SNOQUALMIE PASS UTILITY DISTRICT

PHASE 1 MEMBRANE BIOREACTOR
WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY

HLA PROJECT NO. 19216

DECEMBER 2019
SNOQUALMIE PASS UTILITY DISTRICT
KITTITAS COUNTY, WASHINGTON

CONTRACT DOCUMENTS

FOR

PHASE 1 MEMBRANE BIOREACTOR
WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY

HLA PROJECT NO. 19216

OWNER:
Snoqualmie Pass Utility District
370 Treatment Plant Road
P.O. Box 131
Snoqualmie Pass, WA 98068

ENGINEER:
HLA Engineering and Land Surveying, Inc. (HLA)
2803 River Road
Yakima, WA 98902

DECEMBER 2019
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APPENDIX A – SNOQUALMIE PASS UTILITY DISTRICT WASTEWATER TREATMENT PLANT LOCATION AND PROPOSED TREATMENT PLANT PROCESS FLOW DIAGRAM, SITE PLAN, AND BUILDING PLAN
SECTION 1 - ADVERTISEMENT FOR BIDS
ADVERTISEMENT FOR BIDS

Snoqualmie Pass Utility District
370 Treatment Plant Road
P.O. Box 131
Snoqualmie Pass, WA 98068

The Snoqualmie Pass Utility District (DISTRICT) invites separate sealed BIDS for the PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY, HLA Project No. 19216, including the following major system components:

Supply of a complete skid mounted membrane bioreactor to treat municipal wastewater. The equipment included on the skid includes:

- MBR system tank with ladders and handrails
- Submersible mixer for anoxic tank with hoist
- Pre-aeration tank fine bubble diffusers
- Aeration blower with silencer
- Recirculation pumps
- Submerged membrane units with guides and stabilizers
- Membrane unit lifting tools
- Waste Activated Sludge discharge pumps
- Permeate pumps
- Membrane blower with silencer
- Chlorine solution tank with pump
- Complete chemical feed system
- All required electrical controls and instrumentation.

Item supplied separate from the skid mounted items include:

- Tank mounted internally fed drum screen with integrated washer compactor and associated control panel.

This project also includes providing submittals, O&M manuals, installation assistance, startup, testing, programming, training, and commissioning service during construction and the specified warranty period.

Bids will be received by the District Manager, 370 Treatment Plant Road, Snoqualmie Pass, Washington 98068, until 1:00 p.m., January 17, 2020, and then shortly thereafter will be publicly opened and read aloud.

Electronic copies of the CONTRACT DOCUMENTS may be obtained at no cost at the following website: https://www.hlacivil.com/bid/. Physical copies may be obtained at the office of HLA Engineering and Land Surveying, Inc. (HLA), 2803 River Road, Yakima, Washington 98902, (509-966-7000) upon payment of $70.00 for each set, non-refundable. Planholder list and addenda will be available on the website. Bidders are encouraged to register as planholders on the website, whom will be added to the Planholder list and will receive automatic addenda notification.

All bids or proposals must be in writing on the forms bound in the Specifications, sealed and filed with the District on or before the day and hour above mentioned. A bid bond is not required for this project.

The Snoqualmie Pass Utility District reserves the right to reject any and all bids and to waive technicalities or irregularities, and after careful consideration of all bids and factors involved, make the award to best serve the interests of the District.

Publish:  January 2, 2020
January 9, 2020
SECTION 2 - INFORMATION FOR BIDDERS
INFORMATION FOR BIDDERS

BIDS will be received by the Snoqualmie Pass Utility District (herein called the "OWNER"), at 370 Treatment Plant Road, P.O. Box 131, Snoqualmie Pass, Washington 98068, until 1:00 p.m., January 17, 2020, and then publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to the District Manager at 370 Treatment Plant Road, P.O. Box 131, Snoqualmie Pass, Washington 98068. Each sealed envelope containing a BID must be plainly marked on the outside as BID for PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY, and the envelope should bear on the outside the BIDDER’S NAME, address, and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at 370 Treatment Plant Road, P.O. Box 131, Snoqualmie Pass, Washington 98068.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 60 days after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

The CONTRACT DOCUMENTS contain the provisions required for the supply of equipment and materials, and startup support for the future construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the BIDDER, nor relieve the BIDDER from fulfilling any of the conditions of the Contract.

A CONTRACT BOND in the amount of 100 percent of the CONTRACT PRICE, with a corporate Surety approved by the OWNER, will be required for the faithful performance of the Contract.

Attorneys-in-fact who sign BID BONDS or CONTRACT BONDS must file with each BOND a certified and effective dated copy of their Power of Attorney.

The party to whom the Contract is awarded will be required to execute the Agreement and obtain the CONTRACT BOND within ten (10) working days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

Supplemental BIDDER qualification criteria have been established by the OWNER for this project, to demonstrate that the BIDDER has sufficient experience in the design, operation, and maintenance of similar municipal MBR Wastewater Treatment system equipment, and that the proposed equipment can meet the specified performance requirements. To be considered a responsive BIDDER, documentation shall be provided at the time of BID submission, or within 24 hours of the bid submittal deadline, demonstrating that the BIDDER has a minimum of ten (10) years of experience in the design, operation, and maintenance of Municipal MBR Wastewater treatment systems.

A conditional or qualified BID will not be accepted.
All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the Contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirement under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in these Contract Documents.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

The ENGINEER is HLA Engineering and Land Surveying, Inc. (HLA), represented by Dean P. Smith, PE. The ENGINEER'S address is 2803 River Road, Yakima, Washington 98902, phone (509) 966-7000, FAX: (509) 965-3800.
SECTION 3 - BID PACKAGE
BIDDER'S CHECKLIST

All forms listed below must be fully executed and submitted with the Bid:

1) BID PROPOSAL
2) UNIT PRICE BID PROPOSAL
3) BID PROPOSAL SIGNATURE PAGE
4) NON-COLLUSION AFFIDAVIT - Must be subscribed and sworn to before a Notary Public.
5) BID EVALUATION WORKSHEET
6) BIDDER'S RESPONSIBILITY STATEMENT - Provide supporting documentation as required.

The following forms are to be executed and/or submitted for approval to the Engineer after the Contract is awarded:

1) CONTRACT - To be executed by the successful bidder and the Snoqualmie Pass Utility District.
2) CONTRACT BOND - To be executed by the successful bidder and his Surety Company. Provide Power of Attorney.
BID PROPOSAL

A Proposal of ______________________________________________ (hereinafter called “BIDDER”), organized and existing under the laws of the State of Washington doing business as ________________________¹. To the Snoqualmie Pass Utility District, Washington, (hereinafter called “OWNER”).

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all work for the construction of the PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY, HLA Project No. 19216, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work to prepare submittal documents for review and approval by the ENGINEER, immediately upon receipt of NOTICE OF AWARD, as provided in Section 1-08.4 of the Special Provisions, and to execute the Agreement and obtain the CONTRACT BOND within ten (10) working days. BIDDER further agrees to deliver all equipment and materials to the project site, as specified in Section 1-08.5 of the Special Provisions, and to pay liquidated damages in the sum specified for each working day thereafter, as provided in Section 1-08.9 of the Special Provisions.

BIDDER acknowledges receipt of the following ADDENDA:

__________________________________________________________________________

__________________________________________________________________________

Addenda will be posted on the Engineer’s website:  https://www.hlacivil.com/bid/. Bidders are encouraged to register as planholders on the website, whom will be added to the Planholder list and will receive automatic addenda notification.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum amounts:

¹ Insert "a corporation," "a partnership," or "an individual" as applicable.
UNIT PRICE BID PROPOSAL

(NOTE: Unit prices for all items, all extensions, and total amount of bid must be shown. Any changes/corrections to the bid must be initialed by the signer of the bid, in accordance with Section 1-02.5.)

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

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<th>AMOUNT DOLLARS-CTS</th>
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<td>---</td>
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<td>2</td>
<td>Skid Mounted Membrane Bioreactor Equipment and Materials, Complete</td>
<td>LS</td>
<td>---</td>
<td>X</td>
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<td>Fine Screening Equipment</td>
<td>LS</td>
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<td>4</td>
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<td>LS</td>
<td>---</td>
<td>X</td>
<td>=</td>
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<td>5</td>
<td>Final Startup and Commissioning Reports, Record Drawings, and O&amp;M Manuals</td>
<td>LS</td>
<td>---</td>
<td>X</td>
<td>=</td>
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BID SUBTOTAL

| 8.0% STATE SALES TAX |

BID TOTAL
BID PROPOSAL SIGNATURE PAGE

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

BIDDER

BY

AUTHORIZED OFFICIAL’S SIGNATURE

(TITLE)

(Please print or type name)

Address:

Phone:

Fax:

E-mail address:

BIDDER DUNS NUMBER

BIDDER UBI NUMBER

BIDDER FEDERAL TAX I.D. NUMBER

BIDDER INDUSTRIAL INSURANCE ACCOUNT NUMBER

The names of the principal officers of the corporation submitting this Proposal, or of the partnership, or of all persons interested in this Proposal as principals are as follows:


PROJECT MANAGER

CELL PHONE:

NOTES:

1) If the bidder is a co-partnership, so state, giving firm name under which business transacted. If the bidder is a corporation, this proposal must be executed by its duly authorized officials.

2) Bidders shall acknowledge receipt of all addenda, if any, in the space provided on the first page of this proposal.
NON-COLLUSION AFFIDAVIT

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

STATE OF WASHINGTON )
) ss. NON-COLLUSION AFFIDAVIT
COUNTY OF ____________ )

__________________________, being first
duly sworn, on oath says that the bid above submitted is a genuine and not a sham or collusive bid, or
made in the interest or on behalf of any person not therein named; and the said bidder further says that the
said bidder has not directly or indirectly induced or solicited any bidder on the above work or supplies to
put in a sham bid, or any other person or corporation to refrain from bidding; and that said bidder has not
in any manner sought by collusion to secure to themselves an advantage over any other bidder or bidders.

(Bidder's Signature)

__________________________

Signed and sworn to (or affirmed) before me on _________________________, 2020, by

__________________________.

Notary Public
My Appointment Expires ________________
BID EVALUATION WORKSHEET

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

Bid proposals for the Snoqualmie Pass Utility District PHASE 1 MEMBRANE BIOREACTOR WWTP – EQUIPMENT ONLY project will be evaluated, as mentioned in the Information for Bidders and Section 1-02.1(1) of the Special Provisions. Acceptance of Bidder’s proposal by the Owner and award of a contract will not be solely based upon the lowest cost equipment and services.

In evaluating bid proposals, consideration will also be given to manufacturer experience, operational flexibility, and lead time to receive specified equipment and materials, though no specific ranking will be provided. As described in the Advertisement for Bids and Information for Bidders, the Owner reserves the right to reject any and all bids, and make notice of acceptance of the Bidders proposal to best serve the interests of the Snoqualmie Pass Utility District.

All bid evaluation worksheet information shall be completed by the bidder to be considered a responsive bidder. Where necessary or required, supplemental information shall be attached to this form. Failure to submit any or all of the foregoing information may be cause for rejection of the bid.
BIDDER’S RESPONSIBILITY STATEMENT

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), 5017-S.SL as amended; or does not meet the following Supplemental Criteria:

1. Delinquent State Taxes
   A. **Criterion:** The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.
   
   **Documentation:** The Bidder shall not be listed on the Washington State Department of Revenue’s "Delinquent Taxpayer List" website: http://dor.wa.gov/content/fileandpaytaxes/latefiling/dtlwest.aspx, or if they are so listed, they must submit a written payment plan approved by the Department of Revenue, to the Contracting Agency by the deadline listed below.

2. Federal Debarment
   A. **Criterion:** The Bidder shall not currently be debarred or suspended by the Federal government.
   
   **Documentation:** The Bidder shall not be listed as having an "active exclusion" on the U.S. government’s “System for Award Management” database (www.sam.gov).

3. Claims Against Retainage and Bonds
   A. **Criterion:** The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects in the three years prior to the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.
   
   **Documentation:** The Bidder, if and when required as detailed below, shall submit a list of the public works projects completed in the three years prior to the bid submittal date that have had claims against retainage and bonds and include for each project the following information:
   
   - Name of project;
   - The owner and contact information for the owner;
   - A list of claims filed against the retainage and/or payment bond for any of the projects listed; and
   - A written explanation of the circumstances surrounding each claim and the ultimate resolution of the claim.

4. Public Bidding Crime
   A. **Criterion:** The Bidder and/or its owners shall not have been convicted of a crime involving bidding on a public works contract in the five years prior to the bid submittal date.
   
   **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder and/or its owners have not been convicted of a crime involving bidding on a public works contract.

5. **Termination for Cause / Termination for Default**
   A. **Criterion:** The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency in the five years prior to the bid submittal date,
unless there are extenuating circumstances and such circumstances are deemed acceptable to
the Contracting Agency.

B. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a
form to be provided by the Contracting Agency) that the Bidder has not had any public works
contract terminated for cause or terminated for default by a government agency in the five years
prior to the bid submittal date; or if Bidder was terminated, describe the circumstances.

6. **Lawsuits**

A. **Criterion:** The Bidder shall not have lawsuits with judgments entered against the Bidder in the
five years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of
contracts, unless there are extenuating circumstances and such circumstances are deemed
acceptable to the Contracting Agency.

B. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a
form to be provided by the Contracting Agency) that the Bidder has not had any lawsuits with
judgments entered against the Bidder in the five years prior to the bid submittal date that
demonstrate a pattern of failing to meet the terms of contracts, or shall submit a list of all lawsuits
with judgments entered against the Bidder in the five years prior to the bid submittal date, along
with a written explanation of the circumstances surrounding each such lawsuit. The Contracting
Agency shall evaluate these explanations to determine whether the lawsuits demonstrate a
pattern of failing to meet of terms of construction related contracts.

The Bidder shall sign this Bidder’s Responsibility Statement as evidence that the Bidder meets the
mandatory and supplemental responsibility criteria stated above and shall submit with bid. The Contracting
Agency reserves the right to request further documentation as needed to assess Bidder responsibility. The
Contracting Agency also reserves the right to obtain information from third-parties and independent sources
of information concerning a Bidder’s compliance with the mandatory and supplemental criteria, and to use
that information in their evaluation. The Contracting Agency may (but is not required to) consider mitigating
factors in determining whether the Bidder complies with the requirements of the supplemental criteria.

The basis for evaluation of Bidder compliance with these mandatory and supplemental criteria shall include
any documents or facts obtained by Contracting Agency (whether from the Bidder or third parties) including
but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly
by the Contracting Agency from others for whom the Bidder has worked, or other public agencies or private
enterprises; and (iii) any additional information obtained by the Contracting Agency which is believed to be
relevant to the matter.

If the Contracting Agency determines the Bidder does not meet the bidder responsibility criteria above and
is therefore not a responsible Bidder, the Contracting Agency shall notify the Bidder in writing, with the
reasons for its determination. If the Bidder disagrees with this determination, it may appeal the
determination within two (2) business days of the Contracting Agency’s determination by presenting its
appeal and any additional information to the Contracting Agency. The Contracting Agency will consider
the appeal and any additional information before issuing its final determination. If the final determination affirms
that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder
until at least two business days after the Bidder determined to be not responsible has received the
Contracting Agency’s final determination.

Request to Change Supplemental Bidder Responsibility Criteria Prior To Bid: Bidders with concerns about
the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria may make or submit
requests to the Contracting Agency to modify the criteria. Such requests shall be in writing, describe the
nature of the concerns, and propose specific modifications to the criteria. Bidders shall submit such
requests to the Contracting Agency no later than five (5) business days prior to the bid submittal deadline
and address the request to the Project Engineer or such other person designated by the Contracting Agency
in the Bid Documents.

________________________________________
Contractor’s Signature
SECTION 4 - CONTRACT AND RELATED MATERIALS
CONTRACT

THIS AGREEMENT, made and entered into in triplicate, this ___________ day of ________, 2020, by and between the Snoqualmie Pass Utility District, hereinafter called the OWNER, and ________________________________________________________________, hereinafter called the MANUFACTURER,

WITNESSETH:

That in consideration of the terms and conditions contained herein and attached and made a part of this Agreement, the parties hereto covenant and agree as follows:

I. The CONTRACTOR shall do all work and furnish all tools, materials, and equipment for PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY, HLA Project No. 19216, in accordance with and as described in the attached Plans and Specifications and the Standard Specifications for Road, Bridge, and Municipal Construction, which are by this reference incorporated herein and made a part hereof, and shall perform any alterations in or additions to the work provided under this Contract and every part thereof.

Work shall start within ten (10) calendar days after Notice to Proceed and shall be completed in accordance with the SPECIAL PROVISIONS – Section 1-08.5.

If said work is not completed within the time specified, the MANUFACTURER agrees to pay to the OWNER for each and every working day said work remains uncompleted after expiration of the specified time, liquidated damages as determined in Section 1-08.9.

The MANUFACTURER shall provide and bear the expense of all equipment, work, and labor of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work provided for in this Contract and every part thereof, except such as are mentioned in the Specifications to be furnished by the OWNER.

II. The OWNER hereby promises and agrees with the MANUFACTURER to employ, and does employ the MANUFACTURER to provide the materials and to do and cause to be done the above described work and to complete and finish the same according to the attached Plans and Specifications and the terms and conditions herein contained; and hereby contracts to pay for the same according to the attached Specifications and the schedule of unit or itemized prices hereto attached, at the time and in the manner and upon the conditions provided for in this Contract.

III. The MANUFACTURER for himself, and for his/her heirs, executors, administrators, successors, and assigns does hereby agree to the full performance of all the covenants herein upon the part of the MANUFACTURER.

IV. It is further provided that no liability shall attach to the OWNER by reason of entering into this Contract, except as expressly provided herein.

V. MANUFACTURER is an independent Corporation and not an employee of the OWNER. The OWNER has designated the Contract performance and the MANUFACTURER shall be responsible for the details of that work. The parties recognize the MANUFACTURER has unique skills not otherwise available to the OWNER to accomplish the purpose of the Contract. The MANUFACTURER shall supply all equipment and supplies necessary to accomplish the Contract. The parties recognize that the purpose of the Contract is not within the regular course of business of the OWNER. The parties state that the right of control over the activities necessary to perform the Contract are with the MANUFACTURER.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed the day and year first herein above written.
CONTRACT BOND

SNOQUALMIE PASS UTILITY DISTRICT
PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY
HLA PROJECT NO. 19216

BOND TO SNOQUALMIE PASS UTILITY DISTRICT

KNOW ALL PERSONS BY THESE PRESENTS:

That we, the undersigned, ________________________________,
as principal, and ________________________________,
a corporation organized and existing under the laws of the State of ________________________, as a Surety
corporation, and qualified under the laws of the State of Washington to become Surety upon bonds of contractors
with municipal corporations, as Surety, are jointly and severally held and firmly bound to the Snoqualmie Pass
Utility District in the penal sum of $ ______________ for the payment of which sum on demand we bind
ourselves and our successors, heirs, administrators, or personal representatives, as the case may be.

This obligation is entered into in pursuance of the statutes of the State of Washington and the Resolutions of the
Snoqualmie Pass Utility District.

Dated at __________________, Washington, this ______ day of _______________, 2020.

Nevertheless, the conditions of the above obligation are such that:

WHEREAS, under and pursuant to action of the Snoqualmie Pass Utility District, on
________________________, 2020, the General Manager of said Snoqualmie Pass Utility District, has let or is
about to let to the said ___________________________________, the above bounden
Principal, a certain Contract, the said Contract being numbered HLA Project No. 19216, and providing for the
construction of PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT
ONLY which Contract is referred to herein and is made a part hereof as though attached hereto, and

WHEREAS, the said Principal has accepted, or is about to accept, the said Contract, and undertake to perform
the work therein provided for in the manner and within the time set forth;

NOW, THEREFORE, if the said ___________________________________ shall
faithfully perform all the provisions of said Contract in the manner and within the time therein set forth, or within
such extensions of time as may be granted under said Contract, and shall pay all laborers, mechanics, sub-
contractors and material men and all industrial insurance premiums, and all persons who shall supply said principal
or subcontractors with provisions and supplies for the carrying on of said work, and shall indemnify and hold
the Snoqualmie Pass Utility District harmless from any damage or expense by reason of failure of performance
as specified in said Contract or from defects appearing or developing in the material or workmanship provided or
performed under said Contract within a period of one year after its acceptance thereof by the Snoqualmie Pass
Utility District, then and in that event this obligation shall be void; but otherwise it shall be and remain in full force
and effect.
SECTION 5 - TECHNICAL SPECIFICATIONS
SNOQUALMIE PASS UTILITY DISTRICT  
KITITAS COUNTY, WASHINGTON  

SPECIAL PROVISIONS  
FOR  

PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT - EQUIPMENT ONLY  

HLA PROJECT NO. 19216  

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SECTION 01 11 00 – SUMMARY OF WORK

Work on this project includes, but is not necessarily limited to, the following approximate major quantities and facility components:

Supply of a complete skid mounted membrane bioreactor to treat municipal wastewater. The equipment included on the skid includes:

- MBR system tank with ladders and handrails
- Submersible mixer for anoxic tank with hoist
- Pre-aeration tank fine bubble diffusers
- Aeration blower with silencer
- Recirculation pumps
- Submerged membrane units with guides and stabilizers
- Membrane unit lifting tools
- Waste Activated Sludge discharge pumps
- Permeate pumps
- Membrane blower with silencer
- Chlorine solution tank with pump
- Complete chemical feed system
- All required electrical controls and instrumentation.

Item supplied separate from the skid mounted items include:

- Tank mounted internally fed drum screen with integrated washer compactor and associated control panel.

This project also includes providing submittals, O&M manuals, installation assistance, startup, testing, programming, training, and commissioning service during construction and the specified warranty period.

Refer to 1-09.3(1) of Section 01 11 50 – Special Provisions for further descriptions of unit price bid items of the proposal.

All work on this project shall be completed in accordance with the Plans, the Technical Specifications, the Standard Specifications for Road, Bridge, and Municipal Construction, 2018 edition, as issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter "Standard Specifications"), as modified or supplemented by the Amendments to the Standard Specifications and the Special Provisions, all of which are made a part of the Contract Documents.

Also, incorporated into the Contract Documents by reference are the Manual on Uniform Traffic Control Devices for Streets and Highways, currently adopted edition, with Washington State modifications, if any, and Standard Plans for Road, Bridge and Municipal Construction, WSDOT/APWA, current edition. The Manufacturer shall obtain copies of these publications, at his/her own expense.

END OF SECTION 01 11 00
SECTION 01 11 50 – SPECIAL PROVISIONS

INTRODUCTION

These Special Provisions are made up of both General Special Provisions (GSPs) from various sources, which may have project-specific fill-ins; and project-specific Special Provisions. Each Provision either supplements, modifies, or replaces the comparable Standard Specification, or is a new Provision. The deletion, amendment, alteration, or addition to any subsection or portion of the Standard Specifications is meant to pertain only to that particular portion of the section, and in no way, should it be interpreted that the balance of the section does not apply.

The project-specific Special Provisions are not labeled as such. The GSPs are labeled under the headers of each GSP, with the effective date of the GSP and its source. For example:

(March 8, 2013  APWA GSP)
(April 1, 2013  WSDOT GSP)

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions

Delete the heading Completion Dates and the three paragraphs that follow it, and replace them with the following:

Dates

Bid Opening Date
The date on which the Contracting Agency publicly opens and reads the Bids.

Award Date
The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive Bidder for the Work.

Contract Execution Date
The date the Contracting Agency officially binds the Agency to the Contract.

Note to Proceed Date
The date stated in the Notice to Proceed on which the Contract time begins.

Completion Date
The day all the Work specified in the Contract is completed and all the obligations of the Supplier under the contract are fulfilled by the Supplier. All documentation required by the Contract and required by law must be furnished by the Supplier before establishment of this date.

Final Acceptance Date
The date on which the Contracting Agency accepts the work as complete.

Supplement this Section with the following:

All references in the Standard Specifications, Amendments, or WSDOT General Special Provisions, to the terms "Department of Transportation", "Washington State Transportation Commission", "Commission", "Secretary of Transportation", "Secretary", "Headquarters", and "State Treasurer" shall be revised to read “Contracting Agency”.

All references to the terms “State” or “state” shall be revised to read “Contracting Agency” unless the reference is to an administrative agency of the State of Washington, a State statute or regulation, or the context reasonably indicates otherwise.
All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”.

All references to “final contract voucher certification” shall be interpreted to mean the Contracting Agency form(s) by which final payment is authorized, and final completion and acceptance granted.

All references to “Contractor” shall be revised to read “Supplier” or “Manufacturer”.

**Additive**
A supplemental unit of work or group of bid items, identified separately in the Bid Proposal, which may, at the discretion of the Contracting Agency, be awarded in addition to the base bid.

**Alternate**
One of two or more units of work or groups of bid items, identified separately in the Bid Proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

**Business Day**
A business day is any day from Monday through Friday except holidays as listed in Section 1-08.5.

**Contract Bond**
The definition in the Standard Specifications for “Contract Bond” applies to whatever bond form(s) are required by the Contract Documents, which may be a combination of a Payment Bond and a Performance Bond.

**Contract Documents**
See definition for “Contract”.

**Notice of Award**
The written notice from the Contracting Agency to the successful Bidder signifying the Contracting Agency’s acceptance of the Bid Proposal.

**Notice to Proceed**
The written notice from the Contracting Agency or Engineer to the Supplier authorizing and directing the Supplier to proceed with the Work and establishing the date on which the Contract time begins.

The terms defined in Section 1-01.3 of the Standard Specifications shall be further described by the following:

**Contracting Agency**
Snoqualmie Pass Utility District
370 Treatment Plant Road
P.O. Box 131
Snoqualmie Pass, WA 98068

*The terms “Contracting Agency”, “Agency” and “Owner” are interchangeable.*

**Engineer**
HLA Engineering and Land Surveying, Inc. (HLA)
2803 River Road
Yakima, WA 98902

**Working Drawings**
Working drawings are further defined as electrical diagrams, catalog cut sheets, manufacturer’s informational sheets describing salient features, performance curves, or samples of fabricated and manufactured items (including mechanical and electrical equipment) required for the construction project.
1-02 BID PROCEDURES AND CONDITIONS

1-02.1 Prequalification of Bidders

Delete this section and replace it with the following:

1-02.1 Qualifications of Bidder
(January 24, 2011 APWA GSP)

Before award of a public works contract, a bidder must meet at least the minimum qualifications of RCW 39.04.350(1) to be considered a responsible bidder and qualified to be awarded a public works project.

1-02.1(1) Supplemental Qualifications Criteria

In addition, the Contracting Agency has established Contracting Agency-specific and/or project-specific supplemental criteria, in accordance with RCW 39.04.350(2), for determining Bidder responsibility, including the bases for evaluation and the deadline for appealing a determination that a Bidder is not responsible. These criteria are contained in the Information for Bidders.

1-02.2 Plans and Specifications

Delete this section and replace it with the following:

Information as to where Bid Documents can be obtained or reviewed will be found in the Call for Bids (Advertisement for Bids) for the work. During the bid period, electronic PDF plans and specifications, including any addenda will be available to download at https://hlacivil.com/bid. Following bid period, electronic PDF plans and specifications will only be available upon request. No paper copies will be provided.

1-02.4 Examination of Plans, Specifications, and Site of Work

1-02.4(1) General
(August 15, 2016 APWA GSP Option B)

The first sentence of the last paragraph is revised to read:

Any prospective Bidder desiring an explanation or interpretation of the Bid Documents, shall request the explanation or interpretation in writing by close of business four (4) days preceding the bid opening to allow a written reply to reach all prospective Bidders before the submission of their Bids.

Add the following paragraph:

No pre-bid approval on any proposed substitute equipment shall be granted prior to the bid opening unless specified otherwise in these Specifications.

1-02.5 Proposal Forms

Delete this section and replace it with the following:

The Proposal Form will identify the project and its location and describe the work. It will also list estimated quantities, units of measurement, the items of work, and the materials to be furnished at the unit bid prices. The bidder shall complete spaces on the proposal form that call for, but are not limited to, unit prices; extensions; summations; the total bid amount; signatures; date; and, where applicable, retail sales taxes and acknowledgment of addenda; the bidder’s name, address, telephone number, and signature; and a Business License Number, if applicable. Bids shall be completed by typing or shall be printed in ink by hand, preferably in black ink. The required certifications are included as part of the Proposal Form.
The Contracting Agency reserves the right to arrange the proposal forms with alternates and additives, if such be to the advantage of the Contracting Agency. The bidder shall bid on all alternates and additives set forth in the Proposal Form unless otherwise specified.

1-02.6 Preparation of Proposal

Supplement the second paragraph with the following:

4. If a minimum bid amount has been established for any item, the unit or lump sum price must equal or exceed the minimum amount stated.

5. Any correction to a bid made by interlineation, alteration, or erasure, shall be initialed by the signer of the bid.

Delete the last two paragraphs, and replace them with the following:

The Bidder shall make no stipulation on the Bid form, nor qualify the Bid in any manner.

A bid by a corporation shall be executed in the corporate name, by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign).

A bid by a partnership shall be executed in the partnership name and signed by a partner.

A bid by a joint venture shall be executed in the joint venture name and signed by a member of the joint venture.

Supplement this section with the following:

Any bid item which has a unit price but no extension column amount shall have the extension amount determined by multiplying the unit price times the unit quantity. Any bid item which does not have a unit price but does have an extension column amount shall have the unit price determined by dividing the extension amount by the unit quantity. Should both the unit price and the extension column amount be left blank, then the entire bid shall be considered non-responsive.

1-02.9 Delivery of Proposal

Delete this section and replace it with the following:

Each Proposal shall be submitted in a sealed envelope, with the Project Name and Project Number as stated in the Call for Bids clearly marked on the outside of the envelope, or as otherwise required in the Bid Documents, to ensure proper handling and delivery.

The Contracting Agency will not open or consider any Bid Proposal that is received after the time specified in the Call for Bids for receipt of Bid Proposals or received in a location other than that specified in the Call for Bids. The Contracting Agency will not open or consider any “Supplemental Information” that is received after the time specified above or received in a location other than that specified in the Call for Bids.

1-02.10 Withdrawing, Revising, or Supplementing Proposal

Delete this section, and replace it with the following:

After submitting a physical Bid Proposal to the Contracting Agency, the Bidder may withdraw, revise, or supplement it if:

1. The Bidder submits a written request signed by an authorized person and physically delivers it to the place designated for receipt of Bid Proposals, and

2. The Contracting Agency receives the request before the time set for receipt of Bid Proposals, and
3. The revised or supplemented Bid Proposal (if any) is received by the Contracting Agency before the time set for receipt of Bid Proposals.

If the Bidder’s request to withdraw, revise, or supplement its Bid Proposal is received before the time set for receipt of Bid Proposals, the Contracting Agency will return the unopened Proposal package to the Bidder. The Bidder must then submit the revised or supplemented package in its entirety. If the Bidder does not submit a revised or supplemented package, then its bid shall be considered withdrawn.

Late revised or supplemented Bid Proposals or late withdrawal requests will be date recorded by the Contracting Agency and returned unopened. Mailed, emailed, or faxed requests to withdraw, revise, or supplement a Bid Proposal are not acceptable.

1-02.13 Irregular Proposals
(June 20, 2017 APWA GSP)

Delete this section and replace it with the following:

1. A Proposal will be considered irregular and will be rejected if:
   a. The Bidder is not prequalified when so required;
   b. The authorized Proposal form furnished by the Contracting Agency is not used or is altered;
   c. The completed Proposal form contains any unauthorized additions, deletions, alternate Bids, or conditions;
   d. The Bidder adds provisions reserving the right to reject or accept the award, or enter into the Contract;
   e. A price per unit cannot be determined from the Bid Proposal;
   f. The Proposal form is not properly executed;
   g. The Bid Proposal does not constitute a definite and unqualified offer to meet the material terms of the Bid invitation; or
   h. More than one Proposal is submitted for the same project from a Bidder under the same or different names.

2. A Proposal may be considered irregular and may be rejected if:
   a. The Proposal does not include a unit price for every Bid item;
   b. Any of the unit prices are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the Contracting Agency;
   c. Receipt of Addenda is not acknowledged;
   d. A member of a joint venture or partnership and the joint venture or partnership submit Proposals for the same project (in such an instance, both Bids may be rejected); or
   e. If Proposal form entries are not made in ink.

1-02.14 Disqualification of Bidders

Delete this section and replace it with the following:

A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or does not meet Supplemental Criteria 1-7 listed in this Section.

The Contracting Agency will verify that the Bidder meets the mandatory bidder responsibility criteria in RCW 39.04.350(1), and Supplemental Criteria 1-2. Evidence that the Bidder meets Supplemental Criteria 3-6 shall be provided by the Bidder as stated later in this Section.

1. Delinquent State Taxes

   A. Criterion: The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.

   B. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder does not owe delinquent taxes to the Washington State Department of Revenue, or if delinquent taxes
are owed to the Washington State Department of Revenue, the Bidder must submit a written payment plan approved by the Department of Revenue, to the Contracting Agency by the deadline listed below.

2. **Federal Debarment**
   
   A. **Criterion:** The Bidder shall not currently be debarred or suspended by the Federal government.
   
   B. **Documentation:** The Bidder shall not be listed as having an “active exclusion” on the U.S. government’s “System for Award Management” database (www.sam.gov).

3. **Claims Against Retainage and Bonds**
   
   A. **Criterion:** The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects in the three years prior to the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.
   
   B. **Documentation:** The Bidder, if and when required as detailed below, shall submit a list of the public works projects completed in the three years prior to the bid submittal date that have had claims against retainage and bonds and include for each project the following information:
      
      - Name of project
      - The owner and contact information for the owner;
      - A list of claims filed against the retainage and/or payment bond for any of the projects listed;
      - A written explanation of the circumstances surrounding each claim and the ultimate resolution of the claim.

4. **Public Bidding Crime**
   
   A. **Criterion:** The Bidder and/or its owners shall not have been convicted of a crime involving bidding on a public works contract in the five years prior to the bid submittal date.
   
   B. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder and/or its owners have not been convicted of a crime involving bidding on a public works contract.

5. **Termination for Cause / Termination for Default**
   
   A. **Criterion:** The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency in the five years prior to the bid submittal date, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.
   
   B. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder has not had any public works contract terminated for cause or terminated for default by a government agency in the five years prior to the bid submittal date; or if Bidder was terminated, describe the circumstances.

6. **Lawsuits**
   
   A. **Criterion:** The Bidder shall not have lawsuits with judgments entered against the Bidder in the five years prior to the bid submittal date that demonstrate a pattern of failing to meet
the terms of contracts, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Contracting Agency.

B. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Contracting Agency) that the Bidder has not had any lawsuits with judgments entered against the Bidder in the five years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, or shall submit a list of all lawsuits with judgments entered against the Bidder in the five years prior to the bid submittal date, along with a written explanation of the circumstances surrounding each such lawsuit. The Contracting Agency shall evaluate these explanations to determine whether the lawsuits demonstrate a pattern of failing to meet of terms of construction related contracts.

As evidence that the Bidder meets the Supplemental Criteria stated above, the Bidder must submit a signed Bidder Responsibility Statement with the Bid. The Contracting Agency reserves the right to request further documentation as needed from the low Bidder and documentation from other Bidders as well to assess Bidder responsibility and compliance with all bidder responsibility criteria. The Contracting Agency also reserves the right to obtain information from third-parties and independent sources of information concerning a Bidder's compliance with the mandatory and supplemental criteria, and to use that information in their evaluation. The Contracting Agency may consider mitigating factors in determining whether the Bidder complies with the requirements of the supplemental criteria.

The basis for evaluation of Bidder compliance with these mandatory and supplemental criteria shall include any documents or facts obtained by Contracting Agency (whether from the Bidder or third parties) including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Contracting Agency from others for whom the Bidder has worked, or other public agencies or private enterprises; and (iii) any additional information obtained by the Contracting Agency which is believed to be relevant to the matter.

If the Contracting Agency determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Contracting Agency shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within two (2) business days of the Contracting Agency’s determination by presenting its appeal and any additional information to the Contracting Agency. The Contracting Agency will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the Contracting Agency’s final determination.

Request to Change Supplemental Bidder Responsibility Criteria Prior To Bid: Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria may make or submit requests to the Contracting Agency to modify the criteria. Such requests shall be in writing, describe the nature of the concerns, and propose specific modifications to the criteria. Bidders shall submit such requests to the Contracting Agency no later than five (5) business days prior to the bid submittal deadline and address the request to the Project Engineer or such other person designated by the Contracting Agency in the Bid Documents.

1-03 AWARD AND EXECUTION OF CONTRACT

1-03.1 Consideration of Bids
(January 23, 2006 APWA GSP)

Revise the first paragraph to read:

After opening and reading proposals, the Contracting Agency will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit will control. If a minimum bid amount has been established for any item and the bidder’s unit or lump sum price is less than the minimum specified amount, the Contracting Agency will unilaterally revise the unit or lump sum price, to the minimum specified amount and recalculate the extension. The total of extensions, corrected where necessary,
including sales taxes where applicable and such additives and/or alternates as selected by the Contracting Agency, will be used by the Contracting Agency for award purposes and to fix the Awarded Contract Price amount and the amount of the contract bond.

1-03.2 Award of Contract

Supplement this section with the following:

The Contract will be awarded to the apparent low bidder on the basis of the total of all bid items and schedules accepted by the Contracting Agency. The Contractor shall submit bids for all bid schedules, including all alternate and/or additive bid schedules as applicable, to be considered a responsive bidder.

1-03.3 Execution of Contract

Revise this section to read:

Copies of the Contract Provisions, including the unsigned Form of Contract, will be available for signature by the successful bidder on the first business day following award. The number of copies to be executed by the Supplier will be determined by the Contracting Agency. Award is anticipated to be made on January 28, 2020.

Within ten (10) calendar days after the award date, the successful bidder shall return the signed Contracting Agency-prepared contract, an insurance certification as required by Section 1-07.18, and a satisfactory bond as required by law and Section 1-03.4. Before execution of the contract by the Contracting Agency, the successful bidder shall provide any pre-award information the Contracting Agency may require under Section 1-02.15.

Until the Contracting Agency executes a contract, no proposal shall bind the Contracting Agency nor shall any production of equipment and materials begin. The manufacturer shall bear all risks for any work begun or materials ordered before the contract is executed by the Contracting Agency.

If the bidder experiences circumstances beyond their control that prevents return of the contract documents within the calendar days after the award date stated above, the Contracting Agency may grant additional calendar days for return of the documents, provided the Contracting Agency deems the circumstances warrant it.

1-03.4 Contract Bond

Delete the first paragraph and replace it with the following:

The successful bidder shall provide executed bond for the full contract amount. The bond shall:

1. Be on a Contracting Agency-furnished form;

2. Be signed by an approved surety (or sureties) that:

   a. Is registered with the Washington State Insurance Commissioner, and

   b. Appears on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner;

3. Guarantee that the Supplier will perform and comply with all obligations, duties, and conditions under the Contract, including but not limited to the duty and obligation to indemnify, defend, and protect the Contracting Agency against all losses and claims related directly or indirectly from any failure:

   a. Of the Supplier (or any of the employees, subcontractors, or lower tier subcontractors of the Supplier) to faithfully perform and comply with all contract obligations, conditions, and duties or
b. Of the Supplier (or the subcontractors or lower tier subcontractors of the Supplier) to pay all laborers, mechanics, subcontractors, lower tier subcontractors, material person, or any other person who provides supplies or provisions for carrying out the work;

4. Be conditioned upon the payment of taxes, increases, and penalties incurred on the project under titles 50, 51, and 82 RCW; and

5. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and

6. Be signed by an officer of the Supplier empowered to sign official statements (sole proprietor or partner). If the Supplier is a corporation, the bond(s) must be signed by the president or vice president, unless accompanied by written proof of the authority of the individual signing the bond(s) to bind the corporation (i.e., corporate resolution, power of attorney, or a letter to such effect by the president or vice president).

Supplement this section with the following:

The Supplier shall guarantee the material provided and workmanship performed under the Contract for a period of one year from and after the final acceptance thereof by the Contracting Agency. Repair and/or replacement of defective materials and workmanship shall be as specified in Section 1-05.12(1).

Manufacturer shall also provide a process performance guarantee of the complete skid mounted MBR system to meet the performance requirements specified in Section 46 53 49, MEMBRANE BIOLOGICAL REACTORS, paragraph 2.01.

In addition to the requirements for the Contract Bond according to Section 1-03.4 of the Standard Specifications, the Bond shall further indemnify and hold the Contracting Agency harmless from defects appearing or developing in the material or workmanship provided or performed under the Contract within a period of one year after final acceptance by the Contracting Agency. The Contract Bond document is bound in these Specifications.

1-03.7 Judicial Review
(November 30, 2018 APWA GSP)

Revise this section to read:

Any decision made by the Contracting Agency regarding the Award and execution of the Contract or Bid rejection shall be conclusive subject to the scope of judicial review permitted under Washington Law. Such review, if any, shall be timely filed in the Superior Court of the county where the Contracting Agency headquarters is located, provided that where an action is asserted against a county, RCW 36.01.050 shall control venue and jurisdiction.

1-04 SCOPE OF THE WORK

1-04.1 Intent of the Contract

1-04.1(2) Bid Items Not Included in the Proposal

Delete the first paragraph in its entirety and replace it with the following:

If work is required to complete the project according to the intent of the Plans and Specifications but no bid item is provided in the Bid Schedule, then the Supplier shall include the cost for providing the necessary work in the unit or lump sum price for the bid item most closely related to the work.
1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda
(March 13, 2012 APWA GSP)

Revise the second paragraph to read:

Any inconsistency in the parts of the contract shall be resolved by following this order of precedence (e.g., 1 presiding over 2, 2 over 3, 3 over 4, and so forth):

1. Addenda,
2. Proposal Form,
3. Special Provisions,
4. Contract Plans,
5. Amendments to the Standard Specifications,
6. Standard Specifications,
7. Contracting Agency’s Standard Plans or Details (if any), and
8. WSDOT Standard Plans for Road, Bridge, and Municipal Construction.

1-04.4 Changes

Supplement this section with the following:

No changes in the work covered by the approved Contract Documents shall be made without having prior written or oral (as deemed appropriate due to urgency of change) approval of the Owner. If oral approval is granted, it shall be documented in writing shortly thereafter. Charges or credits for the work covered by the approved change shall be determined by one or more, or a combination of the following methods:

a. Unit bid prices previously approved.

b. An agreed lump sum.

c. The actual costs of:

   (1) Labor, including foremen;

   (2) Materials entering permanently into the work;

   (3) The ownership or rental costs of construction plant and equipment during the time of use on the extra work;

   (4) Power and consumable supplies for the operation of power equipment;

   (5) Insurance;

   (6) Social Security and old age and unemployment contributions.

Should authorized changes be made based upon the actual cost of material and labor, the costs thereof and costs allowed for overhead profit, bonds, insurance, etc., shall be determined via Section 1-09.6 Force Account of the Standard Specifications.

1-04.6 Variation in Estimated Quantities

Supplement this section with the following:

The quantities listed in the unit price Bid Proposal are estimates for bidding purposes only. There will be no adjustments in price due to increases or decreases in quantities regardless of the magnitude. The 25 percent provisions of this Section 1-04.6 shall not apply to: All Bid Items. Payment will be made at the unit contract price for actual quantities of work completed.
1-05 CONTROL OF WORK

1-05.3 Working Drawings

Replace the second, third, and fourth paragraphs of Section 1-05.3 of the Standard Specifications with the following:

The Supplier shall submit shop drawings, samples, test reports and other required submittals in accordance with Section 01 33 00 – Submittals Procedure of the Technical Specifications.

1-05.12(1) One-Year Guarantee Period (New Section)

The following new section shall be added to the Standard Specifications:

The manufacturer/supplier shall return to the project and repair or replace all defects in workmanship and material discovered within one year after Final Acceptance of the Work. The manufacturer/supplier shall start work to remedy any such defects within seven (7) calendar days of receiving Contracting Agency’s written notice of a defect and shall complete such work within the time stated in the Contracting Agency’s notice. In case of an emergency, where damage may result from delay or where loss of services may result, such corrections may be made by the Contracting Agency’s own forces or another manufacturer/supplier, in which case the cost of corrections shall be paid by the manufacturer/supplier. In the event the manufacturer/supplier does not accomplish corrections within the time specified, the work will be otherwise accomplished and the cost of same shall be paid by the manufacturer/supplier.

When corrections of defects are made, the manufacturer/supplier shall then be responsible for correcting all defects in workmanship and materials in the corrected work for one year after acceptance of the corrections by Contracting Agency.

This guarantee is supplemental to and does not limit or affect the requirements that the manufacturer/supplier’s work comply with the requirements of the Contract or any other legal rights or remedies of the Contracting Agency.

The manufacturer/supplier agrees the above one-year limitation shall not exclude nor diminish the Contracting Agency’s rights under any law to obtain damages and recover costs resulting from defective and unauthorized work discovered after one year.

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.2 State Taxes

Delete this section, including its sub-sections, in its entirety and replace it with the following:

1-07.2 State Sales Tax
(June 27, 2011 APWA GSP)

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(3) are meant to clarify those rules. The manufacturer should contact the Washington State Department of Revenue for answers to questions in this area. The Contracting Agency will not adjust its payment if the manufacturer bases a bid on a misunderstood tax liability.

The manufacturer shall include all manufacturer-paid taxes in the unit bid prices or other contract amounts. In some cases, however, state retail sales tax will not be included. Section 1-07.2(2) describes this exception.

The Contracting Agency will pay the retained percentage only if the manufacturer has obtained from the Washington State Department of Revenue a certificate showing that all contract-related taxes have been paid (RCW 60.28.051). The Contracting Agency may deduct from its payments to the manufacturer any amount the manufacturer may owe the Washington State Department of Revenue, whether the amount owed relates to this contract or not. Any amount so deducted will be paid into the proper State fund.
In accordance with WAC 458-20-170, the manufacturer shall collect from the Contracting Agency, retail sales tax on the full contract price. The Contracting Agency will automatically add this sales tax to each payment to the manufacturer. For this reason, the manufacturer shall not include the retail sales tax in the unit bid item prices, or in any other contract amount, subject with the following exception.

Exception: The Contracting Agency will not add in sales tax for a payment the manufacturer makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount.

The manufacturer shall not collect retail sales tax from the Contracting Agency on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).

1-07.18 Public Liability and Property Damage Insurance

Delete this section in its entirety, and replace it with the following:

Within ten (10) days following contract award or prior to start of construction, whichever comes first, the manufacturer shall furnish the Owner a Certificate of Insurance and the additional insured endorsements as evidence of compliance with these requirements. This certificate shall name the SNOQUALMIE PASS UTILITY DISTRICT, its employees, agents, elected and appointed officials, HLA Engineering and Land Surveying, Inc. (HLA), as “additional insureds” and shall stipulate that the policies named thereon cannot be canceled unless at least thirty (30) days written notice has been given to the Owner. The certificate shall not contain the following or similar wording regarding cancellation notification: “Failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or representatives.”

The manufacturer shall obtain and keep in force the following policies of insurance. The policies shall be with companies or through sources approved by the State Insurance Commissioner pursuant to Chapter 48.05, RCW. Unless otherwise indicated below, the policies shall be kept in force from the execution date of the contract until the date of acceptance by the Owner.

1. Commercial General Liability Insurance written under ISO Form CG0001 or its equivalent with minimum limits of $2,000,000 per occurrence and in the aggregate for each policy period. This protection may be a CGL policy or any combination of primary, umbrella or excess liability coverage affording total liability limits of not less than $2,000,000. Products and completed operations coverage shall be provided for a period of one year following final acceptance of the work.

2. Commercial Automobile Liability Insurance providing bodily injury and property damage liability coverage for all owned and non-owned vehicles assigned to or used in the performance of the work with a combined single limit of not less than $1,000,000 each occurrence with the Owner named as an additional insured in connection with the Manufacturer/supplier’s Performance of the contract.

The Commercial General Liability policy and the Commercial Automobile Liability Insurance policy may, at the discretion of the Manufacturer/supplier, contain provisions for a deductible. If a deductible applies to any claim under these policies, then payment of that deductible will be the responsibility of the Manufacturer/supplier, notwithstanding any claim of liability against the Contracting Agency. However, in no event shall any provision for a deductible provide for a deductible in excess of $50,000.00.

Prior to contract execution, the Manufacturer/supplier shall file with the Engineer ACORD Form Certificates of Insurance evidencing the minimum insurance coverages required under these specifications.

All insurance policies and Certificates of Insurance shall include a requirement providing for a minimum of a 30-day prior written notice to the Contracting Agency of any cancellation or reduction of coverage. All insurance coverage required by this section shall be written and provided by “occurrence-based” policy forms rather than by “claims made” forms.
Failure on the part of the Manufacturer/supplier to maintain the insurance as required shall constitute a material breach of contract upon which the Contracting Agency may, after giving a five working day notice to the Manufacturer/supplier to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Manufacturer/supplier from the Contracting Agency. All costs for insurance, including any payments of deductible amounts, shall be considered incidental to and included in the unit contract prices and no additional payment will be made.

The Manufacturer/supplier is responsible for all his subcontractors’ actions and omissions.

1-08 PROSECUTION AND PROGRESS

1-08.3 Progress Schedule
Delete this section and replace it with the following:

The manufacturer will not be required to submit a Progress Schedule for this project. The project schedule will be based on the Equipment Delivery Time as defined in Section 1-08.4. However, the manufacturer shall provide production and delivery time updates to verify conformance with the contract requirements, when requested by the Engineer.

1-08.4 Prosecution of Work
Delete this section and replace it with the following:

1-08.4 Notice to Proceed and Prosecution of Work
(July 23, 2015 APWA GSP)

The Engineer will issue a Notice to Proceed after the Contract has been executed. The manufacturer shall not begin any production of equipment or order of materials until the Notice to Proceed has been issued. Preparation of submittals shall begin immediately upon receipt of Notice of Award from the Engineer. Submittals shall be provided to the Engineer within thirty (30) calendar days after Notice of Award. Award of a contract is anticipated to be made on January 28, 2020, as described in Section 1-03.3.

After receipt of Notice to Proceed, the work shall be prosecuted diligently to completion by the manufacturer within the time allowed, as described in Section 1-08.5. Failure of the manufacturer to provide submittals within the time specified, or deliver equipment by the date specified, will be considered grounds for Termination for Default as specified under Section 1-08.10(1) of the Standard Specifications.

1-08.5 Time for Completion
Add the following:

The manufacturer shall advise the Engineer when equipment and materials will be ready for delivery to the site. The actual dates of delivery to the site shall be coordinated with the Engineer and the Owner but shall be no later than September 30, 2020. The Engineer or Owner will advise the manufacturer of the required delivery dates at least two weeks prior to said delivery date.

This project shall be considered complete when all materials and equipment have been delivered and startup, commissioning, and training services have been provided. Refer to individual Technical Specification sections for additional inspection, startup, training, and commissioning requirements.
1-08.9 Liquidated Damages

Replace the third paragraph with the following:

If the Contract work is not completed within the times specified in Section 1-08.5, the Supplier agrees to pay to the Owner the sum of $2,000 per day for each and every working day said work remains uncompleted after expiration of the specified time.

1-08.10 Termination of Contract

1-08.10(1) Termination for Default

In the last sentence of the fifth paragraph, replace “State of Washington, Department of Transportation” with “Contracting Agency.”

1-09 MEASUREMENT AND PAYMENT

1-09.3 Scope of Payment

Supplement this section with the following:

Payment for work performed under this Contract will be based on the items listed in the Unit Price Bid Proposal. Should a conflict exist between the item descriptions or the units of measurement and payment listed in the Unit Price Bid Proposal and the “Payment” clauses found in each section of the Standard Specifications, the Unit Price Bid Proposal items will prevail. If work is required to complete the project according to the intent of the Plans and Specifications, but no bid item is provided in the Unit Price Bid Proposal, then the Supplier shall include the cost for providing the necessary work in the unit or lump sum price for the bid item most closely related to the work.

1-09.3(1) Description of Bid Items (New Section)

The following new section shall be added to the Standard Specifications:

Bid items listed in the Bid Schedule are defined to include, but not necessarily be limited to, the following:

1. The lump sum price bid for “Bond, Insurance, Design, and Submittals,” shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary for pre-fabrication expenses and costs which occur prior to delivery of completed equipment and materials, including costs related to contract execution, contract bond, insurance, equipment design, submittal preparation, equipment and material procurement and any other similar pre-fabrication costs. Payment for work of this bid item will not be made until submittals have been approved by the Engineer and the production and delivery schedule has been confirmed and approved by the Engineer.

2. The lump sum price bid for “Skid Mounted Membrane Bioreactor Equipment and Materials, Complete,” shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary to fabricate, assemble, factory test, prepare for shipment, and delivery all specified equipment and materials to the project site. This item shall also include all costs for spare parts, properly packaged and delivered to the project site.

3. The lump sum price bid for “Inspection, Startup, Training, Commissioning, and Warranty Support Services,” shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary to provide inspection of the equipment installation, startup and testing assistance, training of plant personnel, assistance during the commissioning period, and warranty support services, as specified.

4. The lump sum price bid for “Final Startup and Commissioning Reports, Record Drawings, and O&M Manuals,” shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary to prepare final reports of successful equipment startup, commissioning, and training, prepare final record drawings of all equipment and controls, including control panel wiring diagrams, and PLC and OIU programming, reflecting any field changes made during the startup and commissioning periods.
commissioning period, and preparation of all required O&M manuals. All changes made during startup and commissioning period shall be included in the final O&M manuals.

1-09.9 Payments

The basis of payment will be the actual quantities of materials supplied and work performed according to the Contract and as specified for payment.

The supplier/manufacturer shall submit a breakdown of the cost of lump sum bid items prior to application for payment, to enable the Engineer to determine the work performed. A breakdown is not required for lump sum items that include a basis for incremental payments as part of the respective Specification. Absent a lump sum breakdown, the Engineer will make a determination based on information available. The Engineer’s determination of the cost of work shall be final.

Progress payments for completed work and material on hand will be based upon progress estimates prepared by the Engineer. A progress estimate cutoff date will be established by the Engineer.

Progress estimates will be made as necessary for the work performed until the Completion Date, not to exceed once a month. Two progress estimates are anticipated to be made for this project prior to final payment. Once following final approval of equipment submittals, and the second following receipt of all equipment and materials for installation at the project site. Progress estimates made during progress of the work are tentative, and made only for the purpose of determining progress payments. The progress estimates are subject to change at any time prior to the calculation of the final payment.

The value of the progress estimate will be the sum of the following:

1. Unit Price Items in the Bid Form — the approximate quantity of acceptable units of work completed multiplied by the unit price.

2. Lump Sum Items in the Bid Form — based on the approved Supplier’s lump sum breakdown for that item, or absent such a breakdown, based on the Engineer’s determination.

3. Materials on Hand — 100 percent of invoiced cost of material delivered to Job site or other storage area approved by the Engineer.

4. Change Orders — entitlement for approved extra cost or completed extra work as determined by the Engineer.

Progress payments will be made in accordance with the progress estimate less:

1. Retainage per Section 1-09.9(1);

2. The amount of progress payments previously made; and

3. Funds withheld by the Contracting Agency for disbursement in accordance with the Contract Documents.

Progress payments for work performed shall not be evidence of acceptable performance or an admission by the Contracting Agency that any work has been satisfactorily completed. The determination of payments under the contract will be final in accordance with Section 1-05.1.

Supplement this section with the following:

The Contracting Agency has up to 45 calendar days after the progress estimate to issue the progress payment to the manufacturer.
The manufacturer shall submit a signed Application for Payment within three (3) working days of the progress estimate cutoff date. After the application for payment is reviewed by the Engineer, the Engineer will make a recommendation to the Contracting Agency for action at the first available meeting of the governing body that payment be made. Payment to the manufacturer will be made within approximately 30 calendar days from said meeting. Failure to submit an Application for Payment within the required time may delay action by the Contracting Agency’s governing body and further delay payment to the manufacturer.

All payments for lump sum items over $5,000.00 or a single payment for a lump sum contract of any amount will be measured by a schedule of values established as follows:

The supplier shall furnish a breakdown for each lump sum bid item or for the total lump sum contract price showing the amount bid for each principal category of the work, in such detail as requested by the Engineer, to provide a basis for determining progress payments. This breakdown, referred to as the “Schedule of Values,” will be approved by the Engineer as described in Section 1-08 Prosecution and Progress before the first payment is made.

1-09.9(1) Retainage

Add the following to the fourth paragraph:

6. An affidavit is delivered to the Contracting Agency by the Supplier, stating that all persons performing labor or furnishing materials have been paid.

1-09.9(2) Contracting Agency’s Right to Withhold and Disburse Certain Amounts (New Section)

The following new section shall be added to the Standard Specifications:

In addition to monies retained pursuant to RCW 60.28 and subject to RCW 39.04.250, RCW 39.12, and RCW 39.76, the Supplier authorizes the Engineer to withhold progress payments due or deduct an amount from any payment or payments due the Supplier which, in the Engineer’s opinion, may be necessary to cover the Contracting Agency’s costs for or to remedy the following situations:

1. Damage to another supplier when there is evidence thereof and a claim has been filed.

2. Where the Supplier has not paid fees or charges to public authorities or municipalities which the Supplier is obligated to pay.

3. Utilizing material, tested and inspected by the Engineer, for purposes not connected with the work (Section 1-05.6).

4. Landscape damage assessments per Section 1-07.16.

5. For overtime work performed by Contracting Agency personnel or its representative, per Section 1-08.0(3).

6. Anticipated or actual failure of the Supplier to complete the work on time:

   a. Per Section 1-08.9 Liquidated Damages; or

   b. Lack of construction progress based upon the Engineer’s review of the Supplier’s approved progress schedule which indicates the work will not be completed within the Contract Time. When calculating an anticipated time overrun, the Engineer will make allowances for weather delays, approved unavoidable delays, and suspensions of the work. The amount withheld under this subparagraph will be based upon the liquidated damages amount per day set forth in Contract Documents multiplied by the number of days the Supplier’s approved progress schedule, in the opinion of the Engineer, indicates the Contract may exceed the Contract time.
7. Failure of the Supplier to perform any of the Supplier’s other obligations under the Contract, including but not limited to:

   a. Failure of the Supplier to provide the Engineer with a field office when required by the Contract Provisions.

   b. Failure of the Supplier to protect survey stakes, markers, etc., or to provide adequate survey work as required by Section 1-05.4.

   c. Failure of the Supplier to correct defective or unauthorized work (Section 1-05.7).

   d. Failure of the Supplier to furnish a Manufacturer’s Certificate of Compliance in lieu of material testing and inspection as required by Section 1-06.3.

   e. Failure to submit Intent to Pay Prevailing Wage forms, or correct underpayment to employees of the Supplier or subcontractor of any tier as required by Section 1-07.9.

   f. Failure of the Supplier to pay workers’ benefits (Title 50 and Title 51 RCW) as required by Section 1-07.10.

   g. Failure of the Supplier to submit and obtain approval of a progress schedule per Section 1-08.3.

The Supplier authorizes the Engineer to act as agent for the Supplier disbursing such funds as have been withheld pursuant to this section to a party or parties who are entitled to payment. Disbursement of such funds, if the Engineer elects to do so, will be made only after giving the Supplier 15 calendar days prior written notice of the Contracting Agency’s intent to do so, and if prior to the expiration of the 15-calendar day period:

1. No legal action has commenced to resolve the validity of the claims, and

2. The Supplier has not protested such disbursement.

A proper accounting of all funds disbursed on behalf of the Supplier in accordance with this section will be made. A payment made pursuant to this section shall be considered as payment made under the terms and conditions of the Contract. The Contracting Agency shall not be liable to the Supplier for such payment made in good faith.

If legal action is instituted to determine the validity of the claims prior to expiration of the 15-day period mentioned above, the Engineer will hold the funds until determination of the action or written settlement agreement of the parties.

When the conditions 1-7 are resolved or the Supplier provides a Surety Bond satisfactory to the Contracting Agency which will protect the Contracting Agency in the amount withheld, payment shall be made for amounts withheld because of them.

1-09.9(3) Final Payment (New Section)

The following new section shall be added to the Standard Specifications:

Upon completion of all work under this Contract, the Supplier shall notify the Engineer, in writing, that he has completed his part of the Contract and shall request final payment. Upon receipt of such request, the Engineer will inspect and, if acceptable, submit to the Owner his recommendation as to acceptance of the completed work and as to the final estimate of the amount due the Supplier. Upon approval of this final estimate and upon final acceptance of the work under this Contract, the Owner will notify the Department of Revenue of the completion of said Contract. Provided the Department of Revenue certifies there are no taxes or penalties due and owing from the Supplier, and there are no other known claims or liens against the retained funds, and further provided the terms of Section 1-09.9(1) are in compliance, the Owner will pay to the Supplier the balance of monies due under this Contract in accordance with RCW Title 60.28. In the event unsatisfied claims or liens for taxes,
material, labor, and other services are known to exist, an amount will be further withheld from the retainage sufficient to satisfy the settlement of such claims and liens, including attorney's fees incurred, and the remainder will be released from escrow, or released from the retained funds and paid to the Supplier.

On contracts for public works, final payment of the retained percentage will not be made until after the Supplier has filed with the Owner the Affidavit of Wages Paid forms required by RCW 39.12.040 certifying that the Supplier and subcontractors have paid not less than the prevailing rate of wages.

The parties further agree that the Owner may, without liability, withhold final payment to the Supplier until such time as the Supplier has completed all forms required by the Owner.

If a contract is funded by grant, state, or federal money, the public body shall pay the supplier for satisfactory performance within thirty calendar days of the date the public body receives a payment request that complies with the contract or within thirty calendar days of the date the public body actually receives the grant or federal money, whichever is later.

1-09.11 Disputes and Claims

1-09.11(3) Time Limitations and Jurisdiction  
(November 30, 2018 APWA GSP)

Revise this section to read:

For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Supplier has against the Contracting Agency arising from the Contract shall be brought within 180 calendar days from the date of final acceptance (Section 1-05.12) of the Contract by the Contracting Agency; and it is further agreed that any such claims or causes of action shall be brought only in the Superior Court of the county where the Contracting Agency headquarters is located, provided that where an action is asserted against a county, RCW 36.01.050 shall control venue and jurisdiction. The parties understand and agree that the Supplier's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Supplier asserts against the Contracting Agency arising from the Contract are filed with the Contracting Agency or initiated in court, the Supplier shall permit the Contracting Agency to have timely access to any records deemed necessary by the Contracting Agency to assist in evaluating the claims or action.

1-09.13 Claims Resolution

1-09.13(3) Claims $250,000 or Less  
(October 1, 2005 APWA GSP)

Delete this section and replace it with the following:

The Supplier and the Contracting Agency mutually agree that those claims that total $250,000 or less, submitted in accordance with Section 1-09.11 and not resolved by nonbinding ADR processes, shall be resolved through litigation unless the parties mutually agree in writing to resolve the claim through binding arbitration.

1-09.13(3)A Administration of Arbitration  
(November 30, 2018 APWA GSP)

Revise the third paragraph to read:

The Contracting Agency and the Supplier mutually agree to be bound by the decision of the arbitrator, and judgment upon the award rendered by the arbitrator may be entered in the Superior Court of the county in which the Contracting Agency’s headquarters is located, provided that where claims subject to arbitration are asserted against a county, RCW 36.01.050 shall control venue and jurisdiction of the
Superior Court. The decision of the arbitrator and the specific basis for the decision shall be in writing. The arbitrator shall use the Contract as a basis for decisions.

END OF SECTION 01 11 50
SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section specifies procedures for equipment manufacturer submittals. The manufacturer shall submit descriptive information that will enable the District to determine whether the proposed materials, equipment, testing and schedule for fabrication are in general conformance to the design concept and in compliance with the Contract Documents. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, test procedures, test results and such other information, all as specifically required in the Contract Documents.

1.02 MANUFACTURER RESPONSIBILITIES

A. The manufacturer shall be responsible for the accuracy and completeness of the information contained in each submittal and shall ensure that the material, equipment, testing, and schedule for fabrication shall be as described in the submittal. The manufacturer shall verify that the material and equipment described in each submittal conforms to the requirements of the Contract Documents. If the information shows deviations from the Contract Documents, the manufacturer shall, by statement in writing accompanying the information, identify the deviations and state the reason. The manufacturer shall ensure that there is no conflict with other submittals and notify the Engineer in each case where such submittal may affect the work.

PART 2 – PRODUCTS

2.01 SHOP DRAWINGS

A. Prior to fabrication or release for manufacturing of all components of the project, the manufacturer shall submit shop drawings to the Engineer for review.

B. Drawings: Unless otherwise specifically directed by the Engineer, the manufacturer shall identify each copy of the shop drawings with the drawing number in the lower right hand corner, shall make all shop drawings accurately to a scale sufficiently large enough to show all pertinent features of the item and its method of connection to the work, and shall make all shop drawing prints in blue or black line on white background. Shop drawings shall be submitted in accordance with paragraphs 3.01 and 3.02 A. Each item listed in Paragraph C below shall be included and be appropriately identified.

C. Manufacturer shall submit the following minimum information with their shop drawings for each model or type of unit supplied by the manufacturer.

1. Manufacturer’s catalog information, physical and operation description, and specifications.
2. Drawings showing the general dimensions of the equipment and confirming the size of the unit. If applicable, drawings shall include size and location of required piping connections, structural supports, construction details, list of input/output signals for manufacturer provided control panel, wiring diagrams, weights of major components, and utility connection requirements.
3. List of all design modifications to accommodate the equipment proposed.
4. Information and location of nearest parts, service crews, and repair facilities to the project location.
5. Installation list for installations in the U.S. with location, contact names, and phone numbers.
6. List of all variances from the Technical Specifications. Failure to specifically list and fully explain all variances will be cause for rejection of the submittal.

7. Any other information required to clearly and readily demonstrate compliance with all parts of the Technical Specifications.

8. Installation instructions.


10. Manufacturer’s certification of factory applied coating system and coating system technical data sheets.

11. Manufacturer’s guarantee, as specified.

12. Any additional information listed elsewhere in the Technical Specifications and required to be submitted with the shop drawings.

D. When revised for resubmission, manufacturer shall clearly identify changes made since previous submission.

E. Substitutions: Any substitutions proposed by the manufacturer shall require submittals to fully enable the Engineer to evaluate the proposed substitution. All submittals shall clearly note and explicitly describe all details of any substitutions or deviations from the Contract Documents. The Engineer's acceptance of any shop drawings shall not release the manufacturer from responsibility for deviations from the Contract Documents.

F. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate they have not been checked by the manufacturer will be considered as not complying with the intent of Contract Documents and will be returned to the manufacturer for resubmission in proper form.

2.02 TEST REPORTS

A. Test reports shall be furnished to the Engineer as specified in the Technical Specifications. Test reports required prior to shop drawing approval shall be submitted with the shop drawings. Test reports required for factory testing shall be submitted and accepted prior to shipment of the equipment to the construction site and shall be submitted with the Operation and Maintenance information unless directed otherwise by the Engineer. Test reports required after installation shall be submitted within 30 days after the final test date.

B. Test reports shall be clearly identified with the equipment title, specification number(s), and manufacturer name printed on the front of the report.

C. If test results are required to be witnessed by an independent testing laboratory, the Test report shall be certified by that laboratory.

D. Unless specified otherwise, factory tests shall be non-witnessed tests. Test reports shall be certified by the manufacturer.

2.03 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Manuals shall be submitted in conformance with this section, except as modified in Section 01 78 00 – Operation and Maintenance Manuals.
2.04 MANUFACTURER'S GUARANTEE

A. The manufacturer's guarantee shall be submitted to the Engineer with the Operation and Maintenance Manuals and shall be in conformance with this section.

2.05 CERTIFICATE OF INSTALLATION AND MANUFACTURER'S CERTIFICATE

A. After equipment installation and on-site performance testing has been completed, the manufacturer shall submit a Certificate of Installation and Startup, according to the Specifications, in accordance with this section and the manufacturer's standard warranty conditions.

PART 3 – EXECUTION

3.01 TRANSMITTAL PROCEDURE

A. Submittals shall be accompanied by transmittal form/letter. A sample transmittal form/letter is included at the end of this section. Equipment or identification numbers shall be listed on the form for items being submitted. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

B. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: “XX”; where “XX” is the sequential number assigned by the manufacturer. Resubmittals shall have the following format: “XX-Y”; where “XX” is the originally assigned submittal number and “Y” is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd, and 3rd resubmittals, respectively. Submittal 02-B, for example, is the second resubmittal of submittal number 2.

C. Submittal Completeness: Submittals which do not have all the information required to be submitted are not acceptable and will be returned without review.

D. Submittal Priority: Manufacturer shall indicate priority for receipt of reviewed submittals when multiple submittals have been sent to the Engineer for review. Engineer will attempt to review and reply to the highest priority submittals in the timeliest manner when manufacturer indicates that there is a priority; otherwise submittals will be reviewed in the order received, in accordance with the time indicated in paragraph 3.02.

3.02 REVIEW PROCEDURE

A. For each required submittal, the manufacturer shall submit the specified information as follows:

1. For standard 8-1/2 x 11 inch, 8-1/2 x 14 inch, and 11 x 17-inch size sheets, provide one electronic copy of each page, including the transmittal form, in PDF format and meeting the following requirements:

   a. Original or scanned PDF files shall have a minimum resolution of 600 dpi, irrespective of document size. Scanned or resized PDF files that do match the original document size, or do not properly fill a standard page size, will not be accepted.

   b. PDF files containing multiple submittal items shall be “bookmarked” to match the submittal table of contents, as specified in paragraph 3.01 A., for easy reference and viewing.

2. For all other size sheets, provide one (1) reproducible high-resolution print and one (1) additional print of each page, until approval is obtained.
B. Unless otherwise specified, within ten (10) working days after receipt of the submittal, the Engineer will review the submittal and return the marked-up reproducible original noted in paragraph 1 above. The returned submittal will indicate one (1) of the following actions:

1. If the review indicates that the material, equipment, test or work method is in general conformance with the design concept and complies with the Contract Documents, submittal copies will be marked “NO EXCEPTIONS TAKEN.” In this event the manufacturer may begin fabrication of materials and equipment.

2. If the review indicates that the submittal is insufficient or that limited corrections are required, copies will be marked “MAKE CORRECTIONS NOTED.” The manufacturer may begin fabrication of materials and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in Operation and Maintenance data, a corrected copy shall be provided; otherwise no further action is required.

3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked “MAKE CORRECTIONS NOTED” or “REVISE AND RESUBMIT.” If the comments are of a nature that can be confirmed without a resubmittal, copies will be marked “MAKE CORRECTIONS NOTED” with “CONFIRM” or “VERIFY” written where appropriate on the submittal. If the comments require a revision and resubmittal, copies will be marked “REVISE AND RESUBMIT.” Except at its own risk, the manufacturer shall not undertake work covered by this submittal until the attached comments have been either confirmed by a separate written communication or the submittal has been revised, resubmitted and returned to the manufacturer marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

4. If the review indicates that the material, equipment, test, or work method is not in general conformance with the design concept or in compliance with the Contract Documents, copies of the submittal will be marked “REJECTED” and “REVISE AND RESUBMIT,” or “REJECTED” and “SUBMIT SPECIFIED ITEM.” Submittals with deviations that have not been identified clearly may be rejected. Except at its own risk, the manufacturer shall not undertake work covered by such submittals until a new submittal is made and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

3.03 EFFECT OF REVIEW OF MANUFACTURER’S SUBMITTALS

A. Review of drawings, tests, methods of work, or information regarding materials or equipment the manufacturer proposes to provide, shall not relieve the manufacturer of its responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Owner or by any officer or employee of the Owner, and the manufacturer shall have no claim under the Contract on account of the failure, or partial failure, of the method of work and test, material, or equipment so reviewed. A mark of “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED” shall mean that the Owner has no objection to the manufacturer, upon the manufacturer’s own responsibility, providing the materials or equipment proposed.

B. The Engineer’s review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review shall not extend to the means, methods, sequences, techniques, or procedures of construction, or to safety precautions or programs incidental thereto. The review by the Engineer of a separate item as such will not indicate review of the assembly in which the item functions.
Date Sent: ____________________________

Submittal No.: __________________________

Specification Section No.: __________________________

Plan Sheet/Detail No.: __________________________

Project Name: PHASE 1 MEMBRANE BIOREACTOR WASTEWATER TREATMENT PLANT – EQUIPMENT ONLY

Project No.: 19216

Owner: SNOQUALMIE PASS UTILITY DISTRICT

Engineer: HLA ENGINEERING AND LAND SURVEYING, INC.

Manufacturer: ____________________________

Phone: ____________________________ Fax: ____________________________

Manufacturer’s Representative: ____________________________

Phone: ____________________________ Fax: ____________________________

Initial each line:

1. Manufacturer verifies that materials and equipment described in this submittal conform the requirements of the Contract Documents.

2. This submittal does not deviate from the Contract Documents.

3. This submittal does not conflict with other submittals or the Contract Documents. The submittals have been coordinated.

The manufacturer has determined and verified all design, quantities, dimensions, material catalog numbers and similar data, or assumes full responsibility for doing so. I have reviewed and coordinated each submittal with the requirements of the Contract Documents.

________________________________________
Signature

END OF SECTION 01 33 00
PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work included in this section consists of preparing, assembling, and submitting operation and maintenance manuals for all equipment supplied under this Contract.

B. Additional requirements for operation and maintenance manuals may be described in other sections of these Specifications.

PART 2 – PRODUCTS

2.01 OPERATION AND MAINTENANCE MANUALS

A. Provide operation and maintenance manual. The following information shall be included in the manual:

1. Catalog information.

2. Maintenance instructions for all components of the installation, including installation instructions, start-up instructions, and specific instructions for maintenance procedures necessary to sustain and extend the service life of the installed equipment.

3. List of recommended spare parts and materials needed to maintain the equipment.

4. Manufacturer’s specifications.

5. Electrical requirements and schematic diagrams.

6. List showing materials of construction of all components.

7. Information and location of parts, service crews, and repair facilities nearest to the Snoqualmie Pass Utility District.

8. When required, manufacturer’s certification of compliance with the specifications.

9. Manufacturer’s guarantee.

10. Safety precautions, warnings, and procedures.

B. All operation and maintenance information shall be comprehensive and detailed, and shall contain information adequately covering all normal operation and maintenance procedures, as well as emergency operation and maintenance procedures.

C. Submit one (1) electronic bookmarked PDF file of each O&M manual in accordance with Section 01 33 00 – Submittals Procedure, and two (2) hard copies bound in three-ring, hard-covered binders with insert pockets on the front and spine with project-specific title sheets inserted. Payment will not be made until all manuals are received and approved by the Engineer.

D. Separate O&M manual binders are not required for each piece of equipment. Information may be combined into single, larger O&M manual binders, grouped based on separate pieces of equipment. Binders shall be neatly organized and each binder shall be provided with project-specific cover sheets and a table of contents to easily locate necessary information. The number of binders, division of materials, and size of binders may need to be adjusted based on the volume of material.
E. The electronic O&M manuals shall be organized to match the format and layout of the hard-copy manual binders. A single PDF file shall be created for each binder provided. PDF files shall be “bookmarked” to match to table of contents, as specified in paragraph 3.02 A. of Section 01 33 00 – Submittals Procedure. Manufacturer’s original PDF documents may be combined with type written scanned documents to create a single PDF file. Scanned documents shall meet the requirements of paragraph 3.02 A. of Section 01 33 00 – Submittals Procedure and all text shall be converted so that the final O&M manual file is searchable.

F. One (1) electronic copy and one (1) hard copy of the initial O&M manual submittal may be provided to the Engineer for review and approval prior to preparing final hard copies of the O&M manuals. The initial O&M manuals will be returned to the manufacturer with the Engineer’s comments for preparation of the final documents.

2.02 MAINTENANCE SUMMARY

A. In addition to the above items, the manuals shall include a "maintenance summary." The "maintenance summary" shall be bound into the manual and shall contain the following information compiled by the manufacturer or the manufacturer’s representative:

1. Description or name of equipment;
2. Manufacturer;
3. Name, address, telephone number, and FAX number of manufacturer’s local representative;
4. Equipment serial number, where applicable;
5. Equipment nameplate data;
6. Recommended maintenance procedures:
   a. Name of part to be maintained and description of procedure;
   b. Frequency of maintenance;
   c. Lubricant(s) or other materials required, where applicable, including type of lubricant, lubricant manufacturer, and specific compound;
   d. Additional information as may be required for proper maintenance;
7. Recommended spare parts.

B. A sample "maintenance summary" form is bound herein for reference.

PART 3 – EXECUTION

3.01 GENERAL

A. It shall be the responsibility of the manufacturer to ensure all operation and maintenance materials are obtained. Material submitted must meet the approval of the Engineer prior to project acceptance.

B. The above described operations and maintenance information shall be submitted in addition to shop drawings.

C. Payment for furnishing operation and maintenance materials as specified herein shall be included in the bid item for O&M Manuals.
1. EQUIPMENT ITEM: ____________________________________________________________

2. MANUFACTURER: __________________________________________________________

3. SERIAL NO. (if applicable): _________________________________________________

4. NAMEPLATE DATA (horsepower, voltage, speed, etc.): _________________________

5. MANUFACTURER’S LOCAL REPRESENTATIVE:
   NAME: ___________________________________________________________________
   ADDRESS: __________________________________________________________________
   TELEPHONE NO.: __________________________________________________________

6. MAINTENANCE REQUIREMENTS:

<table>
<thead>
<tr>
<th>Maintenance operation</th>
<th>Frequency</th>
<th>Lubricant (if applicable)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>List briefly each maintenance operation required and refer to specific information in Manufacturer’s standard maintenance manual, if applicable.</td>
<td>List required frequency of each maintenance operation</td>
<td>Refer by symbol to lubricant list as required.</td>
<td>________________</td>
</tr>
<tr>
<td>________________</td>
<td>__________</td>
<td>__________________</td>
<td>________________</td>
</tr>
<tr>
<td>________________</td>
<td>__________</td>
<td>__________________</td>
<td>________________</td>
</tr>
<tr>
<td>________________</td>
<td>__________</td>
<td>__________________</td>
<td>________________</td>
</tr>
</tbody>
</table>

7. LUBRICANT LIST:

<table>
<thead>
<tr>
<th>Reference Symbol</th>
<th>Standard Oil of California</th>
<th>Union</th>
<th>Texaco</th>
<th>Shell</th>
</tr>
</thead>
<tbody>
<tr>
<td>List symbols used in Item 6 above</td>
<td>List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.</td>
<td>________________</td>
<td>________________</td>
<td>________________</td>
</tr>
<tr>
<td>________________</td>
<td>________________</td>
<td>________________</td>
<td>________________</td>
<td>________________</td>
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<td>________________</td>
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<tr>
<td>________________</td>
<td>________________</td>
<td>________________</td>
<td>________________</td>
<td>________________</td>
</tr>
</tbody>
</table>

8. SPARE PARTS: Include your recommendations regarding what spare parts, if any, should be kept on the job.

END OF SECTION 01 78 00
SECTION 40 70 11 – INSTRUMENTATION FOR PROCESS SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work of this section includes furnishing, installing, testing, startup, training, and warranty support for all process instrumentation, including flow meters, pressure sensors and transmitters, gauges, and all required appurtenances, complete and operable, as specified and shown on the plans.

B. Electrical wiring and equipment with electrical connections and control and safety devices shall be Recognized Electrical Testing Laboratory (RETL) listed and labeled, or the Contractor shall obtain approval from the Washington State Department of Labor and Industries.

C. All process instrumentation and appurtenances for this project shall be the products of a single manufacturer, unless otherwise noted.

1.02 RELATED SECTIONS

A. Section 01 33 00 – Submittals Procedure

B. Section 01 78 00 – Operation and Maintenance Manuals

C. Division 46 – Water and Wastewater Equipment

1.03 SUBMITTALS

A. Refer to Section 01 33 00 – Submittals Procedure, for general submittal requirements.

B. Submit manufacturer’s complete descriptive product data and specification sheets for all process instrumentation and appurtenances. Clearly identify all accessories and options being provided, as specified and shown on the Plans.

C. Submit a copy of the manufacturer’s written warranty, as specified.

D. Submit operation and maintenance manuals in accordance with Section 01 78 00 – Operation and Maintenance Manuals.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver process instrumentation to the job site at appropriate time for installation. All equipment and materials shall be crated and/or packaged with protective wrappings to prevent damage during delivery, storage and handling.

B. Store all equipment and materials above ground and in weather tight enclosures. Keep all equipment and materials dry and protect from excessive heat or cold.

1.05 STARTUP SERVICE

A. The manufacturer or manufacturer’s qualified representative shall provide a minimum of two (2) days of startup service to inspect the installation of all components, confirm proper setup, configuration, and operation of all process instrumentation, and instruct the Owner and Engineer in operation and maintenance of all equipment. Refer to Part 3 of this section for additional requirements.
1.06 TOOLS AND SPARE PARTS
A. Provide any other special tools or spare parts as recommended by the manufacturer.
B. Spare parts shall be properly packaged and labeled for easy identification without opening and protection for long term storage.

1.07 WARRANTY
A. All process instrumentation supplied under this section shall be warranted to be free from defects in workmanship, materials and design for a period of two (2) years from the date of substantial completion.
B. All process gauges shall have a ten (10) year system warranty from the date of substantial completion.

PART 2 – PRODUCTS

2.01 GENERAL
A. All process instrumentation shall be adequately supported and securely mounted in locations shown on the plans and as specified herein. Devices specified to have remote-mounted transmitters/signal converters shall be provided with additional support brackets and/or hardware necessary to securely mount them in locations shown on the plans. Coordinate installation with other equipment, piping, and electrical system installations.
B. All process instrumentation shall be suitable for indoor and outdoor use, and capable of functioning in ambient temperatures ranging from -20 °F to 140 °F, and a relative humidity up to 100%. Devices located in process tanks, flumes, trenches, vaults, or any other locations susceptible to flooding or immersion, shall be watertight and adequately protected for use in such environments. Devices located in hazardous areas shall meet the area classification identified.

2.02 MANUFACTURERS
A. Subject to compliance with these specifications, all flow meter and pressure transmitter process instrumentation shall be as manufactured by Endress+Hauser, Inc., 2350 Endress Place, Greenwood, IN 46143; Phone: (888) 363-7377; www.us.endress.com, or Engineer approved equal.
B. Subject to compliance with these specifications, all pressure gauges shall be as manufactured by REOTEMP Instruments Corp., 10656 Roselle Street, San Diego, CA 92121; Phone: (858) 784-0710; www.reotemp.com, or Engineer approved equal.

2.03 ELECTROMAGNETIC FLOW METERS
A. General
1. Electromagnetic type flow meters shall be provided and installed in piping where indicated in the specifications. Flow meter design, including the flow sensor, transmitter/signal converter, display, and appurtenances, is based upon Endress+Hauser Promag W series flow sensor with a Promag 400 series transmitter.
2. Flow meters shall be of the pulse DC type, volumetric liquid flow rate detector. Magnetic flow meters shall be of low frequency electromagnetic induction type and shall produce a DC pulse signal directly proportional and linear to the liquid flow rate.

3. Meter accuracy shall be 0.5 percent of the flow rate between 10 percent and 100 percent of the range setting. Below 10 percent of the range setting, accuracy shall be diminished no more than a flow rate equal to 0.1 percent of the range setting.

4. Meters shall be sized to maintain the specified accuracy for the anticipated full range of flow with velocities between 3 and 10 ft/s, or as recommended by the manufacturer.

B. Power Supply

1. The flow meter sensors and transmitters shall be designed for operation on a 24VDC power supply, or as recommended by the MBR system equipment manufacturer. The flow meter transmitter shall be a microprocessor-based signal converter, and shall include a magnetic driver to power the magnetic coils of the flow sensor in addition to the transmitter. Sufficient interconnecting manufacturer's cable shall be supplied for remote mounted transmitter installations.

C. Flow Sensor

1. The meter body and flanges shall be constructed of carbon steel and have a two-component epoxy, polyurethane, or baked-on enamel coating. Flanges shall be standard ANSI class 150 lb. drilled. Meters shall be clearly marked with engraved tags connected to the meter indicating meter number and source of water or other medium flowing through meter. Tags shall be attached to the meter by adhesive or screws and shall be visible and readable from a distance of at least 10 feet.

2. Provisions for grounding to the liquid and to a positive ground shall be provided and installed with each meter. The grounding electrode shall be constructed of Type 316 stainless steel, or other material as approved by the Engineer. The grounding electrode shall be built into the meter. A grounding lug shall be provided on the meter/meter head for connection to the control panel grounding system. Grounding connections shall be made in accordance with the manufacturer's instructions. During startup the manufacturer's representative shall confirm adequate grounding.

3. The metering tube/measuring pipe shall be constructed of stainless steel. Meter liners shall be suitable for the medium being metered. For water, sewage, and sludge applications the meter liner shall be hard rubber or other material as approved by the Engineer. For chemical solution applications the meter liner shall be Teflon or other material as approved by the Engineer. Epoxy coating liners will not be accepted. Liner materials for potable water applications shall be NSF-61 approved.

4. The meter terminal box shall be constructed of polycarbonate, fiberglass reinforced polyamide, or other material as approved by the Engineer. Terminal boxes for meters located in process tanks, flumes, trenches, vaults, or any other locations susceptible to flooding or immersion, shall be NEMA 6P rated, supplied with manufacturer's optional potting kit or otherwise sealed and watertight.

D. Transmitter

1. The flow meter transmitter shall produce a 4-20 mA DC signal proportional to flow through the meter for transmitting to a PLC and for other receivers as shown on the Plans. A 30VDC, 250 mA (maximum) signal (pulse) shall be produced for every measured flow of a preconfigured volume. These pulses shall be suitable for use
with the discrete cards used in the PLC and shall be configured so that the minimum pulse width is at least 100 ms.

2. Flow meter transmitters may be integral to the meter tube or remote mounted on a support adjacent to the meter tube at a location and height approved by the Engineer. Transmitters shall be installed so the display can be easily read from the finish floor level. Meters located in process tanks, flumes, trenches, vaults, or any other locations susceptible to flooding or immersion, shall have remote-mounted transmitters. Provide the manufacturer’s optional mounting bracket and terminal box cover for remote-mounted installations. Sufficient interconnecting manufacturer’s cable shall be provided to run from the flow sensor to the transmitter without splicing.

3. Transmitters for both integral and remote mounted installations shall be NEMA 4X/6 rated and constructed of polycarbonate, fiberglass reinforced polyamide, or other material as approved by the Engineer. Transmitters shall be provided with a two-line minimum backlit liquid crystal display (LCD), one line showing gallons per minute (GPM) and the other showing cumulative gallons. The display shall be scaled in GPM for the calibration range of the meter.

2.04 THERMAL MASS FLOW METERS

A. Thermal mass flow meters shall be thermal dispersion direct mass flow measurement type, specifically designed for use in blower air piping with no moving parts, a wide turndown ratio to measure variable flow rates, and ability to correctly measure flow in fluctuating temperatures and a wet vapor environment. Thermal mass air flow meters specified are based upon Endress+Hauser T-Mass 651 series.

B. Meters shall be two-wire, loop powered instruments that utilize precision, lithography structured platinum RTD sensors embedded in equal mass small diameter thermowells. The instrument shall be insertion type with a Type 316L stainless steel body, Hastelloy-C22 thermowell sensors, and a 3/4-inch MNPT Teflon ferrule. The instrument insertion length shall be field adjustable, suitable for the pipe size where used, and installed through a 3/4-inch NPT Type 316 stainless steel ball valve for easy installation and removal. The instrument shall be installed in the side of horizontal piping, or as recommended by the manufacturer, to reduce condensation build-up on the instrument. Flow meters shall be calibrated for the anticipated air composition and shall meet the following minimum performance criteria:

1. Accuracy:  ±2% of reading,
               ±0.5% of full scale

2. Repeatability:  ±0.5% of reading

3. Temperature Compensation Range:  40 °F to 100 °F

4. Turndown Ratio:  100:1

C. Flow transmitters shall have a liquid crystal display (LCD) with 4-20 mA analog output, suitable for operation from a 24VDC power supply. The transmitter housing shall be dual-compartment design, constructed of powder coated die-cast aluminum with 1/2-inch NPT conduit connections. Enclosures shall have a NEMA 4X rating. Transmitters located in hazardous (classified) areas shall have explosion proof enclosures or be certified intrinsically safe, and shall be suitable for installation in the area classification specified.

D. Transmitters shall be mounted at a location directed by the Engineer. Transmitters shall be installed so the display can be easily read from the finish floor level. Remote-mounted transmitters shall be supplied with sufficient length of manufacturer’s interconnecting cable. Provide manufacturer’s optional stainless steel wall mounting bracket and installation hardware for remote mounting transmitter.
2.05 PRESSURE TRANSMITTERS

A. Pressure transmitters shall be provided and installed in piping as specified and shown on the Plans. Transmitters shall be two-wire, capacitance-based analog devices capable of measuring gauge pressure or level. Pressure instrumentation specified are based upon Endress+Hauser Cerabar M PMP51/55 series sensor and transmitter.

B. Transmitters shall have a liquid crystal display (LCD) with 4-20 mA analog output, suitable for operation from a 24VDC power supply. The transmitter housing shall be dual-compartment design, constructed of powder coated die-cast aluminum with 1/2-inch NPT conduit connections. Wetted parts of the transmitter shall be constructed of Type 316 stainless steel. Enclosures shall have a NEMA 4X rating. Transmitters located in hazardous (classified) areas shall have explosion proof enclosures or be certified intrinsically safe and shall be suitable for installation in the area classification specified or identified on the Plans.

C. Pressure transmitters shall meet the following performance criteria:

1. Total Accuracy Performance: ±0.34% of URL
2. Long Term Stability (1-year): ±0.1% of URL
3. Long Term Stability (5-year): ±0.2% of URL
4. Total Error: ±0.35% of URL/year

D. All transmitters shall be installed with and isolation valve at the process connection for ease of maintenance, as shown on the Plans. Size and type of valve shall be as specified and shown on the Plans, minimum 1/2-inch NPT. Transmitters for clean water installations shall be supplied with a factory assembled block and bleed valve. Transmitters for sewage and sludge installations shall be supplied with a threaded diaphragm seal directly connected to the transmitter and constructed of Type 316 stainless steel with a Teflon lined diaphragm and a minimum 1/4-inch NPT diameter flushing connection. A stainless-steel nipple and isolation valve shall be installed on the flushing connection.

E. Pressure transmitters shall be mounted at a location as shown on the Plans or directed by the Engineer. Transmitters shall be installed so the display can be easily read from the finish floor level. Remote diaphragm seals shall be provided where required, or where indicated on the Plans, for process connections that are greater than 5 feet above the finish floor elevation. Remote seals shall be constructed of Type 316 stainless steel, in a size and style as shown on the Plans. Provide sufficient stainless-steel capillary tubing and silicone filling liquid between the remote seal and transmitter. Provide fill and drain ports with valves as required for proper installation and maintenance.

F. Optional mounting brackets and hardware shall be supplied with each transmitter, type to fit the location and mounting requirements as shown on the Plans.

G. Pressure transmitters shall be calibrated for a range suitable for the application specified.

2.06 PRESSURE GAUGES

A. General: Provide a pressure gauge on the suction and discharge side of each pump and at all other locations shown on the Plans. The range of all gauges shall be approximately two times the normal system pressure so that when the system is operating, the pressure gauge will read near center scale or as indicated on the Plans. Gauges on suction side of pumps shall be compound direct reading type. Pressure gauges specified are based upon REOTEMP PT45P series.

B. Gauges shall be process type with 4-1/2-inch dial, stem-mounted black phenolic case, solid front, blowout back, tempered safety glass lens, dry gauge case with built-in pulsation
dampening, suitable for a process temperature range of -40 to 250 degrees F, high-visibility bright yellow dial background with black numerals and gradations, accuracy of +0.5 percent of full scale, maximum pointer, under/overload stop protection, and 1/2-inch NPT process connection. Wetted parts shall be constructed of Type 316L stainless steel.

C. Gauges for sewage, sludge, and scum service shall be provided with a direct-mount 300 series stainless steel clean out type diaphragm seal with a 3/4-inch NPT female process connection and 1/4-inch NPT female flushing connection. A stainless steel ball valve and fittings shall be supplied for flushing the process side of the diaphragm seal. Wetted parts shall be constructed of Type 316L stainless steel. Fill fluid between the gauge and diaphragm seal shall be silicone, or other fluid as recommended by the manufacturer.

D. Gauges for chemical service shall be provided with a direct mount 300 series stainless steel diaphragm seal with a 1/2-inch NPT female process connection. Wetted parts shall be constructed of materials approved by the manufacturer that are suitable for the chemical(s) being measured. Fill fluid between the gauge and diaphragm seal shall be silicone, or other fluid as recommended by the manufacturer.

PART 3 – EXECUTION

3.01 INSTALLATION AND STARTUP

A. Install process instrumentation and appurtenances in accordance with the manufacturer’s instructions. Coordinate installation with installation of equipment, piping, electrical systems, and other related construction.

B. The manufacturer or manufacturer’s representative for each type of process instrumentation specified shall provide a minimum of two (2) days of onsite startup, configuration, testing, and verification of installation for all instruments and appurtenances. All construction, including assembly, installation, electrical and process connections, adjustment and calibration shall be complete and ready for operation, prior to scheduling the services of the manufacturer.

C. For flow meters, the manufacturer’s representative shall certify in writing to the Engineer that proper grounding installation has been achieved.

D. Following successful startup, configuration, and testing, the manufacturer’s representative shall submit a detailed field report confirming proper installation and successful operation of all process instrumentation, and conformance of the process instrumentation with the Plans and Specifications. A copy of the field report shall also be included in the project O&M manuals.

E. The manufacturer or manufacturer’s representative shall provide a minimum of one (1) day of onsite instruction and training to the Owner and Engineer in the operation and maintenance of all process instrumentation and appurtenances.

END OF SECTION 40 70 11
DIVISION 46 – WATER AND WASTEWATER EQUIPMENT
PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section includes furnishing all materials, equipment, and incidentals required for supply of a complete rotating perforated plate screen for removing floating, particulate and fibrous material and for conveying, washing, dewatering and compacting the screenings before discharging the material; as described in the specifications. Also included is all required submittals, O&Ms, installation assistance, and startup services specified.

B. It is the intent of these specifications that all equipment called for under this section shall be supplied by a single manufacturer.

C. The Owner's installation contractor will be responsible for unloading and installing the equipment according to instructions and recommendations of the equipment manufacturer.

1.02 RELATED SECTIONS

A. 01 33 00 - Submittals Procedure
B. 01 78 00 - Operation and Maintenance Manuals
C. 40 70 11 - Instrumentation for Process Systems
D. 46 53 49 - Membrane Biological Reactors

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) Publications:

B. Anti-Friction Bearing Manufacturers Association (AFBMA) Publications:

C. American Institute of Steel Construction (AISC) Publications
D. American Welding Society (AWS) Publications
E. American Structures Painting Council (ASPC) Publications

1.04 SUBMITTALS

A. The following information shall be submitted to the Engineer in accordance with Section 01 33 00 – Submittals Procedure, to establish compliance with this Section:

   1. Product Data:
      a. Descriptive literature, brochures, catalogs, cut sheets and other detailed descriptive material of the equipment.
      b. Motor characteristics and performance information.
      c. Gear reducer data including service factor, efficiency, torque rating, and materials.
d. Parts list including a list of recommended spare parts.

2. Shop Drawings:
   a. Manufacturer’s installation drawings.
   b. Wiring and schematic diagrams.

3. Operations and maintenance manual: Refer to Section 01 78 00 - Operation and Maintenance Manuals. Include a copy of the startup report.

4. Detailed installation instructions, with clear step-by-step points on the correct mechanical and electrical installation procedures.

5. Equipment weights and lifting points.


7. A copy of the manufacturer’s warranty

8. A copy of documents proving certification of the Manufacturer’s Quality Management System according to ISO 9001.

9. Failure to include all drawings applicable to the equipment specified in this section will result in rejection of the entire submittal with no further review.

1.05 QUALITY ASSURANCE

   A. To ensure quality, conformance, and reliability with regard to the manufacturing and production of the equipment, the manufacturer shall meet all requirements listed hereafter:

   B. Manufacturer shall have a minimum of ten (10) years experience producing equipment substantially similar to that required and shall be able to submit documentation of at least fifteen (15) independent installations using the same size or larger equipment as detailed in these specifications. Each installation must have been in satisfactory operation for at least five (5) years.

   C. The Contract Documents represent the minimum acceptable standards for the screening equipment for this project. All equipment shall conform fully in every respect to the requirements of the respective parts and sections of the specifications. All manufacturers shall use materials or provide equipment with finishes as to conform to the quality mandated by the technical and performance requirements of this specification.

   D. All stainless steel components and structures shall be submerged in a chemical bath of nitric acid and hydrofluoric acid (pickling bath) to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel.

   E. Fabrication shall be done in compliance with all applicable ASTM standards or equivalent international standards.

   F. Manufacturer shall have established an ISO 9001 certified quality management system. Equipment suppliers not utilizing ISO 9001 facilities shall not be considered or approved for this project. Equipment supplier shall provide evidence of certification before being named as an acceptable manufacturer.
G. All welding is performed in accordance with American Welding Society (AWS) D1.1 Structural Welding Code, or equivalent.

H. Manufacturer shall provide screen, wash press, motors, gear reducers, controls, separate/remote-mount control panel, and lifting attachments as a complete integrated package to ensure proper coordination, compatibility, and operation of the system. The manufacturer shall test-run the fully assembled machine in the factory before shipment.

I. Manufacturer shall provide services by a factory-trained Service Engineer, specifically trained on the type of equipment specified. The Service Engineer requirements include, but are not limited to the following:

1. The Service Engineer shall be present during initial energizing of equipment to determine directional testing as described in Section 3 (Installation).

2. The Service Engineer shall inspect and verify location of anchor bolts, placement, leveling, alignment and field erection of equipment, as well as control panel operation and electrical connections.

3. The Service Engineer shall provide classroom and/or field training on the operation and maintenance of the equipment to operator personnel. These instructions may include the use of slides, videos, literature, and/or oral presentations.

4. Manufacturer shall state field service rates for a Service Engineer to Owner and Contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, and the requirement for additional time is beyond the manufacturer’s responsibility, additional time shall be purchased by Contractor to correct deficiencies in installation, equipment, or material without additional cost to Owner.

1.06 SPARE PARTS

A. Provide all spare parts as recommended by the Manufacturer. At a minimum, the following Spare Parts shall be included and supplied together with the equipment:

1. One (1) Complete bottom bearing assembly
2. One (1) set of basket cleaning brushes
3. One (1) Solenoid valve rebuild kit
4. One (1) Drum face seal
5. Six (6) spray nozzles

B. Spare parts shall be properly packaged and labeled for easy identification without opening and protection for long term storage.

1.07 WARRANTY

A. All equipment shall be covered against manufacturing defects in materials and workmanship during normal use and service for a period of one (1) year from the date of startup.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Design is based on the Tank Mounted Rotamat Perforated Plate Screen RPPS 780-2 as manufactured by Huber Technology, Inc.

B. Subject to compliance with the specifications, equivalent products from the following manufacturers may be used on this project.

1. Flo-Drum Rotating Drum Screen from Enviro-Care Company, Rockford, IL.

C. All piping, structural, and electrical adjustments necessary for use of alternate screens shall be the responsibility of the manufacturer and coordinated by the Contractor, at the Contractor's cost.

2.02 PERFORMANCE REQUIREMENTS

A. Screen Design Summary

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Number of screens</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Nominal screen basket diameter, inches</td>
<td>31</td>
</tr>
<tr>
<td>3.</td>
<td>Average flow per screen, MGD</td>
<td>0.25 (Average Annual Flow)</td>
</tr>
<tr>
<td>4.</td>
<td>Max. Wastewater flow per screen, MGD</td>
<td>1.0</td>
</tr>
<tr>
<td>5.</td>
<td>Max. Clean water flow per screen, MGD</td>
<td>1.28</td>
</tr>
<tr>
<td>6.</td>
<td>Max. Wet screenings capacity, cfph</td>
<td>75</td>
</tr>
<tr>
<td>7.</td>
<td>Discharge height from top of channel, inches</td>
<td>54</td>
</tr>
<tr>
<td>8.</td>
<td>Screen opening size</td>
<td>2 mm (circular)</td>
</tr>
<tr>
<td>9.</td>
<td>Maximum headloss at 30% blinding, inches</td>
<td>12</td>
</tr>
<tr>
<td>10.</td>
<td>Location rating</td>
<td>Class 1, Division 1</td>
</tr>
</tbody>
</table>

B. The nominal screen opening specified above shall be the size of the circular openings. Screen designs which define the bar spacing as the distance between a fixed bar element and moving adjacent bar element are not acceptable. Screens using rotating rakes, screw flight mounted brushes, or traveling filter media are also not acceptable.

C. The average perforation flow through velocity shall not exceed 3.3 ft/sec (1.0 m/sec) under any flow condition up to the maximum clean water flow specified above. The screen design shall minimize solids deposits in the channel.

D. The screen shall be capable of processing spherical objects with a diameter of 3-1/8 inch. Such objects shall be conveyed through the auger and shall be discharged with the screenings. The unit shall be capable of processing the screenings load specified above.

E. The perforated plate screen shall consist of a rotating cylindrical screen with an integral screw conveyor and screenings press. The fine screen shall use a single drive for screening, conveying, dewatering and compressing the screening material. The screen shall have an inclination of 35 degrees.

F. Operation of the rotating screen shall be automatically initiated at a preset high upstream liquid level. Screens which operate continuously or via timer only will not be acceptable. The rotating basket shall remove solids from the flow and deposit them into the concentric screw conveyor hopper using a spray bar and basket cleaning brush providing positive cleaning of the screen basket surface. The screenings shall be transported up the screw conveyor, through an integrated screening washing system, a compaction and dewatering zone and then shall be discharged. Provide heavy duty screenings bags if specified.

G. All open spaces of the screen shall be positively cleaned via a spray bar and cleaning brush system. Screens using a rotating rake or only screw flights with brushes will not be acceptable.
H. The screening equipment shall produce dewatered screenings capable of passing the EPA Paint Filter Test as described in method 9095 of EPA Publication SW-486.

I. To minimize odors and nuisance, the conveyance, dewatering and compaction zones shall be completely enclosed.

J. The spray wash system shall be enclosed such that spray water, aerosols or leakage do not contaminate the operating floor or splash outside the channel, as applicable.

K. The control system shall be designed such that the cleaning characteristics of the screen and wash system can be changed via the programmable controller. Systems which do not offer this feature will not be acceptable for this project.

2.03 GENERAL

A. Unless otherwise specified, the entire equipment shall be manufactured from AISI Type 304L or Type 316L austenitic stainless steel shapes (rods, angles, and channels), pipes, and sheets. All mechanical parts shall be designed to handle the forces that may be exerted on the unit during fabrication, shipping, erection, and proper operation according to the O&M manual.

B. The equipment, after its fabrication, shall undergo a passivation (pickling) process to ensure maximum resistance to corrosion. All stainless steel components and structures shall be submerged in a chemical bath of nitric acid and hydrofluoric acid to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel. Submergence insures complete coverage. Spray on chemical treatments and glass bead blasting are specifically not acceptable due to their inability to provide complete and uniform corrosion protection.

C. Control Panels shall be manufactured in accordance with ISO 9000-2001 specifications and shall be so constructed for the application of a UL Listing Label by an approved UL Control Panel Assembly Facility with all the required labels properly attached.

D. Electrical wiring and equipment with electrical connections, including the motors, and control and safety devices, shall be Recognized Electrical Testing Laboratory (RETL) listed and labeled, or the Contractor shall obtain approval from the Washington State Department of Labor and Industries for the electrical portions of the equipment.

2.04 TANK ASSEMBLY

A. The tank shall be constructed from Type 304 stainless-steel. The tank shall be designed to withstand the hydrostatic load from the process flow through the unit and provide support of the screenings basket area. The tank shall be supplied with footings for anchoring the unit, and lifting lugs for installation. The tank shall be supplied with flanged 10” inlet, outlet and overflow by pass connections and lifting lugs.

B. The top of the tank shall be enclosed by Type 304 stainless-steel cover, including a hinged access door.

C. A separate support stand shall be constructed from Type 304 stainless-steel and provide support of the conveyor tube extension.

D. Screen cover shall have a safety limit switch installed to prevent the screen from operating with the tank cover in the open position. Screen cover shall be supplied with connections for mounting the ultrasonic level sensor and vent connection.
2.05 SCREEN

A. The perforated plate screen shall be designed and built to withstand static and hydraulic forces exerted by the liquid to the screen. All structural and functional parts shall be sized for the loads encountered during the screening, conveying and pressing operations. All submerged components and all components of the rotary screen in contact with the screened solids shall be of stainless steel construction.

B. The screen basket shall be of a cylindrical shape. The perforated plate shall be around the entire basket circumference. The perforated plate spacing shall be as specified in 2.02.A. Bars or wedge wire will not be acceptable screen media.

C. The basket diameter shall have a width as noted in 2.02.A.

D. The upper end of the basket shall incorporate a support ring which shall be machined and supported by three (3) guide rollers made of polyamide. The guide rollers shall be attached to an upper support plate. This plate shall match a flange that is attached to the auger tube to ensure proper alignment of the basket. A brush shall be clamped to the upper support plate sealing the gap between the rotating screen basket and the fixed upper support plate.

E. The lower support ring of the basket shall be connected to the shaft of the auger and be driven by a common drive with the auger. The basket shall be connected with a solid support arm at the lower end of the basket which is bolted to the auger shaft.

F. A seal plate shall be provided between the circular screen and the channel. The seal plate shall be one-piece fabricated of stainless steel plate. The sealing plate shall be of sufficient height to prevent bypassing of flow around the screen at the maximum screen hydraulic capacity. A polyurethane seal shall be provided to ensure proper sealing of the rotating screen basket against the fixed sealing plate. This polyurethane seal ensures that there will be no bypass of unwanted solids through the screen. Screens using only a brush for sealing the gap between the fixed seal plate and the rotating screen basket shall not be allowed.

G. The screen shall be provided with a support stand constructed of stainless steel.

2.06 CLEANING BRUSHES

A. The screen basket shall rotate in one direction and pass through the topmost position where it is cleaned with a stainless steel high pressure spray bar and a stainless steel backed nylon brush with bristles that penetrate the depth of the perforated plate screen to ensure positive screenings removal. Brush bristles shall be high-strength nylon for superior life.

B. The brush shall be designed to ensure cleaning of the spaces to the full depth of the perforated plate. The cleaning brush shall be mounted upon a stainless steel holding device which keeps the brush in constant contact with the basket and shall be adjustable to allow for brush wear.

C. Another stainless steel backed nylon brush shall be attached to the rotating basket and positioned to make contact with the screening trough to sweep material caught on the edges of the trough.

2.07 SCREENINGS CONVEYOR AND SCREENINGS WASH-PRESS

A. The auger tube shall incorporate two (2) anti-rotation bars which shall be attached to the inside of the transport tube along the longitudinal axis. The screw shall not be in contact with the anti-rotation bars during normal operations, the screw shaft shall be supported by a Teflon® lined bronze slide bearing at the bottom and the gear box at the top.

B. A screen basket support flange shall be welded to the screenings transport tube. The screen basket rollers and the screenings collection hopper shall be attached to this plate.
C. A shafted auger screw that is entirely made of stainless steel shall be provided to transport and dewater the screened material. A shaft-less screw shall not be acceptable. Screw flights shall be of decreasing pitch approaching the compaction zone to provide a mechanical compressing action on the screenings material. The shaft shall have a diameter of 3.5 inches and shall have flights with a minimum thickness of 0.2 inches in the transport zone and 0.4 inches in the compaction zone. A replaceable flight section with an angle of about 120 degrees that is bolted to the shaft shall be provided at the bottom of the shaft where the wear is highest.

D. A compaction zone shall be an integral part of the screenings screw conveyor and transport tube design. The compaction zone shall be designed to form a screenings plug of material and to return water released from the screened material back to the wastewater channel ahead of the screen through circular holes that are machined into the screenings transport tube.

E. The auger shaft shall be fitted with an upper and a lower solid stub. Stubs and screw shaft shall be accurately machined and shrink-fitted.

F. The lower end of the screenings conveyor shall be supported by a sealed, self-lubricated, Teflon® lined bronze slide bearing or a self-lubricated bronze lower bushing with a hardened chrome sleeve. This bearing shall not take any thrust load from the screw conveyor. Ball or roller bearings shall be permanently lubricated and sealed bearings. Bearings requiring lubrication, shall not be acceptable.

G. The lower bearing shaft and arm shall be designed to minimize material wrapping around the shaft. A seal plate shall be furnished to mate between the stationary lower bearing support and the rotating arm to prevent material intrusion into the bearing seals.

H. The compaction zone shall be provided with split glass fiber reinforced or stainless steel housing, furnished with gaskets and bolts, and easily removable for access. Designs requiring removal of the drive assembly, discharge head, or screw conveyor to gain access to the compaction zone will not be acceptable. The housing shall be provided with a drain connection at its lowest point and a clamped flexible PVC hose for drain water whose other is connected to a connection through the screen basket's upper support flange to return the drain water into the screen basket. The plastic housing shall also be provided with a 1 inch flush connection.

2.08 DRIVE

A. The basket mechanism and transport screw shall be driven by a shaft mounted geared motor. The geared motor shall have a minimum service factor of 1.15. The motor shall be provided with thermostats to provide thermal overload protection in addition to current overload protection.

B. The gear reducer shall be bolted to a machined flange welded to the upper end of the transport tube.

C. The gear reducer shall be driven by a 3 phase, 60 Hertz, 230/460 volt, Class 1, Division 1 Group D Inverter-duty, totally-enclosed, fan-cooled motor which leads to a conduit box for outdoor operation. See paragraph 2.10 for additional power requirements. The motor horsepower and rating shall be determined by the screen's basket diameter and manufacturer recommendations.

2.09 SPRAY WASH SYSTEMS

A. The screen shall be designed for a water supply of 20 to 36 gpm @ 60 psi and shall be provided with wash water distribution manifold with a single point of connection to the treatment plant water supply system.
B. An automatic spray wash system shall be provided for cleaning of the screen basket and shall be constructed of minimum 1 inch diameter piping and minimum 1 inch diameter flexible reinforced PVC hose. The spray wash systems shall be operated only while the screen basket is rotating. The spray wash system shall include a single 1 inch solenoid valve for flow control.

C. The screen shall incorporate a screenings washing system consisting of two washing points, one being in the rising tube of the screen and the second being in the screenings collection hopper. The screenings wash zone in the conveyor tube shall be provided with three nozzles located equidistant around the circumference to maximize the washing performance. A lower wash system shall be located above the open top of the hopper and shall utilize a spray bar with a minimum of 6 spray nozzles. The screenings washing system shall include a single 1 inch solenoid valve for flow control.

D. The screen compaction zone shall be provided with a wash nozzle designed to flush the entire interior surface of compaction zone housing to ensure no debris buildup can occur. The compaction zone flushing system shall include a single 1 inch solenoid valve for flow control.

E. The solenoid valves shall be operated by the programmable logic controller. Individual manual operation of each solenoid shall also be possible from the control panel.

F. The solenoid valves shall be minimum 1 inch diameter, brass body, 2-way, and designed for 110 VAC with an explosion-proof rating. Solenoid valves shall be normally closed and rated for up to 100 psig.

G. A brass body Y-strainer shall be provided for the incoming plant water supply.

2.10 ANCHOR BOLTS

A. Equipment manufacturer shall furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment. Anchor bolts, hex nuts, and washers shall be stainless steel. Anchor bolts shall be wedge or epoxy type. The location, diameter, and minimum embedment of the anchor bolts shall be designed by the equipment manufacturer.

B. Anchor bolts shall be set by the contractor. Equipment shall be placed on the foundations, leveled, shimmed, bolted down, and grouted with a non-shrinking grout.

2.11 CONTROL SYSTEM

A. All controls necessary for the fully automatic operation of the screen shall be provided, including a NEMA 12 main control panel, and a NEMA 7 local operator control station for each screen.

B. Control panel shall be suitable for operation from 480V, 3-phase service.

C. The electrical control system shall provide for automatic control of the screen via a high liquid level using a Siemens/Milltronics Pointek or equal ultrasonic level sensor in combination with an adjustable timer. The ultrasonic level sensor shall be an explosion proof NEMA 6 enclosure suitable for installation and operation in a Class 1, Division 1 hazardous environment and wet, channel mounted location. Mount the ultrasonic level sensor above the center of the channel using the manufacturer’s stainless steel bracket. Provide necessary sidewall clearance for accurate measurement.

D. A high level conductivity probe shall be installed in the screen tank and used to initiate a high level alarm in the main control panel.
E. Main control panel shall be suitable for remote, wall-mounting in classified space. Enclosure shall be NEMA 12 Stainless Steel with continuous hinge and lockable door latch, and shall include the following:

1. Main power/system on-off-remote selector switch
2. Door-interlocked and fused disconnect
3. 600 VAC terminal block
4. VFD and Circuit Breaker Branch Circuit Protection for screen motor
5. Control power transformer with 120 VAC transient voltage surge compressor (TVSC) and fused primary and secondary
6. Programmable logic controller (PLC), Allen Bradley Micrologix 1400
7. Operator Interface (OIU), Allen Bradley PanelView C400
8. Pilot lights for
   a. Control power on (white)
   b. Screen running (green)
   c. Screen high level (amber)
   d. Screen fault (red)
9. E-stop push button (red)
10. Screen reset push button (black)
11. Door mounted elapsed time meters for the following:
    a. Screen drive
12. Digital inputs for the following:
    a. Machine start water level
    b. Maximum water level
    c. One spare input
13. Remote dry contact outputs for the following:
    a. Screen running
    b. Screen fault
    c. Screen E-stop
    d. Screen high level
    e. One spare output
    f. Screen feed pump stop on high level
14. Flashing alarm light and alarm horn with silencer-reset button
15. Barrier relays for untrasonic level transmitter, float switch, and door safety switch

16. Plastic nameplates

17. UL label

F. A local operator station shall be provided for each screen, and shall be suitable for wall-mounting. Enclosure shall be NEMA 7 cast Aluminum, and shall include the following:

1. Hand-Off-Auto selector switches for the following:
   a. Screen drive

2. Screen forward-off-reverse
   a. Screen drive

3. Spray wash pushbuttons (push-to-test)
   a. Spray bar
   b. Screenings Washington system
   c. Compaction zone flushing

4. E-stop pushbutton (red)

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING OF EQUIPMENT

A. All equipment shall be shipped and delivered fully assembled, except where partial disassembly is required in order to conform to transportation regulations or for the protection of components.

B. The Contractor shall be responsible for unloading of the machinery and shall have equipment on-site available at the time of delivery permitting proper hoisting of the equipment.

3.02 INSTALLATION, STARTUP AND OPERATOR TRAINING

A. Manufacturer shall furnish the services of a factory-trained Service Engineer for a total of two (2) days in two (2) trips to inspect the installation, carry-out the equipment startup procedures, and provide training to the operators in how to effectively operate and maintain the equipment. The Manufacturer shall provide a startup report with the Operation and Maintenance manual.

1. The first trip shall be to inspect the installation and perform startup services. The second trip shall be allocated solely to instruction of plat personnel in operation and maintenance of the equipment. The instruction period shall be scheduled at least 10 days in advance with the Owner and shall take place prior to acceptance by Owner.

B. The Contractor shall be responsible for coordination and scheduling of startup and training with the Manufacturer, Owner, and Engineer.

C. The Service Engineer shall make all necessary adjustments and settings to the controls. In particular, the Service Engineer shall verify the measurement relay setting and the initial water level setting for the screen.
D. The Service Engineer shall demonstrate proper operation of screen and screenings washer. The screen shall operate automatically based on the water level.

END OF SECTION 46 21 35
SECTION 46 53 49 – MEMBRANE BIOLOGICAL REACTORS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the requirements for the furnishing, installing, testing, startup, training, and warranty support of all process equipment required for a skid mounted submerged membrane microfiltration biological reactor (MBR) system for the treatment of municipal wastewater.

B. These Specifications were primarily written around the MBR System manufactured by Kubota Membrane USA Corporation who uses a polyethylene sheet type membrane material. OVIVO who manufacturers MBR Systems using silicon carbide ceramic membrane sheets is considered an approved alternate membrane system. All other membrane skid components shall conform to the requirement of this specification.

C. The Supplier shall furnish and commission the skid mounted MBR system as described in this specification, inclusive of all equipment, instrumentation, scope-specific piping systems, controls, integration, and warranty support.

D. The MBR Supplier shall design and build a complete MBR skid with process tanks, SMUs, fine bubble diffusers, mixers, pumps, blowers, instruments and control panel(s).

E. The MBR Supplier shall provide the MBR Product Engineering and Design Services in support of the treatment system design as described in this specification. The MBR Supplier shall review the complete MBR system requirements as necessary to achieve the performance requirements specified herein with their specific equipment.

F. The following work and scope of supply is specifically excluded from the supplier’s scope:

1. Structural:
   a. Building(s) for housing MBR system skid.
   b. Concrete foundations for skid mounted MBR system.

2. Mechanical:
   a. Piping, valves, operators, pipe supports and hangers outside the MBR Skid, unless otherwise noted.

3. Electrical:
   a. Electrical wiring interconnections (including wiring, conduit and other appurtenances required) to connect the electrical power source and external control wiring to the MBR system control panel.
   b. Electrical wiring and equipment with electrical connections. Including the motors, and control and safety devices, shall be Recognized Electrical Testing Laboratory (RETL) listed and labeled, or the Contractor shall obtain approval from the Washington State Department of Labor and Industries for the electrical portions of the equipment.
   c. Control Panel enclosure shall be properly grounded in accordance with NEC and local code requirements.
4. Other:
   a. Receiving, unloading and safe storage of equipment at site or a storage facility until ready for installation.
   b. Equipment installation. All labor, rigging, materials, and incidentals required for installation of the MBR skid in accordance with the installation instructions provided by the MBR Supplier.
   c. Raw materials, chemicals and utilities during equipment testing. This includes potable water for system function testing and seed sludge per supplier requirements.
   d. Laboratory services, operating and maintenance personnel during equipment checkout, startup and operations.
   e. Onsite painting or touch-up painting of MBR, with the exception of painting required due to damage incurred prior to equipment being received onsite.
   f. Chemicals for chemical cleaning.
   g. HVAC system.
   h. Equalization tanks/basins.
   i. Reject ponds.
   j. Pump stations.
   k. Sludge holding tanks/basins.
   l. Sludge digesting system.
   m. Disinfecting system.
   n. Chemical storage house/room.
   o. Overhead crane system.

G. Once installed, the MBR skid shall be complete and operational with all control equipment and accessories as specified herein and described in the Contract Documents.

1.02 RELATED SECTIONS
A. Section 01 33 00 – Submittals Procedure
B. Section 01 78 00 – Operation and Maintenance Manuals
C. Section 40 70 11 - Instrumentation for Process Systems
D. Section 46 21 35 – Fine Screen with Integral Washer Compactor

1.03 DEFINITIONS
A. Backwash: Synonymous with backpulse and backflushing. Backwashing is any instance where water and or a chemical solution are charged to membranes in the reverse direction of permeate flow with a membrane soak time less than 0.5hr. A Backwash is performed in-situ and in mixed liquor or activated sludge.
B. Clean-In-Place (CIP): The process of cleaning the MBR system without removing it from service.

C. Contractor: The Company responsible for construction of the build which will house the MBR skid, and installation of the MBR skid system, including, but not limited to, site preparation, and mechanical and electrical installation.

D. Days: Defined as calendar days.

E. Engineer: The prime professional with respect to the project and the Owner’s representative who administers the construction contract.

F. Hydraulic Retention Time (HRT): The hydraulic retention time, or hydraulic residence time, is the average length of time that soluble compounds remain in a reactor, or the quotient of the reactor volume to the influent flow rate.

G. Flux: Gallons of permeate flow per day per square foot of membrane area (gfd). Additional definitions of flux that are used to characterize design criteria and membrane performance include:

1. Instantaneous Flux: Calculated by dividing measured permeate flow rate by working membrane area at any instant.

2. Gross Flux: See instantaneous flux.

3. Net Flux: Calculated by dividing the total amount of permeate produced (available for discharge) in a given time frame by the working membrane area.

H. In-Situ: Inside the normal service area and submerged in mixed liquor.

I. Localized Dewatering: Synonymous with clogging, sludging and plugging. Localized dewatering is the excessive accumulation of solids at a membrane surface in the form of refractory cake and generally in discrete, localized areas. Often caused by excessive filtration in combination with unequal or inadequate air scouring.

J. Maintenance Clean: Synonymous with chemically enhanced backwash and CIP. A Maintenance Cleaning is performed in-situ and in mixed liquor or activated sludge. The procedure is conducted by charging cleaning chemicals to membranes in the reverse direction of permeate flow with a soak time lasting more than 0.5hr.

K. Membrane Biological Reactor (MBR): A tank or basin containing one or more large membrane sub-units that are operated as one unit.

L. Membrane Bank: A grouping of large membrane subunits which share a common permeate header, a common air supply header, and that are taken off-line as an entity for any type of CIP procedure.

M. Membrane Cartridge or Element: The smallest assembled unit of a delivered system that is designed to be removed from a SMU and replaced as a complete unit. Depending on the technology, this may be a single assemblage of fibers in a common potting or flat sheets attached to a support structure and may be referred to as a “module”, “cassette”, or other terms.

N. Membrane Tank: A tank or basin containing one or more large membrane sub-units that are operated as one unit.

O. Membrane Zone: Any membrane tank or MBR containing membranes.
P. MBR skid: A structure with process tanks and platforms to hold mixed liquor and process equipment and instruments respectively. One or two trucks can carry the entire system. MBR skid also includes control panel(s) and wires to process equipment and instruments to run the system automatically.

Q. MBR System: A collective term for all process and membrane zones that make a complete biological treatment system.

R. MBR System Supplier/Supplier: The company responsible for manufacturing the MBR skid, membranes to be used for the project, providing all equipment and services as described herein and for providing warranty support.

S. MLSS: Mixed liquor suspended solids reported as mg/l.

T. Mechanical Cleaning: Synonymous with manual cleaning, physical cleaning and hand cleaning. Mechanical cleaning is any instance where membranes are cleaned by hand or machine (water jetting or other) for the purposes of removing fouling or localized dewatering.

U. Process Train: A stand-alone combination of process zones designed and operated to achieve specific treatment objectives.

V. Process Zone: An area in a process train designed and operated to meet a specific biological treatment objective.

W. Permeability: Equals the instantaneous flux rate divided by the transmembrane pressure (TMP). The units of permeability are gfd/psi.

X. Plant Hydraulic Loading Criteria: The net permeate flow rate over a given period of continuous operation accounting for CIP procedures and relaxation. Production capacity requirements are given in terms of:

1. Average Annual Flow (AAF): The net daily flow requirement averaged over one year (365 days).
2. Maximum Monthly Flow (MMF): The net maximum daily flow requirement averaged over one month (30 days).
3. Peak Week Flow (PWF): The net maximum daily flow averaged over a seven-day period.
4. Peak Daily Flow (PDF): The net daily flow required during peak day flow conditions.
5. Peak Hourly Flow (PHF): The net daily flow required during peak hour flow conditions.
6. Peak Instantaneous Flow: The highest allowable flow rate under any conditions.

Y. Recovery Cleaning: Synonymous with intensive cleaning and CIP. A recovery cleaning is performed in-situ or ex-situ and in water or dilute chemical. The procedure is conducted by charging cleaning chemicals to membranes in either direction with variable soak times.

Z. Relaxation: A temporary suspension of membrane filtration with continued air scouring for the purpose maintaining treatment capacity or reducing CIP requirements.

AA. Submerged Membrane Unit (SMU): An assembly consisting of one or more SMU subunits ("racks", "cassettes", etc.) and an integral diffuser assembly.
BB. Transmembrane Pressure (TMP): The effective pressure differential across the membrane during normal operation.

1.04 SUBMITTALS

A. Refer to Section 01 33 00 – Submittals Procedure, for general submittal requirements.

B. Project Submittal: The Supplier shall submit to the Engineer the manufacturer’s complete descriptive information for all equipment, instrumentation, and components in the Supplier’s scope of supply for the Engineer’s approval prior to purchase of equipment. The Supplier is to provide electronic bookmarked PDF submittal documents as specified in Section 01 33 00 – Submittals Procedure, containing all submittal information organized and by component, clearly marking options, models, materials, etc. The project submittals shall contain the following minimum information:

1. Membrane installation drawings, detailing membrane unit dimensions, materials, weights, locations of lifting lugs/points, and anchor bolt locations.

2. MBR system skid mechanical layout drawings, detailing the number of membrane units, air and permeate piping distribution, piping supports, instrumentation and valves, and all other components comprising the MBR system. Drawings will detail information in plan and elevation/section views and include details as necessary to completely describe the installation requirements.

3. Manufacturer’s literature for all equipment in the Supplier’s scope of supply. Literature will include (as applicable):
   a. Pump curves.
   b. Blower curves.
   c. Materials of construction.
   d. Shop drawings showing all dimensions, sizes and location of anchors, influent piping connection, effluent piping connection, and WAS piping connection.
   e. Minimum, maximum, and design duty points (flow rates and pressures/TDH).
   f. Unit performance and efficiency data.
   g. Motor horsepower and voltage.
   h. Complete wiring, P&ID, and control diagrams which show the point of connection for the power supply and control system.
   i. All project specific installation data for the Contractor’s scope of work.

4. Where manufacturer’s standard literature is submitted, it shall be clearly marked to indicate which features are to be furnished under this contract.

5. Process and instrumentation diagrams (P&IDs) showing all equipment and instrumentation which will be controlled by the MBR control system, including components provided by the Contractor. P&IDs shall differentiate which components are supplied by Supplier and which by the Contractor. Unless otherwise directed by the Engineer, the Supplier is responsible for establishing the tagging scheme for the P&IDs. The tagging scheme shall assign a unique tag to all components and their associated I/O. The tagging scheme shall organize components by subsystem and train.
6. Equipment and instrumentation lists, and manufacturer literature and cut sheets, clearly identifying manufacturer, models, ranges, materials of construction, installation details, power supply voltage, wiring information.

7. Valve list and manufacturer literature and cut sheets, clearly identifying manufacturer, models, Cv range, materials of construction, pressure rating, and dimensions.

8. Valve actuator manufacturer literature and cut sheets, clearly identifying models, motor horsepower and voltage, control wiring, installation/connection details, torque rating, actuation times, duty cycle, and materials of construction.

9. Control panel drawings, detailing the interior and exterior layouts, components, panel dimensions, and panel materials of construction and NEMA rating.

10. Control panel component manufacturer literature, clearly denoting model numbers of all PLC components, relays, terminal blocks, power supplies, buttons, switches, fuse blocks, etc.

11. Control panel wiring schematics.

12. Warranty information, detailing membrane design fluxes for all seasonal flow conditions.

13. System startup and test procedures.

C. Operation and Maintenance (O&M) Manuals: Complete O&M instructions shall be submitted in accordance with Section 01 78 00 – Operation and Maintenance Manuals, for all equipment included under these specifications. The O&M instructions shall include trouble shooting data and full preventative maintenance schedules and complete spare parts lists with ordering information. Manuals shall be prepared with descriptions, etc., that are required to instruct O&M personnel unfamiliar with such equipment.

O&M manuals shall also include Supplier and manufacturer manuals and drawings detailing dimensions, locations, wiring information, and any other information necessary to convey the correct assembly and installation of the MBR system components provided by the Supplier and Contractor, and shall include requirements for the mechanical inspection and a schedule of events for the system commissioning. O&M manuals shall be furnished at least two (2) weeks prior to delivery of the Supplier’s equipment to the project site. The quantity of O&M manuals shall be as specified in Section 01 78 00 – Operation and Maintenance Manuals.

D. Plant Operations Manual (POM): The Supplier shall furnish a POM within four (4) weeks after completion of the system commissioning. The quantity and organization of POMs shall be in accordance with Section 01 78 00 – Operation and Maintenance Manuals. The POMs shall contain the following minimum information:

1. HMI (operator interface) user’s manual detailing screens and functions within the operator interface program.

2. Process variables and final control narrative.

3. As-built P&IDs.

4. As-built electrical schematics and control panel drawings.

5. Safety guidelines.
1.05 QUALITY ASSURANCE

A. All the equipment and services specified under this Section shall be furnished by a single supplier, and shall be standard units of proven ability as manufactured by a competent organization that is fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed.

B. All MBR equipment furnished under this Section shall be new and unused and shall be the standard products of a manufacturer having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of ten (10) years.

C. To show evidence of being able to provide the quality of equipment and services described in this specification, the MBR Supplier shall submit their quality system ISO certification. Certification shall remain in effect throughout the project startup.

1.06 DELIVERY, STORAGE AND HANDLING

A. All equipment and materials shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

C. The Contractor shall inspect delivered equipment upon arrival on site for completeness of scope delivery and to verify that all components have arrived undamaged. The Contractor is responsible for notifying the Supplier immediately of deficiencies in quantities or conditions.

1.07 TOOLS AND SPARE PARTS

A. Responsibility of the MBR Supplier:

1. Five (5) membrane cartridges of the same model provided for the MBR system.

2. Provide one (1) set of all special tools required for normal operation and maintenance of the MBR units. All such tools shall be furnished in a suitable steel tool chest.

3. Provide one (1) repair kit for sealing off damaged membrane sheets.

4. Provide one (1) set of special tools and spare parts as recommended by the manufacturer for each type and model of blower equipment provided, including seals, bearings, gaskets, belts, etc.

5. Provide one (1) set of spare parts and gaskets recommended by the permeate and WAS pump manufacturers, and submerged mixer manufacturer.

6. Provide one (1) set of special tools and spare parts as recommended by the manufacturer for each type and model of chemical metering pumps and appurtenances provided, including seals, bearings, diaphragms, hoses, etc., as applicable.

B. All spare parts shall be properly packaged for protection during long term storage and shall be labeled for easy identification without opening the packaging.

C. Special tools and spare parts shall be stored at a location designated by the Owner.
1.08 WARRANTY

A. Supplier shall warranty and replace the membranes under warranty for a minimum period of ten (10) years from the date of final project acceptance by the Owner. The warranty shall not be pro-rated for the first five (5) years.

B. The Supplier’s guarantee shall include full replacement of the SMUs upon failure of the MBR system. The Supplier also agrees to pay all costs associated with modification and/or replacement of other MBR system components required to accommodate a replacement system.

C. All warranty support, as defined in the warranty statement, shall be provided by the Supplier directly or through certified sub-contractors.

D. The MBR supplier shall warrant membrane subunits under the following terms:
   1. The Supplier shall replace any membrane subunits that fail before the proposed warranty period, from the date of successful completion of the system commissioning and final system testing.
   2. Failure is defined as any of the following:
      a. Inability to meet production capacity requirements as specified herein.
      b. Inability to meet TSS and turbidity requirements as specified herein.
   3. The following are specifically excluded from warranted membrane failure conditions:
      a. Exceeding TSS or Turbidity limits due to physical damage of the membranes and/or loss of piping integrity.
      b. Loss of capacity due to failure to operate within design fluxes and permeability limits as defined in this Section.
      c. Loss of capacity due to failure to perform required Maintenance cleanings.

E. The MBR supplier shall guarantee the system performance to meet the effluent requirement in Part 2, Table 2-2 for a minimum period of 18-months.

F. The MBR supplier shall warranty the system tank for a minimum period of two (2) years from the date of final project acceptance. Failure of is defined as follows:
   1. Liquid leaks from process tanks.
   2. Plasticity deformation of structures, tank walls and platform floor during normal operation.
   3. Plasticity deformation of structures, tank walls and platform floor while MBR skid is lifted per the instruction provided by MBR supplier.

G. MBR supplier shall warranty all actuated valves with an expected number of duty actuations exceeding two actuations per minute for a minimum period of two (2) years from the date of final project acceptance. The warranty shall not be pro-rated.

H. MBR supplier shall warranty all flow, pressure, and level measurement sensors and transmitters for a minimum period of two (2) years from the date of final project acceptance. The warranty shall not be pro-rated.
I. MBR supplier shall warranty all other equipment, not specifically mentioned above, against defects in workmanship and materials for a period of one (1) year from the date of final project acceptance, unless otherwise specified in other sections.

J. MBR supplier shall provide phone support for the MBR system for a period of one (1) year from the date of final project acceptance. Phone support shall be available 24 hours a day, 7 days a week.

1.09 SYSTEM STARTUP, COMMISSIONING AND TRAINING

A. The Owner and Engineer shall be notified a minimum of (2) weeks before scheduling of any inspection, startup, training or commissioning activities. The Owner and Engineer, or Engineer’s representative, shall be present during all inspection, startup, training and commissioning.

B. The Contractor shall provide all equipment, power, labor, and access needed to inspect and startup the MBR system.

C. The Supplier shall provide the services of trained and certified personnel, with complete knowledge of proper operation and maintenance of all system components and the Supplier’s project-specific design, for the following inspection, startup and commissioning services as described in the PART 3 of the section:

1. A minimum of one (1) day for inspection of the MBR system installation and performance of initial startup and testing of equipment to confirm proper installation. If, in the opinion of the Supplier, Owner, or Engineer, substantial installation deficiencies exist, the Contractor will be responsible for arranging an additional day of startup inspection by the Supplier at the Contractor’s expense.

2. A minimum of five (5) days to complete final system inspection, equipment startup and testing, control system verification, operational testing of the system, clean water permeability testing, sludge seeding, and system commissioning.

3. A minimum of two (2) days to instruct representatives of the Owner and the Engineer on proper operation and maintenance of the system during the commissioning period and after final acceptance by the Owner.

4. A minimum of two (2) days to complete stress testing of the system following the system commissioning period and to provide follow-up training of the Owner’s representatives, operating personnel, and the Engineer on operation and maintenance of the system.

D. If there are difficulties in operation of the MBR system or equipment during startup, commissioning, or stress testing, due to the Supplier’s design or fabrication or the Contractor’s installation, additional inspection, startup, and commissioning service shall be provided at no cost to the Owner.
PART 2 – PRODUCTS

2.01 MBR SYSTEM PERFORMANCE REQUIREMENTS

A. The MBR system will be sized to hydraulically convey the flows shown in Table 2-1.

| TABLE 2-1: PLAN HYDRAULIC LOADING CRITERIA (5 DEGREE CELSIUS) |
|-------------------|----------------|----------------|
| PARAMETER         | INFLUENT       | EVENT DURATION | FREQUENCY |
| Average Annual Flow (AAF) | 0.02 MGD | 265 days       | 1/ year   |
| Maximum Month Flow (MMF)    | 0.02 MGD | 30 days        | 3/ year   |
| Peak Daily Flow (PDF)       | 0.04 MGD | 24 hours       | 9/ year   |
| Peak Hour Flow (PHF)        | 0.05 MGD | 3 hours        | 8/ year   |

B. The MBR System shall be capable of treating raw wastewater at listed flows to the specified effluent criteria shown in Table 2-2.

| TABLE 2-2: PLANT POLLUTANT LOADING AND EFFLUENT CRITERIA |
|-------------------|----------------|----------------|
| Parameter         | Influent1 | Effluent |
| Maximum Month CBOD5 | 200 mg/L | <5 mg/L |
| Maximum Month Daily Average TSS2, 3, 5 | 200 mg/L | <2 mg/L |
| Maximum Month Daily Average TN | -- | -- |
| Maximum Month Daily Average NH3-N | -- | -- |
| Maximum Month Daily Average TP | -- | -- |
| Turbidity4 | -- | <0.2 NTU (avg.) |
| Design Minimum Temperature | 5°C | -- |
| Nitrate | -- | <10 mg/L |
| Ammonia | -- | 2.2 mg/L |

Notes:
1. Influent loading shall be within [± 25%] of design value.
2. Measured TSS shall be less than or equal to 2 mg/L on 9 of 10 consecutive samples and no sample shall exceed 5 mg/L.
3. Influent shall be screened so that at least 90% of solids with any 2 dimensions greater than or equal to 3mm in length are removed.
4. Measured turbidity shall be less than or equal to 0.2 NTU on 9 of 10 consecutive samples and no sample shall exceed 0.5 NTU.
5. Concentration of grit, defined as particles having a specific gravity of >1.6 and unable to pass through a 65-mesh screen (0.21mm), shall be less than 5 mg/l

C. Process Redundancy

1. The MBR System shall be able to treat the AAF and MMF for the duration of chemical cleaning (minimum of 4 consecutive hours) and the duration of maintenance inspection (minimum of 8 consecutive hours) with one Membrane Zone out of service.

D. System Configuration

1. The MBR system shall consist of the following major process components:

a. One (1) Anoxic (AX) tank: Minimum volume of 5,733 gallons per tank. At Anoxic tank, mixers are installed and de-nitrification process as well as alkalinity recovery process will occur.
b. One (1) Pre-Aeration (PA) Tank: Minimum volume of 1,638 gallons. PA tank has fine bubble diffuser system to supply oxygen to biology and to intermittently agitate the tank. The air is delivered by PA blower(s).

c. Two (2) MBR tanks: Minimum volume of 4,148 gallons per tank. Minimum total system MBR volume will be 8,296 gallons. At MBR tank, SMU(s) are installed. MBR blower will supply the air for scouring membrane surface as well as supplying oxygen for biological treatment.

d. Control panel platform: Control panel platform consists of two floors (upper and lower) to fasten MBR System Control Panel and other required ancillaries such as permeate pump(s), MBR blower(s), PA blower(s), WAS pump(s), chemical injection system and instruments.

e. MBR skid shall consist of the following process tanks as shown in Table 3. The overall footprint and height is limited to the values shown in Table 3. The dimensions are set for economical transportation to the project site. However, the components that are loose shipped to the project site such as ladders, handrails, piping sticking out over the tank top are NOT counted in the overall footprint or height.

<table>
<thead>
<tr>
<th>TABLE 3: SPECIFICATION OF MBR SKID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anoxic Tank Volume</td>
</tr>
<tr>
<td>Pre-Aeration Tank Volume</td>
</tr>
<tr>
<td>One MBR Tank Volume</td>
</tr>
<tr>
<td>Total MBR Tank Volume</td>
</tr>
<tr>
<td>Total Tank Volume</td>
</tr>
<tr>
<td>Overall Footprint of skid</td>
</tr>
<tr>
<td>Overall height of skid</td>
</tr>
</tbody>
</table>

E. The allowable MLSS concentration in the MBR Tanks shall range between 8,000 mg/l and 15,000 mg/l.

F. The MBR basins shall be considered part of the biological process when calculating aerobic volume requirements.

G. Membrane CIP Procedures

1. Membrane subunits shall be cleaned in place in order to maintain production capacity and meet performance requirements specified herein. The allowable frequency of listed CIP methods shall be as follows:

   a. Maintenance Clean frequency shall be as necessary.

   b. Recovery Clean frequency shall not exceed 2/yr.

H. For MBR Systems that require Recovery Cleaning as part of routine maintenance:

1. Tank liners shall be required for Membrane Zones to protect against corrosion or deterioration of wall materials.

2. All fasteners, including nuts, bolts, screws, cables, washers and other appurtenances, associated with the SMU shall be manufactured from Type 316L stainless-steel.

I. The MBR shall be designed to operate at or below a trans-membrane pressure (TMP) of 3 psig.
J. Membrane Integrity Testing
   1. Online turbidity monitoring shall be sufficient to detect a breach in a single membrane element or element connection.

K. Site Conditions
   1. Influent wastewater shall contain less than 15% of the influent BOD₅ as fats, oils and grease (FOG).
   2. No substances shall be placed in the system in quantities which are not biodegradable or toxic to the biological system.
   3. The influent wastewater pH shall be between 6-8 SU.
   4. Water hardness shall not exceed 300 mg/l as CaCO₃.
   5. Site elevation is approximately 3,000 feet above mean sea level.

2.02 MBR SKID FABRICATION REQUIREMENTS

MBR Supplier shall furnish a MBR skid per the following requirements.

A. MBR skid materials
   1. MBR skid material shall be Carbon Steel with epoxy coating (for corrosion protection).
   2. Plates, Angles, and Channel Shapes:
      a. Steel plates, angles and shapes shall conform to the requirements of ASTM A-36 with a minimum yield strength of 36,000 psi or equal.
      b. Aluminum plates, angles and shapes shall be 6061 alloy with a T6 temper or equal.
   4. Stainless-steel Pipe: Stainless-steel pipe shall conform to the requirements of ASTM A-312, TP304 and ASME B36.19, schedule 10, as specified in tank drawing nozzle schedule.
   5. Unistrut: Unistrut structural members shall be P1000, 1 5/8”, stainless-steel.
   6. Tank materials shall be Type 304 or 316 stainless-steel.

B. Fabrication
   1. Tank welding shall conform to the requirement: Welded Stainless-Steel Tanks for Water Storage.
   2. All welds shall be continuous seal welds.
C. MBR skid structure design

1. MBR skid shall be designed to support all hydrostatic, equipment, live, and seismic loads as indicated in this specification.

2. The bottom structure of the MBR skid that is supported by the flat concrete pad with 1/4" deviations in surface flatness shall be a 1/2" thick flat plate or structure tubes with 6" height or less in order to maximize the liquid volume in process tank(s) within the limited footprint.

3. Loading for structure and tank walls:
   a. Live load (L): loading with static water in the tanks at SWD to contain volumes listed in Table 3.
   b. Dead load (D): Weight of MBR skid material, platform, equipment and MBR System Control Panel.

4. MBR skid design shall comply with the following structural criteria:
   a. Maximum stresses on all MBR skid components (tank outside walls, tank inner walls, beams, tubing, etc.) shall not exceed 60% of yield.
   b. Deflections produced by the live loads and dead loads shall be limited to 1/2" or less.
   c. Tank inner walls shall be designed to meet the criteria (a) and (b) above when one tank is empty and the other side of the tank is full of water.
   d. MBR skid shall have 4 lifting lugs or more to avoid deformation while MBR skid is being lifted. The lifting lugs and MBR skid shall be designed so that maximum stresses on all MBR skid components (tank outside walls, tank inner walls, beams, tubing, etc.) while MBR skid is being lifted dry shall not exceed 60% of yield.

5. The design of MBR skid shall include an anchoring system as necessary to meet seismic resistance requirements as defined in Kittitas County, WA development standards.

6. One pipe support or unistrut shall be applied to support pipes at least every 5 feet.

7. The structure of the platforms shall be considered as a part of MBR skid and the same design criteria as MBR skid shall be applied to the platform structure. Each piece of equipment shall not be supported by walkways but structure of the platforms.

8. After a full assembly of the MBR skid at the MBR SUPPLIER’s shop, the MBR SUPPLIER shall disassemble handrails and similar components or necessary to minimize transport costs. The Contractor will re-assemble removed components based on the MBR skid handling manual submitted by the MBR supplier two (2) weeks prior to shipment.

9. Control panel platform shall be designed so that all mechanical work, installation work and electrical work is completed prior to shipment so there will be no assembly work needed onsite to start up the MBR system except for CIP injection pipe. The Control panel platform shall be a permanent installation before shipment.
D. Finishes

1. All carbon steel surfaces shall be painted.

2. All stainless-steel surfaces and piping shall NOT be painted.

3. All PVC piping shall NOT be painted.

4. Testing and inspection for painting:
   a. Inspection and Testing shall be done by the MBR supplier. The test report shall be submitted to the Engineer. The testing consists of:
      i. 100% visual inspection shall be performed to ensure that there are no runs, sags, blisters, voids or any other irregularities.
      ii. Dry Film Thickness (DFT) testing shall be performed in accordance with SSPC PA 2, with the exception of the number of test “Spots”. One (1) spot, consisting of three (3) readings shall be taken per every Five (5) square feet of surface.
      iii. Holiday detection shall be performed in accordance with NACE RP 0188-99. A low voltage DC current at 67 ½ volts wet sponge shall be used.

E. Wiring

1. General
   a. All wiring, workmanship, and schematic wiring diagrams shall be in compliance with applicable standards and specifications set forth by the National Electric Code (NEC). All internal and external carbon steel surfaces shall be painted.

2. Conduit
   a. All conduit shall be stainless-steel rigid conduit or galvanized rigid conduit with PVC coating.
   b. Flexible conduit shall be limited to 4’ from the end of the rigid conduits and/or terminal junction boxes.
   c. All conduit and fittings shall be UL listed.
   d. Liquid tight flexible metal conduit shall be constructed of a smooth, flexible, galvanized steel core with a smooth abrasion resistant, liquid tight, polyvinyl chloride cover.
   e. Conduit shall be supported in accordance with Articles 346, 347, and 350 of the NEC.
   f. Conduit shall be sized according to NEC requirements.

3. Grounding
   a. The MBR supplier shall ground all electrical equipment including instruments and motors on the MBR skid to a grounding point at the MBR System Control Panel. The mounting surface of all ground connections shall have any paint removed before making final connections.
4. Wire Labels
   a. The MBR supplier shall put wire labels on each wire terminated at MBR skid based on the electrical diagrams and control panel drawings.

F. Piping
   1. The MBR supplier shall furnish piping and pipe supports. Pipe schedule are as follows:
      a. Pipes for air located outside process tanks shall be 304SS SCH10. Pipes for air located inside process tanks shall be PVC SCH80.
      b. All other piping for permeate, mixed liquor, WAS, and CIP, shall be PVC SCH80.
   2. Piping shall have welded, glued, flanged, or mechanical groove (Victaulic) connections.
   3. Pipe supports shall be 304 stainless-steel Unistrut (or equivalent) systems or 304 stainless-steel angle and structural shapes with stainless hardware, clamps, and guides.
   4. Transitions from MBR Supplier piping to Contractor’s piping shall use ANSI 150-pound flat face flanges unless otherwise noted or coordinated with the Contractor.
   5. The MBR Supplier shall furnish required flange bolt kits for flange connections and manual valves. All the bolts, nuts and washers for flanges shall be 304 stainless-steel. Gaskets shall be full-face EPDM.
   6. Provide EPDM flexible joints as needed to cancel offset.

G. Handrails
   1. The MBR Supplier shall furnish and assemble handrails that meet or exceed the requirements of the OSHA design standard of a single 200 lb load applied at any location along the top rail when the correct specification of pipe is used and the correct method of design is employed.
   2. The material of the handrails shall be ether aluminum, galvanized steel or powder coated steel (powder shall be yellow).
   3. Provide toe boards a minimum of 3" high at the platforms, runways or catwalks crossover open areas or open tanks.
   4. The MBR SUPPLIER shall provide an onsite assembly manual that shows how handrail components are assembled two weeks before shipment.

H. Ladder
   1. The MBR Supplier shall furnish and assemble ladders that meet the requirements of the OSHA design standard.
   2. The material of the ladders shall be ether aluminum, galvanized steel or powder coated steel (powder shall be yellow).
   3. The ladders and fasteners for the ladders shall be designed the way where the ladders can be fasten on the floor of process tank(s) so that they can be transported to the site free of damage with the same freight of MBR skid. After transportation, the ladders will be assemble and attached to the tank walls at the site.
4. The MBR supplier shall provide an onsite assembly manual that shows how ladder components are assembled, two weeks before shipment.

2.03 SUBSYSTEM SCOPE OF SUPPLY

The following is a summary of equipment and components that shall be supplied by the MBR Supplier. All components shall be as specified per manufacturer and model number or approved equal.

<table>
<thead>
<tr>
<th>Line</th>
<th>Name</th>
<th>Type</th>
<th>Size / Capacity</th>
<th>MFR</th>
<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
<th>Quantity</th>
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<tbody>
<tr>
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<td>Stainless-Steel</td>
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<td>2</td>
<td>Ladder and Handrails</td>
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<table>
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<th>Line</th>
<th>Name</th>
<th>Type</th>
<th>Size / Capacity</th>
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<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
<th>Quantity</th>
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<tr>
<td>3</td>
<td>Mixer</td>
<td>Submersible</td>
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<td>Flygt</td>
<td>SR4610</td>
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<td>4</td>
<td>Mixer Hoist</td>
<td>Submersible Mixer Hoist</td>
<td>-</td>
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<td>-</td>
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<td>5</td>
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<td>Loop</td>
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### Anoxic Tank (AX) Equipment

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<th>MFR</th>
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<th>HP</th>
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<th>Phase</th>
<th>VFD / Motor Starter</th>
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<tbody>
<tr>
<td>6</td>
<td>Diffuser</td>
<td>Fine Bubble</td>
<td>35 scfm</td>
<td>Aquarius Membrane Disc</td>
<td>-</td>
<td>-</td>
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<td>7</td>
<td>Aeration Blower with Silencer</td>
<td>Regenerative Blower</td>
<td>35 scfm @ 5.7 psig</td>
<td>Fuji</td>
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### Pre-Aeration Tank Equipment

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<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
<th>Quantity</th>
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<tr>
<td>8</td>
<td>Recirculation Pumps</td>
<td>Standard Centrifugal</td>
<td>106 gpm, 11.5' TDH</td>
<td>Pioneer</td>
<td>SC425C75 CC.75</td>
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<td>VFD</td>
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<td>9</td>
<td>Recirculation Flow Meter</td>
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<td>W400</td>
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### Membrane Bioreactor Tank (MBR) Equipment

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<thead>
<tr>
<th>Line</th>
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<th>Size / Capacity</th>
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<td>11</td>
<td>Guide and Stabilizer</td>
<td>Submerged Membrane Unit</td>
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<td>-</td>
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<td>Lifting Tool</td>
<td>Lifting Tool for Submerged Membrane Unit</td>
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<td>Loop</td>
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<td>13</td>
<td>Diffuser Cleaning Valve</td>
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<td>Loop</td>
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<tr>
<td>15</td>
<td>Sludge Discharge Pumps</td>
<td>Self-Priming Centrifugal</td>
<td>11 gpm, 20' TDH</td>
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### Permeate Control Equipment

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<tr>
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<th>Name</th>
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<tr>
<td>16</td>
<td>Permeate Pumps</td>
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<td>Permeate Flow Meter</td>
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<td>Permeate Pressure Transmitter</td>
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### Air Scour Control Equipment

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<th>MFR</th>
<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Membrane Blower with Silencer</td>
<td>Regenerative Blower</td>
<td>106 scfm @ 5.0 psig</td>
<td>Fuji</td>
<td>2VF60-8.4-7W</td>
<td>8.45</td>
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<td>Thermal Mass</td>
<td>2'</td>
<td>Endress + Hauser</td>
<td>T-Mass 651</td>
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<td>Loop</td>
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### Chemical Solution Equipment

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<th>MFR</th>
<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
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<tr>
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<td>Chemical Solution Tank</td>
<td>Round Plastic</td>
<td>300 gal</td>
<td>Chemtainer</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>22</td>
<td>Chemical Solution Pump</td>
<td>Centrifugal</td>
<td>8 gpm, 23' TDH</td>
<td>Goulds</td>
<td>1MC1F2</td>
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### Other

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<th>Model</th>
<th>HP</th>
<th>Power</th>
<th>Phase</th>
<th>VFD / Motor Starter</th>
<th>Quantity</th>
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<td>23</td>
<td>UL-listed Control System</td>
<td>PLC Panel HMI SCADA</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>
2.04 SUBMERSIBLE MIXERS

A. Submersible mixers shall be supplied with the following features:

1. Direct-drive, guide-rail-mounted, non-clogging propeller type designed for mixing of raw or processed sewage. All components of the mixer shall be capable of continuous submerged operation. The mixer shall be sized to provide complete mixing.

2. All major pump components or the submersible mixers shall be manufactured of Type 316 stainless steel. All bearings shall have a minimum B-10 rated bearing life of 100,000 hours.

3. Mixers shall have integral motor thermal overload protection and seal failure (moisture) sensor.

4. The mixers shall be provided with guide rails, guide brackets, lifting cables and lifting hoist.

2.05 FINE BUBBLE DIFFUSER SYSTEMS

A. Fine bubble diffuser systems shall include in-basin aeration piping, pipe drops, submerged manifolds, laterals, diffusers, drain pipes, pipe supports, and purge system.

B. Diffuser system aeration piping, drop piping and pipe supports shall be constructed of Type 304 stainless steel. Submerged manifolds, laterals and drain piping may be constructed of Type 304 stainless steel, Schedule 80 PVC or CPVC as recommended by the manufacturer. Diffusers shall be constructed of materials appropriate for the application and be as recommended by the manufacturer.

2.06 PUMPS

A. Pumps shall be standard and/or self-priming end-suction centrifugal type, unless otherwise specified or approved by the Engineer.

B. Pumps shall be sized to handle peak instantaneous flow as defined in this Specification as well as rates associated with backwashing, maintenance cleaning, and aerator flushing.

C. Pump flow shall be controlled with either a modulating butterfly valve or VFD. If pump control is by means of a VFD then the pumps and pump motors shall be suitable for use with a VFD.

D. Major pump components shall be cast iron, ductile iron, or stainless steel.

2.07 BLOWERS

A. Blowers shall be provided complete with inlet filters, discharge silencers, pressure relief valves, check valves, motors, temperature and pressure gauges, over-temperature sensor/switch, expansion joints, baseplates, and vibration isolating mounts.

B. Process aeration blowers shall be sized to maintain a residual DO of 2.0 mg/l at MMF flow rates and loadings and a minimum of a 2:1 turndown. Process aeration system shall include a standby blower of equal or greater capacity to the duty blowers.

C. MBR scour air blowers shall be sized such that sufficient scour air is provided to support MMF flows as described in this Specification without requiring additional maintenance cleans. The scour air system shall include a standby blower of equal or greater capacity to the duty blowers.
D. MBR scour air blowers shall accommodate a minimum surge of 1.5 psig under normal operating conditions.

E. All blowers for this project shall be the products of a single manufacturer, and shall be standard units manufactured by one of the following:

1. Republic
2. Fuji
3. FPZ

F. Blowers shall be regenerative type and have a maximum noise level of 80 dBA at one meter from the unit.

G. Blowers shall be capable of operating from a 3-phase, 480V, 60Hz, AC power supply. Blower motors shall be NEMA “Premium Efficient,” and shall be capable of operating under a maximum ambient temperature of 40 °C (104 °F).

2.08 MOTORS

A. Motors shall be NEMA Premium® efficient, 3-phase squirrel cage induction type, NEMA design B, connected and rated for operation on a 480-volt, 60 Hz, AC power supply. Conductors shall be copper. Premium efficient motors shall meet or exceed the published guaranteed minimum efficiency value and the tested efficiency shall be in accordance with IEEE Standard 112, test method B. Motors shall also be severe duty rated, meeting or exceeding the requirements of IEEE Standard 841.

B. Motors shall be capable of successful operation in an ambient temperature range of -20 °C to 40 °C (minimum 40 °C ambient temperature nameplate rating), and relative humidity of 100%. Motors shall also be capable of successful operation with voltage variations to 10% of the nameplate rating and frequency variations to 5% of the nameplate rating.

C. Motors shall have Class H insulation, rated on a Class B temperature rise, with a minimum service factor of 1.15 for sine wave current protection, and minimum service factor of 1.0 for inverter operation. The allowable temperature rise shall conform to NEMA standard MG1.

D. Motors for use with VFDs (inverter operation) shall be inverter duty. Motors shall also be equipped with an optional shaft grounding kit, AEGIS™ or Engineer approved equal.

E. Motors shall be provided with optional snap-action, bimetallic, temperature actuated, normally closed winding thermostats for thermal protection. A minimum of one thermostat shall be provided for each phase. Thermostat lead wires shall be routed to the main conduit box main conduits for motor leads and thermostats.

F. Motor enclosures shall be totally enclosed fan cooled (TEFC). TEFC motors shall be provided with drilled and tapped holes to drain cavities within the motor. Automatic breather drain devices shall be provided. Motor frames, end shields and conduit boxes shall be constructed of cast iron. Built-in lifting lugs, or drilling, tapping and lifting eye bolts shall be provided. Motors frame sizes shall be NEMA standard, suitable for the application specified.

G. Motor bearings shall be anti-friction type AFBMA standard sizes. Bearings shall be selected to provide minimum L10 bearing life of 17,500 hours for belted applications and 100,000 hours for flexible or direct-coupled applications. All motors shall have thrust ratings not less than the combined static and dynamic loads to be imposed. The bearing housing shall be large enough to hold sufficient lubricant to minimize the need for frequent re-lubrication. Facilities shall be provided for adding new grease and draining
out old grease without major motor disassembly. The bearing housing shall have long, tight, running fits or rotating shields to protect against the entrance of foreign matter into the bearings, or leakage of grease out of the bearing cavity.

H. Motor leads into the conduit box shall have the same insulation class as the winding. Leads shall be marked throughout the entire length to provide identification after terminals are taped or clipped. Leads insulated with glass braid shall be furnished with a metal marker on the lead.

I. Motor nameplates shall be stainless steel. Nameplates shall be engraved or stamped and shall be fastened to the motor frame with stainless steel screws or drive pins. Nameplates shall clearly indicate all items of information enumerated in NEMA standard MG1. Connection diagrams shall also be permanently attached to the motor, either inside the conduit box or on the motor in a location readable from the conduit box side.

J. Each motor shall be tested to determine that it is free from electrical or mechanical defects, and to provide assurance that it meets the specifications. The routine test(s) shall conform to applicable NEMA and IEEE standards. Copies of test reports will not be required unless actual operation after installation suggests the motor’s performance should be verified, in which case copies of the test report shall be submitted upon the Engineer’s request.

K. Subject to compliance with these specifications, motors shall be as manufactured by Baldor, TECO, GE, Toshiba or Engineer approved equal.

2.09 CLEANING SYSTEMS

A. The cleaning systems shall include backwash, maintenance clean, and recovery clean systems as required by the Supplier’s specific systems.

B. Cleaning systems shall be inclusive of all chemical feed day tanks, chemical feed pumps, valves, instrumentation, controls, and all other ancillary equipment necessary for a complete cleaning operation.

C. Supplier shall clearly identify required minimum building space for all Cleaning systems, including space for:

1. Chemical storage.
2. Mix tanks.
3. Cleaning system equipment.
4. Safety equipment.
5. Containment and neutralization of spent chemicals. Containment space shall include space necessary for separation of incompatible materials to meet International Building Codes and International Fire Codes.

D. The system shall be designed to clean the membranes in-place during backwash and maintenance clean operations without requiring their removal from tanks. Recovery cleaning may be performed with the membranes in-place or through removal from membrane tank to a cleaning tank.

E. The cleaning systems shall be sized to clean one SMU or one membrane bank at a time and allow the other SMUs or membrane banks to remain in production.

F. All components of the cleaning systems shall be compatible with cleaning solutions recommended by the Supplier for its system.
2.10 INSTRUMENTATION

A. Process instrumentation devices shall be as specified in Section 40 70 11.

B. Identification Tags: All field instruments shall have identification tags meeting the following requirements.

1. Tag number of instruments shall be established by the MBR System Supplier and approved by the Engineer.

2. Tags shall be made of stainless steel, engraved with 3/16-inch letters, and attached using a stainless steel cable.

3. Instruments mounted on or within control panels and enclosures shall have the identification tag installed so that the engravings are easily visible to service personnel.

2.11 MBR SYSTEM CONTROL PANEL

A. General:

1. The MBR Supplier shall furnish a MBR System Control Panel that fits on the skid without conflicting with ancillary equipment.

2. Control Panels shall be manufactured in accordance with ISO 9000-2001 specifications and shall be so constructed for the application of UL Listing Label by an approved UL Control Panel Assembly Facility with all the required labels properly attached.

3. The size of the panel shall be determined by the MBR Supplier.

4. MBR System Control Panel shall be pre-mounted, pre-wired and pre-tested before ship-out so that there will be no need for field wiring or field testing before starting MBR skid.

5. The main control panel shall be suitable for operation from a single-point 480 VAC, 60 Hz, 3-phase power supply.

B. Control Panel Features:

1. NEMA 4/12 powder coated steel enclosure (Hoffman or equal) with 2 doors. The size and quantity of panels shall be determined by the MBR supplier so that the MBR System Control Panel will physically fit at the floor level without conflicting to the other ancillary equipment.

2. NEMA 4/12 air conditioner.

3. Phoenix Contact MGUARD remote access VPN firewall.


5. Redundant 24 VDC power supply for field devices.

6. Ethernet switches.

7. Relays, circuit breakers.

8. All I/O points wired to terminal blocks.

9. Terminal blocks and fuse blocks for all I/O points.
10. Surge suppressor on AC mains.
11. LED panel light.
12. Convenience power outlet.
13. Door handle.
14. UPS system allowing operation through power losses of up to 3 minutes.
15. Fabricated and listed per UL 508a requirements.
16. Complete, documented control panel functionality test, including point-to-point testing of all I/O channels.
17. Detailed panel drawings and loop interconnects.
18. Submittals as required.
19. Allen Bradley Powerflex 525 VFDs with 3% line reactors, including over-current and over-heat protections.
   Constant torque VFDs shall be provided for any constant torque loads. Provisions shall be made for motor controllers to accept drive motor winding thermostat wiring.
20. HOA switches (HAND-OFF-AUTO switches) on the front of the panel to allow the operator to manually start/stop without accessing 480VAC area in the panel.
21. Name plates for HOA switches.
22. Emergency stop button on the front of the panel.
23. Fuses for each size.

C. PLC I/O Counts and I/O cards:
1. To be determined by the MBR supplier and panel manufacturer based on the P&ID provided by the MBR supplier.
2. Provide one spare I/O card for every 10 cards, or fraction thereof, of each type of card installed.

D. HMI System Hardware and Software Features:
1. The MBR skid manufacturer shall supply a control system software program for the MBR process system and provide one copy of the control program on a thumb drive.
2. 19 inch NEMA 4/12 Hope Industrial Touchscreen Operator Interface, with Dell SFF PC, Windows 10 compatible.
3. Rockwell Software Factory Talk View SE Station, 100 Display.
4. FactoryTalk View Studio HMI configuration Software.

E. PLC and HMI Programming:
1. PLC Programming following MBR Supplier Control Narratives and using PLC Programming Standards.
2. HMI Programming following MBR Supplier Control Narratives using HMI Programming Standards.

3. PLC/HMI programming FAT at the MSM shop or Remotely witnessed.

F. Engineering:

1. Control panel design, drawings, and wiring schematics in AutoCAD.

2. Loop wiring (point-to-point) drawings in AutoCAD.


4. 100% design documentation.

5. As-delivered documentation.

6. As-built documentation.

G. Remote Access Device:

1. Provide the following equipment to permit remote access for troubleshooting and programming as necessary:
   a. VNC remote access software or equivalent.
   b. Phoenix Contact MGuard Remote VPN Server or equivalent.

2.12 ANCHOR BOLTS AND FASTENERS

A. Anchor Bolts: The equipment manufacturer shall furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment. All anchor bolts, hex nuts, and washers shall be Type 316 stainless steel. Anchor bolts shall be wedge or epoxy type.

B. Fasteners: All fasteners shall be Type 316 stainless steel. The equipment manufacturer shall furnish all fasteners required for the assembly of the equipment.

2.13 POWER COMPONENTS

A. All motor branch and power circuit components shall be of highest industrial quality. The short circuit current rating of all power circuit devices shall be a tested combination or evaluated per NEC article 409. The lowest rated power circuit component shall be the overall control panel short circuit rating and shall not be less than the fault current available. The minimum control panel rating shall not be less than 10 kA, rms symmetrical. Control assemblies operating at 120-volts nominal or less may be provided with transformers which limit the fault current and may be rated less than the minimum required short circuit rating.

B. Circuit Breakers and Operating Mechanisms

1. A properly sized heavy-duty circuit breaker shall be furnished to each motor. The circuit breakers must be sealed by the manufacturer after calibration to prevent tampering.

2. An operating mechanism installed on each motor circuit breaker shall penetrate the control panel door. A padlockable operator handle shall be secured on the exterior surface. Interlocks must prevent opening the door until circuit breakers are in "OFF" position. An additional mechanism(s) shall be provided on the circuit breaker to be operated and/or locked with the control panel door in the open position.
C. Motor Starters: An open frame, across-the-line, NEMA rated magnetic starter with undervoltage release, and overload protection on all three phases, shall be furnished for each pump motor. Starters of NEMA size 1 and above shall allow addition of at least two auxiliary contacts. Starters rated "O", "OO", or fractional size are not acceptable. Power contacts to be double-break type made of cadmium oxide silver. Coils to be epoxy molded for protection from moisture and corrosive atmospheres. Contacts and coils shall be easily replaceable without removing the starter from its mounted position. Each starter shall have a metal mounting plate for durability.

D. Complete arc flash study of all electrical panels and equipment and provide warning labels containing information required by NFPA 70E and affix to each piece of electrical equipment evaluated in the study.

2.14 HAZARDOUS AREAS

A. Unless otherwise specified in the Contract Documents or Drawings, none of the MBR equipment or instrumentation are required to meet the requirements for hazardous area installations (Class 1, Division 1 or Division 2).

PART 3 – EXECUTION

3.01 PROJECT EXECUTION

A. Unless otherwise required in the Contract Documents, the MBR Supplier shall provide all submittal documentation as described in this Section no later than four (4) weeks after execution of Purchase Order by both parties.

B. Unless otherwise required in the Contract Documents, the MBR Supplier shall deliver all components in their Scope of Supply, as described in this Section, no later than September 30, 2020.

3.03 CONTROL SYSTEM FACTORY ACCEPTANCE TEST

A. The MBR Supplier shall coordinate and conduct a factory acceptance test (FAT) of the MBR control system during which:

1. The PLC control logic and HMI operability shall be demonstrated by systematically forcing I/O to verify all controls functions and HMI screen representations defined in the system control narrative.

2. The MBR control panel shall be inspected for completeness, and workmanship.

B. The MBR Supplier shall provide a minimum of 2 weeks’ notice to the Owner and Engineer prior to the FAT. The Owner and Engineer may, at their option and the expense of others, choose to attend and witness the FAT.

C. Whether or not the Owner and/or Engineer attend the FAT, the MBR Supplier shall provide written documentation and certification of the completed FAT.

3.04 MATERIALS INSPECTION

A. The Contractor shall inspect delivered equipment upon arrival on site for completeness of scope delivery and to verify that all components have arrived undamaged. The Contractor is responsible for notifying the MBR Supplier of deficiencies in quantities or conditions within 28 days from the ship date.

B. The Contractor shall provide all labor, materials, and equipment for unloading, de-crating, organizing, and compiling take-off of received MBR equipment, components, and instrumentation.
C. The MBR Supplier shall make available, upon the request of the Contractor, personnel to assist in the inspection of the MBR Supplier’s equipment upon unload at the site. MBR Supplier’s personnel shall provide services in accordance with their standard daily rates.

3.05 MECHANICAL INSPECTION PRIOR TO COMMISSIONING

A. The Contractor shall schedule with the MBR Supplier to perform a Mechanical Inspection at least two (2) weeks prior to the scheduled Commissioning of the System.

B. The Contractor shall complete tank construction, all the piping including leak test and electrical wiring and termination prior to the Mechanical Inspection.

C. The MBR Supplier shall conduct a Mechanical Inspection of the MBR System to verify that the installation is complete and ready to begin Commissioning activities. The MBR Supplier shall verify the following:

1. Installation of all equipment per the Engineer’s and MBR Supplier’s drawings and MBR Supplier’s IOM information.
2. Installation of all instrumentation per the Engineer’s drawings and IOM information.
3. Completeness of all piping installations.
4. Completeness of all electrical installations.
5. Completeness of all basins, including removal of all debris that may cause damage to the MBR SMU membranes.
6. Review of all pipe integrity testing results.

D. Upon completion of the Mechanical Inspection, the MBR Supplier shall provide written documentation of the inspection results.

E. Follow up to Mechanical Inspection

1. If the MBR System is complete per the requirements of the Mechanical inspection, the MBR Supplier shall schedule the System Commissioning with the Contractor. The date for the System Commissioning is to be established within two (2) weeks of the successful completion of the Mechanical Inspection.

2. If the MBR System is not complete at the time of the Mechanical Inspection, the MBR Supplier shall document system deficiencies to the Contractor, Engineer, and Owner. The Contractor will then complete all necessary work and provide documentation (including digital photographs) of the completed work.

   a. Electrical and Control System Documentation Requirements
      i. Wire ring-out documentation signed by electrician
      ii. Pictures of completed terminations (if terminations in contractor scope) in field and PLC panel including wire labeling.
      iii. Documentation of completed network cabling, Ethernet cable termination and fiber optic termination and patching.
      iv. Documentation of all motor and valve terminations, motor cable insulation resistance testing
After all noted deficiencies are resolved to the satisfaction of the Engineer, Owner, and MBR Supplier, the date for the System Commissioning is to be established within two (2) weeks.

3. If the Mechanical Inspection deficiencies are deemed as sufficiently important by the MBR Supplier, Owner, or Engineer, the Contractor shall arrange for the Mechanical Inspection to be repeated at the Contractor’s expense.

4. If electrical and control system wiring is incomplete prior to system commissioning scheduling, Contractor must complete all necessary work and provide documentation of the completed work (as described in 3.04 D. 2. above). The Contractor must update the Engineer, Owner, and MBR Supplier of the progress so that a revised system commissioning date can be organized as soon as possible. In this scenario, penalties for project delay will become the responsibility of the Contractor.

3.06 SYSTEM COMMISSIONING

A. The MBR Supplier shall coordinate with the Contractor, Engineer, and Owner for execution of the System Commissioning. In advance of System Commissioning the MBR Supplier shall perform an onsite Mechanical Inspection of the facility and generate a punch-list of inconsistencies. The Contractor is required to resolve the punch-list items to the satisfaction of the MBR Supplier, prior to scheduling System Commissioning. The System Commissioning will consist of the following:

1. General inspection of systems (lubrication, rotation, calibration).
2. Loop checking, instrumentation, and control system verification.
3. Clean Water diffuser testing.
4. Clean water system testing: test run the system with all equipment/instrument except Membrane Subunits in auto mode by recirculating in clean water.
5. Sludge re-seeding.
6. Training.

B. The Contractor shall provide materials and personnel in support of the System Commissioning to fill basins with clean water, transfer fluids, repair/remedy any and all electrical and mechanical issues, provide temporary tie-ins, temporary piping, transfer pumps, etc.

C. The Contractor shall coordinate with the Engineer and Owner to seed the MBR system with sludge at the conclusion of the clean water testing. The MBR Supplier is not responsible for supplying the seed sludge.

D. The System Commissioning shall begin at the Contractor’s discretion, within the limits defined herein:

1. Successful completion of a pre-commissioning Mechanical Inspection is required.
2. Start of Commissioning shall be no later than 30 days after completion of Mechanical Inspection.

E. The Owner shall operate the plant during the Commissioning Period; however, MBR Supplier and Contractor shall be allowed to provide onsite assistance.

F. MBR Supplier is responsible for monitoring operating conditions and performance during the Commissioning Period.
G. MBR Supplier shall provide the Owner with a Plant Operations Manual after the end of the Commissioning Period. The manual shall include at a minimum:

1. As-built drawings.
4. As-built control schematics.
5. Process variables and control narrative.

H. MBR Supplier shall submit the Plant Operations Manual within four (4) weeks after the end of the Commissioning Period.

I. Membrane permeate quality shall be evaluated to determine compliance of the MBR System with Performance Requirements. If the MBR system fails to comply with requirements of membrane permeate quality, MBR Supplier shall provide the Owner and the Engineer a written plan of modifications to the system (such as repairing damaged membranes, replacing seals, complete replacement of system) to achieve compliance with the requirements. Upon implementation of modifications plan, the permeate quality tests shall re-commence in their entirety.

3.07 STRESS TESTING

A. A Stress Test shall be conducted following the System Commissioning to demonstrate the ability of the MBR System to meet specification requirements regarding Maximum Month Flow and Peak Daily Flow as described in Table 2-1.

B. The MBR Supplier shall be responsible for performing the test and shall coordinate as necessary with plant staff.

C. A certified representative of the MBR Supplier shall be onsite for the duration of testing unless otherwise agreed to in writing.

D. Testing shall not commence until the MBR System is operational and the biological process fully stabilized as indicated by the following:

1. Mixed liquor suspended solids concentrations in the reactor shall be greater than 5,000 mg/L but less than 13,000 mg/L.
2. No excessive foaming indicative of upset conditions.
3. Filterability in excess of 10 mL in five (5) minutes.

E. One of two (2) reactors shall be selected to undergo testing per Table 3-1. Conditions shall simulate rated MMF and PDF per Table 2-1 for the plant. During testing:

1. Membrane cleaning, as required, shall be performed in accordance with MBR Supplier recommendations and may occur during any phase of testing.
2. Instantaneous flux, trans-membrane pressure, permeability, temperature and airflow shall be recorded at one-minute intervals.
3. The net (average) output during testing must be within 10% of target MMF and PDF to be considered successful.
4. Failure to pass the Stress Test shall result in an evaluation and retest of the system. A second failure shall require a remedy at the expense of the MBR Supplier.
Supplier up to and including the installation of additional membrane equipment at no additional cost to the Owner.

### TABLE 3-1: TESTING CONDITIONS

<table>
<thead>
<tr>
<th>Testing</th>
<th>Duration (hr)</th>
<th># MBR</th>
<th># SMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane Cleaning</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MMF</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PDF</td>
<td>4</td>
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<td>1</td>
</tr>
<tr>
<td>Membrane Cleaning</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

3.08 TRAINING

A. The MBR Supplier shall provide Training in the maintenance and operation of all systems included in the MBR Supplier’s control system.

B. Training shall be completed prior to the completion of the System Commissioning. All training shall be performed by the MBR Supplier or a factory-certified representative of the MBR Supplier or component supplier. Training is to include:

1. Navigation of all HMI screens and menus.
2. Review of automatic operations and controls.
3. Changing process set points.
4. Overriding controls from the HMI.
5. Manual operation of the system in the event of a power failure.
7. Trouble shooting.

3.09 PROJECT SCHEDULE

A. The MBR Supplier shall provide the Scope of Supply and associated services specified in this specification in accordance with the Table 3-2.

B. Firm dates for Deliverables as listed in Table 3-2 will be established by Engineer, Contractor, and Owner upon initiation of the project.

### TABLE 3-2: ESTIMATED PROJECT SCHEDULE

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Estimated Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submittal Documentation</td>
<td>Four (4) weeks after execution of Purchase Order by both parties</td>
</tr>
<tr>
<td>Installation Documentation (IOM)</td>
<td>Two (2) weeks prior to Equipment Delivery at Site</td>
</tr>
<tr>
<td>Equipment Delivery at Site</td>
<td>September 30, 2020</td>
</tr>
<tr>
<td>Mechanical Inspection</td>
<td>Two (2) weeks prior to System Commissioning</td>
</tr>
<tr>
<td>System Commissioning</td>
<td>Fully commissioned by November 1, 2020</td>
</tr>
<tr>
<td>Training</td>
<td>Training to be provided at the conclusion of the System Commissioning</td>
</tr>
<tr>
<td>Plant Operations Manual (POM)</td>
<td>Four (4) weeks after completion of System Commissioning</td>
</tr>
</tbody>
</table>
C. Refer to specification 01 11 50 Section 1-08.5 and 1-08.9 for additional project schedule and contract completion requirements.

3.10 MBR SUPPLIER SERVICES

A. In addition to the time necessary to complete the requirements established within this specification and elsewhere within the Contract Documents, the MBR Supplier shall provide twenty-four (24) person-days and nine (9) on-site visits (extra person-days and trips if additional technical support is needed) in support of the Services shown in Tables 3-3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Estimated Person-Days</th>
<th>Estimated Trips</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kickoff Meeting</td>
<td>1</td>
<td>1</td>
<td>Meetings to be at Engineer’s facility</td>
</tr>
<tr>
<td>2</td>
<td>Material Inspection During Delivery</td>
<td>1</td>
<td>1</td>
<td>MBR Supplier to verify completed shipment of material at unload</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical Inspection</td>
<td>5</td>
<td>2</td>
<td>MBR Supplier to verify Correct Installation</td>
</tr>
<tr>
<td>4</td>
<td>Commissioning</td>
<td>15</td>
<td>4</td>
<td>Inclusive of clean water testing and seeding support/startup</td>
</tr>
<tr>
<td>5</td>
<td>Training</td>
<td>2</td>
<td>1</td>
<td>Training during Commissioning</td>
</tr>
</tbody>
</table>

B. Time spent remedying equipment deficiencies/problems shall not count toward the listed durations and trips.

C. MBR Supplier shall be given a minimum of two-week advance notice prior to the scheduling of any of the listed Services.

D. All service shall be provided by a factory representative or certified subcontractor.

E. MBR Supplier shall provide telephone support for a minimum period of 1 year following commissioning during normal working hours.

F. MBR Supplier shall provide a phone number for support during an event of an emergency.

END OF SECTION 46 53 49
APPENDIX A

SNOQUALMIE PASS UTILITY DISTRICT WASTEWATER TREATMENT PLANT LOCATION AND PROPOSED TREATMENT PLAN FLOW DIAGRAM, SITE PLAN, AND OVERALL BUILDING PLANT PROCESS
Phase 1 project includes domestic water well located in Kittitas County. Well location TBD.

New Headworks Building

New Aerobic Digester

New Covered Drying Beds

Phase 1

Phase 2

MBR WWTP

Iron Horse Trail
Includes Phase 1, 2, 3, and 4 Improvements