

INVITATION FOR BIDS



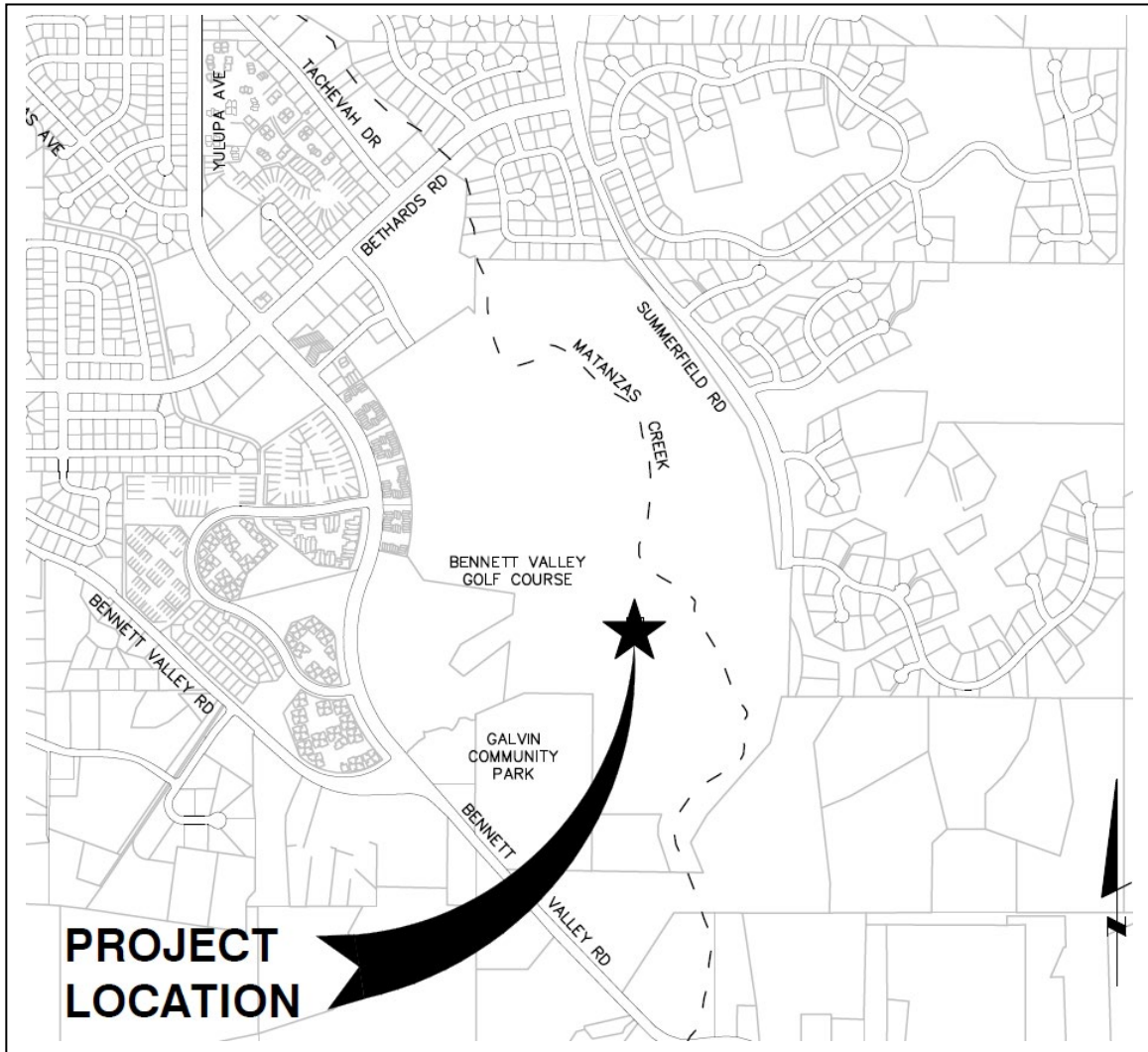
FOR CONSTRUCTION OF

Bennett Valley Golf Course Irrigation System Improvements

CITY CONTRACT NUMBER
C02471

ISSUED BY
CAPITAL PROJECTS ENGINEERING DIVISION
CITY OF SANTA ROSA, CALIFORNIA

2026



LOCATION MAP

City of Santa Rosa

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Notice Inviting Bids

1. **Bid Submission.** City of Santa Rosa ("City") will accept sealed bids for its Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471, before November 5, 2026, at 2:00 p.m., at its Transportation and Public Works office, located at 69 Stony Circle, Santa Rosa, California, at which time the bids will be publicly opened and read aloud.
2. **Project Information.**
 - 2.1 **Location and Description.** The Project is located within the Bennett Valley Golf Course at 3330 Yulupa Road, Santa Rosa, CA 95405. This project improves the water supply systems for the Bennett Valley Golf Course irrigation system and allows further use of the existing irrigation lines and wells for the year-round operating golf course.
 - 2.2 **Time for Final Completion.** The Project must be fully completed within 130 Working Days from the start date set forth in the Notice to Proceed. City anticipates that the Work will begin on or about January 2027, but the anticipated start date is provided solely for convenience and is neither certain nor binding.
3. **License and Registration Requirements.**
 - 3.1 **License.** This Project requires a valid California contractor's license for the following classification(s): Class A.
 - 3.2 **DIR Registration.** City may not accept a Bid Proposal from, or enter into the Contract with, a bidder without proof that the bidder is registered with the California Department of Industrial Relations ("DIR") to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.
4. **Contract Documents.** The plans, specifications, bid forms and contract documents for the Project, and any addenda thereto ("Contract Documents") may be downloaded from the City's PlanetBids portal, which may be accessed by selecting the "Bid/Proposal Opportunities" link on the City's website at <https://www.srcity.org/165/Bids-Proposals>. A printed copy of the Contract Documents is not available.
5. **Bid Security.** The Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's or certified check made payable to City, 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 within ten days after City issues the Notice of Award, the successful bidder will execute the Contract and submit the payment and performance bonds, insurance certificates and endorsements, valid Certificates of Reported Compliance as required under the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), if applicable, and any other submittals required by the Contract Documents and as specified in the Notice of Award.
6. **Prevailing Wage Requirements.**
 - 6.1 **General.** Pursuant to California Labor Code § 1720 et seq., 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.** The prevailing rates are on file with the City and 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 hours. The rate for holiday and overtime work must be at least time and one-half.
- 6.3 Compliance.** The Contract will be subject to compliance monitoring and enforcement by the DIR, under Labor Code § 1771.4.
- 7. Performance and Payment Bonds.** The successful bidder will be required to provide performance and payment bonds, each for 100% of the Contract Price, as further specified in the Contract Documents.
- 8. Substitution of Securities.** Substitution of appropriate securities in lieu of retention amounts from progress payments is permitted under Public Contract Code § 22300.
- 9. Subcontractor List.** Each Subcontractor must be registered with the DIR to perform work on public projects. Each bidder must submit a completed Subcontractor List form with its Bid Proposal, including the name, location of the place of business, California contractor license number, DIR registration number, and portion of the Work to be performed for each Subcontractor that will perform Work or service, or fabricate and install Work, for the prime contractor in excess of one-half of 1% of the total bid price, using the Subcontractor List form included with the Contract Documents.
- 10. Bidders' Conference.** A bidders' conference will be held on October 20, 2026 at 11:00 a.m., at the following location: Bennett Valley Golf Course at 3330 Yulupa Road, Santa Rosa, CA 95405 to acquaint all prospective bidders with the Contract Documents and the Project site. The bidders' conference is mandatory. A bidder who fails to attend a mandatory bidders' conference may be disqualified from bidding.
- 11. Instructions to Bidders.** All bidders should carefully review the Instructions to Bidders for more detailed information before submitting a Bid Proposal. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, as defined therein, including this Notice Inviting Bids.

By: *Lisa Welsh* Date: 10/06/2026
By: Lisa Welsh (Oct 6, 2026 14:39:36 PDT)

Lisa Welsh, Supervising Engineer

Publication Date: October 6, 2026

END OF NOTICE INVITING BIDS

Instructions to Bidders

Each Bid Proposal submitted to the City of Santa Rosa ("City") for its Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471 must be submitted in accordance with the following instructions and requirements:

1. Bid Submission.

1.1 General. Each Bid Proposal must be completed, using the form provided in the Contract Documents, signed, and submitted to City in a sealed envelope, with all required forms and attachments, before the deadline set forth in Section 1 of the Notice Inviting Bids, or as amended by subsequent addendum. Faxed or emailed Bid Proposals will not be accepted, unless otherwise specified. Late submissions (i.e., submissions at or after the exact hour of bid opening) will be returned unopened. The official time clock for accepting bids will be an electric date and time stamping clock located, and available for inspection during normal business hours upon request, at the front public counter in the Transportation and Public Work Department office, 69 Stony Circle, Santa Rosa, CA 95401. City reserves the right to postpone the date or 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 labor, materials, supplies, and equipment and all other direct or indirect costs such as applicable taxes, insurance and overhead.

1.2 Vendor Registration. To participate in the bidding process, each bidder must register as a vendor on PlanetBids, download the Contract Documents, and add itself to the "Prospective Bidders" list for the Project. If City issues an addendum, each bidder must log in to PlanetBids and acknowledge the addendum prior to the bid deadline. (See Section 8, below.)

1.3 Bid Envelope. The sealed envelope containing the Bid Proposal and all required forms and attachments must be clearly labeled and addressed as follows:

BID PROPOSAL:

Bennett Valley Golf Course Irrigation System Improvements Project
Contract No. C02471

Transportation and Public Works Department
69 Stony Circle
Santa Rosa, California 95401
Attn: Jose Mederos

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 §§ 1725.5 and 1771.1):

[Contractor company name]
[street address]
[city, state, zip code]
DIR Registration No: _____

- 1.4 DIR Registration.** Subject to limited legal exceptions for joint venture bids and federally-funded projects, City may not accept a Bid Proposal from a bidder without proof that the bidder is registered with the DIR to perform public work under Labor Code § 1725.5. If City is unable to confirm that the bidder is currently registered with the DIR, City may disqualify the bidder and return its bid unopened. (Labor Code §§ 1725.5 and 1771.1(a).)
- 1.5 Bid Tabulation.** To access the bid tabulation when available, visit the PlanetBids portal or the Project-specific website, available at cippublic.srcity.org/CIPList.html.
- 2. Bid Proposal Form and Enclosures.** Each Bid Proposal must be completed legibly using the Bid Proposal form included with the Contract Documents. The Bid Proposal form must 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 exceptions or terms such as "negotiable," "will negotiate," or similar, will be considered nonresponsive. Each Bid Proposal must be accompanied by bid security, as set forth in Section 4 below, and by a completed Bid Schedule, Subcontractor List, and Noncollusion Declaration using the forms included with the Contract Documents, and any additional forms required by the Notice Inviting Bids or Instructions to Bidders.
- 3. 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 officers of the corporation with full authority to bind the corporation to the terms of the Bid Proposal under California Corporations Code § 313 or as otherwise authorized by law.
- 4. Bid Security.** Each Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's check or certified check, made payable to the City, or bid bond using the form included in the Contract Documents and executed by a surety licensed to do business in the State of California. The bid security must guarantee that, within ten days after issuance of the Notice of Award, the bidder will: execute and submit the enclosed Contract for the bid price; submit payment and performance bonds for 100% of the maximum Contract Price; submit the insurance certificates and endorsements; and submit valid Certificates of Reported Compliance as required by the Off-Road Regulation, if applicable, and any other submittals, if any, required by the Contract Documents or the Notice of Award.
- 5. Requests for Information.** Questions or requests for clarifications regarding the Project, the bid procedures, or any of the Contract Documents must be submitted in writing to City via the PlanetBids portal. Oral responses are not authorized and are not binding on the City. Bidders should submit any such written inquiries at least five Working Days before the scheduled bid opening. Questions received any later might not be addressed before the bid deadline. An interpretation or clarification by City in response to a written inquiry will be issued in an addendum.
- 6. Pre-Bid Investigation.**
- 6.1 General.** Each bidder is solely responsible at its sole expense for diligent and thorough review of the Contract Documents, examination of the Project site, and reasonable and prudent inquiry concerning known and potential site and area conditions prior to submitting a Bid Proposal. Each bidder is responsible for

knowledge of conditions and requirements which reasonable review and investigation would have disclosed. However, except for any areas that are open to the public at large, bidders may not enter property owned or leased by the City or the Project site without prior written authorization from City.

- 6.2 Document Review.** Each bidder is responsible for review of the Contract Documents and any informational documents provided “For Reference Only,” e.g., as-builts, technical reports, test data, and the like. A bidder is responsible for notifying City of any errors, omissions, inconsistencies, or conflicts it discovers in the Contract Documents, acting solely in its capacity as a contractor and subject to the limitations of Public Contract Code § 1104. Notification of any such errors, omissions, inconsistencies, or conflicts must be submitted in writing to the City no later than five Working Days before the scheduled bid opening. (See Section 5, above.) City expressly disclaims responsibility for assumptions a bidder might draw from the presence or absence of information provided by City.
- 6.3 Project Site.** Questions regarding the availability of soil test data, water table elevations, and the like should be submitted to the City in writing, as specified in Section 5, above. Any subsurface exploration at the Project site must be done at the bidder’s expense, but only with prior written authorization from City. All soil data and analyses available for inspection or provided in the Contract Documents apply only to the test hole locations. Any water table elevation indicated by a soil test report existed on the date the test hole was drilled. The bidder is responsible for determining and allowing for any differing soil or water table conditions during construction. Because groundwater levels may fluctuate, difference(s) in elevation between ground water shown in soil boring logs and ground water actually encountered during construction will not be considered changed Project site conditions. Actual locations and depths must be determined by bidder’s field investigation. The bidder may request access to underlying or background information on the Project site in City’s possession that is necessary for the bidder to form its own conclusions, including, if available, record drawings or other documents indicating the location of subsurface lines, utilities, or other structures.
- 6.4 Utility Company Standards.** The Project must be completed in a manner that satisfies the standards and requirements of any affected utility companies or agencies (collectively, “utility owners”). The successful bidder may be required by the third party utility owners to provide detailed plans prepared by a California registered civil engineer showing the necessary temporary support of the utilities during coordinated construction work. Bidders are directed to contact the affected third party utility owners about their requirements before submitting a Bid Proposal.
- 7. Bidders Interested in More Than One Bid.** No person, firm, or corporation may submit or be a party to more than one 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.
- 8. Addenda.** Subject to the limitations of Public Contract Code § 4104.5, City reserves the right to issue addenda prior to bid time. Any addenda issued prior to the bid opening are part of the Contract Documents. Bidders should check City’s PlanetBids portal periodically for any addenda or updates on the Project, which may be accessed via City’s website at: <https://www.srcity.org/165/Bids-Proposals>. Each bidder is solely responsible for ensuring it has received and reviewed all addenda prior to submitting its bid and must acknowledge each addendum in the PlanetBids portal.

9. **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. A request for substitution must be submitted within 35 days after Notice of Award unless otherwise provided in the Contract Documents. 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 § 3400(c).
10. **Bid Protest.** Any bid protest against another bidder must be submitted in writing and received by City at 69 Stony Circle, Santa Rosa, CA 95401 or sent via email at jmederos@srcity.org before 5:00 p.m. no later than two Working Days following bid opening (“Bid Protest Deadline”) and must comply with the following requirements:
- 10.1 **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. For purposes of this Section 10, a “Working Day” means a day that City is open for normal business, and excludes weekends and holidays observed by City. Pursuant to Public Contract Code § 4104, inadvertent omission of a Subcontractor’s DIR registration number on the Subcontractor List form is not grounds for a bid protest, provided it is corrected within 24 hours of the bid opening or as otherwise provided under Labor Code § 1771.1(b).
- 10.2 **Protest Contents.** The bid protest must contain a complete statement of the basis for the protest and must include 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 protesting bidder and any person submitting the protest on behalf of or as an authorized representative of the protesting bidder.
- 10.3 **Copy to Protested Bidder.** Upon submission of its bid protest to City, the protesting bidder must also concurrently transmit the protest and all supporting documents to the protested bidder, and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest, by email or hand delivery to ensure delivery before the Bid Protest Deadline.
- 10.4 **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 Working Days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the “Response Deadline”). The response must attach 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 responding on behalf of or representing the protested bidder if different from the protested bidder.
- 10.5 **Copy to Protesting Bidder.** Upon submission of its response to the bid protest to the City, the protested bidder must also concurrently transmit by email or hand delivery, by or before the Response Deadline, a copy of its response and all supporting documents to the protesting bidder and to any other bidder who has a

reasonable prospect of receiving an award depending upon the outcome of the protest.

- 10.6 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 a 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.
- 10.7 Right to Award.** City reserves the right, acting in its sole discretion, to reject any bid protest that it determines lacks merit, 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.
- 11. Reservation of Rights.** Subject to the provisions of its charter and the Santa Rosa City Code ("City Code"), City reserves the unfettered right, acting in its sole discretion, to waive or to decline to waive any immaterial bid irregularities; to accept or reject any or all bids; to cancel or reschedule the bid; to postpone or abandon the Project entirely; or to perform all or part of the Work with its own forces. The Contract will be awarded, if at all, within 90 days after opening of bids or as otherwise specified in the Special Conditions, to the responsible bidder that submitted the lowest responsive bid. Any planned start date for the Project represents the City's expectations at the time the Notice Inviting Bids was first issued. City is not bound to issue a Notice to Proceed by or before such planned start date, and it reserves the right to issue the Notice to Proceed when the City determines, in its sole discretion, the appropriate time for commencing the Work. The City expressly disclaims responsibility for any assumptions a bidder might draw from the presence or absence of information provided by the City in any form. Each bidder is solely responsible for its costs to prepare and submit a bid, including site investigation costs.
- 12. Bonds.** Within ten calendar days following issuance of the Notice of Award, the successful bidder must submit payment and performance bonds to City 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.
- 13. License(s) and Certificate(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. The successful bidder must also obtain a City business tax certificate, issued pursuant to Chapter 6.04 of the City Code, within ten days following issuance of the Notice of Award and before performing any Work on the Project. Subcontractors must also obtain a City business tax certificate before performing any Work.
- 14. Ineligible Subcontractor.** Any Subcontractor who is ineligible to perform work on a public works project under Labor Code §§ 1777.1 or 1777.7 is prohibited from performing work on the Project.
- 15. Safety Orders.** If the Project includes construction of a pipeline, sewer, sewage disposal system, boring and jacking pits, or similar trenches or open excavations, which are five feet or deeper, 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 § 6707.

16. In-Use Off-Road Diesel-Fueled Fleets. If the Project involves the use of vehicles subject to the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), then within ten calendar days following City's issuance of the Notice of Award, the successful bidder must submit to City valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, in accordance with the Off-Road Regulation, unless exempt under the Off-Road Regulation.

17. Community Workforce Agreement. If checked below, the Project is subject to the City's Community Workforce Agreement ("CWA") and the successful bidder must comply with the requirements therein.

Select One:

☒ This Project is subject to the City's CWA, which is available on the City's website at <https://www.srcity.org/165/Bids-Proposals> and incorporated herein by reference. Within three Working Days following a request from City, the apparent low bidder must submit to City an executed Appendix A, Contractor Agreement to be Bound, using the form provided with the Contract Documents. Each bidder must provide a copy of the CWA to its Subcontractors, and the successful bidder and its Subcontractors must comply with the CWA. Entering into the CWA is a condition of award of the Contract for the Project.

☐ This Project is not subject to the City's CWA.

18. Bid Schedule. Each bidder must complete the Bid Schedule form with unit prices as indicated, and submit the completed Bid Schedule with its Bid Proposal.

18.1 Incorrect Totals. In the event a computational error for any bid item (base bid or alternate) results in an incorrect extended total for that item, the submitted base bid or bid alternate total will be adjusted to reflect the corrected amount as the product of the estimated quantity and the unit cost. 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 § 5100 et seq.

18.2 Estimated Quantities. Unless identified as a "Final Pay Quantity," 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, and no increase in the unit price, and without regard to the percentage increase or decrease of the estimated quantity and the actual quantity. For any quantity that the Bid Schedule identifies a "Final Pay Quantity," there will be no adjustment to the Contract Price if the actual quantity required to perform the Work is greater or less than the estimated amount.

- 18.3 Bid Item Description.** The descriptions of bid items in the Specifications are not intended as exclusive descriptions of the Work. Each bidder must determine, and include in its unit pricing, all things necessary and incidental for the timely performance and completion of the Work as specified in the Contract Documents, including, but not limited to, all necessary labor, materials, supplies, tools, equipment, transportation, facilities, and utilities, unless otherwise specified.
- 19. Withdrawal.** A Bid Proposal may not be withdrawn for a period of 90 days after the bid opening without forfeiture of the bid security, except as authorized for material error under Public Contract Code § 5100 et seq. In the event that a bid includes a material error, the bidder may request to withdraw its bid in accordance with Public Contract Code § 5100 et seq. The written request must establish the elements set forth in Public Contract Code § 5103.
- 20. 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.
- 21. For Reference Only.** The following documents are provided "For Reference Only," as defined in Section 3.4 of the General Conditions:
(A) 141208 BVGC Irrigation Wells Yield Testing & Analysis TM dated December 8th, 2014
(B) 260108 BVGC Geotechnical Investigation Report dated January 8th, 2026

END OF INSTRUCTIONS TO BIDDERS

Bid Proposal

Bennett Valley Golf Course Irrigation System Improvements Project; City Contract # C02471

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

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, including all labor, materials, supplies, and equipment and all other direct or indirect costs including, but not limited to, taxes, insurance and all overhead, for the following price (“Base Bid”):
\$ _____.
2. **Addenda.** Bidder agrees that it has confirmed receipt of or access to, and reviewed, all addenda issued for this bid, as evidenced by its acknowledgement of each addendum on the City’s PlanetBids portal. Bidder waives any claims it might have against the City based on its failure to receive, access, or review any addenda for any reason.
3. **Bidder’s Certifications and Warranties.** By signing and submitting this Bid Proposal, Bidder certifies and 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 § 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 Responsibility.** Bidder is a responsible bidder, with the necessary ability, capacity, experience, skill, qualifications, workforce, equipment, and resources to perform or cause the Work to be performed in accordance with the Contract Documents and within the Contract Time.
 - 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. All statements and information provided in this Bid Proposal and enclosures are true and correct to the best of Bidder’s knowledge.
 - 3.5 **Nondiscrimination.** In preparing this bid, the Bidder has not engaged in discrimination against any prospective or present employee or Subcontractor on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status.
 - 3.6 **Iran Contracting Act.** If the Contract Price exceeds \$1,000,000, Bidder is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the “Act”), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.
 - 3.7 **Agreement to be Bound by CWA.** If the Project is subject to the City’s CWA, Bidder will submit an executed Appendix A, Contractor Agreement to be Bound, using the form provided with the Contract Documents, within three Working Days following a request from City. (See Section 17 of the Instructions to Bidders.)

4. **Award of Contract.** By signing and submitting this Bid Proposal, Bidder agrees that, if City issues the Notice of Award to Bidder, then within ten days following issuance of the Notice of Award, 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 100% of the Contract Price, using the bond forms provided and in accordance with the requirements of the Contract Documents;
- 4.3 **Insurance Requirements.** Submit to City the insurance certificate(s) and endorsement(s) as required by the Contract Documents; and
- 4.4 **Certificates of Reported Compliance.** Submit to City valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, if the Project involves the use of vehicles subject to the Off-Road Regulation.
5. **Bid Security.** As a guarantee that, if awarded the Contract, Bidder will perform its obligations under Section 4 above, Bidder is enclosing bid security in the amount of ten percent of its maximum bid amount in one of the following forms (check one):

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

_____ A bid bond, using the Bid Bond form included with the Contract Documents, payable to City 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

s/ _____
[See Section 3 of Instructions to Bidders]

Name and Title

Company Name

License #, Expiration Date, and Classification

Address

DIR Registration #

City, State, Zip

Phone

Contact Name

Contact Email

END OF BID PROPOSAL

Bid Schedule

BIDDER NAME: _____

This Bid Schedule must be completed legibly and included with the sealed Bid Proposal. Pricing must be provided for each item as indicated. If this Bid Schedule requests pricing for Alternates, pricing must be provided for each Alternate Item as indicated. Items marked "(SW)" are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead.

AL = Allowance
LF = Linear Foot

CF = Cubic Feet
LS = Lump Sum

CY = Cubic Yard
SF = Square Feet

EA = Each LB = Pounds
TON = Ton (2000 lbs)

BASE BID

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
1	Mobilization & Demobilization	1	LS	\$	\$
2	Water Pollution Control	1	LS	\$	\$
3	Layout, Site Preparation & Selective Site Demolition	1	LS	\$	\$
4	Earthwork	1	LS	\$	\$
5	Surfacing & Erosion Control	1	LS	\$	\$
6	North Well & Wellhead Discharge Piping Improvements	1	LS	\$	\$
7	South Well & Wellhead Discharge Piping Improvements	1	LS	\$	\$
8	Hydropneumatic Bladder Tank	1	LS	\$	\$
9	Flow Meter and Vault	1	LS	\$	\$
10	Hydraulic Control Valve and Vault	1	LS	\$	\$
11	Irrigation Site Piping & Appurtenances	1	LS	\$	\$
12	12-inch PVC Irrigation Main	250	LF	\$	\$
13	Existing Irrigation Main Tie-in	1	LS	\$	\$
14	Trench Bracing and Shoring	1	LS	\$	\$
15	Transformer Bollards	12	EA	\$	\$
16	General Electrical Work	1	LS	\$	\$
17	Meter Pedestal & Electrical Service	1	LS	\$	\$
18	Motor Control Center & Controls System	1	LS	\$	\$
19	All Other Items of Work	1	LS	\$	\$

* Final Pay Quantity

TOTAL BASE BID: Items 1 through 19 inclusive: \$ _____

Note: The amount entered as the "Total Base Bid" should be identical to the Base Bid amount entered in Section 1 of the Bid Proposal form.

END OF BID SCHEDULE

Subcontractor List

For each Subcontractor that will perform Work in an amount in excess of one-half of 1% of the Bidder's total Base Bid,¹ the bidder must list a description of the Work, the name of the Subcontractor, its California contractor license number, the location of its place of business, and its DIR registration number. If the Instructions to Bidders include a provision on "Subcontractor Work Limits," the bidder must also list the percentage of Work to be performed by the Subcontractor (based on a percentage of the Base Bid price) in the "Percent of Work" column.

DESCRIPTION OF WORK	SUBCONTRACTOR NAME	CALIFORNIA CONTRACTOR LICENSE NO.	LOCATION OF BUSINESS	DIR REG. NO.	PERCENT OF WORK

END OF SUBCONTRACTOR LIST

¹ For street or highway construction, this requirement applies to any subcontract of \$10,000 or more.

Noncollusion Declaration

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

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 not paid and will not pay, any person or entity for such purpose.

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

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

END OF NONCOLLUSION DECLARATION

Bid Bond

_____ ("Bidder") has submitted a

bid, dated _____, 20____ ("Bid"), to the City of Santa Rosa ("City") for work on the Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471.

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 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 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 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 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;
 - 2.4 **Insurance.** The insurance certificate(s) and endorsement(s) required by the Contract Documents;
 - 2.5 **Certificates of Reported Compliance.** Valid Certificates of Reported Compliance for its fleet and its listed Subcontractors, if applicable, in accordance with the In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.) ("Off-Road Regulation"), if the Project involves the use of vehicles subject to the Off-Road Regulation; and
 - 2.6 **Other Submittals.** Any other documents required by the Instructions to Bidders or Notice of Award.
3. **Enforcement.** If Bidder fails to execute the Contract or to submit the bonds, insurance certificates, and valid Certificates of Reported Compliance 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 and 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 90 days following the bid opening or until this Bid Bond is returned to Bidder, whichever occurs first. Surety waives the provisions of Civil Code §§ 2819 and 2845.

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

SURETY:

Business Name

s/ _____

Date

Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

BIDDER:

Business Name

s/ _____

Date

Name, Title

END OF BID BOND

Bidder's Questionnaire

Bennett Valley Golf Course Irrigation System Improvements; City Contract # C02471

Within 48 hours following a request by City, a bidder must submit to City a completed, signed Bidder's Questionnaire using this form and all required attachments, including clearly labeled additional sheets as needed. City may request the Questionnaire from one or more of the apparent low bidders following the bid opening, and may use the completed Questionnaire as part of its investigation 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 A: General Information

Bidder Business Name: _____ ("Bidder")

Check One: ☐ Corporation (State of incorporation: _____)
 ☐ Partnership
 ☐ Sole Proprietorship
 ☐ Joint Venture of: _____
 ☐ Other: _____

Main Office Address and Phone: _____

Local Office Address and Phone: _____

Website Address: _____

Owner of Business: _____

Contact Name and Title: _____

Contact Phone and Email: _____

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

Bidder's DIR Registration Number: _____

Part B: Bidder Experience

1. How many years has Bidder been in business under its present business name? ____ years
2. Has Bidder completed projects similar in type and size to this Project as a general contractor?
____ Yes ____ No
3. Has Bidder ever been disqualified from a bid on grounds that it is not responsible, or otherwise disqualified or debarred from bidding under state or federal law?

_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding the disqualification or debarment, including the name and address of the agency or owner of the project, the type and size of the project, the reasons that Bidder was disqualified or debarred, and the month and year in which the disqualification or debarment occurred.

4. Has Bidder ever been terminated for cause, alleged default, or legal violation from a construction project, either as a general contractor or as a subcontractor?

_____ Yes _____ No

If yes, provide additional information on a separate sheet 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 most recently completed public works projects within the last three years;
- 5.2 Three largest completed projects within the last three years; and
- 5.3 Any project which is similar to this Project including scope and character of the work.

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

- 6.1 Project name, location, and description;
- 6.2 Owner (name, address, email, and phone number);
- 6.3 Prime contractor, if applicable (name, address, email, and phone number);
- 6.4 Architect or engineer (name, email, and phone number);
- 6.5 Project and/or construction manager (name, email, and phone number);
- 6.6 Scope of work performed (as general contractor or as subcontractor);
- 6.7 Initial contract price and final contract price (including change orders);
- 6.8 Original scheduled completion date and actual date of completion;
- 6.9 Time extensions granted (number of days);
- 6.10 Number and amount of stop notices or mechanic's liens filed;
- 6.11 Amount of any liquidated damages assessed against Bidder; and
- 6.12 Nature and resolution of any project-related claim, lawsuit, mediation, or arbitration involving Bidder.

Part C: Safety

1. Provide Bidder's Experience Modification Rate (EMR) for the last three years:

Year	EMR

2. Complete the following, based on information provided in Bidder's CalOSHA Form 300 or Form 300A, Annual Summary of Work-Related Illnesses and Injuries, from the most recent past calendar year:

- 2.1 Number of lost workday cases: _____
2.2 Number of medical treatment cases: _____
2.3 Number of deaths: _____

3. Has Bidder ever been cited, fined, or prosecuted by any local, state, or federal agency, including OSHA, CalOSHA, or EPA, for violation of any law, regulation, or requirements pertaining to health and safety?
_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding each such citation, fine, or prosecution, including the name and address of the agency or owner of the project, the type and size of the project, the reasons for and nature of the citation, fine, or prosecution, and the month and year in which the incident giving rise to the citation, fine, or prosecution occurred.

4. Name, title, and email for person responsible for Bidder's safety program:

_____	_____	_____
Name	Title	Email

Part D: 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 and Title

END OF BIDDER'S QUESTIONNAIRE

Appendix A

City of Santa Rosa Community Workforce Agreement Contractor Agreement To Be Bound

The undersigned, as a Contractor or Subcontractor ("Contractor") for the Bennett Valley Golf Course Irrigation System Improvements Project, (hereinafter the "Covered Project") City Contract # C02471, for and in consideration of the award to it of a contract to perform work on said Covered Project, and in further consideration of the mutual promises made in the "City of Santa Rosa Community Workforce Agreement" (hereinafter "Agreement"), a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all amendments and supplements now existing or which are later made thereto.
- (2) Agrees to be bound by the legally established local trust agreements as set forth in Article 17 of this Agreement.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor;
- (4) Certifies that it has no commitments or agreements which would preclude its full and complete compliance with the terms and conditions of the Agreement.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a subcontractor (of any tier) to it, a duly executed Agreement to be Bound in form identical to this document.

The obligation to be a party to and bound by the Agreement shall extend to all work for the Covered Project undertaken by the Contractor.

This letter shall constitute a subscription agreement, to the extent of the terms of the letter.

CONTRACTOR/SUBCONTRACTOR: _____

California Contractor State License No. or Motor Carrier (CA) Permit No.: _____

Name of Authorized Person (print): _____

Signature of Authorized Person: _____

Title of Authorized Person: _____

Telephone Number of Authorized Person: _____

Address of Authorized Person: _____

State Public Works Registration Number: _____

Contract

This public works contract ("Contract") is entered into by and between the City of Santa Rosa ("City") and _____ ("Contractor"), for work on the Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471.

The parties agree as follows:

1. **Award of Contract.** In response to the Notice Inviting Bids, Contractor has submitted a Bid Proposal to perform the Work to construct the Project. On _____, 20____, City authorized award of this Contract to Contractor for the amount set forth in Section 4, below. City has elected to include the following bid alternate(s) in the Contract:
No alternates
2. **Contract Documents.** The Contract Documents incorporated into this Contract include and are comprised of the documents listed below. The definitions provided in Article 1 of the General Conditions apply to all Contract Documents, including this Contract.
 - 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 Plans and Specifications;
 - 2.10 Change Orders, if any;
 - 2.11 Notice of Award;
 - 2.12 Notice to Proceed;
 - 2.13 City Standards and City Specifications, as applicable;
 - 2.14 City's CWA, if applicable;
 - 2.15 Caltrans Standard Specifications (excluding Division I) and Caltrans Standard Plans, as applicable; and
 - 2.16 The following: No other documents
3. **Contractor's Obligations.** Contractor will 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, supplies, tools, equipment, transportation, onsite facilities, and utilities, unless otherwise specified in the Contract Documents. Contractor must use its best efforts to diligently prosecute and 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 \$_____ ("Contract Price") for all of Contractor's direct and indirect costs to perform the Work, including all labor, materials, supplies, equipment, taxes, insurance, bonds and all overhead costs, in accordance with the payment provisions in the General Conditions.

5. **Time for Completion.** Contractor will fully complete the Work for the Project, meeting all requirements for Final Completion, within 130 Working Days from the start date set forth in the Notice to Proceed ("Contract Time"). By signing below, Contractor expressly waives any claim for delayed early completion.
6. **Liquidated Damages.** As further specified in Section 5.4 of the General Conditions, if Contractor fails to complete the Work within the Contract Time, City will assess liquidated damages in the amount of \$3000 per day for each day of unexcused delay in achieving Final Completion, and such liquidated damages may be deducted from City's payments due or to become due to Contractor under this Contract.
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, as further specified in Article 9 of the General Conditions.
 - 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 may 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 to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.
8. **Workers' Compensation Certification.** Pursuant to Labor Code § 1861, by signing this Contract, Contractor certifies as follows: "I am aware of the provisions of Labor Code § 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. **Conflicts of Interest.** Contractor, its employees, Subcontractors, and agents may not have, maintain, or acquire a conflict of interest in relation to this Contract in violation of any City ordinance or requirement, or in violation of any California law, including Government Code § 1090 et seq., or the Political Reform Act, as set forth in Government Code § 81000 et seq. and its accompanying regulations. Any violation of this Section constitutes a material breach of the Contract.
10. **Independent Contractor.** Contractor is an independent contractor under this Contract and will have control of the Work and the means and methods by which it is performed. Contractor and its Subcontractors are not employees of City and are not entitled to participate in any health, retirement, or any other employee benefits from City.
11. **Notice.** Any notice, billing, or payment required by or pursuant to the Contract Documents must be made in writing, signed, dated, and sent to the other party by personal delivery, U.S. Mail, a reliable overnight delivery service, or by email as a PDF file. Notice is deemed

effective upon delivery, except that service by U.S. Mail is deemed effective on the second working day after deposit for delivery. Notice for each party must be given as follows:

City:

Transportation and Public Works, Capital Projects
69 Stony Circle
Santa Rosa, CA 95401
707-543-3915; mobile 707-494-5418
Attn: Jose Mederos, Assistant Engineer
jmederos@srcity.org

Copy to: Kimberly Hopwood, Administrative Technician
khopwood@srcity.org

Contractor:

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

12. General Provisions.

- 12.1 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 and City's lawful heirs, successors and permitted assigns.
- 12.2 Third Party Beneficiaries.** There are no intended third party beneficiaries to this Contract.
- 12.3 Governing Law and Venue.** This Contract will be governed by California law and venue will be in the Sonoma County Superior Court, and no other place. Contractor waives any right it may have pursuant to Code of Civil Procedure § 394, to file a motion to transfer any action arising from or relating to this Contract to a venue outside of Sonoma County, California.
- 12.4 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.
- 12.5 Integration.** 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.
- 12.6 Severability.** If any provision of the Contract Documents is determined to be illegal, invalid, or unenforceable, in whole or in part, the remaining provisions of the Contract Documents will remain in full force and effect.

- 12.7 Iran Contracting Act.** If the Contract Price exceeds \$1,000,000, Contractor certifies, by signing below, that it is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the “Act”), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.
- 12.8 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 officers of the corporation are required pursuant to California Corporations Code § 313 or as otherwise authorized by law.
- 12.9 Electronic Signatures.** In accordance with Government Code § 16.5 and Civil Code § 1633.1 et seq., the parties agree that this Contract may be transmitted and executed electronically and that electronic signatures will have the same force and effect as the use of manual signatures.

[Signatures are on the following page.]

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

CITY:

Approved as to form:

s/ _____

s/ _____

Name, Title

Name, Title

Date: _____

Date: _____

Attest:

s/ _____

Name, Title

Date: _____

CONTRACTOR:

Business Name

s/ _____

Seal:

Name, Title

Date: _____

Second Signature (See Section 12.8):

s/ _____

Name, Title

Date: _____

Contractor's California License Number(s) and Expiration Date(s)

END OF CONTRACT

Payment Bond

The City of Santa Rosa ("City") and _____ ("Contractor") have entered into a Contract for Work on the Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471. 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 \$ _____, under California Civil Code § 9550 et seq., to ensure payment to authorized claimants. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.
2. **Surety's Obligation.** If Contractor or any of its Subcontractors fails to pay a person authorized in California Civil Code § 9100 to assert a claim against a payment bond, any amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or 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 § 13020 with respect to the work and labor, then Surety will pay the obligation.
3. **Beneficiaries.** This Bond inures to the benefit of any of the persons named in California Civil Code § 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 §§ 2819 and 2845. City waives the requirement of a new bond for any supplemental contract under Civil Code § 9550. Any notice to Surety may be given in the manner specified in the Contract and sent to Surety as follows:

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

[Signatures are on the following page.]

7. **Effective Date; Execution.** This Bond is entered into and is effective on _____,
20__.

SURETY:

Business Name

s/ _____

Date

Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

Business Name

s/ _____

Date

Name, Title

APPROVED BY CITY:

s/ _____

Date

Name, Title

END OF PAYMENT BOND

Performance Bond

The City of Santa Rosa ("City") and _____ ("Contractor") have entered into a Contract for Work on the Bennett Valley Golf Course Irrigation System Improvements Project ("Project") City Contract # C02471. 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 \$_____ to ensure Contractor's faithful performance of its obligations under the Contract. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.
2. **Surety's Obligations.** Surety's obligations are co-extensive with Contractor's obligations under the Contract. 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. Otherwise, Surety's obligations will remain in full force and effect.
3. **Waiver.** 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 §§ 2819 and 2845.
4. **Application of Contract Balance.** Upon making a demand on this Bond for completion of the Work prior to acceptance of the Project, 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.
5. **Contractor Default.** Upon written notification from City of Contractor's termination for 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 of the following courses of action:
 - 5.1 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;
 - 5.2 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
 - 5.3 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.
6. **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.
7. **Notice.** Any notice to Surety may be given in the manner specified in the Contract and sent to Surety as follows:

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

8. **Law and Venue.** This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Sonoma County Superior Court, 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.

9. **Effective Date; Execution.** This Bond is entered into and effective on _____, 20____.

SURETY:

Business Name

s/ _____

Date

Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

Business Name

s/ _____

Date

Name, Title

APPROVED BY CITY:

s/ _____

Date

Name, Title

END OF PERFORMANCE BOND

General Conditions

Article 1 - Definitions

Definitions. The following definitions apply to all of the Contract Documents unless otherwise indicated, e.g., additional definitions that apply solely to the Specifications or other technical documents. Defined terms and titles of documents are capitalized in the Contract Documents, with the exception of the following (in any tense or form): “day,” “furnish,” “including,” “install,” “work day,” or “working day.”

Allowance means a specific amount that must be included in the Bid Proposal for a specified purpose.

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

Awarding Authority means the City Council or its authorized delegee(s) unless the Contract is awarded by the Water Department, in which case it means the Board of Public Utilities.

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 Santa Rosa, acting through its City Council, officers, employees, City Engineer, and any other authorized representatives.

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

City Specifications means the City’s Construction Specifications for Public Improvements, which may be accessed on the City’s website at <https://www.srcity.org/2321/Design-Construction-Standards>.

City Standards means the City’s Design and Construction Standards, which may be accessed on the City’s website at <https://www.srcity.org/2321/Design-Construction-Standards>.

Claim means a separate demand by Contractor for a 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; a written demand by Contractor disputing a unilateral Change Order or a portion thereof; or a written demand by Contractor objecting to the amount of Final Payment.

Contract means the signed agreement between City and Contractor for performing the Work required for the Project, and all documents expressly incorporated therein.

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 Plans and Specifications; any Change Orders; and any other documents which are clearly and unambiguously made part of the Contract Documents. The Contract Documents do not include documents provided “For Reference Only,” or documents that are intended solely to provide information regarding existing conditions.

Contract Price means the total compensation to be paid to Contractor for performance of the Work, as set forth in the Contract and as may be 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, supplies, or equipment following submission of the Bid Proposal.

Contract Time means the time specified for complete performance of the Work, as set forth in the Contract and as may be amended by Change Order.

Contractor (or You) means the individual, partnership, corporation, or joint venture that has signed the Contract with City to perform the Work.

CWA means the Community Workforce Agreement for the City.

Day means a calendar day unless otherwise specified.

Design Professional means the licensed individual(s) or firm(s) retained by City to provide architectural, engineering, or other design professional 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.

DIR means the California Department of Industrial Relations.

Drawings has the same meaning as Plans.

Engineer means the City Engineer for the City of Santa Rosa and his or her authorized delegates.

Excusable Delay is defined in Section 5.3(B), Excusable Delay.

Extra Work means new or unforeseen work added to the Project, as determined by the Engineer in his or her sole discretion, including Work that was not part of or incidental to the scope of the Work when the Contractor's bid was submitted; Work that is substantially different from the Work as described in the Contract Documents at bid time; or Work that results from a substantially differing and unforeseeable condition.

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

Final Payment means payment to Contractor of the unpaid Contract Price, including release of undisputed retention, less amounts withheld or deducted pursuant to the Contract Documents.

Furnish means to purchase and deliver for the Project.

Government Code Claim means a claim submitted pursuant to California Government Code § 900 et seq.

Hazardous Materials means any substance or material identified now or in the future as hazardous under any Laws, or any other substance or material that may be considered hazardous or otherwise subject to Laws governing handling, disposal, or cleanup.

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

Inspector means the individual(s) or firm(s) retained or employed 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 Laws.

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

Laws means all applicable local, state, and federal laws, regulations, rules, codes, ordinances, permits, orders, and the like enacted or imposed by or under the auspices of any governmental entity with jurisdiction over any of the Work or any performance of the Work, including health and safety requirements.

Materials Lab means City's Materials Engineering Laboratory, which may perform quality assurance functions for a Project relating to asphalt and concrete, including inspection and/or testing of workmanship, materials, and the manner of construction.

Non-Excusable Delay is defined in Section 5.3(D), Non-Excusable Delay.

Plans means the City-provided plans, drawings, details, or graphical depictions of the Project requirements, but does not include Shop Drawings.

Project means the public works project referenced in the Contract, as modified by any Project alternates elected by City, if any.

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.

Recoverable Costs is defined in Section 5.3(F), Recoverable Costs.

Request for Information or **RFI** means Contractor's written request for information about the Contract Documents, the Work or the Project, submitted to City in the manner and format specified by City.

Section, when capitalized in these General Conditions, means a numbered section or subsection of the General Conditions, unless the context clearly indicates otherwise.

Shop Drawings means drawings, plan details or other graphical depictions prepared by or on behalf of Contractor, and subject to City acceptance, which are intended to provide details for fabrication, installation, and the like, of items required by or shown in the Plans or Specifications.

Specialty Work means Work that must be performed by a specialized Subcontractor with the specified license or other special certification, and that the Contractor is not qualified to self-perform.

Specifications means the technical, text specifications describing the Project requirements, which are prepared for and incorporated into the Contract 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 of all tiers, unless otherwise indicated by the context. A third party such as a utility performing related work on the Project is not a Subcontractor, even if Contractor must coordinate its Work with the third party.

Technical Specifications has the same meaning as Specifications.

Water Department means the City of Santa Rosa Water Department.

Work means all of the construction and services necessary for 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 when the City is open for business, and does not include the following holidays observed by the City:

- (A) New Year's Day, January 1;
- (B) Martin Luther King Jr. Birthday, the third Monday in January;
- (C) President's Day, the third Monday in February;
- (D) Cesar Chavez Day, March 31;
- (E) Memorial Day, the last Monday in May;
- (F) Juneteenth, June 19;
- (G) Independence Day, July 4;
- (H) Labor Day, the first Monday in September;
- (I) Veterans Day, November 11;
- (J) Thanksgiving Day, the fourth Thursday in November;
- (K) The day after Thanksgiving Day; and
- (L) Christmas Day, December 25.

Worksite means the place or places where the Work is performed, which includes, but may extend beyond the Project site, including separate locations for staging, storage, or fabrication.

Article 2 - Roles and Responsibilities

2.1 City.

- (A) **City Council.** The City Council has final authority in all matters affecting the Project, except to the extent it has delegated authority to the Engineer.
- (B) **Engineer.** The Engineer, acting within the authority conferred by the City Council, is responsible for administration of the Project on behalf of City, including authority to provide directions to the Design Professional and to Contractor to ensure proper and timely completion of the Project. The Engineer's decisions are final and conclusive within the scope of his or her authority, including interpretation of the Contract Documents.
- (C) **Project Manager.** The Project Manager assigned to the Project will be the primary point of contact for the Contractor and will serve as City's representative for daily administration of the Project on behalf of City. Unless otherwise specified, all of Contractor's communications to City (in any form) will go to or through the Project Manager. City reserves the right to reassign the Project Manager role at any time or to delegate duties to additional City representatives, without prior notice to or consent of Contractor.
- (D) **Design Professional.** The Design Professional 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 Plans and Specifications, including any design changes authorized by Change Order. The Design Professional's

duties may include review of Contractor's submittals, visits to any Worksite, inspecting the Work, evaluating test and inspection results, and participation in Project-related meetings, including any pre-construction conference, weekly meetings, and coordination meetings. The Design Professional's interpretation of the Plans or Specifications is final and conclusive.

2.2 Contractor.

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

(B) **Responsibility for the Work and Risk of Loss.** 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 the Work, including the construction means, methods, techniques, sequences, procedures, safety precautions and programs, 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. Contractor's responsibilities extend to any plan, method or sequence suggested but not required by City or specified in the Contract Documents. From the date of commencement of the Work until either the date on which City formally accepts the Project or the effective date of termination of the Contract, whichever is later, Contractor bears all risks of injury or damage to the Work and the materials and equipment delivered to any Worksite, by any cause including fire, earthquake, wind, weather, vandalism, or theft, subject to the limitations of Laws, including Public Contract Code § 7105.

(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 telephone 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. The superintendent must have full authority to act and communicate on behalf of Contractor, and Contractor will be bound by the superintendent's communications to City. City's approval of the superintendent is required before the Work commences. If City is not satisfied with the superintendent's performance, City may request a qualified replacement of the superintendent. Failure to comply may result in temporary suspension of the Work, at Contractor's sole expense and with no extension of Contract Time, until an approved 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.** Contractor must, at all times, ensure that the Work is performed in an efficient, skillful manner following best practices and in full compliance with the Contract Documents, Laws, and applicable manufacturer's recommendations. Contractor has a material and ongoing obligation to provide true and complete information, to the

best of its knowledge, with respect to all records, documents, or communications pertaining to the Project, including oral or written reports, statements, certifications, Change Order requests, or Claims.

(F) **Meetings.** Contractor, its project manager, superintendent and any primary Subcontractors requested by City, must attend and participate in a pre-construction conference, weekly Project progress meetings, and coordination meetings, as set forth herein.

(1) **Pre-Construction Conference.** City will designate a date and time for a pre-construction conference with Contractor following Contract execution. Project administration procedures and coordination between City and Contractor will be discussed. Contractor must present City with the following information or documents at the conference, unless otherwise specified by City, for City's review and acceptance before the Work commences:

- a. Name, 24-hour contact information, and qualifications of the proposed on-site superintendent;
- b. List of all key Project personnel and their complete contact information, including email addresses and telephone numbers during regular hours and after hours;
- c. Staging plans that identify the sequence of the Work, including any phases and alternative sequences or phases, with the goal of minimizing the impacts on residents, businesses and other operations in the Project vicinity;
- d. If required, traffic control plans associated with the staging plans that are signed and stamped by a licensed traffic engineer;
- e. Draft baseline schedule for the Work as required under Section 5.2, to be finalized within ten days after City issues the Notice to Proceed or as otherwise specified by City;
- f. Breakdown of lump sum bid items, to be used for determining the value of Work completed for future progress payments to Contractor;
- g. Schedule with list of Project submittals that require City review, and list of the proposed material suppliers;
- h. Plan for coordination with affected utility owner(s) and compliance with any related permit requirements;
- i. Videotape and photographs recording the conditions throughout the pre-construction Project site, showing the existing improvements and current condition of the curbs, gutters, sidewalks, signs, landscaping, streetlights, structures near the Project such as building faces, canopies, shades and fences, and any other features within the Project area limits;
- j. If requested by City, Contractor's cash flow projections; and
- k. Any other documents specified by City.

(2) **Progress Meetings.** Contractor, its project manager, superintendent and any primary Subcontractors requested by City, must participate in weekly Project progress meetings scheduled with City.

(3) **Coordination Meetings.** If applicable, Contractor may also be required to participate in coordination meetings with other parties relating to other work being performed on or near the Project site or in relation to the Project, including work or activities performed by City, other contractors, or other utility owners.

(G) **Construction Records.** Contractor will maintain up-to-date, thorough, legible, and dated daily job reports, which document all significant activity on the Project for each day that Work is performed on the Project. The daily report for each day must include the number of workers at the Project site; primary Work activities; major deliveries; problems encountered, including injuries, if any; weather and site conditions; and delays, if any. Contractor will take date and time-stamped photographs to document general progress of the Project, including site conditions prior to construction activities, before and after photographs at offset trench laterals, existing improvements and utilities, damage and restoration. Contractor will maintain copies of all subcontracts, Project-related correspondence with Subcontractors, and records of meetings with Subcontractors. Upon request by the City, Contractor will permit review of and/or provide copies of any of these construction records.

(H) **Responsible Party.** Contractor is solely responsible to City for the acts or omissions of any Subcontractors, or any other party or parties performing portions of the Work or providing equipment, materials or services for or on behalf of Contractor or the Subcontractors. Upon City's written request, Contractor must promptly and permanently remove from the Project, at no cost to City, any employee or Subcontractor or employee of a Subcontractor who the Engineer has determined to be incompetent, intemperate or disorderly, or who has failed or refused to perform the Work as required under the Contract Documents.

(I) **Correction of Defects.** Contractor must promptly correct, at Contractor's sole expense, any Work that is determined by City to be deficient or defective in any way, including workmanship, materials, parts, or equipment. Workmanship, materials, parts, or equipment that do not conform to the requirements under the Contract Documents, as determined by City, will be considered defective and subject to rejection. Contractor must also promptly correct, at Contractor's sole expense, any Work performed beyond the lines and grades shown on the Plans or established by City, and any Extra Work performed without City's prior written approval. If requested by City in City's notice to correct, Contractor must submit a Work plan for correcting defective Work in advance of Contractor taking corrective action. If Contractor fails to correct or to take reasonable steps toward correcting defective Work within five days following notice from City, or within the time specified in City's notice to correct, City may elect to have the defective Work corrected by its own forces or by a third party, in which case the cost of correction will be deducted from the Contract Price. If City elects to correct defective Work due to Contractor's failure or refusal to do so, City or its agents will have the right to take possession of and use any equipment, supplies, or materials available at the Project site or any Worksite on City property, in order to effectuate the correction, at no extra cost to City. Contractor's warranty obligations under Section 11.2, Warranty, will not be waived nor limited by City's actions to correct defective Work under these circumstances. Alternatively, City may elect to retain defective Work, and deduct the difference in value, as determined by the Engineer, from payments otherwise due to Contractor. This

paragraph also applies to any defective Work performed by Contractor during the one-year warranty period under Section 11.2.

(J) **Contractor's Records.** Contractor must maintain all of its records relating to the Project in any form, including paper documents, photos, videos, electronic records, approved samples, and the construction records required pursuant to paragraph (G), above. Project records subject to this provision include complete Project cost records, copies of the insurance policies and endorsements required by the Contract Documents, and records relating to preparation of Contractor's bid, including estimates, take-offs, and price quotes or bids.

(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-related records in an organized manner for a period of five years after City's acceptance of the Project or following Contract termination, whichever occurs first. Subject to prior notice to Contractor, City is entitled to inspect or audit any of Contractor's records relating to the Project during Contractor's normal business hours. Contractor's records may also be subject to examination and audit by the California State Auditor, pursuant to Government Code § 8546.7. The record-keeping requirements set forth in this subsection 2.2(J) will survive expiration or termination of the Contract.

(K) **Copies of Project Documents.** Contractor and its Subcontractors must keep copies, at the Project site, of all Work-related documents, including the Contract, permit(s), Plans, Specifications, addenda, Contract amendments, Change Orders, RFIs and RFI responses, Shop Drawings, as-built drawings, schedules, daily records, testing and inspection reports or results, and any related written interpretations. These documents must be available to City for reference at all times during construction of the Project.

(L) **Quality Control.** Contractor is responsible for developing, implementing, and maintaining a quality control plan that includes sampling, testing, and inspecting the Work to control material quality and to ensure that the Work satisfies the quality characteristics in the Contract Documents. Contractor must submit copies of the quality control plan to City, within two Working Days after the pre-construction conference, and make one copy available at each Worksite.

(1) **Records.** Contractor must prepare and maintain quality control records, including the names and qualifications of samplers, testers, and inspectors; testing laboratories' identification and certifications; testing equipment calibrations and certifications; inspection reports; sampling and testing records organized by date and type of material; test results with comparison of quality characteristic requirements; test results in relation to action and any suspension limits; and records of corrective actions and suspensions. Contractor will submit

any quality control test data and test results to the Engineer within two Working Days following test completion. Contractor must immediately notify the Engineer of any noncompliant Work.

(2) **Quality Control Manager.** Unless otherwise specified in the Special Conditions or Specifications, before starting Work, Contractor will designate in writing, and provide complete contact information for, the quality control manager for the Project who will be responsible for receiving, reviewing, and approving all correspondence and submittals prior to submission to the City; signing and implementing Contractor's quality control plan; and maintaining quality control records. The quality control manager must either be an employee of Contractor, or a Subcontractor retained solely to provide quality control services for the Project. The quality control manager must not be employed or compensated by a Subcontractor who will provide other Work for the Project.

(3) **Test Modifications.** The following specific tests are modified as follows: For California Test 216 (Relative Compaction), a mechanical compactor (Ploog Engineering Co. Model M 100 or equal) with a 10-pound hammer and split compaction molds must be used in lieu of the specified manual compaction equipment. For California Test 231 (Nuclear Gage Determination of In-Place Density), in-place density and relative compaction may be determined on the basis of individual test sites in lieu of the area concept at the discretion of the Engineer.

2.3 Subcontractors.

(A) **General.** All Work which is not performed by Contractor with its own forces must be performed by Subcontractors. City reserves the right to approve or reject any and all Subcontractors proposed to perform the Work, for reasons including the Subcontractor's poor reputation, lack of relevant experience, financial instability, and lack of technical ability or adequate trained workforce. Each Subcontractor must obtain a City business tax certificate before performing any Work.

(B) **Contractual Obligations.** Contractor must require each Subcontractor to comply with the provisions of the Contract Documents as they apply to the Subcontractor's portion(s) of the Work, including the generally applicable terms of the Contract Documents, and to likewise bind their subcontractors. Contractor will provide that the rights that each Subcontractor may have against any manufacturer or supplier for breach of warranty or guarantee relating to items provided by the Subcontractor for the Project, will be assigned to City. 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.

(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, but only if and to the extent that City accepts, in writing, 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 § 4107, Contractor is solely responsible for all costs City incurs in responding to the request, including legal fees and costs to conduct a hearing, and any increased subcontract cost to perform the Work that was to be performed by the listed Subcontractor. If City determines that a Subcontractor is unacceptable to City based on the Subcontractor's failure to satisfactorily perform its

Work, or for any of the grounds for substitution listed in Public Contract Code § 4107(a), City may request removal of the Subcontractor from the Project. Upon receipt of a written request from City to remove a Subcontractor pursuant to this paragraph, Contractor will immediately remove the Subcontractor from the Project and, at no further cost to City, will either (1) self-perform the remaining Work to the extent that Contractor is duly licensed and qualified to do so, or (2) substitute a Subcontractor that is acceptable to City, in compliance with Public Contract Code § 4107, as applicable.

2.4 Coordination of Work.

(A) **Concurrent Work.** City reserves the right to perform, have performed, or permit performance of other work on or adjacent to the Project site while the Work is being performed for the Project. Contractor is responsible for coordinating its Work with other work being performed on or adjacent to the Project site, including by any City work forces or utility companies or agencies, and must avoid hindering, delaying, or interfering with the work of other contractors, individuals, or entities, and must ensure safe and reasonable site access and use as required or authorized by City. To the full extent permitted by law, Contractor must hold harmless and indemnify City 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 any City work forces, utility company or agency, or another contractor or subcontractor.

(B) **Coordination.** If Contractor's Work will connect or interface with work performed by others, Contractor is responsible for independently measuring and visually inspecting such work to ensure a correct connection and interface. Contractor is responsible for any failure by Contractor or its Subcontractors to confirm measurements before proceeding with connecting Work. Before proceeding with any portion of the Work affected by the construction or operations of others, Contractor must give the 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 known or reasonably discoverable 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. Contractor must also promptly notify City if work performed by others, including work or activities performed by City's own forces, is operating to hinder, delay, or interfere with Contractor's timely performance of the Work. City reserves the right to backcharge Contractor for any additional costs incurred due to Contractor's failure to comply with the requirements in this Section 2.4.

2.5 Submittals. Unless otherwise specified, Contractor must submit to the Engineer for review and acceptance, all schedules, Shop Drawings, samples, product data, and similar submittals required by the Contract Documents, or upon request by the Engineer. Unless otherwise specified, all submittals, including Requests for Information, are subject to the general provisions of this Section, as well as specific submittal requirements that may be included elsewhere in the Contract Documents, including the Special Conditions or Specifications. The Engineer may require submission of a submittal schedule at or before a pre-construction conference, as may be specified in the Notice to Proceed.

(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 City-accepted schedule for the Work and within the applicable time specified 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. Contractor must provide submittals in electronic format, unless otherwise specified by the Engineer.

(C) **Required Contents.** Each submittal must be uniquely numbered and include the Project name and contract 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). Submittal resubmissions must include a revision designation.

(D) **Required Corrections.** If corrections are required, Contractor must promptly make and submit any required corrections as specified in full conformance with the requirements of this Section, or other requirements that apply to that submittal. Except as required for corrections, Contractor will not make changes to a submittal upon resubmission. City reserves the right to reject a partial resubmission of a submittal.

(E) **Effect of Review and Acceptance.** Review and acceptance 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 acceptance of a submittal by City is not an assumption of risk or liability by City.

(F) **Enforcement.** Any Work performed or any material furnished, installed, fabricated or used without City's prior acceptance of a required submittal is performed or provided 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 or material, and the cost of additional time or services required of City, including costs for the Design Professional, Project Manager, Inspector, and Materials Lab.

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

2.6 Shop Drawings. When Shop Drawings are required by the Specifications or requested by the Engineer, they must be prepared according to best practices at Contractor's expense. The Shop Drawings must be of a size and scale to clearly show all necessary details. Unless otherwise specified by City, Shop Drawings must be provided to the Engineer for review and acceptance at least 30 days before the Work will be performed. If City requires changes, the corrected Shop Drawings must be resubmitted to the Engineer for review within the time specified by the Engineer. For all Project components requiring Shop Drawings, Contractor will not furnish materials or perform any Work until the Shop Drawings for those components are accepted by City. Contractor is responsible for any errors or omissions in the Shop Drawings, shop fits and field corrections; any deviations from the Contract Documents; and for the results obtained by the use of Shop Drawings. Acceptance of Shop Drawings by City does not relieve Contractor of Contractor's responsibility.

2.7 Material List. Unless otherwise specified by City, Contractor must submit to the Engineer, at or before the pre-construction conference, a list of all materials proposed for use in the Work and any supporting documentation and samples required by the Contract Documents and source of supply. For a material listed on the "Engineer's List of Approved Items," located in the Sewer and Water sections of the City Standards, Contractor must provide the name of the manufacturer and model and part number for

each material proposed for the Work, unless the item has been replaced for the Project, as specifically set forth in the Contract Documents. For all other materials, Contractor must provide the name of the manufacturer, model and part number, and supporting documentation and samples that will enable the Engineer to evaluate the material.

- 2.8 Access to Work.** Contractor must afford prompt and safe access to any Worksite by City and its employees, agents, or consultants authorized by City; and upon request by City, Contractor must promptly arrange for City representatives to visit or inspect manufacturing sites or fabrication facilities for items to be incorporated into the Work.
- 2.9 Personnel.** Contractor and its Subcontractors must employ only competent and skillful personnel to perform the Work. Contractor and its Subcontractor's supervisors, security or safety personnel, and employees who have unescorted access to the Project site must possess proficiency in English sufficient to read, understand, receive, and implement oral or written communications or instructions relating to their respective job functions, including safety and security requirements. Upon written notification from the Engineer, Contractor and its Subcontractors must immediately discharge any personnel who are incompetent, disorderly, disruptive, threatening, abusive, or profane, or otherwise refuse or fail to comply with the requirements of the Contract Documents or Laws, including Laws pertaining to health and safety. Any such discharged personnel may not be re-employed or permitted on the Project in any capacity without City's prior written consent.

Article 3 - Contract Documents

3.1 Interpretation of Contract Documents.

(A) **Plans and Specifications.** The Plans and Specifications included in the Contract Documents are complementary. If Work is shown on one 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 Plans 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 Plans and Specifications, the Specifications will control, unless the drawing(s) at issue are dated later than the Specification(s) at issue. Detailed drawings take precedence over general drawings, and large-scale drawings take precedence over smaller scale drawings. Any arrangement or division of the Plans and Specifications into sections is for convenience and is not intended to limit the Work required by separate trades. A conclusion presented in the Plans or Specifications is only a recommendation. Actual locations and depths must be determined by Contractor's field investigation. Contractor may request access to underlying or background information in City's possession that is necessary for Contractor to form its own conclusions.

(B) **Duty to Notify and Seek Direction.** If Contractor becomes aware of a changed condition in the Project, or of any ambiguity, conflict, inconsistency, discrepancy, omission, or error in the Contract Documents, including the Plans or Specifications, Contractor must promptly submit a Request for Information to the Engineer and wait for a response from City before proceeding further with the related Work. The RFI must notify City of the issue and request clarification, interpretation or direction. The Engineer's clarification, interpretation or direction will be final and binding on the Contractor. If Contractor proceeds with the related Work before obtaining the City's response, Contractor will be responsible for any resulting costs, including the cost of correcting any

incorrect or defective Work that results. Timely submission of a clear and complete RFI is essential to avoiding delay. Delay resulting from Contractor's failure to submit a timely and complete RFI to the Engineer is Non-Excusable Delay. If Contractor believes that City's response to an RFI justifies a change to the Contract Price or Contract Time, Contractor must perform the Work as directed, but may submit a timely Change Order request in accordance with the Contract Documents. (See Articles 5 and 6.)

(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 in the Contract Documents and at the Project site before ordering any material or performing any Work, and will be responsible for the correctness of those measurements or for costs that could have been avoided by independently verifying measurements.

(F) **Compliance with Laws.** The Contract Documents are intended to comply with Laws and will be interpreted to comply with Laws.

3.2 Order of Precedence. Information included in one 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, with the most recent version taking precedent over an earlier version:

- (A) Change Orders;
- (B) Addenda;
- (C) Contract;
- (D) Notice to Proceed;
- (E) Attachment B – Caltrans Contract Requirements (only if used);
- (F) Special Conditions;
- (G) General Conditions;
- (H) Payment and Performance Bonds;
- (I) Specifications;
- (J) Plans;
- (K) Notice of Award;
- (L) Notice Inviting Bids;
- (M) Attachment A – Caltrans Bidding Requirements (only if used);
- (N) Instructions to Bidders;
- (O) Community Workforce Agreement, if applicable;
- (P) Contractor's Bid Proposal and attachments;
- (Q) City Standards and City Specifications, as applicable; and
- (R) Any generic documents prepared by and on behalf of a third party, that were not prepared specifically for this Project, such as the Caltrans Standard Specifications, or Caltrans Standard Plans.

3.3 Caltrans Standard Specifications and Standard Plans. 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 ("Caltrans Standard Specifications"), including the most current amendments and revisions as of the date that Contractor's bid was

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

(A) **Limitations.** The "Division I General Provisions" of the Caltrans Standard Specifications, i.e., Division I (sections 1 through 9), do not apply to these Contract Documents with the exception of any specific provisions, if any, which are expressly stated to apply to these Contract Documents. Unless otherwise specified in the Specifications, the remaining Divisions of the Caltrans Standard Specifications, i.e., Division II through Division XII, are applicable to the extent relevant to the Work and are subject to any modifications set forth in the Specifications. A specific reference in the Specifications to a section from the Caltrans Standard Specifications will not be construed as excluding other applicable sections from the Caltrans Standard Specifications.

(B) **Conflicts or Inconsistencies.** If there is a conflict or inconsistency between any provision in the Caltrans 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 Caltrans Standard Specifications are to be interpreted as follows:

(1) Any reference to the "Engineer" or "Director" is deemed to mean the City Engineer.

(2) Any reference to the "Special Provisions" is deemed to mean the Specifications.

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

(4) Any reference to "Laboratory" is deemed to mean the Materials Lab, or such other laboratory as may be authorized by the City.

3.4 For Reference Only. Contractor is responsible for the careful review of any document, study, or report provided by City or 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. Contractor is advised that the 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. Any record drawings or similar final or accepted drawings or maps that are not part of the Contract Documents are deemed to be For Reference Only. The provisions of the Contract Documents are not modified by any perceived or actual conflict with provisions in any document that is provided For Reference Only.

3.5 Current Versions. Unless otherwise specified by the City, any reference to standard specifications, technical specifications, or any City or state codes or regulations means the latest specification, code, or regulation in effect on the date that bids were due.

3.6 Conformed Copies. If City prepares a conformed set of the Contract Documents following award of the Contract, it will provide Contractor with two hard copy (paper) sets

and one copy of the electronic file in PDF format. It is Contractor's responsibility to ensure that all Subcontractors, including fabricators, are provided with the conformed set of the Contract Documents at Contractor's sole expense.

- 3.7 Ownership.** No portion of the Contract Documents may be used for any purpose other than construction of the Project, without prior written consent from City. Contractor is deemed to have conveyed the copyright in any designs, drawings, specifications, Shop Drawings, or other documents (in paper or electronic form) developed by Contractor for the Project, and City will retain all rights to such works, including the right to possession.

Article 4 - Bonds, Indemnity, and Insurance

- 4.1 Payment and Performance Bonds.** Within ten 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 100% of the Contract Price, and each executed by Contractor and its surety using the bond forms included with the Contract Documents.

(A) **Surety.** Each bond must be issued and executed by a surety admitted in California. If an issuing surety cancels the bond or becomes insolvent, within seven 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.

(B) **Supplemental Bonds for Increase in Contract Price.** If the Contract Price increases during construction by five percent or more over the original Contract Price, Contractor must provide supplemental or replacement bonds within ten days of written notice from City pursuant to this Section, covering 100% of the increased Contract Price and using the bond forms included with the Contract Documents.

- 4.2 Indemnity.** To the fullest extent permitted by law, Contractor must indemnify, defend, and hold harmless City, its Council, officers, officials, employees, agents, volunteers, and consultants (individually, an "Indemnitee," and collectively the "Indemnitees") from and against any and all liability, loss, damage, claims, causes of action, demands, charges, fines, costs, and expenses (including, without limitation, attorney fees, expert witness fees, paralegal fees, fees and costs of litigation or arbitration, and fees and expenses incurred in enforcing this Section) (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 in failing to comply with any obligation of Contractor under the Contract, except such Liability caused by the active negligence, sole negligence, or willful misconduct of an Indemnitee. 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 Contract will be deemed a material breach of the Contract. City will timely notify Contractor upon receipt of any third-party claim relating to the Contract, as required by Public Contract Code § 9201. Contractor waives any right to express or implied indemnity against any Indemnitee. Contractor's indemnity obligations under this Contract will survive the expiration or any early termination of the Contract.

- 4.3 Insurance.** No later than ten days following issuance of the Notice of Award, Contractor must procure and provide proof of the insurance coverage required by this Section in the form of certificates and endorsements acceptable to City. The required insurance must

cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work. The required insurance must remain in full force and effect at all times during the period covered by the Contract through the date of City's acceptance of the Project, except as specified for commercial general liability insurance in subsection (A)(1), below, which requires a longer duration. 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 "VII" or better. Each certificate of insurance must identify this Contract by the Project number and state: "The listed insurance policies include endorsements as required by contract." The City may, but has no obligation to, review insurance policies submitted by Contractor. The City's failure to demand evidence of full compliance with the insurance requirements set forth in this Contract or the City's failure to identify any insurance deficiency will not relieve Contractor from, nor be construed or deemed a waiver of, its obligation to maintain the required insurance in accordance with this Section. 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. The procurement of the required insurance, or Contractor's failure to procure and maintain the required insurance, will not be construed to limit Contractor's liability under this Contract. The procurement of the required insurance will not be construed to fulfill Contractor's indemnification obligations under this Contract.

(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 ("CGL") Insurance:*** The CGL insurance policy must be issued on an occurrence basis, written on a comprehensive general liability form with coverage at least as broad as ISO CG 00 01, and must include coverage for liability arising from Contractor's or its Subcontractor's acts or omissions in the performance of the Work, including contractor's protective coverage, contractual liability, products liability, completed operations, and broad form property damage, with limits of at least \$5,000,000 per occurrence and at least \$5,000,000 general aggregate. If insurance applies separately to a project/location, aggregate may be equal to per occurrence amount. The CGL insurance coverage 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 in this Section, including required endorsements. The products liability and completed operations coverage must continue for a period of three years following City's acceptance of the Project.

(2) ***Automobile Liability Insurance:*** The automobile liability insurance policy must provide coverage of at least \$3,000,000 combined single-limit per accident for bodily injury, death, or property damage, including hired, owned, and non-owned auto liability. Coverage must be at least as broad as ISO Form Number CA 00 01 covering any auto (Code 1).

(3) ***Workers' Compensation Insurance and Employer's Liability:*** The workers' compensation and employer's liability insurance policy must comply with the requirements of the California Labor Code, providing coverage of at least \$1,000,000 or as otherwise required by statute, per accident for bodily injury or disease. If Contractor is self-insured, Contractor must provide its Certificate of Permission to Self-Insure, duly authorized by the DIR.

(4) **Pollution Liability Insurance:** The pollution liability insurance policy must provide coverage of at least \$1,000,000 per occurrence and \$2,000,000 aggregate for all loss arising out of claims for bodily injury, death, property damage, or environmental damage caused by pollution conditions resulting from the Work. If the Work involves lead-based paint or asbestos identification and/or remediation, the pollution liability insurance policy must not contain lead-based paint or asbestos exclusions. If the Work involves mold identification, the pollution liability policy must not contain a mold exclusion and the definition of "pollution" in the policy must include microbial matter, including mold.

(5) **Builder's Risk Insurance:** The builder's risk insurance policy must be issued on an occurrence basis, for all-risk or "all perils" coverage on a 100% completed value basis on the insurable portion of the Project for the benefit of City, without co-insurance provisions. Contractor must name City as loss payee.

(B) **Notice.** Each certificate of insurance must state that the coverage afforded by the policy or policies will not be reduced, cancelled or allowed to expire without at least 30 days prior written notice to City, unless due to non-payment of premiums, in which case ten days prior written notice must be made to City.

(C) **Waiver of Subrogation.** Each required policy must include an endorsement providing that the carrier will waive any right of subrogation it may have against City.

(D) **Required Endorsements.** The CGL policy, automobile liability policy, pollution liability policy, and builder's risk policy must include the following specific endorsements:

(1) The City of Santa Rosa, including its Council, officials, officers, employees, agents, volunteers and consultants (collectively, "Additional Insured") must be named as an additional insured for all liability arising out of the operations by or on behalf of the named insured, and the policy must protect the Additional Insured against any and all liability for personal injury, death or property damage or destruction arising directly or indirectly in the performance of the Contract. Coverage for an Additional Insured will not be limited to the Additional Insured's vicarious liability. The additional insured endorsement must be provided using ISO forms at least as broad as CG 20 10 04 13 or 20 38 04 13 (ongoing operations) and CG 20 37 04 13 (completed operations), or equivalent form(s) approved by the City.

(2) 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.

(3) The insurance provided by Contractor is primary and no insurance held or owned by any Additional Insured may be called upon to contribute to a loss. This endorsement must be provided using ISO form CG 20 01 04 13 or an equivalent form approved by the City.

(4) This policy does not exclude explosion, collapse, underground excavation hazard, or removal of lateral support.

(E) **Contractor's Responsibilities.** This Section 4.3 establishes the minimum requirements for Contractor's insurance coverage in relation to this Project, but is not intended to limit Contractor's ability to procure additional or greater coverage. Contractor

is responsible for its own risk assessment and needs and is encouraged to consult its insurance provider to determine what coverage it may wish to carry beyond the minimum requirements of this Section. Contractor is solely responsible for the cost of its insurance coverage, including premium payments, deductibles, or self-insured retentions, and no Additional Insured will be responsible or liable for any of the cost of Contractor's insurance coverage. Contractor's insurance coverage applies to the full extent of the policies, and nothing contained herein will be construed to limit the application of such coverage.

(F) **Deductibles and Self-Insured Retentions.** Any deductibles or self-insured retentions that apply to the required insurance (collectively, "deductibles") in excess of \$10,000 are subject to approval by the City's Risk Manager, acting in his or her sole discretion, and must be declared by Contractor when it submits its certificates of insurance and endorsements pursuant to this Section 4.3. If the City's Risk Manager determines that the deductibles are unacceptably high, at City's option, Contractor must either reduce or eliminate the deductibles as they apply to City and all required Additional Insured; or must provide a financial guarantee, to City's satisfaction, guaranteeing payment of losses and related investigation, claim administration, and legal expenses.

(G) **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, but excluding pollution liability or builder's risk insurance unless otherwise specified in the Special Conditions. A Subcontractor may be eligible for reduced insurance coverage or limits, but only to the extent approved in writing in advance by the City's Risk Manager. Contractor must confirm that each Subcontractor has complied with these insurance requirements before the Subcontractor is permitted to begin Work on the Project. Upon request by the City, Contractor must provide certificates and endorsements submitted by each Subcontractor to prove compliance with this requirement. The insurance requirements for Subcontractors do not replace or limit the Contractor's insurance obligations.

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. Contractor may not begin performing the Work before the date specified in the Notice to Proceed.

(B) **Authorization.** Contractor is not entitled to compensation or credit for any Work performed before the date specified in the Notice to Proceed, with the exception of any schedules, submittals, or other requirements, if any, that must be provided or performed before issuance of the Notice to Proceed.

(C) **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. Contractor will diligently prosecute the Work to minimize the public's exposure to construction activities. 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. Contractor must prepare all schedules using standard, commercial scheduling software acceptable to the Engineer, and must provide the schedules in electronic and paper form as requested by the Engineer. Contractor must provide the Engineer with a license for use of Contractor's scheduling software, unless otherwise specified by the Engineer. In addition to the general scheduling requirements set forth below, Contractor must also comply with any scheduling requirements included in the Special Conditions or in the Technical Specifications.

(A) **Baseline (As-Planned) Schedule.** Within ten calendar days following City's issuance of the Notice to Proceed (or as otherwise specified in the Notice to Proceed), Contractor must submit to City for review and acceptance a baseline (as-planned) schedule using critical path methodology showing in detail how Contractor plans to perform and fully complete the Work within the Contract Time, including labor, equipment, materials, and fabricated items. The baseline schedule must show the order of the major items of Work and the dates of start and completion of each item, including when the materials and equipment will be procured. The schedule must also include the work of all trades, reflecting anticipated labor or crew hours and equipment loading for the construction activities, and must be sufficiently comprehensive and detailed to enable progress to be monitored on a day-by-day basis. For each activity, the baseline 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 of the activity, and the duration of the activity.

(1) **Specialized Materials Ordering.** Within five calendar days following issuance of the Notice to Proceed, Contractor must order any specialized material or equipment for the Work that is not readily available from material suppliers. Contractor must also retain documentation of the purchase order date(s).

(2) **High Dollar or Long Duration Projects.** In addition to the requirements set forth above, if the Contract Price is \$5,000,000 or more or if the Contract Time is 100 Working Days or more, Contractor's baseline (as-planned) schedule must include the following: the start and completion dates for submittal development, submittal review, milestones and constraints, equipment and plant setup, interfaces with outside entities, erection and removal of falsework and shoring, test periods, major traffic stage change, and final cleanup; logical links between time-scaled Work activities; controlling activities; at least 50 but no more than 500 activities, unless otherwise specified or authorized by the Engineer; alphanumeric activity identification and activity description system for labeling Work activities; identification code for each activity for responsibility, stage, Work shifts, location, and bid items; activity durations of at least one Working Day and no more than 20 Working Days for each activity, unless otherwise authorized by the Engineer; and float as the predecessor activity to Final Completion. Each activity description must indicate its associated scope or location of Work.

(B) **City's Review of Schedules.** City will review and may note exceptions to the baseline schedule, and to the progress schedules submitted as required below, to assure completion of the Work within the Contract Time. Contractor is solely responsible for

resolving any exceptions noted in a schedule and, within seven days, must correct the schedule to address the exceptions. City's review or acceptance of Contractor's schedules will not operate to waive or limit Contractor's duty to complete the Project within the Contract Time, nor to waive or limit City's right to assess liquidated damages for Contractor's unexcused failure to do so.

(C) **Progress Schedules.** After City accepts the final baseline schedule with no exceptions, Contractor must submit an updated progress schedule and three-week look-ahead schedule, in the format specified by City, for review and acceptance with each application for a progress payment, or when otherwise specified by City, until completion of the Work. The updated progress schedule must: show how the actual progress of the Work as constructed to date compares to the baseline schedule; reflect any proposed changes in the construction schedule or method of operations, including to achieve Project milestones within the Contract Time; and identify any actual or potential impacts to the critical path. Contractor must also submit periodic reports to City of any changes in the projected material or equipment delivery dates for the Project.

(1) *Float.* The progress schedule must show early and late completion dates for each task. The number of days between those dates will be designated as the "float." Any float belongs to the Project and may be allocated by the Engineer to best serve timely completion of the Project.

(2) *Failure to Submit Schedule.* Reliable, up-to-date schedules are essential to efficient and cost-effective administration of the Project and timely completion. If Contractor fails to submit a schedule within the time periods specified in this Section or submits a schedule to which City has noted exceptions that are not corrected, City may withhold up to five percent from payment(s) otherwise due to Contractor until the exceptions are resolved, the schedule is corrected and resubmitted, and City has accepted the schedule. In addition, Contractor's failure to comply with the schedule requirements in this Section 5.2 will be deemed a material default and a waiver of any claims for Excusable Delay or loss of productivity arising during any period when Contractor is out of compliance, subject only to the limits of Public Contract Code § 7102.

(D) **Recovery Schedule.** If City determines that the Work is more than one week behind schedule, within seven 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.

(E) **Effect of Acceptance.** Contractor and its Subcontractors must perform the Work in accordance with the most current City-accepted schedule unless otherwise directed or approved by City. If Contractor wants to perform non-critical Work activities that are out of sequence with the current City-accepted schedule, Contractor must notify and request approval from the Engineer in advance of performance of any such activities. Performance of any such Work must not impact the critical path Work activities. City's acceptance 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.

(F) **Posting.** Contractor must at all times prominently post a copy of the most current City-accepted progress or recovery schedule in its on-site office.

(G) **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, to facilitate City's use of its property, or to minimize the public's exposure to construction activities. 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.

(H) **Authorized Working Days and Times.** Contractor is limited to working Monday through Friday, excluding holidays observed by City, with noise generating activities limited to 7:00 a.m. to 7:00 p.m. and vehicular traffic impacts limited to 8:30 a.m. to 4:30 p.m., except as 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 the Contract Documents, including reimbursement of costs incurred for inspection, testing, and construction management services.

5.3 Delay and Extensions of Contract Time.

(A) **Notice of Delay.** If Contractor becomes aware of any actual or potential delay affecting the critical path, Contractor must promptly notify the Engineer in writing, regardless of the nature or cause of the delay, so that City has a reasonable opportunity to mitigate or avoid the delay.

(B) **Excusable Delay.** The Contract Time may be extended if Contractor encounters "Excusable Delay," which is 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 reasonable care, planning, foresight, or diligence, provided that Contractor is otherwise fully performing its obligations under the Contract Documents. Grounds for Excusable Delay may include fire, natural disasters including earthquake or unusually severe weather, acts of terror or vandalism, epidemic, unforeseeable adverse government actions, unforeseeable actions of third parties, encountering unforeseeable hazardous materials, unforeseeable site conditions, or suspension for convenience under Article 13. The Contract Time will not be extended based on circumstances which will not unavoidably delay completing the Work within the Contract Time based on critical path analysis.

(C) **Weather Delays.** A "Weather Delay Day" is a Working Day during which Contractor and its forces, including Subcontractors, are unable to perform more than 40% of the critical path Work scheduled for that day due to adverse weather conditions which impair the ability to safely or effectively perform the scheduled critical path Work that day. Adverse weather conditions may include rain, saturated soil, and Project site clean-up required due to adverse weather. Determination of what constitutes critical path Work scheduled for that day will be based on the most current, City-accepted schedule. Contractor will be entitled to a non-compensable extension of the Contract Time for each Weather Delay Day.

(1) Contractor must fully comply with the applicable procedures in Articles 5 and 6 of the General Conditions regarding requests to modify the Contract Time.

(2) Contractor will not be entitled to an extension of time for a Weather Delay Day to the extent Contractor is responsible for concurrent delay on that day.

(3) Contractor must take reasonable steps to mitigate the consequences of Weather Delay Days, including prudent workforce management and protecting the Work, Project Site, materials, and equipment.

(D) **Non-Excusable Delay.** Delay which Contractor could have avoided or mitigated through reasonable care, planning, foresight, or diligence is "Non-Excusable Delay." Contractor is not entitled to an extension of Contract Time or any compensation for Non-Excusable Delay, or for Excusable Delay that is concurrent with Non-Excusable Delay. Non-Excusable Delay includes delay caused by:

- (1) Contractor's failure to order equipment and materials sufficiently in advance of the time needed for completion of the Work within the Contract Time;
- (2) Contractor's failure to provide adequate notification to utility companies or agencies for connections or services necessary for completion of the Work within the Contract Time;
- (3) foreseeable conditions which Contractor could have ascertained from reasonably diligent inspection of the Project site or review of the Contract Documents or other information provided or available to Contractor;
- (4) Contractor's failure, refusal, or financial inability to perform the Work within the Contract Time, including insufficient funds to pay its Subcontractors or suppliers;
- (5) performance or non-performance by Contractor's Subcontractors or suppliers;
- (6) the time required to respond to excessive RFIs (see Section 2.5(G));
- (7) delayed submission of required submittals, or the time required for correction and resubmission of defective submittals;
- (8) time required for repair of, re-testing, or re-inspection of defective Work;
- (9) enforcement of Laws by City, or outside agencies with jurisdiction over the Work; or
- (10) City's exercise or enforcement of any of its rights or Contractor's duties pursuant to the Contract Documents, including correction of defective Work, extra inspections or testing due to non-compliance with Contract requirements, safety compliance, environmental compliance, or rejection and return of defective or deficient submittals.

(E) **Compensable Delay.** Pursuant to Public Contract Code § 7102, in addition to entitlement to an extension of Contract Time, Contractor is entitled to compensation for costs incurred due to delay caused solely by City, when that delay is unreasonable under the circumstances involved and not within the contemplation of the parties ("Compensable Delay"). Contractor is not entitled to an extension of Contract Time or recovery of costs for Compensable Delay that is concurrent with Non-Excusable Delay. Delay due to Weather Delay Days as set forth in Section 5.3(C), is not Compensable Delay, and will only entitle Contractor to an extension of time commensurate with the time lost due to such delay.

(F) **Recoverable Costs.** Contractor is not entitled to compensation for Excusable Delay unless it is Compensable Delay, as defined above. Contractor is entitled to recover only the actual, direct, reasonable, and substantiated costs ("Recoverable Costs") for each working day that the Compensable Delay prevents Contractor from proceeding with more than 50% of the critical path Work scheduled for that day, based on the most recent progress schedule accepted by City. Recoverable Costs will not include home office overhead or lost profit.

(G) **Request for Extension of Contract Time or Recoverable Costs.** A request for an extension of Contract Time or any associated Recoverable Costs must be submitted in writing to City within 14 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 any entitlement to the Contract Time extension or to the Recoverable Costs 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 consequences of delay 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 Contract Time or Recoverable Costs that does not strictly comply with all of 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, such as by workforce management or by a change in sequencing. 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. If Contractor believes it is entitled to Recoverable Costs for Compensable Delay, the request must specify the amount and basis for the Recoverable 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. The maximum extension of Contract Time will be the number of days, if any, by which an Excusable Delay or a Compensable Delay exceeds any concurrent Non-Excusable Delay. Contractor is entitled to an extension of Contract Time, or compensation for Recoverable Costs, only if, and only to the extent that, such delay will unavoidably delay Final Completion.

(3) **Supporting Documentation.** The request must also include any and all supporting documentation necessary to evidence the delay and its actual impacts, including scheduling and cost impacts with a time impact analysis using critical path methodology and demonstrating the 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 that: the delay was an Excusable Delay or Compensable Delay, as defined above; Contractor has fully complied with its scheduling obligations in Section 5.2, Schedule Requirements; Contractor has made reasonable efforts to mitigate the delay and its schedule and cost impacts; the delay will unavoidably result in delaying Final Completion;

and any Recoverable Costs claimed by Contractor were actually incurred and were reasonable under the circumstances.

(5) **Legal Compliance.** Nothing in this Section 5.3 is intended to require the waiver, alteration, or limitation of the applicability of Public Contract Code § 7102.

(6) **No Waiver.** Any grant of an extension of Contract Time, or compensation for Recoverable Costs due to Compensable Delay, will not operate as a waiver of City's right to assess liquidated damages for Non-Excusable Delay.

(7) **Dispute Resolution.** In the event of a dispute over entitlement to an extension of Contract Time or compensation for Recoverable Costs, Contractor may not stop 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. Contractor's sole recourse for an unresolved dispute based on City's rejection of a Change Order request for an extension of Contract Time or compensation for Recoverable 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 from the delay that are difficult to determine and accurately specify. Pursuant to Public Contract Code § 7203, if Contractor fails to achieve Final Completion within the Contract Time due to Contractor's Non-Excusable Delay, City will charge Contractor in the amount specified in the Contract for each calendar day that Final Completion is delayed beyond the Contract Time, as liquidated damages and not as a penalty. Any waiver of accrued liquidated damages, in whole or in part, is subject to approval of the Director or authorized delegee.

(A) **Liquidated Damages.** Liquidated damages will not be assessed for any Excusable Delay or Compensable Delay, as set forth above.

(B) **Milestones.** Liquidated damages may also be separately assessed for failure to meet milestones specified elsewhere in the Contract Documents.

(C) **Setoff.** City is entitled to deduct the amount of liquidated damages assessed against any payments otherwise due to Contractor, including progress payments, Final Payment, or unreleased 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 Non-Excusable Delay in achieving Final Completion.

(E) **Other Remedies.** City's right to liquidated damages under this Section applies only to damages arising from Contractor's Non-Excusable Delay or failure to complete the Work within the Contract Time. City retains its right to pursue all other remedies under the Contract for other types of damage, including damage to property or persons, costs or diminution in value from defective materials or workmanship, costs to repair or complete the Work, or other liability caused by Contractor.

Article 6 - Contract Modification

6.1 Contract Modification. Subject to the limited exception set forth in subsection (D) below, any change in the Work or the Contract Documents, including the Contract Price or Contract Time, will not be a valid and binding change to the Contract unless it is formalized in a Change Order, including a “no-cost” Change Order or a unilateral Change Order. Changes in the Work pursuant to this Article 6 will not operate to release, limit, or abridge Contractor’s warranty obligations pursuant to Article 11 or any obligations of Contractor’s bond sureties.

(A) **City-Directed Changes.** City may direct changes in the scope or sequence of Work or the requirements of the Contract Documents, without invalidating the Contract. Such changes may include Extra Work as set forth in subsection (C) below, or deletion or modification of portions of the Work. Contractor must promptly comply with City-directed changes in the Work in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement as to adjustments to the Contract Price or Contract Time for the change in the Work or for the Extra Work. Contractor is not entitled to extra compensation for cost savings resulting from “value engineering” pursuant to Public Contract Code § 7101, except to the extent authorized in advance by City in writing, and subject to any applicable procedural requirements for submitting a proposal for value engineering cost savings.

(B) **Disputes.** 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 a City-directed change in the 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. Likewise, in the event that City and Contractor dispute whether a portion or portions of the Work are already required by the Contract Documents or constitute Extra Work, or otherwise dispute the interpretation of any portion(s) of the Contract Documents, 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, as directed by City. If Contractor refuses to perform the Work in dispute, City may, acting in its sole discretion, elect to delete the Work from the Contract and reduce the Contract Price accordingly, and self-perform the Work or direct that the Work be performed by others. Alternatively, City may elect to terminate the Contract for convenience or for cause. Contractor’s sole recourse for an unresolved dispute related to changes in the Work or performance of any Extra Work is to comply with the dispute resolution provisions set forth in Article 12, below.

(C) **Extra Work.** City may direct Contractor to perform Extra Work related to the Project. Contractor must promptly perform any Extra Work as directed or authorized by City in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement on adjustments to the Contract Price or Contract Time for such Extra Work. If Contractor believes it is necessary to perform Extra Work due to changed conditions, Contractor must notify the Engineer in writing, within one Working

Day following the date the Contractor first encounters the circumstances giving rise to Contractor's contention that Extra Work is necessary. Contractor's written notice must specifically identify the Extra Work and the reason(s) the Contractor believes it is Extra Work. This notification requirement does not constitute a Change Order request pursuant to Section 6.2, below. Contractor must maintain detailed daily records that itemize the cost of each element of Extra Work, and sufficiently distinguish the direct cost of the Extra Work from the cost of other Work performed. For each day that Contractor performs Extra Work, or Work that Contractor contends is Extra Work, Contractor must submit, by no later than close of business on that same Working Day, a daily report of the Extra Work performed that day, signed by the City and Contractor, identifying the labor, materials, and equipment used in the Extra Work ("Extra Work Report"). The Engineer may make any adjustments to Contractor's Extra Work Report(s) based on the Engineer's records of the Work. The Extra Work Report enables the parties to document and track the Extra Work, or Work that the Contractor contends is Extra Work. City's signature on the Extra Work Report is intended solely to document City's receipt of the Extra Work Report; it does not constitute any acknowledgement, acceptance, or approval of the Extra Work by City. To request compensation for Extra Work, Contractor must comply with the requirements in Section 6.2, below, including submission of the Extra Work Reports and a breakdown of the costs related to the Extra Work, together with copies of certified payroll, invoices, and other documentation substantiating the costs. Failure to submit the Extra Work Report by close of business on the same Working Day as the Extra Work is deemed a full and complete waiver for any change in the Contract Price or Contract Time for any Extra Work performed that day.

(D) **Minor Changes and RFIs.** Minor field changes, including RFI replies from City, that do not affect the Contract Price or Contract Time and that are approved by the Engineer acting within his or her scope of authority, do not require a Change Order. By executing an RFI reply from City, Contractor agrees that it will perform the Work as clarified therein, with no change to the Contract Price or Contract Time.

(E) **Remedy for Non-Compliance.** Contractor's failure to promptly comply with a 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.

6.2 Contractor Change Order Requests. Contractor must submit a request or proposal for a change in the Work, compensation for Extra 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 or the Contract Time must be submitted in writing to the Engineer within 14 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. If City requests that Contractor propose the terms of a Change Order, unless otherwise specified in City's request, Contractor must provide the Engineer with a written proposal for the change in the Contract Price or Contract Time within five working days of receiving City's request, in a form satisfactory to the Engineer.

(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, subcontract amounts,

and, if applicable, Extra Work Reports. 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. Upon request, Contractor must permit City to inspect its original and unaltered bidding records, subcontract agreements, subcontract change orders, purchase orders, invoices, or receipts associated with the claimed costs.

(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 as to the Work or changes referenced herein, and agrees that any known or foreseeable costs, expenses, or time extension requests not included herein, are deemed waived."

6.3 Adjustments to Contract Price. The amount of any increase or decrease in the Contract Price will be determined based on one of the following methods listed below, in the order listed with unit pricing taking precedence over the other methods. Markup applies only to City-authorized time and material Work and does not apply to any other payments to Contractor. For Work items or components that are deleted in their entirety, Contractor will only be entitled to compensation for those direct, actual, and documented costs (including restocking fees), reasonably incurred before Contractor was notified of the City's intent to delete the Work, with no markup for overhead, profit, or other indirect costs.

(A) **Unit Pricing.** Amounts previously provided by Contractor in the form of unit prices, either in a bid schedule or in a post-award schedule of values pursuant to Section 8.1, Schedule of Values, will apply to determine the price for the affected Work, to the extent applicable unit prices have been provided for that type of Work. No additional markup for overhead, profit, or other indirect costs will be added to the calculation.

(B) **Lump Sum.** A mutually agreed upon, all-inclusive lump sum price for the affected Work with no additional markup for overhead, profit, or other indirect costs.

(C) **Time and Materials.** On a time and materials basis, if and only to the extent compensation on a time and materials basis is expressly authorized by City in advance of Contractor's performance of the Work and subject to any not-to-exceed limit. Time and materials compensation for increased costs or Extra Work (but not decreased costs or deleted Work) will include allowed markup for overhead, profit, and other indirect costs, calculated as the total of the following sums, the cumulative total of which may not exceed the maximum markup rate of 15% (excluding bond or insurance premium markup):

(1) All direct labor costs provided by the Contractor, excluding superintendence, project management, or administrative costs, plus 15% markup;

- (2) All direct material costs provided by the Contractor, including sales tax, plus 15% markup;
- (3) All direct plant and equipment rental costs provided by the Contractor, plus 15% markup;
- (4) All actual direct labor, material, and equipment costs for Work performed by Subcontractors, plus markup on those costs not to exceed 10% of the cumulative total of those actual direct costs, regardless of the number of subcontract tiers; and
- (5) Increased bond and insurance premium costs computed at 1.5% of the total of the previous four sums.

- 6.4 Unilateral Change Order.** If the parties dispute the terms of a proposed Change Order, including disputes over the amount of compensation or extension of time that Contractor has requested, the value of deleted or changed Work, what constitutes Extra Work, or quantities used, 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 for the adjustment to compensation or time that the 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 fully comply with the provisions of this Article. Contractor will not be paid for unauthorized Extra Work.
- 6.6 Post-Bid Cost Increases.** The City is not responsible for any post-bid cost increases that were foreseeable at the time of the bid based on generally available information (e.g., scheduled tariffs), or that arose due to Contractor's failure to timely procure materials or equipment.

Article 7 - General Construction Provisions

7.1 Permits, Fees, Licenses, Certificates, and Taxes.

(A) **Fees, Licenses, Certificates, and Permits.** Contractor must obtain and pay for all fees, licenses, and certificates required to perform the Work, including a City business tax certificate. Contractor must obtain all permits required to perform the Work. Contractor is not responsible for the fees associated with obtaining permits unless otherwise specified in the Special Conditions or Specifications. Contractor must cooperate with and provide notifications to all government agencies with jurisdiction over the Project, as may be required. Contractor must provide City with copies of all records of permits and permit applications, payment of required fees, and any licenses and certificates required for the Work.

(B) **Taxes.** 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 for the Project, including an onsite staging area for materials and equipment, a field office, sanitary facilities, utilities, storage, scaffolds, barricades, walkways, and any other temporary structure required to safely perform the Work along

with any incidental utility services. The location of all temporary facilities must be approved by the City prior to installation. Temporary facilities must be safe and adequate for the intended use and installed and maintained in accordance with Laws and the Contract Documents. Contractor must fence and screen the Project site and, if applicable, any separate Worksites, including the staging area, and its operation must minimize inconvenience to neighboring properties. Additional provisions pertaining to temporary facilities are set forth in this Article 7 and may also be included in the Specifications or Special Conditions.

(A) **Utilities.** Contractor must install and maintain the power, water, sewer, and all other utilities required for the Project site and performance of the Work, including the piping, wiring, internet and Wi-Fi connections, and any related equipment necessary to maintain the temporary facilities. Contractor may obtain water from the City's water system or from a source other than City's water system, if approved in advance by the Engineer. Before obtaining water from the City's water system, Contractor must obtain a Water Use Permit from the Water Department and rent a hydrant or bridge meter. Contractor is responsible for the cost of all water and all related deposits, permits, and fees. Contractor is prohibited from operating gate valves or fire hydrants on the City's water system. The acquisition of water from the City's water system through un-metered hydrants or other facilities is a violation of Laws. Citations and fines may be levied for violation of these and other utility regulations and may be deducted from payment otherwise due Contractor.

(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 or to other property caused by the installation, use, or removal of the temporary facilities, and must promptly restore the property to its original or intended condition.

7.3 Noninterference and Site Management. Contractor must 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. Contractor must also minimize disruption of access to private property in the Project vicinity. Contractor must coordinate with affected property owners, tenants, and businesses, and maintain some vehicle and pedestrian access to their residences or properties at all times. Temporary access ramps, fencing or other measures must be provided as needed. Before blocking access to a private driveway or parking lot, Contractor must provide effective notice to the affected parties at least 48 hours in advance of the pending closure and allow them to remove vehicles. Private driveways, residences and parking lots must have access to a roadway during non-Work hours. Property owners, tenants, and businesses must have full access to their driveways during non-Work hours. The Engineer may, at any time, direct or approve of opening completed sections of surfacing, pavement, or structure roadway surface for public use.

(A) **Offsite Acquisition.** Unless otherwise provided by City, Contractor must acquire, use, and dispose of, at its sole expense, any Worksites, licenses, easements, and temporary facilities necessary to access and perform the Work.

(B) **Offsite Staging Area and Field Office.** If additional space beyond the Project site is needed, such as for the staging area or the field office, Contractor may need to make arrangements with the nearby property owner(s) to secure the space and obtain a temporary use permit, in accordance with City Code § 20-52.040. Before using or occupying any property owned by a third party, Contractor must provide City with a copy of the necessary license agreement, easement, or other written authorization from the

property owner, together with a written release from the property owner holding City harmless from any related liability, in a form acceptable to the City Attorney.

(C) **Traffic Management.** Contractor must provide traffic management and traffic controls as specified in the Contract Documents, as required by Laws, and as otherwise required to ensure public and worker safety, and to avoid interference with public or private operations or the normal flow of vehicular, bicycle, and pedestrian traffic.

(D) **Railroad Property.** Sonoma-Marín Area Rail Transit (“SMART”) maintains railroad property within the City. Contractor will not interfere with railroad operations or perform Work on or adjacent to railroad property unless Contractor has obtained an encroachment permit from SMART. Contractor is responsible for obtaining an encroachment permit from SMART if necessary for the Work or for Contractor’s traffic control. Contractor will not be entitled to an extension of time or additional compensation to obtain the SMART permit. For any excavation on or affecting railroad property, Contractor must submit Work plans to the City and SMART, if requested by SMART, showing the system to be used to protect the railroad facilities. Contractor will prevent material, equipment, and debris from falling onto railroad property.

(E) **Third Party Material Sourcing and Disposal.** If Contractor intends to procure materials from or dispose of materials on any property owned by a third party, before procuring material or disposing of material, Contractor must provide City with a copy of the agreement between Contractor and the third party authorizing the use of the property and absolving the City from responsibility in connection with the property. Contractor must obtain authorization from the third party to start sourcing or disposing of material on the property. As a condition precedent to Final Completion, Contractor must submit a document to the City, signed by the third party property owner, stating that the Contractor complied with its agreement with the third party.

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

7.5 Project Site and Nearby Property Protections.

(A) **General.** Contractor is responsible at all times, on a 24-hour basis and at its sole cost, for protecting the Work, the Project site, and the materials and equipment to be incorporated into the Work, until the City has accepted the Project, excluding any exceptions to acceptance, if any. Except as specifically authorized by City, Contractor must confine its operations to the area of the Project site indicated in the Plans and Specifications. Contractor is liable for any damage caused by Contractor or its Subcontractors to the Work, City’s property, the property of adjacent or nearby property owners and the work or personal property of other contractors working for City, including damage related to Contractor’s failure to adequately secure the Work or any Worksite.

(1) Subject to City’s approval, Contractor will provide and install safeguards to protect the Work; any Worksite, including the Project site; City’s real or personal property and the real or personal property of adjacent or nearby property owners, including plant and tree protections.

(2) City wastewater systems may not be interrupted. If the Work disrupts existing sewer facilities, Contractor must immediately notify City and establish a plan, subject to City’s approval, to convey the sewage in closed conduits back into the

sanitary sewer system. Sewage must not be permitted to flow in trenches or be covered by backfill.

(3) Contractor must remove with due care, and store at City's request, any objects or material from the Project site that City will salvage or reuse at another location.

(4) If directed by Engineer, Contractor must promptly repair or replace any property damage, as specified by the Engineer. However, acting in its sole discretion, City may elect to have the property damage remedied otherwise, and may deduct the cost to repair or replace the damaged property from payment otherwise due to Contractor.

(5) Contractor will not permit any structure or infrastructure to be loaded in a manner that will damage or endanger the integrity of the structure or infrastructure.

(6) All valves, hydrants, and other appurtenances of the City's water system that are the property of City and removed by Contractor in the performance of the Work must be delivered to City's Municipal Services Center (55 Stony Point Road) as a condition precedent to Final Completion, unless Contractor has obtained specific written approval from the Water Department to dispose of the items.

(B) **Securing Project Site.** After completion of Work each day, Contractor must secure the Project site and, to the extent feasible, make the area reasonably accessible to the public unless City approves otherwise. All excess materials and equipment not protected by approved traffic control devices must be relocated to the staging area or demobilized. Trench spoils must be hauled off the Project site daily and open excavations must be protected with steel plates. Contractor and Subcontractor personnel may not occupy or use the Project site for any purpose during non-Work hours, except as may be provided in the Contract Documents or pursuant to prior written authorization from City.

(C) **Unforeseen Conditions.** If Contractor encounters facilities, utilities, or other unknown conditions not shown on or reasonably inferable from the Plans or apparent from inspection of the Project site, Contractor must immediately notify the City and promptly submit a Request for Information to obtain further directions from the Engineer. Contractor must avoid taking any action which could cause damage to the facilities or utilities pending further direction from the Engineer. The Engineer's written response will be final and binding on Contractor. If the Engineer'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.

(D) **Support; Adjacent Properties.** Contractor must provide, install, and maintain all shoring, bracing, and underpinning 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 Laws. See also, Section 7.15, Trenching of Five Feet or More.

(E) **Notification of Property Damage.** Contractor must immediately notify the City of damage to any real or personal property resulting from Work on the Project, including damage to City's water system. Contractor must immediately provide a written report to City of any such property damage in excess of \$500 (based on estimated cost to repair or replace) within 24 hours of the occurrence. The written report must include: (1) the location and nature of the damage, and the owner of the property, if known; (2) the name

and address of each employee of Contractor or any Subcontractor involved in the damage; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with another government agency, Contractor will provide a copy of the report to City.

(F) **Damage to City's Water System.** Contractor must promptly repair and remediate, at its sole expense, any damage caused by Contractor to the City's water system, in a manner satisfactory to the Water Department. This includes damage to property and facilities resulting from Contractor's failure to make a written request for a markout or starting Work without providing the Water Department a reasonable opportunity to mark facilities; Contractor's destruction of markouts; Contractor's failure to perform hand digging or probing for utilities near markouts; and Contractor's failure to use reasonable caution, regardless of whether markouts are present or clear. Reasonable caution includes any efforts to avoid damaging existing facilities, such as when excavating in the vicinity of water mains. All repairs must be witnessed, inspected, and approved by the Water Department prior to backfilling the excavation. If backfilling occurs prior to inspection and approval, City may require re-excavation by Contractor, at Contractor's sole expense. Acting in its sole discretion, City may elect to have the damage remedied otherwise, including by its own forces, and may deduct the cost thereof from payment otherwise due to Contractor. If City elects to remedy damage to the water system with its own forces, the cost thereof will be in accordance with the emergency repair rate schedule of the Water Department.

7.6 Materials and Equipment.

(A) **General.** Unless otherwise specified, all materials and equipment required for the Work must be new, free from defects, and of the best grade for the intended purpose, and furnished in sufficient quantities to ensure the proper and expeditious performance of the Work. All materials, equipment, and tools furnished or installed by Contractor must meet or exceed applicable Occupational Safety and Health Administration ("OSHA") standards. Contractor must employ measures to preserve the specified quality and fitness of the materials and equipment. 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 recommendations or instructions. Contractor is responsible for timely procurement of materials and equipment to avoid delay in Project completion and to avoid incurring additional costs due to known market volatility (e.g., scheduled tariffs). Contractor is responsible for all shipping, handling, and storage costs associated with the materials and equipment required for the Work. Contractor is responsible for providing security and protecting the Work and all of the required materials, supplies, tools and equipment at Contractor's sole cost until City has formally accepted the Project as set forth in Section 11.1, Final Completion. Contractor will not assign, sell, mortgage, or hypothecate any materials or equipment for the Project, or remove any materials or equipment that have been installed or delivered.

(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 in accordance with the Contract Documents. Contractor must notify City of any defects discovered in City-provided materials or equipment, sufficiently in advance of scheduled use or installation to afford adequate time to procure replacement materials or equipment as needed. 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 or license required for use of patented or copyright-protected materials, equipment, devices, or processes that are incorporated into the Work. Upon request, Contractor must provide proof of any such authorization or license to City. Contractor's indemnity obligations in Article 4 apply to any claimed violation of intellectual property rights.

(D) **Equipment Labeling and Information.** Contractor must label each piece of equipment, except hand tools, with the following information, at a clearly visible location on each piece of equipment using a stencil or stamp: an identifying number; and for compacting equipment, its make, model number, and empty gross weight that is either the manufacturer's rated weight or the scale weight, or for meters and on the load-receiving element and indicators of each scale, the make, model, serial number, and manufacturer's rated capacity. Upon request, Contractor must submit the manufacturer's information that designates portable vehicle scale capacities.

(E) **Measuring Devices.** For proportioning materials, Contractor must use measuring devices, material plant controllers, and undersupports that comply with 4 CCR § 4000 et seq. and Business and Professions Code § 12001 et seq. Measuring devices must be tested and approved under California Test 109 in the Engineer's presence by any of the following: County Sealer of Weights and Measures; Scale Service Agency; or Official of the Division of Measurement Standards. The indicator over-travel must be at least one-third of the loading travel. The indicators must be enclosed against moisture and dust. Contractor must group the measuring system dials such that the smallest increment for each indicator can be read from the location at which proportioning is controlled.

7.7 Substitutions.

(A) **"Or Equal."** Any Specification designating a material, product, or thing (collectively, "item") or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate the quality and type of item or service desired, and Contractor may request use of any equal item or service. Unless otherwise stated in the Specifications, any reference to a specific brand or trade name for an item or service that is used solely for the purpose of describing the type of item or service desired, will be deemed to be followed by the words "or equal." A substitution will only be approved if it is a true "equal" item or service in every aspect of design, function, and quality, as determined by City, including dimensions, weight, maintenance requirements, durability, fit with other elements, and schedule impacts.

(B) **Request for Substitution.** A post-award request for substitution of an item or service must be submitted in writing to the Engineer for approval at least four weeks in advance of Contractor's proposed order date and sufficiently in advance of the time needed to avoid delay of the Work. A request for substitution must contain a description of any proposed changes to the Work required to accommodate the substitution and drawings and details showing all such changes.

(C) **Substantiation.** Any available data substantiating the proposed substitute as an equal item or service must be submitted with the written request for substitution. Contractor's failure to timely provide all necessary substantiation, including any required

test results as soon as they are available, is grounds 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 at Contractor's sole cost. 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 or time associated with the substituted item or service. If the proposed substitution is rejected, Contractor must, without delay, install the item or use the service as specified by City.

(F) **Contractor's Obligations.** City's approval 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 and testing by City at all times and at all locations during construction and/or fabrication, including at any Worksite, shops, and yards. All manufacturers' application or installation instructions must be provided to the Engineer at least ten days prior to the first such application or installation. Contractor must, at all times, make the Work available for testing or inspection. City may record, including by photograph or video, all materials, equipment, and workmanship used in the Work. Neither City's inspection or testing of Work, nor its failure to do so, operate to waive or limit Contractor's duty to complete the Work in accordance with the Contract Documents.

(B) **Scheduling and Notification.** Contractor must cooperate with City in coordinating the inspections and testing. Contractor must submit samples of materials, at Contractor's expense, and schedule all tests required by the Contract Documents in time to avoid any delay to the progress of the Work. Contractor will coordinate directly with the Engineer when scheduling inspections or tests, unless otherwise specified in the Special Conditions or Specifications. Contractor must notify the Engineer no later than noon of the Working Day before any inspection or testing and must provide timely notice to the other necessary parties as specified in the Contract Documents. If Contractor schedules an inspection or test beyond regular Work hours, or on a Saturday, Sunday, or recognized City holiday, Contractor must notify the Engineer at least two Working Days in advance for approval. If approved, Contractor must reimburse City for the cost of the overtime inspection or testing. Such costs, including the City's hourly costs for required personnel, may be deducted from payments otherwise due to Contractor. Contractor will not coordinate directly with, or provide direction to, the Materials Lab.

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

- (1) Contractor will be responsible for the costs of any subsequent inspections or 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 hourly rates, for inspection time lost because the Work is not ready, or Contractor fails to appear for a scheduled inspection.

(3) If any portion of the Work that is subject to inspection or testing is covered or concealed by Contractor prior to the inspection or testing, Contractor will bear the cost of making that portion of the Work available for the inspection or testing required by the Contract Documents, and any associated repair or remediation costs.

(4) Contractor is responsible for properly shoring all compaction test sites deeper than five feet below grade, as required under Section 7.15 below.

(5) Any Work or material that is defective or fails to comply with the requirements of the Contract Documents must be promptly repaired, removed, replaced, or corrected by Contractor, at Contractor's sole expense, even if that Work or material was previously inspected or included in a progress payment.

(D) **Contractor's Obligations.** Contractor is solely responsible for any delay occasioned by remediation of defective or noncompliant Work or material. Inspection or testing of the Work does not in any way relieve Contractor of its obligations to perform the Work as specified. Contractor has an independent duty to test and inspect its Work and perform quality control activities to ensure that the Work and the materials, products, and equipment incorporated into the Work comply with the Contract Documents. City is not responsible for any testing performed by Contractor or a third-party retained by Contractor. Contractor will submit its testing methodology to City for review and acceptance. Any Work done without the inspection(s) or testing required by the Contract Documents will be subject to rejection by City.

(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 also apply to final inspection under Article 11, Completion and Warranty Provisions.

7.9 Project Site Conditions and Maintenance. Contractor must at all times, on a 24-hour basis and at its sole cost, maintain the Project site and staging and storage areas in clean, neat, and sanitary condition and in compliance with all Laws pertaining to safety, air quality, and dust control. Adequate toilets must be provided and properly maintained and serviced for all workers on the Project site, and located in a suitably secluded area, subject to City's prior approval. Contractor must also, on a daily basis and at its sole cost, remove and properly dispose of the debris and waste materials from the Project site.

(A) **Air Emissions Control.** Contractor must not discharge smoke or other air contaminants into the atmosphere in violation of any Laws. Contractor must comply with all Laws, including the California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation (13 CCR § 2449 et seq.).

(B) **Dust and Debris.** Contractor must minimize and confine dust and debris resulting from the Work. Contractor must abate dust nuisance by cleaning, sweeping, and immediately sprinkling with water excavated areas of dirt or other materials prone to cause dust, and within one hour after the Engineer notifies Contractor that an airborne nuisance exists. The Engineer may direct that Contractor provide an approved water-

spraying truck for this purpose. If water is used for dust control, Contractor will only use the minimum necessary. Contractor must take all necessary steps to keep wastewater out of streets, gutters, or storm drains. See Section 7.19, Environmental Control. If City determines that the dust control is not adequate, City may have the work done by others and deduct the cost from payment otherwise due to Contractor. Contractor will immediately remove any excess excavated material from the Project site and any dirt deposited on public streets.

(C) **Clean up.** Before discontinuing Work in an area, Contractor must clean the area and remove all debris and waste along with the construction equipment, tools, machinery, and surplus materials.

(1) Except as otherwise specified, all excess Project materials, and the materials removed from existing improvements on the Project site with no salvage value or intended reuse by City, will be Contractor's property.

(2) Hauling trucks and other vehicles leaving the Project site must be cleaned of exterior mud or dirt before traveling on City streets. Materials and loose debris must be delivered and loaded to prevent dropping materials or debris. Contractor must immediately remove spillage from hauling on any publicly traveled way. Streets affected by Work on the Project must be kept clean by street sweeping.

(D) **Disposal.** Contractor must dispose of all Project debris and waste materials in a safe and legal manner. Contractor may not burn or bury waste materials on the Project site. Contractor will not allow any dirt, refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed of onto streets, into manholes or into the storm drain system.

(E) **Completion.** At the completion of the Work, Contractor must remove from the Project site all of its equipment, tools, surplus materials, waste materials and debris, presenting a clean and neat appearance. Before demobilizing from the Project site, 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. Contractor must ensure that all parts of the construction are properly joined with the previously existing and adjacent improvements and conditions. Contractor must provide all cutting, fitting and patching needed to accomplish that requirement. Contractor must also repair or replace, in accordance with City Standards, all existing improvements that are damaged or removed during the Work, both on and off the Project site, including curbs, sidewalks, driveways, fences, gates, signs, landscaping, drainage ditches, irrigation systems, utilities, street surfaces and structures. Repairs and replacements must be at least equal to the previously existing improvements, and the condition, finish and dimensions must match the previously existing improvements. Concrete surface treatment and score marks must match adjacent existing concrete improvements. Contractor must restore to original condition all property or items that are not designated for alteration under the Contract Documents and leave each Worksite clean and ready for occupancy or use by City.

(F) **Non-Compliance.** If Contractor fails to comply with its maintenance and cleanup obligations or any City clean up order, City may, acting in its sole discretion, elect to suspend the Work until the condition(s) is corrected with no increase in the Contract Time or Contract Price, or undertake appropriate cleanup measures without further notice and deduct the cost from any amounts due or to become due to Contractor.

7.10 Instructions and Manuals. Contractor must provide to City three 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.** The instructions and manuals, along with any required guarantees, must be delivered to City for review prior to requesting final inspection pursuant to Section 11.1(A), unless otherwise specified.

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

7.11 As-built Drawings. Contractor and its Subcontractors must prepare and maintain at the Project site a detailed, complete and accurate as-built set of the Plans which will be used solely for the purpose of recording changes made in any portion of the original Plans 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. City may withhold the estimated cost for City to have the as-built drawings prepared from payments otherwise due to Contractor, 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 installed underground, in walls, floors, or otherwise concealed. Deviations from the original Plans must be shown in detail. The exact location of all main runs, whether piping, conduit, ductwork or drain lines, must be shown by dimension and elevation. The location of all buried pipelines, appurtenances, or other improvements must be represented by coordinates and by the horizontal distance from visible above-ground improvements.

(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 the Engineer for review and acceptance as a condition precedent to Final Completion and Final Payment.

7.12 Existing Utilities.

(A) **General.** The Work may be performed in developed, urban areas with existing utilities, both above and below ground, including utilities identified in the Contract Documents or in other informational documents or records. Contractor must take due care to locate identified or reasonably identifiable utilities before proceeding with trenching, excavation, or any other activity that could damage or disrupt existing utilities. This may include excavation with small equipment, potholing, or hand excavation, and, if practical, using white paint or other suitable markings to delineate the area to be excavated. Except as otherwise provided herein, Contractor will be responsible for costs resulting from damage to identified or reasonably identifiable utilities due to Contractor's negligence or failure to comply with the Contract Documents, including the requirements in this Article 7.

(B) **Unidentified Utilities.** Pursuant to Government Code § 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 utility facilities not indicated in the Plans 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 the delay was caused by City's failure to provide for removal or relocation of the utility facilities.

(C) **Alteration or Relocation of Utilities.** If Contractor wishes to alter or relocate utilities for Contractor's convenience, and not due to a conflict that requires alteration or relocation, Contractor will be solely responsible for the time and cost required for such alteration or relocation, which may not proceed except as specified by the prior written authorization of the utility owner. Any damage to utilities or improvements caused by Contractor must be repaired by Contractor at its sole expense and to the full satisfaction of the utility owner and Engineer. Contractor will not be entitled to an extension of the Contract Time in connection with any such Work.

7.13 Notice of Excavation. Contractor must comply with all applicable requirements in Government Code § 4216 et seq., which are incorporated by reference herein, including, but not limited to, the requirement to notify Underground Service Alert ("USA") of a proposed excavation and provide USA all relevant data relating to the excavation, at least two Working Days before starting any excavation Work.

7.14 Trenching and Excavations of Four Feet or More. As required by Public Contract Code § 7104, if the Work includes digging trenches or other excavations that extend deeper than four feet below the surface, the provisions in this Section apply to the Work and the Project.

(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 § 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 Laws;

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

(3) Unknown physical conditions at the Project site 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 materially differ from those indicated, apparent, or reasonably inferred from information about the Project site made available to bidders, or 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 (B) above, or the terms of a

Change Order issued by City, Contractor will not be excused from completing the Work within the Contract Time 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 Laws which pertain to the resolution of disputes between Contractor and City.

- 7.15 Trenching of Five Feet or More.** As required by Labor Code § 6705, if the Contract Price exceeds \$25,000 and the Work includes the excavation of any trench or trenches of five feet or more in depth, a detailed plan must be submitted to City 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 or if the trench is expected to exceed 20 feet, the plan must be prepared by a California 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.** Except as otherwise specified, 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. Contractor must also provide, preserve, and replace if necessary, all construction stakes required for the Project unless otherwise specified in the Special Conditions. All stakes or marks must be set by a California licensed land surveyor or a California registered civil engineer. All survey monuments that may be disturbed or destroyed during performance of the Work must be tied-out by Contractor prior to the start of Work. Contractor must also file a Pre-Construction Corner Record, prepared by a California licensed land surveyor, with the County of Sonoma Surveyor's Office, prior to the start of Work. Contractor must notify the Engineer of any discrepancies found between Contractor's staking and grading and information provided by the Contract Documents. Contractor must replace any survey monuments that are disturbed, damaged, or destroyed during the Work and must file a Post-Construction Corner Record, prepared by a licensed land surveyor as required by law, with the County of Sonoma Surveyor's Office. Upon completion, all Work must conform to the lines, elevations, and grades shown in the Plans, including any changes directed by a Change Order.
- 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 the Project Manager, upon discovery of any potential historic or archeological items, including historic or prehistoric ruins, a burial ground, 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 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, with any such assistance to be compensated as Extra Work on a time and materials basis under Article 6, Contract Modification. At City's discretion, a suspension of Work required due to discovery of

Historic or Archeological Items may be treated as Excusable Delay pursuant to Article 5, or 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 must prevent the release of any hazardous material or hazardous waste into the soil or groundwater and prevent the unlawful discharge of pollutants into City's storm drain system and watercourses as required below. Contractor and its Subcontractors must at all times in the performance of the Work comply with all Laws 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 it 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 also must comply with all other Laws governing discharge of stormwater, including applicable municipal stormwater management programs.

(C) **Pest Management.** Contractor must comply with the City-Wide Integrated Pest Management ("IPM") Policy, Policy Number 000-74, which is available at <https://www.srcity.org/DocumentCenter/View/41774/Integrated-Pest-Management-Policy-030524>. Contractor will not use pesticides or herbicides in the Work without City's prior written approval. Contractor may submit a written request for use of pesticides or herbicides to the Engineer. Contractor's written request must include the location proposed for use, the proposed date and time of application, product specifications, and all other information required by the IPM policy. City reserves the right, in its sole discretion, to approve or reject the use of pesticides or herbicides, for any reason.

7.20 Noise Control. Contractor must comply with all applicable noise control Laws. Noise control requirements apply to all equipment used for the Work or related to the Work, including trucks, transit mixers or transient equipment that may or may not be owned by Contractor.

7.21 Mined Materials. Pursuant to Public Contract Code § 20676, Contractor will not purchase any sand, gravel, or other minerals for the Work from an operation subject to the Surface Mining and Reclamation Act of 1975 (Public Resources Code § 2710 et seq.) unless Contractor certifies, under penalty of perjury, that the minerals are from a mining operation included on the AB 3098 List, which may be accessed online at: <https://www.conservation.ca.gov/smgb/Pages/AB-3098-List.aspx>.

7.22 Water Department Notification. If Contractor requires the services of the Water Department in connection with the Work, Contractor must request such services at least two Working Days in advance of the time the services are needed. If the requested services require Water Department forces for more than eight hours or an extensive number of City-provided parts, Contractor must request services at least seven calendar days in advance of the time the services are needed.

(A) **Service Shut Down.** Contractor must minimize disruption of utility service to the greatest extent practicable. Contractor must coordinate any shut down or disruption of utility service with the Engineer, Water Department, and affected utility customers. If it is necessary to shut down or disrupt utility service to any customer of the Water Department, Contractor must request the services of the Water Department an additional three Working Days in advance of the time such services are needed, for a total of five Working Days advance notification for a standard service request, to allow affected customers a minimum of three days' advance notice. If Contractor fails to keep field appointments, Contractor will be billed for scheduled Water Department crew standby time and for costs incurred by the Water Department for re-notification of customers.

(B) **Water Department Scheduling.** Water Department crews work a 9/80 schedule. This schedule may prohibit shutdowns for tie-ins on alternating Fridays. After-hours work or weekend work may be performed if authorized in advance by the Engineer. Requests by Contractor for after-hours or weekend work are to be avoided when possible. Contractor will be responsible for any overtime costs incurred by City for such work and the cost thereof may be deducted from payment otherwise due Contractor.

7.23 Public Safety and Traffic Control. Contractor must undertake all required and appropriate measures to ensure public safety during construction of the Project, in accordance with Laws, including, but not limited to, the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101 et seq.). Contractor will ensure the safe passage of pedestrians around the Project site at all times. If Work is within a City-owned right-of-way, Contractor will ensure the safe passage of public traffic through the Project site at all times, consistent with the requirements of City Code Chapter 13-04. Contractor is solely responsible for the costs of all public safety and traffic control measures.

(A) **Warning Devices.** Contractor must furnish, install, and maintain, at its sole expense, all fences, barricades, signs, lights, and other devices necessary to prevent accidents, injuries, death, and property damage. All such devices must conform to the requirements of the current edition of the California Manual on Uniform Traffic Control Devices ("CA MUTCD") and the directions of the Engineer. Contractor's warning and safety devices will not obscure the visibility of or conflict with existing signs and traffic control devices. Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic, as directed by the Engineer.

(B) **Flaggers.** Contractor must also furnish, at Contractor's sole expense, trained flaggers as necessary to provide adequate warning to the public of construction conditions that may impact pedestrian or vehicular traffic.

(C) **Project Signage.** Unless otherwise specified in the Special Conditions, Contractor must install and maintain Project identification signs at each boundary of the Project site or as directed by the Engineer. Contractor must install the signs two weeks prior to the start of Work at the Project site, using sign panels furnished by City. To mount sign panels, Contractor must furnish and install 4" X 4" posts or mount by other appropriate methods as approved by the Engineer. Upon completion of the Project, Contractor will remove Project identification signs, in a timely manner, and return the City-furnished sign panels to the City Corporation Yard at 55 Stony Point Road.

(D) **Road Closure Signage.** If the Work requires road closures, Contractor must furnish and install advance notice signs for road closures at each boundary of the Project site. Panel construction and lettering are subject to advance approval of the Engineer. Contractor must install the signs two weeks prior to the start of Work at the Project site.

The signs must remain in place for the duration of the road closure and must be removed by Contractor when no longer necessary for the Work.

(E) **Emergency Response Agencies.** Contractor is responsible for notifying emergency response agencies operating in the jurisdiction of the Worksite(s) of obstructions to roads resulting from Contractor's Work.

(F) **Additional Devices.** City reserves the right to require additional warning or safety devices for the Project at the Contractor's sole expense, but no actions by City to add to or improve signage or any other public safety requirements will waive or limit Contractor's duties under the Contract Documents.

(G) **Compliance.** If Contractor fails or refuses to comply with the requirements of this Section, the Engineer may take immediate action to protect the public, including, but not limited to, furnishing the required safety measures at Contractor's expense or suspending the Work, in addition to all other remedies available to City. Any such remedial costs incurred by City may be deducted from payment otherwise due to Contractor as specified in Section 8.3, Adjustment of Payment Application. If there are insufficient Contract funds remaining to cover the remedial costs, City is entitled to recover the balance from Contractor or its performance bond surety.

Article 8 - Payment

8.1 Schedule of Values. Prior to submitting its first application for payment, Contractor must prepare and submit to the Project Manager a schedule of values apportioned to the various divisions and phases of the Work, including mobilization and demobilization. If a Bid Schedule was submitted with Contractor's bid, the amounts in the schedule of values must be consistent with the Bid Schedule. 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.

(A) **Measurements for Unit Price Work.** Materials and items of Work to be paid for on the basis of unit pricing will be measured according to the methods specified in the Contract Documents.

(B) **Deleted or Reduced Work.** Contractor will not be compensated for Work that City has deleted or reduced in scope, except for any labor, material, or equipment costs for such Work that Contractor reasonably incurred before Contractor learned that the Work could be deleted or reduced. Contractor will only be compensated for those actual, direct and documented costs incurred, and will not be entitled to any mark up for overhead or lost profits.

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 the 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 Project site, as well as authorized and approved Change Orders. Each payment application must be supported by the unit prices submitted with

Contractor's Bid Schedule and/or schedule of values and any other substantiating data required by the Contract Documents.

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

8.3 Adjustment of Payment Application. City may adjust or reject the amount requested in a payment application, including application for Final Payment, in whole or in part, if the amount requested is disputed or unsubstantiated. Contractor will be notified in writing of the basis for the modification to the amount requested. City may also deduct or withhold from payment otherwise due based upon any of the circumstances and amounts listed below. Sums withheld from payment otherwise due will be released when the basis for that withholding has been remedied and no longer exists.

(A) For Contractor's unexcused failure to perform the Work as required by the Contract Documents, including correction or completion of punch list items, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(B) For loss or damage caused by Contractor or its Subcontractors arising out of or relating to performance of the Work or any failure to protect the Project site, City may deduct an amount based on the estimated cost to repair or replace. (See, e.g., Sections 7.5, 7.6, 7.9, and 7.12.)

(C) For Contractor's failure to pay its Subcontractors and suppliers when payment is due, City may withhold an amount equal to the total of past due payments and may opt to pay that amount separately via joint check pursuant to Section 8.6(B), Joint Checks.

(D) For Contractor's failure to timely correct rejected, nonconforming, or defective Work, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(E) For any unreleased stop notice, City may withhold 125% of the amount claimed.

(F) For Contractor's failure to submit any required schedule or schedule update in the manner specified or within the time specified in the Contract Documents, City may withhold an amount equal to five percent of the total amount requested until Contractor complies with its schedule submittal obligations.

(G) For Contractor's failure to maintain or submit as-built documents in the manner specified or within the time specified in the Contract Documents, City may withhold or deduct an amount based on the City's cost to prepare the as-builts.

(H) For Work performed without Shop Drawings that have been accepted by City, when accepted Shop Drawings are required before proceeding with the Work, City may deduct an amount based on the estimated cost to correct unsatisfactory Work or diminution in value.

(I) For fines, payments, or penalties assessed under the Labor Code, City may deduct from payments due to Contractor as required by Laws and as directed by the Division of Labor Standards Enforcement.

(J) For fines, charges, or penalties assessed against the City due to Contractor's acts or omissions, including violations of Laws, City may withhold or deduct such amounts from payment otherwise due to Contractor.

(K) For any other costs or charges that may be withheld or deducted from payments to Contractor, as provided in the Contract Documents, including liquidated damages, City may withhold or deduct such amounts from payment otherwise due to Contractor.

8.4 Early Occupancy. 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 of the full amount due on each progress payment (i.e., the amount due before any withholding or deductions pursuant to Section 8.3, Adjustment of Payment Application), or the percentage stated in the Notice Inviting Bids, whichever is greater, as retention to ensure full and satisfactory performance of the Work. Contractor is not entitled to any reduction in the rate of withholding at any time, nor to release of any retention before 35 days following City's recordation of the Notice of Completion, subject to the terms of Public Contract Code § 7107.

(A) **Substitution of Securities.** As provided by Public Contract Code § 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 § 22300 and will be subject to approval as to form by City's legal counsel. If City exercises its right to draw upon such securities in the event of default pursuant to section (7) of the statutory Escrow Agreement for Security Deposits in Lieu of Retention, pursuant to subdivision (g) of Public Contract Code § 22300 ("Escrow Agreement"), and if Contractor disputes that it is in default, its sole remedy is to comply with the dispute resolution procedures in Article 12 and the provisions therein. It is agreed that for purposes of this paragraph, an event of default includes City's rights pursuant to these Contract Documents to withhold or deduct sums from retention, including withholding or deduction for liquidated damages, incomplete or defective Work, stop payment notices, or back charges. It is further agreed that if any individual authorized to give or receive written notice on behalf of a party pursuant to section (10) of the Escrow Agreement are unavailable to give or receive notice on behalf of that party due to separation from employment, retirement, death, or other circumstances, the successor or delegee of the named individual is deemed to be the individual authorized to give or receive notice pursuant to section (10) of the Escrow Agreement.

(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 pursuant to Section 8.3, Adjustment of Payment Application, will be released as Final Payment to Contractor no sooner than 35 days following recordation of the notice of completion, and no later than 60 days following acceptance of the Project by the Engineer or authorized designee pursuant to Section 11.1(C), Acceptance, or, if the Project has not been accepted, no later than 60 days after the Project is otherwise considered complete pursuant to Public Contract Code § 7107(c).

8.6 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 Project site by the Subcontractor or supplier during the preceding month. Such payments must be made in

accordance with the requirements of Laws pertaining to such payments, and those of the Contract Documents and applicable subcontract or supplier contract.

(A) **Withholding for Stop Notice.** Pursuant to Civil Code § 9358, City will withhold 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, acting in its sole discretion, to issue joint checks made payable to Contractor and a Subcontractor or supplier, if City determines this is necessary to ensure fair and timely payment for a Subcontractor or supplier who has provided services or goods for the Project. 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 the City Attorney's Office. 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.

8.7 Final Payment. 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. If Contractor fails to submit a timely application for Final Payment, City reserves the right to unilaterally process and issue Final Payment without an application from Contractor in order to close out the Project. For the purposes of determining the deadline for Claim submission pursuant to Article 12, the date of Final Payment is deemed to be the date that City acts to release undisputed retention as final payment to Contractor, or otherwise provides written notice to Contractor of Final Payment or that no undisputed funds remain available for Final Payment due to offsetting withholdings or deductions pursuant to Section 8.3, Adjustment of Payment Application. 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.

8.8 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 waiver and release of all claims against City arising from or related to the portion of Work covered by those undisputed amounts subject to the limitations of Public Contract Code § 7100. Any disputed amounts may be specifically excluded from the release.

8.9 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 Laws prohibiting discrimination, including the California Fair Employment and Housing Act

(Govt. Code § 12900 et seq.), Government Code § 11135, and Labor Code §§ 1735, 1777.5, 1777.6, and 3077.5.

9.2 Labor Code Requirements.

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

(B) **Penalty.** Pursuant to Labor Code § 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 hours in any one calendar day or more than 40 hours per calendar week, except if such workers are paid overtime under Labor Code § 1815.

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

(D) **Notices.** Pursuant to Labor Code § 1771.4, Contractor is required to post all job site notices prescribed by Laws.

9.3 Prevailing Wages. Each worker performing Work under this Contract that is covered under Labor Code §§ 1720, 1720.3, or 1720.9, including cleanup at the Project site, must be paid at a rate not less than the prevailing wage as defined in §§ 1771 and 1774 of the Labor Code. The prevailing wage rates are on file with the City and available online at <http://www.dir.ca.gov/dlsr>. Contractor must post a copy of the applicable prevailing rates at the Project site.

(A) **Penalties.** Pursuant to Labor Code § 1775, Contractor and any Subcontractor will forfeit to City as a penalty up to \$200.00 for each calendar day, or portion thereof, 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 currently applicable state or federal prevailing wage rates.

9.4 Payroll Records. Contractor must comply with the provisions of Labor Code §§ 1771.4, 1776, and 1812 and all implementing regulations, which are fully incorporated by this reference, including requirements for monthly electronic submission of payroll records to the DIR.

(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; and

(2) Contractor or the Subcontractor has complied with the requirements of Labor Code §§ 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, to the Division of Labor Standards Enforcement and Division of Apprenticeship Standards of the DIR, and as further required by the Labor Code.

(C) **Enforcement.** Contractor or Subcontractor has ten days in which to comply with the requirements of Labor Code § 1776 following receipt of a written notice requesting certified copies of payroll records pursuant to Labor Code § 1776. If Contractor or Subcontractor fails to comply within the ten-day period, Contractor or Subcontractor will forfeit a penalty of \$100.00 per day, or portion thereof, 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 payments then due to Contractor.

9.5 Labor Compliance. Pursuant to Labor Code § 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the DIR.

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 at all times comply with all applicable health and safety Laws and seek to avoid injury, loss, or damage to persons or property by taking reasonable steps to protect its employees and other persons at any Worksite, materials and equipment stored on or off site, and property at or adjacent to any Worksite.

(A) **Reporting Requirements.** Contractor must immediately notify the City of any death, serious injury or illness resulting from Work on the Project. Contractor must immediately provide a written report to City of each recordable accident or injury occurring at any Worksite within 24 hours of the occurrence. The written report must include: (1) the name and address of the injured or deceased person; (2) the name and address of each employee of Contractor or of any Subcontractor involved in the incident; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. 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 Laws.

(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 Project site 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 in the Contract Documents, this Contract does not include the removal, handling, or disturbance of any asbestos or other Hazardous Materials. If Contractor encounters materials on the Project site 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 is solely responsible for complying with § 5194 of Title 8 of the California Code of Regulations, including by providing information to Contractor's employees about any hazardous chemicals to which they may be exposed in the course of the Work. A hazard communication program and other forms of warning and training about such exposure must be used. Contractor must also maintain Safety Data Sheets ("SDS") at the Project site, as required by Laws, for materials or substances used or consumed in the performance of the Work. The SDS 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 Project site and/or used in the performance of the Work. Contractor must notify the Engineer if a specified product or material cannot be used safely.
- (B) **Labeling.** Contractor must ensure proper labeling on any material brought onto the Project site 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.
- 10.4 Hazardous Condition.** Contractor is solely responsible for determining whether a hazardous condition exists or is created during the course of the Work, involving a risk of bodily harm to any person or risk of damage to any property. If a hazardous condition exists or is created, Contractor must take all precautions necessary to address the condition and ensure that the Work progresses safely under the circumstances. Hazardous conditions may result from, but are not limited to, use of specified materials or equipment, the Work location, the Project site condition, the method of construction, or the way any Work must be performed.
- 10.5 Emergencies.** In an emergency affecting the safety or protection of persons, Work, or property at or adjacent to any Worksite, Contractor must take reasonable and prompt actions to prevent damage, injury, or loss, without prior authorization from the City if, under the circumstances, there is inadequate time to seek prior authorization from the City.
- 10.6 Confined Space Operations.** If the Work requires a confined space entry, including, but not limited to, manhole or water storage tank entry, Contractor must obtain a confined space entry permit pursuant to Cal/OSHA regulations, as set forth in 8 CCR § 5156 et

seq. For any confined space entry for construction operations regulated by 8 CCR § 1502, Contractor must comply with 8 CCR § 5158. For any other confined space operations, Contractor must comply with 8 CCR § 5157. With respect to entry to any City-maintained confined space, Contractor is responsible for obtaining any available information regarding hazards and operations for any City-maintained confined spaces, pursuant to 8 CCR § 5157. The City-maintained Confined Space Entry Manual is available for viewing at the Water Department or Transportation and Public Works Department office. Contractor must immediately notify the Engineer of any previously unidentified hazards confronted or created during confined space entry.

Article 11 - Completion and Warranty Provisions

11.1 Final Completion.

(A) ***Final Inspection and Punch List.*** When the Work required by this Contract is fully performed, Contractor must provide written notification to City requesting final inspection. The Engineer will schedule the date and time for final inspection, which must include Contractor's primary representative for this Project and its superintendent. Based on that inspection, City will prepare a punch list of any items that are incomplete, missing, defective, incorrectly installed, or otherwise not compliant with the Contract Documents. The punch list to Contractor 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. The omission of any non-compliant item from a punch list will not relieve Contractor from fulfilling all requirements of the Contract Documents. Contractor's failure to complete any punch list item within the time specified in the punch list will not waive or abridge its warranty obligations for any such items that must be completed by the City or by a third party retained by the City due to Contractor's failure to timely complete any such outstanding item.

(B) ***Requirements for Final Completion.*** Final Completion will be achieved upon completion or correction of all punch list items, as verified by City's further inspection, and upon satisfaction of all other Contract requirements, including any commissioning required under the Contract Documents and submission of all final submittals, including instructions and manuals as required under Section 7.10, and complete, final as-built drawings as required under Section 7.11, all to City's satisfaction.

(C) ***Acceptance.*** The Project will be considered accepted upon the date of the Engineer's issuance of a written notice of acceptance. In order to avoid delay of Project close out, the City may elect, acting in its sole discretion, to accept the Project as complete subject to exceptions for punch list items that are not completed within the time specified in the punch list.

(D) ***Final Payment and Release of Retention.*** Final Payment and release of retention, less any sums withheld pursuant to the provisions of the Contract Documents, will not be made sooner than 35 days after recordation of the notice of completion. If Contractor fails to complete any of the punch list items within the specified time, City may withhold up to 150% of City's estimated cost to complete each of the remaining items from Final Payment and may use the withheld retention to pay for the costs to self-perform the outstanding items or to retain a third party to complete any such outstanding punch list item.

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. Contractor warrants that materials or items incorporated into the Work comply with the requirements and standards in the Contract Documents, including compliance with Laws, and that any Hazardous Materials encountered or used were handled as required by Laws. 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 year from the date of Project acceptance pursuant to Section 11.1(C) (the "Warranty Period"), except when a longer guarantee is provided by a supplier or manufacturer or is required by the Specifications or Special Conditions. If the City accepts the Project as complete subject to exceptions for incomplete punch list item(s) and the Contractor thereafter completes the punch list item(s), the completed punch list item(s) will be subject to the warranty provisions in this Section 11.2 for a one-year period that begins upon City's acceptance of the completed punch list item(s). 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 Final Completion, 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 agrees to be 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. Work performed during the Warranty Period ("Warranty Work") will be subject to the warranty provisions in this Section 11.2 for a one-year period that begins upon completion of such Warranty Work to City's satisfaction.

(F) **City's Remedies.** If Contractor or its responsible Subcontractor fails to correct defective Work within ten days following notice by City, or sooner if required by the circumstances, City may correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor must reimburse City for its costs in accordance with subsection (H), below.

(G) **Emergency Repairs.** In cases of emergency where any delay in correcting defective Work could cause harm, loss or damage, City may immediately correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor or its surety must reimburse City for its costs in accordance with subsection (H), below.

(H) **Reimbursement.** Contractor must reimburse City for its costs to repair under subsections (F) or (G), above, within 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 and its surety are 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 City incurs 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.

(A) **Non-Waiver.** Occupation or use of the Project, in whole or in part, 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 complete the Work within the Contract Time.

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 City acceptance of the Project, 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) **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.

(B) **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 § 9204 and § 20104 et seq., which are incorporated by reference herein.

(C) **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 a 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.

(D) **Informal Resolution.** Contractor will make a good faith effort to informally resolve a dispute before initiating a Claim, preferably by face-to-face meeting between authorized representatives of Contractor and City.

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 by registered or certified mail with return receipt requested and clearly identified as a "Claim" submitted pursuant to this Article 12. The Claim 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 a copy of 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 known or estimated 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 component of claimed cost. Any Claim for an extension of time or delay costs must be substantiated with a schedule analysis and narrative depicting and explaining claimed time impacts.

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

- (1) Provide a cover letter, specifically identifying the submission as a "Claim" submitted under this Article 12 and specifying the requested remedy (e.g., amount of proposed change to Contract Price and/or change to Contract Time).
- (2) Provide a summary of each Claim, including underlying facts and the basis for entitlement, and identify each specific demand at issue, including the specific Change Order request (by number and submittal date), and the date of City's rejection of that demand, in whole or in part.
- (3) Provide a detailed explanation of each issue in dispute. For multiple issues included within a single Claim or for multiple Claims submitted concurrently, separately number and identify each individual issue or Claim, and include the following for each separate issue or Claim:
 - a. A succinct statement of the matter in dispute, including Contractor's position and the basis for that position;
 - b. Identify and attach all documents that substantiate the Claim, including relevant provisions of the Contract Documents, RFIs, calculations, and schedule analysis (see subsection (A), Substantiation, above);
 - c. A chronology of relevant events; and

d. Analysis and basis for claimed changes to Contract Price, Contract Time, or any other remedy requested.

(4) Provide a summary of issues and corresponding claimed damages. If, by the time of the Claim submission deadline (below), the precise amount of the requested change in the Contract Price or Contract Time is not yet known, Contractor must provide a good faith estimate, including the basis for that estimate, and must identify the date by which it is anticipated that the Claim will be updated to provide final amounts.

(5) Include 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 submittal are true and correct. Contractor warrants that this Claim submittal is comprehensive and complete as to the matters in dispute, and agrees that any costs, expenses, or delay not included herein are deemed waived."

(C) ***Submission Deadlines.***

(1) A Claim disputing rejection of a request for a change in the Contract Time or Contract Price must be submitted within 21 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. A Claim disputing the terms of a unilateral Change Order must be submitted within 21 days following the date of issuance of the unilateral Change Order. These Claim deadlines apply even if Contractor cannot yet quantify the total amount of any requested change in the Contract Time or Contract Price. If the Contractor cannot quantify those amounts, it must submit an estimate of the amounts claimed pending final determination of the requested remedy by Contractor.

(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 21 days of the effective date of Final Payment, under Section 8.7, Final Payment.

(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 45 days of receipt of the Claim with a written statement identifying which portion(s) of the Claim are disputed, unless the 45-day period is extended by mutual agreement of City and Contractor or as otherwise allowed under Public Contract Code § 9204. For a Claim subject to Public Contract Code § 20104 et seq., if City determines that the Claim is not adequately substantiated pursuant to Section 12.2(A), Substantiation, City may first request in writing, within 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 the Claim.

(A) **Duty to Update Estimated Amounts.** If Contractor's Claim is based on estimated amounts, Contractor has a continuing duty to update its Claim as soon as possible with information on actual amounts in order to facilitate prompt and fair resolution of the Claim.

(B) **Non-Waiver.** Any failure by City to respond within the times specified above will 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, within 15 days of receipt of City's response or within 15 days of City's failure to respond within the applicable 45-day time period under Section 12.3, respectively, Contractor may notify City of the dispute in writing sent by registered or certified mail, return receipt requested, and demand an informal conference to meet and confer for settlement of the issues in dispute. If Contractor fails to notify City of the dispute and demand for an informal conference to meet and confer in writing within the specified time, 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 30 days, or later if needed to ensure the mutual availability of each 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 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 working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, the Contractor may identify in writing disputed portion(s) of the Claim, which will be submitted for mediation, as set forth below.

12.5 Mediation and Government Code Claims.

(A) **Mediation.** Within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute following the meet and confer, City and Contractor will mutually agree to a mediator, as provided under Public Contract Code § 9204. Mediation will be scheduled to ensure the mutual availability of the selected mediator and all of the individuals that each party requires to represent its interests. If there are multiple Claims in dispute, the parties may agree to schedule the mediation to address all outstanding Claims at the same time. The parties will share the costs of the mediator and mediation fees equally, but each party is otherwise solely and separately responsible for its own costs to prepare for and participate in the mediation, including costs for its legal counsel or any other consultants.

(B) **Government Code Claims.**

(1) Timely presentation of a Government Code Claim is a condition precedent to filing any legal action based on or arising from the Contract. Compliance with the Claim submission requirements in this Article 12 is a condition precedent to filing a Government Code Claim.

(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 in whole or in part at the conclusion of the meet and confer process, including any period of time used by the meet and confer process. However, if the Claim is submitted to mediation, the time for filing a Government Code Claim will be tolled until conclusion of the mediation, including any continuations, 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. City does not consent to arbitration unless required by Laws. It is expressly agreed, under Code of Civil Procedure § 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 Burden of Proof and Limitations. 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 speculative, special, or consequential damages, including home office overhead or any form of overhead not directly incurred at the Project site or any other 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. The Eichleay Formula or similar formula will not be used for any recovery under the Contract. The City will not be directly liable to any Subcontractor or supplier.

12.9 Legal Proceedings. In any legal proceeding that involves enforcement of any requirements of the Contract Documents, the finder of fact will receive detailed instructions on the meaning and operation of the Contract Documents, including conditions, limitations of liability, remedies, claim procedures, and other provisions bearing on the defenses and theories of liability. Detailed findings of fact will be requested to verify enforcement of the Contract Documents. All of the City's remedies under the Contract Documents will be construed as cumulative, and not exclusive, and the City reserves all rights to all remedies available under law or equity as to any dispute arising from or relating to the Contract Documents or performance of the Work.

12.10 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, including disputes regarding suspension or early termination of the 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, including non-compliance with applicable environmental or health and safety Laws, City may immediately order the Work, or any portion of it, suspended until the circumstances giving rise to the suspension have been eliminated to City's satisfaction.

(A) **Notice of Suspension.** Upon receipt of City's written notice to suspend the Work, in whole or in part, except as otherwise specified in the notice of suspension, Contractor and its Subcontractors must promptly stop Work as specified in the notice of suspension; comply with directions for cleaning and securing the Worksite; and protect the completed and in-progress Work and materials. Contractor is solely responsible for any damages or loss resulting from its failure to adequately secure and protect the Project.

(B) **Resumption of Work.** Upon receipt of the City's written notice to resume the suspended Work, in whole or in part, except as otherwise specified in the notice to resume, Contractor and its Subcontractors must promptly re-mobilize and resume the Work as specified; and within ten days from the date of the notice to resume, Contractor must submit a recovery schedule, prepared in accordance with the Contract Documents, showing how Contractor will complete the Work within the Contract Time.

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

(D) **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. Upon notice by City pursuant to this provision, Contractor must immediately suspend, delay, or interrupt the Work and secure the Project site as directed by City except for taking measures to protect completed or in-progress Work as directed in the suspension notice, and subject to the provisions of Section 13.1(A) and (B), above. If Contractor submits a timely request for a Change Order in compliance with Articles 5 and 6, the Contract Price and the Contract Time will be equitably adjusted by Change Order pursuant to the terms of Articles 5 and 6 to reflect the cost and delay impact occasioned by such suspension for convenience, except to the extent that any such impacts were caused by Contractor's failure to comply with the Contract Documents or the terms of the suspension notice or notice to resume. However, the Contract Time will only be extended if the suspension causes or will cause unavoidable delay in Final Completion. If Contractor disputes the terms of a Change Order issued for such equitable adjustment due to suspension for convenience, its sole recourse is to comply with the Claim procedures in Article 12.

13.3 Termination for Default. City may declare that Contractor is in default of the Contract for a material breach of or inability to fully, promptly, or satisfactorily perform its obligations under the Contract.

(A) **Default.** Events giving rise to a declaration of default include Contractor's refusal or failure to supply sufficient skilled workers, proper materials, or equipment to perform the Work within the Contract Time; Contractor's refusal or failure to make prompt payment to its employees, Subcontractors, or suppliers or to correct defective Work or damage; Contractor's failure to comply with Laws, or orders of any public agency with jurisdiction over the Project; evidence of Contractor's bankruptcy, insolvency, or lack of financial capacity to complete the Work as required within the Contract Time; suspension, revocation, or expiration and nonrenewal of Contractor's license or DIR registration; Contractor's failure to procure, maintain, or renew insurance coverage or provide notice of any modifications or reductions in insurance coverage; dissolution, liquidation, reorganization, or other major change in Contractor's organization, ownership, structure, or existence as a business entity; unauthorized assignment of Contractor's rights or duties under the Contract; or any material breach of the Contract requirements.

(B) **Notice of Default and Opportunity to Cure.** Upon City's declaration that Contractor is in default due to a material breach of the Contract Documents, if City determines that the default is curable, City will afford Contractor the opportunity to cure the default within ten days of City's notice of default, or within a period of time reasonably necessary for such cure, including a shorter period of time if applicable.

(C) **Termination.** If Contractor fails to cure the default or fails to expediently take steps reasonably calculated to cure the default within the time period specified in the notice of default, or if the City determines that the default is not curable, City may issue written notice to Contractor and its performance bond surety of City's termination of the Contract for default.

(D) **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 calendar days from the date of the notice of termination pursuant to paragraph (C), 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, where "additional cost" means all cost in excess of the cost City would have incurred if Contractor had timely completed Work without the default and termination. In addition, City will have the right to immediate possession and use of any materials, supplies, and equipment procured for the Project and located at the Project site or any Worksite on City property for the purposes of completing the remaining Work.

(E) **Compensation.** Within 30 days of receipt of updated as-builts, all warranties, manuals, instructions, or other required documents for Work installed to date, and delivery to City of all equipment and materials for the Project for which Contractor has already been compensated, Contractor will be compensated for the Work satisfactorily performed in compliance with the Contract Documents up to the effective date of the termination pursuant to the terms of Article 8, Payment, subject to City's rights to withhold or deduct sums from payment otherwise due pursuant to Section 8.3, and excluding any costs Contractor incurs as a result of the termination, including any cancellation or restocking charges or fees due to third parties. If Contractor disputes the amount of compensation determined by City, its sole recourse is to comply with the Claim Procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of the total compensation to be paid by City.

(F) **Wrongful Termination.** If Contractor disputes the termination, its sole recourse is to comply with the Claim procedures in Article 12. 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 under Section 13.4, below. Contractor waives any claim for any other damages for wrongful termination including special or consequential damages, lost opportunity costs, or lost profits, and any award of damages is subject to Section 12.8, Burden of Proof and Limitations.

13.4 Termination for Convenience. City reserves the right, acting in its sole discretion, to terminate all or part of the Contract for convenience upon written notice to Contractor.

(A) **Compensation to Contractor.** In the event of City's termination for convenience, Contractor waives any claim for damages, including for loss of anticipated profits from the Project. The following will constitute full and fair compensation to Contractor, and Contractor will not be entitled to any additional claim or compensation:

(1) **Completed Work.** The value of its Work satisfactorily performed as of the date notice of termination is received, based on Contractor's schedule of values and unpaid costs for items delivered to the Project site that were fabricated for incorporation in the Work;

(2) **Demobilization.** Demobilization costs specified in the schedule of values, or if demobilization costs were not provided in a schedule of values pursuant to Section 8.1, then based on actual, reasonable, and fully documented demobilization costs; and

(3) **Termination Markup.** Five percent of the total value of the Work performed as of the date of notice of termination, including reasonable, actual, and documented costs to comply with the direction in the notice of termination for convenience, and demobilization costs, which is deemed to cover all overhead and profit to date.

(B) **Disputes.** If Contractor disputes the amount of compensation determined by City pursuant to paragraph (A), above, its sole recourse is to comply with the Claim procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of total compensation to be paid by City.

13.5 Actions Upon Termination for Default or Convenience. The following provisions apply to any termination under this Article, whether for default or convenience, and whether in whole or in part.

(A) **General.** Upon termination, City may immediately enter upon and take possession of the Project and the Work and all tools, equipment, appliances, materials, and supplies procured or fabricated for the Project. Contractor will transfer title to and deliver all completed Work and all Work in progress to City.

(B) **Submittals.** Unless otherwise specified in the notice of termination, Contractor must immediately submit to City all designs, drawings, as-built drawings, Project records, contracts with vendors and Subcontractors, manufacturer warranties, manuals, and other such submittals or Work-related documents required under the terms of the Contract Documents, including incomplete documents or drafts.

(C) **Close Out Requirements.** Except as otherwise specified in the notice of termination, Contractor must comply with all of the following:

- (1) Immediately stop the Work, except for any Work that must be completed pursuant to the notice of termination and comply with City's instructions for cessation of labor and securing the Project and any other Worksite(s).
- (2) Comply with City's instructions to protect the completed Work and materials, using best efforts to minimize further costs.
- (3) Contractor must not place further orders or enter into new subcontracts for materials, equipment, services or facilities, except as may be necessary to complete any portion of the Work that is not terminated.
- (4) As directed in the notice, Contractor must assign to City or cancel existing subcontracts that relate to performance of the terminated Work, subject to any prior rights, if any, of the surety for Contractor's performance bond, and settle all outstanding liabilities and claims, subject to City's approval.
- (5) As directed in the notice, Contractor must use its best efforts to sell any materials, supplies, or equipment intended solely for the terminated Work in a manner and at market rate prices acceptable to City.

(D) **Payment Upon Termination.** Upon completion of all termination obligations, as specified herein and in the notice of termination, Contractor will submit its request for Final Payment, including any amounts due following termination pursuant to this Article 13. Payment will be made in accordance with the provisions of Article 8, based on the portion of the Work satisfactorily completed, including the close out requirements, and consistent with the previously submitted schedule of values and unit pricing, including demobilization costs. Adjustments to Final Payment may include deductions for the cost of materials, supplies, or equipment retained by Contractor; payments received for sale of any such materials, supplies, or equipment, less re-stocking fees charged; and as otherwise specified in Section 8.3, Adjustment of Payment Application.

(E) **Continuing Obligations.** Regardless of any Contract termination, Contractor's obligations for portions of the Work already performed will continue and the provisions of the Contract Documents will remain in effect as to any claim, indemnity obligation, warranties, guarantees, submittals of as-built drawings, instructions, or manuals, record maintenance, 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 § 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. § 15) or under the Cartwright Act (Chapter 2 (commencing with § 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 any 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 deemed amended accordingly.

- 14.3 Waiver.** City's 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 not be effective unless it is in writing and signed by City. City's waiver of any breach, failure, right, or remedy will not 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 City.
- 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 bids were due.
- 14.6 Survival.** The provisions that survive termination or expiration of this Contract include Contract Section 11, Notice, and subsections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6 of Section 12, General Provisions; and the following provisions in these General Conditions: Section 2.2(J), Contractor's Records, Section 2.3(C), Termination, Section 3.7, Ownership, Section 4.2, Indemnity, Article 12, Dispute Resolution, and Section 11.2, Warranty.

END OF GENERAL CONDITIONS

Special Conditions

1. **Insurance Requirements.** The insurance requirements under Section 4.3 of the General Conditions are modified for this Contract, as set forth below. Except as expressly stated below, all other provisions in Section 4.3 are unchanged and remain in full force and effect.
 - 1.1 **Builder's Risk Insurance Waived.** The builder's risk insurance policy requirement set forth in subsection 4.3(A)(5) of the General Conditions is hereby waived and does not apply to this Contract.
 - 1.2 **Professional Liability Insurance.** Subsection 4.3(A) of the General Conditions is modified to add professional liability (errors and omissions) insurance. The professional liability insurance policy for professional services provided by Contractor must provide coverage of at least \$1,000,000 per occurrence and at least \$2,000,000 aggregate. The professional liability insurance must include the specific endorsements set forth in subsection 4.3(D) of the General Conditions.
2. **Advance Order Requirement.**
 - 2.1 **Materials and Equipment.** Within 15 days following receipt of the fully executed Contract from City, Contractor must provide the material list and/or equipment list of any advanced order items that impact the Baseline Schedule. Within 2 weeks of the City's response to that list, Contractor must provide the material and/or equipment submittal. Within 2 days of City response to the submittal, Contractor must promptly order the materials and/or equipment and submit documentation to City evidencing the order, including, but not limited to the purchase order and documentation showing that the order has been accepted by supplier(s), and the anticipated shipment and delivery date for the materials and/or equipment.
 - 2.2 **Advance Order.** For each material and/or equipment specified in this Section, within two days following City's written response confirming the Contractor may proceed with ordering the material and/or equipment, Contractor must order the material and/or equipment and submit documentation to City evidencing the order, including, but not limited to, the purchase order, documentation showing that the order has been accepted by supplier(s), and the anticipated shipment and delivery date for the material and/or equipment.
 - 2.3 **Delivery Notification.** For each material and/or equipment specified in this Section, within two days following delivery of the specified material and/or equipment to Contractor, Contractor must provide written notice of the delivery to the Engineer. Except as set forth in this Section, Contractor will not perform any Work until the start date set forth in the Notice to Proceed. City anticipates issuing the Notice to Proceed following delivery of the materials and/or equipment set forth in this Section to Contractor.
 - 2.4 **Application for Payment.** Contractor may request payment for the materials and/or equipment specified in this Section, which are delivered to a Worksite but not yet incorporated into the Work, subject to the following conditions: the materials and/or equipment must be delivered and suitably stored at a local Worksite agreed to, in writing, by City; full title vests in City at the time of delivery to the agreed upon Worksite; Contractor obtains and submits to City a negotiable

warehouse receipt, endorsed over to City for materials and/or equipment stored in an off-site warehouse; the materials and/or equipment are segregated and labeled or tagged to identify the Project; the materials and/or equipment are protected from damage, weather, and contamination; if any defects or damage are discovered after delivery, Contractor agrees to replace the materials and/or equipment at Contractor's expense; and Contractor's application for payment is accompanied by a bill of sale, invoice, or other documentation warranting that City has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect City's interest therein, all of which must be satisfactory to City. If these conditions are satisfied, Contractor's application for payment may include up to 15% of the cost of the materials and/or equipment delivered, but not yet incorporated into the Work.

- 3. Pre-Construction Conference.** In addition to the requirements set forth in Section 2.2(F)(1) of the General Conditions, Contractor will be prepared to discuss the following topics and documents at the pre-construction conference:

Topic	Document
Equipment	Equipment list
Labor compliance and equal employment opportunity	Job site posters and benefit and redacted payroll reports procedure
Material inspection	Notice of Materials to be Used form
Advanced Order	Advanced Order material and equipment list per Special Conditions.
Safety	Injury and Illness Prevention Program, Code of Safe Practices, and job site posters
Traffic control	Traffic control plans
Water pollution control	Section 15
Work restrictions	PLACs
Golf Course Access Plan	Provide plan for accessing site across the active golf course and the safety procedures for golf players and workers
Restoration Plan	Provide submittal for the planned access routes and restoration of the golf course

- 4. Site-Specific Safety Requirements.** Contractor shall promptly and fully comply with, and enforce compliance with, all safety requirements set forth in the applicable Technical Specifications sections and Plans, including, without limitation, all fencing and traffic control measures required therein. Compliance with these safety requirements by all Subcontractors of every tier is the responsibility of Contractor. The Contractor shall cause each subcontract to incorporate the requirements of this Special Condition and shall enforce those requirements against each Subcontractor. Contractor remains fully responsible to the City for the performance of these safety requirements notwithstanding any delegation of the Work, in whole or in part, to any Subcontractor. Compliance with this Special Condition is in addition to, and does not limit, Contractor's obligation to comply with all applicable federal, state, and local safety laws, regulations, and orders. Contractor must ensure that its Injury and Illness Prevention Program (IIPP), established and maintained pursuant to, without limitation, California Code Regulations., title 8, § 1509 and § 3203, sufficiently accounts for and addresses the Project's site-specific hazards, including the golf ball projectile hazard arising from the proximity of the Work to the golf course.

END OF SPECIAL CONDITIONS



TECHNICAL SPECIFICATIONS

FOR

BENNETT VALLEY GOLF COURSE
IRRIGATION SYSTEM IMPROVEMENTS

CONTRACT NO. C02471



OCTOBER 2026

10 GENERAL (GENERAL CONSTRUCTION)

10-1.00 Definitions of Amendments to Caltrans Standard Specifications:

Amendments are “In Addition” to the applicable Caltrans Standard Specification per the General Conditions except when the section reference is followed with one of the following:

“**Replace With**” – The Caltrans Standard Specification section or a paragraph of the section have been replaced with the Technical Specification language.

“**Delete**” – The Caltrans Standard Specification section or a paragraph of the section have been removed from the Project.

10-1.01 General:

Technical Specifications use definitions per Standard Specifications 1-1.07 and Abbreviations Standard Specification section 1-1.06.

Equipment used shall follow Standard Specification 5-1.33 “Equipment”.

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

Unless otherwise provided hereafter, when sections and subsections of the Standard Specifications are used or attention is directed to them within the technical specifications, such direction shall not be interpreted as excluding other applicable provisions within the correlating section the Standard Specifications.

10-1.02B Traffic Elements- Delete in its Entirety

10-1.02C(2) Irrigation Facilities- Delete in its Entirety

10-5 Dust Control:

Sweeping, commercial street sweeping, covering stockpiles, applying water, and/or dust palliative, to control dust even caused by public traffic is included in the bid and not change order work.

All dust-producing work and unpaved construction sites shall require a minimum watering in the middle and ending of each workday. The frequency of watering shall increase if dust is airborne. Watering shall not produce runoff.

You shall maintain dust control to the satisfaction of the Engineer, 7 days a week, 24 hours per day.

At the end of each workday, you shall thoroughly sweep all paved and hardscaped areas affected by the project to minimize airborne dust.

At the end of each work week, you shall sweep all paved and hardscaped areas in the work zone with a commercial street sweeping truck equipped with a rear pick up broom and water.

At the Engineer's discretion additional sweeping or watering may be required, including the use of a commercial street sweeping truck equipped with a rear pick up broom, at any time or place.

10-7 Mobilization:

Mobilization includes all preparatory work and operations needed to begin construction. This includes, but is not limited to, furnishing labor, tools, incidentals, facilities, equipment, materials, and supplies to the project site, as well as any other tasks or costs that must be completed before starting work on the contract items.

10-8 Payment: See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

13 WATER POLLUTION CONTROL

13-1.01 General:

Water Pollution Control shall be performed in accordance with Section 13, Water Pollution Control, of the Standard Specifications and these technical specifications. In addition, construction activities shall comply with:

The current California Water Quality Control Board, North Coast Region Order No. R1-2015-0030, National Pollutant Discharge Elimination System Municipal Storm Water Permit, commonly referred to as the "Storm Water Permit". A copy of the Storm Water Permit is available for review at the City of Santa Rosa Transportation and Public Works Department, 69 Stony Circle, Santa Rosa, CA, and at www.srcity.org/stormwaterpermit.

The California Stormwater Quality Association Storm Water BMP Handbook for Construction (CASQA Handbook). BMPs shall be selected, installed and maintained in accordance with the latest edition. A copy of the handbook can be viewed at the City of Santa Rosa Department of Transportation and Public Works office at 69 Stony Circle or downloaded from CASQA, <http://www.casqa.org/>.

In this technical specification the CASQA Handbook BMP numbers are appended to the associated Standard Specification sections. If a conflict occurs the CASQA Handbook BMPs shall govern.

13-1.01B Definitions:

Construction phase: The construction phase starts at the start of job site activities and ends at Contract acceptance.

13-1.01C(4)(c) Water Quality Monitoring Reports:

The Contractor shall complete and sign the Storm Water Correction Site Inspection form with the City as part of the Storm Water Permit. A copy of the Storm Water Correction Notice is included on the following page.

STORM WATER CORRECTION NOTICE

FAILURE TO CORRECT BY DUE DATE MAY RESULT IN STOP WORK NOTICE!

PROJECT NAME: _____

JOB ADDRESS: _____

PROJECT / PERMIT #: _____ DATE: _____

☐ No storm water deficiencies identified.

I HAVE INSPECTED THIS PROJECT SITE. THE FOLLOWING ISSUES AND DEFICIENCIES HAVE BEEN IDENTIFIED AND REQUIRE CORRECTIVE ACTION:

STORMWATER BMPs:

- | | | | |
|--|---|---------------------------|-------------------------|
| ☐ Storm Drain Protection: | Install | Maintain | Replace |
| ☐ Perimeter Controls: | Install | Maintain | Replace |
| ☐ Housekeeping: | Sweep | Clean | Remove Garbage & Debris |
| ☐ Stockpiles: | Cover | Perimeter Controls | Remove |
| ☐ Debris Bins: | Cover | Perimeter Controls | |
| ☐ Tracking: | Clean-Up | Install Tracking Controls | |
| ☐ Portable Toilet: | Secondary Containment Required | | |
| ☐ Concrete: | Install BMPs for Pumper or Concrete Truck
Cover / Maintain Concrete Washout Containers | | |
| ☐ Sediment & Erosion: | Install Appropriate Controls | Dust Controls | |
| ☐ Other: | | | |

***ALL DEFICIENCIES MUST BE CORRECTED PRIOR TO NEXT RAIN EVENT OR NO LATER THAN DUE DATE, WHICHEVER IS SOONER.**

DATE REQUIRED (SEE NOTE*): _____

INSPECTOR: _____ PH #: () _____

CONTRACTOR SIGNATURE: _____ DATE: _____

Inspection Type: ☐ Monthly (Oct 1st-April 30th)

☐ Deficiency Re-Inspection

☐ Pre-Rain (Sept 1st-Oct 1st)

☐ Following First 0.25" Rain

(within 2 business days)

13-2 Water Pollution Control Program

13-2.01C Submittals:

The program to control water pollution required to be submitted under this section of the Standard Specifications shall include a spill contingency plan that establishes clean-up procedures that will be followed in the event of a spill of potentially hazardous, toxic, or polluting materials.

13-3 Storm Water Pollution Prevention Plan - Delete in its Entirety

13-4 Job Site Management

13-4.03B: Spill Prevention and Control:

You shall comply with CASQA Spill Prevention and Control (BMP WM-4). If a spill occurs at the construction site and you do not take immediate and adequate steps to contain and clean up the spill, especially if rain is threatening or if a discharge to a storm drain or creek could occur, the City shall have the right, in its sole and absolute discretion, to clean up the spill using City forces or an independent contractor. The cost of any such cleanup, in addition to recovery of any penalty or fine imposed upon the City, plus an administrative charge of fifteen percent (15%) of the costs incurred by the City, shall be deducted from any amounts owed to you hereunder.

In the event there are insufficient amounts owed to you hereunder to cover the foregoing costs and charges, the City shall have the right to pursue any other remedy to recover same, including, but not limited to, proceeding against any surety or bond in favor of the City. The City's rights under this section are intended to be in addition to and not in lieu of any imposed by the City against Contractor for violations of City Code Chapter 17-12, "Storm Water".

13-4.03C(3): Stockpile Management:

You shall comply with CASQA Stockpile Management (BMP WM-3). Do not block storm water flows.

13-4.03D: Waste Management:

You shall comply with Waste Management/CASQA Solid Waste Management (BMP WM-5). You shall dispose of all trash, rubbish, and waste materials of any kind generated by you, subcontractor, or any company hired by you on a daily basis.

13-4.03D(3 or I): Concrete Waste:

You shall comply with CASQA Concrete Waste Management (BMP WM-8). Ensure the containment of concrete washout areas and other washout areas that may contain pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

13-4.03D(4): Sanitary and Septic Waste:

You shall comply with CASQA Sanitary and Septic Waste Management (BMP WM-9). Sanitation facilities must be maintained periodically by a licensed service to keep them in good working order and prevent overflows. Portable toilets are required to have secondary containment.

13-4.03D(5): Liquid Waste:

Liquid waste includes water generated from excavation dewatering. Minimize transfer piping by locating containers near the excavation to be dewatered while protecting the containers from moving vehicles and equipment.

13-4.03E: Non stormwater Management

13-4.03E(1) Water Control and Conservation:

You shall comply with CASQA Water Conservation Practices (BMP NS-1 and NS-2).

13-4.03E(3): Vehicle and Equipment Cleaning:

You shall comply with CASQA Vehicle and Equipment Cleaning (BMP NS-8).

13-4.03E(4): Vehicle and Equipment Fueling and Maintenance:

You shall comply with CASQA Vehicle and Equipment Fueling (BMP NS-9), and CASQA Vehicle and Equipment Maintenance (BMP NS-10).

13-4.03F: Sweeping:

You shall also comply with CASQA Street Sweeping and Vacuuming (BMP SE-7).

13-4.03G: Dewatering:

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities. Groundwater levels may change depending on the time of year and the amount of seasonal rainfall. See Section B for additional information.

It should be anticipated that groundwater will be encountered within excavations as part of this project. If groundwater is encountered, the Contractor shall immediately notify the City. The Contractor shall **remove all water** which accumulates in excavations during the progress of work until the subgrade has been prepared and backfilling has progressed to a sufficient height above static groundwater levels. The Contractor shall have a minimum of two working pumps onsite and available for immediate use at all times.

Water accumulated in excavations shall be discharged to the sanitary sewer under the conditions set forth in the City's MS4 permit. Said water shall be disposed of in a manner as to cause no injury to public or private property or be a menace to public health. Sediment shall be removed from water to be disposed of, prior to discharge to the sanitary sewer, by placing the pump inlet hose into a sump filled with clean gravel, or a perforated bucket filled with clean gravel. The outlet of the pump shall have a filter sock installed to retain residual sediment.

Upon approval by the Engineer, the Contractor may propose a plan to dispose of groundwater by irrigating it on areas of the golf course outside of fairway areas. Groundwater irrigated on the golf course shall be done in such a manner as to cause no runoff.

The discharge shall be monitored to verify the lack of contamination. Periodic samples may be analyzed by the City's Environmental Compliance Laboratory to confirm the acceptability of the discharge. **If any odor, sheen or other visual discrepancy is noted during excavation or discharge, stop pumping and immediately notify the Engineer.**

Pumped groundwater will not be allowed into any watercourse or storm drain system.

Contractor shall be responsible for constructing, operating, and maintaining all necessary features to complete the work including furnishing, installing, and maintaining all pumping and other equipment required to dewater any excavations containing water as may be encountered during performance of the work. Dewatering plan for each occurrence shall be approved by the Engineer

prior to implementation. At the permanent conclusion of dewatering operations, all dewatering equipment shall be removed from the job site.

13-6 Temporary Sediment Control

13-6.03C Temporary Drainage Inlet Protection:

You shall comply with CASQA Storm Drain Inlet Protection (BMP SE-10).

13-7 Temporary Tracking Control

13-7.01A: General:

You shall comply with Stabilized Construction Entrance and Exit (BMP TC-1), Entrance Outlet Tire Wash (BMP TC-3).

13-7.01C Construction:

You shall comply with CASQA Stabilized Construction Site Entrance / Exit (BMP TC-1).

13-8 Temporary Active Treatment System - Delete in its Entirety

13-10 Temporary Linear Sediment Barrier

13-10.01 General:

You shall comply with CASQA Silt Fence and Sandbag Barrier (BMP SE-1 and SE-8).

13-12.04 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

14 ENVIRONMENTAL STEWARDSHIP

14-1.00 General Environmental Protections:

Based on a review of publicly available information available through the State Water Resources Control Board GeoTracker database, no **known** environmental conditions were identified that would indicate the presence of a documented release of hazardous materials within the project area. However, the absence of identified environmental concerns does not imply that excavated materials are suitable for unrestricted reuse or disposal at any particular facility. Naturally occurring constituents, background concentrations of metals, residual agricultural or golf course-related constituents, and other site-specific conditions may result in excavated materials exceeding acceptance criteria established by disposal facilities, reuse sites, landfills, or regulatory agencies. The Contractor shall be solely responsible for characterization, handling, transportation, recycling, reuse, and disposal of excavated materials in accordance with applicable laws, regulations, permit requirements, and facility acceptance criteria.

14-10 SOLID WASTE DISPOSAL AND RECYCLING

14-10.01 General:

The Contractor must dispose of all portland cement concrete and asphalt concrete, generated from removal or demolition activities on the project, at a recycler for these materials.

All other excess materials from the project shall become the property of you and shall be disposed of at no additional expense to the City.

Contractor shall not assume unconditional reuse of excavated soil. The contractor shall be responsible for the selection of the disposal site(s) for excavated soil and any testing requirements required by the selected disposal site(s). Prior to disposal of any excess material from the work site, submit to the Engineer written authorization for such disposal and entry permission signed by the approved disposal site(s).

The Contractor is solely responsible for selecting, evaluating, and securing acceptance for soil disposal at any reuse, recycling, or disposal facility, including private sites that may have sensitive, restrictive, or site-specific acceptance criteria. The Contractor's selection of a site with stringent acceptance limits shall not establish, imply, or redefine the regulatory cleanup level for excavated material and shall not be used as a basis for reclassifying excavated soil as contaminated. Failure of excavated material to meet the acceptance requirements of any facility or site chosen by the Contractor shall not entitle the Contractor to additional compensation, nor constitute grounds for a differing site condition claim. The Contractor shall perform all sampling, analysis, and characterization required by the receiving facility or disposal site and shall manage all excavated soil at no additional cost to the City.

Material exhibiting no staining, odors, sheen, discoloration, or other indications of a release shall be managed as non-hazardous material unless analytical results indicate an exceedance of Commercial/Industrial screening levels under federal, state or local law. Non-contaminated material may contain naturally occurring metals or low level detections of volatile or semi volatile compounds without being considered contaminated. Non-contaminated material shall become the property of the Contractor upon excavation and shall be removed from the Project site at the Contractor's expense.

Material shall be considered suspected or contaminated only when visual, olfactory, or field indicators of a release are observed, or when laboratory analysis indicates exceedance of

Commercial/Industrial screening levels under federal, state, or local law. Under such conditions, the material shall remain the property of the City and shall be handled and disposed of in accordance with Section 14-11. Upon encountering suspected or contaminated material, the Contractor shall immediately stop work in the affected area, segregate the material, implement protective measures, and notify the City for further direction. The Contractor shall not declare material contaminated based solely on its failure to meet the acceptance limits of a facility selected by the Contractor.

Asbestos cement pipe is anticipated and should be handled and disposed of per Technical Specification Section 15-1.03E at no additional cost to the City.

14-10.02 Solid Waste Disposal and Recycling Report - Replace With:

You shall provide a monthly recycling report for each quantity (in tons) of asphalt concrete and portland cement concrete with receipts verifying delivery to a material recycler.

Submit a solid waste disposal and recycling report between January 1 and 15 for each year work is performed under the Contract at any time during the previous calendar year. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 to December 31 of the previous calendar year.

Submit a final solid waste disposal and recycling report within 5 business days after Contract acceptance. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 to Contract acceptance.

Submit a Solid Waste Disposal and Recycling Report prior to final acceptance of work performed under the Contract. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project.

The Contractor shall be responsible for separating asphalt, concrete, base rock, asbestos cement pipe, and other debris from the soil, whether or not it is classified as contaminated or hazardous, prior to loading the soil for transport to a disposal site. Dispose of asphalt, concrete, and base rock at a recycler of these materials as specified in Section 124 of these Special Provisions. Dispose of asbestos cement pipe as specified in Section 15-1.03E of these Technical Specifications.

14-11 Hazardous Waste and Contamination

14-11.03 Hazardous Waste Management - In Addition: Asbestos cement pipe is anticipated and should be handled per Technical Specification Section 15-1.03F. Should unanticipated hazardous waste be discovered during construction, the Contractor shall develop a plan for handling and disposal of hazardous soils and groundwater.

In general, the Contractor shall maintain awareness of potential signs of hazardous substances in the soil and groundwater throughout the project limits and shall notify the City immediately upon discovery.

If hazardous waste is encountered or suspected, the Contractor shall provide 40-hour OSHA-HAZWOPER certified workers in hazardous waste areas and provide a field Site Safety Officer that is also an 8-hour OSHA-HAZWOPER Supervisor trained to directly oversee the hazardous materials removal and handling operation. All workers in this circumstance must have their initial and annual refresher training, medical clearance, and personal protection equipment in accordance with 8CCR Section 5192.

14-11.07: Department Generated Hazardous Waste

14-11.07C Transport and Disposal of Department-Generated Hazardous Waste: Should hazardous waste be identified, the Contractor shall furnish filled out hazardous waste manifests ready for the Engineer's signature. Contractor shall comply with all disposal regulations, such as City, County, and/or State permits and licenses, as may be required.

Within 5 business days of transporting Department-generated hazardous waste, submit documentation of proper disposal from the receiving landfill.

14-11.11: Department-Generated Contaminated Soil

14-11.11A Contaminated Soil Management: Should contaminated soil be identified, the Contractor shall furnish filled out hazardous waste manifests ready for the Engineer's signature. Contractor shall comply with all disposal regulations, such as City, County, and/or State permits and licenses, as may be required.

Within 5 business days of transporting Department-generated contaminated soil, submit documentation of proper disposal from the receiving landfill.

14-12.05 City Wide Integrated Pest Management (IPM) Policy:

Comply with City Policy number 000-074. This includes the management of pesticides for pests, including unwanted plants, insects, rodents, and fungus. Pests are controlled for assorted reasons including public safety, public health, plant health, aesthetic, and control of invasive plants, pathogenic organisms and/or insects.

14-12.06 City Lead Safety Program: :

Comply with City Lead Removal Procedure if lead removal is required.

14-13 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

15 EXISTING FACILITIES

15-1.03 Construction:

Existing facilities disturbed by construction shall conform to the applicable provisions of Section 5-1.36 of the Standard Specifications. The Contractor's attention is directed to Section 7.5 "Project Site and Nearby Property Protections" of these General Conditions.

All existing active utilities found to reside in excavated areas shall be supported in place with service maintained during construction. You shall be responsible for any damage caused by your operations and any needed repairs shall be completed to the Engineer's satisfaction.

Existing storm drains found to reside in excavated areas shall be supported, removed, or replaced at your option and at no additional cost to the City. You shall be responsible for maintaining the existing line and grade of the storm drains. If you elect to remove and replace, it shall be done per applicable City Standards and Specifications.

Existing utility trenches and/or structures that are in close proximity to proposed trenches shall be safeguarded in an appropriate manner from damage.

15-1.03C Traffic Stripes and Pavement Markings:

All traffic stripes, pavement markings or any other traffic markings shall be removed by you to the satisfaction of the Engineer and in accordance with Sections 84 of the Standards, and the Plans.

15-1.03D Pavement Markers:

All raised pavement markers shall be removed by you to the satisfaction of the Engineer and in accordance with Sections 82 of the Standard Specifications, City Standards, and the Plans.

15-1.03E Asbestos Cement Pipe:

You are advised that asbestos cement pipe (ACP) will likely be encountered on the project and must be cut, handled, and disposed of according to your State Licensing Law and all other applicable laws and regulations.

15-1.03H Concrete Removal:

All removed concrete shall become the property of You and shall be immediately off hauled. None of the removed concrete shall be dumped or stockpiled on the work site. You shall dispose of all removed concrete at a recycler for this material. Burying of broken concrete within the limits of the project will not be allowed.

All concrete which is to be removed from cart path areas shall be removed to the nearest score mark or construction joint as directed by the Engineer unless otherwise noted on Project Plans. The edge of existing concrete to remain shall be neat and free of defects. Saw cutting may be required to achieve this.

Concrete removal includes removal of any reinforcing steel embedded in the concrete and no additional allowance will be made for the removal of such steel.

Where new concrete is to join existing concrete, remove enough concrete to allow splicing of new reinforcement. Protect existing reinforcement to be incorporated into the new work from damage.

15-1.03I Preserving & Restoring Landscaping and Irrigation Facilities:

Irrigation facilities may be encountered during the work. You shall exercise care in this area and repair any damage done at no additional cost to the City.

Keep existing irrigation facilities in place that are described to be removed, relocated, or modified until the Engineer determines they are no longer needed.

Maintain the existing water supply. If the existing irrigation water supply is interrupted for more than 24 hours, provide an alternative water supply and temporary facilities necessary to maintain irrigation. There is no City water supply to this location. Due to the need to maintain irrigation supply, the Contractor is to assume phasing of the Work will be required in the schedule. The schedule must also demonstrate any planned interruptions on Monday through Wednesday and an alternative water supply plan is to be provided to the City for review. The submittal for "Alternative Water Supply" must be submitted for City review 10 Working days prior to the planned Work.

Furnish enough water for watering plantings affected from construction activities as necessary to maintain a healthy condition through Contract acceptance.

If you damage irrigation facilities not to be removed:

1. Remove and dispose of them.
2. Repair and replace damaged facilities within 24 hours.
3. Use similar commercial-quality components from the same manufacturer or components that are compatible with the existing irrigation system if authorized.
4. After completing the repair or replacement of the facilities, perform an operational test in the presence of the Engineer. If you repair or replace the remote-control valves, conduct the test with the irrigation controller in automatic mode.

Landscaping and other surfaces or structures damaged or destroyed during the work shall be restored to original conditions at no additional cost to the City.

If you damage trees or plants not to be removed:

1. Dispose of them unless the Engineer authorizes you to reduce them to chips and spread the chips within locations designated by the Engineer
2. Replace them
 - a. Replace plants with plants of the same species or a species selected by the property owner.
 - b. Replace trees with 24-inch-box trees of the same species or a species selected by the property owner.
 - c. Replace shrubs with no. 15-container shrubs of the same species or a species selected by the property owner.
 - d. Replace ground cover plants with plants from flats of the same species or a species selected by the property owner. Plant ground cover plants 1 foot on center.
3. If a plant establishment or permanent erosion control establishment period is specified, replace plants before the start of the plant establishment or permanent erosion control establishment period; otherwise, replace plants at least 30 days before Contract acceptance.
4. Water each plant immediately after planting. Saturate the backfill soil around and below the roots or the ball of earth around the roots of each plant. Water as necessary to maintain plants in a healthy condition until Contract acceptance.

15-1.03I Utility Clearances:

All items noted in this Section shall take place prior to any other construction activities.

Any pothole information provided on the Project Plans shall be for reference use only and shall not be considered as accurate information for any other areas within the project limits.

Contractor shall investigate, confirm and/or determine the exact locations of existing utilities, and verify clearances between existing and proposed utilities at crossings and/or known potential conflicts. You shall determine elevations and alignments of existing utilities at connection points for proposed utilities.

15-1.04A Payment - Replace With:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

19 EARTHWORK

19-1.01 General:

Earthwork shall conform to the applicable provisions of Section 19 of the Standard Specifications, with the following modifications and additional requirements. Earthwork shall include performing all operations necessary to excavate, earth and rock, regardless of character and subsurface condition; prepare foundation and subgrade materials for the placement of other material thereon; transport, place, compact and finish fill materials; mix, blend and moisture condition materials as required; remove and replace unsuitable materials; and remove, transport and dispose of surplus excavated material in accordance with Section 19-1.03C, Surplus Material, of these Technical Specifications.

19-1.01A Summary:

Earthwork shall also include excavation for trenching.

19-1.03B Unsuitable Material:

Stabilization of unsuitable material shall comply with the following provisions:

- A. Unsuitable material may be excavated and placed on the adjacent grade or other locations suitable for further processing prior to replacement.
- B. Processing may consist of drying or mixing with imported material to provide a stable replacement material meeting the requirements of Section 19-8.04.
- C. Stabilized material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

Backfill the space resulting from excavating unsuitable material with material meeting the requirements of Section 19-8.04.

19-1.03C Surplus Material:

The Contractor shall load, haul from the site of work, and legally dispose of all surplus excavated rock, concrete, asphalt concrete, debris, organics, stripping materials, and other deleterious materials generated by the Work.

The Engineer may approve the on-site disposal of surplus excavated soil that does not meet the requirements for Embankment Fill specified in Section 19-6.02A. Approved on-site disposal shall be limited to overbuilding slopes beyond the limits of embankment fill shown on the Plans or in other locations approved by the Engineer. Surplus material shall not be disposed of within environmentally sensitive areas, drainage courses, wetlands, tree protection zones, cart paths, golf course play areas, or other areas designated by the City.

The Contractor shall notify the City of the disposal location before the disposal of material at an off-site location. The Contractor shall comply with all disposal regulations such as City, County, and/or State permits and licenses, as may be required.

19-1.03D Groundwater:

Groundwater and perched groundwater conditions should be anticipated. The Contractor shall be responsible for all groundwater management, dewatering, stabilization, and maintenance of dry working conditions necessary to complete the Work. Dewatering activities shall comply with applicable permits and Section 13, Water Pollution Control.

No additional compensation will be provided for groundwater management, dewatering, or stabilization associated with groundwater conditions described in the Geotechnical Report.

19-5 Compaction

19-5.03B Relative Compaction:

Within stripped and excavated areas to receive fill, structures, equipment pads, aggregate base, or other improvements, the exposed subgrade should be uniformly moisture conditioned to 4 percent (2 percent for non-expansive soils) above optimum moisture content, scarified and compacted to at least 90 percent relative compaction as determined by ASTM D 1557.

Embankment fill shall be placed in thin lifts (normally 6 to 8 inches depending on compaction equipment), uniformly moisture conditioned to 4 percent (2 percent for non-expansive soils) above optimum moisture content and compacted to at least 92 percent relative compaction as determined by ASTM D 1557.

19-5.04 Payment - Replace With:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

19-6 Embankment Construction

19-6.01E Layout and Site Preparation:

The Contractor shall lay out all work, establish grades, locate existing underground utilities, set markers and stakes, set up and maintain barricades and protect all utilities prior to beginning actual earthwork operations.

Site preparation shall include clearing, grubbing, stripping and disposal of objectionable material within the area of grading activities. Objectionable material is defined as trash, rubbish and junk; lumber, sheet metal, concrete and oversize rubble; and trees, stumps, roots, brush, and other organic matter, whether alive, dead or decaying

After clearing and grubbing, if necessary, the areas designated for earthwork operations shall be stripped to a depth necessary to remove all objectionable material below the existing ground surface. Organic or unsuitable materials shall be removed to expose a firm surface of undisturbed materials.

Excavation shall begin only after site preparation and stripping of organic materials are complete.

19-6.01F Embankment Excavation:

Excavation shall extend downward removing in-situ soils in their entirety as indicated on the Project Plans. The excavation depth shall be as shown on the Project Plans or as directed by the Engineer based on field conditions encountered during construction.

When completed, the average plane of excavation slopes shall conform to the lines, grades, and requirements shown on the Project Plans and no point on the completed slopes shall vary from these designated slopes by more than 0.5 feet measured at right angles to the slope.

All cut slopes shall be periodically examined during and at the completion of excavation by the Engineer who shall evaluate the excavated soils and determine the need for additional excavation beyond plan finished grade.

Should unstable areas of the cut be exposed during excavation, they shall be removed by over-excavation as directed by the Engineer. Any unstable pockets shall be over-excavated and

replaced with embankment fill conforming to the requirements of Section 19-6.02A as directed by the Engineer.

Excavation beyond the limits indicated, unless approved by the Engineer a, will be at the Contractor's expense.

19-6.01G Foundation Preparation:

Foundation subgrade shall be prepared and compacted in accordance with Section 19-5.03.

19-6.02A Embankment Fill Material:

Fill materials shall be approved on-site local materials or imported material. Fill material shall conform to the following requirements:

1. Maximum Plasticity Index of 15 and maximum Liquid Limit of 40 in accordance with ASTM D4318-83, wet preparation method.
2. The percentage composition by weight of the soil materials shall conform to the following gradation:

Screen Size (U.S. Standard)	Percent Passing (By Dry Weight)
6"	100%
4"	90% to 100%
No. 200	15% to 60%

All fill materials must be approved by the Engineer prior to use. The maximum dimension of rock fragments and lumps shall be 6 inches, provided that any such fragments are isolated and fully surrounded by fine-grained material. Imported fill material shall be approved by the Engineer prior to transport to the Project site.

Material containing brush, roots and other organic matter or otherwise deleterious material is not considered suitable for placement as embankment fill and shall be disposed of.

19-6.03C Placing and Compacting Embankment Fill Material:

Embankment fill should be placed in lifts not exceeding 8 inches loose thickness, parallel to the top of embankment berm and compacted with a minimum of 8 passes. Fill should be moisture conditioned and compacted in accordance with Section 19-5.03.

Water may be sprinkled on the embankment if necessary. If, in the opinion of the Engineer, the top or contact surfaces of a fill section become too dry or smooth to permit suitable bond between these surfaces and the additional fill to be placed thereon, it shall be moistened and/or worked with a harrow, scarifier, disc, sheeps-foot roller, or other suitable equipment in an approved manner to a sufficient depth to provide satisfactory bonding before the next succeeding layer of earth fill material is placed.

If work has been interrupted by weather, scheduling, or for any other reason, the Engineer shall be notified by the Contractor at least 24 hours prior to the intended resumption of grading. It may be necessary to re-affirm suitability of placed compacted fill soils or fill materials that have been exposed to adverse weather conditions.

19-8.06 Structure Backfill Placement:

Backfill against structures shall not be placed until the structure footings or other portions of the structural facility have been inspected by the Engineer.

No backfill material shall be deposited against recently poured concrete before 7 days, or until the concrete has either developed a strength of not less than 3,000 pounds per square inch in compression as determined by test cylinders or attained sufficient strength to withstand the loads imposed as directed by the Engineer.

Backfill within the vicinity and against structures shall be placed and compacted in horizontal, uniform loose lifts not exceeding 4-inches in depth, shall be compacted using hand held or walk-behind compactors, and shall be brought up uniformly on all sides of the structure or facility.

Compaction of structure backfill by ponding or jetting will not be permitted. Compaction of material placed within 2 feet of concrete structures shall be attained using hand-operated tampers only.

19-6.03F Embankment Fill Test Methods and Requirements:

Moisture content and compaction testing shall be made in conformance with ASTM D1557. Sieve Analysis shall be made, if required, in conformance with ASTM D422.

All soil evaluations and tests shall be performed by the Engineer. Tests shall be for the purpose of determining compliance with these Specifications and the frequency and locations of tests shall be at the discretion of the Engineer. The Contractor may conduct independent tests for his convenience and control purposes at his sole expense; however, such tests will not be recognized for the purpose of establishing compliance with Specification requirements.

Density tests will be made by the Engineer throughout the embankment fill for quality assurance and quality control of the compaction and permeability. Density tests shall be taken by the Nuclear Method per ASTM D6938. A minimum of two density tests should be taken for every 2 feet of vertical fill placed in locations specified by the Engineer.

When a density test, or group of tests, indicates that the specified compaction has not been achieved, that portion of the embankment shall be reworked until the required density has been attained. Rework may require additional moisture conditioning and compaction or complete removal and replacement.

19-6.03G Finishing Embankments and Tolerances:

Embankment slopes shall be overfilled and then trimmed back to a dense, smooth, unyielding, uniform surface at the final grade. All loose material shall be removed from the slopes and excess hauled off site. When completed, the average plane of the slope shall conform to the slopes shown on the Project Plans and no point on the completed slopes shall vary from these designated slopes more than 0.5 ft measured at right angles to the slope.

Embankments shall be maintained to the grades and cross sections shown on the Project Plans until final acceptance of the Contract.

19-7.04 Payment - Replace With:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

21 EROSION CONTROL AND SITE RESTORATION

21-1 General

21-1.01 Description:

Provide permanent erosion control and site restoration as shown on the Plans and specified herein.

Work includes:

1. Fiber rolls.
2. Mulch placement beneath the dripline of existing trees where ground-disturbing activities is required.
3. Salvaging, amending, and placing planting soil prior to the installation of sod.
4. Restoration of areas disturbed by construction activities.

Protect existing vegetation, landscaping, irrigation facilities, and improvements from damage during construction. Repair or replace damaged improvements at no additional cost to the City.

21-2 Materials

21-2.01 Planting Soil:

Planting soil shall consist of native topsoil salvaged during excavation operations. Salvaged planting soil shall be obtained from the upper 18 inches of excavated material and shall be free from rocks greater than 1 inch in maximum dimension, debris, roots, organic matter unsuitable for planting, and other deleterious materials.

Amend planting soil as recommended by the manufacturers of the proposed soil amendment products and supplier of the sod. Submit proposed soil amendments to the Engineer for review prior to placement.

21-2.02 Sod:

Sod shall be commercial turf-type sod suitable for the project site and compatible with adjacent golf course turf. Sod shall be of the same species as the adjacent golf course turf unless otherwise approved by the Engineer

Sod shall be healthy, vigorous, well-rooted, and free from weeds, disease, insects, bare spots, and other defects.

21-2.03 Mulch:

Mulch shall consist of shredded wood mulch or arbor mulch free of trash, weeds, roots, and other objectionable materials.

Mulch shall not contain chemically treated wood.

21-2.04 Fiber Rolls:

Fiber rolls shall be certified weed-free and fully biodegradable.

Fiber rolls shall not contain plastic netting, wire mesh, synthetic reinforcement, photodegradable materials, or other non-biodegradable components.

21-3 Construction

21-3.01 General:

Install erosion control and restoration measures after completion of grading activities or as directed by the Engineer.

Maintain erosion control measures throughout construction and replace damaged or ineffective measures immediately.

21-3.02 Fiber Rolls:

Install fiber rolls at the locations shown on the Plans.

Anchor fiber rolls securely to prevent displacement due to runoff, maintenance activities, or construction operations.

Fiber rolls shown on the Plans are intended to serve as permanent erosion control measures and shall remain in place following completion of construction unless otherwise directed by the Engineer.

Replace damaged fiber rolls immediately.

21-3.03 Planting Soil:

Prior to placement of planting soil, remove rocks, debris, roots, and other objectionable materials from the finished subgrade.

Place a minimum of 3 inches of amended planting soil beneath all sod areas shown on the Plans.

Compact planting soil sufficiently to provide a stable, uniform surface while avoiding excessive compaction that would inhibit turf establishment.

21-3.04 Sod Installation:

Finish grade areas receiving sod smooth and free from ruts, depressions, abrupt grade changes, and deleterious materials.

Place sod on prepared planting soil immediately after delivery to the site.

Lay sod in a tightly fitted pattern with staggered joints. Roll and water sod immediately after placement.

Replace damaged, dead, bare, unhealthy, or poorly established sod until final acceptance of the Work.

21-3.05 Mulch Placement:

Place mulch beneath existing trees at the locations shown on the Plans.

Install mulch to a uniform depth of 3 inches.

Do not place mulch directly against tree trunks.

21-3.06 Site Restoration:

Restore all areas disturbed by construction activities to a condition equal to or better than that existing immediately prior to construction.

Restore damaged turf, landscaping, irrigation facilities, and other improvements affected by construction activities.

21-4 Maintenance:

Maintain all erosion control measures, mulch, and sod until final acceptance. Replace damaged erosion control measures and restore eroded areas immediately. Water sod as necessary to establish a healthy turf stand.

21-5 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

26 AGGREGATE BASE

26-1.01 General:

Aggregate base shall be Class 2 conforming to and placed in accordance with the requirements of Section 26 of the City Specifications.

Recycled aggregate base material may not be used on this project.

Compacting shall commence immediately after spreading the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles.

26-1.02 Materials

26-1.02B Class 2 Aggregate Base:

The minimum sand equivalent shall be 31 for any individual test.

26-1.03 Construction

26-1.03E Compacting:

The surface of the finished aggregate base shall be firm and unyielding. Aggregate bases shall be compacted to 95% relative compaction as indicated on the Project Plans.

26-1.04 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

43 CRUSHED STONE (SHALE) SURFACING

43-1 General

43-1.01 Description:

Shale surfacing shall consist of grading, compaction, materials quality requirements, placement of shale surfacing within specified tolerances and slopes in the site to the lines, transitions, and existing grades indicated on the Project Plans. Perform necessary grading to achieve final elevations closely approximating those shown on the Project Plans

43-2 Materials

43-2.01 Crushed Shale:

The percentage composition by weight of the shale shall conform to the following gradation as determined by California Test Method No. 202:

Sieve Size	Percent Passing
1½ inch	90-100
No. 4	25-40
No. 200	2-9

The minimum sand equivalent value shall be 20 as determined by California Test Method No. 217. No single aggregate grading or Sand Equivalent test shall represent more than 500 cubic yards or one day's production, whichever is smaller.

Shale shall meet the following quality requirements:

1. Shale shall be free from organic matter and other deleterious substances
2. Shale shall be of such nature that it can be compacted readily under watering and rolling to form a firm stable surface.
3. Crushed shale shall be obtained from a single source and shall not contain recycled aggregate materials.
4. The shale aggregate shall have a minimum durability index of 35 and a minimum resistance (R-value) of at least 78.
5. The shale shall not be treated with lime, cement or other chemical material before the Durability Index test is performed.

Submit test data and gradation information to confirm compliance with the above requirements.

43-3 Construction

43-3.01 Placing:

Place and compact shale surfacing to a relative compaction of not less than ninety percent (90%) per ASTM 1557 Test Procedure to a compacted depth of not less than 6-inches, unless shown otherwise on Project Plans.

The Contractor shall grade and blend the transitions between new and old shale surfacing as required to promote a smooth transition that prevents the puddling of water.

43-3.02 Maintaining:

The Contractor shall maintain shale surfacing in a smooth, stable condition until final acceptance. Areas exhibiting rutting, ponding, segregation, or erosion shall be repaired at no additional cost to the City

43-3.03 Finishing Tolerances:

Finished shale surfacing shall provide positive drainage and be free of abrupt irregularities, rutting, and depressions capable of holding water.

43-4.01 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

51 CONCRETE STRUCTURES

51-7.01 General:

Minor concrete structures include cast-in-place and precast concrete structures. Minor concrete structures shall be constructed in accordance with Section 51 of the Standard Specifications, the details and requirements shown on the plans, these Technical Specifications, and as directed by the Engineer.

Concrete shall be cured in accordance with Section 90-1.03B of the Standard Specifications.

Minor Concrete shall conform to the provisions of Section 90-2 of the Standard Specifications.

Placing of concrete under water will not be permitted.

The Contractor shall provide a submittal for precast vault structures and associated covers, hatches, and appurtenances including the following:

1. Shop drawings of vault sections, base units, construction details, jointing methods, materials, and dimensions.
2. Summary of criteria used in vault design including, as minimum, material properties, loading criteria, and dimensions assumed. Include certification from manufacturer that concrete design meets or exceeds the load and strength requirements of ASTM C 478 and ASTM C 857, reinforced in accordance with ACI 440.1r-15.
3. Cover, hatch, frame, and associated accessories.
4. Materials to be used for pipe connections.
5. Materials to be used for drain pipes.

Meter vault and valve vault structures, covers, and hatches shall be designed to withstand AASHTO H-20 traffic loading.

Meter vault and valve vault shall have clear inside plan dimensions and depth as designated on the Project Plans. Walls shall be reinforced sufficiently to withstand loads imposed by complete burial in saturate soil.

Valve vault and wet well shall be furnished with two-leaf hinged, hydraulic-assisted aluminum hatches. Each leaf shall permit full opening of the vault. Hatch shall be furnished with suitable hardware to secure the leaves in the closed position. Hatch shall be manufactured by Bilco, Halliday, USF Fabrication, or approved equivalent.

51-7.01B Materials:

Portland cement concrete structures shall be constructed in accordance with Section 51 of the Standard Specifications, the details and requirements shown on the Project Plans, these Technical Specifications, and as directed by the Engineer.

Reinforcement shall conform to the provisions of Section 52 of the Standard Specifications and the requirements indicated on the Project Plans.

The Contractor shall waterproof the inside and outside of new precast concrete structures and vaults with a manufacturer approved waterproofing compound. Waterproofing compound shall be one of the following or an approved equal:

1. Xypex as manufactured by Xypex Chemicals Ltd.
2. Thoroseal as manufactured by Standard Drywall Products Inc.

Joint sealants shall meet or exceed all requirements of ASTM 990 for joints, concrete pipe, manholes and precast box sections, using Preformed Flexible Joint Sealants. Sealants shall meet the requirements of the Federal Specifications SS-S210-A, "Sealing Compound Preformed Plastic for Pipe Joints". The sealing compound shall not leak at joints, while being tested at 10 psi, for a period of 24 hours. The Sealing compound shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler, and shall contain no solvents, irritating fumes or obnoxious odors. The compound shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength. Joint sealing compound shall be RAM-NEK as manufactured by Henry Company or approved equal.

Drain piping shall be constructed of solvent welded Schedule 40 PVC.

51-7.01C Reinforcement:

Reinforcement shall conform to the provisions of Section 52 of the Standard Specifications.

In lieu of the inspection of reinforcing steel as provided under Section 52-1.04 of the Standard Specifications, the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

Provide shop drawings for all field installed reinforcement for equipment slabs for review and approval by the Engineer.

51-7.02A Construction:

Backfilling of concrete structures shall comply with the requirements of Section 19 of these Technical Specifications.

It is the Contractor's responsibility to ensure that precast structures are laid and bedded on sound materials, existing and new. Any field conditions that may affect grade shall be brought to the attention of the Engineer prior to installation.

Waterproofing compound shall be applied with two coats as recommended by the manufacturer to achieve a completely watertight wall. The Contractor shall be responsible to provide a completely watertight structure, with no visible signs of leakage.

Joints between vault sections, space around pipe penetrations and lifting holes shall be filled with grout and finished flush with the walls of the structure.

Provide a minimum 12-inch wide by 12-inch thick concrete collar around hatches if the hatch is not cast into the box. Edges shall be protected from site construction.

Exposed concrete work shall be finished in accordance with Section 51-1.03F(2) of the Standard Specifications.

Where concrete cannot be poured around a pipe as part of a new structure, or where a manufactured penetration is not feasible, penetrations through a concrete structure shall be by core drilling other approved method that will not crack or otherwise damage the concrete structure.

The Contractor shall seal the penetration with a modular mechanical seal and the annular space shall be filled with high strength non-shrink grout. Pipe penetrations on the outside of a structure shall be stabilized by a concrete collar prior to backfilling.

51-7.02B Backfill:

Backfill material placed against concrete shall conform to the requirements of embankment fill in Section 19, or be control density fill, as indicated on the project plans, or approved by the Engineer.

51-7.04 Payment- Replace With:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

90 CONCRETE

90-1.01C(6) Mix Design:

The proportions of the water, sand and aggregate shall be regulated so as to produce a plastic, workable and cohesive mixture.

90-1.01D(2) Cementitious Material Content:

Concrete shall contain a minimum of 564 pounds of cementitious material per cubic yard. The amount of cement by weight of the specified cementitious material shall be 75 to 85 percent.

90-1.01D(5) Compressive Strength:

The 28 day compressive strength of concrete shall be 4,000 pounds per square inch (psi) or greater.

90-1.01D(6) Curing Compound:

Concrete shall be cured per Section 90-1.03B of the Standard Specifications. Pigmented curing compound or any other material that will leave a noticeable residue shall not be allowed.

90-1.04 Payment - Replace With:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

106 COATINGS

106-1.01 Description:

Provide protective coating systems for all exposed ferrous metal piping, fittings, valves, appurtenances, supports, tanks, well casing extensions, discharge heads, and miscellaneous metal work shown on the Plans.

Damage to coatings due to welding or cutting operations associated with other items of work under this contract, shall be fully repaired from bare metal.

All coating materials shall be stored in a safe, secure, and environmentally responsible manner and shall be kept above manufacturer's minimum storage temperature or 35 degrees Fahrenheit, whichever is higher, at all times. Coating materials that are found or suspected to have dropped below this temperature shall not be used to fulfill the requirements of this Contract. All empty or discarded coating containers or other surface preparation or coating debris, waste, and garbage shall be stored in a covered, watertight dumpster or equivalent container immediately after being generated and shall be disposed of legally. In general, the jobsite shall be maintained free of coating related refuse at all times.

106-1.02 References:

Coating materials and application shall conform to the latest editions of the following:

1. SSPC Standards
2. ASTM Standards
3. Manufacturer's Recommendations

106-1.03 Submittals:

Submit the following:

1. Coating manufacturer's product data.
2. Surface preparation recommendations.
3. Application instructions.
4. Dry film thickness requirements.
5. Color selections.
6. Touch-up and repair procedures.

All coating materials shall be supplied by a single manufacturer unless otherwise approved by the Engineer.

106-1.04 General:

This section includes the coating and finishing of all surfaces of work in the contract as specified in these technical specifications and as shown on the Plans.

Colors used shall be selected by the City from the manufacturer's standard and custom color charts.

The following items shall not be coated:

1. Stainless Steel
2. Aluminum
3. Electrical Control Panels*
4. Buried Pipe

5. Name Plates & Glass Items
6. Grates and Grate Frames
7. Concrete

*Electrical and control panels shall be required to have a shop applied epoxy coating suitable for outdoor installation with a color approved by the Engineer or as specified herein elsewhere.

Contractor shall apply coatings only when weather conditions are favorable in regard to air temperature and humidity and substrate temperature as per manufacturer's application instructions. At all times coating is in progress, Contractor shall have a psychrometer, satisfactory to the Engineer, available on the job for measuring relative humidity and dew point. Contractor shall also have on site a method to convert temperature readings and variance to dew point such as the US Weather Bureau Psychrometric Tables. A means to measure the temperature of the surface is also necessary.

Coating materials shall be properly stored in accordance with the manufacturer's instructions and protected from moisture, direct sunlight and extreme temperature.

Coating material containers shall have labels bearing manufacturer's name, name and type of material, and color name and number. In addition, thinning instructions and application instructions shall be available at the job site.

Coating shall be done at such times that dust-free and neat work can be obtained. All coating shall be done strictly in accordance with the manufacturer's instructions and in a neat workmanlike manner. All surfaces not being coated shall be protected from over-spray, drip and splatter by covering or masking. All drip and spatter marks shall be immediately cleaned from adjacent surfaces to the satisfaction of the Engineer. Contractor shall take care in preventing off-site over-spray as there are numerous private residences adjacent to portions of the work areas. All costs associated with any damage claims by third parties shall be borne by the Contractor.

Except where factory application of finish coatings is permitted elsewhere in these Specifications, all items of equipment shall be finish-coated after installation. Shop priming will be permitted in all cases. Materials and applications as specified herein shall govern regardless of whether coatings are factory-applied or field-applied. After installation, any damaged areas in prime or finish coatings shall be repaired as directed by the Engineer.

106-1.05 Surface Preparation:

All surfaces to be coated shall be prepared in a workmanlike manner with the objective of obtaining a clean and dry surface. No coating shall be applied before the prepared surfaces are inspected by the Engineer.

Surface preparation of steel items shall conform with specifications set forth in the Society for Protective Coatings "SSPC Painting Manual, Volume 2, 2005 Edition", or as specified by the Engineer.

Surface preparation shall be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Structures" (SSPC-Vis 1), "NACE" Standard TM-01-70, or as described below. Anchor profile for prepared surfaces shall be measured by use of an on-

destructive instrument such as a Keane-Tator Surface Profile Comparator, Testex Press-O-Film System or Clemtox Anchor Pattern Comparator.

All surfaces to be coated shall be prepared in strict conformance with the coating manufacturer's surface preparation requirements. The Contractor shall submit the surface preparation proposed and product data sheets containing the manufacturer's surface preparation requirements.

All ferrous metal to be primed in the shop shall have all rust, dust, and scale, as well as all other foreign substances removed by sandblasting (SSPC-SP-10 Near White Blast) or pickling. Cleaned metal shall be primed with specified primer immediately after cleaning to prevent new rusting. All ferrous metals not primed in the shop shall have all sharp edges, burrs, and weld spatter ground smooth and shall be sandblasted or otherwise cleaned in the field (as approved by the Engineer) prior to application of the primer.

All exposed bituminous coated metal shall receive an abrasive blast (SSPC-SP-6 Commercial Blast) to remove all existing bituminous coating. Bituminous coatings may be encountered on piping. Trace amounts of bituminous coating (not a film) may remain in the pores of the metal. Provide a minimum anchor pattern of 1.5 mils. It is not the intent to remove the annealing when present. The first two (2) new coats shall be roller-applied or if spray-applied, shall be immediately backrolled.

All nonferrous metals, whether to be shop or field primed, shall be solvent cleaned prior to the application of the pretreatment and/or primer. In addition, galvanized surfaces intended for immersion duty shall be sandblasted to provide a profile of 1.5 to 2.0 mils. Galvanized surfaces for exterior exposure shall be prepared in the same manner or by SSPC-SP2 and/or SP3 to remove insoluble contaminants such as white and/or red rust, then chemically treated as recommended by coating manufacturer. Careful attention will be given to prevent blasting through galvanizing. If damaged, galvanized surfaces will have to be repaired in a manner to achieve a smooth transition between the existing substrate to the new galvanized surface.

Epoxy coated steel pipe and fittings shall be brush-off blasted per SSPC-SP-7/NACE 4 Commercial Blast Cleaning or scarified to provide tooth for coating adhesion. If the epoxy coating is to be brush off blasted or scarified in the field, the Contractor shall follow the procedures set forth by the coating supplier. The written procedure provided by the coating supplier shall be submitted to the Engineer. In the event that the underlying epoxy coating is thinned to below the minimum allowable thickness specified in these specifications by the surface preparation procedures, the pipe or fitting shall be fully recoated with epoxy at the Contractor's expense. Field repairs or spot patching shall not be allowed.

Surfaces not intended to be coated shall be adequately protected from the effects of cleaning and coating. Any such surfaces which have been damaged by the Contractor shall be repaired or replaced to the condition which existed prior to the damage, all at the Contractor's expense.

Slag, weld accumulations and spatters shall be removed by chipping and grinding. All sharp edges shall be peened, ground smooth, or otherwise blunted. All weld repairs will be made and approved by the Engineer prior to any coating application.

The Contractor shall keep the area of his work in a clean condition and shall not permit blasting materials to accumulate as to institute a nuisance or hazard to the performance of the work or the operation of the existing facilities. Blast materials should be disposed of daily and kept separate from other debris. Abrasive blast waste materials containing hazardous substances shall be kept in sealed containers on site until they can be picked up and removed by a licensed transporter.

No coating shall be applied over a damp or moist surface. All surfaces with condensation or other moisture shall be blown or wiped dry. If rust is present, all surfaces shall be re-blasted per specification. Climatic conditions and surface conditions shall be measured, recorded and approved by the Engineer prior to the application of any coatings.

106-1.06 Coated Surfaces:

The following items shall receive coating systems in accordance with this Section:

1. Above-grade ductile iron pipe and fittings.
2. Above-grade carbon steel pipe and fittings.
3. Well casing extensions.
4. Discharge heads.
5. Hydropneumatic bladder tank.
6. Restrained flange coupling adapters.
7. Dismantling joints.
8. Miscellaneous exposed ferrous metals.

Coatings shall be applied to the above items in accordance with the following paint schedule. In some cases, the coating specified may have been superseded by the manufacturer, consult with the manufacturer and use their current equivalent product:

SURFACE	TYPE	NO. OF COATS	TENEMEC TRADE NAME OR APPROVED EQUIVALENT	COVERAGE FT ² /GAL.	DFT PER COAT
Unprimed Metal	Epoxy	1	N27L9503	265	4.0
	Acrylic	2	Series 29	340	1.75
Galvanized Metal	Epoxy	1	N27L9503	265	4.0
	Acrylic	2	Series 29	340	1.75
Shop Primed Metal including Tanks	Acrylic	2	Series 29	340	1.75
Fusion-Bonded Epoxy Coated Metal	Acrylic	1	Series 75	225-380	3.0-5.0
Above-Ground Bituminous Coated Metal*	Epoxy	1	Series 69-WH01	175-280	4.0-6.0
	Epoxy	1	Series 69-IN01	175-280	4.0-6.0
	Acrylic	1	Series 75	225-380	3.0-5.0

* Surface Preparation: Abrasive blast to remove all existing bituminous coating. Provide a minimum anchor pattern of 1.5 mils. It is not the intent to remove the annealing. Trace amounts of bituminous coating (not a film) may remain in the pores of the metal. First two (2) coats shall be roller-applied or if spray-applied, shall be immediately backrolled.

106-1.07 Coating Colors:

The Contractor shall submit color samples for approval by the City from a selection of manufacturer's color chart samples submitted to the Engineer at least thirty (30) days prior to start of operations.

106-1.08 Coating Application:

The Contractor shall apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. If material has thickened and must be diluted, the coating shall be built up to the same film thickness achieved with undiluted material. In other words, one gallon of coating as originally furnished by the manufacturer must not cover a greater square foot area than when applied unthinned. Deficiencies in film thickness shall be corrected by the application of one or more additional coats of paint. Total DFT exceeding the NSF approved coating thickness of tank interior applied coatings shall be removed and reapplied at the Contractor's expense. On porous surfaces, it shall be the Contractor's responsibility to achieve a uniform, protective finish free of imperfections either by decreasing the coverage rate or by applying additional coats of paint.

Drying time shall be construed to mean "under normal conditions" or as specified by the manufacturer. Where conditions are other than normal because of cold weather or because coating must be done in confined spaces, longer drying times will be necessary. Additional coats of paint shall not be applied, nor shall units be returned to service until coatings are thoroughly dry. See discussion of dehumidification and environmental monitoring requirements found elsewhere in these Specifications.

Each succeeding coat of paint shall have a slightly different color to readily distinguish between coats.

Coatings shall not be applied in extreme heat or cold; in dusty or smoke laden air; windy, foggy, damp, or humid weather.

Particular care must be taken to obtain a uniform, unbroken coating over all bolts, threads, nuts, welds, edges, and corners.

If coating is applied by spray, the air and/or fluid pressure used shall be within the ranges recommended by the coating and spray equipment manufacturers.

Spray coating shall be conducted under controlled conditions, and the Contractor shall be fully responsible for any damage occurring from spray coating.

On the first day of any coating, the Contractor shall establish, with the Engineer, a schedule so that all surface preparation may be inspected and approved prior to the application of any coatings for the duration of this project.

The Contractor is hereby notified that the Engineer will inspect the project prior to the expiration of the warranty period and all defects in workmanship and materials shall be repaired by the Contractor.

106-1.09 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be

considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

107 TRENCH BRACING AND SHORING

107-1.01 General:

All bracing and shoring shall conform to Sections 7.14 and 7.15 of these General Conditions, Section 7-1.02K(6)(a and b) of the Standard Specifications, and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall provide adequate sheeting, shoring and bracing of trenches and other excavations, and/or equipment method, for the protection of life or limb as required by the State of California Construction Safety Orders, the Safety Regulations of the Federal Occupational Safety and Health Administration and by these General Conditions, Special Conditions, and Technical Specifications.

All safety orders, rules and regulations of Cal/OSHA and/or the Federal OSHA applicable to the work to be done under this Contract shall be obeyed and enforced by the Contractor.

The Contractor shall obtain all permits required by Cal/OSHA before starting work.

The Contractor shall ensure that employees entering excavations are protected from cave-ins, failure of protective systems, hazardous atmospheres, vehicular traffic, falling loads, and any other hazardous conditions.

The Contractor shall have a competent person on-site who will make daily inspections of excavations, adjacent areas, and protective systems. The competent person will be responsible for ensuring that the protective system is based upon soil classifications, and that it provides the required protection in accordance with CCT, Title 8, and Section 1541.1.

107-1.02 Submittals:

At least 15 working days before beginning excavation on a trench 5 feet or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker, adjacent structure, and adjacent utility protection from caving ground hazards.

107-1.03 Execution:

Shoring shall be removed in such a manner as to prevent caving at the walls of excavations or damage to piping or other structures.

Excavations shall be so braced and supported that they will be safe, and the ground alongside the excavation will not slide or settle, and all existing improvements of any kind, either on public or private property will be fully protected from damage. If any damage does result to such improvements, the Contractor shall make the necessary repairs or reconstruction at his own expense and as directed by the Engineer.

All excavations shall have barricading, fall protection handrails, and access ladders in accordance with Cal/OSHA requirements.

107-1.04 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the

prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

[Version: 4/14/09]

112 TREE PROTECTION

112-1.01 General:

The following requirements shall apply to any contractor who works on any property upon which a protected tree is located.

Protected tree means any tree, including a Heritage tree, designated to be preserved on the plans, or as directed by the Engineer. Heritage tree is any of the trees listed under Section 17-24.010 of the City of Santa Rosa Tree Ordinance.

All pruning shall be done according to International Society of Arboriculture (ISA) or National Arborists Association (NAA) standards, by qualified personnel. The Contractor shall provide ISA certified tree workers to perform all work including cutting of root or provide a certified arborists to provide direct supervision and direction when roots are encountered and when trenching activities are required within the dripline of existing trees to remain.

112-1.02 Scope:

Before the start of any clearing, excavation, construction or other work on the site, every protected tree shall be securely fenced off at the protected perimeter. Protected perimeter shall be either the root zone or other limit as directed by the Engineer. Such fences shall remain continuously in place for the duration of all work undertaken in connection with this project. The area so fenced off shall not be used as a storage area, altered, or disturbed except as may be permitted under this section.

If any of the site work encroaches upon the protected perimeter of a protected tree, special measures shall be utilized as approved by the Engineer to ensure that the roots obtain oxygen, water, and nutrients as needed. Any excavation, cutting, filling, or compaction of the existing ground surface within the protected perimeter, if authorized by the Engineer, shall be minimized and subject to such conditions as may be imposed by the Engineer. No significant change in existing ground level shall be made within the drip line of the protected tree except as directed by the Engineer and as shown on the plans. No burning or use of equipment with an open flame shall occur near or within the protected perimeter. All brush, earth, and other debris shall be removed in a manner which prevents injury to the protected tree.

No oil, gas, chemicals, or other substances that may be harmful to trees shall be stored or dumped within the protected perimeter or any other location on the site from which such substances might enter the protected perimeter.

Underground trenching for utilities shall avoid major support and absorbing tree roots of protected trees. If avoidance is impracticable, tunnels shall be made below the roots. Trenches shall be consolidated to serve as many units as possible. Trench within the drip line of the tree shall be avoided and only be done at the approval and direction of the Engineer.

No concrete or asphalt paving shall be placed over the root zones of protected trees. No artificial irrigation shall occur within the root zone of oaks.

No compaction of the soil within the root zones of protected trees shall occur.

Tree removal shall be confined to the limits shown on the plans and not exceed the minimum necessary to complete operations. The Contractor shall not remove any trees, brush, shrubs, or other natural objects outside the limits of construction as shown on the plans, unless directed by the Engineer.

Any trees, brush, shrubs, or other natural objects not ordered removed by the Engineer which have been removed, altered, or damaged shall be replaced in kind by the Contractor before completion of the project.

112-1.03 Tree Root Pruning:

When digging outside the drip line of trees, all tree roots two inches and greater which are encountered during excavation must be pruned by hand in accordance with the direction of a certified arborist provided by the Contractor.

When digging within the drip line of trees or shown in the Plans, the Contractor shall exercise extreme caution to avoid pulling on roots with excavation equipment. Hand dig around all roots greater than one inch in diameter. Roots exceeding one inch in diameter within the drip line of trees or shown in the Plans are to be uncovered free of damage for coordination with an arborist provided by the Contractor.

112-1.03 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

121 NOTIFICATION

121-1.01 General:

The Contractor shall notify the Engineer of any work to be performed on any given work day either on the afternoon of the prior working day or before 7:00 a.m. on the given working day. Any work completed for which the Engineer has not received prior notification of its scheduling MAY NOT BE ACCEPTED FOR PAYMENT.

Prior to mobilization to the site, the Contractor shall notify the City in writing a minimum of ten (10) working days in advance to provide the City and Golf Course Operations personnel time to make irrigation system, golf course operation, and/or crew scheduling adjustments.

The Contractor shall notify the City in writing a minimum of ten (10) working days in advance of performing any work which will impact the existing irrigation system or requires the involvement of City or Golf Course Operations personnel for more than a four-hour period.

121-1.02: Contractor Submittals:

Within fifteen (15) days following notification and award of the contract, the Contractor shall submit to the Engineer a list of all anticipated submittals and suppliers, including all materials, mechanical equipment, and electrical equipment, proposed for use on the project.

Within fifteen (15) days following notification and award of the contract, the Contractor shall provide a contract progress schedule and "sequence of operations" plan for the overall project. The plan shall include detailed sub-schedules to further define the planned work and required electrical and mechanical shutdowns. The Contractor's progress schedule shall include all shutdown notification and shutdown time periods as indicated herein. The Contractor shall also prepare a detailed sub-schedule to further define the planned work during facility shutdown periods.

121-1.03: Shutdown Limitations and Requests:

The Contractor shall carry out construction activities in a manner that does not disrupt facility operations except as indicated herein. A shutdown is any time both existing well pumps cannot operate normally by providing water either through their existing discharge piping or into the new irrigation system which is tied in and fully operational, power to the site is shutdown, or any time where the irrigation system must be shut down for final tie-in work. The Contractor shall submit written requests for shutdowns identifying all construction activities, dates and duration of shutdowns with an advanced ten (10) working day notification as indicated herein.

The wells, irrigation system, and power to the irrigation controllers may be shut down during the wet season which generally extends between November 15th and April 15th of each year. Outside of the wet season, the maximum duration of shutdown shall be 24 hours followed by a period of 48 hours of uninterrupted system operation.

Other than short 24-hour duration shutdowns, at least one well shall remain fully operational at all times between April 15th and November 15th. The contractor shall provide temporary power as needed to maintain well and irrigation controller operation outside of the wet season.

A maximum of four (4) shutdowns will be allowed to occur throughout the project duration.

Shutdowns shall take place only after the Engineer's written approval.

The Engineer reserves the right to delay, change, or modify any shutdown at any time, at no additional cost to the City when the risk of such a shutdown would jeopardize the health of golf course turf and landscaping.

121-1.04 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

135 WELLS AND SUBMERSIBLE PUMPS

135-1 GENERAL

135-1.01 Description:

Provide all labor, materials, equipment, and incidentals necessary to remove the existing pumping equipment and furnish and install complete submersible well pumping systems as shown on the Plans and specified herein.

Work includes, but is not limited to:

1. Removal and disposal of existing pumping equipment.
2. Well casing extensions.
3. New discharge heads.
4. New submersible pumps and motors.
5. Column pipe.
6. Power cable.
7. Sounding tube and level transducer installation provisions.
8. Check valves.
9. Well vents.
10. Appurtenant piping and fittings.
11. Factory testing.
12. Startup and performance testing.
13. Manufacturer's field service.
14. Warranty.

Provide a complete and operational installation.

135-1.02 References:

Equipment and materials shall conform to the latest editions of the following standards and codes:

- AWWA Standards
- ASTM Standards
- IEEE Standards
- NEMA Standards
- NEC
- California Electrical Code
- California Well Standards

135-1.03 Basis of Design and Operating Conditions:

Furnish and install two (2) identical submersible well pumping systems. The Basis of Design is a Grundfos 475S600-7 submersible pump equipped with a Grundfos MMS 6 motor. Approved equal equipment may be submitted in accordance with the Contract Documents.

The pumping systems shall be designed to meet the following operating conditions:

Pumps & Motors

Fluid to be pumped:	Groundwater
Design Capacity:	
1 Pump Operating:	490 gpm at 390-feet TDH
2 Pump Operating:	920 gpm at 445-feet TDH
Minimum Pump Efficiency	75% at Design Operating Points
Minimum Number of Stages:	7
Pump Discharge:	6" NPT female threaded discharge
Motor Horsepower:	60 HP Minimum / 75 HP Maximum
Maximum Motor Speed:	3,600 RPM
Motor Power:	460 VAC, 3 phase, 60 Hz
Motor Service Factor:	1.15

The Basis of Design equipment establishes the minimum acceptable requirements for hydraulic performance, efficiency, materials of construction, dimensions, and compatibility with the existing wells and proposed wellhead improvements.

Any proposed substitute equipment shall meet or exceed the specified operating conditions and shall be fully compatible with the existing wells, proposed well casing extensions, discharge heads, electrical systems, controls systems, and level monitoring equipment as supported by certified pump performance curves and complete shop drawings.

The Contractor shall be responsible for verifying that the proposed equipment is suitable for the existing well conditions, pumping levels, and operating requirements shown on the Plans. Prior to ordering equipment, the Contractor shall verify existing well casing diameters, wellhead dimensions, and other field conditions that may affect installation of the proposed pumping equipment.

Information regarding existing wells provided in the Contract Documents is believed to be accurate but is not guaranteed. The Contractor shall verify existing conditions prior to ordering equipment and shall immediately notify the Engineer of any discrepancies.

Both pumping assemblies shall be identical.

135-1.04 Submittals:

Submit the following:

1. Shop drawings.
2. Certified pump performance curves.
3. Certified motor performance data.
4. Complete bill of materials.
5. Discharge head drawings.
6. Well casing extension details.
7. Column pipe details.
8. Check valve details.
9. Sounding tube details.
10. Cable specifications.
11. Startup procedures.
12. Operations and maintenance manuals.

13. Warranty documentation.
14. Manufacturer's field service qualifications.
15. Level transducer access and sounding tube details.
16. Factory test reports.

Submit pump curves showing:

- Head vs. Flow
- Efficiency vs. Flow
- Brake Horsepower vs. Flow
- NPSHR (if applicable)
- Design operating points

135-1.05 Contractor Qualifications:

Work under this Section shall be performed by a Contractor holding a valid State of California C-57 Water Well Contractor License.

The C-57 licensed contractor shall be responsible for all work associated with removal of existing pumping equipment, installation of new pumping equipment, modification of existing wells, well casing extensions, and startup of the pumping systems.

The Contractor shall submit evidence of the required license upon request by the Engineer.

Subcontractors performing work within the well casing or associated with pump installation shall also possess all licenses required by applicable laws and regulations.

135-2 MATERIALS AND PRODUCTS

135-2.01 General:

All equipment furnished under this Section shall be new, unused, and of the manufacturer's latest design.

Equipment furnished under this Section shall be designed and manufactured for continuous-duty groundwater service.

Materials shall be selected to provide a minimum service life of twenty (20) years under the design operating conditions specified herein.

All equipment shall be furnished by manufacturers regularly engaged in the production of similar equipment and having a minimum of ten (10) years of successful experience manufacturing the specified products.

The pumping system shall consist of a complete operating assembly including, but not limited to:

1. Submersible pump.
2. Submersible motor.
3. Column pipe.
4. Check valve.
5. Discharge head.
6. Well casing extension.
7. Power cable.

8. Sounding tube.
9. Level transducer access provisions.
10. Well vent.
11. Appurtenant hardware and supports.

Equipment furnished under this Section shall be fully compatible with the existing wells and the improvements shown on the Plans.

The Contractor shall verify existing well dimensions and field conditions prior to ordering equipment.

135-2.02 Submersible Pumps:

Pumps shall be multi-stage deep-well submersible turbine pumps meeting the operating conditions indicated in Section 135-1.03.

Pump bowls, impellers, shafts, and wear components exposed to pumped water shall be stainless steel.

Pump components shall be designed for continuous operation at the specified duty point.

Pumps shall be dynamically balanced at the factory.

The pump shall operate continuously without excessive vibration, noise, or overheating.

Submersible pumps shall be manufactured by Grundfos, Floway, Xylem, or approved equal.

135-2.03 Submersible Motors:

Provide submersible motors specifically designed and manufactured for deep-well groundwater service.

Motors shall be supplied by the pump manufacturer and be listed by the pump manufacturer as compatible with the proposed pumping equipment.

Motors shall be water-filled and rewindable.

Motors shall be squirrel-cage induction type designed for continuous-duty vertical installation.

Provide stainless steel motor shafts.

Motor thrust bearings shall be designed to continuously support the cumulative weight of:

1. Pump.
2. Column pipe.
3. Water column.
4. Power cable.
5. Sounding tube.
6. Level transducer cable.
7. Appurtenant attachment hardware.

Motor housings, fasteners, and components exposed to groundwater shall be corrosion resistant and suitable for continuous submergence.

Provide factory pressure testing of each motor assembly.

Motors shall be supplied from the factory completely assembled, tested, and filled with manufacturer-approved fluid.

Provide factory-sealed motor lead penetrations.

Motor leads shall be of sufficient length to permit connection to the power cable without tension or splicing within the discharge head assembly.

The Contractor shall be responsible for providing a complete pumping system from a single pump manufacturer unless otherwise approved by the Engineer.

Motors shall be suitable for a minimum of ten (10) starts per hour and operation with the soft starters specified in Section 201.

Motors shall be manufactured by Grundfos, Franklin Electric, Pleuger, or approved equal.

135-2.04 Column Pipe:

Column pipe shall be 6-inch diameter Schedule 40 ASTM A53 Grade B steel pipe or approved equal.

Column pipe threads shall be accurately machined and assembled in accordance with the pump manufacturer's recommendations.

Provide threaded steel couplings designed for the loads imposed by installation and operation of the pumping equipment.

Column pipe and couplings shall be suitable for the design operating pressure and surge conditions associated with the pumping system.

Column pipe shall be straight, true, and free from dents, kinks, cracks, excessive corrosion, or other defects that could impair operation of the pumping system.

Column pipe sections shall be furnished complete with provisions for attachment and support of:

1. Power cable.
2. Sounding tube.
3. Level transducer cable.
4. Other appurtenant instrumentation shown on the Plans.

Power cable, sounding tube, and level transducer cable shall be securely attached to the column pipe using stainless steel cable guards, clamps, straps, or other approved attachment devices at intervals not exceeding 10 feet.

Attachment hardware shall prevent movement, abrasion, stretching, pinching, or other damage to cables and tubing during installation, operation, and future removal of the pumping assembly.

Column pipe shall be designed to permit future removal and replacement of the pump, motor, power cable, sounding tube, and instrumentation without modification to the well casing, discharge head, or wellhead improvements.

All exposed ferrous components shall be prepared and protected from corrosion in accordance with Section 185 Pipe and Appurtenances.

135-2.05 Check Valves:

Provide one stainless steel check valve installed immediately above each pump as an integral component of the pumping assembly.

Check valve bodies, discs, shafts, springs, and all wetted components shall be stainless steel construction.

Check valves shall be designed to prevent reverse flow, reverse rotation of the pump, and be suitable for vertical orientation under a minimum pressure rating of 250 psi.

Check valves shall be factory-installed above the pump assembly whenever possible.

Check valves shall be supplied by the pump manufacturer.

135-2.06 Power Cable:

Provide pump power cable as recommended by the pump manufacturer.

Cable shall be suitable for continuous submergence and compatible with the supplied motor.

Cable shall be of sufficient size and length to comply with the voltage drop limitations and electrical requirements specified in Section 201.

Provide factory-approved waterproof splices and termination assemblies.

Power cable shall be secured to the column pipe using stainless steel cable guards, clamps, straps, or other approved attachment devices at intervals not exceeding 10 feet.

Cable guards and attachment hardware shall prevent abrasion, stretching, pinching, or other damage during installation, operation, and future removal of the pumping assembly.

135-2.07 Sounding Tube:

Provide one 1-inch Schedule 80 PVC sounding tube for each well.

The sounding tube shall be utilized for installation and protection of the submersible level transducer specified in Section 201.

The sounding tube shall extend from the discharge head to the depth shown on the Plans.

Provide stainless steel supports and attachment hardware.

Secure the sounding tube to the column pipe at intervals not exceeding 10 feet.

The sounding tube shall permit removal and replacement of the level transducer without removal of the pumping equipment.

The sounding tube shall terminate at the discharge head in a manner that permits installation and maintenance of the level transducer specified in Section 201.

135-2.08 Discharge Head Assembly:

Provide new fabricated steel discharge heads for each well.

Discharge heads shall be specifically designed for the proposed pumping equipment, existing well geometry, well casing extensions, and wellhead piping shown on the Plans.

The discharge head shall be capable of safely supporting the full operational and installation loads imposed by the pumping assembly including:

1. Pump.
2. Motor.
3. Column pipe.
4. Water column.
5. Power cable.
6. Sounding tube.
7. Appurtenant hardware and accessories.

Discharge heads shall be fabricated from carbon steel plate and structural steel shapes. The minimum thickness of all load-bearing components shall be 1/2 inch.

Discharge heads shall include a 6-inch flanged discharge connection compatible with the piping shown on the Plans.

Discharge heads shall include the following minimum features:

1. Pump discharge connection.
2. Pump power cable penetration.
3. Sounding tube penetration.
4. Manual water level sounding port.
5. Well vent opening.
6. Removable access opening.
7. Lifting eyes.
8. Stainless steel fastening hardware.

Provide one spare 1-inch NPT threaded coupling complete with threaded plug for future instrumentation, monitoring equipment, or pressure sensing devices.

The manual water level sounding port shall consist of a minimum 1-inch threaded access opening complete with a threaded cap and shall permit future manual water-level measurements without disassembly of the discharge head assembly.

Provide a stainless steel screened vent opening to permit air exchange between the well casing and atmosphere.

All penetrations through the discharge head shall be sealed to prevent entry of surface water, insects, rodents, debris, and other contaminants into the well.

Power cable penetrations shall be provided with watertight cable seals and strain relief devices suitable for outdoor service.

The discharge head assembly shall permit future removal and replacement of the pump, motor, column pipe, sounding tube, and appurtenant equipment without modification to the well casing extension or discharge piping.

Steel surfaces exposed to weather shall be coated in accordance with Section 106.

Fabrication welds shall be continuous and watertight. Welds shall be ground smooth where necessary to permit proper assembly of appurtenant components.

Discharge heads shall be manufactured by the pump manufacturer or specifically designed and certified as compatible with the proposed pumping system.

Shop drawings shall clearly identify all openings, penetrations, dimensions, materials, coatings, and appurtenances provided as part of the discharge head assembly.

135-2.09 Well Casing Extension:

Existing well casings shall be extended as shown on the Plans.

Well casing extensions shall match the diameter of the existing well casing and shall have a wall thickness equal to or greater than the existing casing as field verified by the Contractor prior to ordering.

The completed installation shall provide the minimum casing elevation indicated on the Plans.

Provide continuous full-penetration welds between the existing casing and the casing extension. Welders shall be qualified for the work performed. Welds shall be watertight and free from defects.

Prepare and coat exposed steel surfaces in accordance with Section 106.

The completed casing extension shall be plumb, true, and aligned with the existing well casing.

135-2.10 Fasteners and Hardware:

All exposed bolts, nuts, washers, clamps, brackets, supports, straps, and miscellaneous hardware shall be Type 316 stainless steel unless otherwise approved by the Engineer.

Dissimilar metals shall be isolated to prevent galvanic corrosion.

135-2.11 Nameplates:

Provide a stainless steel nameplate for each pumping installation.

Nameplates shall identify:

1. Pump Manufacturer
2. Pump Model
3. Motor Manufacturer
4. Motor Model

5. Motor Horsepower
6. Voltage
7. Design Flow
8. Design Total Dynamic Head

Nameplates shall be permanently attached to the discharge head assembly and remain visible after installation.

135-3 EXECUTION

135-3.01 General:

Work under this Section shall be performed by a Contractor holding a valid California C-57 Water Well Contractor License.

The C-57 licensed contractor shall be responsible for removal of existing pumping equipment, installation of new pumping equipment, well casing extensions, and all work performed within the existing wells.

Install all equipment in accordance with the Contract Documents, approved shop drawings, manufacturer's recommendations, and industry standards.

Protect existing wells from contamination during all phases of construction.

Maintain a clean and orderly work area throughout installation.

The Contractor shall verify dimensions, elevations, and field conditions prior to installation.

135-3.02 Removal of Existing Pumping Equipment:

Remove existing pumps, motors, column pipe, cable assemblies, sounding tubes, discharge heads, and miscellaneous well components as indicated on the Plans or as necessary to complete the Work.

Protect the existing wells from damage during equipment removal.

Do not drop materials, equipment, tools, debris, or foreign objects into the wells.

Remove all equipment in a manner that allows accurate inspection of the existing well casing.

Dispose of removed materials in accordance with applicable laws and regulations unless otherwise directed by the Engineer.

Equipment designated by the Engineer for retention shall be delivered to a location designated by the City.

Any damage caused to existing wells, casing, piping, structures, or appurtenances during removal operations shall be repaired at no additional cost to the City.

135-3.03 Existing Well Verification:

Prior to fabrication of well casing extensions or installation of new equipment, the C-57 licensed contractor shall verify the existing:

1. Well casing diameter.
2. Well casing wall thickness.
3. Well casing condition.
4. Well casing elevation.
5. Well plumbness and alignment to the extent observable.
6. Existing pump setting depth and configuration.

Immediately notify the Engineer of discrepancies between field conditions and the Contract Documents.

Do not proceed with fabrication of well casing extensions until field verification has been completed.

135-3.04 Well Casing Extension Installation:

Install well casing extensions to the elevations shown on the Plans.

Maintain alignment with the existing well casing.

All welding shall be performed by qualified welders.

Provide continuous full-penetration watertight welds between the existing casing and the casing extension.

The completed casing extension shall be plumb, true, watertight, and aligned with the existing well casing.

135-3.05 Pump Installation:

Install pumps at the depths shown on the Plans and approved shop drawings.

Install pumping assemblies plumb, centered, and free from interference with the well casing.

Pumps shall not contact the well casing during installation or operation.

Install pumping equipment in accordance with the manufacturer's recommendations.

Protect all equipment from damage during handling, installation, and startup.

The Contractor shall verify final pump setting depths prior to completing installation.

135-3.06 Column Pipe Installation:

Column pipe sections shall be installed in the sequence recommended by the pump manufacturer.

Threaded connections shall be properly aligned and tightened.

Damaged threads, couplings, or pipe sections shall not be installed.

Provide proper support for power cable, sounding tube, and appurtenant instrumentation.

135-3.07 Power Cable and Sounding Tube Installation:

Install power cable and sounding tube in accordance with the approved shop drawings.

Secure power cable, sounding tube, and appurtenant instrumentation cables to the column pipe using stainless steel cable guards, clamps, straps, or approved attachment devices at intervals not exceeding 10 feet.

Protect cable and tubing from abrasion, stretching, crushing, pinching, or other damage during installation and operation.

Replace damaged cable assemblies or tubing at no additional cost to the City.

135-3.08 Discharge Head Installation:

Install discharge heads level and plumb.

Verify proper alignment between the discharge head, well casing extension, and discharge piping.

Provide watertight seals at all cable penetrations and openings.

Verify proper operation of the sounding tube access point, well vent, and manual sounding port.

Verify that all discharge head openings, penetrations, and appurtenances are installed in accordance with the approved shop drawings.

135-3.09 Protection of Existing Wells:

Take all necessary precautions to prevent contamination of the wells during construction.

Well casing openings shall remain covered whenever pumping equipment is not being actively installed or removed.

Lubricants, fuels, solvents, construction debris, and foreign materials shall not be permitted to enter the wells.

Immediately notify the Engineer if contamination of a well is suspected.

If contamination occurs as a result of the Contractor's operations, the Contractor shall be responsible for all corrective actions required by the Engineer.

135-3.10 Pump Manufacturer's Field Services:

Provide the services of the pump manufacturer's field representative for inspection of the installation, startup assistance, testing, troubleshooting, and operator training.

The manufacturer's field representative shall verify:

1. Proper installation.
2. Pump rotation.
3. Operating voltage.
4. Motor current.
5. Pump performance.

Submit a written startup report documenting observations, test results, adjustments, and recommendations.

135-3.11 Record Information:

Record the final pump setting depth, sounding tube depth, well casing extension elevation, motor serial number, pump serial number, and other information requested by the Engineer.

Submit record information prior to final acceptance.

135-4 TESTING AND ACCEPTANCE

135-4.01 Factory Testing:

Each pump and motor assembly shall be factory tested prior to shipment.

Factory testing shall verify compliance with the operating conditions specified in Section 135-1.03.

Submit certified factory test reports in accordance with Section 135-1.04.

Factory testing shall include, at a minimum:

1. Head versus Flow.
2. Efficiency versus Flow.
3. Brake Horsepower versus Flow.
4. Motor performance data.
5. Design operating point.

Factory test reports shall be certified by the manufacturer.

135-4.02 Field Performance Testing:

Following installation and startup, perform field performance testing of each well.

Field testing shall demonstrate compliance with the operating conditions specified in Section 135-1.03.

Field testing shall include measurement and documentation of the following:

1. Flow rate.
2. Pump discharge pressure.
3. Voltage.
4. Current.
5. Static water level.
6. Pumping water level.
7. Drawdown.
8. Recovery.

Testing shall be performed in the presence of the Engineer.

135-4.03 Acceptance Criteria:

The pumping system shall be considered acceptable when:

1. Installation has been completed in accordance with the Contract Documents.
2. Pumping equipment operates without excessive vibration, noise, or overheating.

3. The specified operating conditions have been achieved.
4. Sounding tubes and level transducer provisions are fully functional.
5. Manufacturer startup services have been completed.
6. Deficiencies identified during testing have been corrected.
7. Required submittals and record documentation have been submitted.

135-4.04 Correction of Deficiencies:

Equipment that fails to satisfy the specified operating conditions or exhibits operational deficiencies shall be repaired, adjusted, or replaced by the Contractor at no additional cost to the City.

Repair or replacement work shall be followed by retesting until compliance with the Contract Documents is demonstrated.

135-5 WARRANTY

135-5.01 General:

Provide a minimum two-year warranty covering all equipment furnished under this Section.

The warranty period shall commence upon acceptance of the Work by the City.

135-5.02 Covered Equipment:

Warranty shall include, but not be limited to:

1. Pumps.
2. Motors.
3. Column pipe.
4. Check valves.
5. Discharge heads.
6. Well casing extensions.
7. Sounding tubes.
8. Power cable.
9. Appurtenant hardware.
10. Manufacturer-supplied accessories.

135-5.03 Warranty Requirements:

Repair or replace defective equipment during the warranty period at no cost to the City.

Provide all labor, materials, equipment, transportation, pump removal, reinstallation, startup, and testing necessary to complete warranty repairs.

Failures resulting from defects in design, materials, manufacture, workmanship, or installation shall be corrected under the warranty.

135-5.04 Manufacturer Support:

Provide current contact information for warranty service with the Operations and Maintenance Manuals.

Manufacturer or authorized service personnel shall be capable of responding to warranty issues throughout the warranty period.

135-6 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

155 HYDROPNEUMATIC BLADDER TANK

155-1 General:

155-1.01 Description:

Provide all labor, materials, equipment, and incidentals necessary to furnish, install, test, and place into service the hydropneumatic bladder tank system shown on the Plans and specified herein

Hydropneumatic bladder tank shall be provided with the following:

1. Replaceable bladder assembly.
2. Pressure gauge connections.
3. Pressure switch connections.
4. Pressure transmitter connections.
5. Pressure relief valve.
6. Air charging assembly.
7. Drain connection.
8. Vent connection.
9. Supports and anchorage.
10. Factory testing.
11. Startup and testing.
12. Warranty.

Provide a complete and operational installation.

155-1.02 References:

Equipment and materials shall conform to the latest editions of the following:

1. ASME Boiler and Pressure Vessel Code, Section VIII Division 1
2. ASTM Standards
3. NSF Standards
4. AWWA Standards

155-1.03 Basis of Design and Operating Conditions:

The hydropneumatic bladder tank shall be provided to maintain within the well discharge portion of the irrigation system between the pressure sustaining valve and the well pump check valves as needed to minimize well pump cycling.

The hydropneumatic bladder tank shall meet the following design conditions:

Fluid to be handled:	Irrigation Water
Minimum Tank Volume:	792 gallons
Maximum System Operating Pressure:	150 psi
Minimum System Operating Pressure:	85 psi
Minimum Tank Working Pressure:	175 psi
Configuration:	Horizontal
Tank Inlet/Outlet:	4-inches

Any proposed substitute equipment shall meet or exceed the specified operating conditions and shall be fully compatible with the piping, instrumentation, controls, and appurtenances shown on the Plans.

155-1.04 Submittals:

Submit the following:

1. Shop drawings.
2. Tank dimensions and weights.
3. Certified ASME calculations.
4. Bladder material information.
5. Factory pressure test reports.
6. Pressure relief valve information.
7. Anchorage details.
8. Startup procedures.
9. Operations and Maintenance Manuals.
10. Warranty documentation.

Shop drawings shall clearly identify:

1. Tank dimensions.
2. Tank volume.
3. Pressure rating.
4. Connection sizes and locations.
5. Bladder configuration.
6. Supports and saddles.
7. Appurtenances.
8. Anchorage requirements.

155-2 MATERIALS AND PRODUCTS**155-2.01 General:**

The hydropneumatic tank system shall be specifically designed for pressure regulation and surge control of the irrigation pumping system shown on the Plans.

Provide all materials and appurtenances necessary for a complete installation.

Hydropneumatic bladder tank and accessories shall be manufactured by AA Tanks, Amtrol, Flexcon, or approved equal

155-2.02 Tank Construction:

Tank shall be constructed in accordance with ASME Boiler and Pressure Vessel Code Section VIII Division 1. Provide ASME certification and manufacturer's stamp.

Tank shell and heads shall be carbon steel. Tank shall be rated for a minimum working pressure of 175 psi. Tank shall be suitable for outdoor installation.

Provide welded support saddles suitable for horizontal installation.

Provide lifting lugs suitable for transportation, installation, maintenance, and replacement.

155-2.03 Replaceable Bladder Assembly:

Provide a heavy-duty replaceable butyl rubber bladder.

Bladder materials shall be suitable for continuous irrigation water service.

Bladder shall completely separate water and compressed air within the tank.

The bladder shall be replaceable without removal of the tank shell from its installed position.

Provide access openings and hardware necessary for future bladder replacement.

155-2.04 Interior and Exterior Coatings:

Interior wetted surfaces shall be protected by a factory-applied epoxy lining system.

Exterior surfaces shall receive a factory-applied primer suitable for field finish coating.

Final field coating shall comply with Section 106.

155-2.05 Appurtenances:

Provide the following minimum appurtenances:

1. Air charging valve.
2. Pressure gauge connection.
3. Pressure switch connection.
4. Pressure transmitter connection.
5. Pressure relief valve connection.
6. Drain connection.
7. Vent connection.
8. Miscellaneous supports and appurtenances required for a complete installation.

All threaded appurtenance connections shall be NPT.

155-2.06 Pressure Relief Valve:

Provide a pressure relief valve factory installed on the hydropneumatic tank that is sized and selected by the tank manufacturer set for just under the maximum allowable working pressure of the hydropneumatic tank.

Relief valve discharge may be directed to grade immediately adjacent to the tank or to another location approved by the Engineer.

Provide all appurtenances necessary for a complete installation.

155-2.07 Supports and Anchorage:

Provide all anchor bolts, supports, washers, nuts, and miscellaneous anchorage hardware required for installation.

Anchor bolts exposed to weather shall be Type 316 stainless steel.

Coordinate anchorage requirements with the concrete foundation shown on the Plans.

155-3 EXECUTION

155-3.01 Installation:

Install the hydropneumatic tank in accordance with the manufacturer's recommendations.

Install the tank level and plumb.

Protect coatings and appurtenances from damage during installation.

Coordinate installation with piping, instrumentation, controls, and electrical systems.

155-3.02 Precharge Pressure:

Adjust the tank precharge pressure in accordance with the manufacturer's recommendations and the approved pumping system control strategy.

Record the final precharge pressure settings.

Submit final settings as part of the startup documentation.

155-3.03 Startup:

Provide the services of the tank manufacturer's field representative if required by the manufacturer to maintain warranty coverage.

Submit a written startup report documenting observations, settings, test results, and recommendations.

155-4 TESTING AND ACCEPTANCE

155-4.01 Factory Testing:

Tank shall be factory pressure tested. Submit certified factory pressure test reports that verify the following:

1. Structural integrity.
2. Pressure rating.
3. Bladder integrity.
4. Compliance with ASME requirements.

155-4.02 Field Testing:

Following startup, verify satisfactory operation of the completed tank installation as follows:

1. Leak-free operation.
2. Proper pressure regulation.
3. Proper bladder operation.
4. Acceptable response during pump starts and stops.
5. Proper operation of associated instrumentation and controls.

155-4.03 Acceptance:

The hydropneumatic tank system shall not be accepted until:

1. Installation is complete.
2. Startup is complete.
3. Testing is complete.
4. Required submittals have been submitted.
5. Deficiencies identified during testing have been corrected.

155-5 WARRANTY

155-5.01 General:

Provide a minimum two-year warranty covering all equipment furnished under this Section.

The warranty period shall commence upon acceptance of the Work by the City.

155-5.02 Covered Equipment:

Warranty shall include, but not be limited to:

1. Tank shell.
2. Bladder assembly.
3. Pressure relief valve.
4. Gauges.
5. Supports and anchorage.
6. Factory-installed accessories.
7. Miscellaneous appurtenances.

155-5.03 Warranty Requirements:

Repair or replace defective equipment during the warranty period at no cost to the City.

Provide all labor, materials, transportation, startup assistance, and testing necessary to complete warranty repairs.

Failures resulting from defects in design, materials, manufacture, workmanship, or installation shall be corrected under the warranty.

155-6 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

185 PIPE, VALVES, AND APPURTENANCES

185-1 GENERAL

185-1.01 Description:

Provide all labor, materials, equipment, and incidentals necessary to furnish, install, test, and place into service all piping, valves, fittings, appurtenances, supports, and miscellaneous components shown on the Plans and specified herein.

Work includes, but is not limited to:

1. Polyvinyl chloride (PVC) pipe.
2. Ductile iron pipe.
3. Carbon steel pipe.
4. Ductile iron fittings.
5. Restrained flange coupling adapters.
6. Dismantling joints.
7. Butterfly valves.
8. Gate valves.
9. Combination pressure sustaining and pressure reducing hydraulic control valve with solenoid shutoff.
10. Air release valves.
11. Check valves.
12. Pressure gauges.
13. Wye strainers.
14. Type F camlock adapter and cap.
15. Flow meter mechanical installation.
16. Pressure transmitter mechanical installation.
17. Pipe supports.
18. Hydrostatic testing.

Provide a complete and operational installation.

185-1.02 References:

Equipment and materials shall conform to the latest editions of the following standards and codes:

1. AWWA Standards
2. ASTM Standards
3. ANSI Standards
4. MSS Standards
5. NSF Standards
6. California Plumbing Code
7. California Building Code
8. SSPC Standards

185-1.03 Submittals:

Submit the following:

1. Pipe material certifications.
2. Valve manufacturer data.
3. Hydraulic control valve shop drawings and factory test reports.
4. Air release valve shop drawings.

5. Dismantling joint shop drawings.
6. Restrained flange coupling adapter shop drawings.
7. Factory applied coating information.
8. Hydrostatic testing procedures.
9. Coating manufacturer's application instructions.
10. Operations and Maintenance Manuals.

Submit shop drawings identifying dimensions, materials, pressure ratings, factory applied coatings, connection types, and appurtenant equipment.

185-1.04 General Requirements:

Unless otherwise indicated on the Plans:

1. All buried fittings shall be ductile iron.
2. All buried joints shall be restrained.
3. All buried ductile iron pipe and fittings shall receive standard asphaltic coating and polyethylene encasement.
4. Above-grade and vault interior piping, fittings, valves, discharge heads, well casing extensions, supports, and other exposed ferrous components shall be coated in accordance with Section 106.
5. Pipe segments that transition between above-grade and below-grade installations shall be treated as above-grade piping.
6. Magnetic flow meter, pressure indicating transmitter, level transmitters, controls, instrumentation, wiring, and electrical components shall be provided in accordance with Section 201.
7. All joints shall be restrained unless specifically indicated otherwise on the Plans.
8. All piping, fittings, valves, restraints, couplings, adapters, appurtenances, and associated components shall be suitable for the maximum operating pressures and hydrostatic test pressures specified herein without leakage, movement, distortion, or damage.

The Contractor shall verify dimensions, elevations, connection types, and field conditions prior to ordering materials.

185-2 PIPE MATERIALS

185-2.01 General:

Pipe, fittings, valves, and appurtenances shall conform to the requirements specified herein and shall be suitable for the operating conditions shown on the Plans.

Unless otherwise indicated on the Plans, all components of a piping system shall be compatible with adjoining materials, fittings, valves, and appurtenances.

Pipe, fittings, valves, and appurtenances shall be furnished complete with all accessories required for a complete installation.

185-2.02 PVC Pipe:

PVC pipe shall be DR-18 pressure class 235 conforming to AWWA C900.

All PVC pipe joints shall be restrained. PVC pipe joints shall be gasketed bell end or gasketed coupling of the rubber sealing type. Bell end type joints shall be manufactured as an integral part of the pipe with a wall thickness not less than the pipe thickness. Solvent-cement couplings shall not be allowed.

PVC pipe shall only be used where specifically indicated on the Plans.

Ductile iron pipe conforming to the requirements of Section 185-2.03 may be substituted for PVC pipe at no additional cost to the City. The Contractor shall be responsible for providing all fittings, restraints, and appurtenances required by the proposed substitution.

Elastomeric gaskets shall conform to ASTM Standard D3139. Rubber rings installed at fittings and valves shall be solid rubber as recommended by the manufacturer.

Lubricants shall be suitable for use with PVC pipe and as recommended by the manufacturer.

185-2.03 Ductile Iron Pipe:

Ductile iron pipe shall be Pressure Class 350 minimum conforming to AWWA C151. Pipe shall be furnished with the end types shown on the Plans. Additional joints required to complete the Work may not be shown on the Plans and shall be push-on restrained joints or restrained mechanical joints.

Pipe shall be cement-mortar lined in accordance with AWWA C104.

Exterior coating for below grade piping shall be provided with a standard asphaltic coating. Ductile iron piping to be used above-grade shall be provided with a shop primer for field finish coating as indicated in Section 106.

All buried ductile iron pipe shall be polyethylene encased in 8-mil polyethylene tube in accordance with AWWA C105.

All buried joints shall be restrained.

Ductile iron pipe shall be manufactured by U.S. Pipe, American Ductile Iron Pipe, McWane Ductile, or approved equal.

185-2.04 Carbon Steel Pipe and Fittings:

Carbon steel pipe shall be standard weight conforming to ASTM A53 Grade B or ASTM A106 Grade B unless otherwise indicated on the Plans.

Carbon steel fittings shall be standard weight welding fittings conforming to ASTM A234 WPB or approved equal.

Flanges shall conform to ANSI B16.5 Class 150 unless otherwise indicated on the Plans.

Carbon steel piping and fittings may be used in lieu of ductile iron piping and fittings above-grade and within utility vaults unless specifically indicated otherwise on the Plans.

Carbon steel pipe and fittings shall only be used above-grade or within utility vaults unless specifically indicated otherwise on the Plans.

Pipe and fittings shall be suitable for flanged and welded construction.

Carbon steel pipe and fittings shall be suitable for a minimum working pressure of 250 psi.

All flanged connections shall be furnished complete with gaskets, bolts, nuts, washers, and appurtenant hardware required for a complete installation.

Carbon steel pipe and fittings shall be straight, true, and free from dents, cracks, excessive corrosion, lamination defects, or other imperfections that could impair the performance of the piping system.

All fabrication welding shall be performed by qualified welders using procedures appropriate for the materials being joined.

Pipe supports, anchors, guides, and restraints shall be provided as shown on the Plans and as required for a complete installation.

All exposed carbon steel pipe, fittings, flanges, supports, and appurtenant components shall receive the coating system specified in Section 106.

185-2.05 Ductile Iron Fittings:

Ductile iron fittings shall have a minimum pressure rating of 350 psi conforming to AWWA C110 or AWWA C153.

All buried fittings shall be ductile iron and fully restrained.

Buried flanged joints shall only be permitted where specifically indicated on the Plans.

Unless specifically indicated otherwise on the Plans, buried ductile iron fittings shall utilize restrained mechanical joints. Restrained mechanical joints shall utilize Megalug Series 1100, Series 1700, or approved equal restraint devices.

All buried ductile iron fittings shall receive standard asphaltic coating and polyethylene encasement in accordance with AWWA C105.

Above-grade ductile iron fittings shall be flanged unless otherwise indicated on the Plans.

Above-grade ductile iron fittings shall receive a shop primer suitable for field finish coating in accordance with Section 106.

185-2.06 Restrained Flange Coupling Adapters:

Restrained flange coupling adapters shall conform to AWWA C219 and shall be suitable for the maximum operating and hydrostatic test pressures specified herein. Restrained flange coupling adapters shall provide full restraint equivalent to the adjoining piping system.

Restrained flange coupling adapters shall be furnished complete with harness lugs and stainless steel tie rods capable of resisting all thrust forces associated with the operating and test pressures of the system.

Flange coupling adapter end rings and bodies shall be manufactured from ASTM A36 carbon steel and supplied with a fusion bonded epoxy lining and coating conforming to the requirements of Section 106.

Restrained flange coupling adapters shall be Series RFCA manufactured by Romac Industries, Inc., or approved equal.

185-2.07 Dismantling Joints:

Dismantling joints shall provide a minimum adjustment range of 3 inches.

Dismantling joints shall be rated to withstand the required water working pressure indicated herein and shall be fully restrained to resist the forces imposed by the required water working pressure when assembled.

Dismantling joint end ring and body shall be manufactured of ASTM A36 carbon steel and supplied with a fusion bonded epoxy lining and coating conforming to the requirements of Section 106.

Dismantling joints shall be furnished with ANSI B16.5 Class 150 flanges unless otherwise indicated on the Plans. Flange drilling and bolt patterns shall be compatible with the adjacent piping and equipment.

Dismantling joint tie-rods shall be stainless steel per ASTM A193 Grade B8 or B8M.

Dismantling joints shall be Series DJ400 manufactured by Romac Industries, Inc., Model 975 manufactured by Smith-Blair, Inc., or approved equivalent.

185-2.08 Fasteners and Gaskets:

All bolts and nuts for flanges and flange adapters shall be stainless steel, Type 316 conforming to ASTM A193 Grade B8M. Mechanical joint tee bolts and nuts shall be Cor-Ten steel, Type 316 stainless steel, or approved equal.

Flange gaskets shall be full-face EPDM elastomer gaskets with three bulb type rings molded into both faces of the gasket, 1/8 inch thick, per AWWA C207. Gaskets for buried flanged joints shall be suitable for underground water service.

185-2.09 Tracer Wire:

All below-grade non-metallic piping shall be provided with tracer wire. Wire shall be #10 gauge insulated solid copper.

Buried splices in the tracer wire shall be avoided by terminating the ends of the tracer wire in a concrete utility structure (i.e. valve box, meter box, etc.) Where an underground splice in the tracer wire is unavoidable, the ends of the wire shall be stripped bare and fastened together with an appropriately sized brass split bolt. The connection shall be then completely encased with 100% silicone sealant and tightly wrapped with tape.

185-2.10 Pipe Supports:

All pipe supports and accessories shall be manufactured by a single manufacturer. All pipe supports and pipe support accessories shall be made from structural grade stainless steel.

Supports shall be designed to accommodate the weight of piping, fittings, valves, and appurtenant equipment shown on the Plans

Locate supports immediately adjacent to any change in the direction of pipe. In case of concentrated loads (such as valves) the supports shall be placed as indicated on the Project Plans.

Pipe supports shall be installed at the locations and in accordance with the details shown on the Plans.

185-3 VALVES AND APPURTENANCES

185-3.01 General:

Valves and appurtenances shall be suitable for irrigation water service and the operating conditions shown on the Plans.

Unless otherwise indicated on the Plans, valves shall have a minimum pressure rating of 250 psi and shall be furnished complete with all operators, hardware, accessories, supports, restraints, appurtenances, and coatings required for a complete installation.

All buried valves shall be installed in valve boxes as shown on the Plans. All above-grade valves and appurtenances shall be coated in accordance with Section 106.

185-3.02 Butterfly Valves:

Butterfly valves shall conform to AWWA C504 and shall be rubber-seated, tight-closing valves suitable for bi-directional service.

Valve bodies shall be ductile iron. Valve discs shall be epoxy-coated ductile iron or Type 316 stainless steel. Valve shafts shall be Type 316 stainless steel. Valve seats shall be EPDM.

Buried butterfly valves shall be provided with mechanical joint ends unless otherwise indicated on the Plans. Above-grade butterfly valves shall be provided with flanged ends unless otherwise indicated on the Plans.

Above-grade butterfly valves shall be equipped with handwheel operators.

Butterfly valves shall be manufactured by Pratt, DeZurik, Mueller, Kennedy, or approved equal.

185-3.03 Gate Valves:

Gate valves shall conform to AWWA C515 and shall be resilient-seated, non-rising stem gate valves.

Valve bodies and bonnets shall be ductile iron. Gates shall be fully encapsulated with EPDM rubber.

Buried valves shall be furnished with mechanical joint ends unless otherwise indicated on the Plans.

Valve operating nuts shall be two-inch square operating nuts compatible with City maintenance equipment.

Gate valves shall be manufactured by Mueller, American Flow Control, Clow, Kennedy, or approved equal.

185-3.04 Combination Pressure Sustaining and Pressure Reducing Hydraulic Control Valve with Solenoid Shutoff:

Provide a pilot-operated combination pressure sustaining and pressure reducing hydraulic control valve with integral solenoid shutoff at the location shown on the Plans. The valve shall be configured as a combination pressure sustaining and pressure reducing valve throughout the full operating range.

The valve shall be a hydraulically operated, diaphragm-actuated, globe-pattern control valve designed to automatically maintain the required upstream pressure for proper operation of the well pumping system while simultaneously reducing downstream pressure to the setpoints established during startup.

The control valve assembly shall include all pilots, tubing, fittings, gauges, isolation valves, strainers, accessories, and appurtenances required for a complete and fully functional installation.

Valve body and cover shall be ductile iron. Internal trim, pilot tubing, fittings, and wetted hardware shall be stainless steel.

Valve body and components shall have a pressure rating of at least 250 psi.

The diaphragm assembly shall be capable of full-stroke operation throughout the specified operating range and shall be suitable for continuous-duty irrigation water service.

The hydraulic control valve shall be configured for controlled slow opening and slow closing operation. Opening and closing rates shall be field adjustable and coordinated with the pumping system controls to minimize hydraulic surges, water hammer, and pressure transients. Final opening and closing rates shall be established during startup and adjusted as required by the Engineer.

The valve shall be furnished with an anti-cavitation package suitable for the operating conditions shown on the Plans. The anti-cavitation package shall be designed to prevent cavitation damage throughout the full range of anticipated flows, pressures, and operating conditions associated with the project.

The Contractor shall submit manufacturer's sizing calculations and anti-cavitation analysis demonstrating suitability of the proposed valve for the maximum flow rates, pressure differentials, and operating conditions specified herein.

The valve shall be factory assembled and factory tested prior to shipment. Certified factory test reports shall be submitted for review.

The solenoid operator shall be suitable for operation with the control system specified in Section 201 and shall permit remote opening and closing of the valve.

Valve shall be manufactured by Cla-Val, Singer Valve, or approved equal. Basis of design is Cla-Val Model 92-07 (Manufacturer Drawing No. 85012) with Solenoid Shutoff and Anti-Cavitation Trim.

Provide manufacturer's startup assistance and adjustment of the final pressure sustaining, pressure reducing, anti-cavitation, and opening/closing rate settings following completion of installation.

185-3.05 Air Release Valves:

Valves shall be combination air release and vacuum valves and installed at the locations shown on the Plans.

Valve bodies shall be epoxy coated ductile iron. Internal trim and floats shall be Type 316 stainless steel. Valves shall be suitable for irrigation water service and the maximum operating pressures shown on the Plans.

Valves shall be manufactured by Val-Matic, APCO, A.R.I., or approved equal.

185-3.06 Check Valves:

Check valves shall be center-guided, spring-loaded, non-slam type.

Valve bodies shall be ductile iron. Internal trim and springs shall be stainless steel.

Valves shall be designed to prevent reverse flow and minimize surge conditions associated with pump shutdown.

Valve shall be Val-Matic Series 1800A or approved equal providing equivalent non-slam performance.

185-3.07 Pressure Gauges:

Provide liquid-filled pressure gauges at the locations shown on the Plans.

Pressure gauges shall have a minimum dial diameter of 4-1/2 inches.

Gauge cases and movements shall be stainless steel.

Pressure sensing elements shall be bronze, brass, or stainless steel and suitable for irrigation water service.

Gauges shall have an accuracy of 1 percent of full scale. Gauge ranges shall be selected such that normal operating pressures fall within the middle third of the gauge scale.

Gauges located upstream of the combination pressure sustaining and pressure reducing hydraulic control valve shall have a range of approximately 0 to 200 psi.

Gauges located downstream of the combination pressure sustaining and pressure reducing hydraulic control valve shall have a range of approximately 0 to 150 psi unless otherwise indicated on the Plans.

Provide pressure snubbers, gauge cocks, and isolation valves as required for a complete installation.

Pressure gauges shall be manufactured by Ashcroft, WIKA, Winters Instruments, or approved equal.

185-3.08 Wye Strainers:

Strainer body shall be ductile iron or carbon steel matching the adjoining piping system. Strainer screens shall be Type 316 stainless steel.

Strainers shall be furnished complete with bottom blow-off connection and cleanout cover.

Strainers shall have a minimum pressure rating of 250 psi.

185-3.09 Type F Camlock Adapter and Cap:

The 4-inch Type F camlock adapter shown on the Plans shall be Type 316 stainless steel and furnished complete with stainless steel cap, chain, fasteners, and associated appurtenances required for a complete installation.

185-4 EXECUTION

185-4.01 General:

Install piping, valves, fittings, appurtenances, supports, restraints, and miscellaneous equipment in accordance with the Plans, approved shop drawings, manufacturer's recommendations, and applicable industry standards.

Install all components plumb, true, and properly aligned.

Provide all labor, equipment, temporary supports, and materials required for a complete installation.

185-4.02 Piping Installation:

Install piping at the locations and elevations shown on the Plans.

Protect piping from damage during handling and installation.

Install restrained joints and thrust restraint systems in accordance with the manufacturer's recommendations.

Install buried piping with continuous bearing and support throughout its length.

185-4.03 Valve and Appurtenance Installation:

Install valves, dismantling joints, restrained flange coupling adapters, air release valves, strainers, gauges, and miscellaneous appurtenances at the locations shown on the Plans.

Install valves in the orientation recommended by the manufacturer.

Provide access for operation, maintenance, and future removal.

185-4.04 Instrumentation Installation:

Magnetic flow meter, pressure indicating transmitter, submersible level transmitters, controls, instrumentation, wiring, and electrical components shall be provided in accordance with Section 201.

Provide all mechanical supports, piping connections, spool pieces, couplings, vault penetrations, tapping points, and appurtenances necessary for a complete installation.

Install the magnetic flow meter in accordance with the manufacturer's recommendations and the straight-pipe requirements shown on the Plans.

Install pressure indicating transmitters at the locations shown on the Plans.

Pressure indicating transmitters shall be installed on the side of the pipe unless otherwise indicated on the Plans.

185-4.05 Tie-In to Existing Irrigation Main:

Existing 6-inch irrigation main is anticipated to be asbestos cement pipe (ACP) of unknown condition. Contractor shall protect existing ACP from unnecessary damage.

Contractor shall pothole point of connection and field verify pipe dimensions prior to ordering couplings, fittings, and adapters. All couplings, fittings, and adapters necessary shall be provided at no additional cost to the City.

185-4.06 Testing:

Flush all piping to remove sediment, debris, and foreign material from the piping system prior to hydrostatic testing and placement into service.

All piping shall be hydrostatically tested following installation and prior to placing the system into service.

Provide all labor, equipment, water, gauges, temporary restraints, bulkheads, and appurtenances necessary to perform the testing.

Piping located upstream of the combination pressure sustaining and pressure reducing hydraulic control valve shall be hydrostatically tested at 225 psi.

Piping located downstream of the combination pressure sustaining and pressure reducing hydraulic control valve shall be hydrostatically tested at 150 psi.

Maintain test pressure for a minimum of two (2) hours.

No visible leakage shall be permitted.

All piping, valves, fittings, vault penetrations, joints, and appurtenances shall remain leak free during the testing period.

Piping that fails to satisfy the specified test requirements shall be repaired or replaced by the Contractor at no additional cost to the City.

Following completion of repairs, the affected section shall be retested until the specified requirements are achieved.

185-5 Payment:

See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

201 ELECTRICAL SYSTEMS

201-1 GENERAL

201-1.01 SCOPE OF WORK

- A. The Contractor shall install, ready for use, the electrical system as specified herein and shown on the Contract drawings. This document describes the function and operation of the system and particular components, but does not necessarily describe all necessary devices. All components and devices shall be furnished and installed as necessary to provide a complete operable and reliable system for accomplishing the functions and meeting the performance set forth hereinafter.
- B. Furnish all required labor, materials, project equipment, tools, construction equipment, safety equipment, transportation, test equipment, incidentals and services to provide a complete and operational electrical system as shown on the Electrical-Series Contract Drawings, included in these Specifications, or necessary for fully operating facility.
- C. Examine the specification and Drawings for mechanical equipment and provide all circuit breakers, switches, pushbuttons and appurtenances which are not specified to be with the mechanical equipment. Erect all electrical equipment not definitively stated to be erected by others, furnish and install conduit, wire and cable and make connections required to place all equipment in complete operation.
- D. It is recommended that a pre-bid site visit is requested to accomplished the following:
 - 1. Thoroughly examine existing conditions before submitting their bid proposal to perform any work. Compare site conditions with data given on the plans or in these Specifications. No allowance shall be made for any additional costs incurred by the Contractor due to their failure to have examined the site or to have failed to report any discrepancies to the Engineer prior to bid.
 - 2. It is the Contractor's responsibility to be fully familiar with the existing utility locations, conditions and local requirements and regulations.
 - 3. Verify all measurements and conditions and shall be responsible for the correctness of same. No extra compensation will be allowed because of differences between Work shown on the Drawings and measurements at the site.
- E. Deviations to locations and conduit routing, as shown on the Plans, must first be approved by the Engineer.
 - 1. All plan deviations made by the Contractor shall be reflected on the Contractor supplied "Record Drawings."
 - 2. All engineering, drafting, and clerical expenses associated with updating the Record Drawings due to any major unauthorized changes shall be the responsibility of the Contractor and will be deducted from the Contract.
- F. The major areas in the scope of work as illustrated on Electrical Contract drawings, which includes both the furnishing and installation of:
 - 1. Meter/Main Switchboard, MCC, soft starter motor controls, and associated hardware.
 - 2. Processor Logic Controller (PLC), Operator Interface (OI) hardware, radio and programming for controlling the pumps remotely, and other miscellaneous devices. The Contractor is to provide all configuration, programming, integration and setup of the local PLC, and OI.

3. Panelboard and panelboard transformer.
 4. Instrumentation and other miscellaneous devices. This includes all wiring and cables.
 5. New PLC and Operator Interface programming.
 6. Conduits and the field interconnection wiring between the Control Panels, instrumentation, etc. and equipment provided under all other Divisions.
 7. Provide all necessary conduits, junction boxes, grounding system, field interconnection wiring, hardware, fittings, and devices to connect the designated equipment and wiring.
 8. All necessary miscellaneous shut off, sample, and calibration valves to sensors.
 9. Provide trenching, backfilling, and compaction for all underground conduit routes, concrete pads, and pull boxes.
 10. Concrete pads and supports for electrical and instrumentation equipment.
 11. Remove and dispose of all excess dirt, paving, concrete, and other materials from site work.
- G. Existing site is limited in space. It is the Contractor's responsibility to provide an electrical and instrumentation package to fit in the allocated space.
- H. Contractor shall field verify existing conditions as required to complete the project.
- I. It is the Contractor's responsibility for obtaining PLC, and OI, configuration software, manuals and disks necessary for the Contractor to program and configure the PLC, and OI system.
- J. The following specifications incorporate specific equipment and devices that are preferred by the City because of their serviceability, to match existing equipment, because of the local availability of labor, parts and materials, or because of the ability of the City to umbrella the equipment under existing maintenance contracts.
- K. All electrical work shall conform with the National Electric Code (NEC) 2023 issue. Nothing on the Plans or in the Specifications shall be construed to permit work or materials not conforming to these codes and standards.
- L. All panels, panelboards, panelboard transformers, PLC hardware, etc. shall be supplied by one System Supplier. All panels and instrumentation listed herein shall be supplied by the same System Supplier. This includes, but is not limited to all work necessary to select, furnish, supervise installation, calibrate, program, and place into operation all transmitters, instruments, controllers, alarm equipment, monitoring equipment, and accessories as specified herein.

201-1.02 CODES AND STANDARDS

- A. All electrical/instrumentation equipment and materials, including installation and testing, shall conform to the following applicable codes and standards:
1. ANSI - American National Standards Institute, Inc.
 2. EIA - Electronics Industries Association.
 3. ETL - Electrical Testing Laboratories.
 4. FM - Factory Mutual.
 5. GO128 - General Order No. 128, Rules for Construction of Underground Electrical Supply and Communication Systems, Public Utilities Commission of the State of California.
 6. IEEE - Institute of Electrical and Electronics Engineers.
 7. ICEA - Insulated Power Cable Engineers' Association.

8. ISA - International Society of Automation (ISA) Standards (formerly Instrument Society of America).
 9. NEC - National Electrical Code, 2023 Edition.
 10. NEMA - National Electrical Manufacturers Association.
 11. NETA - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems, International Electrical Testing Association.
 12. NESC - National Electrical Safety Code.
 13. NFPA - National Fire Protection Agency & NFPA820
 14. OSHA - Occupational Safety and Health Act Standards.
 15. UL - Underwriter's Laboratories, Inc.
- B. The revisions of these codes and standards in effect on the date of issuance of the Contract Documents shall apply.
 - C. Codes and standards referenced shall be considered minimum acceptable work.
 - D. In instances where two or more codes are at variance, the most restrictive requirements shall apply.
 - E. Nothing on the Drawings or in the Specifications shall be construed to permit work or materials not conforming to the preceding codes and standards.
 - F. All work shall also be performed in accordance with the State, County, City, and local Utility standards and codes.
 - G. The Contractor shall furnish without extra charge any additional material and labor which may be required for compliance with these codes and standards, even though the work is not explicitly mentioned in the Specifications or shown on the Contract Electrical Drawings.
 - H. Amperage listed on the single-line Drawings for motors are per NEC Table 430.250 and may not necessarily match that of the equipment supplied. It is the electrical system supplier and Contractor's responsibility to furnish equipment sized for the motors supplied for this project at no additional cost.

201-1.03 RELATED WORK IN OTHER SECTIONS

- A. Provide an electrical system that interfaces to work performed under other Mechanical and Equipment Sections of these Specifications.
- B. The following is part of Electrical Section:
 1. Section 203 – Electrical System Analysis

201-1.04 ELECTRICAL CONTRACTOR QUALIFICATIONS

- A. It is the intent of this Division that the complete responsibility for management and installation of the electrical and instrumentation required for this project be by a qualified Electrical Contractor. This responsibility includes, but not limited to, supervision and coordination of work performed by all suppliers of Electrical Section.
- B. Uncertified electricians shall not perform electrical work for which certification is required per Labor Code Section 3099. Electricians shall be required to carry proof of certification on their person at all times. Electricians found on the jobsite without proof of certification will be asked

to leave, prohibited from working on-site until proof of certification has been provided and may be reported to the Contractors State License Board (CSLB).

- C. Contractor shall submit the proposed Electrical Subcontractor and System Supplier with a complete set of bid documents that will be used on this project.
- D. If the Contractor, Electrical Subcontractor, and System Supplier listed in bid documents are deemed not qualified by the City, they will have their bid rejected at the City's sole discretion and the next qualified bidder selected.
- E. The Electrical Subcontractor shall meet the following minimum qualifications:
 - 1. Has a current C-10 Electrical Subcontractor's License.
 - 2. Has regularly engaged in similar electrical contracting for the Municipal Water and Wastewater Industry.
 - 3. Has successfully performed work of similar or greater complexity on at least two previous projects under one company name and under the present company name.
 - 4. Has all persons performing work as electricians certified by the California Apprenticeship Council per California Labor Code Section 3099.
 - 5. Has been actively engaged in the type of electrical and instrumentation work specified in this Division for a minimum of two years.

201-1.05 SYSTEM SUPPLIER QUALIFICATIONS

A. General:

- 1. It is the intent of this Division that complete responsibility in the supplying of the MCC/PLC, all instrumentation, and other equipment required for this project be supplied by one System Supplier. This responsibility includes, but not limited to, all work necessary to select, furnish, program, supervise installation, calibrate, and place into operation all transmitters, instruments, controllers, alarm equipment, monitoring equipment, and accessories as specified herein.
- 2. The system supplier shall have an on staff project engineer with prior experience on similar sized projects. This project engineer shall coordinate the technical aspects of this project and prepare the submittals and drawings. The system supplier project engineer shall attend all coordination meetings and be on-site when requested by the Engineer.
- 3. Pre-Qualified System Suppliers
 - a. The Suppliers listed below have been determined to meet minimum qualifications specified in this Division and are pre-qualified by the Owner for providing supplier bids as system suppliers on the project.
 - 1) Advanced Integration and Control, AIC (phone 916 644-9500)
 - 2) Primex Controls (phone 707 449-0341)
 - 3) Technical Services, Inc. (TSI) (phone 707 678-1111)

201-1.06 CONTRACT DOCUMENTS

- A. The Contract drawings and specifications are intended to be descriptive of the type of electrical system to be provided; any error or omissions of detail in either shall not relieve the Contractor from the obligations thereunder to install in correct detail any and all materials necessary for a complete operational system, at no additional cost.
- B. The Contract drawings are generally diagrammatic; exact locations of existing equipment and proposed location for new electrical products shall be verified in the field with the Engineer. Except where special details on drawings are used to illustrate the method of installation of a

particular piece or type of equipment or materials, the requirements or descriptions in this Section shall take precedence in the event of conflict.

- C. The Contract Electrical elementary, elevation and one-line diagrams are the basis of the electrical system to be provided and are for reference only. It is the Contractor's responsibility to adjust and make minor revisions to the diagrams as necessary for operational system at no additional cost to the City. Additional isolators, relays, wiring, terminal blocks, and appurtenances, shall be provided for an operation system at no additional cost to the City.
- D. Location of equipment, inserts, anchors, panels, pull boxes, conduits, stub-ups, and fittings for the electrical system are to be determined by the Contractor and Engineer at time of installation. Contractor shall make minor adjustments to locations of electrical equipment required by existing conditions and coordination with other trades at no additional cost to City.
- E. The Conduit and Wire Routing Schedule, wire fill, and number of conduits are based on the best information available.
 - 1. It is the Contractor's responsibility to modify the conduit schedule based upon approved Shop Drawings for the actual equipment. Such modifications in conduit sizes and numbers of conductors shall be at no additional cost to the City, if such changes are the direct result of the approved equipment selected by the Contractor.
 - 2. A copy of the Conduit Schedule and Electrical plans showing conduit routing shall be updated weekly by the Contractor. Progress payments will be withheld if during monthly checks it is found that the Contractor fails to maintain the Conduit Schedule updates.
- F. Electrical & instrumentation, conduit & wire lengths shown on Project Plans are approximate. The Contractor is responsible for determining actual lengths for bidding and installation purposes.
- G. The Contractor shall examine the architectural, mechanical, structural, civil, electrical and instrumentation equipment provided under other Sections of this Contract in order to determine the exact routing and final terminations for all conduits and cables. The exact locations and routing of cables and conduits shall be governed by structural conditions, physical interferences, and the physical location of wire terminations on equipment. Conduits shall be stubbed up as near as possible to equipment.
- H. All equipment shall be installed and located so that it can be readily accessed for operation and maintenance. The Engineer reserves the right to require minor changes in location of equipment, without incurring any additional costs.
- I. Provide means to furnish equipment and accessories, do the installation, complete connections, submit documentation, perform start-up, and be responsible for the warranty.
- J. Where conduits are shown as "home runs" on the Contract drawings or stated to be furnished, but not explicitly shown, as part of the scope of work; the Contractor shall provide all fittings, boxes, wiring, etc. as required for completion of the raceway system in compliance with the NEC and the applicable specifications in this Section.
- K. No changes from the Contract drawings or specifications shall be made without written approval of the Engineer. Should there be a need to deviate from the Contract documents, submit written details and reasons for all changes to the Engineer for favorable review.

- L. When existing conduits are to be used, it is the Electrical Contractor's responsibility to verify conduit size and routing. This includes all potholing or other location methods. Existing conductors and conduits damaged by Contractor during construction shall be repaired or replaced at no cost to City.
- M. The resolution of conflicting interpretation of the Contract documents shall be determined by the Engineer.
- N. The Contractor shall coordinate with other Suppliers on the project for a complete and operable system.
- O. It is the System Supplier's responsibility for obtaining instrumentation transmitter configuration software, manuals and disks necessary for the Contractor to program and configure the instrumentation transmitters. All software and manuals shall be licensed and turned over to the City following construction.
- P. The Electrical Contractor shall maintain a separate set of neatly and accurately marked set of Record Documents, consisting of spreadsheets, specifications and full size blue-line Electrical Contract Drawings.
 - 1. These documents are to be used specifically for recording the as built locations and layout of all electrical and instrumentation equipment, routing of raceways, junction and pull boxes, and other diagram or document changes.
 - 2. These Record documents shall be kept up-to-date during the progress of the job, with all "change orders", submittal modifications, and construction changes shown and stamped with "As-Built" at end of job.
 - 3. These Record documents shall not be used for daily construction use and shall not contain any mark-ups that are unrelated to as-built corrections.
 - 4. The following lists the record documents shall be as-built by Electrical Contractor:
 - a. Electrical Drawings.
 - b. Panelboard schedules.
 - c. Conduit and Wire Routing Schedule.
 - 1) A copy of the Conduit and Wire Routing Schedule and Electrical plans showing conduit routing shall be updated weekly by the Contractor. Progress payments will be withheld if during monthly checks it is found that the Contractor fails to maintain the Conduit Schedule updates.
 - d. Lighting Schedule.
 - e. Duct banks and their routing with offset measurement and indicate changes in depth.
 - 5. The following lists the record documents that shall be as-built by System Supplier to be maintained by Electrical Contractor:
 - a. I-Series Drawings
 - b. Instrumentation Index.
 - 6. Record documents shall be kept current weekly with all "change orders", submittal modifications, and construction changes shown. Record Documents shall be subject to the inspection by the Engineer at all times, progress payments or portions thereof may be withheld if Record Documents are not accurate or current.
 - 7. When documents are changed, they shall be marked with erasable colored pencils using the following coloring scheme:
 - a. Additions - red
 - b. Deletions - green
 - c. Comments - blue
 - d. Dimensions - black

8. Show the following on the Electrical Record Contract Drawings by dimension from readily obtained base lines:
 - a. Exact location, type and function of electrical and instrumentation equipment and devices.
 - b. Precise routing and locations of underground conduits, pullboxes, junction boxes, and appurtenances that make-up the raceway system.
 - c. Show the dimensions, location and routing of electrical work, which will become permanently concealed.
 - d. Show complete routing and sizing of any significant revisions to the systems shown.
9. Prior to acceptance of the work, the Contractor shall deliver to the Engineer one set of record full size drawings neatly marked accurately showing the information required above.

201-1.07 COORDINATION

- A. The Contractor shall coordinate the electrical work with the other trades, code authorities, utilities, and the Engineer; with due regard to their work, and towards promotion of a rapid completion of the project. If any cooperative work must be altered due to lack of proper supervision of such, or failure to make proper provisions, then the Contractor shall bear expense of such changes as necessary to be made in work of others.
- B. Manufacturer's directions and instructions shall be followed in all cases where such is not shown on the Contract Drawings or herein specified.
- C. The Contractor shall be responsible for coordinating PLC/OI design review meetings specified herein.
- D. The Contractor shall coordinate with PG&E and AT&T for connections.
- E. The Contractor shall coordinate with the City, PLC programmer, Engineer, and System Supplier to test the entire system.
- F. The Contractor shall schedule all the required work with the City, including each shutdown period as indicated in Section 121 of these Specifications. Each shutdown shall be implemented to minimize disruption of the existing operations. The work to be provided under this Contract shall not disrupt any of the existing operations without prior approval.
 1. Contractor shall make provisions for portable generators and automatic transfer switches when areas of the irrigation system will be without power.
 2. The City reserves the right to delay, change, or modify any shutdown at any time, at no additional cost to the City, when the risk of such a shutdown would jeopardize the operation of system.
 3. Contractor is advised that during change out of existing controls, demolition of existing conduits, installation of new conduits, etc., Contractor is responsible to keep equipment running for all necessary system operation. The Contractor shall install temporary generators, motor controls, panelboards, power panelboards, wiring, etc. to keep all irrigation system equipment powered and automatic controls functional.
- G. Schedule within 20 days after award of Contract all service installations and connections with utilities. Delays due to lack of effort by the Contractor which delay the project completion for lack of utility services will not be considered valid and Contract liquidated damages will be assessed.

1. The Contractor is made aware that once PG&E has conducted the final inspection of their facilities, it may take up to four weeks for the related meter installations and each system to become active. It is expected that the Contractor will schedule their operations accordingly and working days will only be suspended during this timeframe if, in the opinion of the Engineer, all items of work are complete except those that need these active systems for completions.
- H. The Contractor shall cease work at any particular point, temporarily, and transfer his operations to such portions of work as directed, when in the judgment of the Engineer it is necessary to do so.
- I. Prior to commencing construction, the General Contractor shall arrange a conference with the General Contractor, Electrical Contractor, System Supplier, Resident Engineer & City as well as all equipment and system suppliers vital to the current phase of work. During the meeting, the equipment supplier shall verify types, sizes, locations, installation requirements, controls and diagrams of all equipment furnished. The Equipment and System Suppliers shall, in writing, inform the Engineer that all phases of coordination of this equipment have been covered and if there are any unusual conditions, they shall be enumerated at this time.
- J. Only Electrical Contractors who are PG&E certified may be allowed to terminate into PG&E equipment and utility metering sections.

201-1.08 SUPERVISION

- A. The General Contractor shall schedule all activities, manage all technical aspects of the project, coordinate submittals and drawings, and attend all project meetings associated with the electrical work.
- B. The General Contractor shall supervise all electrical work, from the beginning to completion and final acceptance.
- C. The General Contractor shall supervise and coordinate all electrical work to ensure each phase of the project, submittal, delivery, installation, and acceptance testing, etc. is completed within the allowable scheduled time frames.
- D. The General Contractor shall be responsible for obtaining, preparing, completing, and furnishing all paper work specified in this Section; which shall include transmittals, submittals, forms, documents, manuals, instructions, and procedures.

201-1.09 INSPECTIONS

- A. All work or materials covered by the Contract documents shall be subject to inspection at any and all times by the Engineer. If any material does not conform to the Contract documents, or does not have a favorably reviewed submittal status; then the Contractor shall, within three days after being notified by the Engineer, remove said material from the premises; and if said material has been installed, the entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the Contractor.
- B. Work shall not be closed in or covered over before inspection and approval by the Engineer. All costs associated with uncovering and making repairs where non-inspected work has been performed shall be borne by the Contractor.

- C. The Contractor shall cooperate with the Engineer and provide assistance at all times for the inspection of the electrical system under this Contract. The Contractor shall remove covers, provide access, operate equipment, and perform other reasonable work that, in the opinion of the Engineer, will be necessary to determine the quality and adequacy of the work.
- D. Before request for final inspection is made, the Contractor shall submit to the Engineer in writing, a statement that the Contractor has made his own thorough inspection of the entire project enumerating punch list items not complete and that the installation and testing is complete and in conformance with the requirements of this Section.
- E. The City may arrange for a facility inspection by Cal-OSHA Consultation Service at any time. The Contractor shall make the necessary corrections to bring all work in conformance with Cal-OSHA requirements, all at no additional cost to the City.
- F. Contractor will be Responsible for any Additional Cost for Overtime, Weekend Overtime or Differential Time, Expenses for Inspection of Defective Work that has to be re-inspected.

201-1.10 JOB CONDITIONS

- A. The Contractor shall make all arrangements and pay the costs thereof for temporary services required during construction of the project, such as temporary electrical power and telephone service. Upon completion of the project, remove all temporary services, equipment, material and wiring from the site as the property of the Contractor.
- B. The Contractor shall provide adequate protection for all equipment and materials during shipment, storage and construction. Equipment and materials shall be completely covered with two layers of plastic and set on cribbing six inches above grade so that they are protected from weather, wind, dust, water, or construction operations. Equipment shall not be stored outdoors without the approval of the Engineer. Where equipment is stored or installed in moist areas, such as unheated buildings, etc., provide an acceptable means to prevent moisture damage, such as a uniformly distributed heat source to prevent condensation.
- C. The normal outdoor, not in direct sunlight, ambient temperature range of the job site will vary between 0 to 110 degrees Fahrenheit. All equipment shall be rated to operate in these temperature ranges or provisions for adequate heating and cooling shall be installed, at no additional cost to City.
- D. The jobsite is prone to vandalism and theft. Contractor shall be responsible for securing all materials and equipment against theft and vandalism for the duration of the project.
- E. Contractor & Subcontractors shall utilize temporary services during construction of the project.

201-1.11 SUBMITTAL AND DRAWING REQUIREMENTS

- A. Electrical submittals shall be submitted by the General Contractor for review by the Engineer per this subsection. They shall be complete giving all details of connections, wiring, instruments, enclosures, materials and dimensions. Standard sales literature will not be acceptable.

- B. A copy of the appropriate Specification Sections, with addendum updates included and with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
1. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated and, therefore, requested by the Contractor, each deviation shall be underlined and denoted by a unique number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the Specifications.
 2. The submittal shall be accompanied by a detailed, written justification for each numbered item explaining variance or non-compliance with specifications.
 3. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no review.
- C. The electrical submittals shall include but not be limited to data sheets and drawings for each product together with the technical bulletin or brochure. No FAX copies of documents are allowed. The electrical submittals shall include:
1. Product (item) name used herein and on the Contract Drawings.
 2. The manufacturer's model or other designation.
 3. Tag name/number per the drawings or schedules.
 4. Index Binder Tab Dividers.
 5. Detailed electrical one line, elementary control diagrams showing all wiring requirements for each system.
 6. Complete documentation with full description of operation.
 7. Complete catalog cuts with full description of equipment. General sales literature will not be acceptable. The part or model number with options to be provided shall be clearly identified. Where more than one item or catalog number appears on a catalog cut, the specific item(s) or catalog numbers(s) proposed shall be clearly identified.
 8. Location of assembly at which it is installed.
 9. Input-output characteristics.
 10. Range, size, and graduations as required.
 11. Physical size with dimensions and mounting details.
 12. Enclosure fabrication and color.
 13. Enclosure layout and elevation drawings to scale.
 14. Quantity and quality requirements for electric power, air, and/or water supply.
 15. Materials of construction of components.
 16. Nameplate schedule.
 17. Failure to provide submittals with heavy duty permanent plastic labeled index tabs may be grounds for immediate rejection without review.
 18. A complete Bill of Materials list shall be provided at the inside of the front cover.
 - a. The Contractor shall provide Bill of Material formatted as shown in Appendix "A." A separate set of Material Listing forms shall be provided for each MCC bucket, control panel and another listing all field equipment.
 - b. Generic names or part numbers used by a distributor or Systems House are not acceptable; originating manufacturer's name and part number shall be listed.
 19. A separate instrument data sheet shall be provided for each instrument per ISA S20 standards or approved equal. Provide an index with proper identification and cross-referencing of each data sheet.
 20. Submit DVD disk copies of all submitted drawing in AutoCAD format.

21. For each resubmittal, provide a copy of submittal comments and a separate letter, on Company letterhead, identifying how each submittal comment has been addressed in the resubmittal.
 22. PLC/OI software program & documentation: Submittal content shall include the following:
 - a. Listing of all setpoints with proposed initial numeric entry values and corresponding Engineering Units for control strategies.
 - b. Listing of all digital and analog registers, bits, timers etc., their respective description and full addresses.
 - c. Complete commented ladder logic program.
 - d. Process control narrative for all controls, alarms, time delays, calculations, etc.
 - 1) Narrative shall be provided each area describing overall control of equipment to start/stop, listing of P&ID equipment tagnames, descriptions, instrumentation tagnames, and instrumentation descriptions.
 - 2) Describe alarms that will stop equipment and list associated interlocks.
 - 3) Describe local control operation, manual control operation and auto operation.
 - 4) Describe totalization and statistics generated.
 - e. Describe operation of real time clock and adjustments.
 23. Electronic PDF version of submittals shall be provided with table of contents regardless of hard copy format of submittal. PDF shall be "bookmarked" at each index, subtab, transmittal letter, copy of appropriate check marked Specification Section, bill of materials, copy of submittal comments (for resubmittals), Contractor's response to submittal comments (for resubmittals), drawings, etc. Bookmarks shall be descriptive of actual document, tab, etc. Failure to bookmark PDF or broken bookmarks may be grounds for immediate rejection without review. Bookmarks shall not be out of order; the English description shall match that listed in the Submittal's Table of Contents.
 24. Electronic submissions of submittals may be provided for submittals less than 40 pages and without drawings. Submittals equal to or over 40 pages or those that contain drawings shall be provided in a hardcopy format. Drawings shall be printed at 11 inches by 17 inches. Hardcopy submittals shall be provided in binders as specified herein. The Owner reserves the right to reject submittals that fail to be organized as described herein.
- D. All drawings shall be drawn using AutoCAD, drawn in a professional manner and submitted on 11" x 17" sheets of paper. Shop drawings shall be provided with minimum drafting details as illustrated on the Contract "electrical" series drawings. Diagrams shall carry a uniform and coordinated set of wire colors, wire numbers, and terminal block numbers. The shop drawings shall include:
1. Electrical one-line diagrams detailing all devices associated with the power distribution system. The following applicable information or data shall be shown on the one-line diagram: location, size and amperage rating of bus; size and amperage rating of wire or cable; breaker ratings, number of poles, and frame sizes; utility metering, voltage, amperage, number of wires and phases; fault interrupt ratings; ground size and connections; neutral size and connections; power fail and other protective devices; fuse size and type; distribution transformer; panelboard; starters; contactor size and overload range; motor full load amperage of submitted motor and horsepower; rating for miscellaneous loads; etc. Submit a list for each piece of equipment containing the motor voltage, phase and full load amps with one-lines for verification of accuracy of submitted one line drawings.
 2. Elementary diagrams shall be provided for all relay logic, power supplies, PLC I/O and other wiring. All elementary diagrams shall be drawn in EMP/EGP format and standards similar to those shown on the Electrical elementary diagrams showing ladder rung numbers and coil and contact cross referencing numbers.

3. Analog and digital PLC I/O wiring diagrams shall be provided showing the wiring requirements for each instrument loop. Graphic symbols shall conform with ISA S5.4 drawing standards. A loop diagram shall be furnished for each analog and digital I/O process and all PLC I/O points. Loop diagrams shall include the following as a minimum:
 - a. The loop diagram shall be drawn with sufficient detail to express control philosophy. The diagram shall show all components and accessories of the instrument loop, highlighting special safety and other requirements. These diagrams shall be arranged to emphasize device elements and their functions as an aid to understanding the operation of a system and for maintaining or troubleshooting that system.
 - b. Analog and digital I/O shall be arranged on the diagram in the same order as the physical arrangement of the group terminations. All termination points on the diagram shall be shown with the actual equipment identification, device and relay terminal number or letter, and I/O point P&ID English descriptor and tag name.
 - c. A separate drawing shall be prepared for each analog and digital card. Each card shall be arranged on the diagram in the same order as the physical arrangement of the card terminations.
 - d. Energy sources – electrical power, air supply, pneumatic and hydraulic fluid supply, designating voltage, current, pressure, etc. shall be shown in detail on the diagram. Input and output signals (e.g., 1-5 VDC, 4-20 mA DC, 3-15 psig, etc.), power and instrument supplies to devices (e.g. 120 VAC, 24 VDC, 80 psig, etc.) shall be shown.
 - e. Engineering units shall be shown on the diagram. Each wire label, equipment identification terminal number or letter and color code shall be shown. Signal and DC polarities shall be shown.
 - f. All spare wires, cables and termination points shall be shown. All jumpers, grounding, shielding, power supply details shall be shown.
4. Enclosure and Elevation layout diagrams; show all front panel and backpan devices drawn to scale. Show fabrication methods and details; including material of construction, paint color, support and latching mechanisms, fans and ventilation system, and conduit entrance areas.
5. Analog and digital I/O wiring diagrams showing the wiring requirements for each instrument loop. Graphic symbols shall conform with ISA S5.4 drawing standards. A loop diagram shall be furnished for each analog and digital I/O process and all PLC I/O cards. Loop diagrams shall include the following as a minimum:
 - a. The loop diagram shall be drawn with sufficient detail to express control philosophy. The diagram shall show all components and accessories of the instrument loop, highlighting special safety and other requirements. These diagrams shall be arranged to emphasize device elements and their functions as an aid to understanding the operation of a system and for maintaining or troubleshooting that system.
 - b. A separate drawing shall be prepared for each analog and digital card. Each card shall be arranged on the diagram in the same order as the physical arrangement of the card terminations. All termination points on the diagram shall be shown with the actual equipment identification, device and relay terminal number or letter, and I/O point P&ID English descriptor and tag name. A separate drawing shall be prepared for each card.
 - c. Energy sources - electrical power, air supply, pneumatic and hydraulic fluid supply, designating voltage, current, pressure, etc. shall be shown in detail on the diagram. Input and output signals (e.g., 1-5 VDC, 4-20 mA DC, 3-15 psig, etc.), power and instrument supplies to devices (e.g. 120 VAC, 24 VDC, 80 psig, etc.) shall be shown.
 - d. Engineering units shall be shown on the diagram. Each wire label, equipment identification terminal number or letter and color code shall be shown. Signal and DC polarities shall be shown.

- e. All spare wires, cables and termination points shall be shown. All jumpers, grounding, shielding, power supply details shall be shown.
 - 6. Submit drawings of all nameplates and tags, as specified herein, to be used on project. The Engineer has the right to adjust nameplate engraving titles during submittals at no additional cost to the City. Submittal to include the following:
 - a. Dimensions of nameplate.
 - b. Exact lettering and font for each nameplate.
 - c. Color of nameplate.
 - d. Color of lettering.
 - e. Materials of construction.
 - f. Method and materials for attachment.
 - g. Drawing showing location of nameplate on each panel.
 - 7. Copying contract drawings and providing them as submittals will be considered unresponsive and the submittal will be rejected without review.
- E. Each submittal shall be bound in a three ring binder, which is sized such that when all material is inserted, the binder is not over 3/4 full. Binder construction shall allow easy removal of any page without complete manual disassembly; spiral ring type binders are not acceptable.
- 1. Each binder shall be appropriately labeled on the outside spine & front cover with the project name, contract number, equipment supplier's name, specification section(s), and major material contained therein.
 - 2. An index shall be provided at the inside of the front cover. This index shall itemize the contents of each tab and sub tab section. Also, list the project name, contract number and equipment supplier's name, address, phone number, and contact person on the index page. Index dividers (tabs) shall be provided to separate each section.
 - 3. All copies shall be clear and legible. Data sheets shall be provided for each instrument, with an index and proper identification and cross-referencing.
 - 4. Exceptions to the Contract specifications or drawings shall be clearly defined by the equipment supplier.
 - a. Data shall contain sufficient details so a proper evaluation may be made by the Engineer. Contractor shall provide separate letter (located in the front of the submittal) detailing specific exceptions to the Contract Specifications or Drawings.
 - b. Exceptions that are noted in the marked-up Drawings or Specifications, but not listed on the Exceptions/Clarifications letter, will be considered as non-responsive and not accepted as changes to the Contract Documents.
 - 5. Request for information (RFIs) shall not be included in submittals. RFIs shall be submitted separately in its individual submittal number.
 - 6. Resubmittals shall be provided with a copy of the previous submittal comments and a separate letter, on company letterhead, identifying how each submittal comment has been addressed in the resubmittal.
 - 7. Failure to provide submittals with heavy duty permanent plastic labeled index tabs may be grounds for immediate rejection without review.
- F. Field equipment shop documents, panel equipment shop documents, drawings, and bill of materials shall be grouped under separate tabs. Catalog cuts shall be ordered in the same sequence as their corresponding Contract specification subsection.
- G. Catalog cuts shall be submitted grouped together by material and not scattered throughout the submittal intermingled with other material cut sheets (i.e. do not submit cut sheet for specific size conduit followed by cut sheet for specific size wire, and then cut sheet for different size conduit and different size wire. Group conduits together, group wires together, etc.)

- H. Drawings shall be submitted in a separate hole-punched binder that covers the entire 11" X 17" length of the Drawing:
1. Shop Drawings with less than 20 sheets total in the submittal, may be provided in an 11½-inch by 17½-inch reinforced folder.
 2. All Interconnection Drawings or Shop Drawings of 20 sheets or more shall be provided in separate heavy duty three-ring binder to allow drawings to be easily removed. Binder shall be Cardinal D-Ring Easy Open Ledger Binder with locking D-Rings or approved equal.
 3. Failure to provide drawing submittal in correct binder format may be grounds for immediate rejection without review.
 4. Each drawing title block shall contain the English description name for drawing contents (i.e. Lift Pump No. 1 Interconnect Drawing) and drawing number. All pages and drawings in the submittal shall be numbered sequentially (with no number skipped) in lower right hand corner.
 5. Drawings that are "C" or "D" size shall be folded, with the title block visible and placed in reinforced clear plastic pockets.
- I. Catalog cuts and drawings shall be submitted for all devices and components in the electrical system.
- J. The Supplier shall coordinate submittals with the work so that project will not be delayed. This coordination shall include scheduling the different categories of submittals, so that one will not be delayed for lack of coordination with another.
- K. No submittal documents shall be labeled as proprietary. Labeling documents as proprietary will be sufficient cause for rejection of entire submittal. The City reserves the right to copy or duplicate any and all portions of the documents provided for the project including copyrighted documents as desired.
- L. Approval of submittals shall not relieve Contractor of their obligation to perform the work in strict accordance with this Contract and the Contract Documents or of their responsibility to provide a complete and reliable system.
- M. No material or equipment shall be allowed at the job site until the submittal for such items has been favorably reviewed by the Engineer and marked "No Exceptions Taken" or "Make Corrections Noted."
- N. Identify all submittals by submittal number on letter of transmittal. Submittals shall be numbered consecutively and resubmittals shall have a letter suffix. For example:
1. 1st submittal: 1.
 2. 1st resubmittal: 1A.
 3. 2nd resubmittal: 1B, etc.
- O. The equipment specifications have prepared on the basis of the equipment first named in the Specifications. The Supplier shall note that the second named equipment, if given, is considered acceptable and equal equipment, but in some cases additional design, options, or modifications may be required, at no additional cost, to meet Specifications.
- P. The decision of the Engineer governs what is acceptable as a substitution. If the Engineer considers it necessary, tests to determine equality of the proposed substitution shall be made, at the Supplier's expense, by an unbiased laboratory satisfactory to the Engineer.

- Q. Electrical submittals shall be complete giving all details of connections, wiring, instruments, enclosures, materials and dimensions. Standard sales literature will not be acceptable.

201-2 PRODUCTS

201-2.01 QUALITY

- A. It is the intent of the Contract specifications and drawings to secure the highest quality in all materials and equipment in order to facilitate operation and maintenance of the facility. All equipment and materials shall be new and the products of reputable suppliers having adequate experience in the manufacture of these particular items. For uniformity, only one manufacturer will be accepted for each type of product.
- B. All equipment shall be designed for the service intended and shall be of rugged construction, of ample strength for all stresses that may occur during fabrication, transportation, erection, and continuous or intermittent operation. All equipment shall be adequately stayed and braced and anchored and shall be installed in a neat and workmanlike manner. Appearance and safety, as well as utility shall be given consideration in the design of details. All components and devices installed shall be standard items of industrial grade, unless otherwise noted, and shall be of sturdy and durable construction suitable for long, trouble free service. Light duty, fragile and competitive grade devices of doubtful durability shall not be used.
- C. Products that are specified by manufacturer, trade name or catalog number established a standard of quality and do not prohibit the use of equal products of other manufacturers provided they are favorably reviewed by the Engineer prior to installation.
- D. Underwriters Laboratories (UL) listing is required for all substituted equipment when such a listing is available for the first named equipment.
- E. When required by the Contract specifications or requested by the Engineer, the Contractor shall submit equipment or material samples for test or evaluation. The samples shall be furnished with information as to their source and prepared in such quantities and sizes as may be required for proper examination and tests, with all freight and charges prepaid. All samples shall be submitted before shipment of the equipment or material to the job site and in ample time to permit the making of proper tests, analyses, examinations, rejections, and resubmissions before incorporated into the work.
- F. All equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall resume normal operation without manual resetting or operator interaction when power is restored.
- G. Signal transmission from remote or field electric and electronic devices shall be 4-20 mA, sourced by a 12 VDC or 24 VDC loop supply from the panel that is to receive the signal. Nonstandard transmission methods such as impulse duration, pulse rate, and voltage regulated will not be permitted except where specifically noted.
- H. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission.

- I. It is the System Supplier's responsibility to visit jobsite to collect and document existing conditions and equipment device part numbers in order for all similar called out new equipment to match existing.

201-2.02 NAMEPLATES AND TAGS

- A. Equipment exterior nameplates - Nameplate material shall be rigid laminated black phenolic with beveled edges and white lettering; except for caution, warning, and danger nameplates the color shall be red with white lettering. The size of the nameplate shall be as shown on the drawings. No letters are allowed smaller than 3/16". Securely fasten nameplates in place using two stainless steel screws if the nameplate is not an integral part of the device. Epoxy cement or glued on nameplates will not be acceptable.
 1. For each major piece of electrical equipment provide a manufacturer's nameplate showing the Contract specified name and number designation, the manufacturer's name, model designation, part number, serial number, and pertinent ratings such as voltage, amperage, # of phases, range, calibration, etc.
 2. For each device with a specific identity (pushbutton, indicator, instrument, etc.) mounted on the exterior or deadfront of a piece of equipment provide a nameplate with the inscription as shown in the Contract documents. Where no inscription is indicated in the Contract documents, furnish nameplates with an appropriate inscription providing the name and number of device.
 3. For all receptacles and switches (including devices located on Switchboard or MCC), provide a faceplate engraved or stamped with the panelboard and circuit number it is fed from. Also, include on faceplate or on a separate nameplate for each light switch identification use such as "OUTSIDE BUILDING LIGHTS," "PERIMETER LIGHTS," "MCC ROOM," etc.
 4. All field instruments and devices shall be labeled with designation shown on P&ID diagrams.
 5. All transformers and panelboards shall have nameplates with 1/2" high letters and be engraved with designations as shown on one-line Drawings.
 6. All safety and disconnect switches shall have nameplates with 1/2" high letters and be engraved with designations as shown on one-line drawings.
 7. Underground Pull Box and Vault Cover Identification: Engrave or bead weld pull box covers with minimum 1/4" thickness and 1/2" letters and Covers shall be engraved with designations as shown on Contract drawings or as directed by Engineer.
 8. Aboveground Pull Box Cover Identification: 316 stainless steel screws attached stamped 316 stainless steel plate nameplates with 1/2" letters and be engraved with designations as shown on Contract drawings or as directed by Engineer.
 9. Provide engraved nameplate at service entrance equipment per NEC 702.7(B)
 10. METERING – Service Equipment Label: Per NEC 110.24 (A) Service equipment shall be legibly marked in field with the maximum available fault current. Field marking shall include date the fault current calculation was performed and be weather & UV rated. Service equipment shall not be hand labeled.
 11. All subpanels shall be identified with an engraved phenolic label of the power source location feeding it (i.e. MCC-100, Panelboard LP-1, etc.)
 12. Provided engraved nameplate, with 1/2" lettering, describing phase rotation at the main breaker. Nameplate shall be installed prior to start-up.

- B. Equipment Interior Nameplates - Nameplate material shall be clear plastic with black machine printed lettering as produced by a KROY or similar machine; except caution, warning, and danger nameplates shall have red lettering.
1. The size of the nameplate tape shall be no smaller than 2" in height with 3/8" lettering unless otherwise approved by the Engineer. Securely fasten nameplates in place on a clean surface using the adhesion of the tape. Add additional clear glue to hold the nameplate securely in place when necessary.
 2. For each device with a specific identity (relay, module, power supply, fuse, terminal block, etc.) mounted in the interior of a piece of equipment provide a nameplate with the inscription as shown in the Contract documents. Where no inscription is indicated in the Contract documents, furnish nameplates with an appropriate inscription providing the name and number of device used on the submittal drawings.
 3. Nameplates shall not be attached to wireway covers or to removable devices.
 4. For all receptacles and switches (including devices located in Control Panel, provide a faceplate printed with the panelboard and circuit number it is fed from.
 5. Provide nameplate on all deadfront doors indicating panelboard and circuit number(s) it is fed from. When multiple panelboard circuits are feeding panel, identify which components are fed from which panelboard circuits.
 6. Provide nameplate next to all backpan mounted heater or fan thermostat indicating panelboard and circuit number(s) it is fed from.
- C. Equipment Tags - When there is no space or it is impractical to attach an engraved phenolic nameplate with screws, as is the case with most field devices and instruments, the Contractor shall attach a tag to the equipment with the same inscriptions as specified above in paragraph A. The tag shall be made from stainless steel material and the size of the nameplate shall be no smaller than 3/8"h x 2"w with 3/16" machine printed or engraved lettering unless otherwise approved by the Engineer. Securely fasten tags in place using 316 stainless steel 0.048 inch diameter wire of the type normally used for this purpose (catalog cut sheet shall be submitted). Stainless steel wire shall be crimp connected. Twisting ends together is not acceptable.
- D. Engrave or machine print the tags with inscriptions as approved by the Engineer in the nameplate submittal.
- E. Provide temporary labels for all instruments and devices immediately when installed. Temporary labels shall be provided with 1/2" letters minimum and labeled with P&ID tag number.

201-2.03 WIRE

- A. This section applies to all wires or conductors used internal for all electrical equipment or external for field wiring. All wires shall be properly fused or protected by a breaker at the amperage rating allowed by the NEC.
- B. Material - Wire shall be new, plainly marked with UL label, gauge, voltage, type of insulation, and manufacturer's name. All wire shall conform to the following:
1. Conductors shall be copper, with a minimum of 98% conductivity.
 2. Wire shall be Class B stranded.
 3. Insulation of all conductors and cables shall be rated 600 volt.
 4. Insulation type for conductors smaller than #10 AWG shall be moisture and heat resistant thermoplastic THWN, rated 90 °C in dry locations and 75 °C in wet locations, or approved equal aboveground. Conductors #10 AWG and larger shall be RHW-XLP insulation rated unless otherwise noted 90 °C in dry locations and 75 °C in wet locations.

5. Field wire minimum AWG sizes:
 - a. #12 for wires used for individual conductor circuits 100 volt and above, except for PLC I/O which may be #14 AWG.
 - b. #14 for wires used for individual conductor circuits below 100 volt.
6. Nonfield or equipment wire minimum AWG sizes:
 - a. #14 for wires used for individual conductor circuits 100 volt and above.
 - b. #18 for wires used for individual conductor circuits below 100 volt.
7. Instrument wiring:
 - a. General: Instrument cables shall have 600V rated insulation and 100% individual shielded twisted pair #18 conductors with drain wire. Single twisted shielded pair (T.S.PR.) cables shall be Belden, or approved equal.

C. Color code - color code of all wire shall conform with the following table:

WIRES COLOR CODE TABLE

DESCRIPTION	PHASE/CODE LETTER	FIELD WIRE WIRE OR TAPE COLOR	NON-FIELD WIRE COLOR
480 V, 3 PHASE	A	BROWN	BROWN
	B	ORANGE	ORANGE
	C	YELLOW	YELLOW
240 V or 208 V, 3P	A	BLACK	-
	B	RED (ORANGE if high leg)	-
	C	BLUE	-
240 / 120 V, 1 P	L1	BLACK	BLACK
	L2	RED	-
12V POSITIVE	12P	DARK BLUE	DARK BLUE
12V NEGATIVE	12N	BLACK/RED STRIPE	BLACK/RED STRIPE
24V POSITIVE	24P	PINK	PINK
24V NEGATIVE	24N	BLACK/WHITE STRIPE	BLACK/WHITE STRIPE
AC CONTROL		VIOLET	RED (YELLOW FOR FOREIGN CIRCUITS)
DC CONTROL		BLUE	BLUE
NEUTRAL	N	WHITE	WHITE
GROUND	G	GREEN	GREEN
SHIELDED PAIR	+	BLACK	RED
	-	CLEAR (WHITE)	BLACK

1. High leg of open delta shall be colored orange per NEC 110.15.
2. The same color shall be connected to the same phase throughout the panel.
3. All wires shall be properly fused or protected by a breaker at the amperage rating allowed by the NEC.
4. Neutral used for AC Control shall be white.
5. Phase color insulation shall be provided for complete length of #8 wire or smaller; colored phase tape is not allowed on #8 and smaller wire.

D. Wire Marking:

1. Wire identification: All wire terminations including field interconnect as well as wiring interior MCC cubicles, switchboard, panels, equipment, junction panels and boxes shall be identified with machine printed labels. Hand lettered labels are not acceptable and shall be replaced at the Contractor's expense. The wire identification code for all field

interconnect and panel interior wiring, shall be similar to the designations shown on the Contract example drawings.

2. Wire Labels: The labels shall be machine printed with indelible ink, heat shrink type capable of accepting a minimum of 23 machine printed characters per sleeve label by Brady "Bradysleeve" or equal. Labeling shall be neatly installed for visibility and shall be clearly legible. Each wire and conductor shall be labeled with wire label as shown on approved loop, elementary Drawings. Labels shall not be wrap-around or snap-on type.
3. Where there is insufficient space for labels on locally interconnected neutral wires such as jumpers between adjacent auxiliary relay coil neutral terminals, these labels may be omitted. "Locally" is defined as wires no longer than 8".
4. Wire labels for lighting and receptacles shall be installed and consist of the panelboard and circuit number (i.e., Panelboard "LP1", circuit breaker #3 would have wire label line "LP1-L3" and neutral "LP1-N3").
5. Ethernet patch cables shall be labeled with primary devices it is connected to (i.e. "PLC", "OI", etc.).
6. All spare wires shall be labeled with equipment number or conduit number followed by SP1, SP2, etc. (i.e. P11001-SP1 for first spare wire, or C151-SP1).
7. All control and signal wiring terminations shall have the correct wire label applied prior to making connection.
8. Ethernet patch cables and fiber cables shall be labeled with primary devices it is connected between (i.e. "PLC/SWITCH," "OI/PLC," "PLC-2/RADIO," etc.). Label shall be white plastic with black machine printed lettering as produced by a KROY or similar machine with lettering no smaller than 3/8". Securely attach to cable with clear tape.

E. SPECIAL PURPOSE WIRING

1. Manufacturer Supplied Cables (MNFR CBL): Cables and wiring for special systems shall be provided by the manufacturer with the equipment and installed per the manufacturer's recommendations.
2. Indoor CAT 6 communication cable meet the following requirements:
 - a. TIA/EIA-568-A Category 6 100 MHz specifications.
 - b. #24 AWG solid bare copper conductor, 4 twisted pairs.
 - c. Thermoplastic Dielectric type.
 - d. Shielded bulk cable.
 - e. PVC jacket.
 - f. Nominal Impedance: 100 ohms.
 - g. Nominal capacitance: 20 pf/ft maximum.
 - h. UL listed.
 - i. Non-plenum usage rated when routed in conduit.
 - j. Plenum usage rated when routed in plenum spaces.

201-2.04 CONDUIT, RACEWAYS, AND WIREWAYS

A. GENERAL - Conduit, raceways, and wireways, wiring methods, materials, installation shall meet all requirements of the NEC, be UL labeled for the application, and meet the minimum following specifications.

1. All wiring shall be installed in conduits, raceways, or wireways when interconnecting equipment and devices.
2. The Contractor shall use special conduit, raceways, wireways, construction methods, and materials as shown on the Contract drawings; which shall take precedence over any general methods and materials specified in this Section.

3. The minimum size conduit shall be $\frac{3}{4}$ -inch unless indicated otherwise on the Drawings or for special connections to equipment. Buried, encased, or conduits located in walls shall be 1-inch minimum.
4. Conduit stubs for future use shall be capped with coupling, nipple, plug and cap and each end identified with conduit labels.
5. Conduits to be abandoned that protrude above graded shall be cut flush and filled with grout
6. Conduits shall not be filled to more than 50% of their total cross – sectional area.
7. Conduit Marking
 - a. All conduits and raceways listed in Conduit & Wire Routing Schedule shall have conduit tags at both ends of each conduit segment. This includes all conduits in pullboxes and vaults.
 - b. Tag material shall be aluminum with machine stamped lettering on both sides. The size of the tag shall be 2" diameter. No letters are allowed smaller than $\frac{7}{16}$ ". Securely fasten tags in place using 316 stainless steel 0.048 inch diameter wire of the type normally used for this purpose (catalog cut sheet shall be submitted). Stainless steel wire shall be crimp connected. Twisting ends together is not acceptable. Engrave the tags with the conduit number as listed in the conduit schedule on the Contract "E"-series Drawings. Labeling shall be neatly installed for visibility and shall be clearly legible.
 - c. Prior to encasement, concealment, backfilling of conduits, temporary conduit labels shall be provided at each end of conduit. Temporary conduit labels shall have $\frac{1}{2}$ -inch (minimum) lettering at all transition points. After encasement and concealment temporary conduit labels shall be placed at each exposed end.
8. Warning Tapes
 - a. Plastic tape shall be colored for particular underground service, 3-inch minimum width, utilize tape made of material resistant to corrosive soil. Tape shall have aluminum backing to facilitate locating it underground using a non-ferrous locator. Use red tape for "Electric" service and orange tape for "Communication" service. Use tape with printed wording listing type of service. Manufacturers and types: Seton, Blackburn, Griffolyn Co., Terra-Tape, Brady or equivalent.

B. Galvanized Rigid Steel Conduit (GRS)

1. Rigid steel conduit, couplings, bends and nipples shall be in accordance with ANSI C80.1 and UL-6.
2. Hotdip galvanized inside and outside after fabrication and then coated with a zinc bichromate finish. Provide threaded type fittings, couplings, and connectors; set screw type and compression type are not acceptable.
3. Minimum trade size - three-quarters inch ($\frac{3}{4}$ ") unless otherwise shown on Contract Drawings.
4. Conduits entering enclosures shall be fitted with locknut and insulated grounding bushing; O-Z "HBLG", Appleton "GIB", or approved equal. All grounding bushings shall be tied to the grounding system with properly sized bonding conductors per the NEC code.
5. Galvanized rigid steel factory elbows for 90 degree transitions.
6. EMT or IMC is not considered an equivalent to GRS.
7. GRS conduit is allowed only when specifically called out in the "Conduit and Wire Routing Schedule."

C. Galvanized Rigid Steel Conduit - PVC Coated (GRS-PVC)

1. Standard weight, galvanized rigid steel conduit with a 40-mil thick polyvinylchloride coating bonded to both the outside and urethane interior coating. Conduit shall be hot-dip

galvanized conforming to NEMA RN 1. GRS-PVC conduit and fittings to be Robroy Plasti-bond Red or approved equal.

2. Provide PVC coated galvanized rigid steel factory ells for 90 degree transitions.
3. Fittings and boxes shall be stainless steel or galvanized cast ferrous metal with a PVC 40 mils thick coating. Provide threaded-type fittings, couplings, and connectors; set-screw type and compression-type are not acceptable.
4. All junction boxes shall be galvanized with exterior surfaces PVC coated to 40 mils thickness, except where stainless steel boxes are called out.
5. Conduits entering enclosures shall be fitted with locknut and insulated grounding bushing; O-Z "HBLG", Appleton "GIB", or approved equal. All grounding bushings shall be tied to the grounding system with properly sized bonding conductors per the NEC code.
6. Support channel and pipe straps shall be PVC coated. Exposed metal/nuts, all-thread rod shall be 316 stainless steel.
7. PVC coating patching material shall be as provided by the manufacturer.
8. PVC coated Aluminum conduit is not acceptable.

D. PVC Conduit, (PVC-80)

1. Shall be high impact polyvinylchloride suitable for use underground, direct burial and for use with 90 C wires, and shall conform to UL 651. Shall be UL listed and labeled for "direct" burial. PVC-40 is unacceptable.
2. A copper bonding conductor shall be pulled in each raceway and bonded to equipment at each end with approved lugs.
3. Each underground run shall be placed in a trench with a minimum of four (4) inch sand bed evenly compacted on all sides, top and bottom.
4. Bends, elbows, and risers shall be made with galvanized rigid steel (GRS) conduit using threaded adapters. Bond each metallic portion to each other and to equipment connected at each end of conduit run. Conduits terminating into underground pull boxes shall be GRS.
5. PVC fittings shall have solvent-weld-type conduit connections.
6. PVC conduit shall be stored on a flat surface and shielded from the sun.
7. PVC conduit shall not be used above grade.
8. PVC-40 conduit shall not be used in place of PVC-80 conduit.

E. Liquid Tight Flexible Metal Conduit - (SEAL TIGHT)

1. Minimum trade size one-half inch (1/2").
2. All flex conduits shall have water tight outer jackets.
3. Connectors:
 - a. Non-NEMA 1 or 12 areas: PVC coated metallic with insulated bushings.
 - b. NEMA 1 or 12 areas: Metallic with insulated bushings.
4. Flexible conduit lengths shall not be greater than 36 inches.
5. Flexible metallic conduit shall not be considered as a ground conductor, install a separate wire for equipment bonding.
6. Flexible conduit shall only be installed in exposed or accessible locations.
7. Flexible conduits shall be used for conduit coupling to all vibrating and shifting equipment.

201-2.05 DEVICES

A. Fuses

1. Fuses used in circuits 200 VAC and above shall be time- delay type FNQ or approved equal, 13/32" x 1½", and have an interrupting rating of 10,000 AIC at 500 VAC. Fuse holders shall be of the barrier type and rated 600 VAC.

2. Fuses used in 120 VAC shall be time-delay type MDL or approved equal, 1/4" x 1 1/4", and have a rating of 250 VAC. Fuse-holders shall be of the terminal block type.
3. Fuses used in signal and 24 VDC circuits shall be fast acting type ABC or approved equal, 1/4" x 1 1/4", and have an rating of 250 VAC. Fuse-holders shall be of the terminal block type.
4. Fuses shall be sized in conformance with the NEC.

B. Switches and Pushbuttons

1. Switches (HS) and pushbuttons (HC) for general purpose applications shall be water and oil tight as defined by NEMA 4X, corrosion resistant as defined by NEMA ICS 6-110.58, U.L. listed, standard 30 mm diameter, with round plastic clamp ring. Switches shall be Allen-Bradley 800H, IDEC ITE, or equal.
2. Switches and pushbuttons shall have contacts rated 10 amperes continuous and 600 VAC. Contract blocks shall have IP2X finger-safe protection.
3. Manufacturer's standard size legend plates shall be provided and engraved to specify each switch and pushbutton function. The legend plate color shall be black.
4. Selector switch handles and pushbutton caps shall be black.
5. Selector Switch Positions
 - a. Hand-off-auto (HOA) applications shall have the hand position to the left, off in center, and auto in the right position.
 - b. On/Off shall have the ON position to the right.
 - c. Local/Remote shall have the REMOTE position to the right.
 - d. Open-Close-Auto applications shall have the open position to the left, close in center, and auto in the right position.
6. Lockout stop shall be a pushbutton with red cap and pad locking assembly for pushbutton.
7. Potentiometers shall be 10K ohm, single turn, finger safe.
8. Illuminated Switches (HS) for general purpose applications shall be water and oil tight as defined by NEMA 4, U.L. listed, standard 22 mm diameter, with round plastic clamp ring, maintained switch, blue lens. Switches shall be Schneider XB4 with LED lamp module, GE, or equal.

C. Relays and Timers

1. General: Relays and timers shall be provided with N.O. or N.C. contacts as shown on the Contract drawings. All spare contacts shown shall be provided. Contacts shall be rated 10 amps minimum at 120 VAC, 60 Hz unless otherwise stated. Supply power or coil voltage shall be 120 VAC unless shown otherwise on the Contract drawings. Relays and timers shall be designed for continuous duty. All relays shall be U.L. listed. The following is a summary of abbreviations associated with relays and timers:

CR	-	Control Relay
TR	-	Timing Relay
PFR	-	Power Fail Relay
TDOE	-	Time Delay On Energization
TDOD	-	Time Delay On De-Energization
2. Control Power relays (CR) shall be plug-in type with indicating lights and clear see-through sealed or enclosed housing to exclude dust. Sockets for plug-in relays shall be standard industrial type octal 8 or 11 pin with barrier pressure screw terminals. Provide IDEC Type RR, or approved equal. Two form-C contacts (minimum) shall be provided on each relay.
3. Interposing PLC Control relays (CR) shall be plug-in type with indicating lights enclosed housing to exclude dust. Provide Finder 4C series or approved equal.
4. Time delay relays (TR) on energization or de-energization shall be solid state plug-in relays with a timer adjustable over the range 1 second to 3 minutes unless other ranges are indicated or required. Provide LED timer energized indicator lamp. Sockets for plug-in

timers shall be standard industrial type octal 8 or 11 pin with barriered pressure screw terminals. Time delay relays shall be IDEC RTE, SSAC TD, or approved equal.

5. The power fail relay (PFR) shall monitor the three phase voltages and phases. It shall monitor low-voltage, voltage unbalance, phase reversal and harmful power line conditions. Relay shall have adjustable trip delay between 2-30 seconds for unbalance and phasing trip delays. Phase Monitor Relay shall be Littlefuse 102A series or approved equal.

D. Indicating Lights

1. Indicating Lights for general purpose applications shall be water and oil tight as defined by NEMA 4X, corrosion resistant as defined by NEMA ICS 6-110.58, U.L. listed, High intensity multi-chip LEDs, full voltage (unless shown otherwise), standard 30 mm diameter, with round plastic lens and miniature bayonet lamp base. Indication lights shall be Allen-Bradley 800H, IDEC ALD, or approved equal.
2. Manufacturer's standard size legend plates shall be provided and engraved to specify each light's function. The legend plate color shall be black.
3. Indicating lights designated "PTT" shall be provided with a push-to-test switch and wiring.
4. Indicating light type and color of lens shall be as shown on the Drawings or specified in the Contract documents.

E. Elapsed Time Meter

1. Elapsed time meters (ETM) for general use shall be nonresettable with 0.0 to 99,999.9 hour readout, permanently lubricated synchronous motor drive, nominal 2-1/2" square two-hole surface mount housing, screw terminals, and rated at 120 VAC, at 60 Hz. Elapsed time meters shall be Cramer 635, Reddington, or approved equal.

F. Circuit Breakers

1. Circuit breakers shall be of the indicating type, providing ON, OFF and TRIPPED positions of the operating handle. Circuit breakers shall be quick-make, quick-break, with a thermal-magnetic (TM) action or Motor Circuit Protectors (MCP) as shown on One-Line Diagrams. Circuit breakers shall be the bolted on type. The use of tandem or dual circuit breakers in a normal single-pole space to provide the number of poles or spaces specified are not acceptable. All multiple-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. Circuit breakers and motor circuit protectors shall be manufactured by Eaton, G.E., ITE, or approved equal.
2. Each 480 volt or 240V circuit breaker shall have a minimum interrupting capacity of 35,000 amperes. Each 120 volt breaker shall be rated for a minimum 10,000 amperes interrupting capacity. Breakers shall be sized as shown on Drawings and as necessary for the supplied equipment.
3. Fused disconnects shall not be used in place of breakers.
4. All breakers shall be supplied with the correct sized copper only lugs for wire sizes as listed in "Conduit & Wire Routing Schedule". Provide larger frame breaker or lug adapters as necessary when connecting to the listed oversized wire.

G. Terminal Blocks

1. Control Panel Terminal Blocks
 - a. Terminal blocks to be clamp type, 6mm spacing, and 600 volt, minimum rating of 30 amps, and mounted on DIN rail, Entrelec M4/6 colored, Weidmuller or approved equal. DIN rail shall be same type as used for the relays. Install an extra DIN rail on each type of terminal strip with 4 terminals for future additions.

- b. Provide terminal blocks with "follower" plates which compress the wires and have wire guide tangs for ease of maintenance. Terminal blocks which compress the wires with direct screw compression are unacceptable. All power, control and instrument wires entering and leaving a compartment shall terminate on terminal blocks with wire numbers on terminals and on both ends of the wires.
 - c. Terminal Tags and Markers: Each terminal strip shall have a unique identifying alphanumeric code at one end (i.e.: TB1, TB2, etc.) and plastic marking strip running the entire length with a unique number for each terminal. On each terminal strip, terminal numbers shall be assigned starting with #1 at one end, incrementing in alphabetical order (i.e.: 1,2,3,4...). Numbers shall be assigned to all blocks except grounding blocks. Fuse blocks shall be assigned unique tag numbers such as FU1, FU2. No two fuses shall be assigned the same tag number.
 - d. Plastic marking tabs shall be provided to label each terminal block. These marking tabs shall have a unique number/letter for each terminal which is identical to the "elementary" and "loop" diagram wire designation. Numbers on these marking strips shall be machine printed and 1/8 inch high minimum.
 - e. Terminal blocks shall be physically separated into groups by the level of signal and voltage served. Power and control wiring above 100 volts shall have a separate group of terminal blocks from terminal blocks for wiring below 100 volts, intermixing of these two types of wiring on the same group of terminal blocks is not allowed.
 - f. Provide a ground terminal or connection point for each grounding conductor.
 - g. Provide a separate common or neutral terminal for every two (maximum) inputs and/or outputs.
2. Power Termination Blocks shall be rated for 600V main power connection. The power termination blocks shall be rated to accept Copper or Aluminum cable rated as shown on Contract one-line diagrams. The power termination block shall be capable of being mounted anywhere in a termination box. Each termination block shall be provided with lug shield to prevent contact with power connections. The power termination blocks shall be Connectron or approved equal.

H. Boxes

- 1. Device boxes shall be cast or galvanized steel type with shape and size best suited for the particular application, rated for the location installed, and shall be supported directly to support structure by means of stainless steel screws, anchors, or bolts.
- 2. Box dimensions shall be in accordance with size, quantity of conductors, and conduit clearances per NEC 314 requirements.
- 3. Boxes exposed to the weather or in moist locations where GRS-PVC conduits are to be used shall be weatherproof (WP) PVC coated cast type with threaded hubs or stainless steel with watertight Myers hubs.
- 4. Non-Weatherproof Boxes Surface boxes shall be cast ferrous, deep FD type.
- 5. Weatherproof Boxes PVC-coated cast ferrous boxes may be used in place of 316 stainless steel boxes, except where boxes contain devices on cover. Boxes shall be deep, FD type. Single gang boxes shall have cast hubs.

I. Switches

- 1. General purpose switches shall be manufactured in accordance with UL 20. Switches shall be one pole rated, 20 amps, at 277 VAC. Bodies shall be of ivory phenolic compound supported by mounting strap having plaster ears. Switches shall have copper alloy contact arm with silver cadmium oxide contacts. Switches shall have slotted terminal screws and a separate green grounding screw. Furnish Hubbell 1221, Leviton, or approved equal.

J. Receptacles

1. General purpose receptacles shall be duplex and rated 20 amps, 120 VAC, 2 pole, 3 wire grounding, NEMA 5-20R configuration, specification grade, and side wired to screw terminals. Face color shall be brown in industrial areas and white or ivory in finished areas. General purpose receptacles shall be Bryant, Hubbell, or approved equal.
2. GFI (ground fault circuit interrupting) receptacles shall be used for providing power to miscellaneous cord powered equipment. GFI receptacles shall be duplex, 20A, 120V, with "test" and "reset" buttons with shallow design for mounting and standard screw terminals for direct wiring. Receptacles shall be designed, manufactured, and tested to prevent nuisance tripping from voltage spikes, RFI, EMI, or electronic component failures. Chaining multiple receptacles from one GFI unit is not acceptable. GFI receptacles shall be Arrow-Hart "specification grade", Leviton, or approved equal.

K. Device Plates and Covers

1. General purpose device plates and covers shall be anodized aluminum. Plates or covers shall be attached with stainless steel screws. Circuit breaker number and panelboard name shall be stamped on each cover.
2. PVC coated device boxes shall have PVC coated gasketed covers.
3. Weatherproof switch, outlet, and receptacle boxes shall be fitted with gasketed covers rated for wet locations in accordance with NEC 406.9.
4. Weatherproof switch, outlet, and receptacle boxes shall be fitted with cast aluminum gasketed cover rated for wet locations. Each receptacle access cover shall have a gasketed spring door to maintain the weatherproof integrity with plug inserted in accordance with NEC 406.9 for unattended locations. Final decision of type of access cover for specific location shall be per Engineer. Screws and hinge springs shall be 316 stainless steel. Receptacles located outside shall have tumbler key lock.
5. Weatherproof access covers shall be Hubbell, Crouse-Hinds, or TayMac Safety Outlet Enclosures, or approved equal.
6. Receptacle and light switch plates shall be stamped or engraved as specified herein.

201-2.06 CONTROL PANEL

A. Control panel shall consist of the PLC system, operator interface, power supply, enclosure, and other devices for a complete and operational system. No equals are allowed for PLC components.

1. Programmable Logic Controller (PLC) to be Allen-Bradley Micro 820 series, provided with number of cards, as shown on Contract drawings:
 - a. CPU 2080-LC20-20QWB with 12-24V DC Inputs, 7-Relay Output, 4-analog inputs with thermistor voltage reference out, 1-Analog Output
 - b. Fuse all individual I/O points.
 - c. Provide end caps as required.
 - d. All wiring from the PLC I/O terminals shall be wired to interface terminal blocks, including all spares.
 - e. Connect OI to PLC via Ethernet.

B. Operator Interface:

1. Provide Operator Interface (OI) Automation Direct (C-More) EA9-T15CL-R, 15" TFT Color Touchpanel system, or approved equal. OI to be panel mounted through cutout in Control Panel door. Provide all cables, configuration software, user manual and mounting hardware necessary for a complete and operable system.
2. Provide an operator interface that meets the following requirements:

- a. Touch screen operator interface with built-in Ethernet Communication Port, USB port (2) and memory card slots (2).
- b. Operator interface with 15" TFT color liquid crystal display with analog resistive NEMA 4X touch screen.
- c. 24VDC powered
- d. Compatible with PLC.
- e. Operator terminal capable of setup using standard PC.
- f. Trending for the following points:
 - 1) North Well Level
 - 2) South Well Level
 - 3) Wells Discharge Pressure
 - 4) Wells Irrigation Flow

C. Miscellaneous Devices:

- 1. Lights, switches, pushbuttons, terminal blocks etc. to match those specified under Devices subsection.
- 2. Connection between Ethernet Port and Ethernet hub shall be made with Cat 5 patch cable. Patch cable shall be 4 pair stranded PVC cable with HI-FLEX conductors. Length shall be 5 feet minimum. Color of cable shall be red.
- 3. Unmanaged Ethernet switch shall be 6 port N-Tron, D-Link, or approved equal.
- 4. RFI filters to be for power line radio frequency protection, Eaton Aegis series AGPH 12015 or approved equal.
- 5. Receptacle to be duplex and rated 20 amps, 120 VAC, 2 pole, 3 wire grounding, NEMA 5-20R configuration, specification grade, and side wired to screw terminals.
- 6. DC power supplies to be linear type and rated per Contract drawings at 24VDC and 12VDC, Power One to match City Standard.
- 7. Isolator shall provide complete isolation of the 4-20 mA output signal from the input signal and isolator power supply. Each isolator shall have all solid state circuitry mounted in a plug-in module. The 4-20 mA output signal shall be capable of driving a 600 ohm load. Both accuracy and linearity shall be +/- 0.10% of span. The isolator shall be powered as shown on Contract Drawings. Each isolator shall be as manufactured by AGM Electronics, Action Instruments, or approved equal.
- 8. Intrusion bypass pushbutton (blue) shall be Allen-Bradley 800H, IDEC ITE, or approved equal.
- 9. Top of operator interface (pilot devices / breaker) to be maximum 66" above finished floor.
- 10. Provide label on Control Panel door, below door handle, identifying all sources of foreign power (i.e. "Control Panel Fed from LP1-Ckt#4", "Fans & Lights Fed from LP1-Ckt#2", etc.). Label shall be white plastic with black machine printed lettering as produced by a KROY or similar machine with lettering no smaller than 3/8". Securely attach to door with clear tape
- 11. Uninterruptible power supply:
 - a. The Uninterruptable power supply (UPS) to provide VA shown on Contract drawings (minimum) backup power upon power failure to the 24 VDC power supply, 120VAC powered instruments & displays, and the processor logic controller (PLC) and PLC I/O cards in the Control Panel for 2 hours (minimum).
 - b. Mount UPS in control compartment and provide all necessary power wiring. Plug cords and receptacles shall be provided so that the UPS can be readily bypassed with power being obtained directly from the panelboard.
 - c. UPS to have temperature rating compatible with expected internal enclosure temperature. Provide enclosure with adequate ventilation fans or AC unit to keep enclosure internal temperature within UPS temperature rating.

- d. UPS to be Allen-Bradley, APC Smart-UPS Smart Slot, Marathon or approved equal.
- 12. Future device and component mounting space shall be provided on door, backpan, and subpanel where detailed on Drawings. Where no detail is shown, provide a minimum of 10 percent usable future space.
- 13. Provide label on Control Panel door, below door handle, identifying all sources of foreign power (i.e. "Control Panel Fed from LP1-Ckt#4", "Fans & Lights Fed from LP1-Ckt#2", etc.). Label shall be white plastic with black machine printed lettering as produced by a KROY or similar machine with lettering no smaller than 3/8". Securely attach to door with clear tape
- 14. RETAINERS: Wire ways, retainers, and other devices shall be screw mounted with round-head 316 stainless steel screws or mechanically mounted by push-in or snap-in attachments. Glue or sticky back attachment of any type or style shall not be used. Retainers shall be Panduit High Bond Adhesive back mounts SGABM series, or approved equal.
- 15. Provide metal data pocket within each enclosure and box to hold as-built drawings.

201-2.07 FIELD DEVICES

A. Submersible level transmitter:

- 1. The submersible level transmitters shall be a loop powered two wire 4-20 mA linear transmitting device proportional to the applied direct pressure of the submerged element. The submersible probe shall be rated for use in water well applications. The transmitter shall have an accuracy +/- 1 5% of span. Minimum operating temperature range shall be 15 degrees Fahrenheit to 122 degrees Fahrenheit. Provide length of submersible cable per instrumentation index. Extra cable shall be coiled up. The submersible level transmitter shall be Druck Smart Check Well, Vegawell 52 or approved equal.

B. Pressure Indicating Transmitter

1. Transmitter:

- a. The pressure transmitter shall incorporate a high-accuracy capacitance sensor. With this sensor, process pressure is transmitted through the isolating diaphragm and fill fluid to the sensing diaphragm in the center of the capacitance cell. Capacitor plates on both sides of the sensing diaphragm detect its position. The differential capacitance between the sensing diaphragm and the capacitor plates shall be directly proportional to process pressure.
- b. The transmitter shall incorporate a temperature measurement to compensate for thermal effects.
- c. The pressure transmitter electronics shall convert the capacitance and temperature input signals directly into digital format for further processing by the electronics module.
- d. Configuration data shall be stored in nonvolatile EEPROM memory in the electronics module of the transmitter.

2. Software Functionality:

- a. The PC based HART protocol software and cables shall be provided.
- b. Configuration: The transmitter shall be configured by the System Supplier. Configuration shall consist of operational/parameters and informational data.
- c. Test: The pressure transmitter shall perform continuous self-tests.

- d. Format: The format function is used during the initial setup of a transmitter and for maintenance of the digital electronics.

Range:	80 psi to 175 psi.
Output:	Two-wire 4-20 mA output. Digital process variable superimposed on 4-20 mA signal.
Power Supply:	Loop power supply required.
Indication:	4-digit LCD meter setup with Engineering Units.
Zero Elevation and Suppression:	Anywhere within the sensor limits.
Overpressure Limits:	Limit is 0 psig to 3,626 psig (25 Mpa) without damage to the transmitter.
Temperature Limits:	Process: 0° F to 185°F (-18° C to 85°C). Ambient: -4° F to 175°F (-20° C to 80°C).
Humidity Limits:	0 – 100% relative humidity.
Accuracy:	±0.075% of span for spans from 1:1 to 10:1 of URL.
Stability:	±0.2% of URL for 12 months.
Process-Wetted Parts:	Isolating Diaphragms: 316 SST. Drain/Vent Valves: 316 SST. Flanges: 316 SST. Wetted O-rings: Glass-filled TFE.

3. The pressure transmitter shall be Rosemount Smart family 3051 with HART transmitter, or approved equal.
4. Calibration Valve - Each calibration valve assembly shall have integral stainless steel block and bleed valving. Valve shall have a non-rotating tip stem and a fully back-seated bonnet. Block and bleed valve shall be Hex HB59 or approved equal.

C. Intrusion System

1. Doors - Each intrusion door switch shall have a wide gap magnetic sensor with S.P.D.T. contacts mounted in a rugged steel housing with a 3 foot stainless steel armored cable for wiring to a junction box. Intrusion door switches shall be Sentrol 2507-A or approved equal.

D. Magnetic flowmeter:

1. Flange connections shall be ANSI Class 150 as required by mechanical Drawings. Flanges shall be coordinated with Contractor installing piping. Flange shall be slip-on, raised-face, carbon steel.
2. Stainless steel grounding rings shall be provided at both ends of the flow tube when required by the manufacturer. The tube internal liner material shall be polyurethane, unless recommended otherwise by the manufacturer for the application and approved by the Engineer. Electrode material shall be 316 stainless steel and shall be flush type. The meter shall incorporate a high impedance amplifier of 100,000 Megohms or greater, eliminating the need for electrode cleaning systems.
3. The converter electronics shall be mounted remotely as shown on Contract Drawings. The converter shall be microprocessor controlled, utilizing digital signal processing with automatic zero correction to provide a linear 4-20 mA signal proportional to the forward and reverse flow rate specified. Electronics shall provide and control output rated for 120VAC. Rangeability shall be field adjustable over a 100 to 1 range. Field adjustable signal dampening shall be provided. Low flow cutoff shall be provided to eliminate flow transients when no flow is present in the pipe. A rate indicator and totalizer scaled in

engineering units shall be provided and shall be viewable on a LCD display(s) through a clear window in the enclosure. The converter shall have self-diagnostics which constantly check for proper operation. If a failure occurs, a fault indication shall be provided to notify the operator of a problem. The converter shall contain a self-test mode to allow the operator to manually simulate the output 4-20 mA signal to any value between 0% and 100% to check out any driven devices in the loop. The converter shall be rated to operate in an ambient temperature range from -4°F to 131°F.

4. The converter electronics shall be designed for operation from a power source of 120VAC, with a power consumption of less than 24 watts.
5. When converter electronics are shown to be mounted remotely, additional special cabling without any splices (Cabling between flow element and remote mounted flow indicating transmitter; field verify), mounting hardware, and devices necessary to complete the installation shall be provided by the manufacturer at no additional cost to the Owner.
6. Electronics shall be provided in NEMA rated enclosures.
7. The meter shall be hydraulically calibrated at a facility located in the United States and the calibration shall be traceable to the National Bureau of Standards. A certified copy of the calibration test results shall be submitted to the Owner prior to shipment of the meter.
8. The accuracy of the complete metering system including flow tube and converter electronics shall be 0.25% of rate over the range settings of 0.033 to 33 feet per second. Variations in temperature, voltage, and frequency within the ranges listed herein shall not affect the accuracy in excess of 0.5% of flow rate. Where shown, the flowmeter shall be accidental submergence proof for forty-eight hours under 30 feet of water. Conduits between flowmeter element and electronics shall be sealed to retain submergence rating per flowmeter manufacturer's requirements.
9. Conduit entry shall be 1-2-14NPT.
10. The flow meter shall be Rosemount with converter/indicator 8750W or approved equal.

201-2.08 SURGE PROTECTIVE DEVICE

- A. The surge suppressor shall be rated for use on a 3 phase system at voltage shown on Contract One Line diagram. The transient current the surge protective device shall have a max surge rating of 130kA per Mode/2600kA per phase, 2000kA short circuit current rating.. Provide fuses feeding the SPD. Locate SPD so that the indicating lights are viewable without removing panels. The surge protective device shall be Leviton M3277-YB series, Eaton, or approved equal.
- B. Surge suppressor shall have normally open contact indicating failure of any surge protective element.

201-2.09 PANELBOARD

- A. The Contractor shall furnish a panelboard of the type indicated on the Contract E-series Plans and specified herein. Panelboard to be provided with breakers shown on Contract Drawings. Panelboard with a 240V high-leg (stinger) shall not be used.
- B. The panelboard shall comply with the applicable sections of UL, NEC, W.U.E.S.S.C., OSHA and NEMA and shall be manufactured by Eaton, Square D, ITT or approved equivalent.
- C. Provide a removable machine typed circuit directory with clear plastic cover on inside of panelboard of door breaker identification when panelboard is delivered to site. Update the panelboard legend at end of project to reflect as-built conditions. "Sticker" type panelboard schedules are not acceptable.

- D. Update the panelboard legend at end of project to reflect as-built conditions.
- E. Provide circuit number tags next to each circuit breaker, including existing panelboards.
- F. Panelboards mounted external of MCCs shall be provided with engraved nameplates listing Panelboard name, voltages, and power source location feeding it (i.e. "MCC-100 via Transformer XFMR-100," "Power Panel 100," etc.). Engraved nameplate shall be as specified herein

201-2.10 PANELBOARD TRANSFORMER

- A. The panelboard transformer shall be ventilated dry type. Voltage, phase and KVA ratings shall be as shown on the Contract One-line drawing. The transformer shall be as manufactured by G.E. Type QL, Eaton, Jefferson, or approved equal.
- B. The transformer shall have 115 degrees Celsius rise, insulation 220 degrees Celsius rise class H insulation system.
- C. Vibration isolators shall be installed between the transformer and its mounting surface to reduce case vibration and compensate for slight unevenness of the mount. They shall be sized for the appropriate loading at twice the fundamental frequency. The Transformer housing shall be securely fastened to the mounting surface to eliminate possible sound generation.
- D. The transformer shall be finished with two coats of heavy enamel to resist rust and corrosion.
- E. Transformers that require neutral grounding shall be grounded in accordance with NEC 250.26, 450.10 and any applicable local ordinances. Protection of the grounding attachments shall be per NEC 250.24.
- F. Transformers mounted external of MCCs shall be provided with engraved nameplates listing name, voltages, and size.
- G. Provide an engraved nameplate for each external transformer as specified herein.

201-2.11 MAIN SWITCHBOARD

- A. General
 - 1. Furnish a free-standing, dead-front type, main switchboard with breakers, and other devices shown on Contract Elevation diagrams. The voltage and amperage rating shall be as shown on Contract Drawings. It shall consist of the required number of vertical sections shown on Contract Drawings bolted together to form a rigid assembly.
 - 2. The switchboard shall comply with the latest applicable standards of NEMA PB-2 and UL Standard 981. The assembly shall bear a UL label.
 - 3. Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished as required. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's wiring diagrams.
 - 4. The assembly shall be provided with adequate lifting means and shall be capable of being moved into installation position and bolted directly to the floor without the use of floor sills. All necessary hardware to secure the assembly in place shall be provided by the Contractor.

5. The switchboard shall be arranged as shown on Contract Drawings. If the proposed arrangements are significantly different than those shown on the Contract Drawings, then the Contractor shall consult with the Engineer and provide proposed layout and catalog cuts prior to first submittal.
6. The switchboard manufacturer shall cooperate with the Contractor by promptly supplying dimensional or other required information prior to delivery of equipment.
7. The switchboard shall be manufactured by Eaton, Square D, ITT, or approved equal.

B. Construction:

1. The switchboard shall be NEMA rated as shown on Contract Drawing and constructed of code gauge galvanized steel fully finished with two coats of baked grey enamel paint.
2. All sections of the switchboard shall align front and rear with depth as shown on the Drawings. Front access shall allow for installation, maintenance and servicing of all components. Switchboard shall not require back or side access for connection of cables or maintenance.
3. All edges of front covers or hinged front panels shall be formed.
4. All control wire shall be type THWN, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals are provided integral to a device. All current transformer secondary leads shall first be connected to conveniently accessible short circuit terminal blocks before connecting to any other device. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring.

C. Short circuit rating:

1. The complete bus assembly and breakers shall be rated to withstand mechanical forces exerted during short circuit conditions when connected directly to a power source having available fault current listed on Contract one-line Drawings at rated 480 volts.
2. Per NEC 110.24 (A) Service equipment shall be legibly marked in field with the maximum available fault current. Field marking shall include date the fault current calculation was performed and be weather & UV rated. Service equipment shall not be hand labeled.

D. Bussing:

1. All bus bars shall be tin plated copper. Bus sizing shall be based on NEMA standard temperature rise criteria of 65 degrees Celsius over a 40 degrees Celsius ambient (outside the enclosure).
2. A copper ground bus shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.
3. All hardware used on conductors shall be high-tensile strength and zinc plated. All bus joints shall be provided with Bellville washers.

E. Main circuit breakers:

1. Each breaker shall be three-pole unit, electrically, and mechanically trip-free power circuit breaker with solid state overcurrent trip device. Breaker arrangement, trip, and frame ratings shall be as shown on Contract single-line diagram.
2. Each breaker shall have a hasp for padlocking the breaker in the OFF position. Each breaker shall be thermal magnetic (TM) type.
3. Tripping devices shall be automatic and self-contained within the breaker frame, and shall not require any external relaying or power supplies.
4. Circuit breakers shall be open frame, Cutler-Hammer, GE or approved equal.

F. Testing:

1. The switchboard shall be completely assembled, wired and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated service conditions to assure the accuracy of the wiring and the functioning of all equipment. The main bus shall be given a dielectric test of 2200 volts for one minute between live parts and ground and between opposite polarities. A certified test report of all tests shall be submitted to the Owner for approval.

201-2.12 MOTOR CONTROL CENTER

A. General:

1. The motor control center (MCC) shall be built and tested in accordance with:
 - a. NEMA Standards.
 - b. ANSI.
 - c. Underwriter's Laboratories, Inc.
2. The MCC shall comply with all provisions of UL 845, and bear a separate UL label on each individual MCC Section. In addition, all wiring, devices, and components contained therein, shall be UL labeled for the application. UL approval and labels shall be provided for the individual MCC Sections prior to delivery from the factory. Field UL labeling will not be allowed.
3. MCC shall be 600 volt class rated to operate from an incoming power as shown on Contract one-line diagrams.
4. MCC construction shall consist of NEMA rated as shown on Contract Drawings deadfront enclosure. MCCs shown as NEMA 12 shall have gasketed doors to reduce dust entry. The height of the MCC shall be 90 inches.
5. MCC fabrication shall be NEMA Class II with NEMA Type B wiring.
6. The MCC shall be provided with the type, capacity, and ratings of components shown on the Drawings or otherwise specified. The 460 VAC breakers shall be rated to withstand an available fault current shown on contract Drawings.
7. MCP and TM breakers shall be selected to have trip and breaker size based on the motor full load amps of motor loads supplied for this project.
8. Top of operator interface, pilot devices, breaker, operator panels, etc. to be maximum 66" above finished floor.

B. Qualifications:

1. MCC structures shall provide for all equipment detailed on the single line Drawings including all spares and spaces. Where possible, the MCC shall be built in strict accordance with overall sizing and component layouts as detailed on the Drawings and no deviations will be allowed without prior approval of the Owner.
2. When physical size requirements for individual components are different than those detailed on the MCC elevation Drawings, the single line Drawing shall supersede the elevation Drawing and the Supplier shall furnish additional vertical Sections based on the Owner's approval as required to provide for all equipment including spares and spaces at no additional cost to Owner.
3. MCC shall have major components and subsystems therein (i.e., breakers, contactors) that are standard for the MCC manufacturer.
4. All devices and components located in different MCC cubicles (i.e., VFDs, contactors, control relays, timers, etc.), shall be the product of same manufacturer throughout for each device or component type.
5. When the circuit breaker/MCP size changes due to a different motor size and full load amps than that shown on the Contract Drawings, the Contractor shall provide the properly sized circuit breaker/MCP breaker at no additional cost to Owner.

6. Provide extension handles for breakers with center of the grip of the operating handle, when in its highest position, is above 78" from floor in order to conform with NEC Article 404-8.
7. MCC components such as relays, starters, breaker, lights, switches, etc. shall meet the requirements as specified herein.
8. MCC shall be Eaton, Allen-Bradley Centerline 2100 or approved equal.

C. Construction:

1. The MCC shall consist of standard metal-enclosed, freestanding, dead-front and dead-back vertical Sections, not more than 90 inches in height and not less than 20 inches deep. The framework shall be made of 12-gauge steel channels. The composite MCC shall consist of vertical sections that are of equal height.
2. Working height excluding the upper and lower wireways of MCC shall be 72 inches (min). Minimum compartment height shall be twelve inches.
3. Each Section shall be provided with a horizontal top and bottom wireways. Wireways shall be readily accessible and isolated from all busing by grounded steel barriers. The bottom wireways shall have adequate conduit entrance area and shall not be obstructed by transformers, capacitors, or other devices. The wireways in each Section shall line up with wireways in the adjacent Sections, with openings between, so that wires may be pulled the entire MCC length.
4. Where shown on the Drawings, isolated vertical wireways shall be provided, each with a separate full height door. Vertical wireways shall intersect the top and bottom horizontal wireways for easy cable routing. Vertical wireways shall have wire hangers for wire tie-down spaced throughout the complete vertical trough. Vertical wireway doors shall be latched by quarter turn indicating type fasteners.
5. The MCC shall be designed for front access maintenance. All wiring, bus joints, and other mechanical parts requiring tightening or other maintenance shall be accessible from the front. Rear or side access shall not be necessary for inspection or maintenance.
6. All steel work shall be immersion cleaned and phosphated to inhibit rust prior to painting. Paint finish shall be electrostatically applied dry powder, baked to thermoset. MCC compartment interior color shall be white. All other interior and exterior MCC structure surfaces shall be finished in an ANSI 61 gray color. No field painting will be allowed except for "touching up" of damaged areas.
7. A manufacturer's nameplate shall be attached to each MCC giving the model number, serial number, bus amps, voltage, and other manufacturer's information pertaining to the MCC construction.
8. MCC shall be furnished completely factory assembled and shipped to the jobsite in shipping sections. Assembly of components into MCC at the jobsite is not allowed (except for connection of shipping section). Removable lifting angles or eyes shall be provided on the top of each MCC shipping section.
9. MCC shall be factory inspected and witness tested by the Owner prior to it being shipped to the jobsite. If a MCC shows up at the jobsite and has not been previously inspected and tested by the Owner, then the Supplier shall remove the MCC from the jobsite and return it to the factory for factory inspection and witness testing, all at the expense of the Supplier.

D. Bus system:

1. All bus material shall be copper. Aluminum buswork is not allowed. All buses, except ground buses, shall be completely isolated by steel plates or insulating material.
2. A continuous horizontal bus shall be furnished and rated as shown on the Contract one-line Drawings.

3. A full length vertical bus shall be furnished in each Section and rated as shown on the Contract Elevation diagrams. Current rating shall apply to the full length of the vertical bus, tapered bus shall not be allowed. Vertical buses shall be insulated and isolated with glass polyester or equivalent continuous barriers. Cutouts shall be provided in the barriers for plug-in stab connections. Unused stab openings shall be plugged. Lower ends of vertical buses shall be insulated.
4. Buses shall be sized and braced to withstand a fault of symmetrical amperes listed on Contract one-line drawings. MCC protective breaker(s) shall have an interrupting capacity to isolate a fault current of this magnitude.
5. A copper ground bus shall be provided in the bottom horizontal wireway of each Section. The ground bus shall be rated 300A minimum. It shall be electrically continuous the entire width of each MCC. Provide cable lugs on ground bus for incoming power grounding conductors.

E. Compartments:

1. Compartments shall be isolated from each other by separate horizontal steel plates without openings that are a part of the unit itself. Draw-out units shall totally isolated enclosed equipment. All unused openings to the adjacent vertical wiring space shall be plugged. All openings used for wiring shall have insulating grommets.
2. Doors for each compartment shall be fabricated from formed sheet steel of not less than 14 gauge thickness. The door opening shall be of sufficient size to permit ready removal of any of the devices in the compartment. Doors shall be mounted on adjustable and removable pin type concealed hinges so arranged that compartment doors may be removed without disturbing compartment doors above or below. Door latches shall be quarter turn indicating type fasteners. Overload relays shall be reset from outside the enclosure by means of an insulated button mounted on the door.
3. An operator mechanism mounted on the draw-out unit shall provide the means for operating the compartment breaker or disconnect switch. The operator shall extend through an opening in the compartment door and shall clearly indicate whether the disconnect is "on", "off", or "tripped." This indication shall function whether the door is open or closed. The operating mechanism shall not be attached to the compartment door.
4. Each compartment for combination starters, breakers, and disconnect switches shall be draw-out construction, containing individual units. Draw-out provisions shall include a positive guide rail system and stab shrouds to absolutely ensure alignment of stabs with the vertical bus. The stabs shall be tin plated copper alloy and shall provide a self-aligning pressure connection. The stab design shall ensure a consistent low-resistance contact with the vertical bus even after repeated insertions and removals. Power wiring to stabs shall be contained within the draw-out unit. No wire shall extend behind the unit.
5. All similar compartments shall have the same structural features and the units shall be interchangeable.
6. With the disconnect in the "on" position, a mechanical interlock shall prevent opening of the door. This interlock shall be provided with a defeater so that authorized personnel may gain access to the compartment without interrupting service. This interlock shall also prevent unintentional closing of the disconnect when the compartment door is open. A second mechanical interlock shall prevent any possibility of removing or reinserting the draw-out unit while the disconnect is in the "on" position.
7. The operator mechanism shall allow padlocking of the disconnect in the "off" position with up to three padlocks.
8. All compartment interconnect wiring to field devices shall be connected to pull apart terminal blocks.

9. Pushbuttons, selector switches, and indicating lights shall mount where shown on the Drawings on a removable device panel which is part of the draw-out unit. The device panel shall not be part of the door.
10. Compartments containing motor starters shall each have an overload selection table posted inside the door.
11. MCC compartments labeled as "SPACE" shall have a blank hinged door and drawout relay panel installed, occupying the full space area.
12. Provide removable metal filters for all vents.

201-2.13 SOFT STARTER

A. General:

1. The solid state starter (SSS) shall be provided as a stand-alone system packaged in an integral unit. The soft start motor controller shall be of the latest technology used exclusively for providing ramp starting and stopping of a three phase induction motor driving a centrifugal pump. The soft starter shall be designed to meet the applicable NEMA, UL, IEEE, CSA, IEC, and EN standards. The soft starter shall be microprocessor based and be provided with both acceleration and deceleration pump speed control. The soft starter shall also have built-in motor overcurrent and phase loss/reversal protection eliminating external overloads and PFR relays. The soft starter shall be Allen-Bradley SMC Flex (Bulletin 150) with Pump Control option, internal bypass contactor and Remote Display Keypad Human Interface Module (HIM), or approved equal.
2. The soft starter shall provide the following starting modes:
 - a. Soft start with selectable kick start.
 - b. Current limit.
 - c. Full voltage.

B. Configuration:

1. The soft starter shall be an open modular device, and shall consist of a logic component and power components. The control module shall be designed for integral mounting on the power section. It shall require no additional panel space or wiring.
2. Front or top control terminals shall be provided and shall be easily accessible for wiring. The control terminals shall be UL rated for 300V, 20A maximum. They shall accept a maximum of two wires each, ranging from #18 to #12 AWG.
3. Soft starter shall be configured to automatically reset after a power failure.

C. Electrical - the control module shall be microprocessor based and shall consist of all the circuitry required to drive the power semiconductors located in the power section.

1. The power section shall consist of six (6) SCRs, rated for a minimum repetitive peak inverse voltage of 1400 V at 480 VAC. The power section shall be capable of the following:
2. Full voltage rating: 600%, 10 seconds.
3. Centrifugal Pump and Fan Duty: 300%, 30 seconds.
4. Continuous Full Load Rating: at the Soft Starter rated amps shown on One-Line Diagrams.
5. The power section of the controller shall have integral fan forced air cooling.

D. Functional - The soft starter shall have the following features switch or keyboard selectable:

1. Acceleration ramp time adjustable from 2 to 30 seconds.
2. Initial torque setting adjustable from 5% to 90% of locked rotor torque.
3. A kickstart function providing an adjustable time pulse of current limit prior to the normal starting mode. The current is held at 500% of full load for a time adjustable between 0.4 and 2 seconds. This feature shall be field defeatable.
4. A deceleration ramp time of soft stop adjustable from 2 to 60 seconds.

5. One (1) N.O. and one (1) N.C. Form C auxiliary contact. The contacts can be setup either to change state instantaneously on a start command or when the controller has determined that the motor is up to speed.
- E. Protection - The following protective functions shall be provided during "starting and "running" modes:
1. Start Fault
 2. Line Fault
 3. Temperature Fault
 4. Stalled Motor
 5. Phase loss.
 6. Over and under voltage.
 7. Phase reversal.
 8. Motor overcurrent.
 9. When these conditions are detected, starting of the controller shall be inhibited or the controller shall be shut down if it is operating.
- F. HMI - Alphanumeric display shall provide status and fault annunciation, and shall be color coded or provided with English descriptions for distinct annunciation. Display shall have two-line 16 character backlit LCD display. Programming of unit shall be through a keypad on front of controller. Provide remote interface module to be mounted remotely to MCC door. This module shall have the LCD display and keypad to allow operator to access Soft Starter programming without opening the MCC door. Provide all necessary cables and modules for using remote interface module with Soft Starter. HMI shall be provided with bezel to be NEMA 4 rated. HMI shall be mounted no higher than 66" above finished floor.
- G. Input terminations - The soft starter assembly shall have functional provisions and termination points at terminal blocks for remote input of each of the following:
1. Start/stop command from an external dry contact.
 2. Emergency stop shutdown and lockout.
 3. Ethernet/IP communication ports for connection to local PLC.
- H. Output terminations - The soft starter assembly shall have functional provisions and termination points at terminal blocks for remote monitoring of the following:
1. Run relay dry contact, Form C.

201-2.14 PULL BOXES

- A. Underground pull boxes, where shown or required by length of conduit runs, shall be prefabricated concrete type with the size shown on the Drawings or larger to allow for adequate pull area. Extension sections shall be provided as necessary to reach the depth of underground conduits. All boxes shall have galvanized steel hold down bolts and hardware. Boxes located in paved areas or other areas which vehicles may travel shall be H/20 loading rated and have diamond plate steel traffic covers. Steel covers or lids shall be galvanized. Pull box covers shall be bead welded with pull box designation. If the cover cannot be bead welded, the Contractor shall propose other permanent marking options. All underground pull boxes shall have a 12-inch bedding of ¾-inch nominal crushed rock. Pull boxes shall be Christy Concrete Products, Brooks, or approved equal.

201-2.15 ELECTRICAL ENCLOSURES AND BOXES

- A. Enclosures and boxes to be wall mounted, minimum 14 gauge, type 316 stainless steel with seams continuously welded & ground smooth, and fast access door latches. A copper ground bus shall be provided in the enclosure. Outer door shall have provisions for locking enclosure with standard padlock. Provide white backpan in box.
- B. Provide larger enclosure as required to accommodate the supplied equipment at no additional cost to the City.
- C. Provide accessories consisting of breaker to disconnect incoming power, heater, fan, louvers, ground bus, and thermostats.
- D. Provide metal data pocket within each enclosure and box to hold as-built drawings.
- E. All panel doors shall be installed with ground straps.
- F. Panels shall be provided with engraved nameplate identifying name of panel, voltage and location of power source feeding it (i.e. MCC-100, Panelboard LP-1, etc.). Engraved nameplate shall be as specified herein.
- G. Enclosure shall be Hoffman, Circle AW or approved equal.

201-2.16 GROUNDING SYSTEM

- A. Ground clamps shall be bolt-on type as manufactured by ILSCO type AGC, O-Z Gedney Type GRC, Burndy Type GAR or GP, or approved equal.
- B. All ground rod, pipe, and steel plate and buried bond connections shall be made by welding process equal to Cadweld.
- C. Ground rods shall not stub up more than 4" in the concrete pad.
- D. Provide a 13-inch diameter, 9-inch nominal throat, concrete ground rod box, minimum 12 inches deep, with a cast iron traffic cover embossed or engraved "GROUND."
- E. Ground buses shall be provided in all electrical enclosures. Each ground bus shall be sized as shown on the Contract drawings or specified herein. The ground bus shall be adequately sized for the connection of all grounding conductors required per NEC. Screw type lugs shall be provided on all ground busses for connection of grounding conductors.
- F. Grounding conductors shall be sized as shown on the Plans or in accordance with NEC table 250.122, whichever is larger.
- G. Conduit grounding bushings and locknuts shall be installed on all metallic conduits. Conduit grounding bushings shall be set screw locking type electra-galvanized malleable iron with insulation collar and shall be provided with a feed through compression lug for securing the ground bonding wire.
- H. Bonding wires shall be installed on all conduits with grounding bushings, expansion joints and for continuity of raceways transitions. Bonding wires shall be solid bare copper sized and

installed per NEC 250.102. Bonding wires at endpoints shall be connected to enclosure ground bus or equipment grounding lug.

- I. Each ground bus shall be copper. Screw type fasteners shall be provided on all ground busses for connection of grounding conductors. Ground bus shall be a Challenger GB series, ILSCO D-167 series or approved equal.
- J. Attachment of the grounding conductor to equipment or enclosures shall be by connectors specifically provided for grounding. Mounting, support, or bracing bolts shall not be used as an attachment point for ground conductors.
- K. All raceway systems, supports, enclosures, panels, motor frames, and equipment housings shall be permanently and effectively grounded.
- L. One side of the secondary on all transformers shall be grounded to the ground bus.
- M. The system neutral conductor and all equipment and devices required to be grounded by the National Electrical Code shall be grounded in a manner that satisfies the requirements of the National Code.
- N. The system neutral (grounded conductor) shall be connected to the system's grounding conductor at only a single point in the system. This connection shall be made by a removable bonding jumper sized in accordance with the applicable provisions of the National Electrical Code if the size is not shown on the Drawings. The grounding of the system neutral shall be in the enclosure that houses the service entrance main overcurrent protection.
- O. All receptacles shall have their grounding contact connected to a grounding conductor.
- P. Branch circuit grounding conductors for receptacles or other electrical loads shall be arranged such that the removal of a lighting fixture, receptacle, or other load does not interrupt the ground continuity to any other part of the circuit.
- Q. Negative side of all VDC power supplies shall be grounded.

201-2.17 APPLICATIONS PROGRAM AND CONTROL STRATEGIES

- A. Provide applications programs in the PLC to implement the control strategies. Note, PLC references the entire PLC, OI, communications module. The Contractor is responsible to provide an application program that meets the intent of the descriptions given along with any additional implementations for a fully operational system at no additional cost to City.
- B. PLC Software Configuration: The Supplier shall provide the PLC completely configured and programmed for the monitoring and control of the system. The PLC shall be setup as defined herein. The PLC shall be ready to be placed in operation at the time of factory test. The programming, setup and configuration of the PLC shall be performed by the System Supplier. All programming shall be performed by an application programmer with prior experience on similar PLC projects. City reserves the right to judge if the application programmer assigned to this project is adequate for the task. If the programming performed is deemed inadequate by City, then the Supplier shall provide a qualified application programmer to meet these requirements.
- C. The setup details given for the PLC and Operator Interface (OI), are intended as guidelines for the Supplier to use to configure the system. The setup details were prepared with the

available information on the software package and may not be the best way to accomplish the task. The opposite logic of that shown, is implied that the programmer will include it in the ladder logic. Errors and omissions in these details shall be the System Supplier's responsibility to correct, at no additional cost to City. The System Supplier shall meet the intent of the setup specified, making modifications as necessary to provide an operational system, at no additional cost to the City.

- D. The PLC ladder logic applications program and the OI configuration shall meet the intent of the P&ID on I-Series Contract Drawings and the Control Strategies described herein. The following additional program functions shall be provided (minimum):
 - 1. Enable/disables and settable time delays for all alarms.
 - 2. All setpoints, enable/disables, time delays, registers and scaling shall be adjustable from OI and PLC.
 - 3. Real Time and historical trends for all analog inputs and digital pump runs or like digital equipment.
- E. Tagname and I/O point designations shall match those listed in Control Strategies.
- F. PLC Programming:
 - 1. The PLC ladder logic applications program shall meet the intent of the P&IDs on Contract Drawings. The following additional program functions shall be provided (minimum):
 - a. All setpoints, enable/disables, time delays and registers shall be adjustable from Operator Interface, and PLC.
 - b. Display of all analog values.
 - c. High and Low alarms for all analog values. Provide High High alarms for analog per Owner's request. Do not provide High High, Low Low alarms or alarm reset setpoints for analog values unless noted in Control Strategies.
 - d. Automatically call the lag pump when the lead pump is unavailable.
 - e. Transducer fail alarms for all analog inputs.
 - f. Enable/disables and settable time delays for all alarms.
 - g. Scaling (minimum) to engineering values of all variables:
 - 1) Level in 1/100s feet resolution.
 - 2) Pressure in 1/10s PSI resolution.
 - 3) Flow in 1s resolution.
 - h. Sequential start time delay between similar equipment and pumps.
 - i. Equipment Fail to start alarm
 - j. Time of day clock; adjustable.
 - k. Runtime counters for all pumps and mixers (today's hours, yesterday's hours, resettable hours, non-resettable hours) 1/10s hours resolution.
 - l. Start counter for all pumps and mixers (today's starts, yesterday's starts, resettable starts)
 - m. Local station alarm light to flash on new alarm. Alarm light to change to steady solid when new alarm has been acknowledged. Light turn off when all alarms have cleared.
 - 2. PLC and Operator Interface programming shall be developed custom for this project. System Integrator Standard PLC program is not acceptable. Add-on instructions are not acceptable
 - 3. PRV113 – Control
 - a. PRV 113 shall open if
 - 1) The Wells Discharge pressure High Alarm (PAH161) is not in alarm
 - 2) AND the time of day is past the "PRV Enable Time" AND not exceed the "PRV Disable Time".

- b. PRV 113 shall close if
 - 1) The Wells Discharge pressure High Alarm (PAH161) is in alarm
 - 2) OR the time of day is between the "PRV Disable Time" and "PRV Enable Time".
- 4. Well Control
 - a. Pump Available (North PMP111 / South PMP112)
 - 1) Pump is available if
 - a) Breaker is on (JN11#A)
 - b) AND Control Power is on (JN11#B)
 - c) AND Pump is in Auto (Y11#)
 - d) AND associated Well Level is not low LAH15#
 - 2) Pump is not available if
 - a) Breaker is not on (JN11#A)
 - b) OR Control Power is not on (JN11#B)
 - c) OR Pump is not in Auto (Y11#)
 - d) OR associated Well Level is low LAH15#
 - b. Pump Selection
 - 1) Well pump operation can be set in fixed rotation (1-2 or 2-1), or rotate on stop (ALT)
 - c. Pump Call
 - 1) Lead Well pump is called when
 - a) Pump is available,
 - b) AND Discharge pressure is less than Lead pressure start setpoint,
 - c) AND there is no Wells Discharge pressure high alarm (PAH161).
 - 2) Lag Well pump is called when
 - a) Pump is available,
 - b) AND Discharge pressure is less than Lag pressure start setpoint,
 - c) AND PRV113 has been called to open (X113)
 - d) AND there is no Wells Discharge pressure high alarm (PAH161).
 - 3) Lag Well pump is called to stop when
 - a) Pump is not available
 - b) OR Discharge pressure is greater than Lag pressure stop setpoint
 - c) OR PRV113 call to open (X113) has been removed,
 - d) OR there is a Wells Discharge pressure high alarm (PAH161).
 - 4) Lead Well pump is called to stop when
 - a) Pump is not available
 - b) OR Discharge pressure is greater than Lead pressure stop setpoint
 - c) OR there is a Wells Discharge pressure high alarm (PAH161).
 - d. Station Alarm
 - 1) Alarm light shall flash on / off (USY199) when there is an active and unacknowledged alarm. Once the alarm has been acknowledged (RA199), the light shall stay lit until Alarm has been reset (RB199) and cleared.
 - e. PLC Fault / Fail to Acknowledge
 - 1) Alarm light shall light when PLC has failed (normally closed, light on PLC contact open).
 - 2) If the alarm hasn't been acknowledged within a time delay, generate (USF199)
 - f. Intrusion Alarm
 - 1) If an intrusion has been detected (ZST191) and pushbutton (ZS191) has not been activated within a time delay, generate Intrusion Alarm (ZAT191)

201-3 EXECUTION

201-3.01 WORKMANSHIP

- A. All work in this Section shall conform to the codes and standards outlined herein.
- B. The Contractor shall employ personnel that are skilled and experienced in the installation and connection of all elements, equipment, devices, instruments, accessories, and assemblies. All installation labor shall be performed by qualified personnel who have had experience on similar projects. Provide first class workmanship for all installations.
- C. Ensure that all equipment and materials fit properly in their installations.
- D. Perform any required work to correct improper installations at no additional expense to the City.
- E. The Engineer reserves the right to halt any work that is found to be substandard or being installed by unqualified personnel.

201-3.02 ELECTRICAL CONSTRUCTION METHODS, GENERAL

- A. All wiring shall be neatly bundled and laced with plastic tie-wraps, anchored in place by screw attached retainer. Where space is available, such as in electrical cabinets, all wiring shall be run in slotted plastic wireways or channels with dust covers. Wireways or channels shall be sized such that the wire fill does not exceed 60%. Wires carrying 100 volts and above shall be physically separated from lower voltage wiring by using separate bundles or wireways with sufficient distance to minimize the introduction of noise, crossing only at 90 degree angles. Tie-wraps shall be T & B TY-RAP's or approved equal.
- B. All devices shall be permanently labeled and secured in accordance with subsections labeled "NAMEPLATES AND TAGS."
- C. All field wires and panel wires have wire markers as specified in the "WIRE" subsection.
- D. All components associated with a particular compartment's or enclosure's function shall be mounted in that compartment or enclosure.
- E. Spacing and clearance of components shall be in accordance with UL, and NEC standards.
- F. Wires shall not be spliced except where shown. Devices with pigtails, except lighting fixtures, shall be connected at terminal blocks. Equipment delivered with spliced wires shall be rejected and the Contractor required to replace all such wiring, at no additional cost to the City.
- G. No wires shall be spliced without prior approval by the Engineer.
- H. Where splices are allowed or approved by the Engineer they shall conform with the following:
 - 1. Splices of #10 and smaller, including fixture taps, shall be with wire caps or approved equal. "Piggys" are not acceptable.
 - 2. Splices of #8 and larger shall be hex key screw two way connectors, with built in lock washers; T & B "Locktite", O-Z type XW, or approved equal, insulated with 3M Scotch Super #88, Plymouth, or approved equal.

3. Splices in underground pullboxes shall be insulated and moisture sealed with 3M "Scotchcast" cast resin splice kits and shall have a date marking for shelf life. Do not use splice kits with a date marking for shelf life that has expired.
 4. Wire splicing devices shall be sized according to manufacturer's recommendations.
 5. Split-bolt splice connectors are not acceptable.
- I. Tapes shall conform to the requirements of UL 510 and be rated: 105 degrees C, 600V, flame retardant, hot and cold weather resistant. Vinyl plastic electrical tape shall be 7 mil black. Phase tape shall be 7 mil vinyl plastic, color coded as specified. Electrical insulation putty shall be rubber-based, elastic putty in tape form. Varnished cambric shall not be used.
 - J. Connections to terminals shall be as follows:
 1. Use connector or socket type terminals furnished with component.
 2. Connections to binding post screw, stud or bolt use:
 - a. For #10 and smaller wire, T & B "Sta-Kon", Buchanan "Termend" or approved equal, self-insulated locking forked tongue lug.
 - b. For #8 to #4/0 wire, T & B "Locktite," Burndy QA or approved equal lug of shape best suited.
 3. Use ratchet type crimping tool which does not release until proper crimp pressure has been applied.
 4. Connections for all terminals shall be made with insulation stripped per manufacturer's instructions.
 - K. Equipment shall be wired and piped by the manufacturer or supplier. Major field modifications or changes are not allowed without the written "change order" authority by the Engineer. When field changes are made, the components, materials, wiring, labeling, and construction methods shall be identical to that of the original supplied equipment. Contractor's cost to replace or rework the equipment to match original manufacturer or supplier methods shall be done at no additional cost to the City.
 - L. Mating fittings, bulkhead fittings, plugs, lugs, connectors, etc. required to field interface to the equipment and panels shall be provided by the supplier when the equipment is delivered.
 - M. All electrical and instrumentation factory as-built drawings associated with the equipment shall be provided with the equipment when it is delivered to the job site. Drawings for each piece of equipment shall be placed in clear plastic packets of sufficient strength that will not tear or stretch from drawing removal and insertion.

201-3.03 ELECTRICAL EQUIPMENT, GENERAL

- A. Panel cutouts for devices (i.e. indicating lights, switches) shall be cut, punched, or drilled and smoothly finished with rounded edges. Exposed metal from cutouts that are made after the final paint finish has been applied shall be touched up with a matching paint prior to installing device. Do not paint nameplates, labels, tags, switches, receptacles, conductors, etc.
- B. All doors shall be fully gasketed with nonshrinkable, water and flame resistant material.
- C. Bolts and screws for mounting devices on doors shall be as specified by the manufacturer; otherwise they shall have a flush head which blends into the device or door surface. No bolt or screw holding nuts shall be used on the external surface of the door.
- D. No fastening devices shall project through the outer surfaces of equipment.

- E. Each component within the equipment shall be securely mounted on an interior cubicle or backpan and arranged for easy servicing, such that all adjustments and component removal can be accomplished without removing or disturbing other components. Mounting bolts and screws shall be front located for easy access and removal without special tools. Access behind the sub panel or backpan shall not be required for removing any component.
- F. HARNESS: Where space is available, all wiring shall be run in slotted plastic wire ways or channels with dust covers. If space is not available for wireways, then all wiring shall be neatly bundled and laced with plastic tie-wraps, anchored in place by stainless steel screw attached retainer. Wire ways or channels shall be sized such that the wire fill does not exceed 60%. Tie-wraps shall be T&B TY-RAP or approved equal.
- G. HINGE LOOPS: Where wiring crosses hinged surfaces, provide a "U" shaped hinge loop protected by clear nylon spiral wrap. The hinge loop shall be of sufficient length to permit opening and closing the door without stressing any of the terminations or connections. Spiral wrap shall be Graybar T25N or approved equal.
- H. RETAINERS: Wire ways, retainers, and other devices shall be screw mounted with round-head 316 stainless steel screws or mechanically mounted by push-in or snap-in attachments. Glue or sticky back attachment of any type or style shall not be used. Retainers shall be Panduit High Bond Adhesive back mounts SGABM series, or approved equal.
- I. ROUTING: Wires shall be routed in slotted plastic wire-ways with snap covers.
 - 1. Wires carrying 120 VAC shall be separated as much as possible from other low voltage wires and signal cables, and shall be routed only in ducts for 120 VAC. If the power wiring has to cross the signal wiring, the crossing shall be as close to a right angle as possible.
 - 2. Ducts for 24 VDC wiring shall be used for all other wires and cables. Routing of 120 VAC in combined ducts is not allowed without prior written approval of the City.
 - 3. Wires and cable shall be routed along the shortest route between termination points, excepting routes which would result in routing 120 VAC and other wires and cables in the same duct. Wires and cables shall have sufficient length to allow slack and to avoid any strain or tension in the wire or cable.
 - 4. Wires and cables shall be placed in the ducts in a straight, neat and organized fashion and shall not be kinked, tangled or twisted together. Additional wire ducting shall be provided for use by the electrical subcontractor for routing field wires to their landing points in the each electrical and instrumentation panel.
 - 5. Wiring not routed in duct work shall be neatly bundled, treed, and laced with plastic ties. Wiring across door hinges shall be carefully made up and supported to avoid straining and chafing of the conductors or from putting any strain on their terminals.
- J. TERMINATIONS: Single wire and cable conductors shall be terminated according to the requirements of the terminal device. All terminations must be made at terminals or terminal blocks. Use of spring or buttsplice connectors is not allowed. Terminal blocks and same equipment type termination wiring shall have wiring terminated with appropriate sized ferrules with insulation collars. Ferrule crimping (full ratcheting) tool with proper sized jigs shall be used per manufacturer's recommendations.
 - 1. Provide 2" minimum separation between wireway and terminal blocks. Installation of wireways too close to terminal blocks will be required to be completely reworked to the satisfaction of the City.

2. For captive screw pressure plate type terminals, the insulation shall be removed from the last 0.25 inches of the conductor. The conductors shall be inserted under the pressure plate to full length of the bare portion of the conductor and the pressure plate tightened without excess force. No more than two conductors shall be installed in a single terminal. All strands of the conductor shall be captured under the pressure plate.
 3. For screw terminals, appropriately sized locking forked spade lugs shall be used. Lugs shall be crimp on type that forms gas tight connections. All crimping shall be done using a calibrated crimping tool made specifically for the lug type and size being crimped.
 4. On shielded cables, the drain wire shall be covered with insulating tubing along its full bare length between the cable jacket and the terminal lug or terminal pressure plate.
 5. For screwless terminals, wire shall be stripped back and inserted per the manufacturer's instructions. When stripping insulation from conductors, do not score or otherwise damage conductor.
 6. Heat shrink shall be placed on ends of shielded cable to cover foil.
 7. Additional condulets with terminal blocks shall be supplied for wire termination to devices with leads instead of terminals. (i.e. solenoid valves, level probe, etc.)
 8. Terminate all status, control, and analog I/O wiring on terminal blocks, including spares. Provide additional relay, DIN rails, terminal blocks and side panels as required.
- K. A ground bus shall be provided in each enclosure or cabinet. It shall have provisions for connecting a minimum of ten grounding conductors. Screw type lugs shall be provided for connection of grounding conductors. All grounding conductors shall be sized as shown on plans or in accordance with NEC Table 250.122, whichever is larger.
- L. Minimum wire bending space at terminals and minimum width of wiring gutters shall comply with NEC Tables 312.6 (a) & (b).
- M. Future device and component mounting space shall be provided on the door, backpan, and subpanel where detailed on the Drawings. Where no detail is shown, provide a minimum of 25 percent usable future space.
- N. Doors shall swing freely and close with proper alignment.
- O. Provide larger motor termination boxes and lugs as required to accommodate conduit and wires.
- P. All conduits entering outdoor panels and enclosures shall use watertight hubs. These hubs shall be located on sides or bottom only. Top entry of outdoor panels or enclosures is not allowed unless specifically shown on Contract Drawings.
- Q. All panels and enclosures be delivered with as-built drawings in clear plastic packets within each panel and enclosure.

201-3.04 DELIVERY

- A. Contractor shall inspect each electrical and instrumentation item delivered to the jobsite.
- B. Contractor shall unpack each item for inspection within two (2) days of arrival.
- C. Complete written inventory shall be produced by Contractor and submitted to Engineer within (2) days after arrival on jobsite for record keeping prior to any payment for the item.

201-3.05 DAMAGED PRODUCTS

- A. Damage products will not be accepted. All damaged products shall be replaced with new products at no additional cost to the City.

201-3.06 FASTENERS & LUGS

- A. Fasteners for securing equipment to walls, floors, and the like shall be 316 stainless steel. The fastener size shall match equipment mounting holes.
- B. Stainless steel anchor bolts, ½" minimum size, shall be installed for the Electrical Equipment in the front and back of each section at locations recommended by Electrical Equipment manufacturer.
- C. Concrete pad with stainless steel anchor bolts shall be provided for all electrical freestanding equipment.
- D. All wall mounted panels or enclosures shall be spaced out from wall by stainless steel unistrut or stainless steel spacers with minimum depth of 1/2".
- E. All wire & cable lugs shall be copper; aluminum or aluminum alloy lugs shall not be used. The Electrical Contractor shall supply all lugs to match the quantity & size of wire listed in the conduit & wire routing schedule.

201-3.07 INSTALLATION, GENERAL

- A. System:
 - 1. Install all products per manufacturer's recommendations and the Drawings.
 - 2. Contract Drawings are intended to show the basic functional requirements of the electrical system and instrumentation system and do not relieve the Contractor from the responsibility to provide a complete and functioning system.
- B. Provide all necessary hardware, conduit, wiring, fittings, and devices to connect the electrical equipment provided under other Sections. The following shall be done by the Contractor at no additional cost to the City:
 - 1. Provide additional devices, wiring, conduits, relays, signal converters, isolators, boosters, and other miscellaneous devices as required to complete interfaces of the electrical and instrumentation system.
 - 2. Changing normally open contacts to normally closed contacts or vice versa.
 - 3. Adding additional relays to provide more contacts as necessary.
 - 4. Installing additional terminal blocks to land wires.
 - 5. Provide larger circuit breakers, conduit and wire, as required for the horsepower of the supplied equipment, when the supplied equipment is larger than that specified, at no additional cost to the Owner.
- C. All programmable devices (except PLC & Operator Interface) shall be programmed, set-up and tested by the Contractor prior to startup at the Contractor system supplier facility. This includes digital displays and instrumentation. Programming and set-up parameters shall be adjusted or changed as directed by the Engineer during start-up and throughout the warranty period, at no additional cost to the City.
- D. Coordinate with the City and setup all alarm, process, and operation setpoints.

E. Panels and Enclosures:

1. Install panels and enclosures at the location shown on the Plans or approved by the Engineer.
2. Install level and plumb.
3. Seal all enclosure openings to prevent entrance of insects and rodents.
4. Seal around bottom edge of all pad mounted enclosures to prevent entrance of insects, rodents, dirt, debris, etc.
5. Clearance about electrical equipment shall meet the minimum requirements of NEC 110.26.
6. Box supports shall be located and oriented as directed in field by City.

F. Conduits and Ducts:

1. Bury detectable warning tapes approximately 12 inches above all underground conduit runs of two or more outside of building. Align parallel to and within 3 inches of the centerline of the conduit or duct bank.
2. Care shall be exercised to avoid interference with the work of other trades. This work shall be planned and coordinated with the other trades to prevent such interference. Pipes shall have precedence over conduits for space requirements. Exposed conduits shall be neatly arranged with runs perpendicular or level and parallel to walls. Bends shall be concentric.
3. Install conduit free from dents and bruises.
4. Conduit label:
 - a. All conduits shall be labeled on all ends; at junction boxes, panels, pull boxes, transitions, enclosures, stub-outs, or other terminations.
 - b. Each conduit listed in Conduit and Wire Routing Schedule shall have permanent tags where it enters an open transition point, enclosures, junction boxes, terminal boxes, pullboxes, vaults, and manholes.
 - c. Prior to encasement, concealment, backfilling of conduits, temporary conduit labels shall be provided at each end of conduit. Temporary conduit labels shall have ½-inch (minimum) lettering at all transition points. After encasement and concealment temporary conduit labels shall be placed at each exposed end.
5. A maximum of three equivalent 90 degree elbows are allowed in any continuous runs. Install pull boxes where required to limit bends in conduit runs to not more than 270 degrees or where pulling tension would exceed the maximum allowable for the cable.
6. Route all above grade outdoor conduits or conduits in rated areas parallel or perpendicular to structure lines and/or piping.
7. Conduits installed outdoor or in NEMA 4X rated areas above grade shall be braced in place with stainless steel Unistrut stanchions or PVC coated clamps with backplates. Flex conduits shall be limited to 36 inches or less.
8. Duct-taping conduits together is not acceptable. Conduits, installed into concrete pads, shall be installed with a minimum of 2" distance between conduits to allow installation of bushings.
9. Conduit entrances: Seal each conduit entrance from below grade into the Panels, and other electrical enclosures with plugging compound sealant to prevent the entrance of insects and rodents.
10. Special "Soft-Jaw" type pipe clamps shall be used to prevent damage to PVC-coated conduits while field threading, cutting to length, and coupling sections.
11. Conduits shall be painted to match the color of surface attached to as directed by Engineer.
12. Spare or Future Conduits:
 - a. All spares conduits shall be labeled; the conduits shall be mandrelled and have pull ropes (pull tapes) installed.

- b. Pull rope shall be ½" wide, polyester, rated 1250 pounds tensile strength. Provide a waterproof label on each end of the pull rope to indicate the destination of the other end. Pull tape shall be printed with sequential footage. Pull tape shall be Neptco Muletape WP1250P or approved equal.
- c. All spares shall be mandrelled and have pull ropes installed.
- d. Provide caps on conduit ends to prevent entrance of dirt or insects.
- 13. For conduit runs over 100', Contractor shall have a mandrel pulled through the entire conduit run to prove the length contains no blockages or obstructions. Mandrelling shall be witnessed by the Owner.
- 14. All existing conduits that are reused shall have a mandrel pulled through the entire conduit run to prove the length contains no blockages or obstructions. Mandrelling shall be witnessed by the Owner.
- 15. Provide caps on conduit ends to prevent entrance of dirt or insects.
- 16. Conduits shall be painted to match the color of surface attached to as directed by Engineer.

G. Conduit and Wire Routing Schedule:

- 1. Conduit material, wire size, and quantity listed in Schedule take precedence over Electrical Section Specifications.
- 2. All of the entries for each line in the conduit schedule apply to each conduit when multiple quantity of conduits (quantity of which are indicated by number entered in conduit no. column in schedule) are listed in the schedule.
- 3. Wire sizes listed are in AWG or Kcmil and are copper conductors.
- 4. Extra wire was intentionally placed in the "Conduit & Wire Routing Schedule," which shall be labeled on both ends with a unique wire label. "Spare" to be on separate tag or included in wire label.
- 5. Contractor to supply and install all conduits and wiring as shown on Utility Engineered Design drawings. Utility primary and secondary conduit and wiring shown in "Conduit and Wire Routing Schedule" is for bid purposes only.
- 6. All control and signal wiring terminations shall have the correct wire label applied prior to making connection.
- 7. Conduit entries listed as "GRS-PVC" in the Conduit & Wire Routing Schedule are to be "Galvanized Rigid Conduits with PVC coating" the entire length.
- 8. Vertical offsets and sloping of conduits are not detailed on plans; the Electrical Contractor shall include in his bid the price for the complete conduit run utilizing the civil and mechanical plans to measure vertical & slope distances.
- 9. Exposed conduits runs shall not be run directly on the ground. Secure conduits to stainless steel unistrut.

H. Excavation and Back Filling:

- 1. The Electrical Contractor shall provide the excavation for equipment foundations and trenches for conduits or buried cables.
- 2. Trenches for all underground utility lines shall be excavated to the required depths.
- 3. Repave any area that was paved prior to excavation. Backfill and surface all areas as shown on the Drawings or where not shown to the original condition that was present prior to the excavation.
- 4. Underground conduits outside of structures shall have a minimum cover of 24 inches except for utility conduits depth shall be as required by the governing utility requirements. Back filling shall be done only after conduits have been inspected.
- 5. Contractor shall uncover any uninspected covered conduit trenches, at no additional cost to City, to verify proper installation.

6. Excavation and back fill conduit trenches shall conform to the requirements of the Earthwork Section of these Specifications, unless modified on plans, and to other entities as required. Backfill shall consist of 3/4 inch class 2 aggregate base material, unless otherwise noted.
 7. At all times during the installation of the electrical distribution system, the Contractor shall provide barricades, fences, guard rails, etc., to safeguard all personnel, including small children, from excavated trenches.
- I. Wiring, Grounding, and Shielding - It is important to observe good grounding and shielding practices in the generally noisy environment in this application. The shield of shielded cables shall be terminated to ground at one end only (source end), the shield at the other end (receive end) shall be encased in an insulated material to isolate it from ground.
- J. Cutting and Patching - The Contractor shall do all core drilling, cutting and patching required to install his work. Any cutting which may impair the structure shall require prior approval by the Engineer. Cutting and patching shall be done only by skilled labor of the respective trades. All surfaces shall be restored to their original condition after cutting and patching. Paint patched surfaces to match the original color.
- K. Seals
1. Seal around all conduits, wires, and cables penetrating between walls, ceilings, and floors in all buildings with a fire stop material. Seal shall be made at both ends of the conduit with a fire-stop putty. Seal shall have a minimum two hour rating. Fire stop sealing shall be International Protective Coatings Flamesafe, or approved equal.
 2. Seal around conduits entering outside to inside structures and around bottom of free standing enclosures to maintain watertight integrity of structure.
 3. Place conduit seal inside each underground conduit riser into panels and enclosures to prevent entrance of insects and rodents.
 4. Conduit entrances: Seal each conduit entrance from below grade into the panel and other electrical enclosures with plugging compound sealant to prevent the entrance of insects and rodents. Conduits between the enclosures shall be sealed with plugging compound sealant on each end. Plugging compound sealant shall be PRC-DeSoto (formerly Courtaulds) Aerospace Semco PR-868 or approved equal.
 5. Seal conduits entering any electrical instrument. Install conduit drain boxes and plug conduit interior to form an effective barrier to keep out water traveling into equipment or instrumentation from conduit installed higher than equipment or instrumentation.
- L. Housekeeping Pads
1. Concrete housekeeping pads are required for all free standing electrical equipment. Housekeeping pads shall be 3-1/2" inches above surrounding finished floor or grade unless otherwise shown and shall be 4 inches (minimum) larger in width on all sides of equipment. The depth of housekeeping pads shall be 18 inches (minimum).
 2. Housekeeping pads shall be installed for future units as shown on the Contract Drawings.
 3. Housekeeping pad shall be Class "A" concrete with rebar crossway network. The minimum size rebar allowed is #4. Concrete shall be precisely leveled so that equipment set in place will not require shimming.
- M. Cleaning and Touch up:
1. Prior to startup and at completion of the work prior to final acceptance, all parts of the installation, including all equipment, exposed conduit, devices, and fittings shall be cleaned and given touch up by Contractor, as follows:

- a. Remove all grease and metal cuttings.
- b. Any discoloration or other damage to parts of the building, the finish, or the furnishings, shall be repaired.
- c. Thoroughly clean any of his exposed work requiring same.
- d. Vacuum and clean the inside of all MCC and electrical and instrumentation enclosures prior to applying power and a second time immediately prior to the final acceptance inspection. Removing debris with an air blower is not permitted.
- e. Clean all above and below ground pull boxes, junction boxes, and vaults from all foreign debris prior to final acceptance.
- f. Paint all scratched or blemished surfaces with the necessary coats of quick drying paint to match adjacent color, texture, and thickness. This shall include all prime painted electrical equipment, including enclosures, panels, poles, boxes, devices, etc.
- g. Remove all decals and lettering from both sides of support plates.
- h. Repair damage to factory finishes with repair products recommended by Manufacturer.
- i. Repair damage to PVC or paint finishes with matching touchup coating recommended by Manufacturer.

201-3.08 ELECTRICAL TESTING

A. GENERAL REQUIREMENTS

1. It is the intent of these tests to assure that all equipment is operational within industry and manufacturer's tolerances and is installed in accordance with design plans and specifications.
2. All equipment setup and assembled by the Contractor shall be in accordance with the design plans and Drawings and the manufacturer's recommendations and instructions and shall operate to the Engineer's satisfaction.
 - a. Follow all manufacturer's instructions for handling, receiving, installation, and pre-check requirements prior to energization.
 - b. After energization, follow manufacturer's instructions for programming, set-up and calibration of equipment.
 - c. The Contractor shall be responsible for, and shall correct by repair or replacement, at his own expense, equipment which, in the opinion of the Engineer, has been caused by faulty mechanical or electrical assembly by the Contractor.
 - d. Necessary tests to demonstrate that the electrical and mechanical operation of the equipment is satisfactory and meets the requirements of these Specifications shall be made by the Contractor at no additional cost to the City.
3. The testing shall not be started until the manufacturer has completed fabrication, wiring, and setup; performed satisfactory checks and adjustments; and can demonstrate the system is complete and operational. Certification of completion of Contractor's in-house tests shall be submitted prior to scheduling of factory testing.
4. Factory Tests Scheduling:
 - a. The testing shall not be scheduled until:
 - 1) The manufacturer has completed fabrication, wiring, and setup; performed satisfactory checks and adjustments; and can demonstrate the system is complete and operational.
 - 2) Submittals associated with the equipment have been approved by the Engineer.
 - 3) PLC Design review meetings have taken place to the satisfaction of the Owner.
 - 4) Certification of completion of Contractor's in-house tests shall be submitted prior to scheduling of factory testing.

- b. If equipment is significantly different from submittal drawings, this shall be grounds for cancellation and rescheduling of factory tests at no additional costs to City or extension of Contract time.
 - c. Engineer reserves the right to postpone the factory test, at no additional cost to the City, until the submittal associated with the factory test has been reviewed by the Engineer and marked "No Exceptions Taken" or "Make Corrections Noted." No extension of Contract time will be allowed.
- 5. The first Pre-Energization tests shall be performed to determine the suitability for energization and shall be completed with all power turned off and complete prior to the start of any of the Post-Energization Tests. The Electrical Contractor shall have qualified personnel on the job site for all Pre-Energization and Post-Energization tests.
- 6. All tests shall be witnessed by the Engineer and/or City personnel. The test forms shall be completed by the testing person for field checkout, testing, and calibration of all equipment and instruments.
 - a. All filled in test forms shall be given to the Engineer and/or City the day of the test. Fill in two sets of test forms if Contractor wants to keep a copy.
 - b. All tests shall be documented in writing by the supplier and signed by the Engineer as satisfactory completed. The supplier shall keep a detailed log of all tests that failed or did not meet specifications, including date of occurrence and correction.
 - c. Completed forms with proper signatures and dates shall be included and become a component of the Operations and Maintenance Manual for each of the respective systems.
- 7. The Contractor shall notify the Engineer of the Supplier's readiness to begin all factory and field tests in writing (a minimum of ten working days prior to start), and shall schedule system checkout on dates agreed to by the Engineer in order that the testing be scheduled and witnessed.
- 8. The Contractor shall fill in & submit for approval the "Scheduled Test Request Form" located in Appendix "A" for each requested inspection, factory and field test.
- 9. The supplier shall submit for approval, the proposed factory & field testing sheets at least 2 weeks prior to the start of the tests. Each testing sheet shall have a title giving the type of test and entry spaces for the name of the person who performed the test, name of the person who witnessed the test, and the date. Tests performed without approved forms shall be retested at no additional cost to City.
- 10. Separate test procedures in separate binders shall be submitted for approval for the Factory and Field Tests. Testing shall not commence until the test procedures have been reviewed and approved by the Engineer. Tests forms shall be similar to those shown on Appendix "A."

B. FAILURE-TO-MEET TEST

- 1. If the results of any of tests are unacceptable to the Engineer, the Contractor shall make corrections and perform the tests again until they are acceptable to the Engineer; these additional tests shall be done at no additional cost to the City.
- 2. Any system material or workmanship which is found defective on the basis of acceptance tests shall be reported to the Engineer. The Contractor shall replace the defective material or equipment and have tests repeated until test proves satisfactory to the Engineer without additional cost to the City.
- 3. If testing, installation or configuration work performed is deemed inadequate by Owner or Engineer, then the Contractor shall provide a qualified technician to meet these requirements. No extension of Contract time will be allowed.
- 4. If Owner Representative determines that the System Set-up is not ready for testing, the Owner Representative reserves the right to cancel the Factory Test as the equipment is

found to be not fully and completely ready for factory testing. The Contractor shall be responsible for paying for the Owner and Engineer to return for the factory testing when it has been cancelled.

C. SAFETY

1. Testing shall conform to the respective manufacturer's recommendations. All manufacturers' safety precautions shall be followed.
2. The procedures stated herein are guidelines for the intended tests, the Contractor shall be responsible to modify these tests to fit the particular application and ensure personnel safety. Absolutely no tests shall be performed that endanger personal safety.
3. The Contractor shall have two or more personnel present at all tests.
4. Two non-licensed portable radios are to be made available by the Contractor for the testing organization to conduct tests.
5. California Electrical Safety Orders (ESO) and Occupational Safety and Health Act (OSHA): The Contractor is cautioned that testing and equipment shall comply with ESO and OSHA as to safety, clearances, padlocks and barriers around electrical equipment energized during testing.
6. Field inspections and pre-energization tests shall be completed prior to applying power to equipment.

D. ELECTRICAL FACTORY TEST

1. The System supplier shall conduct a thorough and complete factory test by qualified factory-trained personnel witnessed by Engineer per the criteria specified herein. Factory test shall be held within 150 miles of project location.
2. The "System set-up" for factory testing shall consist of, but is not limited to:
 - a. Meter/Main Switchboard
 - b. Motor Control Center
 - c. Control Panel
 - d. Panelboard and panelboard transformer
 - e. Any miscellaneous associated electrical equipment.
3. Temporary wiring and equipment shall be setup during these tests to simulate the complete assembled system.
4. The length of the factory testing for the "System setup" shall be a minimum of one (1) working day.
 - a. If in the opinion of the Engineer the factory testing is not completed at the end of the working day, the testing shall be extended, at no additional cost to the City or extension in Contract time.
5. All factory tests shall be conducted at the Supplier's facility. All factory tests shall be completed prior to shipment of any of the "System set-up" to the jobsite. The "System set-up" shall be fully assembled, programmed, and connected as it will be installed in the final configuration. If the "System set-up" is found to be not fully and completely ready for factory testing, the Contractor shall be responsible for paying for the Engineer to return for the factory testing. Factory testing is to ensure that there are no defects. The hardware and software shall be tested for compliance with the plans and Specifications included herein and for the ability to perform the control functions.
6. The testing shall not be started until the manufacturer has completed fabrication, wiring, setup, and programming; performed satisfactory checks and adjustments; factory testing sheets approved by Engineer; and can demonstrate the system is complete and operational.
7. All components of the system setup shall be completely assembled and thoroughly pre-tested by the supplier or manufacturer before start of factory test.

8. Provide a complete clean copy of System Supplier drawings for and the Engineer's use during Factory Test. These drawings shall reflect the equipment being tested. If the Engineer determines that these drawings do not adequately reflect the actual equipment being tested or differs substantially from the approved equipment submittal, the Engineer reserves the right to cancel the Factory Test as the equipment is found to be not fully and completely ready for factory testing. Equipment that differs substantially from the approved equipment submittal shall be resubmitted. Factory test will be rescheduled after revised submittals have been reviewed by the Engineer and marked "No Exceptions Taken" or "Make Corrections Noted". No extension of Contract time will be allowed.
9. Vacuum and clean the inside of all MCC and electrical and instrumentation enclosures prior to the start of the factory test.
10. The associated factory tests for each of the factory testing sheets that are to be performed by the supplier and witnessed by the Engineer shall include the following for the "System set-up" as a minimum:
 - a. Visual and mechanical Inspections of the panels as follows:
 - 1) Inspect for physical damage, proper support, and wiring.
 - 2) Check all starters, breakers, and other components for proper sizes.
 - 3) The Contractor shall fill in test form TF4 located in Appendix "A."
 - b. Testing of the Electrical Equipment as follows:
 - 1) Each line of control logic on the elementary or loop diagrams shall be checked. After a line of control logic is tested, the person performing test shall initial the corresponding line on the elementary diagram. When the complete elementary diagram has been checked, it shall be signed and dated by testing person and person witnessing test.
 - 2) I/O points to terminal blocks shall be simulated for the complete checkout of PLC interfaces.
 - 3) The tests, as a minimum, shall simulate all operating conditions including steady state, transients, upsets, startup, shutdown, power failure, and equipment failure conditions (for control logic).
 - 4) Testing of Control as follows:
 - a) To facilitate testing and system simulation of the "System Set-up", the Supplier shall connect a separate toggle two position on-off switch to each status and alarm digital input. Three digital multi-meters (minimum +/- 0.2% accuracy) with clip-on leads shall be supplied and utilized during testing for measurement of digital and analog outputs. The supplier shall use simulated input signals to replicate varying field device signals during the factory tests in order to verify the proper functioning of hardware and software.
 - 5) The structured factory tests to be performed by the System Supplier and witnessed by the Engineer shall include the following as a minimum:
 - a) Control Checkout Tests: Simulate the digital or analog signals (or combination thereof) at the panel field terminals using the test hardware to verify that each control is functional and properly configured. Verify that all parameters (i.e., relay logic operations, relay timing, controller setpoints, etc.) of the control system are defined and operate according to the design documents.
 - b) Alarm Checkout Tests: Simulate the digital or analog signals (or combination thereof) at the panels using the test hardware to verify that each I/O point is functional and properly configured. Verify that all parameters (i.e., description, engineering units, span, enable/disable, setpoints, runtimes, totalization, logic type, etc.) of the alarms are defined and operate according to the Specifications.

- 6) Unstructured factory tests are required as part of the factory testing phase. These additional tests shall include any and all unstructured tests as directed by the Engineer. The various unstructured tests shall include, but are not limited to, the following:
 - a) Verify the correct inventory of hardware, etc. All spare parts shall be included in the inventory.
 - b) The factory tests, as a minimum, shall simulate all normal and abnormal operating conditions including steady state, change of state, variable changes, fluctuations, transients, upsets, start-up, shutdown, power failure, and equipment failure conditions.
11. The factory test will be considered complete only when the system setup has successfully passed all tests, both structured and unstructured, to the satisfaction of the Engineer and the Factory Test checkout form TF11 has been signed & dated by Engineer. No equipment shall be shipped to jobsite without authorization from the Engineer that the factory test has been completed.
12. Acceptance and witnessing of the factory tests does not relieve or exclude the Contractor from conforming to the requirements of the Contract Documents.
13. The testing personnel shall provide all material, equipment, labor and technical supervision to perform such tests and inspections.
14. During the testing period, under the supervision of the supplier, the Engineer shall have unlimited and unrestricted access to the usage and testing of all hardware and software in the system.
15. The Contractor shall pay all expenses incurred by his personnel, including labor, material, transportation, lodging, daily subsistence, and other associated incidental costs during the factory testing.
16. Faulty and/or incorrect hardware operation of major portions of the system may, at the discretion of the Engineer, be cause for suspension or restarting of the entire factory test, at no additional cost to the City or extension in contract time.
17. The factory test will be considered complete only when the system setup has successfully passed all tests both structured and unstructured to the satisfaction of the Engineer. No equipment shall be installed without authorization from the Engineer that the factory test has been completed.
18. All modifications to drawings and documentation as a result of the factory tests shall be corrected and completed before shipment of drawings with equipment and the submittal and delivery of "operation and maintenance" manuals.
19. Copies of the completed, signed, and witnessed factory testing forms shall be placed in the Operation and Maintenance Manual.

E. ELECTRICAL FIELD TESTS

1. Prior to any field testing, Operation & Maintenance Manuals shall have been submitted by the Contractor and approved by the Engineer.
2. The Contractor shall engage and pay for the services of an approved qualified testing company for the purpose of performing inspections and tests as herein specified. The testing company shall provide all material, equipment, labor and technical supervision to perform such tests and inspections. The Electrical Contractor shall be present on site for all field tests.
3. The Electrical Contractor shall complete and submit "Schedule Test Request Form" as illustrated in Appendix "A" for each electrical field test.
4. Vacuum and clean the inside of all electrical and instrumentation enclosures prior to pre-energization tests and again prior to energization tests. Removing debris with an air blower is not permitted.

5. The Electrical Contractor shall be at the jobsite to assist with all Electrical Field Tests.
6. PRE-ENERGIZATION TESTS: These tests shall be completed prior to applying power to any equipment.
 - a. INSPECTIONS
 - 1) Visual and mechanical inspections:
 - a) Inspect for physical damage, proper anchorage and grounding.
 - b) Compare equipment nameplate data with design plans and starter schedule.
 - c) Compare overload setting with motor full load current for proper size.
 - 2) Performed NETA acceptance testing for each piece of equipment.
 - 3) The Contractor shall compile, by visual inspection of equipment installed for each motor, the following data in neatly tabulated form:
 - a) Equipment driven
 - b) Motor horsepower
 - c) Nameplate amperes
 - d) Service factor
 - e) Temperature rating
 - f) Overload catalog number
 - g) Overload current range and setting
 - h) Circuit breaker rating
 - i) Circuit breaker trip setting, for magnetic only circuit breakers.
 - 4) The Contractor shall fill in, for each piece of equipment, Test Form TF4 located in Appendix "A."
 - b. TORQUE CONNECTIONS
 - 1) All electrical, mechanical and structural threaded connections inside equipment shall be tightened in the field after all wiring connections have been completed. Every worker tightening screwed or bolted connections shall be required to have and utilize a torque screwdriver/wrench at all times. Torque connections to the value recommended by the equipment manufacturer. If they are not available, use NEC Annex I for torque values as guidelines.
 - c. WIRE INSULATION & CONTINUITY TESTS
 - 1) All devices that are not rated to withstand the 500V megger potential shall be disconnected prior to the megger tests.
 - 2) Megger insulation resistances of all 600 volt insulated conductors using a 500 volt megger for 10 seconds. Make tests with circuits installed in conduit and isolated from source and load. Each field conductor shall be meggered conductor to conductor and conductor to ground. These tests shall be made on cable after installation with all splices made up and terminators installed but not connected to the equipment.
 - 3) Each megger reading shall not be less than 10 Meg-ohms resistive. Corrective action shall be taken if values are recorded less than 10 Meg-ohms. Values of different phases of conductors in the same conduit run showing substantially different Meg-ohm values, even if showing above 10 Meg-ohms shall be replaced.
 - 4) Each instrumentation conductor twisted shielded pair shall have the conductor and shield continuity measured with an ohmmeter. Conductors with high ohm values, that do not match similar lengths of conductors the same size, shall be replaced at no additional cost to the City.
 - 5) The Contractor shall fill in test forms Power and Control Conductor Test Form TF1 and Instrumentation Conductor Test Form TF2 located in Appendix "A."
 - d. GROUNDING SYSTEM TESTS
 - 1) Visual and Mechanical Inspection:

- a) Verify ground system is in compliance with Drawings and Specifications.
- 2) Electrical Tests:
 - a) Before backfilling trenches, and placement of sidewalks, landscape and paving, measure the resistance of each electrode to ground using a ground resistance tester. Perform the test not less than two days after the most recent rainfall and in the afternoon after any ground condensation (dew) has evaporated.
 - b) After all individual ground electrode readings have been made, interconnect as required and measure the system's ground resistance.
 - c) The grounding test shall be in conformance with IEEE Standard 81.
 - d) Measurements shall be made at 10 feet intervals beginning 25 feet from the test electrode and ending 75 feet from it in a direct line between the system being tested and the test electrode.
 - e) Point-to-Point: Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.
- 3) Test Values:
 - a) The resistance between the main grounding electrode and equipment ground shall be no greater than five ohms per IEEE Standard 142.
 - b) Investigate point-to-point resistance values that exceed 0.5 ohms.
 - c) Plots of ground resistance shall be made and submitted to the Engineer for approval.
- 4) The Contractor shall fill in Grounding System Test Form TF3 located in Appendix "A."
- e. PANELBOARD TESTS
 - 1) Visual and Mechanical Inspection:
 - a) Inspect for physical damage, proper anchorage and grounding.
 - b) Compare equipment nameplate data with design plans and panelboard schedules.
 - c) Compare breaker legend for accuracy.
 - d) Check torque of bolted connections.
 - 2) The Contractor shall fill in Panelboard Test Form TF5 located in Appendix "A."
- f. BREAKER TEST
 - 1) All breakers shall be checked for proper mounting, conductor size, and feeder designation. Operate circuit breaker to ensure smooth operation. Inspect case for cracks or other defects. Check tightness of connection with torque wrench in accordance with manufacturer's recommendations.
 - 2) All breakers 100 amps and above shall be tested. Time current characteristic tests shall be performed bypassing three hundred percent (300%) rated current through each pole separately. Trip amps and time shall be measured. Instantaneous pickup current shall be determined by run up or pulse method. Clearing times should be within four (4) cycles or less. All trip times shall fall within NETA Table values. Instantaneous pickup current levels should be within 20% of manufacturer's published values. Certification stickers, listing date and company who performed the tests, shall be attached to the inside of the breaker compartment door right after the breaker has passed all tests.
 - 3) Contact and Insulation Resistance: Contact resistance shall be measured and be compared to adjacent poles and similar breaker. Deviations of more than 50% shall be reported to Engineer. Insulation resistance shall be measured and shall not be less than 50 megohms.

- 4) At end of test the all breakers trip settings shall be set by Contractor to values listed in protective device coordination study to properly protect equipment.
 - 5) The Contractor shall fill in MCC Device Test Form TF8 and Breaker Test Form TF9 located in Appendix "A."
7. POST ENERGIZATION TESTS
- a. Vacuum and clean the inside of all MCC and electrical and instrumentation enclosures prior to all energized testing. Removing debris with an air blower is not permitted.
 - b. PANELS AND ENCLOSURE TESTS
 - 1) During these tests, test all local and remote control operations and interlocks.
 - 2) Electrical Tests:
 - a) Perform operational tests by initiating control devices to affect proper operation.
 - b) The Contractor shall fill in Operational Device Checks and Tests Form TF6.
 - c. PHASE ROTATION TESTS
 - 1) Check connections to all equipment for proper phase relationship. During this test, disconnect all devices which could be damaged by the application of voltage or reversed phase sequence. Three phase equipment shall be tested for the phase sequence "ABC" front to back, left to right, and top to bottom.
 - 2) All three phase motors shall be tested for proper phase rotation. Revise wire color codes to indicate correct phase color if wires are swapped.
 - 3) The Contractor shall fill in Phase Rotation Test Form TF7 located in Appendix "A."
 - d. MOTOR TESTING
 - 1) Prior to start-up, record low ohm phase to phase and phase to ground readings for future baseline.
 - 2) Record the amperage draw on all phases of each motor operating under full load. Ensure that these values do not exceed the motor nameplate full load amperage.
 - 3) Record the voltage between all phases of each motor operating under full load. If the voltage balance is not within plus or minus 5 percent of nominal, request the Utility power company or other responsible party to correct the problem.
 - 4) The Contractor shall compile, by visual inspection of equipment installed for each motor, the following data in neatly tabulated form and be placed in the O&M manual:
 - a) Equipment driven.
 - b) Motor horsepower.
 - c) Nameplate amperes.
 - d) Service factor.
 - e) Temperature rating.
 - f) Overload catalog number.
 - g) Overload current range and setting.
 - h) Circuit breaker rating.
 - i) Circuit breaker trip setting, for magnetic only circuit breakers.
 - 5) The Contractor shall fill in Motor Test Form TF10, located in Appendix "A."
 - 6) Additional motor testing requirements per Division 11.
 - e. PANELBOARD TESTS:
 - 1) Visual and Mechanical Inspection:
 - a) Inspect for physical damage, proper anchorage and grounding.
 - b) Compare equipment nameplate data with design plans and panelboard schedules.
 - 2) The Testing Company shall fill in Panelboard Test Form TF5 located in Appendix "A."

- f. INSTRUMENTATION TESTS
 - 1) The Contractor shall provide a minimum of two (2) hours of field acceptance testing for each instrument. If any instrument has not been fully tested during its allotted time, the Contractor shall provide additional hours for finishing testing of the instrument, to be paid by the Contractor.
 - 2) The overall accuracy of each instrument loop shall be checked to ensure that it is within acceptable tolerance.
 - a) As a minimum, all the tests indicated/specified on the test form TF14 in Appendix "A" shall be performed by the Contractor for all instrumentation.
 - 3) Test equipment used for testing shall be of suitable quality so as not to mask performance deficiencies. All test equipment shall be traceable to National Bureau of Standards and have been calibrated within six months of test date.
 - 4) Testing shall be accomplished using simulated inputs only with prior written approval of the Engineer.
 - 5) Calibration stickers shall be supplied for all equipment and instruments. Calibration stickers shall list the following information:
 - a) Tag number.
 - b) Calibrated by who (name), firm, city and telephone number.
 - c) Date calibrated.
 - d) Calibration range.
 - e) Comments.
 - g. CONTROL SYSTEM TESTS
 - 1) All the I/O points for the PLC shall be tested by the System supplier with assistance from Contractor in the field for proper operation of alarms, status, analog, control, and operator interface (OI) display functions, etc. Where practical, the final element shall be used, i.e. trip the intrusion switch or change levels. Testing shall be accomplished using simulated inputs only when necessary.
 - 2) During this task the System supplier shall have:
 - a) Qualified field technician with experience in the startup of similar systems with PLC controls, and other field devices.
 - b) PLC/OI programmer for modifying or adjusting all PLC registers and setpoints to tune the system.
 - c) Test instruments as required.
 - d) A pair of radios for communication.
 - e) Portable PC loaded with diagnostic, configuration, programming PLC software. The latest application programs shall have been loaded on the PLC.
 - 3) All OI graphics shall be tested during the field tests.
 - 4) Contractor to fill in "I/O Point Checkout Sheet" TF13 located in Appendix "A."
 - h. PROGRAM PARAMETER RECORD:
 - 1) The Contractor shall fill in "VFD or Soft Starter Program Parameter Record Sheet" TF12 for each VFD provided on this project. These parameter record sheets shall be filled out by a qualified Contractor field technician when power in field is first applied to each VFD. Completion of VFD record sheets shall be witnessed by Owner and copies provided to Owner on day records are filled in by Contractor. A copy of all completed VFD parameter record sheets shall be placed in O&M manual.
8. TRIAL OPERATIONS:
- a. The entire electrical installation shall be either tested or trial operated to verify Contract compliance. That is, controls, heaters, fans, light switches, convenience receptacles,

lights, etc. shall be trial operated. Contractor shall conduct trial operations in the presence of the Engineer and Operations and Maintenance personnel.

F. OPERATIONAL TESTING

1. After all the previous tests in this subsection are complete, the Contractor shall conduct operational testing.
2. The Contractor shall demonstrate operation of each part of the control and instrumentation system to the satisfaction of the Engineer. Tests shall be repeated by the Contractor at no additional cost to the City and at the discretion of the Engineer to resolve whether the system has been demonstrated that it will operate under all modes of operations and varying conditions.
3. For the operational testing the new equipment shall be activated to automatically run for 5 days, Monday through Friday 24 hours a day. During this five day period the City will run the different combinations of the pump control options. If equipment failure occurs during the 5 days of operational testing, the Contractor shall repair or replace the defective equipment and shall begin another 5 day operational test, Monday through Friday 24 hours a day. This shall be continued until the new equipment functions acceptably for 5 consecutive days.
4. The Electrical Contractor, testing firm and System Supplier shall re-visit the jobsite as often as necessary until all field tests, start-up and operation tests are completed and approved.

201-3.09 TRAINING

- A. All training sessions shall be held on dates and times agreeable to Owner. A total of 6 or fewer Owner personnel shall be trained.
- B. Training sessions shall not take place on dates when field testing is occurring.
- C. Acceptable Operation and Maintenance Manuals shall be on site and available when training sessions are implemented.
- D. The following training sessions shall be provided:
 1. 8 hours – After Operation Testing has started the Contractor shall provide training for instruction of operation and maintenance personnel in the use of all the new control and instrumentation systems. The Contractor shall make necessary arrangements with manufacturer's representative. Provide product literature and application guides for user's reference during instruction.
 2. 4 hours – Arc Flash Training: Electrical Engineer, who sealed the Electrical System Analysis, shall train Owner personnel of the potential arc flash hazards associated with working on energized equipment. Maintenance procedures shall be in accordance with the requirements of NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces and shall be provided in the equipment manuals.
 3. 8 hours (minimum) – "Diagnostic and calibration" training shall demonstrate PLC hardware diagnostic routines, test equipment, PLC communication setup, and test procedures as required to enable the personnel to detect and isolate system faults to the circuit board or module level and to implement repairs by replacing failed circuit boards or modules. Demonstrate uploading and downloading software to make backups and restore programs.

201-3.10 OPERATION AND MAINTENANCE MANUALS

- A. Four (4) sets of operating manuals covering instruction and maintenance on each type of equipment shall be furnished prior to completion of the project.
- B. These instructions shall provide the following as a minimum:
 - 1. Each set bound in a three ring binder, hard tab separators and organized as specified herein.
 - 2. A complete "Record" set of favorably reviewed electrical submittals as provided under SUBMITTAL AND DRAWING REQUIREMENTS.
 - 3. As-built one-line, elevation, loop, and elementary drawings with all field changes included.
 - 4. A complete list of the equipment supplied, including serial numbers, ranges, options, and pertinent data necessary for ordering replacement parts.
 - 5. Instrument data sheets for all instruments supplied on the project, clearly identifying the instrument tagname, range, part number, serial number, size, etc.
 - 6. Full, technical specifications on each item.
 - 7. Detailed service, maintenance and operation instructions for each item supplied. Schematic diagrams of all electronic devices shall be included. A complete parts list with stock numbers shall be provided on the components that make up the assembly.
 - 8. Record of the following:
 - a. Each motor nameplate data including manufacturer, full part number, size, voltage, amps, service factor, bearings, etc.
 - b. Each breaker and overload heater element including manufacturer, full part number, size, setting etc.
 - c. Spread sheet listing all setpoints and programmable parameters entered for this project for VFD, UPS, HIM, etc.
 - 9. Safety precautions and procedures.
 - 10. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
 - 11. No photo copies are allowed of standard published manuals available from manufacturers, such as for the RTU. All of the manuals shall be originals.
 - 12. All of these sets of O & M Manuals shall be made up of "original" (no copies, PDFs or reproductions) documents. No photo or fax copies are allowed of standard published manuals available from Manufacturers.
 - 13. Software program & documentation including complete as-installed PLC ladder logic, and PLC configuration printouts.
 - 14. All completed and signed test data and forms from factory and field tests.
 - 15. Warranty certificate with start dates, duration and contact information.
 - 16. Troubleshooting instructions.
 - 17. Record of all settings or parameters for all programmable devices.
- C. At the end of the project these manuals shall be updated to show "as-built or as-installed" conditions.
- D. Provide to the City two sets of flash drives (flash drives shall contain all documents in both PDF format and unlocked AutoCAD - DWG format, version 2010 or later):
 - 1. As-built Contract electrical and instrumentation drawings prepared for this project.
 - 2. As-built set of all required Drawings for the project.
 - 3. As-built sets of other computer generated documents prepared for this project, including PLC ladder logic files, and Bill of Materials prepared for this project.
 - 4. Electronic PDF version of O&M manual. Version format shall follow the hard copy submittal of the O&M, including index, equipment record sheet, warranty information,

theory of operation, maintenance instruction, etc. PDF shall be "bookmarked" at each index, subtab, transmittal letter, equipment record sheet, warranty information, theory of operation, maintenance instruction, etc. Failure to bookmark PDF may be grounds for immediate rejection without review. Bookmarks shall be descriptive of actual document, tab, etc. Bookmarks shall not be out of order; the English description shall match that listed in the Submittal's Table of Contents.

5. These flash drives shall be the property of the City, for its use on this and future projects.
6. Label drives with site name using clear plastic with black machine printed lettering as produced by a KROY or similar machine. The size of the nameplate tape shall be with 3/8-inch lettering unless otherwise approved by the Engineer. Securely fasten nameplates in place on the USB drive using the adhesion of the tape.

201-3.11 WARRANTY

- A. The Contractor shall have a staff of experienced personnel available to provide service on 2 working days' notice during the warranty period. Such personnel shall be capable of fully testing and diagnosing the hardware, software and implementing corrective measures.
- B. If the Contractor "fails to respond" in 2 working days, the City at its option will proceed to have the warranty work completed by other resources; the total cost (direct and indirect) for these other resources shall be reimbursed in full by the Contractor.
 1. "Fail to respond" shall be defined as: The Contractor has not shown a good faith effort and has not expended adequate resources to correct the problem.
 2. The use of other resources, as stated above, shall not change or relieve the Contractor from fulfilling the remainder of the warranty requirements.
- C. The Contractor shall warrant all electrical and instrumentation equipment including PLC, and OI software programming for the full warranty period of this contract as specified herein.
- D. The Contractor shall provide all labor and material to troubleshoot, program, replace, or repair any hardware or software that fails or operates unpredictably during the warranty period, at no additional cost to the City.
- E. Each time the Supplier's repair person responds to a system malfunction during the warranty period, he or she must contact the City Project Manager for scheduling of the work, access to the jobsite, and permission to make repairs. Operation of facilities necessary to test equipment shall only be performed by or under the direction of City staff. City reserves the right at its sole discretion to deny operations requested by the Supplier. A written description of all warranty work performed shall be documented on a field service report to be given to City prior to the repair person leaving job site. This field service report shall detail and clearly state problem, corrective actions taken, additional work that needs to be done, data, repair person name and company.
- F. Prior to "final acceptance", the Contractor shall furnish to the Engineer a listing of warranty information for all manufacturers of materials, instruments, and equipment used on the project. The listing shall include the following:
 1. Manufacturer's name, service contact person, phone number, and address.
 2. Material and equipment description, equipment number, part number, serial number, and model number.
 3. Manufacturer's warranty expiration date.

- G. Software support which shall be provided by the Supplier:
1. Free technical PLC software and hardware configuration phone support for a period of one year after acceptance of project completion. PLC phone support shall be provided directly from the group that configured the PLC. Phone support shall be available between 8 a.m. and 5 p.m. Pacific Standard Time Monday through Friday.
 2. The Supplier shall correct any PLC software configuration error that is discovered within the warranty period, at no additional cost to City. Updated documentation for each "operation and maintenance" manual and two sets of new floppy disks of updated software shall be provided for each correction.
 3. Program changes made by City or under direction of City by others shall not relieve or void Contractor of warranty requirements for parts of software programmed under this Contract.

201-3.12 FINAL ACCEPTANCE

- A. Final acceptance will be given by the Engineer after the equipment has passed the "operational testing trial period," each deficiency has been corrected, final documentation has been provided, and all the requirements of design documents have been fulfilled.
- B. Upon completion of the project, prior to final acceptance, remove all temporary services, equipment, material, and wiring from the site.
- C. At the end of the project, following the completion of the field tests, and prior to final acceptance, the Supplier shall provide the following to the City:
1. Verify Service equipment has been legibly marked in field with the maximum available fault current per NEC 110.24 (A). Field marking shall include date the fault current calculation was performed and be weather & UV rated. Service equipment shall not be hand labeled
 2. Listing of warranty information.
 3. Each "operation and maintenance" manual shall be modified or supplemented by the Supplier to reflect all field changes and as-built conditions.
 4. Four (4) USB drives with copies of all final documentation to reflect as-built conditions.
 5. Two sets of all keys for locks supplied on this project. Wire all keys for each lock securely together. Tag and plainly mark with lock number or equipment identification, and indicate physical location, such as panel or switch number.
 6. Verify that as-installed drawings have been placed in all new or modified panels in reinforced clear plastic pockets.
 7. Resubmit all Electrical System Analysis studies with all calculations rerun, data and graphs updated to reflect as-left conditions. Provide new Arc Flash labels to reflect as-constructed equipment and as-left circuit breaker settings.
 8. Record full size drawings neatly marked accurately showing the information required herein

201-4 PAYMENT

- A. See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

APPENDIX "A"

TEST FORMS

Index of Forms:

Bill of Materials

Schedule Test Request Form

TF1 Power and Control Conductor Test Form

TF2 Instrumentation Conductor Test Form

TF3 Grounding System Test Form

TF4 Visual and Mechanical Inspection Form

TF5 Panelboard Test Form

TF6 Operational Device Checks and Tests Form

TF7 Phase Rotation Test Form

TF8 MCC Device Test Form

TF9 Breaker Device Test Form

TF10 Motor Test Form

TF11 Factory Test Checkout Form

TF12 VFD or Soft Starter Program Parameter Record Sheet

TF13 I/O Point Checkout Test Sheet

TF14 Instrument Data Sheet and Calibration Record

BILL OF MATERIAL

PROJECT: _____
LOCATION: _____

DATE / /
PAGE

[illegible]

SCHEDULED TEST REQUEST FORM

COMPANY PERFORMING TEST: _____
 TESTING PERSONNEL : _____
 PHONE NUMBER OF COMPANY: _____
 TEST PROCEDURE SUBMITTAL: _____ APPROVED : ____/____/____
 SCHEDULED TEST DATE : _____ DATE : ____/____/____

TIME	DESCRIPTION OF TEST
8:00	
9:00	
10:00	
11:00	
12:00	
13:00	
14:00	
15:00	
16:00	

NOTES:

TESTED BY : _____ DATE : ____/____/____
 WITNESSED BY: _____

POWER AND CONTROL CONDUCTOR TEST FORM

TEST FORM (TF1)

EQUIPMENT

NAME : _____ LOCATION : _____

CALIBRATION EQUIPMENT

DATE: _____

DESCRIPTION _____

CONDUCTOR NUMBER	INSULATION TESTS					
	PHASE TO GROUND			PHASE TO PHASE		
	A	B	C	AB	BC	CA

NOTES:

Record insulation test values in meg-ohms.

TESTED BY : _____

DATE : ____/____/____

WITNESSED BY: _____

[illegible]

GROUNDING SYSTEM TEST FORM

TEST FORM (TF3)

CALIBRATION EQUIPMENT
DESCRIPTION :

DATE: _____

FALL IN POTENTIAL TEST

MAIN GROUND LOCATION	APPLIED VOLTAGE V	MEASURED POINT 1 VOLTAGE	MEASURED POINT 2 VOLTAGE	MEASURED POINT 3 VOLTAGE	CALCULATED RESISTANCE OHMS

TWO POINTS TESTS

EQUIPMENT NAME	EQUIPMENT #	CIRCUIT #	APPLIED CURRENT	MEASURED VOLTAGE	CALCULATED RESISTANCE OHMS

NOTES:

TESTED BY : _____
WITNESSED BY: _____

DATE : ____/____/____

VISUAL AND MECHANICAL INSPECTION FORM

TEST FORM (TF4)

EQUIPMENT

NAME : _____ LOCATION : _____

NAMEPLATE DATA

MFGR. :	_____	SERIES # :	_____
MODEL # :	_____	U.L. # :	_____
VOLTAGE :	_____	PHASE :	_____
AMPERAGE :	_____	SERVICE :	_____
BUS TYPE :	_____	BUS BRACING:	_____
VERT. BUS :	_____	HORZ. BUS :	_____
GND. BUS :	_____	NEU. BUS :	_____
ENCLOSURE :	_____		_____
	_____		_____

INSPECTION CHECK LIST

ENTER: A-ACCEPTABLE R-NEEDS REPAIR OR REPLACEMENT NA-NOT APPLICABLE

TIGHTEN ALL BOLTS AND SCREWS	_____
TIGHTEN ALL WIRING AND BUS CONNECTIONS	_____
VERIFY ALL BREAKERS AND FUSES HAVE PROPER RATING	_____
CHECK BUS BRACING AND CLEARANCE	_____
CHECK MAIN GROUNDING CONNECTION AND SIZE	_____
INSPECT GROUND BUS BONDING	_____
CHECK EQUIPMENT GROUNDS	_____
CHECK CONDUIT GROUNDS AND BUSHINGS	_____
INSPECT NEUTRAL BUS AND CONNECTIONS	_____
CHECK HEATERS AND THERMOSTATS	_____
CHECK VENTILATION AND FILTERS	_____
CHECK FOR BROKEN OR DAMAGED DEVICES	_____
CHECK DOOR AND PANEL ALIGNMENT	_____
INSPECT ANCHORAGE	_____
CHECK FOR PROPER CLEARANCES AND WORKING SPACE	_____
REMOVE ALL DIRT AND DUST ACCUMULATION	_____
INSPECT ALL PAINT SURFACES	_____
CHECK FOR PROPER WIRE COLOR CODES	_____
INSPECT ALL WIRING FOR WIRE LABELS	_____
CHECK FOR PROPER WIRE TERMINATIONS	_____
CHECK FOR PROPER WIRE SIZES	_____
INSPECT ALL DEVICES FOR NAMEPLATES	_____
CHECK IF DRAWINGS MATCH EQUIPMENT	_____
CHECK ACCURACY OF OPERATION & MAINTENANCE	_____

TESTED BY : _____

DATE : ____/____/____

WITNESSED BY: _____

PANEL-BOARD TEST FORM

TEST FORM (TF5)

PANEL NAME: _____ LOCATION : _____

NAMEPLATE DATA

MFGR. :	_____	SERIES # :	_____
MODEL # :	_____	U.L. # :	_____
VOLTAGE :	_____	PHASE :	_____
AMPERAGE :	_____	SERVICE :	_____
BUS TYPE :	_____	BUS BRACING:	_____
VERT. BUS :	_____	HORZ. BUS :	_____
GND. BUS :	_____	NEU. BUS :	_____
ENCLOSURE :	_____	MAIN BKR :	_____

CALIBRATION EQUIPMENT

DATE: _____

DESCRIPTION :

INSULATION RESISTANCE TESTS - MEGOHMS					
A-GND	B-GND	C-GND			

INSPECTION CHECK LIST

ENTER: A-ACCEPTABLE R-NEEDS REPAIR OR REPLACEMENT NA-NOT APPLICABLE

TIGHTEN ALL BOLTS AND SCREWS	_____
TIGHTEN ALL WIRING AND BUS CONNECTIONS	_____
VERIFY ALL BREAKERS AND FUSES HAVE PROPER RATING	_____
CHECK BUS BRACING AND CLEARANCE	_____
CHECK MAIN GROUNDING CONNECTION AND SIZE	_____
INSPECT GROUND BUS BONDING	_____
CHECK EQUIPMENT GROUNDS	_____
CHECK CONDUIT GROUNDS AND BUSHINGS	_____
INSPECT NEUTRAL BUS AND CONNECTIONS	_____
CHECK FOR BROKEN OR DAMAGED DEVICES	_____
CHECK DOOR AND PANEL ALIGNMENT	_____
INSPECT ANCHORAGE	_____
CHECK FOR PROPER CLEARANCES AND WORKING SPACE	_____
REMOVE ALL DIRT AND DUST ACCUMULATION	_____
INSPECT ALL PAINT SURFACES	_____
CHECK FOR PROPER WIRE COLOR CODES	_____
INSPECT ALL WIRING FOR WIRE LABELS	_____
CHECK FOR PROPER WIRE TERMINATIONS	_____
CHECK FOR PROPER WIRE SIZES	_____
INSPECT ALL DEVICES FOR PROPER LEGEND NAMEPLATES	_____

CALIBRATION TEST EQUIPMENT PART NO.

DATE CALIBRATED:

TESTED BY : _____

DATE : ____/____/____

WITNESSED BY: _____

OPERATIONAL DEVICE CHECKS AND TESTS FORM

TEST FORM (TF6)

NAME : _____

LOCATION : _____

CUB. #	EQUIPMENT NAME	EQUIP #	LOCAL SITE DEVICE CHECKS AND TESTS							REMOTE SITE DEVICE CHECKS & TESTS		
			SELECTOR SWITCH	INDICATOR LIGHTS	PUSHBUTTON & LOS	METERING & INDICATORS	OVERLOAD RESET	INTERLOCKS & CONTROL	ALARM & STATUS	SELECTOR SWITCH	INDICATOR LIGHTS	PUSHBUTTON & LOS

TESTED BY : _____ DATE : ____/____/____
 WITNESSED BY : _____

NOTES:

PHASE ROTATION TEST FORM

TEST FORM (TF7)

EQUIPMENT NAME	EQUIPMENT #	CIRCUIT #	PHYSICAL PHASE LOCATION	PHASE COLOR CODE	MEASURED PHASE ROTATION

NOTES:

Use phase tester to verify all circuits and equipment have a clockwise A-B-C phase rotation.

Physical phase locations: Left to Right - LR or Top to Bottom - TB

Phase color codes: Brown, Orange, & Yellow -BOY

Black, Red, & Blue -BkRBe

TESTED BY : _____

DATE : ____/____/____

WITNESSED BY: _____

MCC DEVICE TEST FORM

TEST FORM (TF8)

MCC # : _____ CUBICLE : _____
EQUIP NAME: _____ EQUIP # : _____

MOTOR DATA

H.P. : _____
F.L.A. : _____

CONTACTOR DATA

MFGR. : _____ PART # : _____
NEMA SIZE : _____ COIL VOLT : _____

CALIBRATION EQUIPMENT

DATE: _____

DESCRIPTION : _____

OVERLOAD TESTS

MFGR. : _____ HEATER # : _____ RANGE : _____
PART # : _____ FINAL OVERLOAD SETTING: _____

TEST
AMPS

MEASURE TRIP TIME @ TEST AMPS

PHASE A

PHASE B

PHASE C

MFGR LISTED
TRIP TIME

AMBIENT
COMPENSATION

BREAKER TESTS

MRGR. : _____ PART # : _____ FRAME # : _____

CONTACT RESISTANCE TESTS - OHMS

PHASE A

PHASE B

PHASE C

INSULATION RESISTANCE TESTS-MEGOHMS

A-GND

B-GND

C-GND

MFGR TRIP TIME @300% MIN: _____
MFGR TRIP TIME @300% MAX: _____

BREAKER RATING / RANGE: _____
FINAL BREAKER SETTING: _____
MFGR INST. PICKUP AMPS: _____

TIME-CURRENT TEST

TRIP TIME IN SECONDS @ 300% AMPS

PHASE A

PHASE B

PHASE C

INSTANTANEOUS TRIP TEST - AMPS

PHASE A

PHASE B

PHASE C

NOTES:

TESTED BY : _____
WITNESSED BY: _____

DATE : ____/____/____

BREAKER DEVICE TEST FORM

TEST FORM (TF9)

FEEDER : _____
EQUIP NAME: _____
EQUIP H.P. : _____

LOCATION : _____
EQUIP # : _____
EQUIP KVA : _____

MFGR. : _____ PART # : _____ FRAME # : _____
VOLTAGE : _____ INTERRUPT : _____ CHARACTER: _____
RATING CURVE

CALIBRATION EQUIPMENT
DESCRIPTION : _____

DATE: _____

CONTACT RESISTANCE TESTS - OHMS INSULATION RESISTANCE TESTS - MEGOHMS

PHASE A	PHASE B	PHASE C	A-GND	B-GND	C-GND

MFGR TRIP TIME @300% MIN : _____
MFGR TRIP TIME @300% MAX: _____

BREAKER RATING / RANGE: _____
FINAL BREAKER SETTING : _____
MFGR INST. PICKUP APMS: _____

TEST-CURRENT TESTS

TRIP TIME IN SECONDS @ 300% AMPS

PHASE A	PHASE B	PHASE C

INSTANTANEOUS TRIP TEST - AMPS

PHASE A	PHASE B	PHASE C

ADDITIONAL TESTS AND SETTING AS APPLICABLE

FUNCTION	PICKUP		DELAY-TIME		
	RANGE	SETTING	RANGE	SETTING	
LONG TIME					
SHORT TIME					
GROUND FLT.					

NOTES:

TESTED BY : _____
WITNESSED BY: _____

DATE : ____/____/____

MOTOR TEST FORM

TEST FORM (TF10)

EQUIPMENT

NUMBER : _____ NAME : _____

CALIBRATION EQUIPMENT

DATE: _____

DESCRIPTION : _____

NAMEPLATE DATA - FIELD RECORDED

MANUFACTURER		MODEL #		SERIAL #		FRAME #	
H.P.	R.P.M	F.L.A	VOLTS	PHASE	FREQ.	P.F.	S.F.
CODE	N.E.M.A.	INSUL.	ENCLOS.R.	DUTY	DESIGN		

CALIBRATION EQUIPMENT

DESCRIPTION : _____ DATE: _____

INSULATION TESTS PHASE TO GROUND MEG-OHMS			MOTOR FRAME GROUNDING SYSTEM TEST			MOTOR HEATER MEAS. AMPS	MOTOR THERMAL TRIP TEST
A	B	C	APPLIED VOLTS	MEAS. AMPS	CALC. OHMS		

MOTOR TESTS - MEASURED VALUES

AMPERAGE			VOLTAGE			POWER FACTOR	WATTAGE
A	B	C	AB	BC	CA		

NOTES:

VOLTAGE, AMPERAGE, POWER FACTOR, & WATTAGE SHALL BE RECORDED WITH A TRUE RMS METER.

TESTED BY : _____

DATE : ____/____/____

WITNESSED BY: _____

FACTORY TEST
MCC/CONTROL PANEL CHECKOUT FORM (TF11)

Manufacturer: _____ **Location:** _____
Tel: _____
Test Equipment: Description _____ Calib Date: _____

MCC / Control Panel: _____ **TEST RESULT**

OVERALL PANEL INSPECTION

Pass **Fail**

- | | | |
|--|--------------------------|--------------------------|
| 1. All front panel and back panel components mounted securely..... | ☐ | ☐ |
| 2. All wiring terminated and labeled correctly..... | ☐ | ☐ |
| 3. All components, wiring, and labeling accurately reflected on the drawings.. | ☐ | ☐ |

POWER-UP INSPECTION

- | | | |
|--|--------------------------|--------------------------|
| 1. Voltage levels on load side of circuit breakers..... | ☐ | ☐ |
| 2. Voltage levels at the DC terminals of the power supply..... | ☐ | ☐ |
| 3. Voltage levels at the DC power distribution terminals..... | ☐ | ☐ |

POWER DISTRIBUTION AND GENERAL COMPONENT TESTING

- | | | |
|---|--------------------------|--------------------------|
| 1. Power distribution to the appropriate components..... | ☐ | ☐ |
| 2. Operation of the ancillary components such as receptacles, work lights, etc. | ☐ | ☐ |

CONTROL COMPONENTS CHECKS

- | | | |
|---|--------------------------|--------------------------|
| 1. Operators (push buttons, selector switches, pilot lights)..... | ☐ | ☐ |
| 2. Inputs from External Sources..... | ☐ | ☐ |
| 3. Outputs to External Sources..... | ☐ | ☐ |
| 4. Relay Logic..... | ☐ | ☐ |
| 5. PLC I/O and Program Verification..... | ☐ | ☐ |
| 6. O/I Display Verification..... | ☐ | ☐ |

Notes:

1. For relay logic checks, each rung of the elementary or loop diagram is to be highlighted in yellow as they are verified for correct control functions.
2. For PLC I/O and program verification, the control strategies shall be highlighted in yellow as each logic function is tested.

Tested by: _____ **Witnessed by:** _____
Date: _____

VFD OR SOFT STARTER PROGRAM PARAMETER RECORD SHEET

TEST FORM (TF12)

EQUIPMENT
NAME : _____ LOCATION : _____

EQUIPMENT
NAME : _____ LOCATION : _____

[illegible]

NOTES:

TESTED BY : _____ DATE : ____/____/____
WITNESSED BY: _____

TESTED BY : _____ DATE : ____/____/____
WITNESSED BY: _____

I/O POINT CHECKOUT TEST FORM

TEST FORM (TF13)

I/O TYPE : _____

LOCATION : _____

TEST EQUIPMENT : _____

CAL. DATE : _____

[illegible]

NOTES:

TESTED BY : _____

WITNESSED BY: _____

DATE : ____ / ____ / ____

INSTRUMENTATION DATA SHEET AND CALIBRATION RECORD TEST FORM (TF14)

<u>Component Description</u>			<u>Manufacturer</u>		<u>Location</u>
<u>Component Tag Name</u>			Name _____		Site _____
			Model _____		Equip _____
			Serial # _____		
Indicator Range	<u>Range</u>	<u>Unit</u>	<u>Test Equipment</u>		General Notes 1) Attach Calibration Curves for dp Flowmeters 2) Include mounting elevations for level Instruments 3) All entries within solid box to be typed in prior to start of test
			Description: _____		
	Input Range		Calibration Date: _____		
	Output Range				
<u>Designed Calibration</u>			<u>Measured Calibration</u>		
Input Signal	Output	Eng. Value	Input	Output	Comments
Notes _____ _____ _____ _____ _____					
Tested by (Print Name) _____ Witnessed by (Print Name) _____					
Signature _____			Signature _____		
Date / /			Date / /		

END OF SECTION 201

203 ELECTRICAL SYSTEM ANALYSIS

203-1 GENERAL

203-1.01 Scope of Work

- A. Provide the following submittals, per Section 16010, for the entire electrical power system at Bennett Valley Golf Course, including the 208/120V distribution system:
 - 1. Short Circuit Study
 - 2. Protective Device Coordination Study
 - 3. Arc Flash Study
- B. Electrical System Studies shall be prepared, stamped and signed by a professional Electrical Engineer registered in the State of California and in accordance with IEEE 242, IEEE 399, ANSI/IEEE C37.13 and IEEE 519.
- C. Exceptions / Clarifications
 - 1. Itemize all exceptions and clarifications to the Contract Documents in a letter (located in the front of the submittal) on Owner letterhead.
 - 2. Exceptions that are noted in the study, but not listed on the Exceptions/Clarifications letter, will be considered as non-responsive and not accepted as changes to the Contract Documents.
 - 3. All exceptions taken from the Drawings and specifications shall be documented with justifications. When noting the exception, list which Drawings or which Specification Subsection number the exception is taken.
 - 4. Clarification requests shall list which Drawing or Specification Subsection number the clarification is required for.
- D. Provide two (2) DVDs at the completion of the project. One DVD will contain the as-built set of studies, reports, settings, etc. The other DVD will contain the original source format of input data used for the PC based computer software, including all SKM files used to create the studies. Provide all setup information used for the computer based study and report.
- E. For each resubmittal, provide a copy of submittal comments and a separate letter, on Owner letterhead, identifying how each submittal comment has been addressed in the resubmittal.
- F. When submittals are provided in PDF format, utilize the "Bookmark" feature of the Adobe Acrobat and clearly bookmark locations in the report to locations identified in the Report's Table of Contents. Bookmarks shall not be out of order; the English description shall match that listed in the Report's Table of Contents.

203-1.02 Sequencing And Scheduling

- A. It is the responsibility of those performing the electrical system analysis to collect and field verify all data. This includes verifying existing electrical distribution and obtaining all data from the Utility Owner and Vendors necessary for completing the requested studies.
 - 1. Utilize proposed load data for the Studies obtained from submittals, Utility Owner, Generator manufacturers, field verifications, etc.
 - 2. Include copy correspondence with Utility showing fault data used in report.
 - 3. Include copy correspondence with Generator supplier showing generator data used in report, if generator is provided.

- B. A complete Protective Device Coordination Study shall be submitted within 60 days after approval of Short Circuit Study.
- C. At the completion of the project, all studies shall be resubmitted with all calculations rerun, data and graphs updated to reflect as-left conditions. Provide new Arc Flash labels to reflect as-constructed equipment and as-left circuit breaker settings.
- D. When previous electrical system analysis studies are available and provided to the Contractor, it is the Contractor's responsibility to verify the accuracy of the data used and to update it to match existing conditions. Contractor shall assume that electrical system analysis studies are not available.

203-2 MATERIALS

203-2.01 General

- A. Equipment and component titles and numbers used in the Studies shall be identical to the equipment and component titles and numbers shown on the Drawings.
- B. Perform Studies using PC based computer software. State program name and version (e.g. version 2.1) in report.
- C. Perform complete fault calculations for Utility and generator sources (if applicable). Equipment shall not be grouped as a single large load; they shall be treated as individual loads. When generators are incorporated into the system, develop two separate networks: one with utility only (no generator attached) and one with generator only (no utility attached)
- D. Complete protective device coordination study listing all device settings shall be utilized during start-up of electrical equipment.
- E. Provide unique page numbers for every sheet in all Studies. Unique page numbers to be manually placed by Study Owner after printout if study report doesn't assign page numbers.
- F. One line diagrams
 - 1. Shall be readable on 11" x 17" paper. One-line diagrams shall be redrawn in AutoCAD on multiple sheets if necessary or as requested by Owner.
 - 2. Buses and branches shall have descriptive names matching one line diagram or existing system (i.e. not Bus-0084).
 - 3. Automatic transfer switches (ATs), Main Switchboards (MSBs), shall not have multiple node buses.
 - 4. Primary and secondary for transformers, Variable Frequency Drives (VFDs), etc. shall be changed to node buses.
- G. Multiple scenarios for the short circuit and arc flash reports shall be provided.
 - 1. Maximum available fault current from utility transformer.
 - 2. Generator (when shown) with all motors contributing.
 - 3. Do not combine networks when multiple sites are modeled.
 - 4. All studies shall be repeated with the arc flash reduction switch enabled (where applicable).

203-2.02 Short Circuit Study

- A. Include the following in the short circuit study:
 - 1. Cable impedances based on copper conductors.
 - 2. Bus impedances based on copper bus bars.
 - 3. Transformer impedances based on tolerances specified in ANSI C57.12.00.
 - 4. Source data (i.e. cable lengths, sizes, and quantity, for all runs in study, listing of bus loads, etc.).
 - 5. Utility data:
 - a. Size of Utility transformer.
 - b. Impedance of Utility transformer.
 - c. Primary voltage of Utility transformer.
 - d. Fault information on primary side of Utility transformer:
 - 1) Three phase bolted fault.
 - 2) X/R ratio (positive sequence).
 - 3) Line to ground fault.
 - 4) X/R ratio (zero sequence).
 - e. Protective relays (type & settings).
 - 6. Voltage drop and current flow at each node and load in system.
- B. Calculate Short Circuit interrupting duties for an assumed three-phase bolted fault and line-to-ground fault at each of the following locations:
 - 1. Power transformer's primary
 - 2. Main Switchboard.
 - 3. All Motor Control Centers (MCCs).
 - 4. All panelboards.
 - 5. All 480V, 3-phase motor and equipment loads.
 - 6. All 3-phase transformer secondaries.
 - 7. All 240/208V equipment.
- C. Verify:
 - 1. Equipment and protective devices are applied within their ratings.
 - 2. Adequacy of switchboard, panelboard and MCC bus bars to withstand Short Circuit stresses.
 - 3. Adequacy of transformer windings to withstand Short Circuit stresses and over-current.
 - 4. Cable sizes for ability to withstand normal and fault load currents.
- D. Provide the following in the Short Circuit study report:
 - 1. Calculation methods and assumptions.
 - 2. Input data.
 - 3. Short circuit data.
 - a. Impedances.
 - b. X to R ratios.
 - c. Asymmetry factors.
 - d. Motor contributions.
 - e. Short Circuit kVA.
 - f. Symmetrical and asymmetrical line-to-line and line-to-ground fault currents.
 - g. Device evaluation including rating of equipment.
 - h. Bus evaluation including rating of equipment.
 - i. Source data, from Electric Utility Owner. Include copy of correspondence with Utility Owner indicating values used.

- j. Source data from Generator Supplier (where applicable). Include copy of Generator provided values used.
- 4. Tabulations of calculated quantities.
- 5. Results, conclusions and recommendations.
- 6. One line diagrams of distribution system.
- 7. Impedance diagram showing the resistances and reactances for all cables of the distribution system.

203-2.03 Protective Device Coordination Study

- A. Provide Protective Device Coordination drawings for each section of distribution system that includes the following:
 - 1. Graphically diagram displaying coordination time-current curves on conventional log-log curve sheets. Each time-current curve shall have a unique identifier label. This identifier shall be used in the tabulated settings spreadsheet and on the associated one-line diagram.
 - 2. Time-current curves shall include the following curves (minimum):
 - a. Utility relays (phase & ground) and high voltage switchgear relays (phase and ground).
 - b. All upstream protective devices and breakers.
 - c. All mechanical overloads.
 - d. All MCP breaker and associated motor or equipment load. Duplicates of the same sized protective device and motor size may be omitted (i.e., when there are 3 pumps for same application).
 - e. All transformers and associated primary and secondary protection.
 - f. Unique identifier for each protective device.
 - g. Provide separate TCC for phase and ground curves.
 - h. TCC for Ground curves shall include the transformer magnetizing inrush currents for all transformers downstream of the circuit breaker. Ground shall clear the inrush currents.
 - 3. One-line diagram that applies to specific portion of distribution system associated with time-current curves. One-line diagram shall include the following:
 - a. Location of each device.
 - b. Power and voltage ratings, primary and secondary transformers amperages.
 - c. All significant circuit elements such as transformers, cables, breakers, fuses, relays, etc. with their corresponding amperage ratings.
 - d. Tag of each branch and node (shall be the same tags used in short circuit study).
 - e. Mechanical overload and contactor.
 - f. English description, equipment name, HP, and full load amp rating of motors and other 3 phase loads.
 - g. Terminate device characteristic curves at a point reflecting maximum fault current to which device is exposed as calculated in short circuit study.
 - 4. Time current curves shall be provided for all protective devices with adjustable settings.
- B. Characteristics plotted on time current curves shall include:
 - 1. Protective current relays.
 - 2. Fuses including manufacturer's minimum melts, total clearing, tolerance, and damage bands.
 - 3. Circuit breaker trip devices, including manufacturer's tolerance bands.
 - 4. Transformer full-load currents at 100% and 600%.

5. Motor and equipment full load currents. Motors fed from VFDs and Soft Starters shall have their starting curves adjusted according to inrush currents on the TCC. Motors on TCC shall show the DC offset for VFD and Soft Starter fed pumps.
 6. Transformer magnetizing inrush currents.
 7. Transformer damage curves.
 8. ANSI transformer withstand parameters.
 9. Fault currents.
 10. Ground fault protective device settings.
 11. Other electronic protective devices.
- C. Provide the following recommended settings in spreadsheet format in the Protective Device Coordination study report:
1. Relay settings including CT values.
 2. Circuit Breakers adjustments:
 - a. Long Delay Pickup and Time.
 - b. Short Time Pickup and Time.
 - c. Instantaneous Pickup and Time.
 - d. Ground Pickup and Time.
 3. Programmable settings for all electronic devices. Settings for non-current relay settings shall also be provided.
 4. Settings shall be given both in amps and seconds as well as the corresponding physical setting (i.e. 30A and setting B on MCP) for device.
 5. Identify protective device associated with each curve by manufacturer type, function and part number.

203-2.04 Arc Flash Hazard Study

- A. General:
1. Arc flash boundary and incident energy shall be calculated using a PC computer program at all significant locations in the electrical network, including switchgears, switchboards, MCCs, transformers, and other major equipment where work could be performed on energized equipment.
 2. Arc flash computation shall include both line and load side of main breaker calculations, where necessary.
 3. Document method of calculation.
 4. Do not include the motor contribution of motors fed by VFDs in the arc flash hazard study.
- B. Safe working distances shall be specified for calculated fault locations based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm².
- C. Study shall include the following:
1. All significant locations in 480 volt, 240 volt and 208 volt systems fed from transformers equal to or greater than 125 kVA.
 2. Incident energy and flash protection boundary calculations in spreadsheet format in the Arc Flash Hazard study report.
 3. Provide the following incident energy and flash protection boundary calculations in spreadsheet format in the Arc Flash Hazard study report (values shall be calculated for all electrical equipment in the power distribution system):
 - a. Arcing fault magnitude
 - b. Device clearing time
 - c. Duration of arc

- d. Boundary for:
 - 1) Arc flash limited shock approach
 - 2) Limited shock approach
 - 3) Restricted shock approach
- e. Working distance
- f. Incident energy at 18 inches (in cal/sq.-cm)
- g. Recommendations for arc flash energy reduction for each location having more than 8 cal/sq.-cm. Provide preliminary cost estimate for implementing recommendations.
- h. Provide separate spreadsheets for all scenarios listed in subsection 2.01.G. Do not combine the spreadsheet values nor only provide the worst case scenario. Clearly list on each spreadsheet the English description of the Scenario presented.
4. Provide recommendations for the Personal Protective Equipment (PPE) that the Owner should maintain on site for the level of hazard.
5. Provide recommendations for safety label design that should be posted on electrical equipment.

203-2.05 Study Reports

- A. Written reports submitted for approval shall contain:
 1. Scope of Studies performed.
 2. Explanation of bus and branch numbering system.
 3. Report calculations, tabulations and spreadsheets.
 4. Selected equipment deficiencies.
 5. Results of Studies.
 6. Comments, recommendations or suggestions regarding:
 - a. Changes and additions to equipment rating and/or characteristics.
 - b. Circuit protective devices improperly rated for overload or fault conditions.
 - c. Arc Flash protective equipment and safety labels.
 7. Tabulation spreadsheet for all protective device settings with the following column entries (minimum):

Device Code	Description	MFR	Type	Plug Trip	Frame	KAIC	Long Time		Short Time		Inst	Ground	
							Amps	Time	Amps	Time	Amps	Amps	Time

- B. Stamped, signed and dated by Electrical Engineer registered in the State of California who performed the analysis.
- C. Reports are to be updated to reflect as-built conditions and placed in O&M manual, per Section 201 requirements.

203-3 EXECUTION

203-3.01 General

- A. Make minor modifications to equipment settings as required to accomplish conformance with the Short Circuit and Arc Flash Studies.
- B. Notify Engineer in writing of any required major equipment modifications.

203-3.02 Field Tests

- A. Provide field testing of protective equipment.
- B. Adjust relay and protective device settings according to values established by Coordination Study.

203-3.03 Arc Flash Warning Labels

- A. All Arc Flash warning labels shall meet NEC requirements, OSHA standards and NFPA recommendations.
- B. Provide and install 4 in. x 6 in. thermal transfer type labels of high adhesion polyester for each work location analyzed and as required by the NEC for flash protection on power distribution equipment.
- C. Each label shall have an orange header with the wording, "WARNING, ARC FLASH HAZARD," and shall include the following machine printed information:
 - 1. Location Designation
 - 2. Nominal system voltage
 - 3. Arc Flash boundary
 - 4. Available incident energy and working distance (in inches)
 - 5. Minimum arc rating of clothing
 - 6. Site specific level of PPE
 - 7. Engineering report number, revision number and issue date
 - 8. Contractor preparing report and contact phone number.
- D. Labels shall not be hand labeled.
- E. For all areas, Contractor shall post the following:
 - 1. Working distances
 - 2. Shock hazard voltage
 - 3. Shock Approach Boundaries:
 - a. Limited
 - b. Restricted
- F. Provide Arc Flash labels for the each of the following pieces of equipment (including existing):
 - 1. 480V and applicable 208V panelboards
 - 2. MCCs
 - 3. Switchboard
 - 4. Switchgears
 - 5. Control Panels
 - 6. All electrical equipment with an incident energy level greater than 1.2 Cal/cm².
 - 7. Where Switchgear, Switchboard, MCC, Panelboard, Distribution Panel, etc. feed multiple circuit breakers from the enclosure, provide separate line and load side Arc Flash Labels for the Main Circuit Breaker.
 - 8. Provide separate labels at each circuit breaker that has arc flash reduction switches indicating the appropriate values when the switch is enabled.
- G. Labels shall be submitted for approval. No labels shall be installed without prior approval by Owner or Owner representative.

203-3.04 Arc Flash Training

- A. Arc Flash labels shall be installed prior to the start of the Arc Flash training session.
- B. Electrical Engineer, who sealed the Electrical System Analysis, shall train Owner personnel of the potential arc flash hazards associated with working on energized equipment (minimum of 4 hours) at the Owner's Facility.

- C. Arc Flash training shall not be performed by general or electrical contractor.
- D. Maintenance procedures shall be in accordance with the requirements of NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces and shall be provided in the equipment manuals.

203-4 PAYMENT

- A. See **Section C** of these Technical Specifications for payment of contract items. Full compensation for conforming to the provisions presented in this section shall be considered as included in the prices paid for the various contract items of work described in Section C and no additional compensation will be allowed therefor.

END OF SECTION 203

A – FEES AND PERMITS

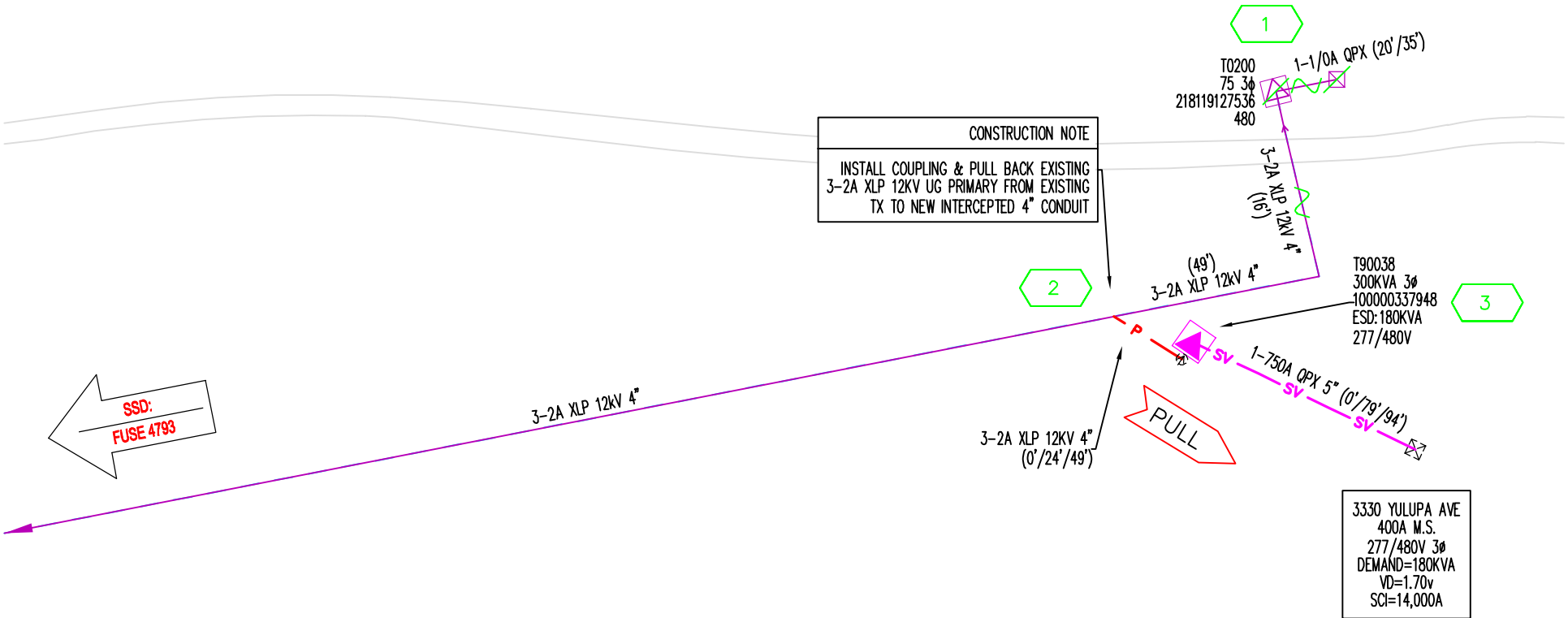
The Contractor shall pay for and obtain all permits, licenses, inspections, and approvals necessary to complete the Work except as specifically noted herein:

All electrical service charges or fees required by Pacific Gas and Electric Company (PG&E) will be paid by the City at no cost to the Contractor.

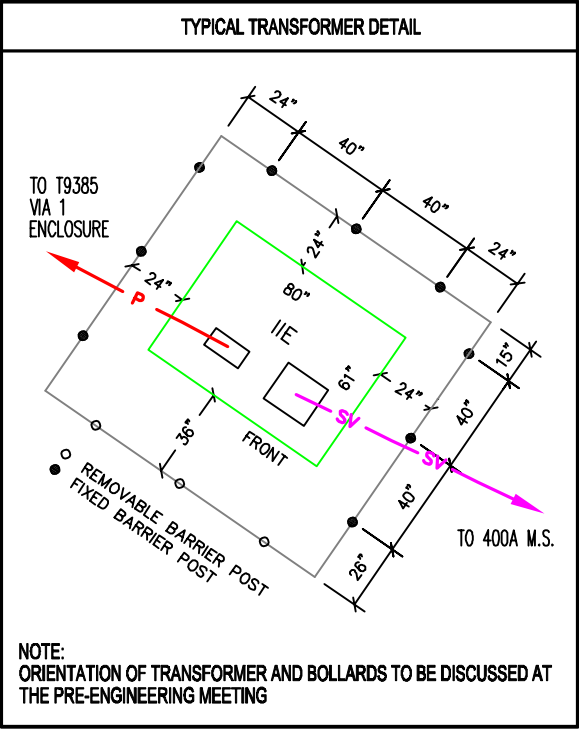
The Contractor shall coordinate a pre-construction meeting with PG&E and the City. PG&E construction drawings for the new electrical service are included in the Contract Documents. The Contractor shall schedule and coordinate all PG&E work.

The Contractor shall obtain a well modification permit from the County of Sonoma and shall perform all work requiring a well modification permit, including well casing extensions, wellhead modifications, installation of interior well components, removal of existing pumping equipment, installation of new pumping equipment, and startup of the new well pumps through a C-57 licensed Water Well Contractor.

Full compensation for securing permits, licenses, inspections, approvals, and for complying with the requirements of such permits shall be considered included in the Contract prices paid for the various items of work involved, and no additional compensation will be allowed therefor.



INSTALL	DESCRIPTION
SV	1-750A QPX XLP UNDERGROUND SERVICE CABLE (600V) IN APPLICANT TO INSTALL 1-5" SCHEDULE 40 CONDUIT
	(1) 300KVA PADMOUNT TRANSFORMER, 277/480V, 3φ ON APPLICANT TO PROVIDE 61"x80" PAD (M040291)
	(1) 277/480V 3φ METER IN 400A PANEL W/ CT'S (FRANCHISE & 3RD PARTY/ PRIVATE/ TOTAL CABLE)
XX'/XX'/XX'	
TRANSFER	DESCRIPTION
P	EXISTING 3-2A XLP 12KV UNDERGROUND PRIMARY CABLE TO NEW 1-4" SCHEDULE 40 CONDUIT BY APPLICANT
REMOVE	DESCRIPTION
	3-2A XLP 12KV UNDERGROUND PRIMARY CABLE & ABANDON 4" CONDUIT
	ABANDON 1-1/0A QPX UNDERGROUND SERVICE CABLE
	(1) 75KVA PADMOUNT TRANSFORMER, 277/480V, 3φ & ABANDON TX PAD
	(1) 277/480V 3φ METER IN 100A PANEL



CONSTRUCTION NOTES
1. PER M&C COORDINATOR, SHON MOORE @ 707-775-9333, PULL EXISTING 3-2A XLP PRIMARY CABLE IN NEW 4" CONDUIT TO NEW PMTX LOCATION
2. REMOVE 16' OF THE EXISTING 65' UG PRIMARY CABLE AND RE-ROUTE REMAINING CABLE TO NEW PMTX
3. CUSTOMER CONTACT INFO: BENJAMIN BRYANT @ (707) 636-3747

TYPICAL TRENCH DETAIL
APPLICANT NOTES: 1. APPLICANT TO TRENCH, INSTALL SUBSTRUCTURES, & BACKFILL 2. APPLICANT TO PROVIDE FIELD MAKINGS DELINEATING EASEMENTS 3. APPLICANT TO TRENCH PER S5453 EXHIBIT B 4. APPLICANT TO INSTALL CONDUIT PER DWG #062288 5. FOR PG&E APPROVED MANUFACTURES, SEE DWG #066211 6. APPLICANT MUST INSTALL A POLYESTER PULLING TAPE WITH SEQUENTIAL FOOTAGE MARKINGS IN ALL DUCT(S) 7. APPLICANT'S CONDUIT MUST BE PROVEN FREE AND CLEAR BY MEANS OF A MANDREL AND ALL CONDUITS WILL BE CAPPED 8. APPLICANT'S BACKFILL MATERIAL MUST BE ON SITE AND THE TRENCH MUST BE INSPECTED PRIOR TO BACKFILL 9. APPLICANT WILL BE REQUIRED TO INSTALL APPROVED SHORING FOR ANY TRENCH ACCORDING TO STATE EXCAVATION SAFETY STANDARDS 10. APPLICANT IS RESPONSIBLE FOR OBTAINING NECESSARY PERMITS REQUIRED BY LOCAL, CITY, COUNTY OR STATE AUTHORITIES 11. APPLICANT TO HAVE PRE-CONSTRUCTION MEETING CONDUIT NOTES PER DWG# 038193: 1. FOR PRIMARY CABLES, TOTAL BENDS INSTALLED IN CONDUIT RUN MUST NOT EXCEED 300 DEGREES, INCLUDING THE BEND AT THE FEED-IN LOCATION (ONLY FACTORY BENDS ARE ALLOWED) 2. FOR SECONDARY & SERVICE CABLES, TOTAL BENDS INSTALLED IN CONDUIT RUN HAVING MAXIMUM LENGTH OF 200 FEET MUST NOT EXCEED 315 DEGREES. IF THE TOTAL LENGTH EXCEEDS 200 FEET, THEN THE TOTAL NUMBER OF BENDS MUST NOT EXCEED 300 DEGREES. 3. FOR SECONDARY, SERVICES, & 200 AMPS PRIMARY, THE CONDUIT RUN MUST NOT EXCEED 600 FT IF THERE IS A VERTICAL 90 DEGREES BEND AT BOTH ENDS OF THE CONDUIT 4. THE MAXIMUM LENGTH OF ANY STRAIGHT CONDUIT RUN (NO FACTORY BENDS) MUST NOT EXCEED 1200 FT 5. WHEN THE CONDUIT RUN INCLUDES BENDS (300 DEGREES OR LESS), THE MAX LENGTH MUST BE LIMITED TO 800 FT 6. ALL HORIZONTAL BENDS TO BE 60" MIN RADIUS ON 4"/5" DUCT(S) FOR 90 DEGREES 7. ALL VERTICAL BENDS TO BE 36" MIN. RADIUS ON 4"/5" DUCT(S) FOR 90 DEGREES TRENCH NOTES: 1. ALL CHANGES IN TRENCH DEPTH TO BE GRADUAL OVER 20' MINIMUM 2. MAINTAIN MINIMUM OF 2' BETWEEN SPOIL BANK AND EDGE/TRENCH 3. INSTALLATION OF A 6" WIDE WARNING TAPE TO BE PLACED OVER CENTER OF ELECTRIC ONLY CONDUITS 4. BACKFILL MATERIAL CONTAINING NOT MORE THAN OCCASIONAL ROUNDED ROCKS LESS THAN 1/2" DIAMETER IS ACCEPTABLE 5. MAINTAIN PROPER SEPARATION BETWEEN PG&E & WET UTILITIES. THE MINIMUM ALLOWABLE HORIZONTAL SEPARATION BETWEEN IS 3FT WITH A MINIMUM OF 1 FT OF UNDISTURBED EARTH OR THE INSTALLATION OF A SUITABLE BARRIER BETWEEN THE FACILITIES 6. SOIL COMPACTION MUST MEET PG&E'S AND ANY APPLICABLE FEDERAL, STATE, COUNTY, AND LOCAL REQUIREMENTS, SEE DWG #063928 7. FOR ALL TRENCHES (ELECTRIC & JOINT) IN FRANCHISE AREA THE MINIMUM COVER FROM FINISHED GRADE TO TOP OF ELECTRIC CONDUITS IS 30"

TRENCH NOTES FOR APPLICANT INSTALL
1. CUSTOMER IS RESPONSIBLE FOR CROSSING EXISTING WATER, SEWER & STORM DRAIN LINES, EITHER UNDER OR OVER, AS REQUIRED TO MEET PG&E COVER REQUIREMENTS & 6" MINIMUM CLEARANCE. MAINTAIN AT LEAST 3' SEPARATION BETWEEN UTILITY TRENCH & ANY WATER, SEWER, STORM DRAIN TRENCH
2. THE CUSTOMER SHALL NOT RELY ON PG&E TO LOCATE FACILITIES. (PG&E WILL LOCATE PG&E FACILITIES UPON PROPER USE NOTIFICATION. CALL USA AT 811 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION)
3. CUSTOMER WILL BE REQUIRED TO REMOVE & REPLACE TRENCH SPOIL WITH SELECT BACKFILL AS REQUIRED BY PG&E SPECIFICATIONS & ANY LOCAL CITY, COUNTY, OR STATE REQUIREMENTS
4. CUSTOMER WILL BE REQUIRED TO PLACE TEMPORARY AND/OR PERMANENT PAVING IN ACCORDANCE WITH ANY LOCAL CITY, COUNTY, OR STATE REQUIREMENTS
5. CUSTOMER TO BACKFILL AND HAND TAMP SOIL AROUND RISER

CABLE & PULLING DATA										
DWG CABLE LOCATION	LOCATION OF PULL	FROM ENCLOSURE	NO OF CABLES	CABLE TYPE	ESTIMATED TENSION (LBS)	MAX ALLOWABLE TENSION(LBS)	ACTUAL TENSION(LBS)	GALLONS LUBE	FRONT END PACKS	RUN LENGTH W/TAIIS (FT)
3	LOC 2	T90038	3	2A	42LBS (GRIP)	1062		0.5	1	49

PRIMARY VOLTAGE: 12 kV	INSULATION DIST:B
LATITUDE:38.420398	LONGITUDE: -122.661785
SOURCE SIDE DEVICE: 4793	
SUB & CIRCUIT: SANTA ROSA A 1111	
DSGN SAG: LT RURAL	RAPTOR ZONE: YES
LOADING AREA:LIGHT	ARRESTER DIST: 3
CORROSION AREA: NON	
EXEMPT EQUIPMENT	

CONSTRUCTION SKETCH

3330 YULUPA AVE

SANTA ROSA



Know what's below.
Call before you dig.

NO ENVIRONMENTAL
ISSUES



EST: NANCY LOR	530-433-6603
ADE: CHRIS SPEARS	530-513-2258
SUPV: LEW BLEVINS	530-410-8472
REP: ALEX IVAKHNENKO	707-328-0950
PLNR: JEFFREY JUNG	707-579-6115
NOTIF: 133657291	JPA#:
SCALE: 1"=50'	DATE: 08/19/2026
PM: T55796010	SPECIFICATIONS OF 1
REVISIONS	REV. 0

B – REPORTS

The following documents are provided for information and reference only. These documents are not considered part of the Contract Documents and are provided solely to assist bidders in understanding existing site conditions and background information related to the Project.

1. Geotechnical Investigation Irrigation Pond Bennett Valley Golf Course, 3330 Yulupa Avenue, Santa Rosa, California, prepared by Bauer Associates, Inc., dated January 8, 2026.
2. Bennett Valley Golf Course Irrigation Wells Yield Testing and Analysis, prepared by Brelje & Race Consulting Engineers, dated December 8, 2014.

An electronic copy (PDF) of the above documents may be obtained via Planet Bids.

C – DESCRIPTION OF WORK AND PAYMENT ITEM DESCRIPTIONS

The descriptions below are intended to generally describe the work included in each bid item. The Contractor shall provide all labor, materials, equipment, incidentals, installation, permits, testing, startup, coordination, and appurtenant work necessary to complete the work shown on the Plans and specified in the Contract Documents whether specifically identified herein or not. The Contractor shall provide a schedule of values breakdown for all lump sum items listed.

1. **Mobilization and Demobilization** shall be paid for at the contract **lump sum** price, which price shall not exceed 2 percent of the total contract price for the Work, and shall include full compensation for furnishing all labor, materials, tools, equipment, bonds, insurance, permits, schedules, submittals, work plans, temporary facilities, temporary utilities, transportation, delivery and removal of personnel, equipment, materials, and supplies, including but not limited to project administration, site establishment, mobilization, traffic control measures and access coordination within the City facility, phasing of work for the maintenance of irrigation supply to the golf course, demobilization, final cleanup, and all other work and operations necessary to commence and complete the Work, and no additional allowance will be made therefor.

The first payment for Mobilization and Demobilization shall be no more than 75 percent of the bid item amount. The first payment request may be made after all mobilization requirements specified herein have been completed. The second payment request may be made following completion of all contract items of work and completion of the final punch list.

2. **Water Pollution Control** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to dust control; installation, inspection, maintenance, repair, and replacement of BMPs; temporary soil stabilization; temporary erosion and sedimentation control; temporary construction entrance; temporary construction access routes; dewatering management; stormwater compliance; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
3. **Layout, Site Preparation and Selective Site Demolition** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to construction staking and layout; potholing and utility locating; selective demolition and removal of existing improvements as shown on the Plans; tree protection; tree removal; arborist services; coordination with PG&E; utility coordination; protection of existing drainage facilities; protection of existing irrigation facilities; alternate water supply as required for the continuous irrigation needs for the golf course, temporary capping, modification, and reconnection of existing irrigation facilities required to maintain golf course irrigation operations during construction; removal and disposal of miscellaneous structures, appurtenances, and improvements; site preparation; temporary fencing and temporary protections for Work areas including fencing or netting as needs to secure the Work site; protection of existing facilities designated to remain; removal and disposal of vegetation

within the limits of work; protection of golf course facilities, cart paths, utilities, and improvements adjacent to the work; temporary power to maintain supply of irrigation water; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.

4. **Earthwork** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to excavation; trenching; grading; embankment construction; loading, hauling, stockpiling, import, export, and disposal of materials; handling, disposal, and final placement of unsuitable and surplus materials; placement of unsuitable and surplus materials in approved on-site disposal areas; over-excavation; preparation of subgrade; embankment fill; compaction; trench backfill; fine grading; trimming of slopes; dewatering; groundwater management; excavation support associated with earthwork operations; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
5. **Surfacing and Erosion Control** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to shale surfacing; planting soil preparation; soil amendments; sod; mulch; fiber rolls; permanent erosion control measures; maintenance of erosion control measures until final contract acceptance; watering and establishment of restored areas; restoration of areas disturbed by construction activities; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
6. **North Well & Wellhead Discharge Piping Improvements** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to removal and disposal of existing pumping equipment and discharge piping; verification of existing well conditions; C-57 licensed well contractor services; well casing extension; discharge head; sounding tube and level sensor down pipe; manual sounding port; submersible pump and motor; column pipe; power cable; column check valve; coatings; pressure testing; wellhead discharge piping; ductile iron pipe and fittings; pipe supports; check valve; air release valve; wye strainer; pressure gauge; dismantling joint; restrained joints and couplings; welding and fabrication; reinforced concrete wellhead; excavation and backfill; startup; testing; manufacturer's field services; modifications to the existing well necessary to complete the work; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
7. **South Well & Wellhead Discharge Piping Improvements** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to removal and disposal of existing pumping equipment and discharge piping; verification of existing well

conditions; C-57 licensed well contractor services; well casing extension; discharge head; sounding tube and level sensor down pipe; manual sounding port; submersible pump and motor; column pipe; power cable; column check valve; coatings; pressure testing; wellhead discharge piping; ductile iron pipe and fittings; pipe supports; check valve; air release valve; wye strainer; pressure gauge; dismantling joint; restrained joints and couplings; welding and fabrication; reinforced concrete wellhead; excavation and backfill; startup; testing; manufacturer's field services; modifications to the existing well necessary to complete the work; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.

8. **Hydropneumatic Bladder Tank** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to hydropneumatic bladder tank; replaceable bladder assembly; pressure relief valve; air charging assembly; reinforced concrete foundation; anchor bolts; anchorage system; anchorage calculations; tank supports; piping, valves, fittings, and appurtenances associated with the tank installation; pressure gauge connections; coating of the hydropneumatic bladder tank; startup; testing; adjustment of tank precharge pressure; manufacturer's field services; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
9. **Flow Meter and Vault** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to reinforced concrete vault; vault frame and hatch; excavation and backfill; aggregate base; grouted vault floor; reinforced concrete vault collar; magnetic flow meter; pressure indicating transmitter; pipe and fittings; restrained joints and couplings; restrained flange coupling adapter; pipe support; vault drain; coatings; startup; testing; coordination with electrical and controls work; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
10. **Hydraulic Control Valve and Vault** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to reinforced concrete vault; vault frame and hatch; excavation and backfill; aggregate base; grouted vault floor; reinforced concrete vault collar; combination pressure sustaining and pressure reducing hydraulic control valve with solenoid shutoff; anti-cavitation package; pilots; stainless steel pilot tubing; pressure gauges; isolation valves; pilot system strainers; pipe and fittings; restrained joints and couplings; restrained flange coupling adapters; vault drain; coatings; startup; testing; manufacturer's field services; adjustment of pressure sustaining, pressure reducing, anti-cavitation, and opening and closing rate settings; coordination with electrical and controls work; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.

11. **Irrigation Site Piping & Appurtenances** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to ductile iron pipe; carbon steel pipe; ductile iron fittings; couplings, sleeves, and adapters; restrained joints; restrained flange coupling adapters; butterfly valves; gate valves; air release valves; pressure gauges; camlock adapter and cap; tracer wire; polyethylene encasement for buried ductile iron pipe and fittings; coatings; pipe supports; valve risers and boxes; valve box concrete collars; welding and fabrication; excavation and backfill; bedding; startup; testing; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
12. **12-inch PVC Irrigation Main** shall be paid for at the contract unit price per **linear foot**, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to PVC pipe; ductile iron pipe if substituted by the Contractor; restrained joints; ductile iron fittings; sleeves; joint restraints; piping appurtenances; tracer wire; excavation and backfill; bedding; testing; trench dewatering if required; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
13. **Existing Irrigation Main Tie-In** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to potholing; locating the existing irrigation main; exposing the existing irrigation main; handling, cutting, removal, transport, and disposal of asbestos cement pipe; pipe and fittings; valves; valve risers and boxes; concrete valve box collars; couplings; sleeves; adapters; restraints; tracer wire; tie-in work; thrust restraint; excavation and backfill; bedding; testing; restoration of disturbed facilities and improvements; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
14. **Trench Bracing and Shoring** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to trench bracing, sheeting, shoring, and shielding as may be required for the protection of adjacent improvements and the protection of life and limb; support of existing utilities; bracing and shoring plans; compliance with Cal/OSHA and applicable safety orders requirements including permits; installation, maintenance, adjustment, and removal of trench support systems; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
15. **Transformer Bollards** shall be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to removable and non-removable bollards;

reinforced concrete foundations; reinforcing steel; excavation and backfill; coatings; coordination with PG&E; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.

This quantity may be increased, decreased or eliminated in its entirety based on field condition evaluation by the Engineer or PG&E and no adjustment in the contract bid price or other contract items shall be made therefor. The provisions in Section 9-1.06(B)(C) of the Standard Specifications shall not apply.

16. **General Electrical Work** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to electrical demolition; trenching; conduit bedding; backfill; electrical equipment installation and connections; enclosures; junction boxes; pull boxes; conduits; conductors; grounding; bonding; miscellaneous electrical equipment; electrical testing; utility coordination; temporary electrical facilities required to complete the work; electrical connections and terminations; electrical system analysis; startup support; cleanup; other miscellaneous and appurtenant electrical improvements necessary to provide a complete and working electrical system; and all other appurtenant work incidental thereto to complete the Work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
17. **Meter Pedestal & Electrical Service** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to meter pedestal; meter socket; meter/main switchboard; main service disconnect; service conductors; utility transformer pad; transformer pad interfaces; heater; lights; receptacles; conduits; fittings; wire and cable; wiring connections; grounding and bonding; electrical terminations; anchorage; utility point of connection including potholing; utility service requirements; PG&E coordination; excavation and backfill; testing; startup; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.
18. **Motor Control Center & Controls System** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for the work, including but not limited to motor control center; programmable logic controller (PLC); operator interface (OI); telemetry equipment; communications equipment; control panels; anchorage; motor controls; soft starters; level transmitters; instrumentation wiring and terminations; control programming; control narratives and control logic implementation; startup; testing; operator training; coordination with process controls; adjustment of control setpoints; calibration of instrumentation; and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.

19. **All Other Items of Work** shall be paid for at the contract **lump sum** price and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for all work shown on the Plans and specified in the Contract Documents that is not specifically provided for under another bid item, including but not limited to miscellaneous appurtenances, incidental work, coordination, modifications, adjustments, cleanup, restoration, and all other appurtenant work incidental thereto to complete the work as shown on the Plans and as specified herein, and no additional allowance will be made therefor.