GUAM WATERWORKS AUTHORITY
"Better Water. Better Lives."
Gloria B. Nelson Public Service Building | 688 Route 15, Mangilao, Guam 96913
Telephone No.: (671) 300-6036

Invitation For Bid:	IFB-08-ENG-2023
Project:	Ugum Water Treatment Plant Rehabilitation (Re-bid) GWA Project No. W22-10-BND
Addendum No.:	04
Date:	July 14, 2023

All Potential Bidders:

This addendum is issued to modify the previously issued bid documents and/or given for informational purposes, and is hereby made a part of the bid documents. Failure to acknowledge receipt of this addendum shall be grounds for the bidder's disqualification and rejection of the bidder's proposal.

1. **Bid Documents**

   Any references to construction period of **365** calendar days in the entirety of the bid documents shall be amended to **425** calendar days.

2. **Section 00410 – Bid Form**

   Discard all previously issued Section 00410 Bid Form in its entirety and replace with the enclosed **Section 00410 Bid Form (Re-bid Addendum 4**).

3. **Assessment and Procurement Report**

   Discard all previously issued Assessment and Procurement Report in its entirety and replace with the enclosed **Assessment and Procurement Report (Re-bid Addendum 4**).

4. **Technical Specification**

   Section 011000 – Summary (Re-bid Addendum 4) was added to the Technical Specifications

   Section 407233 – Capacitance Type Level Meters (Continuous and Point Type) (Re-bid Addendum 4) was added to the Technical specifications.

Discard previously issued Section 431311 – Centrifugal Pumps in its entirety and replace with **Section 431311 – Centrifugal Pumps (Re-bid Addendum 4)**

Discard previously issued Section 432321.13 - Between-Bearings Impeller, One and Two Station Axially Split Centrifugal Pump in its entirety and replaced with **Section 432321.13 - Between-Bearings Impeller, One and Two Station Axially Split Centrifugal Pump (Re-bid Addendum 4)**

Discard previously issued Section 400557 - Gates in its entirety and replace with **Section 400557 - Gates (Re-bid Addendum 4).**

Bidders are also notified to visit the GWA website, http://guamwaterworks.org/bids/ to ensure that addenda to the bid, answers to questions, and reminders communicated are received by all bidders throughout the solicitation process.

MIGUEL C. BORDALLO, P.E.
General Manager

Attachments:
Section 00410 Bid Form (Re-bid Addendum 4)
Assessment and Procurement Report (Re-bid Addendum 4)
Specification Section 011000 – Summary, (Re-bid Addendum 4)
Specification Section 431311 – Centrifugal Pumps, (Re-bid Addendum 4)
Specification Section 432321.13 Between-Bearings Impeller, One and Two Station Axially Split Centrifugal Pump, (Rebid Addendum 4)
Specification Section 400557 – Gates (Re-bid Addendum 4)
Specification Section 407233 Capacitance Type Level Meters, (Re-bid Addendum 4)

cc: MCB;elv

GUAM WATERWORKS AUTHORITY

Ugum Water Treatment Plant Rehabilitation (Re-bid)
GWA Project No. W22-10-BND
IFB-08-ENG-2023
RFI Response No. **9, 10, and 11** to Contractor Inquiries

This Addendum and/or Response to Request for Information (RFI) is issued to modify the previously issued bid documents and/or given for informational purposes and to the extent the responses below modify the bid documents, please treat them as an amendment to the Bid. The following responses are in response to RFIs received.

	REFERENCE	QUESTION/INQUIRY AS SUBMITTED:	GWA RESPONSE:
Questions from July 05 thru 07, 2023			
1. SPECIFICATIONS			
a.		On the Spec Section 400557 gates, Paragraph 3.2 Factory Service and Paragraph 3.3 Certification, we would like to inquire in the bid schedule if there is a separate line item same as provided for Bid Schedule 4.0 Membranes 4.1q On Site Manufacturer's Technical Field Service for this scope of work. Please confirm if that will be incidental to Bid schedule 3.1 & 3.2.	***See revised Section 00410 – Bid Form (Re-bid Addendum 4) reflecting startup and manufacture service***
2. BID FORM			
a.		On Bid Schedule 3.5 (Deliver two 40 ft. containers), please include description in the bid schedule for required level and access into the container for uniformity of bids to include leveling and pedestal as may be needed.	***The surface must be level and access into the container shall not exceed 6 inches in height without access steps. Pedestals may be used. See revised assessment/procurement report (Re-bid Addendum 4)***

b.		In addition to the Two (2) containers, we would like to know if owner would specify High Cube or just a standard 40 ft. container. Please confirm.	***Standard height. See revised assessment/procurement report (Re-bid Addendum 4)***
c.		On the Bid Schedule Item 2.1 for Equipment #P100 and P102, we would like to request the following information that will be replaced as provided in Figure Sheet M1.2 (procurement report); a. Height of the Extended Motor Support b. Total Length of the Extended Column	***See revised assessment/procurement report (Re-bid Addendum 4) for requested information***
d.		On Addendum 2 Bid Schedule Item 4.1q, On-site manufacturer's field service. Is this for the spare parts requirement for Technical Field Service. Please provide more information on the technical field service requirement or guidance as to request from the manufacturer/supplier of the membrane spare parts.	***This field service is for technical support to GWA. The field tech will inspect and review the installed membranes.*** ***Bidders shall allow for 10 consecutive working days at 8 hours per day.***
3. GENERAL			
a.		On the total construction period of 365 calendar days, given the long lead items for materials and equipment approximate 9 months procurement, production and shipping and we are 9 months construction work, we believe the 365 calendar days is not sufficient to complete the works. We request for your consideration to increase the total construction duration to 540 calendar days.	***Refer to Re-bid Addendum No. 4.***
b.		We would like to know what will be the maximum window or total outage hours at a given time to complete an area work.	***See part 3 of assessment/procurement report and specification 011000 (Re-bid Addendum 4)***

c.		With regard to the spare parts item/materials that is included in this project, can the spare parts materials to be procured and handed over immediately and contractor can bill after materials are received and accepted by GWA member. Please confirm.	***Please refer to Section 00700 General Conditions Article 15, Subsection 15.01, Item B.1 – Application for Payments.***
d.		Besides Contractor arrange vacuum truck needed during construction work, will GWA vacuum trucks be available to rent by awarded contractor during construction operation at what rates?	***GWA vacuum truck will not be available to the Contractor.***
e.		Given the time to coordinate & receive proposal/quotes from vendors, suppliers and subcontractor and due to 4th of July Week, we would like to request your consideration for a three (3) weeks bid submission extension from July 14, 2023 to August 4, 2023.	***See Re-bid Addendum 4.***
f.		What will GWA do if all bidder's proposal exceed the fund currently secured? Will there be partial descoping from the current bid items to match with available fund, or intending to secure additional funds to proceed full scope or any other options GWA is planning to do?	***Please refer to Section 00200 Instructions to Bidders, Article 19 – Evaluation of Bids and Award of Contract.***
4. RIVER INTAKE			
a.		On the River Intake works, is there any restriction or required timing of the said works such as work must be during dry season, etc. Please provide guidance for contractor consideration.	***See part 3 of assessment/procurement report and specification 011000 (Re-bid Addendum 4).***
b.		On Bid Schedule Item 5.1, for the submersible transfer pump, and Item 6.1 submersible pump, refers to specification Section 431311 Centrifugal Pumps. On this spec section Paragraph 3.3 Testing and Certification Item E,	***Witness testing requirements have been updated, see revised specification Section 431311 (Re-bid Addendum 4).***

		states performance testing shall be witnessed with the customer's motor, manufacturer's inquiry is if standard factory testing can be acceptable.	
c.		On the same spec section 431311 Centrifugal Pumps, if Item E requirement for performance testing on the customer's motor, if the testing will be on the exact supplied motor, the manufacturer may start the warranty period for the pumps as it has been loaded and used for testing. Please confirm this will be acceptable.	***Not acceptable. Warranty period shall begin after pump is field installed and accepted.***
d.		On the same spec section 431311, Paragraph 3.3 Testing and Certification Item H, states at GWA'S request, the pump manufacturer shall include all expenses for travel, food and lodging for all witness testing in the price of the pumping system for two GWA Representatives. We would like to re-confirm if this is really needed as this adds to the project bid cost. There are 2 pumps on the bid schedule for this spec section.	***See revised specification Section 431311 (Rebid Addendum 4).***
5. THICKENER TANK			
a.		On the thickener tank works to remove and replace thickener assembly, we would like to know what is the maximum downtime or outage to remove, clean, install (new) and activate the equipment.	***Additional time (~1 week) can be given for thickener tank outage. See specification Section 011000 (Re-bid Addendum 4).***

Bidders are also notified to visit GWA website: http://guamwaterworks.org/bids/ to ensure that addenda to the bid, answers to questions, and reminders are communicated to all bidders throughout the solicitation process.

MIGUEL C. BORDALLO, P.E.
General Manager

MCB;elv/kmr

BID FORM

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BID FORM

ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

Guam Waterworks Authority
Gloria B. Nelson Public Service Building
688 Route 15 Mangilao, Guam 96913

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with Buyer in the form included in the Bidding Documents to furnish the Goods and Special Services as specified or indicated in the Bidding Documents, for the prices and within the times indicated in this Bid, and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Buyer.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date

B. Bidder has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided and become familiar with and is satisfied as to the observable local conditions that may affect cost, progress, or the furnishing of Goods and Special Services, if required to do so by the Bidding Documents, or if, in Bidder's judgment, any local condition may affect cost, progress, or the furnishing of Goods and Special Services.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations in effect as of the date of the Bid that may affect cost, progress, and the furnishing of Goods and Special Services.

D. Bidder has carefully studied, considered, and correlated the information known to Bidder; information commonly known to sellers of similar goods doing business in the locality of the Point of

Destination and the site where the Goods will be installed or where Special Services will be provided; information and observations obtained from Bidder's visits, if any, to the Point of Destination and the site where the Goods will be installed or Special Services will be provided; and any reports and drawings identified in the Bidding Documents regarding the Point of Destination and the site where the Goods will be installed or where Special Services will be provided, with respect to the effect of such information, observations, and documents on the cost, progress, and performance of Seller's obligations under the Bidding Documents.

E. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution (if any) thereof by Engineer is acceptable to Bidder.

F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services for which this Bid is submitted.

ARTICLE 4 - BIDDER'S CERTIFICATIONS

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Buyer, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Buyer of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Buyer, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will furnish the Goods and Special Services in accordance with the Contract Documents for the following price(s): **See attached Attachment 1 – Unit Price Bid Form**

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, to be determined and as provided in the Contract Documents. Bidder also acknowledges that each unit price includes an amount considered by Bidder to be adequate to cover Bidder's overhead and profit for each separately identified item.

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the furnishing of Goods and Special Services will conform to the schedule set forth in Article 5 of the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the form of _____.

B. List of Proposed Major Suppliers;

C. Required Bidder Qualification Statement with Supporting Data; and

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____

(Individual's signature)

Doing business as: _____

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____ _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____

(Signature of general partner - attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, other): _____

By: _____

(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

(Signature of Corporate Secretary)

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____

A Limited Liability Company (LLC)

LLC Name: _____

State in which organized: _____

By: _____

(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____

A Joint Venture

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____

(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone: _____ Facsimile: _____

E-mail address: _____

Phone and Facsimile Number, and Address for receipt of official communications to Joint Venture: _____

_____

_____

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation, and limited liability company that is a party to the joint venture should be in the manner indicated above.)

Attachment 1 – Unit Price Bid Form

UGUM WATER TREATMENT PLANT REHABILITATION (RE-BID)

GWA Project No. W22-10-BND

Base Bid - Description of Work:

The base bid items consist of but not specifically limited to mobilization/demobilization, replacement of existing equipment in the river intake, settling basins, membranes, backwash, neutralization tank, pipe gallery/generator building, thickener tank, operation/chemical building, improvements to administration building.

Bidders will complete the work for the following price(s) as broken down per scope item:

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
1.0 - General Conditions					
1.1	Mobilization/Demobilization, Permitting, Insurance, Bonds, and Contractor's Administration	LS	$_____	1	$_____
2.0 – River Intake					
2.1	Remove pumps/motors #1 and #3 (outer left and right pumps) and replace with new pumps/motors including accessories, complete in place (Specs Section 432321.13) Equipment # P100 and P102	LS	$_____	1	$_____
2.1a	Factory testing and certification (Specs Section 432321.13)	LS	$_____	1	$_____
2.2a	Remove existing MCC for pump #1 and install new VFD including accessories, complete in place (Specs Section 262923) Motor Control Drive for Equipment # P100	LS	$_____	1	$_____
2.2b	Remove existing VFD screens for pump #2 and pump #3 and replace with new, complete in place (Specs Section 262923) Component of Motor Control Drives for Equipment #s P101 and P102	LS	$_____	1	$_____
2.3	Remove existing 16-inch flow meter including support and replace with new, complete in place (Specs Section 407113) Equipment # FIT101	LS	$_____	1	$_____

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
2.4	Remove two (2) existing filters, piping, and fittings from the flange connection at the main discharge piping, install two (2) 12-inch blind flanges to the flange ends of the remaining main discharge piping, demolished pipe and fittings to be disposed of at the site (Specs Section 017320)	LS	$_____	1	$_____
3.0 – Settling Basins					
3.1	Remove two (2) existing manual sluice gates for flocculation basins and replace with new manually operated sluice gates (work will require draining of water inside the basins), including accessories, complete in place (Specs Section 400557)	LS	$_____	1	$_____
3.2	Remove eight (8) existing automatic sluice gates for sedimentation tanks and replace with new manually operated sluice gates (work will require draining of water inside the basins), including accessories, complete in place (Specs Section 400557)	LS	$_____	1	$_____
3.2a	Factory service for new sluice gate installation and commissioning (Specs Section 400557)	LS	$_____	1	$_____
3.3	Remove and replace sludge collection system (chain and flight) at two (2) contact basins and two (2) recycle basins including accessories, complete in place (Specs Section 464311)	LS	$_____	1	$_____
3.4	Remove accumulated sludge inside the tank including disposal to Inarajan WTP drying beds (Specs Section 022100)	CYD	$_____	533	$_____
3.5	Deliver two 40 ft shipping containers (new) with door locks to Ugum WTP. (See Report)	LS	$_____	1	$_____
4.0 - Membranes					
4.1	Provide the following spare parts (manufactured by Memcor/Dupont or approved equal) delivered to the				SEE REPORT

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
	job site, inclusive of taxes and other miscellaneous fees				
4.1a	Membrane Module, Spare S10N PVDF, PN 12038357	EA	$_____	864	$_____
4.1b	Manifold, Clover Top CS Nylon SS Stud-119006, PN 12038845	EA	$_____	220	$_____
4.1c	Manifold, Clover Bottom GFPP Duraprop, PN 12037192	EA	$_____	220	$_____
4.1d	Clip, Clover Module CS/CSII, PN 12038846	EA	$_____	870	$_____
4.1e	Gasket, Bottom Clover EPDM 9710 3 Hole, PN 12032200	EA	$_____	220	$_____
4.1f	O-Ring, EPDM 9710 148.6MMx5.7MM Blue DT, PN 12037177	EA	$_____	100	$_____
4.1g	Top Clover O-Ring, EPDM 9710 BS352 WRC Blue Dot, PN 12032190	EA	$_____	220	$_____
4.1h	Assembly, Valve MLD FILT ISOL Rack, PN 12037880	EA	$_____	220	$_____
4.1i	Nut, Hex M8x1.25MM 316SS 6H 800MPA, PN 12032244	EA	$_____	2000	$_____
4.1j	Washer, Spring M8x3.75MM Thk 316SS, PN 12032250	EA	$_____	2000	$_____
4.1k	Washer, Flat M8x17MM OD 316SS, PN 12032248	EA	$_____	2000	$_____
4.1l	Center, Insert CS NLY-GRP Rack Sea, PN 12032409	EA	$_____	220	$_____
4.1m	9 Clover Stainless Steel Membrane Racks, PN 12038806	EA	$_____	24	$_____
4.1n	Membrane Aeration Hose, PN 12032313	FT	$_____	500	$_____
4.1o	Rack Lock Mechanism and Lever, PN 12040036	EA	$_____	4	$_____
4.1p	Rack Lower Guides, PN 12039311	EA	$_____	4	$_____
4.1q	On-Site Manufacturer's Technical Field Service for 10 days, including travel and all miscellaneous expenses	LS	$_____	1	$_____
4.2	Remove two (2) existing electric chain hoists and replace with two (2) 1-ton variable speed hoists with single controller each, including necessary electrical work, complete in place (Specs Section 412223.19)	LS	$_____	1	$_____

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
4.3	Remove and replace the rusted existing steel angle iron and plates between Cell #1 and Cell #2. Contractor to submit shop drawings for approval. (Specs Section 055000)	LS	$_____	1	$_____
4.4	Install new anchor bolts for existing upper support angle (See Report)	LS	$_____	1	$_____
4.5	Install new anchor bolts for existing lower support angle (See Report)	LS	$_____	1	$_____
5.0 - Backwash					
5.1	Remove existing submersible transfer pumps and install new, (Specs Section 431311) Equipment #s P301 and P302	EA	$_____	2	$_____
5.1a	Testing and certification (Specs Section 431311)	LS	$_____	1	$_____
5.2	Remove existing level sensor/level monitor and replace with new, (Specs Section 407233) Equipment # LIT301	EA		1	
5.3	Remove existing mixer and replace with new, see (Specs Section 464123) Equipment # M301	EA		1	
5.4	Remove existing 4-inch flow meter and replace with new meter complete with screen cover protection (Specs Section 407113) Equipment # FIT301	EA		1	
5.5	Remove accumulated sludge inside the tank including disposal to Inarajan WTP drying beds (Specs Section 022100)	CYD	$_____	46	$_____
6.0 – Neutralization Tank/Sludge Tank					
6.1	Remove and Replace submersible pump and nozzles within the tank, complete in place, (Specs Section 431311) Equipment # P401	LS	$_____	1	$_____
6.1a	Testing and certification (Specs Section 431311)	LS	$_____	1	$_____
6.2	Replace 1-inch pH/Orp Meter (Specs Section 407513) Equipment #s AIT401 and AIT402	EA	$_____	1	$_____

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
6.3	Remove existing level sensor/level monitor one each for Neutralization tank and Sludge Tank and replace with new, (Specs Section 407233) Equipment # LIT401 Neutralization and LIT501 Sludge	EA	$_____	2	$_____
6.4	Remove accumulated sludge inside the tank including disposal to Inarajan WTP drying beds (Specs Section 022100)	CYD	$_____	84	$_____
7.0 – Filter Pipe gallery/Generator Room					
7.1	Remove and replace existing aluminum access doors, jambs, and hardware in the piping room, MCC room and in the generator room, complete in place. (Specs Section 081116)	LS	$_____	1	$_____
7.2	Provide spare Bray butterfly valves, pneumatic actuators, and status monitors as follows: (Specs Section 400564)				
7.2a	16” Flanged Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	2	$_____
7.2b	14” Flanged Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	3	$_____
7.2c	12” Flanged Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	4	$_____
7.2d	10” Wafer Style Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	2	$_____
7.2e	8” Wafer Style Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	4	$_____
7.2f	4” Wafer Style Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	2	$_____
7.2g	2” Wafer Style Butterfly Valve, Series 30/31, complete with accessories	EA	$_____	3	$_____
7.2h	Pneumatic Actuator Part #92-2100-11300-532	EA	$_____	5	$_____
7.2i	Pneumatic Actuator Part #92-1600-11300-532	EA	$_____	4	$_____
7.2j	Pneumatic Actuator Part #92-1270-11300-532	EA	$_____	2	$_____
7.2k	Pneumatic Actuator Part #92-1190-11300-532	EA	$_____	2	$_____

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
7.2l	Pneumatic Actuator Part #92-1180-11300-532	EA	$_____	4	$_____
7.2m	Pneumatic Actuator Part #92-0630-11300-532	EA	$_____	4	$_____
7.2n	Status Monitors Part #50-0406-12610-532	EA	$_____	14	$_____
8.0 – Thickener System (Diameter = 20 feet, Type BST)					
8.1	Remove existing thickener assembly and replace with new inclusive of complete drive assembly, with gear motor and weatherproof drive torque control. Drive unit is completely factory assembled, calibrated and tested, Walkway, beam supported (half the diameter), 36" wide with aluminum I-bar flooring, Center Drive platform, Aluminum handrail, Feedwell, Rake arms with plow blades and pickets, Operation and Maintenance manuals, Torque tube, Influent pipe, Finish paint, Weirs, FRP, Field service 2 days/1 trip (See Report) Equipment # M370	LS	$_____	1	$_____
8.2	Remove two (2) existing thickener pumps and replace with new pumps, (Specs Section 432357) Equipment #s P371 and P372	LS	$_____	1	$_____
8.3	Remove accumulated sludge inside the tank including disposal to Inarajan WTP drying beds, (Specs Section 022100)	CYD	$_____	125	$_____
9.0 – Operations/Chemical Building					
9.1	Remove existing chemical pumps and replace with new for proper dosages, (Specs Section 463342) Equipment #s P501, P601, P701, P801 and P901.	EA	$_____	5	$_____
9.2	Remove existing hydraulic lift including hydraulic pump, tank, motor, hoses, hydraulic rams, all cables and pulleys and replace with new, (See Report)	LS	$_____	1	$_____
10.0 – Administration Building					

Item No.	Description	Unit	Unit Price	Qty	Bid Amount
10.1	Remove front door entrance and replace with new 3'-8.5" wide, aluminum swing door with vision glass, (Specs Section 081116)	LS	$_____	1	$_____
10.2	Remove leaking roof hatch cover at the Control Room and cover the opening with concrete (See Report)	LS	$_____	1	$_____
10.3	Remove existing and install new roll up door at basement level of Administrative Building. (Specs Section 083300)	LS	$_____	1	$_____
TOTAL BASE BID (TOTAL of Items 1 through 10, inclusive)					$_____
(Please write out total bid amount in words below)					

Attachments:

1. Assessment Photos
2. DuPont Report
3. Equipment List
4. Site Sketches and Plan Excerpts

1. Introduction Statement

Duenas Camacho and Associates (DCA) is contracted with the Guam Waterworks Authority (GWA) to provide program and construction management services. As part this contract, DCA has conducted a site assessment of the Ugum Surface Water Treatment plant (Plant) located in Talofofo, see Figure 1. The assessment was intended to cover the existing condition of the plant with the exception of the: Existing Steel 2.0 million gallon storage tank and the plant control system.

The results of the assessment are presented on this report. These results are to be used as part of a procurement package to repair, replace or upgrade equipment. GWA will issue a notice to bid to contractors for the:

- Demolition and removal works
- Purchase and installation of equipment
- Installation and/or replacement of safety equipment

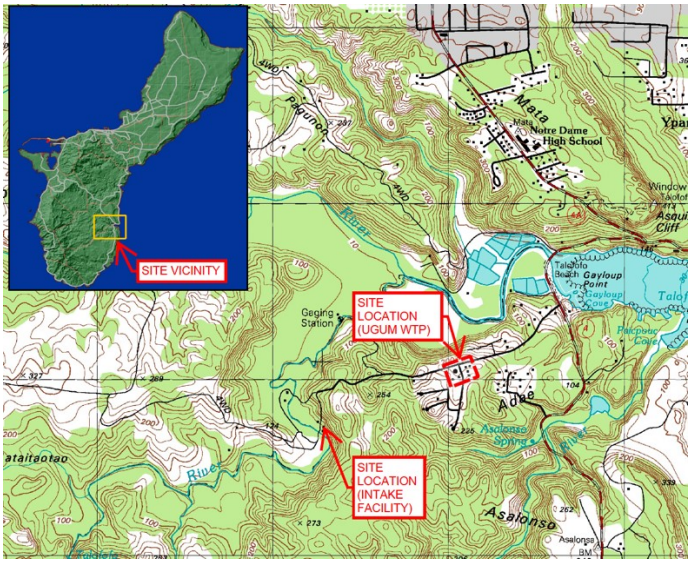


Figure 1: Project Location

2. Assessment Approach

The assessment was conducted in the months of June to August 2021. The project team consisted of process, civil and structural engineers from DCA, Electrical engineers from EMCE, and Mechanical engineer Marvic Acabado. GWA operations staff, Engineers and management assisted in the assessment. The assessment of the plant membranes was conducted by Mr. Charles Heard of DuPont.

Below is a list of the plans and reports provided by GWA and used as part of this assessment:

- 2007 Upgrade Plans Basis of Design
- 1993 As-built Plans
- 2021 DuPont Assessment Report

The objective of this assessment is to determine existing equipment that can be replaced or repaired in kind. In some cases the replacement will include operation modifications requested by the owner. These modifications are listed in section 3 of this report. This assessment is not intended to address any new parts of the plant that will require design works.

The methodology used for this assessment was:

- Inspect and evaluate all existing equipment
- Take field measurements
- Interview GWA operations and engineering
- Review past plans and record drawings
- Review past assessment reports
- Conduct coordination meetings
- Develop equipment replacement list
- Develop sketches and specifications for replacement works
- Prepare cost estimate
- Provide a listing of future design needs

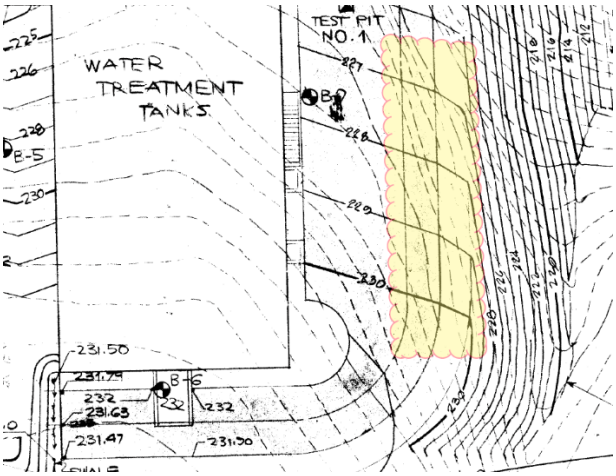
3. Procurement and Installation Needs

Sections below provide site specific information and shall be used with the project bid form and specifications.

1. GWA will have first right of refusal for all materials removed. Contractor shall dispose of off demolished materials.

2. GWA will allow for the Contractor to utilize a 30ft X 30ft area adjacent to GWA's site clarifiers for the two 40ft containers (Refer to Attachment A Site Plan). This 600 area may be leveled by the contractor.

3. Provide two heavy duty 14-gauge steel, weather resistant forty-foot with exterior dimensions of 40ft X 8ft X 8.5ft (LXWXH) and interior dimensions of 39.25 ft X 8 ft X 8.5 ft containers to be used as storage for new membrane equipment. These containers shall be new, single sided entrance and equipped with security lock box. These two containers shall be delivered to the project site and located on site as shown below. The surface must be level and access into the container shall not exceed 6 inches in height without access steps. Pedestals may be used.



40ft Container Location, Excerpt from 1989 As-built prepared by GMP Associates

INSTALLATION

1. The Contractor shall schedule and conduct activities to enable the existing GWA facilities to operate continuously, unless otherwise specified. The Contractor shall perform Work continuously during critical connections and changeovers as required to prevent interruption of GWA's operations. When necessary plan, design and provide various temporary services, utilities, connections, temporary piping, access, and similar items to maintain continuous operations of GWA's facility at no additional cost to GWA.

2. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary outage of existing water system service. In such cases, the Contractor shall coordinate Work with the Contracting Officer and GWA as described below. The Contractor shall complete the GWA Scheduled Outage Request Form (**Exhibit A GWA Scheduled Outage Request**).

3. Upon GWA approval of the Outage Request Form, GWA Operations will provide the Contractor support for each tank outage. GWA operations may allow for up to an 8-hour outage duration non-peak times (9pm-5am). Contractor will be responsible for all materials needed for each outage.

4. The Contractor shall not close lines, open or close valves, or take other action which would affect the operation of existing systems. Only GWA staff is authorized to operate existing equipment, valves, and systems; and such request by the Contractor will be considered within 48 hours after receipt of Contractor's written request.

5. In addition to the construction schedule, the Contractor shall submit a detailed outage plan and time schedule for all construction activities which will make it necessary to remove a tank, pipeline, electrical circuit, equipment, structure, road or other facilities from service. The Contractor shall schedule all connections to existing facilities with GWA and the interruption to system operations and services shall be held to a minimum. This may require

outages to be scheduled at off-peak times. The cost for overtime labor of GWA staff required during an outage shall be borne by the Contractor and considered part of the cost of the outage.

6. The outage plans shall be submitted to the Contracting Officer for acceptance and receive a favorable review before submitting the outage request to GWA. The outage plan shall describe the Contractor's method; the length of time required to complete said operation; any necessary temporary power, controls, instrumentation or alarms required to maintain control and monitoring for the water system; and the manpower, plant, and equipment which the Contractor shall provide in order to ensure proper operation of associated water system. All costs for preparing and implementing the outage plans shall be at no increase in cost to GWA.

7. Outages and service connections shall be performed during the dry weather season, unless specifically allowed to occur during the wet weather season. The outage plans shall be coordinated with the construction schedule and shall meet the restrictions and conditions of this Section.

8. The removal of the existing system from service and reconnect the pipelines to resume service shall be completed no more than **8 hours** for each shut down. The Contractor shall perform all cutting, patching, and connection to existing facilities with extreme care and take all precautions necessary to ensure that the existing facilities are not damaged. The Contractor shall be responsible for dewatering of the existing lines and disposal of water as required at no additional cost to GWA.

9. The Contractor shall not begin an alteration affecting existing facilities until specific written approval has been granted by GWA in each case. An outage request shall be submitted to GWA a minimum of 14 calendar days in advance of the time that such outages are required. No more than one outage request will be considered per week. The Contractor shall coordinate the planned procedures with GWA. GWA has the authority to modify any proposed shutdown procedures if such procedures would adversely impact the water system operations.

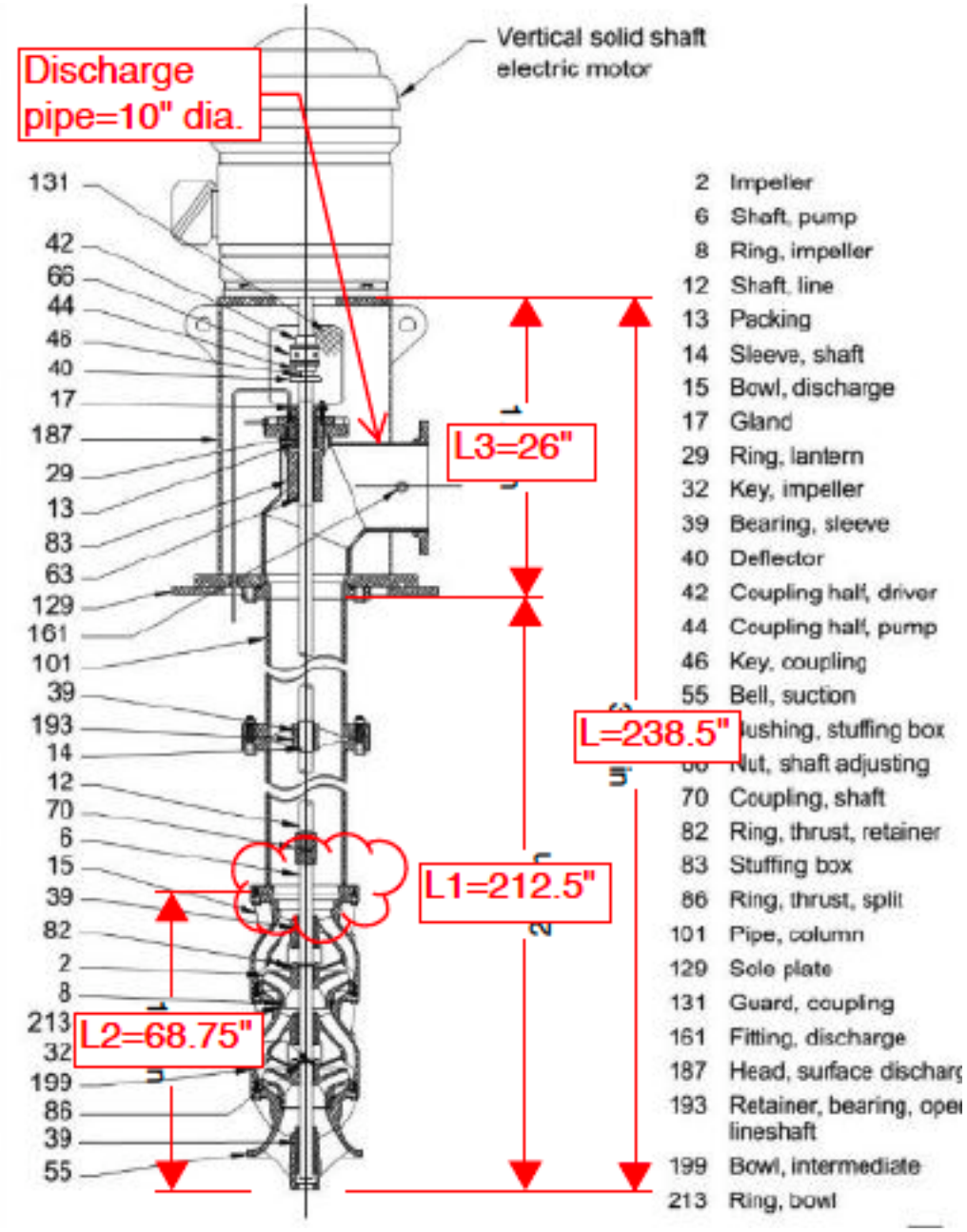
10. The Contracting Officer shall be notified in writing at least seven (14) calendar days in advance of the required outage if the schedule for performing the work has changed or if revisions to the outage plan are required.

11. The Contractor shall provide written confirmation of the shutdown date and time three (3) working days prior to the actual shutdown.

3.1. RIVER/INTAKE FACILITY

A. Existing (3) intake pumps are old and outdated. Pumps (P100 and P102) will need to be replaced
   - Existing pumps' seals are leaking

- Pump and motors #1 and #3 will be replaced in kind
- No additional electrical power supply will be needed because of a one-to-one replacement
- See attached photo assessment form for existing information and figure below.

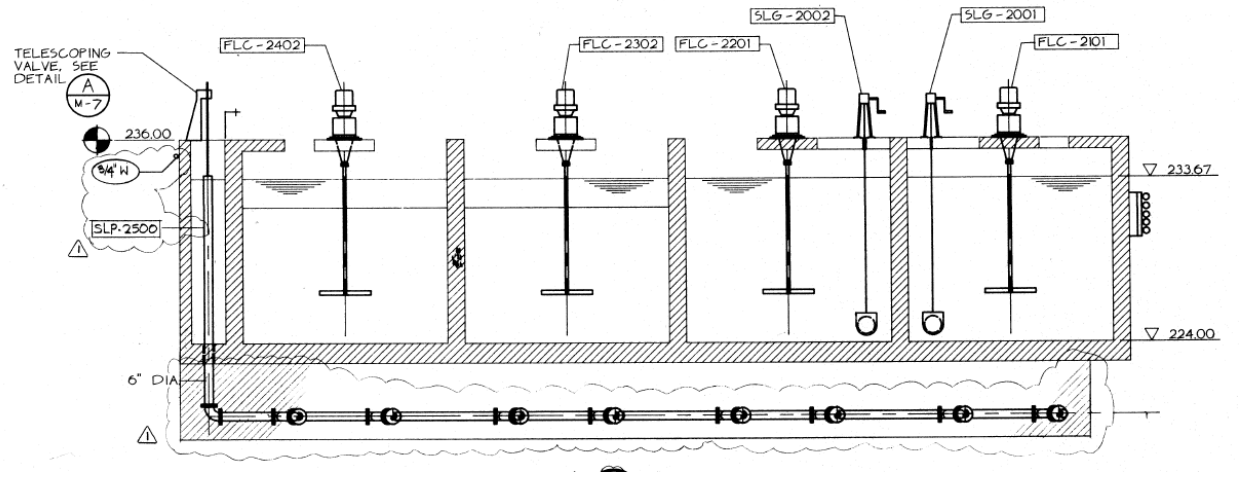


Existing Intact Pump Cross Section

B. The VFD for pump #1 was removed to address a wastewater emergency and was replaced with MCC. Existing MCC will need to be removed and replaced with VFD. Existing VFD screens for pumps #2 and #3 will need to be replaced in kind.
C. Existing 16-inch flowmeter screen is unreadable and will need to be replaced in kind
   - No additional electrical power supply will be needed because of a one-to-one replacement
   - Replacement includes all meter supports.
   - See attached photo assessment form for existing information.
D. Strainers have been bypassed
   - Strainers shall be removed and disposed of. Twelve-inch blind flanges shall be installed.

3.2. FLOCCULATION/SEDIMENTATION TANKS

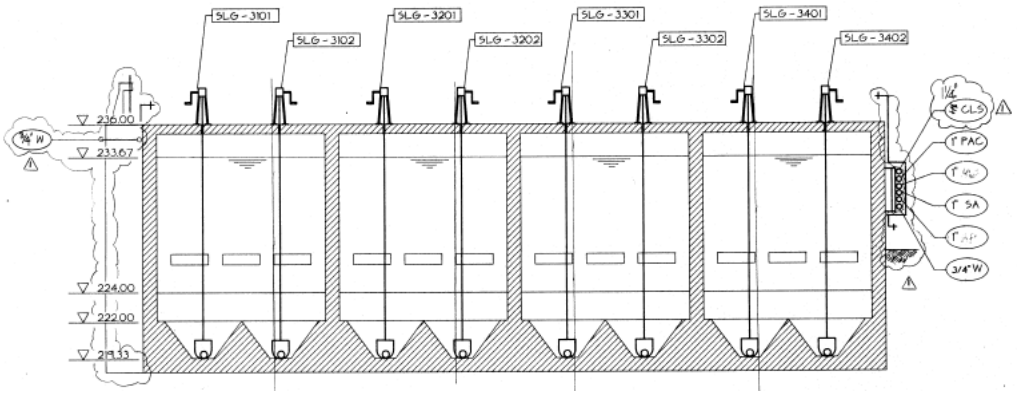
A. Furnish and install two (2) manual sluice gates on tank inlet.
   - Sluice gates will be removed and replaced in kind with manual ones.
   - Operators will need to be able to operate the new manual sluice gates
   - Water in tanks will need to be removed to replace the sluice gates
   - No electrical supply will be needed as the sluice gates will be operated manually
   - Inv. El. 224.50' 2. Top El. 236.00' 3. Opening 12" 4. Water El. 233.67' 5. Bott. El. 224.00'
   - Contractor will have to bypass at most two of the four basins at any time. Bypassing of two basins must be limited to one sedimentation basin and one backwash clarifying basin. Existing sluice drain line gates do not hold tight so temporary "trash" pumps will be needed to control the leakage from drain line.
   - See attached documents for existing pictures and specification.



Inlet Sluice Gates, Excerpt from 1989 As-built prepared by GMP Associates

B. Furnish and install eight (8) sluice gates on drain line.
   - Sluice gates will be removed and replaced in kind with manual hand crank.
   - Operators will need to be able to operate the new manual sluice gates
   - Water in drain wells will need to be removed to replace the sluice gates.

- No electrical supply will be needed as the sluice gates will be operated manually
- Inv. El. 219.33' 2. Top El. 236.00' 3. Opening 6" 4. Water El. 233.67' 5. Bott. El. 219.33'
- See attached photo assessment form for existing information.

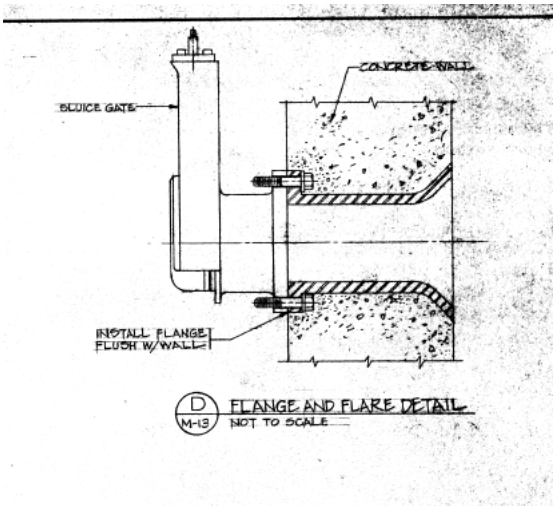


Drain Line Sluice Gates, Excerpt from 1989 As-built prepared by GMP Associates

The flocculation and sedimentation basins will need to be bypassed to install the eight new sluice gates along the drain line The following is a suggested approach to bypassing these basins. This work may be done in 3 phases. Other, contractor proposed, bypass options may be considered.

Phase 1. GWA operations will stop production and all tanks will be drained. At this time sludge shall be removed and sluice gates may be inspected

Phase 2. GWA operations will stop production and all tanks will be drained. Existing sluice gates will be removed, and temporary plugs shall be installed in all four basins. These plugs shall be fitted into the drain opening shown below.



Insert 6-inch diameter plug on each of the 8 drains.

Phase 3. Single isolation of each tank may be done. A single tank will be drained while the remaining three tanks remain in operation. The new sluice gates shall be installed into isolated

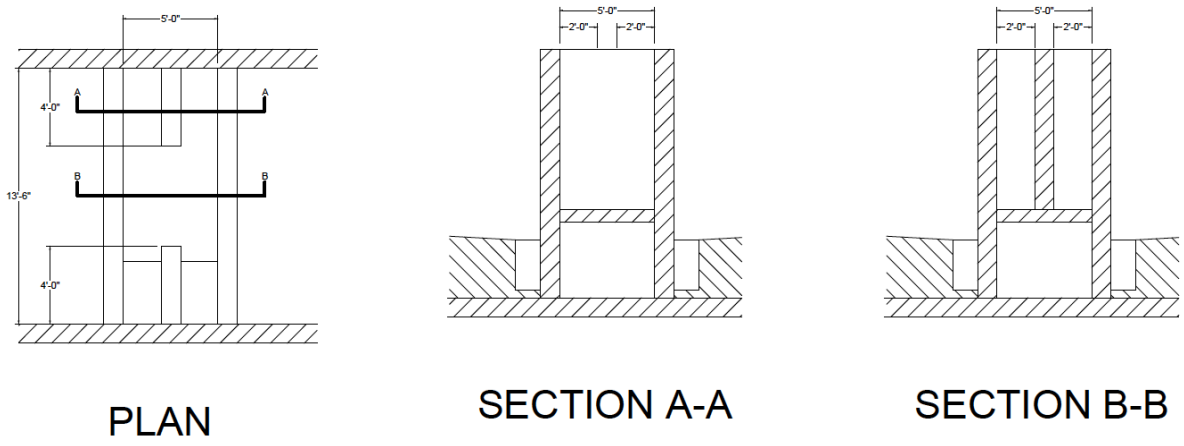
tank. This process shall then be repeated for the remaining tanks.

C. Remove and Replace sludge collection system (chain and flight) motors and gear drives at contact basins (2 each) and recycle basins (2 each) total of four (4)
   - Water will need to be removed from the basins to replace the sludge collection system.
   - See attached photo assessment form for existing information.
   - See attached documents for specifications for new chain and flight system.

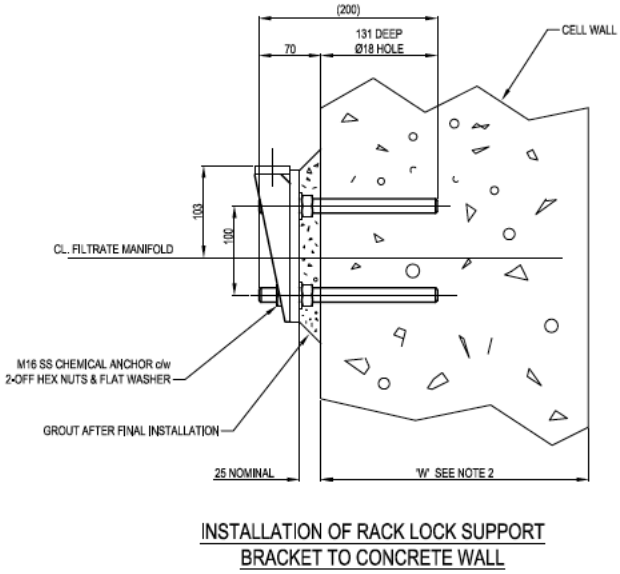
D. Remove and dispose of accumulated sludge.

3.3. MEMBRANE CELLS

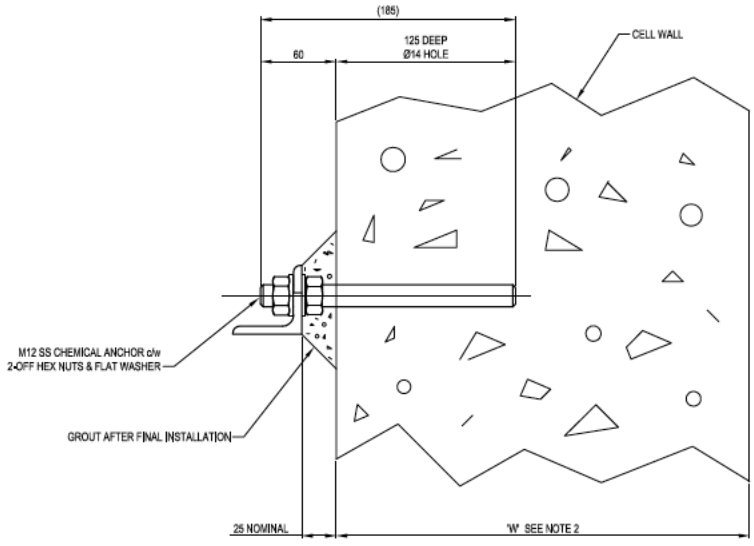
A. Remove and replace membrane equipment, see bid form list.
B. Provide and install new rack lock support and lower guide support brackets at each of the two membrane cells. See record drawings (0211193-241 & 021193-242) for installation specifics. Contractor shall provide all materials and resources needed for the complete bracket install. Owner will provide the bypass needs for each membrane cell. One membrane cell may be worked on at any time.
C. Membrane parts shall be by Memcor /Dupant or approved equal.
D. Provide variable speed 1-ton chain hoist (2 each) for membrane cell maintenance.
   - Variable speed chain hoists will be needed to easily access the membranes for cleaning. Existing hoists are considered a hazard for the workers
   - Existing hoists will need to be replaced from its location and replaced in kind with a variable speed 1-ton chain
   - Electrical power supply will be needed to power the variable speed chain hoist
   - See attached photo assessment form for existing information.
E. Angle irons holding up metal plates on walkway between filter cells are rusted out and need to be replaced.
   - Steel 2X2X1/2 angle iron and ¼ inch galvanized steel checkered plates with gaskets will be replaced, see sketch.
   - Electrical power supply not applicable
F. Remove and install new rack lock support guides.
G. Install new anchor bolts on upper and lower rack lock support angles to match existing. Install at 3 inch off set from exiting, see excerpt below and refer to sheets 021193-242-A and 021193-242-A both prepared by TG engineers/Memcor as part of the 2007 Ugum Rehabilitation
   a. Total number of bolts for upper rack lock support angle: 20
      1. Replace with Hilti HSL-GR Stainless Steel heavy duty expansion anchor with 4 inch embedment or approved equal
   b. Total number of bolts for lower rack lock support angle: 10
      1. Replace with Hilti HSL-GR Stainless Steel heavy duty expansion anchor with 4 inch embedment or approved equal



Filter Cell Center Tank Sketch



Existing upper rack bolts, 2007 Memcor Plan Set Excerpt



Existing Lower rack bolts, 2007 Memcor Plan Set Excerpt

3.4. FILTER PIPE GALLERY AND GENERATOR ROOM

A. Replace single (1) aluminum door and jamb in the piping room and double aluminum door (1) and jamb the generator room, two (2) single aluminum doors and jamb at the upstairs MCC room
   - Remove existing steel door and jamb and replace in kind.

B. Provide butterfly valves actuators and status monitors replacement spares to be turned over to GWA.
   - See attached document for specifications.
   - BRAY BUTTERFLY VALVES: MAINLY SERIES 30/31 (Or approved Equal)
     - 2 each - 16" Flanged butterfly valves
     - 3 each - 14" Flanged butterfly valves
     - 4 each - 12" Flanged butterfly valves
     - 2 each - 10" wafer style butterfly valves
     - 4 each - 8 " wafer style butterfly valves
     - 2 each - 4" wafer style butterfly valves
     - 3 each - 2" wafer style butterfly valves

   - BRAY PNUEMATIC ACTUATORS (Or approved Equal)
     - 5 each - PART# 92-2100-11300-532
     - 4 each - PART# 92-1600-11300-532
     - 2 each - PART# 92-1270-11300-532
     - 2 each – PART#92-1190-11300-532
     - 4 each - PART# 92-1180-11300-532
     - 4 each - PART# 92-0630-11300-532
     - 2 each - PART # 92-1190-11300-532

- BRAY VALVE STATUS MONITORS (Or approved Equal)
  - 14 each - PART# 50-0406-12610-532

3.5. BACKWASH (HOLDING TANK)

A. Install new submersible pumps (P301 and P302)
   - The submersible pumps will be replaced in kind.
   - Backwash will have to be drained or lowered to a certain level in order for operators to remove the existing backwash and install new one.
   - See attached document for specifications of submersible pump.

B. Remove and install new level sensor/level monitor.
   - Level sensors/level monitors (one each) will be replaced in kind.

C. Remove and install new mixer (M301)

D. Remove and install new 4-inch magnetic flowmeter.
   - Magnetic flowmeter removed and will be replaced in kind.
   - No additional electrical power supply needed.

E. Remove and dispose of accumulated sludge.

3.6. NEUTRALIZATION/SLUDGE TANK

A. Install new submersible pump (P401) and nozzles within the tank.
   - Water will be drained from the neutralization tank for the submersible pump to be removed.
   - Submersible pump and nozzles will be replaced in kind.
   - See attached document for spec and information.

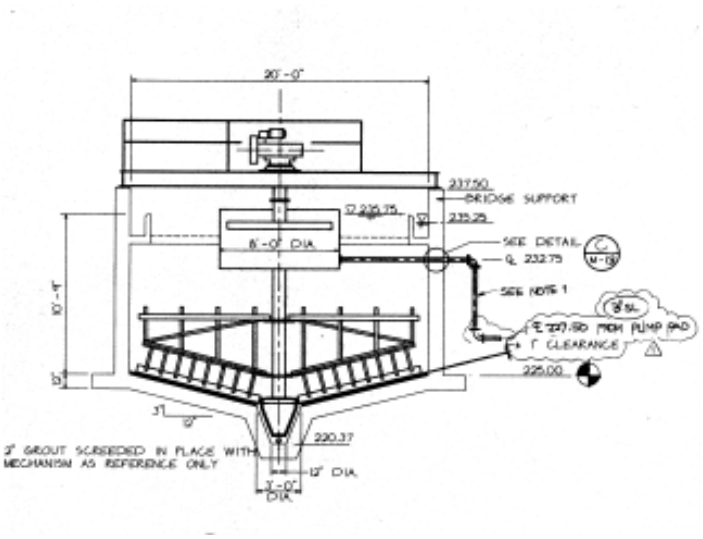
B. Replace ORP and pH meter.
   - 1 inch pH meter will be replaced in kind.
   - Additional electrical power supply not applicable
   - Future expandability not applicable

C. Replace level sensor/ level monitors.
   - Level sensors/level monitors one each for Neutralization and sludge tank will be replaced in kind.

D. Remove and dispose of accumulated sludge.

3.7. THICKENER TANK

A. Remove and replace thickener assembly (M370), see attachment 4
   - Manufacture shall be IEMCO (Or approved equal), 20ft diameter with 10.75ft side water depth complete with drive assembly. Epoxy coated carbon steel with stainless steel hardware.
   - Complete drive assembly, with gear motor and weatherproof drive torque control. Drive unit shall be factory assembled, calibrated and tested.
   - Provide center drive platform, rake arms with plow blades and pickets, torque tubes and influent pipe.
   - Provide 2 days of startup service with manufacturer representative once unit installed and ready for startup,
   - Aluminum walkway with handrail and supports
   - Installed complete in place



Thickener assembly, Excerpt from 1989 As-built prepared by GMP Associates

B. Remove and replace thickener feed pumps and motors (P371 and P372).
   - Thickener and feed pumps will be removed.
   - See attached document for additional information.

C. Remove and dispose of accumulated sludge.

3.8. OPERATIONS BUILDING

A. Remove and replace existing feed (piping) including metering pumps, 5 total.
B. Remove and replace existing 2-ton hydraulic lift system to include cables, hydraulic cylinders, pump, hoses and motor assembly

3.9. ADMINISTRATION BUILDING

A. Remove and replace front door
B. Repair leak from roof hatch at control room.
C. Remove and replace the existing roll up door located at the basement level of the administration building. The door opening is 104 inches X 98 Inches.

GUAM WATERWORKS AUTHORITY

688 Route 15
Mangilao, Guam 96913
Phone: 300-6058 Fax: 647-2621

SCHEDULED OUTAGE REQUEST
Engineering Department
(01/2017 version)

Requirements:

(1) The outage request must be submitted at least two weeks prior to the requested event.
(2) GWA must provide the public with at least three days prior notice to the outage.
(3) Bacteriological and pressure test results must be submitted before the public notice can be released.
(4) On the day of the outage, all materials and equipment must be onsite prior to start of the outage.
(5) On the day of the outage, preparation work around active water mains must be conducted so as to not damage the water mains before the start of the outage.

Date: _____

COMPANY NAME:_____ **CONTACT #'S:**_____

COMPANY POINT OF CONTACT:_____

EMAIL ADDRESS:_____

MAILING ADDRESS: _____

_____

PROJECT LOCATION: _____

PROJECT DATE: _____

ESTIMATED PROJECT TIME: _____

WORK DESCRIPTION:

_____

_____

AREAS AFFECTED: _____

NAME OF PROJECT INSPECTOR (G.W.A.):_____ **EMPLOYEE. NO.**_____

ESTIMATED COSTS*:

Employee	Hours	Hourly Wage	Overtime Wage (Hourly wage x 1.5)	Total
		$25.00/hour/employee		
Equipment	Hours	Hourly Cost		
		$55.00/hour/vehicle		
			Total Estimated Cost:	

***Labor costs are estimated based on projected time for completion but may increase if completion time goes beyond projected completion time.**

***Costs are estimates and may change due to employee and equipment availability.**

***Labor, materials and equipment will be billed to the contractor as stated on the Operation Work Order.**

***Inspector and Operations Sections will bill overtime charges separately.**

I fully understand and agree to pay for all GWA employee labor costs, materials and equipment used as indicated above relative to this request.

REQUESTOR SIGNATURE: _____ DATE: _____

SECTION 011000 - SUMMARY

PART 1 - GENERAL

A. Section Includes:

1. Contract description.
2. Work by Owner or other Work at the Site.
3. Contractor's use of Site
4. Owner occupancy.
5. Permits.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes supply and installation of equipment to the Ugum Water treatment plant.

B. Perform Work of each Contract under fixed cost Contract with Owner according to Conditions of Contract.

1.3 WORK BY OWNER OR OTHERS

A. Owner will award a separate contract for the construction of a new water tank located a separate lot adjacent to the Ugum Water Treatment plant.

B. If Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Contractor's Use of Site and Premises" Articles in this Section.

C. Coordinate Work with utilities of Owner and public or private agencies.

D. Where two or more contracts are being performed at one time on the same Site or adjacent land in such manner that work under one contract may interfere with work under another, GWA will determine the sequence and order of the Work in either or both contracts. When the Site of one contract is the necessary or convenient means of access for performance of work under another, GWA may grant privilege of access or other reasonable privilege to the contractor so desiring, to the extent, amount, and in manner and at time that GWA may determine. No GWA determination of method or time or sequence or order of the work or access privilege shall be the basis for a claim for delay or damage except under provisions of the General Provisions for temporary suspensions of the work. The Contractor shall conduct its operations so as to cause a minimum of interference with the work of such other contractors and shall cooperate fully with such contractors to allow continued safe access to their respective portions of the Site, as required to perform work under their respective contracts.

E. Interference with Work on Utilities: The Contractor shall cooperate fully with all employees or other agents of GWA or employees/agents of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities, which interfere with the progress

of the Work, and shall schedule the Work so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of Site and premises to allow:

1. Owner occupancy.
2. Work by Owner.
3. Work by Others.

B. Construction Operations: Limited to existing tanks, processes, and buildings. Staging and work area shall be limited to the existing Ugum Water treatment site as delineated by the existing project site fence line.

1. Noisy and Disruptive Operations (such as Use of Jack Hammers and Other Noisy Equipment): Not allowed in close proximity to existing building during regular hours of operation. Coordinate and schedule such operations with Owner to minimize disruptions.

C. Utility Outages and Shutdown:

1. Continuous operation of GWA's facilities is of critical importance. The Contractor shall schedule and conduct activities to enable the existing facilities to operate continuously, unless otherwise specified.
2. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary outage of existing water system service. In such cases, the Contractor shall coordinate Work with the RPR as described below.
3. The Contractor shall perform Work continuously during critical connections and changeovers, and as required to prevent interruption of GWA's operations. When necessary, plan, design and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of GWA's facility at no additional cost to GWA.
4. The Contractor shall not close lines, open or close valves, or take other action which would affect the operation of existing systems. Only GWA staff is authorized to operate existing equipment, valves, and systems; and such request by the Contractor will be considered within 48 hours after receipt of Contractor's written request.
5. The Contractor shall submit a detailed outage plan and time schedule for all construction activities which will make it necessary to remove a pipeline, electrical circuit, equipment, structure, road or other facilities from service. The Contractor shall schedule all connections to existing facilities with GWA and the interruption to system operations and services shall be held to a minimum.
6. The removal of the existing system from service and reconnect the pipelines to resume service shall be completed no more than **8 hours** for each shut down. The Contractor shall perform all cutting, patching, and connection to existing facilities with extreme care and take all precautions necessary to ensure that the existing facilities are not damaged. The Contractor shall be responsible for dewatering of the existing lines and disposal of water as required at no additional cost to GWA.
7. The outage plans shall be submitted to the GWA and RPR for acceptance at a minimum of two (2) weeks in advance of the time that such outages are required. The outage plan

shall describe (1) the Contractor's method; (2) the length of time required to complete said operation; (3) any necessary temporary power, controls, instrumentation or alarms required to maintain control and monitoring for the water system; and (4) the manpower, plant, and equipment which the Contractor shall provide in order to ensure proper operation of associated water system. All costs for preparing and implementing the outage plans shall be at no increase in cost to GWA.

8. The Contractor shall not begin an alteration affecting existing facilities until specific written approval has been granted by GWA in each case. The Contractor shall coordinate the planned procedures with GWA. GWA has the authority to modify any proposed shutdown procedures if such procedures would adversely impact the water system operations.
9. The GWA and the RPR shall be notified in writing at least one (1) week in advance of the required outage if the schedule for performing the work has changed or if revisions to the outage plan are required.
10. The Contractor shall provide written confirmation to GWA of the shutdown date and time at least two (2) working days prior to the actual shutdown.

D. Construction Plan: Before start of construction, submit three copies of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.5 OWNER OCCUPANCY

A. Schedule and substantially complete designated portions of the Work for occupancy before Substantial Completion of the entire Work.

1. Owner's use and occupancy of designated areas before Substantial Completion of the entire Project do not relieve Contractor of responsibility to maintain specified insurance coverages on a 100 percent basis until date of final payment.

B. Schedule the Work to accommodate Owner occupancy.

1.6 PERMITS

A. Furnish necessary permits for construction of Work including the following:

1. Building permit.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 011000

SECTION 431311- CENTRIFUGAL PUMPS

PART 1 – GENERAL

1.1 SUMMARY

A. This section of the Specification describes centrifugal pumps, of which consists four (4) effluent pumps, and all related appurtenances. Pumps shall be designed for use in water applications and be of heavy-duty, high-efficiency design with a minimum service life of 20 years. All pumps and their associated equipment shall be suitable for the specified application and shall conform to this Specification.

B. These specifications are intended to give a general description of the equipment required but do not cover all details that will vary in accordance with the requirements of the equipment application. It is, however, intended to cover the furnishing, shop testing, delivery, complete installation and field testing of all materials, equipment and all appurtenances required to complete the Work of this Section, whether or not specifically mentioned in these Specifications.

C. The Contractor shall be responsible for equipment installation in accordance with the manufacturer's written directions. The manufacturer shall be responsible for verification of system installation, start-up, testing, and operation and maintenance training of the GWA's personnel.

D. After approval of submittals but prior to installation and start-up of equipment, the manufacturer shall furnish copies of installation, operating, and maintenance instructions to GWA as required in Division 01. These materials shall include complete manufacturer's approved drawings of ALL major equipment, depicting ALL major dimensions and views of important details; COMPLETE and COMPREHENSIVE instructions for operation and maintenance, including details of system piping, name and address of the manufacturer's representative, parts lists, wiring diagrams, design data, guides for "troubleshooting"; and ALL other pertinent texts, diagrams, and illustrations. These materials shall be provided in a standard 8-1/2-inch by 11-inch three-ring binder. Oversized drawings shall be folded as necessary and supplied in pouches suitable for inclusion in the three-ring binder.

1.2 DEFINITIONS/STANDARDS

A. Each pump shall be tested and approved in accordance with national and international standards (IEC34-1, HI, CSA) and ISO 9906.

1.3 SUBMITTALS

A. Follow 013300 SUBMITTAL PROCEDURES when submitting information on this project.

B. Product Data: Complete engineering data including, but not limited to, descriptive data, material specifications, performance data, and wiring diagrams. Differentiate between manufacturer-installed and field installed wiring.

C. Shop Drawings:

1. Complete fabrication, assembly and layout drawings, including plan, section and elevation views; and details necessary to accurately and completely depict the equipment to be furnished.
2. Wiring diagrams for power, signal, control and instrumentation wiring and devices.
3. Hydraulic calculations demonstrating compliance with the required hydraulic characteristics.
4. Certified pump drawing.
5. Factory-certified characteristic curves of pump performance, NPSHR, power requirements, and efficiency.
6. Pump operation and maintenance manual.
7. Typical cross sectional drawing.
8. Performance test procedures.

D. At the time of submission, the manufacturer shall, in writing, call GWA's and Engineer's attention to any deviations that the submittal may have from the requirements of these Specifications.

E. All material submitted for review shall be contained in one submission. Partial submittals will not be reviewed. Sales bulletins or other general publications are not acceptable for review, except where necessary to provide supplemental technical data.

F. Performance Affidavit.

G. A complete written description of the warranty to be provided.

H. Manufacturer's Certification: Following installation, provide a certification by a qualified representative of the system manufacturer that the equipment is installed properly, operating within the design parameters, and will be warranted as specified herein. Certification shall be based on the detailed inspection of the installation following the successful start-up of the system.

1.4 QUALITY ASSURANCE

A. The centrifugal pumps shall be the product of a recognized manufacturer whose personnel have been regularly engaged in the design and manufacturing of such equipment. The manufacturer shall demonstrate upon the request of the Engineer that:

1. They maintain a reasonable stock of spare parts for this equipment.
2. They employ sufficient qualified servicing and operation control advice.

B. Provide a list of references (name, location, and contact information) of at least five (5) operating installations currently using the same or similar model proposed located in the United States.

C. Factory Test: All centrifugal pumps with greater than 100 horsepower motors (wet weather influent pumps and effluent pumps) shall be tested at the manufacturer's facility to ensure compliance with the specified Performance Requirements.

D. Identification: The specified system shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous location. Nameplate information shall include equipment model number, serial number, supplier's name and location.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Pumps shall ship fully assembled with the driver mounted. They shall be skidded and shipped in the position specified by the manufacturer. The suction and discharge flange shall be protected with a flange cover.

B. Pumps and related equipment shall ship F.O.B. to the Project site. All claims relating to short shipments or damaged equipment must be filed within two (2) working days after receipt of equipment with the freight line.

C. At the Contractor's expense, the skidded pump and related equipment shall be unloaded and stored in strict accordance with the manufacturer's requirements until installed and accepted by GWA for beneficial use. Prior to storage, the Contractor shall review in detail items relating to mounting, lubrication, alignment, power requirements and rotation as specified by the manufacturer to insure proper warranty. If storage is longer than three (3) months or in a harsh environment, the manufacturers long term storage instructions must be adhered to by the Contractor.

D. Package equipment in containers constructed for international shipping, handling and storage.

E. Protect all components against damage during shipping, delivery, storage, and handling.

F. Comply with manufacturer's written instructions for storage and handling.

1.6 WARRANTIES AND BONDS

A. The Contractor shall provide a warranty against defective or deficient materials and workmanship for at least one (1) year in accordance with the requirements of Division 01.

1.7 SPARE PARTS

A. Pump manufacturers are to include recommended spare parts required for normal operation during the first five years of operation.

B. Once complete pump and motor separate from the installed pumps shall be provided as a shelved spare.

PART 2 - PRODUCTS

2.1 GENERAL

A. The manufacturer shall furnish all centrifugal pumps, complete with all appurtenances required for proper operation.

B. The Contractor shall install the centrifugal pumps in accordance with approved submittals, manufacturer's written instructions and Engineer's Drawings. The Contractor shall coordinate with the pump manufacturer and shall provide all interconnecting cabling and piping.

C. The manufacturer shall be responsible for verification of installation, including electrical connection of equipment, start-up testing, and operation and maintenance instruction of GWA's personnel.

D. The pump and motor shall be produced by the same manufacturer.

2.2 ACCEPTABLE MANUFACTURERS

A. Manufacturers

1. Flygt of Rye Brook, New York,.
2. Sulzer Ltd. of Switzerland; (ABS).
3. Or approved equivalent.

2.3 PERFORMANCE REQUIREMENTS

A. See schedule

B. The centrifugal pumps shall be capable of operating under variable frequency drives (VFDs) in their entire specified operating range at not less than 60% efficient.

2.4 OPERATING PARAMETERS

A. Furnish and install centrifugal, submersible mounted pumps designed for pumping water. Each pump shall be equipped with a submersible electric motor connected for operation on 460 volts, 3-phase, 60 hertz, with a minimum of twenty (20) feet of submersible cable. The power cable shall be sized according to IEC.

2.5 PUMP CONSTRUCTION

A. Major pump components shall be of cast iron EN GJL-250 or ASTM A 48, Class 35B with smooth surfaces devoid of blow holes or other casting irregularities. EN GJS-500-7 or ASTM-No 80-55-06 is also allowed. All exposed nuts or bolts shall be made of stainless steel A2 according to ISO 3506-1 or ASTM 304 or better.

B. The outer surfaces of the pump shall be protected by suitable painting system including a two-component high-solid top coating.

C. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Pump/Motor unit mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings.

D. Rectangular cross section rubber, paper or synthetic gaskets that require specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

2.6 DRY WELL INSTALLATION

A. Pump shall be capable of operating in a continuous non submerged condition in a vertical position in a dry pit installation and permanently connected to inlet and outlet pipes. Pump shall be of submersible construction and will continue to operate satisfactory if the dry pit is subject to flooding.

2.7 HYDRAULIC END DESIGN

A. The impeller(s) shall be of semi open multi vane, back-swept leading edge, non-clog design and dynamically balanced. The leading edges shall be horizontal and due to the backswept form, transport any debris to the perimeter of the inlet. The impeller vanes shall be self-cleaned upon each rotation as they pass across a sharp relief groove and shall keep the vane clear of debris, maintaining an unobstructed pumping. The impeller shall have heavily back swept leading edges with a specific angle distribution enabling the capability of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The clearance between the insert ring and the impeller shall be adjustable.

B. The leading edges and tip of the vanes (facing the insert ring) shall be hardened to a minimum 58 HRC to a depth of 4 mm. The impeller shall be of Hard iron ASTM A-532, Alloy III A.

C. Pump volute shall be single-piece non-concentric design with smooth passages large enough to pass any solids that may enter the impeller. The insert ring (suction cover) shall be replaceable. Pump volute shall be Cast Iron, ASTM A-48, Class 35B. The insert ring shall be made of Hard Iron, ASTM A-532, Alloy III A.

2.8 COOLING SYSTEM

A. A stainless steel motor cooling jacket shall encircle the stator housing, providing for dissipation of motor heat regardless of the type of pump installation. An integrated axial-flow propeller shall be located between the inner and outer mechanical seals providing a positive flow and circulation of the cooling liquid. The cooling liquid shall pass the stator housing with the help of an inner cooling mantle to create a narrow space and in combination with turbulent flow providing for superior heat transfer. The cooling system shall have one fill port and one drain port integral to the cooling jacket. The cooling system shall provide for continuous pump operation in liquid or in air having a temperature of up to 40 degree C (104 degree F). Operational restrictions at temperatures below 40 degree C are not acceptable. Fans or blowers are not acceptable.

2.9 PUMP SHAFT

A. Pump and motor shaft shall be a solid continuous shaft. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The pump shaft shall be of stainless steel EN 1.4057 or AISI 431.

2.10 MECHANICAL SEAL

A. Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seals, each having an independent spring system. The seal material shall consist of corrosion resistant wolfram carbide (Corrosion resistant tungsten carbide). The seals shall require neither maintenance nor adjustment and shall be capable of operating in

either clockwise or counter clockwise direction of rotation without damage or loss of seal function. Should both seals fail and allow fluid to enter the stator housing, an alarm shall stop the pump before the fluid come into contact with the lower bearings, or the stator. The outer primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide ring. The inner secondary seal, located between the seal chamber and the seal inspection chamber shall be an active seal. The inner seal shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring. The rotating inner seal ring shall have small back-swept grooves laser inscribed upon its face to act as a micro pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

B. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication.

C. In the case of a seal cavity, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

D. The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to affect sealing shall be used.

2.11 BEARINGS

A. The shaft shall rotate on grease lubricated bearings. The support bearing, provided for radial forces, shall be a rolling bearing. The main bearings shall consist of a double row angular contact ball bearing.

2.12 MOTOR

A. The pump motor shall be induction type with a squirrel cage rotor, housed in an air filled watertight chamber. The stator windings and stator leads shall be insulated with moisture resistant Class H insulation rated for 180 degree C (355 degree F). The stator shall be heat-shrink fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be specifically designed for submersible pump usage and designed for continuous duty pumping media of up to 40 degree C (104 degree F).

B. Thermal switches shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be set to open at 140 degree C and shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. In addition, at least one analogue sensor shall be embedded in the phase windings to enable continuous measurement and recording of temperature.

C. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40 degree C (104 degree F) ambient and with an average temperature rise of the stator windings not to exceed 80 degree C. A performance chart shall be provided showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no load characteristics.

D. Provide 460V, 3-phase, wet-pit, submersible motors suitable for VFD operation with winding temperature protection

2.13 JUNCTION BOX

A. The cable entry junction chamber and motor shall be separated by a feed through type terminal board of non-hygroscopic material, which shall isolate the stator housing from foreign material gaining access through the pump top.

2.14 POWER AND MONITORING CABLE

A. The submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and have P-MSHA Approval.

2.15 CABLE ENTRY SEAL

A. The cable entry seal design shall not require specific torque requirements to ensure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer sleeves, flanked by washers, all having a close tolerance fit against the cable and the cable entry. The sleeves shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall permit easy changing of the cable. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

2.16 PROTECTION AND MONITORING

A. All stators shall incorporate three normally closed thermal switches in series to monitor the temperature of each phase winding. Should high temperature occur, the thermal switches shall open, stop the motor and activate an alarm.

B. Any leakage that occurs from the mechanical seals shall be gathered in a separate leakage chamber. A float leakage sensor shall detect water entering the leakage chamber. When activated, the control shall stop the motor and activate an alarm. The manufacturer shall provide a control and status relay to be mounted into any control panel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Contractor shall install all centrifugal pumps.

B. The manufacturer shall provide written installation instructions to GWA and answer any related installation questions that GWA may have.

C. The centrifugal pumps specified herein shall be factory assembled to the largest extent possible, complete with all components specified.

D. Construct reinforced concrete foundation with embedded anchor bolts in accordance with Structural Drawings.

E. Provide connection of motor to electrical service.

F. Support discharge piping to prevent excessive dead and live loads from being imposed on pump casings.

3.2 START-UP AND OPERATOR TRAINING

A. After complete installation of equipment by Contractor, including placement of pumps, setting and leveling the equipment, piping, electrical connections to all the equipment specified herein, the manufacturer's factory trained service representative shall approve the installation during a site inspection.

B. Upon approval of the installation, the services of the manufacturer's factory trained service representative shall be provided at the project site for equipment start-up and testing.

C. During the start-up and testing phase, the manufacturer's representative shall inspect all system components for proper functionality and alignment and assist the Contractor in placing the equipment in proper operating condition. If additional testing is required to provide proper function and operation conditions this shall be provided at no additional cost to GWA or Contractor.

D. Upon satisfactory completion of the start-up and testing, a representative of the manufacturer shall be provided to instruct GWA's personnel in the proper operation and maintenance of the equipment. The manufacturer's representative who will be providing the instruction shall have prior operation, maintenance and instructing experience.

E. If the equipment manufacturer arrives at the jobsite and equipment installation is not complete, the equipment manufacturer may bill the Contractor at the manufacturer's standard service rates, or as agreed to at the time of the service request.

3.3 TESTING AND CERTIFICATION

A. Duty points shall be guaranteed either by ISO 9906 or Hydraulic institute. The use of old standards ISO 2548 or ISO 3555 shall not be allowed.

B. For closed coupled pumps, total efficiency shall always be guaranteed. (Pump efficiency shall be used only for pumps sold without motors.

C. All hydrostatic and performance testing shall be completed prior to the application of any "FINAL" paint and/or coating. All factory testing shall be in accordance with the standards of the Hydraulic Institute, latest edition. All testing is to be performed at the pump manufacturer's approved facility.

D. All test results shall be submitted with the Pump submittal package. Pump shall not be shipped prior to final approval of the pump submittal package by the Engineer.

E. Performance testing shall be completed with the customer's motor. The test shall include head, capacity and power readings at eight (8) points including the rated point, to determine the actual pump performance and efficiency. Testing of the fully assembled pump with customer motor shall establish that the complete pump system is free of overheating, cavitation and excessive vibration over the specified conditions. A certified performance curve shall be completed after the test and included in the final data package. The certified test data plot shall define pump performance at various speeds, $NPSH_R$, power requirements, and efficiency sand shall be sealed by a registered Professional Engineer.

F. At the Project site, field/functional testing shall be performed to insure proper mechanical operation and the pumps will meet the specified operating conditions. Perform all field testing in the presence of an Engineer.

G. Vibration testing is required on fully assembled pump with customer motor to confirm unit operation is within limits as stated in the standards of the Hydraulic Institute, latest edition.

H. Make repairs and retest pumps and motors until specified capacities, operating characteristic, and vibration limits are achieved.

I. The contractor shall Furnish labor, piping, equipment, and materials necessary for conducting tests. All repairs shall be the responsibility of the contractor. This includes overhead cost borne by the owner as a result of re-testing.

END OF SECTION 431311

SECTION 432321.13 - BETWEEN-BEARINGS IMPELLER, ONE- AND TWO-STAGE AXIALLY SPLIT CENTRIFUGAL PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Horizontal axially split pumps and accessories.

1.2 REFERENCE STANDARDS

A. American Bearing Manufacturers Association:

1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings.

C. ASTM International:

1. ASTM A29/A29M - Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought.
2. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
3. ASTM A606/A606M - Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
4. ASTM A744/A744M - Standard Specification for Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service.
5. ASTM B148 - Standard Specification for Aluminum-Bronze Sand Castings.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation and startup of Work of this Section with plant operations

1.4 SCHEDULING

A. Section 013000 - Administrative Requirements for scheduling.

B. Schedule Work of this Section to install pumps prior to connecting piping Work.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for materials of construction and fabrication.

C. Shop Drawings:

1. Submit detailed dimensions for materials and equipment, including wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details.
2. Include manufacturer's specified displacement tolerances for vibration at operational speed specified for pumps.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures, anchoring, and layout.

F. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

1.6 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1.7 WARRANTY

A. Furnish five year manufacturer's warranty for pumps and accessories.

PART 2 - PRODUCTS

2.1 ONE- AND TWO-STAGE AXIALLY SPLIT CENTRIFUGAL PUMPS

A. Manufacturers:

1. Simflow

2. Simmons

3. Or approved equal

B. Description:

1. Horizontal, single-stage axially split centrifugal pump, with direct-coupled variable-speed electric motor.

C. Pump Designation:

1. P100, 101 and 102.

D. Performance and Design Criteria:

1. Design Flow Rate: 1400 gpm
2. Design Flow Total Dynamic Head: 270
3. Maximum Pump Speed: 1800 rpm.

E. Casing:

1. Type: Axially split; removable top portion.
2. Material: ASTM A48/A48M, cast iron
3. Connections: Air vent and drain.
4. End Connections:

    a. Flanged.
    b. Comply with ASME B16.1, Class 125

F. Impeller:

1. Material: ASTM A744/A744M, stainless steel
2. Description: Double suction; enclosed; keyed to pump shaft.
3. Statically and dynamically balanced after assembly.

G. Shaft:

1. Materials: Type 316 stainless steel
2. Furnish positioners to center impeller on shaft.
3. Fully cantilevered into pump elbows.

H. Coupling:

1. Connect pump shaft to drive motor with universal flexible coupling to compensate for minor misalignment.
2. Shaft Guard: Enclose shaft and universal joint with enclosed-type metal shaft guard complying with OSHA standards.

I. Wearing Rings:

1. Type: Renewable.
2. Fasteners: Stainless steel.

J. Bearings:

1. Thrust and radial roller bearings with split-bearing housing.
2. Minimum L-10 Life: 100,000 hours at continuous maximum load and speed

K. Fabrication:

1. Base: Heavy cast-iron base with drip rim and drain connection.
2. Pump and Drive Mating Surfaces: Machine finished.

L. Operation:

1. Electrical Characteristics:

a. 200 hp
b. Voltage: 460V, three phase, 60 Hz.

PART 3 - EXECUTION

3.1 TESTING AND CERTIFICATION

A. All hydrostatic and performance testing shall be completed prior to the application of any "FINAL" paint and/or coating. All factory testing shall be in accordance with the standards of the Hydraulic Institute, latest edition. All testing is to be performed at the pump manufacturer's approved facility.

B. All test results shall be submitted with the Pump submittal package. Pump shall not be shipped prior to final approval of the pump submittal package by the Engineer.

C. Performance testing shall be completed with the customer's motor. The test shall include head, capacity and power readings at eight (8) points including the rated point, to determine the actual pump performance and efficiency. Testing of the fully assembled pump with customer motor shall establish that the complete pump system is free of overheating, cavitation and excessive vibration over the specified conditions. A certified performance curve shall be completed after the test and included in the final data package. The certified test data plot shall define pump performance at various speeds, $NPSH_R$, power requirements, and efficiency sand shall be sealed by a registered Professional Engineer.

D. At the Project site, field/functional testing shall be performed to insure proper mechanical operation and the pumps will meet the specified operating conditions. Perform all field testing in the presence of an Engineer.

E. Vibration testing is required on fully assembled pump with customer motor to confirm unit operation is within limits as stated in the standards of the Hydraulic Institute, latest edition.

F. Make repairs and retest pumps and motors until specified capacities, operating characteristic, and vibration limits are achieved. All repairs shall be the responsibility of the contractor. This includes overhead cost borne by the owner as a result of re-testing.

3.2 INSTALLATION

A. Install pumps where indicated on Drawings and according to manufacturer instructions.

B. Provide and connect piping, power and control conduit, and wiring to make system operational and ready for startup.

C. Flush piping with clean water.

END OF SECTION 432321.13

SECTION 400557 – GATES

1 PART 1 – GENERAL

1.1 SUMMARY

A. The work covered by this section included furnishing all labor, materials, tools and equipment required to install, test and place into satisfactory operation gates shown on gate schedules and the drawings and specified herein. Each gate shall be installed complete with wall thimbles, if called for, anchor bolts, operating stem, gate lift operator and other appurtenances as required for a complete and operable system.

1.2 SUBMITTALS

A. Product Data:
   1. Sluice Gates
   2. Channel Slide Gates
   3. Weir Gates
   4. Manual Lifting Devices

B. Shop Drawings; Submit for approval the following:
   1. Product literature
   2. Complete description
   3. Dimensions and required clearances
   4. Weights
   5. Layout drawing for all equipment showing installation details
   6. A list of all deviations from drawings and specifications
   7. Manufacturer's Warranty
   8. Calculations for guide stem size, guide stem support locations, lift operator sizing, and other necessary sizing calculations.

C. The Contractor shall provide operation and maintenance data in accordance with the requirements of Division 01 Section "Operating and Maintenance Data" of these Specifications.

1.3 QUALITY ASSURANCE

A. Gates shall be the product of a recognized manufacturer whose personnel have been regularly engaged in the design and manufacturing of such equipment. The manufacturer must be able to demonstrate experience with the design, fabrication, supply, and successful operation of a sludge dewatering system of similar size and capacity. The manufacturer shall demonstrate upon the request of the Engineer that:
   1. They maintain a reasonable stock of spare parts for the equipment.
   2. They employ sufficiently qualified servicing and operational control staff.

B. Provide a list of references (name, location, and contact information) of at least three operating installations currently using the same or similar model proposed located in the United States.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Package equipment in containers constructed for international shipping, handling and storage.

B. Delivery and Handling of Equipment:
1. Inspect all equipment and materials against reviewed shop drawings at the time of delivery.
2. Equipment and materials damaged or not meeting the requirements of the reviewed shop drawings shall be immediately returned for replacement or repair.

C. Storage:
1. Equipment shall be stored and protected in accordance with the requirements of the manufacturer
2. Carefully prepare for storage and label all equipment and materials after they have been inspected.
3. Store materials to permit easy access for inspection and identification. Support all material off of the ground and protect steel members and packaged material from corrosion and deterioration as per manufacturers' instructions.

1.5 WARRANTIES AND BONDS

A. The contractor shall provide a warranty against defective or deficient materials and workmanship for at least one (1) year in accordance with the requirements of Division 01.

PART 2 - **PRODUCTS**

2.1 MANUFACTURER

A. Manufacturers with products that GWA believes meet the specifications are listed below:

1. Fontaine.

2. Whipps.

3. Watermann

4. Or approved equivalent

1. These brands are provided only as examples and any manufacturer providing substantially equivalent products that meet the specification will be considered pending evaluation and approval by GWA.

2.2 SLUICE GATES

A. Performance

1. Leakage: Sluice gates shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.001 U.S. gallon per minute per foot of periphery under the design seating head and 0.002 U.S. gallon per minute per foot of periphery for an unseating head of 30 feet.
2. Design Head: The sluice gates shall be designed to withstand a head of 30 feet, unless otherwise specified.

B. Product
   1. General Design:
      a. Gates shall be self-contained of the rising stem configuration.
      b. Gates shall consist of a frame on which are mounted the rails and a movable slide. Wedging action upon closure is obtained by constructing the seating surface of the frame at an angle to the vertical mounting of the gate.
      c. Sluice gates shall meet the requirements of the latest version of AWWA C-560.
   2. Wall Thimble: The wall thimble shall be stainless steel and supplied by the gate manufacturer. Refer to the gate schedule for type and applicable locations. Material thickness should be per manufacturer's recommendations.
   3. Frame: The gate frame shall be made of structural members or formed plate welded to form a rigid one-piece frame. The frame shall be of the flange back design and allow mounting directly on a concrete wall (CW) or a wall thimble (WT). The seating face of the frame shall be at an angle to the plane of the mounting flange. The frame shall support at least two thirds (2/3) of the vertical height of the slide in the fully open position.
   4. Slide: The slide shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the span of the gate under the design head.
   5. Guides and Seals: The guide bar shall be UHMWPE (ultra high molecular weight polyethylene), attached to the slide by means of bolts. The guide bar shall be adjustable to change compression of the seals on seating surface.

C. Operators and Stem
   1. Stem and Couplings
      a. The operating stem shall be of stainless steel designed to transmit in compression at least two times the rated output of the operating manual mechanism with a 40 pound effort on the handwheel.
      b. The stem shall have a slenderness ratio (L/r) less than 200. The threaded portion of the stem shall have machine cut threads of the Acme type.
      c. Where a hydraulic, pneumatic or electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the hydraulic or pneumatic cylinder with a pressure equal to the maximum working pressure of the supply, or 1.25 times the output thrust of the electric motor in the stalled condition.
   2. For stems in more than one piece and with a diameter of 1-3/4 inches and larger, the different sections shall be joined together by stainless steel couplings. Stems with a diameter smaller than 1-3/4 inches shall be pinned to an extension tube. Couplings shall be grooved and keyed and shall be of greater strength than the stem.
   3. Gates having a width equal to or greater than two times their height shall be provided with two lifting mechanisms connected by a tandem shaft.

4. Stem Guides: Stem guides shall be fabricated from stainless steel. The guide shall be equipped with UHMWPE bushings. Guides shall be adjustable and spaced in accordance with the manufacturer's recommendation to limit the L/r ratio to less than 200.
5. Stem Cover: Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents and a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.
6. Lifting Mechanism: Manual operators shall be provided by the gate manufacturer.
   a. All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.
   b. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 pounds on the handwheel, and shall be able to withstand, without damage, an effort of 80 lbs.
   c. The handwheel shall be a corrosion-resistant rotating mechanism. The maximum handwheel diameter shall be 24 inches.
7. Yoke: Self-contained gates shall be provided with a yoke made of structural members or formed plates. The maximum deflection of the yoke shall be 1/360 of the gate's span.
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11.
12.

D. Materials

PART	MATERIAL
Frame, yoke, stem guides, slide, stem extension, rails	Stainless steel ASTM A-240 type 316L
Guide bar	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020
Top and side seals	EPDM ASTM D2000-01 BA910 C12 and ASTM D2000-01 BA415
Bottom seal	Neoprene ASTM D2000 M2 BC 503
Threaded stem	Stainless steel ASTM A-276 type or 316
Fasteners	ASTM F593 and F594 GR2 for type 316
Pedestal, handwheel	Tenzaloy aluminum
Gasket (between frame and wall)	EPDM ASTM 1056
Stem cover	Polycarbonate ASTM D-3935
Lift nut, couplings	Manganese bronze ASTM B584 UNS-C86500

2.3 SLIDE GATES

A. Performance

1. Leakage: Channel gates shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.05 U.S. gallon per minute per foot of seal periphery under the design seating head and unseating head.
2. Design Head: The slide gates shall be designed to withstand the maximum design head (maximum design head shall be taken as the height of the slide unless otherwise shown on the Drawings).
3. Seal Performance Test: The gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.

B. Product
1. General Design: Gates shall be either self-contained and of the rising stem configuration.
2. All slide gates shall be in compliance with the latest version of AWWA C-561.
3. Frame: The gate frame shall be constructed of structural members or formed plate. The frame shall be embedded inside a channel (FE). The guide slot shall be of UHMWPE (ultra-high molecular weight polyethylene). The frame configuration shall be of the flush-bottom type.
4. Slide: The slide shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the gate's span under the design head.
5. Guides and Seals: Guides shall be made of UHMWPE (ultra-high molecular weight polyethylene) and shall be of such length as to retain and support at least two thirds (2/3) of the vertical height of the slide in the fully open position.
    a. Side seals shall be made of UHMWPE (ultra-high molecular weight polyethylene) of the self-adjusting type. A compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and let the water flow only in the open part of the gate.
    b. Seals shall maintain the specified leakage rate in both seating and unseating conditions. The bottom seal shall be made of resilient neoprene set into the bottom member of the frame and shall form a flush-bottom.

C. Operators and Stem
1. Stem and Couplings: The operating stem shall be of stainless steel designed to transmit in compression at least two (2) times the rated output of the operating manual mechanism with a 40 lbs effort on the handwheel.
    a. The stem shall have a slenderness ratio (L/r) less than 200. The threaded portion of the stem shall have machine cut threads of the Acme type.
    b. Where a hydraulic, pneumatic or electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the hydraulic or pneumatic cylinder with a pressure equal to the maximum working pressure of the supply, or 1.25 times the output thrust of the electric motor in the stalled condition.
        1) For stems in more than one piece and with a diameter of 1-3/4 inches (45 mm) and larger, the different sections shall be joined together by stainless steel couplings. Stem with a diameter smaller than 1-3/4 inches (45 mm) shall be pinned to an extension tube.
        2) The couplings shall be grooved and keyed and shall be of greater strength than the stem.

3) Gates having width equal to or greater than two times their height shall be provided with two lifting mechanisms connected by a tandem shaft.

2. Stem Guides: Stem guides shall be fabricated from type 316L stainless steel. The guide shall be equipped with a UHMWPE bushing. Guides shall be adjustable and spaced in accordance with the manufacturer's recommendation. The L/r ratio shall not be greater than 200.
3. Stem Cover: Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents as well as a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.
4. Lifting Mechanisms: Manual operators shall be provided by the gate manufacturer.
   a. All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of the operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.
   b. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lbs on the handwheel and shall be able to withstand, without damage, an effort of 80 lbs.
   c. The handwheel shall be removable and fitted with a corrosion resistant rotating mechanism. The maximum handwheel diameter shall be 24 inches.
5. Yoke: Self-contained gates shall be provided with a yoke made of structural members or formed plates. The maximum deflection shall be 1/360 of the gate's span.

D. Materials

PART	MATERIAL
Frame, yoke, stem guides, slide, stem extension, rails	Stainless steel ASTM A-240 type 316L
Guides, slide seals, stem guide liner	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020
Compression cord	Nitrile ASTM D2000 M6BG 708, A14, B14, E014, E034
Bottom seal	Neoprene ASTM D2000 Grade 2 BC-510
Threaded stem	Stainless steel ASTM A-276 Type 303 MX or 316
Fasteners	ASTM F593 and F594 GR2 for Type 316
Pedestal, handwheel and crank	Tenzaloy aluminum
Gasket (between frame and wall)	EPDM ASTM D-3935
Stem cover	Polycarbonate ASTM D-3935
Lift nut, couplings	Manganese bronze ASTM B584 UNS-C86500

2.4 MANUAL LIFTING DEVICES

A. Lifting devices shall be handwheel operated as specified herein.

B. Handwheel operated type shall be without a gear ratio and crank-operated type shall be either a single- or double-gear type. It shall have a lift nut threaded to fit the operating stem. Ball or roller bearings shall be provided above and below the flange on the lift nut to take the thrust developed in opening and closing the gate with a force of 100 foot-pounds on the crank or handwheel.

C. Gears shall be machined accurately with cut teeth to provide smooth, proper operation for the lifting mechanism. Suitable shafts shall be installed with sleeve, ball, or roller bearings of appropriate size. All gears and bearings shall be enclosed in a housing. Fittings shall be provided so that all gears and bearings can be lubricated periodically.

D. The lift mechanism shall be supplied with a pedestal, machined and drilled to receive the gear housing, and drilled for bolting to the operating floor or a top of wall mounting bracket. The mechanism shall be geared so as to permit 50 foot-pounds on the lifting device after the slide is unseated from the wedges, based on the operating head specified. All geared lifts shall be suitable for operation by use of a portable-motor apparatus.

E. The handwheel shall be positioned a minimum of 36-inches above the operating floor.

F. The direction of wheel rotation to open the gate shall be indicated on the lift mechanism. Single-speed operators shall open counterclockwise. Two-speed operators shall open counter-clockwise for low mechanical-advantage gear ratio and open clockwise at the high mechanical-advantage gear ratio.

G. Each rising-stem unit shall be provided with a stem cover. The cover shall be made of clear butyrate plastic that will not discolor or become opaque for at least five years after installation. The cover shall be graduated in tenths of an inch intervals. The cover shall be of sufficient diameter and length to permit full travel of the threaded stem without obstruction. The top of the stem cover shall be closed. The bottom end of the stem cover shall be vented, drained, and mounted in a housing adapter plate for easy field mounting installation.

H. Each actuator for rising-stem gates with galvanized pipe cover and all actuators for non-rising stem gates shall be provided with a position indicator to show the position of gate at all times. The indicator shall be attached to the mechanism.

I. All gates having widths greater than twice their height shall be provided with two lifting devices connected by a tandem shaft for simultaneous operation.

J. A power pony shall be provided for use in operating the sluice and slide gates. The power pony shall operate on 120V power and be suitable for use with the handwheel provided on the gates.

PART 3 - **EXECUTION**

3.1 INSTALLATION

A. All equipment shall be installed in accordance with the Manufacturer's requirements to produce a finished product that is clean and demonstrates true craftsmanship. The operators shall be easily accessed, moving components shall be adequately shielded, and walking areas shall be unobstructed.

B. Gates shall be checked prior to installation for projections or warping that would promote excessive leakage. Defective gates shall be removed and replaced at no cost to the Owner.

C. Gates shall be installed true to the lines and elevations shown and accurately aligned. Frames and/or thimbles shall be internally braced and adequately supported during concrete placement and/or installation.

D. The Contractor shall coordinate gate installation with all disciplines so as to ensure correct alignment and elevation of the gates.

E. All slide gates and weir gates shall have a maximum allowable leakage rate of 0.2 gallons per minute per peripheral foot of seating perimeter. All sluice gates shall be field leakage tested and shall meet the requirements for maximum leakage as specified in AWWA C501 (latest revision).

F. The ability of each gate to operate easily without binding or excessive leakage or wear shall be demonstrated to the satisfaction of the Engineer. If an electric operator is used, limit switches shall be adjusted following the manufacturer's instructions.

3.2 FACTORY SERVICE

A. The equipment manufacturer shall provide factory on-site field service for installation inspection, equipment start up, and operator training. Length of service shall be at least three working days.

3.3 CERTIFICATION

A. Manufacturer's representative that is qualified in the particular equipment requirements shall fully inspect and certify the equipment installation. Written certifications shall be provided that state the equipment is installed properly, is operating within the design parameters, and will be warranted as required by the specifications.

END OF SECTION 400557

SECTION 407233 - CAPACITANCE TYPE LEVEL METERS (CONTINUOUS AND POINT TYPE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Capacitance-level measurement devices.
2. Transmitters.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum). B.

NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with piping and tank work

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for system materials and component equipment, including connection requirements. C. Shop Drawings:

1. Indicate system materials and component equipment.
2. Submit installation requirements and other details.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Source Quality-Control Submittals: Indicate results of shop tests and inspections.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

H. Qualifications Statement:

1. Submit qualifications for manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Section 017700 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1.6 QUALITY ASSURANCE

A. Ensure that materials of construction of wetted parts are compatible with process liquid.

B. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.9 WARRANTY

A. Section 017700 - Closeout Requirements: Requirements for warranties.

B. Furnish five year manufacturer's warranty for capacitance-type level measurement devices.

PART 2 - PRODUCTS

2.1 CAPACITANCE-TYPE-LEVEL MEASUREMENT DEVICES

A. Description:

1. Type: Rod probe.
2. Measuring Range: 1.4 to 33 feet
3. Operating Temperature Range: Minus 40 to plus 212 degrees F .
4. Operating Pressure: Up to 145 psig B. Transmitters:

1. Selected by sensor manufacturer to match sensor.
2. Visual Display: Four digit or analog. 3. Output Signal: 4- to 20-mA 4. Location: As indicated on Drawings.
5. Control Power:

a. Wiring: As specified in Section 260503 - Equipment Wiring Connections.
b. 120-V ac, single phase, 60 Hz.
c. Furnish local transformers as required.

6. Enclosures: NEMA 250 Type 4X 7.
Mounting:

a. Integral with sensor.

8. Furnish cable, field preamplifiers, and signal conditioners as required to maintain accuracy from sensor to terminal device.

2.2 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017700 - Closeout Requirements: Requirements for installation examination.

B. Verify that items provided by other Sections of Work are ready to receive Work of this Section.

3.2 INSTALLATION

A. Coordinate location and orientation of level probe assemblies with final equipment installations.

B. Ensure that instruments are located to be easily accessible for maintenance.

3.3 FIELD QUALITY CONTROL

A. Section 017700 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Equipment Acceptance:

1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

C. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.4 DEMONSTRATION

A. Section 017700 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

END OF SECTION 407233