EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR QUOTATION (RFQ) No. 2305
for
LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION

Contact Person: John W. Grimes, Buyer II
Phone Number: (510) 287-0316
E-mail Address: John.Grimes@ebmud.com

For complete information regarding this project, see RFQ posted at https://www.ebmud.com/business-center/materials-and-supplies-bids/current-requests-quotation-rfqs/ or contact the EBMUD representative listed above. Please note that prospective bidders are responsible for reviewing this site during the RFQ process, for any published addenda regarding this RFQ.

Bids Due
by
1:30 p.m.
on
March 8, 2023

All bid submissions hand delivered or mailed (USPS, FedEx, UPS, etc.) to the address or PO Box noted below and must be received no later than 1:30 p.m. on the bid due date.

RESPONSE DELIVERED IN-PERSON, BY COURIER, OR PACKAGE DELIVERY SERVICE (UPS, FedEx, DHL, etc.)	RESPONSE DELIVERED BY MAIL (USPS) to:
EBMUD–Purchasing Division 375 Eleventh Street, First Floor Oakland, CA 94607	EBMUD–Purchasing Division P.O. Box 24055 Oakland, CA 94623

EAST BAY MUNICIPAL UTILITY DISTRICT

RFQ No. 2305

for

LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION

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I. STATEMENT OF WORK

A. SCOPE

It is the intent of these specifications, terms, and conditions to describe the fabrication and delivery of five large diameter valves and a flowmeter for use at the 82nd Ave Rate Control Station (RCS).

East Bay Municipal Utility District (District) intends to award a contract to the lowest cost bidder(s) (hereinafter referred to as "Contractor") whose response meets the District's requirements.

Work includes furnishing and delivering the following:

- One (1) Motorized Flanged 16-inch High Performance Butterfly Valve
    - Approved valve manufacturers: Henry Pratt, Bray/McCannalok Series 40, Pentair Keystone K-Lok or Approved Equal
    - Approved actuator manufacturers: Limitorque MX or Approved Equal
- One (1) Motorized 36-inch AWWA Ball Valve
    - Approved valve manufacturers: Henry Pratt or Approved Equal
    - Approved actuator manufacturers: Limitorque MX, AUMA SA Range with AC Intelligent Controls or Approved Equal
- Two (2) Manually-Operated Flanged 16-inch AWWA Butterfly Valves
    - Approved manufacturers: Henry Pratt, Val-Matic, GA, DeZurik, K-Flo or Approved Equal
- One (1) Manually-Operated Buried 54-inch AWWA Butterfly Valve
    - Approved manufacturers: Henry Pratt, Val-Matic, GA, DeZurik, K-Flo or Approved Equal
- One (1) Flanged 36-inch Magnetic Flowmeter
    - Approved manufacturers: Endress & Hauser zero straight length W400 or Approved Equal

B. BIDDER QUALIFICATIONS

1. Bidder Minimum Qualifications

   a. Bidder, bidder's principal, or bidder's staff shall have been regularly engaged in the business of providing fabricating valves of the same or larger diameter required for the work, including application of lining and coating for at least five (5) years.

   b. Bidder shall be an authorized manufacturer, dealer, or provider of specified brands of equipment.

   c. Bidder shall possess all permits, licenses, and professional credentials necessary to supply product and perform services as specified under this RFQ.

C. APPROVED MANUFACTURERS & MODELS / PRE-APPROVAL PROCESS

I. Below are listed the approved manufacturers and models desired by the District:

Item	Description	Approved Manufacturers
1	(1) Motor, Flanged 16-inch High Perform. Butterfly Valve	Henry Pratt, Bray/McCannalok Series 40, & Pentair Keystone K-Lok
	(Approved actuator manufacturers: Limitorque MX, AUMA SA Range with AC Intelligent Controls)	
2	(1) Motor, 36-inch AWWA Ball Valve	Henry Pratt
	(Approved actuator manufacturers: Limitorque MX, AUMA SA Range with AC Intelligent Controls)	
3	(2) Manually-Operated Buried 16-inch AWWA Butterfly Valves	Henry Pratt, Val-Matic, GA, DeZurik, K-Flo
4	(1) Manually-Operated Buried 54-inch AWWA Butterfly Valves	Henry Pratt, Val-Matic, GA, DeZurik, & K-Flo
5	(1) Flanged 36-inch Magnetic Flowmeter	Endress & Hauser

II. Manufacturers/models other than those listed above will be considered as part of this bid submittal process, only as provided below:

Proposals for "pre-approved or equal" substitutions requested during the bidding period shall be furnished by **no later than February 16, 2023,** in writing to:

Design Division, Roya Yazdani (MS#502)
ofc (510) 287-7064, roya.yazdani@ebmud.com
East Bay Municipal Utility District
P. O. Box 24055
Oakland, CA 94623-1055

Proposals shall be accompanied by complete technical and descriptive data necessary to determine equality of the material, product, thing, or service. Samples shall be provided when requested. The burden of proof as to availability, comparative quality, suitability, and performance of the proposed substitution shall be upon the bidder. The bidder will not be reimbursed for any work and costs necessary for making the substitution workable. Proposals will be evaluated and deemed accepted, rejected, or incomplete by the District; the District will be the sole judge as to such matters. **If the substitution is accepted, bidders will be notified by addenda.**

D. SPECIFIC REQUIREMENTS

1. Furnish and deliver one (1) motorized flanged 16-inch high performance butterfly valve, one (1) motorized 36-inch AWWA ball valve, two (2) manually -operated flanged 16-inch AWWA butterfly valves, one (1) manually-operated buried 54-inch AWWA butterfly valve, and one (1) Flanged 36-inch Magnetic Flowmeter as described in the Specifications (Exhibit E).

2. Technical Requirements

   A. The products supplied and services provided shall comply with the requirements of the following specifications, drawings, and forms (Exhibit E):

   - 01 31 23.10 Web-based Construction Document Management
   - 01 33 00 Submittal Procedures
   - 01 43 11 Seismic Qualification and Certification
   - 01 45 27 Shop Inspection
   - 01 75 17 Field Testing and Startup

- 01 81 02 Seismic Design Criteria
- 09 96 56.05 High-Build Epoxy Coatings
- 09 96 56.10 Fusion Bonded Epoxy Coatings
- 33 09 11 Instruments and Recorders
- 33 12 16.15 AWWA Butterfly Valves
- 33 12 16.16 High Performance Butterfly Valves
- 33 12 16.27 AWWA Ball Valves
- 33 12 16.32 Electric Motor Valve Actuators
- 17001 Sample Submittal Log
- 17015 Manufacturer's Certificate of Proper Installation
- 17018 O&M Manual Review Check List Form
- 17019 Manufacturer's Maintenance Summary Form

3. Scope of Supply Critical Delivery Schedule

   A. The District has scheduled critical 82nd Ave RCS infrastructure work to start December 1, 2023. To support the critical treatment plant work, the District has scheduled an outage of the facility. The scope of supply is required to be available onsite starting on November 15, 2023 so that the improvements may be completed by the end of the WTP outage. The five valves and the flowmeter are essential to the 82nd Ave RCS improvements. Delayed delivery of the valves and flowmeter will result in the District being unable to complete critical improvements during the scheduled outage. Delayed delivery will impact the District's ability to provide adequate levels of service to customers. Delayed submittals prior to fabrication will delay timely delivery of the valves and flowmeter. The Contractor is notified of this contract requirement. See Section III. I. for information on liquidated damages

All products shall be in new and unused condition and shall be of the most current and up to date model.

Materials in Contact with Drinking Water.

1. All materials, equipment, or products that will be in contact with drinking water (potable water) shall be tested and certified as meeting the specifications of NSF/ANSI 61 Standard in accordance with California Code of Regulations, Title 22, Section 64591. Examples include, but are not limited to, valves, pumps, flow meters, protective materials (coatings, linings, liners), joining and sealing materials, pipes, tanks, pipe fittings, filters, cleaning chemicals, and lubricants.

2. All materials, equipment, or products that will be in contact with drinking water (potable water) shall be tested and certified as "lead-free" per California Health and Safety Code Section 116875 and NSF 61 Annex G or NSF 372.

3. All chemicals that will be in contact with drinking water shall be certified by NSF to NSF/ANSI Standard 60.

4. For materials:

    a. Documentation which demonstrates current NSF/ANSI Standard 61 certification shall be submitted by the bidder in their bid package.

    b. If awarded, contractor is responsible for informing the District within 5 days, if and when their certification lapses or expires. Failure to inform the District within the allotted time will be sufficient grounds for immediate termination of the contract.

E. DELIVERABLES

1. Equipment

    a. One (1) motorized flanged 16-inch high performance butterfly valve, one (1) motorized 36-inch AWWA ball valve, two (2) manually- operated flanged 16-inch AWWA butterfly valves, one (1) manually operated buried 54-inch AWWA butterfly valve, and one flanged 36-inch magnetic flowmeter, each manufactured by those listed in Section I.A.

2. Submittals

    a. See Technical Specifications in Exhibit E for submittal requirements.

    b. Liquidated Damages will apply to Submittals, see Section III., I. "Liquidated Damages".

    c. Revisions to submittals must be re-submitted to the District within ten (10) business days or less of receipt of submittal review comments from the District.

3. Equipment Storage, Transport and Delivery

   a. Equipment must be delivered no later than November 15, 2023.

   b. Equipment must be delivered to the District's Oakport Storage Facility located at 5601 Oakport Street, Oakland, CA. After inspection and verification of the equipment by District upon delivery by Contractor, Contractor shall off-load the equipment in a manner to avoid soiling or damage in a location directed by the District or its representative.

   c. Delivery shall be coordinated with the District or its representative a minimum of 5 workdays in advance of delivery. Schedule deliveries only between the hours of 7:00 a.m. to 3:00 p.m. Monday through Friday. No deliveries will be accepted on Saturdays, Sundays, or District Holidays. Contact Javier Prospero at 510-287-2065 to schedule delivery.

   d. During storage and transport, equipment shall be protected from the elements in covered storage, protected from moisture and dust, and in a manner that protects flanges and valve interiors.

   e. Equipment shall be shipped in containers that can be accessed at the ship-to location for inspection of shipping damage to equipment. Contractor shall provide access to the crate interior for inspection by the District.

   f. Contractor shall off-load the equipment in a location of the District's choosing at Oakport Storage Facility.

   g. Contractor shall be present at the time of inspection and shall facilitate the inspection as requested by the District.

   h. Contractor shall allocate minimum of 4 hours of onsite from time of delivery for inspection assistance.

   i. Once the inspection is complete, Contractor shall reseal the containers to ensure that the equipment is protected during storage.

F. INSPECTION

All materials furnished and Work completed under the contract is subject to inspection by the Engineer. The Engineer's inspections are solely for the District's benefit and do not constitute acceptance of any of the Contractor's work or waiver of the requirement that the Contractor's work conforms to the requirements of the Contract Documents. The Contractor shall furnish, without extra charge, all necessary test pieces and samples, including facilities and labor for obtaining those pieces, as requested by the Engineer.

The Engineer will have safe access to the work site or shop where the work, material or equipment subject to inspection is being performed or manufactured or where any off-site work is being performed, including shops, sites, and assembly facilities of Subcontractors and Suppliers.

All material, equipment or Work that does not conform to the Contract Documents is non-conforming work and will be rejected regardless of whether it may have been inspected by the Engineer or its representative. Installation of unapproved materials and equipment is non-conforming work until the materials or equipment are approved by the Engineer. Deficiency Notices may be issued by the Engineer to advise the Contractor of non-conforming work. However, lack of a Deficiency Notice shall not waive the Contractor's obligation to correct any and all non-conforming work, patent or latent, through the expiration of the warranty period, or other such longer period as specified in the Contract Documents.

Within 5 working days after receipt of a Deficiency Notice, the Contractor shall submit its proposal and schedule for correcting all non-conforming work. The material or equipment will not be allowed to ship until the non-conforming work is completed in accordance with the requirements of the Contract Documents. Additional costs for engineering, observation, administrative, clerical or other work associated with or resulting from the Contractor's failure to perform its work in conformance with the Contract Documents shall be borne solely by the Contractor, and the Engineer may elect to deduct the District's additional costs from any future payments to the Contractor. If the Contractor refuses or neglects to replace the non-conforming work, the District may correct or replace the non-conforming work at the Contractor's expense. The District's expenses in correcting any non-conforming work will be calculated as fully burdened costs for labor, plus actual
costs for materials and equipment, plus a 15% markup on materials and equipment.

Work completed without the Engineer's inspection and approval may be required to be reconstructed or replaced upon the Engineer's inspection. Work covered without prior approval of the Engineer may be required to be uncovered to the extent necessary for the Engineer to determine if the covered Work is satisfactory. The entire cost of replacing or uncovering and re-covering the Work, including the cost of materials

furnished by the District, shall be borne by the Contractor, whether or not the Work uncovered or replaced is found to be defective.

The District reserves the right-of-access to the Contractor's facility to verify conformance to this specification. See Section 01 45 27 for travel costs reimbursement requirements.

SHOP INSPECTION:

The Engineer will witness the following tests at the valve manufacturer for: High Performance Butterfly Valves: Performance test; shell hydrostatic test; seat leakage test(s) in both directions. Butterfly Valves: shell hydrostatic test; seat leakage tests(s) in both directions; interior coating dry film thickness test; and interior coating holiday test. For Ball Valves: Performance test, body hydrostatic test, ball and seat test, seat leakage test. Any valve found not to comply with the specifications will not be accepted until the deficiencies are corrected.

The Engineer will release the valves for shipping after satisfactory completion of all tests. All valves shall be provided in accordance with the approved technical submittal.

Provide notification for Engineer to be present for testing. See Exhibit E, Section 01 45 27 – Shop Inspection for inspection advance notification requirements, travel restrictions, nondisclosure agreements, and District travel expenses reimbursement.

Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery

G. FAILURE TO MEET SPECIFICATIONS

In the event any shipment or shipments of a Contractor's product do not meet the specification or delivery requirements, the District may reject the shipment or shipments and, at its option, may purchase this material from any supplier on the open market who can meet the District's specification requirements, or the District may demand immediate replacement by Contractor of the non-conforming product. Any costs over and above the original contract price will be charged back to the Contractor. In addition, Contractor shall bear the costs of removal and disposition for any delivery which fails to conform to the specifications.

II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION
RFQ Issued	February 1, 2023
Deadline For Submission of Questions	February 9, 2023
Pre-Approval or Equal Submittals Deadline	February 16, 2023
Addendum to Announce Pre-Approved Equivalents (if necessary)	February 27, 2023
Response Due	**March 8, 2023** by 1:30 p.m. At this time all bids will be opened publicly in the EBMUD Board Room at 375 Eleventh St., Oakland, CA 94607*
Anticipated Contract Start Date	April 13, 2023
Required Delivery Date for Equipment	November 15, 2023

Note: All dates are subject to change **by District**.
*Due to COVID-19, in-person bid inspection will be suspended. Following the opening a list of submitted pricing will be posted to:
https://www.ebmud.com/business-center/materials-and-supplies-bids/

Bidders are responsible for reviewing **https://www.ebmud.com/business-center/materials-and-supplies-bids/current-requests-quotation-rfqs/** for any published addenda. Hard copies of addenda will not be mailed out.

III. DISTRICT PROCEDURES, TERMS, AND CONDITIONS

A. RFQ ACCEPTANCE AND AWARD

1. RFQ responses will be evaluated to determine that they are responsive, responsible, and that they meet the specifications as stated in this RFQ.

2. The District reserves the right to award to a single or to multiple Contractors, dependent upon what provides the lowest overall cost to the District.

3. The District has the right to decline to award this contract or any part of it for any reason.

4. Any specifications, terms, or conditions, issued by the District, or those included in the bidder's submission, in relation to this RFQ, may be incorporated into any purchase order or contract that may be awarded as a result of this RFQ.

5. Award of contract. The District reserves the right to reject any or all proposals, to accept one part of a proposal and reject the other, unless the bidder stipulates to the contrary, and to waive minor technical defects and administrative errors, as the interest of the District may require. Award will be made, or proposals rejected by the District as soon as possible after bids have been opened.

B. BRAND NAMES, APPROVED EQUIVALENTS, DEVIATIONS, AND EXCEPTIONS

Any references to manufacturers, trade names, brand names, and/or catalog numbers are intended to be descriptive, but not restrictive, unless otherwise stated, and are intended to indicate the quality level desired. Bidders may offer an equivalent product that meets or exceeds the specifications.

The District reserves the right to be the sole judge of what shall be considered equal and/or acceptable and may require the bidder to provide additional information and/or samples. If the bidder does not specify otherwise, it is understood that the brand and/or product referenced in this RFQ will be supplied.

Taking exception to the RFQ, or failure on the part of the bidder to comply with all requirements and conditions of this RFQ, may subject the RFQ response to rejection. If no deviations are shown, the bidder will be required to furnish the material exactly as specified. The burden of proof of compliance with the specifications will be the responsibility of the bidder.

This RFQ is subject to acceptance only on the terms and conditions stated in this RFQ. Any additional or different terms and conditions proposed by the bidder are hereby rejected and shall be of no force or effect unless expressly assented to in writing by the District.

Proposals for “pre-approved or equal” substitutions requested during the bidding period shall be furnished in writing to:

Design Division, Roya Yazdani (MS#502)
ofc (510) 287-7064, roya.yazdani@ebmud.com
East Bay Municipal Utility District
P. O. Box 24055
Oakland, CA 94623-1055

Proposals for acceptable equivalents are due **NO LATER THAN February 16, 2023 at 4:00 p.m. and** shall be accompanied by complete technical and descriptive data necessary to determine equality of the material, product, thing, or service. Samples shall be provided when requested. The burden of proof as to availability, comparative quality, suitability, and performance of the proposed substitution shall be upon the bidder. The bidder will not be reimbursed for any work and costs necessary for making the substitution

workable. Proposals will be evaluated and deemed accepted, rejected, or incomplete by the District; the District will be the sole judge as to such matters. **If the substitution is accepted, bidders will be notified by addenda.**

C. PRICING

1. All prices are to be F.O.B. destination. Any freight/delivery charges are to be included.

2. All prices quoted shall be in United States dollars.

3. Price quotes shall include any and all payment incentives available to the District.

4. Bidders are advised that in the evaluation of cost, if applicable, it will be assumed that the unit price quoted is correct in the case of a discrepancy between the unit price and extended price.

D. NOTICE OF INTENT TO AWARD AND PROTESTS

At the conclusion of the RFQ response evaluation process, all entities who submitted a bid package will be notified in writing by e-mail or USPS mail with the name of the Bidder being recommended for contract award. The document providing this notification is the Notice of Intent to Award.

Protests must be in writing and must be received no later than seven (7) workdays after the District issues the Notice of Intent to Award. The District will reject the protest as untimely if it is received after this specified time frame. Protests will be accepted from bidders or potential bidders only.

If the protest is mailed and not received by the District, the protesting party bears the burden of proof to submit evidence (e.g., certified mail receipt) that the protest was sent in a timely manner so that it would be received by the District within the RFQ protest period.

Bid protests must contain a detailed and complete written statement describing the reason(s) for protest. The protest must include the name and/or number of the bid, the name of the firm protesting, and include a name, telephone number, email address and physical address of the protester. If a firm is representing the protester, they shall include their contact information in addition to that of the protesting firm.

Protests must be mailed, hand delivered, or emailed to the Manager of Purchasing, Mailstop 102, East Bay Municipal Utility District, 375 Eleventh Street, Oakland, CA 94607 or P.O. Box 24055, Oakland, California 94623. Facsimile and electronic mail protests must be followed by a mailed or hand delivered identical copy of the protest

and must arrive within the seven workday time limit. Any bid protest filed with any other District office shall be forwarded immediately to the Manager of Purchasing.

If the protest is denied, the bid protester can appeal the determination to the requesting organization's Department Director. The appeal must be submitted to the Department Director no later than five workdays from the date which the protest determination was transmitted by the District, to the protesting party. The appeal shall focus on the points raised in the original protest, and no new points shall be raised in the appeal.

Such an appeal must be made in writing and must include all grounds for the appeal and copies of the original protest and the District's response. The bid protester must also send the Purchasing Division a copy of all materials sent to the Department Director. The Department Director will make a determination of the appeal and respond to the protester by certified mail in a timely manner. If the appeal is denied, the letter will include the date, time, and location of the Board of Directors meeting at which staff will make a recommendation for award and inform the protester it may request to address the Board of Directors at that meeting.

The District may transmit copies of the protest and any attached documentation to all other parties who may be affected by the outcome of the protest. The decision of the District as to the validity of any protest is final. This District's final decision will be transmitted to all affected parties in a timely manner.

E. METHOD OF ORDERING

1. Written POs may be issued upon approval of written itemized quotations received from the Contractor.

2. Individual order price quotations shall be provided upon request per project and shall include, but not be limited to, an identifying (quotation) number, date, requestor name and phone number, ship to location, itemization of products and/or services with complete description (including model numbers, fabric and finish grade, description, color, etc.) and price per item, and a summary of total cost for product, services, shipping, and tax.

3. POs and payments for products and/or services will be issued only in the name of Contractor.

4. Any and all change orders shall be in writing and agreed upon, in advance, by Contractor and the District.

F. TERM / TERMINATION / RENEWAL

1. The term of the contract, which may be awarded pursuant to this RFQ, will be approximately two (2) years.

2. At the sole discretion of the District, any contract which may be awarded pursuant to this RFQ, may be extended for two (2) additional one-year terms at agreed prices with all other terms and conditions remaining the same. In the event that a Contractor does not agree to an extension, the District shall be given a minimum of 90 days' notice to locate a suitable replacement contractor.

3. This Agreement may be terminated for convenience by the District provided the Contractor is given written notice of not less than 30 calendar days. Upon such termination, the District shall pay the Contractor the amount owing for the products ordered and satisfactorily received by the District. This shall be the sole and exclusive remedy to which the Contractor is properly entitled in the event of termination by the District.

4. This Agreement may be terminated for cause at any time, provided that the District notifies Contractor of impending action.

G. WARRANTY

1. For any contract awarded pursuant to this RFQ, Contractor expressly warrants that all goods furnished will conform strictly with the specifications and requirements contained herein and with all approved submittals, samples and/or models and information contained or referenced therein, all affirmations of fact or promises, and will be new, of merchantable quality, free from defects in materials and workmanship, including but not limited to leaks, breaks, penetrations, imperfections, corrosion, deterioration, or other kinds of product deficiencies. Contractor expressly warrants that all goods to be furnished will be fit and sufficient for the purpose(s) intended. Contractor expressly warrants that all goods shall be delivered free from any security interest, lien, or encumbrance of any kind, and free from any claim of infringement, copyright or other intellectual property violation, or other violation of laws, statutes, regulations, ordinances, rules, treaties, import restrictions, embargoes or other legal requirements. Contractor guarantees all products and services against faulty or inadequate design, manufacture, negligent or improper transport, handling, assembly, installation or testing, and further guaranties that there shall be strict compliance with all manufacturer guidelines, recommendations, and requirements, and that Contractor guaranties that it will conform to all requirements necessary to keep all manufacturer warranties and guarantees in full force and effect. These warranties and guarantees are inclusive of all parts, labor, and equipment necessary to achieve strict conformance, and shall take precedence over any conflicting warranty or guarantee. These warranties and

guaranties shall not be affected, limited, discharged, or waived by any examination, inspection, delivery, acceptance, payment, course of dealing, course of performance, usage of trade, or termination for any reason and to any extent. In the absence of any conflicting language as to duration, which conflicting language will take precedence as being more specific, Contractor's aforesaid warranties and guarantees shall be in full force and effect for a period of one year from the date of installation by the District but shall continue in full force and effect following notice from District of any warranty or guarantee issue, until such issue has been fully resolved to the satisfaction of District.

H. INVOICING

1. Following the District's acceptance of the pre-fabrication submittals, the District will issue the Contractor payment for fifteen (15) percent of the award amount within thirty (30) days of receipt of a correct invoice.

2. Following the successful completion of shop inspection as stipulated in this RFQ and Exhibit E, the District will issue the Contractor payment for ten (10) percent of the award amount within thirty (30) days of receipt of a correct invoice.

3. Following delivery and the District's acceptance of the valves and flowmeter, the District will issue the Contractor payment for sixty five (65) percent of the award amount within thirty (30) days of receipt of a correct invoice.

4. Following the completion of field testing, manufacturer's certification of proper installation and receipt of the Final O&M manuals, the District will issue the Contractor ten (10) percent of the award amount within thirty (30) days of receipt of a correct invoice.

5. The District shall notify Contractor of any invoice adjustments required.

6. Invoices shall contain, at a minimum, District purchase order number, invoice number, remit to address, and itemized products and/or services description.

7. The District will pay Contractor in an amount not to exceed the total amount quoted in the RFQ response.

I. LIQUIDATED DAMAGES

1. A deduction for liquidated damages of $5,000 per day will be assessed from the required delivery milestone defined in Section I, C. Specific Requirements, until the delivery and District acceptance of the scope of supply. This deduction is related to the critical district work defined in
Section I, C.

2. A deduction for liquidated damages of $1,000 per day will be assessed from the required equipment submittal date defined in Section II until the actual submittal date.

3. The delivery milestone is not subject to adjustment for compensable, excusable, or inexcusable delay. Contractor shall provide sufficient personnel and resources to ensure timely completion before the deadline.

4. It being impracticable or extremely difficult to fix the actual damage, the amount set forth above is hereby agreed upon as liquidated damages and will be deducted from any money due under the agreement arising from this RFQ.

5. In the event performance and/or deliverables have been deemed unsatisfactory, the District reserves the right to withhold future payments until the performance and/or deliverables are deemed satisfactory.

IV. RFQ RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION

A. DISTRICT CONTACTS

All contact during the competitive process is to be through the contact listed on the first page of this RFQ. The following persons are to be contacted only for the purposes specified below.

TECHNICAL SPECIFICATIONS:
Attn: Roya Yazdani, Associate Civil Engineer
EBMUD-Design Division/Engineering Department
E-Mail: roya.yazdani@ebmud.com
PHONE: (510) 287-7064

CONTRACT EQUITY PROGRAM:
Attn: Contract Equity Office
PHONE: (510) 287-0114

AFTER AWARD:
Attn: Roya Yazdani, Associate Civil Engineer
EBMUD-Design Division/Engineering Department
E-Mail: roya.yazdani@ebmud.com
PHONE: (510) 287-7064

B. SUBMITTAL OF RFQ RESPONSE

1. Responses must be submitted in accordance with Exhibit A – RFQ Response Packet, including all additional documentation stated in the "Required Documentation and Submittals" section of Exhibit A.

2. Late and/or unsealed responses will not be accepted.

3. RFQ responses submitted via electronic transmissions will not be accepted. Electronic transmissions include faxed RFQ responses or those sent by electronic mail ("e-mail").

4. All RFQ responses must be SEALED and received by 1:30 p.m. on the due date specified in the Calendar of Events. Any RFQ response received after that time/date, or at a place other than the stated addresses, cannot be considered and will be returned to the bidder unopened. The EBMUD mailroom and Purchasing Division timestamp shall be considered the official timepiece for the purpose of establishing the actual receipt of RFQ responses.

5. RFQ responses are to be addressed/delivered as follows:

   Mailed (USPS):

   East Bay Municipal Utility District
   LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION
   RFQ No. 2305
   EBMUD–Purchasing Division
   375 Eleventh Street, First Floor
   Oakland, CA 94607

   Hand Delivered, delivered by courier or package delivery service (USPS, UPS, FedEx, DHL, etc.):

   East Bay Municipal Utility District
   LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION
   RFQ No. 2305
   EBMUD–Purchasing Division
   375 Eleventh Street, First Floor
   Oakland, CA 94607

   Bidder's name, return address, and the RFQ number and title must also appear on the mailing package.

6. All costs required for the preparation and submission of an RFQ response shall be borne by the bidder.

7. California Government Code Section 4552: In submitting an RFQ response to a public purchasing body, the bidder offers and agrees that if the RFQ response is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the RFQ response. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

8. Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms “claim” and “knowingly” are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act.

9. The RFQ response shall remain open to acceptance and is irrevocable for a period of one hundred eighty (180) days, unless otherwise specified in the RFQ documents.

10. It is understood that the District reserves the right to reject any or all RFQ responses.

11. RFQ responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFQ response or part thereof so marked. RFQ responses submitted in response to this RFQ may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

EXHIBIT A
RFQ RESPONSE PACKET
RFQ No. 2305 – LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION

To: The EAST BAY MUNICIPAL UTILITY District ("District")

From: _____

(Official Name of Bidder)

RFQ RESPONSE PACKET GUIDELINES

- **BIDDERS ARE TO SUBMIT ONE (1) ORIGINAL HARDCOPY RFQ RESPONSE WITH ORIGINAL INK SIGNATURES, AND ONE (1) COPY CONTAINING THE FOLLOWING IN THEIR ENTIRETY:**
  - **EXHIBIT A – RFQ RESPONSE PACKET**
    - **INCLUDING ALL REQUIRED DOCUMENTATION AS DESCRIBED IN "EXHIBIT A-REQUIRED DOCUMENTATION AND SUBMITTALS"**
- **ALL PRICES AND NOTATIONS MUST BE PRINTED IN INK OR TYPEWRITTEN; NO ERASURES ARE PERMITTED; ERRORS MAY BE CROSSED OUT AND CORRECTIONS PRINTED IN INK OR TYPEWRITTEN ADJACENT AND MUST BE INITIALED IN INK BY PERSON SIGNING THE RFQ RESPONSE.**

- **BIDDERS THAT DO NOT COMPLY WITH THE REQUIREMENTS, AND/OR SUBMIT AN INCOMPLETE RFQ RESPONSE MAY BE SUBJECT TO DISQUALIFICATION AND THEIR RFQ RESPONSE REJECTED IN TOTAL.**

- **IF BIDDERS ARE MAKING <u>ANY</u> CLARIFICATIONS AND/OR AMENDMENTS, OR TAKING EXCEPTION TO ANY PART OF THIS RFQ, THESE <u>MUST</u> BE SUBMITTED IN THE EXCEPTIONS, CLARIFICATIONS, AND AMENDMENTS SECTION OF THIS EXHIBIT A – RFQ RESPONSE PACKET. THE DISTRICT, AT ITS SOLE DISCRETION, MAY ACCEPT AMENDMENTS/EXCEPTIONS, OR MAY DEEM THEM TO BE UNACCEPTABLE, THEREBY RENDERING THE RFQ RESPONSE DISQUALIFIED.**

- **BIDDERS SHALL NOT MODIFY DISTRICT LANGUAGE IN ANY PART OF THIS RFQ OR ITS EXHIBITS, NOR SHALL THEY QUALIFY THEIR RFQ RESPONSE BY INSERTING THEIR OWN LANGUAGE OR FALSE CLAIMS IN THEIR RESPONSE. ANY EXCEPTIONS AND CLARIFICATIONS MUST BE PLACED IN THE "EXCEPTIONS/ CLARIFICATIONS" PAGE, NOT BURIED IN THE PROPOSAL ITSELF."**

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BIDDER INFORMATION AND ACCEPTANCE

1. The undersigned declares that all RFQ documents, including, without limitation, the RFQ, Addenda, and Exhibits, have been read and that the terms, conditions, certifications, and requirements are agreed to.

2. The undersigned is authorized to offer, and agrees to furnish, the articles and services specified in accordance with the RFQ documents.

3. The undersigned acknowledges acceptance of all addenda related to this RFQ.

4. The undersigned hereby certifies to the District that all representations, certifications, and statements made by the bidder, as set forth in this RFQ Response Packet and attachments, are true and correct and are made under penalty of perjury pursuant to the laws of California.

5. The undersigned acknowledges that the bidder is, and will be, in good standing in the State of California, with all the necessary licenses, permits, certifications, approvals, and authorizations necessary to perform all obligations in connection with this RFQ and associated RFQ documents.

6. It is the responsibility of each bidder to be familiar with all of the specifications, terms, and conditions and, if applicable, the site condition. By the submission of an RFQ response, the bidder certifies that if awarded a contract it will make no claim against the District based upon ignorance of conditions or misunderstanding of the specifications.

7. Patent indemnity: Contractors who do business with the District shall hold the District, its Directors, officers, agents, and employees, harmless from liability of any nature or kind, including cost and expenses, for infringement or use of any patent, copyright, or other proprietary right, secret process, patented or unpatented invention, article, or appliance furnished or used in connection with the contract or purchase order.

8. Insurance certificates are not required at the time of submission. However, by signing Exhibit A – RFQ Response Packet, the bidder agrees to meet the minimum insurance requirements stated in the RFQ. This documentation must be provided to the District prior to execution of an agreement by the District and shall include an insurance certificate which meets the minimum insurance requirements, as stated in the RFQ.

9. The undersigned acknowledges that RFQ responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFQ response or part thereof so marked. RFQ responses submitted in response to this RFQ may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

10. The undersigned bidder hereby submits this RFQ response and binds itself on award to the District under this RFQ to execute in accordance with such award a contract and to furnish the bond or bonds and insurance required by the RFQ. The RFQ, subsequent Addenda, bidder's Response Packet, and any attachments, shall constitute the Contract, and all provisions thereof are hereby accepted.

11. The undersigned acknowledges ***ONE*** of the following (please check only one box):

☐ Bidder is not an SBE and is ineligible for any bid preference; **OR**

☐ Bidder is an SBE or DVBE as described in the Contract Equity Program (CEP) and Equal Employment Opportunity (EEO) Guidelines, is requesting a 7% bid preference, and has completed the CEP and EEO forms at the hyperlink contained in the CEP and EEO section of this Exhibit A.

For additional information on SBE bid preference, please refer to the Contract Equity Program and Equal Employment Opportunity Guidelines at the above referenced hyperlink.

Official Name of Bidder (exactly as it appears on Bidder's corporate seal and invoice): _____

Street Address Line 1: _____

Street Address Line 2: _____

City: _____ State: _____ Zip Code: _____

Webpage: _____

Type of Entity / Organizational Structure (check one):

☐ Corporation ☐ Joint Venture

☐ Limited Liability Partnership ☐ Partnership

☐ Limited Liability Corporation ☐ Non-Profit / Church

☐ Other: _____

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification Number: _____

Department of Industrial Relations (DIR) Registration Number: _____

Primary Contact Information:

Name / Title: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Street Address Line 1: _____

City: _____ State: _____ Zip Code: _____

SIGNATURE: _____

Name and Title of Signer (printed): _____

Dated this _____ day of _____ 20_____

BIDDING SHEET

Cost shall be submitted on this Bid Form as is. The prices quoted shall not include Sales Tax or Use Tax; said tax, wherever applicable, will be paid by the District to the contractor, if licensed to collect, or otherwise directly to the State.

No alterations or changes of any kind to the Bid Form(s) are permitted. RFQ responses that do not comply may be subject to rejection in total. The cost quoted below shall be the cost the District will pay for the term of any contract that is a result of this RFQ process.

Quantities listed herein are annual estimates based on past usage and are not to be construed as a commitment. No minimum or maximum is guaranteed or implied.

Item	Description	Unit of Measure	Estimated Quantity	Unit Cost	Extended Cost
1.	High Performance Butterfly Valve – 16", Motorized Flanged, as specified within.	Each	1	$_____	$_____
2.	AWWA Ball Valve – 36", Motorized, as specified within.	Each	1	$_____	$_____
3.	AWWA Butterfly Valve – 16", Manually-Operated, Flanged, as specified within.	Each	2	$_____	$_____
4.	AWWA Butterfly Valve – 54", Manually-Operated, Buried, as specified within.	Each	1	$_____	$_____
5.	Magnetic Flowmeter – 36", Flanged, as specified within.	Each	1	$_____	$_____
				TOTAL COST	$_____

REQUIRED DOCUMENTATION AND SUBMITTALS

All of the specific documentation listed below is required to be submitted with the Exhibit A – RFQ Response Packet. Bidders shall submit all documentation, in the order listed below, and clearly label each section of the RFQ response with the appropriate title (i.e. Table of Contents, Letter of Transmittal, Key Personnel, etc.).

1. **Description of the Proposed Equipment/System**: RFQ response shall include a description of the proposed equipment/system, as it will be finally configured during the term of the contract. The description shall specify how the proposed equipment/system will meet or exceed the requirements of the District and shall explain any advantages that this proposed equipment/system would have over other possible equipment/systems. The description shall include any disadvantages or limitations that the District should be aware of in evaluating the RFQ response. Finally, the description shall describe all product warranties provided by bidder.

2. **Implementation Plan and Schedule**: The RFQ response shall include an implementation plan and schedule. The plan for implementing the proposed equipment/system and services shall include an Acceptance Test Plan. In addition, the plan shall include a detailed schedule indicating how the bidder will ensure adherence to the timetables for the final equipment/system and/or services.

3. **Evidence of Qualification Testing**: RFQ response provides evidence that the proposed equipment/system has successfully completed the qualification test standard requirements defined in this RFQ. Evidence shall include a statement from an Independent Testing Authority (ITA) that both the hardware elements and the software elements of the proposed equipment/system comply with the requirements of the qualification standard. If the equipment/system specified requires the addition of components or features not previously tested by the ITA, the District will determine, in its sole discretion, whether qualification testing of such components or features will be required prior to the award of a contract.

4. **Sustainability Statement:** Contractors shall submit a statement regarding any sustainable or environmental initiatives or practices that they or their suppliers engage in. This information can be in relation to the specific products procured under this RFQ or in relation to the manufacture, delivery, or office practices of your firm.

   If applicable, please also provide any information you have available on the below:

   a. Has your firm taken steps to enhance its ability to assess, track and address issues regarding Greenhouse Gas (GHG) Emissions in answer to recent legislations such as the Buy Clean California Act? If so, please attach any data you can on the embedded greenhouse gas emissions in the production and transport of the products and/or

services which will be provided via this RFQ. If this is not available, please describe the approach you plan to take in order to gather and report this information in the future. For further information in this topic, please see: http://www.ghgprotocol.org/scope-3-technical-calculation-guidance

5. **Evidence of current NSF 60 and/or 61 certification:**

6. **References:**

(a) Bidders must use the templates in the "References" section of this Exhibit A – RFQ Response Packet to provide references.

(b) References should have similar scope, volume, and requirements to those outlined in these specifications, terms, and conditions.

- Bidders must verify the contact information for all references provided is current and valid.
- Bidders are strongly encouraged to notify all references that the District may be contacting them to obtain a reference.

(c) The District may contact some or all of the references provided in order to determine Bidder's performance record on work similar to that described in this RFQ. The District reserves the right to contact references other than those provided in the RFQ response.

7. **Exceptions, Clarifications, Amendments:**

(a) The RFQ response shall include a separate section calling out all clarifications, exceptions, and amendments, if any, to the RFQ and associated RFQ documents, which shall be submitted with Bidder's RFQ response using the template in the "Exceptions, Clarifications, Amendments" section of this Exhibit A – RFQ Response Packet.

(b) **THE DISTRICT IS UNDER NO OBLIGATION TO ACCEPT ANY EXCEPTIONS, AND SUCH EXCEPTIONS MAY BE A BASIS FOR RFQ RESPONSE DISQUALIFICATION.**

8. **Contract Equity Program:**

(a) Every bidder must fill out, sign, and submit the appropriate sections of the Contract Equity Program and Equal Employment Opportunity documents located at the hyperlink contained in the last page of this Exhibit A. Special attention should be given to completing Form P-25, "Contractor Employment Data and Certification". Any bidder needing assistance in completing these forms should contact the District's Contract Equity Office at (510) 287-0114 prior to submitting an RFQ response.

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REFERENCES

RFQ No. 2305 – LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION

Bidder Name: ________________________________

Bidder must provide a minimum of five (5) references.

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

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EXCEPTIONS, CLARIFICATIONS, AMENDMENTS

RFQ No. 2305 - LARGE DIAMETER VALVES FOR 82ND AVE RATE CONTROL STATION

Bidder Name: _____

List below requests for clarifications, exceptions, and amendments, if any, to the RFQ and associated RFQ Documents, and submit with bidder's RFQ response. **The District is under no obligation to accept any exceptions and such exceptions may be a basis for RFQ response disqualification.**

Reference to:			Description
Page No.	Section	Item No.	
p. 23	**D**	**1.c.**	***Bidder takes exception to…***

*Print additional pages as necessary

CONTRACT EQUITY PROGRAM & EQUAL EMPLOYMENT OPPORTUNITY

The District's Board of Directors adopted the Contract Equity Program (CEP) to enhance equal opportunities for business owners of all races, ethnicities, and genders who are interested in doing business with the District. The program has contracting objectives, serving as the minimum level of expected contract participation for the three availability groups: white-men owned businesses, white-women owned businesses, and ethnic minority owned businesses. The contracting objectives apply to all contracts that are determined to have subcontracting opportunities, and to all contractors regardless of their race, gender, or ethnicity.

All Contractors and their subcontractors performing work for the District must be Equal Employment Opportunity (EEO) employers and shall be bound by all laws prohibiting discrimination in employment. There shall be no discrimination against any person, or group of persons, on account of race, color, religion, creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, or sexual orientation.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

All Contractors shall include the nondiscrimination provisions above in all subcontracts.
Please include the required completed forms with your bid.
Non-compliance with the Guidelines may deem a bid non-responsive, and therefore, ineligible for contract award. Your firm is responsible for:

1) Reading and understanding the CEP guidelines.

2) Filling out and submitting with your bid the appropriate forms.

   The CEP guidelines and forms can be found at the following direct link:
   Contract Equity Guidelines and Forms

   The CEP guidelines and forms can also be downloaded from the District website at the following link:
   http://ebmud.com/business-center/contract-equity-program/

If you have questions regarding the Contract Equity Program, please call (510) 287-0114.

EXHIBIT B
INSURANCE REQUIREMENTS

BIDDER shall take out and maintain during the life of the Agreement all insurance required and BIDDER shall not commence work until such insurance has been approved by DISTRICT. The proof of insurance shall be on forms provided by DISTRICT directly following these Insurance Requirements.

BIDDERS are not required to submit completed insurance verification documents with their bid but will be required to submit them upon notification of award. By signing Exhibit A – RFP Response Packet, the BIDDER agrees to meet the minimum insurance requirements stated in the RFP.

The following provisions are applicable to all required insurance:

A. Prior to the beginning of and throughout the duration of Services, and for any additional period of time as specified below, CONTRACTOR shall, at its sole cost and expense, maintain insurance in conformance with the requirements set forth below.

B. CONTRACTOR shall provide Verification of Insurance as required by this Agreement by providing the completed Verification of Insurance as requested below signing and submitting this Exhibit B to the DISTRICT. The Exhibit B may be signed by an officer of the CONTRACTOR (Agent) or by the Insurance Broker for the CONTRACTOR. CONTRACTOR shall update Exhibit B throughout the specified term of the insurance required by this Agreement by resubmitting the completed Exhibit B prior to the expiration date of any of the required insurance. The updated Exhibit B shall become a part of the Agreement but shall not require a change order to the Agreement. The Notice to Proceed shall not be issued, and CONTRACTOR shall not commence Services until such insurance has been accepted by the DISTRICT.

C. CONTRACTOR shall carry and maintain the minimum insurance requirements as defined in this Agreement. CONTRACTOR shall require any subcontractor to carry and maintain the minimum insurance required in this Agreement to the extent they apply to the scope of the services to be performed by subcontractor.

D. Acceptance of verification of Insurance by the DISTRICT shall not relieve CONTRACTOR of any of the insurance requirements, nor decrease liability of CONTRACTOR.

E. The insurance required hereunder may be obtained by a combination of primary, excess and/or umbrella insurance, and all coverage shall be at least as broad as the requirements listed in this Agreement.

F. Any deductibles, self-insurance, or self-insured retentions (SIRs) applicable to the required insurance coverage must be declared to and accepted by the DISTRICT.

G. At the option and request of the DISTRICT, CONTRACTOR shall provide documentation of its financial ability to pay the deductible, self-insurance, or SIR.

H. Any policies with a SIR shall provide that any SIR may be satisfied, in whole or in part, by the DISTRICT or the additional insured at its sole and absolute discretion.

I. Unless otherwise accepted by the DISTRICT, all required insurance must be placed with insurers with a current A.M. Best's rating of no less than A- V.

J. CONTRACTOR shall defend the DISTRICT and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier.

K. For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified) the retroactive date must be shown and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.

L. Insurance must be maintained, and updated Verification of Insurance be provided to the DISTRICT before the expiration of insurance by having CONTRACTOR's insurance broker or agent update, sign and return Exhibit B to the DISTRICT's contract manager. For all claims-made policies the updated Verification of Insurance must be provided to the DISTRICT for at least three (3) years after expiration of this Agreement.

M. If claims-made coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the effective date of this Agreement or the start of any Services related to this Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after expiration of the Agreement.

N. If requested by the DISTRICT, a copy of the policies' claims reporting requirement must be submitted to the DISTRICT for review.

O. Where additional insured coverage is required, the additional insured coverage shall be "primary and non-contributory," and will not seek contribution from the DISTRICT's insurance or self-insurance.

P. CONTRACTOR agrees to provide immediate Notice to the DISTRICT of any loss or claim against CONTRACTOR arising out of, pertaining to, or in any way relating to this Agreement, or Services performed under this Agreement. The DISTRICT assumes no obligation or liability by such Notice but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve the DISTRICT.

Q. CONTRACTOR agrees, upon request by the DISTRICT, to provide complete, certified copies of any policies and endorsements within 10 days of such request (copies of policies may be redacted to eliminate premium details.)

R. It is CONTRACTOR's responsibility to ensure its compliance with the insurance requirements. Any actual or alleged failure on the part of the DISTRICT to obtain proof of insurance required under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard.

S. Notice of Cancellation/Non-Renewal/Material Reduction The insurance requirements hereunder are mandatory, and the DISTRICT may, at its sole and absolute discretion, terminate the services provided by CONTRACTOR, should CONTRACTOR breach its obligations to maintain the required coverage and limits set forth in this Agreement. No coverage required hereunder shall be cancelled, non-renewed or materially reduced in coverage or limits without the DISTRICT being provided at least thirty (30) days prior written notice, other than cancellation for the non-payment of premiums, in which event the DISTRICT shall be provided ten (10) days prior written notice. Replacement of coverage with another policy or insurer, without any lapse in coverage or any reduction of the stated requirements does not require notice beyond

submission to the DISTRICT of an updated Verification of Insurance which shall be met by having the CONTRACTOR's insurance broker or agent update, sign and return this EXHIBIT B.

I. Workers' Compensation and Employer's Liability Insurance Coverage

A. Workers' Compensation insurance including Employer's Liability insurance with minimum limits as follows:

Coverage A. Statutory Benefits Limits

Coverage B. Employer's Liability of not less than:

Bodily Injury by accident:	$1,000,000 each accident
Bodily Injury by disease:	$1,000,000 each employee
Bodily Injury by disease:	$1,000,000 policy limit

B. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

C. If there is an onsite exposure of injury to CONTRACTOR, subcontractor, and/or subcontractor's employees under the U.S. Longshore and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations or statutes applicable to maritime employees, coverage is required for such injuries or claims.

D. If CONTRACTOR is self-employed, a sole proprietorship or a partnership, with no employees, and is exempt from carrying Workers' Compensation Insurance, CONTRACTOR must return the completed Verification of Insurance confirming that CONTRACTOR has no employees and is exempt from the State of California Workers' Compensation requirements.

E. If CONTRACTOR is self-insured with respect to Workers' Compensation coverage, CONTRACTOR shall provide to the DISTRICT a Certificate of Consent to Self-Insure from the California Department of Industrial Relations. Such self-insurance shall meet the minimum limit requirements and shall waive subrogation rights in favor of the DISTRICT as stated below in section "F."

F. Waiver of Subrogation. Workers' Compensation policies, including any applicable excess and umbrella insurance, must contain a waiver of subrogation endorsement providing that CONTRACTOR and each insurer waive any and all rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind arising out of, pertaining to, or in any way relating to CONTRACTOR's failure to provide waiver of subrogation from the insurance carrier.

INSURANCE VERIFICATION DOCUMENTS

Verification of Workers' Compensation and Employer's Liability Insurance Coverage

☐ **By checking the box and signing below, I hereby verify that the CONTRACTOR is exempt from the State of California's requirement to carry workers' compensation insurance.**

As the CONTRACTOR's insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries workers' compensation insurance as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured Retention Amount: $_____

Policy Limit: $_____

Policy Number: _____

Policy Period: from: _____ to: _____

Insurance Carrier Name:_____

Insurance Broker or Agent: Print Name:_____

Insurance Broker or Agent's Signature: _____

II. Commercial General Liability Insurance ("CGL") Coverage

A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

C. Minimum Requirements. CGL insurance with minimum per occurrence and aggregate limits as follows:

Bodily Injury and Property Damage	$2,000,000 per occurrence & aggregate
Personal Injury/Advertising Injury	$2,000,000 per occurrence & aggregate
Products/Completed Operations	$2,000,000 per occurrence & aggregate

D. Coverage must be on an occurrence basis.

E. Coverage for Products, and Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any "prior work" coverage limitation or exclusion applicable to any Services performed by CONTRACTOR and/or subcontractor under this Agreement.

F. Insurance policies and Additional Insured Endorsement(s) Coverage shall be included for all premises and operations in any way related to this Agreement.

G. There will be no exclusion for explosions, collapse, or underground liability (XCU).

H. Insurance policies and Additional Insured Endorsement(s) shall not exclude liability and damages to work arising out of, pertaining to, or in any way relating to services performed by Subcontractor on CONTRACTOR's behalf.

I. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an "insured contract."

J. Waiver of Subrogation. The policy shall be endorsed to include a Waiver of Subrogation ensuring that the CONTRACTOR and its insurer(s) waive any rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, agents, volunteers, and employees. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind, arising out of, pertaining to, or in any way resulting from CONTRACTOR's failure

to provide the waiver of subrogation from its insurance carrier(s).

K. "Independent CONTRACTOR's Liability" shall not limit coverage for liability and/or damages arising out of, pertaining to, or in any way resulting from Services provided under this Agreement.

To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional Insureds on a primary and noncontributory basis on all underlying, excess and umbrella policies that shall be evidenced in each case by an endorsement. The Additional Insureds must be covered for liability arising in whole, or in part, from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

L. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made, or suit is brought, except with respect to the policies' limit(s).

Verification of Commercial General Liability (CGL) Insurance Coverage

As the CONTRACTOR'S insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Commercial General Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured: Amount: $_____

Policy Limit: Per Occurrence: $_____ **Aggregate: $**_____

Policy Number: _____

Policy Period: from:_____**to:** _____

Insurance Carrier Name:_____

Insurance Broker or Agent: Print Name:_____

Insurance Broker or Agent's Signature: _____

III. Business Auto Liability Insurance Coverage

CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

A. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

B. Minimum Requirements. Auto insurance with minimum coverage and limits as follows:
Each Occurrence Limit (per accident) and in the Aggregate: $2,000,000
Bodily Injury and Property Damage: $2,000,000

C. Coverage must include either "owned, non-owned, and hired" autos or "any" automobile

This provision ensures the policy covers losses arising out of use of company-owned vehicles ("owned autos"), employee's personal autos ("non-owned autos" meaning not owned by company/insured) or autos that are rented or leased ("hired autos").

D. If CONTRACTOR is transporting hazardous materials or contaminants, evidence of the Motor Carrier Act Endorsement-hazardous materials clean-up (MCS-90, or its equivalent) must be provided.

E. If CONTRACTOR's Scope of Services under this Agreement exposes a potential pollution liability risk related to transport of potential pollutants, seepage, release, escape or discharge of any nature (threatened or actual) of pollutants into the environment arising out of, pertaining to, or in any way related to CONTRACTOR's and/or Subcontractor's performance under this Agreement, then Auto Liability Insurance policies must be endorsed to include Transportation Pollution Liability insurance. Alternatively, coverage may be provided under the CONTRACTOR's Pollution Liability Policies if such policy has no exclusions that would restrict coverage under this Agreement. Coverage shall also include leakage of fuel or other "pollutants" needed for the normal functioning of covered autos.

F. To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional Insureds on a primary and noncontributory basis on all underlying and excess and umbrella policies. The Additional Insureds must be covered for liability arising in whole, or in part, from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

G. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made, or suit is brought, except with respect to the insurer's limits of liability.

Verification of Business Auto Liability Insurance Coverage

As the CONTRACTOR'S insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Business Automobile Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured: Amount: $_____

Policy Limit: Per Accident/Occurrence $_____Aggregate: $_____

Policy Number: _____

Policy Period: from:_____to: _____

Insurance Carrier Name:_____

Insurance Broker or Agent: Print Name:_____

Insurance Broker or Agent's Signature: _____

IV. Excess and/or Umbrella Liability Insurance Coverage

A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

C. Minimum Requirements: It is expressly understood by the parties that CONTRACTOR's Excess and/or Umbrella Liability policies shall, at minimum, comply with all insurance requirements set forth within this Agreement.

1. Coverage for Products, Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any "prior work" coverage limitation or exclusion applicable to any Services performed under this Agreement and, if it is a claims-made policy, it must be maintained for a minimum of three (3) years following final completion of the Services.

2. Coverage shall be included for all premises and operations in any way related to this Agreement.

3. There will be no exclusion for explosions, collapse, or underground damage (XCU).

4. Insurance policies and Additional Insured Endorsements shall not exclude coverage for liability and damages from services performed by Subcontractor on CONTRACTOR's behalf.

5. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an "insured contract."

6. "Independent CONTRACTOR's Liability" shall not limit coverage for liability and/or damage arising out of, pertaining to, or in any way related to Services provided under this Agreement.

7. To the fullest extent permitted by law, the DISTRICT, its directors, officers, officials, agents, volunteers, and employees must be covered as Additional Insureds on a primary and noncontributory basis on all excess and umbrella policies. The Additional Insureds must be covered for liability arising in whole or in part from any premises, Products, Ongoing

Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

8. A severability of interest provision must apply for all the Additional Insureds, ensuring that the CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the policy's limits.

9. CONTRACTOR and its excess and/or umbrella Liability insurance coverage must waive any rights of subrogation against the DISTRICT, its directors, officers, officials, employees, agents, and volunteers, and CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).

D. CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).

Verification of Excess and/or Umbrella Liability Insurance Coverage

As the CONTRACTOR'S insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Excess and/or Umbrella Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured: Amount: $_____

Policy Number: _____

Policy Period: from:_____ to: _____

Insurance Carrier Name:_____

Insurance Broker or Agent: Print Name:_____

Insurance Broker or Agent's Signature: _____

EXHIBIT C

GENERAL REQUIREMENTS

Effective: June 9, 2021
Supersedes: September 1, 2021

CONTENTS

1. DEFINITIONS

The following terms shall be given the meaning shown, unless context requires otherwise or a unique meaning is otherwise specified.

a. **"Change Order"** A Change Order is a written instrument used for modifying the contract with regards to the scope of Work, contract sum, and/or Contract Time. An approved

Change Order is a Change Order signed by the District. An executed Change Order is a Change Order signed by both the District and the Contractor.

b. **"Contract"** means the agreement between the District and Contractor as memorialized in the Contract Documents.

c. **"Business Entity"** means any individual, business, partnership, joint venture, corporation, sole proprietorship, or other private legal entity recognized by statute.

d. **"Buyer"** means the District's authorized contracting official.

e. **"Contract Documents"** comprise the entire agreement between the District and the Contractor and can include the District's contract form if used, any purchase order, RFP, RFQ or Contractor response packet, and any addenda, appendices and District approved changes or amendments. The Contract Documents are intended to be complementary and include all items necessary for the Contractor's proper execution and completion of the Work. Any part of the Work not shown or mentioned in the Contract Documents that is reasonably implied, or is necessary or usual for proper performance of the Work, shall be provided by the Contractor at its expense.

f. **"Contractor"** means the Business Entity with whom the District enters into a contractual agreement. Contractor shall be synonymous with "supplier", "vendor", "consultant" or other similar term.

g. **"Day"** unless otherwise specified, days are calendar days, measured from midnight to the next midnight.

h. **"District"** means the East Bay Municipal Utility District, its employees acting within the scope of their authority, and its authorized representatives.

i. **"Goods"** means off the shelf software and all types of tangible personal property, including but not limited to materials, supplies, and equipment.

j. **"Project Manager"** shall be the District designated individual responsible for administering and interpreting the terms and conditions of the Contract Documents, for matters relating to the Contractor's performance under the Contract with the District, and for liaison and coordination between the District and Contractor.

k. **"Work"** means all labor, tasks, materials, supplies, and equipment required to properly fulfill the Contractor's obligations as required in the Contract Documents.

l. **"Work Day"** Unless otherwise specified, work day includes all days of the year except Saturdays, Sundays and District holidays.

2. BOND

a. When required in the District's bid or proposal solicitation documents, the Contractor to whom award is made shall furnish a good and approved faithful performance bond and/or payment bond within ten business days after receiving the forms for execution.

b. The bonds shall be executed by a sufficient, admitted surety insurer (i.e.: as listed on website http://interactive.web.insurance.ca.gov/webuser/idb_co_list$.startup) admitted to transact such business in California by the California Department of Insurance. After acceptance of the bond(s) by the District, a copy of the bond(s) will be returned to the Contractor.

c. If, during the continuance of the Contract, any of the sureties, in the opinion of the District, are or become irresponsible, the District may require other or additional sureties, which the Contractor shall furnish to the satisfaction of the District within ten days after notice. If the Contractor fails to provide satisfactory sureties within the ten-day period, the Contract may be terminated for cause under Article 18.

3. CONTRACTOR'S FINANCIAL OBLIGATION

The Contractor shall promptly make payments to all persons supplying labor and materials used in the execution of the contract.

4. SAMPLES OR SPECIMENS

The Contractor shall submit samples or prepare test specimens of such materials to be furnished or used in the work as the Project Manager may require.

5. MATERIAL AND WORKMANSHIP

a. All goods and materials must be new and of the specified quality and equal to approved sample, if samples have been required. In the event any goods or materials furnished or services provided by the Contractor in the performance of the Contract fail to conform to the requirements, or to the sample submitted by the Contractor, the District may reject the same, and it shall become the duty of the Contractor to reclaim and remove the item promptly or to correct the performance of services, without expense to the District, and immediately replace all such rejected items with others conforming to the Contract. All work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission from these specifications or the drawings, and it shall be the duty of the Contractor to call attention to apparent errors or omissions and request instructions before proceeding with the work. The Project Manager may, by appropriate instructions, correct errors and supply omissions, which instructions shall be binding upon the Contractor as though contained in the original Contract Documents.

b. All materials furnished and all Work must be satisfactory to the Project Manager. Work, material, or machinery not in accordance with the Contract Documents, in the opinion of the Project Manager, shall be made to conform.

6. DEFECTIVE WORK

The Contractor shall replace at its own expense any part of the work that has been improperly executed, as determined by the Project Manager. If Contractor refuses or neglects to replace such defective work, it may be replaced by the District at the expense of the Contractor, and its sureties shall be liable therefor.

7. WARRANTY

Contractor expressly warrants that all goods furnished will conform strictly with the specifications and requirements contained herein and with all approved submittals, samples and/or models and information contained or referenced therein, all affirmations of fact or promises, and will be new, of merchantable quality, free from defects in materials and workmanship, including but not limited to leaks, breaks, penetrations, imperfections, corrosion, deterioration, or other kinds of product deficiencies. Contractor expressly warrants that all goods to be furnished will be fit and sufficient for the purpose(s) intended. Contractor expressly warrants that all goods shall be delivered free from any security interest, lien or encumbrance of any kind, and free from any claim of infringement, copyright or other intellectual property violation, or other violation of laws, statutes, regulations, ordinances, rules, treaties, import restrictions, embargoes or other legal requirements. Contractor guarantees all products and services against faulty or inadequate design, manufacture, negligent or improper transport, handling, assembly, installation or testing, and further guaranties that there shall be strict compliance with all manufacturer guidelines, recommendations, and requirements, and that Contractor guaranties that it will conform to all requirements necessary to keep all manufacturer warranties and guarantees in full force and effect. These warranties and guarantees are inclusive of all parts, labor and equipment necessary to achieve strict conformance, and shall take precedence over any conflicting warranty or guarantee. These warranties and guaranties shall not be affected, limited, discharged or waived by any examination, inspection, delivery, acceptance, payment, course of dealing, course of performance, usage of trade, or termination for any reason and to any extent. In the absence of any conflicting language as to duration, which conflicting language will take precedence as being more specific, Contractor's aforesaid warranties and guarantees shall be in full force and effect for a period of one year from the date of acceptance by the District, but shall continue in full force and effect following notice from District of any warranty or guarantee issue, until such issue has been fully resolved to the satisfaction of District.

8. NOT USED

9. SAFETY AND ACCIDENT PREVENTION

In performing work under the Contract on District premises, Contractor shall conform to any specific safety requirements contained in the Contract or as required by law or regulation. Contractor shall take any additional precautions as the District may reasonably require for safety and accident prevention purposes. Any violation of such rules and requirements, unless promptly corrected, shall be grounds for termination of this Contract or Contractor's right to precede in accordance with the default provisions of the Contract Documents.

10. CHARACTER OF WORKFORCE

The Contractor shall employ none but skilled competent qualified personnel to perform the Work, and shall maintain discipline and order in the conduct of the Work at all times.

11. PREVAILING WAGES & DIR REGISTRATION

a. Please see www.dir.ca.gov for further information regarding the below.

b. All Contractors and Subcontractors of any tier bidding on, or offering to perform work on a public works project shall first be registered with the State Department of Industrial Relations (DIR) pursuant to Section 1725.5 of the Labor Code. No bid will be accepted nor any contract entered into without proof of the Contractor and Subcontractors' current registration with the DIR (LC § 1771.1).

c. All public works projects awarded after January 1, 2015, are subject to compliance monitoring and enforcement by the DIR (LC § 1771.4) and all Contractors are required to post job site notices, "as prescribed by regulation" (LC § 1771.4).

d. To the extent applicable, pursuant to Section 1773 of the Labor Code, the District has obtained from the Director of Industrial Relations of the State of California, the general prevailing rates of per diem wages and the general prevailing rates for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification, or type of worker needed to execute the contract. Pursuant to Section 1773.2 of the Labor Code, a copy of the prevailing wage rates is on file with the District and available for inspection by any interested party at www.dir.ca.gov.

e. The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the Work.

f. The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code.

g. Pursuant to Section 1774 of the Labor Code, the Contractor and any of its Subcontractors shall not pay less than the specified prevailing rate of wages to all workers employed in the execution of the contract.

h. As set forth with more specificity in Section 1773.1 of the Labor Code, "per diem" wages include employer payments for health and welfare, pension, vacation, travel, subsistence and, in certain instances, apprenticeship or other training programs, and shall be paid at the rate and in the amount spelled out in the pertinent prevailing wage determinations issued by the Director of Industrial Relations.

i. The Contractor shall, as a penalty to the State or the District, forfeit not more than the maximum set forth in Section 1775 of the Labor Code for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for the work or craft in which the worker is employed under the contract by the Contractor or by any Subcontractor under him. The difference between the prevailing wage rates and the amount paid to

each worker for each calendar day or portion thereof for which such worker was paid less than the stipulated prevailing wage rate shall be paid to such worker by the Contractor.

j. The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of its payment of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at its own expense.

k. General prevailing wage determinations have expiration dates with either a single asterisk or a double asterisk. Pursuant to California Code of Regulations, Title 8, Section 16204, the single asterisk means that the general prevailing wage determination shall be in effect for the specified contract duration. The double asterisk means that the predetermined wage modification shall be paid after the expiration date. No adjustment in the Contract Sum will be made for the Contractor's payment of these predetermined wage modifications.

12. PAYROLL RECORDS & ELECTRONIC SUBMISSION

If prevailing wages apply, Contractor and each Subcontractor, as appropriate, shall comply with the following:

a. Contractor and each Subcontractor shall keep an accurate payroll record, 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. The payroll records shall be certified and shall be available for inspection in accordance with the provisions of Section 1776 of the Labor Code. Certified payroll records shall be on the forms provided by the DIR or contain the same information required on the Department's form.

b. The Contractor shall submit for each week in which any contract Work is performed a copy of all payroll records to the Project Manager. The Contractor shall be responsible for submission of copies of payroll records of all Subcontractors.

c. The Contractor or Subcontractor shall certify the payroll records as shown on the DIR form. In addition, the records shall be accompanied by a statement signed by the Contractor or Subcontractor certifying that the classifications truly reflect the Work performed and that the wage rates are not less than those required to be paid.

d. For public works projects awarded on or after April 1, 2015, or that are still ongoing after April 1, 2016, no matter when awarded, each Contractor and Subcontractor shall furnish the certified payroll related records as more specifically described above and in Labor Code section 1776 directly to the Labor Commissioner (see LC § 1771.4). These records shall be provided to the Labor Commissioner at least monthly or more frequently if required by the terms of the Contract. For exception on projects covered by collective bargaining agreements like a PLA, please see Labor Code section 1771.4.

e. In the event of noncompliance with the requirements of Section 1776 of the Labor Code, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with said Section. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1776 of the Labor Code for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.

f. The Contractor and every Subcontractor shall post at the workplace and comply with all required wage related workplace postings. Copies of the required postings may be downloaded or ordered electronically from the Department of Industrial Relations website at http://www.dir.ca.gov/wpnodb.html.

13. HOURS OF LABOR

Pursuant to the provisions of Sections 1810, et seq. of the Labor Code and any amendments thereof:

a. Eight hours of labor constitutes a legal day's Work under the contract.

b. The time of service of any worker employed upon the work shall be limited and restricted to eight hours during any one calendar day, and forty hours during any one calendar week except as provided in Article 13.iv below.

c. The Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1813 of the Labor Code for each worker employed in the execution of the contract by the Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any calendar day and forty hours in any one calendar week in violation of this Article and the provisions of Labor Code, Sections 1810, et seq.

d. Work performed by employees of the Contractor in excess of eight hours per day, and forty hours during any one calendar week, shall be permitted upon compensation for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay.

e. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the Work; the record shall be kept open at all reasonable hours to the inspection of the District and to the Division of Labor Standards Enforcement of the State of California.

14. EMPLOYMENT OF APPRENTICES

a. In the performance of the contract, the Contractor and any Subcontractor shall comply with the provisions concerning the employment of apprentices in Section 1777.5 of the Labor Code and any amendments thereof.

b. In the event the Contractor or any Subcontractor willfully fails to comply with the aforesaid section, such Contractor or Subcontractor shall be subject to the penalties for noncompliance in Labor Code, Section 1777.7.

15. CHANGES

a. Changes in the Work can only be made in writing signed by an authorized employee of the District. If the change causes an increase or decrease in the contract sum, or a change in the time for performance under the Contract, an adjustment may be made as determined by the Project Manager.

b. The District reserves the right to make changes in the design of materials, equipment, or machinery, to make alterations or additions to or deviations or subtractions from the Contract and any specifications and drawings, to increase or decrease the required quantity of any item or portion of the Work or to omit any item or portion of the Work, as may be deemed by the Project Manager to be necessary or advisable and to order such extra work as may be determined by the Project Manager to be required for the proper execution and completion of the whole Work contemplated. Any such changes will be ordered in writing by the Project Manager. The determination of the Project Manager on all questions relating to changes, including extra work, shall be conclusive and binding.

c. Prior to issuing an amendment or change to the Contract, the Project Manager may request that the Contractor submit a proposal covering the changes. Within 10 business days of receiving the request, the Contractor shall submit its proposal to the Project Manager of all costs associated with the proposed amendment or change and any request for an extension of Contract time. Contractor's proposal shall include detailed estimates with cost breakdowns, including labor, material, equipment, overhead, and profit. Labor shall be broken down into hours and rate per hour. If applicable, the proposal shall include a breakdown for off-site labor (including factory labor, engineering, etc.). The Contractor's proposal shall include an analysis of schedule impact when the Contractor is requesting an adjustment in contract time. The Contractor shall be responsible for any delay associated with its failure to submit its change proposal within the time specified. If the Project Manager decides not to issue an amendment or change after requesting a proposal from the Contractor, the Contractor will be notified in writing. The Contractor is not entitled to reimbursement for Change Order preparation costs if the Contractor's proposal is not accepted by the Project Manager.

d. If the Contractor agrees with the terms and conditions of the approved Change Order, the Contractor shall indicate its acceptance by signing the original copy and returning it to the Project Manager within 10 Work Days after receipt or with reasonable promptness and in such sequence as to not delay the Work or activities of the District or of separate contractors, whichever is sooner. If notice of any change is required to be given to a surety by the provisions of any bond, the Contractor shall provide notice and the amount of each applicable bond shall be adjusted separately. Payment in

accordance with the terms and conditions set forth in the executed Change Order shall constitute full compensation for all Work included in the Change Order and the District will be released from any and all claims for direct, indirect, and impact expenses and additional time impact resulting from the Work. If the Contractor disagrees with the terms and conditions of the approved Change Order, the Contractor shall indicate specific areas of disagreement and return the approved Change Order to the Project Manager with a detailed written dispute. No payment will be made on the disputed work until the approved Change Order is returned to the Project Manager. However, whether or not the Contractor agrees with the terms and conditions of an approved Change Order, the Contractor shall immediately revise its sequence of operations as required to facilitate timely completion of the changed work and shall proceed with the revised work sequence.

e. The Project Manager may, after having received a written cost quotation from the Contractor, order the Contractor, in writing, to proceed with the work prior to issuance of an approved Change Order through a change directive. The change directive will authorize the Contractor to proceed with the work subject to the cost quotation submitted by the Contractor. Within five days following receipt of the change directive, the Contractor shall submit a detailed change proposal documenting the amount of compensation. The Project Manager will review the change proposal and, at its option, will either issue an approved Change Order for the work or direct the Contractor to perform the work through Force Account. Until the method of compensation is determined and the approved Change Order is received, the Contractor shall keep full and complete time and material records of the cost of the ordered work and shall permit the Project Manager to have access to such records. An approved Change Order shall supersede any previously issued written change directive covering the same Work.

16. EFFECT OF EXTENSIONS OF TIME

The granting, or acceptance, of extensions of time to complete the Work or furnish the labor, supplies, materials or equipment, or any one of the aforementioned, will not operate as a release of Contractor or the surety on Contractor's faithful performance bond.

17. DELAYS

a. The Contractor shall take reasonable precautions to foresee and prevent delays to the Work. When the Contractor foresees a delay event, and upon the occurrence of a delay event, the Contractor shall immediately notify the Project Manager of the probability or the actual occurrence of a delay, and its cause. With respect to all delays (compensable, excusable or inexcusable), the Contractor shall reschedule the Work and revise its operations, to the extent possible, to mitigate the effects of the delay. Within 15 days from the beginning of a delay the Contractor shall provide the Project Manager with a detailed written description of the delay, its cause, its impact and the Contractor's mitigation plans. Failure to provide the notification required above waives the Contractor's right to any additional time or compensation resulting from the delay for whatever cause. The Project Manager will investigate the facts and ascertain the extent of the delay, and the Project Manager's findings thereon shall be final and conclusive, except in the case of gross error. An extension of time must be approved by the Project Manager to be effective, but an extension of time, whether with or without consent of

the sureties, shall not release the sureties from their obligations, which shall remain in full force until the discharge of the contract.

b. For inexcusable delays (delays caused by circumstances within the Contractor's control, the control of its subcontractors or supplies of any tier, or within the scope of the Contractor's contract responsibilities) the Contractor shall not be entitled to an extension of time or additional compensation for any loss, cost, damage, expense or liability resulting directly or indirectly from the inexcusable delay.

c. For excusable delays (delays to completion of the Work within the time limits set forth in the Contract Documents directly caused by events beyond the control of both the Contractor and the District, which delay is not concurrent with an inexcusable delay and which could not have been avoided by the Contractor through reasonable mitigation measures the Project Manager will grant the Contractor an extension of time in an amount equal to the period of Excusable Delay based on the analysis of schedule impact and delay analysis diagram, which shall be the Contractor's sole and exclusive remedy for such delay. Excusable Delays shall include labor strikes, adverse weather as defined in Article 8.5, and Acts of God.

d. For compensable delays (delays to completion of the Work within the time limits set forth in the Contract Documents that could not be avoided by Contractor mitigation, caused directly and solely by the District or by causes within the exclusive control of the District, and which were not concurrent with any other type of delay) the Project Manager will grant the Contractor an extension of the time to perform under the Contract and compensation in an amount that represents the Contractor's actual direct costs incurred as a direct result of the compensable delay. The Contractor may recover its direct costs only and may not recover (and waives) all other types of indirect, consequential, special and incidental damages.

e. For concurrent delays (two or more independent causes of delay directly preventing the Contractor from completing the Work within the time limits set forth in the Contract Documents where the delays occur at the same time during all or a portion of the delay period being considered, and where each of the delays would have caused delay to the

Contractor even in the absence of any of the other delays, and none of the delays could have been avoided by Contractor mitigations) the following rules apply:

i. One or more of the concurrent delays are excusable or compensable, then the period of concurrent delay will be treated as an excusable delay; and

ii. All of the concurrent delays are inexcusable, then the period of concurrent delay will be inexcusable.

18. TERMINATION

a. Termination by the District for Cause:

i. District may terminate the Contractor's right to proceed under the Contract, in whole or in part, for cause at any time after the occurrence of any of the following events, each of which constitutes a default:

1. The Contractor becomes insolvent or files for relief under the bankruptcy laws of the United States.

2. The Contractor makes a general assignment for the benefit of its creditors or fails to pay its debts as the same become due.

3. A receiver is appointed to take charge of the Contractor's property.

4. The Contractor fails to supply skilled supervisory personnel, an adequate number of properly skilled workers, proper materials, or necessary equipment to prosecute the Work in accordance with the Contract Documents.

5. The Contractor fails to make progress so as to endanger performance of the Work within the contractually required time.

6. The Contractor disregards legal requirements of agencies having jurisdiction over the Work, the Contractor, or the District.

7. The Contractor fails to provide the District with a written plan to cure a District identified default within five business days after the District's request for a plan to cure; the District does not accept the Contractor's plan for curing its default; or the Contractor does not fully carry out an accepted plan to cure.

8. The Contractor abandons the Work. Abandonment is conclusively presumed when the District requests a written plan to cure a default and the Contractor does not submit the plan within five business days of the District's request.

9. The Contractor materially fails to meet its obligations in accordance with the Contract Documents.

10. The Contractor is in default of any other material obligation under the Contract Documents.

ii. If any of the above events occur, the District may, in its discretion, require that the Contractor submit a written plan to cure its default, which plan must be provided to the District within 5 business days of the request and must include a realistic, executable plan for curing the noted defaults.

iii. Upon any of the occurrences referred to in Article 18.a.i. above, the District may, at its election and by notice to the Contractor, terminate the Contract in whole or in part; accept the assignment of any or all of the subcontracts; and then complete the Work by any method the District may deem expedient. If requested by the District, the Contractor shall remove any part or all of the Contractor's materials, supplies, equipment, tools, and machinery from the site of the Work within seven days of such request; and, if the Contractor fails to do so, the District may remove or store, and after 90 days sell, any of the same at the Contractor's expense.

iv. No termination or action taken by the District after termination shall prejudice any other rights or remedies of the District provided by law or by the Contract Documents.

v. Conversion: If, after termination for other than convenience, it is determined that the Contractor was not in default or material breach, or that the default or material breach was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for convenience pursuant to Article 18.b. below.

b. Termination by the District for Convenience:

i. The District may, at its option, and for its convenience, terminate the Contract at any time by giving written notice to the Contractor specifying the effective date of termination. Upon such termination, the Contractor agrees to comply with the notice and further agrees to waive any claims

for damages, including loss of anticipated profits, on account of the termination; and, as the sole right and remedy of the Contractor, the District shall pay the Contractor as set forth below.

ii. Upon receipt of a notice of termination for convenience, the Contractor shall, unless the notice directs otherwise, do the following:

1. Immediately discontinue its performance of the Contract to the extent specified in the notice.

2. Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of a portion of the Work that is not discontinued or that is necessary for an orderly cessation of the Work.

3. Promptly cancel, on the most favorable terms reasonably possible, all subcontracts to the extent they relate to the performance of the discontinued portion of the Work.

4. Thereafter, do only such Work as may be necessary to preserve and protect Work already in progress and to protect materials, plants, and equipment in transit to or on the site of performance.

iii. Upon such termination for convenience, the District will pay to the Contractor the sum of the following:

1. The amount of the contract sum allocable to the portion of the Work properly performed by the Contractor as of the effective date of termination, less sums previously paid to the Contractor.

2. Previously unpaid costs of any items delivered to the project site that were already fabricated for subsequent incorporation into the Work.

3. Any proven losses with respect to materials and equipment directly resulting from the termination.

4. Reasonable demobilization costs.

iv. The above reimbursement is the sole and exclusive remedy to which the Contractor is entitled in the event the contract is terminated for convenience; and the Contractor expressly waives any other claims, damages, demands, compensation or recovery related to this contract or

project. The Contractor agrees to sign a general release incorporating this waiver.

c. Effect of Termination: Upon termination, the obligations of the Contract shall continue as to portions of the Work already performed and, subject to the Contractor's obligations under Article 18.b.ii, as to bona fide obligations assumed by the Contractor prior to the date of termination.

d. Force Majeure: If the contract is suspended or terminated by the District because Contractor's performance is prevented or delayed by an event including an irresistible, superhuman cause, or by the act of public enemies of the State of California or of the United States ("Force Majeure"), the Contractor will be paid for Work performed prior to the Force Majeure event at either (i) the unit prices named in the Contract; or (ii) in the event no unit prices are named, a sum equal to the percentage of the total contract amount that matches the percentage of the total contract Work performed prior to the Force Majeure event.

19. DAMAGES

All losses or damages to material or equipment to be furnished pursuant to the Contract Documents occurring prior to receipt and final acceptance of the Work shall be sustained by the Contractor. The Contractor shall sustain all losses arising from unforeseen obstructions or difficulties, either natural or artificial, encountered in the prosecution of the Work, or from any action of the elements prior to final acceptance of the work, or from an act or omission on the part of the Contractor not authorized by the Contract Documents.

20. ORDER OF PRECEDENCE

a. In the case of conflicts, errors, or discrepancies in any of the Contract Documents, the order of precedence is as follows. Within the same order of precedence, specific requirements shall take precedence over general requirements.

i. Approved Change Orders.
ii. Addenda.
iii. RFQ or RFP.
iv. Referenced Standard Specifications and Drawings.
v. Contractor's Response Packet.

b. With reference to drawings:

i. Numerical dimensions govern over scaled dimensions.
ii. Detailed drawings govern over general drawings.
iii. Addenda/Change Order drawings govern over contract drawings.
iv. Contract drawings govern over standard drawings.

v. Notes apply only to the drawing where the notes appear, unless classified as "typical" or intended to apply elsewhere in which case they apply to all drawings where the conditions or circumstance noted occurs.

vi. Typical details apply to all drawings unless a specific different detail is shown.

21. INDEMNIFICATION

Contractor expressly agrees to defend, indemnify, and hold harmless DISTRICT and its Directors, officers, agents and employees from and against any and all loss, liability, expense, claims, suits, and damages, including attorneys' fees, arising out of or resulting from Contractor's, its associates', employees', subconsultants', or other agents' negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance under this Agreement.

22. PROHIBITION OF ASSIGNMENT

The Contractor shall not assign, transfer, or otherwise dispose of any of its rights, duties or obligations under this Contract. This prohibition does not apply to the District. The District retains the right to assign this Contract in whole or in part at any time upon reasonable terms.

23. NEWS RELEASES

The Contractor, its employees, subcontractors, and agents shall not refer to the District, or use any logos, images, or photographs of the District for any commercial purpose, including, but not limited to, advertising, promotion, or public relations, without the District's prior written consent. Such written consent shall not be required for the inclusion of the District's name on a customer list.

24. SEVERABILITY

Should any part of the Contract be declared by a final decision by a court or tribunal of competent jurisdiction to be unconstitutional, invalid or beyond the authority of either party to enter into or carry out, such decision shall not affect the validity of the remainder of the Contract, which shall continue in full force and effect, provided that the remainder of the Contract can be interpreted to give effect to the intentions of the parties.

25. COVENANT AGAINST GRATUITIES

The Contractor warrants that no gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the District with a view toward securing the Contract or securing favorable treatment with respect to any determinations concerning the performance of the Contract. For breach or violation of this warranty, the District shall have the right to terminate the Contract, either in whole or in part, and any loss or damage sustained by the District in procuring on the open market any items which Contractor agreed to supply shall be borne and paid for by the Contractor. The rights and remedies of the District provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or in equity.

26. RIGHTS AND REMEDIES OF THE DISTRICT

The rights and remedies of the District provided herein shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

27. WAIVER OF RIGHTS

Any action or inaction by the District or the failure of the District on any occasion, to enforce any right or provision of the Contract, shall not be construed to be a waiver by the District of its rights and shall not prevent the District from enforcing such provision or right on any future occasion. Rights and remedies are cumulative and are in addition to any other rights or remedies that the District may have at law or in equity.

28. CONFIDENTIALITY

Contractor agrees to maintain in confidence and not disclose to any person or entity, without the District's prior written consent, any trade secret or confidential information, knowledge or data relating to the products, process, or operation of the District. Contractor further agrees to maintain in confidence and not to disclose to any person or entity, any data, information, technology, or material developed or obtained by Contractor during the term of the Contract. The covenants contained in this paragraph shall survive the termination of this Contract for whatever cause.

EXHIBIT D
IRAN CONTRACTING ACT CERTIFICATION

Pursuant to Public Contract Code (PCC) § 2204, an Iran Contracting Act Certification is required for solicitations of goods or services of $1,000,000 or more.

To submit a bid or proposal to East Bay Municipal Utility District (District), you must complete **ONLY ONE** of the following two paragraphs. To complete paragraph 1, check the corresponding box **and** complete the certification for paragraph 1. To complete paragraph 2, check the corresponding box and attach a copy of the written permission from the District.

☐ 1. We are not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to PCC § 2203(b), and we are not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

CERTIFICATION FOR PARAGRAPH 1:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the BIDDER/bidder to the clause in paragraph 1. This certification is made under the laws of the State of California.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

OR

☐ 2. We have received written permission from the District to submit a bid or proposal pursuant to PCC § 2203(c) or (d). *A copy of the written permission from the District is included with our bid or proposal.*

SECTION 01 31 23.10

CONSTRUCTION MANAGEMENT INFORMATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor, and its subcontractors and suppliers shall utilize the District's Construction Management Information System (CMIS) for submission of all data and documents (unless specified otherwise herein and in this Section) throughout the duration of the Contract. "Copy" or Copies" shall refer to electronic copies unless a hard copy is specified. Where a hard copy is specified, both electronic and paper versions shall be submitted.

1. The District's current CMIS is Kahua, a web-based construction management software hosted by Kahua, Inc.

2. The CMIS is paid for by the District.

3. The CMIS will be made available to all Contractor's personnel, subcontractor personnel and suppliers working under the Contract.

4. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of Contract Documentation.

5. The CMIS shall be the primary means of project information submission and management.

B. Related Sections:

1. Section 01 33 00 – Submittal Procedures

1.2 USER ACCESS LIMITATIONS

A. The Engineer will establish the Contractor's access to the CMIS by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system and determine assigned function-based authorizations and user privileges to enter and access information in the CMIS. Subcontractors and suppliers will be given access to the CMIS by and through the Contractor. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers on the CMIS shall be the responsibility of the Contractor.

1.3 OWNERSHIP OF DATA

A. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the CMIS) by the Engineer and the Contractor will be jointly owned.

1.4 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

A. Review comments made (or lack thereof) by the Engineer on Contractor-submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. District's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

1.5 PRECONSTRUCTION SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures.

B. Within five work days after receiving the Notice to Proceed, Contractor shall submit:

1. List of Contractor's personnel responsible for CMIS administration, as well as that for the Contractor's subcontractors and suppliers

2. Include descriptions of key personnel's roles and responsibilities for this project. Contractor shall also identify its organization's administrator on the list.

1.6 COMPUTER REQUIREMENTS

A. The Contractor shall use PC based computer hardware and software that meets the requirements of the CMIS as recommended by the host of the CMIS, and as described herein to access and utilize the CMIS. As recommendations are modified by the host of the CMIS, the Contractor shall upgrade its system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems shall not be justification for a cost or time modification to the Contract.

B. The Contractor shall ensure that connectivity to the CMIS is accomplished through an internet connection with a minimum bandwidth requirement of 128 kb/s for using the system. It is recommended that a faster connection be used when uploading pictures and files into the system.

C. The CMIS currently supports the current and prior two versions of Chrome, Firefox, Edge, and Safari.

D. The Contractor shall use applications compatible with Adobe Acrobat Professional Version XI or later to create Portable Document Format (PDF) files.

1.7 CONTRACTOR RESPONSIBILITY

A. Contractor shall be responsible for scanning or otherwise converting to electronic format all project submittals and Contractor correspondence, drawings, sketches, etc., and uploading them to the CMIS.

B. The Contractor shall be responsible for the validity of its information placed in the CMIS.

C. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, CAD drawing applications, and Portable Document Format (PDF) document distribution program.

D. The Contractor shall utilize the existing forms in the CMIS to the maximum extent possible. If a required form does not exist in the CMIS, the Contractor shall include a form of its own or one provided by the Engineer (if available) as an attachment to a submittal. The District discourages the use of e-mails and other methods of submitting requests and documents. Unless approved in advance by the Engineer, requests and documents not submitted through the CMIS will not be recognized as official correspondence.

E. PDF documents shall be created through electronic conversion rather than optically scanned whenever possible. If optically scanned, the document shall be converted through OCR (Optical Character Recognition) software so that all documents are searchable. If the documents have multiple sections then the Contractor shall provide a "bookmark" for each section. The Contractor is responsible for the training of its personnel in the use of the CMIS (outside what is provided by the District) and the other programs indicated above as needed. The Contractor shall disable all security so that copying and pasting of information from the PDF document is enabled.

F. User Access Administration

1. Provide a list of Contractor's key CMIS administration personnel for the Engineer's acceptance. Contractor is responsible for informing the Engineer of additional personnel, subcontractors and suppliers to be added to the system, or of personnel, subcontractors and suppliers to be removed from the system. The Engineer reserves the right to perform a background check on all potential users.

1.8 CONNECTIVITY LIMITATIONS

A. The CMIS is a web-based environment and therefore, subject to the inherent speed and connectivity limitations of the Internet. The Contractor is responsible for its own connectivity to the Internet. CMIS response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The District will not be liable for any delays associated from the usage of the CMIS including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor shall ensure connectivity to the CMIS (whether at the home office or job site). Under no circumstances will usage of CMIS be grounds for a time extension or cost adjustment to the Contract.

1.9 TRAINING

A. The host of the CMIS will provide training consisting of a 2-hour web-based seminar in conjunction with a conference call. The seminar will accommodate multiple participants. Contractor shall determine how many seminars it requires.

B. Contractor shall arrange and pay for the facilities and hardware/software required to facilitate the Contractor's own training.

C. Contractor shall be responsible for coordinating the provision of training from the host of the CMIS for its personnel and its subcontractors' personnel.

PART 2 - PRODUCTS

2.1 DESCRIPTION

1. Kahua project management application (no substitutions) provided by Kahua, Inc.

PART 3 - EXECUTION

3.1 CMIS UTILIZATION

A. The CMIS shall be utilized in connection with all document and information management required by these Contract Documents. Documents and information to be submitted electronically include, but are not limited to, the documents described below.

1. Submittals:

a. Shop Drawings

1) Shop drawings and design data documents shall be submitted as MicroStation or AutoCAD format files and PDF attachments to the CMIS submittal work flow process and form. Examples include, but are not limited to:

a) Standard manufacturer installation drawings

b) Drawings prepared to illustrate portions of the work designed or developed by the Contractor

c) Steel fabrication, piece, and erection drawings

d) Electrical interconnection drawings

b. Product Data

1) Product data and manufacturers instructions shall be submitted as PDF attachments to the CMIS submittal work flow process and form. Examples include, but are not limited to:

a) Manufacturer's printed literature

b) Preprinted product specification data and installation instructions

c. Samples

1) Sample submittals shall be physically submitted as specified in Section 01 33 00 – Submittal Procedures; additionally, Contractor shall enter submittal data information into the CMIS with a copy of the submittal form(s) attached to the actual sample. Examples include, but are not limited to:

a) Product finishes and color selection samples

b) Product finishes and color verification samples

c) Finish/color boards

d) Physical samples of materials

d. Administrative Submittals

1) All correspondence and pre-construction submittals shall be submitted using the CMIS. Examples include, but are not limited to:

a) Permits

b) List of project personnel

c) Requests for Information (RFI)

d) System Outage Requests

e) Monthly Subcontractor Payment Reports (P-047 Form)

f) Plant Inspection Requests

g) Survey Requests

h) Requests for Meetings

2) All schedules and associated reports and updates shall be submitted as specified in these Contract Documents and as a native backed-up file of the scheduling program being used. The schedule shall be posted as a PDF file in the format specified in these Contract Documents and as backed-up file.

3) Plans for safety, demolition, environmental protection, and similar activities

4) Outage Plans

5) Meeting minutes for weekly construction meetings, progress meetings, pre-installation meetings, etc.

6) Any general correspondence submitted

e. Compliance Submittals

1) Test reports, certificates, and manufacture field report submittals shall be submitted on the CMIS as PDF attachments. Examples include, but are not limited to:

a) Field test reports

b) Quality Control certifications

c) Manufacturers' documentation and certifications for quality of products and materials provided

f. Record and Closeout Submittals

1) Operation and maintenance data closeout submittals shall be submitted via the CMIS as PDF documents during the approval and review stage as specified, with actual hardcopy set of documents submitted for final (in addition to the final being submitted via the CMIS). Examples include, but are not limited to:

a) Operation and Maintenance Manuals: Final documents shall be submitted as specified.

b) Extra Materials, Spare Stock, etc.: Submittal forms shall indicate when and where actual materials are submitted.

g. Financial Submittals

1) Schedule of Costs, Pay Estimates, Daily Extra Work Reports, and Change Order Requests shall be submitted via the CMIS. Supporting material for Pay Estimates and Change Order Requests shall be submitted via the CMIS as PDF attachments. Examples include, but are not limited to:

a) Contractor's Schedule of Costs utilizing both the native CMIS Schedule of Costs format and as required by the Contract Documents in both PDF and Microsoft Excel

b) Contractor's Monthly Progress Payment Requests utilizing the CMIS

c) Contract Change proposals requested by the District

2) The Contractor shall provide the craft, material, and equipment data via the CMIS, which will be utilized for Daily Extra Work Reports and Change Order Requests.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. The requirements of this section apply to all submittals in the Contract Documents.

2. Submit samples, drawings, and data for the Engineer's review which demonstrate fully that the construction, and the materials and equipment to be furnished will comply with the provisions and intent of this Specification. All submittals shall be written in Standard American English and all numerical data, whether in drawings, test reports, engineering calculations, manufacturer's literature, or maintenance manuals, shall be in United States Customary System (USCS) measuring units (foot, pound, gallons, etc). If original design work was completed in metric units, their equivalent USCS dimension and unit shall be indicated. All submittals, in printed or electronic format, shall be original quality and completely legible. Any obfuscation or loss of clarity of original which may result in ambiguous interpretation is not acceptable.

3. Specific items to be covered by the submittals shall include, as a minimum, the following:

a. For structures, submit all shop, setting, equipment, miscellaneous iron and reinforcement drawings and schedules necessary.

b. For pipelines, submit a detailed layout of the pipeline with details of bends and fabricated specials and furnish any other details necessary. Show location of shop and field welds.

c. For equipment which requires electrical service, submit detailed information to show power supply requirements, wiring diagrams, control and protection schematics, shop test data, operation and maintenance procedures, outline drawings, and manufacturer's recommendation of the interface/interlock among the equipment.

d. For mechanical equipment submit all data pertinent to the installation and maintenance of the equipment including shop drawings, manufacturer's recommended installation procedure, detailed installation drawings, test data and curves, maintenance manuals, and other details necessary.

e. Substitutions

4. Additional submittals required: See pertinent sections of this specification.

5. Submit a Schedule of Submittals including monthly updates.

6. For mechanical or electrical equipment that require submittals: provide separate submittals for each piece of equipment to be installed at each site. Title the submittals to denote which site the equipment pertains to.

B. Related sections:

1. Section 01 31 23.10 – Construction Management Information System

1.2 PRODUCT HANDLING

A. Submittals shall be accompanied by a cover page and shall be in strict accordance with the provisions of this section.

B. Submit priority of processing when appropriate.

C. Submit materials to the EBMUD Materials Testing Laboratory when so specified. Submit other submittals to Construction Division, EBMUD, in accordance with Article 3.1 unless specified otherwise.

D. Proposals for "or equal" substitutions made prior to bid opening, pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3), shall be delivered after coordinating the delivery with the District. Contractor shall coordinate with the District's Purchasing Division at the following telephone numbers: (510) 287-1253, or (510) 287-2017.

1.3 SUBMITTALS

A. Submittals shall include the following information:

1. A copy of the applicable section(s), with addendum updates included as appropriate, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.

2. A check mark 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 number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer is the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications.

B. 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 further consideration.

C. Any deviation from the contract documents not specifically requested and clearly identified, although accepted through oversight, may be rejected at any stage of the Work. The Contractor shall, at its own expense, reconstruct all work affected by the later rejection of a contract deviation that was not specifically called out and explained for review and acceptance by the District as detailed above.

PART 2 - PRODUCTS

2.1 SCHEDULE OF SUBMITTALS

A. Schedule of Submittals shall be in the form of a submittal log similar to that shown in Appendix A.

B. Complete columns (a) through (g) showing all submittals required by the specifications.

1. Dates in column (g) shall be coordinated with the construction progress schedule to ensure sufficient time is allowed for processing of submittals and procurement of material prior to start of a construction activity.

C. A Schedule of Submittals is not required for proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3).

2.2 SHOP DRAWINGS

A. Scale required:

1. Make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

B. Type of prints required:

1. Make all shop drawing prints in blue or black line on white background. Reproductions of District drawings are not acceptable.

C. Size of drawings required:

1. The overall dimensions of each drawing submitted to the Engineer shall be equal to one of the District's standard sheet sizes as listed below. The title block shall be located in the lower right hand corner of each drawing and shall be clear of all linework, dimensions, details, and notes.

Sheet Sizes
Height x Width

11" x 8-1/2"
11" x 17"
22" x 34"

D. Stamp or permanently print on each drawing “Reference EBMUD Drawing _____” and enter the pertinent drawing number.

2.3 COLORS

A. General:

1. Unless the precise color and pattern are specified elsewhere, submit accurate color charts and pattern charts to the Engineer for his review and selection whenever a choice of color or pattern is available in a specified product. Label each chart naming the source, the proposed location of use on the project, and the project.

2.4 MANUFACTURERS' LITERATURE

A. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

B. Clearly mark the literature with the materials and options being provided to illustrate conformance with the specification details.

C. Provide the complete part number and include the legend containing the descriptive details that define the meaning of each digit of the number.

2.5 SUBSTITUTIONS

A. Engineer's approval required:

1. The contract is based on the materials, equipment, and methods described in the Contract Documents. Any Contractor-proposed substitutions within the time frame specified in RFQ 2305 Section II. Calendar of Events and are subject to the Engineer's approval.

2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data, and all other information required by the Engineer to evaluate the proposed substitution.

3. Where substitutions are proposed for consideration, Contractor shall submit a written request for the substitution and shall show that it is equal to the specified item. The proposed substitution shall be identified separately and

included with the required submittal for the item. When submitting a variation or substitution the Contractor warrants that:

a. The contract has been reviewed to establish that the substitution, when incorporated, will be compatible with other elements of work.

b. The Contractor shall perform all necessary work for making substitutions workable and shall bear any additional cost necessary because of the proposed substitution.

4. Substitutions not specifically requested, although accepted through oversight, may be rejected at any stage of the work. The Contractor shall, at its own expense, reconstruct all work affected by the later rejection of a substitution that was not specifically requested.

B. Trade names and "or equal as approved by the Engineer" provision:

2.6 MATERIALS, PRODUCTS, SERVICES OR EQUIPMENT SPECIFIED OR DESIGNATED IN THE CONTRACT DOCUMENTS ARE INTENDED TO INDICATE THE MEASURE OF QUALITY AND UTILITY. UNLESS THE CONTRACT DOCUMENTS SPECIFICALLY STATE THAT THERE ARE NO SUBSTITUTIONS, THE CONTRACTOR MAY SUBMIT OTHER BRANDS OF THE SPECIFIED PRODUCT PROVIDED THAT THE SUBMITTED PRODUCT IS OF EQUAL OR BETTER QUALITY, POSSESSES THE REQUIRED CHARACTERISTICS FOR THE PURPOSE INTENDED AND SHALL NOT INVOLVE ADDITIONAL COST TO THE DISTRICT. BY PROPOSING A SUBSTITUTE, THE CONTRACTOR WARRANTS THAT IT IS EQUAL TO THAT SPECIFIED AND TAKES COMPLETE RESPONSIBILITY FOR ANY ERRORS, OMISSIONS, CONFLICTS, ALL MODIFICATIONS TO EXISTING PIPING, DUCTWORK OR ELECTRICAL CONNECTIONS, OR INCONSISTENCIES CAUSED BY USING THE SUBSTITUTE, INCLUDING ANY ADDITIONAL COSTS OF ENGINEERING OR INSPECTION, OR NECESSARY COORDINATION WITH CONNECTIONS TO MAKE THE SUBSTITUTE PERFORM AS SPECIFIED. ALL SUBMITTALS SHALL RECEIVE WRITTEN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION.SEE RFQ 2305 SECTION III. B. BRAND NAMES, APPROVED EQUIVALENTS, DEVIATIONS, AND EXCEPTIONS REGARDING TRADE NAMES AND FOR PROPOSALS FOR “OR EQUAL” SUBSTITUTIONS MADE PRIOR TO BID OPENING.OPERATIONS AND MAINTENANCE MANUALS

A. See “Table 1: O&M Manual Summary” at the end of this section.

B. The provisions of this article are considered minimal requirements and do not supersede any requirements in individual sections of this specification.

C. When O&M manuals are required to be submitted covering items included in this work, prepare all such manuals in approximately 8-1/2" x 11" format in durable, three ring plastic binders. Each manual shall be identical and include at a minimum

information identified on the O&M Manual Review Checklist attached in Appendix A. In addition, furnish the following:

1. Binder Cover: Identification on, or readable through, the front cover stating the District's specification (project) number and project title, District facility or facilities where the equipment will be installed, specification section number, and the system or equipment described in the manual.

2. Binder Spine Label: Include the system or equipment name as shown on the binder cover along with the specification section number.

3. Title page including applicable equipment tag numbers and equipment manufacturer's name, address, telephone number, and the submittal date. In addition, provide name, address and telephone number of the local manufacturer's representative.

4. Table of contents organized and referenced to manual section dividers

5. Complete instructions regarding storage, handling, installation, operation, servicing, and maintenance of all equipment involved

6. Comprehensive replacement parts list, with complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts

7. Detailed description of handling, replacement, and disposal of all fluids and replacement parts

8. Copies of Safety Data Sheets (SDS) as required

9. Copies of all guarantees and warranties issued including the start and end dates for the warranty period or conditions for the initial start date and the duration

10. Copies of drawings with all data concerning changes made during construction

11. Copies of calculations or reports appropriately prepared including sketches, given or known information with the source of the data, equations with each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes

12. All field and factory test data

13. Engineering calculations or reports pertinent to the content of the O&M manual. See Article 2.8 Engineering Calculations or Reports.

14. Provide a separate section with tab divider for documents developed in the field after the O&M manual has been accepted. These documents include, but not limited to the following: manufacturer's certificate of proper installation, field test results, etc.

D. Materials shall be word-processed.

E. For mechanical or electrical equipment that require O&M manuals: provide separate O&M manuals for each piece of equipment installed at each site. Title the O&M manuals to denote which site the equipment pertains to.

F. Manufacturer's literature shall be originals, or original quality copies. Specifically identify all equipment models and features being provided. Delete or cross out any extra information provided in standard manufacturer's literature that does not apply to the equipment furnished.

G. Operating and Testing Procedures, and Diagrams: All manufacturers' standard procedures shall be customized or rewritten as necessary to accurately describe the system as it is installed and operated for the project. Procedures shall include District device tag numbers (as shown on the P&IDs) whenever available. All diagrams illustrating the system shall be customized to show installed conditions, and shall include District device tag numbers whenever available.

H. Three-hole punch shall not obliterate any information. Reduce original material as necessary to provide a suitable margin for three-hole punching or provide three-hole punched clear plastic pockets for inserting single sheet material.

I. O&M Manual Review Checklist:

1. The manufacturer's representative shall fill out a minimum of one O&M Manual Review Checklist form per submittal (See Appendix A) and include a copy in each submitted manual. Provide more than one checklist when specified in the technical specification sections. Clearly identify the location in the O&M Manual for each element in the Technical Content section (O&M tab number and page number). If the content is in multiple locations or on multiple pages, identify each location in the space provided or in the Comments column on the form.

2. All portions of the form shall be completed prior to submittal, or the submittal may be returned unreviewed. Submittals may also be returned unreviewed if the O&M Manual Checklist form contains multiple error and/or omissions.

J. O&M Manual Review Process

1. Preliminary O&M Manuals: Submit preliminary O&M manuals as searchable Portable Document Format (PDF) per Section 01 31 23.10 for review. The District will return the submittals to the Contractor along with comments identifying necessary corrections or additions to the manuals. The District reserves the right to keep possession of all O&M manuals, and have the Contractor arrange to correct the manuals to comply with the reviewer comments.

a. Preliminary O&M manuals shall be submitted and accepted prior to the delivery of the respective equipment or system.

2. Final O&M Manuals:

    a. The manuals shall not be considered final until the submittal has received a review status of "No Exceptions Taken".

        1) Submit the Final O&M Manuals per the requirements of Paragraph 2.6.C.

        2) Submit requested number of Final O&M Manual hard copies as shown in Table 1 at the end of this section.

        3) Final O&M manuals shall be submitted and accepted prior to RFS milestone.

K. Electronic Files:

1. After the District has accepted each O&M Manual, two copies of an electronic version shall be supplied in addition to the required number of hard copies.

2. Electronic files shall be created in both searchable Portable Document Format (PDF) compatible with Adobe Acrobat version XI and Word format compatible with Microsoft Word 2010 or later. The security features (e.g. password protection) of all submitted files shall be disabled so that the District can perform future editing without restriction. Custom-developed drawings included in the O&M manuals (i.e. loop diagrams, system interconnection diagrams, etc.) shall also be submitted electronically in both PDF and the native CAD file format for future editing of the drawings by the Engineer. For CAD files, the associated PDF files shall be saved such that all CAD layering is preserved in the PDF file.

3. Electronic versions shall match the hard copy page for page with blank pages deleted. Electronic files shall be converted to PDF directly rather than using optical scanning. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide searching capability in the document.

4. All electronic files shall be submitted to the Engineer via the CMIS.

L. Maintenance Summary Forms

1. Furnish a completed Maintenance Summary Form (see Appendix A for typical format) as part of the O&M Manual. Include all typical, routine, or preventive maintenance required to ensure satisfactory performance during warranty period and longevity of the equipment. Manufacturer's representative shall sign and date the form certifying accuracy of the information.

2. Briefly summarize each maintenance activity on the form. Specific references to more detailed maintenance information located elsewhere in the O&M manual may be placed in the "Comments" column. However, simply

referencing other sections in the O&M manual without a brief description of the maintenance activity is not acceptable.

3. Information on the form shall be word-processed, or typewritten.

4. Maintenance Summary Forms shall be on 8-1/2 inch by 11-inch paper and may be as many pages as required to completely summarize the required maintenance. However, the order and format shall be in accordance with the supplied form. The Maintenance Summary Forms will be provided in electronic format (MS Word) upon request.

2.7 AS-BUILT DRAWINGS

A. Marked-up as-built drawings:

1. Two sets of full-size contract and shop drawing mark-ups shall be kept on file in the Contractor's site office exclusively for recording all as-built data associated with this work, including all addenda, force account work, clarifications, and contract change orders. Information to be recorded shall include but not be limited to the following:

   a. Actual routing of electrical conduits including those conduits only indicated in general or diagrammatically on the drawings

   b. Actual detail used where more than one option is allowed by the contract documents

   c. Actual location of electrical manholes, handholes, junction boxes, and terminal boxes

   d. Actual profiles of all underground electrical duct banks

   e. Actual alignment of installed pipe

      1) For all pipelines: The pipeline Station Notes in the Contract Drawings shall be completed with the pipeline stationing and depth of cover.

      2) Record any deviations from the design drawings regarding isolation valves, pipe connections, blowoffs, air valves, galvanic anodes and test stations, manhole structures, and other miscellaneous appurtenances. Add/revise line work, callouts and Station Notes, as applicable.

      3) Record any deviations from the design drawings regarding pipeline alignment, elevations, materials, outside diameter, and fitting types in the notes. Add/revise station equations, line work, callouts, offsets and Station Notes, as applicable.

f. Specific details of pipe connections and manhole structures

g. Specific details on the installation and connection of mechanical and electrical equipment (e.g., location, wiring, mounting, overall dimensions, etc.).

h. Actual details of all material lists and schedules including quantities, descriptions, sizes, model numbers, and materials of construction

i. Field dimensions where they differ from those on the drawings

j. Other details showing as-built conditions that are shown differently or only in general on the drawings

k. Any deviations between the project drawings and the "as found" conditions encountered during the Contractor's work including location of existing buried features uncovered during construction

l. Only symbols and abbreviations shown on District Standard Drawings included in the contract reference drawings shall be used. Where no District symbol or abbreviation is available, industry association standards such as ISA, IEEE, ANSI etc. shall be applicable.

2. The Contractor shall record dimensions and changes during construction, and shall permit the Engineer to review the accuracy and completeness of the as-built data on a monthly basis in accordance with Section 01 32 00.

a. Red pencil shall be used to indicate additions and/or modifications to the drawings.

b. Green pencil shall be used to indicate deletions to the drawings.

c. Yellow highlighter or yellow pencil shall be used to indicate portions of the drawing that have been field verified to confirm portions installed as designed and to show construction progress.

d. All marks on drawings shall be dark and legible. Text shall be legibly printed in block style letters

e. Only symbols and abbreviations shown on District Standard Drawings included in the contract reference drawings shall be used. Where no District symbol or abbreviation is available, industry association standards such as ISA, IEEE, ANSI, etc. shall be applicable.

B. Record as-built shop and vendor drawings shall be created as described below:

1. Submit record as-built shop and vendor drawings to document any and all design work developed for this project by the Contractor, subcontractors, equipment manufacturer's, vendors, or suppliers.

2. Create record as-built shop drawings utilizing MicroStation or AutoCAD software. Drawings shall be sized 22-inch by 34-inch. Other drawing sizes are not acceptable. Manually drafted shop drawings in pencil or ink are not acceptable.

    a. Provide one set of record as-built shop drawings in addition to the number and type of shop drawings specified in Article ”SUBMITTAL QUANTITIES” below. Drawings shall be sized 22-inch by 34-inch on vellum.

    b. Record as-built shop drawings shall also be submitted on EADOC in:

        1) MicroStation or AutoCAD format and

        2) Searchable PDF (compatible with Adobe Acrobat version XI or later).

3. Text size used on drawings shall have a minimum height of 1/10 inch, if computer generated or typed, and 1/8" if printed by hand.

4. Drawings shall contain a 2-1/2" wide by 3/4" high blank box for the District's use, which shall be placed directly against the margin at the bottom right corner of the drawing.

5. Drawings shall also contain the manufacturer's title block at the bottom right side in a boxed area with a maximum size of 8" wide by 4" high. The manufacturer's title block shall contain the manufacturer's name, address, and telephone number, the name of the project as it appears on the cover of the project specifications, the District specification number, a descriptive title for the drawing, the date the drawing was approved, the total number of drawings included in the set of drawings, and the manufacturer's drawing number.

C. As-Built Log

1. The Contractor shall develop and maintain a spreadsheet or database type log recording all construction correspondence documents that identify modifications to the as-built drawings. The construction correspondence documents shall include RFIs, clarifications, change orders, field directives, submittals, letters, and any other construction correspondence that identifies modifications to the as-built drawings. At a minimum, the as-built log shall contain separate fields for the following information:

    a. Log Number: sequential integer numbering system

    b. Correspondence type (e.g. RFI, change order, letter, etc.)

    c. Correspondence number (if available)

    d. Title correspondence (if available)

e. Correspondence date

f. Contract drawing referenced in correspondence

2. Each as-built log entry (row) shall contain only one as-built drawing reference. For instance, if the response to a change order results in modifications to three as-built drawings, then three separate as-built log entries are required, one for each as-built drawing referenced in the change order. (Similarly, if 3 change orders affect a specific drawing, then three separate as-built log entries are required).

3. Provide an electronic file in Microsoft Excel format of the complete up-to-date as-built log at any time upon request from the Engineer.

D. Schedule for submitting Record As-Built Drawings.

1. One final marked-up set of contract and shop drawings shall be submitted within 30 days after Ready for Integration Programming as a prerequisite for establishing that the facility is ready for service.

2. Contractor shall submit current as-built drawing files, PDF full-size plots of as-built drawings, and as-built log electronically through EADOC to receive assigned cost for monthly preparation of as-builts per Section 01 32 00 – Construction Progress Documentation.

3. Final electronic files and one (1) complete full-size hardcopy print shall be submitted at least 30 days prior to the beginning of the Startup Test. This submittal shall include all record as-built contract drawings and record as-built shop drawings. If there is not a Startup Test, the final electronic files and one (1) complete full-size hardcopy shall be turned over to the Engineer upon Contract Completion.

4. Marked-up contract drawings or record as-built contract drawings refers to those drawings originally included in the bid documents, as modified by the Contractor (via hand-markup and electronic update, respectively) to reflect as-built conditions.

2.8 SUBMITTAL QUANTITIES

A. Submit four (4) copies of all hard-copy (printed) items as identified herein unless specified otherwise.

B. Submit one (1) electronic copy of the scanned data and drawings in searchable PDF (compatible with Adobe Acrobat version XI). Submit scanned copy via the CMIS.

C. Submit three (3) of each sample, unless specified otherwise.

D. Submit five (5) copies of each manual unless specified otherwise.

E. Submit quantity specified of materials submitted to the EBMUD Materials Testing Laboratory.

2.9 ELECTRONIC SUBMITTALS

A. Provide electronic submittals in searchable PDF (compatible with Adobe Acrobat version XI). All portions of the electronic submittals shall be legible and shall be in full color identical to the original material. Provide manufacturer's literature in original electronic file, if available.

B. Provide one electronic submittal file for each submittal except as noted hereinafter. The electronic submittal file name shall use the following format: submittal number – specification section number - description (e.g.: "001.1-01 33 00-Coating of Widgets"). Providing multiple electronic files for a single submittal (except as noted hereinafter) is not acceptable. The Contractor shall merge multiple files into a single electronic file.

C. For larger submittals containing multiple volumes, submit one electronic file for each hardcopy volume and each electronic submittal file name shall include the corresponding hard copy volume number (e.g. "001.1-01 33 00-Coating of Widgets – Volume 3").

D. Upon acceptance of the electronic submittal (marked as "No Exceptions Taken", "Make Corrections Noted", or "Acknowledged Receipt"), submit three (3) hardcopy sets of the submittal. The hardcopies shall be edited with highlighting, addressing/incorporating District review comments. A revised electronic file shall accompany the hardcopy submission, and shall match the hard copy submittal page for page including cover transmittal forms, title pages, and blank pages.

E. Exceptions requiring hardcopy material initially, are:

1. O&M processing, per Article 2.6

2. When hardcopy material is originally in a form larger than 11" x 17"; the material shall not only be included in the electronic submittal, but shall also be submitted in hardcopy form along with the original electronic submittal required in Paragraphs A and B above. Seven (7) submittal copies of the large materials shall be provided.

F. The Contractor is solely responsible for verifying that the hardcopy submittal and accompanying electronic submittal are identical and address/incorporate prior Engineer review comments.

G. All portions of the electronic submittals shall be provided with text searching capabilities whenever possible. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide text searching capability in the document.

H. Electronic files shall be submitted to the Engineer via the CMIS – See Section 01 31 23.10.

1. Submittals and RFIs shall be linked to at least one drawing within the File Manager application of the CMIS that provides the most relevant details regarding the subject equipment, material, item, or work. Linking shall be accomplished using the CMIS's "pin" feature. Submittals and RFIs received without at least one linked drawing or with a linked drawing that is not relevant will be Returned Without Review.

2.10 REVIEW CHECKLISTS

A. Review Checklists are required for some specification sections (when specified in the section) and for all O&M manual submittals.

B. Each submittal requiring review checklists shall comply with the following:

1. Each page of the submittal shall include a unique and sequential page number. The page numbers shall be located in the same general location on each page.

2. Page numbering may include "point numbers" (10.1, 10.2, etc.) to facilitate inserting pages without renumbering an entire submittal. However, all pages in the submittal shall be in numerical order.

3. The review checklists shall be completed in its entirety with accurate page number references for each checklist item. Submittals with inaccurate review checklists may be returned without review for correction.

4. The review checklist shall be inserted at the beginning of the submittal.

PART 3 - EXECUTION

3.1 GENERAL

A. Prepare and use a transmittal form for submittals that includes the following information:

1. *Project name and specification number

2. *Date of submittal

3. *"To: Construction Division, MS #62
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055
ATTN: Office Engineer"

Or

If and only if, this submittal is a proposal for “or equal” substitutions made prior to RFQ No. 2305 Section III.B Brand Names, Approved Equivalents, Deviations, and Exceptions made prior to quote submissionuse the following address (envelope shall be marked: “Submittal Request for Substitution, RFQ No. 2305 ”):

“To: Purchasing Division, Contract Supervisor, MS #102
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055

4. *"From:" Name and address of Contractor

5. Name and address of subcontractor

6. Name and address of supplier

7. Name of manufacturer

8. *Spec. Section, Article Number, Paragraph and Subparagraph Number and/or drawing number and detail references

9. Location of use

10. *Submittal number

11. *Signature and title of transmitter

12. *Original submittal or resubmittal

Note: All transmittals shall include asterisked items as a minimum to be acceptable for review.

B. Use the "Item Number" on the Schedule of the Submittal for the corresponding submittal number. On a resubmittal, add a numerical suffix to the original submittal number. For example, 6.1 indicates the first resubmittal of submittal Number 6.

C. Use a separate transmittal form for each specific item or class of material or equipment within a division for which a submittal is required. Transmittal of a submittal of multiple items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or when items are so functionally related that review of the group as a whole is appropriate.

D. If a submittal contains multiple items, then each item shall be clearly labeled throughout the submittal or indexed in a manner eliminating confusion in identifying how each item relates to the whole. When submittal items have been assigned a “District equipment tag number” in the contract documents, each tag number shall be included throughout the submittal to clearly associate the specific submittal information to specific tag numbers.

E. Stamp or permanently print on each submittal the following certification statement.

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into RFQ Number 2305, is in compliance with the Contract drawings and specifications, can be installed in the allocated spaces, and is submitted for District (record/review).

Certified by _____Date _____"

3.2 SCHEDULE OF SUBMITTALS

A. Submit initial Schedule of Submittals within 15 days after Notice to Proceed.

B. Submit revised Schedule of Submittals within 15 days after date of request from the Engineer. Engineer will review Schedule of Submittals and will notify Contractor that schedule is acceptable or not acceptable within 10 days after receipt.

C. The Schedule of Submittals shall identify Contractor “or equal” substitution proposals made prior to bid opening (see RFQ 2305 Section III.B. Brand Names, Approved Equivalents, Deviations, and Exceptions), which have been accepted by the Engineer.

3.3 COORDINATION OF SUBMITTALS

A. General:

1. Prior to submittal for Engineer's review, use all means necessary to fully coordinate all material, including the following procedures:

a. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.

b. Coordinate as required with all trades and with all public agencies involved.

c. Secure all necessary approvals from agencies having jurisdiction and signify with agency stamp, or other means, that approvals have been secured.

d. Clearly indicate all deviations from the Contract Documents.

B. Grouping of submittals:

1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

C. Resubmittals:

1. The Contractor shall include a Comment and Response sheet with each resubmittal. The Comment and Response sheet shall be the first item after the submittal transmittal form. The Comment and Response sheet shall include each review comment (word for word) from the previous submittal cycle, followed by the Contractor's response clarifying how the comment has been addressed in the resubmittal. All responses shall at a minimum have a general description of what new information in the resubmittal addresses the review comment; and where in the resubmittal this new information can be located (tab number, page number, etc).

2. Resubmittals that do not comply with the requirements set forth in subparagraph C.1 above will be returned to the Contractor without review. The Contractor shall resubmit with an appropriate Comment and Response sheet as specified herein.

3.4 TIMING OF SUBMITTALS

A. Article 3.4 – Timing of Submittals, is not applicable for proposals for "or equal" substitutions made prior to bid opening pursuant to RFQ 2305.

B. General:

1. Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

2. In scheduling, unless otherwise noted, allow at least twenty (20) work days for the Engineer's review, plus the transit time to and from the District office.

3.5 REVIEW BY ENGINEER

A. Acceptance of each submittal by the Engineer will be general only and shall not be construed as:

1. Permitting any departures from the contract requirements.

2. Relieving the Contractor of the responsibility for any errors and omissions in details, dimensions, or of other nature that may exist.

3. Approving departures from additional details or instructions previously furnished by the Engineer.

B. Submittals (excluding manuals and as-built drawings) will be returned to the Contractor marked "No Exceptions Taken", "Make Corrections Noted", "Revise and Resubmit", "Acknowledged Receipt", or "Rejected", except that in some cases, all copies of a submittal may be returned to the Contractor marked "Returned Without Review". See paragraph 3.5.E for proposals for "or equal" substitutions

made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3).

1. "No Exceptions Taken" indicates that item covered by the submittal may proceed provided it complies with requirements of the specifications. Final acceptance will depend upon that compliance.

2. "Make Corrections Noted" indicates that item covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the specifications. Final acceptance will depend on that compliance.

3. "Revise and Resubmit" indicates that the Contractor shall not proceed with any phase of the item covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and requirements of the specifications.

4. "Acknowledged Receipt" indicates that the item is required to be submitted to the Engineer primarily for information or record purposes, and is not subject to Engineer's review.

5. "Returned Without Review" indicates that the submittal was not reviewed by the Engineer due to the submittal being incomplete, illegible, inadequate, or otherwise failing to conform to the requirements of the specification. Contractor shall prepare a new submittal for this item.

6. "Rejected" indicates that the submittal proposes an action of which the Engineer does not approve, makes an assertion with which the Engineer disagrees, appears to show intent to violate the terms of the Contract, or is otherwise objectionable to the Engineer and is returned to the Contractor with prejudice.

C. Resubmit revised drawings or data as indicated unless otherwise specified.

D. Work requiring the Engineer's review and acceptance shall not begin until the submittals for that work have been returned as "No Exceptions Taken" or "Make Corrections Noted".

E. Proposals for "or equal" substitutions made prior to bid opening pursuant to PCC Section 3400 (see Instructions To Bidders, Article 3) will be evaluated by the Engineer, and if accepted, bidders will be notified by addenda.

3.6 CHANGES TO ACCEPTED SUBMITTALS

A. A resubmittal is required for any proposed change to a submittal that has been marked "No Exceptions Taken" or "Make Corrections Noted". Changes which require resubmittal include, but are not limited to, drawing revisions, changes in materials and equipment, changes to installation procedures and test data. All resubmittals shall include an explanation of the necessity for the change.

B. Minor corrections to an accepted submittal may be accomplished by submitting a "Corrected Copy".

3.7 O&M MANUAL SUMMARY LIST

A. Table 1 is a summary of equipment/systems that require O&M manuals. Additional O&M manuals might be required when specified elsewhere.

Table 1: O&M Manual Summary (Additional O&M manuals might be required in other Sections)		Number of Hard Copy(ies) to Print
Section	System / Equipment, or Facility	
33 13 16.15	AWWA Butterfly Valves	
33 12 16.24	Ball valves	
33 13 16.16	High Performance Butterfly Valves	
33 09 11	Magnetic flow meters	
33 12 16.32	Electric Motor Valve Actuators (include with valve manuals)	

END OF SECTION

SECTION 01 43 11

SEISMIC QUALIFICATION AND CERTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. All products to be furnished under this contract shall be designed, constructed, and installed in conformance with the seismic requirements contained in the California Building Code (CBC) as modified below and in the related sections.

B. Related Sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 81 02 – Seismic Design Criteria

3. Section 33 12 16.16 High Performance Butterfly Valves

4. Section 33 12 16.27 AWWA Ball Valves

1.2 STRUCTURAL INTEGRITY AND ANCHORAGE

A. Structural integrity of the equipment shall be certified by calculations that demonstrate the adequacy of the equipment housing for seismic forces. These calculations may be based on principles of structural analysis and engineering mechanics, or based on approved shake table tests

B. Provide electrical and mechanical equipment and other non-structural components with proper anchorage to the supporting structures designed to resist seismic forces as specified in Section 01 81 02.

C. The equipment and all components listed in Section 33 12 16.16, and Section 33 12 16.27shall not undergo loss of their intended function after application of the Building Code prescribed seismic forces in Section 13.2 of ASCE 7

1.3 PROOF OF COMPLIANCE

A. For equipment installed in sites or structures designated as seismic design category C, D, E or F, prepare and submit the following:

1. Statement of seismic qualification, or special seismic certification:

a. “Statement of Seismic Qualification:” Provide manufacturer’s statement that the equipment satisfies the seismic design requirements of the building code, including the requirements of ASCE 7, Chapter 13.

1) Contractor shall submit for review and approval test data or calculations certified by a Civil or Structural Engineer registered in the State of California to show compliance with the requirements of Article 1.2.

b. "Special Seismic Certification:" Provide manufacturer's certification of compliance when subjected to shake table testing, including both operability and containment of hazardous materials as appropriate for the unit being tested. The certification shall be prepared in accordance with:

1) IEEE Std. 693, for equipment listed in paragraph 1.2.C above. This equipment shall meet or exceed IEEE Std 693 "High seismic level" qualification requirements.

2) ICC-ES AC 156, for equipment not covered in paragraph 1.2.C. This equipment shall meet the "Post-Test Functional Compliance Verification" requirements for "Components with Ip=1.5."

2. Substantiating test data: With seismic qualification and special seismic certification statements, submit results of testing in accordance with applicable standards.

B. Exemptions: A "statement of seismic qualification" and a "special seismic certification" are not required for the following equipment:

1. Temporary or moveable equipment.

2. Equipment anchored to the structure and having a total weight of 20 pounds or less.

3. Distribution equipment anchored to the structure and having a total unit weight of 5 pounds per linear foot, or less.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 45 27

SHOP INSPECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Provide the District's Plant Inspection Section with advanced notification for Short Term (three consecutive weeks or less at one facility), and Long Term (more than three consecutive weeks at one facility) inspection assignments, and reimburse the District for travel expenses described in this Section. Also see General Conditions Article 3.2.

2. Provide notification to the District's Plant Inspection Section of all work performed off the project site in fabrication, assembly, and coating plants; provide safe access to all areas where work is being performed.

3. The District reserves the right to use Third Party Inspectors in lieu of District personnel. All aspects of this section shall also apply to District contracted Third Party Inspectors.

4. For Long Term assignments provide the following:

a. Adequate office space including desk, office chair, lighting, and climate control;

b. A large format (up to 11 X 17 paper size) printer/scanner/copier and paper and printer supplies for the duration of the assignment;

B. Contractor and its Material Suppliers shall ensure that there shall be adequate lighting, ventilation, and safety procedures in place to permit safe and thorough inspection at all times.

C. All inspection and measurement tools and equipment employed by Contractor or Material Suppliers shall be made available to the District and remain in the area for inspection, and shall be subject to regular inspection and verification by the Contractor that such tools and equipment are properly calibrated and in an operable condition.

D. Contractor and its Material Suppliers shall identify in writing the person responsible for the receipt and coordination of all Inspector communications. A representative from the Material Supplier responsible for Quality Control shall be present and available to the Engineer at all times during the course of inspections.

E. Contractor and its Material Suppliers shall respond promptly to address and correct all fabrication and inspection processes to comply with the Contract Documents. Corrective measures undertaken by the Contractor and/or Material Supplier shall be documented and the documentation made available for review, inspection and copying by the Engineer at all times.

F. See individual sections, listed in Article 1.4, for specific processes requiring shop inspection.

1.2 WITNESS NOTIFICATION

A. The Contractor shall provide advanced written notification including the following information:

1. The related specification section(s);
2. Details of materials, parts or components to be inspected/tested;
3. Name and location of shop to be visited;
4. Shop's contact information;
5. Approved submittal number; and,
6. Proposed dates for those processes described in this and related Sections (Quality Control) for each shop location.

B. The shop where the inspections and tests will occur shall contact the District Plant Inspection Section at (510) 287-1132 to schedule all shop inspections. Visits will be scheduled based on Engineer's availability.

C. Notification Schedule:

ONE-WAY DISTANCE FROM OAKLAND	SHORT TERM ASSIGNMENTS	LONG TERM ASSIGNMENTS
less than 75 miles	5 work days in advance	15 work days in advance
75 to 200 miles	10 work days in advance	15 work days in advance
greater than 200 miles	15 work days in advance	20 work days in advance
International	30 work days in advance	30 work days in advance

D. Shift work outside of standard first shift work hours (7 AM to 5 PM), including changes to previously staffed shift work (excluding cancelation of

shift work), require advanced approval by the Engineer. Following approval by the Engineer, shift work shall start no sooner than the first Monday following 10 work days' notice for locations up to 200 miles from Oakland, and the first Monday following 15 work days' notice for locations over 200 miles from Oakland.

E. If the required notification is not given, the District will schedule the witness inspection at its convenience and the activity to be witnessed shall not proceed until the Engineer arrives or the Engineer notifies the Contractor that it is choosing to waive its witness inspections. In the event that the required notification is not given and the activity has occurred in the absence of the Engineer, the Engineer may reject the processes completed to date and require the activity to be redone.

1. Delays resulting from failure to provide the required notification will be non-excusable. Expenses incurred by delays; repeat of the work process; or to correct unacceptable work shall be borne by the Contractor.

F. Out of Country Inspection and Witnessing

1. Equipment and items of supply that are subject to witness inspection by the District as identified in Article 1.4, "Witness Schedule" and other contractually required work and all places to be used for their production or testing, shall be available to District personnel. The District's decision that such equipment, items, or work cannot be safely inspected or observed, including a decision that the country, area, or facility in which production or testing is to occur may not be safe for District personnel shall be final and shall preclude the Contractor's utilization of such country, area or facility. The District will consult the US Department of State website (https://travel.state.gov/content/passports/en/alertswarnings.html) for "Travel Advisories" to countries and regions to determine the safety of international travel. Areas with travel advisories shall not be considered for procurement of items that require District inspection.

G. Confidentiality or Non-Disclosure Agreements

1. Facilities that require execution of a Confidentiality or Nondisclosure Agreement (NDA) shall submit a copy of the agreement for review to the District through the submittal process for the project or purchase agreement prior to requesting District inspection. The NDA will be considered an agreement between the District (not individual inspectors) and the requesting company. The requirements of the California Public Records Act shall supersede the terms of any NDA and language to that effect will be included in the NDA by the District.

1.3 TRAVEL EXPENSES

A. The Contractor shall include in the bid price all travel expenses for the Engineer to conduct the witness inspections noted if any of the inspections are to be performed at a locality exceeding 125 miles one way from Oakland, CA.

B. Travel expenses include hotel lodging at an establishment rated three diamond or better by American Automobile Association (AAA), or comparable listing, and a minimum $74 meal and incidental expenses allowance per day, or at the rate established by US General Services Administration (for domestic) or US Department of State (for international), whichever is greater, for the duration of the trip.

C. If travel exceeds 200 miles one way from Oakland, CA, in addition to the expenses described in 1.3.B, travel expenses shall also include round trip direct route coach airfare from Oakland, CA; San Francisco, CA; Sacramento, CA; or San Jose, CA Airports to manufacturer's plant or testing facility, mid-sized car rental or taxi services, fuel, tolls, ground transportation to and from the airport, and airport parking at the departing airport; the following expenses shall apply as determined by the Engineer:

1. For international or travel outside the continental United States, per diem rates are those established by the US Department of State for the specific location and dates of travel. Travel expenses may include the direct cost of securing passports, visas, language interpreters, document translators, communications, and internet access.

2. If weekend stays are requested to defray transportation costs, reimbursement for the Engineers' stay over the weekend will include meal allowance, hotel expenses, phone and internet access charges, rental car or transportation charges to and from eating establishments, laundry service, language interpreters, or other necessary business expenses or services.

3. Reimburse the District for any inspection that has to be repeated due to repair or rework of unacceptable work. Reimbursement shall include District Engineers' wages, or if done by a District agent, the agent's complete invoice for the needed inspection.

D. All fees incurred such as airline reservation change fees, loss of fare due to purchase of nonrefundable tickets, hotel cancellation/rebooking fees, etc., due to Contractor-requested changes to the inspection schedule after the initial notification shall be borne by the Contractor.

1.4 WITNESS SCHEDULE

A. The District will witness the following processes as specified in the applicable specification sections listed below or as required elsewhere in the Contract Documents. For purposes of estimating, anticipate that one Engineer will cover only one shift of shop inspection work per plant site. The costs for additional inspection required by the operation of more than one work shift per day or by more than one shop inspection site per day shall be included in the bid costs.

B. For pipeline projects, one additional Engineer is required at pipe manufacturing facilities for the sole purpose of reviewing radiographs.

Spec. Section	Section Title and Description
09 96 56.05	High-Build Epoxy Coatings – Surface preparation, coating application and testing
09 96 56.10	Fusion-Bonded Epoxy Coatings – Surface preparation, coating application and testing
33 12 16.15	AWWA Butterfly Valves – Seat leakage both directions, hydrostatic tests, and interior coating Holiday and DFT
33 12 16.16	High Performance Butterfly Valves-Performance, Seat leakage both directions, hydrostatic tests, dimensional and material check against submittals
33 12 16.27	AWWA Ball Valves- Production hydrostatic and seat tests, performance tests. Interior coating holiday and DFT
33 12 16.32	Electric Motor Valve Actuators – Functional tests

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 75 17

FIELD TESTING AND STARTUP

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Manufacturer's representative shall participate with he Installation Contractor to perform field testing, and startup of installed equipment and systems, as well as other manufacturer services.

B. All field testing shall comply with the requirements of this section. Additional field testing requirements are specified in other sections.

C. For factory testing and other testing requirements, see technical sections.

D. District Furnished Services: The District will furnish potable water required for testing unless otherwise specified.

1.2 DEFINITIONS

A. Commissioning: The process of testing the installation for compliance with contract requirements and demonstrating, through documented verification, that the project has successfully met the contractual requirements and the Project is ready for Operational Start-up.

B. Factory Acceptance Testing (FAT): Quality control testing conducted at the Manufacturer's facility to demonstrate components, devices, equipment/systems, and software meets specified performance requirements prior to shipment. Also referred to as source testing

C. Functional Test: The field testing required to determine if installed equipment or system will operate in a satisfactory manner and as specified. The Functional Test is a point-by-point test to confirm that all components associated with the equipment or system is operating properly. Functional testing is not intended to measure efficiency and performance.

D. Manufacturer's Certificate of Proper Installation: The form is submitted to the Engineer prior to Functional Testing to confirm that the equipment/system is installed in conformance with the Contract Documents. The form is provided in Appendix A.

E. Operational Startup Test: A test of all systems operating together to demonstrate satisfactory performance of the facility as a whole for a continuous period.

F. Performance Test: The field testing required to demonstrate the individual equipment or system meets all of the specified performance requirements.

G. Startup: The process of performing startup testing of the facility.

H. Test Procedures: Test procedures shall include testing methods, acceptance criteria, procedures, and test data forms for functional and performance tests.

1.3 FIELD TESTING INSTRUMENTS

A. The manufacturer's representative shall provide all instruments and materials necessary to complete the field tests unless otherwise specified. If required calibration instruments and materials are not provided on the day of test, the Engineer may postpone witnessing and sign off of instrument testing.

B. All instruments shall be calibrated prior to the start of testing. Certificates of calibration for all instruments used for testing shall be current, and shall be at the job site during testing. If an uncalibrated instrument was used in a test, the entire test shall be redone with calibrated instruments at the Contractor's sole expense including labor costs and other expenses incurred by District staff to witness the retest.

1.4 QUALITY ASSURANCE

A. All tests shall be subject to approval of the Engineer and shall be witnessed by the District. No testing shall be scheduled by the Contractor without Engineer approved test submittals. The Contractor shall provide a minimum of 5 work days' written notice confirming testing dates to the Engineer to enable witnessing of the testing.

1.5 SUBMITTALS

A. Submit the following within 90 days of NTP

1. Comprehensive Testing Schedule

B. Submit the following at least 60 calendar days prior to factory and field testing:

1. Test procedures for all field tests

2. Manufacturer's representative's resume demonstrating their qualifications and ability to perform the specified services

C. Prior to field testing, submit Calibration certificates for all instruments to be used during testing.

D. Test Reports:

1. Test Reports shall be submitted for complete systems; which is typically by specification section. Submitting partial test reports is not acceptable. Test submittals shall include the Specification Section number and Equipment Name in the title.

2. Upon completion of testing for each equipment item or system, the Contractor shall submit typewritten or word processed test reports and forms for review and acceptance within 10 calendar days of completed testing. Submit test results with signed statement by manufacturer's representative that results meet specification requirements and manufacturer standards; when a manufacturer's representative is not required to be present during testing, this signed statement shall be provided by the Contractor. Upon acceptance, all test reports (including all factory and field testing) shall be inserted by the Contractor into their respective O&M manuals.

1.6 MANUFACTURERS' SERVICES

A. A manufacturer's authorized representative shall perform all services when manufacturer's services are specified in the technical sections. The authorized representative shall be factory trained and experienced in the technical applications, installation, operation, and maintenance of the equipment, subsystem, or system. Additional qualifications may be specified elsewhere.

B. Manufacturer's representatives shall be subject to acceptance by the Engineer. No substitute representatives will be allowed without prior written approval by the Engineer.

1.7 TEST AND STARTUP SCHEDULE

A. Updated test schedules shall be submitted on a monthly basis after the first test schedule submittal.

B. List all equipment testing by specification section number and name. Include the following for each equipment/system:

1. Specification section and paragraph number

2. Testing pre-requisites as specified in technical specification sections

3. Test type (functional, performance, startup)

4. Test procedure submittal date

5. Testing and startup dates

6. Test report submittal date

C. Estimate dates as necessary, include actual dates when known

1.8 TEST PROCEDURES

A. The manufacturer's representative shall compose test procedures and Field Functional Test Data Forms for each required Functional and Performance test and for all equipment specified in the individual equipment specifications.

B. Unless otherwise noted, submit individual Field Test Procedures and Field Functional Test Data forms by specification section. Grouping test procedures for multiple specification sections into a single submittal is not acceptable. If functional tests are submitted together with performance tests, then separate each procedure and clearly identify each test by name: Functional Test, or Performance Test.

C. Coordinate with the Engineer to determine the operating requirements of adjacent or related systems that may be required to complete the Startup Test.

D. Prior to submitting for Engineer review, the Contractor shall review all test procedures to verify completeness and compliance with the specifications.

E. All test procedures shall be comprehensive, neatly organized, and word-processed. Test procedures shall include the following:

1. Detailed test methods including sample calculations as required.

2. Test setup procedures including details of all necessary adjustments, balancing, required equipment isolations or configurations, testing equipment, and testing instruments.

3. Step-by-step testing procedures (number each step). Specifically identify each test instrument (including tag numbers) used during testing.

4. Acceptance Criteria: For each test phase, specifically indicate what is considered an acceptable test result.

5. Data Forms: Include test name, equipment (with tag numbers as applicable) or system name, specification section and paragraph number, test instrument tag numbers, test date, space for testing personnel names, test data names and units, reference equations for all calculated values, and signature lines for manufacturer's representative, Contractor, and District witness.

6. Field Functional Test Data Form: A template for a field functional test data form is included at the end of each relevant section. The manufacturer's representative may use this template as a starting point when developing specific field functional test data forms, or the Contractor may develop their own data form provided that the data forms include all required information as specified in the template. A Microsoft Word electronic version of the field functional test data form template will be made available upon request.

7. Test Procedures: Testing procedures and manufacturer representative’s resumes shall be approved by the Engineer prior to performing any tests.

1.9 FUNCTIONAL TESTS

A. Functional tests shall not proceed until the Engineer has received, reviewed and approved the items listed below. The Contractor shall ensure that copies of these materials are on-site during testing.

1. Interconnection diagrams

2. As-builts

3. Manufacturer's Certificate of Proper Installation (when required)

4. Approved equipment or system technical submittal

5. Approved draft O&M Manuals with all factory test results and certificates excluding field functional testing and as-builts

6. All factory test reports

7. Calibration certificates (for all instruments used during testing)

8. All piping, conduit, equipment and systems have been properly tagged and labeled

9. Functional Test Procedures and Field Functional Test Data Forms

B. Field Commissioning of Instruments:

1. All instruments, including those provided by the District, which will be used as part of a functional test shall be properly commissioned prior to the start of the test

2. EBMUD “Field Calibration Tags” shall be properly completed and hung on all instruments in a system and in any related sub-system prior to functional testing of any equipment or other device in that system.

C. Equipment ID Tags:

1. All ID tags and labels on equipment, piping, valves, instruments, conduit and other devices or systems directly or indirectly related to the functional test shall be installed by the Contractor and verified by the Engineer prior to conducting the functional test.

D. Installation witness check of control systems wiring and devices with District staff shall not proceed until the following has been completed:

1. The Contractor has completed an initial un-witnessed loop or point-to-point test prior to requesting District staff to witness functional testing.

2. All field cables and wires are properly pulled, terminated, and labeled per contract requirements and match the latest drawings and interconnects.

3. All piping, conduit, equipment, and systems have been properly tagged and labeled.

E. Functional tests include:

1. Installation Inspection: Check for proper rotation, adjustment, alignment, mechanical and electrical connections, wire labeling, proper lubrication, and any other conditions which may damage or impair functioning.

2. Operation Check: Check for the proper operation of all system components.

3. Controls Check: Demonstrate proper function of all local and remote controls, instrumentation, and other equipment functions.

4. Alarms Check: Simulate alarm conditions and verify the proper operation of each alarm at the specified set point. Simulations shall be by means of direct element stimulation whenever possible, or by other means when direct element stimulation is not practical as determined by the Engineer.

5. Run Check: Each system or equipment item shall be operated continuously for 1 hour, minimum, to verify satisfactory operation. Additional operating time may be required as specified in the individual technical specifications, or as recommended by the manufacturer.

6. The individual technical specifications or the manufacturer may specify additional functional test requirements for each component or system.

7. If any part of a unit shows evidence of unsatisfactory or improper operation during the one-hour test period, or the test period specified by equipment technical specifications, correction or repairs shall be made, and the full test operation, as specified herein, shall be repeated after all parts operate satisfactorily.

1.10 PERFORMANCE TESTS

A. Performance tests shall not proceed until the Functional Test has been successfully completed.

B. Copies of all prior test results (factory, and field functional tests) shall be available on-site, prior to proceeding with performance tests.

C. Performance tests shall demonstrate that the equipment or system meets all specified performance requirements; see technical specification sections.

1.11 CONTROL SYSTEMS FUNCTIONAL TESTS

A. The CSFTs shall demonstrate the proper function each process systems' control modes (local manual/automatic, remote manual/automatic) from all interface locations (local and remote).

B. The District will not begin control systems functional testing until the Contractor has satisfied all prerequisites below:

1. All special tools and equipment related to instruments, controllers, and control systems furnished under this contract, including but not limited to HART communicators, shall be provided prior to the start of CSFT.

C. CSFTs will be completed by District staff with the primary assistance of a qualified representative of the control system equipment supplier provided by the Contractor, and the System Integrator. The Contractor furnished control system representative shall assist District staff in resolving potential conflicts between the control systems and other equipment or systems installed under the contract. The Contractor furnished representative shall be on-site during CSFTs and shall be dedicated only to those activities identified by the Engineer.

1.12 OPERATIONAL STARTUP TEST

A. The facilities startup test shall not proceed until all of the following have been completed:

1. The District has successfully completed all control systems functional testing work specified in this Section during the designated period allotted for the work after “Ready for Integration Programming”.

2. All other required tests have been completed and accepted by the Engineer. At the Engineer’s discretion, selected performance tests may be conducted during the Startup Test period.

3. Copies of all prior tests (factory, field functional, and performance tests) shall be available on-site.

B. Operational Startup tests shall be scheduled no sooner than 7 calendar days after the projected completion of Functional Testing on all related systems. All equipment/systems required by these specifications shall be included in the Startup Test.

C. The Contractor shall coordinate with District staff to startup the facility equipment and systems. The District will conduct a seven (7) day Operational Startup test with support of the Contractor, Subcontractors and Vendor Representatives as required by the Engineer to demonstrate to the District’s satisfaction that all equipment and systems required by these specifications operate together as intended

D. The Contractor shall provide qualified personnel to support startup and testing, and appropriate construction trade personnel to correct malfunctions and deficiencies at any time during the Startup Test. Only District personnel shall operate the equipment and systems.

E. The District will provide Contractor-trained operating personnel for the duration of the Startup Test. The District’s operating personnel shall be monitored by the Contractor and/or the manufacturer's representatives to ensure each system is being operated as intended.

F. The District will determine facility operating parameters such as plant flow rates, chemical dosages, and which systems or equipment will be operated at any given time. All systems and equipment will be operated within their normal operating ranges.

G. All defects in operation, materials, or workmanship that appear during the Startup Test shall be immediately corrected by the Contractor. In case of a system interruption, the Contractor shall repeat the Operational Startup Test of the affected systems and any other system directly related to the operation of the affected system. The Startup Test shall not be accepted as complete until all systems have successfully operated together to the satisfaction of the Engineer for a continuous seven (7) day period. All costs for corrective work and retesting shall be borne by the Contractor.

H. System interruptions include the following:

1. Malfunction or deficiency that results in a shut down or partial shutdown of any system

2. Malfunction or deficiency in any backup system that cannot be corrected by the Contractor within 4 hours after notification of the problem

3. Malfunction or deficiency that results in system or equipment performance that is less than specified

I. The Contractor shall maintain the qualified staff or vendor representatives (either onsite or on-call) to be able to respond immediately (24-hours per day) to system or equipment related questions and to correct deficiencies. The Contractor shall provide a list of qualified staff or vendor representatives to perform troubleshooting services during the Operational Startup period. On call staff shall report to the site within 2 hours of being informed of a deficiency.

J. The Engineer will maintain a log of equipment or system deficiencies along with the date and time when the Contractor was notified of the deficiency and the date and time when the Contractor notifies the Engineer that the deficiency has been corrected. All corrected deficiencies must be inspected and approved by the Engineer.

K. The Contractor shall maintain a log of equipment or system deficiencies along with a description of the required repairs necessary to correct the problem. The Contractor shall furnish up-to-date copies of this log to the Engineer upon request.

L. If the Operational Startup Test is interrupted through no fault of the Contractor, the test may resume at the earliest mutually agreeable time at no additional cost to the District.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. The qualified equipment manufacturer representative shall perform all functional and performance testing of installed equipment unless otherwise specified. The Contractor shall be present during all testing, even if the specific functional or performance test is performed by its equipment manufacturer representative.

B. The contractor shall coordinate with the manufacturer to schedule and perform testing. The contractor shall ensure that the job site and equipment is suitable for testing at the scheduled time of the test. The contractor shall provide personnel to operate or manipulate equipment under contractor control as required for the duration of the test.

C. The manufacturer's representative shall complete all testing in the presence of the contractor and in accordance with the District approved test procedures.

D. The manufacturer's representative, at a minimum, shall maintain and provide to the Engineer, the following records:

1. Daily logs indicating all equipment testing and startup activities and activities of all manufacturers' representatives

2. Records of all tests, calibrations, inspections, adjustments, services and corrective actions taken

3. Copies of all test data collected at the end of each day of testing

E. In addition to the tests specified in the individual technical specifications, the manufacturer shall perform additional tests as required by the Engineer to demonstrate to the Engineer's satisfaction that all equipment and systems required by the specifications will operate as intended.

F. If the testing of any equipment may affect the operation of existing District facilities, the testing shall be done under direct supervision of the Engineer. The Contractor shall comply with directions given by the Engineer.

G. Table 1 is a summary of equipment/systems that require functional, and performance tests. Additional testing may be required when specified elsewhere.

Table 1: Testing Summary (Additional tests may be required in other specification sections.)			
Specification Section	System / Equipment Name	Functional Test Required	Performance Test Required
33 12 16.15	AWWA Butterfly Valves	Y	N
33 12 16.27	AWWA Ball Valves	Y	Y
33 12 16.32	Electric Motor Valve Operators	Y	N
33 09 11	Magnetic Flow Meters	Y	N
33 12 16.16	High Performance Butterfly Valves	Y	Y
All equipment/systems required by these specifications shall be included in the Startup Test.			

3.2 CONTROL SYSTEMS FUNCTIONAL TESTS

A. All systems designed for control through PLC or SCADA will require testing. The Contractor shall make scheduling allowances for these tests and incorporate this information into the construction schedule (see Section 01 32 00 – Construction Progress Documentation). If the Engineer identifies deficiencies in workmanship, installation, materials, products, or anything else associated with the Contract work that delays the progress of the CSFT, then the Engineer may require additional time (beyond the number of calendar days specified in Section 01 11 00) to complete the testing to compensate for actual time lost due to troubleshooting and correcting the deficiencies as well as additional time to compensate for testing inefficiencies.

3.3 FIELD TESTING COORDINATION MEETINGS

A. The Contractor shall prepare materials for and attend periodic testing coordination meetings. During periods when field testing occurs regularly, the Engineer will schedule weekly or biweekly field testing coordination meetings. The Contractor's Testing Coordinator shall attend all meetings, and the Contractor shall provide suitable representation from each subcontractor or manufacturer having testing responsibilities so that informed decisions can be made during the meetings.

END OF SECTION

SECTION 01 81 02

SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 REFERENCES:

A. ASCE 7, American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

1.2 RELATED SECTIONS:

A. Section 01 43 11 – Seismic Qualification and Certification

B. Section 33 12 16.16 – High Performance Butterfly Valves

C. Section 33 12 16.27 – AWWA Ball Valves

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. Architectural elements, mechanical and electrical components, equipment housings and their attachments, supporting structures, and anchorages shall comply with the requirements of ASCE 7, using the following values:

a. Peak ground acceleration = 1.g

b. Seismic Design Category, D

c. Component importance Factor, Ip = 1.50

d. Component amplification factor, ap: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.

e. Component response modification factor, Rp: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.

f. Overstrength Factor, Ω: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1 for anchorage in concrete.

2. Do not use friction to resist sliding due to seismic forces.

3. Do not use more than 90 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.

4. Do not use more than 60 percent of the weight of the tanks for resisting overturning due to seismic forces.

5. Resist seismic forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction to resist seismic loads.

6. Anchoring and fastening to concrete and masonry.

    a. Use cast-in anchors (anchor bolts or welded studs) whenever possible for anchors at connections that resist seismic forces.

    b. Do not use concrete anchors, flush shells, sleeve anchors, screw anchors, powder actuated fasteners, or other types of post-installed anchors unless indicated on the Drawings or accepted in writing by the Engineer.

1.3 SEISMIC QUALIFICATION AND CERTIFICATION

A. The equipment and all components listed in listed in this specification shall not undergo loss of their intended function after application of the Code prescribed seismic forces as specified in Section 01 43 11.

1.4 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and seismic calculations.

B. Seismic Qualification and Certification shall be verified by an approved calculation that demonstrates the adequacy of the system for seismic forces. This calculation may be based on principles of structural analysis and engineering mechanics, or based on similarity to approved shake table tests as specified in Section 01 43 11.

C. Contractor shall submit for review and approval test data or calculations signed and sealed by a Civil or Structural Engineer registered in the State of California to show compliance with the above requirements.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 09 96 56.05

HIGH-BUILD EPOXY COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Provide high-build epoxy coatings as specified herein.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 45 27 – Shop Inspection

3. Section 09 96 56.10 – FusionBonded Epoxy Coatings

1.2 REFERENCES

A. Good Painting Practice, SSPC Painting Manual, Volume 1

B. Systems and Specifications, SSPC Painting Manual, Volume 2

1. SSPCSP 5 – White Metal Blast Cleaning

2. SSPCSP 10 – Near White Blast Cleaning

3. SSPCPA 1 – Shop, Field, & Maintenance Painting

4. SSPC-PA 2 – Procedure for Determining Conformance to Dry Coating Thickness Requirements

1.3 SUBMITTALS

A. Product data: Submit manufacturer's current specifications or technical information that proves compliance with the specified requirements.

B. Manufacturer's instructions: Submit manufacturer's written instructions and recommendations for surface preparation, coating repair, application of coating system, curing of coating system, and maximum recoat time.

C. Submit list of all coatings proposed for use.

1. Identify each coating by brand name and manufacturer, and indicate what items will be painted with the coating.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Applicator: Regularly engaged in application of similar coatings for at least two years immediately prior to this work.

2. Workers: Experienced and knowledgeable in preparation for and application of high performance industrial coatings.

B. Workmanship: Conform to standards and recommendations of SSPC Vol 1, especially Chapters 5.1 and 6.

C. Weather conditions:

1. Do not abrasive blast when ambient temperature is less than 5 degrees F above dew point.

2. Apply coatings only when conditions are within the limits prescribed by the manufacturer but, in any case, do not apply coating when:

a. Metal temperature is less than 50 degrees F.

b. Ambient temperature is less than 5 degrees F above dew point.

c. Relative humidity is greater than 85 percent.

d. Ambient temperature is below 40 degrees F or expected to drop below 40 degrees F within 6 hours.

PART 2 - PRODUCTS

2.1 COATING SYSTEM MATERIALS

A. Primer, intermediate, and finish coats shall be of same manufacturer.

B. Coatings in contact with potable water shall be certified by the National Sanitation Foundation in accordance with ANSI/NSF Standard 61.

C. Protective interior coatings for valves and hydrants shall conform to the requirements of American Water Works Association coating standard C550.

D. Liquid-epoxy coating for the interior and exterior of steel water pipelines shall conform to the requirements of American Water Works Association coating standard C210.

E. Acceptable products (Water Contact):

1. High build epoxy coatings:

a. Scotchkote 306, Scotchkote 314, 3M Corrosion Protection Products, (800) 722-6721

b. Amercoat 90HS, Amercoat 233ER, Amercoat 395FD, Amerlock 2, Amerlock 400, Pacific Southwest Coatings, (562) 691-9600 or (714) 777-0300

c. Series N140 Pota-Pox Plus, Series N140F Pota-Pox Plus Fast Cure, Tnemec Company, Inc., (800) 4863-6321

d. Carboguard 891 or Plasite 4500, Carboline Company, (800) 848-4645

e. Or equal as approved by the Engineer

F. Acceptable products (Air Contact):

1. High build epoxy coatings:

a. Carboguard 890 or Plasite 4500, Carboline Company, (800) 848-4645

b. Hi-Build Epoxy V78 Series, Valspar Corporation, (800) 637-7793

c. Tnemec Series N69, Tnemec Co., (707) 792-2646

d. Interseal 670 HS, International Protective Coatings. Local supplier: International Paint, (800) 821-2871

e. Bar-rust 235, Devoe Coatings Co., local supplier: ICI Paints Store, 3356 Piedmont Avenue, Oakland, CA 94611, (510) 547-4924

f. Or equal as approved by the Engineer.

G. Acceptable Products (Top Coat):

1. Urethane coatings (where urethane finish is specified):

a. Tnemec Co. Series 1075 Urethane

b. Carbothane 134 VOC Aliphatic Urethane

c. Or equal as approved by the Engineer

H. Thinners and solvents as specified by the coating system manufacturer

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Prepare surfaces to be coated in accordance with the manufacturer's instructions but not less than specified herein.

B. Grind off weld beads, slag, projections, and weld spatter and grind sharp edges of all metal round and smooth, so that it is ready for painting.

C. Surface preparation shall conform to the following:

1. SSPC-SP 5 for surfaces which will be submerged or buried.

2. SSPC-SP 10 for all other surfaces, except:

a. Pretreat galvanized surfaces in accordance with the manufacturer's recommendations.

3. Anchor profile as recommended by coating system manufacturer. If manufacturer does not recommend, anchor profile shall be 1.5 to 3.0 mils.

D. Blast cleaned surfaces shall be tested for soluble salts prior to the application of coatings. Chloride levels shall be 10 µg/cm² or less as determined using the "Chlor-test" method for chlorides or engineer approved equivalent. At least 3 tests shall be performed in each area of 10 m² (100 ft²). If any single test is greater than 10 µg/cm², the area shall be water washed and re-blasted. It shall then be retested prior to coating application, and the same limits shall apply.

E. Install an oil and moisture separator in air line between compressor and blast machine. Use Clemco Triplex filter or equal as approved by the Engineer.

3.2 APPLICATION

A. Mix, thin, and apply all coatings in accordance with the manufacturer's instructions, the applicable requirements of SSPC-PA 1, and as specified herein.

B. Surface to be painted shall have specified surface preparation at the time of application of coating.

C. Minimum Dry Film Thickness (DFT) of coating system: 12 mils. Maximum DFT per manufacturer's data.

D. Coating shall be free of holidays and pinholes.

E. Apply coatings by air or airless spray except:

1. Stripe all welds, edges, and repairs by brush prior to applying first full coat.

F. Each coat shall be a different color than the preceding coat. Additional coats, where required, shall be tinted to provide color contrast but final coat shall be color specified.

G. After each coat and immediately prior to application of a subsequent coat, clean surface as required to remove dirt, dust, overspray, and other contaminants that may affect adhesion of the subsequent coat.

H. Discard all catalyzed coatings at the end of each work day or at end of manufacturer's recommended pot life, whichever is first.

I. Final coat shall be well bonded, uniform in color over the entire surface, and smooth to touch with no sags, runs, overspray, cracks, or other surface defects.

J. Coating repairs in shop:

1. Touch up or refinish all chipped, abraded, or otherwise unsatisfactory portions of the work in accordance with the manufacturer's recommendations.

3.3 QUALITY CONTROL

A. The District may inspect the surface preparation and the application of the coating system. Provide notification for Engineer to be present for abrasive blasting. See Section 01 45 27, Shop Inspection, for inspection advance notification requirements and District travel expenses.

B. Contractor shall furnish test equipment and personnel for testing.

C. Contractor's tests shall be made in the presence of the Engineer. The Engineer may conduct its own coating tests at the shop and after installation.

D. Measure coating thickness after each coat using non-destructive magnetic dry film gauges and in accordance with SSPC-PA 2.

E. Adhesion:

1. The adhesion of properly applied and cured coating shall be such that it cannot be removed except by sand or grit-blasting or by power brushing.

2. The second coat shall show complete adhesion to the first coat 72 hours after its application.

3. If the Engineer disagrees with the Contractor about coating application, coating curing, or coating failures, the Engineer may use destructive test instruments to evaluate the condition of the coating. The Contractor shall repair the coating at the areas of destructive testing.

4. Cured coating shall show no peeling of coating from metal or separation between coats.

F. Contractor shall test all coated surfaces for holidays and pinholes after application of the final coat and before application of urethane topcoat (if required).

1. Perform test after coating has cured as recommended by the manufacturer.

2. As directed by the Engineer, use either a low voltage wet sponge holiday detector or a high voltage holiday detector.

a. Low voltage wet sponge holiday detector shall be equal as approved by the Engineer to K-D Bird Dog or Tinker-Rasor M-1. Add a non-sudsing wetting agent, such as Eastman Kodak Photo-Flo to the water used to saturate the sponge.

b. High voltage holiday detector shall be equal as approved by the Engineer to Tinker-Rasor AP-W or D. E. Stearns Model 14/20. Use in accordance with coating manufacturers recommendations except use voltage of 150 volts per mil of coating.

3. Retest after coating repairs.

3.4 FIELD REPAIR OF COATINGS

A. After installation of coated items, repair damaged areas and any gaps in shop-applied coatings. Gaps are typically from coating hold-back areas for field welds.

B. Bare Metal: Prior to coating, prepare the bare metal surface per SSPC-SP3 by removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by power wire brushing, power sanding, power grinding, power tool chipping, and power tool descaling.

C. Feathered Coating Overlap: Prepare the shop applied coating next to the bare metal by using 80-grit sandpaper to roughen the coating and also uniformly feather the coating from full thickness at 1” minimum from the metal edge to bare metal at the metal edge.

D. Debris left from power tool and sanding preparation shall be removed by blasting with compressed air.

E. After preparation by power tool, then prepare surface per SSPC-SP1, by removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying agent, or steam.

F. In cold weather, uniformly preheat the bare steel area prior to application as required by the coating manufacturer. The steel surface area temperature shall be measured to be at least 5 deg-F higher than the measured air dew-point temperature in the work area.

G. Coat the bare metal and feathered coating overlap areas with the shop coating manufacturer's recommended field repair material. Apply the number of coats as required to obtain a dry film thickness of 12 mils minimum, using brush or spray. Brush shall only be used for touch-up work of less than 3 sq-ft.

H. Comply with recommendations of the coating manufacturer.

END OF SECTION

SECTION 09 96 56.10

FUSION-BONDED EPOXY COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Provide fusion-bonded epoxy coatings as specified herein.

B. Related sections:

1. Section 01 45 27 – Shop Inspection

2. Section 09 96 56.05 – High-Build Epoxy Coatings

C. Special requirements:

1. Either electrostatic spray method or fluidized bed method of application may be used for shop coating of fabricated piping or miscellaneous metal.

a. Depth of fluidized bed shall be a minimum of one foot greater than the longest pipe section.

1.2 REFERENCES

A. SSPC-1 – Solvent Cleaning

B. SSPC-SP 10 – Near-White Metal Blast Cleaning

C. SSPC-SP 5 – White Metal Blast Cleaning

D. SSPC-SP 11 – Power Tool Cleaning to Bare Metal

E. SSPC-PA 2 – Procedure for determining conformance to dry coating thickness requirements

F. AWWA C116– Protective Fusion-Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings

G. AWWA C213 – Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines

1.3 SUBMITTALS

A. Product data: Submit manufacturer's current specifications or technical information that proves compliance with the specified requirements.

B. Manufacturer's instructions: Submit manufacturer's written instructions and recommendations for field coating and repair of coating system.

C. Submit list of all coatings proposed for use.

1. Identify each coating by brand name and manufacturer, and indicate what items will be painted with the coating.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Applicator: Regularly engaged in application of similar coatings for at least two years immediately prior to this work.

2. Workers: Experienced and knowledgeable in preparation for and application of fusion-bonded epoxy coatings.

1.5 JOB CONDITIONS

A. Environmental conditions:

1. Do not abrasive blast when ambient temperature is less than 5 degrees F above dew point.

2. Apply coatings only when conditions are within the limits prescribe by the manufacturer but, in any case, do not apply coatings when:

a. Metal temperature is less than 425 degrees F for fluidized bed

b. Metal temperature is below 55 degrees F for repair work

c. Relative humidity is greater than 70 percent for fluidized bed

d. Relative humidity is greater than 85 percent for repair work

3. The cleaned pipe surface shall be protected from conditions of high humidity, rainfall, and surface moisture. The pipe surface shall not be allowed to flash rust before coating.

B. Safety:

1. Comply with the applicable safety recommendations of SSPC-PA-Guide 3 and Good Painting Practice, Chapters 2.4 and 5.3.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Coating: 100% solids, fusion-bonded, thermo-setting resin powder.

B. Approved products:

1. Electrostatic spray: Scotchkote No. 134 (green), 3M

2. Fluidized bed: Scotchkote No. 203 or No. 206N, 3M

3. Or equal as approved by the Engineer

2.2 APPROVED APPLICATORS

A. California Pipe Fabricators, Dixon, CA, (707) 678-3069

B. U.S. Pipe Fabrication, Inc., Marysville, CA, (530) 742-5171

C. Reliable Powder Coating, San Leandro, CA, (510) 895-5551

D. Or equal that is certified by the manufacturer and approved by the Engineer

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Grind smooth all surface irregularities, welds, and weld spatter.

B. Grind smooth and round all sharp metal edges.

C. Abrasive blast surfaces to white metal in accordance with SSPC-SP 5.

D. Surface anchor profile: 1.5 to 4.0 mils or as recommended by manufacturer.

E. Oxidation of the steel prior to coating in the form of “blueing” or other apparent oxide formation is not acceptable. If such oxidation occurs, the pipe shall be cooled to ambient temperature and re-cleaned.

F. The heat surface shall not leave a residue or contamination on the pipe surface. Graduated “Tempilstik” crayons shall be used and supplied to the District by the Contractor to measure the temperature. Only a small spot of pipe shall be touched with the “Tempilstik”. Optical pyrometers may be used in addition to, or in lieu of “Tempilstik”. The calibration of the optical pyrometer shall be checked at least twice daily.

3.2 COATING APPLICATION

A. Preheating, coating application, and post-curing shall be in accordance with the coating manufacturer's instructions and AWWA C213.

B. Dry film thickness of cured coating shall be 12 mils minimum (but not less than the coating manufacturer’s recommendations), unless otherwise shown.

C. Coating shall be free of holidays and pinholes.

D. Finished coating shall be well bonded and have no sags and runs.

3.3 QUALITY CONTROL

A. District may inspect surface preparation and application of the coating system. Provide notification for Engineer to be present for abrasive blasting. See Section 01 45 27 – Shop Inspection, for inspection advance notification requirements and District travel expenses.

B. The finished coating shall be inspected and tested at the coating plant by the applicator for holidays and for coating thickness. All testing shall be done in the presence of the Engineer.

C. Thickness shall be measured with a non-destructive paint film thickness gauge such as Mikrotest and in accordance with SSPC-PA 2, Procedure for determining conformance to dry coating thickness requirements.

D. As directed by the Engineer, test using either a low voltage wet sponge holiday detector or a high voltage holiday detector.

1. Low voltage wet sponge holiday detector, for coatings to 20 mils dry film thickness, shall be equal as approved by the Engineer to KD Bird Dog or -Tinker-Rasor M-1. Add a non-sudsing wetting agent, such as Eastman Kodak PhotoFlo- to the water used to saturate the sponge.

2. High voltage holiday detector, for coatings more than 20 mils dry film thickness, shall be equal as approved by the Engineer to Tinker-Rasor AP-W or D. E. Stearns Model 14/20. Use in accordance with coating manufacturer's recommendations except use voltage of 125 volts per mil of coating.

E. The finished coating shall have the following physical properties:

1. Adhesion test: 3,000 psi minimum when pulling the appropriate sized dolly from surface coating to which it has been adhered using a DeFelsko PosiTest Automatic Adhesion Tester Model AT-A, or equal as approved by the Engineer.

F. Any work found deficient shall be repaired and brought to full compliance with these specifications. Retest after coating repairs.

3.4 FIELD REPAIR OF COATINGS

A. After installation of coated items, repair damaged areas and any gaps in shop-applied coatings. Gaps are typically from coating hold-back areas for field welds.

B. Bare Metal: Prior to coating, prepare the bare metal surface per SSPC-SP3 by removing all loose mill scale, loose rust, loose paint, and other loose detrimental

foreign matter by power wire brushing, power sanding, power grinding, power tool chipping, and power tool descaling.

C. Feathered Coating Overlap: Prepare the shop applied coating next to the bare metal by using 80-grit sandpaper to roughen the coating and also uniformly feather the coating from full thickness at 1” minimum from the metal edge to bare metal at the metal edge.

D. Debris left from power tool and sanding preparation shall be removed by compressed air blast.

E. After preparation by power tool, then prepare surface per SSPC-SP1, by removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying agent, or steam.

F. In cold weather, uniformly preheat the bare steel area prior to application as required by the coating manufacturer. The steel surface area temperature shall be measured to be at least 5 deg-F higher than the measured air dew-point temperature in the work area.

G. Coat the bare metal and tapered coating overlap areas with the shop coating manufacturer's recommended field repair material. Apply the number of coats as required to obtain a dry film thickness of 12 mils minimum, using brush or spray. Brush shall only be used for touch-up work of less than 3 sq-ft.

H. Comply with recommendations of the coating manufacturer.

END OF SECTION

SECTION 33 09 11

INSTRUMENTS AND RECORDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish, and test zero length magnetic flow meter as specified herein and as shown on the ISA sheet

B. Related sections:

1. Section 01 75 17 – Field Testing and Startup

1.2 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 - Submittal Procedures.

B. Within 30 days after receipt of the Notice to Proceed, submit descriptive literature and drawings for all items. The literature and drawings shall contain the manufacturer's name, description, manufacturers' product data, and the full item number or equipment designation. Submit for approval a completed ISA TR20 specification form for each device, referenced by the equipment identification tag number given on the P&ID.

C. ISA TR20 specification forms shall not be required for the types of instruments listed directly in the products section. Instead, provide literature and drawings containing the manufacturer's name, description, manufacturers' product data, and the full item number or equipment designation.

D. For buried flowmeters, the Manufacturer's Representative shall certify and provide a field report for the installation, which shall include verification of the necessary potting at the junction box of the flow tube. This shall be submitted prior to tape-wrapping and backfill. Additionally, complete and submit the Manufacturer's Certificate of Proper Installation, provided in Appendix A.

E. Submit calibration certification for each test kit to be used for field commissioning.

F. Submit shop drawings for instrument mounting supports and panels.

G. Submit all as-built markups of District's drawings and equipment suppliers' record drawings and documents to the Engineer in accordance with Section 01 33 00, Submittal Procedures.

H. Field Calibration Verification Testing Instrument: see Calibration Verification and Set Point Adjustment in Article 3.2.

I. Instrument Calibration Worksheet: The contractor shall submit all field calibration verification using the instrument calibration worksheet included in Appendix A.

J. Field Test Reports: See Section 01 75 17 – Field Testing and Startup. In addition to the requirements specified in Section 01 75 17, document the calibration verifications with the

Instrument Calibration Worksheet (see Appendix A) for each instrument including, at a minimum, all the information recorded on the EBMUD Field Calibration Tag.

K. Operation and Maintenance (O&M) Manuals: Refer to Section 01 33 00 – Submittal Procedures.

1. Submit a separate O&M Manual Review Checklist for each type of device provided.

1.3 REFERENCES

A. ASME B40.100 – Pressure Gauges and Gauge Attachments

B. ISA RP16.6 – Methods and Equipment for Calibration of Variable Area Meters (Rotameters)

C. ISA TR20.00.01-2001 – Specification Forms For Process Measurement and Control Instrumentation

1.4 QUALITY ASSURANCE

A. All components of the equipment furnished shall be of the best quality, constructed of durable materials, and designed for long life in continuous service with a minimum of maintenance.

B. All mechanisms shall be enclosed in such a manner that they shall be protected against damage from dust, moisture, or striking by external objects.

C. All working parts shall be of corrosion resistant materials. All switches within the instruments, except temperature switches, shall be miniature snap-action switches.

1.5 PRODUCT STORAGE AND HANDLING

A. Materials shall be suitably protected from the weather during storage.

1.6 MANUFACTURER'S FIELD SERVICES:

A. Manufacturer's Representative: the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedures for each of the services listed.

B. Training Services: the manufacturer's representative shall be present at the site and classroom designated by the Engineer, for the minimum number of days listed below.

Minimum Total Time (Person-Days*)	Manufacturer's Service
1	Installation assistance and certification.
1	Field testing and startup (see Section 01 75 17 for additional requirements)
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

PART 2 - PRODUCTS

2.1 GENERAL

A. Service Conditions and Operation: Refer to either the System Functional Description or the service description for each device.

B. Unless otherwise indicated, provide all new materials and equipment, free from any defects, and suitable for the space provided. Provide materials and equipment listed by UL wherever standards have been established by that agency.

C. Standard products: Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications.

D. Equipment finish: Provide materials and equipment with manufacturer's standard finish system. Provide manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment in accordance with ANSI No. 61, medium gray color.

E. ISA TR20.00.01-2001 Specification Forms: Instrument product specifications are located on the ISA specification forms at the end of this Section. Products not conforming to a standard specification form are detailed in the following Articles.

2.2 INSTRUMENTS

A. Flow

1. Magnetic Flowmeter – Water Service: See ISA specification form.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The installation of all instrumentation and associated components shall conform to drawings, Manufacturer's installation instructions, and as specified. Any proposed deviation shall be approved by the Engineer prior to implementation.

B. Installation shall be performed by an ISA Certified Control Systems Technician (CCST).

C. Before installation can commence, the technician shall present their ISA certification for verification.

D. Equipment shall be installed in a neat and workmanlike manner, and firmly secured to the surface on which it is mounted.

E. All instruments and instrument groups shall have all internal connections factory piped and wired, as shown on drawings. All electrical wiring shall be in ¾-inch liquid tight flexible conduit at the instrument enclosure. Unused conduit connections shall be sealed with threaded stainless steel conduit plugs.

F. Terminals shall be easily accessible with the terminal cover having a minimum of 9-inches external clearance.

G. View of the indication shall be convenient and unobstructed. The instrument housing shall be rotated as required to provide this.

H. Ensure that process connections match the instrument connections.

I. All level transmitters shall be installed at a location easily accessible for routine maintenance.

J. Pressure and level transmitters shall be mounted as follows:

1. Suction and discharge pressure transmitters shall be mounted on channel strut next to the pipe tap (for interior tap connections) and at the same elevation at the pipe centerline (see drawings for centerline elevations).

2. Reservoir level transmitters shall be mounted in the valve pit on channel strut at the same elevation as the reservoir bottom. A two-ply plastic laminated reservoir elevation information sign (per TM413) shall be installed where shown on the drawings or as directed by the engineer. Submit the sign layout and text for approval.

3. Where it is not possible to mount the pressure transmitters at the above elevations, the transmitters shall be programmed with a pressure offset to read the pressure as it would be at the pipe centerline elevation. Where it is not possible to mount the level transmitters at the above elevations, the transmitters shall be programmed with a level offset to read the level as it would be at the reservoir bottom elevation. Any programmed offset shall be recorded on the EBMUD Field Calibration Tag.

K. All instrument tubing shall be routed with a continuous slope at 1/4" per foot minimum, containing no high or low spots between the tap and the instrument.

L. Install wiring from grounding rings for magnetic flowmeters in plastic or plastic lined piping.

M. Prior to backfilling the buried magmeters, the Manufacturer's Representative shall, in the presence of the Engineer, visually inspect the junction box potting installation. Potting shall be re-applied as required. Installation of the buried magmeters shall be performed per TM416.

3.2 FIELD TESTING AND STARTUP

A. Refer to section 01 75 17 for additional requirements.

B. Field Commissioning:

1. Commissioning shall be performed by an ISA Certified Control Systems Technician (CCST).

2. Before commissioning can commence, the technician shall present their ISA certification for verification.

3. All instruments shall have the calibration verified, settings adjusted and visual checks performed as required below in conformance to this specification and the P&IDs. Pressure calibration verifications and setting adjustments shall be performed "dry". The liquid must be drained from the instrument. "Wet" calibration verifications are not acceptable.

a. Setting Adjustments: Adjustment of zero, span, deadband, setpoint, and elevation offset, as applicable. Additional setting adjustments may be required by the manufacturer's instructions.

1) Instruments included: Magnetic flowmeters, sonic transit-time flowmeters, thermal massflow transmitters, flow switches, capacitance level transmitters, ultrasonic level transmitters, capacitance level transmitters, ultrasonic level transmitters, radar level transmitters, level switches, pressure and DP switches, temperature switches, position transmitters, position switches.

2) Valves included: Pilot valves and adjustable relief valves.

b. Visual Check: Verify that the instrument is properly installed and not damaged, the readout indicator position appears appropriate for the system conditions (is not beyond full scale and returns to zero when expected), and the readout movement is smooth.

1) Instruments included: Rotameter, flow indicator, thermometers.

c. Calibration Verification and Set Point Adjustment:

1) Prior to field verifications, the Contractor shall submit information on the calibration equipment that will be used for field verification of instruments and devices.

2) Flow Devices: A portable sonic transit-time flowmeter such as GE TransPort PT878 shall be used. The test kit shall have an accuracy of ±2% of reading or better. Switches may be verified with the installed flow transmitter if available.

4. The verified settings shall be recorded on the EBMUD Field Calibration Tag. All relevant fields shall be completed:

a. Equipment Tag ID

b. Transmitters:

1) Input: Lower & Upper Range Value with units

2) Output: Lower & Upper Range Value with units

3) Offset: For pressure transmitters, any programmed pressure offset for transmitter elevation relative to the piping.

c. Switches: Setpoint(s) with units for each contact, notated “INC” for increasing or “DEC” for decreasing. If the deadband is adjustable, the deadband setpoint with units.

d. Gauges: Enter “Calibration Verified” into the Remarks.

e. Pilot valves (controlling larger valves) and adjustable relief valves: Setpoint with units, notated “INC” for increasing or “DEC” for decreasing, as applicable.

f. Initials of the technician, the inspector, and the date of calibration.

C. Functional Tests: demonstrate that all functional criteria specified herein are met for each respective device in accordance with Section 01 75 17.

3.3 SUPPLEMENTS

A. The following supplements follow END OF SECTION and are a part of this section:

1. ISA TR20.00.01-2001 Specification Forms

END OF SECTION

1		RESPONSIBLE ORGANIZATION	MAGNETIC FLOWMETER (Exposed)	6		SPECIFICATION IDENTIFICATIONS	
2		EBMUD	Service: Water	7		Document no	<Spec No.>
3			Device Specification	8		Latest revision	0 Date
4				9		Issue status	
5				10			

11		FLOWMETER BODY			60		TOTALIZER INDICATOR		
12		Body type	Flanged		61		Totalizer type	Integral totalizer required	
13		Flow tube style	MFR STD; IP68 for buried svc		62		Enclosure type no/class	MFR STD	
14		End conn nominal size, inch	36”	Rating Note 3	63		Signal power source	MFR STD	
15		End conn termn type	Flanged	Style Note 3	64		Contacts arrangement	MFR STD	Quantity
16		Flow tube diameter	Same	Thickness Std Wt	65		Totalizer reset style	MFR STD	
17		Hardware mounting kit	MFR STD		66		Integral indicator style	MFR STD	
18		Flow tube material	Carbon Steel, SST or ceramic		67		Cert/Approval type	MFR STD	
19		Lining material	Polyurethane, EPDM, or Viton		68		Mounting location/type	MFR STD	
20		End termination material	Same as body		69		Enclosure material	MFR STD	
21		Gnd/protective ring matl	Built in electrode with no rings		70				
22					71		PERFORMANCE CHARACTERISTICS		
23					72		Min press at design temp	0 psig	At 70 deg F
24		END EXTENSIONS			73		Max press at design temp	150psig	
25		End termination type	MFR STD	Style	74		Min working temperature	33 deg F	Max 100 deg F
26		Bolting material	N/A		75		Accuracy rating	+/- 0.5% of rate or better (Note 4)	
27		End termination material	Carbon Steel		76		Min velocity URL	0.5	Max 33
28		Gasket/O ring material	EPDM		77		Min liquid conductivity	H2O	
29					78		Output signal damping LRL	MFR STD	URL MFR STD
30		SENSING ELEMENT			79		Min ambient working temp	33 deg F	Max 120 deg F
31		Electrode type/Qty	MFR STD/ Minimum 6		80		Contacts ac rating	N/A	At max N/A
32		Insertion length	MFR STD		81		Contacts dc rating	N/A	At max N/A
33		Electrode material	316L SST		82		Max sensor to receiver lg	MFR STD	
34					83		Fluid	Water	
35		COILS AND HOUSING			84				
36		Housing construction type	Sealed		85				
37		MFR STD	MFR STD		86		ACCESSORIES		
38		Enclosure type no/class	MFR STD		87		Connecting cables length	MFR STD	
39		Signal power source	MFR STD		88		Cable Glands	N/A	
40		Signal termination type	MFR STD		89		Ultrasonic cleaner style	N/A	
41		Cert/Approval type	MFR STD		90		Empty tube detector	MFR STD	
42		Housing material	MFR STD		91		Calibrator adaptor	N/A	
43					92		Calibrator/configurator	N/A	
44					93				
45		TRANSMITTER OR CONVERTER			94		SPECIAL REQUIREMENTS		
46		Housing type, above grade	Weatherproof		95		Custom tag	Per Section 01 91 13.10	
47		Housing type, below grade	IP67		96		Reference specification	33 09 11	
48		Output signal type	4-20 mA into 1000 ohm load		97		Compliance standard	EBMUD	
49		Enclosure type no/class	NEMA 4X, Class I, Div II		98		Calibration report	MFR STD	
50		Characteristic curve	N/A		99		Software configuration	MFR STD	
51		Digital communication std	Hart protocol or DeviceNet		100				
52		Signal power source	24 VDC (Four-wire, two f/ power)		101		PHYSICAL DATA		
53		Failsafe style	N/A		102		Estimated weight	N/A	
54		Integral indicator style	LCD with engineering units		103		Face-to-face dimension	N/A	
55		Signal termination type	MFR STD		104		Overall height	MFR STD	
56		Cert/Approval type	MFR STD		105		Removal clearance	MFR STD	
57		Mounting location/type	Attached to flow element		106		Signal conn nominal size	MFR STD	Style MFR STD
58		Failure/Diagnostic action	MFR STD		107		Mfr reference dwg	MFR STD	
59		Enclosure material	MFR STD		108				

110		CALIBRATIONS AND TEST		INPUT OR TEST			OUTPUT OR SCALE	
111		EQUIPMENT TAG ID #S	MEAS/SIGNAL/TEST	LRV	URV	ACTION	LRV	URV
112		457-TWS-FE-148	Flow rate-Analog output	0 gpm	34720 gpm	Direct	4 mA	20 mA
113								
114								
115								
116								
117								

118		COMPONENT IDENTIFICATIONS		
119		EQUIPMENT TAG ID #S	MANUFACTURER	MODEL NUMBER
120		All	See Note 1	See Note 1
121				

Notes	
*	Supplier shall complete or update data fields as applicable for equipment actually furnished.
1.	Acceptable Products: Endress and Hauser zero straight length W400, or equal as approved by the Engineer.
2.	Meter shall be bi-directional flow measurement capable. Contact closure shall indicate flow direction.
3.	Pressure ratings: 24-inch & smaller = ASME Class 150 (285-psig). 30-inch & larger = AWWA C207 Class D (150-psig).
4.	The meter shall have +/- 0.5% or better with 0 diameters of straight piping up/down.

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SECTION 33 12 16.15

AWWA BUTTERFLY VALVES

(1) GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish complete and testAWWA butterfly valves. See Table A.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 45 27 – Shop Inspection

3. Section 01 75 17 – Field Testing and Startup

4. Section 09 96 56.05 – High-Build Epoxy Coatings

5. Section 09 96 56.10 – Fusion-Bonded Epoxy Coatings

1.2 REFERENCES

A. ANSI/AWWA C504-latest revision – AWWA Standard for Rubber-Seated Butterfly Valves 3" through 72"

B. ANSI/AWWA C207 – AWWA Standard for Steel Pipe Flanges for Waterworks Service, Sizes 4" Through 144" (for Valve Class E flange bolt drilling dimensions)

C. AWWA M49, Third Edition – Quarter-Turn Valves: Head Loss, Torque, and Cavitation Analysis

1.3 SUBMITTALS

A. All butterfly valves furnished for this contract shall be by same manufacturer, unless approved in writing by the Engineer prior to submittals or manufacture.

B. Submit the following prior to fabrication:

1. See the submittal content requirements listed in the “AWWA Butterfly Valve Technical Submittal Checklist” attached at the end of this section.

2. Each page of the submittal shall have a unique sequential page number (hand-written is acceptable, but must be completely legible).

3. The first page of the submittal shall include the “AWWA Butterfly Valve Technical Submittal Checklist” completed by the manufacturer’s

representative. Each submittal requirement listed in the checklist shall include the corresponding submittal page number(s).

4. If the "AWWA Butterfly Valve Technical Submittal Checklist" is not included with the submittal or if all portions of the checklist are not completed accurately by the manufacturer's representative, the submittal will be returned without review.

C. Submit the following prior to shipping:

1. Operating and Maintenance (O&M) Manuals:

a. In addition to the requirements of section 01 33 00 – Submittal Procedures, O&M manuals shall include a section for field installation certification (if required) and field test results. The Contractor shall furnish the required number of copies for insertion into the final O&M Manuals.

2. Certified copies of all manufacturer tests made under AWWA Standard C504 or AWWA C516 depending on which size applies:

a. Performance Test

b. Leakage Test

c. Hydrostatic Test

d. Proof-of-Design Test: For each basic valve type provided by the manufacturer

3. Coating Report:

a. Surface Preparation: Type of blast media used, surface cleanliness achieved (e.g. SSPC-SP-10), and surface profile

b. Coatings: Type (High solids epoxy, fusion bonded epoxy), brand or trade name, lot or batch number, color for each layer of coating, mixing parameters (if required) amounts mixed for each component and dwell "soak" time

c. Environmental Conditions at Time of Application: Air temperature, substrate temperature, dew point

d. Date and Time of Application: For each layer

e. Application Method (electrostatic, flock, airless, conventional, brush, roller)

f. Coating thickness achieved

D. Submit the following prior to Ready for Service:

1. Field Functional Test results

2. Manufacturer's Certificate of Proper Installation is required for all valves except manually operated valves 12" and smaller.

TABLE A - AWWA BUTTERFLY VALVES

Tag #	Size [inch]	Type	Pressure and Velocity Class	Modulating Service (Yes/No)	Installation Type	Rotation to Open	Int. Coating	Ext. Coating	Cv	Features
457-TWS-HV-01	54	Flanged	150B	No	Buried	CW	A	A	TB	1
457-TWS-HV-147A	16	Flanged	150B	No	Exposed	CCW	A or B	A or B	TB	2
457-TWS-HV-147B	16	Flanged	150B	No	Exposed	CCW	A or B	A or B	TB	2

Notes:

Valve Operator Rotation: CCW Counterclockwise; CW Clockwise

Coatings: A = High-Build Epoxy per Section 09 96 56.05; B = Fusion Bonded Epoxy per Section 09 96 56.10

Cv: Minimum Flow Coefficient (flow rate in gpm that results in a pressure drop of 1.0 psi across the valve)

TB = see Table B (below) for Cv values

Features:

Actuator:

(1) 2” nut with extension

(2) Manual with handwheel

TABLE B - MINIMUM FLOW COEFFICIENT (for pressure class up to 150B)			
SIZE	**Cv**	**SIZE**	**Cv**
LESS THAN 24”	MFR’S STD	60”	163,000
24”	22,500	66”	198,000
30”	35,500	72”	236,000
36”	52,000	78”	275,000
42”	71,500	84”	318,000
48”	103,000	90”	365,000
54”	131,000	96”	416,000
Cv: minimum flow coefficient (flow rate in gpm that results in a pressure drop of 1.0 psi across the valve)			

1.4 QUALITY ASSURANCE

A. Shop Inspection:

1. The Engineer will witness the following tests at the valve manufacturer for each valve: shell hydrostatic test; seat leakage test(s); interior coating dry film thickness test; interior coating holiday test; and functional test. Any valve found not to comply with the specifications will not be accepted until the deficiencies are corrected.

2. The Engineer will release the valves for shipping after satisfactory completion of all tests. All valves shall be provided in accordance with the approved technical submittal.

3. Provide notification for Engineer to be present for testing. See Section 01 45 27 – Shop Inspection for inspection advance notification requirements, travel restrictions, nondisclosure agreements, and District travel expenses reimbursement.

4. Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery.

B. Coordination:

1. Contractor shall coordinate dimensions of piping and valves so there are no interferences and piping, flanges and valves match.

2. Contractor shall coordinate dimensions of inside diameter of pipe lining and outside diameter of disc for disc clearance when valve is open.

3. Contractor shall coordinate length of valve stem extensions, based on actual field measurements of existing dimensions, including verification of depth of

buried valves and height of roof for valves inside vaults (roof mounted 2" square nut with extension stem).

1.5 MANUFACTURER'S FIELD SERVICES:

A. Manufacturer's Representative: the Contractor shall furnish the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedures for each of the services listed. The installing contractor will coordinate the manufacturer's field services as described herein with the valve supplier.

B. Training Services: the manufacturer's representative shall be present at the site and classroom designated by the Engineer, for the minimum number of days listed below.

Minimum Total Time (Person-Days*)	Manufacturer's Service
2	Installation assistance and certification.
2	Field testing and startup (see Section 01 75 17 for additional requirements)
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

(2) PRODUCTS

2.1 RUBBER SEATED BUTTERFLY VALVES

A. General

1. Service Conditions (potable water service):

2. Butterfly valves shall comply with AWWA Standard C504 (for 3" through 72" valves) or AWWA Standard C516 (for 78" and larger valves), depending on which size applies, except as modified in this section. In cases where the requirements of this section conflict with the AWWA requirements, the requirements of this section shall govern

3. Refer to table A for connections. . All flanges are flat faced.

4. All valves specified in this section shall be suitable for operation with maximum pressure, designated by number, and flow velocity, designated by letter, as listed under “Pressure Class” in Table A. Actuators shall be sized to operate the valve at this combined flow velocity and maximum differential pressure condition given by the valve pressure class listed in Table A.

5. Serial Number: Valves shall be provided with a unique permanent number so each valve has traceability back through the manufacturing, testing and inspection processes. This serialized number shall be included with the other required labeling specified in AWWA C504 Sec. 6.1.

6. Valves shall be tagged with the tag number shown in Table A, in accordance with Section 01 91 13.10 – Asset Identification Tags.

B. Materials

1. Valve bodies and flanges shall be integral single castings of ductile iron. Fabricated bodies are not acceptable.

2. If the valve was NSF 61 certified before January 4, 2014, the valve shall also be NSF/ANSI 61 Annex G or NSF/ANSI 372 certified.

3. The manufacturer shall certify that valve components made in conformance with ASTM or other standards specified herein have been tested in accordance with those standards

4. Bolts, nuts and washers shall be stainless steel if they will be in contact with the process fluid. Other bolts, nuts and washers shall also be stainless. Bolts bearing on finished surfaces shall have semi-finished heads and nuts. Bolting grades shall conform to the specific materials and grades listed in Section 05 05 26 – Flange Bolting.

5. All rubber components in contact with water shall be suitable for 2.5 mg/l chloramine content. The use of chloramines shall not have any effect on the manufacturer's warranty.

C. General Design:

1. Machined surfaces: Bearing and packing surfaces shall be finished to 125 microinches or better.

2. Valve Discs:

a. Fabricated steel discs are not acceptable.

b. Cast discs of flow-thru type design are acceptable.

c. Disc edges shall be of corrosion resistant material such as stainless steel, Monel, chrome, bronze or nickel.

d. Discs, except for edges, shall have coating specified in Table A.

3. Valve Seats:

a. Rubber seats shall conform to AWWA C504 or AWWA C516 requirements, depending on which size applies, and shall be peroxide-cured EPDM, or Viton.

b. For valves 18" and larger, rubber seats mounted on the disc shall be clamped thereon. Rubber seats mounted in valve bodies shall be cemented and clamped, bonded, or vulcanized to the valve body. Any hardware shall be stainless steel. Bolting or machine screws shall have stainless steel lock washers.

c. Rubber seats shall not mate with cast iron, alloy ductile iron, or alloy cast iron seating surfaces. All other surfaces listed in AWWA C504 or C516, depending on which size applies, are acceptable.

d. All metal to rubber seating metallic surfaces shall be finished to 125 microinches or better.

4. Valve Bearings:

a. For valve sizes 30" and larger, bearing materials shall be oil impregnated bronze meeting ASTM B438 Specifications; or noncold flowing woven oriented Teflon with a minimum compressive strength of 40,000 psi and contained in a bronze, stainless steel cylinder, fiberglass/epoxy outer shell, or equal as approved by the Engineer.

5. Lifting Lugs: All valves 54" and larger shall have lifting lugs suitable for lifting valve with valve shaft vertical and/or horizontal.

6. Shaft Seals: Pulldown packings are not acceptable.

D. Valve Actuators:

1. All valve actuators shall comply with the provisions of this article.

2. Torque:

a. The rated torque capability of each actuator assembly shall at a minimum meet the Actuator Sizing Torque (AST). The AST shall be calculated by the manufacturer and based on the minimum required sizing torque (MRST) times the application factor (AF).

AST = AF x MRST

b. The AF is defined in AWWA C504 Table 4. The valve's required torque shall be as defined in AWWA C504: minimum required shaft torque (MRST). The MRST shall be provided by the valve manufacturer. The torque shall be evaluated (assuming the values shown in Table A for differential pressure and pipeline velocity class) under the following conditions:

1) Seated position (seating and unseating),

2) Midstroke maximum (5 degrees to 90 degrees) total dynamic run (opening or closing).

3. Mechanical Stop-Limiting Devices: Set and locked in the valve factory prior to the seat leakage test. If necessary, field adjustments may be made by the valve manufacturer's authorized representative.

4. Position Indicators: Required on the gearbox enclosure for all exposed actuators (when actuator is above ground or in a vault). Buried actuators shall not have position indicators on gear box, but shall have position indicator in valve box near surface.

5. Handwheels:

a. Surfaces shall be smooth with no rough edges to cut or abrade the person operating the valve.

b. The maximum handwheel diameter shall be 24".

c. The maximum rim pull shall not exceed 40 lbs under any operating condition, including breakaway.

6. Extension Stem Supports: Provide supports for exposed extension stems as shown on the drawings. Actuator extension stems shall have a support at the top, just below the operating nut and the maximum unsupported span shall not exceed 6 feet.

7. Proximity Position Switches: Per Section 33 09 11 – Instruments and Recorders; provide where shown.

8. Valve operating shaft extension per District’s Standard Drawing 1241-A, unless otherwise shown.

9. All valves shall be furnished with means for being locked with padlock, or padlock and chain, or other secure means approved by the Engineer.

E. Manual Actuators:

1. Manual actuators shall be sized and installed in the factory prior to factory test and shipment.

2. Handwheels:

    a. Surfaces shall be smooth with no rough edges to cut or abrade the person operating the valve.

    b. The maximum handwheel diameter shall be 24".

    c. The maximum rim pull shall not exceed 40 lbs at the actuator sizing torque (AST), described above.

3. Nut torque: the maximum input of 100 ft-lb on wrench nut or input shafts.

4. The rated torque capability of each actuator shall be sufficient to seat, unseat and rigidly hold, in any intermediate position, the valve disc it controls under the conditions shown in Table A.

5. In addition to the requirements of AWWA C504 or AWWA C516, depending on which size applies, nut operated, buried service valve actuators that include worm gearing and have mechanical stops that bear directly on the worm gear shall be furnished with:

    a. A positive input shaft stop or other torque limiting device, or

    b. Gear operators capable of withstanding 450 ft-lbs of input torque without damage.

6. Buried Valves with Vertical Stems:

    a. Provide exposed manual actuators for buried valves as required by Table A and the drawings.

    b. Actuator design shall meet the requirements listed above and shall be a complete unit including the following: torque tube with extension bonnet, floor-stand, gearbox, AWWA nut, and position indicator. The extension bonnet and floor-stand may be integral. The actuator shall also incorporate proximity position switches for valve open and valve closed positions as required by Table A and the drawings.

    c. The gearbox shall be mounted to the top of the 3-foot tall floor-stand or mounted to the integral valve housing as shown on the drawings. The gearbox shall transfer the torque from the horizontal shaft with the AWWA nut to the vertical torque tube and vertical valve shaft. Contractor shall field verify the extension bonnet and torque tube lengths required to reach the buried valve depth, and the Contractor shall coordinate these requirements directly with the valve manufacturer.

7. Buried Valves with Horizontal Stems:

    a. Buried actuators shall be furnished with extension stems and 2” square AWWA nut inside an operator assembly with lockable cover. The top of

the nut shall be approximately 6” below grade, inside a valve pot, with cover, and shaft pipe sleeve, all furnished by the Contractor in accordance with District Drawings 288-EA and 1241-A. Valve pot shall be backfilled as shown on the Drawings.

b. The shaft pipe sleeve and shaft lengths shall be as required to reach the buried valve depth. The Contractor shall field verify the lengths required for shafts and shaft sleeves and shall coordinate these requirements directly with the valve manufacturer.

8. Direct Mount Chain Wheels:

a. Direct mount to input shaft

b. Chain Wheel: Cast iron with epoxy coating, aluminum, or stainless steel

c. Chain: 316 Stainless steel

d. The chain and chain wheel sprockets shall be per DIN 766.

e. Acceptable Products: Rotork Gears DMCW or equal as approved by the Engineer

F. Workmanship and Painting:

1. All labor, materials, and transportation necessary to replace or repair any valve or portion thereof which fails to meet the requirements of either this section or AWWA C504 or C516 as applicable, shall be at the expense of the Contractor.

2. All ferrous metal parts of the valve assembly including actuator (except those made of stainless steel), excluding the seating edge of the disc, flange faces, and finished surfaces, shall be coated with the coatings listed in Table A.

3. Flange faces shall be coated with a lubricant or rust inhibitor in accordance with Section 33 12 01 – Basic Mechanical Materials and Methods. This inhibitor shall be applied only after application and curing of all other coatings.

4. All defects in film thickness or continuity shall be repaired at the expense of the Contractor. The extent of the repair work required to correct defects found upon inspection after delivery will be determined by the Engineer. Application of the repair coating, including surface preparation, shall be the same as that specified by the coating manufacturer for overcoating an old or fullycured coating.

G. Inspection, Testing and Rejection

1. Factory tests shall be witnessed by the Engineer, unless otherwise noted. See Section 01 45 27 for shop inspection requirements.

2. Valves shall be tested for leak tightness in both directions per AWWA Standard C504 or AWWA C516 as applicable.

H. Acceptable Manufacturers:

1. Henry Pratt, Val-Matic, GA, DeZurik, K-Flo

2. Or equal as approved by the Engineer

2.2 EQUIPMENT TAGS (NOT USED IN PREPURCHASE)

(3) EXECUTION

3.1 SHIPPING AND HANDLING

A. All valves 18" and larger shall be bolted to skids.

B. Valves shall be shipped with full face flange protectors in place. Flange protectors shall be replaced after any inspections.

C. If stored outdoors, valves shall be covered with tarpaulins, or plastic sheeting, etc., to protect them from sunlight and ozone damage.

D. All valves will be inspected upon delivery for compliance with these specifications. Any valve found not to comply with the contract documents will not be accepted until deficiencies are corrected.

3.2 INSTALLATION

A. The valves will be installed by the Installing Contractor in consultation with the valve representative, after all testing has been completed in the shop. The Manufacturer's representative shall provide on site commissioning and start-up support.

B. Buried valves shall not be backfilled until after the Field Leakage Test has been completed. Access to the valve mechanical stops must be maintained until completion of this test.

C. All valves installed in horizontal piping shall be installed with the shaft horizontal, unless otherwise shown on the drawings or recommended by the manufacturer and approved by the Engineer. This provides a self-cleaning action.

D. All valves shall be installed with the seat side facing upstream, unless otherwise shown on the drawings or recommended by the manufacturer and approved by the Engineer. This minimizes torque requirements.

E. A ring type gasket shall be used on wafer and lugged valves. Full-faced gaskets shall be used on flanged valves.

F. The valve mechanical stops shall be properly set for zero leakage.

G. Valve Position Indicator and "Open" and "Closed" markings shall be painted a contrasting color. If valves have no "OpenClosed" markings, marks shall be hand painted.

H. Field Finish: Coating of all non-buried ferrous valves and valve gear shall be the system and color as designated on the “Finish, Coating and Color Schedule” on the drawings.

3.3 FIELD TESTING

A. See Section 01 75 17 – Field Testing and Startup for general requirements.

B. Valves shall be leakage tested with the piping.

C. Functionally test each valve using the Field Functional Test Data Form.

D. Tests shall be in accordance with Section 01 75 17 and shall be conducted in the presence of the Engineer.

E. For buried valves, testing shall be performed prior to backfill of the valve area. Failure to do this shall require re-excavation of the buried valve for testing.

3.4 SEE FIELD FUNCTIONAL TEST DATA FORM SUPPLEMENTS

A. The following supplements follow END OF SECTION and are a part of this section:

1. AWWA Butterfly Valve Technical Submittal Checklist

2. Field Functional Test Data Form

END OF SECTION

AWWA BUTTERFLY VALVE TECHNICAL SUBMITTAL CHECKLIST
(Manufacturer's Representative to complete one form per type of valve)

SPEC. SECTION TITLE & NO.:	
Valve Tag No:	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
1. Affidavit of compliance that the valves furnished comply with the applicable provisions of AWWA Standard C504 or AWWA Standard C516 (as applicable based on size) and this specification.	
2. Certified manufacturers' drawings shall show dimensions, construction details, and materials used for all parts of valves including:	
a. Outline and principal dimensions of each assembled valve with its actuator attached.	
b. Details of the following:	
1) Disc and body seats, including provisions for clamping and adjusting if provided	
2) Attachment of disc to shaft	
3) All bearings and stuffing boxes	
4) Finish thickness (where applicable), given in microinches	
5) Actuator extension stem supports (when required)	
c. Dimensions of the following:	
1) Body shell thickness, flange thickness and drilling, face-to-face length, and valve supports	
2) Shaft diameter at all sections, and fillets at changes in shaft diameter	
3) Disc details at section on shaft centerline and at attachment of disc to shaft	
4) Main shaft bearing length and diameter	
5) The clearance required for the valve disc	
6) The minimum inside diameter required on adjoining pipe for the valve disc to clear. Contractor shall coordinate both O.D. of the valve disc (with his valve supplier) and inside diameter of the adjoining pipe internal lining so that interferences do not occur.	
d. Number of turns to open	
e. Direction of handwheel or nut rotation to open valve, for each valve	
3. Submit for valves 78" and larger:	
a. Body shell minimum thickness calculations in accordance with AWWA C516, paragraph 4.3.1.3 shall be submitted for approval. Design pressure shall be 250 psi, unless otherwise noted in Table A this section.	
b. Calculations for minimum valve shaft diameter, in accordance with AWWA C516, paragraph 4.3.2, shall be submitted for approval. Design pressure shall be 250 psi, unless otherwise noted in Table A this section.	
4. Net weight of each valve complete assembly	
5. Specific coating materials and thickness to be used. Submit proof that the coating applicator is currently certified by the coating manufacturer to be competent in the preparation and application of the coating to be used. Refer to sections 09 96 56.05 and 09 96 56.10 for specific requirements.	
6. Illustrations of the proposed actuator mounting orientation for each valve as shipped from the factory. This shall conform to the drawings. Assume that the valve will be installed with the seat side facing upstream, unless otherwise shown.	
7. NSF/ANSI 61 certification for each size and type of valve or all materials in contact with potable water.	

SPEC. SECTION TITLE & NO.:	
Valve Tag No:	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
8. Torque calculations for submitted valve. Include the complete equations and the basis and references for any coefficients used. Calculations shall be verifiable with AWWA M49. The flow velocity and the differential pressure conditions shall be per "Pressure Class" in Table A. The follow torque variable shall be calculated and included for each valve size, type, and operating condition: a. Total seating torque: (AWWA M49-3rd Edition, equation 3-1) b. Total unseating (break) torque: (AWWA M49-3rd Edition, equation 3-2) c. Total Opening (run) torque: (AWWA M49-3rd Edition, equation 3-3) d. Total closing (run) torque: (AWWA M49-3rd Edition, equation 3-4) Minimum supporting data shall include torque tables or curves, with maximum valve opening increments of 10 degrees, to illustrate bearing torques and dynamic torques throughout the operating range.	
9. Manual valve actuators. Calculations shall be verifiable with AWWA M49. At a minimum, submit the following for each actuator: a. Data sheet for actuator including torque output capability and gear ratio, open direction, position indicator and limit switches (if applicable) b. Actuator sizing torque (AST) of the actuator assembly, as defined by AWWA C504: Application Factor (AF, per AWWA C504 table 4) multiplied by the minimum required shaft torque (MRST). AST = AF x MRST c. Handwheel diameter d. Actuator Mechanical Advantage e. Handwheel rimpull/AWWA nut input	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **<project name>** Test Date(s): _____

Equipment Name: **AWWA Butterfly Valves** Section No.: **33 12 16.15**

Tag No.: _____ P&ID No. _____

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Interconnection & Loop diagrams provided	☐	☐	☒	
b) Mfr Cert of Proper Installation provided	☐	☐	☐	
c) Technical Submittal complete (contractor show EADOC record)	☐	☐	☐	
d) Spare Parts provided	☐	☐	☒	
e) Final O&Ms provided (contractor show final O&Ms)	☐	☐	☐	
f) Pipe pressure tests completed for adjacent piping (contractor to show test records).	☐	☐	☐	

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc)**:**

II. Field Functional Test

1. Calibration/Loop/Electrical	Yes	No	NA	Comments:
	☐	☐	☒	

2. Installation Check	Pass	Fail	NA	Comments:
2.1 Verify that the valve has been installed with the stem horizontal.	☐	☐	☐	
2.2 Verify that the valve has been installed with the seat side facing upstream.	☐	☐	☐	
2.3 Verify that the valve handwheel/operator has been installed so that it is easily accessible and there is no interference.	☐	☐	☐	
2.4 Correct equipment tags have been installed (tags shall match P&IDs). Valve pots for buried services shall be properly tagged.	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **<project name>** Test Date(s): _____

Equipment Name: **AWWA Butterfly Valves** Section No.: **33 12 16.15**

Tag No.: _____ P&ID No. _____

2.5 All fields on Asset List Spreadsheet completed for device (Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)	☐ ☐ ☐	
3. Operations Check	Pass Fail NA	Comments:
3.1 Verify valve opens in the correct direction (indicate opening direction, CW or CCW, in comments).	☐ ☐ ☐	
3.2 Verify valve opens and closes smoothly with valves under operating pressure.	☐ ☐ ☐	
3.3 Count and record the number of turns of the nut, or handwheel required needed to fully open and close the valve. Account for any discrepancies between actual number turns and the number of turns identified by the manufacturer.	☐ ☐ ☐	
3.4 Handwheel Rim Pull / Nut Torque Test: For handwheels, verify the maximum rim pull is less than 40 lbs under any operating condition including breakaway. For buried valves, verify the maximum input torque applied to the 2" nut 100 ft-lbs, or less.	☐ ☐ ☐	
3.5 Leakage Test (Close the valve and apply the corresponding system operating pressure to one side of the valve and atmospheric pressure to the other. Test duration shall be a minimum of 15 minutes. Verify that the valve seat leakage is drop tight. Open a drain, or loosen a nearby flange as necessary to verify the valve is leak-tight. If there are any signs of leakage, the valves shall be adjusted or replaced, and the valves shall then be retested until they are leak-tight.	☐ ☐ ☐	
4. Controls Check	Pass Fail NA ☐ ☐ ☒	Comments:
5. Alarms Check	Pass Fail NA ☐ ☐ ☒	Comments:
6. Run Check	Pass Fail NA	Comments:

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **<project name>** Test Date(s): _____

Equipment Name: **AWWA Butterfly Valves** Section No.: **33 12 16.15**

Tag No.: _____ P&ID No. _____

	Pass	Fail	NA	Comments:
7. Other Tests and Checks	☐	☐	☒	

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

SECTION 33 12 16.16

HIGH PERFORMANCE BUTTERFLY VALVES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish complete and test high performance butterfly valves with modulating electric motor actuators as shown in Table A hereinafter.

TABLE A
HIGH PERFORMANCE BUTTERFLY VALVES

Tag #	Size [inch]	Type	ASME Class	Maximum Velocity (ft/sec)	Maximum Differential Pressure Forward/Reverse (psi)	Service[4]	Installation Type	Rotation to Open[1]	Cv, Min[2]	Features
457-TWS-FCV-147	16”	Flanged	150	16	Per Valve’s Pressure Class[3]	MOD	Exposed	CCW	9,000 - 10,050	4

Notes:

1.Valve Operator Rotation: CCW Counterclockwise; CW Clockwise

2. Cv given is approximate for valve full open position; refer to Table B for detailed flow requirements for modulating service valves.

3. Per AWWA C519 article 4.2.8.2.2: Manufacturer shall size actuator based on the valve’s pressure class except where prior approval has been granted in writing by the Engineer

4.Service: OC = Open-Close service, MOD = Modulating service

Features:

Actuator:
(1) 2” nut with extension
(2) Manual with handwheel
(3) Manual with handwheel and chain
(4) Electric motor actuator per Section 33 12 16.32
(5) Hydraulic actuator
(6) Pneumatic actuator

Other Features:
(7) Position switch: Barrel Type Proximity switch
(8) Position switch: Rotary Type Proximity Switch
(9) Floor stand
(10) Footing anchorage

TABLE B
FLOW CRITERIA

Tag Number	Controllable Flow Point	Flow (gpm)	Upstream Pressure (psig)	Downstream Pressure (psig)	Estimated Required Cv (gpm)	Estimated Pipe Velocity (feet/sec)	Approx. Valve Position (% open)
457-TWS-FCV-147	Minimum	1389	80	49	251	2	13%
	Typical	3472	80	49	638	6	26%
	Maximum	9375	77	63	3960	15	62%

1. Fluid is water at 60 deg F.
2. The appropriate upstream and downstream reducers must be included in valve sizing. The Contractor shall coordinate any change of valve basic size and be responsible for any resulting cost change.
3. Maximum sound level shall not exceed __94 dBA measured 6 feet from valve.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures
2. Section 01 43 11 – Seismic Qualification and Certification
3. Section 01 45 27 – Shop Inspection
4. Section 01 75 17 – Field Testing and Startup
5. Section 01 81 02 – Seismic Design Criteria
6. Section 09 96 56.05 – High-build Epoxy Coatings
7. Section 09 96 56.10 Fusion Bonded Epoxy Coatings
8. Section 33 12 16.32 – Electric Motor Valve Actuators

1.2 SUBMITTALS

A. All butterfly valves furnished shall be by the same manufacturer, unless approved in writing by the Engineer prior to submittals or manufacture.

B. Submittals shall include electric motorvalve actuator data (as required in Table A); see Section 33 12 16.32 – Electric Motor Valve Actuators

C. Submit the following prior to fabrication:

1. See the submittal content requirements listed in “High-Performance Butterfly Valve Technical Submittal Checklist” attached at the end of this section.
2. Each page of the submittal shall have a unique sequential page number (hand-written is acceptable, but must be completely legible).

3. The first page of the submittal shall include the "High-Performance Butterfly Valve Technical Submittal Checklist" completed by the manufacturer's representative. Each submittal requirement listed in the checklist shall include the corresponding submittal page number(s).

4. If the "High-Performance Butterfly Valve Technical Submittal Checklist" is not included with the submittal, or if all portions of the checklist are not completed accurately by the manufacturer's representative, the submittal will be returned without review.

D. Submit the following prior to shipping:

1. Operation and Maintenance (O&M) manuals in accordance with Section 01 33 00 – Submittal Procedures

2. Certified copies of shop tests

3. Affidavit of Compliance: The manufacturer shall furnish the District with an affidavit stating that the valve and valve actuator and all materials used in its construction conform to the applicable requirements of this specification, and that all tests specified therein have been performed and all test requirements have been met

E. Submit the following prior to field testing:

1. Manufacturer's Certificate of Proper Installation (a copy shall also be included in the final O&M Manuals)

2. Field Test Procedures (in accordance with Section 01 75 17 – Field Testing and Startup)

3. Detailed lesson plans for on-site training classes

F. Submit after field testing:

1. Field Test Results (a copy shall also be included in the final O&M Manuals)

1.3 REFERENCES

A. MSS SP-68 – High Pressure Offset Seat Butterfly Valves

B. API 609 – Butterfly Valves – Lug Type and Wafer Type

C. ANSI/AWWA C504-15 – AWWA Standard for Rubber-seated Butterfly Valves

D. ANSI/AWWA C519-18 – AWWA Standard for High Performance Waterworks Butterfly Valves

E. AWWA M49, Third Edition – Quarter-Turn Valves, Head Loss, Torque, and Cavitation Analysis

F. ANSI/ISA-75.11 – Inherent Flow Characteristics and Rangeability of Control Valves

1.4 QUALITY ASSURANCE

A. General

1. Dimensional and materials check shall be made against approved submittals. Motor actuated valves shall be tested. See Section 33 12 16.32 – Electric Motor Valve Actuators

B. Seismic requirements for valves with powered actuators:

1. Refer to Section 01 43 11 – Seismic Qualification and Certification.

C. Shop Inspection:

1. The Engineer will witness the following tests at the valve manufacturer for each valve: Performance test, shell hydrostatic test and seat leakage test(s).

2. The Engineer will release the valves for shipping after satisfactory completion of all tests.

3. Provide notification for Engineer to be present for testing. See Section 01 45 27 – Shop Inspection for inspection advance notification requirements and District travel expenses.

4. Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery.

5. Motor, Hydraulic, and Pneumatic actuated valves shall have actuators installed before valve testing. Actuators shall be tested in conjunction with valve testing.

1.5 MANUFACTURER'S FIELD SERVICES:

A. Manufacturer's Representative: the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedures for each of the services listed. The installing contractor will coordinate the manufacturer's field services as described herein with the valve supplier.

B. Training Services: the manufacturer's representative shall be present at the site and classroom designated by the Engineer, for the minimum number of days listed below.

Minimum Total Time (Person-Days*)	Manufacturer's Service
2	Installation assistance and certification.
2	Field testing and startup (see Section 01 75 17 - Field Testing and Startup for additional requirements)
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

1.6 PACKAGE RESPONSIBILITY

A. The valve manufacturer shall be responsible to supply the complete valve package including the valve, gear, actuator, and attached instrumentation. The valve manufacturer shall enlist the services of the gear and actuator manufacturer(s) as required to meet all requirements of this Section.

PART 2 - PRODUCTS

2.1 GENERAL

A. Service Conditions and Environmental Requirements: Treated water (potable)

B. Complete Assembly:

1. The Valve/Actuator shall be delivered fully assembled with valve and actuator as required by Tables A and B.

C. Shaft extensions with epoxy coated extension bonnets shall be provided as part of the actuator connection to the valve as required by Table A.

D. Valve shall be suitable for continuous throttling service, within the ranges given in Table B.

E. Valve shall provide a range of flows controllable by PID logic as listed in Table B.

2.2 VALVE

A. Valve shall have a minimum (full open) flow coefficient, Cv, as required by Table A in gpm of water at 60 degrees F (at 1 psi of pressure differential). Valves for modulating service shall also conform to the flow requirements listed in Table B, and the published Cv shall be within the maximum deviation range permitted by ISA–75.11 over the entire opening range.

B. Body shall be threaded lug, also known as a "single flange", or flanged as shown in Table A and sized for installation between two ASME B16.5 standard flanges, pressure class as shown in Table A.

C. Valves for Open-Close service (OC) shall be single, double or triple off-set seat design. Valves for modulating service (MOD) shall be of double or triple off-set seat design to minimize seat wear and eliminate torque peaks in the control range.

D. Valve Materials:

1. Body and disc: Stainless Steel ASTM A351 Gr CF8M, A744 Gr CF8M, or A182 F304 or F316

2. Retaining Ring: Stainless Steel, Type 304 or 316

3. Stem - Stainless Steel: Type 304, 316, or 17–4PH ASTM A564-Type 630. Other types of manufacturer recommended stainless steel may be submitted for approval by the Engineer.

4. Seat: Reinforced TFE or UHMWPE

5. Bearings: 316 SS, TFE-coated graphite, or reinforced TFE. Other types of manufacturer recommended corrosion resistant materials may be submitted for approval by the Engineer

6. Packing: PTFE, reinforced TFE or UHMWPE

7. Seal Rings: Viton (FKM)

8. Retaining Ring Screws: Stainless Steel, Type 304 or 316

9. Stem/Disc Pins: Stainless Steel, Type 304, 316 or 17-4PH

10. Bolting: Stainless steel conforming to the same material and grade requirements as the flange bolting requirements in Section 05 05 26 – Flange Bolting

E. The valve shall comply with MSS SP-68 and API-609.

F. Coatings:

1. All interior and exterior surfaces of carbon steel or cast iron gear operator bodies and electric actuators, including aluminum, shall be coated with 8 mils of hi-build epoxy in accordance with Section 09 96 56.05 – High-Build Epoxy Coatings. All sharp edges shall be rounded to 1/16" radius prior to application of the coating.

2. Stainless steel, brass and bronze parts shall not be coated.

G. Acceptable products (modulating service):

1. Pratt

2. Bray/McCannalok Series 40

3. Pentair Keystone K-Lok

4. Or equal as approved by the Engineer

2.3 VALVE FACTORY TESTING

A. Shell and Seat Test and interior dry film thickness test; and interior coating holiday test.

2.4 VALVE ACTUATORS

A. All valve actuators shall comply with the provisions of this article.

B. Mechanical Stop-Limiting Devices: Set and locked in the valve factory prior to the seat leakage test. If necessary, field adjustments may be made by the valve manufacturer's authorized representative.

C. Position Indicators: Required on the gearbox enclosure for all exposed actuators (when actuator is above ground or in a vault). Buried actuators shall not have position indicators on gear box, but shall position indicator in valve box near surface.

D. Extension Stem Supports: Provide supports for exposed extension stems as shown on the drawings. Actuator extension stems shall have a support at the top, just below the operating nut and the maximum unsupported span shall not exceed 6 feet regardless of the quantity of supports shown on the drawings.

E. Valve operating shaft extension per District’s Standard Drawing 1241-A, unless otherwise shown.

F. All valves shall be furnished with means for being locked with padlock, or padlock and chain, or other secure means approved by the Engineer.

G. Torque:

1. The rated torque capability of each actuator assembly shall at a minimum meet the Actuator Sizing Torque (AST). The actuator sizing torque (AST) shall be calculated by the manufacturer and based on the minimum required sizing torque (MRST) times the application factor (AF).

   AST = AF x MRST

2. The application factor (AF) is defined in AWWA C519 Table 2. The valve's required torque shall be as defined in AWWA C519: minimum required shaft torque (MRST). The minimum required shaft torque (MRST) shall be provided by the manufacturer. The torque at both the seated position (seating and unseating) and the midstroke maximum (5 degrees to 90 degrees) total dynamic run (opening or closing) shall be evaluated using the valve under the differential pressure and pipeline velocity shown in Table A.

H. Actuators shall be sized and installed by the valve manufacturer's authorized representative and installed at the factory prior to factory test and shipment.

2.5 MANUAL GEAR AND HANDWHEEL ACTUATORS

A. The manual gear and handwheel actuator shall comply with AWWA C519, except as modified herein.

B. Handwheels:

1. Surfaces shall be smooth with no rough edges to cut or abrade the person operating the valve.

2. The maximum handwheel diameter shall be 24".

3. The maximum rim pull shall not exceed 40 lbs at the actuator sizing torque (AST), described herein.

C. Torque Tube and Extension Bonnet (install when shown on the drawings): The gearbox shall be mounted to the top of the 3-foot tall floor-stand, or mounted to the integral valve housing as shown on the drawings. The gearbox shall multiply the torque from the gear input shaft to the vertical torque tube. Torque tubes shall be used instead of shafting material for lengths longer than 3-ft. Contractor shall field verify the extension bonnet and torque tube lengths, and the Contractor shall coordinate these requirements directly with the valve manufacturer.

2.6 ELECTRIC-MOTOR, ACTUATORS

A. Valves that require electric motor actuators (see Table A) shall be provided with actuators conforming to the requirements of Sections 33 12 16.32 – Electric Motor Valve Actuators.

2.7 DIRECT MOUNT CHAIN WHEELS: (NOT USED)

2.8 POSITION SWITCHES (NOT USED)

2.9 EQUIPMENT TAGS (PREPURCHASE NOT USED)

PART 3 - EXECUTION

3.1 SHIPPING AND HANDLING

A. All valves 18” and larger shall be bolted to skids.

B. Valves shall be shipped with full face flange protectors in place. Flange protectors shall be replaced after any inspections.

C. If stored outdoors, valves shall be covered with tarpaulins, or plastic sheeting, and shall comply with the manufacturer’s recommendations for storage and handling.

D. All valves will be inspected upon delivery for compliance with these specifications. Any valve found not to comply with the contract documents will not be accepted until deficiencies are corrected.

3.2 INSTALLATION

A. The valve and actuator assembly will be installed by the Installing Contractor in consultation with the actuator and valve representatives, after all testing has been completed in the shop. The Manufacturer’s authorized representative shall provide on-site commissioning and start-up support.

B. Notify the Engineer of the scheduled delivery date for the valves a minimum of five work days prior to the actual delivery. The Engineer will inspect the valves within two days upon delivery to the job site. The valves shall not be installed prior to inspection by Engineer, but shall be uncrated and ready for inspection. Defects found in the coatings shall be repaired prior to installation.

C. The manufacturer’s authorized representative and the Contractor shall insure that the valves are installed in accordance with the instructions supplied by the manufacturer and in accordance with the drawings.

D. All valves installed in horizontal piping shall be installed with the shaft horizontal, unless otherwise shown on the drawings or recommended by the manufacturer and approved by the Engineer. This orientation provides a self-cleaning action.

E. All valves shall be mounted with the seat side facing upstream, unless otherwise recommended by the manufacturer and approved by the Engineer. This orientation minimizes torque requirements.

F. All valves shall be installed with good access to the valve handwheel. For motor actuated valves, the installed orientation shall allow easy access to the manual

override lever and handwheel and the push-button controls. Also, the installed position shall provide for easy access and removal of limit switch compartment cover, termination enclosure cover and motor. All installed valve orientations shall be approved by the Engineer.

G. The manufacturer’s authorized representative shall complete the Manufacturer’s Certificate of Proper installation prior to operating the valves.

H. Initial adjustments and startup of the valves shall be done in the presence of the package manufacturers' authorized representative.

I. Field Finish: Coating of all non-buried ferrous valves and valve gear shall be the system and color as designated on the “Finish, Coating and Color Schedule” on the drawings. Stainless steel parts, including valve bodies and bolting shall not be coated.

3.3 FIELD TESTING

A. Valves shall be leakage tested with the piping. .

B. Manufacturer’s Representative shall support field testing and coordination with the installing contractor.

C. Tests shall be in accordance with Section 01 75 17 ad shall be conducted in the presence of the engineer.

D. Functional Testing:

1. The Contractor shall provide services as specified in Section 01 75 17 – Field Testing and Startup, and as specified herein.

2. Complete the field functional tests in accordance with the Field Functional Test Form at the end of this section, and as directed by the Engineer.

3. Additional testing shall be performed on power actuated valves in accordance with Sections 33 12 16.32 – Electric Motor Actuators

E. Performance Testing:

1. Perform in accordance with Section 01 75 17 – Field Testing and Startup.

2. For modulating service valves, record pressures and flows at the points specified in Table B and verify that the valve Cv versus percent open matches the approved curve.

3.4 SUPPLEMENTS

A. The following supplements follow END OF SECTION and are a part of this section:

1. High-Performance Butterfly Valve Technical Submittal Checklist
2. Field Functional Test Data Form

END OF SECTION

HIGH-PERFORMANCE BUTTERFLY VALVE
TECHNICAL SUBMITTAL CHECKLIST
(Manufacturer's Representative to complete one form per type of valve)

SPEC. SECTION TITLE & NO:	
Valve Tag No.	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
1. Certified manufacturers' drawings shall show dimensions, construction details, and materials used for all parts of valves including:	
a. Drawings showing valve and operator dimensions, construction details, parts list, weights, and materials, including ASTM material information. Copper alloys shall have the ASTM specification and UNS designation numbers provided.	
b. Electrical wiring diagrams for position switches, power and control systems	
2. Control valve sizing data sheet demonstrating conformance with Table B, including the following information at minimum flow, typical flow, maximum flow, and valve full open: a. Flow rate in gpm, inlet and outlet pressures in psig, pressure drop in psid, inlet temperature in degrees F, Cv, valve % open, calculated noise level in dBA, pipeline inlet and outlet size and thickness	
3. Curve of valve Cv versus degrees open for all valves. Minimum Cv at 90 degrees must meet or exceed Cv's given in Table "A".	
4. Curve of valve flow (GPM) vs. % open valve stem position with inlet/outlet conditions given in Table B.	
5. Calculations for predicted cavitation	
6. Curve for dBA (noise level) with inlet/outlet conditions given in Table B	
7. Illustrations of the proposed actuator mounting orientation for each valve as shipped from the factory. This shall conform to the drawings. Assume that the valve will be installed with the seat side facing upstream, unless otherwise shown. Direction of hand wheel or nut rotation of open valve, for each valve.	
8. NSF/ANSI 61 certification for each size and type of valve or all materials in contact with potable water	
9. Minimum Required Shaft Torque (MRST): Include the complete equations and the basis and references for any coefficients used. Calculations shall be verifiable with AWWA M49, Third Edition. The flow velocity and the differential pressure conditions shall be per "Pressure Class" in Table A. The follow torque variable shall be calculated and included for each valve size, type, and operating condition: a. Total seating torque: (AWWA M49-3rd Edition, equation 3-1) b. Total unseating (break) torque: (AWWA M49-3rd Edition, equation 3-2) c. Total Opening (run) torque: (AWWA M49-3rd Edition, equation 3-3) d. Total closing (run) torque: (AWWA M49-3rd Edition, equation 3-4) Minimum supporting data shall include torque tables or curves, with maximum valve opening increments of 10 degrees, to illustrate bearing torques and dynamic torques throughout the operating range.	

SPEC. SECTION TITLE & NO:	
Valve Tag No.	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
10. Manual valve actuators. Calculations shall be verifiable with AWWA M49.. At a minimum, submit the following for each actuator: a. Data sheet for actuator including torque output capability and gear ratio, open direction, position indicator and limit switches (if applicable) b. Actuator sizing torque (AST) of the actuator assembly, as defined by AWWA C519: (Application Factor (AF, per AWWA C519 table 2) multiplied by the minimum required shaft torque (MRST). AST = AF x MRST c. Handwheel diameter d. Actuator Mechanical Advantage e. Handwheel rimpull/AWWA nut input	
Append Powered Valve Actuator Technical Submittal Checklist (see Table A).	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **High Performance Butterfly Valves** Section No.: **33 12 16.16**

Tag No.: _____ P&ID No. _____

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Interconnection & Loop diagrams provided	☐	☐	☒	
b) Mfr Cert of Proper Installation provided	☐	☐	☐	
c) Technical Submittal complete (contractor show EADOC record)	☐	☐	☐	
d) Spare Parts provided	☐	☐	☒	
e) Preliminary O&Ms provided (contractor show Preliminary O&Ms)	☐	☐	☐	
f) Pipe pressure tests completed for adjacent piping (contractor to show test records).	☐	☐	☐	

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc)**:** _____

II. Field Functional Test

1. Calibration/Loop/Electrical	Yes	No	NA	Comments:
	☐	☐	☐	

2. Installation Check	Pass	Fail	NA	Comments:
2.1 Verify that the valve has been installed with the stem horizontal.	☐	☐	☐	
2.2 Verify that the valve has been installed with the seat side facing upstream.	☐	☐	☐	
2.3 Verify that the valve handwheel/operator has been installed so that it is easily accessible and there is no interference.	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **High Performance Butterfly Valves** Section No.: **33 12 16.16**

Tag No.: _____ P&ID No. _____

2.1 Correct equipment tags have been installed (tags shall match P&IDs). Valve pots for buried services shall be properly tagged.	☐☐☐	
2.2 All fields on Asset List Spreadsheet completed for device (Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)	☐☐☐	

3. Operations Check	Pass Fail NA	Comments:
3.1 Stroke each valve fully open to fully closed, using the valve's actuator (electric, hydraulic, etc.), three times with valves under operating pressure. Verify valve opens and closes smoothly.	☐☐☐	
3.2 For valves with manual operating features (handwheels, nuts, chainfall), count and record the number of turns of the manual operator needed to fully open and close the valve (two values). Account for any discrepancies between actual number turns and the number of turns shown in the valve O&M manual.	☐☐☐	
3.4 Handwheel Rim Pull / Nut Torque Test: For handwheels, verify the maximum rim pull is less than 40 lbs under any operating condition including breakaway. For buried valves, verify the maximum input torque applied to the 2" nut 100 ft-lbs, or less.	☐☐☐	
3.5 Leakage Test : Close the valve and apply the corresponding system operating pressure to one side of the valve and atmospheric pressure to the other. Test duration shall be a minimum of 15 minutes. Verify that the valve seat leakage is drop tight. Open a drain, or loosen a nearby flange as necessary to verify the valve is leak-tight. If there are any signs of leakage, the valves shall be adjusted or replaced, and the valve shall then be retested until it is leak-tight.	☐☐☐	

4. Controls Check	Pass Fail NA	Comments:

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **High Performance Butterfly Valves** Section No.: **33 12 16.16**

Tag No.: _____ P&ID No. _____

None	☐ ☐ ☐	
5. Alarms Check	Pass Fail NA	Comments:
None	☐ ☐ ☒	
6. Run Check	Pass Fail NA	Comments:
None	☐ ☐ ☒	
7. Other Tests and Checks	Pass Fail NA	Comments:
7.1 For valves with electric or hydraulic/pneumatic actuators, complete the actuator tests and append that form to this data form (valve and actuator functional tests shall be completed together).	☐ ☐ ☐	

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

SECTION 33 12 16.27

AWWA BALL VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work includes: Furnish complete one AWWA ball valve with electric motor actuator assembly as specified herein. Coordinate and perform testing for the valve assembly with the Installation Contractor.

B. Valve Tag Number: 457-TWS-FCV-148

C. The electric actuator furnished with this valve shall also comply with the requirements of Section 33 12 16.32.

D. Related specification sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 43 11 – Seismic Qualification and Certification

3. Section 01 45 27 – Shop Inspection

4. Section 01 75 17 – Field Testing and Startup

5. Section 01 81 02 - Seismic Design Criteria

6. Section 09 96 56.05 – High-Build Epoxy Coatings

7. Section 09 96 56.10 – Fusion-Bonded Epoxy Coatings

8. Section 33 12 16.32 – Electric Motor Valve Actuators

1.2 SUBMITTALS

A. All AWWA ball valves furnished for this contract shall be by same manufacturer, unless approved in writing by the Engineer prior to submittals or manufacture.

B. Submit prior to field testing

1. See the submittal content requirements listed in the “AWWA Ball Valve Technical Submittal Checklist” attached at the end of this section.

2. Each page of the submittal shall have a unique sequential page number (hand-written is acceptable, but must be completely legible).

3. The first page of the submittal shall include the “AWWA Ball Valve Technical Submittal Checklist” completed by the manufacturers’ representative. Each

submittal requirement in the checklist shall include the corresponding submittal page number(s).

4. If the "AWWA Ball Valve Technical Submittal Checklist" is not included with the submittal, or if all portions of the checklist are not completed accurately by the manufacturer's representative, the submittal will be returned without review.

C. Submit the following prior to shipping:

1. Operating and Maintenance (O&M) Manuals:

a. In addition to the requirements of the O&M manual checklist form, O&M manuals shall include a section for field installation certification (if required) and field test results. The Valve supplier shall furnish the required number of copies for insertion into the final O&M Manuals.

2. Certified copies of all manufacturer tests made under AWWA Standard C507:

a. Performance Test

b. Leakage Test

c. Hydrostatic Test

d. Proof-of-Design Test: for each basic valve type provided by the manufacturer

3. Field Test Procedures (in accordance with Section 01 75 17)

D. Submit the following prior to contract closeout:

1. Field Functional Test Results

2. Manufacturer's Certificate of Proper Installation: Required for all valves except manually operated valves 12" and smaller

1.3 QUALITY ASSURANCE:

A. General

1. Dimensional and materials check shall be made against approved submittals. Motor actuated valve shall be tested. See Section 33 12 16.32 – Electric Motor Valve Actuators

B. Seismic requirements for valves with powered actuators

1. Refer to Section 01 43 11- Seismic Qualification and Certification

C. Shop Inspection:

1. The District will witness the following tests at the valve manufacturer for each valve: shell hydrostatic test; seat leakage test(s); interior dry film thickness test; and interior coating holiday test, and actuator performance tests.

2. The Engineer will release the valves for shipping after satisfactory completion of all tests.

3. Provide notification for Engineer to be present for testing. See Section 01 45 27 for inspection advance notification requirements and District Travel Expenses.

4. Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery.

D. Coordination:

1. The Installing Contractor will coordinate the Manufacturer's field services as described herein with the Valve Supplier.

1.4 DESIGN FUNCTION AND CRITERIA

A. General Valve Criteria: Refer to Table A.

TABLE A
AWWA BALL VALVES

EQUIPMENT ID TAG NUMBER	QTY	CONNECTION SIZE [NCH]	AWWA PRESSURE CLASS, MIN (@ 100°F)	SEAT TYPE[1]	Cv, MIN @ 100% OPEN[2]	MAXIMUM DIFFERENTIAL PRESSURE[3] (PSID)	OPERATING SPEED RANGE FULL OPEN TO FULL CLOSED WITHOUT PULSING [SECONDS]	DIRECTIONAL SHUTOFF, SINGLE OR DUAL	COATING
457-TWS-FCV-148	1	36	150	R	180,000	150	300	Dual	Note 4

Notes

1. R = Resilient seat, M = Metal seat.
2. Cv given is approximate; refer to Table B for detailed flow requirements.
3. DP when closed under normal operating conditions. Does not include initial pipeline filling, surge, or other adverse conditions.
4. Coating shall be either high-build or fusion-bonded epoxy coating per Sections 09 96 56.05 and 09 96 56.10.

1.5 APPLICABLE STANDARDS

A. AWWA C507, "Ball Valves, 6 In. Through 60 In."

B. AWWA C542, "Electric Motor Actuators for Valves and Slide Gates"

C. ANSI/ISA-S75.11, "Inherent Flow Characteristics and Rangeability of Control Valves"

D. ASME B16.1, "Cast Iron Pipe Flanges and Flanged Fittings"

1.6 PACKAGE RESPONSIBILITY

A. Primary supplier responsibility:

1. The valve supplier shall be the primary supplier and shall supply the complete valve assembly including valve, actuator, couplings and attached instrumentation. The primary supplier shall enlist the services of the secondary suppliers as required to meet all requirements of this specification including all testing of the assembly.

1.7 MANUFACTURER'S FIELD SERVICES:

A. Manufacturer's Representative: the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedures for each of the services listed. The Installing Contractor will coordinate the timing with the Valve Supplier for these services to be provided.

B. The District will notify the Contactor of which manufacturer will be providing this valve.

C. Training Services: The manufacturer's representative shall be present at the site for the minimum number of days listed below:

Minimum Total Time (Person-Days*)	Manufacturer's Service
1	Installation assistance and certification.
1	Field testing and startup (see Section 01 75 17 for additional requirements)
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

PART 2 - PRODUCTS

2.1 GENERAL

A. The valve/actuator assembly will comply with modifications of ANSI/AWWA C507 and C549 respectively.

B. Valve shall be tagged with the tag number given in Table A

C. All internal cast or ductile iron surfaces, except finished or bearing surfaces, shall be shop painted with NFS/ANSI 61 fusion bonded epoxy in accordance with Spec Section 09 96 56.10. All exterior or cast ductile iron surfaces shall be shop painted with fusion bonded epoxy in accordance with Specification Section 09 96 56.10.

D. Wherever these modifications conflict with the applicable ANSI/AWWA standard, the specific requirements of these modifications shall govern.

E. All parts of ANSI/AWWA standards not modified herein shall apply to the valve and actuator.

F. All bolting shall comply with ANSI Specification B18.2.1 for regular, square or hexagon bolts and nuts. All exterior bolting shall be zinc coated as specified by ASTM B 633.

G. Flange faces shall be coated with a rust inhibitor (LPS Laboratories LPS-3 or approved equal) or other easily removable protective coating after application and curing of all other coatings.

H. Complete Assembly:

1. The valve/actuator assembly shall be delivered fully assembled with motor actuator, intermediate reduction gear and manual override handwheel and with all position switch and torque switch settings correctly adjusted at the factory.

2. The valve/actuator assembly shall include a reduction gear between the valve and electric actuator, in a separate gar box independent of the actuator, such as a worm gear reducer or helical or bevel gear reducer.

3. Operating speed to open or close shall be per Table A. This operating speed is required to mitigate pressure surges in the distribution system.

I. Resilient seating materials (e.g. EPDM) shall be compatible with the service specified herein and shall not impart taste or odor to the water.

J. The valve supplier shall determine whether resilient materials (e.g. EPDM) are suitable for the velocities in this application. If resilient are determined to be not acceptable by the supplier, then corrosion and erosion resistant metallic seats shall be furnished.

K. Valve shall be suitable for continuous throttling service, within the ranges given in Table "B" below.

L. Valve seats shall be suitable for continuous throttling service, with conditions given in Table "B".

M. Valve shutoff shall be rated at ASME Class II or better. All valves furnished shall be leak tight within the specified leakage class.

N. Valve shall provide a range of flows controllable by PID logic as listed in Table B.

O. Valve shall have a minimum full open Cv per Table A (units: GPM / square root of differential pressure in psid).

(See Table "B" next page)

Table B

Flow Criteria

Controllable Flow Point	Flow [gpm]	Upstream Pressure [psig]	Downstream Pressure [psig]	Estimated Required Cv [gpm]	Approximate Valve Position[2] [% open]
Typical	13,889	77	54	2900	18
Maximum	34,722	76	69	13,615	56

Notes

1. Fluid is treated water at 60 deg F.

P. All valve brass and bronze components (if any) and accessories that have contact with water shall be made of copper alloys containing neither more than 16% zinc nor more than 2% lead.

2.2 WORKMANSHIP

A. The interior and exterior of the valve body, cover and operator shall be free from casting defects, burrs, sharp corners or rough edges. Removal of these conditions shall be completed prior to application of coatings.

B. The sealing surfaces of the seat, flange faces, cover/body mating surfaces, and ball shall be free from nicks, scratches, burrs or other defects.

2.3 VALVE CONSTRUCTION

A. Pressure and Temperature Ratings: Per Table A.

B. Body and ball material:

1. Class 150: Gray iron per ASTM A126 class B, or per ASTM A48 Class 40, or the ductile iron listed for class 250 and class 300. End connections shall be flat faced flanges with dimensions and drilling per ASME B16.1, Class 125.

2. Class 250 and Class 300: Ductile iron per ASTM A536 grade 65-45-12 or per ASTM A395. End connections shall be flat faced flanges with dimensions and drilling per ASME B16.1, Class 250.

3. Cast steel is not acceptable.

C. Shaft material: 17-4 type 630 stainless steel.

D. The ball shall be taper pinned to the shaft.

E. Gland Flange and Cap: Type 304 or 316 stainless steel for stainless steel body valve.

F. Ball and Body Seats: Single seat set for single direction shutoff and double seat set for dual direction shutoff per Table A. Materials:

1. Metal seats: Monel per ASTM B127 or stainless steel. Bronze, and nickel-chrome overlays are not acceptable.

2. Resilient seats: EPDM. Buna-N is not acceptable.

G. Shaft Seals: V-packing (chevron) type of the following material: Reinforced TFE.

H. Bearings: Sleeve type of dissimilar hardness from the shaft with self-lubricating reinforced TFE coating.

I. Valve and gear fastener material: Stainless steel, type 304 or 316.

J. The body shall have integrally cast support lugs.

K. Acceptable Products:

1. Resilient seated:

a. Pratt Rubber Seated Ball Valve

b. Or equal as approved by the Engineer.

2. Metal seated:

a. Pratt Metal Seated Ball Valve

b. Or equal as approved by the Engineer.

2.4 ELECTRIC-MOTOR ACTUATORS

A. Provide electric-motor actuator according to Section 33 12 16.32, Electric Motor Valve Actuators. Motor actuator valves shall have the actuators installed before valve testing. Actuators shall be tested in conjunction with valve testing.

2.5 FACTORY TESTING

A. All valve testing shall be in accordance with AWWA C507 and as follows:

1. Body hydrostatic test, and ball and seat hydrostatic test:

a. 1.5 times the design pressure shown on Table A with no leakage for a duration of:

1) 8-inch and smaller: 1 minute

2) 10-inch thru 20-inch: 3 minutes

3) 24-inch thru 60 inch: 10 minutes.

2. Seat hydrostatic and stroke test: Pressurize the closed valve to the maximum differential pressure and then stroke fully open. Repeat three times. After the third stroke test, measure and record the leakage for either 5 minutes (valves 20-inchand smaller) or 10 minutes (valves 24-inch and larger). During this time, the differential pressure must not drop below 50% of the initial maximum. The maximum leakage past the closed seat shall be

a. Metal seats: 6 fluid-ounce per hour per inch of valve nominal port diameter

b. Resilient seats: 1 fluid-ounce per hour per inch of valve nominal port diameter.

B. Perform functional test of motor actuator valve assembly, in accordance with AWWA C542 and Section 33 12 16.32. Position switches, torque switches and mechanical stops shall be set for the test.

C. The Valve Supplier shall give notice to the Engineer of the time of conducting all tests, see Section 01 45 27 - Shop Inspection for notification requirements.

2.6 PREPARATION FOR SHIPMENT

A. In addition to the preparation for shipment requirements of AWWA C507, all valve ports 12-inch and smaller shall have plastic plugs installed under the plywood flange protectors prior to shipment.

2.7 DELIVERY

A. Valve Supplier shall notify the Engineer upon delivery to the site for inspection. Two days minimum shall be allowed for inspection. Valve will be inspected upon delivery for compliance with these specifications. Any valve found not to comply will not be accepted until deficiencies are corrected by the Valve Supplier. Valves shall not be installed until inspected by the District.

B. Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The valve and actuator assembly will be installed by the Installing Contractor in consultation with the actuator and valve representatives. The Manufacturer’s authorized representative shall provide on-site commissioning and start-up support, which shall be coordinated by the Contractor.

B. The Manufacturer’s authorized representative and the Contractor shall insure that the valves are installed in accordance with the instructions supplied by the Manufacturer and in accordance with the drawings.

C. The Manufacturer’s authorized representative shall complete the Manufacturer’s Certificate of Proper installation prior to operating the valves.

D. Initial adjustments and startup of the valves shall be done in the presence of the package Manufacturers' authorized representative.

E. Valve position indicator pointers and "Open" and "Closed" markings shall be painted a contrasting color. If valves have no "Open-Closed" markings, marks shall be painted in a permanent manner.

3.2 FIELD TESTING

A. Valve and actuator assemblies will be field tested by the Contractor with the support of the Manufacturer's authorized representative.

B. Tests shall be in accordance with Section 01 75 17 and shall be conducted in the presence of the engineer.

C. Valves shall be leakage tested with the piping.

D. Functional Testing:

1. Functional Tests shall not proceed until the Manufacturer's Certificate of Proper Installation has been received and approved.

2. Functionally test each valve using the Field Functional Test Data Form.

3. Additional testing shall be performed on power actuated valves in accordance with Section 33 12 16.32 – Electric Motor Valve Actuators.

E. Performance Testing:

1. Record pressures and flows at the points specified in Table B and verify that the valve Cv versus percent open matches the approved curve.

3.3 SUPPLEMENTS

A. The following supplements follow END OF SECTION are a part of this section:

1. AWWA Ball Valve Technical Submittal Checklist

2. Field Functional Test Data Form

END OF SECTION

AWWA BALL VALVE TECHNICAL SUBMITTAL CHECKLIST
(Manufacturer's Representative to complete one form per submittal)

SPEC. SECTION TITLE & NO.:	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
1. Affidavit of compliance that the valves furnished comply with the applicable provisions of AWWA Standard C507-11 and this specification.	
2. Certified manufacturers' drawings shall show dimensions, construction details, and materials used for all parts of valves including:	
a. Outline of arrangement with the principal dimensions of each assembled valve with its actuator attached.	
b. Details of the following:	
1) Ball and body seats, including provisions for clamping and adjusting if provided.	
2) Attachment of ball to shaft.	
3) All bearings and stuffing boxes.	
4) Finish thickness (where applicable), given in microinches.	
5) Actuator extension stem supports (when required)	
c. Dimensions of the following:	
1) Body shell thickness, flange thickness and drilling, laying length, and any valve support lugs.	
2) Shaft diameter at all sections, and fillets at changes in shaft diameter.	
3) Ball details at section on shaft centerline and at attachment of ball to shaft.	
4) Main shaft bearing length and diameter.	
d. Number of turns to open.	
e. Direction of handwheel or nut rotation to open valve, for each valve.	
f. Valve component materials. Stainless steel alloys shall have the ASTM material designations and type listed. Copper alloys shall have the ASTM specification and UNS designation numbers listed.	
3. Control valve sizing data sheet demonstrating conformance with Table B, including the following information at minimum flow, typical flow, maximum flow, and valve full open: Flow rate in gpm, inlet and outlet pressures in psig, pressure drop in psid, inlet temperature in ºF, Cv, valve %-open, calculated noise level in dBA, assumed pipeline inlet and outlet size and thickness.	
4. Curve of valve Cv versus degrees open in 5 degree increments from 0 to 90.	
5. Calculations for predicted cavitation.	
6. Net weight of each valve and each complete assembly.	
7. Specific coating materials and thickness to be used. Proof of applicator certification. Refer to sections 09 96 56.05 and 09 96 56.10 for specific requirements.	
8. Torque calculations for any manual actuators/gearboxes including, but not limited to, bearing torque, seating torque, hydrostatic torque, dynamic torque and total torque. Include the complete equations and the basis and references for any coefficients used. The flow velocity and the differential pressure conditions shall be per "Pressure Class" in Table A.	
9. Statement of maximum handwheel rim pull and maximum AWWA nut input demonstrating that the loads are within the maximum specified.	
10. NSF/ANSI 61 certification for each size valve or for all materials in contact with potable water.	
11. Submit proof that the coating applicator is currently certified by the coating manufacturer to be competent in the preparation and application of the coating to be used.	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Motor Actuated Ball Valve** Section No.: **33 12 16.27**

Tag No.: **457-TWS-FCV-148** P&ID No. _____

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Interconnection & Loop diagrams provided	☐	☐	☐	
b) Mfr Cert of Proper Installation provided	☐	☐	☐	
c) Technical Submittal complete	☐	☐	☐	
d) Spare Parts provided	☐	☐	☐	
e) Final O&Ms provided (Valve Supplier show final O&Ms)	☐	☐	☐	
f) Pipe pressure tests completed for adjacent piping (installing contractor to show test records).	☐	☐	☐	

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc)**:**

II. Field Functional Test

1. Calibration/Loop/Electrical	Yes	No	NA	Comments:
	☐	☐	☐	

2. Installation Check	Pass	Fail	NA	Comments:
2.1 Verify that the valve has been installed with the stem horizontal.	☐	☐	☐	
2.2 Verify that the valve has been installed with the seat side facing upstream.	☐	☐	☐	
2.3 Verify that the valve handwheel/operator has been installed so that it is easily accessible and there is no interference.	☐	☐	☐	
2.1 Correct equipment tags have been installed (tags shall match P&IDs). Valve pots for buried services shall be properly tagged.	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Motor Actuated Ball Valve** Section No.: **33 12 16.27**

Tag No.: **457-TWS-FCV-148** P&ID No. _____

2.2 All fields on Asset List Spreadsheet completed for device (Installing Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)	☐ ☐ ☐	
3. Operations Check	Pass Fail NA	Comments:
3.1 Stroke each valve fully open to fully closed, using the valve's actuator (electric, hydraulic, etc.), three times with valves under operating pressure. Verify valve opens and closes smoothly.	☐ ☐ ☐	
3.2 For valves with manual operating features (handwheels, nuts, chainfall), count and record the number of turns of the manual operator needed to fully open and close the valve (two values). Account for any discrepancies between actual number turns and the number of turns shown in the valve O&M manual.	☐ ☐ ☐	
3.4 Handwheel Rim Pull Test: Verify the maximum rim pull is less than 40 lbs under any operating condition including breakaway.	☐ ☐ ☐	
3.5 Leakage Test: Close the valve and apply the corresponding system test pressure to one side of the valve and atmospheric pressure to the other. Test duration shall be a minimum of 10 minutes. Verify that the valve seat leakage is no greater than 1 ounce/minute/in of nominal port diameter. Open a drain, or loosening a nearby flange as necessary to verify. If measured leakage is greater, the valves shall be adjusted, or replaced, and the valve shall then be retested until the leakage is less than 1 ounce/min/in of nominal port diameter.	☐ ☐ ☐	
4. Controls Check	Pass Fail NA	Comments:
none	☐ ☐ ☐	
5. Alarms Check	Pass Fail NA	Comments:
none	☐ ☐ ☒	
6. Run Check	Pass Fail NA	Comments:

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Motor Actuated Ball Valve** Section No.: **33 12 16.27**

Tag No.: **457-TWS-FCV-148** P&ID No. _____

none	☐ ☐ ☒	
7. Other Tests and Checks	Pass Fail NA	Comments:
7.1 For valves with electric or hydraulic/pneumatic actuators, complete the actuator tests and append that form to this data form (valve and actuator functional tests shall be completed together).	☐ ☐ ☐	

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

SECTION 33 12 16.32

ELECTRIC MOTOR VALVE ACTUATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish and install Electric Motor Actuators for the valves listed in Table A.

B. Related sections:

1. Section 01 33 00 – Submittal Procedures

2. Section 01 45 27 – Shop Inspection

3. Section 01 75 17 – Field Testing and Startup

4. Section 33 12 16.16 – High Performance Butterfly Valves

5. Section 33 12 16.27 – AWWA Ball Valves

1.2 SUBMITTALS

A. All electric motor valve actuators furnished shall be by the same manufacturer, unless approved in writing by the Engineer prior to submittals or manufacture.

B. Submittals in this section shall be submitted as a complete system with their respective valve submittals.

C. It is the responsibility of the Contractor to coordinate the valve and actuator requirements with both valve and electric motor actuator vendors.

D. Submit the following prior to assembly:

1. See the submittal content requirements listed in “Electric Motor Valve Actuator Technical Submittal Checklist” and “Electric Motor and Gearbox Actuator Sizing Calculation Datasheet” attached at the end of this section.

2. Each page of the submittal shall have a unique sequential page number (hand-written is acceptable but shall be completely legible).

3. The first page of the submittal shall include the “Electric Motor Valve Actuator Technical Submittal Checklist” completed by the manufacturer’s representative. Each submittal requirement listed in the checklist shall include the corresponding submittal page number(s).

4. If the “Electric Motor Valve Actuator Technical Submittal Checklist” and “Electric Motor and Gearbox Actuator Sizing Calculation Datasheet” is not included with the submittal or if all portions of the checklist and datasheet are not completed accurately by the manufacturer’s representative, the submittal will be returned without review.

E. Submit the following prior to shipping:

1. Operations and Maintenance (O&M) Manual:

a. Provide submittals for each type of actuator in accordance with Section 01 33 00 – Submittal Procedures.

b. In addition to the requirements in Section 01 33 00, O&M manuals shall include:

1) Copies of all final technical submittals

2) As-built actuator wiring diagrams

3) A section for field installation certification and field test results.

b) The manufacturer shall furnish the required number of copies for insertion into the final O&M Manuals.

4) Certified copies of all tests made under AWWA Standard C542, Performance Tests shall be furnished by the actuator manufacturer whether or not the tests are witnessed by the Engineer.

c. O&M manual materials shall be included with the manual for the corresponding valve and submitted as a single valve and actuator system O&M manual.

F. Submit prior to field testing:

1. Field Functional Test Procedures: In accordance with Section 01 75 17 – Field Testing and Startup and as specified herein. Coordinate and submit valve and actuator test procedures in a single submittal.

2. Manufacturer’s Certificate of Proper Installation (copy to be inserted by the Contractor in the final O&M Manuals).

G. Submit after field testing:

1. Field Test Results (copy to be inserted by the Contractor in the final O&M Manuals).

1.3 REFERENCES:

A. ANSI/AWWA C504 – AWWA Standard for Rubber-seated Butterfly Valves

B. ANSI/AWWA C507-18 – Ball Valves, 6-In. Through 60-In.

C. ANSI/AWWA C542 – AWWA Standard for Electric Motor Actuators for Valves and Slide Gates

D. NEMA MG-1 – National Electric Manufacturers Association Standard for Motors and Generators

1.4 OPERATING CONDITIONS

A. Valve actuators shall be installed indoors with unheated and unconditioned air conditions. Room temperature will vary from 35 Deg F to 104 Deg F. Because these are water facilities humidity levels can be high. Typical humidity ranges are 60 percent to 97 percent.

B. Water temperature will be between 40 deg F and 78 deg F.

1.5 MANUFACTURER'S FIELD SERVICES:

A. Manufacturer's Representative: the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper installation and field testing. The installing contractor will coordinate the manufacturer's field services as described herein with the valve supplier.

B. Training Services: the manufacturer's representative shall be present at the site and classroom designated by the Engineer, for the minimum number of days listed below.

Minimum Total Time (Person-Days*)	Manufacturer's Service
1	Installation assistance and certification.
1	Field testing and startup (see Section 01 75 17 - Field Testing and Startup for additional requirements)
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

1.6 PACKAGE RESPONSIBILITY

A. The valve manufacturer shall be responsible to supply the complete valve package including the valve, gear, actuator, and attached instrumentation. The valve manufacturer shall enlist the services of the gear and actuator manufacturer(s) as required to meet all requirements of this Section.

PART 2 - PRODUCTS

2.1 ELECTRIC MOTOR ACTUATORS FOR VALVES

A. General Requirements:

1. Electric motor actuators shall comply with AWWA Standard C542 except as modified in this specification. In cases where the requirements of this specification conflict with the AWWA requirements, the requirements of this specification shall govern.

2. All electric motor actuators provided under this specification shall be made by the same manufacturer.

3. All electric valve actuators shall include an intermediate reduction gear (worm gear, helical or spur gear type or combinations thereof) in a separate gear box located between the valve and the electric actuator.

4. The Contractor shall provide the Engineer with an affidavit of compliance from the manufacturer or the manufacturer's authorized representative that the motor operators furnished comply with the applicable provisions of AWWA Standard C542 and this specification (see AWWA Standard C542, Affidavit of Compliance).

5. All motor starters shall be solid state reversing type.

6. Torque:

    a. The rated torque capability of each actuator assembly (motor and gear) shall at a minimum meet the Actuator Sizing Torque (AST). The actuator sizing torque (AST) shall be calculated by the manufacturer and based on the minimum required sizing torque (MRST) times the application factor (AF).

        AST = AF x MRST

    b. The application factor (AF) is defined per AWWA C519 Table 2 for High Performance Butterfly Valves, and AWWA C507 Table 3 for AWWA Ball Valves. The valve's required torque shall be as defined in AWWA C519 for High Performance Butterfly Valves and AWWA C507 for AWWA Ball Valves: minimum required shaft torque (MRST). The minimum required shaft torque (MRST) shall be provided by the manufacturer. The torque at both the seated position (seating and unseating) and the midstroke maximum (5 degrees to 90 degrees) total dynamic run (opening or closing) shall be evaluated using the valve under the differential pressure and pipeline velocity shown in Table A.

    c. Unless the referenced valve section (See Table A) requires that the valve be designed to isolate flow in both directions, the valve's required torque shall be for installation in the preferred direction.Valve shall be installed in parallel with smaller flow control valve, isolates flow in one direction when it is shut.

7. If adjustable mechanical stop-limiting devices are used, they shall be accurately set and locked by the valve manufacturer.

8. Motor actuators shall be able to operate the valve from fully open to fully closed position, or the reverse, within the range of allowable stroke times shown in Table A.

9. Use only copper wiring inside the actuator, the use of aluminum wiring is not acceptable.

10. All terminal connections for District use shall be located in a sealed terminal compartment that is separated from control components.

11. If a handheld remote control unit is required for actuator setup and calibration, one unit shall be furnished for each actuator.

12. The motor and controls enclosures shall have space heaters, 120 volt AC.

B. Motors:

1. The actuator motors shall meet the requirements of AWWA C542 – Electric-Motor Actuators. General design shall be totally enclosed, ball bearing,

squirrel cage, 3-phase, induction motors, Class "F" insulated or higher, for operation at the voltage specified in Table A. Motors shall be provided with solid state thermistors to prevent damage due to temperature overloads.

2. Starts per hour: Motors and controls shall be suitable for 1,200 starts per hour when actuators are shown as modulating in Table A. Other motors and controls shall be suitable for 60 starts per hour minimum unless otherwise noted. Duty cycle time must be a minimum of twice stroke time as listed in Table A.

C. Position Sensing and Indication:

1. Position sensing circuits shall be solid state with no electro-mechanical contacts.

2. Actuators shall have a local position indicator digital readout in percent open units.

3. Remote position indication shall be provided via a 4-20 mA output signal.

D. Torque Sensing:

1. The actuator shall include adjustable torque sensing to limit actuator output torque in both the opening and closing directions.

2. The torque sensing feature shall be factory set to be 110 percent of the maximum torque required by the valve or as otherwise determined to be appropriate by the manufacturer and approved by the Engineer.

E. Contacts for District Use:

1. Four contacts for District use shall be wired to the terminal block that can be configured to perform any of the following functions:

a. Normally-open contact shall close when valve is 100 percent closed (valve closed status).

b. Normally-open contact shall close when valve is 100 percent open (valve open status).

c. Normally-open contact shall close at a field adjustable point when valve is from 2 percent to 100 percent open. This switch shall be factory-set to close when valve is 3 percent open.

d. Normally-open contact shall close when the actuator's selector switch is in the "remote" position.

F. Electric Controls:

1. All control components shall be enclosed in a sealed compartment separated from the external connection terminal compartment.

2. Actuator calibration shall be "non-intrusive" such that no electrical compartments need to be opened to set position limits or torque limits.

3. Limit sensing, three-phase reversing starter, and other required controls shall be mounted in a NEMA 4X weatherproof enclosure which shall also contain a space heater powered from the actuator.

4. Reversing starter shall be electrically and mechanically interlocked, complete with overload relay and automatic reset. In addition each starter shall be provided with one normally open auxiliary run status contact wired to terminal strip for district use.

5. The reversing starters for modulating service valves shall be of a solid state design.

6. Unless stated otherwise, a 4-20 mA input signal shall be used for position control of modulating service valves , as noted in Table “A” of this Section.

7. Local controls shall include one selector switch marked "remote-stop-local", controls for OPEN and CLOSE operation and indicator lights for OPEN and CLOSE positions. Controls shall be heavy duty oiltight, and contacts shall meet NEMA A300 or A600 standards.

8. All devices and controls in the limit switch compartment shall be factory wired. All connections to external or field devices must be wired to the terminal block in the terminal compartment. Refer to Project Drawings for elementary diagram.

9. The actuator shall be equipped with an optional interrupt timer that allows the stroke time to be adjusted by pulsing/stepping the motor.

    a. Actuator must also comply with stroke time in Table A without pulsing.

10. The actuator shall be equipped with a phase correction circuit that detects and corrects motor rotation faults.

G. Handwheels:

1. Surfaces shall be smooth with no rough edges to cut or abrade the person operating the valve.

2. The maximum rim pull shall not exceed 40 lbs under any operating condition including breakaway.

3. The handwheel shall not turn when power is applied to the motor.

H. Factory Finish:

1. Manufacturer's standard factory finish shall be used.

I. Acceptable Manufacturers:

1. Limitorque MX

2. Or equal as approved by the Engineer

TABLE A
ELECTRIC MOTOR ACTUATORS FOR NEW VALVES

Tag # and Location	Valve Spec Section	Valve Size (inch)	Modulating Service (Yes/No)	Power Supply Voltage/Phase (VAC)/ø	Required Starts per Hour, minimum	Handwheel Rotation to Open[1]	Acceptable Stroke Time Range[2] (sec)	Maximum Differential Pressure Forward/Reverse (psi)	Maximum Flow Velocity[3] (ft/s)
457-TWS MOA-148	33 12 16.27	36	Yes	240V/3 ø	1200	CCW	330	Per Valve's Pressure Class[4]	16 ft/s
457-TWS MOA-147	33 12 16.16	16	Yes	240V/3 ø	1200	CCW	240	Per Valve's Pressure Class[4]	16 ft/s

Notes:

1. CW =Clockwise, CCW =Counterclockwise

2. Stroke time with continuous movement, without pulsing.

3. With the valve full open.

4. Per AWWA C519 Article 4.2.8.2.2: Manufacturer shall size actuator based on the valve's pressure class except where prior approval has been granted in writing by the Engineer

5. Per AWWA C507 Article 4.3.10.2.2: Manufacturer shall size actuator based upon the valve's pressure class if temperature, range, differential pressure, or flow is not specified.

PART 3 - EXECUTION

3.1 SHIPPING AND HANDLING

A. Electric motor actuators shall be stored per the manufacturer's instructions.

B. Electric motor actuators shall be stored inside a heated building or structure and shall have dust tight plastic coverings.

3.2 INSTALLATION

A. All powered actuators shall be sized and installed by an authorized representative of the actuator manufacturer.

B. Install per manufacturer's instructions and as shown on drawings.

C. All actuators shall be installed with good access to pushbutton controls and the declutch lever and the manual override handwheel. Installation shall include adequate clearances with walls or other obstacles to remove enclosure covers, and motor, and to maintain safe electrical device work clearances.

D. All valve and actuator assemblies shall be shop or factory assembled. All mechanical end travel (stops), torque and limit settings shall be shop or factory adjusted and tested. Assembled units shall be fully stroked (open-closed-open or closed-open-closed) in the shop or factory at least three times.

3.3 INSPECTIONS

A. All electric motor operators will be inspected upon delivery for compliance with these specifications. Any actuator found not to comply will not be accepted until deficiencies are corrected.

B. Each actuator shall be performance-tested at the factory per AWWA C542. Position switches, torque switches and mechanical stops shall be set for the test. During factory testing, the actuators shall operate without any intermittent or continuous tapping sounds. Operator exhibiting any noises other than a quiet and continuous motor noise during operation shall be repaired, or replaced, and then retested prior to shipping.

1. At the discretion of the District, the District will have a representative at the shop to witness the testing of the actuators. See Section 01 45 27 – Shop Inspection for inspection advance notification requirements and travel expenses. Failure by the Engineer to inspect or witness tests at the shop or factory shall not be construed as waiving inspection upon delivery.

C. Contractor shall repair all coating defects in accordance with the coating manufacturer's instructions. Stainless steel, brass or bronze items shall not be coated.

3.4 FIELD TESTING

A. Valve actuators shall be tested with the valve during the Field Functional Test and in accordance with Section 01 75 17 – Field Testing and Startup.

B. Manufacturer's Representative shall perform field testing in coordination with the installing contractor.

C. Valve and actuator and all appurtenances shall be tested together as a system.

D. Demonstrate smooth and quiet operation of all actuators without any intermittent or continuous tapping sounds. Operator exhibiting any noises other than a quiet and continuous motor noise during operation shall be repaired, or replaced, and then retested at the sole expense of the Contractor.

E. Electric Motor Actuators: Complete the field functional tests in accordance with the Field Functional Test Form at the end of this Section, and as directed by the Engineer.

3.5 SUPPLEMENTS

A. The following supplements follow END OF SECTION and are a part of this section:

1. Electric Motor Valve Actuator Technical Submittal Checklist (for High-Performance Butterfly Valve or AWWABall Valve)

2. Electric Motor and Gearbox Actuator Sizing Calculation Datasheet

3. Field Functional Test Data Form

END OF SECTION

ELECTRIC MOTOR VALVE ACTUATOR
TECHNICAL SUBMITTAL CHECKLIST

(Manufacturer's Representative shall complete one form per type of valve and actuator combination)

SPEC. SECTION TITLE & NO:	
TAG NO(s):	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
1. Certified manufacturers' drawings shall include:	
a. Motor operator dimensions, construction details and materials.	
b. An outline drawing showing proposed orientation and mounting on the valve, with overall dimensions.	
c. A drawing showing the proposed valve/actuator orientation and relationship to nearby structures or obstacles. The drawing should also show floor/ platform location and any wall within 6 feet.	
d. Provide net weight of each actuator including required intermediate reduction gear.	
e. Coating materials to be used.	
2. For electric motor actuators, certified drawings shall also include:	
a. Electric wiring diagrams for position switches, power and control systems. These diagrams shall show the terminal designations for the control wiring.	
b. Number of handwheel turns to open the valve.	
c. Motor nameplate data.	
d. Weights of actuators and gearing assemblies.	
3. A data sheet summarizing all pertinent data for the actuator and the valve, including valve and actuator torques, motor and actuator nameplate data, starts per hour, motor duty time, total combined valve and actuator weights, valve pressure rating, speed range capability, factory set open and closing times, gear ratio for the electric actuator and the intermediate reduction gear, etc.	
4.	
5.	
6.	
7. Affidavit of Compliance.	
Append Electric Motor Valve Actuator Technical Submittal Checklist with the valve technical submittal checklist.	

ELECTRIC MOTOR AND GEARBOX ACTUATOR SIZING CALCULATION DATASHEET

(Manufacturer's Representative shall complete one calculation datasheet for each type of valve and electric actuator combination)

SPEC. SECTION TITLE & NO:	
TAG NO(s):	
Valve Size and Model	
Valve Gear Box Model	
Motorized Actuator Model	

SUBMITTAL CONTENT REQUIREMENTS	**Page Number(s)**
Instructions: Electric Motor Actuator Calculations for sizing the actuators meeting all the requirements at the maximum differential pressure and velocity conditions listed in Tables A. Include any referring calculations and/or literature in the reference pages.	
1. Minimum Required Shaft Torque (MRST). The minimum required shaft torque (MRST) shall be calculated by the manufacturer. The torque at both the seated position (seating and unseating) and the midstroke maximum (5° through 90°) total dynamic run (opening or closing) shall be evaluated	
a. Total seating torque: (AWWA M49-3rd Edition, equation 3-1)	
b. Total unseating (break) torque: (AWWA M49-3rd Edition, equation 3-2)	
c. Total Opening (run) torque: (AWWA M49-3rd Edition, equation 3-3)	
d. Total unseating (break) torque: (AWWA M49-3rd Edition, equation 3-2)	
2. Actuator Sizing Torque (AST). The actuator sizing torque (AST) shall be calculated by the manufacturer and based on the minimum required sizing torque (MRST) times the application factor (AF)	
a. Application Factor (AF): (AWWA C519 Table 2 Butterfly Valves, AWWA C507 Table 3 Ball Valves))	
b. Actuator Sizing Torque: (AST = AF × MRST)	
3. Electric Motor Actuator (Motor and Gear Box Sizing Calculations	
a. Selected electric motor and gearbox rated torque	
b. Calculated operation time	
c. Calculated handwheel rimpull	
Append Electric Motor and Gearbox Actuator Sizing Calculation Datasheet with the valve technical submittal checklist.	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Electric Motor Valve Actuators** Section No.: **33 12 16.32**

Tag No.: _____ P&ID No. _____

I. Pretest Documentation/Setup

Documents:

This test shall be conducted in conjunction with the valve functional test. Append these results to the valve test data sheet.

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc)**:** amp meter, volt meter

II. Field Functional Test

1. Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Loop Checks complete	☐	☐	☐	
1.3 Electrical commissioning complete	☐	☐	☐	

2. Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed (tags shall match P&IDs)	☐	☐	☐	
2.2 All fields on Asset List Spreadsheet completed for device (Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)	☐	☐	☐	
2.3 Verify O&M manual installation instructions have been completed.	☐	☐	☐	
2.4 Verify that the motor and actuator frame is electrically grounded.	☐	☐	☐	
2.5 Verify all position switches are properly adjusted and functional (see P&IDs for switch settings).	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Electric Motor Valve Actuators** Section No.: **33 12 16.32**

Tag No.: _____ P&ID No. _____

3. Operations Check	Pass	Fail	NA	Comments:
3.1 Electrical Imbalance Test: Measure and record input voltage motor amperes on each phase at the terminals of the motor. Verify that there is no significant phase imbalance, and that adequate voltage levels are applied to the motor.	☐	☐	☐	
3.1 Actuator Stroke Time: Open and close each valve fully and measure and record stroke time in both directions. Stroke time shall be between _240_ – 330__ seconds.	☐	☐	☐	
3.2 Valve Closure Test: Close the valve with the actuator and verify that the valve is leak tight (this test should be done with the valve "Leakage Test"). Adjust the actuator and repeat the test as necessary so that the valve closes fully meeting the leakage requirements.	☐	☐	☐	
3.3 Actuator Operation Test: The actuator operates smoothly and quietly without any intermittent or continuous tapping sounds.	☐	☐	☐	
4. Controls Check	Pass	Fail	NA	Comments:
4.1 Local Check: Place the actuator in "LOCAL" control mode, manually opening and closing the valve at the actuator, and verifying that the local valve position indicator and remote position indication 4-20 mA output signal (if applicable) read the proper values.	☐	☐	☐	
4.2 Open/Close Service Valves: Simulate an open or close remote contact input signal and verify that the valve opens and closes.	☐	☐	☐	
4.3 Modulating Service Valves: Simulate a 4-20 mA remote position input signal and use the following values: 0, 25, 50, 75, and 100 percent open. Verify that the valve opens or closes to the correct position without overshooting the target position. Also, verify that the local valve position indicator and remote position indication 4-20 mA output signal read the proper values at each position.	☐	☐	☐	
4.4 Status Checks: Verify motor run status operates properly.	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: _____ Test Date(s): _____

Equipment Name: **Electric Motor Valve Actuators** Section No.: **33 12 16.32**

Tag No.: _____ P&ID No. _____

	Pass	Fail	NA	Comments:
5. Alarms Check none	☐	☐	☒	
6. Run Check none	☐	☐	☒	
7. Other Tests and Checks				
7.1 Field Calibration Tag: Attach to the valve actuator at the conclusion of the functional test. Tag shall include valve tag number, type of valve service (OPEN/CLOSE, or MODULATING), actuator stroke time (recorded above), and position switch settings (including switch tag numbers).	☐	☐	☐	
7.2 Cover and seal the actuator to protect it from dust and water prior to operation (covers shall be removed prior to startup test).	☐	☐	☐	

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

EBMUD

SUBMITTAL LOG

SPEC NO.	PROJECT TITLE	DATE
1234	xxxxxxxx	

(a) EADOC Submittal No.	(b) SPEC. SECTION	(c) SPEC ARTICLE	(d) DWG NO.	(e) Dwg.Section/ Detail No.	(f) Submittal Title/Description	(g) Planned Submit Date	(h) Actual Submit Date	(i) Date Returned by EBMUD	(j) Submittal Status	(k) Reviewer	(l) Notes
8	03 11 00	1.3A	2116-S-010	Section A	Reservoir Roof Shoring Design & Calculations	9/30/2012	10/25/2012	11/15 12	AR	PF	CA PE Stamped
12	33 12 16.11	1.2B1a1-3	2116-M-012	Item #5	Resilient Seated Gate Valves	12/19/2012	1/3/2013	1/20/2013	RR	MT	NSF Cert required
15	01 29 00	1.2A	N/A	N/A	Initital Subcontractor Payment Report P-47	8/15/2012	9/9/2012	9/16/2012	AAN	TK	Update and submit monthly on the 25th
22	23 09 33	1.2A	2116-E-002, 202 Rev 1	Section A & B	HVAC Control Panel	4/15/2012	4/30/2012	5/12/2012	RR	PG	Clearly mark proposed enclosure

M-113.2/14

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER:_____ EQPT SERIAL NO.:_____

EQPT TAG NO.:_____ EQPT/SYSTEM:_____

PROJECT NO.:_____ SPEC. & SECTION:_____

I hereby certify that the above-referenced equipment/system has been:

Complete	Not Applicable	
☐	☐	Installed in accordance with Manufacturer's recommendations.
☐	☐	Inspected, checked, and adjusted.
☐	☐	Serviced with proper initial lubricants.
☐	☐	Electrical and mechanical connections meet quality and safety standards.
☐	☐	All system instruments are calibrated.
☐	☐	All applicable safety equipment has been properly installed.

Comments:_____

_____

_____

_____

_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate the equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and ready for startup and operations. I further certify that all information contained herein is true and accurate.

Date: _____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

O&M MANUAL REVIEW CHECKLIST

(Manufacturer's Representative to complete one form per submittal)

SPEC. SECTION TITLE & NO:	
MFR Name, Address, Phone:	
Local Rep Name, Address, Phone:	

GENERAL FORMAT (See Section 01 33 00 for additional details)			
DESCRIPTION	**PROVIDED?**		**COMMENTS**
	YES	**NO**	
Specified copies provided			
Binder cover clearly labeled			
Spine Label			
System/Equipment type clearly identified			
District facility or facilities name(s) identified			
Specification number & title shown			
Title page provided			
Equipment tag numbers correctly shown			
Manufacturer's name, address, phone number provided			
Local Representative's name, address, phone number provided			
Table of contents provided			
Heavy section dividers w/ numbered or lettered plastic tabs provided			
Pages punched for 3-ring binder			
Info larger than 8-1/2 x 11 folded showing title block			
Original quality copies provided			

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	**LOCATION IN O&M**			**COMMENTS**
	TAB#	**PAGES**	**N/A**	
Equipment Descriptions				
• Equipment names, model numbers & tag numbers				
• Equipment & major component functions				
• Drawings, diagrams & illustrations				
• Equipment Specification				
• Bill of materials				
• Legend, Abbreviation, and Acronym List				
Performance Information				
• Nameplate data				
• Performance test data/curves				

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	LOCATION IN O&M			COMMENTS
	TAB#	PAGES	N/A	
Installation Instructions				
• Installation procedures & drawings				
• Equipment tolerances				
• Adjustment procedures				
Operating Instructions				
• Startup procedures				
• Normal & routine operations				
• Control functions				
• Alarms description and settings				
• Shutdown procedures				
• Emergency operations				
Electrical Information				
• Nameplate data				
• Relay, control, alarm contact settings				
• Motor test data				
Electrical Drawings				
• Single-line diagrams, three-line diagrams				
• Interconnection wiring diagram				
• Schematic and elementary diagrams				
• Panel layout drawings				
Instrumentation & Control				
• Control diagrams				
• Panel layout drawings				
• Instrument data sheets (specification forms)				
• Calibration Procedures				
• Final settings for adjustable control devices				
• Block diagrams and riser diagrams				
• Loop diagrams				
• Pneumatic/Hydraulic piping drawings				
• Hard copy printouts of control programs				
• Field calibration data sheets				
• Programming software (licensed to EBMUD) with user manuals				
Shipping and Storage Instructions				
Testing				
• Factory Test Report (procedures and results)				
• Field Test Procedures				
• Manufacturer's Certificate of Proper Installation (where specified)				
• Field Test Results				
Troubleshooting guide				

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	LOCATION IN O&M			COMMENTS
	TAB#	PAGES	N/A	
Safety				
• Safety procedures/Lockout discussion				
• CAUTION, WARNING, DANGER text				
• Material Safety Data Sheets (MSDS)				
• Special safety equipment				
Preventive Maintenance				
Maintenance Summary Forms				
Lubrication Information				
• Location of lube points & frequency				
• Recommended type & grade, state specific MFR				
• Recommended viscosity & temperature range				
Overhaul Instructions				
• Detailed assembly drawings w/OEM part numbers				
• Tear down/rebuild instructions				
Spare Parts for Equipment & Components				
• Predicted life of parts subject to wear or aging				
• Recommended spare parts list w/ part numbers				
• Complete instructions for obtaining parts				
• Long-term storage requirements				
• Special tools				
Long-term Shutdown/Lay-up Instructions				
Warranty/Guarantee				

TYPICAL MAINTENANCE SUMMARY FORM

(Use as many pages as necessary. MS Word file available upon request)

1. Equipment Name: _____
2. Manufacturer: _____
3. Identification Numbers:

   Tag: _____

   Model: _____

   Serial: _____

4. Nameplate Data (HP, voltage, speed, flow rate, head, etc.): _____

   _____

5. Manufacturer's Local Representative:

   Name: _____

   Telephone: _____

   Address: _____

6. LUBRICANT LIST

Reference Symbol List symbols used in Item 8 below	Lubricant Description List equivalent lubricants: brand name(s), type, grade, viscosity, etc.

7. SPARE PARTS (Recommendation spare parts with part numbers; if any.)

8. Equipment Replacement Cost [$] _____

9. MAINTENANCE REQUIREMENTS

Maintenance Task Briefly list each required preventive maintenance activity	Frequency List required frequency of each operation (daily, weekly, monthly, annual, etc)	Task Duration Time needed to complete each task (with units: hours, days, weeks, etc)	Lubricant Refer by symbol to lubricant list (Item 6)	Task Details Location List O&M Manual Tab and page number which provides additional details on the maintenance activity

I, _____ certify that the information on this form is an accurate and complete summary of all typical, routine, and preventive maintenance tasks required to ensure satisfactory performance during warranty period and the overall longevity of the equipment or systems.

_____ _____

(Manufacturer's Representatives Signature) (Date)