

SPECIFICATION and CONTRACT DOCUMENTS

FOR

BOYS RANCH WELL #2A & JACKSON #3 WELL

PROJECT



MORGAN HILL, CALIFORNIA
PUBLIC WORKS DEPARTMENT

PREPARED BY
PUBLIC WORKS DEPARTMENT

APRIL, 2017

NOTICE INVITING BIDS

1. **Bid Acceptance.** The City of Morgan Hill (“City”), will accept sealed bids for its Boys Ranch Well #2A and Jackson #3 Well Pump Stations Project (“Project”), by or before **Wednesday, April 19, 2017, at 2:30 p.m.**, at its Development Services Center’s office, located at 17575 Peak Avenue Morgan Hill, California, at which time the bids will be publicly opened and read aloud.

2. Project Information.

2.1 Location and Description. The Project sites are located at the following locations:

- The Boys Ranch #2, 2A, and 3 well sites are located near the Anderson Lake Visitor Center at the intersection of the Coyote Creek Trail head and the northern extension of Malaguerra Avenue.
- Jackson #1 and 3: well sites are located at 2150 E. Dunne Avenue, east of the Hill Rd./E. Dunne Ave. intersection.

The Project’s Scope of Work is described as follows:

- Furnishing all materials, labor, equipment, fuel, tools, and transportation required to:
 - Abandon a total of three (3) existing wells; Boys Ranch #2, Boys Ranch #3, and Jackson sites;
 - Install new water pipelines and one (1) 125-hp (horsepower) vertical turbine lineshaft well pump to an existing well at the Boys Ranch #2 well site and all related site work from the Boys Ranch #2A well site to the existing Boys Ranch #2 pump station;
 - Install new water pipelines and one (1) 100-hp vertical turbine lineshaft well pump to an existing well at the Jackson well; and related site work from the Jackson #3 well site to the existing Jackson #1 pump station;
 - Complete all work related to the above items as shown on the Plans and as detailed in these Specifications.

2.2 Time for Completion. The planned timeframe for commencement and completion of construction of the Project is: 220 calendar days from the Notice to Proceed date.

3. License and Registration Requirements.

3.1 License. This Project requires a valid California contractor’s license for the following classification(s): A or C-57.

3.2 DIR Registration. City will not accept a Bid Proposal from or enter into the Contract with a bidder, without proof that the bidder and its

Subcontractors are registered with the California Department of Industrial Relations (“DIR”) to perform public work under Labor Code Section 1725.5, subject to limited legal exceptions.

4. **Contract Documents.** The plans, specifications, bid and contract documents for the Project (“Contract Documents”) may be obtained from the City of Morgan Hill, at 17575 Peak Avenue, Morgan Hill, CA, (408) 778-6480. **Contractors may obtain a copy of the Contract Documents for Twenty-Five dollars (\$25.00) per set. A Five dollar (\$5.00) charge will be added for mailing by USPS. Electronic copies of the Contract Documents are available on CD for ten dollars (\$10.00). To download plans and specifications at no charge, register at www.publicpurchase.com.**

5. **Bid Proposal and Security.**

5.1 Bid Proposal Form. Each Bid must be submitted using the Bid Proposal form provided with the Contract Documents.

5.2 Bid Security. The Bid Proposal must be accompanied by bid security of ten percent (10%) of the maximum bid amount, in the form of a cashier’s or certified check made payable to City of Morgan Hill, or a bid bond executed by a surety licensed to do business in the State of California on the Bid Bond form included with the Contract Documents. The bid security must guarantee that upon award of the bid, the bidder will execute the Contract and submit payment and performance bonds and insurance certificates as required by the Contract Documents within ten (10) days after issuance of the notice of award.

6. **Prevailing Wage Requirements.**

6.1 General. This Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes.

6.2 Rates. These prevailing rates are available online at <http://www.dir.ca.gov/DLSR>. Each Contractor and Subcontractor must pay no less than the specified rates to all workers employed to work on the Project. The schedule of per diem wages is based upon a working day of eight (8) hours. The rate for holiday and overtime work must be at least time and one-half (1/2).

6.3 Compliance. The Contract will be subject to compliance monitoring and enforcement by the California Department of Industrial Relations, under Labor Code Section 1771.4.

- 7. Performance and Payment Bonds.** The successful bidder will be required to provide performance and payment bonds for one hundred percent (100%) of the Contract Price.
- 8. Substitution of Securities.** Substitution of appropriate securities in lieu of retention amounts from progress payments is permitted under Public Contract Code Section 22300.
- 9. Subcontractor List.** Each bidder must submit the name, location of the place of business, and California contractor license number and DIR registration number for each Subcontractor who will perform work or service or fabricate or install work for the prime contractor in excess of one-half (1/2) of one percent (1%) of the bid price, using the Subcontractor List form included with the Contract Documents.
- 10. Instructions to Bidders.** Additional and more detailed information is provided in the Instructions for Bidders, which should be carefully reviewed by all bidders before submitting a Bid Proposal.
- 11. Bidders' Conference.** No bidders' conference will be held.
- 12. Estimated Cost.** The estimated construction cost is \$1.3 Million.

By: Irma Torrez, City Clerk

Date: March 27, 2017

Publication Dates: 1) March 31, 2017 2) April 7, 2017

END OF NOTICE INVITING BIDS

INSTRUCTIONS TO BIDDERS

Each Bid Proposal submitted to the City of Morgan Hill (“City”) for its Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project (“Project”) must be submitted in accordance with the following instructions and requirements:

1. Bid Submission.

1.1 General. Each bid (“Bid Proposal”) must be signed, sealed and submitted to City, using the form provided in the Contract Documents, by or before the date and time set forth in the Notice Inviting Bids, or as amended by subsequent addendum. Faxed or emailed Bid Proposals will not be accepted, unless otherwise specified. Late submissions will be returned unopened. City reserves the right to postpone the date and time for receiving or opening bids. Each bidder is solely responsible for all of its costs to prepare and submit its bid and by submitting a bid waives any right to recover those costs from City. The bid price(s) must include all costs to perform the Work as specified, including all indirect costs such as applicable taxes, insurance and field offices.

1.2 Bid Envelope. The envelope containing the sealed Bid Proposal and required attachments must be clearly labeled as follows:

BID PROPOSAL
Morgan Hill DSC
Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations
Project
City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037
Attention: Bid Opening/RFP
Bid Date: Wednesday, April 19, 2017
Bid Time: 2:30 p.m.

The envelope must also be clearly labeled, as follows, with the bidder’s name, address, and its registration number with the California Department of Industrial Relations (“DIR”) for bidding on public works contracts (Labor Code sections 1725.5 and 1771.1):

[Contractor company name]
[Street address]
[City, state, zip code]
DIR Registration No. _____

Please note: If City is unable to confirm that the bidder's DIR registration is current, City must disqualify the bidder and return its bid unopened (Labor Code section 1725.5).

- 2. Examination of Contract Documents and Project Site.** Each bidder is solely responsible for diligent and thorough review of the Contract Documents (as defined in the General Conditions), examination of Project site, and reasonable and prudent inquiry concerning known and potential site conditions prior to submitting a Bid Proposal. However, bidders should not enter onto City's property or the Project site without prior written authorization from City. Bidders are responsible for reporting any errors or omissions in the Contract Documents to City prior to submitting a Bid Proposal, subject to the limitations of Public Contract Code Section 1104. City expressly disclaims responsibility for assumptions the bidder might draw from the presence or absence of information provided by City.
- 3. Requests for Information.** Questions regarding the Project, the bid procedures or any of the Contract Documents must be submitted in writing to David Gittleson at david.gittleson@morganhill.ca.gov.
- 4. Addenda.** Any addenda issued prior to the bid opening are part of the Contract Documents. Subject to the limitations of Public Contract Code section 4104.5, City reserves the right to issue addenda prior to bid time.
- 5. Brand Designations and "Or Equal" Substitutions.** Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate quality and type of item desired, and bidders may request use of any equal material, product, thing, or service. All data substantiating the proposed substitute as an "equal" item must be submitted with the written request for substitution. This provision does not apply to materials, products, things, or services that may lawfully be designated by a specific brand or trade name under Public Contract Code Section 3400(c).

5.1 Pre-Bid Requests. Any request for submission made before the Contract is awarded must be submitted to the City Engineer at least ten (10) days before the opening of bids so that all interested bidders may be notified of any approved alternative.

5.2 Post-Award Requests. After the Contract is awarded, Contractor may submit a substitution within fourteen (14) days after the date of award of the Contract, or as specified in the Special Conditions.
- 6. Bidders Interested in More Than One Bid.** No person, firm, or corporation may submit or be a party to more than one (1) Bid Proposal unless alternate bids are specifically called for. However, a person, firm, or

corporation that has submitted a subcontract proposal or quote to a bidder may submit subcontract proposals or quotes to other bidders, and may also submit a Bid Proposal as a prime contractor.

- 7. Bid Proposal Form and Enclosures.** Each Bid Proposal must be completed in ink using the Bid Proposal form included in the Contract Documents. The Bid Proposal form should be fully completed without interlineations, alterations, or erasures. Any necessary corrections must be clear and legible, and must be initialed by the bidder's authorized representative. A Bid Proposal submitted with terms such as "negotiable," "will negotiate," or similar, will be considered non-responsive. Each Bid Proposal must be accompanied by bid security, as set forth in Section 9 below, and by the completed Subcontractor List, and Non-Collusion Declaration using the forms included in the Contract Documents.
- 8. Authorization and Execution.** Each Bid Proposal must be signed by the bidder's authorized representative. A Bid Proposal submitted by a partnership must be signed in the partnership name by a general partner with authority to bind the partnership. A Bid Proposal submitted by a corporation must be signed with the legal name of the corporation, followed by the signature and title of two (2) officers of the corporation with full authority to bind the corporation to the terms of the Bid Proposal, under California Corporation Code section 313.
- 9. Bid Security.** Each Bid Proposal must be accompanied by bid security of ten percent (10%) of the maximum bid amount, in the form of a cashier's check, a certified check, or a bid bond, using the form included in the Contract Documents, executed by a surety licensed to do business in the State of California, made payable to City. The bid security must guarantee that upon award of the bid, the bidder will execute and submit the Contract on the form included in the Contract Documents, will submit payment and performance bonds one hundred percent (100%) of the maximum Contract Price, and will submit the insurance certificates and endorsements as required by the Contract Documents within ten (10) days after issuance of the notice of award.
- 10. Withdrawal of Bid Proposals.** A Bid Proposal may not be withdrawn for a period of ninety (90) days after the bid opening without forfeiture of the bid security, except as authorized for material error under Public Contract Code Section 5100 et seq.
- 11. Bid Protest.** Any bid protest must be in writing and received by City at the City Attorney's Office at 17575 Peak Avenue, Morgan Hill, CA, (Fax: (408) 779-1592), before 5:00 p.m. no later than two (2) working days following bid opening (the "Bid Protest Deadline") and must comply with the following requirements:

11.1 General. Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest. If required by City, the protesting bidder must submit a non-refundable fee in the amount specified by City, based upon City's reasonable costs to administer the bid protest. Any such fee must be submitted to City no later than the Bid Protest Deadline, unless otherwise specified. For purposes of this Section 11, a "working day" means a day that City is open for normal business, and excludes weekends and holidays observed by City.

11.2 Protest Contents. The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder if different from the protesting bidder.

11.3 Copy to Protested Bidder. A copy of the protest and all supporting documents must be concurrently transmitted by fax or by email, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

11.4 Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by City before 5:00 p.m., within two (2) working days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder if different from the protested bidder.

11.5 Copy to Protesting Bidder. A copy of the response and all supporting documents must be concurrently transmitted by fax or by email, by or before the Response Deadline, to the protesting bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

11.6 Exclusive Remedy. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

11.7 Right to Award. City reserves the right to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest responsive bid, and to issue a notice to proceed with the Work notwithstanding any pending or continuing challenge to its determination.

- 12. Rejection of Bids; Award of Contract.** City reserves the right, acting in its sole discretion, to waive immaterial bid irregularities, the right to accept or reject any and all bids, or to abandon the Project entirely. The Contract will be awarded, if at all, within ninety (90) days after opening of bids or as otherwise specified in the Special Conditions, to the responsible bidder that submitted the lowest responsive bid.
- 13. Bonds.** The successful bidder is required to submit payment and performance bonds as specified in the Contract Documents using the bond forms included in the Contract Documents. All required bonds must be calculated on the maximum total Contract price as awarded, including additive alternates, if applicable.
- 14. Evidence of Responsibility.** Within twenty four (24) hours following a request by City, a bidder must submit to City satisfactory evidence showing the bidder's financial resources, the bidder's experience in the type of work being required by City, the bidder's organization available for the performance of the Contract and any other required evidence of the bidder's qualifications to perform the proposed Contract. City may consider such evidence before making its decision awarding the proposed Contract.
- 15. License(s).** The successful bidder and its Subcontractor(s) must possess the California contractor's license(s) in the classification(s) required by law to perform the Work.
- 16. Taxes.** The bid price must include all applicable federal, state, and local taxes.
- 17. Ineligible Subcontractor.** Any Subcontractor who is ineligible to perform work on a public works project under Labor Code Sections 1777.1 or 1777.7 is prohibited from performing work on this Project.
- 18. Subcontract Limitation.** The successful bidder may not subcontract out more than fifty percent (50%) of the original total contract price, except that any items of work in the Engineer's Estimate designated "Specialty Items" may be performed by subcontract and the value of the work may be deducted from the original total contract price before computing the amount of work required to be performed by Contractor's own forces. When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), those items are designated as "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the

contract item bid price. When a portion of an item is subcontracted, the value of work subcontracted will be determined by the Engineer based on the estimated percentage of the contract item bid price.

19. DIR Registration. City will not accept a Bid Proposal from or enter into the Contract with a bidder, without proof that the bidder and its Subcontractors are registered with the DIR to perform public work under Labor Code Section 1725.5, subject to limited legal exceptions.

20. Bid Schedule. Bidders are required to fully complete the Bid Schedule form accompanying the Bid Proposal form with unit prices as indicated, and to submit the completed Bid Schedule with their Bid Proposal.

20.1 Incorrect Totals. In the event of a computational error for any bid item (base bid or alternate) resulting in an incorrect extended total for that item, the submitted base bid or bid alternate total will be adjusted to reflect the corrected amount (estimated quantity X unit cost), unless the cumulative amount of correction changes the total amount of the base bid or bid alternate by more than five percent (5%). In the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid, and the amount entered as the base bid on the Bid Proposal form, the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid will be deemed the base bid price. Likewise, in the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for any bid alternate, and the amount entered for the alternate on the Bid Proposal form, the actual total of the itemized prices shown on the Bid Schedule for that alternate will be deemed the alternate price. Nothing in this provision is intended to prevent a bidder from requesting to withdraw its bid for material error under Public Contract Code Section 5100 et seq.

20.2 Estimated Quantities. The quantities shown on the Bid Schedule are estimated and the actual quantities required to perform the Work may be greater or less than the estimated amount. The Contract Price will be adjusted to reflect the actual quantities required for the Work based on the itemized or unit prices provided in the Bid Schedule, with no allowance for anticipated profit for quantities that are deleted or decreased.

21. Bidder's Questionnaire. A completed, signed Bidder's Questionnaire using the form provided with the Contract Documents and including all required attachments must be submitted within 48 hours following a request by City. A bid that does not fully comply with this requirement may be rejected as nonresponsive. A bidder who submits a Bidder's Questionnaire which is subsequently determined to contain false or misleading information, or material omissions, may be disqualified as non-responsible.

- 22. Safety Orders.** Each Bid must include a bid item for adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb, which comply with safety orders as required by Labor Code Section 6707.

END OF INSTRUCTIONS TO BIDDERS

BID PROPOSAL

Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project

_____ (“Bidder”) hereby submits this Bid Proposal to the City of Morgan Hill (“City”) for the above-referenced project (“Project”) in response to the Notice Inviting Bids and in accordance with the Contract Documents referenced therein.

1. **Base Bid.** Bidder proposes to perform and fully complete the Work for the Project as specified in the Contract Documents, within the time required for full completion of the Work, for the following price (“Base Bid”):
\$ _____.

2. **Addenda.** Bidder acknowledges receipt of the following addenda:

Addendum:	Date Received:	Addendum:	Date Received:
#01	_____	#05	_____
#02	_____	#06	_____
#03	_____	#07	_____
#04	_____	#08	_____

3. **Bidder’s Warranties.** By signing and submitting this Bid Proposal, Bidder warrants the following:

3.1 **Examination of Contract Documents.** Bidder has thoroughly examined the Contract Documents, and represents that, to the best of Bidder’s knowledge there are no errors, omissions, or discrepancies in the Contract Documents subject to the limitations of Public Contract Code Section 1104.

3.2 **Examination of Worksite.** Bidder has had the opportunity to examine the Worksite and local conditions at the Project location.

3.3 **Bidder is Qualified.** Bidder is fully qualified to perform the Work.

3.4 **Responsibility for Bid.** Bidder has carefully reviewed this Bid Proposal and is solely responsible for any errors or omissions contained in its completed Bid.

4. **Award of Contract.** By signing and submitting this Bid Proposal, Bidder agrees that if Bidder is awarded the Contract for the Project, that within ten (10) days following issuance of the notice of award to Bidder, Bidder will do all of the following:

4.1 Execute Contract. Enter into the Contract with City in accordance with the terms of this Bid Proposal, by signing and submitting to City the Contract prepared by City using the form included with the Contract Documents;

4.2 Submit Required Bonds. Submit to City a payment bond and a performance bond, each for one hundred percent (100%) of the Contract Price, using the bond forms provided and in accordance with the requirements of the Contract Documents; and

4.3 Insurance Requirements. Submit to City the insurance certificate(s) and endorsement(s) as required by the Contract Documents.

5. Bid Security. As a guarantee that if awarded the Contract, it will perform its obligations under Section 4, above, Bidder is enclosing bid security in the amount of ten percent (10%) of its maximum bid amount in the following form:

_____ A cashier's check or certified check payable to City of Morgan Hill and issued by _____ Bank in the amount of \$_____.

_____ A bid bond, using the Bid Bond form included with the Contract Documents, payable to City of Morgan Hill and executed by a surety licensed to do business in the State of California.

This Bid Proposal is hereby submitted on _____, 20__:

s/ _____

Name and Title [print]

Company Name

License # and Classification

DIR Registration #

Address

Phone

City, State, Zip

Fax

END OF BID PROPOSAL

BID SCHEDULES “A”-“E” – GENERAL

This Bid Schedule must be completed in ink and must be included with the sealed Bid Proposal. The unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the “Extended Total” column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal Form. Quantities shown are required for bid purposes and may or may not be final pay quantities. Actual quantities, if different, must be substantiated during the Project by the Contractor (either by field measurement, trucking tags, or other means acceptable to the Engineer).

Schedule “A” - Boys Ranch #2A Well Improvements:

Bid Item	Description of Bid Item	Approx. Quantity	Unit	Unit Price	Extended Total
A-1	Mobilization	1	LS	\$	\$
A-2	Project Records and Submittals	1	LS	\$	\$
A-3	Preservation and Cleanup	1	LS	\$	\$
A-4	Earthwork	1	LS	\$	\$
A-5	Paving	1	LS	\$	\$
A-6	Chain Link Fencing	1	LS	\$	\$
A-7	Concrete	1	LS	\$	\$
A-8	Painting	1	LS	\$	\$
A-9	Building	1	LS	\$	\$
A-10	Signs and Safety Equipment	1	LS	\$	\$
A-11	Pipe (Station, Distribution, and Drainage)	1	LS	\$	\$
A-12	Valves and Related Appurtenances	1	LS	\$	\$
A-13	Vertical Turbine Components	1	LS	\$	\$
A-14	Disinfection of Wells, Pumps, and Piping	1	LS	\$	\$
A-15	Performance Testing and Facility Startup	1	LS	\$	\$
A-16	Electrical	1	LS	\$	\$
Base Bid Schedule “A” Total (Items A-1 – A-16):				\$	

Abbreviations:

CY: Cubic Yard, HR: Hour, LF: Linear Feet, LS: Lump Sum

Schedule "B" - Jackson #3 Well Improvements:

Bid Item	Description of Bid Item	Approx. Quantity	Unit	Unit Price	Extended Total
B-1	Mobilization	1	LS	\$	\$
B-2	Project Records and Submittals	1	LS	\$	\$
B-3	Preservation and Cleanup	1	LS	\$	\$
B-4	Earthwork	1	LS	\$	\$
B-5	Paving	1	LS	\$	\$
B-6	Chain Link Fencing	1	LS	\$	\$
B-7	Concrete	1	LS	\$	\$
B-8	Painting	1	LS	\$	\$
B-9	Building	1	LS	\$	\$
B-10	Signs and Safety Equipment	1	LS	\$	\$
B-11	Pipe (Station, Distribution, and Drainage)	1	LS	\$	\$
B-12	Valves and Related Appurtenances	1	LS	\$	\$
B-13	Vertical Turbine Components	1	LS	\$	\$
B-14	Disinfection of Wells, Pumps, and Piping	1	LS	\$	\$
B-15	Performance Testing and Facility Startup	1	LS	\$	\$
B-16	Electrical	1	LS	\$	\$
Base Bid Schedule "B" Total (Items B-1 – B-16):				\$	

Abbreviations:

CY: Cubic Yard, HR: Hour, LF: Linear Feet, LS: Lump Sum

Schedule "C" - Boys Ranch Well #2 Destruction:

Bid Item	Description of Bid Item	Approx. Quantity	Unit	Unit Price	Extended Total
C-1	Mobilization	1	LS	\$	\$
C-2	Inspection of Well	1	LS	\$	\$
C-3	Well Perforation	58	LF	\$	\$
C-4	Placement of Sealing Material	8	CY	\$	\$
C-5	Site Restoration, Cleanup, and Reports	1	LS	\$	\$
Base Bid Schedule "C" Total (Bid Items C-1 – C-5):				\$	

Abbreviations:

CY: Cubic Yard, HR: Hour, LF: Linear Feet, LS: Lump Sum

Schedule "D" - Boys Ranch Well #3 Destruction:

Bid Item	Description of Bid Item	Approx. Quantity	Unit	Unit Price	Extended Total
D-1	Mobilization	1	LS	\$	\$
D-2	Removal of Pumping Equipment	1	LS	\$	\$
D-3	Inspection of Well	1	LS		
D-4	Well Perforation	83	LF	\$	\$
D-5	Placement of Sealing Material	28	CY	\$	\$
D-6	Site Restoration, Cleanup, and Reports	1	LS	\$	\$
Base Bid Schedule "D" Total (Bid Items D-1 – D-6):				\$	

Abbreviations:

CY: Cubic Yard, HR: Hour, LF: Linear Feet, LS: Lump Sum

Schedule "E" - Jackson Well #1 Destruction:

Bid Item	Description of Bid Item	Approx. Quantity	Unit	Unit Price	Extended Total
E-1	Mobilization	1	LS	\$	\$
E-2	Removal of Pumping Equipment	1	LS	\$	\$
E-3	Inspection of Well	1	LS	\$	\$
E-4	Removal of Well Pedestal	1	LS	\$	\$
E-5	Well Perforation	78	LF	\$	\$
E-6	Placement of Sealing Material	1	CY	\$	\$
E-7	Site Restoration, Cleanup, and Reports	1	LS	\$	\$
Base Bid Schedule "E" Total (Bid Items E-1 – E-7):				\$	

Abbreviations:

CY: Cubic Yard, HR: Hour, LF: Linear Feet, LS: Lump Sum

TOTAL BASE BID FOR SCHEDULES "A", "B", "C", "D", & "E" (TOTAL = A+B+C+D+E)	\$
---------------------------------------------------------------------------------------	-----------

END OF BID SCHEDULE

NONCOLLUSION DECLARATION

(To be executed by bidder and submitted with bid)

State of California)	ss.
)	
County of _____)	

The undersigned declares:

I am the _____ [title] of
_____ [business name], the party
making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or 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 no paid and will not pay, any person or entity for such purpose.

This declaration is intended to comply with California Public Contract Code Section 7106 and Title 23 U.S.C Section 112.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].

s/ _____

Name [print]

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT
1189

CIVIL CODE ' '

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of **CALIFORNIA**)
County of **SANTA CLARA**)

On _____, before me, _____
a Notary Public in and for said County and State, personally appeared

_____ proved to me on the basis of satisfactory evidence to be the person/s whose name/s is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity/ies, and that by his/her/their signature/s on the instrument the person/s, or the entity upon behalf of which the person/s acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

BID BOND

_____ (“Bidder”) has submitted a bid, dated _____, 20____ (“Bid”), to the City of Morgan Hill (“City”) for work on the Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project (“Project”). Under this duly executed bid bond (“Bid Bond”), Bidder as Principal and _____, its surety (“Surety”), are bound to City as obligee in the penal sum of ten percent (10%) of the maximum amount of the Bid (the “Bond Sum”). Bidder and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, as follows:

1. **General.** If Bidder is awarded the Contract for the Project, Bidder will enter into the Contract with City in accordance with the terms of the Bid.
2. **Submittals.** Within ten (10) days following issuance of the notice of award to Bidder, Bidder must submit to City the following:
 - 2.1 **Contract.** The executed Contract, using the form provided by City in the Project contract documents (“Contract Documents”);
 - 2.2 **Payment Bond.** A payment bond for one hundred percent (100%) of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Payment Bond form included with the Contract Documents;
 - 2.3 **Performance Bond.** A performance bond for one hundred percent (100%) of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Performance Bond form included with the Contract Documents; and
 - 2.4 **Insurance.** The insurance certificate(s) and endorsement(s) required by the Contract Documents, and any other documents required under the Instructions for Bidders.
3. **Enforcement.** If Bidder fails to execute the Contract and to submit the bonds and insurance certificates as required by the Contract Documents, Surety guarantees that Bidder forfeits the Bond Sum to City. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____

Fax: _____
Email: _____

4. **Duration; Waiver.** If Bidder fulfills its obligations under Section 2, above, then this obligation will be null and void; otherwise it will remain in full force and effect for ninety (90) days following award of the Contract or until this Bid Bond is returned to Bidder, whichever occurs first. Surety waives the provisions of Civil Code Sections 2819 and 2845.

This Bid Bond is entered into and is effective on _____,
20____.

SURETY:

s/ _____

Name: _____

Title: _____

(Attach Acknowledgement, Notary Seal, and Attorney-In-Fact Certificate)

CONTRACTOR:

s/ _____

Name: _____

Title: _____

BIDDER'S QUESTIONNAIRE

BOYS RANCH WELL #2A AND JACKSON WELL #3 WELL PUMP STATIONS PROJECT

Within forty eight (48) hours following a request by City, a bidder must submit to City a completed, signed Bidder's Questionnaire using this form and including all required attachments. City may request the Questionnaire from one (1) or more of the apparent low bidders following the bid opening, and may use the completed Questionnaire to evaluate a bidder's qualifications for this Project. The Questionnaire must be filled out completely, accurately, and legibly. Any errors, omissions, or misrepresentations in completion of the Questionnaire may be grounds for rejection of the bid or termination of a Contract awarded pursuant to the bid.

Part 1: General Information

Bidder Business Name: _____ ("Bidder")

Check One: Corporation
 Partnership
 Sole Proprietorship
 Joint Venture of: _____
 Other: _____

Address: _____

Phone: _____

Fax: _____

Owner of Company: _____

Contact Person: _____

Email: _____

Bidder's California Contractor's License Number(s):

Part 2: Bidder Experience

1. How many years has Bidder been in business under its present business name? _____

2. Has Bidder completed projects similar in type and size to this Project as a general contractor? _____

3. Has Bidder ever been disqualified on grounds that it is not responsible? If yes, provide additional information on a separate sheet of paper regarding the disqualification, including the name and address of the agency or owner of the subject project, the type and size of the project, the reasons that Bidder was disqualified as not responsible, and the month and year in which the disqualification occurred.

4. Has Bidder ever been terminated from a construction project, either as a general contractor or as a subcontractor? If yes, provide additional information on a separate sheet of paper regarding the termination, including the name and address of the agency or owner of the subject project, the type and size of the project, whether Bidder was under contract as a general contractor or a subcontractor, the reasons that Bidder was terminated, and the month and year in which the termination occurred.

5. Provide information about Bidder's past projects performed as general contractor as follows:

5.1 Six (6) most recently completed public works projects within the last three (3) years;

5.2 Three (3) largest completed projects within the last three (3) years; and

5.3 Any project which is similar to this Project.

6. Use separate sheets of paper provide all of the following information for each project identified in response to the above three (3) categories:

6.1 Project name

6.2 Location

6.3 Owner

6.4 Owner contact (name and current phone number)

6.5 Architect or engineer name

6.6 Architect or engineer contact (name and current phone number)

6.7 Project manager (name and current phone number)

6.8 Description of project, scope of work performed

6.9 Initial contract value (at time of bid award)

6.10 Final cost of construction (including change orders)

6.11 Original scheduled completion date

6.12 Time extensions granted (number of days)

6.13 Actual date of completion

- 6.14 Number and amount of stop notices or mechanic's liens filed
- 6.15 Amount of liquidated damages assessed against Bidder
- 6.16 Nature and resolution of any claim, lawsuit, and/or arbitration between Bidder and the owner.

Part 3: Verification

In signing this document, I, the undersigned, declare that I am duly authorized to sign and submit this Bidder's Questionnaire on behalf of the named bidder, and that all responses and information set forth in this Bidder's Questionnaire and accompanying attachments are, to the best of my knowledge, true, accurate and complete as of the date of submission. **I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.**

Signature: _____ Date: _____

By [name, title]: _____

END OF BIDDER'S QUESTIONNAIRE

CONTRACT

This public works contract ("Contract") is entered into by and between the City of Morgan Hill ("City") and _____ ("Contractor") for work on the Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project ("Project").

The parties agree as follows:

1. **Award of Contract.** In response to the Notice Inviting Bids, Contractor has submitted a Bid Proposal to perform work on the Project, and on _____, 20____, (contract date) City authorized award of this Contract to Contractor for the amount of Contractor's bid.
2. **Contract Documents.** The Contract Documents incorporated into this Contract include and are comprised of all of the following:
 - 2.1 Notice Inviting Bids;
 - 2.2 Instructions to Bidders;
 - 2.3 Addenda, if any;
 - 2.4 Bid Proposal and attachments thereto;
 - 2.5 Contract;
 - 2.6 Payment and Performance Bonds;
 - 2.7 General Conditions;
 - 2.8 Special Conditions;
 - 2.9 Project Drawings and Specifications;
 - 2.10 Change Orders, if any;
 - 2.11 Notice of Award;
 - 2.12 Notice to Proceed;
 - 2.13 And the following: No other documents
3. **Contractor's Obligations.** Contractor agrees to perform all of the Work required for the Project, as specified in the Contract Documents. Contractor must provide, furnish, and supply all things necessary and incidental for the timely performance and completion of the Work, including all necessary labor, materials, equipment, transportation, and utilities, unless otherwise specified in the Contract Documents. Contractor must use its best efforts to complete the Work in a professional and expeditious manner and to meet or exceed the performance standards required by the Contract Documents.

4. **Payment.** As full and complete compensation for Contractor's timely performance and completion of the Work in strict accordance with the terms and conditions of the Contract Documents, City will pay Contractor

Dollars (\$_____) (the "Contract Price"), in accordance with the payment provisions in the General Conditions. The Contract Price includes all applicable federal, state, and local taxes.

5. **Time for Completion.** Contractor will fully complete the Work for the Project within two-hundred and twenty (220) calendar days from the commencement date given in the Notice to Proceed ("Contract Time"). By signing below, Contractor expressly waives any claim for delayed early completion.

6. **Liquidated Damages.** If Contractor fails to complete the Work within the Contract Time, City will assess liquidated damages in the amount of One Thousand Dollars (\$1,000.00) for each day of unexcused delay in completion, and the Contract Price will be reduced accordingly.

7. **Labor Code Compliance.**

7.1 **General.** This Contract is subject to all applicable requirements of Chapter 1 of Part 7 of Division 2 of the Labor Code, including requirements pertaining to wages, working hours and workers' compensation insurance.

7.2 **Prevailing Wages.** This Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes. Copies of these prevailing rates are available online at <http://www.dir.ca.gov/DLSR>.

7.3 **DIR Registration.** City will not enter into the Contract with a bidder, without proof that the bidder and its Subcontractors are registered with the California Department of Industrial Relations ("DIR") to perform public work under Labor Code Section 1725.5, subject to limited legal exceptions.

8. **Workers' Compensation Certification.** Under Labor Code Section 1861, by signing this Contract, Contractor certifies as follows: "I am aware of the provisions of Labor Code Section 3700 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 on this Contract.”

9. **Notice.** Any notice, billing, or payment required by the Contract Documents must be made in writing, and sent to the other party by personal delivery, U.S. Mail, a reliable overnight delivery service, facsimile, or by email as a PDF (or comparable) file. Notice is deemed effective upon delivery unless otherwise specified. Notice for each party must be given as follows:

City:

City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037
Phone: (409) 779-7259
Attn: David Gittleson
Email: david.gittleson@morganhill.ca.gov

Contractor:

Name: _____
Address: _____
City/State/Zip: _____
Phone: _____
Attn: _____
Email: _____
Copy to: _____

10. **General Provisions.**

- 10.1 **Assignment and Successors.** Contractor may not assign its rights or obligations under this Contract, in part or in whole, without City’s written consent. This Contract is binding on Contractor’s successors and permitted assigns.
- 10.2 **Third Party Beneficiaries.** There are no intended third party beneficiaries to this Contract except as expressly provided in the General Conditions or Special Conditions.
- 10.3 **Governing Law and Venue.** This Contract will be governed by California law and venue will be in the Superior Court of Santa Clara County, and no other place.
- 10.4 **Amendment.** No amendment or modification of this Contract will be binding unless it is in a writing duly authorized and signed by the parties to this Contract.

10.5 Integration; Severability. This Contract and the Contract Documents incorporated herein, including authorized amendments or Change Orders thereto, constitute the final, complete, and exclusive terms of the agreement between City and Contractor. If any provision of the Contract Documents, or portion of a provision, is determined to be illegal, invalid, or unenforceable, the remaining provisions of the Contract Documents will remain in full force and effect.

10.6 Authorization. Each individual signing below warrants that he or she is authorized to do so by the party that he or she represents, and that this Contract is legally binding on that party. If Contractor is a corporation, signatures from two (2) officers of the corporation are required pursuant to California Corporation Code Section 313.

[Signatures are on the following page.]

AS SET FORTH IN CA. CORP. CODE § 313, TWO SIGNATURES ARE REQUIRED FOR CALIFORNIA CORPORATIONS:

- (1) CHAIRPERSON OF THE BOARD, PRESIDENT, OR VICE PRESIDENT; AND
- 2) SECRETARY, ASSISTANT SECRETARY, CHIEF FINANCIAL OFFICER OR ASSISTANT TREASURER.

The parties agree to this Contract as witnessed by the signatures below:

CITY OF MORGAN HILL:

CONTRACTOR:

Steve Rymer
City Manager

Name/Title [print]

Date: _____

Date: _____

Attest:

Corporate entities must provide a second signature:

Michelle Wilson
Deputy City Clerk

Name/Title [print]

Date: _____

Date: _____

Approved as to Form:

Contractor's License Number(s)

Donald A. Larkin
City Attorney

Expiration Date(s)

Date: _____

Seal:

DIR Registration Number

END OF CONTRACT

PAYMENT BOND

The City of Morgan Hill ("City") and _____ ("Contractor") have entered into a contract, dated _____, 20__ ("Contract") for work on the Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project ("Project"). The Contract is incorporated by reference into this Payment Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee in an amount not less than (\$_____) ("Bond Sum"), under California Civil Code Sections 9550, et seq.

2. **Surety's Obligation.** If Contractor or any of its Subcontractors fails to pay any of the persons named in California Civil Code Section 9100 amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of Contractor and its Subcontractors, under California Unemployment Insurance Code Section 13020, with respect to the work and labor, then Surety will pay for the same.

3. **Beneficiaries.** This Bond inures to the benefit of any of the persons named in California Civil Code Section 9100, so as to give a right of action to those persons or their assigns in any suit brought upon this Bond. Contractor must promptly provide a copy of this Bond upon request by any person with legal rights under this Bond.

4. **Duration.** If Contractor promptly makes payment of all sums for all labor, materials, and equipment furnished for use in the performance of the Work required by the Contract, in conformance with the time requirements set forth in the Contract and as required by California law, Surety's obligations under this Bond will be null and void. Otherwise, Surety's obligations will remain in full force and effect.

5. **Waivers.** Surety waives any requirement to be notified of alterations to the Contract or extensions of time for performance of the Work under the Contract. Surety waives the provisions of Civil Code Sections 2819 and 2845. City waives requirement of a new bond for any supplemental contract under Civil Code Section 9550. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____

Address: _____

City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____

6. Law and Venue. This Bond will be governed by California law, and any dispute pursuant to this Bond will be venued in the Superior Court of Santa Clara County, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

7. Effective Date; Execution. This Bond is entered into and is effective on _____, 20___. Three (3) identical counterparts of this Bond, each of which is deemed an original for all purposes, are hereby executed and submitted.

SURETY:

CONTRACTOR:

s/ _____

s/ _____

Name: _____

Name: _____

Title: _____

Title: _____

(Attach Acknowledgment with Notary Seal and Power of Attorney)

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

END OF PAYMENT BOND

PERFORMANCE BOND

The City of Morgan Hill ("City") and _____ ("Contractor") have entered into a contract, dated _____, 20____ ("Contract") for work on the Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project ("Project"). The Contract is incorporated by reference into this Performance Bond ("Bond").

1. **General.** Under this Bond, Contractor as Principal and _____, its surety ("Surety"), are bound to City as obligee for an amount not less than Dollars (\$_____) (the "Bond Sum"). By executing this Bond, Contractor and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, to the provisions of this Bond.
2. **Surety's Obligations; Waiver.** If Contractor fully performs its obligations under the Contract, including its warranty obligations under the Contract, Surety's obligations under this Bond will become null and void upon recordation of the notice of completion, provided Contractor has timely provided a warranty bond as required under the Contract. Otherwise Surety's obligations will remain in full force and effect until expiration of the one (1) year warranty period under the Contract. Surety waives any requirement to be notified of and further consents to any alterations to the Contract made under the applicable provisions of the Contract Documents, including changes to the scope of Work or extensions of time for performance of Work under the Contract. Surety waives the provisions of Civil Code Sections 2819 and 2845.
3. **Application of Contract Balance.** Upon making a demand on this Bond, City will make the Contract Balance available to Surety for completion of the Work under the Contract. For purposes of this provision, the Contract Balance is defined as the total amount payable by City to Contractor as the Contract Price minus amounts already paid to Contractor, and minus any liquidated damages, credits, or backcharges to which City is entitled under the terms of the Contract.
4. **Contractor Default.** Upon written notification from City that Contractor is in default under Article 13 of the Contract General Conditions, time being of the essence, Surety must act within the time specified in Article 13 to remedy the default through one (1) of the following courses of action:
 - 4.1 Arrange for completion of the Work under the Contract by Contractor, with City's consent, but only if Contractor is in default solely due to its financial inability to complete the Work;

4.2 Arrange for completion of the Work under the Contract by a qualified contractor acceptable to City, and secured by performance and payment bonds issued by an admitted surety as required by the Contract Documents, at Surety's expense, or

4.3 Waive its right to complete the Work under the Contract and reimburse City the amount of City's costs to have the remaining Work completed.

5. Surety Default. If Surety defaults on its obligations under the Bond, City will be entitled to recover all costs it incurs due to Surety's default, including legal, design professional, or delay costs.

6. Notice. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____

Address: _____

City/State/Zip: _____

Phone: _____

Fax: _____

Email: _____

7. Law and Venue. This Bond will be governed by California law, and any dispute pursuant to this Bond will be venued in the Superior Court of Santa Clara County, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

8. Effective Date; Execution. This Bond is entered into and effective on _____, 20____. Three (3) identical counterparts of this Bond, each of which is deemed an original for all purposes, are hereby executed and submitted.

[Signatures are on the following page.]

SURETY:

s/ _____

Name: _____

Title: _____

(Attach Acknowledgment with Notary
Seal and Power of Attorney)

CONTRACTOR:

s/ _____

Name: _____

Title: _____

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

END OF PERFORMANCE BOND

WARRANTY BOND

The City of Morgan Hill ("City") and _____ ("Contractor") have entered into a contract, dated _____, 20__ ("Contract") for work on the Boys Ranch Well #2A and Jackson Well #3 Well Pump Stations Project ("Project"). The Contract is incorporated by reference into this Warranty Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee in the maximum amount of \$_____ or 50% of the final Contract Price, whichever is greater ("Bond Sum").
2. **Warranty Period.** The Contract requires Contractor to guarantee its work and that of its Subcontractors on the Project, against defects in materials or workmanship which are discovered during the one (1) year period commencing with recordation of the Notice of Completion (the "Warranty Period").
3. **Surety's Obligations.** If Contractor faithfully carries out and performs its guarantee under the Contract, and, on due notice from City, repairs and make good at its sole expense any and all defects in materials and workmanship in the Project which are discovered during the Warranty Period, or if Contractor promptly reimburses City for all loss and damage that City sustains because of Contractor's failure to makes such repairs in accordance with the Contract requirements, then Surety's obligations under this Bond will be null and void. Otherwise, Surety's obligations will remain in full force and effect.
4. **Waiver.** Surety waives the provisions of Civil Code Sections 2819 and 2845.
5. **Notice.** Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____
6. **Law and Venue.** This Bond will be governed by California law, and any dispute pursuant to this Bond will be venued in the Superior Court of Santa

Clara County, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

7. Effective Date; Execution. This Bond is entered into and is effective on _____, 20___. Five (5) identical counterparts of this Bond, each of which is deemed an original for all purposes, are hereby executed and submitted.

SURETY:

CONTRACTOR:

s/ _____

s/ _____

Name: _____

Name: _____

Title: _____

Title: _____

(Attach Acknowledgment with Notary Seal and Power of Attorney)

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

END OF WARRANTY BOND

GENERAL CONDITIONS

Table of Contents:

Article 1 – Definitions	1
Article 2 – Roles and Responsibilities	5
Article 3 – Contract Documents	9
Article 4 – Bonds, Indemnity and Insurance.....	11
Article 5 – Contract Time	16
Article 6 – Contract Modification	21
Article 7 – General Construction Provisions.....	24
Article 8 – Payment.....	32
Article 9 – Labor Provisions	37
Article 10 – Safety Provisions	39
Article 11 – Completion and Warranty Provisions	40
Article 12 – Dispute Resolution	43
Article 13 – Suspension and Termination	48
Article 14 – Miscellaneous Provisions.....	50

Article 1 Definitions

1.1 Definitions. The following definitions apply to all of the Contract Documents unless otherwise indicated. Defined terms and titles of documents are capitalized in the Contract Documents, with the exception of the words “day,” “furnish,” “including,” “install,” “work day” or “working day.”

Allowance means an amount included in the Bid Proposal for Work that may or may not be included in the Project, depending on conditions that will not become known until after bids are opened. If the Contract Price includes an Allowance and the cost of performing the Work covered by that Allowance is greater or less than the Allowance, the Contract Price will be increased or decreased accordingly.

Article, as used in these General Conditions, means a numbered Article of the General Conditions, unless otherwise indicated by the context.

Change Order means a written document duly approved and executed by City, which changes the scope of Work, the Contract Price, or the Contract Time.

City means the City of Morgan Hill, acting through its City Council, officers, employees, and authorized representatives.

City Engineer means the City Engineer for City and his or her authorized delegate(s) designated to oversee and manage the Project on City’s behalf.

Claim means a separate demand by Contractor for change in the Contract Time or Contract Price, that has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected by City, in whole or in part; or a written demand by Contractor objecting to the amount of Final Payment.

Contract means the signed agreement between City and Contractor.

Contract Documents means, collectively, all of the documents listed as such in Section 2 of the Contract, including the Notice Inviting Bids; the Instructions to Bidders; addenda, if any; the Bid Proposal, and attachments thereto; the Contract; the notice of award and notice to proceed; the payment and performance bonds; the General Conditions; the Special Conditions; the Project Drawings and Specifications; any Change Orders; and any other documents expressly made part of the Contract Documents.

Contract Price means the total compensation to be paid to Contractor for performance of the Work, as set forth in the Contract and as amended by Change Order or adjusted for an Allowance. The Contract Price is not subject to adjustment due to inflation or due to the increased cost of labor, material, or equipment following submission of the Bid Proposal. The Contract Price is deemed to include all applicable federal, state, and local taxes

Contract Time means the number of calendar days for performance of the Work, as set forth in the Contract and as amended by Change Order.

Contractor means the individual, partnership, corporation, or joint-venture who has signed the Contract with City to perform the Work.

Day means a calendar day unless otherwise specified.

Design Professional means the licensed individual(s) or firm(s) retained by City to provide architectural or engineering services for the Project. If no Design Professional has been retained for this Project, any reference to Design Professional is deemed to refer to the Engineer.

Drawings means City-provided plans and graphical depictions of the Project requirements, and does not include Shop Drawings.

Engineer means the City Engineer for the City of Morgan Hill and his or her authorized delegee(s).

Final Completion means Contractor has fully completed all of the Work required by the Contract Documents, including all punch list items, any required commissioning, and has provided all required submittals, including the warranty bond, instructions and manuals, and as-built drawings to City's satisfaction.

Final Payment means payment to Contractor of the unpaid Contract Price, including release of undisputed retention, less amounts withheld pursuant to the Contract Documents, including liquidated damages, up to one hundred twenty five percent (125%) of the amount of any unreleased stop notice, amounts subject to setoff, up to one hundred fifty percent (150%) of any unresolved third-party claim for which Contractor is required to indemnify City, and up to one hundred fifty percent (150%) of any amount in dispute as authorized by Public Contract Code Section 7107.

Furnish means to purchase and deliver to the Worksite designated for installation.

Hazardous Materials means any substance or material identified now or in the future as hazardous under any federal, state, or local law or regulation, or any other substance or material that may be considered hazardous or otherwise subject to statutory or regulatory requirements governing handling, disposal, or cleanup.

Including, whether or not capitalized, means “including, but not limited to,” unless the context requires otherwise.

Inspector means the individual(s) or firm(s) retained by City to inspect the workmanship, materials, and manner of construction of the Project and its components to ensure compliance with the Contract Documents and all applicable codes, regulations, and permits.

Install means to fix in place for materials, and to fix in place and connect for equipment.

Project means the public works project referenced in the Contract.

Project Manager means the individual designated by City to oversee and manage the Project on City’s behalf and may include his or her authorized delegee(s) when the Project Manager is unavailable. If no Project Manager has been designated for this Project, any reference to Project Manager is deemed to refer to the Engineer.

RFI means a written request from Contractor for information from City or its Design Professional.

Section as used in these General Conditions, means a numbered Section of the General Conditions, unless otherwise indicated by the context.

Shop Drawings means drawings, plan details or other graphical depictions prepared by or on behalf of Contractor, and subject to City approval, which are

intended to provide details for fabrication, installation, and the like, of items required by or shown in the Drawings and Specifications.

Specifications means the technical, text specifications describing the Project requirements, which are prepared for and incorporated into this Project by or on behalf of City, and does not include the Contract, General Conditions or Special Conditions.

Subcontractor means an individual, partnership, corporation, or joint-venture retained by Contractor directly or indirectly through a subcontract to perform a specific portion of the Work. The term Subcontractor applies to subcontractors, suppliers, fabricators, and equipment lessors of all tiers, unless otherwise indicated by the context.

Technical Specifications means Specifications.

Work means all of the construction and services necessary or incidental to completing the Project in conformance with the requirements of the Contract Documents.

Work Day or Working Day, whether or not capitalized, means a weekday which is not a holiday observed by City.

Worksite means the place or places where the Work is performed.

Article 2 Roles and Responsibilities

2.1 Design Professional.

(A) **General.** Design Professional, as City's representative, is responsible for the overall design of the Project, and to the extent authorized by City, may act on City's behalf to ensure performance of the Work in compliance with the Contract Documents.

(B) **Interpretation.** Design Professional will decide all questions pertaining to interpretation of the Drawings or Specifications. The Design Professional's decision regarding interpretation of the Drawings or Specifications is final and conclusive.

2.2 Contractor.

(A) **General.** Contractor must provide all labor, materials, equipment and services necessary to perform and timely complete the Work in strict accordance with the Contract Documents, and in an economic and efficient manner in the best interests of City.

(B) **Responsibility for the Work.** Contractor is responsible for supervising and directing all aspects of the Work to facilitate the efficient and timely completion of the Work. Contractor is solely responsible for, and required to exercise full control over, construction means, methods, techniques, sequences, procedures, and coordination of all portions of the Work with that of all other Contractors and Subcontractors, except to the extent that the Contract Documents provide other specific instructions.

(C) **Project Administration.** Contractor must provide sufficient and competent administration, staff, and skilled workforce necessary to perform and timely complete the Work in accordance with the Contract Documents. Before starting the Work, Contractor must designate in writing and provide complete contact information, including phone numbers and email address, for the officer or employee in Contractor's organization who is to serve as Contractor's primary representative for the Project, and who has authority to act on Contractor's behalf. A Subcontractor may not serve as Contractor's primary representative.

(D) **On-Site Superintendent.** Contractor must, at all times during performance of the Work, provide a qualified and competent full-time superintendent, acceptable to City, and assistants, as necessary, who must be physically present at the Project site while any aspect of the Work is being performed. Failure to comply may result in temporary suspension of the Work, at Contractor's sole expense and with no extension of

Contract Time, until the superintendent is physically present to supervise the Work. Contractor must provide written notice to City, as soon as practicable, before replacing the superintendent.

(E) **Standards; Compliance.** Contractor must, at all times, ensure that the Work is performed in a good workmanlike manner following best practices and in full compliance with the Contract Documents and all applicable laws, regulations, codes, standards, and permits.

(F) **Responsible Party.** Contractor is solely responsible to City for the acts or omissions of any party or parties performing portions of the Work or providing equipment, materials or services for or on behalf of Contractor or its Subcontractors. If any person employed by Contractor fails or refuses to comply with the Engineer's directions regarding the performance of the Work, or is determined by the Engineer to be incompetent to perform the Work, or acts in a disorderly or improper manner at the Worksite, that person may be permanently dismissed from the Project at the request of the Engineer.

(G) **Correction of Defects.** Contractor must promptly correct, at Contractor's sole expense, any Work that is determined by City, Project Manager, or the Inspector to be deficient or defective in workmanship, materials, and equipment.

(H) **Contractor's Records.** Contractor must maintain all of its records relating to the Project in any form, including paper documents, photos, videos and electronic records. Project records subject to this provision include, but are not limited to, Project cost records and records relating to preparation of Contractor's bid.

(1) Contractor's cost records must include all supporting documentation, including original receipts, invoices, and payroll records, evidencing its direct costs to perform the Work, including, but not limited to, costs for labor, materials and equipment. Each cost record should include, at a minimum, a description of the expenditure with references to the applicable requirements of the Contract Documents, the amount actually paid, the date of payment, and whether the expenditure is part of the original Contract Price, related to an executed Change Order, or otherwise categorized by Contractor as extra work. Contractor's failure to comply with this provision as to any claimed cost operates as a waiver of any rights to recover the claimed cost.

(2) Contractor must continue to maintain its Project records in an organized manner for a period of four (4) years after City's

acceptance of the Project or following termination, whichever occurs first. Subject to prior notice to Contractor, City is entitled to inspect or audit any of Contractor's Project records relating to the Project or to investigate Contractor's plant or equipment during Contractor's normal business hours.

2.3 Subcontractors.

(A) **General.** All Work which is not performed by Contractor with its own forces must be performed by Subcontractors, subject to the fifty percent (50%) limitation set forth in the Instructions to Bidders. City reserves the right to approve or reject any and all Subcontractors proposed to perform the Work.

(B) **Contractual Obligations.** Contractor must require every Subcontractor to be bound to the provisions of the Contract Documents as they apply to the Subcontractor's portion(s) of the Work, and to likewise bind their subcontractors or suppliers. Nothing in these Contract Documents creates a contractual relationship between a Subcontractor and City, but City is deemed to be a third-party beneficiary of the contract between Contractor and each Subcontractor.

Copies of subcontracts must be available to the Engineer upon request. Before a Subcontractor commences Work on the Project, Contractor must provide the Engineer a written statement with the name of the Subcontractor, a description of each portion of the Work performed by the Subcontractor, and the percentage of the overall Work to be performed by the Subcontractor.

(C) **Termination.** If the Contract is terminated, each Subcontractor's agreement must be assigned by Contractor to City, subject to the prior rights of any surety, provided that City accepts the assignment by written notification, and assumes all rights and obligations of Contractor pursuant to each such subcontract agreement.

(D) **Substitution of Subcontractor.** If Contractor requests substitution of a listed Subcontractor under Public Contract Code Section 4107, Contractor is solely responsible for all costs City incurs in responding to the request, including legal fees and costs to conduct a hearing.

2.4 Coordination of Work.

(A) **Concurrent Work.** City reserves the right to perform or to have performed other work on or adjacent to the Project site while the Work is being performed. Contractor is responsible for coordinating its Work with other work being performed on or adjacent to the Project site, and must

avoid hindering, delaying, or interfering with the work of other contractors and subcontractors. To the full extent permitted by law, Contractor must hold harmless and indemnify City, Design Professional, and Project Manager against any and all claims arising from or related to Contractor's avoidable, negligent, or willful hindrance of, delay to, or interference with the work of another contractor or subcontractor.

(B) **Defects.** Before proceeding with any portion of the Work affected by the construction or operations of others, Contractor must give Project Manager prompt written notification of any defects Contractor discovers which will prevent the proper execution of the Work. Failure to give notice of any such known defects will be deemed acknowledgement by Contractor that the work of others is not defective and will not prevent the proper execution of the Work.

2.5 Submittals. Unless otherwise specified, Contractor must submit to Project Manager for review and approval, all schedules, Shop Drawings, samples, product data and similar submittals required by the Contract Documents, or upon request by Project Manager. Unless otherwise specified, all submittals, including requests for information (RFIs) are subject to the provisions of this Section.

(A) **General.** Contractor is responsible for ensuring that its submittals are accurate and conform to the Contract Documents.

(B) **Time and Manner of Submission.** Contractor must ensure that its submittals are prepared and delivered in a manner consistent with the current approved schedule for the Work and within the applicable time specified elsewhere in the Contract Documents, or if no time is specified, in such time and sequence so as not to delay the performance of the Work or completion of the Project.

(C) **Required Contents.** Each submittal must include the Project name and contact number, Contractor's name and address, the name and address of any Subcontractor or supplier involved with the submittal, the date, and references to applicable Specification section(s) and/or drawing and detail number(s).

(D) **Required Corrections.** If corrections are required, Contractor must promptly make and submit any required corrections in full conformance with the requirements of this Section.

(E) **Effect of Review and Approval.** Review and approval of a submittal by City will not relieve Contractor from complying with the requirements of the Contract Documents. Contractor is responsible for

any errors in any submittal, and review or approval of a submittal by City is not an assumption of risk or liability by City.

(F) **Enforcement.** Any Work performed or material used without prior approval of a required submittal will be performed at Contractor's risk, and Contractor may be required to bear the costs incident thereto, including the cost of removing and replacing such Work, repairs to other affected portions of the Work, and the cost of additional time or services required of the Design Professional, Project Manager, or Inspector.

(G) **Excessive RFIs.** RFIs will be considered excessive or unnecessary if the Engineer determines that the explanation or response to the RFI is clearly and unambiguously discernable in the Contract Documents. City's costs to review and respond to excessive or unnecessary RFIs may be deducted from payments otherwise due to Contractor.

Article 3 Contract Documents

3.1 Interpretation of Contract Documents.

(A) **Drawings and Specifications.** The Drawings and Specifications included in the Contract Documents are complementary. If Work is shown on one (1) but not on the other, Contractor must perform the Work as though fully described on both, consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. The Drawings and Specifications are deemed to include and require everything necessary and reasonably incidental to completion of the Work, whether or not particularly mentioned or shown. Contractor must perform all work and services and supply all things reasonably related to and inferable from the Contract Documents. In the event of a conflict between the Drawings and Specifications, the Specifications will control.

(B) **Duty to Notify.** If Contractor becomes aware of any ambiguity, discrepancy, omission, or error in the Drawings or Specifications, Contractor must immediately notify the Design Professional and request clarification of such, by submitting a written request for information (RFI) in the manner specified by City. The Design Professional's clarifications or interpretations will be final and binding.

(C) **Figures and Dimensions.** Figures control over scaled dimensions.

(D) **Technical or Trade Terms.** Any terms that have well-known technical or trade meanings will be interpreted in accordance with those

meanings, unless otherwise specifically defined in the Contract Documents.

(E) **Measurements.** Contractor must verify all relevant measurements at the Worksite before ordering any material or performing any Work, and will be responsible for the correctness of those measurements.

3.2 Order of Precedence. Information included in one (1) Contract Document but not in another will not be considered a conflict or inconsistency. Unless otherwise specified in the Special Conditions, in case of any conflict or inconsistency among the Contract Documents, the following order of precedence will apply, beginning from highest to lowest:

- (A) Change Orders;
- (B) Addenda;
- (C) Contract;
- (D) Notice to Proceed;
- (E) Notice of Award;
- (F) Special Conditions;
- (G) General Conditions;
- (H) Payment and Performance Bonds;
- (I) Specifications;
- (J) Drawings;
- (K) Contractor's Bid Proposal and attachments;
- (L) Notice Inviting Bids;
- (M) Instructions to Bidders; and
- (N) Any documents prepared by and on behalf of a third party, that were not prepared specifically for this Project, e.g., Caltrans Standard Specifications or Caltrans Special Provisions.

3.3 Caltrans Standard Specifications. Any reference to or incorporation of the Standard Specifications of the State of California, Department of Transportation ("Caltrans"), including "Standard Specifications," "Caltrans Specifications," "State Specifications," or "CSS," means the most current edition of Caltrans' Standard Specifications, unless otherwise specified ("Standard Specifications"), including the most current amendments as of the date that Contractor's bid was submitted for this Project. The following provisions apply to use of or reference to the Standard Specifications:

(A) **Limitations.** None of the "General Provisions" of the Standard Specifications, i.e., Sections 1 through 9, applies to these Contract Documents with the exception of any specific provisions, if any, which are expressly stated to apply to these Contract Documents.

(B) **Conflicts or Inconsistencies.** If there is a conflict or inconsistency between any provision in the Standard Specifications and a provision of

these Contract Documents, as determined by City, the provision in the Contract Documents will govern.

(C) **Meanings.** Terms used in the Standard Specifications are to be interpreted as follows:

(1) Any reference to the “Engineer” is deemed to mean the City Engineer.

(2) Any reference to the “Special Provisions” is deemed to mean the Special Conditions.

(3) Any reference to the “Department” or “State” is deemed to mean City.

3.4 For Reference Only. Contractor is responsible for the careful review of any document, study, or report appended to the Contract Documents solely for informational purposes and identified as “For Reference Only.” Nothing in any document, study, or report so appended and identified is intended to supplement, alter, or void any provision of the Contract Documents. However, Contractor is advised that City or its representatives may be guided by information or recommendations included in such reference documents, particularly when making determinations as to the acceptability of proposed materials, methods, or changes in the Work. Contractor must promptly notify City of any perceived or actual conflict between the Contract Documents and any document provided For Reference Only.

Article 4 Bonds, Indemnity, and Insurance

4.1 Payment and Performance Bonds. Within ten (10) days following issuance of the notice of award, Contractor is required to provide a payment bond and a performance bond, each in the penal sum of not less than one hundred percent (100%) of the Contract Price, using the bond forms included with the Contract Documents. Each bond must be issued by a surety admitted in California. If an issuing surety cancels the bond or becomes insolvent, within seven (7) days following written notice from City, Contractor must substitute a surety acceptable to City. If Contractor fails to substitute an acceptable surety within the specified time, City may, at its sole discretion, withhold payment from Contractor until the surety is replaced to City’s satisfaction, or terminate the Contract for default.

4.2 Indemnity. To the fullest extent permitted by law, Contractor must indemnify, defend, and hold harmless City, its agents and consultants, and Design Professional (individually, an “Indemnatee,” and collectively the

“Indemnitees”) from and against any and all liability, loss, damage, claims, expenses (including, without limitation, attorney fees, expert witness fees, paralegal fees, and fees and costs of litigation or arbitration) (collectively, “Liability”) of every nature arising out of or in connection with the acts or omissions of Contractor, its employees, Subcontractors, representatives, or agents, in bidding or performing the Work or its failure to comply with any of its obligations under the Contract, except such Liability caused by the active negligence, sole negligence, or willful misconduct of an Indemnatee. This indemnity requirement applies to any Liability arising from alleged defects in the content or manner of submission of Contractor’s bid for the Contract. Contractor’s failure or refusal to timely accept a tender of defense pursuant to this provision will be deemed a material breach of this Contract. City will timely notify Contractor upon receipt of any third-party claim relating to the Contract, as required by Public Contract Code Section 9201.

4.3 Insurance. No later than ten (10) days following issuance of the notice of award, Contractor is required to procure and provide proof of the insurance coverage required by this section in the form of certificates and endorsements. The required insurance must cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work, and must remain in full force and effect at all times during the period covered by the Contract until the date of recordation of the notice of completion. The coverages may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by excess or “umbrella” policies, provided each such policy complies with the requirements set forth herein. All required insurance must be issued by a company licensed to do business in the State of California, and each such insurer must have an A.M. Best’s financial strength rating of “A” or better and a financial size rating of “VIII” or better. If Contractor fails to provide any of the required coverage in full compliance with the requirements of the Contract Documents, City may, at its sole discretion, purchase such coverage at Contractor’s expense and deduct the cost from payments due to Contractor, or terminate the Contract for default. Contractor further understands that City reserves the right to modify the insurance requirements set forth herein, with thirty (30) days’ notice provided to Contractor, at any time as deemed necessary to protect the interests of City.

(A) **Policies and Limits.** The following insurance policies and limits are required for this Contract unless otherwise specified in the Special Conditions:

- (1) **Commercial General Liability Insurance (“CGL”).**
Contractor shall maintain CGL and must include coverage for

liability arising from Contractor's or its Subcontractor's acts or omissions in the performance of the Work against claims and liabilities for personal injury, death, or property damage providing protection in the minimum amount of: (i) Two Million Dollars (\$2,000,000.00) for bodily injury or death to any one person for any one accident or occurrence and at least Two Million Dollars (\$2,000,000.00) for property damage, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.

- a. CGL policy may not exclude explosion, collapse, underground excavation hazard, or removal of lateral support.
- b. CGL policy must include contractor's protected coverage, blanket contractual, and completed operations.

(2) **Workers' Compensation Insurance and Employer's Liability:** Contractor shall maintain Workers Compensation coverage, as required by law. The policy must comply with the requirements of the California Workers' Compensation Insurance and Safety Act and provide protection in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) for any one accident or occurrence, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.. If Contractor is self-insured, Contractor must provide its Certificate of Permission to Self-Insure, duly authorized by the Department of Industrial Relations.

(3) **Automobile Liability:** Contractor shall maintain Automobile Liability covering all owned, non-owned and hired automobiles (if Contractor does not own automobiles, then Contractor shall maintain Hired/Non-owned Automobile Liability) against claims and liabilities for personal injury, death, or property damage providing protection in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) for bodily injury or death to any one person for any one accident or occurrence and at least One Million Dollars (\$1,000,000.00) for property damage, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.

(4) **Pollution (Environmental) Liability:** Because the performance of Contractor's work or service under this Contract

involves hazardous materials, contaminated soil disposal, and/or a risk of accidental release of fuel oil, chemicals or other toxic gases or hazardous materials, Contractor shall procure and maintain Pollution Liability covering Contractor's liability for bodily injury, property damage and environmental damage resulting from pollution and related cleanup costs arising out of the work or services to be performed under this Contract. Coverage shall be provided for both work performed on site, as well as during the transport of hazardous materials. Such coverage shall be in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) for any one accident or occurrence, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.

(B) **Required Endorsements.** Contractor must provide proof of the following endorsements, listed for each policy for which endorsements are required, as outlined below:

- (1) For all Policies except Professional Liability:
 - a. "Waiver of Subrogation" endorsements providing that the carrier agrees to waive any right of subrogation it may have against the City of Morgan Hill and the City's elected or appointed officials, boards, agencies, officers, agents, employees, and volunteers.
- (2) General Liability Policy:
 - a. "Additionally Insured" endorsements naming the City of Morgan Hill, its elected or appointed officials, boards, agencies, officers, agents, employees, and volunteers as additional insureds;
 - b. "Primary and Non-Contributing" endorsements stating that the policy is primary non-contributing;
 - c. "Separation of Insureds" endorsements stating that the inclusion of more than one insured will not operate to impair the rights of one insured against another, and the coverages afforded will apply as though separate policies have been issued to each insured.

(C) **Subcontractors.** Contractor must ensure that each Subcontractor is required to maintain the same insurance coverage required under this

Section 4.3, with respect to its performance of Work on the Project, including those requirements related to the additional insureds and waiver of subrogation.

(D) **Certificates.** Contractor must furnish City with copies of all policies or certificates as outlined herein, whether new or modified, promptly upon receipt. No policy subject to Contractor's Contract with City shall be reduced, canceled, allowed to expire, or materially changed except after thirty (30) days' notice by the insurer to City, unless due to non-payment of premiums, in which case ten (10) days written notice must be made to City. Certificates, including renewal certificates, may be mailed electronically to riskmgmt@morganhill.ca.gov or delivered to the Certificate Holder address as follows:

City of Morgan Hill
Attn: Risk Management
17575 Peak Avenue
Morgan Hill, CA 95037

4.4 Warranty Bond. As a condition precedent to Final Completion, Contractor must submit a warranty bond, using the form provided by City, to guarantee its Work as specified in Article 11, Completion and Warranty Procedures. The warranty bond must be issued by a surety admitted in California for fifty percent (50%) of the final Contract Price or as otherwise specified in the Contract Documents. If an issuing surety cancels the bond or becomes insolvent, within seven (7) days following written notice from City, Contractor must substitute a surety acceptable to City.

Article 5 Contract Time

5.1 Time is of the Essence. Time is of the essence in Contractor's performance and completion of the Work, and Contractor must diligently prosecute the Work and complete it within the Contract Time.

(A) **General.** Contractor must commence the Work on the date indicated in the notice to proceed, and must fully complete the Work, in strict compliance with all requirements of the Contract Documents, and within the Contract Time.

(B) **Rate of Progress.** Contractor and its Subcontractors must, at all times, provide workers, materials, and equipment sufficient to maintain the rate of progress necessary to ensure full completion of the Work within the Contract Time. If City determines that Contractor is failing to prosecute the Work at a sufficient rate of progress, City may, in its sole discretion, direct Contractor to provide additional workers, materials, or equipment, or to

work additional hours or days without additional cost to City, in order to achieve a rate of progress satisfactory to City. If Contractor fails to comply with City's directive in this regard, City may, at Contractor's expense, separately contract for additional workers, materials, or equipment or use City's own forces to achieve the necessary rate of progress. Alternatively, City may terminate the Contract based on Contractor's default.

5.2 Schedule Requirements. All schedules must be prepared using standard scheduling software acceptable to City, and must provide schedules in electronic and paper form as requested.

(A) ***As-Planned (Baseline) Schedule.*** Within fifteen (15) calendar days following issuance of the notice of award (or as otherwise specified in the Special Conditions), Contractor must submit to City for review and approval an as-planned (baseline) schedule showing in detail how Contractor plans to perform and fully complete the Work within the Contract Time using critical path methodology. The as-planned schedule must include the work of all trades required for the Work, and must be sufficiently comprehensive and detailed to enable progress to be monitored on a day-by-day basis. For each activity, the as-planned schedule must be dated, provided in the format specified in the Contract Documents or as required by City, and must include, at a minimum, a description of the activity, the start and completion dates, and the duration.

(B) ***Progress Schedules.*** Contractor must submit an updated progress schedule and three (3) week look-ahead schedule, in the format specified by City, for review and approval with each application for a progress payment. The progress schedule must show how the actual progress of the Work to date compared to the as-planned schedule, and must identify any actual or potential impacts to the critical path.

(C) ***Recovery Schedule.*** If City determines that the Work is more than one (1) week behind schedule, within seven (7) days following written notice of such determination, Contractor must submit a recovery schedule, showing how Contractor intends to perform and complete the Work within the Contract Time, based on actual progress to date.

(D) ***Effect of Approval.*** Contractor and its Subcontractors must perform the Work in accordance with the most current approved schedule unless otherwise directed by City. City approval of a schedule does not operate to extend the time for completion of the Work or any component of the Work, and will not affect City's right to assess liquidated damages for Contractor's unexcused delay in completing the Work within the Contract Time.

(E) **Posting.** Contractor must at all times maintain a copy of the most current approved progress or recovery schedule posted prominently in its on-site office.

(F) **Reservation of Rights.** City reserves the right to direct the sequence in which the Work must be performed or to make changes in the sequence of the Work in order to facilitate the performance of work by City or others, or to facilitate City's use of its property. The Contract Time or Contract Price may be adjusted to the extent such changes in sequence actually increase or decrease Contractor's time or cost to perform the Work.

(G) **Authorized Working Days and Times.** Contractor is limited to working Monday through Friday, excluding City of Morgan Hill-observed holidays, during City's normal business hours, except as expressly provided in the Special Conditions, or as authorized in writing by City. City reserves the right to charge Contractor for additional costs incurred by City due to Work performed on days or during hours not expressly authorized in these Contract Documents, including reimbursement of costs incurred for inspection, testing, and construction management services.

5.3 Delay and Extensions of Contract Time.

(A) **Excusable Delay.** The Contract Time may be extended if Contractor encounters an unavoidable delay in completing the Work within the Contract Time due to causes completely beyond Contractor's control, and which Contractor could not have avoided or mitigated through planning, foresight, and diligence ("Excusable Delay"). Grounds for Excusable Delay may include fire, earthquake, acts of terror or vandalism, epidemic, unforeseeable adverse government actions, unforeseeable actions of third parties, encountering unforeseeable hazardous materials, unforeseeable site conditions, suspension for convenience under Article 13, or unusually severe weather.

(B) **Non-Excusable Delay.** Excusable Delay does not include delay that is concurrent with non-Excusable Delay, and does not include delay caused by:

- (1) weather conditions which are normal for the location of the Project, as determined by reliable records, including monthly rainfall averages, for the preceding ten (10) years;
- (2) Contractor's failure to order equipment and materials sufficiently in advance of the time needed for timely completion of the Work;

- (3) Contractor's failure to provide adequate notification to utility companies for connections or services necessary for the timely performance and completion of the Work;
- (4) foreseeable conditions Contractor could have ascertained from reasonably diligent inspection of the Worksite or review of the Contract Documents; or
- (5) Contractor's financial inability to perform the Work, including insufficient funds to pay its Subcontractors or suppliers.

(C) ***Request for Extension of Contract Time.*** A request for an extension of time and associated delay costs must be submitted in writing to City within ten (10) calendar days of the date the delay is first encountered, even if the duration of the delay is not yet known at that time, or will be deemed waived. In addition to complying with the requirements of this Article 5, the request must be submitted in compliance with the Change Order request procedures in Article 6, below. Strict compliance with these requirements is necessary to ensure that any delay or delay costs may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project and timely performance of the Work. Any request for an extension of time or delay costs that does not strictly comply with the requirements of Article 5 and Article 6 will be deemed waived.

(1) ***Required Contents.*** The request must include a detailed description of the cause(s) of the delay, and must also describe the measures that Contractor has taken to mitigate the delay and/or its effects, including efforts to mitigate the cost impact of the delay, e.g., by workforce management, change in sequencing, etc. If the delay is still ongoing at the time the request is submitted, the request should also include Contractor's plan for continued mitigation of the delay or its effects.

(2) ***Delay Days and Costs.*** The request must specify the number of days of Excusable Delay claimed, or provide a realistic estimate if the duration of the delay is not yet known. The request must specify the amount of any delay-related costs that are claimed, or provide a realistic estimate if the amount is not yet known. Any estimate of delay duration or cost must be updated in writing and submitted with all required supporting documentation as soon as the actual time and cost is known.

(3) ***Supporting Documentation.*** The request must also include any and all supporting documentation necessary to evidence the delay and its actual impacts, including schedule and cost impacts,

including a time impact analysis using critical path methodology, and demonstrating unavoidable delay to Final Completion. The time impact analysis must be submitted in a form or format acceptable to City.

(4) *Burden of Proof.* Contractor has the burden of proving 1) that the delay was an Excusable Delay, as defined above, 2) that Contractor has made reasonable efforts to mitigate the delay and its schedule and cost impacts, 3) that the delay will unavoidably result in delaying Final Completion, and 4) that any delay costs claimed by Contractor were actually incurred and were reasonable under the circumstances.

(5) *Recoverable Costs.* If Contractor is granted an extension of time for Excusable Delay, recompense for delay costs will be limited to actual, direct, reasonable, and substantiated costs, and will not include home office overhead, or markup for overhead and profit.

(6) *Legal Compliance.* Nothing in this provision is intended to require the waiver, alteration, or limitation of the applicability of Public Contract Code Section 7102.

(7) *No Waiver.* Any grant of an extension of time or delay costs due to an Excusable Delay will not operate as a waiver of City's right to assess liquidated damages for unexcused delay.

(8) *Dispute Resolution.* In the event of a dispute over entitlement to an extension of time or delay costs, Contractor may not stop working pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work. Contractor's sole recourse for an unresolved dispute based on City's rejection of a Change Order request for an extension of time or delay costs is to comply with the Dispute Resolution provisions set forth in Article 12, below.

5.4 Liquidated Damages. It is expressly understood that if Final Completion is not achieved within the Contract Time, City will suffer damages which are difficult to determine and accurately specify. Pursuant to Public Contract Code section 7203, if Contractor fails to achieve Final Completion within the Contract Time, City will charge Contractor in the amount specified in the Contract for each day that Final Completion is delayed beyond the Contract Time, as liquidated damages and not as a penalty.

- (A) **Liquidated Damages.** Liquidated damages will not be assessed for any Excusable Delay, as set forth above.
- (B) **Milestones.** Liquidated damages will also be separately assessed for failure to meet milestones specified elsewhere in the Contract Documents.
- (C) **Setoff.** City is entitled to set off the amount of liquidated damages assessed against any payments otherwise due to Contractor, including setoff against release of retention. If there are insufficient Contract funds remaining to cover the full amount of liquidated damages assessed, City is entitled to recover the balance from Contractor or its performance bond surety.
- (D) **Occupancy or Use.** Occupancy or use of the Project in whole or in part prior to Final Completion does not constitute City's acceptance of the Project and will not operate as a waiver of City's right to assess liquidated damages for Contractor's unexcused delay in achieving Final Completion.

Article 6 Contract Modification

6.1 Changes in Work. City reserves the right to make changes in the Work without invalidating the Contract. City may direct or Contractor may request changes in the Work, and any such changes will be formalized in a Change Order, which may include commensurate changes in the Contract Price or Contract Time as applicable. Contractor must promptly comply with City-directed changes in the Work in accordance with the intent of the original Contract Documents, even if Contractor and City have not yet reached agreement as to adjustments to the Contract Price or Contract Time.

(A) **City-Directed Change.** In the event of a dispute over entitlement to or the amount of a change in Contract Time or a change in Contract Price related to an City-directed change, Contractor must perform the Work as directed and may not delay its work or cease work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute.

(B) **Contractor's Obligations.** In the event that City and Contractor dispute whether a portion or portions of the Work are already required by the Contract Documents as opposed to changed or extra Work, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute.

(C) **Remedy for Non-Compliance.** Contractor's failure to promptly comply with an City-directed change is deemed a material breach of the Contract, and in addition to all other remedies available to it, City may, at its sole discretion, hire another contractor or use its own forces to complete the disputed Work at Contractor's sole expense, and may deduct the cost from the Contract Price.

(D) **Dispute Resolution.** Contractor's sole recourse for an unresolved dispute related to changes in the Work is to comply with the dispute resolution provisions set forth in Article 12, below.

6.2 Contractor Change Order Requests. Contractor must submit a request or proposal for a change in the Work or a change in the Contract Price or Contract Time as a written Change Order request or proposal.

(A) **Time for Submission.** Any request for a change in the Contract Price must be submitted in writing to Project Manager within ten (10) calendar days of the date that Contractor first encounters the circumstances, information or conditions giving rise to the Change Order request, even if the total amount of the requested change in the Contract Price or impact on the Contract Time is not yet known at that time.

(B) **Required Contents.** Any Change Order request or proposal submitted by Contractor must include a complete breakdown of actual or estimated costs and credits, and must itemize labor, materials, equipment, taxes, insurance, and subcontract amounts. Any estimated cost must be updated in writing as soon as the actual amount is known.

(C) **Required Documentation.** All claimed costs must be fully documented, and any related request for an extension of time or delay-related costs must be included at that time and in compliance with the requirements of Article 5 of the General Conditions.

(D) **Required Form.** Contractor must use City's form(s) for submitting all Change Order requests or proposals, unless otherwise specified by City.

(E) **Certification.** All Change Order requests must be signed by Contractor and must include the following certification:

“The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Change Order request are true and correct. Contractor warrants that this Change Order request is comprehensive and complete, and agrees that any costs, expenses, or time extension request not included herein is deemed waived. Contractor understands that submission of claims which have no basis in fact or which Contractor knows to be false may violate the False Claims Act, as set forth in Government Code Sections 12650 et seq.”

6.3 Adjustments to Contract Price. The amount of any increase or decrease to the Contract Price will be determined based on one (1) of the following methods in the order provided:

(A) **Unit Pricing.** Amounts previously provided by Contractor in the form of unit prices, either in a bid schedule or schedule of values, will apply if unit pricing has previously been provided in Contractor’s accepted bid schedule or schedule of values for the affected Work;

(B) **Lump Sum.** A mutually agreed upon lump sum;

(C) **Time and Materials.** On a time and materials basis, which may include a not-to-exceed limit, calculated as the total of the following sums:

- (1) All direct labor costs plus fifteen percent (15%) for overhead and profit;
- (2) All direct material costs, including sales tax, plus fifteen percent (15%) for overhead and profit;
- (3) All direct plant and equipment rental costs, plus fifteen percent (15%) for overhead and profit;
- (4) All direct subcontract costs plus ten percent (10%) for overhead and profit; and
- (5) Increased bond or insurance premium costs computed at one and one half percent (1½%) of total of the previous four (4) sums.

6.4 Unilateral Change Order. If City disagrees with the amount of compensation or extension of time that Contractor has requested, City may elect to issue a unilateral Change Order, directing performance of the Work, and authorizing a change in the Contract Price or Contract Time in

the amount City believes is merited. Contractor's sole recourse to dispute the terms of a unilateral Change Order is to submit a timely Claim pursuant to Article 12, below.

- 6.5 Non-Compliance Deemed Waiver.** Contractor waives its entitlement to any increase in the Contract Price or Contract Time if Contractor fails to full comply with the provisions of this Article. Contractor will not be paid for unauthorized extra work.

Article 7 General Construction Provisions

7.1 Permits and Taxes.

(A) **General.** Contractor must obtain and pay for any and all permits, fees, or licenses required to perform the Work, unless otherwise indicated in the Contract Documents. Contractor must cooperate with and provide notifications to government agencies with jurisdiction over the Project, as may be required. Contractor must provide City with copies of all notices, permits, licenses, and renewals required for the Work.

(B) **Federal Excise Tax.** Contractor must pay for all taxes on labor, material and equipment, except Federal Excise Tax to the extent that City is exempt from Federal Excise Tax.

7.2 Temporary Facilities. Contractor must provide, at Contractor's sole expense, any and all temporary facilities, including onsite office, sanitary facilities, storage, scaffolds, barricades, walkways, and any other temporary structure required to safely perform the Work along with any utility services incidental thereto.

(A) **Standards.** Such structures must be safe and adequate for the intended use, and installed and maintained in accordance with all applicable federal, state, and local laws, codes, and regulations.

(B) **Removal and Repair.** Contractor must promptly remove all such temporary facilities when they are no longer needed or upon completion of the Work, whichever comes first. Contractor must promptly repair any damage to City's property caused by the installation, use, or removal of the temporary facilities, and must promptly restore the property to its original or intended condition.

(C) **Additional Requirements.** Additional provisions pertaining to temporary facilities may be included in the Specifications or Special Conditions.

7.3 Signs. No signs may be displayed on or about City's property, except signage which is required by law or by the Contract Documents, without City's prior written approval as to content, size, design, and location.

7.4 Protection of Work and Property.

(A) **General.** Contractor is responsible at all times for protecting the Work and materials and equipment to be incorporated into the Work from damage until the Notice of Completion has been recorded. Except as specifically authorized by City, Contractor must confine its operations to the area of the Project site indicated in the Drawings. Contractor is liable for any damage caused to City's real or personal property, the real or personal property of adjacent property owners, or the work or personal property of other contractors working for City.

(B) **Unforeseen Conditions.** If Contractor encounters facilities, utilities, or other unknown conditions not shown on or reasonably inferable from the Drawings or apparent from inspection of the Project site, Contractor must promptly notify Project Manager, and must avoid taking any action which could cause damage to the facilities or utilities pending further direction from Project Manager. If Project Manager's subsequent direction to Contractor affects Contractor's cost or time to perform the Work, Contractor may submit a Change Order request as set forth in Article 6, above.

(C) **Support; Adjacent Properties.** Contractor must provide, install, and maintain all shoring, bracing, underpinning, etc., necessary to provide support to City's property and adjacent properties and improvements thereon. Contractor must provide notifications to adjacent property owners as may be required by law.

7.5 Noninterference. Contractor must take reasonable measures to avoid interfering with City's use of its property at or adjacent to the Project site, including use of roadways, entrances, parking areas, walkways, and structures.

7.6 Materials and Equipment.

(A) **General.** Unless otherwise specified, all materials and equipment required for the Work must be new and of the best grade for the intended purpose, and furnished in sufficient quantities to ensure the proper and expeditious performance of the Work. Unless otherwise specified, all materials and equipment required for the Work are deemed to include all components required for complete installation and intended operation, and must be installed in accordance with the manufacturer's recommendation. Contractor is responsible for all shipping, handling, and storage costs

associated with the materials and equipment required for the Work, and is responsible for protecting the Work and all of the required materials, supplies, tools and equipment at Contractor's sole cost until City accepts the Project.

(B) **City-Provided.** If the Work includes installation of materials or equipment to be provided by City, Contractor is solely responsible for the proper examination, handling, storage, and installation of such items in accordance with the Contract Documents. Contractor must promptly notify City of any defects discovered in City-provided materials or equipment. Contractor is solely responsible for any loss of or damage to such items which occurs while the items are in Contractor's custody and control, the cost of which may be offset from the Contract Price and deducted from any payment(s) due to Contractor.

(C) **Intellectual Property Rights.** Contractor must, at its sole expense, obtain any authorization required for use of patented or copyright protected materials, equipment, devices or processes that are incorporated into the Work. Contractor's indemnity obligation in Article 4, applies to any claimed violation of intellectual property rights in violation of this provision.

7.7 Substitutions.

(A) **"Or Equal."** Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate quality and type of item desired, and Contractor may request use of any equal material, product, thing, or service.

(B) **Request for Substitution.** A request for substitution must be submitted to Project Manager for approval within the applicable time period provided in the Contract Documents. If no time period is specified, the substitution request may be submitted any time within thirty five (35) days after the date of award of the Contract, or sufficiently in advance of the time needed to avoid delay of the Work, whichever is earlier.

(C) **Substantiation.** All data substantiating the proposed substitute as an "equal" item must be submitted with the written request for substitution. Contractor's failure to timely provide necessary substantiation is ground for rejection of the proposed substitution, without further review.

(D) **Burden of Proving Equality.** Contractor has the burden of proving the equality of the proposed substitution. City has sole discretion to determine whether a proposed substitution is “equal,” and City’s determination is final.

(E) **Approval or Rejection.** If the proposed substitution is approved, Contractor is solely responsible for any additional costs associated with the substituted item(s). If the proposed substitution is rejected, Contractor must, without delay, install the item specified.

(F) **Contractor’s Obligations.** City’s review of a proposed substitution will not relieve Contractor from any of its obligations under the Contract Documents. In the event Contractor makes an unauthorized substitution, Contractor will be solely responsible for all resulting cost impacts, including the cost of removal and replacement and the impact to other design elements.

7.8 Testing and Inspection.

(A) **General.** All materials, equipment, and workmanship used in the Work are subject to inspection by Inspector at all times and locations during construction and/or fabrication. All manufacturers’ application or installation instructions must be provided to the Inspector at least ten (10) days prior to the first such application or installation. Contractor must, at all times, make the Work available for inspection.

(B) **Scheduling and Notification.** Contractor must schedule all tests required by the Contract Documents in time to avoid any delay to the progress of the Work. Contractor must provide timely notice to all necessary parties as specified in the Contract Documents.

(C) **Responsibility for Costs.** City will bear the initial cost of testing to be performed by independent testing consultants retained by City, subject to the following exceptions:

(1) Contractor will be responsible for the costs of any subsequent tests which are required to substantiate compliance with the Contract Documents, and any associated remediation costs.

(2) Contractor will be responsible for inspection costs, at City’s established rates, for inspection time lost because the Work is not ready or Contractor fails to appear for a scheduled inspection.

(3) In addition, if any portion of the Work which is subject to testing is covered or concealed by Contractor prior to testing, Contractor will bear the cost of making that portion of the Work available for

the testing required by the Contract Documents, and any associated repair or remediation costs.

(D) **Contractor's Obligations.** Any Work that fails to comply with the requirements of the Contract Documents must be promptly repaired, replaced, or corrected by Contractor, at Contractor's sole expense, even if that Work was previously inspected or included in a progress payment. Contractor is solely responsible for any delay occasioned by remediation of noncompliant Work. Inspection of the Work does not in any way relieve Contractor of its obligations to perform the Work as specified.

(E) **Distant Locations.** If required off-site testing or inspection must be conducted at a location more than 100 miles from the Project site, Contractor is solely responsible for the additional travel costs required for testing and/or inspection at such locations.

(F) **Final Inspection.** The provisions of this Section 7.8 apply to final inspection under Article 11, Completion and Warranty Provisions.

7.9 Clean up. Contractor must regularly remove debris and waste materials and maintain the Worksite in clean and neat condition.

(A) **General.** Prior to discontinuing work in an area, Contractor must clean the area and remove all rubbish along with its construction equipment, tools, machinery, waste and surplus materials. Contractor must, at all times, minimize and confine dust and debris resulting from construction activities.

(B) **Completion.** At the completion of the Work, Contractor must remove from the Worksite all of its equipment, tools, surplus materials, waste materials and debris. Before demobilizing from the Worksite, Contractor must ensure that all surfaces are cleaned, sealed, waxed, or finished as applicable, and that all marks, stains, paint splatters, and the like have been properly removed from the completed Work and the surrounding areas.

(C) **Non-Compliance.** If Contractor fails to commence compliance with its cleanup obligations within two (2) business days following written notification from City or its representative, City may undertake appropriate cleanup measures without further notice and the cost will be deducted from any amounts due or to become due Contractor.

7.10 Instructions and Manuals. Contractor must provide three (3) copies each of all instructions and manuals required by the Contract Documents, unless otherwise specified. These must be complete as to drawings, details, parts lists, performance data, and other information that may be

required for City to easily maintain and service the materials and equipment installed for this Project.

(A) **Submittal Requirements.** All manufacturers' application or installation instructions must be provided to the Inspector at least ten (10) days prior to the first such application. The instructions and manuals, along with any required guarantees, must be delivered to City for review.

(B) **Instruction of Personnel.** Contractor or its Subcontractors must instruct City's personnel in the operation and maintenance of any complex equipment as a condition precedent to Final Completion, if required in the Contract Documents.

7.11 As-built Drawings. Contractor and its Subcontractors must maintain on the Worksite a separate complete set of the Drawings which will be used solely for the purpose of recording changes made in any portion of the Work in order to create accurate record drawings at the end of the Project.

(A) **Duty to Update.** The as-built drawings must be updated as changes occur, on a daily basis if necessary. Progress payments may be delayed, in whole or in part, until the as-built drawings are brought up to date to the satisfaction of City. Actual locations to scale must be identified on the as-built drawings for all runs of mechanical and electrical work, including all site utilities, etc., installed underground, in walls, floors, or otherwise concealed. Deviations from the original Drawings must be shown in detail. The location of all main runs, whether piping, conduit, ductwork, drain lines, etc., must be shown by dimension and elevation.

(B) **Final Completion.** Contractor must verify that all changes in the Work are depicted in the as-built drawings and must deliver the complete set of as-built drawings to City for review and approval as a condition precedent to Final Completion.

7.12 Existing Utilities. As required by Government Code Section 4215, if, during the performance of the Work, Contractor discovers utility facilities not identified by City in the Contract Documents, Contractor must immediately provide written notice to City and the utility. City assumes responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Project site, if those utilities are not identified in the Contract Documents. Contractor will be compensated in accordance with the provisions of the Contract Documents for the costs of locating, repairing damage not due to Contractor's failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Drawings or Specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. Contractor will not be assessed

liquidated damages for delay in completion of the Work, to the extent such delay was caused by City's failure to provide for removal or relocation of the utility facilities.

7.13 Notice of Excavation. Government Code Section 4216.2, requires that except in an emergency, Contractor must contact the appropriate regional notification center, or Underground Services Alert at 800-642-2444 (for Northern California), at least two (2) working days, but not more than fourteen (14) calendar days before starting any excavation if the excavation will be conducted in an area that is known, or reasonably should be known, to contain subsurface installations, and if practical, Contractor must delineate with white paint or other suitable markings the area to be excavated.

7.14 Trenching and Excavations.

(A) ***Duty to Notify.*** Contractor must promptly, and before the following conditions are disturbed, provide written notice to City if Contractor finds any of the following conditions:

(1) Material that Contractor believes may be a 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 the provisions of existing law;

(2) Subsurface or latent physical conditions at the Worksite differing from those indicated by information about the Worksite made available to bidders prior to the deadline for submitting bids;
or

(3) Unknown physical conditions at the Worksite of any unusual nature, materially different from those ordinarily encountered and generally recognized as inherent in work of the character required by the Contract Documents.

(B) ***City Investigation.*** City will promptly investigate the conditions and if City finds that the conditions do materially differ or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, City will issue a Change Order.

(C) ***Disputes.*** In the event that a dispute arises between City and Contractor regarding any of the conditions specified in subsection (A) above, Contractor will not be excused from any scheduled completion date provided for in the Contract Documents, but must proceed with all Work to be performed under the Contract. Contractor will retain any and

all rights provided either by the Contract or by law which pertain to the resolution of disputes between Contractor and City.

- 7.15 Trenching of Five Feet or More.** As required by Labor Code Section 6705, if the Contract Price exceeds Twenty Five Thousand Dollars (\$25,000.00) and the Work includes the excavation of any trench or trenches of five (5) feet or more in depth, a detailed plan must be submitted to City or its civil or structural engineer, for acceptance in advance of the excavation. The detailed plan must show the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation. If the plan varies from the shoring system standards, it must be prepared by a registered civil or structural engineer. Use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders is prohibited.
- 7.16 New Utility Connections.** City will pay connection charges and meter costs for new permanent utilities required by the Contract Documents, if any. Contractor must notify City sufficiently in advance of the time needed to request service from each utility provider so that connections and services are initiated in accordance with the Project schedule.
- 7.17 Lines and Grades.** Contractor is required to use any benchmark provided by the Engineer. Unless otherwise specified in the Contract Documents, Contractor must provide all lines and grades required to execute the Work.
- 7.18 Historic or Archeological Items.**
- (A) **Contractor's Obligations.** Contractor must ensure that all persons performing Work at the Project site are required to immediately notify Project Manager, upon discovery of any potential historic or archeological items, including historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints or other archeological, paleontological or historical feature on the Project site (collectively, "Historic or Archeological Items").
- (B) **Discovery; Cessation of Work.** Upon discovery of any potential Historic or Archeological Items, Work must be stopped within an eighty five (85) foot radius of the find and may not resume until authorized in writing by City. If required by City, Contractor must assist in protecting or recovering the Historic or Archeological Items, any such assistance to be compensated as extra work on a time and materials basis under Article 6, Contract Modification. Any suspension of Work required due to discovery of Historic or Archeological Items will be treated as a suspension for convenience under Article 13.

7.19 Environmental Control. Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. Contractor and its Subcontractors must at all times in the performance of the Work comply with all applicable federal, state, and local laws and regulations concerning pollution of waterways.

(A) **Stormwater Permit.** Contractor must comply with all applicable conditions of the State Water Resources Control Board national Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activity (“Stormwater Permit”).

(B) **Contractor’s Obligations.** If required for the Work, a copy of the Stormwater Permit is on file in City’s principal administrative offices, and Contractor must comply with the same without adjustment of the Contract Price or the Contract Time. Contractor must timely and completely submit required reports and monitoring information required by the conditions of the Stormwater Permit, Contractor must comply with all other applicable state, municipal or regional laws, ordinances, rules or regulations governing discharge of stormwater, including applicable municipal stormwater management programs.

Article 8 Payment

8.1 Schedule of Values. Prior to submitting its first application for payment, Contractor must prepare and submit to Project Manager a schedule of values apportioned to the various divisions and phases of the Work. Each line item contained in the schedule of values must be assigned a value such that the total of all items equals the Contract Price. The items must be sufficiently detailed to enable accurate evaluation of the percentage of completion claimed in each application for payment, and the assigned value consistent with any itemized or unit pricing submitted with Contractor’s bid.

8.2 Progress Payments. Following the last day of each month, or as otherwise required by the Special Conditions or Specifications, Contractor will submit to Project Manager a monthly application for payment for Work performed during the preceding month based on the estimated value of the Work performed during that preceding month.

(A) **Application for Payment.** Each application for payment must be itemized to include labor, materials, and equipment incorporated into the Work, and materials and equipment delivered to the Worksite, as well as

authorized and approved Change Orders. Each pay application must be supported by Contractor's schedule of values and any other substantiating data required by the Contract Documents.

Each application for payment shall be accompanied by completed "Contract Balance Form," a copy of which is provided at the end of Article 8.

(B) **Payment of Undisputed Amounts.** City will pay the undisputed amount due, as certified the Design Professional, within thirty (30) days after Contractor has submitted a complete and accurate payment application, subject to Public Contract Code Section 20104.50. City will deduct a percentage from each progress payment as retention, as set forth in Section 8.5, below, and may deduct additional amounts as set forth in Section 8.3, below.

8.3 Adjustment of Payment Application. City may adjust or reject a payment application, including application for Final Payment, in whole or in part, based upon any of the circumstances listed below. Contractor will be notified in writing of the basis for the adjustment, and will be promptly paid once the basis for that adjustment has been remedied and no longer exists.

(A) Contractor's unexcused failure to perform the Work as required by the Contract Documents, including correction or completion of punch list items;

(B) Loss or damage caused by Contractor or its Subcontractor(s) arising out of or relating to performance of the Work;

(C) Contractor's failure to pay its Subcontractors and suppliers when payment is due;

(D) Failure to timely correct rejected, nonconforming, or defective Work;

(E) Unexcused delay in performance of the Work;

(F) Any unreleased stop notice, retained as one hundred twenty five percent (125%) of the amount claimed;

(G) Failure to submit any required schedule or schedule update in the manner and within the time specified in the Contract Documents;

(H) Failure to maintain or submit as-built documents in the manner and within the time specified in the Contract Documents;

(I) Work performed without approved Shop Drawings, when approved Shop Drawings are required before proceeding with the Work;

(J) Contractor's payroll records are delinquent or inadequate; and

(K) Any other costs or charges that may be offset against payments due, as provided in the Contract Documents, including liquidated damages.

8.4 Acceptance of Work. Neither City's payment of progress payments nor its partial or full use or occupancy of the Project constitutes acceptance of any part of the Work.

8.5 Retention. City will retain five percent (5%) of the amount due on each progress payment, or the percentage stated in the Notice Inviting Bids, whichever is greater, as retention to ensure full and satisfactory performance of the Work.

(A) **Substitution of Securities.** As provided by Public Contract Code Section 22300, Contractor may request in writing that it be allowed, at its sole expense, to substitute securities for the retention withheld by City. Any escrow agreement entered into pursuant to this provision must fully comply with Public Contract Code Section 22300, and will be subject to approval as to form by City's legal counsel.

(B) **Release of Undisputed Retention.** All undisputed retention, less any amounts that may be assessed as liquidated damages, retained for stop notices, or otherwise withheld under Section 8.3 or 8.6 will be released as Final Payment to Contractor no sooner than thirty five (35) days following recordation of the notice of completion, and no later than sixty (60) days following acceptance of the Project by City's governing body or authorized designee, or, if the Project has not been accepted, no later than sixty (60) days after the Project is otherwise considered complete under Public Contract Code Section 7107(c).

8.6 Setoff. City is entitled to set off any amounts due from Contractor against any payments due to Contractor. City's entitlement to setoff includes progress payments as well as Final Payment and release of retention.

8.7 Payment to Subcontractors and Suppliers. Each month, Contractor must promptly pay each Subcontractor and supplier the value of the portion of labor, materials, and equipment incorporated into the Work or delivered to the Worksite by the Subcontractor or supplier during the preceding month. Such payments must be made in accordance with the requirements of the law, and those of the Contract Documents and applicable subcontract or supplier contract.

(A) **Withholding for Stop Notice.** City will withhold one hundred twenty five percent (125%) of the amount claimed by an unreleased stop notice, a portion of which may be retained by City for the costs incurred in handling the stop notice claim, including attorneys' fees and costs, as authorized by law.

(B) **Joint Checks.** City reserves the right to issue joint checks made payable to Contractor and its Subcontractors or suppliers. As a condition to release of payment by a joint check, the joint check payees may be required to execute a joint check agreement in a form provided or approved by City. The joint check payees will be jointly and severally responsible for the allocation and disbursement of funds paid by joint check. Payment by joint check will not be construed to create a contractual relationship between City and a Subcontractor or supplier of any tier beyond the scope of the joint check agreement.

8.8 Final Payment. Final Completion, acceptance of the Work by City, and recordation of the Notice of Completion, and any release required by the Contract Documents are conditions precedent to Final Payment and release of undisputed retention, as set forth above. Contractor's application for Final Payment must comply with the requirements for submitting an application for a progress payment as stated in Section 8.2, above. Corrections to previous progress payments, including adjustments to estimated quantities for unit priced items, may be included in the Final Payment. The date of Final Payment is deemed to be effective on the date that City acts to release retention as final payment to Contractor, or otherwise provides written notice to Contractor of Final Payment. If the amount due from Contractor to City exceeds the amount of Final Payment, City retains the right to recover the balance from Contractor or its sureties.

8.9 Release of Claims. City may, at any time, require that payment of the undisputed portion of any progress payment or Final Payment be contingent upon Contractor furnishing City with a written release of all claims against City arising from or related to the portion of Work covered by those undisputed amounts. Any disputed amounts may be specifically excluded from the release.

8.10 Warranty of Title. Contractor warrants that title to all work, materials, or equipment incorporated into the Work and included in a request for payment will pass over to City free of any claims, liens, or encumbrances upon payment to Contractor.

Article 9 Labor Provisions

9.1 Discrimination Prohibited. Discrimination against any prospective or present employee engaged in the Work on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status is strictly prohibited. Contractor and its Subcontractors are required to comply with all applicable Federal and California laws including the California Fair Employment and Housing Act (Government Code Sections 12900 et seq.), Government Code Section 11135, and Labor Code Sections 1735, 1777.5, 1777.6, and 3077.5.

9.2 Labor Code Requirements.

(A) **Eight Hour Day.** Under Labor Code Section 1810, eight (8) hours of labor constitute a legal day's work under this Contract.

(B) **Penalty.** Under Labor Code Section 1813, Contractor will forfeit to City as a penalty, the sum of \$25.00 for each day during which a worker employed by Contractor or any Subcontractor is required or permitted to work more than eight (8) hours in any one (1) calendar day or more than forty (40) hours per calendar week, except if such workers are paid overtime under Labor Code Section 1815.

(C) **Apprentices.** Contractor is responsible for compliance with the requirements governing employment and payment of apprentices, as set forth in Labor Code Section 1777.5, which is fully incorporated by reference.

(D) **Notices.** Under Labor Code Section 1771.4, Contractor is required to post all job site notices prescribed by law or regulation.

9.3 Prevailing Wages. Each worker performing Work under this Contract that is covered under Labor Code Section 1720, including cleanup at the Project site, must be paid at a rate not less than the prevailing wage as defined in Sections 1771 and 1774 of the Labor Code. The prevailing wage rates are available online at <http://www.dir.ca.gov/dlsr>. Contractor must post a copy of the applicable prevailing rates at the Worksite.

(A) **Penalties.** Under Labor Code Section 1775, Contractor and any Subcontractor will forfeit to City as a penalty up to Two Hundred Dollars (\$200.00) for each calendar day, or portion a day, for each worker paid less than the applicable prevailing wage rate. Contractor must also pay each worker the difference between the applicable prevailing wage rate and the amount actually paid to that worker.

(B) **Federal Requirements.** If this Project is subject to Federal prevailing wage requirements in addition to California prevailing wage requirements, Contractor and its Subcontractors are required to pay the higher of the current applicable prevailing wage rates under federal law, available online at <http://www.access.gpo.gov/davisbacon/ca.html>.

9.4 Payroll Records. Contractor must comply with the provisions of Labor Code Sections 1776 and 1812 and all implementing regulations, which are fully incorporated by this reference, including requirements for electronic submission of payroll records.

(A) **Contractor and Subcontractor Obligations.** Contractor and each Subcontractor must 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 in connection with the Work. Each payroll record must 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) Contractor or Subcontractor has complied with the requirements of Labor Code Sections 1771, 1811, and 1815 for any Work performed by its employees on the Project.

(B) **Certified Record.** A certified copy of an employee's payroll record must be made available for inspection or furnished to the employee or his or her authorized representative on request, to City, or to the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations, and as further provided by the Labor Code.

(C) **Enforcement.** Upon notice of noncompliance with Labor Code Section 1776, Contractor or Subcontractor has ten (10) days in which to comply with requirements of this section. If Contractor or Subcontractor fails to do so within the ten (10) day period, Contractor or Subcontractor will forfeit a penalty of One Hundred Dollars (\$100.00) per day, or portion a day, for each worker for whom compliance is required, until strict compliance is achieved. Upon request by the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement, these penalties will be withheld from progress payments then due.

9.5 Labor Compliance. Under Labor Code section 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

Article 10 Safety Provisions

10.1 Safety Precautions and Programs. Contractor and its Subcontractors are fully responsible for safety precautions and programs, and for the safety of persons and property in the performance of the Work. Contractor and its Subcontractors must comply with all applicable safety laws, rules and regulations and seek to avoid injury, loss, or damage to persons or property by taking reasonable steps to protect its employees and other persons at the Worksite, materials and equipment stored on or off site, and property at or adjacent to the Worksite.

(A) **Reporting Requirements.** Contractor must immediately provide a written report to City of all recordable accidents and injuries occurring at the Worksite. If Contractor is required to file an accident report with a government agency, Contractor will provide a copy of the report to City.

(B) **Legal Compliance.** Contractor's safety program must comply with the applicable legal and regulatory requirements. Contractor must provide City with copies of all notices required by law or regulation.

(C) **Contractor's Obligations.** Any damage or loss caused by Contractor arising from the Work which is not insured under property insurance must be promptly remedied by Contractor.

(D) **Remedies.** If City determines, in its sole discretion, that any part of the Work or Worksite is unsafe, City may, without assuming responsibility for Contractor's safety program, require Contractor or its Subcontractor to cease performance of the Work or to take corrective measures to City's satisfaction. If Contractor fails to promptly take the required corrective measures, City may perform them and deduct the cost from the Contract Price. Contractor agrees it is not entitled to submit a Claim for damages, for an increase in Contract Price, or for a change in Contract Time based on Contractor's compliance with City's request for corrective measures pursuant to this provision.

10.2 Hazardous Materials. Unless otherwise specified, this Contract does not include the removal, handling, or disturbance of any asbestos or other Hazardous Materials. If Contractor encounters materials on the Worksite that Contractor reasonably believes to be asbestos or other Hazardous Materials, and the asbestos or other Hazardous Materials have not been

rendered harmless, Contractor may continue Work in unaffected areas reasonably believed to be safe, but must immediately cease work on the area affected and report the condition to City. No asbestos, asbestos-containing products or other Hazardous Materials may be used in performance of the Work.

10.3 Material Safety. Contractor must maintain Material Safety Data Sheets (“MSDS”) at the Worksite, as required by law, for materials or substances used or consumed in the performance of the Work. The MSDS will be accessible and available to Contractor’s employees, Subcontractors, and City.

(A) **Contractor Obligations.** Contractor is solely responsible for the proper delivery, handling, use, storage, removal, and disposal of all materials brought to the Worksite and/or used in the performance of the Work.

(B) **Labeling.** Contractor must ensure proper labeling on any material brought onto the Worksite so that any persons working with or in the vicinity of the material may be informed as to the identity of the material, any potential hazards, and requirements for proper handling, protections, and disposal.

Article 11 Completion and Warranty Provisions

11.1 Final Completion.

(A) **Final Inspection.** When the Work required by this Contract is fully performed, Contractor must provide written notification to Project Manager requesting final inspection. Based on this inspection, the Design Professional will prepare a punch list of items that are incomplete, incorrectly installed, or not operating as required by the Contract Documents. The omission of any such item from this punch list will not relieve Contractor from fulfilling all requirements of the Contract Documents.

(B) **Punch List.** City will promptly deliver the punch list to Contractor and will specify the time by which all of the punch list items must be completed or corrected. The punch list may include City’s estimated cost to complete each punch list item if Contractor fails to do so within the specified time.

(C) **Requirements for Final Completion.** Final Completion will be achieved upon completion or correction of all punch list items, as verified by inspection, and upon satisfaction of all other Contract requirements,

including any commissioning required under the Contract Documents, and submission of all final submittals, including a warranty bond as required under Section 4.4, instructions and manuals as required under Section 7.10, and as-built drawings as required under Section 7.11, all to City's satisfaction. Once Final Completion is achieved, and the Project has been formally accepted by City, City will file a notice of completion with the County Recorder.

(D) **Final Payment.** Final Payment and release of retention, less any sums withheld pursuant to the provisions of the Contract Documents, will not be made sooner than thirty five (35) days after recordation of the notice of completion. If Contractor fails to complete all of the punch list items within the specified time, City may elect to accept the Project and record the notice of completion, and withhold up to one hundred fifty percent (150%) of City's estimated cost to complete the remaining items from Final Payment.

11.2 Warranty.

(A) **General.** Contractor warrants that all materials and equipment will be new unless otherwise specified, of good quality, in conformance with the Contract Documents, and free from defective workmanship and materials. Contractor further warrants that the Work will be free from material defects not intrinsic in the design or materials required in the Contract Documents. At City's request, Contractor must furnish satisfactory evidence of the quality and type of materials and equipment furnished. Contractor's warranty does not extend to damage caused by normal wear and tear, or improper use or maintenance.

(B) **Warranty Period.** Contractor's warranty must guarantee its Work for a period of one (1) year from the date of recordation of the notice of completion (the "Warranty Period"), except when a longer guarantee is provided by a supplier or manufacturer or is required by the Specifications or Special Conditions. Contractor must obtain from its Subcontractors, suppliers and manufacturers any special or extended warranties required by the Contract Documents.

(C) **Warranty Documents.** As a condition precedent to acceptance, Contractor must supply City with all warranty and guarantee documents relevant to equipment and materials incorporated into the Work and guaranteed by their suppliers or manufacturers.

(D) **Subcontractors.** The warranty obligations in the Contract Documents apply to Work performed by Contractor and its Subcontractors, and Contractor expressly agrees to act as co-guarantor of such Work.

(E) **Contractor's Obligations.** Upon written notice from City to Contractor of any defect in the Work discovered during the Warranty Period, Contractor or its responsible Subcontractor must promptly correct the defective Work at its own cost. Contractor's obligation to correct defects discovered during the Warranty Period will continue past the expiration of the Warranty Period as to any defects in Work for which Contractor was notified prior to expiration of the Warranty Period.

(F) **City's Remedies.** If Contractor and/or its responsible Subcontractor fails to correct defective Work within ten (10) days following notice by City, or sooner, if required by the circumstances, Contractor expressly agrees that City may correct the defects to conform with Contract Documents at Contractor's sole expense, and Contractor agrees to reimburse City for its costs within thirty (30) days following City's submission of a demand for payment pursuant to this provision. If City is required to initiate legal action to compel Contractor's compliance with this provision, and City is the prevailing party in such action, Contractor is solely responsible for all of City's attorney's fees and legal costs expended to enforce Contractor's warranty obligations herein in addition to any and all costs incurred by City to correct the defective Work.

11.3 Use Prior to Final Completion. City reserves the right to occupy or make use of the Project, or any portions of the Project, prior to Final Completion if City has determined that the Project or portion of it is in a condition suitable for the proposed occupation or use, and that it is in its best interest to occupy or make use of the Project, or any portions of it, prior to Final Completion. City will notify Contractor in writing of its intent to occupy or make use of the Project or any portions of the Project, pursuant to this provision.

(A) **Non-Waiver.** Occupation or use prior to Final Completion will not operate as acceptance of the Work or any portion of it, nor will it operate as a waiver of any of City's rights or Contractor's duties pursuant to these Contract Documents, and will not affect nor bear on the determination of the time of substantial completion with respect to any statute of repose pertaining to the time for filing an action for construction defect.

(B) **City's Responsibility.** City will be responsible for the cost of maintenance and repairs due to normal wear and tear with respect to those portions of the Project that are being occupied or used before final completion. The Contract Price or the Contract Time may be adjusted pursuant to the applicable provisions of these Contract Documents if, and only to the extent that, any occupation or use under this Section actually adds to Contractor's cost or time to perform the Work.

11.4 Substantial Completion. For purposes of determining “substantial completion” with respect to any statute of repose pertaining to the time for filing an action for construction defect, “substantial completion” is deemed to mean the last date that Contractor or any Subcontractor performs Work on the Project prior to recordation of the Notice of Completion, except for warranty work performed under this Article.

Article 12 Dispute Resolution

12.1 Claims. This Article applies to and provides the exclusive procedures for any Claim arising from or related to the Contract or performance of the Work.

(A) **Definition.** “Claim” means a separate demand by Contractor, submitted in writing, for change in the Contract Time or Contract Price that has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected by City, in whole or in part.

(B) **Limitations.** A Claim may only include the portion of a previously rejected demand that remains in dispute between Contractor and City. With the exception of any dispute regarding the amount of money actually paid to Contractor as Final Payment, Contractor is not entitled to submit a Claim demanding a change in the Contract Time or the Contract Price, which has not previously been submitted to City in full compliance with Article 5 and Article 6, and subsequently rejected in whole or in part by City.

(C) **Scope of Article.** This Article is intended to provide the exclusive procedures for submission and resolution of Claims of any amount, and applies in addition to the provisions of Public Contract Code Section 9204 and Sections 20104 et seq.

(D) **No Work Delay.** Notwithstanding the submission of a Claim or any other dispute between the parties related to the Project or the Contract Documents, Contractor must perform the Work and may not delay or cease Work pending resolution of the Claim or other dispute, but must continue to diligently prosecute the performance and timely completion of the Work, including the Work pertaining to the Claim or other dispute.

12.2 Claims Submission. The following requirements apply to any Claim subject to this Article:

(A) **Substantiation.** The Claim must be submitted to City in writing, clearly identified as a “Claim” submitted pursuant to this Article 12, and

must include all of the documents necessary to substantiate the Claim including the Change Order request that was rejected in whole or in part, and copy of the City's written rejection that is in dispute. The Claim must clearly identify and describe the dispute, including relevant references to applicable portions of the Contract Documents, and a chronology of relevant events. Any Claim for additional payment must include a complete, itemized breakdown of all labor, materials, taxes, insurance, and subcontract, or other costs. Substantiating documentation such as payroll records, receipts, invoices, or the like, must be submitted in support of each claimed cost. Any Claim for an extension of time or delay costs must be substantiated with schedule analysis and narrative depicting and explaining claimed time impacts.

(B) **Claim Format.** A Claim must be submitted in the following format:

(1) General introduction, specifically identifying the submission as a "Claim" submitted under this Article 12.

(2) Relevant background information, including identification of the specific demand at issue, and the date of City's rejection of that demand.

(3) Detailed explanation of the issue(s) in dispute. For multiple issues, separately number and identify each issue and include the following for each separate issue:

(a) The background of the issue, including references to relevant provisions of the Contract Documents;

(b) A succinct statement of the matter in dispute, including Contractor's position and the basis for that position;

(c) A chronology of relevant events;

(d) The identification and attachment of all supporting documents (see subsection (A), above, on Substantiation); and

(e) Use of a separate page for each issue.

(4) Summary of issues and damages.

(5) The following certification, executed by Contractor's authorized representative:

“The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Claim are true and correct. Contractor warrants that this Claim is comprehensive and complete as to the matters in dispute, and agrees that any costs, expenses, or delay claim not included herein are deemed waived. Contractor understands that submission of a Claim which has no basis in fact or which Contractor knows to be false may violate the False Claims Act (Government Code Section 12650 et seq.).”

(C) **Submission Deadlines.**

(1) A Claim must be submitted within fifteen (15) days following the date that City notified Contractor in writing that a request for a change in the Contract Time or Contract Price, duly submitted in compliance with Article 5 and Article 6, has been rejected in whole or in part.

(2) With the exception of any dispute regarding the amount of Final Payment, any Claim must be filed on or before the date of Final Payment, or will be deemed waived.

(3) A Claim disputing the amount of Final Payment must be submitted within fifteen (15) days of the effective date of Final Payment, under Section 8.8, above.

(4) Strict compliance with these Claim submission deadlines is necessary to ensure that any dispute may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project. Any Claim that is not submitted within the specified deadlines will be deemed waived by Contractor.

12.3 City’s Response. City will respond within forty five (45) days of receipt of the Claim with a written statement identifying which portion(s) of the Claim are disputed, unless the forty five (45)-day period is extended by mutual agreement of City and Contractor. However, the City may first request, in writing, within thirty (30) days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim that City may have against Contractor. If Contractor fails to submit the additional documentation to City within fifteen (15) days of receipt of City’s request, the Claim will be deemed waived.

(A) **Additional Information.** If additional information is thereafter required, it may be requested and provided upon mutual agreement of City and Contractor.

(B) **City's Response.** City's written response to the Claim, as further documented, will be submitted to Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by Contractor in producing the additional information, whichever is greater.

(C) **Non-Waiver.** Any failure by City to respond within the times specified above may not be construed as acceptance of the Claim in whole or in part, or as a waiver of any provision of these Contract Documents.

12.4 Meet and Confer. If Contractor disputes City's written response, or City fails to respond within the specified time, Contractor must notify City in writing, either within fifteen (15) days of receipt of City's response, or within fifteen (15) days of City's failure to respond within the specified time, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. If Contractor fails to dispute City's response, in writing, within the specified times, Contractor's Claim will be deemed waived.

(A) **Schedule Meet and Confer.** Upon receipt of the demand to meet and confer, City will schedule the meet and confer conference to be held within thirty (30) days, or later if needed to ensure the mutual availability of all of the individuals that each party requires to represent its interests at the meet and confer conference.

(B) **Location for Meet and Confer.** The meet and confer conference will be scheduled at a location at or near City's principal office.

(C) **Written Statement After Meet and Confer.** Within ten (10) working days after the meet and confer has concluded, City will issue a written statement identifying which portion(s) of the Claim remain in dispute, if any.

(D) **Submission to Mediation.** If the Claim or any portion remains in dispute following the meet and confer conference, within ten (10) working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, the disputed portion(s) will be submitted for mediation as set forth below.

12.5 Mediation and Government Code Claims.

(A) **Mediation.** Mediation under this Article will be scheduled within sixty (60) days following conclusion of the meet and confer process, with a mediator that the parties mutually agreed upon. The mediation itself may take place more than sixty (60) days following conclusion of the meet and confer process to ensure the mutual availability of the selected mediator

and all of the individuals that each party requires to represent its interests. The parties must share the costs of mediation equally, except costs incurred by each party for representation by legal counsel or any other consultant.

(B) **Government Code Claims.**

(1) Timely presentment of a Government Code Claim is a condition precedent to filing any legal action based on or arising from the Contract.

(2) The time for filing a Government Code Claim will be tolled from the time Contractor submits its written Claim pursuant to Section 12.2, above, until the time that Claim is denied as a result of the meet and confer process, including any period of time used by the meet and confer process. If the parties agree to mediation, the time for filing a Government Code Claim will be tolled until conclusion of the mediation if the Claim is not fully resolved by mutual agreement of the parties during the mediation or any continuation of the mediation.

12.6 Tort Claims. This Article does not apply to tort claims and nothing in this Article is intended nor will be construed to change the time periods for filing tort-based Government Code Claims.

12.7 Arbitration. It is expressly agreed, under California Code of Civil Procedure Section 1296, that in any arbitration to resolve a dispute relating to this Contract, the arbitrator's award must be supported by law and substantial evidence.

12.8 Damages. Contractor bears the burden of proving entitlement to and the amount of any claimed damages. Contractor is not entitled to damages calculated on a total cost basis, but must prove actual damages. Contractor is not entitled to recovery of any alleged home office overhead. The Eichleay Formula or similar formula may not be used for any recovery under the Contract. Contractor is not entitled to consequential damages, including home office overhead or any form of overhead not directly incurred at the Worksite; lost profits; loss of productivity; lost opportunity to work on other projects; diminished bonding capacity; increased cost of financing for the Project; extended capital costs; non-availability of labor, material or equipment due to delays; or any other indirect loss arising from the Contract.

12.9 Other Disputes. The procedures in this Article 12 will apply to any and all disputes or legal actions, in addition to Claims, arising from or related to this Contract, unless and only to the extent that compliance with a

procedural requirement is expressly and specifically waived by City. Nothing in this Article is intended to delay suspension or termination under Article 13.

Article 13 Suspension and Termination

13.1 Suspension for Cause. In addition to all other remedies available to City, if Contractor fails to perform or correct work in accordance with the Contract Documents, City may immediately order the Work, or any portion of it, suspended until the cause for the suspension has been eliminated to City's satisfaction.

(A) **Failure to Comply.** Contractor will not be entitled to an increase in Contract Time or Contract Price for a suspension occasioned by Contractor's failure to comply with the Contract Documents.

(B) **No Duty to Suspend.** City's right to suspend the Work will not give rise to a duty to suspend the Work, and City's failure to suspend the Work will not constitute a defense to Contractor's failure to comply with the requirements of the Contract Documents.

13.2 Suspension for Convenience. City reserves the right to suspend, delay, or interrupt the performance of the Work in whole or in part, for a period of time determined to be appropriate for City's convenience, and not due to any act or omission by Contractor or its Subcontractors. Upon notice by City pursuant to this provision, Contractor must immediately suspend, delay, or interrupt the Work as directed by City. The Contract Price and the Contract Time will be equitably adjusted by Change Order to reflect the cost and delay impact occasioned by such suspension for convenience.

13.3 Termination for Default. Contractor may be deemed in default for a material breach of or inability to perform the Contract, including Contractor's refusal or failure to supply sufficient skilled workers, proper materials, or equipment to perform the Work within the Contract Time; refusal or failure to make prompt payment to its employees, Subcontractors, or suppliers or to correct rejected work; disregard of laws, regulations, ordinances, rules, or orders of any public agency with jurisdiction over the Project; or if Contractor lacks financial capacity to complete the Work within the Contract Time; or is otherwise responsible for a material breach of the Contract requirements.

(A) **Notice.** Upon City's determination that Contractor is in default, City may provide Contractor and its surety written notice of default and intent to terminate the Contract.

(B) **Termination.** Within seven (7) calendar days after notice of intent to terminate for default has been given, unless the default is cured or arrangements to cure the default have been made and memorialized in writing, to City's satisfaction, City may terminate the Contract by written notice to Contractor with a copy to Contractor's surety.

(C) **Waiver.** Time being of the essence in the performance of the Work, if Contractor's surety fails to arrange for completion of the Work in accordance with the Performance Bond, within seven (7) calendar days from the date of the notice of termination, Contractor's surety will be deemed to have waived its right to complete the Work under the Contract, and City may immediately make arrangements for the completion of the Work through use of its own forces, by hiring a replacement contractor, or by any other means that City determines advisable under the circumstances. Contractor and its surety will be jointly and severally liable for any additional cost incurred by City to complete the Work following termination. In addition, City will have the right to use any materials, supplies, and equipment belonging to Contractor and located at the Worksite for the purposes of completing the remaining Work.

(D) **Wrongful Termination.** If a court of competent jurisdiction or an arbitrator later determines that the termination for default was wrongful, the termination will be deemed to be a termination for convenience, and Contractor's damages will be strictly limited to the compensation provided for termination for convenience, in Section 13.4, below. Contractor waives any claim for any other damages for wrongful termination including consequential damages, lost opportunity costs or lost profits.

13.4 Termination for Convenience. City reserves the right to terminate all or part of the Contract for convenience upon written notice to Contractor. Upon receipt of such notice, Contractor must immediately stop the Work, comply with City's instructions to protect the completed Work and materials, and use its best efforts to minimize further costs. In the event of termination for convenience, the parties agree that the following will constitute full and fair compensation to Contractor, and that Contractor will not be entitled to any additional compensation:

(A) **Completed Work.** The value of its Work satisfactorily performed to date, including Project overhead and profit based on Contractor's schedule of values;

(B) **Demobilization.** Actual and substantiated demobilization costs; and

(C) **Markup.** Five percent (5%) of the total value of the Work performed as of the date of notice of termination or five percent

(5%) of the value of the Work yet to be completed, whichever is less.

- 13.5 Provisions Remaining in Effect.** Upon termination pursuant to this Article, the provisions of the Contract Documents remain in effect as to any claim, indemnity obligation, warranties, guarantees, submittals of as-built drawings, instructions, or manuals, or other such rights and obligations arising prior to the termination date.

Article 14 Miscellaneous Provisions

- 14.1 Assignment of Unfair Business Practice Claims.** Under Public Contract Code Section 7103.5, Contractor and its Subcontractors agree to assign to City 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. Section 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 Contract or subcontract. This assignment will be effective at the time City tenders Final Payment to Contractor, without further acknowledgement by the parties.
- 14.2 Provisions Deemed Inserted.** Every provision of law required to be inserted in the Contract Documents is deemed to be inserted, and the Contract Documents will be construed and enforced as though such provision has been included. If it is discovered that through mistake or otherwise that any required provision was not inserted, or not correctly inserted, the Contract Documents will be amended accordingly.
- 14.3 Waiver.** No waiver of a breach, failure of any condition, or any right or remedy contained in or granted by the provisions of the Contract Documents will be effective unless it is in writing and signed by the party waiving the breach, failure, right, or remedy. No waiver of any breach, failure, right, or remedy will be deemed a waiver of any other breach, failure, right, or remedy, whether or not similar, nor will any waiver constitute a continuing waiver unless specified in writing by the waiving party.
- 14.4 Titles, Headings, and Groupings.** The titles and headings used and the groupings of provisions in the Contract Documents are for convenience only and may not be used in the construction or interpretation of the Contract Documents or relied upon for any other purpose.
- 14.5 Statutory and Regulatory References.** With respect to any amendments to any statutes or regulations referenced in these Contract

Documents, the reference is deemed to be the version in effect on the date that that bids were due.

END OF GENERAL CONDITIONS

SPECIAL CONDITIONS

1.0 Shop Drawings. Whenever Shop Drawings are required by the Contract Documents or by the Engineer, Contractor must submit five (5) prints of each shop drawing to the Engineer.

(A) If three (3) prints of the drawing are returned to Contractor marked "NO EXCEPTIONS TAKEN," further revision of the drawings will not be required. If one (1) print of the drawing is returned to Contractor marked "REVISE AND RESUBMIT," Contractor must revise the drawing and resubmit five (5) copies of the revised drawing to the Engineer. City reserves the right to withhold payment due Contractor to cover additional costs of the Engineer's review beyond the second submission.

(B) Fabrication of an item may not commence before the Engineer has reviewed the pertinent shop drawings and returned copies to Contractor marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

(C) Revisions indicated on shop drawings are deemed necessary to meet the existing requirements of the Contract Documents and may not be taken as the basis of claims for extra Work. Contractor is not entitled to claim for damages or extension of time due to any delay resulting from making the required revisions to shop drawings. The Engineer's review of the shop drawings does not relieve Contractor of responsibility for any errors or omissions contained in the shop drawings nor will such review operate to waive or modify any provision contained in the Contract Documents.

2.0 Construction Water and Wastewater. City will provide water required for performance of the Work. Contractor is responsible for the appropriate disposal of waste water in coordination with City personnel. Contractor must provide a backflow preventer on all point of connections to City's Water System. All backflow preventers must be checked and approved by City's Public Works Water Division. Contractor must provide a deposit (refundable) and make necessary arrangements to pick up a hydrant meter at City's Public Works Office. At the completion of the Project, if the hydrant meter is not returned promptly or if it is damaged, Contractor shall forfeit its deposit.

3.0 Equipment. Contractor must provide and use equipment and plants suitable to produce the quality of Work and materials required by the Contract Documents. Contractor may be required to remove equipment which the Engineer deems unsuitable for the Work. Contractor must ensure that equipment is operated by trained, experienced operators, and at a speed or rate of

production not to exceed that recommended by the manufacturer. Any vehicles used to haul materials over existing streets and highways must be equipped with pneumatic tires.

4.0 Lines and Grades. The Engineer will set the stakes or marks necessary to establish the lines and grades required for the completion of the Work in accordance with the Contract Documents. Contractor must give at least two (2) working days' notice to the Engineer of the need for setting any lines and grades.

(A) **Measurements.** Distances and measurements are given and will be made in a horizontal plane. Grades are given from the top of stakes or nail unless otherwise noted. Three (3) consecutive points shown on the same rate of slope must be used in common in order to detect any variation from a straight grade. Any variation from a straight grade, straight slope or line, must be reported to the Engineer. If such discrepancy is not reported to the Engineer, Contractor is responsible for any error in the finished work.

(B) **Stakes.** Contractor must preserve all stakes and points set for lines, grades or measurements of the Work in their proper places until authorized by the Engineer to remove them. All expense incurred by replacing stakes that have been removed without proper authority may be deducted from any payment due to Contractor.

5.0 Disposal of Materials Outside of Street Right-of-Way. Unless otherwise specified in the Specifications or Special Conditions, Contractor is solely responsible for disposing of materials outside the street right-of-way and for all associated costs. Before disposing materials outside the street right-of-way, Contractor must 1) obtain a written release from the property owner releasing City from any and all responsibility in connection with the disposal of material on that property; and 2) obtain permission from the Engineer to dispose of the material at the permitted location.

6.0 Emergency Contact. Prior to the commencement of Work on the Project, Contractor must provide contact information to the Engineer for the person designated by Contractor to respond to any emergency that arises on the Worksite during the course of the Project. That person will be responsible for responding to the Worksite within thirty (30) minutes following notification of an emergency by City's Police or Fire Department, regardless of the time of day.

7.0 Right-of-Way. City will provide the right-of-way for performance of the Work. Contractor is solely responsible for any additional area required outside of the designated the right-of-way, unless otherwise provided in the Contract Documents.

(A) **Environmental Control.** Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. Contractor and its subcontractors shall at all times in the performance of the Work comply with all applicable federal, state, and local laws and regulations concerning pollution of waterways.

8.0 **Use of Explosives.** When the use of explosives is necessary for the prosecution of the Work, Contractor must ensure that they are used with the utmost care to avoid endangering persons or property. All explosives must be used and stored in strict accordance with all applicable federal, state, and local laws and regulations.

9.0 **Authorized Work Days and Hours.**

(A) **Authorized Work Days.** Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project on the following days of the week, excluding holidays observed by City: (May 29, 2017, July 4, 2017, and Sept 4, 2017, November 24 & 25, 2017, December 25, 2017 and January 1, 2018)
Monday through Friday

(B) **Authorized Work Hours.** Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project during the following hours:7am-5pm

END OF SPECIAL CONDITIONS

Table of Contents

	Section
Division 1 - General Requirements	
Summary of Work.....	01100
Codes and Permits.....	01160
Mobilization.....	01200
Project Records and Submittals	01330
Reference Standards, Definitions and Abbreviations	01420
Preservation and Cleanup	01740
 Division 2 - Site Construction	
Well Destruction	02215
Earthwork.....	02300
Trench Excavation and Backfill.....	02320
Paving	02740
Chain Link Fencing.....	02820
 Division 3 - Concrete	
Concrete	03300
Precast Concrete.....	03400
 Division 4 - 8 – (Not used)	
 Division 9 - Finishes	
Painting	09900
 Division 10 - Specialties	
Building	10050
Signs and Safety Equipment	10440
 Division 11 - 14 (Not used)	
 Division 15 - Mechanical	
Pipe (Station, Distribution, and Drainage).....	15025
Valves and Appurtenances	15110
Vertical Turbine Pump Components	15130
Disinfection of Wells, Pumps and Piping	15145
Performance Testing and Facility Startup.....	15950

Table of Contents (Cont.)

	Section
Division 16 - Electrical	
General Electrical	16010
Electrical Related Work	16055
Service Distribution and Grounding	16305
Motor Control Centers	16400
Transient Voltage Surge Suppression	16430
Dry Type Transformers	16460
Solid State Reduced Voltage Starters	16926

SECTION 01100 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 PROJECT DESCRIPTION

A. Location

The project is divided into three locations: The Boys Ranch well field site is located near the intersection of the Coyote Creek Trail and the northern extension of Malaguerra Avenue along Coyote Creek in the city limits of Morgan Hill, California in an open space park area. The Jackson well field site is located near the intersection of Hill Road and East Dunne Avenue in Morgan Hill, California near a residential area.

Coordinates for the wells which require work as detailed in the contract documents are as follows:

Well	Coordinates
Boys Ranch #2	37° 10' 5.37" N 121° 39' 1.16" W
Boys Ranch #2A	37° 10' 4.93" N 121° 39' 0.23" W
Boys Ranch #3	37° 10' 1.30" N 121° 39' 11.12" W
Jackson #1	37° 8' 19.06" N 121° 36' 50.93" W
Jackson #3	37° 8' 19.57" N 121° 36' 49.99" W

B. Description of Work

The work to be completed under this contract consists of furnishing all materials, labor, equipment, fuel, and tools required to abandon three existing wells, install new water pipelines and vertical turbine well pumps in existing wells at the Boy's Ranch and Jackson sites, all in conformance with City Standard Details. The work required in this specification relating includes, but is not limited to the following:

1. Clearing, grading and compacting of the immediate area around the new Boys Ranch #2A and Jackson #3 well sites and where the new above ground and below ground station piping, well pump pedestals, fencing and aggregate base are to be located. This work is to be accomplished prior to construction of the aboveground and underground facilities.
2. Destruction/abandonment of Boys Ranch #2, Boys Ranch #3 and Jackson #1 wells. Work includes removal of the Jackson Well #1 pedestal.
3. Construction of two new reinforced concrete pump pedestals at the Boys Ranch #2A and

Jackson #3 wellheads including all concrete, rebar, air vent, gravel fill pipe and sounding pipe. Construction of slabs and concrete pads for piping supports.

4. Relocation of the metal well head shade structure from the Boys Ranch #2 wellhead and installation on to the Boys Ranch #2A wellhead. A new metal wellhead shade structure shall be fabricated (as an equal to the existing Boys Ranch #2 wellhead shade structure) and installed at the Jackson #3 wellhead.
5. Installation of a 125-horsepower vertical turbine line-shaft pump at Boys Ranch #2A and 100-horsepower vertical turbine line-shaft pump at Jackson #3, including the bowl assemblies and suction pipe, water lubricated column assemblies, discharge heads, electric motors, and water level measuring equipment.
6. Tie-in to existing above ground station piping at the existing pump stations and installation of new underground piping and new station piping to include new valves, flanges, gauges, meter and all other related appurtenances.
7. The trenching, installation of, backfill, and compaction of all required underground piping, and electrical conduits.
8. Installation of new 460-volt, 60-Hz, 3-phase, 4-wire underground conduit and conductors from the Jackson #3 well site to the existing Jackson #1 well pump station and from the Boys Ranch #2A well site to the existing Boys Ranch #2 well pump station
9. Demolition and disposal of existing electrical equipment and installation of new and replacement MCC equipment at the Jackson #3 and Boys Ranch #2A well pump sites.
10. Preparation and painting of all aboveground station piping and exposed well pump components.
11. Placing and compacting aggregate base at the Boys Ranch #2A site for all weather access area.
12. Installation of new chainlink fencing, mangate and swing gates at the Boys Ranch #2A site.
13. Repair and installation of new chain link fencing at the Jackson site.
14. Installation of new redwood fencing and swing gates at the Jackson site.
15. Placement of new AC paving at the Boys Ranch #2A and Jackson #3 sites and replacement of all disturbed AC paved areas.

16. Restoration and clean-up of the sites after project completion.
17. Performance testing of all components of the new well pump sites.
18. Disinfection of the wells, pumps, and all piping and fittings.
19. Record keeping of submittals and performance testing.
20. Submission of five (5) paper copies of the operation and maintenance manuals for all equipment as well as one (1) electronic copy on CD-ROM.
21. Submission of two (2) copies of as-built drawings for the civil, structural, mechanical, electrical, and instrumentation work at the end of construction.
22. One year Maintenance Bond.

1.02 QUALIFICATIONS OF THE CONTRACTOR

- A.** All bidders and subcontractors shall hold a valid California Contractor's License for the Work specified. Contractor shall submit as part of the bid package a list of five (5) or more prior projects, which the Contractor has installed of similar size and capacity. Projects shall have been completed within the last five (5) years. Failure to submit prior project list, shall be grounds for rejection of the bid.

1.03 REFERENCE STANDARDS

- A.** The Contract Documents also contain references to various Standard Specifications, code practices, and requirements for materials, Work quality, installation, inspections, and tests, which are published and issued by the organizations, societies, and associations. Such references are hereby made a part of the Contract Documents to the extent required.
- B.** When such references are specified, and the effective dates are not given, it shall be understood that the current edition or latest revision thereof and any amendments of supplements in effect on the date of issue of these Contracts, as indicated on the cover, shall govern the work.
- C.** Reference standards are not furnished with the Contract Documents since the Contractor, subcontractors, manufacturers, and the trades involved are assumed to be familiar with their requirements. The Engineer will furnish, upon request, information as to how copies of specified standards may be obtained.

- D. Whenever reference is made to “CALTRANS Standard Specifications” it shall be understood to be the most recent addition of the State of California, Department of Transportation, Standard Specifications.

1.04 EXAMINATION OF DOCUMENTS AND PROJECT SITE

- A. Before submitting a proposal, each bidder shall carefully examine all bid documents. Bidder shall also visit the site and fully inform himself as to all existing conditions and limitations applying to the Work. If, after such examination and study, it appears that any change from the Drawings and Specifications should be allowed, the bidder shall so state in writing seven (7) days prior to submission of bids.
- B. By the act of submitting a proposal, each bidder shall be deemed to have made such examinations of the Drawings, Specifications and premises, and it will be assumed that the bidder is therefore familiar with the entire scope of the project and has based the proposal upon the Work described in the Drawings and Specifications and upon all existing conditions and limitations applying to the bidder’s Work. The bidding Contractor shall not withhold information related to conflicts of the Contract Documents and should seek interpretation during the bidding.

1.05 PRE-CONSTRUCTION CONFERENCE

- A. A pre-construction conference will NOT be held for this project. City staff will open the gates at Jackson Well #3 site on April 11, 2017 at 2pm for contractors to access the site. The Boys Ranch site will be visited afterwards.

1.06 BEGINNING OF WORK, TIME OF COMPLETION, LIQUIDATED DAMAGES

- A. Contractor shall conform to CALTRANS Standard Specification provisions contained in Section 8-1.03, “Beginning of Work”, in Section 8-1.06, “Time of Completion”, and in Section 8-1.07, “Liquidated Damages,” and these special provisions.

1. Beginning of Work

The Contractor shall begin Work within ten (10) calendar days from the Notice to Proceed and shall diligently prosecute the same to completion. Contractor may begin work immediately after receiving Notice to Proceed.

2. Time of Completion

The Contractor shall complete the Work within 220 calendar days after the date of receipt of the Notice to Proceed.

3. Liquidated Damages

The Contractor shall pay to City the sum of \$1,000 per day, for each and every calendar day delay in finishing the Work in excess of the number of working days prescribed above.

1.07 MATERIALS FURNISHED BY CONTRACTOR

- A.** All materials furnished by the Contractor shall be new, in first-class condition and subject to the approval of the Engineer.
- B.** All materials, installation, and construction shall comply with the applicable provisions of current laws, safety rules and regulations of the City of Morgan Hill, Santa Clara County, the State of California, the Federal Government, and any other applicable authority.
- C.** If any of these laws and standards should conflict with any of the Specifications contained herein, the Contractor shall notify the Engineer in writing and the Engineer shall resolve the conflict.

1.08 CONTRACTOR'S TEMPORARY FACILITIES

A. Electricity

The Contractor shall provide, at its own cost, all electric power required for construction, general and security lighting, and all other purposes as deemed necessary. The Contractor shall make any necessary arrangements with the local electric utility company for temporary electric service and shall pay all expenses in connection therewith.

B. Water

The City will provide water for disinfecting and testing of the facilities. The Contractor shall supply all associated backflow prevention devices and piping for the connection to the City's system throughout construction. The Contractor shall provide and maintain protective barricades around the service area during construction.

C. Heating, Cooling and Ventilation

Provide temporary heating, cooling and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials and to protect materials and finishes from damage due to temperature or humidity.

Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity and to prevent hazardous accumulations of dust, fumes, vapors or gases.

Portable heaters shall be standard approved units complete with controls.

D. Sanitary Facilities

The Contractor shall make arrangements for providing sanitary facilities in compliance with laws and regulations for their personnel. Locations of sanitary facilities, storage areas, parking and other Contractor installations shall be subject to the prior approval of the Engineer. Service, clean and maintain facilities and enclosures.

E. Air and Steam

Provide all air and steam, including temporary piping and appurtenances required for cleaning and testing pipelines and equipment necessary for Contractor's and subcontractor's work. Remove temporary piping and appurtenances upon approval of equipment being tested.

1.09 WORK HOURS

- A. Work may be performed between the hours of 7:00 a.m. and 5:00 p.m. Monday through Friday. If work is planned to be performed outside of these hours, the Contractor shall obtain permission from the City or Engineer prior.
- B. The Contractor shall not Work on the City's Holidays unless prior approval is obtained from the Engineer and arrangements for inspection services are made.

1.10 SAFETY AND PRECAUTIONS

A. General

The Contractor shall conduct operations in accordance with the rules and regulations of the Local Government, California Division of Industrial Safety, and the current requirements of the Occupational Safety and Health Administration (Cal. OSHA). Contractor is responsible for site conditions, including public safety, dust control, and sediment control, continually and not limited to normal working hours. Contractor shall provide contact information for representatives available during working hours and during after-hours, weekends, and holidays.

B. Noise Control

It shall be the Contractor's responsibility to keep noise due to construction activities as low as possible. Contractor shall take measures to minimize noise of construction and shall be responsible for compliance with City noise ordinances. All measures to mitigate noise shall be included in the prices stated on the Bid Form with no additional or separate payment by the City.

C. Dust Prevention

Contractor shall use water to prevent abnormal dust conditions due to construction operations, as deemed necessary by Engineer. Contractor will be allowed to draw water from the City only after

obtaining a hydrant meter from the City and an inspection of a proper backflow device or “air-gap” filling pipe. Contractor shall keep down dust from construction activity to the maximum extent possible. Contractor shall clean all existing streets, curbs, gutters, and sidewalks affected by the project at the end of each working day.

D. Sidewalks and Curbs

The Contractor shall take the appropriate measures to protect City property from becoming damaged, including sidewalks and curbs. During the course of the project, if the Contractor damages any public or private property, the Contractor shall repair or replace it at the Contractor’s expense.

E. Fencing and Pedestrian Traffic

The site shall be completely enclosed with orange mesh barrier fencing and signs shall be posted to direct pedestrian traffic around the Work area in accordance with City and County ordinances.

F. Well Security

The Contractor shall provide at all times during well construction suitable means of protecting the well bore and casing assemblies, when installed, from the entrance of foreign objects.

1.11 PERMIT REQUIREMENTS

A. The Contractor shall comply with the terms and conditions of all appropriate licenses or permits as outlined in SECTION 01160 – CODES AND PERMITS.

1.12 PRESERVATION, RESTORATION, AND CLEANUP

A. Preservation and Cleanup

At all times during the Work, keep the premises clean and orderly, and upon completion of the Work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind. Refer to SECTION 01740 – PRESERVATION AND CLEANUP for project preservation and cleanup requirements.

B. Erosion and Sediment Control

The Contractor shall exercise care and diligence to limit damage caused by erosion and sediment loosened by the Contractor’s operation and shall take all precautions necessary to sustain adjacent properties. Refer to SECTION 02300 – EARTHWORK for erosion control requirements.

C. Discharge of Water

Discharge of any water, shall be at a location delineated by the City. Water discharged at pump startup shall be monitored in accordance with SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP. All chlorinated water shall be completely de-chlorinated prior to disposal.

1.13 INSPECTION AND TESTING

A. The Contractor shall not cover, or allow to be covered, any of the Work installed under this Contract before it has been inspected and approved by the Engineer. Should any of the Work be covered prior to such approval, the Engineer shall have the authority to require the Work to be uncovered for inspection and approval, recovered, and all resultant damage repaired, at the Contractor’s expense.

1. The City will employ, and pay for services of an independent material testing laboratory.
2. The laboratory will perform inspections, tests, and other services specified in individual Specification sections and as required by the Engineer.
3. Reports will be submitted by the laboratory to the Engineer, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
4. The Contractor shall cooperate with the laboratory; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - a. The Contractor shall notify Engineer and the laboratory 48-hours prior to requiring services.
 - b. The Contractor shall make arrangements with the laboratory and pay for any additional samples and tests required for Contractor’s use.
5. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by the same laboratory on instructions by the Engineer. Payment for re-testing or re-inspection will be the responsibility of the Contractor.

PART 2 – MATERIALS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Summary of Work. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 01160 - CODES AND PERMITS

PART 1 - GENERAL

1.01 SCOPE

- A. This Section describes: (1) the applicable codes and standards by which all Work is governed except where more stringent and/or expensive requirements are specified or shown in the Contract Documents; (2) the permits relating to this project for which the City either has obtained or will obtain and pay the associated fees; and (3) the permits which the Contractor shall obtain and for which the City shall pay the associated fees directly to the permitting agency. All other permits and fees are the responsibility of the Contractor, some of which are listed in this Section.
- B. The Contractor shall confirm that any outside agency information that has been attached, has not been modified prior to the bid date. If it has been modified, the Contractor shall incorporate these permit modifications and obligations into the Work.
- C. Specific reference in the Specifications to codes and regulations or requirements of regulatory agencies shall mean the latest printed edition of each adopted by the regulatory agency in effect at the time of the opening or submittal of bids, except as may be otherwise specifically stated in the Contract Documents.
- D. Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a change order detailing and specifying the required Work shall be submitted to and approved by City before proceeding with the Work.
- E. Where no requirements are identified on Drawings or in Specifications, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.
- F. If any of these laws and standards should conflict with any of the Specifications contained herein, the Contractor shall notify the Engineer in writing and the Engineer shall resolve the conflict.

1.02 RELATED WORK

- A. SECTION 01100 – SUMMARY OF WORK

1.03 APPLICABLE LAWS, CODES, ORDINANCES, AND REGULATIONS

A. During prosecution of Work to be done under the Contract Documents, Contractor shall comply with the applicable laws, ordinances, rules, and regulations, including, but not limited to, the following:

1. Federal

- a. 29 CFR, Section 1910.1001, Asbestos
- b. 40 CFR, Subpart M, National Emission Standards for Asbestos
- c. Clean Water Act
- d. Federal Endangered Species Act

2. State of California

- a. California Department of Public Health, CDPH
- b. California Department of Transportation, CALTRANS
- c. California Endangered Species Act
- d. California Environmental Quality Act
- e. Office of the State Fire Marshall
- f. Department of Fish and Game
- g. Office of Statewide Health Planning and Development
- h. State and Consumer Services Agency
- i. Cal/OSHA
- j. California Building Code
- k. California Fire Code
- l. California Electrical Code
- m. California Mechanical Code
- n. California Plumbing Code
- o. California Labor Code
- p. California Civic Code
- q. California Government Code
- r. California Code of Civil Procedure
- s. California Public Resources Code
- t. California Water Code
- u. California Health and Safety Code
- v. California Public Contract Code
- w. California Code of Regulations, Titles 5, 8, 19, 21, 22, 24, and 25

3. Local Agencies

- a. City of Morgan Hill Municipal Code
- b. Santa Clara County Standard Engineering Specifications
- c. Santa Clara County Fire Department
- d. Santa Clara County Department of Environmental Health
- e. City of Morgan Hill Public Works

B. References on Drawings or in Specifications to “code” or “building code” not otherwise identified shall mean the codes specified in this Section, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction.

1.04 OUTLINE AND PURCHASE OF APPLICABLE PERMITS

A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these Specifications. Codes, laws, ordinances, rules and regulations are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements. The Contractor shall comply with the terms and conditions of all appropriate licenses or permits.

B. The Contractor shall supply the Engineer with a list of all permits and licenses that the Contractor is required to obtain and the expected date of receipt of the permit from the authorizing agency. Permits and licenses to be obtained by the Contractor shall include but are not limited to the following:

1. Electrical Service Application

The Contractor shall complete and submit all necessary applications for Building Permit (electrical service) at the site. The City shall be responsible for paying all fees for electrical service.

2. Encroachment Permit

The Contractor shall secure City of Morgan Hill encroachment permit(s) for the connection to existing storm, sewer, drainage and water supply facilities and contract Work construction in the public right-of-way. City will waive the fee.

3. Stormwater Discharge (NPDES) Permit

The Contractor shall secure the National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity, including the required Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices.

PART 2 – MATERIALS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Codes and Permits. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 01200 – MOBILIZATION

Bid Item No. A-1, B-1, C-1, D-1, E-1

PART 1 – GENERAL

1.01 SCOPE

- A. This section covers mobilization which shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all offices, buildings, sanitation and other facilities necessary for work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items at the project site, complete.

PART 2 – MATERIALS (Not used)

PART 3 – EXECUTION (Not used)

3.01 MOBILIZATION

- A. Location of sanitary facilities, storage areas, parking areas and other Contractor installations shall be subject to the prior approval of the Engineer. The following principle items shall be included in the Contractor's mobilization.
1. The Contractor shall move all of the necessary plant and equipment that will be required for the first month of operation onto the job site.
 2. The Contractor shall provide any needed temporary construction power and lighting facilities.
 3. The Contractor shall comply with all fire protection requirements.
 4. The Contractor shall provide on-site sanitary facilities.
 5. The Contractor shall obtain all necessary permits. See SECTION 01330 – PROJECT RECORDS AND SUBMITTALS for additional requirements.
 6. The Contractor shall comply with all OSHA required notices and establish safety programs.
 7. The Contractor shall comply with all required CEQA mitigation measures. The Contractor

shall note that the noise mitigation requirements must be in-place prior to any other work taking place on-site.

8. The Contractor shall have the construction superintendent on the job site full time.

PART 4 – MEASUREMENT AND PAYMENT

- A.** When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization, is 5-percent or more of the original contract amount, 50-percent of the contract item price for mobilization shall be included in said estimate for payment.
- B.** When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization is 50-percent or more of the original contract amount, the total amount earned for mobilization shall be 100-percent of the contract item price for mobilization and said amount shall be included in said estimate for payment.
- C.** The contract lump sum price paid for mobilization shall include full compensation for furnishing all labor, material, tools, equipment, and incidentals for doing all the work involved in mobilization as specified herein.
- D.** No adjustment shall be made what-so-ever to the original lump sum item price of mobilization. If other contract items are adjusted, and if the costs applicable to such item work include mobilization cost, such mobilization will be deemed to have been recovered by the payments made for mobilization, and will be excluded from consideration in determining compensation.
- E.** The retention provisions contained in this contract shall apply to the lump sum item price of mobilization.

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below and shall be no more than five percent (5%) of the Bid Total:

Bid Item No. A-1 – MOBILIZATION (BOYS RANCH #2A)

Bid Item No. B-1 – MOBILIZATION (JACKSON #3)

Bid Item No. C-1 – MOBILIZATION (BOYS RANCH #2)

Bid Item No. D-1 – MOBILIZATION (BOYS RANCH #3)

Bid Item No. E-1 – MOBILIZATION (JACKSON #1)

-END OF SECTION-

SECTION 01330 - PROJECT RECORDS AND SUBMITTALS

Bid Item No. A-2, B-2

PART 1 - GENERAL

1.01 SCOPE

- A. This Section specifies the general methods, requirements and procedures of Contractor submissions applicable to Shop Drawings, Product Data, Samples, Calculations, Mock Ups, Construction Photographs, Construction or Submittal Schedules, Schedule of Values, and other documentation required for material approval to be submitted by the Contractor during the project and following completion of the work. Detailed submittal requirements are specified in the technical provisions in this section.

PART 2 - MATERIALS (Not Used)

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITIES

A. Submittal Review

Review Shop Drawings, product data and samples, including those by Subcontractors, prior to submission to determine and verify the following:

1. Field measurements
2. Field construction criteria
3. Catalog numbers and similar data
4. Conformance with related Sections

B. Certification Statement

Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor:

"Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved Shop Drawings and all Contract requirements."

Shop Drawings and product data sheets 11-inch x 17-inch and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project representative a copy of each transmittal sheet for Shop Drawings, product data and samples at the time of submittal to the Engineer.

C. Numbering System

The Contractor shall utilize an 8-character submittal identification numbering system in the following manner:

1. The first five digits shall be the applicable specification section number.
2. The next two digits shall be the numbers 01 to 99 to sequentially number each initial separate item or drawing submitted under each specific Section Number.
3. The last character shall be a letter, A to Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3rd submission, etc. A typical submittal number would be as follows:

03300-08-B

03300 = Section for Concrete

08 = The eighth initial submittal under this section

B = The second submission (first resubmission) of that particular shop drawing

D. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

E. The review and approval of Shop Drawings, samples or product data by the Engineer shall not relieve the Contractor from the responsibility for the fulfillment of the terms of the Contract. The Contractor assumes all risks of error and omission in submittals - the Engineer will have no responsibility for Contractor mistakes.

F. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or onsite construction accomplished which does not conform to approved Shop Drawings and data shall be at the Contractor's risk. The City will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

3.02 SUBMITTAL REQUIREMENTS

A. Submittals shall be delivered promptly in accordance with approved schedule and in such sequence as to cause no delay in the work or in the work of any other Contractor. Contractor shall submit all submittals to Engineer. Submittals shall include:

1. The date of submission and the dates of any previous submissions.
2. The Project title and number.
3. Contractor identification.
4. The names of:
 - a. Contractor
 - b. Sub-Contractor
 - c. Supplier
 - d. Manufacturer
5. Identification of the product, with the section number, page and paragraph(s). Where catalog or cut sheets contain more than one model or option(s) for the product, the specific model or option(s) proposed shall be highlighted, circled, or otherwise clearly indicated within the submittal.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM, AWWA or Federal Standards numbers.
9. Identification by colored highlighting of deviations from Contract Documents.
10. Identification by colored highlighting of revisions on resubmittals.
11. A 5-inch x 3-inch blank space for Engineer review stamp.
12. Where calculations are required to be submitted by the Contractor, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.

B. At least ten (10) working days prior to the need for approval, the Contractor shall forward to the

Engineer, for approval, all submittals required by the individual sections of the specifications. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the work. Unless a different number is called for by an individual section, six (6) copies of each shop drawing, material description, and specification literature and three (3) specimens of each sample are required, all of which will be retained or distributed by the Engineer. If the Contractor requires more than two copies returned, the Contractor shall submit any additional number of shop drawings and literature, in addition to the above requirements. Contractor shall number each type of material separately and identify the use of each material. All submittals shall be clearly identified by reference to Section Number, Paragraph, Drawing Number or Detail as applicable. Submittals shall be clear and legible and of sufficient size for presentation of data.

- C. All submittals shall be transmitted to the Engineer by mail or in person with the letter of transmittal included in these documents. The Engineer will return all reviewed submittals to the Contractor within ten (10) working days.
- D. Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness, and compliance with contract requirements, and shall indicate approval thereon as evidence of such coordination and review.
- E. Submittals shall be delivered promptly in accordance with approved schedule and in such sequence as to cause no delay in the Work or in the Work of any other Contractor. Contractor shall submit all submittals to Engineer. Submittals shall include:

F. Supervisory Personnel

Within seven (7) calendar days after receiving the Notice to Proceed and before any work has begun, the Contractor shall submit four (4) copies of a list of supervisory personnel who will be responsible for the performance of the Contract. The Contractor shall designate one (1) person who will have full decision-making authority to represent the Contractor on a daily basis at the project site. The list shall include phone numbers where the Engineer may reach the Contractor's personnel.

G. Shop Drawings

The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the Contract.

- 1. Shop drawings as specified in individual Sections include, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports

including performance curves and certifications, as applicable to the work.

2. All shop drawings submitted by subcontractors and vendors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
3. The Contractor shall check all subcontractors' and vendors' shop drawings regarding measurements, size of members, materials and details to make sure that they conform to the intent of the Drawings and related Sections. Return shop drawings found to be inaccurate or otherwise in error to the subcontractors for correction before submission thereof.
4. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.

H. Product Data

Product data as specified in individual Sections include, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the work.

I. Certificates

When called for in individual sections, the Contractor must furnish certificates from manufacturers, suppliers, or others certifying that materials or equipment being furnished under the Contract comply with the requirements of these specifications. Certificates of compliance shall conform to the provisions in Section 6-1.07 "Certificates of Compliance" of the CALTRANS Standard Specifications and these special provisions. Certificates of compliance from the Contractor, suppliers, and/or manufacturers, shall clearly indicate that the material to be delivered to the jobsite will meet all requirements of the specifications. A certificate of compliance shall include, but not be limited to the project title, delivery location, date (or approximate date) of delivery, name of the material with appropriate classification or model numbers, quantity, name of the manufacturer, statement of compliance with all requirements of the specifications, and certifier's name, title and signature. In addition, a factory or mill certification (laboratory test report), if required by the specifications, shall be submitted with certificate of compliance. The factory or mill shall not substitute the certificate of compliance, unless it contains all information required for a certificate of compliance as described above.

Insufficient, incomplete, or unclear certificates shall be rejected and shall be resubmitted. The Contractor shall be responsible for all delays caused by the re-submittals.

J. Samples

Samples specified in individual Sections include, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Engineer or City for independent inspection and testing, as applicable to the work.

3.03 ENGINEER'S APPROVAL

A. The Engineer will indicate approval or disapproval of each submittal, and the reasons for disapproval.

1. If no corrections are required, the copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately on incorporating the material and equipment covered by the submittal into the project.
2. If limited corrections are required, the copies will be returned marked "MAKE CORRECTIONS NOTED." Work may begin immediately on incorporating the material and equipment covered by the corrected submittal into the project.
3. If insufficient or incorrect data has been submitted, the copies will be returned marked "AMEND & RESUBMIT." No work incorporating the material and equipment covered by this submittal into the project may begin until the submittal has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
4. If the submittal is unacceptable, the copies will be returned marked "REJECTED" No work incorporating the material and equipment covered by this submittal into the project may begin until a new submittal has been made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
5. The Contractor shall not change any drawing after it has been marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED", or change any approved equipment or material without written permission of the Engineer.
6. Resubmittals will be handled in the same manner as first submittals. The Contractor shall identify all revisions made to the original submittals in the resubmittal, either in writing on the letter of transmittal or on the shop drawings by the use of color highlighting, and by use

of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Engineer on the previous submission. Additionally, the Contractor shall direct specific attention to any revisions made other than the corrections requested by the Engineer on previous submissions.

7. If more than two (2) submittals for a single item are required because of incorrect or insufficient data, or the submittal is unacceptable, or because the Contractor wishes to change previously approved material, then all costs incurred by the Engineer for the additional review shall be deducted from monies due the Contractor.
8. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
9. Approval by the Engineer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this Contract. At the time of submission, the Contractor shall provide on the submittal coversheet specific written notice of all variations, if any, that the submittal may have from the Contract Documents and the reasons therefore. In addition, the Contractor shall provide a specific notation on each item submitted for the Engineer's review and approval of each variation. All such variations must be approved by the Engineer.

3.04 NOTIFICATIONS

- A. The Contractor shall notify the Engineer at least two (2) working days prior to commencement of the construction in writing and shall give the Engineer at least one (1) working day notice when inspections are required.
- B. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven (7) working days prior to release for manufacture.

3.05 OPERATION AND MAINTENANCE RECORDS

- A. The Contractor shall provide, prior to acceptance of all work, all records as herein specified and as specified in the individual sections of the contract documents. The Contractor shall provide technical operation and maintenance instructions for all portions of work. Six (6) sets of all records shall be furnished to the Engineer for review, approval and distribution to the interested parties.

- B.** All submitted records shall be contained in a manual or manuals consisting of 8-1/2-inch x 11-inch hardback 3-ring binders. Included in each manual shall be catalog data on each item, together with parts lists, description of operation, maintenance information, shop drawings, wiring and riser diagrams, along with all test data. Catalogs and data in the manual shall be neat, clean copies. Drawings shall be accordion folded to 8-1/2-inch x 11-inch and installed in an envelope within the manual. An index shall be provided, which shall list all contents in an orderly manner, with the respective equipment suppliers' name, address and telephone number. The manufacturer's recommended servicing instructions shall also be included. Diagrams shall be complete for each system installed. Provide divider sheets with identifying tabs between each category. Final payment shall be withheld until the technical and operation records are received and accepted by the Engineer.

3.06 AS-BUILT DRAWINGS

- A.** The Contractor shall maintain a separate, neat, and legible set of construction drawings showing as-built conditions of all constructed facilities as specified herein. Changes shall be shown to scale in red on the appropriate Drawings. The locations of installed underground and hidden utilities will be shown and dimensioned to appropriate reference points. No work shall be permanently concealed until the required information has been recorded. Relevant change orders shall be noted on the Drawings by number and date.
- B.** Where the Drawings are not of sufficient size, scale, or detail, the Contractor's own drawings shall be submitted for incorporation of details and dimension. In such cases, the Contractor shall provide a reproducible set of drawings, suitability cross referenced to the Contract Drawings.
- C.** The As-Built drawings shall be maintained at least weekly. Prior to any progress payments, the Engineer shall review the status of the as-built construction drawings. The Engineer shall withhold approval of progress payments until the as-built drawings are up to date.
- D.** Upon completion of the Contract, the Contractor shall furnish two (2) satisfactory sets of As-Built construction drawings prior to or simultaneously with the Contractor's request for final payment. The Contractor shall certify that the As-Built drawings show the existing conditions correctly. Final payment shall be withheld until the As-Built construction drawings are received and approved by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below and shall be no more than one percent (1%) of the Bid Total:

**Bid Item No. A-2 – PROJECT RECORDS AND SUBMITTALS (BOYS RANCH
#2A)**

Bid Item No. B-2 – PROJECT RECORDS AND SUBMITTALS (JACKSON #3)

-END OF SECTION-

SECTION 01420 – REFERENCE STANDARDS, DEFINITIONS AND ABBREVIATIONS

PART 1 – GENERAL

1.01 REFERENCE STANDARDS

- A.** The Contract Documents contain references to various standard specifications, code practices, and requirements for materials, work quality, installation, inspections, and tests, which are published and issued by various organizations, societies, and associations. Such references are hereby made a part of the Contract Documents to the extent required.
- B.** When such references are specified, and the effective dates are not given, it shall be understood that the current edition or latest revision thereof and any amendments or supplements in effect on the date that the work is advertised for Bids shall govern the work.
- C.** Reference standards are not furnished with the Contract Documents since the Contractor, subcontractors, manufacturers, and the trades involved are assumed to be familiar with their requirements. The Engineer will furnish, upon request, information as to how copies of specified standards may be obtained.

1.02 INTERPRETATION OF SPECIFICATIONS AND DRAWINGS

- A.** The Special Provisions, Description of Work, Construction Details, Drawings, Shop Drawings, Contract Change Orders, and all other supplementary documents are essential parts of the Contract Documents, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for complete work. In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:
 - 1. Environmental Permits (CEQA, EIR, etc.) or permits from other agencies as may be required by law.
 - 2. Addenda, Supplemental Agreements and Change Orders (with those of later date having preference over those of earlier date.
 - 3. The Contract Agreement
 - 4. Contractor's Bid (Bid Form)
 - 5. Special Provisions

6. General Requirements
7. Supplementary General Conditions
8. Invitation to Bid
9. Instructions to Bidders
10. Technical Specifications (All Divisions)
11. Shop Drawings
12. Drawings

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail or Shop Drawings govern over General Drawings.
3. General Drawings govern over standard drawings.
4. Addenda/Change Order Drawings govern over any other Drawings
5. Technical Specifications shall govern over Drawings, except where items are shown on the Drawings are not specifically included in the Specifications, then the Drawings shall govern.

C. The provisions of the Contract Documents shall take precedence over any Laws or Regulations applicable to the performance of the work unless such an interpretation of the provisions of the Contract Documents would result in a violation of such Law or Regulation.

D. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence. Where Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, Drawings and Specifications shall take precedence so long as such increase is legal.

E. Should it appear that the work to be done or any of the matters relative to the project are not sufficiently detailed or explained in the Contract Documents, the Bidder or Contractor shall apply in writing to the Engineer for further explanations as may be necessary.

1.03 LAWS, CODES AND REGULATIONS

- A. All materials, installation, and construction shall comply with the applicable provisions of current laws, safety rules and regulations of the City of Morgan Hill, County of Santa Clara, the State of California, the Federal Government, and any other applicable authority. In this connection, the Contractor's special attention is directed to the following:

ACI	-	American Concrete Institute
AISC	-	American Institute of Steel Construction
ASTM	-	American Society for Testing and Materials
AWWA	-	American Water Works Association
CEQA	-	California Environmental Quality Act
EPA	-	Environmental Protection Agency
NFPA	-	National Fire Protection Association
NEC	-	National Electric Code
OSHA	-	Occupational Safety and Health Administration
RCRA	-	Resource Conservation and Recovery Act
UBC	-	Uniform Building Code
UFC	-	Uniform Fire Code
UMC	-	Uniform Mechanical Code
UPC	-	Uniform Plumbing Code

- B. Whenever reference is made to "CALTRANS Standard Specifications" it shall be understood to be the most recent addition of the State of California, Department of Transportation, Standard Specifications.
- C. If any of these laws and standards should conflict with any of the Specifications contained herein, the Contractor shall notify the Engineer in writing and the Engineer shall resolve the conflict.

1.04 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The Contractor shall comply with all EPA, OSHA, RCRA, NFPA, CAL-EPA and any other Federal, State, County, City, and other local regulations governing the storage and conveyance of hazardous materials, including petroleum products, for all work included in the Contract Documents.

1.05 DEFINITIONS

- A. Unless otherwise stated, the words directed, required, permitted, ordered, instructed, designated, applicable, appropriate, sufficient, proper, desirable, necessary, prescribed, approved, acceptable, satisfactory or words of like import, refer to actions, expressions, and prerogatives of the City or Engineer.
- B. Singular words include the plural and "person" includes firms, companies, and corporations.
- C. Where used in the Contract Documents, the following words and terms shall have the meanings indicated. The meanings shall be applicable to the singular and plural of the words and terms.

Acceptance – The formal written acceptance by the Owner of an entire work which has been completed in all respects in accordance with the Contract Documents and any modifications thereof previously approved.

Act of God – An earthquake, flood, cyclone, or other cataclysmic phenomenon of nature. A rain, windstorm, high water, or other natural phenomenon, which might reasonably have been anticipated from historical records of the general locality of the work, shall not be construed as an Act of God. This definition includes the definition of act of God set forth in Section 7105 of the Public Contract Code, where applicable.

Addenda – Written or graphic instruments, issued prior to the bid, which modify or interpret the Contract Documents, Drawings, and Specifications, by additions, deletions, clarifications, or corrections.

Agreement – The written contract between the Owner and the Contractor covering the work to be performed; other documents are attached to the agreement and made a part thereof, as provided therein.

Asbestos – Any material that contains more than one-tenth of one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration. Asbestos means fibrous forms of various hydrated minerals, including chrysolite (fibrous serpentine), crocidolite (fibrous riebeckite), amosite (fibrous cummingtonite-grunerite), fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.

Bid – The offer or proposal of the Bidder, submitted on the prescribed forms, setting forth the price or prices for the work.

Bidder – Any properly licensed and qualified individual, firm, partnership, corporation, joint venture, or combination thereof, submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

Bond(s) – Bid, Performance, or Payment Bonds and other instruments of surety, furnished by the Contractor and Contractor's surety in accordance with the Contract Documents.

Calendar Day – Any day of 24-hours, measured from midnight to the next midnight, including legal holidays, Saturdays and Sundays.

City – City of Morgan Hill

Complete-In-Place – All items listed within these Specifications as "Complete in Place" shall include furnishing all labor, equipment and materials not specified as furnished by the Owner. The unit price bid shall include, but not be limited to, excavation and backfill, hauling of material, furnishing of thrust blocks, repair of pavement, restoration of structures, and all other work as may be required to complete the installation.

Contract Change Order – A written order to the Contractor, recommended by the Owner, Engineer, or District and signed by the Contractor, Owner and the District, issued on or after the date of the agreement, which authorizes an addition, a deletion or a revision in the work, and which establishes the basis for an adjustment in the Contract Price or the Contract Time for the work affected by the changes.

Contract Documents – The words "Contract Documents" shall mean any or all of, but not limited to, the following items, as applicable:

- Notice Inviting Bids
- Bid Proposal Forms
- Contract Documents
- Special Provisions
- Standard Specifications
- Technical Specifications
- Drawings
- Addenda, if any
- Executed Change Orders, if any
- Notice of Award
- Notice to Proceed

Each of these items is to be considered by reference as part of the Contract Documents, also referred to as Contract.

Contract Price – The amount payable to the Contractor under the terms and conditions of the Contract based on the price given on the bidding schedule, with adjustments made in accordance with the Contract. The base amount given in the bidding schedule shall be either a lump sum bid or the summation of the unit price bids multiplied by the estimated quantities set forth in the bid form. Also referred to as Contract Amount or Contract Sum.

Contract Time – Number of calendar days stated in the Contract for the completion of the work.

Contract Completion Date - The date on which the Owner accepts the work as being complete.

Contractor – The individual, partnership, corporation, joint-venture, or other legal entity with whom the Owner has executed the agreement.

Contractor's Plant and Equipment – Equipment, material, supplies, and all other items, except labor, brought onto the site by the Contractor to carry out the work, but not to be incorporated in the work.

Day(s) – Calendar Day(s).

Defective Work – Work that is unsatisfactory, faulty or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or any work that has been damaged prior to final payment.

Design Engineer – Refers to the Engineer, architect, or other entity responsible for developing and certifying the Contract Documents associated with the work.

Direction – Action of the Owner or District by which the Contractor is ordered to perform or refrain from performing work under the Contract.

District – Santa Clara Valley Water District.

Drawings – Refers to the Contract Drawings, profiles, cross sections, elevations, details, and other working Drawings and supplementary Drawings, or reproductions thereof, signed by the Designer, approved by the Owner, and are referred to in the Contract Documents, which show the location, character, dimensions, and details of the work to be performed. The terms drawing, plan and plans have the same meaning as the term Drawings unless otherwise stated or specified. Shop Drawings are not Drawings as defined herein.

Engineer – The Engineer, architect, or scientist designated by the Owner to have design control

over the work, or a specified portion of the work, acting through the Owner.

Field Order – A written instruction, given to the Contractor, authorizing work that is a change of the scope of work carried out on a time and material basis.

Float – Float or "total float" shall be defined as provided in the Associated General Contractors of America book "CPM in Construction, A Manual for General Contractors."

Furnish – To deliver to the job site or other specified location any item, equipment, or material.

General Conditions – Part of the Contract Documents representing the general clauses that establishes how the project is to be administered.

General Requirements – Division 1 of the Technical Specifications.

Hazardous Waste – The term Hazardous Waste shall have the meaning provided in California Health and Safety Code Section 25117, as last amended.

Holidays – Legal holidays designated by the Owner or specifically identified in the Contract.

Install – Placing, erecting, or constructing any item, equipment, or material.

Laboratory – The designated materials testing laboratory authorized by the Owner or District to test materials and work involved in the Contract.

Liquidated Damages – The amount prescribed in the Contract Documents, to be paid to the Owner or to be deducted from any payments due or to become due the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the Specifications.

Milestone – A principal event specified in the Contract Documents relating to an intermediate completion date of a separately identifiable part of the work or a period of time within which the separately identifiable part of the work should be performed prior to Substantial Completion of the work.

Notice of Award – A written notice by the Owner to the Contractor informing it that the Contract has been awarded to the Contractor .

Notice to Proceed – The written notice by the Owner to the Contractor authorizing the Contractor to proceed with the work and establishing the date of commencement of the work.

Owner – City of Morgan Hill

Owner’s Representative – The person designated in writing by the Owner to act as its agent on specified matters relating to this Contract. The Owner’s Representative may or may not be the District.

Paragraph – For references or citation purposes, refers to the paragraph(s), called out by paragraph number and alphanumeric designator.

Partial Utilization – Placing a portion of the work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion of all the work.

Person – Includes firms, companies, corporations, partnerships, and joint ventures.

Project – The undertaking to be performed under the provisions of the Contract.

Provide – Furnish and install, complete in place.

Punch List – List of incomplete items of work and of items of work which are not in conformance with the Contract.

Resident Engineer – Authorized representative of the District who is assigned to the site or any part thereof.

Shall – Refers to actions or omissions which are obligations of either the Contractor or the Owner under the Contract Documents.

Shop Drawings – All Drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the Contractor and submitted by the Contractor to illustrate some portion of the work, and all illustrations, brochures, schedules, performance charts, instructions, and diagrams to illustrate material or equipment for some portion of the work.

Shown – Refers to information presented on the Drawings or in the Specifications, with or without reference to the Drawings or the Specifications.

Site – The property as described in the General Conditions or as shown on the Drawings.

Specifications – That part of the Contract Documents consisting of the Invitation to Bid, the Instructions to Bidders, the Bid, General Conditions, Supplementary Conditions, General Requirements, applicable State Standard Specifications, and Technical Specifications.

Specify – Refers to information described, shown, noted or presented in any manner in any part of the Contract.

State of California Specifications – The State of California Department of Transportation Standard Specifications in effect at the time of advertising the work. Also referred to as State Standard Specifications and CALTRANS Standard Specifications.

Subcontractor – A subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the work at the Site. The term subcontractor means a subcontractor or subcontractor's authorized representative. The term subcontractor does not include any separate Contractor or any separate Contractor's subcontractors.

Submittals – The information which is specified for submission to the District in accordance with the Contract Documents

Substantial Completion – Substantial Completion is the stage in the progress of the work when the work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the work for its intended use. Substantial Completion of the entire work shall mean that as a minimum all of the work has been completed except for those items identified in the Special Conditions.

Sub-subcontractor – A sub-subcontractor is a person or entity who has a direct or indirect contract with a subcontractor to perform any of the work at the Site. The term sub-subcontractor means a sub-subcontractor or an authorized representative thereof.

Supplier – Any person, firm, corporation, or organization who supplies materials or equipment for the work, including that fabricated to a special design, and may also be a Subcontractor or a Sub-subcontractor.

Surety – The person, firm, corporation, or organization that joins with the Contractor in assuming the liability for the faithful performance of the work and for the payment of all obligations pertaining to the work in accordance with the Contract Documents by issuing the Bonds required by the Contract Documents or by law.

Technical Specifications – Division 1 and subsequent sections of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the work.

Trench Prism – The term "Trench Prism" shall mean the area from bottom of pipe to ground surface the width of the minimum design trench.

Will – Same as Shall.

Work – The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.06 ABBREVIATIONS

A. Whenever the following abbreviations are used in these Specifications, the intent and meaning shall be interpreted as follows:

AA	-	Aluminum Association
AAMA	-	Architectural Aluminum Manufacturer's Association
AAR	-	Association of American Railroads
AASHTO	-	American Association of State Highway and Transportation Officials
AATCC	-	American Association of Textile Chemists and Colorists
ACI	-	American Concrete Institute
AFBMA	-	Anti-Friction Bearing Manufacturer's Association, Inc.
AFPA	-	American Forest Products Association
AGA	-	American Gas Association
AGMA	-	American Gear Manufacturers Association
AHA	-	American Hardboard Association
AHAM	-	Association of Home Appliance Manufacturers
AI	-	The Asphalt Institute
AIA	-	American Institute of Architects
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
AITC	-	American Institute of Timber Construction
AMCA	-	Air Moving and Conditioning Association
ANS	-	American Nuclear Society
ANSI	-	American National Standards Institute, Inc.
APA	-	American Plywood Association or American Parquet Association, Inc.
API	-	American Petroleum Institute
APWA	-	American Public Works Association
ARI	-	Air-Conditioning and Refrigeration Institute
ASA	-	Acoustical Society of America
ASAE	-	American Society of Agricultural Engineers
ASCE	-	American Society of Civil Engineers
ASHRAE	-	American Society of Heating, Refrigerating, and Air Conditioning

Engineers

ASLE	-	American Society of Lubricating Engineers
ASME	-	American Society of Mechanical Engineers
ASNT	-	American Society of Nondestructive Testing
ASQC	-	American Society for Quality Control
ASSE	-	American Society of Sanitary Engineers
ASTM	-	American Society for Testing and Materials
AWCI	-	American Wire Cloth Institute
AWPA	-	American Wood Preservers Association
AWPI	-	American Wood Preservers Institute
AWS	-	American Welding Society
AWWA	-	American Water Works Association
BBC	-	Basic Building Code, Building Officials and Code Administrators International
BHMA	-	Builders Hardware Manufacturer's Association
CABO	-	Council of American Building Officials
CBM	-	Certified Ballast Manufacturers
CDA	-	Copper Development Association
CEMA	-	Conveyor Equipment Manufacturer's Association
CGA	-	Compressed Gas Association
CLPCA	-	California Lathing and Plastering Contractors Association
CLFMI	-	Chain Link Fence Manufacturer's Institute
CMA	-	Concrete Masonry Association
CRSI	-	Concrete Reinforcing Steel Institute
DCDMA	-	Diamond Core Drill Manufacturer's Association
DHI	-	Door and Hardware Institute
DIPRA	-	Ductile Iron Pipe Research Association
EIA	-	Electronic Industries Association
ETL	-	Electrical Test Laboratories
EPA	-	Environmental Protection Agency
FCC	-	Federal Communications Commission
FCI	-	Fluid Controls Institute
FM	-	Factory Mutual System
FPL	-	Forest Products Laboratory
HI	-	Hydronics Institute
HPMA	-	Hardwood Plywood Manufacturers Association
IAPMO	-	International Association of Plumbing and Mechanical Officials
ICBO	-	International Conference of Building Officials
IEEE	-	Institute of Electrical and Electronics Engineers
IES	-	Illuminating Engineering Society
IME	-	Institute of Makers of Explosives
IP	-	Institute of Petroleum (London)

IPC	-	Institute of Printed Circuits
IPCEA	-	Insulated Power Cable Engineers Association
ISDSI	-	Insulated Steel Door Systems Institute
ISA	-	Instrument Society of America
ISEA	-	Industrial Safety Equipment Association
ISO	-	International Organization for Standardization
ITE	-	Institute of Traffic Engineers
MBMA	-	Metal Building Manufacturer's Association
MIL	-	Military Standards (DoD)
MPTA	-	Mechanical Power Transmission Association
MSS	-	Manufacturers Standardization Society
MTI	-	Marine Testing Institute
NAAMM	-	National Association of Architectural Metal Manufacturer's
NACE	-	National Association of Corrosion Engineers
NAGDM	-	National Association of Garage Door Manufacturers
NB	-	Boiler and Pressure Vessel Inspectors (alternate NBBPVI)
NBS	-	National Bureau of Standards (Now NIST)
NCCLS	-	National Committee for Clinical Laboratory Standards
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturer's Association
NETA	-	International Electrical Testing Association
NFPA	-	National Fire Protection Association, or National Fluid Power Association
NFPA	-	National Forest Products Association
NISO	-	National Information Standards Organization
NLGI	-	National Lubricating Grease Institute
NMA	-	National Microfilm Association
NRCA	-	National Roofing Contractors Association
NSF	-	National Sanitation Foundation
NWMA	-	National Woodwork Manufacturers Association
NWWDA	-	National Wood Window and Door Association
OSHA	-	Occupational Safety and Health Administration
PCA	-	Portland Cement Association
PPI	-	Plastics Pipe Institute
RCRA	-	Resource Conservation and Recovery Act
RIS	-	Redwood Inspection Service
RMA	-	Rubber Manufacturers Association
RVIA	-	Recreational Vehicle Industry Association
RWMA	-	Resistance Welder Manufacturer's Association
SAE	-	Society of Automotive Engineers
SAMA	-	Scientific Apparatus Makers Association
SDI	-	Steel Door Institute

SMA	-	Screen Manufacturers Association
SMACCNA	-	Sheet Metal and Air Conditioning Contractors National Association
SPI	-	Society of the Plastics Industry, Inc.
SPIB	-	Southern Pine Inspection Bureau
SPR	-	Simplified Practice Recommendation
SSA	-	Swedish Standards Association
SSBC	-	Southern Standard Building Code, Southern Building Code Congress
SSPC	-	Society for Protective Coating
SSPWC	-	Standard Specifications for Public Works Construction
TAPPI	-	Technical Association of the Pulp and Paper Industry
TFI	-	The Fertilizer Institute
TIA	-	Telecommunications Industries Association
TPI	-	Truss Plate Institute
UBC	-	Uniform Building Code
UPC	-	Uniform Plumbing Code
UL	-	Underwriters Laboratories, Inc.
WCLIB	-	West Coast Lumber Inspection Bureau
WCRSI	-	Western Concrete Reinforcing Steel Institute
WEF	-	Water Environment Federation
WIC	-	Woodwork Institute of California
WRI	-	Wire Reinforcement Institute, Inc.
WWPA	-	Western Wood Products Association

PART 2 – MATERIALS (Not used)

PART 3 – EXECUTION (Not used)

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Reference Standards, Definitions and Abbreviations. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 01740 - PRESERVATION AND CLEANUP

Bid Item No. A-3, B-3

PART 1 – GENERAL

1.01 SCOPE

- A.** This Section covers the work necessary to preserve, restore and cleanup the project site to its original state, when damaged either directly or indirectly by the operations incidental to the construction of the project, complete.

PART 2 – MATERIALS (Not used)

PART 3 – EXECUTION

3.01 PRESERVATION AND CLEANUP

- A.** The Contractor shall protect all existing utilities, fences, and any other improvements or existing facilities. Any damaged or destroyed improvements or existing facilities shall be replaced to a condition equal to or better than the condition which existed prior to the damage. All repairs to damaged improvements or existing facilities shall receive the approval of the Engineer or City.
- B.** Stockpile excavated materials in a manner that will cause the least damage to adjacent property, trees, shrubbery, or fences, regardless of whether these are on private property, or on state, city, or county rights-of-way. Remove all excavated materials upon completion and leave the surfaces in a condition equivalent to their original condition.
- C.** At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.
- D.** Contractor shall keep all paved roads clean and free of dust, mud, and debris resulting from the Contractor's operations. If mud or debris is tracked to any paved street the Contractor shall promptly utilize whatever means are necessary to return the pavement to a clean condition.

3.02 EXISTING TREES AND SHRUBS

- A.** The Contractor shall take all necessary precautions to not damage or remove any of the existing trees or shrubs that are to remain. Trees and shrubs that are to remain may be flagged in the field.

The Contractor shall immediately notify the Engineer if any tree or shrub is damaged by the Contractor's construction operations.

- B.** Trees or shrubs that are to remain on the site shall not be trimmed without the approval of the Engineer. If trimming is approved, then the symmetry of the tree shall be preserved, no stubs or splits or torn branches shall be left. All cuts shall be made close to the trunk or large branch. Cuts over 1-1/2- inches in diameter shall be coated with a tree paint product that is waterproof, adhesive, and elastic, and free of materials that would injure the tree.
- C.** Damaged trees or shrubs shall be replaced if in the opinion of the Engineer such replacement is necessary. The trees or shrubs shall be of like size and variety. The minimum size of any replacement tree shall not be less than 1-inch in diameter nor less than 6-feet high.

3.03 EROSION AND SEDIMENT CONTROL

A. General Requirements

Temporary erosion control shall consist of, but not be limited to, constructing such facilities and taking such measures as are necessary to prevent, control, and abate water, mud, construction materials, hazardous materials and erosion damage to public and private property as a result of the Contractor's operations.

During initial mobilization of the project the temporary erosion control features as are necessary to prevent damage during forthcoming winter season shall be constructed and functioning. If the earthwork in any area has not progressed to a point where any part of the facilities on the temporary erosion control plans for that area can be constructed, the Contractor shall construct such supplementary temporary erosion control facilities as are necessary to protect adjacent private and public property.

Conformance with the requirements of this section shall in no way relieve the Contractor from the Contractor's responsibilities, as provided in Section 7-1.01G, "Water Pollution," Section 7-1.11, "Preservation of Property," of the Caltrans Standard Specifications.

Contractor shall employ applicable best management practices to perform all work under the project contract in a safe and efficient manner and which protects the environment. The best management practices shall not be limited to the requirements set forth in this Section.

The Contractor shall maintain the temporary erosion control features throughout the duration of the project. Repairs, sediment cleanup, and disposal will be at no additional cost to the City.

Temporary erosion control measures shall include, but not be limited to, the following:

1. The Contractor shall conduct operations in such a manner that storm runoff will be contained within the site or channeled into the storm drain system which serves the runoff area. Storm runoff from one area shall not be allowed to divert to another runoff area.
2. Storm drain systems, toe of slope drains, and outlet structures shall be constructed and operating prior to commencing, or concurrently with placing an embankment. Temporary downdrains, drainage structures, and other devices shall be provided to channel storm runoff water into the respective permanent storm drain systems during construction. Mud and silt shall be settled out of the storm runoff before the runoff enters the storm drain system.
3. Embankment areas, while being brought up to grade and during periods of completion prior to final roadbed construction, shall be protected by various measures to eliminate erosion and the siltation of downstream facilities and adjacent areas. These measures may include, but shall not be limited to: temporary downdrains, either in the form of pipes or paved ditches with protected outfall areas; graded berms around areas to eliminate erosion of embankment slopes by surface runoff; confined ponding areas to de-silt runoff; and temporary check dams in toe of slope ditches to de-silt runoff.
4. Excavation areas, while being brought to grade, shall be protected from erosion and the resulting siltation of downstream facilities and adjacent areas by use of various temporary erosion control measures. These measures may include, but shall not be limited to: check dams; confined ponding areas to de-silt the runoff; and protection, such as sandbags around inlets which have not been brought up to grade.
5. Contour graded areas shall be protected against erosion and the resulting siltation of downstream facilities and adjacent areas during grading operations. Various measures may include, but shall not be limited to: the use of graded contour berms to control sheet flow; supplemental grading of large areas around temporary or unfinished inlet structures to provide de-silting basins; and temporary ditch paving.
6. During embankment construction, an earth berm or appropriate grading to direct drainage away from the edge of the top of the embankment shall be constructed and maintained on those embankments where earthwork operations are not in progress.
7. Special attention will be required to protect areas, which have been cleared, and grubbed prior to excavation or embankment operations, and which are subject to runoff. Temporary measures may include, but shall not be limited to: temporary de-silting basins; contour graded ditches; temporary paved and unpaved ditches; and filter fabric fences to contain silt and sediment from runoff.
8. After each storm, de-silting basins shall be checked against their design capacity and if necessary, silt and sediment shall be removed to restore capacity.

9. Construction vehicles and equipment entering existing paved areas shall be free of mud, silt and other debris during all phases of work. No mud, silt and other debris shall be tracked on paved surfaces. If such materials are tracked on the streets or other paved areas both public and private, the Contractor shall immediately remove these materials prior to these materials entering into the storm drain system.
10. Stockpiling of materials on the street will not be allowed unless otherwise approved by the Engineer. The Contractor shall cover with plastic any construction or excavated materials which may possibly erode and enter the storm drain system of paved streets or other paved areas both public and private. Stockpiling of dirt on paved areas will not be allowed.
11. The Contractor shall sweep the work area and clean up the work site daily before leaving the site. Hosing down the street is not allowed.

B. Inspection and Maintenance

To ensure the proper implementation and functioning of temporary erosion control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the Drawings and in. The Contractor shall identify corrective actions and time frames to address any damaged measures or reinstate any measures that have been discontinued.

Inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a predicted storm;
2. After all precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24-hour intervals during extended precipitation events; and
4. Routinely, on a minimum twice monthly basis.

If the Contractor identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected in a timely manner. If the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the Contractor will be notified in writing and the deficiencies shall be corrected by the Contractor in a timely manner.

3.04 PAVEMENT RESTORATION

- A. All paved areas that are outside of the areas to be re-paved or demolished which are damaged during construction shall be replaced with similar materials of equal thickness to match existing undamaged adjacent areas, including base and subbase. Pavements that are to be partially removed shall be neatly saw cut in straight lines to provide a clean, sound, vertical joint.

3.05 SITE RESTORATION

- A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend with abutting properties. Areas used for the deposit of waste materials shall be furnished to properly drain and blend with the surrounding terrain.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-3 – PRESERVATION AND CLEANUP (BOYS RANCH #2A)

Bid Item No. B-3 – PRESERVATION AND CLEANUP (JACKSON #3)

-END OF SECTION-

SECTION 02215 -WELL DESTRUCTION

Bid Item No. C-2 through C-5

Bid Item No. D-2 through D-6

Bid Item No. E-2 through E-7

PART 1 - GENERAL

1.01 - SCOPE OF WORK

The work to be completed as part of this project includes the destruction of Boy's Ranch wells 2 and 3, and Jackson well No. 1. The purpose of the work is to properly seal the wells to prevent vertical migration of water between the aquifers penetrated by the wells and from the ground surface. All work shall be performed in conformance with the applicable regulations of the Santa Clara Valley Water District (SCVWD) and the State of California Department of Water Resources.

Summary of Wells and Work to be Performed

Each well shall be destroyed in according to all applicable local and state regulations. The work generally includes:

- Removal and disposal of pumping equipment (if equipped)
- Preparing well for video inspection
- Performing video inspection
- Submission of final destruction plan and permits to SCVWD
- Destruction of well pedestal (if required)
- Perforation of well casing
- Placement of sealing material in well
- Disposal of fluid displaced from the well destruction process.
- Site Cleanup
- Submission of Well Completion Report and Records

Boys Ranch Well No. 2 is located next to the pump station building. The pumping equipment shall be removed by Contractor. The pedestal shall be left in place. The well casing shall be perforated from 102 to 160 feet bgs and filled with 11 sack sand/cement grout. The sand cement grout shall be brought up to the top of the well pedestal, finished and made ready for use by the City.

Boys Ranch Well No. 3 is located adjacent to the pump station building. The pumping equipment has been removed from the well. The Well is located directly under the discharge piping from Well No. 3A. The discharge piping is equipped with a removable spool above the pedestal, see detail on sheet C-1B in the plans. The Contractor shall remove the spool prior to well destruction operations. The pedestal shall be left in place. The well casing shall be shot perforated from 47 to 130 bgs and filled with neat cement. The neat cement shall be brought to the top of pedestal, finished and made ready for use by the City.

Jackson Well No. 1 is in the pump station building. Access to the well/pumping equipment is through a removable roof section. The well pedestal and casing shall be removed to one foot below the existing building floor level. Well casing shall be shot perforated from 20 to 98 feet bgs and filled with neat cement. The neat cement shall be brought to one foot below floor level. The excavated floor area shall be filled with concrete to the existing level of the floor and made ready for use by the City.

The following table includes all currently available information for each well to be destroyed as part of this project.

	Boys Ranch No. 2	Boys Ranch No. 3	Jackson No. 1
Pump Installed	Yes	No	Yes
Well Diameter (in)	16	14	14
Well Depth (ft)	366	291	410
Liner Diameter (in)	NA	10	10
Liner Depth (ft)	NA	280	400
Seal Depth (ft)	100	45	0*
Perforated Interval (Well) (ft)	161-180, 196-206, 216-246, 256-296, 316-346	132-142, 150-158, 176-218, 260-279	112-410
Perforated Interval (Liner) (ft)	NA	166-218, 250-280	100-400

* No seal depth noted on WCR, assuming no seal.

1.02 CONTRACTOR'S QUALIFICATIONS

Contractor destroying the wells shall have a valid California C-57 Water Well Contractors License. The well destruction Contractor shall have previously completed five similar projects as described herein in the last four years and shall be able to demonstrate this to the satisfaction of the City. All Subcontractors shall be lawfully licensed for the work they are contracted to perform and shall have be able to demonstrate experience to the satisfaction of the City.

1.03 INSPECTION OF SITE

The Contractor shall inspect the work site and note all existing conditions before submitting a bid for this project.

The contractor shall be responsible for determining the subsurface conditions and extent of underground foundations that may not be detectable by casual observation and must take this into consideration when submitting their bid. The City does not guarantee the accuracy of the data provided. Information sources used to develop specifications will be made available to the Contractor upon request. No allowances shall be made for expenses incurred as a result of failure to examine the sites and available data.

1.04 COORDINATION/COOPERATION

The Contractor shall notify the City at least three (3) working days in advance of the tentative starting date. The Contractor shall coordinate well destruction activities with other Contractors that may be working concurrently at the project sites to minimize conflicts and down time of the well stations.

The Contractor shall be responsible for contacting and coordinating with all utility companies with regards to the location of existing underground facilities in the construction area. The Contractor shall call Underground Service Alert at (800) 642-2444, at least 2 working days before commencement of underground work for location of underground facilities.

1.05 PRESERVATION OF PROPERTY

The Contractor shall use such means as are necessary to confine all work to the well station and adjacent properties as directed by the City.

Utility facilities damaged, temporarily disconnected, abandoned or relocated as a result of construction shall be repaired/reconnected or properly abandoned as directed by the governing utility at the Contractor's expense.

1.06 PERMITS, BONDS, LICENSES AND INSURANCE

The Contractor shall procure all permits, bonds, licenses and insurance, pay all charges and fees, and give all notices necessary and incidental to the prosecution of the work.

The Contractor shall prepare, pay applicable fees, and submit the Well Destruction Application(s) as required by Santa Clara Valley Water District (SCVWD).

1.07 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall be responsible for assuring that the work site is safe and secure and that temporary coverings are provided whenever there is an interruption in work. All excavations shall be secured and protected from the public, animals, and debris when not under direct control of the Contractor.

PART 2 - PRODUCTS

2.01 SEALING MATERIALS

The slurries shall consist of the following mixtures:

1) Neat Cement

- Materials: a) Potable Water
b) Type I or II Portland Cement
- Mixture: 5.2 to 5.8 gallons of water to every 94-pounds of cement with retarder as specified by manufacturer

2) Sand/Cement Grout

- Materials: a) Potable Water
b) Type I or II Portland Cement
c) Clean washed sand – free of clay or other impurities
- Mixture: 7 gallons of water to 94-pounds of cement and 188-pounds of sand (11 sack mix)

3) Concrete

- Materials a) Potable Water
b) Type I or II Portland Cement
c) Clean washed 3/8 aggregate – free of clay or other impurities
- Mixture 5.3 gallons of water to 94-pounds of cement and 473-pounds of aggregate

PART 3 - EXECUTION

3.01 MOBILIZATION

Mobilization shall include procuring and paying for all required permits, transportation of personnel, equipment and operating supplies to and from the site, providing portable sanitary facilities, maintaining fencing and barricades suitable to keep unauthorized

personnel away from construction activities around the site and other necessary facilities at the site.

3.02 REMOVAL OF PUMPING EQUIPMENT

Jackson Well No. 1

The pumping equipment shall be removed by Contractor. Access to the well/pumping equipment is through a removable roof section. See pump profile sheet at the end of Section 02215 for equipment details.

Boys Ranch Well No. 2 is located next to the pump station building. The pumping equipment shall be removed by Contractor. See pump profile sheet at the end of Section 02215 for equipment details.

The City shall retain ownership of the turbine motors. The Contractor shall deliver the turbine motors to the Cities Corporation yard. All other pumping equipment and discharge assemblies removed from the wells shall be properly disposed of by the Contractor.

3.03 INSPECTION OF WELL

A video survey with side scan capabilities shall be conducted on each well to determine the present condition of the well structure, confirm location of perforation and determine the amount of fill. The Contractor shall add water to the well for a minimum of 24 hours before conducting the video surveys. Water for flushing the well will be available at the site from a hose bib.

The video survey shall be delivered to the Engineer for review. If the Engineer determines that the video survey is not clear enough to see the well structure the Contractor shall conduct another video survey at no additional cost to the City.

Based upon the results of the video inspection and Engineers review, the Contractor shall submit a final well perforation schedule, destruction plan and well destruction permit to the SCVWD for approval.

3.04 PEDESTAL REMOVAL

Jackson No. 1

The well pedestal and casing shall be removed to one foot below the existing building floor level. Debris generated as part of the pedestal destruction shall be disposed by the Contractor

Boys Ranch Well No. 2 and 3

The well pedestals shall remain in place.

3.05 PREPARATION FOR SEALING

The wells shall be cleaned so that all undesirable materials, obstructions, or debris that could interfere with the well destruction process are removed and disposed of prior to perforating and cementing.

3.06 WELL DESTSTRUCTION

Well destruction includes perforation of each well, placement of sealing material, and well head completion.

A. Well Perforation

Each well casing and liner shall be perforated sufficiently to allow the sealing material to pass through the casing and liners and fill any void space that may exist between the well casing and the borehole. The method of perforating shall be submitted to the Engineer for approval before final destruction plan is submitted to the SCVWD.

The wells shall be perforated as follows:

Boys Ranch Well No. 2

The well casing may be perforated either by mills knife or by shot perforation.

- Mills Knife Perforation scheduled - The blank casing shall be perforated from 102 feet to 160 feet below ground surface at four (4) knife cuts per foot. Each cut shall be 90 degrees apart.
- Shot Perforation schedule - The blank casing shall be perforated from 102 feet to 160 feet below ground surface at one shot per foot.

Boys Ranch Well No. 3

The well casing shall be shot perforated at one shot per foot between 47 feet and 130 below ground surface.

Jackson Well No. 1

The well casing shall be shot perforated at one shot per foot between 10 feet and 98 feet below ground surface.

B. Sealing Material

The well casing shall be filled with sealing material as follows:

	Boys Ranch No. 2	Boys Ranch No. 3	Jackson No. 1
Sealing Material	11-Sack Slurry	Neat Cement	Neat Cement

The estimated volume of sealing material is as follows:

	Boys Ranch No. 2	Boys Ranch No. 3	Jackson No. 1
Estimated Sealing Material Volume (yards)	28	8	11

Sealing material in excess of what is estimated above required to complete destruction of well structure according to specifications, will be billed on a per yard basis as verified by the City.

C. Placement of Seal Material

The following requirements shall be observed while placing sealing material in wells to be destroyed:

1. All displaced fluids from sealing operations shall be contained and properly disposed of by the Contractor.
2. Each well will be filled with the appropriate cement mix as described in Section 2.1 of this Section.
3. Seal material shall be placed in the well using the positive displacement tremie pipe method. Sealing material shall be placed in one continuous operation. The end of the tremie pipe shall remain submerged below the surface of the slurry during the entire sealing procedure.
4. To assure that the well is filled and voids or bridging of the material do not exist, verification shall be made that the volume of material placed in the well is at least equal to the volume listed in Section 3.6.2.

D. Wellhead Completions

Boys Ranch Wells No. 2 and No. 3 – Sealing material from the destruction process shall be brought up to the level of the concrete pedestal and shall be finished smooth and level.

Jackson Well No. 1 – Sealing material from the destruction process shall be brought to one (1) foot below building floor. The excavated area resulting from the removal of the pedestal

shall be filled with six (6) sack concrete and brought to the level of the building floor. The concrete shall be finished smooth and level and made ready for use by the City.

3.07 TEMPORARY COVER

During periods when no work is being performed on the well, such as overnight or while waiting for sealing material to set, the well and surrounding excavation, if any, shall be covered. The cover shall be sufficiently strong and well enough anchored to prevent the introduction of foreign material into the well and to protect the public from a potentially hazardous situation.

3.08 SITE RESTORATION, CLEANUP, AND REPORTS

Prior to the final acceptance of the work, the Contractor shall prepare and deliver to the City the following reports.

1. A California Water Well Driller's Report shall be fully completed in the format required by the State of California.
2. The Contractor shall prepare two final prints of each log or survey, daily tour reports, and cement tickets.

Within 30 days from the dates of well destruction, the Contractor shall file the required reports with the California State Department of Water Resources in accordance with Water Code Section 13751.

All materials and fluids generated during the destruction process and equipment removed from the wells by the Contractor in accordance with this project shall become property of the Contractor and shall be removed off-site and disposed of legally at the Contractor's expense, with the exception of the vertical hollow shaft motors, which the Contractor shall transport to the Cities corporation yard.

PART 4 - MEASUREMENT AND PAYMENT

Direct payment will be made only for the items listed in the bid proposal. Items of work not listed, but necessary to satisfactorily complete the work, will not be paid for separately, and all costs in connection therewith shall be considered included for payment with the listed items. The City, or Cities agent, shall measure and determine all quantities subject to payment.

4.2 REMOVAL OF PUMPING EQUIPMENT – Bid Item No. D-2, E-2

Measurement: Removal of the pumping equipment.

Payment: Removal of the pumping equipment, satisfactorily completed, will be paid for at the applicable contract unit price.

Unit of Measure: Lump Sum

4.3 INSPECTION OF WELL - Bid Item No. C-2, D-3, E-3

Measurement: Satisfactory completion of video survey to the total depth of well.

Payment: Video survey shall be paid for at the applicable contract unit price.

Unit of Measure: Lump Sum

4.4 REMOVAL WELL PEDESTAL - Bid Item No. E-4

Measurement: Removal of the well pedestal.

Payment: Removal of the well pedestal, satisfactorily completed, will be paid for at the applicable contract unit price.

Unit of Measure: Lump Sum

4.5 WELL PERFORATION – Bid Item No. C-3, D-4, E-5

Measurement: Successful perforation of the well.

Payment: Well perforation, satisfactorily completed, will be paid for at the applicable contract unit price.

Unit of Measure: Lump Sum

4.6 PLACEMENT OF SEALING MATERIAL – Bid Item No. C-4, D-5, E-6

Measurement: Successful placement of sealing material in the well.

Payment: Seal material, satisfactorily installed, will be paid for at the applicable contract unit price.

Unit of Measure: Lump Sum

4.7 SITE RESTORATION, CLEANUP, AND REPORTS – Bid Item No. C-5, D-6, E-7

Measurement: Satisfactorily completed site cleanups and submission of required project records.

Payment: Site clean-up and preparation and delivery of the specified records of the well, satisfactorily completed, shall be paid for at the lump sum price stated in the proposal.

Unit of Measure: Lump Sum

SECTION 02300 - EARTHWORK

Bid Item No. A-4, B-4

PART 1 - GENERAL

1.01 SCOPE

- A. The work shall consist of performing all operations necessary to excavate all materials, regardless of character, subsurface conditions and of whatever nature, necessary for the construction of the footings and foundation for the structures. This section includes work necessary to excavate, place, fill, remove and dispose of all excess and unsuitable materials as required by the Engineer, and to establish site grades as shown on the Contract Drawings. Excavation includes grading for earthen embankments, facilities, pads, roadways, and areas adjacent to structures, slope rounding, and removal of unsuitable material from the roadbed and beneath fill areas.

1.02 RELATED WORK

- A. SECTION 02320 – TRENCH EXCAVATION AND BACKFILL

1.03 DEFINITIONS

A. Relative Compaction (ASTM Method)

The ratio expressed as a percentage, of the dry density of the backfill material as compacted in the field, to the maximum dry density of the same material determined in the laboratory by ASTM D1557.

B. Optimum Moisture Content (ASTM Method)

The ratio, expressed as a percentage, of the weight of water in the solid material to the weight of the solids, which occurs at the maximum dry density as determined by ASTM D1557.

C. Optimum Moisture Content (CALTRANS Method)

The ratio, expressed as a percentage, of the weight of water in the solid material to the weight of the solids, which occurs at the maximum dry density as determined by CALTRANS Test Method 219.

D. Well-Graded

Well-graded as used in this section defines a mixture of particle sizes that have no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity or any other specific grain size

distribution parameters. Well-graded is used to help define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

1.04 SUBMITTALS

- A. The Contractor shall provide Certifications that all materials to be used on the project meet the requirements of the standards referenced.
- B. Samples and a list of the source of the samples of all imported materials to be used shall be submitted two (2) weeks in advance of use. Samples shall consist of one-half cubic feet (0.5 ft³) of each type of material

1.05 PROJECT CONDITIONS

- A. Maintain fills, slopes, and ditches within the limits of the new construction until final acceptance. Repair areas damaged as a result of storms or construction. Take necessary precautions to prevent the entrance of soils and other materials into streambeds, lakes, or watercourses.

1.06 NOTIFICATION

- A. Earthwork shall not be performed without the notification and approval of the Engineer. The Contractor shall notify the Engineer at least two (2) working days prior to the commencement of any aspect of the site earthwork.

PART 2 – MATERIALS

2.01 NATIVE MATERIAL

- A. Native material is the on-site, unclassified material or soil. Native soil may not be used as Imported Fill or Structural Backfill.

2.02 IMPORTED FILL SOIL

- A. Imported fill soils shall conform to the following properties:
 - 1. All fill particles shall be less than three inches (3”) in size.
 - 2. The fill material shall have a Plasticity Index (PI) no greater than 15.

3. The fill material shall contain less than three percent (3%) by weight of organics, in accordance with ASTM D2974 and shall be free of other objectionable material (concrete, plastic, metal, and other wastes).
4. Recycled material (crushed asphalt pavement and concrete) may be used in areas more than two feet (2') from finish grade of buildings and roadways.

2.03 SUBGRADE

- A. The subgrade shall be Class 3, in accordance with CALTRANS Standard Specification, Section 25 and as specified herein.

2.04 IMPORTED TOPSOIL

- A. Imported topsoil shall be suitable sandy loam from an approved source, which possesses friability and a high degree of fertility. It shall be free of clods, roots, gravel, and other foreign material. It shall be free of noxious vegetation and seed. Imported topsoil shall be obtained and transported at the Contractor's expense.

2.05 STRUCTURAL BACKFILL

- A. The material used to backfill footings, foundations, walls, pipes, culverts and conduits shall conform to the following requirements.
 1. The material shall have a Sand Equivalent value less than 20.
 2. The backfill must be free of organic or unsatisfactory material as deemed by the Engineer.
 3. The backfill shall conform to the following grading:

Sieve Size	Percent Passing
1"	100%
No. 4	35%-100%
No. 30	20%-100%
No. 200	2%-5%

2.06 CRUSHED ROCK

A. Crushed rock shall consist of durable rock and gravel that is free of deleterious material and free of slaking or decomposition under the action of wetting or drying and meet the following requirements:

1. The crushed rock must have a minimum Cleanliness Value of 60 as determined by California Test Method 227.
2. Material shall contain at least seventy-five percent (75%) of particles having 2 or more fracture faces.
3. The durability index shall be 40 or greater.
4. The crushed rock shall conform to the following gradation:

Sieve Size	Percent Passing
1"	100%
3/4"	75%-100%
1/2"	5%-55%
3/8"	0%-15%
No. 4	0%-10%
No. 200	0%-2%

2.07 AGGREGATE BASE

A. Aggregate base shall be Class 2, meet the requirements of ASTM D2940, CALTRANS Section 26, and conform to the following requirements:

1. The aggregate base shall be free from organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.
2. Aggregate may include material processed from reclaimed asphalt concrete, Portland cement concrete, lean concrete base, cement treated base or a combination of any of these materials. The amount of reclaimed material shall not exceed 50-percent of the total volume of the aggregate used.
3. The aggregate must have a minimum 22 Sand Equivalent, minimum 35 Durability Index, and minimum 78 Resistance (R-Value).

4. The aggregate base shall conform to the following gradation:

Sieve Size	Percent Passing
1"	100%
3/4"	87%-100%
No. 4	30%-65%
No. 30	5%-35%
No. 200	0%-12%

2.08 FILTER FABRIC

- A. Filter fabric shall be a non-woven material consisting of polyester, nylon, and polypropylene, filaments formed into a stable network. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot-proof, and resistant to ultraviolet light. The filter fabric shall be Tencate Mirafi FW700, or equal.

2.09 ANCHOR PINS

- A. Anchor pins shall be of steel, a minimum of 3/16" in diameter, and at least fifteen inches (15") in length, or equivalent pins recommended by the manufacturer of the filter fabric.

PART 3 - EXECUTION

3.01 GENERAL

- A. All work shall comply with the CALTRANS Standard Specification, Section 19 and unless otherwise noted in the following provisions:

1. Surplus Material

Unless otherwise noted, surplus excavated material shall be disposed of offsite in accordance with applicable ordinances, environmental requirements, and in accordance with CALTRANS Standard Specification Section 7-1.13. All costs related to the hauling and disposal of surplus material shall be at no additional cost to the City.

2. Hauling

When hauling is done over highways or city streets, the loads shall be trimmed and the vehicle shelf areas shall be cleaned after each loading. The loads shall be watered after trimming to eliminate dust, tarped, and transported pursuant to local requirements.

3. Erosion Control

The Contractor shall maintain earthwork surfaces true and smooth and protected from erosion. Where erosion occurs, the Contractor shall provide fill or shall excavate as necessary

to return earthwork surfaces to the grade and finish specified.

4. Ground Water

Groundwater is not anticipated in the course of this work.

5. Control of Water

If water is encountered, the Contractor shall furnish, install, maintain and operate all necessary machinery, appliances and equipment to keep the excavation reasonably free from water until the placing of the bedding material, pouring of concrete, and placing of the backfill has been completed, inspected and approved, and all danger of flotation and other damage is removed. Ground water pumped from the excavation shall be disposed of in such a manner as to not cause injury to public or private property or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer.

Surface water shall be diverted or otherwise prevented from entering excavations to the greatest extent possible without causing damage to adjacent property.

The Contractor shall be responsible for the condition of any pipe or conduit which they may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

6. Seasonal Limits

Fill material shall not be placed, spread or rolled during unfavorable weather conditions, as determined by the Engineer. If work is interrupted by heavy rains, fill operations shall not resume until field tests indicate that the moisture content of the subgrade and fill materials are satisfactory.

7. Finish Grading

Finished grading shall be smooth, compacted and free from irregularities. The degree of finish shall be that normally obtainable with a blade-grader.

Finished grade shall be as specified in the Drawings plus or minus 0.10-feet except where a local change in elevation is required to match sidewalks, curbs, manholes, and catch basins, or to ensure proper drainage. Allowance for topsoil and grass cover, and sub base and pavement thickness shall be made so that the specified thickness of topsoil or pavement can be applied to attain the finished grade.

If the soil is to be cultivated or straw is to be incorporated into the surface, rocks larger than shall be removed and disposed of prior to cultivation or placement of straw.

8. Classification of Excavated Materials

No classification of excavated materials will be made. Excavation shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the work, regardless of the type, character, composition, or condition thereof.

3.02 COMPACTION TESTING

- A.** The Contractor shall make all necessary excavations for compaction tests. Costs of excavation, backfilling, and compacting in connection with compaction testing shall be borne by the Contractor. The City will pay for compaction testing. The Contractor shall be responsible for payment of any corrective work and testing resulting from an initial failed test.
- B.** After areas has been excavated and scarified, the area shall be diced or bladed until uniform and free from large clods, and brought to the proper moisture content before compaction. Measurement of compaction will be determined by using the ASTM D1557 Compaction Test Method.
- C.** Field tests of compacted density will be in accordance with CALTRANS 216 (sand cone) or 231 (nuclear gage) at the Engineer's option.

3.03 EXCAVATION

- A.** Initial site grading should include a reasonable search to locate soil disturbed by previous activities, any undocumented fill soils, abandoned underground structures, or existing utilities that may exist within the area of construction. Any areas or pockets of soft or loose soils, saturated soils, void spaces made by burrowing animals, or other disturbed soil that are encountered, shall be excavated to expose firm native material. Excavations for removal of any unsuitable conditions should be backfilled with Imported Fill Soil or Structural Backfill.
- B.** The bottoms of all areas to receive fill shall be scarified to a minimum depth of eight inches (8"), uniformly moisture conditioned, proof rolled to detect soft or pliant areas, and compacted to the requirements for Imported Fill Soil or Structural Backfill.
- C.** When the moisture content of the sub grade is below the optimum moisture content, water shall be added until the proper moisture content is reached. When the moisture content is too high to permit the specified compaction to be achieved, then the sub grade shall be aerated by blading or other methods until the moisture content is satisfactory for compaction.
- D.** Compaction operations shall be performed in the presence of the Engineer who will evaluate the performance of the materials under compactive load. Unstable soil deposits, as determined by the

Engineer, shall be excavated to expose a firm base and the grades restored with Imported Fill Soil or Structural Backfill in accordance with these Specifications.

3.04 UNSUITABLE MATERIAL

- A.** When unsuitable material is encountered during the grading operation, which would prevent the material from being compacted as specified, the Engineer may order the site to be ripped a minimum of one foot (1') deep and three feet (3') wider than the finish lines, where applicable, and left to dry. In this event a time extension shall be granted for every working day delay for drying. No other consideration or cost shall be given for ripping, delay or stand-by and shall be considered as included in this item of work and no additional compensation will be allowed therefore.
- B.** Once underground installations are completed and prior to placing imported material on the site, the grading and compaction of the top half foot (0.5') of subgrade and any other material and area's disturbed by trenching, backfilling and/or other work shall be reworked, graded, and compacted to meet the above site grading requirements to receive the imported material.

3.05 AREA BACKFILL

- A.** The site shall be graded to the lines and grades shown on the plans and in accordance with Section 19-2 of the CALTRANS Standard Specifications and these special provisions.
- B.** Area Backfill is defined for all areas not covered under trench backfill, structural backfill, or roadway backfill. Area Backfill shall be constructed to the lines and grades as shown on the Drawings as directed by the Engineer, and shall conform to Section 19-3.06 of the CALTRANS Standard Specifications and these Specifications, except that ponding and jetting shall not be allowed. Backfill shall consist of on-site or imported fill and shall be brought to the optimum moisture content.
- C.** On-site or imported fill shall be placed in horizontal lifts not to exceed six-inches in compacted thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to promote uniformity of material in each layer.
- D.** When the moisture content of the fill material is below the optimum moisture content, water shall be added until the proper moisture content is reached. When the moisture content is too high to permit the specified compaction to be achieved, then the fill material shall be aerated by blading, discing, or other methods until the moisture content is satisfactory for compaction.
- E.** After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of ninety percent (90%), as determined by ASTM D1557. Compaction shall be

accomplished while the fill material is at the required moisture content. Moisture content shall be uniform throughout each layer. Each layer shall be compacted over its entire area until the desired density has been obtained.

- F. Compaction tests and acceptance by the Engineer will be required prior to the starting of trenching or excavating for placing any underground facilities.

3.06 STRUCTURAL BACKFILL

- A. Place structural backfill around structures. Do not exceed loose lifts of eight inches (8"). Compact each lift to at least ninety-five percent (95%) relative compaction. Stop structural backfill six inches (6") below finished grade in all areas where topsoil is to be placed. Place material in a manner that avoids segregation.
- B. Any subsequent damage to slabs, piping, concrete structures, facilities, or structures caused by settlement of structural backfill shall be corrected and repaired by the Contractor at no cost to the City.

3.07 ROADWAY SUBGRADE

- A. Subgrades for roadways shall conform to CALTRANS Standard Specifications, Section 25 and these specifications. Prior to any underground work, other than removal of structures, concrete, culverts, piping, conduits or other facilities to be removed, all clearing, stripping, excavating, and grading shall be completed to subgrade of the lowest grading plane to receive imported material (i.e. sub base, base, or concrete). Subgrades shall be constructed to the lines and grades as shown on the Drawings.
- B. Prior to backfilling, the subgrade surface shall be bladed or trimmed to the proper grade and rolled to a reasonably smooth surface. The surface of the subgrade at any point will not vary more than five hundredths of a foot (0.05') above or one tenth of a foot (0.10') below the grading plane at any point. Material to be used for backfill shall be as specified on the Drawings. After satisfactory grading and compaction of all backfills in areas to be paved, subgrade soils shall be moisture conditioned to achieve optimum moisture content. The upper six inches (6") of subgrade soils shall then be uniformly compacted to a minimum of ninety-five percent (95%) relative compaction. This operation shall include any reshaping and wetting or drying required to obtain proper compaction. After compaction, and shaping to line, grade, and cross section, the subgrade shall be sprinkled regularly to moisten the surface and to prevent it from drying out and/or cracking prior to the placement of aggregate base. This operation shall include any reshaping and wetting or drying required to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material.

3.08 FINAL SUBGRADE PREPARATION

A. Final subgrade compaction shall be performed just prior to placement of the subgrade base.

1. Paved Areas (Boy's Ranch #2A and Jackson #3 Sites)

The upper twelve inches (12") of the final subgrade for the areas to be paved shall be scarified and uniformly compacted to a minimum of ninety-five percent (95%) relative compaction at the optimum moisture content. Aggregate base shall be placed within 72-hours of the final subgrade soils compaction.

2. All Weather Access Road Area (Boys Ranch #2A Site)

The upper twelve inches (12") of the final subgrade for the areas to be paved shall be scarified and uniformly compacted to a minimum of ninety-five percent (95%) relative compaction at the optimum moisture content. Aggregate base shall be placed within 72-hours of the final subgrade soils compaction.

3.09 FILTER FABRIC

A. Preparation of Subgrade

The surface to be lined with filter fabric shall be graded to obtain smooth side and bottom surfaces so that the cloth will not bridge cavities in the soil or be damaged by projecting rock. Filter fabric should be placed between native soil and fill material.

B. Installation of Filter Fabric

The filter fabric shall be laid flat, but not stretched on the soil, and shall be secured with anchor pins spaced not more than ten feet (10') on centers. Overlaps shall be a minimum of eighteen inches (18") wide. The filter fabric shall be held in place with anchor pins at the overlaps and corners to maintain the position of the fabric during placement of fill material.

C. Protection From Exposure To Sun

Prior to and during installation, the filter fabric may be exposed to sunlight not more than twenty (20) days.

D. Inspection

All filter fabric installations shall be inspected and approved by the Engineer before backfilling. If any defective or damaged areas are found, the fabric shall be removed and replaced with new fabric or the damaged area may be repaired at the Contractor's option by covering damaged area with new fabric.

3.10 PLACEMENT OF AGGREGATE BASE

- A.** Final subgrade compaction shall be performed just prior to placement of the subgrade base.
- B.** Placing of aggregate base shall comply with CALTRANS Standard Specifications Section 26 and in conformity with the lines, grades, and dimensions shown on the Drawings. Aggregate base shall be brought to the optimum moisture content and compacted to a minimum of ninety-five percent (95%) in accordance with ASTM D1557 and California Standard Test Method No. 231. Where the required final thickness is six inches (6”) or less, the aggregate base may be spread and compacted in one layer. Where the required final thickness is more than six inches (6”), the aggregate base shall be spread and compacted in lifts not to exceed six inches (6”) of thickness. Place sufficient aggregate base on the subgrade to obtain the specified thickness shown after compaction. The surface of the finished aggregate base at any point shall not vary more than 0.05-feet above or below the grade established by the Engineer.

3.11 REMOVAL AND REPLACEMENT OF TOPSOIL

- A.** Where excavation crosses lawns, garden areas, pasture lands, cultivated fields, orchards, or other areas on which reasonable topsoil conditions exist, remove the topsoil for a minimum depth of fifteen inches (15”) for the full width of the excavation. Stockpile this topsoil to one side of the right-of-way and do not mix with the remaining excavated material. Replace the topsoil in the top twelve inches (12”) in the backfilled excavation. In lieu of stockpiling and replacing the topsoil, imported topsoil may be substituted in the top twelve inches (12”) at no additional cost to the City.
- B.** Maintain the finished grade of the topsoil level with the area adjacent to the excavation or mounded until final acceptance by the Engineer. Repair damage to adjacent topsoil caused by work operations. Remove all rock, gravel, clay, and any other foreign materials from the surface, re-grade, and add topsoil as required.

3.12 SHORING, SHEETING, AND BRACING

- A.** Except where banks are cut back on a stable slope if approved and as directed by the Engineer, excavations for structures and trenches shall be supported as necessary to prevent caving or sliding.
- B.** Sheet and brace the excavation when necessary for safety to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public. Increase trench widths accordingly by the thickness of the sheeting, shoring, or trench box. Maintain shoring in place until the pipe has been placed and backfilled at the pipe zone. The trench box

shall be raised as the backfilling is done in a manner that will not damage the pipe or permit voids in the backfill. Shoring or sheeting shall be removed after placing the pipe zone.

- C. All sheeting, shoring, and bracing of trenches and other excavations shall conform to the safety requirements of the Federal, State, or local public agency having jurisdiction. The most stringent of these requirements shall apply.

3.13 DRAINAGE DITCH, PIPELINES, AND CULVERT RESTORATION

- A. Except where banks are cut back on a stable slope if approved and as directed by the Engineer, excavations for structures and trenches shall be supported as necessary to prevent caving or sliding.
- B. Roadside drainage ditches and all other ditches shall be graded to drain and prevent ponding. Cross-sections and location of ditches shall be as shown in the Drawings. The Contractor shall repair drainage ditches damaged either directly or indirectly by his operations. Drainage ditches shall be compacted to ninety-percent (90%) relative compaction. No ponding of surface water near foundations shall be allowed. The Contractor shall correct any drainage ditch breaches occurring as a result of his operations at no cost to the City.
- C. Replace in kind drainage pipelines and culverts, which are removed or damaged. Replace pipelines and culverts to the existing lines and grades. Do not replace pipelines and culverts until the work in the immediate area has been completed, unless otherwise directed by the Engineer. At the inlet and outlet of all culverts the ditch shall be sloped and graded to drain without ponding.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-4 – EARTHWORK (BOYS RANCH #2A)
Bid Item No. B-4 – EARTHWORK (JACKSON #3)

-END OF SECTION-

SECTION 02320 - TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary for the trench excavation, structural backfill, trench backfill, installation of locating wire and warning tape and all incidental work, complete.
- B. The Contractor shall ensure safety in the trenches, conform to all applicable OSHA requirements and provide all sheeting, shoring, or bracing as required. All materials, labor and workmanship associated with the installation of the piping shall conform to the applicable AWWA, ASTM and City or County standards.

1.02 RELATED WORK

- B. SECTION 02300 – EARTHWORK

1.03 SUBMITTALS

- C. The Contractor shall provide Certifications that all materials to be used on the project meet the requirements of the standards referenced.
- D. Samples and a list of the source of the samples of all imported materials to be used shall be submitted two (2) weeks in advance of use. Samples shall consist of one-half cubic feet (0.5 ft³) of each type of material.

PART 2 - MATERIALS

2.01 NATIVE MATERIAL

- B. Native material is the on-site, unclassified material or soil. Native soil may not be used for any backfill purposes.

2.02 COARSE GRADE SAND

- A. Sand shall be clean, non-plastic, and free from deleterious or foreign matter and shall meet the requirements of Section 90 of the Caltrans Standard Specifications following gradation requirements:

Sieve Size	Percent Passing
------------	-----------------

No. 4	90%-100%
No. 200	0%-5%

B. Beach, pit-run, or crusher-run sand shall generally be acceptable.

2.03 FINE GRADE BEDDING SAND

A. Fine grade bedding sand shall be #2 sand that is clean, non-plastic, and free from deleterious or foreign matter, and shall be natural sand or manufactured sand from crushed rock. Use of limestone screenings or stone dust is not permitted. The chloride content of the sand shall be less than 100 ppm and the sulfate content shall be less than 200 ppm. The sand shall be in conformance with ASTM C33, as follows:

Sieve Size	Percent Passing
No. 4	95%-100%
No. 8	85%-100%
No. 16	50%-85%
No. 30	25%-60%
No. 50	0%-30%
No. 100	2%-10%

2.04 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Pipe bedding and pipe zone material shall be sand, fine grade, or coarse grade depending on the type of pipe. Schedule 40 PVC pipe and conduit shall have coarse grade sand bedding and fine grade sand pipe zone material. C900, C905, C909 PVC, polyethylene wrapped ductile iron, and wrapped steel pipe smaller than 3-inches in diameter shall have fine grade sand bedding and pipe zone material. Cement mortar coated pipe, bituminous-coated pipe, CMP, RCP, and unwrapped steel pipe may have either fine or coarse grade pipe bedding and zone material.

2.05 CONTROL DENSITY FILL

A. Refer to SECTION 03300 – CONCRETE for control density fill requirements.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

A. Trench excavation is unclassified which includes all excavation, regardless of type, nature or condition of materials encountered. The contractor shall assume full responsibility to estimate the kind and extent of various materials to be encountered in order to accomplish work.

- B.** Work includes removal of all materials or obstructions of any nature, the installation and removal of all sheeting and bracing, and the control of water, necessary to construct mains, services or other works. Unless otherwise indicated on the Drawings or permitted by the City, excavation shall be open cut.

1. Trench Depth and Width

Trenches shall conform to the trench detail shown on the Drawings for both developed and undeveloped areas.

If trench widths at the top of the pipe exceed 12-inches greater than the outside diameter of the pipe, by any amount, for any reason, the Contractor shall provide at his own expense stronger pipe, improved bedding conditions, or concrete protection, as approved by the Engineer to meet the load requirements of the condition.

2. Trench Grade

Excavate the trench to the lines and grades shown or as established by the Engineer with proper allowance for pipe thickness and pipe bedding. Remove any high spots that would prevent a uniform thickness of bedding. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade at no additional cost to the City, with material of the type specified for pipe bedding in this section.

3.02 PIPE BEDDING MATERIAL

- A.** Place pipe bedding material under the pipe for the full width of the trench in maximum 6 inch lifts. Minimum depth of bedding below the pipe barrel shall be as shown on the Drawings. Excavate bell holes at each joint to permit proper bedding and assembly.
- B.** Grade the pipe bedding material, by hand if necessary, to the line and grade to which the pipe is to be laid. The pipe bedding material shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle. If during pipe installation it is found that a pipe section will be at an incorrect grade, that piece shall be removed and the pipe bedding material re-graded to the proper elevation. Compact pipe bedding material to 90-percent relative compaction, in accordance with ASTM D1557.

3.03 PIPE ZONE MATERIAL

- A.** Place pipe zone material in even lifts on each side of the pipe. Limit compacted lift thickness to 6-inches or the depth of penetration of the compaction equipment used, whichever is less,

and compact with mechanical tampers, rollers, or surface vibrators to at least 90-percent relative compaction and in accordance with ASTM D1557. Operate this equipment to prevent damage to the pipe linings and coatings. The pipe shall not be warped by the compaction procedures. Precautions shall be taken to prevent shifting or flotation of the pipe.

3.04 TRENCH BACKFILL IN IMPROVED AREAS

- A. The upper layer of trench backfill material that will be the subgrade for paved, graveled, or other traveled surfaces shall be Class 2 aggregate base and shall be compacted to at least 95-percent relative compaction. Depth of subgrade shall be as shown on the Drawings.

3.05 TRENCHES BELOW SLABS OR STRUCTURAL SECTIONS

- A. Where trenches are located below slabs or structural sections of imported material, the pipe zone material shall continue to the subgrade of the lowest layer of imported structural material beneath the slab or structural section, plus longitudinally three feet before and beyond said slab or structural sections.

3.06 MOISTURE CONTROL

- A. Maintain backfill at optimum practical moisture content required for compaction. Add water or dry as required prior to placing material in trench. Supplement, if required, by sprinkling. Do not place excessively dry or wet material in trench and then attempt to compact it or modify its moisture content in place.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Trench Excavation and Backfill. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 02740 - PAVING

Bid Item No. A-5, B-5

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers all work necessary for furnishing and mixing aggregate and asphalt binder at a central mixing plant, excavating, placing, spreading, grading, and compacting the subgrade and structural imported materials including base and asphalt concrete for paved areas, complete. See SECTION 02300 - EARTHWORK for additional requirements and City Standards.

1.02 SUBMITTALS

- A. The Contractor shall submit asphalt concrete design mix and data, in accordance with SECTION 01330 – PROJECT RECORDS AND SUBMITTALS. The Contractor shall submit materials testing reports for the asphalt concrete and header boards to be used, as well as other pertinent information, certifying that the asphalt concrete pavement meets the requirements of the referenced standards and manufacturer's installation instructions. Contractor shall submit copies of a report from a testing laboratory verifying that the aggregate material conforms to the specified gradations and characteristics as defined herein.

PART 2 - MATERIALS

2.01 AGGREGATE SUBBASE

- A. Aggregate subbase shall conform to Section 25 of the CALTRANS Standard Specifications except as modified herein. The aggregate subbase shall Class 2 (R-value 50 minimum). No waiver of R-value will be allowed. The aggregate subbase shall be untreated material.

2.02 AGGREGATE BASE

- A. Aggregate base shall conform to Section 26 of the CALTRANS Standard Specifications except as modified herein. The aggregate base shall be three-quarters of an inch (3/4") maximum and Class 2 (R-value 78 minimum). No waiver of R-value will be allowed. The aggregate base shall be untreated material.

2.03 ASPHALT CONCRETE AGGREGATE

- A. Asphalt concrete aggregate shall conform to Section 39 of the CALTRANS Standard

Specifications and shall be Type B, ½-inch maximum, medium. Aggregates shall be clean and free from decomposed materials, organic material, and other deleterious substances.

2.04 ASPHALT BINDER

- A. The asphalt binder to be mixed with aggregate shall conform to the requirements of Section 92 of the CALTRANS Standard Specifications. Asphalt shall be performance graded (PG) 64-10.

2.05 LIQUID ASPHALT

- A. Liquid asphalt for prime coat shall conform to Section 93 of the CALTRANS Standard Specifications.

2.06 HEADER BOARDS

- A. Header boards shall be either Redwood or Douglas Fir with an American Wood Preservers Bureau stamp, indicating its use for ground contact and application of L22 waterborne preservative or approved equal.

PART 3 - EXECUTION

3.01 ASPHALT CONCRETE REMOVAL

- A. All existing asphalt concrete pavement shall be jack-hammered and sawcut where required for installation of new roadway or underground utilities. Contractor shall sawcut along seams where new pavement is to be placed. Cuts shall be straight, clean, and vertical for the full depth of cut. Longitudinal cuts may be wheel-cut with the approval of the Engineer, but shall be discontinued if excessive breakage or deflection of the adjacent pavement to remain occurs. Additional areas shall be cut out when, in the opinion of the Engineer, the edge of the remaining pavement is loose, depressed, or unstable.
- B. The asphalt concrete material removed shall become the property of Contractor and shall be disposed of in accordance with the CALTRANS Standard Specifications, Section 7-1.13 at no additional cost to the City.

3.02 AGGREGATE SUBBASE

- A. The subgrade shall be prepared in accordance with Section 25 of the CALTRANS Standard Specifications as applicable for roadways and embankments.

- B.** The aggregate subbase may be spread by the use of motor graders as long as segregation of large or fine particles of aggregate is avoided and the material as spread is free from pockets of large or fine material. Segregated materials shall be remixed until uniform. Aggregate subbase shall have a relative compaction of not less than ninety-five percent (95%) as determined by ASTM D1557 or Test Method No. California 216.

3.03 AGGREGATE BASE

- A.** Aggregate base shall be placed and compacted on the prepared subbase in accordance with Section 26 of the CALTRANS Standard Specifications and in conformity with the lines, grades, and dimensions shown in the Drawings.
- B.** The aggregate base may be spread by the use of motor graders as long as segregation of large or fine particles of aggregate is avoided and the material as spread is free from pockets of large or fine materials. Aggregate base shall have a relative compaction of not less than ninety-five percent (95%) as determined by ASTM D1557 or Test Method No. California 216.
- C.** The Contractor shall be responsible for protecting the aggregate base after it has been placed and compacted. The Contractor will not be allowed any additional compensation for the recompaction or retesting of the aggregate base due to the Contractor's failure to place the successive asphalt concrete pavement or other materials within a reasonable time period as determined by the Engineer. The Contractor shall pay for all costs to retest the aggregate base, at no cost to the City.
- D.** Where the required thickness is eight-inches (8") or less, the aggregate base may be spread and compacted in one layer. Where the required thickness is more than eight-inches (8"), the aggregate base shall be spread and compacted in lifts not to exceed six-inches (6").

3.04 ASPHALT CONCRETE PAVEMENT

- A.** Workmanship in producing, hauling, placing, compacting, and finishing of asphalt concrete on aggregate base shall conform to Section 39 of the CALTRANS Standard Specifications except as modified and supplemented herein. Unless otherwise shown on the Drawings, an eleven-inch (11") compacted layer of aggregate base shall be installed in accordance with CALTRANS Section 26 with a three-inch (3") layer of asphalt concrete in accordance with CALTRANS Section 39.
- B.** Asphalt concrete shall be produced in a batch mixing plant, a continuous pugmill mixing plant or a drier drum mixing plant. Proportioning shall be either by hot-feed control or cold-feed control.

- C. The asphalt concrete shall be placed in maximum two-inch (2") deep lifts and spread and compacted by methods approved by the Engineer that will ensure a satisfactory end product. Dikes shall be shaped and compacted with an extrusion machine.
- D. The Contractor is required to provide adequate protection of the subgrade, aggregate subbase, aggregate base and other materials if the asphalt concrete pavement is not placed within a specified time as determined by the Engineer. Retesting of the subgrade, aggregate subbase, aggregate base or other material will be required and will be paid for by the Contractor, if the asphalt concrete pavement is not placed within a specified time as determined by the Engineer.

3.05 CONSTRUCTION JOINTS

- A. Construction joints shall be made in such a manner as to ensure a neat junction, thorough compaction, and sufficient bonding.
- B. A transverse joint extending over the full width of the strip being laid at right angles to its centerline shall be constructed at the end of each day's work and at any other times when the operations of placing the mixture are suspended for a period of time which will permit the mixture to chill. The forward end of a freshly laid strip shall be thoroughly compacted by rolling before the mixture has become chilled. When work is resumed, the end shall be cut vertically for the full depth of the layer.

3.06 HEADER BOARDS

- A. Header boards shall be provided to protect the edges of asphaltic concrete where indicated on the Drawings. Boards shall be staked, and 2" x 8" members unless otherwise indicated on the Drawings.

3.07 PROTECTION OF STRUCTURES

- A. Provide all coverings necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, plantings, trees, and any other structures from splashing oil and asphalt, dirt, or any other undesirable matter than may come upon these structures by reason of the paving operations.
- B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the resurfacing shall be level with the top of the existing finished elevation of these facilities. If it is evident that these facilities are not in accordance with the proposed finished surface, notify the Engineer to have the proper authority contacted in order to

have the facility altered before proceeding with the resurfacing around the obstruction, unless otherwise approved. Consider any delays experienced from such obstructions as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application. After completion of the paving operation, all areas are to be cleaned of excess spilled asphalt materials to the satisfaction of the Engineer.

3.08 WEATHER CONDITIONS

- A.** Asphalt shall not be applied to a wet material. Asphalt shall not be applied during rainfall, sand or dust storms, or any imminent storms that might adversely affect the construction. Asphalt concrete shall not be placed in the following conditions:
1. When the atmospheric temperature is lower than 50-degrees F
 2. During heavy rainfall
 3. When the surface upon which it is to be placed is frozen or wet.

3.09 TESTING

A. Thickness Variation

The tolerance of the finished asphalt grade shall be plus or minus 0.01-feet from the required elevation. The finish grade of the new paving shall match the existing pavement and shall conform to the existing cross slope or crown. Variances of more than one quarter inch (1/4") from the edge of existing pavement to new pavement shall not be acceptable.

B. Smoothness Variation

No pockets or depressions, which may cause water to pool, shall be permitted. The surface smoothness of the pavement shall be such that when a 12-foot straightedge is laid across the pavement; the surface shall not deviate from the straightedge more than one quarter inch (1/4").

3.10 EXCESS MATERIALS

- A.** The asphaltic concrete material removed shall become the property of the Contractor and shall be disposed off-site in accordance with all applicable State and Local ordinances and CALTRANS Standard Specifications, Section 7-1.13.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-5 – PAVING (BOYS RANCH #2A)
Bid Item No. B-5 – PAVING (JACKSON #3)

-END OF SECTION-

SECTION 02820 - CHAIN LINK FENCING

Bid Item No. A-6, B-6

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary to furnish and install galvanized chain link fencing, gates, and appurtenances per City standards. If damage to existing fencing or the existing gate occurs, all damage shall be corrected by repair or replacement as detailed in these Specifications. This section also covers relocation of the existing gate and demolition of existing fencing as shown on the Drawings and specified herein, complete.
- B. All new and replacement fencing construction materials shall match the existing fencing currently installed on site (color, gage, height, etc.). The specifications contained herein provide material, dimension and product requirements which are intended to match the existing fencing construction at the Jackson and Boys Ranch sites. Contractor shall notify the Engineer of any differences between the existing fencing and this specification if discovered.

1.02 SUBMITTALS

- A. Contractor shall make the following submittals to the Engineer.
 - 1. One square foot sample of chain link fabric, and shop drawings showing gauge, dimensions, and coating information.
 - 2. Shop drawings showing standard pipe section, wall thickness, coating, and other pertinent information for line posts and end posts.

PART 2 - MATERIALS

2.01 GENERAL

- A. To ensure system integrity, the chain link system, framework, fabric, fittings, gates and accessories must be obtained from a single source.

2.02 CHAIN LINK FABRIC

- A. Chain link fence fabric shall be two-inch (2") diamond mesh size with 9-gauge wire

- B.** Chain link fence fabric shall be made of steel wire helically wound and interwoven in such a manner as to provide a continuous mesh without knots or ties except in the form of knuckling or twisting the ends of the wire to form the desired selvage of the fabric. Chain link fabric shall be knuckled along the top and bottom. Wire strengths shall conform to ASTM A817.
- C.** Fencing fabric shall be 6 feet (+/- 3/4") high unless otherwise shown.
- D.** Chain link fence fabric shall be hot-dipped galvanized after weaving, conforming to ASTM A392 and shall have a Class 2 coating with zinc coating not less than 2.0 oz. a square foot.

2.03 STEEL PIPE

- A.** Steel pipe used for posts, rails and braces shall have a minimum steel yield strength of 30,000 psi conform to ASTM F1043 Group IA, regular strength grade ASTM F1083, schedule 40 hot-dip galvanized pipe having a zinc coating of not less than 2.0 oz. a square foot on the outside and inside surface.
- B.** Line posts shall be 2-3/8 inch outside diameter with wall thickness of 0.154-inches, weighing 3.65 pounds per foot.
- C.** Corner and end posts shall be 5-9/16 inch outside diameter with wall thickness of 0.258-inches, weighing 14.63 pounds per foot.
- D.** Mid braces and bottom rails shall be 1-5/8-inch outside diameter with wall thickness of 0.140-inches, weighing 2.27 pounds per foot.

2.04 GATES, FRAMES AND POSTS

- A.** Gate frames shall be 1-5/8-inch outside diameter with wall thickness of 0.140-inches, weighing 2.27 pounds per foot. Gate frames shall be provided with a 4-inch by 4-inch opening in fabric for locking chain.
- B.** Gate posts shall be 4-inch outside diameter with wall thickness of 0.226-inches, weighing 9.12 pounds per foot. Each swing gate leaf shall be provided with a two diagonal braces. Gate post braces shall be 1-5/8-inch outside diameter with wall thickness of 0.140-inches, weighing 2.27 pounds per foot.
- C.** Chain link swing gates shall be constructed/installed as per ASTM F900.

2.05 MISCELLANEOUS FITTINGS & ACCESSORIES

A. All chain link fence etc. described below shall conform to ASTM F626 as applicable.

1. Post caps shall be made of steel, cast iron or aluminum alloy and must be weatherproof to prevent moisture intrusion into post. Top with arm to be provided when barbed wire is specified. Intermediate or line post tops to have loop for top rail when specified.
2. Gate hinges, drop bar locking devices, caps, gate stops and miscellaneous nuts, bolts, screws, bands, and other appurtenances shall be consistent in quality and strength to the rest of the fence.
3. Bottom rail ends shall be formed steel or iron, designed to provide secure connection of top rails to terminal post and brace or other rails to terminal and intermediate posts.
4. Top tension wires and hog rings to attach fabric mesh to tension wires shall be at least 7-gauge coil spring steel having a tensile strength of 75,000 psi.
5. Fabric ties shall be 9-gauge for attachment of chain link fabric to rails. Wire clips shall be minimum 6-gauge, hot dip galvanized. Steel bands shall be minimum 11-gauge, one-inch wide, hot dip galvanized.
6. Fabric bands and brace bands to be pressed steel.
7. Tension (stretcher) bars to be made of one continuous piece of steel or aluminum, 3/16" x 3/4", in the same height as the fence. Provide one bar, per end or gate post and two bars per corner or pull post.
8. Truss rods shall be 3/8-inch outside diameter and shall have turnbuckles or similar means of adjustment.
9. All nuts and bolts shall be 3/8" diameter, hot dip galvanized.
10. **Boys Ranch Site:**
Razor wire shall be galvanized coated steel wire, concertina style wire, CBT-65 reference number. Razor wire shall be installed above all gates.
11. **Jackson Site:**
Barbed wire shall be galvanized coated steel wire, double strand, 13 gauge, twisted line wire with aluminized steel 4 point barbs, spaced approximate 3" on center. Barbed wire shall be installed above all gates. Vertical extension arms for barbed wire shall be steel or malleable

iron with provisions for attaching 3 rows of barbed wire. Arms shall withstand 250 lb. (113.5 kg) pull at outermost end of arm without failure.

2.06 FENCE SLATS

- A. Fence slats shall be flat tubular in shape, with reinforced “legs” inside for extra durability. Slats shall be extruded from High Density Polyethylene, color pigments and ultra violet (UV) inhibitors, specifically designed to retard the harmful effects of the sun and lengthen the life of the product. Slats shall be as wide as to maximize coverage area of the chain link fabric with a minimum 75% wind load and privacy factor. Slats shall be Bottom – Lock type as manufactured by Pexco, or equal. Color of slats to be determined by City.

2.07 CONCRETE

- A. Concrete for post foundations shall be as specified in SECTION 03300 - CONCRETE.

PART 3 - EXECUTION

3.01 GENERAL

- A. Fencing shall be installed in accordance with ASTM F567.

3.02 FENCE

- A. Line posts shall be equally spaced between corners, end posts, and gateposts at a spacing not exceeding 10-feet. Posts shall be set vertical, shall be accurately aligned, and shall have their tops level or at a constant slope between changes in grade. Tubular posts shall be fitted with extension arms for barbed wire. Post top shall permit passage of top rail or rainproof malleable iron caps as applicable.
- B. All posts shall be centered in concrete foundation and shall be set into the concrete to a minimum depth of 36-inches. Corner, end, and gate posts shall be set in concrete foundations not less than sixteen inches (16”) in diameter, and line posts shall be set in concrete foundations not less than twelve inches (12”) in diameter. The top surface of the concrete foundations shall be at least one inch (1”) above grade, be sloped to drain, and have a neat and uniform appearance.
- C. Corner, end, and gateposts shall be braced to the nearest line post. Corner and end posts shall be braced as shown on the Drawings. Bracing for gateposts shall be horizontal braces with truss rods. Line posts shall be braced horizontally and trussed in both directions with truss rods at 10-

foot minimum intervals. Top rails, where specified, shall be in lengths not less than 18-feet and shall be fitted with couplings for connecting lengths into continuous runs. Couplings shall be not less than 6-inches long and allow for expansion and contraction of the rail.

- D. Chain link fabric shall be taut and shall be attached to posts, rails, and wires with galvanized fabric bands or tie wires at a maximum spacing of 12-inches on posts and 18-inches on the rails or tension wires. Stretcher bars shall be provided at ends of fabric. The bottom rail shall be located a minimum of 1-inch and maximum of 2-inches above the finished grade and on a straight grade between posts by excavating the high points of ground, and in no case shall depressions be filled.

3.03 GATES

- A. All swing and man gates shall be installed to the manufacturer's specifications. Gate frames shall be fabricated with welded joints or rigid connectors. The fabric shall be the same as that used for the fence and shall be rigidly attached to the frames. Frames shall be suitably braced and trussed. Gates shall be equipped with suitable offset hinges to permit a 180-degree swing and a drop bar locking device with provision for padlocking. A stop to hold the gate open and a center rest with catch shall be provided. City will provide the locks.

3.04 GALVANIZED COATING REPAIR

- A. Any galvanized coating damaged during construction of the fencing shall be repaired as stated in SECTION 09900 - PAINTING.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-6 – CHAIN LINK FENCING (BOYS RANCH #2A)
Bid Item No. B-6 – CHAIN LINK FENCING (JACKSON #3)

-END OF SECTION-

SECTION 03300 - CONCRETE

Bid Item No. A-7, B-7

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary for furnishing and placing of all concrete for construction of the well pump pedestal, slab, utility pads, thrust blocks and other miscellaneous concrete structures including forms, reinforcing steel, cement finishing, fence footings and all other miscellaneous related work, complete. The Contractor shall determine the mix proportions for concrete in conformance with these specifications.

1.02 SUBMITTALS

- A. The Contractor shall submit complete data on the concrete mix for approval of all materials used in the mixture, in conformance with ASTM C94, as last amended.
- B. The Contractor shall make the following submittals for the Engineers approval:
1. Complete data on each concrete mix including aggregate gradations and admixtures in conformance with ASTM C94.
 2. Submit either data compiled by a certified Testing Laboratory from a minimum of 30 previous compression tests or a batch test for each proposed mix design.
 3. Curing compound, joint filler, and joint sealant data, including the manufacturer's application instructions.
 4. Reinforcing steel shop drawings in accordance with CRSI 1990 Manual of Standard Practice and ACI Standard Practices.

1.03 TESTING

- A. The City reserves the right to have test cylinders taken and tested by an approved testing laboratory to verify strength of the concrete. Acceptance and evaluation of the concrete strengths shall be by the City in accordance with ACI 318, current edition.

1.04 STANDARDS

- A.** All work in this section shall conform to the requirements in the Specifications set forth herein, in the Drawings, with Section 90 of the CALTRANS Standard Specifications, and in accordance with the applicable ACI, ASTM, and CRSI Standards.

PART 2 - MATERIALS

2.01 PORTLAND CEMENT

- A.** Portland cement shall be Type II-V low alkali. Milling data sheet shall be provided with submittal demonstrating compliance with ASTM C150, as last amended.

2.02 FLY ASH

- A.** Class F coal fly ash as a raw or calcined natural pozzolan may be used to replace up to 25% by mass of Portland cement in concrete mixtures. Materials data sheet shall be provided with submittal demonstrating compliance with ASTM C618, as last amended.

2.03 SLAG CEMENT

- A.** Ground granulated blast furnace slag, Grade 100 minimum, may be used to replace up to 25% by mass of Portland cement in concrete mixtures containing fly ash. If no fly ash is used in the mixture, up to 50% slag cement, by mass, may be used to replace Portland cement. Milling data sheet shall be provided with submittal demonstrating compliance with ASTM C989, as last amended.

2.04 AGGREGATE

- A.** Fine aggregates shall be clean, hard, natural and free from all foreign matter. Coarse aggregate shall be sound, crushed rock or gravel, free from adherent coating, organic water or injurious amounts of flat or friable pieces. All aggregates shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.
- B.** Fine and coarse aggregate shall conform to ASTM C33 or CALTRANS Standard Specifications Section 90-3.04, as shown below. The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the concrete that meets the grading requirements below:

GRADING LIMITS OF COMBINED AGGREGATES

<u>Sieve Sizes</u>	<u>1" Max.</u>
1 1/2"	100%
1"	90%-100%
3/4"	55%-100%
3/8"	45%-75%
No. 4	35%-60%
No. 8	27%-45%
No. 16	20%-35%
No. 30	12%-25%
No. 50	5%-15%
No. 100	1%-8%
No. 200	0%-4%

2.05 WATER

- A. Water for washing aggregate, mixing, and for curing shall be free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1,000 mg/L of chlorides as Cl, nor more than 1,300 mg/L of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than twenty five percent (25%) in the setting time of the mix nor a reduction of more than five percent (5%) in the compressive strength of the mix at 14-days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the mix.

2.06 CHEMICAL ADMIXTURES

- A. To facilitate concrete construction applications, Water-Reducing (Normal, Mid-Range, and High-Range) and Set-Controlling Admixtures such as Type A or F, (water-reducing); Type B, (retarding); or Type D or G, (water-reducing and retarding) admixtures, meeting ASTM C494, as last amended, are permitted for use.

2.07 AIR-ENTRAINING ADMIXTURES

- A. Air entraining admixtures shall meet the requirements of ASTM C260 as last amended.

2.08 REINFORCING STEEL

- A. Reinforcing bars shall meet the requirements of ASTM A615 as last amended, for structural grade, deformed bars, (except that 1/4" shall be plain rounds). No. 5 bars and smaller shall be

minimum Grade 40, No. 6 bars and larger shall be Grade 60. Welded wire fabric shall meet the requirements of ASTM A185. All reinforcements shall be clean and free of paint, loose rust, scale, and shall be securely held in place and tied at all intersections, corners, and splices with #16-gauge minimum annealed wire. Provide concrete blocks of same strength as the concrete mix to support reinforcing bars. Do not use broken concrete brick or stone.

2.09 FORMS

- A. Forms shall be accurately constructed of clean lumber. The surface of forms against which concrete is placed shall be smooth and free from irregularities, dents, sags or holes. Forms shall be a minimum size of 1-inch thick, or other suitable material spaced with spreaders, and tied together, all subject to the Engineer's approval. Removal of forms shall be as directed with all debris removed, in, under, or around the structures. Forms shall be mortar-tight, true to the dimensions, lines and grades of the structure, and of sufficient strength to prevent dislocation of the formwork during the placement of the concrete. Forms shall follow the recommendations of ACI 347, unless otherwise specified.

2.10 FORM TIES

- A. Form ties on exposed surfaces shall be located in a uniform pattern or as indicated on the Drawings. Form ties shall be constructed so that the tie remains embedded in the wall, except for a removable portion at each end. Form ties shall have conical or spherical type inserts, inserts shall be fixed so that they remain in contact with forming material, and shall be constructed so that no metal is within 1-inch of the concrete surface when the forms, inserts, and tie ends are removed. Wire ties will not be permitted. Ties shall withstand all pressures and limit deflection of forms to acceptable limits.

2.11 BITUMINOUS TYPE PREMOLDED JOINT FILLER

- A. Bituminous type pre-molded joint filler shall conform to ASTM D994 or D1751, as last amended, unless otherwise shown or specified on the Drawings.

2.12 JOINT SEALANT

- A. Joint sealant shall be a two-component, traffic grade polyurethane, elastomeric sealant, and shall conform to ASTM C920, Type M, Grade NS.

2.13 CURING COMPOUND

- A. The curing compound to be used shall be Non-Pigmented-Chlorinated Rubber Base-Clear, as listed in CALTRANS Standard Specifications Section 90-7.01B conforming to ASTM C309,

Type 1, Class B, as last amended.

2.14 BONDING COMPOUNDS

- A.** Bonding compounds shall be recommended by manufacturer as suitable to meet job requirements with regard to surface, pot life, shelf life, set time, vertical or horizontal application, forming restrictions, etc. Furnish manufacturer's specific instructions for this job application, and obtain Engineer's review prior to purchase.
- B.** Epoxy resin bonding compounds shall be used for wet areas and shall be Adhesive Engineering, Concrese Nos. 1001, 1001-LPL or 1180 as applicable; Sika Chemical Corporation, Sikadur 35, Hi-Mod LV, Sikadur 32, Hi-Mod, or Sikadur 31, Hi-Mod Gel as applicable; Burke Company 881 LPL Epoxy; or equal.
- C.** Non-epoxy bonding compounds shall be used for dry areas and shall be Burke Company, Acrylic Bondcrete; Imperial Chemical Industrial, Inc., Thoro System Products, Acryl 60; Thorobond; or equal. Bonding compounds shall be applied in accordance with the manufacturer's instructions.

2.15 VAPOR BARRIER

- A.** Subgrade preparation of the concrete floor slab shall include applying a 0.004-inch thick polyethylene film vapor barrier over a 4-inch thick $\frac{3}{4}$ -inch maximum clean, crushed rock layer. The barrier shall be covered by 2-inches of moist sand. The polyethylene film shall be Visqueen as manufactured by Visking Co., Fremont, CA, or approved equal, and shall be installed per the manufacturer's instructions.

PART 3 - EXECUTION

3.01 CONCRETE

A. Mixing

Concrete may be ready-mixed or batch mixed at the site. Ready mix concrete shall conform to ASTM C94, as last amended. Concrete shall be placed within 1-1/2-hours after cement has been added to the mix. A delivery ticket shall be furnished to the Engineer with the following information:

1. Name of concrete supplier
2. Serial number of ticket
3. Date
4. Truck number
5. Mix Identification #

6. Amount of concrete
7. Time loaded
8. Water added
9. Time unloaded

On-site batch mixing shall be performed upon written approval of Engineer. After all ingredients are in the mixer, concrete shall be mixed for a minimum of 1-1/2-minutes.

B. Slump

Slump shall be tested to meet the requirements of ASTM C143, as last amended. Slump range shall be 4 ± 1 -inches for ring wall, pump stations, slabs, utility pads, pipe embedment, pipe and fence encasements, and thrust blocks. Slump range shall be 9 ± 1 -inches for control density fill applications such as trench backfill, pipe bedding, or pipe filling for abandonment in place.

C. Compressive Strengths

1. Structural Concrete

Unless otherwise specified on the Drawings, the minimum allowable 28-day compressive strength for structural concrete (used for slabs, foundations, pump pedestal, thrust blocks, ringwalls, duct banks, etc.) shall be 3,000 psi when cured and tested in conformance with ASTM C31 and C39, as last amended.

2. Minor Concrete

Unless otherwise specified on the Drawings, the minimum allowable 28-day compressive strength for minor concrete structures (used for small utilities pads, and other miscellaneous concrete pours) shall be 2,500 psi when cured and tested in conformance with ASTM C31 and C39, as last amended.

3. Control Density Fill / Slurry

Unless otherwise specified on the Drawings, the minimum allowable 28-day compressive strength for control density fill and slurry concrete shall be 50-150 psi when cured and tested in conformance with ASTM C31 and C39, as last amended.

4. Water/Cementitious Materials Ratio

Cementitious materials include, but are not limited to, Portland cement, Slag Cement, and Fly Ash. The maximum allowable water-cementitious materials ratio (w/cm) for minor and structural concrete mixtures is 0.5 unless otherwise specified on the contract drawings. The maximum allowable w/cm for control density fill is not limited unless otherwise specified on the contract drawings. The water content of all admixtures and aggregates shall be taken into account in the determination of the w/cm.

3.02 FORMS

- A.** Concrete structures shall be constructed as shown on the Drawings. Construct forms accurately to dimensions and elevations required and to be strong and unyielding. Construct forms with tight joints to prevent the escape of mortar and to avoid the formation of fins. Brace as required to prevent distortion and to fully support all loads during concrete placement and curing. The inside surfaces of forms shall be cleaned of all dirt, mortar, and foreign material prior to placing concrete. Forms shall be kept wet before concrete is placed.

3.03 PLACING REINFORCING STEEL

- A.** Place reinforcing steel, when required, in accordance with the Drawings, ACI 301, and Concrete Reinforcing Steel Institute's (CRSI) "Recommended Practice for Placing Reinforcing Bars," except as modified herein. The reinforcement shall be so secured in position that it will not be displaced during the placement of concrete. All reinforcing steel, welded wire reinforcement, and tie wire shall be completely encased in concrete. Reinforcing steel shall not be welded unless specifically required by the Drawings or otherwise directed by the Engineer. Bars shall not be straightened or re-bended in a manner that will damage the material; all reinforcing steel shall be cold bent. All reinforcements shall be clean and free of paint, loose rust, and scale.
- B.** Minimum length of splices shall be as herein specified. Top bars shall be defined as any horizontal bar placed such that twelve inches (12") of fresh concrete is cast below in any single pour. Horizontal wall bars are considered top bars. All top bars shall have 42 diameter lap with minimum of 24-inches. All other bars shall have 30 diameter lap with minimum of 18-inches. Tie splices with #16-gauge minimum annealed wire as specified in the referenced CRSI standard.

3.04 PLACING CONCRETE

- A.** Prior to placing concrete, remove water from excavation and all debris and foreign material from forms. Check the reinforcing steel, if required, for proper placement and correct any discrepancies. Before depositing new concrete on old concrete, clean surface and pour a cement sand grout to a minimum depth of 1-inch over the surface.
- B.** Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, minimizing splashing on forms or steel above, and in layers not over 2-feet deep. The vertical drop to final placement shall not exceed 6-feet. Placement shall conform to the requirements of ACI 301 and ACI 318, except as modified herein. No concrete shall be placed or used after it has begun to set, and no tempering shall be allowed. Chuting will be permitted only if means are taken to prevent segregation.
- C.** Do not place concrete when the ambient temperature is below 40-degrees F or approaching 40-

degrees F and falling, without special protection as approved by the Engineer. Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at no additional cost to the City. The Contractor shall conform to the requirements of “Hot Weather Concreting” as reported by ACI Committee 305R when placing concrete in hot weather.

- D. Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.
- E. All concrete shall be vibrated during placement to assure a dense and homogeneous set. Apply concrete vibrator at points spaced not farther apart than vibrator’s effective radius. Apply close enough to forms to vibrate surface effectively but not damage form surfaces. Vibrate until concrete becomes uniformly plastic. Vibrator must penetrate the fresh placed concrete and into the previous layer of fresh concrete layer below.

3.05 PLACING CONCRETE PAVEMENT

- A. Portland cement concrete pavement shall conform to Section 40 “Portland Cement Concrete Pavement” of the CALTRANS Standard Specifications, ASTM C94, ACI 304R, and these Specifications. The Portland cement concrete shall be constructed in conformance with the requirements of Section 90 “Portland Cement Concrete” of the CALTRANS Standard Specifications. Portland cement concrete pavement shall be constructed to the dimensions, lines and grades shown on the Plans.
- B. The Contractor shall make adequate advance arrangements to prevent delay in delivery and placing of concrete. An interval of more than forty-five (45) minutes between placing of any two (2) consecutive batches or loads shall constitute cause for stopping paving operations, and the Contractor shall make a construction joint, in the concrete already placed, at the location and of the type directed by the Engineer. Such construction joint shall be made at the Contractor’s expense.
- C. Slip-form paving and finishing equipment shall be properly adjusted and in satisfactory operating condition. Prior to placing concrete, the Contractor shall demonstrate proper adjustment of all screeds and floats on slip-form pavers by measurement from grade stakes driven to known elevations. Satisfactory operation and adjustment of all propulsion and control equipment, including pre-erected grade and alignment lines, shall be demonstrated by moving slip-form pavers and finishing machines over a five-hundred-foot (500’) length of prepared subgrade with all propulsion and control equipment fully operational.

- D. All pavement concrete shall be placed while fresh. The use of water for re-tempering any concrete will not be permitted. The temperature of the concrete mix at the time of placement shall not exceed 90-degrees F. Pavement shall be placed, finished, textured, cured, protected, and repaired in accordance to Section 40 "Portland Cement Concrete Pavement" of the CALTRANS Standard Specifications, except that final texturing with a spring steel tine will not be required and pavements shall be finished by ACI certified finishers and also in compliance with ACI 121R.

3.06 CONSTRUCTION JOINTS

- A. Locate as shown or as approved, except that maximum spacing between construction joints shall be 10-feet.
- A. The pre-molded joint filler shall be of sufficient width to completely fill the joint space.

3.07 FINISHING

- A. Concrete work for the pump station pedestal/slab shall be ball floated with a wood float and finished with a light broom finish. All exposed edges shall be finished with a steel-edging tool.
- B. Sidewalks and exterior slabs available to foot traffic shall be ball floated with a wood float, wood troweled, and lightly troweled with a steel trowel, and finished with a coarse broom to obtain a nonskid surface.
- C. All other concrete work shall be ball floated with wood float and troweled with steel trowel to a smooth finish free from trowel marks. Do not absorb wet spots with neat cement.

3.08 REMOVAL OF FORMS

- A. Remove forms after concrete has set sufficiently to carry the dead load and construction load it has to sustain and when approved by the Engineer. The minimum time or strength allowed before backfilling is allowed against concrete slabs and walls shall be three (3) days or 2,000 psi, unless otherwise approved by the Engineer. Remove forms with care to prevent scarring and damaging the surface.
- B. Immediately upon the removal of forms, voids shall be neatly filled with cement mortar, non-shrink grout, or epoxy bonding agent and repair mortar as required for the application and as directed by the Engineer.

3.09 PROTECTION AND CURING

- A. Protect fresh concrete from direct rays of the sun, drying winds, and wash by rain, when possible. Cure formed surfaces with an approved curing compound applied in conformance with the manufacturer's directions as soon as the forms are removed and finishing completed.
- B. The curing compound shall be uniformly applied immediately after the finishing operation, before the moisture sheen disappears from the surface. The curing compound shall be used within 120-days of manufacture.

3.10 PATCHING

- A. Cut out all honeycombed and defective areas. Cut edges perpendicular to surface at least 1-inch deep, no feather edge allowed, and patch. Using bonding agent, fill holes' flush with cement mortar composed of 1-part cement and 2-parts sand. Rub surface with wood float and burlap. Keep patches damp for a minimum of 7 days or spray with curing compound to minimize shrinking. Fill all form tie holes in same manner. Defective work shall be corrected to the satisfaction of the Engineer.

3.11 CONCRETE BEDDING AND ENCASEMENT

- A. Place concrete bedding up to a height of 1/3 of the outside diameter of the pipe in all trenches requiring concrete bedding. Place concrete bedding and encasement in such a manner that no dirt or foreign material becomes mixed with the concrete. Concrete shall be placed as shown on the Drawings. Concrete shall have sufficient strength before any additional backfill material is placed in the trench.

3.12 TESTING

- A. The City shall have test cylinders taken and tested by an approved testing laboratory to verify strength of the concrete, in conformance with ASTM C31. Acceptance and evaluation of the concrete strengths shall be by the City in accordance with ACI 318.

3.13 FAILURE TO MEET STRENGTH REQUIREMENTS

- A. Concrete is expected to reach higher compressive strength than that which is indicated in 3.01. The strength level of concrete will be considered acceptable if following conditions are satisfied per ACI 318:
 - 1. The averages of all sets of 3 consecutive strength test results are greater or equal to the specified compressive strength.

2. No individual strength test (average of 2 cylinders) falls below the specified compressive strength, by more than 500 pounds per square inch.
3. Whenever one, or both, of 2 conditions stated above is not satisfied, the City may request the Contractor to provide additional curing of affected portion followed by cores taken in accordance with ASTM C42, ACI 318, and ACI 350 and comply with the following requirements:
 - a. If the additional curing does not bring average of 3 cores taken in affected area to at least specified compressive strength, designate such concrete in affected area as defective.
 - b. The Engineer may require the Contractor to strengthen defective concrete by means of additional concrete, additional reinforcement, or replacement of all defective concrete, all at the Contractor's expense.
4. If the above conditions are not satisfied and the concrete fails to meet the minimum 28-day compressive strength, the under-strength concrete shall be removed and replaced at no additional cost to the City.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-7 – CONCRETE (BOYS RANCH #2A)

Bid Item No. B-7 – CONCRETE (JACKSON #3)

-END OF SECTION-

SECTION 03400 - PRECAST CONCRETE

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary to furnish and install all precast concrete boxes, catch basins, manholes and appurtenances, complete.

1.02 GENERAL

- A. Precast concrete structures shall be constructed of units of the types, dimensions, arrangements, and coursing indicated on the drawings and specified herein, complete with all materials, accessories, and appurtenances as indicated, specified, or required.

1.03 SUBMITTALS

- A. The Contractor shall make the following submittals:

1. Shop drawings for all precast concrete items. Submitted drawings shall show all dimensions, location and type of embedded items, knockouts, lifting inserts, and details of reinforcement and joints.
2. The design criteria used by the manufacturer, for all precast items.
3. Approved ICBO reports for all lifting inserts, showing allowable design loads on the inserts.
4. Verification of compressive strength. Such verification shall be laboratory trial batch test results with a minimum of three test cylinders or a series of production compression tests with a minimum of 20 sets of test data which fall within the acceptance criteria specified herein. Such tests must have been made within the previous 2 years on the identical concrete mix submitted.

PART 2 - MATERIALS

2.01 PRECAST BOXES, VAULTS, AND MANHOLES

A. Size

Boxes, vaults, and manhole dimensions shall be as required on the Drawings.

B. Material

Concrete used for precast boxes, vaults, and manholes shall have a minimum compressive

strength of 3,000 psi, unless otherwise shown on Drawings.

C. Covers

Unless otherwise noted on the Drawings, electrical manholes and pull boxes shall have concrete covers with minimum 30-inch diameter galvanized steel lids, which are bolted to galvanized steel frames with stainless steel bolts. Valve and meter boxes shall have cast iron covers. Valve boxes shall have triangular-shaped covers. The frames and lids shall be provided by the box or vault manufacturer. All covers shall have a minimum of two hex head bolts to secure them to the frame. Covers shall have lifting handles. When leveling bolts are used to set the vault top sections, the Contractor shall ensure that the load on the vault will be transferred through the mortar to the vaults and will not be carried by the leveling bolts. All covers shall be marked with cast-in or weld bead lettering to identify the service as shown. All manhole covers which do not fit neatly and bear firmly in the ring will be rejected.

D. Loading

Where boxes, vaults, or manholes are in areas that may be subjected to vehicular traffic, they shall be designed for H-20 traffic loading. In other areas, they shall be designed for a vertical live load of 300 psf. Lateral loads on all boxes, vaults, and manhole walls shall be as follows:

1. Soil Static: $65 \times h$ (psf) triangular equivalent fluid pressure plus surcharge of 240 psf in areas designated for vehicular traffic, where h = depth of fill (feet).
2. Soil Seismic: $29 \times h$ (psf) uniform load distribution, where h = depth of fill (feet).
3. Seismic Acceleration: As determined using the provisions set forth in the CBC Zone 4 requirements but with $Z = 0.5$, $I = 1.25$ but not less than 0.28 g acting on structure mass.

2.02 PRECAST STORM DRAIN AND SEWER MANHOLES AND COVERS

- A. Precast manhole barrels, risers, cones, and grade rings shall conform to ASTM C478 with the additional requirement that the cement used shall be Type II. Standard concentric cones shall be used on all manholes and manhole sections shall be manufactured without the provision for steps. Manhole bases shall be precast when the internal diameter of the largest pipe is less than thirty-three inches (33"). Standard concentric cones conforming to ASTM C478 shall be used. Storm drain manholes and manhole covers shall conform to the County of Santa Clara and City of Morgan Hill.

2.03 SITE-CAST ITEMS

- A. Site-cast items shall conform to SECTION 03300 - CONCRETE and shall include all reinforcing steel, embeds, and other items necessary for such placement. All portions of embeds which

remain embedded in the concrete shall be made of stainless steel.

2.04 NON-SHRINK GROUT

- A. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, nonmetallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or container in which the materials are packaged. Non-metallic aggregate grout shall be Five Star Products Inc. Five Star Grout, Master Builders Masterflow 928, Burke Company Non-Ferrous, Non-shrink grout, or approved equal. Grout shall conform to CALTRANS Standard Specifications Section 58-2.02D. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application:

Class A

Class A non-shrink grout shall have a minimum 28-day compressive strength of 5,000 psi, no shrinkage (0%), a maximum four percent (4.0%) expansion in the plastic state when tested in accordance ASTM C827, and shall have no shrinkage (0%) and a maximum of 2 tenths percent (0.2%) expansion in the hardened state when tested in accordance with CRD C621. Class A non-shrink grout shall be used for the repair of all holes and defects in concrete members which are water bearing or in contact with soil or other fill material, grouting under all equipment baseplates, and at all locations where grout is specified in the contract documents; except for those applications for Class B non-shrink grout and epoxy grout specified herein. Class A non-shrink grout may be used in place of Class B non-shrink grout for all applications.

Class B

Class B non-shrink grout shall have a minimum 28-day compressive strength of 5,000 psi and shall meet the requirements of CRD C621. Class B non-shrink grout shall be used for the repair of all holes and defects in concrete members which are not water-bearing and not in contact with soil or other fill material, grouting under all baseplates for structural steel members, and grouting railing posts in place.

2.05 RESILIENT CONNECTORS

- A. Resilient connectors shall conform to ASTM C923 and shall be a flexible compression gasket, which is set during the precast process or a boot connector, shall be Calpico Pipe Link, Kor-N-Seal, A-lock, or approved equal.

2.06 MORTAR

- A. Unless otherwise specified on the Drawings, masonry mortar shall have a 28-day compressive strength of not less than 2,000 psi in accordance with ASTM C109.

1. Aggregate

Fine aggregate shall conform to ASTM C144, fine aggregate for mortar. Aggregate shall conform to ASTM C404, aggregates for masonry grout. Aggregate shall be non-reactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing grout work.

2. Cement

Portland cement shall be Type II-V low alkali. Milling data sheet shall be provided with submittal demonstrating compliance with ASTM C150, as last amended.

3. Hydrated Lime

Hydrated lime shall conform to the latest revision of ASTM C207, Type S. Quicklime shall conform to ASTM C5, pulverized. Lime putty shall be Quicklime, conforming to ASTM C1489.

4. Water

Water for washing aggregate, mixing, and for curing shall be free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1,000 mg/L of chlorides as Cl, nor more than 1,300 mg/L of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than twenty five percent (25%) in the setting time of the mix nor a reduction of more than five percent (5%) in the compressive strength of the mix at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the mix.

5. Admixtures

Admixtures may be used in mortar to retard curing and provide additional workability, provided that the admixture does not adversely affect bonding or compressive strength. Water reducing admixtures shall be ASTM C494 Type D and shall be Master Builders Pozzoloth 300R, Sika Corporation Plastiment, or equal. Set retarding admixtures shall be ASTM C494 Type B and shall be Master Builders Pozzoloth 300R, Sika Corporation Plastiment, or equal.

2.07 EPOXY ADHESIVE

A. Epoxy adhesives shall conform to CALTRANS Standard Specifications Section 95.

2.08 PREFORMED JOINT SEALANT

- A. The joint sealing compound shall be Quik-Seal, a preformed, cold-applied, ready to use plastic joint sealing compound as supplied by Quikset Utility Vaults; Ram-Neck by K.T. Snyder Company; or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Precast items shall be installed in accordance with the manufacturer's recommendations, unless otherwise shown on the Drawings. All joints shall be sealed by the use of preformed sealant so as to be watertight. All precast items shall be set on a minimum foundation of six inches (6") of Class 2 aggregate base and compacted to at least ninety five percent (95%) relative compaction, unless otherwise shown on the Drawings.
- B. Connections to manufactured precast items shall be made by casting sections of pipe into the items, using non-shrink grout as shown on the Drawings, and/or using an approved resilient connector. All such connections shall be watertight.

3.02 MASONRY MORTAR

- A. Masonry mortar shall be used to seal reinforced concrete pipe joints. Masonry mortar shall be placed in accordance with the requirements of CALTRANS Standard Specifications Section 51, Section 58-2.03 and Section 65-2.02F.
- B. Mortar shall be mixed in volumetric proportions as follows:

Service and Type	Portland Cement	Hydrated Lime or Lime Putty	Sand (Max)
Type M, S	1	1/4	Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials.

Mixing

Mortar shall be mixed in accordance with ASTM C270 to obtain type mortar required. Mortar materials shall be measured in 1 cubic foot containers to maintain control and accuracy of

proportions; measuring materials with shovels is not permitted. Mortar shall be mixed in a mechanical batch mixer for not less than 3 nor more than 5 minutes after all ingredients are in so as to produce a uniform mixture. Water shall be added gradually as required to produce a consistency suitable for the purpose intended. Admixtures of hydrated lime, fire clay, diatomaceous earth or other approved inert material may be used in the mortar to facilitate workability if the Contractor elects. Unless otherwise specified, concrete grout shall have a slump ranging from 5 to 8 inches.

Mortar not formulated to include retarding admixtures, which has not been placed in final position within 1-1/2 hours after the initial mixing, shall not be retempered and used. No mixing off the job site, either complete or in part, will be allowed with exception for mixing of lime putty. Mortar left on hand when work is stopped shall be discarded. Use of antifreeze compounds, salts, or other substances to lower the freezing point of mortar is prohibited.

Where colored mortars are required, pigments may be added at the site or provided as part of prepackaged mortar mix. When masonry cement is used, mixing shall conform to printed instructions of the masonry cement manufacturer. Dosages and mixing of integral waterproofing shall conform to the manufacturer's recommendations.

Placement

Fully mortar web and face shells, head joints shall be at least as thick as CMU face shell thickness

3.03 NON-SHRINK GROUT

- A. Non-shrink, nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates, and bearing plates. Non-shrink metallic aggregate grout shall be used for setting anchor bolts and grouting reinforcing steel holes. Grout shall meet the requirements of CRD-C621 and shall be placed in accordance with manufacturer's instructions.
- B. Holes required for grouting shall be blown clean with compressed air and left free of dust or standing water. Horizontal holes for grouting shall be drilled at a slight downward angle to facilitate holding the grout until setting is complete. Bolts or reinforcing steel installed in horizontal grout holes shall be bent slightly accordingly.

3.04 STORM DRAIN, SEWER, AND OVERFLOW MANHOLES

- A. Construction of storm drain, sewer, and overflow manholes shall conform to the American Public Works Standards, detail B20-1 and these Specifications. Pipe connections to precast manhole bases shall be made with a resilient connector. For cast-in-place bases the connection shall be made with a water stop. All connections shall be water and soil tight. The method of

placement of mortar to finish the manhole shall conform to CALTRANS Standard Specifications Section 51-1.03.

- B.** Joints in precast manhole shafts shall be sealed by buttering the joint space of the previously laid barrel section or base with mortar or shall be sealed with preformed plastic sealing compound and installed as recommended by the manufacturer. All joint surfaces shall be thoroughly cleaned prior to placing the sealing compound or buttering with mortar. The inside and outside of mortared joints shall be plastered with mortar and the inside brushed to a smooth finish with a wet brush. Special precautions shall be taken to see that the entire joint space is filled with mortar, is watertight, and is approved by the Engineer.
- C.** The joint between the manhole frame and the cone or grade ring shall be sealed by buttering the joint space with mortar or epoxy adhesive.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Precast Concrete. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 09900 – PAINTING

Bid Item No. A-8, B-8

PART 1 – GENERAL

1.01 SCOPE

- A. This section includes everything necessary for, or incidental to, executing and completing the painting and coating of all above ground station piping, well pump motor and discharge head, except as otherwise hereinafter specifically excluded, complete.
- B. All necessary ventilation, lighting equipment, and scaffolding shall be furnished and installed by the Contractor. Such scaffolding shall conform to regulations of the State Industrial Accident Commission and local ordinances.

1.02 SUBMITTALS

- A. The Contractor shall submit the following items to the Engineer for review and color selection:
 - 1. **Color Cards**
Submit Color cards for all coatings proposed for use showing full range of standard colors.
 - 2. **Product Data**
Submit product data including generic description, complete technical data, surface preparation and application instructions.
 - 3. **Coating System Data Sheets**
Submit Coating System Data Sheets. A sample is included at the end of this Section.
 - 4. **Manufacturer's Certification**
Submit the manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
 - 5. **Warranty**
Submit the manufacturer's standard warranty.

1.03 SURFACES REQUIRING PAINTING

- A. The following items shall be painted: All exposed pump components including the motor, discharge head, and base plate, above ground piping, including valves and fittings.

PAINTING SCHEDULE

Indoor Coatings	System #	Color
Station Piping (Steel)	3,4,24	To be determined by Owner
Station Piping (Ductile Iron)	8	To be determined by Owner
PVC Conduit	17	To be determined by Owner

Outdoor Coatings	System #	Color
Station Piping (Steel)	3,4,24	To be determined by Owner
Station Piping (Ductile Iron)	7	To be determined by Owner
PVC Conduit	16	To be determined by Owner
Above ground well pump components	3	To be determined by Owner

1.04 SURFACES NOT REQUIRING PAINTING

- A. Manufacturer coated equipment such as the motor control center, telemetry, pneumatic components, roofing, machined surfaces, grease fittings, glass, equipment nameplates, aluminum and stainless steel components except as required for electrical insulation between dissimilar metals or where aluminum and stainless steel are in contact with concrete.

1.05 QUALITY ASSURANCE

A. Single Source

All materials of a paint system, including primer and finish coats, shall be produced by the same paint manufacturer unless otherwise approved by the Engineer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer of the particular coating.

B. Manufacturer Representative

The paint manufacturer shall provide a representative to visit the job site at intervals during surface preparation and painting as may be required for product application questions and to determine compliance with the manufacturer's instructions as may be required for product application quality assurance. A manufacturer representative's visit may be necessary to resolve field problems attributable to, or associated with, the manufacturer's products furnished under this contract.

C. Surface Preparation

Preparation of surfaces and application of coatings shall be in conformance with the applicable

AWWA, SSPC, and ASTM specifications, this Specification, and the printed recommendations of the paint manufacturer. All surfaces must be dry, clean, free of oil, grease, form release agents, curing compounds, laitance, other foreign matter and be structurally sound. Remove all loose paint, mortar spatter, mill scale, and rust.

D. Weather

Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with the manufacturer's instructions foremost. Abrasive blast cleaning shall not be performed whenever the relative humidity exceeds 85-percent, nor whenever the surface temperature is less than 5-degrees F above the dew point of the ambient air. The surface temperature shall be a minimum of 40-degrees F and at least 5-degrees above the dew point before coating can occur for all coating systems. Do not prepare surfaces or apply coatings in dust, smoke, rain, fog, or damp or humid weather or if the wind velocity is above the manufacturer's limit. Schedule coating work to avoid release of excessive dust and airborne contaminants.

E. Ventilation

Provide ventilation during coating evaporation stage in confined or enclosed areas.

F. Inspection

The Contractor shall give the Engineer a minimum of 3-days advance notice of the start of any surface preparation work or coating application work. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in his absence.

Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve the Contractor of his responsibility to perform the work in accordance with these Specifications.

For all coatings subject to immersion, full cure must be obtained for the completed system prior to submersion. Consult the coatings manufacturers written instructions for these requirements. The coating shall not be immersed for any purpose until completion of the curing cycle.

PART 2 – MATERIALS

2.01 GENERAL

A. All materials used, except as otherwise specified in carrying out the provisions of this contract, shall be manufactured by the following companies, or approved equals:

1. Devoe Coatings

2. TNEMEC
3. Rain Guard
4. Glidden Professional
5. Kelley Moore

B. Alternate systems will be considered subject to the review of the Engineer. Deviations from the specified paint systems must be reviewed by the Engineer prior to use. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all coating system materials used in contact with the production, treatment or distribution of drinking water including contact with raw water to be treated. Use only products that are in compliance with local VOC regulations.

2.02 PAINT MATERIALS

The following surface preparations and paint and coating materials shall apply to this project:

A. System Number 3 – (Indoor/Outdoor Coating) Exterior of Station Piping, Valves, Fittings, Pump Discharge Heads, Pump Motors, and Pump Base Plates.

All exposed steel surfaces exposed to weather or are located above grade inside a building shall be coated as follows:

1. Surface Preparation

Commercial Blast (SSPC 6)

2. First Coat

Aromatic Urethane, Zinc-Rich or Reinforced Inorganic Zinc Urethane

TNEMEC Series 90-97 Tneme-Zinc @ 2.5 to 3.5 mils DFT

OR

Devoe Catha-Coat 302H @ 2.5 to 4.0 mils DFT

3. Second Coat

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devoe Bar-Rust 235V (In Winter) or Bar-Rust 231 (In Summer) @ 4 to 6 mils DFT

4. Third Coat

Aliphatic Acrylic Polyurethane

TNEMEC Series 1075 Endura-Shield II @ 3 to 5 mils DFT

OR

Devco Devthane 379H @ 2 to 3 mils DFT

B. System Number 4 – (Indoor/Outdoor Coating) Exterior of Epoxy Coated Steel Piping, Valves, Fittings, Pump Discharge Heads, Pump Motors, and Pump Base Plates.

All steel piping with existing fusion bonded epoxy coating including valves, fittings, pump discharge heads, pump motors, and pump base plates that are exposed to weather or are located above grade inside a pump station building shall be coated as follows:

1. Surface Preparation

Hand Tool Clean (SSPC 2,3) Abrade and De-Gloss existing surface.

2. First Coat

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devco Bar-Rust 235V (In Winter) or Bar-Rust 231 (In Summer) @ 4 to 6 mils DFT

3. Second Coat

Aliphatic Acrylic Polyurethane

TNEMEC Series 1075 Endura-Shield II @ 3 to 5 mils DFT

OR

Devco Devthane 379H @ 2 to 3 mils DFT

C. System Number 7 – (Outdoor Coating) Exterior of Ductile and Cast Iron Pipe, Valves, and Fittings

All ductile iron and cast iron piping, valves, and fittings exposed to weather and ultraviolet light deterioration or underground conditions shall be coated as follows:

1. Surface Preparation

Hand Tool Clean (SSPC 2 and SSPC 3) Abrade and De-Gloss existing surface.

2. First Coat (Exterior Applications)

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devco Bar-Rust 235V @ 4 to 6 mils DFT

3. Second Coat (Exterior Applications)

Aliphatic Acrylic Polyurethane

TNEMEC Series 1075 Endura-Shield II @ 3 to 5 mils DFT

OR

Devco Devthane 379H @ 2 to 3 mils DFT

4. First Coat (Below Ground Applications)

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devco Devtar 5A-HS @ 6 to 8 mils DFT

5. Second Coat (Below Ground Applications)

Coal Tar Epoxy or Hydrocarbon Epoxy

TNEMEC Series 46H-413 Hi-Build Tneme-Tar @ 16 to 20 mils DFT

OR

Devco Devtar 5A-HS @ 6 to 8 mils DFT

D. System Number 8 – (Indoor Coating) Exterior of Ductile and Cast Iron Pipe Valves and Fittings

All ductile iron and cast iron piping, valves, and fittings located in a building or exposed to other interior humid conditions shall be coated as follows:

1. Surface Preparation

Hand Tool Clean (SSPC 2 and SSPC 3) Abrade and De-Gloss existing surface.

2. First Coat

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devco Bar-Rust 235V @ 4 to 6 mils DFT

3. Second Coat

Polyamidoamine Epoxy or High Solids Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devoe Bar-Rust 235V @ 4 to 6 mils DFT

E. System Number 16 – (Outdoor Coating) Exterior of PVC and Fiberglass Piping and Conduit Materials

The exterior of PVC and fiberglass piping and conduits exposed to weather and ultraviolet light shall be coated as follows:

1. Surface Preparation

PVC and Fiberglass surfaces shall be wiped with a clean rag and clean solvent compatible with the specified coating prior to coating application. Scarify all PVC or Fiberglass surfaces prior to coating.

2. First Coat

Polyamidoamine Epoxy or Waterborne Epoxy Primer

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devoe Devran 203 @ 3 to 4 mils DFT

3. Second Coat

Aliphatic Acrylic Urethane

TNEMEC Series 1075 Endura-Shield II @ 3 to 5 mils DFT

OR

Devoe Devthane 379H @ 2 to 3 mils DFT

F. System Number 17 – (Indoor Coating) Exterior of PVC and Fiberglass Piping and Conduit Materials

The exterior of PVC and fiberglass piping and conduits that are located inside buildings or enclosures and are not exposed to weather and ultraviolet light shall be coated as follows:

1. Surface Preparation

PVC and Fiberglass surfaces shall be wiped with a clean rag and clean solvent compatible with the specified coating prior to coating application. Scarify all PVC or Fiberglass surfaces prior to coating.

2. First Coat

Polyamidoamine Epoxy or Waterborne Epoxy Primer

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devoe Devran 203 @ 3 to 4 mils DFT

3. Second Coat

Polyamidoamine Epoxy or Waterborne Epoxy

TNEMEC Series V69F Hi-Build Epoxoline @ 4 to 6 mils DFT

OR

Devoe Bar-Rust 235V @ 4 to 6 mils DFT

G. System Number 24 – (Indoor/Outdoor Coating) Interior and/or Exterior Fusion Bonded Epoxy Coating

The interior and/or exterior of pipe coated with fusion bonded to be repaired, shall be as follows:

1. Surface Preparation

Defects in factory applied fusion bonded coatings for buried and non-buried applications shall be repaired with a manufacturer-approved liquid repair material for use at the project site. Contractor shall use all available means to protect coating from damage during shipping. Items will be rejected for extensive damage. Welding of coated segments will not be permitted.

Fusion bonding applicator shall submit to the Engineer the procedure to be employed for surface preparation, liquid coating application, and holiday inspection. Manufacturer's product data sheets shall be included. Alternates to materials specified will be considered subject to the approval of the Engineer.

All sharp edges and corners shall be ground smooth and all weld spatter, slag burrs, and other objectionable surface conditions must be removed prior to the surface preparation for coating. Lightly abrade or sandblast the existing Scotchkote 206N coating on either side of welds before application of the liquid epoxy coating. All surface irregularities, welds and weld spatter shall be ground smooth to a 1/8 inch radius. All surfaces shall be blasted to near-white metal in accordance with Steel Structures Painting Council Surface Preparation Specification SSPC 10 or NACE No. 2 near-white finish.

All pinholes, welds and damaged areas shall be patched with Scotchkote 312 coating, a two-component, 80% solids liquid epoxy coating.

Small nicks or chips in the Scotchkote 206N coating caused by field handling should be prepared prior to the application of Scotchkote 312 coating using a suitable solvent to remove all oils, grease, oxidation or other contaminants. If rust is apparent in the damaged area, remove as much as possible by wire brushing, grinding, filing or sanding. If the damaged area is more extensive, it is advisable to abrade or lightly sandblast to roughen the surface of the Scotchkote 206N coating before solvent washing and application of Scotchkote 312. Again, care should be taken to

remove as much rust as possible in an attempt to achieve a white metal surface.

Finish shall be pinhole free and checked, after cure, for continuity using a holiday detector in accordance with the coating manufacturer's instructions. All voids, cracks, and damaged areas will be touched up.

2. First Coat

Thermosetting dry powder epoxy

3M Company Scotchkote 312 @ 10 to 16 mils DFT

PART 3 – EXECUTION

3.01 GENERAL

- A.** No paint shall be reduced or applied in any way except as herein specifically called for, or as recommended by the manufacturer. Should conflict occur between specifications and manufacturer's recommendations and/or standard practice, the Engineer shall be notified prior to bid submittal for clarification.
- B.** It is the responsibility of the Contractor to inspect and provide substrata surfaces that are prepared in accordance with these Specifications and the printed directions and recommendations of the paint manufacturer whose product is to be applied.
- C.** All doors, windows, trim, moldings, base boards, electrical boxes, light fixture boxes, penetrations through the ceilings, walls or floors, shall be caulked prior to coating.

3.02 MATERIAL DELIVERY AND STORAGE

- A.** All materials shall be new and shall be delivered to the worksite in unopened containers that plainly show, at the time of use, the designated name, date of manufacturer, and name of manufacturer. Materials shall be stored in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the manufacturer.
- B.** Empty and dry paint containers may be disposed of onsite; however wet paint containers or containers with unused product may not be disposed as general debris and must be discarded as hazardous waste or taken back to Contractor's place of business for reuse. Washing of brushes in sinks that flow to sanitary must only be allowed if permitted by the owner or wash water collected and disposed by Contractor.

3.03 AIR QUALITY

- A. All coatings shall conform to the pertinent Volatile Organic Compound (VOC) requirements and any other air quality regulations applicable at the location of use. Coating materials which cannot be guaranteed by the manufacturer to conform, whether or not specified by product designation, shall not be used.

3.04 COATING COMPATIBILITY

- A. The Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with the coatings on shop coated or previously coated surfaces. Coatings used in the first field coat over shop coated or previously coated surfaces shall cause no wrinkling, lifting, or other damage to underlying coats. Coatings used in successive field coats shall be produced by the same manufacturer.

3.05 PROTECTION OF MATERIALS NOT TO BE PAINTED

- A. Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring any adjacent surfaces. Protect working parts of all mechanical and electrical equipment from damage during surface preparation and painting process. All openings in motors shall be masked to prevent paint and all other materials from entering the motors.

3.06 PAINT MIXING

- A. Multiple-component coatings shall be prepared using all of the contents of the container for each component as packaged by the paint manufacturer. No partial batches will be permitted. Multiple-component coatings that have been mixed shall not be used beyond their pot life.

3.07 SCAFFOLDING

- A. All necessary scaffolding shall be furnished and installed by the Contractor. Such scaffolding shall conform to regulations of the State Industrial Accident Commission and local ordinances.

3.08 SAFETY

- A. Painting shall be performed in strict accordance with the safety recommendations of the paint manufacturer; with the safety recommendations of the National Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; Federal, state, and local agencies having jurisdiction. All necessary ventilation, lighting equipment, and scaffolding shall

be furnished and installed by the Contractor.

- B. All necessary precautions shall be taken to prevent fire. Rags and waste soiled with paint shall be removed from the premises at the end of each day's work, or stored in metal containers with metal covers.

3.09 SURFACE PREPARATION

Metal Surface Preparation

All sharp edges and corners shall be ground smooth and all weld spatter, slag burrs, and other objectionable surface conditions must be removed prior to the surface preparation for coating.

No surface preparation blasting will be permitted prior to submission of samples. All workmanship for metal surface preparation as specified shall be in strict conformance with the current Steel Structures Painting Council (SSPC) Specifications as follows:

Solvent Cleaning	SSPC 1
Hand Tool Cleaning	SSPC 2
Power Tool Cleaning	SSPC 3
Flame Cleaning	SSPC 4
White Metal Blast Cleaning	SSPC 5
Commercial Blast Cleaning	SSPC 6
Brush-Off Blast Cleaning	SSPC 7
Pickling	SSPC 8
Weathering Followed by Blast Cleaning	SSPC 9
Near-White Blast Cleaning	SSPC 10
Power Tool Cleaning to Bare Metal	SSPC 11
Ultra-High Pressure Water Jetting	SSPC 12
Concrete	SSPC 13

Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surface uncoated for more than 8-hours.

Alternatives to standard abrasive blast cleaning methods, will be permitted subject to a review by the Engineer.

Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Coating manufacturer's recommendations for wet blast additives and first coat application shall apply.

Other Surfaces

All other surfaces shall be prepared in accordance with these specifications and the manufacturer's recommendations.

3.10 APPLICATION OF PAINT

A. General

Manufacturer's written instructions for applying each type of paint or protective coating shall be furnished to the Engineer prior to application. Cleaned surfaces and all coats shall be inspected prior to the succeeding coat. Schedule such inspection with the Engineer in advance. Apply all coatings in strict accordance with the paint manufacturer's recommendations, as approved by the Engineer. Succeeding coats shall be painted in a different color to facilitate inspection. Final colors shall be as selected by the City. Sufficient time shall be allowed between coats to assure thorough drying of previously applied paint. Coating shall be applied in a neat manner that will produce an even film of uniform and proper thickness, with finished surfaces free of runs, sags, ridges, laps, and brush marks. Units to be bolted together shall be painted prior to assembly or installation, unless otherwise specified.

B. Shop Primed Surfaces

All shop primed items shall be inspected at the jobsite for compliance with these Specifications. Schedule such inspection with the Engineer in advance. Areas of chipped, peeled, or abraded primer shall be hand or power sanded feathering the edges. The areas shall then be spot primed with the specified primer.

C. Manufacturer Applied Paint Systems

Abraded areas on factory finished items shall be repaired in strict accordance with the manufacturer's directions. Repaired areas shall be carefully blended into the original finish.

D. Film Thickness

Coverage is listed as either total dry film thickness in mils (DFT) or the spreading rate in square feet per gallon (sf/gallon). The number of coats is the minimum required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions. Maximum film build per coat shall not exceed the coating manufacturer's recommendations.

E. Damaged Coatings

Damaged coatings, pinholes and holidays shall have the edges feathered and repaired in accordance with the recommendations of the paint manufacturer, as approved by the Engineer. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.

F. Unsatisfactory Application

Work shall be free of runs, bridges, shiners, laps, delamination, wrinkling, peeling, blistering, cracks, chips, abrasions or other imperfections. Evidence of these conditions shall be cause for rejection. All visible areas of imperfections shall be hand- or power-sanded feathering the edges. The areas shall then be primed and finish coated in accordance with the Specifications. Depending on the extent of repair and its appearance, a finish sanding and topcoat may be required by the Engineer.

If the item has insufficient film thickness, the surface shall be cleaned, and then prepared as required by the manufacturer taking into account the recoat window, and top coated with the specified paint material to obtain the specified appearance and coverage. Specific surface preparation requirements shall be determined by the coating manufacturer, as approved by the Engineer.

All areas of overspray including floors, windows, and equipment shall be cleaned or repainted if unable to be cleaned, to the satisfaction of the Engineer.

Leave all staging up until areas are inspected and approval is given by the Engineer, for each surface or coating. Staging removed prior to inspection shall be replaced.

Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer, at no additional cost to the City.

3.11 SHIPPING

- A.** In all cases where pre-coated items are to be shipped to the jobsite, all efforts shall be made to protect the coating from damage. Coated items shall be battened to prevent abrasion. Contractor shall use nonmetallic or padded slings and straps in handling. Items will be rejected for excessive damage.

3.12 TOUCH-UP PAINT

- A.** The Contractor shall leave a minimum of 1-gallon of paint for each type and color used on the project for the City's use in future maintenance operations. Appropriate touch-up paint for factory coated items including factory coated electrical panels, gutters, and doors and window frames, shall be delivered to the City.

3.13 ANNIVERSARY INSPECTION

A. Schedule

A first anniversary warranty inspection of all painted surfaces will be conducted by the City,

approximately eleven (11) months from the date of recording the Notice of Completion. The City shall establish the date of the inspection and will notify the Contractor at least thirty (30) calendar days in advance of the inspection.

B. Equipment

The Contractor shall furnish ventilation, scaffolding, and lighting equipment as necessary for warranty inspections, and shall be present for such inspections.

C. Inspection Report

The City will prepare and deliver to the Contractor a report of the warranty inspection, prior to the expiration of the 12-month warranty period. The inspection report will set forth the number and types of failures observed, the percentage of surface area where failures have occurred, and the names of the persons making the inspections. Photographs or reports of the coating imperfections or failures shall be considered acceptable evidence of failure.

D. Failure

Any location where coating has delaminated, peeled, blistered, or cracked; and any location where rusting is evident will be considered a failure of the coating system.

E. Remedial Work

Repair all failures by removing the deteriorated coating, cleaning the surface, and recoating with the same system in accordance with this Section and the coating manufacturer. With the approval of the City, surface preparation of small failures (areas less than 1 sq./ft.) may be made by cleaning to bare metal in accordance with appropriate SSPC-SP standards.

F. Schedule of Remedial Work

The City shall establish a starting date and reasonable time of completion for the remedial work. The starting date shall be no more than thirty (30) calendar days after the submittal of the inspection report to the Contractor. Should the Contractor fail to start the remedial work within ten (10) calendar days after the starting date established by the City, the City may at its option perform the remedial work, and the Contractor shall pay to the City the actual cost of such work, plus 20-percent to cover added engineering and administrative cost.

G. Cost

Warranty inspections of the remedial work shall be at the expense of the Contractor.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-8 – PAINTING (BOYS RANCH #2A)
Bid Item No. B-8 – PAINTING (JACKSON #3)

-END OF SECTION-

COATING SYSTEM DATA SHEET

Surface Description:	System Number:
----------------------	----------------

Surface Preparation Description:	
----------------------------------	--

Coating	DFT (mils)	Color	Manufacturer and Product
First Coat (Primer)			
Touch up			
Second Coat			
Third Coat			
Total System			Not less than minimum thickness specified

Notes: (Attached if needed.)

Project:
Painting Contractor:

Attach Technical Data Sheet (if applicable) for each paint system submittal.

SECTION 10050 - BUILDING

Bid Item No. A-9, B-9

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers all work necessary to furnish materials required for modification of the pump station buildings. The Contractor shall furnish all labor and materials needed to complete the work included in this section, complete.

1.02 SUBMITTALS

- A. Contractor shall submit manufacturer's specifications and installation instructions for the following products, in accordance with SECTION 01330 - PROJECT RECORDS AND SUBMITTALS. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

PART 2 - MATERIALS

2.01 CONCRETE

- A. All concrete shall comply with the requirements of SECTION 03300 - CONCRETE.

2.02 PAINTING

- A. All painting shall comply with the requirements of SECTION 09900 - PAINTING.

2.03 SUMP PUMP (Jackson Site Only)

- A. The sump pump shall be a 1/4 HP, thermoplastic submersible sump pump with built-in float switch, Model #3YU69 as manufactured by Dayton or approved equal.

2.04 REDWOOD FENCING (Jackson Site Only)

- A. Redwood slats shall be 1"x8"x6' nailed with a spacing of about ¼". The upper and side rails shall be 2x6 pressure treated wood. The three center rails shall be 2x4 pressure treated wood and one shall be nailed to the upper 2x6 rail. The bottom 2x4 rail shall be installed about 6" above grade at an elevation similar to remaining fence rails. The middle 2x4 rail shall be installed at a center height similar to remaining fence rails. Nails shall be 10d galv for the slats to the rails and 16d galv for the top 2x6 to the upper 2x4 rail. Rail to side rails are toe-nailed 10d galv.

2.05 MOLDED FIBERGLASS GRATING (Jackson Site Only)

- A. Molded fiberglass grating shall be made in one-piece construction by interweaving continuous thoroughly wetted fiberglass strand with a sodium hypochlorite and ammonia hydroxide corrosion resistant resin system with ultraviolet (UV) inhibitors. Grating shall be a minimum of 2-inches thick and 2-inches square mesh designed to support a minimum of 200-pounds per square foot uniform load with deflection not to exceed 0.250 inches, and shall be the manufacturer's standard color. Surface shall be concave top. Grating shall be McNichols Fibergrate, Strongwell Duragrate, Gridwalk High Strength Molded Grating, or approved equal.
- B. All fasteners including clips, bolts, nuts and washers shall be type 316 stainless steel grating clips.
- C. Grating supports shall be constructed of fiberglass with a corrosion resistant Vinyl Ester resin system conforming to ASTM E84 Class 1 and ASTM D635.

2.06 MISCELLANEOUS HARDWARE

A. Wood Screws

Wood screws shall be FS FF-S-111C and Am-1.

B. Nails

All nails shall be Common wire, FS FF-N-105a and Int. Am-2. Box nails are not permitted unless specifically noted. Use annular ring shank and spiral type nails where called for on the Drawings.

C. Bolts and Nuts

Bolts and nuts shall be FS FF-B575C and FS-FF-N-836C and Am-1.

D. Lagbolts

All lagbolts shall be FS FF-B-561b.

E. Expansion Bolts

Expansion bolts shall be Red Head, We-It, or equal.

F. Washers

Washers shall be malleable iron or steel plate, cut washers are not permitted.

G. Gauge Metal Items

All gauge metal items (11 gauge and lighter) shall be fabricated from steel sheet, heavily galvanized.

PART 3 - EXECUTION

3.01 MOLDED FIBERGLASS GRATING

- A.** Contractor shall use a heavy-duty rotary saw with either a masonry carbide or diamond coated blade with the panel turned bottom-side up. All cut edges shall be ground smooth using a coarse grit open coated (resin) grinding disk. All cut surfaces shall be coated with a light coating of a two-part resin system or a urethane spray paint to prevent corrosion of glass fibers. Safety precautions shall be taken when cutting fiberglass materials including safety goggles, dust mask, and gloves to protect the eyes, reduce dust inhalation and prevent skin irritation.
- B.** Panels shall be supported on all sides and attached to the supporting framework with hold down clips. A minimum of four clips per side are required for full size panels. Use end panel clips to unite two adjacent panels, where panels cannot be supported on all sides.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-9 – BUILDING (BOYS RANCH #2A)

Bid Item No. B-9 – BUILDING (JACKSON #3)

-END OF SECTION-

SECTION 10440 - SIGNS AND SAFETY EQUIPMENT

Bid Item No. A-10, B-10

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers work necessary to furnish and install all signs, safety equipment, delineators, fire extinguishers, pipe/conduit markers, and all appurtenances as shown on the Drawings and specified herein, complete.

1.02 GENERAL

- A. Signs, delineators, pipe markers, and safety equipment shall be furnished and installed as specified herein. Where not specifically indicated or specified, fasteners, posts, and other accessories shall be provided as required and as recommended by the manufacturer of the specific item.

1.03 SUBMITTALS

- A. Complete product literature and detailed drawings shall be submitted in accordance with the submittals sections.

PART 2 - MATERIALS

2.01 SIGNS

- A. Signs shall be constructed of 0.040 aluminum with a baked enamel finish. Signs shall be for outdoor duty, pre-drill for mounting, and contain OSHA heading descriptions as specified herein. Signs shall be as manufactured by the Seton Name Plate Company (New Haven, CT (800) 243-6624) or an approved equal.

2.02 CONDUIT AND PIPELINE MARKERS

- A. All conduit or pipe shall be labeled by means of a pre-formed snap-around outdoor grade acrylic plastic marker with the condition, direction, and type of fluid marked in bold capital letters. The markers must have the proper coating to ensure resistance to acid and/or other corrosive conditions. All markers shall be OSHA and ANSI color coded, lettered, and comply with the requirements of the National Fire Protection Association (NFPA).

2.03 PAINT

A. Paint shall be as specified in SECTION 09900 - PAINTING.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Signs and pipe markers shall be installed after all equipment and building surfaces have been primed and painted. Delineators shall be installed after all backfilling and finish grading is complete.

3.02 SIGNS

A. Signs shall be furnished and mounted at various locations described herein, for the purpose of indicating and defining specific hazards throughout the work area.

B. Signs with placement locations are:

Location	No. Required	OSHA Heading	Wording
On or near pump motor and discharge head	1 ea. station	DANGER	EQUIPMENT STARTS AUTOMATICALLY

3.03 CONDUITS AND PIPELINES

A. All conduits and pipelines shall be labeled as to the type and condition of fluid conveyed. The following table presents the minimum number of markers required. However, the Contractor shall be responsible for labeling all conduits and pipelines, as identified by the Engineer.

B. Conduits and pipes to be marked are as follows:

Pipe or Conduit	Conduit/Pipe Size	No. Required	Location	Wording for Marker
-----------------	-------------------	--------------	----------	--------------------

Well Level Airline	2"	1 ea. station	Near Pump Pedestal	WATER WELL LEVEL AIRLINE
Pre-Lube Line	3/4"	1 ea. station	Near Pump Pedestal	PUMP PRE-LUBE

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-10 – SIGNS AND SAFETY EQUIPMENT (BOYS RANCH #2A)

Bid Item No. B-10 – SIGNS AND SAFETY EQUIPMENT (JACKSON #3)

-END OF SECTION-

SECTION 15025 - PIPE (STATION, DISTRIBUTION AND DRAINAGE)

Bid Item No. A-11, B-11

PART 1 – GENERAL

1.01 SCOPE

- A.** This section consists of furnishing and installing black steel pipe (BSP), polyvinyl chloride (PVC) pipe, ductile iron pipe (DIP), copper tubing, high density polyethylene pipe (HDPE), fittings, closure pieces, pipe supports, bolts, nuts, gaskets, thrust blocks and all associated appurtenances. Pipe types, lengths, and dimensions are indicated on the Drawings. No substitution or deviation from Drawings will be allowed.
- B.** All materials, labor and workmanship associated with the installation of the piping shall conform to the Drawings and Specifications and applicable AWWA, ASTM, Santa Clara County and to the Improvement Standards and Technical Specifications of the City. Copies of the subject standards are available from the City.
- C.** Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all new piping related appurtenances used in the production or distribution of drinking water in contact with drinking water including contact with raw water to be treated.
- D.** Do not prepare any shop drawings for, or make final order for, or design any pipe materials for any particular section of pipeline, until all utilities that are to remain in that section of pipeline have been exposed.

1.02 RELATED WORK

A. SECTION 02300 - EARTHWORK

SECTION 02320 - TRENCH EXCAVATION AND BACKFILL

B. SECTION 03300 - CONCRETE

1.03 SUBMITTALS

- A.** Prior to the start of manufacturing, the following shall be submitted to, and approved by the Engineer:

1. Shop Drawings

The Contractor shall submit complete data on pipe, fittings, linings, coatings, and any manufacturer's installation instructions showing conformance with the applicable standard.

Shop drawings shall include a laying plan showing the location of each pipe section and each special length with each piece numbered or otherwise designated in sequence. Laying plans shall be submitted for all welded steel and ductile iron pipe and underground PVC pipe. All outlets and bends shall be installed where located on the Drawings unless otherwise approved.

2. Certification

Certification properly executed by the manufacturer shall be furnished to the Engineer showing compliance to the required Specifications and applicable standards. Test data on tests performed shall be provided as requested by the Engineer.

1.04 HANDLING, STORAGE AND SHIPPING

- A.** Coated pipe shall be shipped on bunks, and secured with nylon belt tied down straps or padded banding located approximately over braces. Coated pipe shall be stored on padded skids, sand or dirt berms, sand bags, old tires or other suitable means so that coating will not be damaged. Coated pipe shall be handled with the wide belt slings, padded forks, or other means that will not damage the pipe. Chains, cables or other equipment likely to cause damage to the pipe or coating shall not be used. Prior to shipment, the pipe shall be visually inspected for damage to the coating. Any damaged areas shall be repaired in accordance with the standard to which the coating was applied.
- B.** Pipe that shows evidence of exposure to sunlight, age, surface deterioration, or other physical damage is not acceptable. The decision of the Engineer shall be final as to the acceptability of the pipe to be installed. For pipe older than 24-months, the City will require information on the pipe storage during the period. The City reserves the right to reject pipe older than 24-months or to require retesting and recertification by the pipe manufacturer.

1.05 DESIGN PRESSURES

- A.** The design pressure of pipe shown on the Drawings or in these Specifications is the minimum required static internal design pressure in pounds per square inch. The pipe shall be designed for this internal pressure, for earth loads, and for an AASHTO H-20 wheel load, all without exceeding the allowable design stresses. Pipe shall be designed for earth and wheel load both with and without internal pressure. In addition, pipe shall be designed for the test pressure specified herein without exceeding 50-percent of yield stresses or joint design pressures.

- B.** Pipe shall be designed for 100 psi working pressure with an additional 50 psi allowance for surge.
- C.** All fittings, couplings, valves, and other appurtenances shall be rated for the same or a higher design pressure as the pipe they are used on and shall withstand the test pressure without damage.
- D.** Provide thrust blocks or restrained joints at valves and fittings as shown or where not shown as necessary to prevent the movement or deflection of the pipe when under pressure. Thrust restraint design pressure shall be 200% of the pipe design pressure, or the test pressure, whichever is greater.

1.06 PIPE DIAMETERS

- A.** The pipe diameters shown on the Drawings and used in these Specifications are inside diameters unless specific reference is made to outside diameter of the pipe or the pipe is a standardized product normally designated by a nominal size, e.g., ductile iron pipe.

1.07 MARKING AT PLANT

- A.** Each pipe and fitting shall be marked at the plant. Marking shall include size or diameter and class of pipe or fittings, manufacturer's identification, and date of manufacture.

1.08 INSPECTION

- A.** All pipe may be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards as supplemented by the requirements herein. The Contractor shall notify the City in writing of the manufacturing starting date not less than 14-calendar days prior to the start of any phase of the pipe manufacture. In addition, the Contractor shall give the City three (3) working days' advance notice of the start of any surface preparation or coating application work.
- B.** During the manufacture of the pipe, the City shall be given access to all areas where manufacturing is in process and shall be permitted to make all inspections necessary to confirm compliance with the Specifications. Material, fabricated parts, and pipe that are discovered to be defective, or that do not conform to the requirements of this Specification, will be subject to rejection at any time prior to final acceptance of the pipe.

PART 2 – MATERIALS

2.01 PIPE

Pipe used in the construction of the water distribution system shall be of the type shown on the Drawings. It shall be the regular product of a manufacturer who is fully experienced, reputable, and qualified in the manufacture of the materials to be furnished and has successfully manufactured comparable pipe for at least three (3) years.

1. Black Steel Pipe (under 6-inch diameter)

Black steel piping shall conform to the requirements of ASTM A53, Schedule 40 and shall be Grade B. Butt-welded flanged fittings shall conform to ASME B16.5.

2. Stainless Steel Pipe

All stainless steel pipe shall be type 304/304L or as indicated on the Drawings. Pipe shall have welded construction with exception of 1/8" to 3/8" pipe sizes which shall be seamless. Pipe shall meet ASTM A733, ASTM A312, and ANSI/ASME B1.20.1.

3. Galvanized Steel Pipe

Galvanized steel pipe shall conform to the requirements of ASTM A53, Schedule 40 and shall be Grade B.

4. Black Steel Pipe (6-inch diameter and larger)

Steel pipe shall be designed in accordance with AWWA M11. Steel pipe shall be manufactured of steel plate of the thickness shown on the Drawings. Where not shown, the thickness shall be not less than 3/16 of an inch for pipe 24-inches in diameter and smaller, and not less than 1/4 of an inch for larger sizes unless otherwise approved by the Engineer.

Pipe materials, fabrication, and shop testing of straight pipe shall conform to the requirements of the "AWWA Standard for Steel Water Pipe 6-Inches and Larger" (AWWA C200). All outlets, 4-inches in diameter and larger, shall be provided with reinforcing designed for the water working pressure specified or shown. For pipe 14-inches in diameter and larger, the inside diameter after lining shall be not less than the nominal diameter specified or shown. Pipe smaller than 14 inches in diameter may be furnished in standard outside diameters.

Pipe, fittings and flanges shall be lined and coated with a fusion-bonded epoxy conforming to AWWA C213 and SECTION 09900 - PAINTING. Field application and repair of fusion

bonded epoxy lined and coated pipe shall be performed in accordance with SECTION 09900 - PAINTING.

5. Ductile Iron Pipe (DIP)

Ductile iron pipe furnished in diameters four-inches (4") through twenty-four inches (24") shall be manufactured in accordance with AWWA C151 with single rubber gasket joints in accordance with AWWA C111. Where shown on the Drawings, flanged ductile iron pipe shall be manufactured in accordance AWWA C115. Laying length shall be the manufacturer's standard length, not to exceed 20-feet. Shorter lengths may be used when required for closures and proper location of special sections. Four-inch (4") diameter pipe shall be Class 51 wall thickness, and six-inch (6") through twenty-four-inch (24") diameter pipe shall be Class 50 wall thickness in accordance with ANSI A21.50 (AWWA C150), unless otherwise specified or shown on the plans. Ductile iron castings shall conform and be tested in accordance with ASTM A536. Casting grade for pipe shall be 60-42-10.

Pipe, fittings and flanges shall be cement mortar lined in accordance with AWWA C104. Field application and repair of cement mortar lined pipe shall be performed in accordance with AWWA C602.

6. Polyvinyl Chloride Pipe (PVC)

a. Schedule 40 PVC

Schedule 40 PVC pipe in sizes ½-inch to 8-inches shall conform to the latest revision of ASTM D1785, ASTM D2467 and ASTM D2665. The PVC pipe shall be manufactured in sections not to exceed 20-feet in length. The Contractor shall use either solvent weld or gasketed bell and spigot pipe. Pipe and couplings shall be US manufactured by Johns-Manville, CertainTeed, or approved equal.

b. Schedule 80 PVC

Schedule 80 PVC pipe in sizes ½-inch to 8-inches shall conform to the latest revision of ASTM D1785, ASTM D2467 and ASTM D2665. The PVC pipe shall be manufactured in sections not to exceed 20-feet in length. The Contractor shall use either solvent weld or gasketed bell and spigot pipe. Pipe and couplings shall be US manufactured by Johns-Manville, CertainTeed, or approved equal.

7. Brass Pipe and Fittings

Brass pipe and fittings shall be lead free, conform to ASTM A43 and be minimum class 150 psi.

8. Copper Tubing

Copper tubing for use in underground water service shall be continuous-run (no joints) Type K soft copper tubing. Copper tubing for use in interior water service shall be Type K hard copper tubing and compression or lead-free solder sweat connections. Pipe shall conform to the latest revisions of AWWA C800, ASME B31, and ASTM B88. Copper pipe shall be Mueller Streamline with Poly Coat.

2.02 FITTINGS, JOINTS AND COUPLINGS

A. PVC Bell-and-Spigot Fittings

Socket or bell-and-spigot type PVC fittings shall be standard commercial products fabricated by molding or by extrusion and machining and shall conform to the requirements of ASTM D2241 and these Specifications. The manufacture of the fittings shall be in accordance with good commercial practice so as to produce fittings compatible with the type of PVC pipe furnished. Dimensions and tolerances of fitting joints shall conform to the tolerances of the PVC pipe furnished. The minimum burst strength of the fittings shall be not less than that of the adjacent pipe.

B. Ductile and Cast Iron Fittings

Fittings shall be of cast-iron conforming to the requirements AWWA C110. Joints between PVC pipe and cast-iron valves or fittings shall be mechanical joint or approved equal. AWWA C153 compact fittings may also be used as an approved equal. Fittings shall be of a class at least equal to that of the adjacent pipe.

C. Black Steel Fittings

Fabricated fittings shall be made up of steel pipe, conforming to ASTM A53, 35,000 psi minimum yield strength, 1/4-inch wall, except 20-inch diameter through 24-inch diameter, which shall be 3/8-inch wall. Welding fittings shall be seamless steel conforming to ASTM A234.

D. Stainless Steel Fittings

Stainless steel fittings shall be made up of type 304/304L stainless steel unless otherwise indicated by the Drawings. Fittings shall conform to ANSI/MSS SP-114 (for heat treating, material thickness, and marking) and ASTM A351, except hex-socket plugs.

E. Brass Fittings

Brass fittings shall be lead free and meet ASTM B584 or B927, as well as ANSI/ASME B16.15 and B1.20.1.

F. Polyethylene Molded Fittings and Joints

Molded fittings shall be manufactured and tested in accordance with ASTM D3261 and shall be so marked.

Joints between plain end pipes and fittings shall be made by butt fusion. Joints between the main and saddle branch fittings shall be made using saddle fusion. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets that have the same outside diameter and are not different in wall thickness by more than one Standard DR. Transitions between unlike wall thickness greater than one SDR shall be made with a transition nipple or by mechanical means or electrofusion. External and internal beads shall not be removed. The butt fusion and saddle fusion procedures used shall be procedures that are recommended by the pipe and fitting Manufacturer. The contractor shall ensure that persons making heat fusion joints have received training in the Manufacturer's recommended procedure.

G. Flanged Coupling Adapters

Flanged coupling adapters shall be wrought steel or cast iron capable of withstanding the designated internal pressure without leakage or overstressing. Diameter of the coupling shall be compatible with the outside diameter of the pipe on which the coupling is installed. Furnish all joint accessories with couplings. Verify dimensions of all existing pipelines in the field before ordering couplings.

Steel style flanged couplings shall consist of a steel body, steel or malleable iron follower rings, and steel bolts. Steel flanged coupling shall be as manufactured by Rockwell International, Inc.; Dresser Manufacturing Division of Dresser Industries, Inc.; or equal.

Cast style flexible coupling shall consist of a cast iron middle ring, malleable iron follower rings, and steel bolts. Cast flexible couplings shall be as manufactured by Rockwell International, Inc.; Dresser manufacturing Division of Dresser Industries, Inc.; Romac Industries, Inc.; or equal.

H. Flexible Couplings

Flexible couplings for use with steel pipe shall be Dresser, Style 38; Rockwell, Style 411; or equal. Flexible couplings for use with ductile iron pipe shall be Dresser, Style 53, 153, or 38; Rockwell, Style 431; or equal. Steel middle rings shall be pressure tested beyond the yield point. Verify dimensions of all existing pipe.

Cast style flexible coupling shall consist of a cast iron middle ring, malleable iron follower rings, and steel bolts. Cast flexible couplings shall be as manufactured by Rockwell International, Inc.; Dresser manufacturing Division of Dresser Industries, Inc.; Romac Industries, Inc.; or equal.

I. Transition Couplings and Expansion Joints

Flexible transition couplings shall be bolted, with ductile iron sleeve and end rings, Ford Model 501, Dresser No. 153, or Rockwell No. 431. Flexible expansion joints shall have fully molded arches. Diameter of the coupling shall be compatible with the outside diameter of the pipe on which the coupling is installed. Furnish all joint accessories with Flexible Couplings.

J. Mechanical Joint Restraints

Restraint devices for mechanical joint fittings and appurtenances shall conform to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53 and the following:

1. Restraint devices for nominal pipe sizes 3-inch through 48-inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
2. The devices shall have a working pressure rating of 350 psi for 3-16-inch and 250 psi for 18-48-inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

Gland body wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536. Restraint devices shall be Listed by Underwriters Laboratories (3" through 24" size) and Approved by Factory Mutual (3" through 12" size). Mechanical joint restraint shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal.

K. Flanges

Flanges shall have flat faces. Pipe flanges shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. All flanges shall conform to AWWA C207 and the following requirements:

Flanges shall be Class D for pressures to 175 psi on 4-inch through 12-inch diameter, and 150 psi on diameters over 12-inches.

L. Gaskets

Flange gaskets shall be full-faced, in accordance with applicable parts of ANSI B16.21 and AWWA C207, as last amended. Gaskets shall have holes to pass bolts, and be free from corrosive alkali or acid ingredients. Segmented straight-joint or interlocking gaskets will not be accepted. Gaskets shall be BLUE-GARD Style 3000 or approved equal.

M. Nuts, Bolts and Washers

Nuts, bolts and washers shall conform to AWWA C207 the sizes and quantities recommended in Section 2 of AWWA C207. Bolts shall be threaded to conform to ANSI B1.1, Class 2A coarse threads

Nuts, bolts, and washers shall be Class 2, type 316 stainless steel and conform to ASTM A194 Grade B8M, ASTM A193 Grade B8M, and ASTM F436 respectively.

2.03 APPURTENANCES

A. Service Saddles

Bronze bodied saddles with a wide single stainless steel strap or full circle body clamp double bolted to each side of the saddle shall be used on pipe sizes 6-inch through 12-inch. The saddle body shall be manufactured from cast bronze in accordance with ASTM B62 or B584 and AWWA C800. The single strap shall have double bolts on each end of the strap to connect it to the bronze saddle. The ears of the strap shall turn inward and rest against the inside of the strap. The gasket shall be Buna N. The saddle shall be threaded with 1-inch or 2-inch iron pipe threads.

A fabricated two-part carbon steel saddle shall be used for wet tap connections. The carbon steel used in the saddle shall have a minimum yield strength of 30,000 psi. The bolts and nuts shall be stainless steel, Type 316. The entire sleeve shall be shop coated with a minimum of 8 mils of fusion bonded powder epoxy in accordance with AWWA C213.

No wet taps will be allowed where the outlet is the same size as the main.

Fabricated steel and cast iron saddles shall have a minimum ½-inch welded thread-o-let or 3000 lb. half-coupling for testing.

Brass saddles shall not be used.

B. Butyl Rubber Tape Wrap

Tape wrap shall be 15 mil butyl rubber adhesive, polyethylene-backed tape as produced by Polyken Division of the Kendall Company, Boston, MA; Royston Laboratories, Inc., Pittsburgh, PA; or equal.

C. Joint Lubricant

Furnish joint lubricant with the pipe. Furnish the amount and type recommended by the pipe manufacturer. The lubricant for water pipes shall be a water-soluble, nontoxic, vegetable soap compound conforming to United States Pharmacopoeia No. P39.

D. Feeler Gauge

Furnish sufficient feeler gauges of the proper size, type, and shape for use during installation to check the rubber gaskets.

E. Concrete for Thrust Blocks and Concrete Encasement

Concrete shall conform to SECTION 03300 - CONCRETE.

F. Adjustable Pipe Support

Adjustable pipe supports shall be 3-inch diameter stand with 2-½-inch pipe diameter pipe

supports, and yolk as shown on the Drawings. All exposed pipe support material/parts shall be constructed from galvanized steel. Manufacturer shall be Grinnell, Tripac or approved equal.

G. Flange Insulation Kits

Provide flange insulation kits consisting of:

1. Insulating Gaskets

Gaskets shall be full-face, 1/8-inch minimum thickness, and laminated phenolic with neoprene gaskets on each side. Insulating gaskets shall be Johns-Manville No. 71 dielectric sheet packing, Raybestos-Manhattan No. 73, or equal.

2. Insulating Stud Sleeves for Each Bolt

Sleeves shall be a high-density polyethylene or spiral wrapped mylar.

3. Insulating Washers for Each Bolt

Washers shall be 1/8-inch thick phenolic.

4. Steel Washers Over Each Insulating Washer

1/8-inch thick cadmium plated. One-piece molded acetal resin, combination sleeve and washers are acceptable.

2.04 LOCATING WIRE

- A. Where called for on the Drawings, locating wire shall be No. 10 A.W.G. insulated copper wire. Insulation shall be 1/16-inch PVC.

2.05 WARNING TAPE

- A. Where called for in the Drawings, a non-detectable warning tape for the water line shall consist of a nominal 4.0 mil (0.004") overall thickness of polyethylene film formulated to resist degradation due to acid and alkaline soils. The color of the water line tape shall be blue and in black bold letters printed "CAUTION - WATER LINE BELOW." The tape shall be Hytech Non-Detectable Tape provided by Northtown Company or equivalent.

2.06 POLYETHYLENE WRAP

- A. All underground steel and ductile iron pipe and fittings shall be wrapped in polyethylene film. The polyethylene wrap shall be 8 mil minimum in thickness, group 2, linear low density, flat tube, virgin polyethylene film. The wrap shall meet or exceed the requirements of AWWA C105. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance applicable pipe sizes and the words "warning corrosion protection – repair any

damage.”

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILL

- A. Refer to the requirements of SECTION 02320 - TRENCH EXCAVATION AND BACKFILL.

3.02 PREPARATION AND HANDLING

- A. All pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer’s recommendations and according to accepted water works practice. Each section of pipe and each fitting shall be thoroughly cleaned out before it is installed. All pipe, fittings, and appurtenances, shall be carefully lowered into the trench by suitable tools or equipment in such a manner as to prevent any damage, particularly to the lining and coating. When required by the City, approved slings shall be used to lower the pipe. Under no circumstances shall pipe or accessories be dropped into a trench. All pipe, fittings and appurtenances, shall be examined for defects before lowering into the trench. Any defective, damaged, or unsound materials shall be rejected.

3.03 DIRECTION OF LAYING

- A. On slopes of 10-percent or less, the pipe may be laid in either direction on the slope. On slopes exceeding 10-percent, the pipes shall be laid in the uphill direction, unless otherwise permitted by the Engineer. For pipes with push-on joints, the bell end shall normally face the direction of laying.

3.04 ALIGNMENT

- A. Pipelines intended to be straight shall be so laid, and in no case shall deviation from a straight line exceed 0.30-foot for line and 0.10-foot for grade from the line and grade shown on the Drawings. Where pipelines are to be laid on a curve by means of unsymmetrical closure of spigot into bell, the pipe may be deflected at the joints. Under no circumstances shall the deflection exceed the maximum allowable as recommended by the pipe manufacturer. At no time shall horizontal or vertical deflections be achieved by pulling the pipe.
- B. Where horizontal or vertical curves are shown in the alignment which cannot be installed by joint deflection of standard pipe lengths, the Contractor with the Engineer’s approval, may select from the following options:
 - 1. Use shorter pipe lengths and allowable joint deflection as specified.

2. Use special mitered joints.
 3. Use standard or special fabricated bends.
 4. Use high deflection couplings.
- C. If alternates two or three are used, thrust blocking may be required. If the Engineer determines that thrust blocking is necessary, it shall be furnished at no additional cost to the City.

3.05 LAYING AND JOINTING PIPE AND FITTINGS

- A. Materials used in jointing pipe shall only be that furnished with the pipe or recommended by the manufacturer. Pipe laying shall proceed with the bell ends pointing upstream. After a section of pipe has been lowered into the prepared trench, clean the end of the pipe to be joined, the inside of the joint, and the rubber ring immediately before joining the pipe. Make assembly of the joint in accordance with the recommendations of the manufacturer. Provide all special tools and appliances required for the jointing assembly.
- B. The gasket position shall be checked with a feeler gauge, furnished by the pipe manufacturer, to assure proper seating. After the joint has been made, check pipe for alignment and grade. Apply sufficient pressure in making the joint to assure that the joint is "home," as defined in the standard installation instructions provided by the pipe manufacturer. To assure proper pipe alignment and joint makeup, place sufficient pipe zone material to secure the pipe from movement before the next joint is installed.
- C. Take the necessary precautions required to prevent excavated or other foreign material from entering the pipe during the laying operation. At all times, when laying operations are not in progress, at the close of the day's work, or whenever the workers are absent from the job, close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints.
- D. Take all precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.
- E. Flexible expansion joints shall be installed against full-face flanges on each side of joint to protect fitting from cracking.
- F. The raised face on steel flanges must be removed for all connections to cast iron flanges.

3.06 UNSUITABLE CONDITIONS FOR LAYING PIPE

- A. Do not lay pipe in water, or on an unstable trench bottom, or when in the opinion of the Engineer, trench conditions are unsuitable.

3.07 PIPE CUTTING

- A. When necessary to cut pipe, it shall be neatly and squarely cut to length using methods recommended by the manufacturer. All field-cut PVC shall be beveled and lubricated before joining.

3.08 COPPER TRACING WIRE

- A. All runs of non-metallic pipe shall have locating wire laid along the top of the pipe and at all valves and appurtenances and held in place with ties or hitches of the same kind of wire, except RCP pipe used for storm drains or overflow lines. The wire shall be stubbed up inside each valve box and be placed as shown in the Drawings. The ties or hitches shall be spaced not more than 20-feet apart. The copper wire is to be used in the future as a means of locating the pipe with an electronic-type pipe locator. The copper wire shall be brought to the surface in each valve box so a direct connection can be made to the electric pipe locator. Care shall be taken to insure no "open" circuits occur. Electrical wire nuts will be an acceptable method of connection. Such joints will be taped and coated to prevent corrosion from damaging connections. Splice tracing wire by stripping insulation and twisting bare copper wires together and soldering or electrical wire nuts may be used to form a permanent connection. Wrap connection with standard black electrical tape.

3.09 THRUST BLOCKS

- A. All pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist shall be thrust restrained as shown or specified.
- B. Thrust blocks shall be installed such that the thrust block shall extend from the fitting to undisturbed soil, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. Minimum size of thrust blocking shall be in accordance with the standard detail shown in the Drawings. The excavation configuration and soil conditions may require additional concrete. Additional concrete shall be furnished and installed as a part of the contract prices.
- C. Thrust blocks shall be kept clear of the joints so that the pipe and fitting joints will be accessible for repairs, unless otherwise directed. Side forms shall be used to contain the concrete. The concrete shall be placed in accordance with SECTION 03300 - CONCRETE.

3.10 CONCRETE ENCASEMENT

- A. Concrete encasement shall be installed as indicated on the Drawings. All pipe to be encased shall be suitably supported and blocked in proper position, and shall be anchored to prevent flotation.
- B. Except for welded joint pipe, a flexible joint shall be provided within 18-inches and as shown on the Drawings, from the terminations of any concrete encasement.

3.11 DISCONTINUED PIPE LAYING

- A. Whenever pipe laying is discontinued for an hour or more, the open end of all mains and fittings shall be closed with watertight plugs or bulkheads. The plug or bulkhead shall not be removed unless, or until, the trench is dry. Pipe shall not be laid when the condition of the trench or the weather is unsuitable.

3.12 BEVELED PIPE

- A. Sections of pipe with one or both ends beveled may be used for curved alignment. Beveled pipe shall have a maximum deflection of five (5) degrees from a plane perpendicular to the pipe axis unless otherwise shown on the Drawings or approved by the Engineer.

3.13 WELDING

- A. All hand welding shall be done by welders certified in accordance with the "AWWA Standard for Field Welding of Steel Water Pipe" (AWWA C206). Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints. Joints shall be welded with the use of butt-straps. No welding of ductile iron pipe will be allowed.
- B. Periodic testing of field-welded joints will be completed by the Engineer by the liquid penetrant inspection procedure conforming to the requirements of ASTM E 165 under Method "B" and "Leak Testing", at the expense of the Contractor. All defects shall be chipped out, re-welded and retested at no additional cost to the City. Upon retest, the repaired area shall show no leaks or other defects. Following testing of the joint, the exterior joint spaces shall be coated in accordance with these specifications after which backfilling may be completed.
- C. All welding procedures used to install pipe shall be prequalified under provisions of ANSI/AWS D1.1. Welding procedures shall be required for field attachments and field welded joints.

3.14 THREADED JOINTS

- A. Threaded joints, for service connections, air release assemblies, etc., shall be made with Teflon

Plumber's Tape.

3.15 WARNING TAPE FOR WATER LINE

- A. Non-detectable warning tape shall be placed on top of the twelve (12) inch backfill covering the water line.

3.16 PIPE HYDROSTATIC TESTING

- A. All pipe and appurtenances shall be hydrostatically tested. See SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP for testing requirements.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-11 – PIPE (STATION, DISRIBUTION AND DRAINAGE) (BOYS RANCH #2A)

Bid Item No. B-11 – PIPE (STATION, DISRIBUTION AND DRAINAGE) (JACKSON #3)

-END OF SECTION-

SECTION 15110 - VALVES AND RELATED APPURTENANCES

Bid Item No. A-12, B-12

PART 1 - GENERAL

1.01 SCOPE

- A.** This section covers the work necessary for furnishing and installing gate valves, check valves, corporation stops, ball valves, combination air/vacuum valves, valve boxes and all related appurtenances, complete.
- B.** Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all new valving and related appurtenances used in the production or distribution of drinking water in contact with drinking water including contact with raw water to be treated.

1.02 SUBMITTALS

- A.** Complete specifications, data, and catalog cuts or drawings covering the items furnished under this section shall be submitted by the Contractor.

PART 2 - MATERIALS

2.01 GENERAL

- A.** The Contractor shall furnish and install all valves as shown and specified. All valves shall be designed for and have a working pressure class rating equal to or greater than the design pressure for the adjoining pipe. Valves shall be capable of withstanding the field test pressure of the connecting piping without damage. All valves of one type and class shall be provided by the same manufacturer.
- B.** Each valve body shall be shop tested under a test pressure equal to twice its design water-working pressure, by the manufacturer, unless otherwise specified.

2.02 GATE VALVES - 3 INCHES OR SMALLER

- A.** Gate valves 3-inches and smaller shall be ASTM B62 bronze-bodied, with integral seat and union-ring bonnet and copper-silicon bronze stems. Gate valves shall have solid bronze wedge discs with full-open ports and asbestos free packing. Gate valves shall be rated to a minimum of 150 psig working pressure. Gate valves shall be manufactured by Crane Valve, Nibco, Powell or

an approved equal.

2.03 DRAIN CHECK VALVE

- A. The drain check valve shall be 1 ½” in size and be constructed from PVC. The drain check valve shall be located next to the ball valve, installed in a horizontal position immediately above the sump. The drain check valve shall be manufactured by Dayton or approved equal.

2.04 BALL VALVES

- A. Ball valves shall be bronze and manufactured by Mueller, Nibco, Apollo Valve, Watts or equal.

2.05 AIR RELEASE AND VACUUM VALVE

- A. The location, inlet size, and valve type are shown on the Drawings. Pipe and fittings used to connect valves shall be as indicated on the Drawings.
- B. Valves shall be manufactured and tested in accordance with AWWA C512. Valves 3-inches and smaller shall be threaded with NPT inlets and outlets. The body inlet connections shall be hexagonal for a wrench connection. Larger valves shall have ANSI Class 125 flanged inlets. The valves shall have two additional NPT connections for the addition of gauges, testing, and draining.
- C. The covers shall be bolted to the valve body and sealed with a flat gasket. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating. Floats shall be unconditionally guaranteed against failure including pressure surges. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure. A stainless steel screened outlet and protective hood shall be provided when valve is located outdoors to prevent debris from entering the valve.
- D. Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550 when in contact with potable water.
- E. The valve body and covers shall be constructed of ASTM A126 Class B cast iron for working pressures up to 300 psig. Higher pressure rated valves shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.

1. Combination Air Release Valves

Combination air release valves (CARV) shall have operating features of both the air and vacuum valve and the air release valve. They include both single and dual-body construction. Size and capacity shall be as specified in the Drawings.

The float shall be double guided with a guide shaft extending through the float to prevent any contact with the body. The float shall be protected against direct water impact by an internal baffle bolted to the cover or integrally cast in the body. A resilient bumper shall be provided to cushion the float during sudden opening conditions.

The compound lever design shall consist of two levers and an adjustable threaded resilient orifice button. The float, guide shafts, and bushings shall be constructed of Type 316 stainless steel. Non-metallic floats, linkage, or bushings are not acceptable.

Single body combination valves shall have an expanded outlet to provide full flow area around the guide mechanism. The valve shall have a double guided plug on 2-inch and larger sizes, and an adjustable threaded orifice button. The plug shall be protected against direct water impact by an internal baffle.

The orifice button and resilient seat shall be Buna-N. A low durometer orifice button and resilient seat shall be provided when valves are used at low operating pressures. The resilient seat shall be a minimum of 0.5-inches thick on 2-inch and larger valves and secured in such a manner as to prevent distortion.

An optional Regulated Exhaust Device shall be provided when specified to reduce pressure surges due to column separation or rapid changes in velocity and pressure in the pipeline. The Regulated Exhaust Device shall be mounted on the inlet of the Combination Air Valve, allow free air flow in and out of the valve, close upon rapid air exhaust, and control the air exhaust rate to reduce pressure surges. The device shall have a flanged globe-style body with a center guided disc and seat assembly. The disc shall have threaded holes to provide adjustment of the air exhaust rate through the valve. The holes shall provide for a flow area of 5% of the nominal valve size. The material of the body shall be consistent with the Combination Air Valve. The seat and disc shall be bronze.

- F. Valves shall be APCO as manufactured by Valve and Primer Corporation, Crispin as manufactured by Multiplex Manufacturing Company; Empire as manufactured by GA Industries, Inc.; Val-Matic or equal.

2.06 BRONZE APPURTENANCES

- A. Unless otherwise specified, all interior bronze parts of valves except gate valve stems shall conform to the requirements of the "Specification for Composition Bronze or Ounce Metal Castings" (ASTM B62). Gate valve stems shall be of bronze containing not more than five percent of zinc nor more than two percent of aluminum, and shall have a minimum tensile strength of 60,000 psi, a yield strength of 40,000 psi, and an elongation of at least ten percent in

2-inches, as determined by a test coupon poured from the same ladle from which the valve stems to be furnished are poured.

2.07 VALVE OPERATORS

- A.** Valve operators shall be of the ACME screw, traveling-nut type, sealed, gasketed, and lubricated for underground service. The operators shall be designed to meet the input torque requirements of AWWA C504 with a maximum pull of 80 pounds on a handwheel and a maximum input of 150 foot-pounds on an operating nut. They shall be capable of withstanding an overload torque of 450 foot-pounds at full-open or full-closed position without damage to the valves or valve operators. They shall be designed to resist submergence in water to 10-foot head pressure.
- B.** All valves shall open counterclockwise. Valves to be installed in vaults shall be equipped with hand wheels at locations shown on the Drawings.
- C.** All buried valves shall be equipped with a 2-inch operating nut. Operating nuts shall comply with the requirements of AWWA Specification C500, where applicable.

2.08 VALVE OPERATING EXTENSION

- A.** A valve operating extension shall be required whenever the valve is installed such that the operating nut is more than 32-inches below finished grade. The valve operating extension shall be constructed of steel with a 2-inch square operating nut.

2.09 WATER VALVE BOXES

- A.** Water valve boxes shall be Christy G-5 or Brooks 1 RT, having a cast iron face and cast iron traffic lid. Covers shall be marked "WATER", and shall have a loose fit in the box. Valve box risers shall be fabricated from 8-inch diameter PVC pipe.

2.10 PAINTING

- A.** The interior of valves, unless of noncorrosive materials, shall be coated with the standard manufacturer's coating which is equal to or exceeds asphalt varnish, except for fabricated steel components.
- B.** The interior fabricated steel components of valves and the exterior of all valves shall be coated in accordance with SECTION 09900 - PAINTING.

2.11 PRESSURE GAUGES

- A. General purpose pressure gauges shall be 1% accurate with C-type bourdon tube. The bourdon tube, socket and connection tube of the gauge shall be 316 stainless steel. The case and bezel ring shall be constructed of type 304 stainless steel. Dials shall be 3-1/2" in diameter with a black pointer and a white gauge face with black print unless otherwise shown on Drawings. The gauge shall be filled with liquid glycerin or silicone oil. A bottom mount process connection shall include a snubber as a separate component. The process connection shall be 1/4" stainless steel. Pipe and fittings used to connect pressure gauges shall be as indicated on the Drawings. The dial range shall indicate 10-pound intermediate graduations, with a total range of 0-150 psi unless otherwise specified herein or shown on the Drawings. The pressure gauge shall be Ametek gauge model 1535, Ashcroft 1009, Wika or approved equal.
1. The pressure gauge mounted upstream of air release and air vacuum valve assembly shall be Duralife® Ashcroft 351009SWL02LXGV150# or approved equal.
 2. The pressure gauge mounted on the air bubbler line at the well head shall be 4-1/2" in diameter and have a range of 0-390 ft H₂O. The pressure gauge shall be Part # PG45-WL as manufactured by Boshart Industries or approved equal.

2.12 HIGH PRESSURE SWITCHES

- A. Pressure switches shall be installed at the locations shown on the Plans with pressure ranges as noted. Pressure switch shall be Type 4 watertight construction, (non-mercury) adjustable set-point range per Engineer, Ashcroft G-series, Asco SA-series, or equal.

2.13 PRESSURE TRANSMITTER

- A. Pressure transmitters shall be installed at the locations shown on the Plans. Pressure transmitters shall be Ashcroft Duratran Transmitter Type 2279, Model #45-2279-ssh-04L-160#, no equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Valve-operating units, stem extensions and other accessories shall be furnished and installed by the Contractor where shown, or where required in the opinion of the Engineer to provide for convenience in operation. Where buried valves are indicated, the Contractor shall furnish and install valve boxes to grade. All valves shall be new and of current manufacture.

3.02 VALVES

- A.** Before installation, the valves shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing, and to verify that the valves seat properly. Valves shall be installed so that the stems are vertical, unless otherwise directed by the Engineer. Jointing shall conform to AWWA C600 or AWWA C603, whichever is applicable. Valves shall be installed as depicted on the Drawings. Joints shall be tested with the adjacent pipeline. If joints leak under test, valves shall be disconnected and reconnected, and the valve and/or the pipeline retested.

- B.** Faces of flanges shall be cleaned thoroughly before flanged joint is assembled. After cleaning, the gasket shall be inserted and the nuts tightened uniformly around the flange. If flanges leak under test, the nuts shall be loosened, the gasket reset or replaced, the nuts retightened, and the valve and/or pipeline retested.

3.03 VALVE BOXES

- A.** Center the valve boxes and set plumb over the wrench nuts of the valves. Set valve boxes so that they do not transmit shock or stress to the valves. Set the valve boxes and covers in accordance with the Drawings. Cut stem extensions to the proper length so that the valve box does not ride on the stem extension when set at grade.

- B.** Backfill for water valve boxes shall be the same as specified for the adjacent pipe. Backfill drain valve boxes with crushed rock as shown on the Drawings. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed, and backfilled at the Contractor's expense.

3.04 VALVE TESTING

- A.** All valves shall be operated and hydrostatically pressure tested in the field. Refer to SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for testing requirements. Valves may be operated while filling the pipe for hydrostatic testing or as a separate step. Valves must open and close smoothly with full design pressure on upstream side and atmospheric pressure on downstream side. Test mainline valves for smooth operation will full design hydrostatic pressure on both sides of valve.

- B.** After hydrostatic test, operate all drain valves under design static hydraulic pressure to verify that they operate correctly. Valves must open and close smoothly and seat watertight. Repair all defective drain valves and retest at design static hydraulic pressure. Additional crushed rock and

erosion control may be required based on actual flow patterns.

- C. During filling, check all air and vacuum valves to verify that they are operating correctly. Operate all service valves (but not isolation valves) on air and vacuum valves, under design hydrostatic pressure to ensure that they open and close smoothly. Repair any defective valves.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-12 – VALVES AND RELATED APPURTENANCES (BOYS RANCH #2A)

Bid Item No. B-12 – VALVES AND RELATED APPURTENANCES (JACKSON #3)

-END OF SECTION-

SECTION 15130 - VERTICAL TURBINE PUMP COMPONENTS

Bid Item No. A-13, B-13

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary to furnish and install two (2) vertical turbine lineshaft pumps complete with motors, discharge heads, steel lifting plates (if the pump setting exceeds the manufacturer's recommended setting depth), water lubricated open lineshaft assemblies, bearings and bearing retainers, bowl assemblies, column pipe, suction pipe, and water level measuring equipment. The same pump manufacturer shall furnish the pumps, motors, column pipe, discharge heads, lineshaft, and other pumping system components described under this Section. The vertical turbine pumps and motors shall be capable of operating with variable frequency drive equipment that may be furnished in the future.
- B. Equipment and materials shall conform to current standards of the Hydraulic Institute, ANSI/AWWA E103, and NEMA MG-1 unless otherwise specified by this section. Equipment shall be installed in accordance with the manufacturer's recommendations and industry standard practices/procedures. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all well and pump materials installed that are in contact with potable drinking water.
- C. The Contractor is responsible for providing all equipment necessary for field and well pump performance testing. See SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP and SECTION 15145 – DISINFECTION OF WELLS, PUMP AND PIPING for additional requirements.

1.02 SUBMITTALS

- A. All equipment manufacturers shall have an ISO 9001 certification. The only manufacturers acceptable shall be Flowserve, National, Peerless, Floway, or Goulds or approved equal.
- B. The Contractor, as part of the submittal process (bid package), shall furnish for approval by the Engineer the following:
 - 1. A manufacturer factory catalog pump performance curve which summarizes performance characteristics (including thrust bearing, hydraulic thrust, shaft weight and column shaft losses), total dynamic head (measured from top of bowls), flow rate capacity, minimum continuous service factor, net positive suction head characteristics, input horsepower, and

bowl efficiency ratings, over the full operating capacity of the pump, from shut-off to run out at startup.

2. Dimensional and material drawings of the proposed pump indicating the manufacturer and model of the equipment being proposed.

C. Prior to ordering materials the Contractor shall furnish for approval by the Engineer the following:

1. A manufacturer catalog curve and calculations depicting rated capacity, rated head, NPSHr and MCSF characteristics, natural frequencies, horsepower rating, thrust calculations, efficiency ratings, motor and bowl speed, and torque curves. All pump calculations shall be provided over the full operating capacity of the pump, from shut-off to run out conditions. **The Contractor is cautioned to furnish accurate catalog pump curves to ensure that the subsequent factory performance test results closely match the documented catalog pump curve.**
2. A complete bowl thrust curve depicting capacity and thrust over the full operating capacity of the pump, from shut-off to run out at startup.
3. An outline dimension drawing/equipment data sheet, which includes dimensions, lengths, and equipment data for the column assembly, top collar flange adapter, bowl assembly, discharge head, suction assembly and driver. The drawings shall contain dimensions along with the materials of construction for all components to be furnished.
4. Provide natural frequency calculations for the discharge head, assuming that the natural frequency is 20-percent above the maximum operating speed or 0.8 of the minimum operating speed.

D. Prior to pump installation, the Contractor shall furnish, for approval by the Engineer:

1. A certified factory curve depicting the actual tested pump performance curve (horsepower, head, capacity, efficiency, and thrust). The pump and motor shall be performance tested at the factory after assembly. Pumps shall be tested assembled with a minimum of two lengths of column pipe. Actual column losses for the full column length shall be extrapolated from the test data.
2. A minimum of six hydraulic test readings shall be taken between shutoff and runout. One of these points shall be at the rated capacity. The data shall be plotted on a pump curve showing head, flow, brake horsepower, efficiency, and NPSHr.

3. For acceptance purposes, the characteristics of the pump shall be such that the 100% motor nameplate rating is not exceeded (including shaft and thrust horsepower losses) between the minimum and maximum design points specified in Section 2.01.
4. For acceptance purposes, the total measured head from the factory performance test shall be within two percentage difference OR ± 10 -feet (whichever value is larger) at the same capacity and motor full load speed of the approved manufacturer's published catalog curve between the minimum and maximum design points specified in Section 2.01. **The Contractor is cautioned to furnish accurate factory performance pump curves to ensure that the subsequent field performance test results closely match the documented factory performance curve.**
5. The factory pump test performance curve and raw data shall be stamped and signed by a currently licensed professional mechanical or civil engineer.
6. Factory settings for the pump such as shaft tension length (amount of adjustment required to remove the "slack" of the lineshaft) and lateral setting.
7. Factory "megger" specifications for the motor.

E. Subsequent to pump installation and startup and testing, the Contractor shall furnish, for approval by the Engineer:

1. A vibration analysis report prepared by an independent testing company which specializes in and performs the pump vibration testing. The report shall present the results of all testing and provide a conclusion and verification statement that the well pump testing and vibration results meet the requirements set forth in Code M121 (ANSI.HI 9.6.4) "Vibration Testing for Centrifugal and Vertical Pumps." See SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP for additional requirements.
2. A well pump performance and efficiency analysis report shall be prepared by an independent testing company which specializes in and performs the well pump performance testing. The report shall present a summarize all of the testing results from testing and startup activities and provide a conclusion and verification statement that the well pump performance and efficiency results meet the requirements set forth in these specifications. See SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP for additional requirements.
3. A list of oils, grease, and other lubricants utilized in the motor, packing, and on the threads.

The list should contain the name of the product, the name of the manufacturer and on which part(s) the product was utilized.

4. Measurements of all pump adjustments and/or settings (i.e. lateral, tension, etc.)
5. Complete installation, operation and maintenance manuals for all equipment supplied.

PART 2 - MATERIALS

2.01 DEEP WELL TURBINE PUMP

2.02 BOY'S RANCH #2A DEEP WELL TURBINE PUMP

- A. The Boys Ranch #2A deep well turbine pump unit shall be water lubricated with an open lineshaft, water lubricated assembly, turbine motor, discharge head, discharge column, drive shaft including headshaft, bearings with bearing retainers, pump suction pipe, and all other necessary appurtenances for providing a complete and reliable pump unit. The pump shall be of a size and type to comply with the specifications herein.

Boy's Ranch #2A General Design Parameters:

Well casing diameter ID/OD (inches)	15.875" / 16.625"
Static water level (feet)	72 ft to 190 ft
Maximum nominal diameter of pump bowls (inches)	12"
Column pipe diameter (inches)	10"
Suction pipe diameter (inches)	8"
Column pipe length, bottom of discharge elbow to top of bowls (feet)	240 ft
Suction intake elevation	330 ft
Minimum motor efficiency (%) (at full load)	95%
Nominal motor speed (RPM)	1,800
Motor voltage, phase (V, Ø)	460V, 3Ø
Motor power (HP)	125 HP
Motor Enclosure Type	NEMA Type 1
Impeller type (enclosed/semi-open)	Enclosed
Minimum lineshaft diameter (inches)	1.25"

Discharge size (inches)	8"
-------------------------	----

Boy's Ranch #2A Pump Design Points:

Discharge (gallons per minute)	800	950	1100
Total dynamic head (feet) (developed at the eye of top impeller)	433	368	286
Minimum bowl efficiency (%) (at rating point)	83	80	71
Minimum overall plant efficiency (%) (pump and motor at rating point)	76	73	65

- B.** The total dynamic head specified **includes** the hydraulic column loss, discharge head friction loss and all other above ground head losses as determined by the Engineer (**above the eye of the uppermost impeller**). The total dynamic head specified **excludes** all velocity, frictional and minor head losses through the suction pipe and bowl assembly which shall be accounted for by the Contractor (**below the eye of the uppermost impeller**). The laboratory bowl efficiency at the design condition shall be to the right of the best efficiency point (BEP) on the head vs. capacity curve (head as ordinate and capacity as abscissa). The pump shall be designed to continuously operate at any point throughout the complete capacity-head range with short-term periods at shut-off, or longer periods at run-out, at startup, or during fire flows. The efficiency of the pumping unit shall be as high as possible to minimize operating costs.
- C.** Pump tests shall be performed at the factory and witnessed by a currently licensed professional mechanical or civil engineer prior to delivery. The Contractor shall make the facilities available for the City to witness pump tests if requested.

2.03 JACKSON #3 DEEP WELL TURBINE PUMP

- A.** Jackson #3 deep well turbine pump unit shall be water lubricated with an open lineshaft, water lubricated assembly, turbine motor, discharge head, discharge column, drive shaft including headshaft, bearings with bearing retainers, pump suction pipe, and all other necessary appurtenances for providing a complete and reliable pump unit. The pump shall be of a size and type to comply with the specifications herein.

Jackson #3 General Design Parameters:

Well casing diameter ID/OD (inches)	15.875" / 16.625"
Static water level (feet)	59 ft to 124 ft

Maximum nominal diameter of pump bowls (inches)	10"
Column pipe diameter (inches)	8"
Column pipe length, bottom of discharge elbow to top of bowls (feet)	225 ft
Suction intake elevation	430 ft
Minimum motor efficiency (%) (at full load)	95%
Nominal motor speed (RPM)	1,800
Motor voltage, phase (V, Ø)	460V, 3Ø
Motor power (HP)	100 HP
Motor Enclosure Type	NEMA Type 1
Impeller type (enclosed/semi-open)	Enclosed
Minimum lineshaft diameter (inches)	1.25"
Discharge size (inches)	8"

Jackson #3 Pump Design Points:

Discharge (gallons per minute)	600	725	850
Total dynamic head (feet) (developed at the eye of top impeller)	401	357	300
Minimum bowl efficiency (%) (at rating point)	80	81	78
Minimum overall plant efficiency (%) (pump and motor at rating point)	73	74	71

B. The total dynamic head specified **includes** the hydraulic column loss, discharge head friction loss and all other above ground head losses as determined by the Engineer (**above the eye of the uppermost impeller**). The total dynamic head specified **excludes** all velocity, frictional and minor head losses through the suction pipe and bowl assembly which shall be accounted for by the Contractor (**below the eye of the uppermost impeller**). The laboratory bowl efficiency at the design condition shall be to the right of the best efficiency point (BEP) on the head vs. capacity curve (head as ordinate and capacity as abscissa). The pump shall be designed to continuously operate at any point throughout the complete capacity-head range with short-term periods at shut-off, or longer periods at run-out, at startup, or during fire flows. The efficiency of the pumping unit shall be as high as possible to minimize operating costs.

C. Pump tests shall be performed at the factory and witnessed by a currently licensed professional

mechanical or civil engineer prior to delivery. The Contractor shall make the facilities available for the City to witness pump tests if requested.

2.04 DEEP WELL TURBINE PUMP COMPONENTS

A. Electric Motor

1. The motor shall be a vertical, premium efficiency hollow-shaft, squirrel-cage induction type, inverter duty type motor compatible with a variable frequency drive as manufactured by U.S. motors, GE motors or an approved equal. The motor shall be wound for 460 volts, 3-phase A.C. power and be designed, manufactured, and tested in accordance with the latest issue of NEMA MG-1 and have a minimum service factor of 1.15 at 40 degrees C.
2. The motor shall be NEMA Weather Protected Type I Enclosure (NEMA MG1-1, 1.25.8.1) specifically designed to minimize the entrance of rain and dust and provided with screens to prevent entrance of debris and rodents.
3. The insulation shall be Class F or better with a Class B temperature rise, be non-hydroscopic and shall be resistant to attack by moisture and mechanical or thermal shock.
4. Motor bearings are to be oil lubricated with reservoir sight glass.
5. The motor shall be equipped with a 115-volt space heater. Heater shall be installed by the manufacturer or a manufacturer-approved facility. The heater shall be terminated in a separate junction box.
6. The motor shall be supplied with a non-reverse ratchet to prevent reverse rotation of the rotating elements.
7. The thrust bearings shall be designed to carry the total weight of the rotating parts, plus the hydraulic thrust at maximum operating head. If the design and operating conditions are such that up thrust can occur, proper provisions by the manufacturer shall be made to accommodate the up thrust. The thrust bearing shall also have ample bearing capacity to permit the pump to operate during temporary operating conditions with the discharge valve in the closed position. The thrust bearing design shall obtain a minimum of 10,000 starts over the life of the motor at specified pump setting depth and static water level. At the design capacity of the pump, the motor bearing shall be sized to have a minimum B10 life of one year (or 8,760-hours) or an average life of 5-years (43,800-hours).
8. The BD of the motor shall be the same as provided for on the discharge head. No overhang or adapter is permissible.

9. The motor shall be equipped with a non-integral steady bushing which is able to be removed or installed in the field as needed during vibration testing. See SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP for additional requirements.
10. The complete motor unit shall be painted after assembly with epoxy or enamel as required. Any scratches or gouges in the coating shall be field patched and coated.

B. Discharge Head Assembly

1. The discharge head assembly shall be of heavy construction, fabricated steel and shall be lined with an NSF 61 certified epoxy.
2. The head shall be equipped with AWWA Class E flat faced flanged outlets.
3. The head shall be designed to support the entire pump column/bowl setting depth when filled with water and the shut-off pressure condition times a 1.5 safety factor. The head shall be welded only by certified welders conforming to ASME code section IX. The head shall be provided with lifting "ears". A threaded drain tap shall also be provided. The discharge head and base plate shall be sealed with a 1/8-inch neoprene gasket followed with silicon sealant.
4. A 3/4-inch tap shall be provided for a pre-lubrication line, two 1/2" threaded taps shall be provided for the two 1/4" sounding tube lines and one 1" inch threaded tap with a plug shall be furnished on the head to permit access to the well for sounding.
5. Anchor bolts shall be furnished for securely anchoring the discharge head in place. Anchor bolts shall be per pump manufacturer's recommendations and shall be cast in place to suit the discharge head furnished.
6. The head shall be of sufficient size to permit the use of a two-piece headshaft, coupled above the stuffing box. The water slinger shall be provided and installed below the coupling.
7. Safety screens shall be provided at the discharge head openings.
8. A natural frequency calculation shall be provided for the head, assuming that the natural frequency shall be 20-percent above the maximum operating speed or 0.8-percent of the minimum operating speed. The calculations shall be submitted with the factory drawings prior to construction of the pump.
9. The top of the head at the mating point with the motor shall not be more than 0.002-inches T.I.R. (Total Indicator Reading), out of tolerance.

C. Base Plate

1. The base plate shall have a minimum thickness of 1-inch and shall be strong enough not to flex with the application of leveling shims.
2. The inside diameter of the base plate shall be equal to the outside diameter of the well casing.
3. The base plate shall be machined and tapped with a minimum of 8 holes total. 4 holes shall be provided for anchoring the base plate to the pump pedestal and a minimum of 4 holes shall be provided for anchoring the pump discharge head through the base plate to the pump pedestal.
4. Anchor bolts shall be furnished for securely anchoring the discharge head in place. Anchor bolts shall be per pump manufacturer's recommendations and shall be cast in place to suit the discharge head furnished.

D. Column Pipe

1. The column pipe shall be ASTM A53 grade B steel pipe with the ends machined with 8 threads per inch. The ends of each section of column pipe shall be faced parallel, and the threads machined to sufficient length so that the column ends will butt against the spider bearing retainer shoulder to ensure proper alignment and to secure the bearing retainers when assembled. Pipe shall be connected with threaded sleeve type steel couplings. The column pipe shall be furnished in sections not over 10-feet in length. Minimum column pipe wall thickness for each nominal pipe diameter shall be Schedule 30 as follows:

<u>Nominal Size</u>	<u>Outside Diameter</u>	<u>Minimum Wall Thickness</u>	<u>Weight per Length</u>
4"	4.500"	0.237"	10.79 lb/ft
5"	5.563"	0.258"	14.62 lb/ft
6"	6.625"	0.280"	18.97 lb/ft
8"	8.625"	0.277"	24.70 lb/ft
10"	10.750"	0.307"	34.24 lb/ft
12"	12.750"	0.330"	43.77 lb/ft
14"	14.000"	0.375"	54.57 lb/ft
16"	16.000"	0.375"	62.58 lb/ft

2. Column size shall conform to the standard bowl discharge size and to the permissible column sizes for the selected discharge head. Column pipe wall thickness shall be designed to bear

the entire load of the column pipe and bowl assembly.

E. Lineshaft

1. Lineshaft shall conform to the requirements of AWWA E103-07. The maximum combined shear stress shall not exceed 30% of the elastic limit in tension or be more than 18% of the ultimate tensile strength of the shafting steel used. The lineshaft shall be of ample size to operate the pump without distortion or vibration while transmitting the maximum horsepower imposed by the bowl assembly.
2. The maximum combined shear stress for the lineshaft couplings shall not exceed 20% of the elastic limit in tension, nor be more than 12% of the ultimate tensile strength of the shafting steel used.
3. The lineshaft (including headshaft) shall be ASTM A582, type 416 stainless steel connected to type 316 stainless steel lineshaft couplings and shall have a surface finish at bearing locations not to exceed 40 Ra per ANSI B46.1. The lineshaft shall be furnished in interchangeable sections not over 10-feet in length. The butting faces shall be machined, faced, and recessed square to the axis of the shaft. To insure accurate alignment, the shaft shall be straightened to within 0.005-inches total indicator reading per 10-feet in length. The maximum permissible error in the axial alignment of the thread axis with the axis of the shaft shall be 0.002-inches per 6-inches in length. The sections shall be turned, ground, and polished. Lineshaft couplings shall have left handed thread to tighten during pump operation. The lineshaft shall be of ample size to operate the pump without distortion or vibration while transmitting the maximum horsepower imposed by the bowl assembly. Lineshaft shall be sized such that elongation due to hydraulic thrust will not exceed the clearance available of the impellers in the pump bowls.
4. The pump manufacturer shall include a method of adjusting the pump impellers at the top of the headshaft. The adjustment method shall provide a positive locking device.

F. Bronze Centering Spiders (Bearing Retainers)

1. The shaft bearings shall be designed to be lubricated by the water pumped. Shaft bearings shall be mounted in bronze centering spiders (bearing retainers) that shall be held in position in the column couplings by means of the butted ends of the column pipes. Bearings shall be fluted neoprene rubber retained in the spider by a shoulder on each end of the bearing.
2. The bearings shall be spaced at intervals of not more than 10-feet. A spider bearing shall be installed no lower than five feet below the discharge head to ensure adequate support of the lineshaft through the head for alignment purposes.

G. Pump Bowl Assembly

1. Internal and external ferrous surfaces in contact with water shall be coated with an NSF/ANSI 61 certified vitreous glass enamel or fusion bonded epoxy.
2. The pump bowl assembly shall include bowls made of close-grained cast iron, free from blow holes, sand holes or other detrimental defects, ASTM A48 Class 30. The bowl design shall be heavy walled to withstand the pressure developed by the pump. The intermediate bowls shall be constructed with alternating bronze-backed marine bearing and neoprene bearing to support the impeller shaft. The bowl unit shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at the rated capacity or 1.5 times the shutoff head, whichever is greater.
3. The impeller shaft shall be made of 416 stainless steel, turned, grained and polished. It shall be supported by bronze bearings above and below each impeller. Each impeller shall be made of bronze, cast in one piece, enclosed, accurately machined, underfiled, slurry polished to 60 microns RMS (ISO 19-40 Grade 6.3) and be statically and dynamically balanced. Each impeller shall be securely fastened to the shaft with a tapered lock collet/bushing of the same material as the bowl shaft. The bowl shall include an inserted side seal at the impeller skirt. The top discharge case shall be fitted for water lubricated duty. All bolting shall be 316 stainless steel.

H. Suction Assembly

1. The suction pipe and couplings shall be made from unplasticized PVC compounds having a minimum cell classification of 12454, as defined in ASTM D1784. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4° F, in accordance with the requirements of ASTM D2837. White pipe shall be supplied, unless otherwise approved by the Engineer. The suction pipe shall be intended for contact with potable water and shall be evaluated, tested, and certified for conformance with NSF 61. Pipe sections shall be 20' long.
2. All pipe supplied to this specification shall meet the performance requirements of ASTM D1785 for SCH 80 pipe.
3. Pipe shall be joined using a spline lock joint. High-strength, acid-resistant, flexible thermoplastic splines shall be inserted into mating precision-machined grooves to provide continuous restraint with evenly distributed loading. No external pipe-to-pipe restraining devices which clamp onto or otherwise damage the pipe surface as a result of point-loading shall be permitted. The joining system shall incorporate elastomeric sealing gaskets which

are designed to provide a watertight seal. Drop pipe shall be joined to the pump using a Stainless Steel Drop Pipe Adapter provided by the same manufacturer as provides the drop pipe, and which utilizes the same spline lock joint as used on the drop pipe.

4. Drop pipe shall be legibly and permanently marked in ink with the following information: Manufacturer and Trade Name, Nominal Size & SCH Rating, Manufacturing Date Code and NSF 61 certification.
5. PVC suction pipe shall be Certa-Lok as manufactured by North American Pipe Corporation, or approved equal.

2.05 NAMEPLATES

- A. Each major item of equipment shall have the manufacturer's name, address, type or style, model, serial number, and catalog number on a stainless steel plate secured to the item of equipment. In the case of the submerged pump assembly and vertical turbine motor, a pump/bowl nameplate shall be placed in a visible location on the pump discharge head and a vertical turbine motor nameplate shall be placed in a visible location on the vertical turbine motor.
- B. The nameplate for the pump located on the discharge head shall show the manufacturer, size, capacity in gallons per minute, rated total dynamic head in feet, speed in revolutions per minute, model type, # of stages, impeller diameter, year, serial number, and other pertinent data.
- C. The nameplate for the vertical turbine motor located on the discharge head shall show the manufacturer, model type, rated horsepower, rated full load amps, service factor, voltage, nominal efficiency, frequency, phases, time rating, maximum ambient temperature, insulation class code letter, revolutions per minute, year, serial number, and other pertinent data.

2.06 WATER LEVEL MEASURING EQUIPMENT

A. Air Bubbler System

Two 1/4-inch O.D. x 0.065" wall thickness, 316 stainless steel tubing airlines shall be furnished and strapped on the column pipe. The airline tubing shall be strapped on opposite sides of the column pipe at 40-foot intervals starting at the pump setting depth (top of pump bowls) and terminating 5 feet from the discharge head. The stainless steel tubing shall be installed from one continuous roll with no joints. The tubing shall be furnished with sufficient length to reach the termination box at the well head to the top of the well pump bowl assembly. SS bushings or compression fittings shall be used to seal the annular space between each airline tubes and two 1/2" discharge head ports. The airline assembly shall be connected to a water level readout assembly as shown on the Drawings. The extra airline assembly shall be capped and sealed inside of the air bubbler termination box. The air bubbler termination box shall be waterproof

and house a direct reading (in feet) depth gauge of 4-½” diameter, Schrader valve and all other necessary fittings. Refer to SECTION 15110 – VALVES AND RELATED APPURTENANCES for pressure gauge requirements.

The airline from the wellhead termination box to the existing well pump building shall be a 3/8 inch O.D. 160 psi working pressure rated, clear high-density polyethylene tubing. Tubing shall be furnished with a total length of tubing sufficient to reach the wellhead from the air compressor in the existing building five additional feet. The HDPE tubing shall be installed from one continuous roll with no joints.

B. Air Compressor

The air bubbler line shall be charged by a new air compressor mounted in the MCC. The air compressor shall be a GAST, 1/6 HP, Model #1HAB-84T-M100X, no equal.

C. Sounding Tube

The Contractor shall furnish and install HDPE tubing to be used as a sounding pipe. Before installing tubing, the Contractor shall verify that there is enough diametrical clearance between the discharge head barrel and the well casing. The tubing shall be strapped to the column pipe at 40-foot intervals starting at the pump setting depth (top of pump bowls) and terminating 5 feet from the discharge head. The Contractor shall ensure the tubing is not strapped so tightly as to cause deformation to the tubing. The Contractor shall ensure the completed installation of the well pump and HDPE sounding tube allows for clear passage of a well sounder probe from the surface to the pump setting depth. The tubing shall be connected and strapped to a threaded 1 inch, 316 Stainless Steel King Combination Hose Nipple. The King Nipple shall connect to the discharge head and the tubing shall be covered with threaded PVC plug. The HDPE tubing shall be ¾” inch nominal diameter, SIDR 7. HDPE tubing shall be manufactured Centennial Plastics Inc. (CenFlo), or approved equal. The column straps shall be stainless steel, 0.75 inch wide and 0.30 thick, and shall be manufactured by Band (Model Band-It C206 Easy Scale Band), or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. The manufacturer’s authorized service representative shall visit the site for as long as necessary to complete the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation. The manufacturer’s authorized service representative shall:

1. Witness the proper installation of the equipment.

2. Witness the inspection, checking, and adjusting the equipment.
3. Witness startup and field-testing operations, and efficiency testing.
4. Instruct the City's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Instruction and materials shall be specific to the models of equipment provided. The representative shall have at least two years' experience or training with equipment provided.

3.02 INSTALLATION

- A.** The vertical pump and motor components shall be installed in accordance with the pump manufacturer's recommendations for proper handling and installation of vertical turbine well pumps. The well pump shall be installed by a Contractor who is engaged in the full-time business of selling, installing, and repairing vertical turbine lineshaft pumps. The pump subcontractor shall also be a factory dealer for the proposed equipment. The Contractor shall possess a valid C-57 or C-61 (D-21) license in effect and in good standing with the California Contractors State License Board. The well pump shall be installed to the approved shop drawings and in accordance with the Contract Documents. The installation rig and equipment shall be an industry rig, set up and configured for the sole purpose of installing and removing well pumps. All rigging and equipment shall be properly sized to safely accommodate the load. All installation personnel shall wear all appropriate safety equipment, including hard hats.
- B.** The column pipe, suction pipe, and pump bowls are to be hot water high pressure cleaned prior to transporting the entire pump to the site. If in the opinion of the Engineer the pump has not been adequately cleaned, the pump components shall be hot water high pressure cleaned again to the satisfaction of the Engineer.
- C.** The Contractor shall verify lineshaft straightness by rotating the lineshaft sections on V blocks and measuring the lineshaft run out at two points by means of a dial indication. Lineshaft sections with a run-out in excess of 0.002-inches shall be straightened.
- D.** The pump equipment, including motor, shall be stored on clean timbers at all times. Suitable precautions shall be taken to restrict sand, silt, or other foreign matter from entering the pump or motor.
- E.** Prior to installation of the pump, the well shall be bailed to remove any oil or fill material that may be present to the satisfaction of the Engineer. The Contractor shall measure the static water level and total well depth. Report any deviation to the Engineer prior to installation.
- F.** The factory assembled pump assembly shall be lifted into the vertical position before uncrating.

If the pump is disassembled for installation, a factory representative acceptable to the Engineer shall be present to ensure proper re-assembly. The Contractor shall take precautions to install the pump assembly without causing damage. The specified pumps are rather long and damage may occur when off-loading the pump assembly.

- G.** Measure and record the available lateral in the bowl assembly.
- H.** The Contractor shall utilize the proper or manufacturer recommended thread compounds for column and lineshaft threads. Pipe lubricants and compounds shall be certified to NSF 60/61 where contact with potable water is expected.
- I.** Install the pump in accordance with the manufacturer's directions. The Contractor shall maintain a copy of the manufacturer's installation manual on location during installation, start-up, and testing.

3.03 PUMP ALIGNMENT

- A.** Once the pump, discharge head, and motor have been installed, the motor and shaft shall be aligned by the Contractor. The discharge piping shall be disconnected from the discharge head, the discharge head bolts and base plate bolts must be loosened and the motor steady bushing shall be removed from the motor prior to alignment procedure.
- B.** Ensure the stub shaft and head shaft are within factory straightness tolerances of 0.002-inches. Straighten shafts as needed. Without straight shafts the balance of the work shall not proceed.
- C.** With the stub shaft installed, the head shaft removed and the stuffing box not in place, carefully measure the clearance around the stub shaft to the side of the machined discharge head stuffing box bore and drive tapered metal shims between the concrete pedestal and the base plate on the side opposite the largest measured clearance to the shaft. Record clearance and drive additional shims until the clearance measured around the shaft is uniform. Ensure, and demonstrate if so requested by the Engineer, that shaft alignment is within manufacturer's tolerances.
- D.** After alignment is completed, the void area under the base plate shall be filled with hydrophilic non-shrink grout, in accordance with manufacturer's directions. Recheck the alignment adjusting shims as necessary if alignment has been disturbed. After the grout has hardened, the leveling shims shall be removed or backed off and the base plate shall be fastened tightly to the anchor bolts, solidly against the grout bed. Damaging vibration may result if the base plate is not solidly in contact with the grout bed.
- E.** Install and adjust the stuffing box per the manufacturer's instructions. Install the steady bushing under the motor. Install the head shaft and motor drive coupling. Do not install the key in the

coupling until the motor rotation is correct. Check rotation, and correct if necessary.

- F.** Thread the lateral adjusting nut and screw it down the shaft until just seated on top of the drive coupling. Measure and record the shaft stickup above the adjusting nut. Take up the lateral until the impeller comes in contact with the top of the bowl housing. Measure and record the shaft stickup above the adjusting nut. This is the total lateral take-up. Lower the shaft to affect the impeller lateral setting recommended by the pump manufacturer. Record the shaft length above the coupling.
- G.** Measure the static voltage, start the pump and after recording the running voltage and amperage, stop the pump and reset the lateral (to ensure the lateral settings are the same after lineshaft coupling makeup).
- H.** Ensure and demonstrate, if so requested by the Engineer, that shaft alignment is within manufacturer's tolerances by lowering the lateral and removing the drive clutch for inspection of the headshaft adjustment within the motor hollow-shaft. If the shaft is not centered (within 0.005-inch), the Contractor shall realign the pump at no cost to the City and reimburse the City for follow up inspection(s).

3.04 TESTING

- A.** The Contractor shall perform all required pump performance and vibration testing in accordance with SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP. Any malfunctioning equipment, excessive vibration, or other problems shall be corrected by the Contractor at his/her expense. The fully completed installation shall be placed in typical operation for a period no less than 4-hours, one day prior to acceptance testing by the Engineer.

3.05 DISINFECTION

- A.** The well and well pump shall be disinfected in accordance to AWWA C654. See SECTION 15145 – DISINFECTION OF WELL, PUMP & PIPING for disinfection requirements before, during, and after well pump installation and startup.

3.06 WARRANTY

- A.** The Contractor shall provide a full warranty on all pump materials and installation for a period of three (3) years from date of start-up. In the case of non-compliance with the stated specifications, the City may require Contractor to repair the pump unit, including parts and labor to make repairs, up to and including removal and replacement of all or part of the pump unit.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-13 – VERTICAL TURBINE PUMP COMPONENTS (BOYS RANCH #2A)
Bid Item No. B-13 – VERTICAL TURBINE PUMP COMPONENTS (JACKSON #3)

-END OF SECTION-

Pump Field Test Data

Date Tested: _____
Performed by: _____ (Contractor)
Witnessed by: _____ (Engineer)

Static Water Level: _____

Wait 20 minutes after starting the pump before taking Test 1 readings.

All field test measurements shall be read from the panel and compared to head measurements.

Drive Readings (Read from Panel)							
Test	Voltage (Volts)	Current (Amps)	Frequency (Hz)	Power (HP)	Flow (gpm)	Discharge Pressure ⁺ (psi)	PWL (feet)
1							
2							
3							
4							

Readings Taken By Hand							
Test	Voltage* (Volts)	Current* (Amps)	Frequency* (Hz)	Power* (HP)	Flow** (gpm)	Discharge Pressure ⁺ (psi)	PWL*** (feet)
1							
2							
3							
4							

* Readings taken at the pump by hand

** Readings from the flowmeter

*** Readings taken with the use of a water level sounder apparatus

⁺ Pressure readings taken from pressure gauge located as close as possible to well pump discharge head

SECTION 15145 - DISINFECTION OF WELL, PUMPS AND PIPING

Bid Item No. A-14, B-14

PART 1 - GENERAL

1.01 SCOPE

- A.** This section covers the work necessary to disinfect all wells, pumps, water mains, station piping and other piping facilities.

PART 2 - MATERIALS

2.01 DISINFECTANT

- A.** Disinfectant shall be liquid sodium hypochlorite (chlorine) at 12.5-percent available, for the well and pump. Calcium hypochlorite tablets or liquid sodium hypochlorite shall be used to disinfect the water mains.
- B.** Certification with NSF Standard 60 shall be provided by the National Sanitation Foundation for all disinfectant added to the drinking water including raw water to be treated.

2.02 DECHLORINATION AGENT

- A.** The dechlorination agent shall be in tablet or liquid form. Only one type of dechlorination agent shall be used during dechlorination activities. Dechlorination agent shall be any of the following chemicals: sodium thiosulfate, sodium sulfite, sodium bisulfite, sodium metabisulfite, calcium thiosulfate, ascorbic acid, or sodium ascorbate.

PART 3 – EXECUTION

3.01 DISINFECTION OF WELL AND WELL PUMP

- A.** Prior to delivery to the site, the Contractor shall clean all column pipe sections and pump assembly and all other components to be installed in the well with a hot-water high-pressure cleaner. If the Engineer requires additional cleaning measures, the Contractor shall pressure wash the pumps using a solution containing trisodium phosphate with use of an appropriate BMP approved by the Engineer for containment of cleaning solution. The Contractor shall cover and protect the column pipe sections and pump assembly if they are not installed on the same day they are delivered to the site.

- B.** All permanent equipment and material to be installed in the well shall be chlorinated during installation. This shall be done by spraying all areas of permanent equipment (pump, column, etc.) with a solution having a chlorine residual of not less than 200 mg/L (200 ppm).
- C.** Immediately prior to disinfection and bacteriological testing and after the well pump has been installed and is operable, the Contractor shall run the pump at the design flow rate to waste for a 2-hour minimum period or longer if visual evidence suggests discharge water is not free of solids. The pump waste flow shall not exceed the design flow rate specified in SECTION 15130 – VERTICAL TURBINE PUMP COMPONENTS.
- D.** After the well pump has been run to waste the well shall be disinfected in accordance with the procedures specified in AWWA C654 and as specified herein. The Contractor shall add sufficient disinfectant to the well to reach a chlorine residual of not less than 50 mg/L (50 ppm) which takes into account the well casing size, gravel pack (if present) and water column. Prior to the introduction of the chlorine solution, the Contractor shall verify all quantities with the Engineer. The liquid disinfectant shall be added through a suspended tube (tremie pipe), directed either through the well sounding port in the discharge head (if available) or the well air vent pipe assembly. The liquid chlorine solution shall be evenly distributed through the well by withdrawing the tube from the bottom of the well as the liquid chlorine solution is pumped through the tube. Prior to the introduction of the chlorine solution, the Contractor shall verify all quantities with the Engineer.
- E.** After the chlorine has been applied, the well shall be surged at least three times to improve mixing and induce contact of the chlorinated water with the adjacent aquifer. The chlorinated water shall be allowed to rest in the casing for 24-hours. After 24-hours, the well pump shall be started and pumped to waste. The chlorine residual shall be measured immediately upon discharge and recorded. If the chlorine residual is less than 25 mg/L (25 ppm), the Contractor shall flush the well for not less than 1-hour. The well shall then be rechlorinated again to 50 mg/L (50 ppm) and this step shall be repeated until the chlorine residual is measured above 25 mg/L (50 ppm)
- F.** Any oil or other significant contaminant pumped from the well must be collected for proper disposal. See SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for discharge specific discharge requirements of chlorinated water, dechlorinated water and solids to the storm drain or sanitary sewer.
- G.** Once the 24-hour chlorine residual is measured above 25 mg/L (25 ppm), the well water shall be pumped to waste for at least 15-minutes or longer until zero chlorine residual is measured. The Contractor shall then coordinate with the City to collect a bacteriological sample for laboratory analysis. Lab testing will be paid for by the City.

3.02 DISINFECTION OF WATER MAINS

- A. After all other work has been completed, hydrostatic pressure and leakage tests have been passed, and prior to placing in service, all water lines shall be completely disinfected in accordance with the *Continuous-Feed Method* outlined in AWWA C651 as specified herein. Other disinfection methods contained in AWWA C651 may be used at the approval of the Engineer.
- B. Prior to chlorination, the water main shall be flushed as thoroughly as possible using corporation cocks, drain valves or other suitable valves, acceptable to the Engineer. However, if calcium hypochlorite tablets are attached to the pipe at the time of installation for purposes of sterilization, it will not be possible to flush the main prior to disinfection. It shall therefore be necessary to exercise extreme care to keep the pipe clean during installation. The Contractor shall furnish and install temporary disinfection equipment and supplies (hoses, temporary piping, etc. as required) to dispose of flush water without damage to adjacent properties.

1. Disinfection

Inject the chlorine mixture into the pipeline to be treated at the beginning of the line through a corporation stop or suitable tap in the top of the pipeline. Water shall be controlled so as to flow slowly into the piping during the application of chlorine. The rate of chlorine mixture shall be in proportion to the rate of water entering the pipe so that the combined mixture shall contain 25 mg/L (25 ppm) of free available chlorine.

2. Retention Period

Chlorinated water shall be retained in the pipeline long enough to destroy all non-spore-forming bacteria. This period shall be at least 24-hours. After the chlorinated water has been retained for at least 24-hours, the chlorine residual at the pipe extremities and at the other representative points shall be at least 10 mg/L (10 ppm).

3. Chlorinating Valves

During the process of chlorinating the piping and pipelines, all valves and other appurtenances shall be operated while the pipeline is filled with the chlorinated water.

4. Final Flushing

Following chlorination, all treated water shall be thoroughly flushed from the pipes and pipelines until the replacement water shall, upon testing, both chemically and bacteriologically, be proven equal to the water quality at the point of supply. Chlorination shall be repeated, if necessary, by the Contractor at no additional cost to the City, if the replacement water does not prove equal to the water quality at the point of supply.

- C. The number of calcium hypochlorite tablets used shall be in accordance with the following table from AWWA C651, which is based on 5-gram calcium hypochlorite tablets for a dosing of 25 mg/L (25 ppm). The number of 5-gram tablets required for each pipe section shall be $0.0012d^2L$ rounded to the next higher integer, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet.

OF 5-GRAM Ca(ClO)₂ TABLETS REQUIRED PER PIPE LENGTH

Length of Pipe Section	Pipe Diameter					
	4"	6"	8"	10"	12"	16"
13' or less	1	1	1	2	3	4
18'	1	1	2	3	4	6
20'	1	1	2	3	4	7
30'	1	2	3	4	6	10
40'	1	2	4	5	7	13

- D. Prior to acceptance of the system by the City, all pressurized mains shall be thoroughly flushed and successfully tested for bacteriologic quality. The Contractor shall coordinate with the City to collect a bacteriological sample for laboratory analysis. Lab testing will be paid for by the City.

3.03 FINAL CONNECTION TO DISTRIBUTION SYSTEM

- A. After cleaning, disinfecting, and testing, the new pipeline shall be connected to the existing pipeline in accordance with AWWA C651, 4.6. The connection spool and fitting shall be swabbed with a minimum 1 to 5-percent solution of chlorine just prior to being installed.

3.04 DISCHARGE REQUIREMENTS

- A. The Contractor shall properly dispose of flush water in a manner that will not cause damage and nuisance to the environment. Non-chlorinated flush water shall be disposed of as directed by the Engineer. Otherwise, the Contractor shall dechlorinate the flush water completely and discharge it to the nearest storm drain or drainage channel in a manner which shall not cause erosion or other environmental problems. Refer to SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for specific discharge requirements.

3.05 BACTERIOLOGICAL TESTS

- A. After final flushing and before the pumps and water mains are placed in service, wells and water mains shall be sampled by the City and tested for coliform organisms and iron bacteria in accordance with "Standard Methods for the Examination of Water and Wastewater."

1. Contractor shall coordinate bacteriological testing with the City. Samples shall be collected by the City from the station piping, from the downhill end of the water main. No hose or fire hydrant shall be used in collection of samples.
2. Test results shall show the absence of coliform organisms.
3. The City will conduct the laboratory tests at no cost to the Contractor. If the initial disinfection fails to produce satisfactory bacteriological samples, the Engineer shall evaluate the results and direct the Contractor to take corrective actions.
4. The Contractor shall be responsible for any time delay and pay all costs incurred for retesting and any corrective actions taken.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-14 – DISINFECTION OF WELLS, PUMPS AND PIPING (BOYS RANCH #2A)

Bid Item No. B-14 – DISINFECTION OF WELLS, PUMPS AND PIPING (JACKSON #3)

-END OF SECTION-

SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP

Bid Item No. A-15, B-15

PART 1 – GENERAL

1.01 SCOPE

- A. This section covers the acceptance tests of the hydraulic efficiency and mechanical operation of the pumping equipment, piping systems, complete. The Contractor shall furnish all necessary personnel and testing equipment to accurately determine the hydraulic efficiency and mechanical operation of the pumping, electrical, piping and all other equipment as required. Refer to SECTION 15130 – VERTICAL TURBINE PUMP COMPONENTS, SECTION 15145 – DISINFECTION OF WELLS, PUMPS AND PIPING, and Division 16 for additional systems testing requirements.

1.02 RELATED WORK

- A. SECTION 15025 – PIPE (STATION, DISTRIBUTION AND DRAINAGE)
- B. SECTION 15130 – VERTICAL TURBINE PUMP COMPONENTS
- C. SECTION 15145 – DISINFECTION OF WELLS, PUMPS AND PIPING.

1.03 GENERAL

A. System Commissioning

Commission all systems and equipment to verify performance, function, and correct operation by performing procedures to activate, startup, adjust, test, and demonstrate that the work is in operating order in accordance with the general requirements of this Section and the detailed requirements of the technical sections under the system or equipment specified. Ensure that the work is ready for full-testing, documentation, inspection by equipment manufacturers and operator training, where specified.

B. Notification

Notify the Engineer five (5) days prior to starting the well pumps.

C. Coordination

During the startup period, coordinate the operation of the facility with the Engineer, subcontractors, City's operators, and manufacturer's representatives. Coordinate field service

technicians and subcontractors to provide power controls, chemicals, water, and ancillary systems to allow for pressurizing and starting equipment. The Contractor shall prepare a detailed checklist for all equipment noting that all prerequisite steps have been updated.

D. Testing

Furnish all test equipment including safety equipment, gauges, bulkheads, discharge and dechlorination facilities, valve and piping identification, hoses, temporary piping, caps, gauges, measuring devices and all other equipment required to conduct tests. Devices and equipment shall be fully functional, adjusted, and tested.

E. Equipment Maintenance

Maintain the equipment until acceptance. Provide all lubricants, chemicals, and electricity necessary until acceptance.

F. Expendable Supplies

The Contractor shall furnish all expendable supplies, including chemicals, gas, water, chlorine and other necessary supplies required for startup, demonstration and testing and dispose of all waste or used supplies, water, etc., in accordance with all applicable local, state, and federal regulations.

G. Facility Shut Down

The Contractor shall notify the City three (3) days prior to any shut down of the existing facility and shall coordinate with the City to insure minimal disruption of service to the community.

1.04 SUBMITTALS

- A. Submit name, address and resume of proposed field services technicians at least ten (10) working days in advance of the need for such services.
- B. Submit, in accordance with SECTION 01330 – PROJECT RECORDS AND SUBMITTALS, detailed testing procedures for shop tests including specified test and performance requirements for various equipment, per manufacturer recommendations. The Contractor shall coordinate with the City to prepare the work plan for testing.

1.Submittals shall include the following:

- a. Name of equipment to be tested, including reference to Specifications section number and title.
- b. Testing schedule of proposed dates and times for testing.

- c. Summary of power, lighting, chemical, water, sludge, gas, etc., needs and identification of who will provide them.
 - d. Outline specific assignment of the responsibilities of the Contractor and manufacturers' factory representatives or field service personnel.
 - e. Detailed description of step-by-step testing requirements, with reference to appropriate standardized testing procedures and laboratory analyses by established technical organizations (e.g., ASTM, WPCF Standard Methods, etc).
 - f. Samples of forms to be used to collect and record test data and to present tabulated test results.
2. Copies of test reports upon completion. Test reports shall incorporate the information provided in the test procedures submittals, modified to reflect actual conduct of the tests and the following additional information:
 - a. Copy of all test data sheets and results of lab analyses.
 - b. Summary comparison of specified test and performance requirements vs. actual test results.
 - c. Should actual test results fail to meet specified test and performance requirements, describe action to be taken prior to re-testing equipment.
 3. Copies of the manufacturer's field service technician's report summarizing the results of his/her initial inspection, operation, adjustment and pre-tests. The report shall include detailed descriptions and tabulations of the points inspected, tests and adjustments made, quantitative results obtained, suggestions for precautions to be taken to ensure proper maintenance, and the equipment supplier's Certificate of Installation in the format specified herein.

1.05 QUALITY ASSURANCE AND WITNESS REQUIREMENTS

- A.** Field service technicians shall be competent and experienced in the proper installation, adjustment, operation, testing and startup of the equipment and systems being installed.
- B.** Manufacturers' sales and marketing personnel will not be accepted as field service technicians.

- C. The City and/or City's representatives, as required by the various equipment Specifications, may witness shop tests or factory tests.

PART 2 – MATERIALS

2.01 GENERAL

The Contractor shall furnish all necessary personnel and testing equipment to accurately determine the hydraulic efficiency and mechanical operation of the pumping, piping, and all other equipment as required.

PART 3 – EXECUTION

3.01 PRELIMINARY TESTING REQUIRMENTS

- A. The following shall be completed before testing and startup begins.
1. The Engineer has reviewed and accepted the Contractor's Testing and Startup Plan.
 2. Functional verification of the individual interlocks between the field-mounted control devices and the motor control circuits, control circuit of packaged system controls and City SCADA System.
 3. Functional verification of the individual instrumentation loops (analog, status, alarm, and control) from the field devices to the workstation display screens.
 4. Adjustment of the pressure switches, flow switches, timing relays, level switches, temperature switches, RTD monitors, and other control devices to the settings determined by the Engineer or the equipment manufacturer.
- B. The operation, testing and adjustment shall be as required to prove that the equipment has been left in proper condition for satisfactory operation under the conditions specified.
- C. All performance tests and inspections shall be conducted during the work week of Monday through Friday, unless otherwise specified.
- D. No testing or equipment operation shall take place until it has been verified by the Engineer that all specified safety equipment has been installed and is in good working order.
- E. No testing or equipment operation shall take place until it has been verified by the Engineer that all lubricants, tools, maintenance equipment, spare parts and approved equipment operation and

maintenance manuals have been furnished as specified.

- F.** In the event of failure to demonstrate satisfactory performance of the facility on the first or any subsequent attempt, all necessary alterations, adjustments, repairs and replacements shall be made. When the facility is again ready for operation, it shall be brought on line and a new test shall be started. This procedure shall be repeated as often as necessary until the facility has operated continuously to the satisfaction of the City and Engineer, for the specified duration.
- G.** Do not, at any time during testing, allow the facility to be operated in a manner which subjects equipment to conditions that are more severe than the maximum allowable operating conditions for which the equipment was designed.

3.02 DISCHARGE OF WATER

- A.** Discharged water includes but is not limited to rainwater, groundwater, water pumped or otherwise removed from excavations, whether introduced to the excavation or naturally occurring groundwater, wash water, water used for testing, flushing and chlorination, water removed from existing pipelines and water used by the Contractor for any other purpose.
- B.** The Contractor shall follow requirements of the Regional Water Quality Control Board, San Francisco Bay Region, Central Coast Region and the City Best Management Practices for discharge to surface waters, as applicable. The Contractor shall also follow applicable requirements of U.S. Army Corps of Engineers Section 404 Permits, California Department of Fish and Game Streambed Alteration Agreements and Regional Water Quality Control Board Water Quality certification or waiver, each as applicable.
- C.** The Contractor shall follow requirements of the State Water Resources Control Board, Order WQ 2014-0194-DWQ (General Order No. CAG140001) Statewide National Pollutant Discharge Elimination System (NPDES) Permit, as applicable.
- D.** All water discharged from or flowing from the jobsite shall be of such purity and cleanliness as not to introduce any contaminants into any watercourse, stream, lake, reservoir, or storm drain system.
 - 1. No liquid shall be discharged into any sewer, storm drain system or water course without appropriate permits or approval.
- E.** The Contractor shall be responsible for caring for the drainage on the entire work area and the disposal of such drainage from commencement of work until contract completion. Silt, eroded materials, construction debris, concrete or washings thereof, petroleum or paint products or other hazardous substances, shall not be introduced, or placed where they may be

washed by rainfall or runoff, into any water course, stream, lake, reservoir, or storm drain system.

- F. Water shall cause no erosion of earth, whether disturbed or not disturbed, or of excavated or dredged earth stored on site, or of material imported for fill or other purposes.
- G. No soil or other material shall be discharged in a quantity that will have an adverse effect on the receiving waters. Discharge shall not cause or contribute to a violation of any water quality standard.

H. Discharge to the Storm Drain

The Contractor is required to adhere to the following effluent limits for discharge to the storm drain and provide discharge-monitoring submittals for each discharge event to include discharge date, flow, duration, and monitoring records:

1. Total chlorine residual less than 0.19 mg/L.
2. pH greater than 6.5 and less than 8.5.
3. Turbidity must not be greater than 5 NTU above the receiving waters if receiving water turbidity is between 1 and 50. Turbidity shall not be more than 10% higher than receiving water for NTU's greater than 50. Turbidity may not exceed 100 NTU at any time.

The Contractor may discharge water into the existing storm drain mainline/manhole located within the pump station site once the discharge water has been sampled to show effluent limits are not exceeded. In the event any of the samples do not meet the requirements specified above, the Contractor shall stop discharge immediately and notify the Engineer.

During discharge events, samples shall be taken from the discharge stream at the farthest available location downstream of the well, prior to discharge into the storm drain mainline/manhole.

The Contractor shall prepare and submit a discharge plan to the Engineer which describes all planned activities prior to discharge to the storm drain. The Contractor shall submit copies of the plan to the Engineer a minimum of 2-weeks prior to discharges from the well/pump for review. The discharge plan shall include the following:

1. Drawings showing plan view of piping system to be used, and piping components.
2. Map showing piping discharge path to the storm drain.

3. Description of planned BMPs for prevention of erosion along the discharge path and at the discharge point.
4. Estimated discharge rate, duration, and total volume of discharge water.
5. Description of means to control discharge flow.

3.03 MAINLINE AND STATION PIPING PRESSURE TESTING

A. General

After installation, flushing and disinfection of any newly installed main lines, station piping, and appurtenances has been completed, all piping shall be hydrostatically tested, as specified herein. Hydrostatic testing shall occur after the pipe is backfilled but prior to permanent resurfacing and connection to the existing water system. Valves and other flanged fittings may be left exposed during hydrostatic testing provided sufficient thrust restraint is provided by the Contractor as necessary. The Contractor shall provide the Engineer with a minimum of five (5) working days' notice prior to the requested date and time for hydrostatic tests. All testing shall be performed in the presence of the Engineer.

Thrust blocks shall have been in place for a minimum of seven (7) days prior to testing. Pipe with mortared joints shall not be filled with water within twelve (12) hours of the time the last joint has been completed and the interior mortar placed. Do not subject the pipe to internal hydrostatic pressure until all mortared joints have cured at least thirty-six (36) hours.

Separate tests shall be made on pipelines that can be sectionalized by valves. The Contractor shall furnish all labor, materials, tools, and equipment for testing and make all necessary connections and provide all necessary bulkheads, blind flanges, spool pieces, backflow devices, piping and appurtenances, as needed.

B. Isolation

The new pipelines shall remain isolated from the existing wells until after acceptance of the disinfection and hydrostatic testing. The Contractor shall provide a hydrostatic, disinfection, and bacteriological testing plan complete with locations of bulkheads, or blind flanges, or steel plates or other methods to maintain isolation from the potable water supply, to the Engineer for approval, prior to testing. All isolation equipment shall remain in-place until the new water line has passed the pressure test, passed the chlorination test, passed the bacteriological test and is approved by the City for connection.

C. Fill Rate

Fill pipeline at a rate of two (2) feet per second so as not to cause any surges or exceed the rate at

which air can be released through the air valves. During filling, check all air valves to verify that they are venting correctly.

1. Mortar Lined Pipe – After pipe has been filled and all of the air purged, the pipe shall be allowed to stand under a slight pressure for at least 48-hours prior to the hydrostatic test to allow the mortar lining, to absorb water. Additional water shall be added to replace water absorbed by the cement mortar lining.
2. Pipe with other types of lining may be tested without a waiting period.

D. Test Pressure

Pipeline and mainline valves shall be tested at a pressure of not less than 1.25 times the stated working pressure of the pipeline measured at the highest elevation along the test section and not less than 1.5 times the stated working pressure at the lowest elevation of the test section. The test pressure shall not exceed the thrust restraint design pressures or 1.5 times the pressure rating of the pipe or joint, whichever is less.

Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. The test pressure shall not exceed the rated working pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.

The pressure gage reading at the time of test shall be located at the highest point of the section of pipe being tested. A blind flange shall be utilized at the connection to any pump discharge heads. Test pressure shall be maintained for a period of two (2) hours. Apply and maintain the test pressure by continuous pumping if necessary for the entire test period. The pump suction shall be in a barrel or similar device or metered such that the amount of water required to maintain the test pressure may be measured accurately. The Engineer shall reserve the right to evaluate test pressure at any point along the section being tested.

E. Allowable Leakage

Leakage is defined as the quantity of water required to hold the test pressure for the duration of the test period.

1. The allowable leakage for steel (flanged or welded), ductile iron (flanged), threaded, compression fitted, and soldered pipe, shall be zero.
2. The allowable leakage for polyvinyl chloride (PVC) pipe and for steel or ductile-iron pipes with rubber joints shall be in accordance with AWWA C600 and calculated using the following formula:

$$L = \frac{S * D * (P)^{0.5}}{133,200}$$

L = testing allowance (gallons / hour)

S = length of pipe tested (feet)

D = nominal diameter of pipe (inches)

P = average test pressure during test (pounds / sq. inch (gage))

3. If leakage exceeds the allowable loss, the leaking areas shall be located and repaired as required by the Engineer. All defective pipe, fittings, valves, and other appurtenances discovered shall be removed and replaced with reliable material. Additional disinfection shall be performed as necessary per SECTION 15145 – DISINFECTION OF WELLS, PUMPS AND PIPING. The hydrostatic test shall be repeated until the leakage does not exceed the rates specified above.

F. Correction of Defects

If the leakage exceeds the allowance, the installation shall be repaired or replaced and pressure tests shall be repeated until conformance to the leakage test requirements specified herein have been met. All visible leaks from the piping, valves, flanges or gaskets shall be repaired even if the pipeline passes the allowable leakage test. All work associated with finding and fixing leaks and performing additional testing shall be performed at no additional cost to the City.

G. Contractor's Report

The Contractor shall keep records of each piping test, including:

1. Description and identification of piping tested.
2. Description of test procedure.
3. Date of test.
4. Witnessing by Contractor and Engineer.
5. Test evaluation.
6. Remarks, to include such items as;
 - a. Leaks (type, location)
 - b. Repairs made on leaks.

3.04 VERTICAL TURBINE WELL PUMPING EQUIPMENT TESTING PROCEDURES

- A. Acceptance tests will be conducted after installation of the vertical turbine well pumping equipment, station piping, and pipelines. The Contractor shall be responsible for field testing of all vertical turbine well pumps after installation to demonstrate satisfactory operation without causing excessive noise, cavitation, vibration, and overheating of the motor/pump bearings. Refer to SECTION - 15130 VERTICAL TURBINE PUMP COMPONENTS.

- B.** All testing shall be witnessed by a representative of the City. The Contractor shall notify the City 5-days in advance of the field tests. The Contractor shall furnish all necessary personnel and testing equipment to accurately determine the hydraulic efficiency and mechanical operation of the pumping equipment as required.
- C.** Test equipment to be provided by the Contractor for use during pump performance testing includes, but is not limited to a flow measurement instrument (Collins tube, Pitot Tube, Cox meter, Ultrasonic meter, etc.) to verify pump flowrate, a well level sounder to verify well water level, pressure gauges to verify system pressures, and an electrical multimeter to verify input horsepower (amperage, voltage, power factor, etc.).
- D.** After each pumping system has satisfied the requirements, the Contractor shall certify in writing that it has been satisfactorily tested and that all final adjustments have been made. Certification shall include the date of the field tests, a listing of all persons present during the tests, and the test data results.
- E.** The Contractor shall bear all costs of field tests, including related services of the Manufacturer's representative, an independent vibration analysis company, and independent pump test company, except for power and water which the City will bear. If more than one 8-hour day is required for testing, due to the failure of the equipment to meet the specified performance requirements, the Contractor shall reimburse the City for the cost of any subsequent inspection for performance testing. Therefore, the Contractor is strongly urged to perform all testing, to ensure proper equipment operation, prior to the performance testing witnessed by the City and/or the Engineer. Tests and acceptance include:
1. Measure the static voltage "leg to leg" and "leg to ground."
 2. Disconnect the motor leads and using a 1,000-volt megaohm meter, "meg" each lead to check the motor. With the permission of the Engineer, the motor may be "megged" just prior to the electrician connecting and taping the motor leads. However, this is permissible only as long as this procedure is performed within 5-days of the pump performance testing and is witnessed by either a representative of the City or the Engineer. The measurements are to be within accepted motor manufacturers' tolerances for the specific motor used.
 3. Prior to performance of the acceptance tests, start the well pump and allow the well pump to pump at or within 10-percent of the design capacity. Measure the amperage per leg and the running voltage "leg to leg" and "leg to ground." Stop the pump and "roll" the leads. Start the pump and again repeat the measurements. Repeat a third time. Line balance is to be calculated and the line position with the least "unbalance" used. If the unbalance is not within the motor manufacturer's accepted tolerances, the pump is to be shut down and the problem

investigated and corrected by the Contractor at no additional cost to City, prior to further acceptance testing.

4. The Contractor shall be responsible for field-testing to check for any deviation from the rated voltage, phase, frequency, efficiency, or improper installation. Unless the measured amperage between phases is less than 5-percent, the Contractor shall “roll the leads” to balance power. If amperage cannot be balanced, the pump Manufacturer shall assess and identify the problem and implement corrective measures as appropriate.
 5. The Contractor shall verify the proper stuffing box packing tension and proper operation of the pre-lubrication system, all hydraulic control valves, all manual valves, the flow meter and chemical feed equipment.
 6. The Contractor shall operate the well pump and measure the capacity, discharge pressure, and pumping water level at 100% speed for a minimum of three different capacities (all three capacities shall be as selected by the Engineer which shall include the pump design point). The well pump is to be run a minimum of 10-minutes at each capacity. **For acceptance purposes, the total measured head shall be within ± 15 feet of the manufacturer’s factory performance test pump curve.**
- F.** The Contractor shall use the field test results and calculate the overall plant efficiency (OPE). The minimum overall plant efficiency shall meet the minimum design OPE referenced in SECTION 15130 – VERTICAL TURBINE PUMP COMPONENTS.
- G.** A well performance and efficiency analysis report shall be prepared by an independent testing company which specializes in and performs the well pump performance testing. Six (6) copies of a report of the results shall be provided. The report shall present a summarize all of the testing results (total dynamic head, flow, input horsepower to motor, brake horsepower, pumping water level, discharge pressure, etc.) from testing and startup activities and provide a conclusion and verification statement that the well pump performance and efficiency results meet the requirements set forth in these specifications.
- H.** Concurrent with the performance testing of the pump, the Contractor shall employ a company specialized in vibration testing to perform a vibration analysis, to be witnessed by the Engineer. The vibration company performing the analysis shall not be a representative or affiliated with the pump manufacturer or the Contractor. The Contractor shall furnish the necessary equipment and an operator skilled in the operation of the equipment to test the installed pump for compliance with vibration limits prescribed by the Hydraulic Institute. The test is to be done in strict accordance with the standards set forth in the latest revision of ANSI/HI 9.6.4 “Vibration Testing for Centrifugal and Vertical Pumps.” Six (6) copies of a report of the results, in the Hydraulic Institute format, shall be provided. The report shall present the results of all testing and provide a

conclusion and verification statement that the well pump testing and vibration results meet the requirements set forth in the latest revision of ANSI.HI 9.6.4. Any deviation from ANSI.HI 9.6.4, malfunctioning, excessive vibration, or other problems shall be corrected by the Contractor at no additional expense to the City. The Contractor shall reimburse the City for the cost of any subsequent vibration testing or inspection required to confirm compliance with these Specifications.

- I. In the event of failure of any pump and or pump motor to meet any of the design requirements or efficiencies provided in the drawings, plans or the approved submittal, the Contractor shall make all necessary modifications, repairs, or replacements, and conduct field tests to conform to these specifications at no additional cost to the City. The Contractor shall reimburse the City for the cost of any subsequent inspection for performance testing.

3.05 MAINLINE VALVES AND AIR/VAC VALVES

A. General

All valves shall be tested. On all valves count and record the turns required to operate from full open to full closed and record on as-built drawings.

B. Mainline Valves

Test each mainline valve by pressurizing each section between valves after completion of the pipe pressure test. Check the proper operation of valves by demonstrating smooth operation under full design hydrostatic pressure.

C. Air/Vac Valves

During filling, check all air/vac valves to verify that they are venting correctly. Operate all service valves (but not isolation valves) on air/vac valves, under design hydrostatic pressure to ensure that they open and close smoothly. Repair any defective valves.

3.06 ELECTRICAL

- A. All electrical equipment shall be tested including time delays, automatic and hand operation of the pumping plant, fans, and thermostats. Refer to the applicable Electrical sections for additional testing requirements.

3.07 TRACING WIRE CONTINUITY CHECK

- A. Check continuity of all tracing wire, connection and splices and repair as necessary.

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-15 – PERFORMANCE TESTING AND FACILITY STARTUP (BOYS RANCH #2A)

Bid Item No. B-15 – PERFORMANCE TESTING AND FACILITY STARTUP (JACKSON #3)

-END OF SECTION-

SECTION 16010 - GENERAL ELECTRICAL

Bid Item No. A-16, B-16,

PART 1 - GENERAL

1.01 SCOPE

The Contractor shall install the complete electrical systems as shown on the plans and specifications. The Contractor shall verify any existing control circuitry and modify controls, conduit, and cable as required to support modified control schemes for the project. The Contractor shall demolish all items indicated as to be removed in accordance with the Drawings and Specifications.

The Contractor shall provide all materials, tools, equipment, labor, and services necessary to furnish and install complete working electrical systems as shown on the Drawings and described within these Specifications. The Contractor shall furnish all power supplies, disconnects, controls, and any other work, as well as all electrical and electrical-related work as called for in all sections of the Specification and Drawings. All systems, at project completion and before final acceptance, shall be demonstrated to have complete and working functional operations. The work includes, but is not specifically limited to, the items indicated below.

1. Obtain permits.
2. Electrical main service if shown.
3. Furnish and install all new electrical equipment as shown on the Drawings.
4. Trenching, conduits, feeders, and cables for electric power and controls.
5. Controls, wiring, and misc. materials as shown and/or specified.
6. New instrumentation and controls as shown on the Drawings.
7. Demolition as required by the Drawings.

1.02 RELATED DOCUMENTS

Contract requirements of the foregoing General Conditions, supplements thereto and all requirements of all sections of these Specifications shall form a part of this Section with the same force and effect as though repeated herein.

A. Codes and Regulations

All electrical equipment and material and its installation shall conform to the current requirements of the following authorities:

1. Occupational Safety and Health Act (OSHA).
2. National Electric Code (NEC), (latest edition).

3. California Administrative Code (CAC), (latest edition).
Title 8, California Electrical Code (CEC)
Title 19, Fire and Panic Safety Standards. Title 24, Building Standard.
4. Uniform Building Code, (latest edition).
5. Uniform Mechanical Code, (latest edition).
6. Uniform Plumbing Code, (latest edition).
7. National Fire Code, (latest edition).

NOTE: Where two or more codes conflict, the most restrictive shall apply. Nothing in the Drawings and Specifications shall be construed to permit work not conforming to applicable codes.

B. Tests and Standards

The tests, standards, or recommended procedures of the following agencies shall relate to all parts of these Specifications and shall be considered a minimum:

1. American National Standards Institute (ANSI)
2. Underwriters Laboratories, Inc. (UL)
3. National Electric Manufacturers Association (NEMA)
4. Electrical Testing Laboratories (ETL)
5. National Fire Protection Association (NFPA)
6. Insulated Power Cable Engineers Association (IPCEA)
7. Institute of Electrical and Electronic Engineers (IEEE)
8. Illumination Engineering Society (IES)
9. National Electrical Testing Association, Inc. (NETA)
10. International Conference of Building Officials (ICBO)

1.03 PROJECT DESCRIPTION

Project summary. See drawings and specifications for full details.

1. P.G.E service per P.G.E.
2. Pump power and control system.
3. Well flow, level and pressure transmitters.
4. TESCO PLC and radio system per city standards
5. Building lighting and auxiliaries.
6. Extend control to existing chlorine chemical metering systems.

The electrical drawings are diagrammatic and do not necessarily show all raceway, wiring, number or types of fittings, offsets, bends or exact locations of items required by the electrical systems. Items not shown or indicated, which are clearly necessary for proper operation or installation of systems shown, shall be provided at no increase in contract price.

The exact routing of systems and location of devices and equipment shall be governed by coordination with other trades, structural, and architectural conditions. The local agency Inspector reserves the right, at no increase in contract price, to make reasonable changes in location of electrical equipment or wiring system so as to coordinate with other systems, to group them into orderly relationships, or to increase their utility. Contractor shall verify requirements in this regard prior to roughing-in.

Install electrical work in cooperation with other trades, make proper provisions to avoid interferences, and coordinate with structural and architectural features in a manner approved by the local agency Inspector. All changes caused by neglect to make such provisions shall be at Contractor's expense. Provide offsets and special fittings, as required to facilitate installation of the work.

When a particular product or type of product is specified with a manufacturer's designation, the latest published specifications, installation, and construction information of the manufacturer shall constitute the minimum acceptable standard. Any substitutions shall be made in accordance with subsection "Submittals."

1.04 QUALITY CONTROL

A. Workmanship

The work shall be performed by competent trained workmen, skilled in the particular phase of the work entailed. The work shall be first class throughout, neat, accurate and in full accordance with the intent of these Specifications, and to the satisfaction of the Engineer. All electrical work will be performed by a State licensed Contractor having a C-10 license.

B. Safety

All standard safety procedures as set forth by OSHA, CAC, and California Division of Industrial Safety shall be strictly adhered to.

C. Coordination

Before rough-in of any utility lines, services, and feeders, or of any equipment, the Contractor must coordinate the work with that of other crafts and trades so that these services shall be installed in their proper locations and without interference to the equipment or building structure. This will require cooperation among all crafts and trades, the Engineer, and Contractor, along with study of shop drawings and the building plans. The Contractor shall be familiar with the work of, other power utility company work so as to be able to provide electrical service of correct size, voltage, and other requirements to any equipment to be installed. The installation shall be coordinated as to location and time, and interference causing delays and non-acceptable construction shall be avoided.

Exact equipment rough-in locations shall be verified by the Contractor from the shop drawings describing the equipment being installed.

D. Cutting and Repairing

The Contractor shall do all cutting necessary for the proper installation of the work, repair any damage done by the Contractor or the Contractor's workers and coordinate the work with that of others.

E. Cleaning and Painting

All exposed work shall be thoroughly cleaned upon completion of work. Panel board enclosures, fixtures, and equipment, where finish has been marred in shipment or installation, shall be completely refinished. Minor damage shall be rectified as indicated by the Engineer. Contractor shall remove from the site all waste and rubbish resulting from his work.

F. Permits and Fees

For work on this section, Contractor shall secure necessary permits and licenses, pay fees and deposits, and arrange for inspection, as required by applicable governmental rules, regulations, codes, utilities, and ordinances.

G. Utility Work Approval

The Contractor shall give required notice and obtain approval from the utility prior to commencing work, and shall coordinate utility inspections of work being done for the utility.

H. Supervision

The Contractor shall personally, or through a competent representative, constantly supervise the work from beginning to completion and final acceptance. The Contractor shall cooperate fully with the inspection authorities in providing information and access to the work. The Contractor, as best as possible, shall maintain the same job foreman throughout the life of the project unless a replacement is requested or authorized by the Engineer.

I. Inspection and Tests

The Contractor shall furnish all labor and test equipment required to fully test and adjust the equipment installed under the Specifications and demonstrate its proper operation.

1. Arrange for all tests and inspections and provide minimum 48 hours prior notice to the Engineer.
2. A test must demonstrate that each piece of equipment, outlet, fixture, device, and appurtenance is in sound operating condition and in proper cooperative relation to associated equipment.

3. All tests shall be conducted under supervision of the Owner or his designated representative, and any defects of any nature which are apparent as a result of such test shall be made correct to the satisfaction of the Engineer before final acceptance is made.
4. No equipment shall be tested, or operated for any other purpose, such as checking motor rotation, until it has been fully checked in accordance with the manufacturer's instructions.
5. Check and tighten nuts, bolts, lugs, and similar elements of equipment: switchboards, motor control centers, bus ways, panels, etc.
6. Submit complete test reports with the maintenance manual submission.

1.05 SUBMITTALS

Make submittals for all material to be used on the project, whether as specified or substitutions, as specified in the General Conditions.

1. All submittals shall be neat and bound in a suitable folder or binder.
2. Identify each item by manufacturer, brand, trade name, number, size, ratings, and whatever data is necessary to properly identify and check materials and equipment. Words "as specified" are not sufficient identification.
3. Identify each submittal item by reference to Specifications section in which item is specified, or Drawings and detail number.
4. Submittals shall be submitted in coherent groups, e.g., all light fixtures at one time. No partial, or incomplete submittals will be accepted.
5. Organize submittals in same sequence as they appear in Specification sections, articles, or paragraphs.
6. Submittals shall be made and approved before any material is ordered.

A. Product Data

Submit seven (7) copies, in groups, as follows:

1. Conduits and raceway types required, including fittings.
2. Electric wire, cable and connectors.
3. Electric boxes. and fittings.

4. Wiring devices.
5. Splice kits.
6. Signal system devices and equipment.
7. Instrumentation.
8. Transfer switches, services, power equipment.
9. Starters.
10. Lighting fixtures.
11. Signal system devices.

B. Shop Drawings

After receiving satisfactory product review, submit shop drawings showing physical arrangement, wiring diagrams, construction details, finishes, materials used in fabrication, provisions and conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, weight, power sources, circuit numbers, and compatibility with the Drawings and Specifications.

Show wiring as actually installed, connected, and identified for the specific project. Include identification of cables and cable conductors. Include control schematic and elementary diagrams.

Shop and instruction drawings shall cover the specific equipment or device to be installed and not merely the general class of such equipment or device.

Submit seven prints and one reproducible as follows:

1. Switchboards and Switchboard Equipment.
2. Control schematic and elementary diagrams.
3. Generation and related equipment and piping.

1.06 DOCUMENTATION

A. Construction Record Drawings

The Contractor shall furnish to the Engineer, in accordance with the General Conditions, a complete set of "as constructed" drawings which clearly indicate all deviations from the basic contract Drawings, including exact dimensioned locations and depths for all stubbed conduits, location and size of spare conduits, and conductors, all new and uncovered existing work outside the buildings, power feeder runs, and communications "primary" conduit runs. Corrections and changes shall be kept up-to-date at all times.

All submittals and shop drawings will be resubmitted, in the number required above with record drawings showing all revisions and changes made, clearly marked with field termination wire so as to reflect actual construction record conditions. Revisions and

changes will be enumerated and new dates of drawings shown. Final submittal of shop drawings shall include revised control schematic & elementary diagrams. Submit with final submittals all switch board & mechanical drawings, one line diagrams, and control schematics & elementary diagrams on Computer Aided Drawing (CAD) formatted drawings along with two (2) floppy 3-1/2-inch 1.4 MB disks containing files of all drawings in format readily acceptable to Autodesk AutoCAD, Version 14.0.

1.07 OPERATION AND SERVICE MANUALS

Contractor shall prepare manuals describing the operations, servicing, maintenance requirements of, and complete parts lists for all electrical equipment. Submit seven (7) copies.

A. General

B. Equipment

Equipment described in the manual shall include all equipment listed under "Submittals," and all other auxiliary miscellaneous systems.

Information contained in the manual shall consist of 8 1/2-inch x 11-inch size catalog data on each item, together with parts lists, description of operation, maintenance information, shop drawings, wiring and riser diagrams, and test reports as installed. Catalogs and data in the manuals shall be neat, clean copies. Drawings shall be accordion folded to letter size and installed in an envelope within the manual. An index shall be provided, which shall list all contents in an orderly manner with the provided, respective equipment supplier's name, address and telephone number, and the manufacturer's recommended servicing instructions. Diagrams shall be complete for each system installed. Provide divider sheets with identifying tabs between each category. The Contractor will include in the manuals a complete description and documentation of any programming done for any device or system- and include a list of all variable set points, their access address and the value as left.

A reproducible copy of the final manufacturers control drawings is required. Control plans are to be in Autocad and the drawing file submitted as a part of the operations manual.

After completion of work a factory representative shall be present for a training course for the Owner's maintenance crews on the electrical controls and equipment. The training course shall be at least one eight-hour session.

1.08 SEISMIC RESTRAINT AND ANCHORAGE

Provide complete seismic anchorage and bracing for the lateral and vertical support of electrical equipment. For the purpose of this project, it will be assumed the work is located in Seismic Zone 4.

All equipment mounted on concrete shall be secured with steel stud expansion anchors requiring a

drilled hole. Powder driven anchors are not acceptable. Minimum concrete embedment shall be as required by ICSO report. Minimum spacing shall be 10 diameters center to center and 5 diameters center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80 percent of the ICSO test report values (Hilti, Phillips).

1.09 EXISTING SUB-SURFACE STRUCTURES

It shall be the Contractor's responsibility to locate and protect all underground systems and structures while excavating and installing the electrical distribution system. Any damage done to the existing systems during the course of the electrical work shall be repaired to the satisfaction of the Owner and the utility or agency involved, at the expense of the Contractor. Before any digging, boring, or probing is started the Contractor will notify "U.S.A. Underground" and the "Owner" and request an underground facilities investigation.

1.10 PORTABLE OR DETACHABLE PARTS

The Contractor shall retain in his possession, and shall be responsible for, all portable and detachable parts of portions of the installation, such as fuses, keys, locks, adapters, locking clips, and inserts, until final completion of the work. These parts shall be itemized and delivered to the Owner at Final Acceptance.

1.11 GROUNDING

The conduit system supports, cabinets, switchboards, etc., and neutral conductors must be permanently and effectively grounded by means of an approved ground clamp, in accordance with the California Electrical Code of the Department of Industrial Relations of the State of California, and the National Electrical Code. All main services will have a minimum of two grounding sources with a 25 \square UFER ground being one.

The Contractor shall exercise every precaution to obtain good contacts at all panel boxes, pull boxes, etc. Where it is not possible to obtain good contacts, the conduit shall be bonded around the boxes with a No. 6, B&S gauge, rubber covered, double braided wire with ground clamps.

Equipment and raceway bonding procedures shall be rigidly maintained and meet all jurisdictional requirements of all codes and regulations. A grounding conductor shall be included in every raceway.

PART 2 - MATERIALS (Not used)

PART 3 - EXECUTION (Not used)

PART 4 – MEASUREMENT AND PAYMENT

All work as specified herein, satisfactorily completed, shall be paid for on a Lump Sum basis as

stated in **Bid Item Schedule** for the item listed below:

Bid Item No. A-16 – ELECTRICAL (BOYS RANCH #2A)

Bid Item No. B-16 – ELECTRICAL (JACKSON #3)

-END OF SECTION-

SECTION 16055 - ELECTRICAL RELATED WORK

PART 1 - GENERAL

1.01 SCOPE

Provide all related work required for installation of electrical systems. Types of electrical related work specified in this section include the following:

A. Excavating for Electrical Work:

1. Underground electrical wiring;
2. Independent (isolated) foundations;
3. Vaults and pull boxes;
4. Power and light poles; and
5. Transformer pad.

B. Concrete for Electrical Work:

1. Underground structural concrete to accommodate electrical work;
2. Vaults for electrical work;
3. Electrical equipment foundations and mounting pads;
4. Rough grouting in and around electrical work;
5. Patching concrete which has been cut to accommodate electrical work; and
6. Duct banks.

1.02 SUBMITTALS

Shop Drawings, Electrical Concrete Work

Submit shop drawings for structural type concrete work (vaults, foundations and other supports), showing dimensions of formed shapes of concrete; bending, placement, sizes, and spacing of

reinforcing steel; locations of anchors, isolation units, hangers and similar devices to be integrated with concrete work; and conduit penetrations, access openings, inlets and other accessories and work to be accommodated by concrete work.

1.03 MATERIALS AND EQUIPMENT

Materials and equipment shall be new and of the best quality used for the purpose in good commercial practice.

1.04 UL APPROVAL

All material and equipment within the scope of the UL re-examination service shall be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear their label.

1.05 STORAGE

All material and equipment shall be stored in a manner to prevent damage or corrosion. Equipment with components which can be damaged by moisture shall be placed in special heated storage facilities.

1.06 DRAWINGS

Drawings for all equipment are intended to be diagrammatic only. Any location not actually dimensioned is not to be considered as necessarily final or accurate. Exact locations must be determined in the field from the requirements of the equipment that is to be installed.

1.07 COORDINATION

Before rough-in of any utility lines, services, and feeders, or of any equipment, the Contractor must coordinate the work with that of other crafts and trades so that these services shall be installed in their proper locations and without interference to the equipment or building structure. This will require cooperation among all crafts and trades, the Engineer, and Contractor, along with study of shop drawings and the building plans.

1.08 ELECTRICAL WORK EXPOSED TO WEATHER

All electrical devices and equipment installed in exposed locations shall be protected by suitable NEMA type 3R JIC enclosures, cast steel boxes with gasketed steel covers, or other Engineer approved methods.

All ferrous metal portions of electrical work exposed to weather including conduits, clamps,

supports, etc., shall be hot-dip galvanized steel.

1.09 PRODUCT DATA

Submit manufacturer's data including specifications, installation instructions, and general recommendations for each item.

PART 2 - MATERIALS

2.01 CONDUIT MATERIALS AND COMPONENTS

All conduits installed outdoors, under roads, driveways, etc. are to have a minimum of 36 inches(see 3.01) cover to finish grade.

A. Threaded Metal; Rigid Steel

All locations as follows, excepting those specifically indicated for PVC Coated GRC, PVC Schedule 40 or 80. All exterior locations above grade, in concrete walls and slabs, in concrete block walls, or elsewhere as shown on the Drawings. Runs within, passing through, or above hazardous areas shall be rigid conduit exiting the duct bank or underground stub ups. Rigid steel conduit shall be new galvanized threaded, conforming to UL 6. All coupling and connectors shall be threaded.

B. Flexible Liquid Tight Metallic Conduit

Connections to machinery. Conduit shall be flexible interlocking single strip steel conduit with liquid tight exterior cover, with all connections made with plastic bushed compression fittings and with copper ground wire. Maximum length is 36 inches. American Brass Seal tight or equal, conforming to UL 1.

C. Plastic PVC, Schedule 40

Underground locations and below vapor barrier of slabs, in duct bank, and in solid grouted masonry walls where wall entry and exit points are made with rigid galvanized steel. PVC conduit shall be Type 40 thick wall polyvinyl chloride conduit, Underwriters' Laboratories tested, furnished in 10 foot lengths .

D. Plastic PVC, Schedule 80

Use in locations above grade in chemical rooms and corrosive atmosphere locations. PVC conduit shall be Type 80 heavy thick wall polyvinyl chloride conduit, Underwriters' Laboratories tested, furnished in 10 foot lengths.

E. PVC Coated Galvanized Rigid Conduit

All metallic conduits installed in contact with concrete in contact with earth, shall be coated with a minimum 40 Mil PVC coating on all conduit lengths and fittings. The coating shall correspond to ASTM D638-68, D140-64, and D746-64T specifications and Federal Test Standard 141, Method 61 5z. Coating shall be continuous without flaws showing exposed metal. Coating shall extend to the device where the conduit is terminated in exposed locations and 12 inches above grade in unexposed locations. Field applied PVC tape is not an acceptable substitute for PVC coated rigid conduit.

Conduits which start up through floor shall be installed so that none of the curved portion of the elbow is exposed.

2.02 WIRING DEVICES

Receptacles:

A. Standard Duplex Receptacles

Full gang size, polarized duplex, parallel blade, U-grounding slot, specification grade, rated at 20 amperes, 125 volts, designed for split feed service. Hubbell, GE, or Bryant 5362 with S.S. Plates.

All switches are to be mounted at plus 48 inches to center line of handle from finish grade or floor.

B. Duplex Receptacle - Ground Fault Interrupting

Hubbell, GE, or Bryant No. GF-5362 with S.S. Plates. All receptacles are to be mounted no lower than 15" from finished grade or floor to center of receptacle.

C. Nameplates

Provide engraved cover plates for receptacles and/or switches other than standard duplex receptacles or switches, indicating voltage, phase and amperes, or function of switch or plug.

D. Color

Normal Power Circuits: Provide ivory receptacles in areas with light wall finish, and brown receptacles in areas with wood or dark wall finish. Receptacles on Emergency Power Circuits are to be red.

2.03 WIRE

Low Voltage - (Under 600 Volts):

A. Wire Type and Sizes

Conductors shall be flexible stranded tinned copper, UL listed Type THHN/THWN and shall

be rated 600V. Wires for instrument signal circuits shall be No. 16 AWG minimum. Control and alarm input circuits shall be #14 AWG. Wires supplying 120 VAC power on the line side of a fused disconnect shall be #12 AWG (minimum). All 20/1 home runs over 180 feet from panel for 277 volt circuits, and 100 feet from panel for 120 volt circuits shall be increased to next larger size.

Twisted single pair aluminum polyester shielded signal cable shall be Belden No. 8760, #18 AWG tinned copper, 300V polyethylene insulated, copper drain wire or equal.

Twisted single triad aluminum polyester shielded signal cable shall be Belden No. 8770, #18 AWG tinned copper, 300V polyethylene insulated, copper drain wire or equal.

Modbus plus RS-485 Twisted single pair aluminum polyester shielded signal cable shall be Belden No. 9841, #24 AWG tinned copper, 300V polyethylene insulated, overall copper braid sheath or equal.

B. Wire Insulation Colors

Conductors shall be identified by color-coded insulation. The color of the insulation of the conductors shall be as follows, except as indicated otherwise in the Contract Documents.

120/240 VAC Power

Hot - Black
Neutral - White
Ground - Green

120 VAC Control

PLC Output - Red
PLC Input - Orange
All Other Control - Violet
Foreign Voltage Source - Yellow

24 VDC Power

Positive (+) - Dark Blue
Negative (-) - Dark Blue
w/White

24 VDC Control

PLC Output - Pink
PLC Input - Light Blue
All Other Control - Light Blue/White

Analog Signal

0-5 VDC - Brown w/White
4-20 mA - Positive (+) - Red
Negative (-) - Black
Pulse - Black w/White

C. Conductor Identification

Wire marking shall be as follows: Each signal, control, alarm, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique wire number which shall be shown on all shop drawings. These numbers shall be marked on all conductors at every termination.

The letters and numbers that identify each wire shall be machine printed on sleeves with permanent black ink. The figures shall be 1/8-inch high. Sleeves shall be yellow or white tubing and sized to fit the conductor insulation. Hot air shall be used to shrink the sleeves to fit the conductor after installation. The sleeves shall be TMS Thermofit Marker System by Raychem Co., sleeve style wire marking system by W. H. Brady Co. or equal. Adhesive strips are not acceptable.

2.04 LIGHT FIXTURE SCHEDULE

See drawings

2.05 CONCRETE WORK

A. Equipment Bases

2,500 psi concrete in 28 days and reinforcing in accordance with Section 03300.

B. Pole Fixture Bases

3,000 psi concrete in 28 days and reinforcing in accordance with Section 03030.

PART 3 EXECUTION

3.01 EXCAVATING FOR ELECTRICAL WORK

A. General

Do not excavate for electrical work until work is ready to proceed without delay, so that total elapsed time from excavation to completion of backfilling will be minimal.

Excavate with vertical-sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.

B. Width and Cover

Unless otherwise noted, minimum earth cover above conduit shall be 36-inches. Excavate for conduit with 6-inch to 9-inch clearance at both sides of conduit, except where otherwise shown or required for proper installation of joints and fittings. Excavate for other electrical work to provide minimum practical but adequate working clearances.

Excavate near large trees (within drip line) by hand, and protect the root system from damage or dry out to greatest extent possible. Verify trench locations with Engineer prior to trenching. Maintain moist conditions for root system and cover exposed roots with burlap.

Store excavated material (temporarily) near excavation, in manner which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).

1. Retain excavated material which complies with requirements for backfill material.
2. Dispose of excavated material which is either in excess of quantity needed for backfilling or does not comply with requirements for backfill material. Remove unused material from project site, and dispose of in a lawful manner.

3.02 DEWATERING

Maintain dry excavations for electrical work by removing water. Protect excavations from inflow of surface water. Pump minor inflow of ground water from excavations.

3.03 BACKFILLING

Coordinate backfill with piping contractor to prevent pipe damage. Except as otherwise indicated, backfill with Class 2 aggregate base compacted to a 95 percent relative density free from boulders, trash, and rubble. Pavement replacement shall be as shown on the Drawings.

Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials. No jetting will be permitted.

Backfill simultaneously on opposite sides of electrical work, and compact simultaneously.

Backfill excavations in 6-inch high courses of backfill material, uniformly compacted to the following densities (percent of maximum density, ASTM D 1 557), using power-driven hand operated compaction equipment. Minimum acceptable compaction shall be 95 percent.

Backfill to elevations matching adjacent grades.

Install marker □WARNING□ tape 12 inches below finish grade for all conduit installations, or as per detail.

Compaction Test: Demonstrate proper compaction by testing at one-half of the trench depth. Perform three tests per 100 feet of trench (Contractor pays fees).

3.04 BORING AND CUTTING

Where trench crosses concrete walks or paved areas, bore or saw cut and patch as required for conduit installation. Boring shall be by screw auger or dry ramming. Where soil conditions warrant, (water boring may be allowed on a case by case basis upon approval of the Engineer). No water jetting shall be allowed.

Bore and saw cut as indicated on the Drawings, or where not indicated; bore under walls, paved or concrete surfaces 30'-0" wide or less, saw cut walls, paved or concrete surfaces wider than 30'-0".

3.05 INSTALLATION OF CONDUIT RACEWAYS

A. General

Install conduits in a neat manner, concealed except as noted. Mount conduits directly to building structure with clamps or one hole straps where possible. Secure straps with cadmium-plated wood screws into wood, machine screws into metal or inserts preset in concrete. Where impractical to secure directly to structure, suspend on conduit hangers. Wherever possible, group and rack multiple conduit runs.

B. Installation And Cleaning

Install free from dents, kinks and bruises. Plug ends at time of installation to prevent entry of dirt or moisture. Thoroughly clean out conduits before installing conductors. Thoroughly clean all exposed conduit exteriors.

Provide tagged pull wire in all empty conduits. Pull wire shall be 3/16-inch stranded nylon with a minimum breaking strength of 800 pounds. Leave 36 inches free coiled each end and tag as to where other end is.

Plastic conduit shall be installed in accordance with manufacturer's recommendations and accepted trade practice. Where plastic conduit runs rise above ground in exposed locations, and for all conduit runs larger than 1-inch diameter, the riser bend and riser shall be of galvanized rigid metal conduit installed according to rigid metal portion and requirements of electrical specification sections.

All plastic, flexible, feeder and receptacle branch conduits shall carry a grounding bond wire with the size as shown, or where not shown, as determined by applicable codes for the capacity of the circuit being carried.

C. Protective Coating

All metallic conduits installed in contact with earth, or in concrete in contact with earth, shall be coated with a minimum 40 Mil PVC coating on all conduit lengths and fittings. The coating shall correspond to ASTM D638-68, D140-64, and D746-64T specifications and Federal Test Standard 141, Method 61 5z. Coating shall be continuous without flaws showing exposed metal. Coating shall extend to the device where the conduit is terminated in exposed locations and 12 inches above grade in unexposed locations. Field applied PVC tape is not an acceptable substitute for PVC coated rigid conduit.

Conduits which start up through floor shall be installed so that none of the curved portion of the elbow is exposed.

D. Concrete Encased Conduits

All conduits for circuits over 600 Volts indicated on the Drawings shall be concrete encased to a minimum of 3 inches beyond the outside wall of the conduit, all around. Use 2,000 psi red concrete.

E. Conduits Penetrating Floors and Walls

Provide grouting around raceways where penetrating floor slabs, concrete or masonry walls. At fire separation walls or floors use Engineer approved expanding type foam, 3M or equal, to maintain the fire rating of the surface penetrated. Seal all conduit entrances into switch gear of motor starter. All conduits are to be installed inside walls and under floor where possible. Only overhead lighting conduits are to be installed in ceilings and will exit walls in attic.

3.06 INSTALLATION OF EXTERIOR PULL BOXES

Where pull boxes are used without bottoms, they shall be set on 3/4-inch crushed rock of a volume equal to that of the pull box used. Bottoms and joints will be grouted over for paper layer, made water tight, and sloped toward middle with a 1/12 inch drain hole.

Where pre-cast units are used, all joints are to be tongue and groove, sealed with a suitable sealer. Where conduits enter horizontally, they shall be bushed with belled ends and terminated flush with the inside of window. All cracks and openings shall be grouted smooth.

Where conduits enter, other than from horizontal runs, they shall be properly bushed and extended a minimum -inch from inside of wall or bottom into pull box. They shall be at no more than a 45

degree rise from the horizontal runs.

All conduits entering pull boxes and manholes shall be sealed watertight with suitable duct sealing compound.

3.07 INSTALLATION OF WIRE

A. Scope

Provide all wiring for complete electrical work, installed in code conforming raceway.

Color coding shall be strictly adhered to and shall be as follows:

1. Color coding for 277/480-volt system shall be:

A Phase - Brown	B Phase - Orange	C Phase - Yellow
Neutral - Gray	Ground - Green	Travelers - Lavender

2. Color coding utilized shall be noted on electrical "as constructed" drawings and shop drawings.
3. Wires shall be of solid colors in size No. 6 and smaller. In sizes No. 4 and larger, the wires shall be black and a 3-inch width of the appropriate color tape shall be applied around the wire at 12-inch intervals starting 2-inches from the termination of the end of the wire.
4. The color coding for control circuit wires will be as noted on the Drawings or as agreed upon with the Engineer and will be of a color other than that designated for the phase wires. Where control wires are installed and various colors are used, they shall be noted on the "as constructed" drawings and shop drawings turned in at the completion of the job.
5. Where modifying or renovating existing systems, color coding shall match existing. Where existing color coding is different than that indicated in No. 1 and No. 2 above, Contractor shall notify the Engineer prior to ordering wire so that a logical system can be agreed upon.

B. Pulling

Use approved wire pulling lubricant for pulling No. 4 AWG and larger wire. Oil or grease is prohibited as a conductor pulling lubricant. All conductors No. 8 and smaller shall only be pulled by hand. Pulling lubricant for conductors over 600 V shall be approved by the conductor manufacturer and the Engineer.

C. Splices

Join the conductors securely, both mechanically and electrically using crimp connectors, except that screw-on spring-type compression connectors may be used for No. 10 AWG wires or smaller. The splice area shall be taped to provide equal or greater insulation than the original. Tape run-back over the original insulation shall extend 3 to 5 overall diameters of the insulated wire. All wet location and below grade splices shall utilize 3M Scotchcast resin splicing kits or equal.

Splice only in accessible junction or outlet boxes.

Wiring in panel boards, switchboards, and cabinets shall be neatly installed. Wiring shall be grouped, laced or clipped, and fanned out to wiring terminals.

D. Identification and Markings

In addition to all other requirements for identification and marking of wires, panelboards, and junction boxes the following shall be strictly adhered to:

1. The identification of individual wires terminating in either junction boxes, circuit breakers, terminal strips, or on control devices shall be done by means of waterproof ink on a linen tag or approved equal.
2. Each end of particular feeder or sub distribution class circuits shall be marked as to its phase and point of origination of destination and either voltage line to line in distribution class circuits or voltage to ground in sub distribution class circuit.
3. Where distribution wires are terminated in distribution panels, they shall be marked by a minimum 1-1/2 inch square tag, or approved equal, as to either the point of supply or the point of destination, phase and line voltage.
4. Where sub-distribution wires terminate they shall be marked with the point of origination or point of destination, phase, and voltage to ground. This will include all sub-distribution circuits originating from 480/277 volt or 208/120 volt distribution panel serving lighting circuits, receptacle circuits, smaller power equipment, and small mechanical equipment.
5. All control circuits will be marked at each control panel as to their function and where they terminate. Where control wires terminate into relays, enclosures or terminal cans remote from the main point of control, the wires will be marked as to their function and where they originate.

6. All associated wiring integral within a control cabinet may be marked with the printed circular wire wrapping at each end.

E. Testing

1. All wires under 600 volt potential shall be tested with a 600 volt megohm prior to energization and the readings shall be recorded and handed in with the record drawings at the completion of the project. The tests shall be conducted from phase to phase and from each phase to ground.

3.08 INSTALLATION OF CONCRETE WORK

Install concrete for electrical work in accordance with the Drawings

3.09 PERFORMANCE AND MAINTENANCE, EXCAVATION WORK

Where subsidence is measurable or observable at electrical work excavations during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of the surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Electrical Related Work. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 16305 - SERVICE, DISTRIBUTION, AND GROUNDING

PART 1 - GENERAL

1.01 SCOPE

Furnish and install a complete electrical service, distribution, and grounding system. Conditions of this section apply to all Electrical sections included.

1.02 QUALITY ASSURANCE

Codes and Regulations, Reference Standards: See section 16010 1.02.

1.03 SUBMITTALS

A. Product Data

Submit manufacturer's data on service entrance equipment, switchboards, motor control centers and/or individual starters, transformers, panel boards, disconnect switches and grounding components.

1. Data submitted shall describe all circuit breakers by frame type and published AIC system rating.

B. Trip Curves

Submit trip curves for all circuit interrupting devices.

C. Nameplate Schedule

Submit nameplate schedule for approval.

1.04 COMPONENT COORDINATION

In order to maintain close control and coordinate the various components of the distribution systems, the number of manufacturers shall be kept to a minimum.

Equipment manufacturer shall be General Electric, Eaton, or Square D. It shall be the manufacturer's responsibility through the Contractor to coordinate all components of the system in order to ensure systems that will provide maximum protection of equipment and reliable safe operation.

PART 2 - MATERIALS

2.01 GROUNDING

Electrical grounding and bonding systems shall be installed as indicated herein and/or on the other Contract Documents with materials including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding electrodes and plate electrodes, bonding jumper braid, exothermic

connections, and additional accessories needed for a complete installation. Where materials or components are not indicated, provide products which comply with NEC, UL, and IEEE requirements and with established industry standards.

System ground conductors shall run continuously in duct banks and cable trays, through manholes, hand holes, and other raceway boxes. The system ground conductor shall be connected to the structure grounding systems to provide a continuous ground system.

The grounding electrode system shall consist of concrete encased, bare minimum #2/0 AWG copper ground conductors and/or ground rods. Also refer to plans and conform to size shown. Any minimum service and equipment ground conductors will be per CEC-ART. 250 where not shown on Plans or described in Specifications.

Each raceway, panel, switchboard, and other metallic device associated with the electrical and instrumentation systems shall be bonded to this system. All equipment cases, devices, etc. shall be grounded. Metallic raceways terminated in power distribution equipment, MCCs, junction and/or control boxes will have plastic bushed grounding bushing.

Ground rods shall be driven or concrete-encased bare copper conductors installed before a building or structure is built, and ground conductors shall be brought through the concrete to accessible points for grounding equipment. Each structure or building where switchgear, MCCs, switchboards, panel boards, etc. are installed shall have a ground system.

Driven ground rods shall be steel with copper welded exterior (Copperweld), 3/4-inch diameter by 10 feet in length.

All connections of ground cable to rods or to cable shall be by means of exothermic welded connections, or approved equal.

The Contractor shall ground the electrical service system neutral at the service entrance equipment to the grounding electrode system and ground each separately derived system neutral to the nearest effectively grounded structural steel member or the grounding electrode system. Do not ground system neutral down stream from a main service or transformation point.

The Contractor shall connect together service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems as required by Section 250-80 of the National Electrical Code and/or California Electrical Code (CEC).

Unless otherwise indicated on the Contract Documents, the Contractor shall provide electrical grounding conductors for grounding system connections that match power supply wiring materials

and are sized according to NEC/CEC. All equipment grounding conductors shall consist of a separate insulated equipment grounding conductor run in the conduit or multi-conductor cable from the equipment to the MCCS, panel board, switchgear, etc. equipment ground bus. A separate equipment grounding conductor, in addition to the cable shields, shall be provided in each raceway containing medium voltage power cables.

The Contractor shall terminate feeder and branch circuit insulated equipment grounding conductors with grounding lug or bushing.

The Contractor shall tighten grounding and bonding connectors and terminals, including screws and bolts, to the manufacturer's recommended torque values. Where manufacturer's torque values do not exist, comply with torque values specified in UL 486A.

2.02 MOLDED CASE CIRCUIT BREAKERS

A. General

Provide factory-assembled, molded case circuit breakers of frame sizes, characteristics, and ratings indicated. Circuit breakers shall be UL listed and meet NEMA Standards Publication AB1. Breakers covered under this specification may be applied in switchboards, panel boards, motor control centers, combination motor starters, and individual enclosures. Circuit breakers shall be manufactured by General Electric, Eaton, or Square D.

B. Construction

Construct with over center, trip-free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle trip indication. Construct breakers for reverse connection capability, mounting and operating in any physical position, and operating in an ambient temperature of 40 degrees C. Two and three-pole breakers shall be common trip. Provide breakers with mechanical screw type removable connector lugs, AL/CU rated.

C. Operation

Automatic operation of the circuit breaker shall be obtained by means of thermal and magnetic tripping devices located in each pole of the breaker. The thermal device shall provide time-delay tripping on overloads, and the magnetic device shall provide instantaneous tripping on short circuits. The instantaneous magnetic trip shall be adjustable and accessible from the front of the breaker on frame sizes above 125 amperes.

D. Current Limiting Breakers

Provide breakers with current limiting capability as indicated or required to meet system short circuit requirements. Square D, I-Limited, General Electric, Eaton, or equal.

1. On high level fault currents, the circuit breaker shall limit peak current and let-through energy and provide a voltage transient-free interruption at near unity power factor. On

fault currents below the threshold of limitation, the circuit breaker shall provide conventional overload and short circuit protection.

2. The unit shall not contain replaceable elements and the limiter shall automatically reset after circuit interruption.

E. Series Connected Ratings

Where utilized to meet short circuit requirements, combinations for series interrupting ratings shall be recognized by Underwriters Laboratories and shall appear in the Recognized Component Directory under the "Circuit Breakers - Series Connected" product category DSKY2. Current limiting circuit breakers shall allow the use of branch circuit breakers with lower interrupting capacities on systems capable of delivering fault currents up to 200,000 rms symmetrical amperes at 480VAC and 100,000 rms symmetrical amperes at 600VAC. Series connected rating shall be indicated on electrical equipment per N.E.L. Articles 110-22 and 240-83 (c).

F. Solid State Trip Breakers

Main and feeder breakers indicated "SS" shall be solid state trip type with ampere setting adjustment knobs for changing current carrying capability of units, and with ground-fault protection components with external neutral current transformer (CT).

Construct with current carrying components isolated from the trip unit and field installed accessories, and with integral trip unit independent of any external power source. Square D, ME/NE/PE/SE, General Electric, Eaton, or equal.

1. Provide with Long Time, Short Time, Instantaneous, and Ground Fault pickup and delay (LS16), unless indicated otherwise.

G. Ground Fault Protection

All 1,000 amp or greater, 480 volt and "GFI" indicated service breakers shall be furnished with ground fault protection. Protection may be provided by a zero sequence/shunt trip system or solid state breaker with integral GFI. System shall be complete with all required CTs, power supplies, etc., required. Trip units shall be LSIG. Unit will be approved by U.L. for intended purposes. Test and submit results to Engineer per NEC/CEC.

2.03 PANELBOARDS

Panelboards shall be Air Circuit Breaker bolted type, UL rated for 75 degree C connections, with voltage, phase, breakers, and NEMA rating as specified in panel board schedules. Panelboards shall be installed flush or surface as indicated. Panelboards shall be installed in code gauge rustproof steel cabinets with flush doors having flush locks all keyed alike and with trim cut square and true.

A. 120/240-208 Volt Panelboards

Square D type NQOB, General Electric, Eaton, or equal.

2.04 SWITCHBOARDS

A. General

Except as otherwise indicated, provide switchboards of types, sizes, characteristics, and ratings indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information. All main services and attached switch boards are to meet the level of incoming short circuit current as delivered by the serving utility.

B. Manufacturer

Subject to compliance with requirements, provide switchboards manufactured by General Electric, Eaton, or Square D Company.

C. Auxiliary Components

Where indicated or specified, auxiliary components such as transformers, meters, contactors, controllers, etc., shall be incorporated at the factory. Miscellaneous components such as current transformers, instrument transformers, etc., shall be included as required to form complete and functional systems, whether specifically specified or not.

D. AC Dead-front Distribution Switchboards

Provide factory assembled, dead-front, metal enclosed, self-supporting secondary power switchboards, consisting of panel (vertical) units, and containing circuit breakers of quantities, ratings and types indicated. Provide copper main bus and connections to switching devices of sufficient capacity to limit rated continuous operating temperature rise to 54 degrees F, and 90 degrees F for circuit breaker branches; with main bus and tap connections silver-surfaced and tightly bolted for maximum conductivity. Brace bus for short circuit stresses up to maximum interrupting capacity. Prime and paint switchboard with manufacturer's finish and color. Use tin plated copper buss bars.

E. Enclosures

Construct dead-front switchboards, suitable for floor mounting, with front cable/wire and conduit accessibility. Provide welded steel channel framework, hinge wireway front covers to permit ready access to branch circuit breaker load side terminals. Coat enclosures with manufacturer's standard corrosive resistant finish. NEMA Type 3R construction, unless otherwise noted.

F. Short Circuit Rating

Switchboards shall have integrated short circuit rating meeting the serving Utility Company available. Delivery and as a minimum, 480/277V (400A and below) 35,000AIC, 240/120V

(400A and below) 65,000 AIC, 480/277V (401-1,000A) 65,000 AIC, and 480/277V (above 1,001 amps) 100,000AIC.

G. Service Switchboards

Switchboards to be utilized as service boards shall be construct in accordance with the serving Utility Company requirements; pull section, lugs, meter provisions, etc.

1. Provide with specific grounding provisions as indicated on Drawings.
2. Provide any and all requirements, equipment, and wiring or bussing as required by servicing utility.

2.05 NAMEPLATES

Laminated engraved phenolic plastic, color coded blue for 277/480 volt equipment, black for 120/208 volt equipment and red for emergency functions and equipment, with white letters. Provide for identification of each piece of equipment, switchboards, transformers, panel boards, disconnects and enclosed breakers, and motor control centers. Secure to face with two (2) stainless steel screws each. A schedule of nameplates shall be included with the shop drawings for approval. Nameplates shall be secured with permanent adhesive and two (2) chrome plated self tapping screws.

Each piece of equipment junction, central panels and or fleet equipment enclosures shall be provided with a 2-inch x 3-1/2-inch nameplate on the front of the door or on the trim, indicating designation and distribution panel and circuit feeding the panel.

Switchboards, distribution panel boards, and all starters and disconnects shall have sub feeders and main breakers marked with 1-inch x 3-inch nameplates indicating load served, amp frame, amp trip, starter size, starter breaker sizing, maximum horsepower, voltage, amperage, and phase.

2.06 FEEDER CONNECTIONS

Provide cast saddle type bolted lugs, or hydraulically set compression lugs, for all bus connections. Manufacturer shall be Thomas and Betts, Burndy, O.Z. or approved equal. Lugs in which the set screw embeds directly into feeder conductor shall not be used. All splices will be compression butt spliced with heat-shrink insulation.

2.07 MISCELLANEOUS

A. Equipment Bases

Provide appropriately sized concrete housekeeping bases for all floor-mounted equipment.

B. Hoisting Lifting Lugs

Provide on all heavy equipment as required to ensure safe hoisting.

C. Space for Future Protective Device

Provide as indicated on the Drawings; shall be completely equipped for the future addition of a circuit breaker or fused switch, including all connections.

D. Keys

All equipment enclosures shall be keyed alike.

PART 3 - EXECUTION

3.01 INSTALLATION OF GROUNDING

A. Scope

Provide grounding system complying with the codes and ordinances specified. Grounding system shall provide continuity through the entire electrical system including:

1. Panel board ground buses.
2. All conduit, other raceways, and ground bushings.
3. All motors.
4. All lighting fixtures.
5. Grounding terminals of all receptacles.
6. Miscellaneous grounds required by code.

Equipment and raceway bonding procedures shall be rigidly maintained and meet all jurisdictional requirements of codes and regulations.

Good, electrically continuous, metal to metal contacts shall be made wherever possible at all panel boxes, etc. Where it is not possible to obtain good contacts, the conduit shall be bonded around the boxes with a No. 6 B&S gauge, rubber covered, double braided wire with ground clamps.

A separate grounding conductor shall be run in all conduit runs from distribution, lighting, and power, etc., panel boards, motor control outlet, etc., back to their respective service or distribution panel boards.

B. Flexible Conduit Grounding

Provide a separate grounding conductor in all conduit runs to include watertight flexible conduit with integral grounding straps. Install ground conductors inside conduit with

ungrounded conductors. Extend from nearest panel to device being connected.

3.02 INSTALLATION OF SWITCHBOARDS

Install switchboards as indicated, in accordance with manufacturer's written instruction, and with recognized industry practices to ensure that the switchboards comply with requirements of NEMA and NEC standards, and applicable portions of NECA's "Standard of Installation."

Prior to energization of circuitry, check all accessible connections to manufacturer's torque specifications. Subsequent to wire and cable hook-ups, energize switchboards and demonstrate functioning in accordance with requirements.

A. Testing

All GFI breakers shall be tested and shown to comply with NEC Section 230-95 in accordance with International Electrical Testing Association, Inc. (NETA) standards by a NETA certified independent testing company. Submit results to Electrical Engineer and Owner.

Panel boards shall have a plastic-covered circuit directory card on the inside of each door with all circuit destinations neatly typed. Provide also project name and date of installation.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Service, Distribution and Grounding. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 16400 - MOTOR CONTROL CENTERS AND CONTROLS

PART 1 - GENERAL

1.01 SCOPE

Furnish and install the motor control center consisting of one or more enclosed vertical sections joined together to form a rigid, free standing assembly as indicated on the Drawings and as specified.

1.02 QUALITY ASSURANCE

Codes and Standards

Comply with requirements set forth by Underwriters Laboratories publication, UL-845, NEMA publication No. ICS-2, the National Electric Code, and other applicable codes.

1.03 SUBMITTALS

A. General

Voltage, phase, frequency, horizontal and vertical bus capacity, short-circuit ratings branch circuit-breaker ratings, types of motor starting types of wiring, panel boards, and transformers.

B. Shop Drawings

Submit layout drawings of motor control centers (MCC) showing accurately sealed basic equipment sections including, but not limited to, motor starters, controllers, device panels, and circuit breakers. Show spatial relationships of MCC components to proximate electrical equipment. Clearly differentiate on wiring diagrams those conductors which are factory-installed and those which are field-installed. Show all areas for conduit and wire entrances.

C. Maintenance Data

Submit maintenance data and parts list for all electrical equipment supplied, including "trouble-shooting" maintenance guide.

1.04 MANUFACTURER

Subject to compliance with requirements, provide motor control centers of one of the following: Square D, General Electric, Furnas(Siemens), Allen Bradley, Eaton, or an approved equal.

PART 2 - MATERIALS

2.01 MOTOR CONTROL CENTERS AND COMPONENTS

A. General

Provide motor control centers and ancillary components of sizes, ratings, classes, types, and

characteristics indicated; which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, as required for complete installation, and as specified herein.

B. Motor Control Centers

Provide motor control centers for operation on 480 VAC, 3-phase, 4-wire, or as shown the Drawings, 60 Hz grounded service, or otherwise indicated on the Drawings, consisting of one or more vertical sections, each with components and spaces as indicated on the Drawings. Design MCC for connection to available faults of not less than that of main service panel. Provide MCC with NEMA Class 2, Type B wiring.

C. Structures

Provide factory-assembled, deadfront, with enclosed vertical sections, as indicated on the Drawings, fastened together to form rigid free-standing assembly. Unit shall be able to house the horizontal and vertical busses, motor starters, panelboards, circuit breakers, control and distribution transformers and other components and shall be designed to allow for easy rearrangement of components by the purchaser. Construct units NEMA type 3R enclosure for exterior service and NEMA 1G for indoor applications. All units to be UL labeled.

D. Bus System

Construct bus bars of tin-plated copper, braced to withstand fault equal to main service panel; provide main horizontal bus with rating of per drawings, and vertical bus rating of 300 amperes; and construct vertical bus bars with protective barriers to prevent accidental contact of personnel with bus. Provide tin-plated copper ground bus running full width of MCC at bottom of lineup.

E. Starter Units

Starter units based on DIN or IEC standards are not acceptable. Starter units utilizing electronic circuitry to reduce the physical area of the main contacts are not acceptable. Provide magnetic motor starters with circuit breaker type disconnects and auxiliary control devices as indicated on the Drawings. Motors 50 HP and over or per drawings will be provided with reduced voltage starting. Enclose and isolate each unit from adjacent units. Design units so that faults will be contained within compartments; and with stated rms symmetrical fault withstanding ability. Equip with thermal and magnetic overload protection device for each motor, indicating circuit breaker position switch, selector switch, two (2) auxiliary contacts (interchangeable NO to NC), and an individual control transformer. Also refer to the Drawings for added control devices to be included.

F. Power Metering

Motor control centers shall include metering for voltage and amperage. Manufacturer to be ElectroIndustries Shark, Eaton IQ Data, Square D Powerlogic, Allen-Bradley Powermonitor,

or Yokogawa 2350 Multifunction meter.

G. Control Transformers

A 480-120 V control transformer shall be supplied for each magnetic motor starter and lighting and heating controller, and shall be one standard size larger than is required for the motor space heater, control devices, and/or indicating lights shown on the Drawings.

Each control transformer shall have both primary legs fused, one secondary leg fused, and the other secondary leg grounded. Connections to both secondary legs shall be provided at the control terminal strip.

H. Disconnect Operators

Provide external operator handles for switches and circuit breakers. Design handle with up-down motion and with down position indicating OFF. Construct handles which permit locking hand in ON and OFF position with three padlocks.

I. Identification Operators

Provide equipment/system identification nameplates for each section complying with Section NAMEPLATES, and in accordance with Motor Control Schedule on the Drawings.

J. Finishes

All exterior and interior surfaces shall be properly cleaned, and primed with a rust inhibiting prime coat. Provide two (2) finish coats of manufacturer's standard color baked-on enamel finish.

2.02 CONTROL STATIONS AND CONTROL

A. Control Stations

Push buttons, selector switches, and pilot lights shall be heavy duty, oiltight/watertight devices installed in NEMA 4X enclosures, MCCs, and control panels. Lamp devices shall use LED style lights. These devices shall be Allen-Bradley 800T/800H, Square D Company Class 9001, General Electric CR104, or equal.

Red	Alarms or trips
Green	Motor Running, valve open
Yellow	Pump Call
White	Control Power On

B. Control Relays

480V service control relays shall be industrial type, 600V, with 10A contacts and contact arrangement and operating coils of the proper voltage rating as required by the control circuit

sequence and the Drawings. Each relay shall have a minimum of three reversible-pole contacts. The coils shall be sealed by pressure molding. The relays shall be Allen-Bradley 700-P, Square D Company Class 8501 Type X, Eaton D26 Type M or equal.

120V and lower voltage miniature plug in type relays will have indicating pilot light to indicate relay is energized. The relays shall be Allen-Bradley 700-HF, Square D Company Class 8501 Type R, IDEC RR, Eaton D5 or equal.

Timers shall be SSAC TRU3, Allen Bradley 700HX or equal. Multifunction Onboard Selectable Modes of Operation: Delay on Make, Interval, Single Shot, Recycle, Delay on Break & Retriggerable Single Shot. Six Built-in Ranges from 0.1 Seconds to 1000 Minutes. Multi-voltage Operated From 19-264VAC and 19-30VDC automatically. 10 Ampere Output Contacts- DPDT 11 pin. Onboard LED's to indicate Input and Output Status

C. Terminal Blocks

Intermediate terminations of panel wiring shall be done using modular screw-clamp terminal blocks, rated not less than 20 amperes at 600 V. White or other light-colored marking strips, fastened by snapping numbers into molded sections at each block, shall be provided for circuit designation. Each connected terminal of each block shall have the circuit designation or wire number imprinted on the marking strip with permanent marking fluid. Terminal blocks shall be Weidmuller SAK Series mounted on assembly rail TS 32, Phoenix Series UK mounted on Series NS assembly rail, or equal.

D. Thermostat

Thermostats shall have heavy-duty controls suitable for 120/240V operation. Contacts shall be hermetically sealed and mercury wetted. Units shall include integral thermometer. Enclosures shall be indoor type. Units shall be bellows actuated and shall have removable setpoint adjust knob. Unit shall have minimum adjustable temperature range of 40EF to 60EF and double-pole single-throw switch which opens on temperature rise. Units shall be Mercoid Model 860-54-62 or approved equal.

E. Limit Switches

Limit switches mounted on panel doors for intrusion detection or light activation shall be proximity-type and shall be self contained, side or end sensitive as required. Sentrol 100 series or equal.

Mechanical sensing limit switches for valve position sensing shall be Square D Class 9007 Type C, Allen-Bradley 802T Series, or equal.

F. Pressure Switch

The Bourdon tube pressure switch shall be Mercoid Series DA operated by a brass Bourdon tube actuating a mercury switch. Switch shall have deadband adjustable up to a maximum of

100% of switch range. Switch shall have calibrated dial and two pointers indicating set and reset points. Switch shall have visible on/off indication. Set points shall be adjustable without removing switch cover or shutting down process. Pressure switch shall be UL listed and shall be Mercoird Series DA/DS, Model DA-31-153-7 or approved equal.

G. DC Power Supplies

DC power supplies shall be supplied with proprietary equipment when part of a manufacturer's standard assembly or system.

Direct current supplies for bulk 24V nominal instrumentation power shall be convection-cooled switching type. Line regulation shall be 0.4 percent for line variations from 105 to 132 V, and load regulation shall be 0.4 percent for load variations from 0 to full load. Ripple and noise shall not exceed 100 mV peak-to-peak. Hold-up time at maximum load shall be not less than 16 milliseconds. Efficiency shall be better than 70 percent. Power supply shall be rated for continuous duty from 0 to 50EC at rated load. Connected load shall not exceed 50 percent of the rated load. Output shall be electronically current limited, and over voltage crowbar shutdown shall be provided. Power supplies shall be Acopian B series, Sola Silverline series, Power One International series, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF MOTOR CONTROL CENTERS

A complete functional test will held at the shop of the panel fabricator with the MCC and all control components to verify correct functional operation. This test will be witnessed by the owner's representative and the engineer.

Install motor control centers as indicated, in accordance with equipment manufacturer's written instruction, and with recognized industry practices, to ensure that motor control centers comply with requirements.

Prior to energization of circuitry, check all accessible connections to meet manufacturer's torque specifications. Subsequent to wire and cable hook-ups, energize motor control center circuitry and demonstrate capability and compliance with requirements.

3.02 GROUNDING OF MOTOR CONTROL CENTERS

Provide equipment grounding connections, sufficiently tight to assure permanent and effective ground, for motor control centers. All motor control centers will have a continuous ground bus through the entire width of the control center and any control cabinet attached to it. Where the motor control center is attached to a distribution panel or main service panel the continuous ground bus shall be tied to the bus in that equipment.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Motor Control Centers. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 16430 - TRANSIENT VOLTAGE SURGE SUPPRESSION

- GENERAL

SUMMARY

Transient voltage surge suppression shall be provided on all main services (Class C) with a 240 KA per phase minimum rating and the secondary main bus of station step-down transformers with an 80 KA rating.

RELATED SECTIONS

Section 16440 Motor Control Centers

SUBMITTALS

Contractor shall furnish submittals for all products identified in this Section.

MANUFACTURER QUALIFICATIONS

The manufacturer of transient voltage surge suppression equipment must have engaged in the design and manufacture of similar equipment for a minimum of 5 years.

- PRODUCTS

TRANSIENT VOLTAGE SURGE SUPPRESSION

Provide transient voltage surge suppressors suitable for the circuit voltage rating, service equipment, and connected loads.

SOURCE QUALITY CONTROL

The specified system shall be tested to meet ANSI/IEEE C62.41-1991, tested per ANSI/IEEE C62.45-1992.

The system shall be tested to 1,000 sequential ANSI/IEEE C62.41 Category C waveforms. The system shall be tested to MIL-STD 220A for electrical line noise attenuation per 50 ohm insertion loss measurement method of RF Frequencies up to 100 MHz.

- EXECUTION

INSTALLATION

Transient voltage surge suppression equipment shall be installed in accordance with manufacturer's instructions and all applicable codes and standards.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Transient Voltage Surge Suppression. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION SECTION 16460 - DRY TYPE TRANSFORMERS

- GENERAL

SUMMARY

This section provides specifications for dry type transformers.

RELATED SECTIONS

Section 16400 Motor Control Centers

SUBMITTALS

Contractor shall furnish submittals for all products identified in this Section.

Shop Drawings: Submit manufacturer's name and data as required:

1. Nameplate Data:
 - a. kVA rating.
 - b. Nominal primary voltage.
 - c. Tap voltages.
 - d. Nominal secondary voltage.
 - e. Percent impedance.
 - f. Weight.
 - g. Physical dimensions and mounting requirements.

Single Submittal: A single complete submittal is required for all products covered by this Section.

MANUFACTURER QUALIFICATIONS

The manufacturer of dry type transformer equipment must have engaged in the design and manufacture of similar equipment for a minimum of 5 years.

- MATERIALS

GENERAL PURPOSE

Transformers for supplying lighting and small power loads shall be dry type, general purpose, two winding, 60 Hertz, copper windings, temperature rise not exceeding 80°C under full load in an ambient of 40°C with Class H, 220°C insulation. Capacity ratings and voltages shall be as shown on the Drawings. Transformers shall comply with all applicable provisions of NEMA Standard ST20 and shall have NEMA Standard taps. Transformers shall be indoor type with sound levels 5 dB below NEMA Standard or outdoor type with NEMA Standard sound levels. Terminal compartment shall have a temperature rise not to exceed 35°C. Outdoor units shall be equipped with weather shields. Transformers shall be energy efficient type.

SOURCE QUALITY CONTROL

Tests on transformers shall include the manufacturer's standard tests, including winding resistance, ratio, polarity, phase relation, no-load loss, impedance, full load losses, and dielectric tests. Certified copies shall show compliance with all referenced standards.

- EXECUTION

INSTALLATION

Dry type transformer equipment shall be installed in accordance with manufacturer's instructions and all applicable codes and standards.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Dry Type Transformers. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-

SECTION 16926 - 480V SOLID STATE REDUCED VOLTAGE STARTERS

- GENERAL

SUMMARY

Section includes furnishing and installing solid state reduced voltage starters(s) as indicated on the drawings and as specified.

REFERENCES

Codes and Standards: Comply with requirements set forth by Underwriters Laboratories publication, and the National Electric Code, and other applicable codes.

SUBMITTALS

Product Data: Make submittals for all material to be used in accordance with these Specifications. Submit manufacturer's technical product data to include, but not limited to, the following:

Voltage, phase, frequency, rated amperage short-circuit ratings, circuit breaker ratings, and temperature ratings

Shop Drawings: Submit layout drawings of solid state reduced voltage starters showing accurately scaled basic equipment sections including, but not limited to, motor starters, controllers, device panels, and circuit breakers. Show spatial relationships of motor control center components to proximate electrical equipment. Clearly differentiate on wiring diagrams those conductors that are factory-installed and those that are field-installed.

Maintenance Data: Submit maintenance data and parts list for each motor control center; including "trouble-shooting" maintenance guide.

- MATERIALS

REDUCED VOLTAGE BYPASS MOTOR STARTER

Motor starter shall be Cutler-Hammer IT S811, Square D Altistart 46, or Allen Bradley SMC Dialog Plus with pump control option. No exceptions without owner approval. Starter size 125% of motor rated full load amperes.

The solid-state reduced-voltage starter shall be UL and CUL listed and consist of an SCR based power section, logic board and paralleling bypass contactor.

The paralleling bypass contactor shall energize when the motor reaches full speed and close/open under one (1) times motor current.

The contactor shall be fully rated for across-the-line starting duty should this be desired.

The contactor shall utilize an energy balanced contact closure to limit contact bounce and an intelligent coil controller to optimize coil voltage during varying system conditions.

The coil shall have a lifetime warranty.

The UL approved overload protection shall be electronic and be based on an inverse time-current algorithm. Additional protection for phase reversal, undervoltage, overvoltage voltage unbalance, stall protection, jam protection, open gate, excess starts per hour, controller temperature, and communication fault shall be provided.

Overload protection shall be adjustable.

Class 10 or 20 overload characteristic shall be selectable.

Units using bi-metal overload relays are not acceptable.

Over-temperature protection (on heat sink) shall be standard.

The solid-state logic shall be phase sensitive, and shall inhibit starting on incorrect rotation. Improper phase rotation shall be indicated.

Starters shall protect against a phase loss/unbalance condition shutting down if a 35% current differential between any two phases is encountered.

A normally open (NO) contact shall annunciate fault conditions, with contact ratings of 60 VA (resistive load) and 20 VA (inductive load). In addition, an LED display on the logic board shall indicate type of fault (current trip, phase loss, phase rotation).

The following adjustments are required:

1. Ramp Time; 1 to 45 seconds, on a hexadecimal switch
2. Initial Torque; 100 to 200% current, on a hexadecimal switch
3. Current limit; 100 to 500% current, on a hexadecimal switch
4. FLA of motor; 4 to 1 range of starter, on a dip switch.

Optional smooth stopping shall provide a linear voltage deceleration should the load require it. It is to be adjustable from 1 to 75 seconds.

Enclosed units shall include a thermal magnetic circuit breaker or HMCP for short-circuit protection and quick disconnect means.

Starters and breakers/HMCPs are to rated per UL 508D for a withstand rating of 65 kAIC RMS.

Units enclosed in motor control centers shall be of the same manufacturer as that of the circuit breaker and motor control center for coordination and design issues.

The manufacturer of the solid-state starter shall employ a field-based factory service organization for the purpose of start-up and repair of units. Third party service contractors are not acceptable.

Maximum continuous operation shall be at 115% of continuous ampere rating.

- EXECUTION

FACTORY TESTING

The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.

1. All printed circuit boards shall be functionally tested via fault finder bench equipment

prior to unit installation

2. All final assemblies shall be load tested.

The manufacturer shall provide three (3) certified copies of factory test reports.

FIELD QUALITY CONTROL

Provide the services of a qualified factory-trained manufacturer's representative to assist the Contractor in installation and start-up of the equipment specified under this section. The manufacturer's representative shall provide technical direction and assistance to the Contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained herein.

The following minimum work shall be performed by the Contractor under the technical direction of the manufacturer's service representative.

1. Inspection and final adjustments
2. Operational and functional checks of controllers/starters and spare parts.

The Contractor shall provide three (3) copies of the manufacturer's field start-up report.

FIELD TESTING

After all wiring to each unit is complete, the Electrical Contractor shall cooperate with Mechanical or Equipment Contractors in testing equipment for proper operation and shall correct wiring as required for proper operation.

MANUFACTURER'S CERTIFICATION

A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

The Contractor shall provide three (3) copies of the manufacturer's representative's certification.

TRAINING

The Contractor shall provide a training session for up to 20 owner's representative for 1 normal workdays at a jobsite location determined by the owner.

The training representative shall be conducted by a manufacturer's qualified representative.

TESTING AND STARTUP

After all wiring to each unit is complete, the Electrical Contractor shall cooperate with Mechanical or Equipment Contractors in testing equipment for proper operation and shall correct wiring as required for proper operation.

PART 4 – MEASUREMENT AND PAYMENT

No separate payment will be made for Solid State Reduced Voltage Starters. Payment for work in this section shall be included as part of the applicable Lump Sum or Unit Prices stated in other sections.

-END OF SECTION-