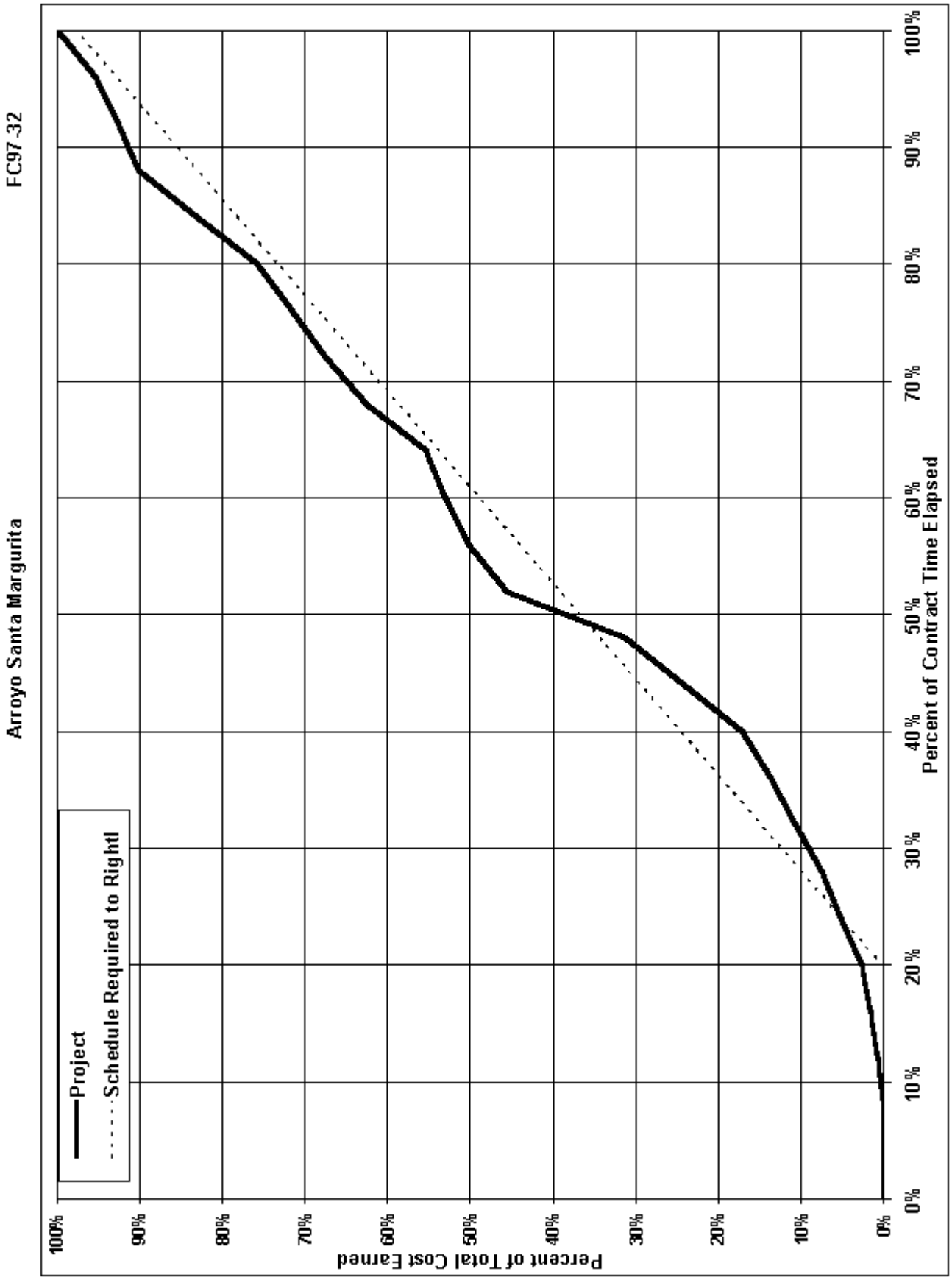
Submitted _____ Contractor

By _____ Date

Title _____


Project Name
Spec. No.
Project
Schedule Required to Right!
Percent of Total Cost Earne
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Contract Time Elapsed


Project:
Arroyo Santa Margurita
Contractor:
Dilbert and Company Construction
Specification No:
FC97-32
Item No.
Work or Material
Mobilization
1 & 2
Clearing & Grubbing
Removal & Salvage
3
of Existing Facilities
Diversion & Control of Water
4 & 5
Excavation Safety
6
Excavation
Reinforcing Steel
8 & 9
Concrete for Major Structures
Fill & Backfill
7 & 14
Unclassified Fill
Masonary Block Wall
12 & 13
Planter Wall
18
Surface Coating
10
Surface Drainage Facilities
17
Site Lighting
18 & 19
Fence & Gate
11
Stop Logs & Rack
WORKING DAYS OF CONSTRUCTION CONTRACT TIME
10
20
30
40
50
60
70
80
90
BEGINNING OF CONTRACT TIME
EACH HORIZONITAL INTERVAL EQUALS 1 WORKING DAYS OF CONTRACT TIME
Submitted Dilbert and Company Construction
Contractor
By Tina Blair
5/22/97
Date
Title President


Arroyo Santa Margurita
FC97-32
Project
Schedule Required to Right
Percent of Total Cost Earned
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 %
10 %
20 %
30 %
40 %
50 %
60 %
70 %
80 %
90 %
100 %
Percent of Contract Time Elapsed

ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between
("Agency") whose address is _____ and
("Contractor") whose address is _____ and
("Escrow Agent") whose address is _____.

For the consideration hereinafter set forth, the Agency, 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 Agency pursuant to the Construction Contract entered into between the Agency and Contractor for _____ in the amount of dated _____, (hereinafter referred to as the "Contract") which Contract is identified by Spec. No._____ and Auditor Controller's Contract No._____. Alternatively , on written request of the Contractor, the Agency shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Agency within ten 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 Agency and Contractor. Securities shall be held in the name of _____ , and shall designate the Contractor as the beneficial owner.

(2) The Agency 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 Agency makes payments of retentions earned directly to Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as 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 Agency 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. These expenses and payment terms shall be determined by the Agency, 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 Agency.

(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 Agency to the Escrow Agent that Agency consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Agency 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 Agency of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Agency.

(8) Upon receipt of written notification from the Agency certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, the Escrow Agent shall release to the 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 Agency and the Contractor pursuant to Sections (1) to (8), inclusive, of this Agreement and the Agency 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 Agency and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Agency:

_____, Director,
Public Works Agency

_____, Director
Central Services Department

_____, Director
Engineering Services Department

Address for all of the above:
Public Works Agency
800 South Victoria Avenue
Ventura, CA 93009

SAMPLE FORM

Form used for escrow will have names and signatures of persons authorized in accordance with paragraph 10.

On behalf of Contractor:

Title

Name

Signature

Street Address

City & State Zip Code

On behalf of Escrow Agent:

Title

Name

Signature

Street Address

City & State Zip Code

At the time the Escrow Account is opened, the Agency 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.

Agency:
(Agency name)

Title

Name

Signature

Contractor:
(Contractor company name)

Title

Name

Signature

EXHIBIT "A"
ESCROW INSTRUCTIONS

The parties to this escrow are _____("Agency") and _____ ("Contractor") and _____("Escrow Agent"). Agency and Contractor have entered into a contract for the construction of _____which contract is identified by Spec. No. _____ and Auditor-Controller's Contract No. _____ and was entered into by and between Agency and Contractor ("Construction Contract"). Pursuant to Public Contract Code Section 22300, Contractor may substitute certain securities for an equivalent amount of money required to be withheld from progress payments by Agency to Contractor pursuant to the Construction Contract.

The Escrow Agent is hereby instructed as follows:

1. Contractor may deliver to Escrow Agent:

   (a) Securities of the types specified in Sections 22300 of the Public Contract Code and Section 16430 of the Government Code.

   (b) Such other documents as are necessary to enable Escrow Agent to convert such securities into cash.

2. Upon receipt of such securities and other documents, Escrow Agent shall notify Agency within ten days of the deposit, and shall examine them to determine whether they are in a form sufficient to effect conversion of the securities into cash. Escrow Agent shall thereupon send written notice of its determination to Agency.

3. Escrow Agent shall hold such securities as trustee for Agency. The right of Agency to such securities is superior to any other lien or claim of lien; provided, however, that Contractor shall be entitled to any interest earned by such securities prior to their conversion to cash pursuant to section 5 hereof, and further provided that such interest may be withdrawn by Contractor at any time and from time to time without notice to Agency.

   Securities may be substituted by Contractor, but any securities substituted for securities previously deposited shall not reduce the current cash value of securities held below that last reported to Agency by Escrow Agent.

4. Escrow Agent shall determine the current cash value of such securities held by it as of the close of business on the first business day following the _____ day of each month and, in addition, on any other days which the Agency may from time to time specify in a written notice to Escrow Agent. Current cash value shall be determined as follows:

   (a) For securities traded over-the-counter or on a stock exchange:

      (1) Determine either the current bid price for the securities as of the close of business or the face value of the securities, whichever is less.

      (2) Subtract the cost of sale (broker commission).

      (3) Subtract all unpaid escrow fees and costs associated therewith.

   (b) For certificates of deposit:

      (1) Determine the face amount.

      (2) Subtract the potential interest penalty for immediate conversion.

      (3) Subtract all unpaid escrow fees and costs associated therewith.

   (c) Determine the value of other securities by procedures calculated to determine net realizable value. Promptly upon making each such determination, Escrow Agent shall notify Agency of the securities held and current cash value of such securities.

5. At any time or times that Agency believes it has a right to do so under the provisions of the Construction Contract, Agency may, without the consent of Contractor, deliver to Escrow Agent a written demand that Escrow Agent convert to cash all or any part of such securities. Upon seven days' written notice from Agency of such demand, Escrow Agent shall convert to cash all or part of such securities as demanded and shall distribute the cash as instructed by the Agency.

6. When the Construction Contract has been satisfactorily completed on the part of Contractor and any stop notices filed against the Construction Contract have been released, Agency shall give written notice to Escrow Agent that such securities may be returned to Contractor. Upon receipt of such written notice and payment of all escrow fees and costs, the Escrow Agent shall deliver to Contractor all money, interest, securities and other documents remaining in escrow and the escrow shall terminate.

7. Contractor, and not Agency, shall be liable to Escrow Agent for all of Escrow Agent's fees and costs associated with this escrow.

8. The Director of the Ventura County Public Works Agency, a Department Director of said Agency, or other person authorized in writing by such Director or Department Director is authorized to give written notice and to make written demands on behalf of Agency pursuant to sections 4, 5 and 6 hereof.

9. All written notices and demands pursuant to the escrow agreement and these Instructions shall be addressed as follows:

(a) To Agency:

Director, Ventura County Public Works Agency
800 South Victoria Avenue
Ventura, California 93009

(b) To Contractor:

(c) To Escrow Agent:

DATED: _____

_____	_____	_____
_____	_____	_____
By _____	By_____	By_____
Title _____	Title _____	Title_____
AGENCY	CONTRACTOR	ESCROW AGENT Bank Charter: State [ ] Federal [ ] Escrow Agent's Address: _____ _____

APPENDIX E BLANK

RELEASE ON CONTRACT

CONTRACT NAME: _____

SPEC. NO. _____, PROJECT NO. _____

WHEREAS, by the terms of the contract dated ____ _, 20___ entered into by _____

_____and the undersigned CONTRACTOR,

_____

_____

_____

undersigned CONTRACTOR agreed to perform certain work for the compensation specified in said contract; and

WHEREAS, the CONTRACTOR represents that said work is fully completed and that final payment is due to the CONTRACTOR under terms of said contract,

NOW, THEREFORE, in consideration of the promises and the payment by [AGENCY NAME] to the CONTRACTOR of the amount due under the contract, to wit, the sum of $_____ and the additional consideration of $1.00, receipt of which is hereby acknowledged by the CONTRACTOR, the CONTRACTOR hereby releases and forever discharges _____ of and from all manner of debts, dues, demands, sum or sums of money, accounts, claims and causes of action, in law and in equity, under or by virtue of said contract except the claim against the Agency for the remainder, if any, of the amounts retained as provided in 9-3.2, any amounts retained as required by Stop Notices or Labor Code Provisions, and any unsettled claims or disputes as follows: (If none, leave blank)

Description of Claim or Dispute	Amount	Date of Claim	Date of Notice of Potential Claim

The CONTRACTOR certifies that each unsettled claim or dispute listed hereon has been processed in compliance with the requirements for making claims under the contract, including giving notice pursuant to the applicable provisions of the contract, and following the procedures for resolution of disputes or claims set forth in subsection 6-12 of the contract. Acceptance of this Release on Contract by the [Agency Name] shall not be deemed as a waiver or release of its right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

IN WITNESS WHEREOF, the hand and seal of the CONTRACTOR have been hereunto set this ___ day of _____, 20___.

THIS FORM MUST BE ACCOMPANIED
by a proper acknowledgement form
(See Civil Code Section 1189)

Contractor

By

Title

SAMPLE PERFORMANCE AND PAYMENT BOND FORM

Bond No._____

SURETY BONDS

PERFORMANCE BOND

Whereas, the «Agency», hereinafter called "Agency", and «Contr», hereinafter called "principal", have entered into a contract dated «ContrDate» whereby principal agrees to complete certain designated work identified as project «ProjName» (Spec. No.«SpecNo»), and to perform other duties and obligations as described in said contract, which is incorporated herein by this reference and made a part hereof; and

Whereas, principal is required under the terms of said contract to furnish a bond to guarantee principal's faithful performance of the work and all terms and conditions of the contract;

Now, therefore, we the principal and the undersigned, as corporate surety, are held and firmly bound unto Agency in the penal sum of «CostText» ($«OrigCostFmtd») lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the principal, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and provisions in the said contract and any alteration thereof made as therein provided, on principal's part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless Agency, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The above obligation shall continue after Agency's acceptance of the work for the duration of the warranty period as specified in the contract during which time if principal fails to make full, complete, and satisfactory repair or replacement to the work and/or fails to protect Agency from loss or damage resulting from or caused by defective materials or faulty workmanship, the obligation of surety hereunder shall continue so long as any obligation of principal remains.

PAYMENT BOND

And, whereas, under the terms of said contract, principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the Agency to secure the claims to which reference is made in Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code of the State of California.

Now, therefore, said principal and the undersigned, as corporate surety, are held firmly bound unto the Agency and all contractors, subcontractors, laborers, material suppliers and other persons employed in the performance of the aforesaid contract and referred to in the aforesaid Civil Code in the like sum of «CostText» dollars ($«OrigCostFmtd») for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld and paid over to the Franchise Tax Board from the wages of employees of the contractor and the contractor's subcontractors, that said surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees including reasonable attorney's fees incurred in successfully enforcing such obligation, to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies and corporations entitled to file claims under Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should this condition of this bond be fully performed, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

GENERAL TERMS

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said contract or the plans and specifications accompanying the same shall in any manner affect its obligations on these bonds, and it does hereby waive notice of any such change, extension, alteration or addition.

Nothing herein shall limit the Agency's rights or surety's obligations under the contract or applicable law, including, without limitation, California Code of Civil Procedure section 337.15.

In witness whereof, this instrument has been duly executed by the principal and surety above named

on ,_____, 20 .

«Contr»
Name of Principal

By_____

Title_____

_____
Name of Surety

By_____
Attorney-in-Fact

Address _____

City_____ State ___ Zip_____

INDICATE COMPLETE ADDRESS OF SURETY TO WHICH CORRESPONDENCE CONCERNING THIS BOND SHOULD BE DIRECTED.

Telephone No._____

SAMPLE BOND FORM

Agency will prepare the Bond in this format and transmit it to the Contractor along with the Contract and the Notice of Award letter.

Surety shall fill in the Bond No., date identification and signature of surety in places provided.

Contractor shall sign and indicate title in place provided.

A-467/9-Tmpl

SECTION 1000
GENERAL REQUIREMENTS

SECTION 1000
GENERAL REQUIREMENTS

1000-1 PROJECT DESCRIPTION

The project consists of Installation of motor control center, panel board, panel board transformer, power monitoring equipment, lighting and plc control center. Furnish and install all conduits, conduit fittings, pull boxes, junction boxes, wires, and cables as shown on the drawings and conduit schedule. All conduits below grade shall be PVC conduits and conduits above grade shall be Rigid Galvanized Steel or Aluminum conduits with appropriate conduit fittings. Furnish and install new supply and exhaust fans. Furnish and install new astronomical timer lighting control panel with photo electric sensor wired to existing lighting.

1000-2 DEFINITIONS

1. District – Ventura County Waterworks District No. 38 and/or its authorized agents.

1000-3 SUBMITTALS

3.1 General

A. The terms Shop Drawings and Submittals are used interchangeably in these specifications. The Contractor is required to prepare and submit Shop Drawing submittals to the District for review and approval. Shop Drawings are required for all materials and equipment proposed to be incorporated into the work. The Contractor, in accordance with these specifications, shall submit six (6) complete sets of shop Drawings. Faxed Shop Drawings are not acceptable.

B. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show the materials and equipment the Contractor proposes to provide and to enable the District to review the information for the limited purposes described herein.

C. As part of each Shop Drawing submittal, the Contractor shall provide written notices of all deviations that the Shop Drawing or sample submitted may have from the requirements of the Contract Documents. The Contractor shall also provide a notation of each such variation on each Shop Drawing or sample submitted to the District for review and approval.

D. The District will review the Shop Drawings and samples. The District's review and approval or disapproval will be only to determine if the items covered by the submittals generally comply with the intent of the design. The District's review and approval or disapproval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

E. The District's s review and approval of Shop Drawings or samples shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents. No portion of the work requiring a Shop Drawing submittal shall be started until the submittal has been reviewed by and returned to the Contractor with a notation indicating that re-submittal is not required.

F. Revisions indicated on Shop Drawings shall be considered as changes necessary to meet the requirements of the Drawings and Specifications and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from making changes to Shop Drawings that have been requested by the District.

3.2 Procedures

A. Before submitting each Shop Drawing, the Contractor shall have done the following:

1. Verified and determined all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog number, and similar information.

2. Verified and determined materials with respect to intended use, fabrication shipping, handling, storage, assembly and installation pertaining to the performance of the work.

3. Verified and determined all information relative to the Contractor's means, methods, techniques, sequences and procedures of construction, and safety precautions and programs.

4. Reviewed and coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the work and the Contract Documents.

    a. Each Shop Drawing submission will bear a stamp or specific written indication that the Contractor has reviewed and approved all information in the submittal.

    b. The Contractor shall submit each Shop Drawing to the District for review and approval at least thirty (30) calendar days before drawings will be required for ordering materials and commencing the work.

    c. Every submittal shall be accompanied by a letter of transmittal containing the following:

        i. Contractor's name;

        ii. Project title;

        iii. Description of the submittal;

        iv. Applicable section of the specifications.

    d. Failure of the Contractor to comply with all of the requirements of this section will result in the Shop Drawings being returned to the Contractor marked "REJECTED."

    e. Within 21 calendar days of receipt of properly submitted said Shop Drawings, the District will return 2 copies of each drawing to the Contractor with comments noted thereon. Shop Drawings will be returned to the Contractor with one of the following conditions:

        i. "Approved" and "No Exception"

        ii. "Approved" and "Note Comments"

        iii. "Resubmit" and "Note Comments"

        iv. "Rejected"

    f. If so indicated, the Contractor shall make corrections requested by the District, and shall resubmit the corrected copies of the Shop Drawings and samples for review and approval. In the

case of resubmittals, the Contractor shall direct specific written attention to revisions other than the corrections specifically called for by the District.

1000-5 PRE-BID CONFERENCE

Prospective bidders may wish to attend a pre-bid conference to be held on a day set by the District, at the Moorpark Waterworks District Office located at 6767 Spring Road, Moorpark, California. A tour of the project site will be conducted as part of the meeting. Attendees are required to wear mask.

The meeting will be held for the purpose of answering any questions concerning the project. None of the information transmitted at this meeting is to be construed to in any way modify the plans and specifications. Any modification will be forwarded to all plan holders as an addendum.

1000-6 PROJECT PLANS

The Contractor shall have on file one (1) set of project plans on which shall be recorded all variations between the work as-built and the contract drawings, or other information specified. The project plans shall be supplemented by any detailed sketches as necessary or directed to indicate fully the work “as-built”. The project plans shall be delivered to the District upon completion of the work.

1000-7 OPERATION, MAINTENANCE, AND REPAIR MANUALS

Submit six (3) copies of operation and maintenance manuals for all operating apparatus and equipment furnished under this contract to the District 30 days prior to acceptance. Manuals shall be bound in durable covers, clearly indexed or provided with thumb tabs for each item or product, and a directory of related subcontractors, service representatives and parts sources shall be included.

Manuals shall contain full information for each item of equipment, including instructions for installation, start-up, operation, inspection and maintenance, lubrication schedules, parts lists, control or power circuitry, and other pertinent data as applicable. If literature covers more than one model, neatly identify appropriate provisions.

Manuals shall include detailed narrative of intended operation of the completed facilities as a whole system, and the process operation of each sub-system, including but not limited to:

- Sump pump

- Motor Control Center
- Panel boards
- Panel board transformer
- Power monitoring equipment
- Plc control center.

The detailed narrative shall also describe the intended system control logic and all alarms.

A. Manuals shall include:

1. List of all equipment furnished for project including name, address, and telephone number of vendor.
2. List of serial numbers of equipment furnished.
3. A copy of all approved shop drawings in final form.
4. All electrical record drawings showing conduit locations dimensioned from the walls and/or other monuments.
5. All piping record drawings showing locations dimensioned from walls and/or other monuments.
6. Manufacturer's operation and maintenance instructions and parts lists.
7. List of all fuses, lamps, seals, and other expendable equipment and devices. Size, type, and ordering description shall be specified. Name, address, and telephone number of vendor shall be listed.

B. Supplemental pump data required.

(Certified Lab Pump Tests)

1000-8 PRE-CONSTRUCTION MEETING

A Pre-construction meeting shall be scheduled at least 7 days prior to the start of the project, to be held at 6767 Spring Road, Moorpark. The District, the Contractor and the Engineer shall be present. A schedule pf work to be accomplished and a list of labor, material, and equipment rates for additional

work will be established and maintained throughout the project. Contractor shall furnish a complete set of submittal data for use by inspector. Resumes of personnel to be used on the project shall also be submitted.

1000-9 MANUFACTURER'S EQUIPMENT INSTALLATION INSTRUCTIONS

Contractor shall obtain and distribute necessary copies of manufacturer's instructions, including two (2) copies to the District. If a conflict exists between the manufacturer's equipment installation instructions and the contract documents, the Contractor shall notify the District in writing and shall obtain the District's instructions prior to proceeding with equipment installation.

1000-10 HOURS OF WORK

Work areas will be available for performance of the contract work between 7:00 A.M. and 5:00 P.M. excluding Saturdays, Sundays and holidays. No work shall be accomplished during hours or on days other than specified above, unless approved in advance by the District.

Inspections requested by or made necessary as a result of actions of the Contractor on Saturdays, Sundays, or holidays must be scheduled in writing by the District. The contractor shall bear all additional fees or expenses of District services created by extraordinary work hours including standby time or overtime.

1000-11 SAFETY

The Contractor shall comply with all the requirements of Section 7-10.4. They shall review work area safety practices with the District prior to the commencement of any work. The District and any other personnel or consultants visiting the job site shall comply with the established safety practices.

1000-14 QUALITY CONTROL

The Contractor shall be responsible for executing the contract provisions in a quality fashion. This shall include providing new, high quality equipment and materials and employing professional craftspersons, skilled in their trades. All inspections required by the Public Works Inspector or by other regulatory agencies shall be complied with.

In order to prevent contamination of the nearby golf course, avocado and citrus orchards and local stream beds, all refuse, oil, greases and other petroleum products; all toxic materials; all cement or concrete; or water

containing such products shall be disposed of in such a manner as to prevent said contamination.

1000-15 INSTRUCTION

The Contractor shall instruct the District's personnel in operation of all systems, treatmentworks, mechanical, electrical and other equipment, as required by the individual product specifications. The Contractor will include a minimum of two (2) 8-hour days time for field representatives(s) of all the different project equipment and material to the District's personnel in operation and maintenance of that equipment and material unless specified otherwise.

1000-16 CONTRACT OBLIGATIONS

The successful bidder will be required to enter into a construction contract with the agency. A performance bond will be required to cover the performance of the Motor Control Center for a period of two years.

1000-17 MEASUREMENT AND PAYMENT

All costs for the requirements in this section shall be included in the contract unit or lump sum prices for such work appurtenant thereto, and no additional payment will be made therefore.

Payment for bid items listed in the proposal but not specified in the Specifications will be made at the lump sum price or unit price shown in the proposal. Such payment will be considered full compensation for furnishing and installing the item including all labor, material, tools, equipment, and appurtenances as may be required and as shown on the plans for the bid item.

END OF SECTION

SECTION 01011

WORK DESCRIPTION AND GENERAL STATEMENTS

PART 1 GENERAL

1.1 WORK DESCRIPTION

Provide all materials, labor, equipment, and supervision required to perform all work in strict accordance with the Contract Documents including the Specifications, Drawings, and applicable portions of Codes and Standards. The project is located at Zone II Booster Pump Station on 2624 Stafford Road, Lake Sherwood, CA. The project is generally described and scheduled as follows:

ELECTRICAL ITEMS:

1. Furnish and install a motor control center with an automatic transfers switch, two soft starters, panel board, panel board transformer, power monitoring equipment, lighting controller, and plc control panel as shown on the drawings.

2. Furnish and install a house keeping pad to mount the motor control center on using manufacturer recommended concrete anchors and per California Seismic requirements.

3. Furnish and install all conduits, conduit fittings, pull boxes, junction boxes, wires, and cables as shown on the drawings and conduit schedule. All conduits below grade shall be PVC conduits and conduits above grade shall be Rigid Galvanized Steel or Aluminum conduits with appropriate conduit fittings.

4. Furnish and install new supply and exhaust fans for the vault as shown on the drawings.

5. Furnish and install new sump pump for the vault sump well as shown on the drawings.

6. Furnish and install new astronomical timer lighting control panel with photo electric sensor wired to existing lighting.

7. After the new motor control center and PLC equipment has been installed and operational, the Contractor shall remove the existing PLC control equipment panel, the existing pump control panel, and pump soft starters in the vault and return to the District. The Contractor shall remove all abandoned conduits, panels, and junction boxes from the vault and site.

8. Furnish spare parts as listed in the Specifications and Drawings.

9. Plc programming and graphic user interface configuration is not part of the project and shall be programmed by others.

10. The Contractor shall get all required permits for the project and the Contractor shall coordinate with Southern California Edison with any required power shutdowns during the project. It is unforeseen that there will be any electrical shutdowns in the project.

MECHANICAL: (not applicable)

CIVIL: (not applicable)

GENERAL:

1. It is not anticipated that any shutdown of services will be required for the duration longer than the normal working hours. Any shutdown shall be coordinated with District.

2. Other work includes patching, coring, boring, anchoring, within the scope of work under this project.

3. The installation of the field wiring cables uses existing conduits and pull-boxes as shown in the Drawings. Most of the conduits have sufficient space for new conductors. If additional conduits are required, the Contractor shall furnish and install the new conduits and conductors as noted in the conduit schedule. The Contractor shall finalize all new conduit locations and routing with the District.

4. New conduits are detailed in size, material, and location as noted in the conduit schedule. The Contractor shall finalize all new conduit locations and routing with the District.

5. Provide two complete sets of "As-Built" mark-up prints.

6. Contactor shall not program the PLC or add additional costs for the PLC programming since it is to be done by others.

7. Any abandoned wiring or equipment shall be removed, and the District shall decide what to do with the removed equipment. The equipment the District does not desire shall be removed and disposed of lawfully by the Contractor.

8. Any abandoned conduits shall have all conductors removed and replaced with a 3/8” nylon pull cord.

9. The booster pump station is in constant operation and coordination is required for the installation of the new equipment. The following is a tentative schedule for the project.

   a. Prepare submittals for the equipment for the District to review prior to the procurement of any equipment and components. When all of the submittals are approved the Contractor can procure and begin the fabricate the project components.
   b. When all of the equipment has been prefabricated, the Contractor shall contact the District to schedule the installation of the equipment.
   c. Install the conduits outside of the vault and inside of the vault.
   d. Install the house keeping pad for the motor control center.
   e. Install the motor control center on to the new house keeping pad.
   f. Install the wires from the switchboard to the motor control center, and to all of the field devices but do not make final terminations.
   g. When all conduits and wiring is ready, coordinate with the county on the final terminations to the switchboard, motors, motor control devices, sensors, and control equipment.
   h. Furnish and install the new supply and exhaust fans, the sump pump, and the related lighting equipment.
   i. When all new equipment is operational, the contractor can remove the equipment noted for removal on the drawings.
   j. On completion of the project work, the contractor shall clean up the site removing construction debris and equipment.

1.2 DRAWING SCHEDULE

The following Drawings accompany this specification and are a part of the Contract Documents:

Sheet Number	Title of Drawing
1	TITLE SHEET, SITE LOCATION AND TABLE OF CONTENTS
2	ELECTRICAL AND CONTROLS SYMBOL AND ABBREVIATION LEGENDS
3	SITE LAYOUT, EQUIPMENT LOCATIONS, AND PROJECT SCOPE OF WORK
4	ELECTRICAL SINGLE LINE, GROUNDING, AND PANEL BOARD SCHEDULE
5	MOTOR CONTROL CENTER LAYOUT, HOUSEKEEPING PAD, AND CONDUIT SCHEDULE
6	BOOSTER PUMPS 1 AND 2 CONTROL SCHEMATIC AND INSTALLATION DETAILS
7	MISCELLANEOUS ELECTRICAL SCHEMATICS
8	PROCESS AND INSTRUMENTATION DIAGRAM
9	PLC CONTROL PANEL DETAILS PANEL LAYOUT AND PARTS LIST
10	PLC CONTROL PANEL DETAILS AC POWER DISTRIBUTION WIRING
11	PLC CONTROL PANEL DETAILS DC POWER DISTRIBUTION WIRING

12 PLC CONTROL PANEL DETAILS ANALOG AND DIGITAL INPUT WIRING
13 PLC CONTROL PANEL DETAILS DIGITAL OUTPUT WIRING
14 INSTRUMENTATION INSTALLATION DETAILS

1.3 CODES AND STANDARDS

Various codes and standards are referenced in specific parts of these specifications. Generally, the full titles, the year designations, and the names of the promulgating associations or agencies do not appear with references in the regular specification text but are detailed in Subpart 1.2 of each section. Addresses, and telephone and facsimile numbers for referenced associations and agencies are listed in Section 01000, "General Requirements". In some cases, when the year designation has been deleted, it shall be assumed that materials or methods specified conform to the latest adopted code or standard unless otherwise indicated.

In addition to specific references and to codes and regulations of governing authorities, the following are applicable to the work as a whole:

Abbreviation	Codes or Standards
General Industry Orders	State of California Code of Regulations, Safety Title 8, Division of Industrial Safety, Sub-Chapter 7, General Industry Safety Orders, Group 1 General Physical Conditions and Structures
Electrical Safety Orders	California Code of Regulations, Title 8, Division of Industrial Safety, Subchapter 5, Electrical Safety Orders
CEC	California Electrical Code, 2019 Edition
NFPA	National Fire Protection Association Code, 202 Edition (National Fire Protection Association)
CBC	California Building Code, 2019 Edition
CPC	California Plumbing Code, 2019 Edition
CMC	California Mechanical Code, 2019 Edition

1.4 TERMINOLOGY

The following are definitions and explanations to terminology used on the drawings and in the specifications:

General Provisions and Special Conditions: Refers to the requirements of the General Provisions - Fixed-Price Construction Contract and the Special Conditions - Fixed-Price Construction Contract that apply to the entire work of the Contract and to other elements of work included in the Project.

District: The term "District", when used in the technical specifications, shall refer to the County of Ventura Water Works District 38.

Engineer: The term "Engineer", when used in technical specifications, shall refer to MSO Technologies Inc.

Contracting Officer: The term "Contracting Officer", when used in the technical specifications, shall refer to the District representative.

Indicated: The term "indicated" is used to reference details, notes, and schedules on the drawings, as well as other passages of text, and schedules in the specifications. Where terms such as "shown", "noted", "scheduled", and "specified" are used instead of "indicated", it is for referring to the Contract Documents and no specific limitation of location in the Contract Documents is intended except as explicitly noted.

Terms such as "directed", "requested", "authorized", "selected", “approved", "required", "accepted", and "permitted" shall mean "directed by the District representative".

Provide, Furnish, and Install: Except as further defined in the Contract Documents, the terms "provide", "furnish", and "install" shall mean to supply and deliver to the project site, and to install complete and ready for the intended use.

Testing Laboratory: Refers to an independent organization engaged by the Contractor to perform specific inspections or tests of the work, at either the site or elsewhere, and to report the results of those inspections or tests to District. Independent testing and inspection do not alter District's rights to test and inspect the work.

1.5 CALIFORNIA CONTRACTOR'S LICENSE LAW

See Part 1 of specification for California Contractor's License Law requirements.

1.6 AS-BUILT DRAWINGS

The Contractor shall, within thirty (30) days after completion of construction, provide the District with two (2) sets of marked-up prints showing clearly and neatly in red ink all changes, corrections, and additions made during the construction period. Such features shall be recorded and kept up to date on a complete as-built record set of drawings which shall be corrected daily and show every change from the contract

drawings and specifications and the exact as-built location, size, and kind of every valve, fixture, wire conduit, etc. The District will supply one (1) set of prints to be maintained continuously on the site by the Contractor. The set of record as-built information shall be subject to inspection by the District at any time.

1.7 PRE-BID APPROVAL OF CONSTRUCTION MATERIALS AND OTHER ITEMS NOT INDICATED IN THE CONTRACT

There shall be no pre-bid approval by the District for materials, products, equipment, processes, and other construction items, all to be conducted after award during the submittal phase of the project.

1.8 OCCUPANCY AND USE OF EXISTING FACILITIES

County of Ventura personnel are operating and using the facilities within and adjacent to the areas of work during the entire construction period. The Contractor shall be required to plan and coordinate work activities in order to provide all necessary controls for the abatement of dust, noise, and inconvenience to District personnel during all phases of the work. The Contractor shall submit to the District a work schedule for approval before commencing work.

1.9 SCHEDULING OF WORK

Wherever specifications or drawings call for advance notification, Contractor shall include that notification in the project work schedule as a separate line item in the time slot appropriate to ensure proper coordination of the construction activities with the District representative.

For the purpose of notifying the District technical staff, the work schedule shall specifically identify those construction activities, which would generate heavy concentrations of airborne dust or which use construction or cleaning techniques emitting heavy concentrations of airborne solvents, hydrocarbons, and other aerosols. Such activities would include but not be limited to demolition work are patching and painting. Notification of such construction activities shall be given at least 10 days before commencing such work.

Perform on site work in conformance with the District approved work schedule. Do not disrupt operation of essential equipment except during time periods established and approved by the District representative. Notify the District representative in writing at least 10 calendar days in advance of necessary interruptions of pump station operations and shut offs of utility services. The utility service (electrical) may only be shut off for less than one working day. Utility interruptions shall occur during regular working hours (7:30 a.m. to 4:30 p.m., Monday through Friday).

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 Schedule of Work

After the submittals have been approved, the Contractor can begin procurement and construction. The Contractor shall coordinate with District staff for each step of the installation. The equipment must be installed in a certain order to minimize the interruption of the process. The general schedule of installation shall follow the order as described Section 1.1.

PART 4 PAYMENT

4.1 MOBILIZATION/DEMOBILIZATION

Mobilization/Demobilization will be paid for on a lump sum basis at the contract price bid for Item No. 1. Such payment shall be considered full compensation for mobilization per VCSS Section 9-3.

4.2 INSTALLATION OF HOUSEKEEPING PAD

Installation of housekeeping pad will be paid for on a lump sum basis at the contract price bid for Item No. 2. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 item 2.

4.3 INSTALLATION OF MOTOR CONTROL CENTER

Installation of Motor Control Center will be paid for on a lump sum basis at the contract price bid for Item No. 3. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 items 1, 9, and 10.

4.4 INSTALLATION OF WIRES, CABLES, CONDUITS AND JUNCTION BOXES

Installation of wires, cables, conduits and junction boxes will be paid for on a lump sum basis at the contract price bid for Item No. 4. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 3.

4.5 INSTALLATION OF SUPPLY AND EXHAUST FANS

Installation of supply and exhaust fans will be paid for on a lump sum basis at the contract price bid for Item No. 5. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 4.

4.6 INSTALLATION OF SUMP PUMP

Installation of supply and exhaust fans will be paid for on a lump sum basis at the contract price bid for Item No. 6. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 5.

4.7 INSTALLATION OF CEILING LIGHTS AND TIMER

Installation of ceiling lights and timer will be paid for on a lump sum basis at the contract price bid for Item No. 7. Such payment shall be considered full compensation for furnishing all equipment, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 6.

4.8 DEMOLITION

Demolition will be paid for on a lump sum basis at the contract price bid for Item No. 8. Such payment shall be considered full compensation for removing existing improvements, labor, materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 7.

4.9 FURNISH SPARE PARTS OF PLC AND INSTRUMENTS

Furnish spares parts will be paid for on a lump sum basis at the contract price bid for Item No. 9. Such payment shall be considered full compensation for furnishing all materials, and other incidentals necessary to complete the work in accordance with the plans, specifications, and as described in Section 01011-1.1 Item 8

-- End of Section –

SECTION 01315

PROJECT MEETINGS

PART 1 GENERAL

1.1 SUMMARY

The requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 REFERENCES (Not Applicable)

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01330, "Submittal Procedures," in sufficient detail to show full compliance with the specification:

Pre-construction Submittals

A Project Submittal Schedule shall be submitted in accordance with paragraph entitled, "Project Meetings," of this section.

1.4 PRECONSTRUCTION CONFERENCE

The Contractor shall attend a pre-construction conference scheduled by the Contracting Officer. Work shall not commence prior to the conference. Subcontractor representatives shall attend.

Discussion shall address project orientation, personnel contact, safety issues, permits, deficiencies, and the location of the Contractor's office.

1.5 PROJECT MEETINGS

The Contractor shall attend bi-weekly project meetings scheduled by the District. The Contractor is responsible for taking attendance and recording meeting minutes. These meeting minutes will be reviewed at the beginning of each meeting. Subcontractor representatives shall attend if determined by Contractor. This meeting shall address the progress schedule, potential factors of delay, deficiencies, material delivery schedules, submittals, and safety issues.

A Project Submittal Schedule shall be submitted showing full coordination with the project schedule. All products and tests under each submittal number shall be prioritized and linked to the progress schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

Requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 REFERENCES (Not Applicable)

1.3 SUBMITTALS

A standard transmittal form shall be used to transmit each submittal.

Submittal Description (SD): Drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials to be furnished by the Contractor explaining in detail specific portions of the work required by the contract.

The following submittal items are descriptions of data to be submitted for the project. The requirements to furnish the applicable items will be called out in each specification.

Pre-construction Submittals

After the District has issued a notice with proceed, submittals are required prior to work commencing on the project. Submittals required prior to the start of the next major phase of the construction on a multi-phase contract. Schedules or tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work, submitted prior to work commencing or next major phase of construction.

Shop Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work.

Product Data

Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents.

Samples

Samples, including both fabricated and un-fabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

Manufacturer's Instructions

Preprinted material describing installation of a product, system, or material, including special notices and material safety data sheets, if any concerning impedances, hazards, and safety precautions.

Operation and Maintenance Data

Data intended to be incorporated in an operations and maintenance manual.

Closeout Submittals

Special requirements are necessary properly to close out a construction contract. For example, as-built drawings, manufacturer's help, and product lines necessary to maintain and install equipment. In addition, submittal requirements are necessary properly to close out a major phase of construction on a multi-phase contract.

1.4 PREPARATION

1.4.1 Marking

Permanent marking shall be provided on each submittal to identify it by contract number; transmittal date; Contractor's, Subcontractor's, and supplier's name, address(es) and telephone number(s); submittal name; specification or drawing reference; and similar information to distinguish it from other submittals. Submittal identification shall include space to receive the review action by the District.

1.4.2 Drawing Format

Drawing submittals shall be prepared on translucent, reproducible sheets, not less than 11 x 17 inches nor larger than 24 x 36 inches in size, except for full size patterns or templates. Drawings shall be prepared to accurate size, with scale indicated, unless other form is required. Drawing reproducibles shall be suitable for

microfilming and shall be of a quality to produce clear, distinct lines and letters. Drawings shall have dark lines on a white background.

Copies of each drawing shall have the following information clearly marked thereon:

a. Job name, which shall be the general title of the contract drawings.

b. Date of the drawings and revisions.

c. Name of Contractor.

d. Name of Subcontractor.

e. Name of the item, material, or equipment detailed thereon.

f. Number of the submittal (e.g., first submittal, etc.) in a uniform location adjacent to the title block.

g. District contract number shall appear in the margin, immediately below the title block.

Drawings shall be numbered in logical sequence. Contractor may use his own number system. Each drawing shall bear the number of the submittal in a uniform location adjacent to the title block. District contract number shall appear in the margin, immediately below the title block, for each drawing.

A blank space, no smaller than 4 by 4 inches, shall be reserved on the right-hand side of each sheet for the District disposition stamp.

1.5 SUBMISSION REQUIREMENTS

1.5.1 Schedules

Within 30 days of notice to proceed, the Contractor shall provide, for approval by the District, the following schedule of submittals:

a. A schedule of shop drawings and technical submittals are required by the specifications and drawings. Schedule shall indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the specification section number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date.

b. A separate schedule of other submittals required under the contract but not listed in the specifications or drawings. Schedule will indicate the contract requirement reference; the type or title of the submittal; the Contractor's anticipated submission date and the approved need date (if approval is required).

c. Submittals called for by the contract documents will be listed on one of the above schedules. If a submittal is called for but does not pertain to the contract work, the Contractor shall include it in the applicable schedule and annotate it "N/A" with a brief explanation. Approval of the schedules by the District does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the schedules or marked "N/A".

d. Copies of both schedules shall be re-submitted monthly annotated by the Contractor with actual submission and approval dates. When all items on a schedule have been fully approved, no further re-submittal of the schedule is required.

1.5.2 Drawings Submittals

One (1) translucent reproducible copy(s) and six (6) black line or blue line opaque prints of each drawing shall be submitted. One (1) set of prints, marked with review notations by the Contracting Officer, will be returned to the Contractor.

1.5.3 Data Submittals

Six (6) complete sets of indexed and bound product data shall be submitted. One (1) set, marked with review notations by the District, will be returned to the Contractor.

1.6 DISTRICT'S REVIEW

1.6.1 Review Notations

The District will review submittals and provide pertinent notation within twenty-one (21) calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" authorize the Contractor to proceed with the work covered.

b. Submittals marked "approved as noted" authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections. Notes shall be incorporated prior to submission of the final submittal.

c. Submittals marked "return for correction" require the Contractor to make the necessary corrections and revisions and to re-submit them for approval in the same routine as before, prior to proceeding with any of the work depicted by the submittal.

d. Submittals marked "not approved" or "disapproved" indicate noncompliance with the contract requirements and shall be re-submitted with appropriate changes. No item of requiring a submittal shall be accomplished until the submittals are approved or approved as noted.

e. Contractor shall make corrections required by the District. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes" shall be given to the District. Approval of the submittals by the District shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Contractor shall be responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the District requiring rejection and removal of such work at the Contractor's expense.

f. If changes are necessary to approved submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change shall be accomplished until the changed submittals are approved.

1.7 PROGRESS SCHEDULE

1.7.1 Bar Chart

Contractor shall:

a. Submit the progress chart, for approval by the District, at the Preconstruction Conference in one reproducible and four copies.

b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the District.

c. Include no less than the following information on the progress chart:

(1) Break out by major headings for primary work activity.

(2) A line item break out under each major heading sufficient to track the progress of the work.

(3) A line item showing contract finalization task, which includes punch list, clean up, demolition, and final construction drawings.

(4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the contract performance period.

(5) The estimated cost and percentage weight of total contract cost for each materials and labor bar on the chart.

(6) Separate line items for mobilization and drawing submittal and approval. (These items are to show no associated costs.)

d. Update the progress schedule in one reproduction and 4 copies every 30 days throughout the contract performance period.

1.7.2 Project Network Analysis

Contractor shall submit the initial progress schedule within 21 days of notice of award and notice to proceed. Schedule shall be updated and resubmitted monthly beginning 7 days after return of the approved initial schedule. Updating shall entail complete revision of the graphic and data displays incorporating changes in scheduled dates and performance periods. Red lined updates will only be acceptable for use as weekly status reviews.

Contractor shall provide a single point contact from his on-site organization as his Schedule Specialist. Schedule Specialist shall have the responsibility of updating and coordinating the schedule with actual job conditions. Schedule Specialist shall participate in weekly status meetings and present current information on the status of purchase orders, shop drawings, off-site fabrication, materials deliveries, Subcontractor activities, anticipated needs for District furnished equipment, and any problem, which may impact the contract performance period.

Project network analysis shall include:

a. Graphic display shall be a standard network or arrow diagram capable of illustrating the required data. Drafting shall be computer generated on standard drafting sheets or on small (11 by 17-inch minimum) sheets with separate overview and detail breakouts. Any graphic display system used shall be readily legible with a clear, consistent method for continuations

and detail referencing. Critical path shall be clearly delineated on the display. When milestone dates are included in the Contract they shall be clearly indicated on the display.

b. Data shall be presented as a separate printout on paper or, where feasible, may be printed on the same sheet as the graphic display. Data shall be organized in a logical coherent display capable of periodic updating.

c. Data shall include verbal activity descriptions with a numerical ordering system cross-referenced to the graphic display. Additionally, costs (broken down into separate materials and labor costs), duration, early start date, early finish date, late start date, late finish date, and float shall be detailed for each activity. A running total of the percent completion based on completed activity costs versus total contract cost shall be indicated. A system for indicating scheduled versus actual activity dates and durations shall be provided.

d. Schedule shall be of sufficient detail to facilitate the Contractor's control of the job and to allow the District readily to follow progress for portions of the work.

1.8 STATUS REPORT ON MATERIALS ORDERS

Within thirty (30) days after notice to commencement of construction activities, the Contractor shall submit, for approval by the District, an initial status report on materials orders. This report will be updated and re-submitted every week as the status on material orders changes.

Report shall list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

a. Material name, supplier, and invoice number.

b. Bar chart line item or CPM activity number affected by the order.

c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.

d. Current delivery date agreed on by supplier.

e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.

f. When item d exceeds item c, a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01411

GENERAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

The requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 REFERENCES

The publications listed below form a part of this section to the extent referenced:

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1926 Safety and Health Regulations for Construction

1.3 SUBMITTALS

Submittals shall be submitted in accordance with Section 01330, "Submittals," in sufficient detail to show full compliance with Federal, State and local laws, regulations, ordinances, codes, and orders relating to safety and health in effect on the date of this Contract.

1.4 GENERAL SAFETY PROVISIONS

Contractor shall take safety and health measures in performing work under this Contract. Contractor shall meet with the District to develop a mutual understanding relative to administration of the safety plan.

During the performance of work under this Contract, the Contractor shall comply with procedures prescribed for control and safety of persons visiting the project site. Contractor is responsible for his personnel and for familiarizing each of his subcontractors with safety requirements. Contractor shall advise the District of any special safety restriction he has established so that District personnel can be notified of these restrictions.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Reference publications are cited in other sections of the specifications along with identification of their sponsoring organizations. The addresses of the sponsoring organizations are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AMERICAN CONCRETE INSTITUTE (ACI)

P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3700
Fax: 248-848-3701
Internet: http://www.aci-int.inter.net

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001
Ph: 312-670-2400
Publications: 800-644-2400
Fax: 312-670-2400
Internet: http://www.aiscweb.com

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St
New York, NY 10036
Ph: 212-642-4900
Fax: 212-302-1286
Internet: http://www.ansi.org/

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
Internet: www.astm.org

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

Three Park Avenue
New York, NY 10016-5990
Ph: 212-591-7722
Fax: 212-591-7674
Internet: www.asme.org

AMERICAN WELDING SOCIETY (AWS)

550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353
Fax: 305-443-7559
Internet: www.amweld.org

CODE OF FEDERAL REGULATIONS (CFR)

Order from:
Government Printing Office
Washington, DC 20402
Ph: 202-512-1800
Fax: 202-275-7703
Internet: http://www.pls.com:8001/his/cfr.html

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

2500 Wilson Blvd.
Arlington, VA 22201-3834
Ph: 703-907-7500
Fax: 703-907-7501
Internet: www.eia.org

FEDERAL SPECIFICATIONS (FS)

Order from:
General Services Administration
Federal Supply Service Bureau
470 L'Enfant Plaza, S.W.
Washington, DC 20407
Ph: 202-619-8925
Fax: 202-619-8978

Internet: http://pub.fss.gsa.gov/h1-pub.html

FEDERAL STANDARDS (FED-STD)

Order from:
General Services Administration
Federal Supply Service Bureau
470 E L'Enfant Plaza, S.W.
Washington, DC 20407
Ph: 202-619-8925
Fax: 202-619-8978
Internet: http://pub.fss.gsa.gov/hi-pub.html

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

445 Hoes Ln, P. O. Box 1331
Piscataway, NJ 08855-1331
Ph: 732-981-0060 OR 800-701-4333
Fax: 732-981-9667
Internet: http//www.standards.ieee.org
E-mail: customer.service@ieee.org

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

3, rue de Varembe, Case Postale 131
CH-1211 Geneva 20, Switzerland
Ph: 41-22-919-0211
Fax: 41-22-919-0300
Internet: http://www.iec.ch
e-mail: custserv@iec.ch

INTERNATIONAL STANDARDS ORGANIZATION (ISO)

1, rue de Varembe'
Case Postale 56
CH-1211 Geneve 20
Switzerland
Internet: www.iso.ch

INSTRUMENT SOCIETY OF AMERICA (ISA)

67 Alexander Drive
P.O. Box 12277

Research Triangle Park, NC 27709
Ph: 919-549-8411
Fax: 919-549-8288
e-mail: ISA@isa.org
Internet: http://www.isa.org

JOINT INDUSTRIAL COUNCIL (JIC)

Association for Manufacturing Technology
7901 Westpark Dr.
McLean, VA 22102
Ph: 703-893-2900
Fax: 703-893-1151

MILITARY SPECIFICATIONS (MS)

Order from:
Standardization Documents Order Desk
Building 4, Section D
700 Robbins Ave.
Philadelphia, PA 19111-5094
Ph: 215-697-5147
Fax: 215-697-5148
Internet: www.dodssp.daps.mil

MILITARY STANDARDS (MIL-STD)

Order from:
Standardization Documents Order Desk
Building 4, Section D
700 Robbins Ave.
Philadelphia, PA 19111-5094
Ph: 215-697-2179
Fax: 215-697-2978
Internet: www.dodssp.daps.mil

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

1300 N. 17th St., Suite 1847
Rosslyn, VA 22209
Ph: 703-841-3200
Fax: 202-841-3300
Internet: http//www.nema.org/

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
Ph: 800-344-3555
Fax: 800-593-6372
Internet: http://www.nfpa.org

SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL
ASSOCIATION (SMACNA)

4201 Lafayette Center Drive
Chantilly, VA 20151-1209
Ph: 703-803-2980
Fax: 703-803-3732
Internet: http://www.smacna.org

UNDERWRITERS LABORATORIES (UL)

333 Pfingsten Rd.
Northbrook, IL 60062-2096
Ph: 847-272-8800
Fax: 847-272-8129
Internet: http://www.ul.com/
Order from:
Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112-5776
Ph: 800-569-7128
Fax: 303-397-7945
Internet: http://global.ihs.com
E-mail: global@ihs.com

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SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

Requirements of this Section apply to, and are a component of, each section of the specifications.

1.2 REFERENCES (Not Applicable)

1.3 SUBMITTALS (Not Applicable)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 TEMPORARY UTILITIES

Contractor shall provide temporary utilities required for construction. Materials may be new or used, shall be adequate for the required usage, shall not create unsafe conditions, and shall not violate applicable codes and standards.

3.1.1 Electricity

The Contractor shall use existing connections by use of power cords. The District will furnish electricity used.

3.1.2 Water

Contractor shall make connections to existing facilities to provide water for construction purposes. The District will furnish water used.

3.1.3 Telephone Service

There is no telephone service on site. The Contractor shall provide any cellular telephone service.

3.1.4 Sanitary Facilities

Contractor shall provide temporary sanitary facilities and shall service, clean, and maintain these facilities and enclosures. Temporary facilities shall be removed from the site at the completion of the work.

3.1.5 Fire Protection

Debris and flammable materials shall be removed daily to minimize potential hazards.

3.2 TEMPORARY STRUCTURES

Contractor-owned or -leased trailers shall be located in areas designated areas designated by District's staff on the site. There may only room for a small Job Box and lay down area behind the pump station. The Contractor will review the location with the Owner staff.

3.5 PROTECTION OF EXISTING SYSTEMS

3.5.1 Utility

Connection to existing utilities, identified on the drawings to the Contractor, shall be protected from damage during construction activity.

3.5.2 Safety

Contractor shall protect the integrity of any installed safety systems or personnel safety devices.

If entrance into systems serving safety devices is required, the Contractor shall obtain prior approval from the District. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, the Contractor shall provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and shall obtain prior approval from the District.

-- End of Section --

SECTION 01630

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 GENERAL

1.1 PROPOSED SUBSTITUES OR "OR-EQUAL" ITEMS

Whenever material or equipment are indicated in the contract documents by using proprietary item or the name of a particular supplied and/or manufacturer, the naming of the item is intended to establish the type, function and quality required. Unless expressly prohibited, materials or equipment of other suppliers and/or manufacturers may be accepted if the Contractor to the District for review to determine that the material or equipment is equivalent or equal to that named submits sufficient information. The District shall be the sole judge of acceptability, and no substitute shall be ordered without the District's prior written acceptance.

1.2 SUBSTITUTE REQUEST

The Contractor's application for Substitution Request shall contain the following statements and information, which shall be considered by the District in evaluating the proposed substitution:

1. The evaluation and acceptance of the proposed substitute will not prejudice the Contractor's achievement of substantial completion on time.

2. Whether or not acceptance of the substitute for use in the work will require a change in any of the contract documents to adopt the design to the proposed substitute.

3. Whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty.

4. All variations of the proposed substitute from the items originally specified.

5. Available maintenance, repair, and replacement service will be indicated. The manufacturer shall have a local service agency (within 50 miles of the site), which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.

6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUMMARY

The requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 REFERENCES (Not Applicable)

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01330, "Submittals," in sufficient detail to show full compliance with the specification:

Post-Construction Submittals

The following shall be submitted in accordance with paragraph entitled, "General," of this section.

Reproducible Drawings
CAD System Drawings

Shop Drawings

As-Built Drawings shall be submitted in accordance with paragraph entitled, "General," of this section.

Product Data

Spare Parts Data shall be in accordance with paragraph entitled, "General," of this section.

Certificates

Work Plan shall be submitted in accordance with paragraph entitled, "General," of this section.

Manufacturer's Instructions

The following shall be submitted in accordance with paragraph entitled, "General," of this section.

Posted Instructions

Operation and Maintenance Data

Operation and Maintenance Manuals shall be submitted in accordance with paragraph entitled, "Operation and Maintenance," of this section.

1.4 GENERAL

Reproducible Drawings and CAD System Drawings shall be submitted as follows:

One reproducible copy of each drawing, product data record, or CAD system CD ROM showing each drawing, product data record, or log shall be submitted for historical record.

Final drawings shall incorporate contract changes and plan deviations. Lines, letters, and details will be sharp, clear, and legible. Additions or corrections to the drawings will be drawn to the scale of the original drawing. One copy, marked with review notations by the District, will be returned to the Contractor. Drawings are to be resubmitted within thirty (30) calendar days after the completion of the representative work effort.

Documents shall be current. Contractor shall not conceal record information until as-built drawings have been made. Record drawings shall be submitted with a transmittal letter containing date, project title, Contractor's name and address, document list, and Contractor's signature.

As-Built Drawings shall be submitted under the following criteria:

In order to minimize the time for final payment at the completion of the project, the Contractor shall update the as-built drawings every month with the District's authorized representative. This update will be a part of "the monthly request for payment meeting," and payment--or a portion of the payment, including final payment--may be withheld until the as-built drawings have been updated, and accepted by the District.

After completion of all construction and before final payment is made under this contract, the Contractor shall provide the District with one complete set of contract drawings in sepia marked-up reproducible blackline, and one full size reproduction, on paper, of marked-up sepias. (District will provide original contract sepias for this purpose.) In addition, one complete set of CAD system drawings with all changes clearly identifiable on the computer screen along with one hard copy of the same (with advance permission given by the District).

A Work Plan shall be submitted to the District for project closeout. Plan shall include all scheduled inspections, instruction classes, items, closeout dates for all functions, and shall list the required District and Contractor personnel that will be taking part in these functions.

Posted Instructions shall be submitted by the Contractor with labels, signs, and templates of operating instructions that are required to be mounted or installed on or near the product for normal, safe operation.

Contractor shall submit six (6) copies of the project operation and maintenance manuals 30 days prior to testing the system involved. Data shall be updated and resubmitted for final approval no later than 30 days prior to contract completion.

Spare Parts Data shall indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

Contractor shall supply items of each part for spare parts inventory. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 OPERATION AND MAINTENANCE

Operation and Maintenance Manuals shall be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions. Information shall be bound in manual format and grouped by technical sections. Pages for vendor data and manuals shall have 3/16 inch holes and be bound in 3-ring, loose-leaf binders. Data sheets shall be organized by separate index and tabbed sheets, in a loose-leaf binder. Binder shall lie flat with printed sheets that are easy to read. Caution and warning indications shall be clearly labeled.

The Contractor shall supply six (6) copies of operation and maintenance manuals. The Contract Officer shall review the manuals for discrepancies and missing information.

-- End of Section --

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SECTION 13801

INSTRUMENTATION

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

Preconstruction Submittals
- Flow Transmitter
- Gage Pressure Transmitter
- Differential Pressure/Level Transmitter
- Electronic Pressure Switch
- Door Limit Switches
- Valve Limit Switches
- ISA Calibration Sheets

Maintenance Instructions Data
- Flow Transmitter
- Gage Pressure Transmitter

Differential Pressure/Level Transmitter
Electronic Pressure Switch
Door Limit Switches
Valve Limit Switches

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NFPA 70, IEEE C2 and NEMA Z 535 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 FLOW TRANSMTITERS

The flow transmitter measures the flow in the process piping line using the electro-magnetic flow measurement technology and provides a proportional current (4-20

mA) for the PLC input. The flow meter shall have an input power range of 77 to 265 VAc, 50 to 60 Hz, with a power consumption of less than 20 Watts. The flow meter shall have an integral transmitter connected to the flow tube. The flow meter shall have an isolated active 4-20 mA DC output with a maximum impedance of 800 ohms, scaled pulse 24 VDc outputs, two flow alarms, open collector fault alarm, RS232 communications. The flow meter shall have an adjustable full-scale output value. The flow meter shall have an accuracy of +/- 0.5% over the full span and a repeatability of 0.1%.

The flow transmitter shall have an operating temperature range of -30 to 60 C and the sensor shall have an operating temperature range of -10 to 60 C. The flow tube shall have standard ANSI flange fittings installed with the manufacturer's suggested ground rings. The flow meter shall have powder coated die cast aluminum sensor housing and transmitter. The flow meter shall have a PTFE lining. The flow meter shall have a liquid crystal two-line 16-character interface on the transmitter that can display flow rate, and flow total. The flow meter shall have two (2) interface buttons for monitoring and configuring the flow meter. The flow meter shall have an Ethernet IP port for direct communications to PLC controller.

The flow meter shall be an Endress Hauser Promag 300 or a pre- approved equivalent.

No flow meters are required with this project.

2.2 GAGE PRESSURE TRANSMTITERS

The gage pressure transmitter measures the pressure in the process piping line using the strain gauge technology and provides a proportional current (4-20 mA) for the PLC input. The gage pressure transmitter shall have an input power range of 12 to 36 VDc. The gage pressure transmitter s shall have a passive 4-20 mA DC output with a maximum impedance of 700 ohms. The gage pressure transmitter shall have the ability to be configured with the Hart protocol. The gage pressure transmitter shall have an accuracy of +/- 0.15% over the full span and a repeatability of 0.1%.

The gage pressure transmitter shall have an operating temperature range of -20 to 60 C and the sensor shall have a process operating temperature range of -20 to 105 C. The gage pressure transmitter shall have a measurement range of 1.5 to 500 psi. The gage pressure transmitter shall have plastic PBT enclosure with an IP 66/67 ingress protection. The process connection shall have a 1/2" NPT process connection and circular process M12 x 1 connection. The gage pressure transmitter shall have a stainless-steel diaphragm and silicon oil media. The gage pressure transmitter shall have a liquid crystal display with a 4 ½ digit main display with a 20-segment bar graph display.

The gage pressure transmitter shall be a Rosemount 3051TG, or a pre-approved equivalent. The discharge pressure transmitter shall have a range of 0-500 psi and the suction pressure transmitter shall have a range of 0-100 psi.

No pressure transmitters are required with this project.

2.3 DIFFERENTIAL PRESSURE/LEVEL TRANSMTITERS

The differential pressure transmitter measures the pressure in the process piping line using the strain gauge technology and provides a proportional current (4-20 mA) for the PLC input. The differential pressure transmitter shall be have an input power range of 12 to 36 VDc. The gage pressure transmitter s shall have an passive 4-20 mA DC output with a maximum impedance of 700 ohms. The differential pressure transmitter shall have the ability to be configured with the Hart protocol. The differential pressure transmitter shall have an accuracy of +/- 0.5% over the full span and a repeatability of 0.15%.

The differential pressure transmitter shall have an operating temperature range of -20 to 60 C and the sensor shall have a process operating temperature range of -40 to 85 C. The differential pressure transmitter shall have a measurement range of 0.1 to 420 psi. The differential pressure transmitter shall have powder coated die cast aluminum sensor housing. The process connection shall have two (2) 1/4" -18 NPT process connections and 1/2" electrical connection. The differential pressure transmitter shall have a stainless-steel diaphragm and silicon oil media. The differential pressure transmitter shall have a liquid crystal four-line 16-character interface on the transmitter that can display pressure reading. The differential pressure transmitter shall have four (4) interface buttons for monitoring and configuring the flow meter,

The differential pressure transmitter shall be a Rosemount CD, or a pre-approved equivalent. The differential pressure level transmitter shall have a range of 0-10 ft.

No differential pressure transmitters are required with this project.

2.4 ELECTRONIC PRESSURE SWITCH

The electronic pressure switch measures the pressure in the process piping line using the strain gauge technology and provides a programmable switch for control circuits. The electronic pressure switch shall have an input power range of 85 to 250 VAc, 45 to 65 Hz, and power draw is less that 12 VA. The electronic pressure switch shall have an accuracy of +/- 1.0% over the full span and a linearity of 0.5%. The electronic pressure switch shall have a triac output that can be programmed for low pressure, high pressure, window function, normally open contact, normally closed contact, damping, time delay, and selectable units.

The electronic pressure switch shall have an operating temperature range of -25 to 80 C. The electronic pressure switch shall have a measurement range of 0 to 363 psi. The electronic pressure switch shall have powder coated die cast aluminum sensor housing with IP65 rating. The process connection shall have one (1) 1/4" NPT process connection and a quick cable connection for the electrical connection. The electronic pressure switch shall have a LED display with two (2) programming keys.

The electronic pressure switch shall be an IFM Efector PN4223 or PN4224 with the connection cable E18027, and protective cover E30006. The pump discharge pressure switch shall have a range of 0-363 psi and the suction pressure switch shall have a range of 0-141.5 psi.

Tag Name	Location	Range
PSL-310	Pump 1 Suction Pressure	0-141.5 psi
PSHL-312	Pump 1 Discharge Pressure	0-363 psi
PSL-320	Pump 2 Suction Pressure	0-141.5 psi
PSHL-322	Pump 2 Discharge Pressure	0-363 psi

2.5 DOOR LIMIT SWITCHES

The door limit switch indicates door fully closed position for intrusion detection. The switch shall be mounted internal to pump station doors to provide switch closure when door is fully closed. The doors switch shall be rated for AC 600 Vac or DC voltages up to 250 VDc and shall have one normally open contact and one normally closed contact. The door switch shall have an enclosure rating NEMA 4 with 1/2" NPT conduit ports. The door limit switch shall be Micro Switch LSA6B or equivalent. The Contractor is responsible for furnishing and installing the required accessories for the door limit switch to operate.

Tag Name	Location	Quantity
XA-303A	PLC Control Panel Door	1
XA-303B	MCC Control Panel Doors	4
XA-303-C	Vault Hatches	1

2.6 VALVE LIMIT SWITCHES

The valve limit switches indicate full closed and/or fully open position of the valve. Switch shall be side rotary with momentary contacts capable of 10A at 600 VAc and 250 VDC. Valve limit switch shall have an operating temperature range of -12 C to +121 C. The valve limit switch shall have 2 normally closed and 2 normally open contacts. The valve limit switch body shall be zinc diecast with an electrostatic epoxy coating with an IP65/66/67 rating.

The valve limit switch shall be a CLA-Val X105L and contractor shall furnish and install all fittings, components, and accessories required to properly retrofit valve limit switches to existing valves.

Tag Name	Location
ZSC-313	Pump 1 Pump Control Valve
ZSC-323	Pump 2 Pump Control Valve
ZSC-331	PRV Valve

2.7 LEVEL FLOAT SWITCHES

The float level switch shall indicate when the vault has a few inches of water above the floor of the pump station or vault. The float level switch shall have a single pole normally closed contact rated at 20 VA. The wetted materials shall have a body of 304 stainless steel and a float of Buna N with a stem and mounting of 316 stainless steel. The float switch shall have a mounting backet to attach to the wall or equipment panel. The enclosure shall have a rating of NEMA 4X and a temperature rating of -40 to 100 C. The level float switch shall be a Gems 43760 LS-270 or an approved equivalent.

Tag	Description	Type, Rating
LSH-260	Vault Flooded	NC, 20 VA

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 INSTALLATION

3.2.1 FLOW TRANSMITTER

The flow transmitter shall be mounted in the process piping as shown on the Drawings. The flow meter shall be installed with manufacturer specified grounding rings and wired according to the manufacturer’s recommendations.

3.2.2 GAGE PRESSURE TRANSMITTER

The gage pressure transmitter shall be mounted in the process piping as shown on the Drawings with isolation valve, drain valve, and related pipe fittings. The Contractor shall furnish and install the equipment as shown on the Drawings.

3.2.3 DIFFERENTIAL PRESSURE/LEVEL TRANSMITTER

The differential pressure/level transmitter shall be mounted in the process piping for the hydro-pneumatic tank as shown on the Drawings with isolation valve, and related pipe fittings. The differential pressure transmitter shall be mounted lower than the high-pressure input port (lower port) on the lowest point of the hydropneumatic tank. The Contractor shall furnish and install the equipment and process piping as shown on the Drawings.

3.2.4 ELECTRONIC PRESSURE SWITCH

The electronic pressure switch shall be mounted in the process piping as shown on the Drawings with isolation valve, drain valve, and related pipe fittings. The Contractor shall furnish and install the equipment as shown on the Drawings.

3.2.5 VALVE LIMIT SWITCHES

The valve limit switches shall be mounted to according the pump control valve manufacturer and the limit switch manufacturer recommendations. The Contractor shall provide all associated parts as shown on the drawings. There shall be two limit switches, on for valve open limit and one for valve closed limit monitoring.

3.3 SPARE PARTS

The Contractor shall furnish one of each type of pressure transmitter, electronic pressure switch, valve limit switch, level float switch, and door switch. The spare parts shall be placed in a plastic storage bin and labeled as SPARE PARTS.

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SECTION 16003

GENERAL ELECTRICAL PROVISIONS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

FEDERAL SPECIFICATIONS (FS)
FS W-J-800 (Rev F) Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc-Coated)

FEDERAL STANDARDS (FED-STD)
FED-STD 595 (Rev B) Colors Used in Government Procurement

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA Z 535 - Safety Color Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS (Not Applicable)

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable facility.

Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

Except where shown in dimensional detail, the locations of switches, receptacles, lights, motors, outlets, and other equipment shown on plans are approximate. Such items shall be placed to eliminate interference with ducts, piping, and equipment. Exact locations shall be determined in the field. Door swings shall be verified to ensure that light switches are properly located.

Equipment sizes indicated on drawings are sized for the minimum application. Before installing any wire or conduit, the Contractor shall obtain the exact equipment requirements and shall install wire, conduit, disconnect switches, motor starters, heaters, circuit breakers, and other items of the correct size for the equipment actually installed. Wire and conduit sizes shown on the drawings shall be taken as a minimum and shall not be reduced without written approval.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NFPA 70 and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

1.7 PREVENTION OF CORROSION

Metallic materials shall be protected against corrosion. Equipment enclosures shall be given a rust-inhibiting treatment and the standard finish by the manufacturer. Aluminum shall not be used in contact with earth. Dissimilar metals in intimate contact shall be protected by approved fittings, barrier material, and treatment. Ferrous metals such as anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous parts not of

corrosion-resistant steel or nonferrous materials shall be hot-dip galvanized in accordance with ASTM A 123 for exterior locations and cadmium-plated in conformance with FS W-J-800 for interior locations.

1.8 HAZARDOUS AREA

Electrical work within any hazardous location shall meet the applicable requirements of NFPA 70, Chapter 5, and Articles 500 through 517. The following definitions apply:

Explosion proof: A receptacle, fixture, device, or equipment enclosure that is designed to withstand explosion of a specified liquid, gas, vapor, or dust within the enclosure and to prevent the ignition of a specified gas, vapor, or dust surrounding the enclosure by sparks, flashes, or explosions of the specified liquid, gas, vapor, or dust that may occur within the enclosure. Enclosure shall be capable of operating at an external temperature that will not ignite a surrounding flammable atmosphere.

Hazardous location: An area where ignitable vapors or dust may cause a fire or explosion created by energy emitted from lighting or other electrical equipment or by electrostatic generation.

NFPA 70, Article 500-2 lists chemical atmospheres by groups A, B, C, and D. In addition, although not defined as a hazardous material by the NEC, oxygen concentrations (liquid and gaseous) are considered to provide a hazard because of the increased flammability of materials exposed to oxygen. Therefore, oxygen concentrations shall be classified under Group D.

PART 2 CONSTRUCTION MATERIALS

2.1 IDENTIFICATION PLATES

Identification plates shall be 3-layer black-white-black, engraved to show white letters on a black background. Letters shall be uppercase. Identification plates 1 ½ inch high and smaller shall be 1/8-inch-thick with engraved lettering 1/8 inch high. Identification plates larger than 1 ½ inch high shall be 1/8-inch-thick with engraved lettering not less than ¼ inch high. Identification plates having edges of 1 ½ inch high and larger shall be beveled. The plates shall be attached using stainless steel machine screws.

2.2 WARNING SIGNS

Each item of electrical equipment operating at 480 volts and above shall be provided with conspicuously located warning signs conforming to the requirements of Occupational Safety and Health Agency (OSHA) standards.

Any equipment with externally powered wiring shall be marked with a laminated plastic nameplate having ¼-inch high white letters on a red background as follows:

DANGER - EXTERNAL VOLTAGE SOURCE

Safety color-coding for identification of warning signs shall conform to NEMA Z 535.

2.3 ANCHOR BOLTS

Anchor bolts shall be provided for equipment placed on concrete equipment pads or slabs. Anchors shall be placed at standard distances for the devices are mounted to existing structures. Anchor bolts shall be made from stainless steel or hot dipped galvanized no smaller than 1/2” in diameter.

2.4 SEISMIC ANCHORAGE

Electrical equipment, except communications, emergency, and standby equipment, shall be designed to 2013 California Building Code (CBC) by a professional or Structural engineer registered in the state of California, hired by the contractor or manufacturer.

FP = 1.6 SDS IP WP
FP = Lateral Seismic Force
SDS = Short Period Spectral Acceleration (see general structural note)
IP = Seismic Importance Factor = 1.5
WP = Operating Weight of the Equipment Including Contents

Seismic forces shall be considered acting at the center of gravity of the piece under consideration. Anchorages shall be designed and detailed assuming that they will not receive special Inspection as defined in the California Building Code.

Anchorage of equipment shall be coordinated with the concrete subcontractor so that anchorage may be installed at the time of concrete placement. If calculations and anchorage details are not submitted prior to placement of concrete, the Contractor shall be responsible for any strengthening of concrete elements because of superimposed seismic loading.

Equipment with vibration isolators shall be provided with snubbers capable of retaining the equipment in its designated location without any material failure or deformation of the snubbers when exposed to a vertical or horizontal force at the contact surface equal to 100 percent of the operating weight of the equipment.

Air gaps between retainer and equipment base shall not exceed 1/4 IN. Deflection must be considered with respect to piping attached to the equipment. Equipment without vibration isolators shall be anchored directly to the supporting floor system.

In addition to the anchorage, all equipment shall be internally designed so that all static and moving parts are anchored to the supporting framework to resist the imposed seismic forces. All forces must be transmitted to the base in order to be anchored as required. All piping, raceways, ductwork, accessories, appurtenances, and other items furnished with equipment shall be anchored to resist lateral considered acting at the center of gravity of the piece under consideration.

Radio masts or antennas shall be anchored to support the devices mounted on the mast to withstand a 100-mph wind load.

2.5 PAINTING

Enclosures of the following listed items shall be cleaned, primed, and factory-painted inside and outside in accordance with MS MIL-T-704.

ITEM	FINISH COLOR
Panel boards	Manufacturer's standard
Electric Heaters	Manufacturer's standard
Motors	Manufacturer's standard
Limit Switches	Manufacturer's standard
Control Components	Manufacturer's standard

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

Installation shall be accomplished by workers skilled in this type of work. Installation shall be made so that there is no degradation of the designed fire ratings of walls, partitions, ceilings, and floors. Except as otherwise indicated, emergency switches and alarms shall be installed in conspicuous locations.

3.2 PAINTING APPLICATION

Exposed conduit, supports, fittings, cabinets, pull boxes, and racks, if not factory painted, shall be thoroughly cleaned, and painted. Work shall be left in a neat and clean condition at final completion of the contract.

Emergency equipment, such as fire-alarm boxes, shall be cleaned, primed, and painted red. Color shall conform to FED-STD 595, Color 11105.

3.3 IDENTIFICATION PLATE INSTALLATION

Identification plates shall be fastened by means of stainless-steel machine screws. Hand lettering, marking, or embossed self-adhesive tapes are not acceptable.

3.4 EQUIPMENT PADS

Equipment pads shall be constructed with a minimum 4-inch margin around the equipment and supports.

3.5 CUTTING AND PATCHING

Contractor shall install his work in such a manner and at such time as will require a minimum of cutting and patching on the building structure.

Holes in or through existing masonry walls and floors in exposed locations shall be drilled and smoothed by sanding. Use of a jackhammer will be permitted only where specifically approved.

3.6 DAMAGE TO WORK

Required repairs and replacement of damaged work shall be done as directed by and subject to the approval of the Engineer, and at no additional cost to the District.

3.7 CLEANING

Exposed surfaces of wire ways, conduit systems, and equipment that have become covered with dirt, plaster, or other material during handling and construction shall be thoroughly cleaned before such surfaces are prepared for final finish or painting or are enclosed within the building structure.

Before final acceptance, electrical equipment, including lighting fixtures and glass, shall be clean and free from dirt, grease, and finger marks.

3.8 FIELD TESTING AND TEST EQUIPMENT

All field-testing specified in Divisions 16 electrical specification shall be made with test equipment specially designed and calibrated for the purpose. Test equipment used shall be calibrated and certified by an approved testing laboratory. Date of last calibration and certification shall not be more than 90 days old at the time of field-testing.

-- End of Section --

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA 250 - Enclosures for Electric Equipment (1000 Volts Maximum)
NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
NEMA PB 1 - Panel boards
NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 13 - Electrical Nonmetallic Tubing (ENT)
NEMA WD 6 - Wiring Devices - Dimensional Requirements
NEMA Z 535 - Safety Color Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL 1 - UL Standard for Safety - Flexible Metal Conduit
UL 1242 - UL Standard for Safety - Intermediate Metal Conduit
UL 489 - UL Standard for Safety Molded-Case Circuit Breakers and Circuit-Breaker Enclosures
UL 506 - UL Standard for Safety Specialty Transformers
UL 6 - UL Standard for Safety - Rigid Metal Conduit
UL 797 - UL Standard for Safety - Electrical Metallic Tubing
UL 870 - UL Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent

equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
Material, Equipment, and Fixture Lists shall be submitted for the following:
- Wire and Cable
- Switches
- Circuit Breakers
- Panel boards

1.3 PREVENTION OF CORROSION

Metallic materials shall be protected against corrosion. Equipment enclosures shall have the standard finish by the manufacturer. Aluminum shall not be used in contact with earth and, where connected to dissimilar metal, shall be protected by approved fittings and treatment. Ferrous metals such as, but not limited to, anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous spare parts not of corrosion-resistant steel shall be hot-dip galvanized except where other equivalent protective treatment is specifically approved in writing.

1.4 GENERAL REQUIREMENTS

Material, Equipment, and Fixture Lists shall be submitted for the following items showing manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site.

Manufacturer's Instructions shall be submitted including special provisions required to install equipment components and system packages. Special notices shall detail impedances, hazards, and safety precautions.

PART 2 CONSTRUCTION MATERIALS

2.1 MATERIALS

Materials and equipment to be provided shall be the standard cataloged products of manufacturers regularly engaged in the manufacture of the products.

2.1.1 Rigid Steel Conduit

Rigid steel conduit shall be in accordance with UL 6 and shall be galvanized by the hot-dip process. Where underground and in corrosive areas, rigid steel conduit shall be polyvinyl chloride (PVC) coated in accordance with NEMA RN 1 or shall be painted with bitumastic.

Fittings for rigid steel conduit shall be threaded.

Gaskets shall be solid. Conduit fittings with blank covers shall have gaskets, except in clean, dry areas or at the lowest point of a conduit run where drainage is required.

Covers shall have captive screws and shall be accessible after the work has been completed.

2.1.2 Electrical Metallic Tubing (EMT)

EMT shall be in accordance with UL 797 and shall be zinc coated steel. Couplings and connectors shall be zinc-coated, rain tight, gland compression with insulation throat. Crimp, spring, or setscrew type fittings shall not be acceptable.

2.1.3 Flexible Metallic Conduit

Flexible metallic conduit shall be in accordance with UL 1 and shall be galvanized steel.

Fittings for flexible metallic conduit shall be specifically designed for such conduit.

Liquid tight flexible metallic conduit shall be provided with a protective jacket of PVC extruded over a flexible interlocked galvanized steel core to protect wiring against moisture, oil, chemicals, and corrosive fumes.

Fittings for liquid tight flexible metallic conduit shall be specifically designed for such conduit.

2.1.4 Intermediate Metal Conduit

Intermediate metal conduit shall be in accordance with UL 1242 and shall be galvanized.

2.1.5 Rigid Nonmetallic Conduit

Rigid nonmetallic conduit shall be in accordance with NEMA TC 13 and shall be PVC with wall thickness not less than Schedule 40.

2.1.6 Wireways and Auxiliary Gutters

Wireway and auxiliary gutters shall be a minimum 4 by 4 inches trade size conforming to UL 870.

2.2 WIRE AND CABLE

Conductors installed in conduit shall be copper 600-volt type THWN. All conductors 8 AWG and larger, shall be stranded. All conductors smaller than 8 AWG shall be stranded.

Flexible cable shall be Type SO and shall contain a grounding conductor with green insulation.

Conductors installed in plenums shall be marked plenum rated.

2.3 SPLICES AND CONNECTORS

Splices in 8 AWG and smaller shall be made with approved indentor crimp-type connectors and compression tools.

Splices in 6 AWG and larger shall be made with bolted clamp-type connectors. Joints shall be wrapped with an insulating tape that has an insulation and temperature-rating equivalent to that of the conductor.

2.4 SWITCHES

2.4.1 Safety Switches

Safety switches shall be in accordance with NEMA KS 1, and shall be the heavy-duty type with enclosure, voltage, current rating, number of poles, and fusing as indicated. Switch construction shall be such that, with the switch handle in the "ON" position, the cover or door cannot be opened. Cover release device shall be coin proof and shall be so constructed that an external tool must be used to open the cover. Provisions shall be made to lock the handle in the "OFF" position, but the switch shall not be capable of being locked in the "ON" position.

Switches shall be of the quick-make, quick-break type. Terminal lugs shall be approved for use with copper conductors.

Safety color-coding for identification of safety switches shall conform to NEMA Z 535.

2.4.2 Toggle Switches

Toggle switches shall be in accordance with EIA 480, and shall control incandescent, mercury, and fluorescent lighting fixtures and shall be of the heavy duty, general purpose, and non-interchangeable flush-type.

Toggle switches shall be industrial grade toggle type, single-pole, devices rated 20 amperes at 277 volts, 60-hertz alternating current (ac) only.

All toggle switches shall be products of the same manufacturer.

2.5 RECEPTACLES

Receptacles shall be commercial grade, 20A, 125 VAC, 2-pole, 3-wire duplex conforming to NEMA WD 6, NEMA 5-20R.

2.6 OUTLETS, OUTLET BOXES, AND PULL BOXES

Outlet boxes for use with conduit systems shall be in accordance with NEMA FB 1 and NEMA OS 1 and shall be not less than 2.5 inches deep. Pull and junction boxes shall be furnished with stainless steel screw-fastened covers.

2.7 PANELBOARDS

Lighting and appliance branch circuit panel boards shall be the circuit-breaker type in accordance with NEMA PB 1.Circuit breakers shall be bolted to the bus. Plug-in circuit breakers shall not be acceptable. Buses shall be copper of the rating indicated, with main lugs or main circuit breaker as indicated. Panel boards for use on grounded ac systems shall be provided with a full-capacity isolated neutral bus and a separate grounding bus bonded to the panel board enclosure. Panel board enclosures shall be NEMA 250, Type 1, in accordance with NEMA PB 1. Enclosure fronts shall have latchable-hinged doors.

2.8 CIRCUIT BREAKERS

Circuit-breaker interrupting rating shall be not less than those indicated shall and in no event less than 10,000 amperes root-mean-square (rms) symmetrical at 240 volts, respectively. Multi-pole circuit breakers shall be the common-trip type with a single handle. Molded case circuit breakers shall be bolt-on type conforming to UL 489.

2.9 LAMPS AND LIGHTING FIXTURES

Manufacturers and catalog numbers shown are indicative of the general type desired and are not intended to restrict the selection to fixtures of any particular manufacturer. Fixtures with the same salient features and equivalent light distribution and brightness characteristics, of equal finish and quality, will be acceptable. Lamps of the proper type and wattage shall be provided for each fixture.

Ballasts shall be high power factor and be energy efficient. Ballasts shall have a Class P terminal protective device for 120-volt operation as indicated and shall be rapid-start fluorescent. Ballasts shall be "A" sound rated. Fluorescent lamps shall be standard reduced wattage type.

High intensity discharge (HID) lighting fixtures shall have pre-wired integral ballasts and cast aluminum housings complete with tempered glass lenses suitable for installation in damp or wet locations. Fixtures and lamps shall be provided.

2.10 DRY-TYPE DISTRIBUTION TRANSFORMERS

General-purpose dry-type transformers with windings 600 volts or less shall be two-winding, 60 hertz, self-cooled in accordance with UL 506. Windings shall have a minimum of two 2-1/2-percent taps above and below nominal voltage.

PART 3 CONSTRUCTION METHODS

3.1 CONDUITS, RACEWAYS, AND FITTINGS

Conduit runs between outlet and outlet, between fitting and fitting, or between outlet and fitting shall contain not more than the equivalent of three 90-degree bends, including those bends located immediately at the outlet or fitting.

Crushed or deformed conduit shall not be installed. Trapped conduit runs shall be avoided where possible. Care shall be taken to prevent the lodgment of foreign material in the conduit, boxes, fittings, and equipment during the course of construction. Clogged conduit shall be cleared of obstructions or shall be replaced.

Conduit and raceway run concealed in or behind walls, above ceilings, or exposed on walls and ceilings 5 feet or more above finished floors and not subject to mechanical damage may be electrical metallic tubing (EMT).

3.1.1 Rigid Steel Conduit

Field-made bends and offsets shall be made with approved hickey or conduit bending machine. Conduit elbows larger than 2-½ inch shall be long radius.

Conduit stubbed-up through concrete floors for connections to freestanding equipment with the exception of motor-control centers, cubicles, and other such items of equipment, shall be provided with a flush coupling when the floor slab is of sufficient thickness. Otherwise, a floor box shall be provided and set flush with the finished floor. Conduits installed for future use shall be terminated with a coupling and plug set flush with the floor.

3.1.2 Electrical Metallic Tubing (EMT)

EMT shall be grounded in accordance with NFPA 70, using pressure-grounding connectors especially designed for EMT.

3.1.3 Flexible Metallic Conduit

Flexible metallic conduit shall be used to connect recessed fixtures from outlet boxes in ceilings, transformers, and other approved assemblies.

Bonding wires shall be used in flexible conduit as specified in NFPA 70, for all circuits. Flexible conduit shall not be considered a ground conductor. Electrical connections to vibration-isolated equipment shall be made with flexible metallic conduit.

Liquid tight flexible metallic conduit shall be used in wet and oily locations and to complete the connection to motor-driven equipment.

3.1.4 Intermediate Conduit

Field-made bends and offsets shall be made with approved hickey or conduit bending machine. Intermediate metal conduit shall be used only for indoor installations.

3.1.5 Rigid Nonmetallic Conduit

Rigid PVC conduit shall be direct buried.

A green insulated copper-grounding conductor shall be in conduit with conductors and shall be solidly connected to ground at each end. Grounding wires shall be sized in accordance with NFPA 70.

3.1.6 Wireway and Auxiliary Gutter

Straight sections and fittings shall be bolted together to provide a rigid, mechanical connection and electrical continuity. Dead ends of wireways and auxiliary gutters shall be closed. Unused conduit openings shall be plugged.

Wireways for overhead distribution and control circuits shall be supported at maximum 5 feet intervals.

Auxiliary gutters used to supplement wiring spaces for equipment not contained in a single enclosure shall contain no switches, over current devices, appliances, or apparatus and shall be not more than 30 feet long.

3.1.7 Surface Raceways and Assemblies

Surface raceways shall be mounted plumb and level, with the base and cover secured. Minimum circuit run shall be three-wire with one wire designated as ground.

3.1.8 Cable Trays

Cable trays shall be supported from ceiling hangers, equipment bays, or floor or wall supports. Cable trays may be mounted on equipment racks. Support shall be provided when the free end extends beyond 3 feet. Maximum support spacing shall be6 feet. Trays 10 inches wide or less shall be supported by one hanger. Trays greater than 10 inches wide shall be supported by two hangers. Cable trays shall be bonded at splices.

3.2 WIRING

Feeder and branch circuit conductors shall be color-coded as follows:

CONDUCTOR	COLOR AC
480 Phase A	Brown
480 Phase B	Orange
480 Phase C	Yellow
208/240 Phase A	Red
208/240 Phase B	Black
208/240 Phase C	Blue
Neutral	White
Equipment Grounds	Green or Green with Yellow Stripe

Conductors up to and including 2 AWG in diameter shall be manufactured with colored insulating materials. Conductors larger than 2 AWG shall have ends identified with color plastic tape in outlet, pull, or junction boxes.

Splices shall be in accordance with the NFPA 70. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made and at the equipment terminal of each conductor. Terminal and conductor identification shall match as indicated.

Where several feeders pass through a common pull box, the feeders shall be tagged clearly to indicate the electrical characteristics, circuit number, and panel designation.

Wire nuts and butt splices shall not be used on any part of this project. All wiring connections will be made on terminals in junction boxes or control enclosures.

3.3 IDENTIFICATION PLATES AND WARNINGS

Identification plates shall be furnished for lighting and power panel boards, motor control centers, all line voltage heating and ventilating control panels, fire detector and sprinkler alarms, doorbells, pilot lights, disconnect switches, manual starting switches, and magnetic starters. Process control devices and pilot lights shall have identification plates.

Identification plates shall be furnished for all line voltage enclosed circuit breakers, identifying the equipment served, voltage, phase(s), and power source. Circuits 480 volts and above shall have conspicuously located warning signs in accordance with OSHA requirements.

3.4 PAINTING

Exposed conduit, supports, fittings, cabinets, pull boxes, and racks shall be thoroughly cleaned and painted.

3.5 FIELD TESTING

After completion of the installation and splicing, joints, and terminations, and prior to energizing the conductors, wire and cable shall be given continuity and insulation tests before the conductors are energized.

Final acceptance will depend upon the satisfactory performance of equipment. No conductor shall be energized until the installation has been approved.

-- End of Section --

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SECTION 16286

OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
ANSI C37.121 Unit Substation Requirements
ANSI C37.16 Switchgear - Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors - Preferred Ratings, Related Requirements, and Application Recommendations
ANSI C37.17 Trip Devices for AC and General-Purpose DC Low-Voltage Power Circuit Breakers
ANSI C39.1 Electrical Analog Indicating Instruments
ANSI C78.23 Electric Lamps - Incandescent Lamps-Miscellaneous Types

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
ASTM A 167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 48 Standard Specification for Gray Iron Castings
ASTM D 877 Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)
EIA 443 Solid State Relays, EIA/NARM, Standard for

INSTITUTE FOR INTERCONNECTING AND PACKAGING ELECTRONIC CIRCUITS (IPC)
IPC D330 7.1.3.5 Switches

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C12.1 Code for Electricity Metering
IEEE C37.13 Low-Voltage AC Power Circuit Breakers Used in Enclosures
IEEE C37.90 Standard for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C57.13 Standard Requirements for Instrument Transformers
IEEE C63.2 Standard for Instrumentation - Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz - Specifications

IEEE C63.4 Methods of Measurement of Radio - Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

JOINT INDUSTRIAL COUNCIL (JIC)
JIC-01 Electrical Standards for Mass Production Equipment

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA 107 Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus
NEMA 250 Enclosures for Electric Equipment (1000 Volts Maximum)
NEMA AB 1 Molded Case Circuit Breakers and Molded Case Switches
NEMA AB 3 Molded Case Circuit Breakers and Their Application
NEMA FU 1 Low Voltage Cartridge Fuses
NEMA ICS 1 General Standards for Industrial Control and Systems
NEMA ICS 2 Industrial Control Devices and Assemblies
NEMA ICS 3 Industrial Control and Systems Factory Built Assemblies
NEMA ICS 6 Enclosures for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL 20 UL Standard for Safety General-Use Snap Switches
UL 489 UL Standard for Safety Molded-Case Circuit Breakers and Circuit-Breaker Enclosures
UL 50 UL Standard for Safety - Enclosures for Electrical Equipment
UL 508 UL Standard for Safety Industrial Control Equipment

1.2 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions," applies to work specified in this section.

Detail Drawings shall be submitted for the panel boards consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the District to check conformity with the requirements of the contract documents. Drawings shall include details of bus layout.

Outline Drawings for panel boards shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system or material meet specified

requirements. Statements must be dated after the award of this contract, name the project, and list the specific requirements, which it is intended to address.

1.3 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

- Preconstruction Submittals
- Shop Drawings
  - Connection Drawings shall be submitted in accordance with paragraph entitled “General Requirements” of this section.

    Installation Drawings shall be submitted for the following items in accordance with the paragraph entitled “Installation” of this section.
    - Control Devices
    - Protective Devices
- Product Data
  - Manufacturer’s Catalog Data shall be submitted for the following items:
    - Instrument Transformers
    - Enclosures
    - Circuit Breakers
    - Fuses
    - Control Devices
    - Time Switches
    - Protective Relays
    - Indicating Instruments
    - Indicating Lights
- Certificates

Certificates shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Manufacturer's Instructions

Manufacturer's instructions shall be submitted for the following including special provisions required to install equipment components and system packages. Special notices shall detail hazards and safety precautions.

Control Devices
Protective Devices

Test Reports

Short Circuit Study
Protective Device Coordination Analysis Study
Arc Flash Analysis Study
NETA Test Report

Operation and Maintenance Data

Operation and Maintenance Manuals shall be submitted for the following equipment:

Protective Relays
Indicating Instruments

PART 2 CONSTRUCTION MATERIALS

2.1 MOTOR CONTROL

Motor controllers shall conform to NEMA ICS 1, NEMA ICS 2, and UL 508. Controllers shall have thermal overload protection in each phase.

2.1.1 Magnetic Motor Controllers

2.1.1.1 Full Voltage Controllers

Magnetic motor controllers for the control and protection of single- and three-phase, 60-hertz, squirrel-cage induction motors shall be full-voltage, full magnetic devices in accordance with NEMA ICS 1, NEMA ICS 2, and UL 508.

Operating coil assembly shall operate satisfactorily between 85 and 110 percent of rated coil voltage. Motor control circuits shall be 120 volts, 60 hertz.

Controller shall be provided with two normally open and two normally closed auxiliary contacts rated per NEMA ICS 1 and NEMA ICS 2 in addition to the sealing-in contact for control circuits and local lamp indication circuits.

Light emitting diodes (LED) with push to test functionality will be used for location operation indication. The voltage rating for the LED shall be 120 VAC, 60 Hz.

Each motor starter shall incorporate a control hand switch for local, no operation, and remote operation of the starter. The local hand switch will come with a legend "Hand Off Auto". Each hand switch shall be provided with have two normally open and two normally closed auxiliary contacts rated per NEMA ICS 1 and NEMA ICS 2 in addition to the contacts for control circuits.

Solder less pressure wire terminal connectors shall be provided for line-and load-connections to controllers. Additional terminals shall be provided for future control requirements.

Over current protection shall include three manual reset thermal overload devices, one in each pole of the controller. Thermal overload relays shall be bimetallic nonadjustable type with continuous current ratings and service-limit current ratings and shall have a plus or minus 15 percent adjustment to compensate for ambient operating conditions.

An externally operable manual-reset button shall be provided to re-establish control power to the holding coil of the electromagnet. After the controller has tripped from overload, resetting the motor-overload device shall not restart the motor.

Enclosure shall be in accordance with NEMA 250, Type Nema 1.

2.1.2 Combination Motor Controllers

Following requirements are in addition to the requirements specified for magnetic motor controller:

Combination motor controllers for the control and protection of single-and three-phase 60-hertz alternating-current squirrel-cage induction motors with branch-circuit disconnecting and protective devices shall be in accordance with NEMA ICS 1, NEMA ICS 2, and JIC-01.

Combination motor controllers shall include magnetic motor controllers and molded-case circuit breakers or MCP in metal enclosures in accordance with NEMA 250 or motor-control center draw-out assemblies with control-power transformers, selector switches, pushbuttons, and indicating lights as follows:

Magnetic motor controllers and enclosures shall be full-voltage, full-magnetic devices as specified in this section under paragraph entitled, "Remote-Control Station Enclosures."

Molded-case circuit breakers shall be thermal-magnetic breakers as specified in paragraph entitled, "Manual Motor Controllers." Manufacturer's standard MCP may be used in lieu of molded-case circuit breakers.

Control-power transformers 120-volt ac maximum selector switches, pushbuttons, and pilot lights shall be as required.

Combination motor controllers shall be identified with identification plates affixed to front cover of the controller.

2.1.2.1 Non-Reversing Motor Controllers

Following requirements are in addition to the requirements for magnetic motor controllers:

Non-reversing combination motor controllers for the control and protection of single-speed squirrel-cage induction motors shall include a magnetic controller with molded-case circuit breaker or MCP with selector switch or start/stop pushbutton and indicating light in the cover of the enclosure.

Rating of single and three-phase single-speed full-voltage magnetic controllers for non-plugging and non-jogging duty shall be in accordance with NEMA ICS 1 and NEMA ICS 2.

Wiring and connections for full-voltage single-speed magnetic controllers shall be in accordance with NEMA ICS 1 and NEMA ICS 2.

2.2 INSTRUMENT TRANSFORMERS

Instrument transformers shall comply with the interference requirements listed below, measured in accordance with IEEE C63.2, IEEE C63.4, and NEMA 107.

2.2.1 Current Transformers

Current transformers shall conform to IEEE C57.13 for installation in metal-clad switchgear. Standard 3-A secondary transformer shall be used.

Transformers shall have single secondary winding.

Transformers shall be complete with secondary short-circuiting device.

Window-type current transformers shall be indoor dry type construction with secondary current ratings as indicated. Burden, frequency, and accuracy shall be as specified.

2.2.2 Power Meter

The motor control center shall be provided with a digital power meter to monitor the power usage of the motor control center. The power meter shall provide ability to measure line voltages, line currents, line power, three phase power, power factor, power demand, and peak power usage.

The power meter shall allow for 480 VAC, 3 phase power on its potential terminals and 120 VAC, 0 to 5 Amp current inputs. The meter shall allow for Delta or Wye power systems. The power meter shall wired with voltage fuses, current shortening terminal, and current transformers as indicated in the drawings.

The power meter shall have Ethernet communications to extract power information to the local control equipment. Ethernet wiring shall be shielded and isolated from the AC voltage power and control wiring. The power meter shall support ABCIP Ethernet communications protocol.

2.2.3 Phase Monitor

The phase monitor shall monitor the three phase line voltages for phase loss, phase reversal, low voltage, using a solid-state sensing circuit driving an electromechanical relay. The relay shall have a contact rating of 10 Amps at 240 VAC. The phase monitor will have a response time of 50 milliseconds. The phase monitor shall have a nominal voltage input for the motor control center operational voltage. The phase monitor shall have an operating temperature of -20 F to 131 F and a humidity tolerance of 97%. The phase monitor shall have UL and CSA agency approvals.

2.3 ENCLOSURES

2.3.1 Equipment Enclosures

Enclosures for equipment shall be in accordance with NEMA 250.

Equipment installed in industrial locations shall be contained in a gasketed NEMA Type 3R industrial use, sheet-steel enclosures constructed to prevent the entrance of dust, lint, fibers, flyings, oil, and coolant seepage.

Sheet-steel enclosures shall be fabricated from uncoated carbon-steel sheets of commercial quality, with box dimensions and thickness of sheet steel in accordance with UL 50.

Ferrous-metal surfaces of electrical enclosures shall be cleaned, phosphatized, and painted with the manufacturer's standard finish.

2.4 CIRCUIT BREAKERS

Circuit breakers shall conform to UL 489, NEMA AB 1, and NEMA AB 3.

2.4.1 Molded Case Circuit Breakers

Circuit breakers shall be molded case, manually operated, trip-free, with inverse-time thermal-overload protection and instantaneous magnetic short-circuit protection as required. Circuit breakers shall be completely enclosed in a molded case, with the calibrated sensing element factory-sealed to prevent tampering.

Thermal-magnetic tripping elements shall be located in each pole of the circuit breaker and shall provide inverse-time-delay thermal overload protection and instantaneous magnetic short-circuit protection. Instantaneous magnetic tripping element shall be adjustable and accessible from the front of the breaker on frame sizes larger than 100 amperes.

Breaker size shall be as required for the continuous current rating of the circuit. Breaker class shall be as required.

Interrupting capacity of the panel and lighting branch circuit breakers shall be sufficient to successfully interrupt the maximum short-circuit current imposed on the circuit at the breaker terminals. Circuit breaker interrupting capacities shall be a minimum of 10,000 amperes and shall conform to NEMA AB 3.

Multi-pole circuit breakers shall be of the common-trip type having a single operating handle and shall a have two-position on/off indication. Circuit breakers shall have temperature compensation for operation in an ambient temperature of 104 degrees F. Circuit breakers shall have root mean square (rms) symmetrical interrupting ratings sufficient to protect the circuit being supplied. Interrupting ratings may have selective type tripping (time delay, magnetic, thermal, or ground fault).

Breaker body shall be of phenolic composition. Breakers shall be capable of having such accessories as handle-extension, handle-locking, and padlocking devices attached where required.

Circuit breakers used for motor-circuit disconnects shall meet the applicable requirements of NFPA 70 and shall be of the motor-circuit protector type.

Circuit breakers used for service disconnection shall be the enclosed circuit-breaker type with external handle for manual operation. Enclosures shall be sheet metal with a hinged cover suitable for surface mounting.

2.4.2 Enclosed Molded Case Circuit Breakers

Enclosed circuit breakers shall be thermal-magnetic molded-case circuit breakers in surface-mounted, non-ventilated enclosures conforming to the appropriate articles of NEMA 250 and NEMA AB 1.

Enclosed circuit breakers in nonhazardous locations shall be as follows:

Circuit breakers installed inside, clean, dry locations shall be contained in NEMA Type 3R, general purpose sheet steel enclosures.

Circuit breakers installed in unprotected outdoor locations shall be contained in NEMA Type 3R, weather-resistant sheet steel enclosures that are splash-proof, weatherproof, sleet-proof, and moisture resistant.

Circuit breakers installed in wet locations shall be contained in NEMA Type 4, watertight corrosion-resistant sheet steel enclosures constructed to prevent entrance of water.

Circuit breakers installed in industrial locations shall be contained in NEMA Type 3R2, industrial-use sheet steel enclosures constructed to prevent the entrance of dust, lint, fibers and flyings, and oil and coolant seepage.

Steel enclosures shall be fabricated from corrosion-resistant steel sheet conforming to ASTM A 167, 300 series corrosion-resistant steel. Box dimensions and thickness of sheet steel shall be in accordance with UL 50.

2.4.3 Power Circuit Breakers

Power circuit breakers rated below 600 volts shall be the air-break type enclosed in ventilated housings. Current, voltage, and interrupting ratings shall be as required.

Power circuit breakers shall comply with ANSI C37.16 and IEEE C37.13.

Power circuit breakers shall be equipped with electromechanical devices with long-time/short-time, instantaneous elements. Breakers shall be electrically and mechanically trip-free in any position of the closing stroke. Ground fault protection shall be included in either type trip device. Main contacts shall be silver-plated. Arcing contacts shall be sintered tungsten alloy.
Breakers installed in metal housings such as unit substations shall be the draw out type. Breakers installed in isolated locations or not as units of a central distribution

center shall be switchboard -mounted, provided a correctly ventilated protective metal cover is installed.

Alarms, auxiliary switches, interlocks, and similar devices shall be supplied.

Breakers shall have a removable operating handle, provision for padlocking, and position indicator.

2.5 FUSES

A complete set of fuses for all switches and switchgear shall be provided. Fuses shall have a voltage rating not less than the circuit voltage.

Fuses rated 30 amperes, 125 volts or less shall be the nonrenewable cartridge type. Fuses rated above 30 amperes 600 volts or less shall be the renewable cartridge type with time-delay dual elements, except where otherwise indicated. Fuses shall conform to NEMA FU 1.

Special fuses such as extra-high interrupting-capacity fuses, fuses for welding machines, and capacitor fuses shall be installed where required. Plug fuses are not permitted.

Power fuses on ac systems above 600 volts shall be in accordance with NEMA SG 2.

Fuses shall be labeled showing UL class, interrupting rating, and time-delay characteristics, when applicable.

Fuse holders field-mounted in a cabinet or box shall be porcelain. Field installation of fuse holders made of such materials as ebony asbestos, Bakelite, or pressed fiber shall not be used.

2.6 CONTROL DEVICES

2.6.1 Control Circuit Transformers

Control-circuit transformers shall be provided within the enclosure of magnetic contactors and motor controllers when the line voltage is in excess of 120 volts. Transformer shall be encapsulated dry type, single-phase, 60-hertz, with a 120-volt (or 24-volt) isolated secondary winding.

Rated primary voltage of the transformer shall be not less than the rated voltage of the controller. Rated secondary current of the transformer shall be not less than continuous-duty current of the control circuit.

Voltage regulation of the transformer shall be such that, with rated primary voltage and frequency, the secondary voltage shall not be less than 95 percent nor more than 105 percent of rated secondary voltage.

Source of supply for control-circuit transformers shall be the load side of the main disconnecting device. Secondary winding of the transformer and control-circuit wiring shall be protected against overloads and short circuits with fuses selected in accordance with JIC-01. Secondary winding of the control-circuit transformer shall be grounded in accordance with JIC-01.

2.6.2 Magnetic Control Relays

Magnetic control relays for energizing and de-energizing the coils of magnetic contactors or other magnetically operated devices in response to variations in the conditions of electric control devices shall be in accordance with NEMA ICS 1, and NEMA ICS 2.

Core-and-coil assembly shall operate satisfactorily with coil voltages between 85 and 110 percent of their voltage rating.

Relays shall be designed to accommodate normally open and normally closed contacts.

Magnetic control relays shall be 120 -volt, 60-hertz, Class AIB devices with a continuous contact rating of 10 amperes and with current-making and -breaking ability in accordance with NEMA ICS 1 and NEMA ICS 2, two normally open and two normally closed.

2.6.3 Push Button and Selector Switches

2.6.3.1 Push Buttons

Pushbuttons for low-voltage ac full-voltage magnetic controllers shall be heavy-duty oil tight NEMA 250, Type 12, momentary-contact devices rated 600 volts, with pilot light, and with the number of buttons and the marking of identification plates as shown. Color code for pushbuttons shall be in accordance with JIC-01.

Pushbuttons shall be designed with normally open, circuit-closing contacts; normally closed circuit-opening contacts; and two-circuit normally open and normally closed circuit-closing and -opening contacts. Pushbutton-contact ratings shall be in accordance with NEMA ICS 1 and NEMA ICS 2 with contact designation A600.

Pushbuttons in remote control stations shall be identified with identification plates affixed to front cover in a prominent location. Identification plate shall carry the identification of the system being controlled.

2.6.3.2 Selector Switches

Selector switches for low-voltage control circuits shall be heavy-duty oil tight maintained-contact devices with the number of positions and the marking of identification plates in accordance with NEMA ICS 1 and NEMA ICS 2.

Selector switches in remote control stations shall be identified with engraved identification plates affixed to front cover in a prominent location. Identification plate shall carry the identification of the system being controlled.

2.7 INDICATING LIGHTS

Indicating lights shall be oil tight instrument devices with threaded base and collar for flush-mounting, translucent convex lens, candelabra screw-base lamp holder, and 120-volt, led lamp. The indicating lights shall be push to test operating. Indicating lights shall be provided in remote-control stations when pushbuttons and selector switches are out of sight of the controller.

2.8 FACTORY TESTING

Factory tests on control and protective devices shall be performed in accordance with the manufacturer's recommendations. Short-circuit tests shall be in accordance with Section 2 of NEMA ICS 1.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

Control devices and protective devices not factory installed in equipment shall be installed in accordance with the manufacturer's recommendations and shall be field adjusted and operation tested. Installations shall conform to NFPA 70, NEMA ICS 1, NEMA ICS 2, and NEMA ICS 3 requirements for installation of control and protective devices.

3.2 TEST REPORTS

The contractor shall provide Short Circuit study, System Protective Device Coordination Analysis study and Arch Flash Analysis in accordance with requirements of the NFPA 70E using the calculation methods in IEEE 1584. The calculation shall result in a table showing the available fault current with a comparison to the short circuit withstand ratings of all equipment, coordination

curves for all overcurrent protective devices (OCPD), arc flash table with labels for each item rated 480V, and recommended protective device settings for all overcurrent protective devices. Settings shall be established to minimize the arc flash hazard rating while maximizing OCPD coordination. The calculations shall be based on actual equipment and wiring installed. The reports shall be performed by a licensed electrical engineer in California.

3.3 FIELD TESTING

Control and protective devices not factory installed in equipment shall be demonstrated to operate as indicated.

Insulating oil in oil circuit breakers shall have dielectric tests performed before the breakers are energized. Oil shall be tested in accordance with ASTM D 877, and breakdown voltage shall be not less than 25,000 volts.

Reduced-voltage starting devices shall be field adjusted to obtain optimum operating conditions. Test meters and instrument transformers shall conform to IEEE C12.1 and IEEE C57.13.

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SECTION 16345

MOTOR CONTROL CENTERS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS2 - Industrial Control Devices and Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL 845 - UL Standards for Safety Motor Control Centers

1.2 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions," applies to work specified in this section.

Detail Drawings shall be submitted for the panel boards consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the District to check conformity with the requirements of the contract documents. Drawings shall include details of bus layout.

Outline Drawings for panel boards shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified requirements. Statements must be dated after the award of this contract, name the project, and list the specific requirements, which it is intended to address.

1.3 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment

and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals

Shop Drawings

Connection Drawings shall be submitted in accordance with paragraph entitled “General Requirements” of this section.

Installation Drawings shall be submitted for the following items in accordance with the paragraph entitled “Installation” of this section.

- Motor Control Centers
- Motor Control Units
- Protective Devices

Product Data

Manufacturer’s Catalog Data shall be submitted for the following items:

- Motor Control Centers
- Motor Control Units
- Protective Devices

Test Reports

- Short Circuit Study
- Protective Device Coordination Analysis Study
- Arc Flash Analysis Study
- NETA Test Report

Certificates

Certificates shall be submitted in accordance with paragraph entitled, “General Requirements,” of this section.

Manufacturer's Instructions

Manufacturer’s instructions shall be submitted for the following including special provisions required to install equipment components and system packages. Special notices shall detail hazards and safety precautions.

- Motor Control Centers

Motor Control Units
Protective Devices

1.4 SHIPPING

Motor control centers longer than 96” shall be shipped in coordinated sub assemblies for field connection. Maximum shipping length shall be as approved.

PART 2 CONSTRUCTION MATERIALS

2.1 EQUIPMENT

Motor control centers shall conform to NEMA UCS 2, UL 845, and NFPA 70.

2.2 CONFIGURATION

Motor control centers shall be NEMA ICS 2, Class I, Type B, totally enclosed, free standing, dead front distribution type with one or more vertical sections in which motor control units, transformers, panels, and associated control equipment units are grouped in an integrated assembly.

2.3 CONSTRUCTION

Motor control centers shall be accessible from the front. The motor control center shall have a NEMA Type 3R gasketed enclosure for outdoor installation. The motor control center shall have a sunshield mounted to the top of the equipment.

Provisions shall be made for leveling the entire assembled motor control center sections and bolting them together so that they form a contiguous structural enclosure.

Motor control centers shall contain electrical interlocks, unit terminal blocks, master control terminal blocks, unit wiring to terminal blocks, and unit interconnections, and power connection terminal blocks as required.

Covers for motor control centers shall be fabricated from cold-rolled carbon-steel sheets of commercial quality with stretcher-level flatness. Vertical sections shall be reinforced to form a rigid structure.

Lifting angles shall be 7 gauge and shall be provided on the top of each section, and shall extend the entire width of the section, and shall be capable of supporting the entire weight of the motor control center section without distortion. Base channels shall be provided with holes to facilitate floor mounting and leveling.

Design of the motor control centers shall allow addition of sections with the same height and width without major modifications. Top cover shall not sag or be deformed.

Top and sides shall have removable covers secured with bolts or fasteners. Covers shall permit access from the rear to the main bus and bus-tap connections in each vertical section. Access doors to motor control draw out units, wiring channels, and the protective cover of the main horizontal bus shall provide dead front construction.

Horizontal wiring channels shall be provided in the top and bottom of motor control centers for wiring between vertical sections. Wiring channels shall extend the entire length of the motor control center and shall allow space for duct and conduit entrances. Vertical wiring channels shall be provided in each vertical section for side wiring to individual motor control units. Vertical wiring channels shall extend the entire length of each vertical section. Covers of motor control units and vertical wiring channels shall be side hinged to the vertical section and fastened in the closed position with captive bolts, screws, or latches. Horizontal wiring channels shall be removable and fastened in place with captive bolts or screws. A removable steel-plate barrier shall be provided at the tip of each vertical structure to isolate the main horizontal bus from the horizontal wire way.

Horizontal bus structure shall extend the entire length of the motor control center and shall be tinned copper with a continuous rating of 200 amperes.

All vertical sections shall be completely bused (200-ampere rating) and electrically interconnected with copper-plated solid copper busbars to accommodate plug-in starter units with main horizontal and vertical buses uniformly positioned and phase sequenced. Main horizontal buses shall be readily accessible for connection of future vertical sections at either end.

Vertical sections shall have a width not less than 20 inches.

Buses shall be supported and braced to withstand the short-circuit currents indicated. Contact surfaces of main buses shall be silver plated and bolted together to ensure conductivity.

Main incoming lug compartments shall be provided.

A continuous rigid tin-plated copper ground bus shall extend through the bottom of the entire assembly and shall ground the stationary structure and equipment. Ground bus shall be capable of carrying the rated short-circuit current available in the motor control center.

After fabrication, steel surfaces of motor control centers shall be cleaned and phosphatized prior to the application of paint. External and internal surfaces shall be finished with baked enamel or fast air-drying enamel. Nonpainted parts shall be cadmium plated or coated with zinc chromate. The motor control center shall be painted white instead of custom gray paint

2.4 COMBINATION MOTOR CONTROL UNITS

Combination motor control units for the control and protection of single-and three-phase, 60-hertz squirrel-cage induction motors with branch-circuit disconnection and protective devices shall include magnetic motor controllers, molded-case circuit breakers, or motor control circuit protectors in compartmentalized draw-out unit construction with fused control-power transformers, selector switches, pushbuttons, and indicating lights, as indicated. Motor control and protective devices shall conform to the requirements of Section 16286, "Overcurrent Protective Devices."

Unit spaces in vertical sections shall be provided with guide rails for the support and alignment of motor control draw-out units. Latches shall be provided to ensure complete electrical connection of the draw-out unit with the main bus and to allow removal of the draw-out unit from the motor control center. Plug-in units shall be interchangeable.

Draw-out unit shall be provided with spring-loaded, silver-plated, plug-in stabs for connection to the main bus on the line side of the motor control unit and fixed terminal blocks for the load-side connections. Wiring shall be accessible from the front. No wiring shall extend into the bus compartment. Unit terminal blocks shall be the split type, allowing unit removal without disturbing outgoing wires.

Motor control units shall be provided with a single separate hinged door interlocked with its associated disconnecting device to prevent access to draw-out units when the circuit breaker contacts are closed, and the operating handle is in the "ON" position. Doors shall swing open a minimum of 112 degrees. An interlock release shall be provided, however, to defeat the interlocking mechanism and permit access to the draw-out unit using a simple hand tool.

Doors shall be provided with openings for the operating handle of molded-case circuit breakers, thermal-overload relay reset buttons, indicating lights, selector switches, and pushbuttons as required.

Disconnect switch overload reset button, selector switches, and any indicating lights and pushbuttons shall be operable with the compartment door closed. The ON-OFF position of the main disconnect method shall be clearly indicated with the door closed.

Feeder tap units shall include externally operable molded-case circuit breakers in combination motor control unit enclosures for the protection of non-motor loads or remotely located magnetic motor controllers. Not more than two molded-case circuit breakers shall be contained in feeder tap units.

Compartments for future combination motor control units shall be complete with hardware, buses, and hinged doors ready to receive future draw-out units. Compartments for spare combination motor control units shall be complete with buses, hinged doors, and draw-out units but without load terminal connections. Spare spaces shall be complete with buses and screwed-on front cover plates.

Combination motor control units shall be identified with identification plates affixed to the front hinged door or cover plate of each compartment. Identification plate shall identify the connected load.

Combination motor control units shall have control and power wires identified as depicted in the contract drawings. Combination motor control units shall have terminals identified as depicted in the contract drawings.

2.5 CONTROL WIRING

The control wiring for each section in the motor control center shall refer to specification sections 17031, 17032, 17033, and 17034 for the components in each section. All wiring shall have wire labels as shown on the drawings. All devices and terminals shall have labels as shown on the drawings.

2.6 CONTROL UNIT DRAWING

A directory card shall be mounted on the inside of hinged fronts and doors in a metal frame, with spaces for circuit numbers, outlets controlled, and room numbers. Where hinged fronts or doors are not required, the directory card shall be provided in a metal frame mounted on the left-hand side of the front trim. Directory card shall identify each branch circuit with its respective and numbered circuit breaker.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

Complete assembly shall be electrically and mechanically connected and assembled from coordinated subassemblies shipped in complete sections from the manufacturer. Installation shall be aligned, leveled, and secured to the supporting construction in accordance with the manufacturer's recommendations.

3.2 TEST REPORTS

The contractor shall provide Short Circuit study, System Protective Device Coordination Analysis study and Arch Flash Analysis in accordance with requirements of the NFPA 70E using the calculation methods in IEEE 1584. The calculation shall result in a table showing the available fault current with a comparison to the short circuit withstand ratings of all equipment, coordination curves for all overcurrent protective devices (OCPD), arc flash table with labels for each item rated 480V, and recommended protective device settings for all overcurrent protective devices. Settings shall be established to minimize the arc flash hazard rating while maximizing OCPD coordination. The calculations shall be based on actual equipment and wiring installed. The reports shall be performed by a licensed electrical engineer in California.

3.3 FIELD TESTING

Motor control centers shall be subjected to continuity and insulation tests after the installation has been completed and before the motor-control center is energized.

Contractor shall provide test equipment, labor, and personnel to perform the tests required. Continuity tests shall be conducted using a dc device with bell or buzzer or digital voltage meter.

Motor-control centers shall be completely isolated from extraneous electrical connections. Substation feeder breakers, circuit breakers in switchboards, and other disconnecting devices shall be used to isolate the motor-control center under test.

Insulation tests on 600-volt motor-control centers shall be conducted using a 1,000-volt insulation-resistance test set. Readings shall be recorded every 15 seconds for the first minute and every minute thereafter for 10 minutes. Resistance between phase conductors and between phase conductors and ground shall be not less than 50 megohms.

Insulation tests on motor-control centers 480 volts or less shall be conducted using a 500-volt insulation-resistance test set. Readings shall be recorded every 15 seconds for the first minute and every minute thereafter for 10 minutes. Resistance between phase conductors and between phase conductors and ground shall be not less than 25 megohms.

Prior to final acceptance the motor control center shall be energized and loaded (to the maximum load possible, but not less than 10 percent of expected full load) for a minimum of 10 minutes and the temperature measured, with a non-contact device, to verify connection integrity. The temperature detector shall be accurate within 0.5 degrees C. Each phase temperature of 3 phase circuits and individual connections

compared to other similarly loaded connections shall be within 3 degrees C of each other. Temperatures outside these values warrant investigation.

Phase-rotation tests shall be conducted on all three-phase circuits using a phase-rotation indicating instrument. Phase rotation of electrical connections to motors and other connected equipment shall be clockwise.

Test data shall be recorded and shall include location and identification of motor-control centers and megohm readings versus time.

Final acceptance shall depend upon the satisfactory performance of the motor-control centers under test. No motor-control center shall be energized until recorded test data have been approved by the Engineer and District. Final test reports shall be provided to the Engineer and District. Reports shall have a cover letter/sheet clearly marked with the System name, Date, and the words "Final Test Report".

-- End of Section --

SECTION 16415

AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

NATIONAL ELECTRICAL CODE (NEC)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

UNDERWRITERS LABORATORIES (UL)

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in IEEE 100.

1.3 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions" applies to work specified in this section.

Section 16050, “Basic Electrical Materials and Methods”, applies to work specified in this section.

1.4 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
Shop Drawings
Itemized bill of materials
Circuit diagrams, wring diagrams, dimensional data, conduit entry locations, and a list of accessories.

Product Data
Transfer switch ratings, program, and configuration data

Operation and Maintenance Data
Start up inspection report signed by the transfer switch manufacturer authorized field service representative.
Three copies of operation and maintenance manuals

1.5 MANUFACTURER'S SERVICES

Provide equipment manufacturer's services at the job site for the minimum labor days listed below, travel time included.

One Labor Day to check installation and perform the start up, testing, and adjustment of the equipment and to instruct the Districts personnel in the operation and maintenance of the equipment. Submit operations and maintenance manuals prior to this instruction.

1.6 WARRANTY

Equipment furnished under this section shall be guaranteed against defective parts or workmanship for a period of 24 months from the date of acceptance by the District.

PART 2 CONSTRUCTION MATERIALS

2.1 TRANSFER SWITCH

The transfer switch shall be an enclosed type with an environmental rating as shown on the drawings. The transfer switch shall have the number of three (3) phases, three (3) wire, 200-amp rating for the 480 VAC service. The transfer switch shall have current not less than 65KAIC RMS symmetrical. The transfer

switch shall have an enclosure rated for gasketed NEMA type 3R for outdoor installation.

The transfer switch shall be listed as per UL 1008 as a recognized component for emergency power systems and rated for all classes of loads.

The transfer switch shall be electrically operated and mechanically held in each direction by a single operating mechanism momentarily energized from the source to which the load shall be transferred. The transfer switch shall accomplish mechanical locking in each direction without the aid of latching solenoids, toggle mechanisms, or gear arrangements. The total operation transfer time shall not exceed one sixth (1/6) of a second.

The transfer switch operation shall be inherently double throw where normal and emergency contacts operate simultaneously with no momentary delay in mid-position. An overload or short circuit shall not cause the switch to go into a neutral position. The main contact structures shall not originally manufacture for transfer switch such as main circuit breakers or contactors. Inspection and replacement of all contacts (stationary or arcing) shall be possible from the front of the transfer switch without any disassembly of operating linkages or power conductors. The transfer switch shall provide a handle to permit no-load manual operation of the transfer switch.

2.2 TRANSFER SWITCH CONTROLLER

The transfer switch shall have an automatic controller with a solid-state sensing and control logic panel. The controller shall have an adjustable time delay, 0.5 to 6.0 seconds) on engine starting to override momentary dips in the normal utility service set at 1 second. The controller shall have a full phase voltage relay sensing the normal utility source with at least one close differential relay to detect brown out conditions, set at 70% drop out and 90% pick up voltage levels. The controller shall have a voltage/frequency relay to prevent premature transfer, set at 90% voltage and 90% frequency on the standby/emergency source.

The controller shall have engine starting contacts (dry ore voltage free) with one normally open contact and one normally closed contact. The controller shall have an adjustable time delay, (2 minutes to 30 minutes) on retransfer to normal utility, initially set at 20 minutes. The controller shall have an adjustable unloaded or cool down running time delay (0.1 to 10 minutes) initially set at 5 minutes. The controller shall have an adjustable transfer time delay, (1 to 300 seconds) initially set at 10 seconds.

The controller shall provide a test switch (momentary type) on the front of the transfer switch enclosure. The controller shall have a manual push button to bypass the time delay on the retransfer back to normal utility service. The

controller shall have indicating light to indicate the presence of normal power service. The control shall have indicating light to indicate the presence of standby/emergency power. The transfer switch shall include pilot contacts rated at 10 amps and 250 volt that open 60 seconds prior to transfer and reclose three seconds after transfer. The pilot contacts will be used to de-energize during the transfer time of the transfer switch. The controller shall provide three (3) contacts for transfer switch on normal service, transfer switch on standby/emergency source, and transfer switch failure rated at 10 Amps and 250 volts.

The transfer switch shall be configured as a manual transfer switch.

2.3 Manufacturers

The transfer switch shall be Automatic Switch Company, (ASCO), Russelectric Co, or Zenith or an approved equivalent.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

The transfer switch shall be mounted on a house keeping pad and anchored as per seismic requirements. The utility source and standby/emergency conduits shall enter trough the base of the transfer switch. The generator control conduit and the transfer monitoring conduits shall also enter through the base of the transfer switch.

3.2 FIELD TESTING

The manufacturer's representative shall field test and calibrate the timing and monitoring operational logic. All adjustments shall be within 5% of the previously mentioned settings. The transfer switch controller settings shall be documented and indicated in the operation and maintenance manuals.

-- End of Section --

SECTION 16446

PANELBOARDS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)
EIA 416 - Filters, Radio Interference
EIA 46 - Test Procedure for Resistance to Soldering (Vapor Phase Technique) for Surface Mount Devices

FEDERAL STANDARDS (FED-STD)
FED-STD 595 (Rev B) Colors Used in Government Procurement

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA 250 - Enclosures for Electric Equipment (1000 Volts Maximum)
NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches
NEMA PB 1 - Panel boards

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL 67 - Panel boards

1.2 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions," applies to work specified in this section.

Detail Drawings shall be submitted for the panel boards consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the District to check conformity with the requirements of the contract documents. Drawings shall include details of bus layout.

Outline Drawings for panel boards shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified

requirements. Statements must be dated after the award of this contract, name the project, and list the specific requirements, which it is intended to address.

1.3 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Data
- Panel boards

Manufacturer's Instructions
- Panel boards

Manufacturer's instructions shall be submitted for Panel boards including special provisions required to install equipment components and system packages. Special notices shall detail impedances, hazards, and safety precautions.

PART 2 CONSTRUCTION MATERIALS

2.1 PANELBOARDS

Power-distribution panel boards and lighting and appliance branch-circuit panel boards shall be totally enclosed in a steel cabinet, dead-front circuit breaker type with copper buses, surface- or flush-mounted as indicated. Panel boards shall conform to NEMA PB 1 and NEMA AB 1.Branch circuit panels shall have buses fabricated for bolt-on type circuit breakers.

An outer door or cover, hinged on one side, shall be provided on surface-mounted panel boards to provide gutter space access. A center door shall be provided for circuit breaker/switch access only. The enclosure shall be rated as a gasketed NEMA 1 enclosure.

Voltage and current rating, number of phases, and number of wires shall be as indicated. Four-wire distribution panel boards and lighting and appliance branch-circuit panel boards shall be provided with an isolated full-capacity neutral bus. Panel boards shall be rated for 120/240-volt, single-phase, 60-hertz current.

Panel boards shall be provided with a separate grounding bus bonded to the enclosure. Grounding bus shall be a solid bus bar of rectangular cross section equipped with binding screws for the connection of equipment grounding conductors.

Each panel board, as a complete unit, shall have a short-circuit current rating equal to or greater than the integrated equipment rating shown on the panel board schedule or as indicated.

Panel boards and main lugs or main breaker shall have current ratings as shown on the panel board schedule.

Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. Single-phase, three-wire panel board busing shall be such that when any two adjacent single-pole breakers are connected to opposite phases, two-pole breakers can be installed in any location. Three-phase, four-wire busing shall be such that when any two adjacent single-pole breakers are individually connected to each of the two different phases, two-pole breakers can be installed at any location.

Current-carrying parts of the bus assembly shall be plated. Mains ratings shall be as shown. Mechanical lugs furnished with panel boards shall be cast copper or copper alloys of sizes suitable for the conductors indicated to be connected thereto.

Boxes shall have the manufacturer's standard knockouts and shall be galvanized code-gage sheet steel. Fronts shall be of code-gage sheet steel furnished with hinged doors with adjustable trim clamps for securing the fronts to the boxes.

Panel board enclosures shall be NEMA 250, Type 1. Enclosures shall be provided with hinged fronts and corrosion-resistant steel pin-tumbler cylinder locks. Locks shall be keyed alike, and two keys shall be provided for each enclosure. Panel boards shall be finished with baked enamel. Finish color shall be No. 61 gray conforming to FED-STD 595.

The panel board shall include a branch circuit monitor current transformer for each branch breaker for future sub metering as per Title 24, 2013.

2.2 CIRCUIT BREAKERS

Circuit breakers shall be the molded-case type as specified in Section 16286, "Overcurrent Protective Devices." Frame and trip ratings shall be as indicated.

Interrupting rating of circuit breakers shall be as indicated. If not shown, the interrupting rating for circuit breakers in 120/208/240-volt panel boards shall be not less than 10,000 amperes rms symmetrical.

Circuit breakers shall be bolt-on type. Plug-in type shall not be acceptable. Connections to the bus shall be bolt-on type.

In branch circuit panel boards, branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker to prevent repeated arcing shorts resulting from frayed appliance cords. Single-pole 15- and 20-ampere circuit breakers shall be UL listed as "Switching Breakers" at 120 volts ac. UL Class A (1/4-inch sensitivity) ground fault circuit protection shall be provided on 120-volt ac branch circuit as indicated. This protection shall be an integral part of the branch circuit breaker that also provides overload and short-circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panel board. A single-pole circuit breaker with integral ground fault circuit interruption shall require no more panel board branch circuit space than a conventional slide pole circuit breaker.

When multiple wires per phase are specified, the circuit breakers shall be furnished with connectors made to accommodate multiple wires. Circuit breaker spaces called out on the drawings shall be complete with mounting hardware to permit ready installation of the circuit breakers.

2.3 DIRECTORY CARD AND HOLDER

A directory card shall be mounted on the inside of hinged fronts and doors in a metal frame, with spaces for circuit numbers, outlets controlled, and room numbers. Where hinged fronts or doors are not required, the directory card shall be provided in a metal frame mounted on the left-hand side of the front trim. Directory card shall identify each branch circuit with its respective and numbered circuit breaker.

2.4 FACTORY TESTING

Complete panel boards shall be tested in accordance with UL 67.

2.5 PRECAUTIONARY LABEL

To ensure persons are aware of immediate or potential hazard in the application, installation, use, or maintenance of panel boards, each panel board shall be conspicuously marked on the trim or dead front shield with the text (or equivalent)

DANGER symbol. If the panel is supplied with a door, the label shall be visible when the door is in the open position.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

Panel boards shall be installed as indicated and in accordance with the manufacturer's instructions. Panels shall be fully aligned and mounted so that the height of the top operating handle will not exceed 72-inches above the finished floor.

Directory-card information shall be typewritten in capital letters to indicate outlets controlled and final room numbers served by each circuit and shall be mounted in holders behind protective covering.

-- End of Section --

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SECTION 16480

LOW VOLTAGE MOTOR CONTROLS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)
EIA 416 - Filters, Radio Interference
EIA 46 - Test Procedure for Resistance to Soldering (Vapor Phase Technique) for Surface Mount Devices

FEDERAL STANDARDS (FED-STD)
FED-STD 595 (Rev B) Colors Used in Government Procurement

1.2 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions," applies to work specified in this section.

Detail Drawings shall be submitted for the low voltage motor controls consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the District to check conformity with the requirements of the contract documents. Drawings shall include details of bus layout.

Outline Drawings for panel boards shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified requirements. Statements must be dated after the award of this contract, name the project, and list the specific requirements, which it is intended to address.

1.3 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
Product Data from Manufacturer's catalog data shall be submitted for the following items:
- Combination Magnetic Starters
- Variable Frequency Drives
- Control equipment

Manufacturer's instructions shall be submitted for the following Items:
- Combination Magnetic Starters
- Variable Frequency Drives
- Control Equipment

PART 2 CONSTRUCTION MATERIALS

2.1 COMBINATION MAGNTEIC STARTERS

The combination magnetic motor starters shall comply with NEMA ICS, Class A and with NEC article 430. The combination magnetic motor starters shall be equipped with a circuit breaker type equipped with adjustable magnetic trip circuit breakers (motor circuit protection) as noted in the drawings. The short circuit rating shall be at least 65,000 amperes symmetrical at 480 volts. Where a higher short circuit rating is shown in the drawings, provide combination starters with a higher short circuit rating or provide current limiting type breakers or circuit breakers with current limiters to achieve the short circuit rating.

The combination magnetic motor starters will include motor thermal overload device with adjustable overloads or field installed overload heaters. The contractor shall verify motor ratings and coordinate the starter overloads with the actual horsepower and voltage ratings of the applicable motor. Provide externally operable overload reset buttons and disconnect operators. The combination magnetic motor starter shall have two normally open (NO) and two normally closed (NC) auxiliary contacts for operational status. The combination magnetic motor starter overloads shall have one normally open (NO) and one normally closed (NC) for control interlocks.

The combination magnetic motor starters shall include control switches, push buttons, indicating lights, and elapsed time meters, as shown on the motor control

wiring schematics in the drawings. The control switches, pushbuttons, indicating lights, and elapsed time meters shall be UL listed and round, oil tight, and legend plates as shown on the drawings. The indicating lamps shall be push to test LED lights with colors as indicated on the drawings.

The combination magnetic motor starters control wiring shall include relays, time relay relays, terminals, fuse blocks, and current switches as shown on the motor control wiring schematics in the drawings. All of the combination magnetic motor starters control components shall be UL listed. The general-purpose relays and the time delay relays shall be DIN rail mounted, the plug-in type with coil and contact ratings as shown in the drawings.

Every control wire for the combination magnetic starter motor starter shall have typed lettering heat shrunk wire labels as shown on the drawings. Every terminal shall have typed lettering on the terminals as shown on the drawings. Every relay or device shall have a typed label besides, above, or below that device that is clearly visible with labels as shown on the drawings.

The combination magnetic motor starters shall also include a three-phase monitoring device that will monitor the system voltage for three phase loss, phase reversal, under voltage, current and unbalance functions. The device shall provide Form C (NO and NC) contacts rated at 10 Amps and 250 VAc.

2.2 SOFT STARTERS

The soft motor starters are solid state reduced voltage starters shall be UL listed and consist of a SCR based power section, logic board, and provisions for an external bypass contactor. The contractor shall size the soft motor starter for the actual horsepower and voltage ratings of the applicable motor. The SCR base power section shall consist of 6 back to back SCRs, two SCRs per phase, and shall be rated for a minimum peak inverse voltage rating 2.5 times the line voltage, 1200PIV for 480 volts. Units using triacs or SCR/Diode combinations shall not be acceptable. Resistor/capacitor snubber networks shall be used to prevent false firing of SCRs due to dv/dt characteristics of the electrical system.

The soft motor starters shall be equipped with a circuit breaker type equipped with adjustable magnetic trip circuit breakers (motor circuit protection) as noted in the drawings. The short circuit rating shall be at least 65,000 amperes symmetrical at 480 volts.

The soft motor starter shall have operational service conditions of ambient temperature of 0 to 40 C, 0 to 95% humidity, ac line input voltage of +/-10% of rated system voltage, and AC input frequency of +/- 2 hertz. The soft motor starter shall include cooling fans or panel heaters if the ambient temperatures are above or below the standard service conditions.

The soft motor starter shall include the following control functions:

- Adjustable maximum starting current from 200 to 500 percent of motor full load current rating.
- Ramp time adjustable from 1 to 60 seconds.
- Adjustable linear voltage deceleration.
- Kick start function.
- Phase loss and phase reversal protection.
- Under and over voltage protection.
- Current unbalance protection
- Stall, jam, and under load protection
- Ground fault protection
- Class 20 overload protection
- Heat sink over temperature protection
- Digital inputs for start, stop, and reset functions
- Dry contacts for Run, Fail, and Bypass indications
- Provide voltage, current, and power measurements for the soft motor starter during starting and when in bypass mode.

The soft starter installation shall also include a bypass contactor rated for the horsepower and voltage rating of the applicable motor. The bypass contactor shall be wired to the bypass connection terminals on the soft starter. The soft starter shall provide power measurement when in soft starter mode or bypass contactor mode. All of the above protections shall provide protection of the soft starter during use of the soft starter and the bypass contactor.

The soft motor starters shall include control switches, push buttons, indicating lights, and elapsed time meters, as shown on the motor control wiring schematics in the drawings. The control switches, pushbuttons, indicating lights, and elapsed time meters shall be UL listed and round, oil tight, and legend plates as shown on the drawings. The indicating lamps shall be push to test LED lights with colors as indicated on the drawings.

The soft motor starters control wiring shall include relays, time relay relays, terminals, fuse blocks, and current switches as shown on the motor control wiring schematics in the drawings. All of the soft motor starter's control components shall be UL listed. The general-purpose relays and the time delay relays shall be DIN rail mounted, the plug-in type with coil and contact ratings as shown in the drawings.

Every control wire for the soft starter motor starter shall have typed lettering heat shrunk wire labels as shown on the drawings. Every terminal shall have typed lettering on the terminals as shown on the drawings. Every relay or device shall

have a typed label besides, above, or below that device that is clearly visible with labels as shown on the drawings.

The soft motor starter shall be Allen Bradley SMC Flex 150 series of soft motor starters sized for the horsepower and voltage rating of applicable motor.

2.3 SCHEMATIC CARD

A schematic card shall be mounted on the inside of hinged fronts and door of the starter cubicle or section. The schematic card shall show the as built wiring diagram including bill of materials and part numbers for the devices. The schematic card shall include wiring numbers, terminal numbers, and pin numbers of the devices in the starter cubicle. The schematic card shall insert in a clear protective plan holder.

2.4 FACTORY TESTING

Complete motor starter cubicles or sections shall be tested in accordance with UL 67.

2.6 PRECAUTIONARY LABEL

To ensure persons are aware of immediate or potential hazard in the application, installation, use, or maintenance of panel boards, each panel board shall be conspicuously marked on the trim or dead front shield with the text (or equivalent) DANGER symbol. If the panel is supplied with a door, the label shall be visible when the door is in the open position.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

The motor starter components shall be installed as indicated and in accordance with the manufacturer's instructions. Motor starter panels shall be fully aligned and mounted so that the height of the top operating handle will not exceed 90-inches above the finished floor.

3.2 SPARE PARTS

The contractor shall provide one (1) of each type of relay, time delay relays, hand switch, push button, elapsed time meter, current switch, and indicating lamp of each color. The contractor shall provide one (1) power board, control board, operator interface terminal of the soft starter or variable frequency drive furnished for the project.

-- End of Section --

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SECTION 16500

LIGHTING

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

NATIONAL ELECTRICAL CODE (NEC)

ASTM INTERNATIONAL (ASTM)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

CALIFORNIA ENERGY COMMISSION (CEC)

ILLUMINATING ENGINEEREING SOCIETY (IES)

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

UNDERWRITERS LABORATORIES (UL)

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in IEEE 100.

1.3 GENERAL REQUIREMENTS

Section 16003, "General Electrical Provisions" applies to work specified in this section.

Section 16050, “Basic Electrical Materials and Methods”, applies to work specified in this section.

1.4 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and

District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
Product Data
- Interior Lighting
- Exterior Lighting
- Emergency Lighting
- Dimmer Switches
- Astronomical Timer

Manufacturer's Instructions Submittals
- Astronomical Timer

1.5 WARRANTY

Equipment furnished under this section shall be guaranteed against defective parts or workmanship for a period of 24 months from the date of acceptance by the District.

PART 2 CONSTRUCTION MATERIALS

2.1 INTERIOR LIGHTING

The interior lighting shall be wet location four (4) feet LED luminaire with an input voltage range of 120 to 277 VAC, power factor 0.9, and efficiency of 98 LPW. The LED luminaire shall provide 5000 lumens with a 4000 Kelvin color temperature. The LED luminaire shall have wall or ceiling mounting capabilities. The LED luminaire shall have a lifetime warranty of 10 years and designed to operate at 70,000 hours. The LED luminaire shall be UL listed, IP65 rated, and DLC qualified for Linear Ambient applications. The LED luminaire shall allow for 10% dimming with 0-10 Volt controls. The Contractor shall provide appropriate combination dimmer and switches for the interior lights.

2.2 EXTERIOR LIGHTING

The exterior lighting shall be outdoor applications with a LED luminaire with an input voltage range of 120 to 277 VAC, power factor 0.83, and efficiency of 89 LPW. The LED luminaire shall provide 5000 lumens with a 4000 Kelvin color temperature. The LED luminaire shall have wall mounting capabilities. The LED luminaire shall have a lifetime warranty of 10 years and designed to operate at 100,000 hours. The LED luminaire shall be UL listed, IP66 rated, Title 24, and ADA compliant. It is recommended that the exterior lights be mounted at and elevation of nine (9) or ten (10) feet above grade. The Contractor shall provide appropriate combination dimmer and switches for the interior lights.

2.3 EMERGENCY EGRESS LIGHTING

The emergency egress lighting shall consist of an exit sign and two indoor remote lamps. The emergency egress lighting shall have an input voltage range of 120 to 277 VAC, with LED lighting. The exit lettering shall be red in color that is 6 inches tall and 3/4-inch-wide, viewable at 100 feet, that meets the UL924 standard. The emergency egress lighting shall have maintenance free nickel cadmium battery that provides 90 minutes to the emergency lamps. The emergency egress lighting shall have a test push button that will provide a 30 second diagnostic testing. The emergency egress lighting shall have a self diagnostic test that it will perform 30 seconds every 30 days, and 30 minutes every 180 days. The emergency egress lighting shall be UL listed.

2.4 ASTRONOMICAL TIMER

The astronomical timer shall be a NEMA 4 surface mount enclosure with 120/277 V voltage input. The astronomical timer shall be UL listed for UL916 and UL924. The astronomical timer shall have occupancy sensor for exterior lighting. The astronomical timer shall have eight (8) relay outputs normally closed contacts rated for 277 VAc at 30 Amps.

PART 3 CONSTRUCTION METHODS

3.1 INSTALLATION

The Contractor shall install the light fixtures and astronomical timer as shown in the drawings and as manufacturer’s instructions. The contractor shall furnish all components to meet the Title 24 requirements. The interior lighting shall be mounted either suspended from the roof at one (1) foot below the roof with seismically approved supports or directly to the roof with unistrut channels. The exterior lighting shall be mounted as shown on the drawings. The emergency egress lighting shall be mounted above the pump station door.

Install lighting fixtures as close as possible to the locations showing on the drawings, making adjustments for the purpose of avoiding interferences. Install lighting fixtures plumb and level, with the fixture surfaces parallel and perpendicular to walls and other major structures. Support lighting fixtures at two points minimum from structural elements which are capable of carrying the total weight of the fixture and accessories. Mount fixtures rigidly with no rocking action. Where fixtures are mounted in or on a suspended grid type ceiling, support fixtures at two points in addition to support from the ceiling grid.

3.2 SPARE PARTS

The contractor shall provide one (1) of type of lighting fixture, LED lamps, and dimmer switches.

-- End of Section --

SECTION 17001

CONTROL ENCLOSURES

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- Control Enclosures and Accessories
- Factory Acceptance Test Procedure
- Site Acceptance Test Procedure

Manufacturer’s Instructions Submittals

Control Enclosures and Accessories
Factory Acceptance Test Procedure
Site Acceptance Test Procedure

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NEMA ICS 1, NFPA 70, and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 FREE STANDING ENCLOSURES

The free-standing enclosures are for mounting control equipment at the various sites. The enclosure shall be free standing enclosure with anchoring mounting struts inside the bottom of the panel. The enclosure shall be NEMA 12 rated to

protect electronic equipment. The panel shall be fabricated out of 12-gauge steel with continuous welded seams. The door shall have a 3-point latch for security and a pad lock lockable hasp. The door shall have oil resistant door gasket and a continuous welded hinge with a stainless-steel pin. The panel shall have mounting channels welded horizontally to the side, back, and bottom of enclosure. The panel shall be powder coated inside and out over pretreated surfaces with an ANSI 61 exterior finish and a white interior finish. The panel shall have a 12-gauge steel mounting plate power coated white with anchoring attachments and grounding points.

2.2 WALL MOUNT ENCLOSURE

The wall mount enclosures are for mounting control and instrumentation equipment at the various sites. The enclosure shall be wall mounted enclosure that has mounting tabs for anchoring panel to wall or structure. The enclosure shall be NEMA 3R or 4 rated as noted on the drawings, to protect electronic equipment in outdoor applications. The panel shall be fabricated out of 14-gauge stainless steel with continuous welded seams. The door shall have clamp assemblies and a hasp and staple for pad locking. The door shall have an oil resistant door gasket and a continuous welded hinge with a stainless-steel pin. The panel shall have mounting channels welded horizontally to the back of the enclosure. The panel shall be powder coated inside and out over pretreated surfaces with an ANSI 61 exterior finish and a white interior finish.

2.3 PANEL ACCESSORIES

The panel light shall be a 120 VAc LED or fluorescent light that can be mounted to the panel enclosure with included mounting hardware. The panel light shall have a door switch that will mount to the door frame and turn on the light when the panel door is opened. The door switch shall be Saginaw SCE-SLOF.

The panel security switch is a form C contact that is mounted to the door frame that changes state when the panel door is opened. The door switch contacts shall be rated as 5 Amps at 250 VAc and have suitable wiring from 22 to 14 AWG.

The panel shall have a panel heater that has a built-in adjustable thermostat. The panel heater shall operate on 120 VAC 60 Hz and have an output of 125 W. The panel heater shall be a Saginaw SCE-HF1251A.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 CONSTRUCTION

The Contractor shall assemble all the components of the control panels at the Contractors shop. Any conflicts arise in the construction; the Contractor shall contact the Engineer for proper guidance. Drawings and products shall be submitted for review.

3.3 PAINTING

The panel equipment is mostly the same exterior color. If any equipment does not match the prevalent color, the Contractor shall paint the mismatched equipment to the prevalent color using similar techniques used by the manufacturer. Any damage to the paint, the Contractor shall repair after installation and final start up of equipment.

3.4 SHIPMENT

The Contractor is responsible for all shipping from the factory to the job site. The Contractor shall protect the equipment internal to the panel for shipping. The Contractor shall protect the exterior of the panel for transportation. The Contractor shall be responsible for the equipment in transit until it is mounted on the floor at the job site. Any broken equipment shall be replaced with new equipment at no cost to the District.

3.5 MOUNTING

The free standing and battery enclosures shall be mounted on a concrete housekeeping pad that is 3” larger on each side of the enclosure and a minimum of 6” deep. The house keeping pad shall be formed using proper concrete forming equipment and materials. The housekeeping pad shall have concrete rated 3000 psi with 1/2” reinforcement bar (rebar) at 12” intervals horizontally and 6” vertically. The rebar shall be connected together with wire to form a cage prior to the addition of the cement. The cement shall be allowed to cure for seven (7) days before the installation of the control enclosure.

The wall mount enclosures shall be mounted on mounting channels to the wall or structure with spring bolt assemblies. The mounting channels shall be securely attached to the wall or structure by having several anchors per channel mounted at 12” intervals.

3.6 FACTORY ACCEPTANCE TEST

When all of the internal equipment has been procured, installed, and wired the control enclosure or control back plate shall go through a factory acceptance test at

the Contractor's facility. The factory acceptance test shall test the power distribution of the AC and the DC power systems, test the PLC inputs and outputs to the operational PLC processor. The factory acceptance test includes the operation of the inputs and outputs operations but not to the operation of the facility.

The Contractor shall prepare and submit a test procedure for the factory acceptance test to be review by the District and Engineer. Once the submitted test procedure has been approved, then the factory acceptance test can be scheduled with the District and Engineer. The control back plate shall not be installed in the field until the factory test has been passed and all corrections have been made to the wiring of the equipment.

3.6 SITE ACCEPTANCE TEST

After the control enclosure or control back plate has passed the factory acceptance test, is installed at the site, and all of the field wiring is connected to the control panel or control back plate then a site acceptance test shall be performed on the equipment. The site acceptance test is to test all power connections, all input and output connections to the control equipment and to the PLC. Instruments calibration shall be tested, and device operations shall be tested to ensure safe and proper operation of the equipment.

The Contractor shall submit the site acceptance test procedure to the District and Engineer to be reviewed by the District and Engineer. Once the submitted site acceptance test procedure has been approved, then the site acceptance test can be scheduled with the District and Engineer.

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SECTION 17011

PROGRAMMABLE LOGIC CONTROLLER EQUIPMENT

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- PLC PROCESSOR
- PLC POWER SUPPLY
- PLC DIGITAL INPUT MODULES
- PLC RELAY OUTPUT MODULES
- PLC ANALOG INPUT MODULES

PLC ANALOG OUTPUT MODULES
COMMUNICATIONS EQUIPMENT

Manufacturer's Instructions Submittals
PLC PROCESSOR
PLC POWER SUPPLY
PLC DIGITAL INPUT MODULES
PLC RELAY OUTPUT MODULES
PLC ANALOG INPUT MODULES
PLC ANALOG OUTPUT MODULES
COMMUNICATIONS EQUIPMENT

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NEMA ICS 1, NFPA 70, and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

The PLC equipment consists of several modular components. The components consist of the processor, power supply input modules and output modules. Since the equipment is going into an existing larger existing system, no substitutions shall be accepted. The equipment selected reflects current equipment in use and in common spare parts. Refer to the parts lists in the drawings for the exact quantity of each module.

2.1 PLC PROCESSOR

The processors shall be an Allen Bradley CompactLogix processor with one DFI communications port and 10/100 MB Ethernet port. The processor shall have 3 Mega Bytes of available memory and no non-volatile memory. A PLC battery shall back up the processor memory and the Contractor shall supply an extra battery for each processor. The processor shall support the following programming languages: ladder diagram, function block diagram, structured text, and sequential flow diagrams. The temperature operating range shall be 0 to 60 Celsius.

The PLC processor shall be the Allen Bradley 1769-L33ER processor and the 1769-BA1 battery.

2.2 PLC POWER SUPPLY

The PLC power supply provides power for the PLC modules in the PLC chassis. The temperature operating range shall be 0 to 60 Celsius. The PLC power supply input power is 20 to 30 VDc and provides 4 Amps at 5 VDC. The PLC power supply shall be Allen Bradley 1769-PB4.

2.3 PLC DIGITAL INPUT MODULES

The digital input modules shall be 10 to 31 VDC True High with thirty-two (32) points per module. There shall be four groups of eight (8) per common. The module will have a detachable wiring arm for ease of module replacement. The temperature operating range shall be 0 to 60 Celsius. The update time shall be 420 us. The digital input module shall be Allen Bradley 1769-IQ32.

2.4 PLC DIGITAL OUTPUT MODULES

The digital output module shall provide 24 VDC rated at 2 Amps. The digital output module shall have sixteen points per module. The module will have a detachable wiring arm for ease of module replacement. The temperature operating range shall be 0 to 60 Celsius. The digital output module shall be Allen Bradley 1769-OB16.

2.5 PLC ANALOG INPUT MODULES

The analog input modules shall allow current and voltage signals of 4-20 mA or 0-10, 0-5, or 1-5 VDC inputs. The module shall have isolated analog inputs with 300 VDC of isolation between channels. The module shall have a 16-bit analog to digital processor and support eight (8) points per module. The module will have a detachable wiring arm for ease of module replacement. The temperature operating range shall be 0 to 60 Celsius. The analog input modules shall be Allen Bradley 1769-IF8.

2.6 PLC ANALOG OUTPUT MODULES

The analog output modules shall allow current and voltage signals of 4-20 mA or 0-10 VDC. The digital to analog processor shall have 15-bits of resolution and support four (4) or eight (8) points per module. The module will have a detachable wiring arm for ease of module replacement. The temperature operating range shall be 0 to 60 Celsius. The analog output modules shall be Allen Bradley 1769-OF8 or 1769-OF4CI as indicated on the drawings

2.7 COMMUNICATIONS EQUIPMENT

2.7.1 Network Switch

The Network Switch shall have eight (8) RJ45 Ethernet connections. The network switch shall be powered from 10-30 VDC and allow for two power supplies. The temperature operating range shall be 0 to 60 Celsius. The Ethernet switch shall mount on standard 35 mm DIN rail. The Ethernet switch shall be an unmanaged style switch.

The network switch shall be an Allen Bradley 1783-US8T.

2.7.2 Ethernet Patch Cables

The Ethernet patch cables are standard Cat5E patch cables rated for 10/100 MBaud communications. The cables shall be manufactured cables with the size determined by the field installation.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 SHIPMENT

The Contractor is responsible for all shipping from the factory to the job site. The Contractor shall protect the equipment. The Contractor shall be responsible for the equipment in transit until it is mounted at the job site. Any broken equipment shall be replaced with new equipment at no cost to the District.

3.3 MOUNTING

The PLC and communications equipment shall be mounted as shown in the drawings. The PLC chassis shall be mounted to the panel back plate by using DIN rail and the DIN rail shall be mounted to the control panel using machine screws, drilling, and tapping the holes.

3.4 SPARE PARTS

The Contractor shall supply one of each type of PLC processor, power supply module, digital input module, digital output module, analog input module, analog output module, and one network switch.

3.5 PROGRAMMING

The Contractor is NOT responsible for the programming of the PLC equipment, communications interface, and computer operating screens. Others shall do the programming and start up and shall not be included in the bid price.

-- End of Section –

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SECTION 17021

CONTROL PANEL POWER EQUIPMENT

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- DC Power Supplies
- Battery Chargers
- UPS Batteries
- DC to DC Converters

Manufacturer's Instructions Submittals
- DC Power Supplies
- Battery Chargers
- UPS Batteries
- DC to DC Converters

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NEMA ICS 1, NFPA 70, and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 DC POWER SUPPLIES

The DC power supplies provide power for the panel equipment. The power supply shall rectify 120 VAc to 24 VDC. The power supply shall have a ripple less than 3% peak to peak. The output current limit shall be 115% of rated output. The input power shall have a range of 90 to 132 VAC. The power supply shall provide 5 Amps (120 Watts) of power at 80% efficiency. The power supplies shall mount on a regular DIN rail.

The power supply shall be IDEC PS5R-VF24.

2.2 BATTERY CHARGERS

The battery chargers are used to charge DC sealed lead acid batteries performing two or three stage charging routines; bulk, absorption, and float charging. The battery charger shall be powered by 120 VAC power and have a regulated output for charging 12 VDC batteries. The battery charger shall have temperature compensation to prevent damaging the batteries during adverse weather conditions. The battery charger shall have a selector switch to choose charging between Gel Cell, Flooded, AGM, and Lead cadmium battery types. The battery charger shall have an operational temperature range of 0 to 60 C.

The battery charger shall be a Xantrex True Charge2.

2.3 UPS BATTERIES

The UPS batteries are used for energy storage with constant charging equipment like uninterruptable power supplies or battery chargers. The battery shall be sealed maintenance free operation using AGM technology. The battery shall have flame-arresting one-way pressure-relief vent. The battery shall have a nominal voltage of 12 VDc and 100 Amp-hour capacity. The battery shall have an operational temperature of -40 to 60 C. The battery shall have “L” terminals posts to accept 6mm bolt.

The UPS batteries shall be C&D Technology UPS 12-350MR.

2.4 DC TO DC CONVERTERS

The DC to DC converter changes the input power from one voltage to another voltage. The DC to DC converter shall have the ability to step up voltages as well as step down voltages depending on the part number. The DC to DC converter shall have reverse input protection and short circuit protection. The DC to DC converter shall have an operating temperature range of -25 to 40 C and a relative humidity range of 0-95%. The DC to DC converter shall step up the voltage from 12 VDC to 24 VDC with a power rating of 150 W.

The DC to DC converter shall be PHOENIX CONTACT 2320131.

PART 3 CONTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 INSTALLATION

The power equipment shall be mounted in the control panels as shown on the drawings and according to manufacturer recommendations. Any broken equipment shall be replaced with new equipment at no cost to the District. The installation of the above equipment shall include all of the ancillary equipment noted in the drawings.

3.2 SPARE PARTS

The Contractor shall supply one of each type of power supply, battery charger, and DC/DC converter.

-- End of Section --

SECTION 17031

CONTROL PANEL TERMINALS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- Fused Terminals
- Feed Through Terminals (Low Current)
- Feed Through Terminals (High Current)
- Disconnect Terminals
- Ground Terminals

Terminal Rail End Terminals
Terminal Rail
Terminal Rail Supports

Manufacturer's Instructions Submittal
Fused Terminals
Feed Through Terminals (Low Current)
Feed Through Terminals (High Current)
Disconnect Terminals
Ground Terminals
Terminal Rail End Terminals
Terminal Rail
Terminal Rail Supports

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NEMA ICS 1, NFPA 70, and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete

compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 FUSE TERMINALS

The low current fuse terminals shall provide for an AGC style fuse. The fuse shall have a current capacity up to 10 amps at 120 VAC. Each level shall use screw compression type connections. The terminal shall allow wires up to 10 AWG. Jumper bars or fixed bridges shall be used to carry power to adjacent terminals. The terminal shall work with the 35 mm DIN terminal rails. Partition plates shall be used to separate fuse terminals from other terminals. The terminals shall be numbered as appears in the drawings.

The fuse terminal shall be Allen Bradley 1492-H6.

The fuse terminal insulated fixed bridge shall be Allen Bradley 1492-SJS.

The fuse terminal jumper bar shall be Allen Bradley 1492-N49.

2.2 FEED THROUGH TERMINALS (LOW CURRENT)

The feed through terminals shall allow two connection points per terminal. The feed through terminal shall have a current capacity of 10 Amps at 120 VAC. Each terminal connection shall use screw compression type terminals. Jumper bars or fixed bridges shall be used to carry power to adjacent terminals. The terminal shall work with the 35 mm DIN terminal rails. Partition plates shall be used to separate terminals as shown on the drawings.

The feed through terminal shall be Allen Bradley 1492-J3 or 1492-J4.

The feed through terminal partition shall be Allen Bradley 1492-EBJ3.

The double level feed through terminal shall be Allen Bradley 1492-JD3.

The double feed through terminal partition shall be Allen Bradley 1492-EBJD3.

The feed through terminal fixed bridge shall be Allen Bradley 1492-CJJ5-10 or 1492-CJJ6-10.

2.3 FEED THROUGH TERMINALS (HIGH CURRENT)

The feed through terminals shall allow two connection points per terminal. The feed through terminal shall have a current capacity of 50 Amps at 120 VAC. Each terminal connection shall use screw compression type terminals. Jumper bars or fixed bridges shall be used to carry power to adjacent terminals. The terminal shall work with the 35 mm DIN terminal rails. Partition plates shall be used to separate terminals as shown on the drawings.

The feed through terminal shall be Allen Bradley 1492-J6.

The feed through terminal partition shall be Allen Bradley 1492-EBJ6.

The feed through terminal fixed bridge shall be Allen Bradley 1492-CJJ8-10.

2.4 DISCONNECT TERMINALS

The disconnect terminals shall allow to disconnection of the electrical circuit with a simple knife-edge switch. The disconnect terminal shall have two connection points per terminal. The feed through terminal shall have a current capacity of 10 Amps at 120 VAC. Each terminal connection shall use screw compression type terminals. Jumper bars or fixed bridges shall be used to carry power to adjacent terminals. The terminal shall work with the 35 mm DIN terminal rails. Partition plates shall be used to separate terminals as shown on the drawings.

The disconnect terminal shall be Allen Bradley 1492-JKD3.

2.5 GROUND TERMINALS

The ground terminal shall electrically connect the connection points to the terminal rail. The ground terminal shall have two connection points per terminal. The feed through terminal shall have a current capacity of 10 Amps at 120 VAC. Each terminal connection shall use screw compression type terminals. The terminal shall work with the 35 mm DIN terminal rails.

The ground terminal shall be Allen Bradley 1492-JG3.

2.6 TERMINAL RAIL END TERMINALS

These terminals clamp the end of the terminals to prevent movement of the other terminals. The terminal shall work with the 35 mm DIN terminal rails.

The terminal rail end anchors shall be Allen Bradley 1492-EAJ35.

2.7 TERMINAL RAIL

The terminal rail shall be 35 mm DIN terminal rails. The terminal rails shall be slotted for installation ease. The terminals rails shall be installed on isolated supports spaced every twelve (12) inches.

The terminal rail shall be Weidmuller 996497.

2.8 TERMINAL RAIL SUPPORTS

The terminal rail supports lift the rail for the mounting back plate and allow for electrical isolation from the back plane.

The terminal rail supports shall be Weidmuller 049492.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 INSTALLATION

The terminals shall be installed according to the drawings and the manufacturer specifications. Any terminals broken shall be replaced by the Contractor at no expense to the District. The Contractor shall install terminal labels as shown on the Drawings. The din rails shall be mounted with stainless steel screws, drilled, and tapped into the panel back or side plate. No self-tapping screws allowed.

3.3 SPARE PARTS

The Contractor shall supply 10 spare terminals of each type except the terminal rail and terminal rail supports as noted in the drawings.

-- End of Section --

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SECTION 17032

CONTROL RELAYS AND TIMERS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA Z 535 - Safety Color Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- General Purpose Relays (AC DPDT)
- General Purpose Relays (DC DPDT)
- General Purpose Relays (AC 4PDT)
- General Purpose Relays (DC 4PDT)
- Time Delay Relays (AC 4PDT)

Slim Line Control Relays (AC)
Slim Line Control Relays (DC)

Manufacturer's Instructions Submittals
General Purpose Relays (AC DPDT)
General Purpose Relays (DC DPDT)
General Purpose Relays (AC 4PDT)
General Purpose Relays (DC 4PDT)
Time Delay Relays (AC 4PDT)
Slim Line Control Relays (AC)
Slim Line Control Relays (DC)

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NFPA 70 and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 GENERAL PURPOSE RELAYS (AC DPDT)

Relays are used for control of the field equipment. The relays shall be double-pole, double-throw relays (DPDT). The coil voltage for the relay shall be 120 VAC, 60 Hz. The relays shall have contacts rating for 5 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HA32A1, with terminal rail mounting base 700-HN125. The relays shall be attached to the relay base with appropriate hold-down clips.

2.2 GENERAL PURPOSE RELAYS (DC DPDT)

Relays are used for control of the field equipment. The relays shall be double-pole, double-throw relays (DPDT). The coil voltage for the relay shall be 24 VDC. The relays shall have contacts rating for 5 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HA32Z24 with terminal rail mounting base 700-HN125. The relays shall be attached to the relay base with appropriate hold-down clips.

2.3 GENERAL PURPOSE RELAYS (AC 4PDT)

Relays are used for control of the field equipment. The relays shall be four-pole, double-throw relays (4PDT). The coil voltage for the relay shall be 120 VAC, 60 Hz. The relays shall have contacts rating for 10 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HC14A1, with terminal rail mounting base 700-HN128. The relays shall be attached to the relay base with appropriate hold-down clips.

2.4 GENERAL PURPOSE RELAYS (DC 4PDT)

Relays are used for control of the field equipment. The relays shall be four-pole, double-throw relays (4PDT). The coil voltage for the relay shall be 24 VDC. The relays shall have contacts rating for 10 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HC14Z24, with terminal rail mounting base 700-HN128. The relays shall be attached to the relay base with appropriate hold-down clips.

2.5 TIME DELAY RELAYS (AC 4PDT)

Relays are used for control of the field equipment with time delay functions. The timer relay shall have a dial for adjusting the delay time from 0.1 seconds to 10 minutes. The timer relay shall have dip switch settings to define the mode and timing range of the relay. The relays shall be four-pole, double-throw relays (4PDT). The coil voltage for the relay shall be 120 VAC, 60 Hz. The relays shall have contacts rating for 10 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HNC44AA12, with terminal rail mounting base 700-HN128. The relays shall be attached to the relay base with appropriate hold-down clips.

2.6 SLIM LINE CONTROL RELAYS (AC)

Relays are used for control of the field equipment. The relays shall be double-pole, double-throw relays (SPDT). The coil voltage for the relay shall be 120 VAC. The relays shall have contacts rating for 5 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HK32A1 with terminal rail mounting base 700-HN122. The relays shall be attached to the relay base with appropriate hold-down clips.

2.7 SLIM LINE CONTROL RELAYS (DC)

Relays are used for control of the field equipment. The relays shall be double-pole, double-throw relays (SPDT). The coil voltage for the relay shall be 24 VDC. The relays shall have contacts rating for 5 amps per contact. The relays shall have LED or mechanical indicator.

The general-purpose relays shall be Allen Bradley 700-HK32Z24 with terminal rail mounting base 700-HN122. The relays shall be attached to the relay base with appropriate hold-down clips.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer approval.

3.2 INSTALLATION

The relays and time delay relays shall be installed according to manufacturer specifications and according to the drawings. Any broken equipment shall be replaced with new equipment at no additional cost to the District. The relays shall be labeled as shown on the drawings.

3.3 SPARE PARTS

The Contractor shall supply four (4) of each type of relays as shown on the drawings.

-- End of Section --

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SECTION 17033

HAND SWITCHES AND PILOT LIGHTS

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA Z 535 - Safety Color Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
- Three Position Hand Switch, Maintained, Non-Illuminated
- Two Position Push Button, Maintained, Non-Illuminated
- Push To Test Indicating Lamp

Manufacturer's Instructions Submittals

Three Position Hand Switch, Maintained, Non-Illuminated
Two Position Push Button, Maintained, Non-Illuminated
Push To Test Indicating Lamp

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NFPA 70 and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 THREE POSITION HAND SWITCH, MAINTAINED, NON-ILLUMINATED

The hand switch shall have three (3) positions, which are maintained positions. The contacts have a rating of 10 A at 600 VAC or 2.5 A at 600 VDC. The hand switch shall have two sets of normally open (NO) and normally closed (NC) contacts. The hand switch shall be keyed to prevent rotation of the body. The hand switch shall be Nema Type 4/13, water, and oil tight. The hand switch shall have gaskets to prevent leakage into the panel.

The three-position hand switch shall be Allen Bradley 800T-J2B with legend as shown in the drawings. An auxiliary contact block is required, Allen Bradley 800T-XA.

2.2 TWO POSITION PUSH BUTTON, MAINTAINED, NON-ILLUMINATED

The push button switch shall have two (2) positions, which are maintained positions. The contacts have a rating of 10 A at 600 VAC or 2.5 A at 600 VDC. The push button shall have two sets of normally open (NO) and normally closed (NC) contacts. The push button shall be keyed to prevent rotation of the body. The push button shall be Nema Type 4/13, water, and oil tight. The push button shall have gaskets to prevent leakage into the panel.

The push button hand switch shall be Allen Bradley 800T-HA2 with legend as shown in the drawings. An auxiliary contact block is required, Allen Bradley 800T-XA.

2.3 PUSH TO TEST INDICATING LAMP

The push to test indicating lamp shall have an LED lamp that shall push button contacts that shall have momentary contacts to switch the power from normal to a secondary power source. The lamp shall be a LED lamp with the color as indicated Red, Green, or Amber and shall have a full voltage rating of 120 VAC.

The red push to test lamps shall be Allen Bradley 800T-QBH2R with legend as shown in the drawings.

The green push to test lamps shall be Allen Bradley 800T-QBH2G with legend as shown in the drawings.

The amber push to test lamps shall be Allen Bradley 800T-QBH2A with legend as shown in the drawings.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer approval.

3.2 INSTALLATION

The hand switches and the lamps shall be installed according to manufacturer specifications and according to the drawings. Any broken equipment shall be replaced with new equipment at no cost to the District.

3.3 SPARE PARTS

The Contractor shall supply two (2) of each type of hand switch, push button, or lamp as shown on the drawings.

-- End of Section --

SECTION 17034

CONTROL WIRE AND WIRE ACCESSORIES

PART 1 GENERAL REQUIREMENTS

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2 - National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
NEMA ICS 1 - General Standards for Industrial Control and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 70 - National Electrical Code

UNDERWRITERS LABORATORIES (UL)
UL-05 - Electrical Construction Materials Directory

1.2 SUBMITTALS

Prior to procurement and construction, the Contractor shall submit Preconstruction drawings and equipment information sheets for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal. The Contractor is responsible for finding Equivalent equipment on rejected submittals at no cost to the District. Once the equipment and drawings have been approved, the Contractor can begin procurement and construction of equipment.

Prior to the completion of construction, the Contractor shall submit Manufacturers Instructions information collected into operational and maintenance manual for approval. The Engineer and District staff will review the submittals and accept or reject any equipment within two (2) weeks of submittal.

The following submittals shall be supplied by the Contractor:

Preconstruction Submittals
PRODUCTS

Manufacturer’s Instructions Submittals
PRODUCTS

1.3 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

It is the intent of these specifications and the contract drawings to provide a complete and workable system. Design drawings are diagrammatic and do not show all offsets, bends, elbows, or other specific elements that may be required for proper installation of the work. Such work shall be verified at the site. Additional bends and offsets, and conduit as required by vertical and horizontal equipment locations or other job conditions, shall be provided to complete the work at no additional cost to the District.

1.4 CODES AND STANDARDS

Equipment design, fabrication, testing, performance, and installation shall, unless shown or specified otherwise, comply with the applicable requirements of NEMA ICS 1, NFPA 70, and IEEE C2 to the extent indicated by the references.

1.5 COORDINATION

Installation of the control equipment electrical work shall be coordinated with the work of other trades.

1.6 APPROVAL REQUIREMENTS

Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories (UL), Inc., the label of, or listing with re-examination, in UL-05 will be acceptable as sufficient evidence that the items conform to the requirements.

Where materials or equipment are specified to be constructed or tested in accordance with the standards of NEMA, ANSI, ASTM, or other recognized standards, a manufacturer's certificate of compliance indicating complete compliance of each item with the applicable NEMA, ANSI, ASTM, or other commercial standards specified will be acceptable as proof of compliance.

PART 2 CONSTRUCTION MATERIALS

2.1 WIRE

Several types of wire shall be used for the different control, power, and instrumentation.

2.1.1 Equipment Power Wiring

All control power wiring shall be AWG type THWN. The size as depicted on the drawings and on the conduit schedule. The minimum wire size for power wiring

shall be 12 AWG and all field wiring shall be 14 AWG. The wires shall be stranded; no solid conductors will be accepted. The color of the wire shall be as follows:

Power Wire Colors

Service	Wire Color
120 VAC	Black
24 VAC	Grey
Neutral	White
Ground	Green

2.1.2 Control Panel Wiring

The control console wiring shall be AWG type THHN, HW, or MTW. The wire sizes are as shown on the drawings. The wires shall be stranded no solid conductors will be accepted. The color of the wire shall be as follows:

Control Panel Wire Colors

Service	Wire Color
120 VAC	Black
Neutral	White
Ground	Green
Control	Red
48 VDC	Grey
24 VDC	Blue
12 VDC	Purple
DC Common	White with Blue Stripe

2.1.3 Field Control Wiring

The field wiring shall be AWG Type THHN with a 600 V rating. For power circuits, the size shall not be less than 12 AWG. For control circuits the wire size shall not be less than 16 AWG. The wires shall be stranded; no solid conductors will be accepted. This only applies to digital or discrete function. The color of the wire shall be as follows:

Field Wire Colors

Service	Wire Color
120 VAC	Black
24 VAC	Grey
Neutral	White
Ground	Green
Control	Red
24 VDC	Blue
12 VDC	Purple
DC Common	White with Blue Stripe

2.1.4 Field Instrument Wiring

Instrument wiring shall use 1 pair shielded cable with 18 AWG conductors. The shield shall be an overall shield with a drain wire. The overall jacket shall meet 600 VAC insulation requirements. The wire pairs shall not be less than 18 AWG. The wire shall be stranded; no solid wires will be accepted. The color of the wire shall be as follows:

Instrument Wire Color

Service	Color
Signal Positive	White
Signal Negative	Black
Signal Shield	Drain Wire

2.2 WIRE LABELS

Each wire shall be labeled as shown on the drawings. The wire label shall be heat shrink type appropriately sized for wire size and type. The wires shall have the wire labels at both ends of the wire with the same wire label.

2.3 WIRE FERRULES

Wire ferrules will be used on all wires in the control panel and field wiring except wires larger than 14 AWG. The ferrules shall be crimped with appropriate crimping tools.

Spade and eyelet lugs shall be used wherever appropriate for secure connections. The lugs shall be sized and crimped with appropriate crimping tools.

2.4 WIRE DUCT

Wire duct shall be used in the control console as a means of organizing, maintain control, and power wiring. The duct shall be sized at 40% fill. The duct shall be having wiring access slots at 1/2" increments or less and the wire ducts shall have a cover. The wire duct size shall be as shown on the drawings.

PART 3 CONSTRUCTION METHODS

3.1 SUBSTITUTIONS

No materials or equipment may be substituted without District staff and the Engineer written approval.

3.2 INSTALLATION

The wire and accessories shall be installed according to manufacturer specifications and as shown on the drawings. All wires shall be labeled as shown on the drawings. If any questions arise on wire labeling, please contact the Engineer.

-- End of Section --

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