

CITY OF SANDY
SPECIFICATIONS FOR
ALDER CREEK WATER TREATMENT PLANT UPGRADE

PROFESSIONAL OF RECORD CERTIFICATION(s):

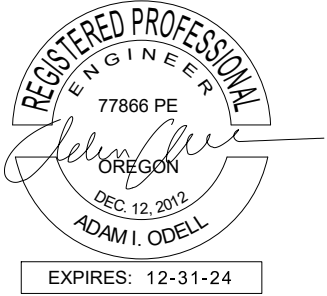
Adam Odell	<p>I declare the Technical Specification(s) listed in the Specification TOC are applicable to the design for the subject project for the City of Sandy were prepared by me or under my supervision.</p> <div style="text-align: center;"><p>REGISTERED PROFESSIONAL ENGINEER 77866 PE OREGON DEC. 12, 2012 ADAM I. ODELL</p><p>EXPIRES: 12-31-24</p></div>
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Alder Creek Water Treatment Plant Upgrade

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SECTION 00 10 00
REQUEST FOR PROPOSALS

1. The City of Sandy requests Proposals for membrane equipment for its upgraded water treatment plant. Sealed Proposals, following a “two-envelope” approach outlined in Section 00 40 00, will be accepted until **2:00 PM Pacific Time on March 14th, 2024 “Proposal Closing Time.” Proposals received after the deadline will not be accepted.** Further detail is found in Section 00 20 00, Instructions to Proposers, which is a part of this Request for Proposals. The anticipated schedule may be changed as needed.

Activity	Date(s)
Advertisement of RFP	02/14/24
Respondents to submit Proposals	03/14/24
City to review qualifications	03/27/24
City to issue Notice of Intent to Award (NOI)	04/04/24
Contract Negotiations Completed	05/02/24
Anticipated Council Approval of Agreement	05/20/24
Notice to Proceed	05/27/24

2. One PDF copy of the Proposal Documents will be provided to pre-qualified PROPOSERS. The BUYER will not be responsible for full or partial sets of Proposal Documents, including any addenda, obtained from other sources.
3. A Pre-Proposal Conference will not be held. All questions regarding the Proposal Documents shall be submitted in writing to the BUYER at least 10 days prior to the deadline for submitting proposals. Oral statements may not be relied upon and will not be binding or legally effective.
4. A Proposal Bond or certified bank check in the amount of 5 percent of the Base Proposal shall be included with each Proposal.
5. Contract Times for commencement and completion shall be in accordance with Article 5 of the Procurement Agreement.
6. The acceptance of any Proposal shall be subject to funds approved for such purposes.
7. Proposals shall be mailed, or hand delivered to Jenny Coker, P.E., Public Works Director, City of Sandy, 39250 Pioneer Boulevard, Sandy, OR 97055. Additional information may be obtained from Ms. Coker, (503) 668-6927, Jcoker@ci.sandy.or.us, or from Stantec, 601 SW 2nd Avenue, Suite 1400, Portland, OR 97204, Attn: Adam Odell, P.E., (503) 220-5409, Adam.Odell@Stantec.com. The outside of the envelope or box should be marked: “MEMBRANE PROPOSAL ENCLOSED.”
8. This Request for Proposals may be cancelled or bids may be rejected for not complying with all prescribed procedures and requirements or when it is in the best interest of the City, as determined in its sole discretion. City is not liable to any bidder for any loss or expense caused by or resulting from the cancellation or rejection of a solicitation, bid, proposal or award.



9. This project was funded in part with a financial award from the Special Public Works Fund, funded by the Oregon State Lottery and administered by the Oregon Infrastructure Finance Authority
10. Any and all bids may be rejected for good cause on a finding that it is in the public interest to do so.

Dated: February 14th, 2024

Engineer:

City of Sandy, OR
c/o Jenny Coker, PE
39250 Pioneer Blvd.
Sandy, OR 97055
(503) 668-6927
Jcoker@ci.sandy.or.us

Stantec Consulting Services Inc.
Attn: Adam Odell, P.E.
601 SW 2nd Avenue, Suite 1400
Portland, OR 97204
(503) 220-5409
Adam.Odell@Stantec.com

END OF SECTION

RESPONSIBILITY INQUIRY

The City will determine responsibility of a firm prior to award and execution of a contract. In addition to this form, the City may obtain any information the City deems necessary to make the determination. The City will notify the firm of any other documentation required, which may include, but is not limited to, Oregon Department of Revenue Letter of Debt Compliance, recent profit-and-loss history; current balance statements and cash flow information; assets-to-liabilities ratio, including number and amount of secured versus unsecured creditor claims; availability of short and long-term financing; bonding capacity; insurability, credit information; material; equipment; facility and personnel information; record of performance under previous contracts; etc. The City may postpone the award of the Contract in order to complete its investigation and evaluation. Failure to promptly provide requested information and clearly demonstrate Responsibility may result in offer rejection and ineligibility of contract award.

1. Does your firm have available the appropriate financial, material, equipment, facility and personnel resources and expertise, or ability to obtain the resources and expertise, necessary to demonstrate the capability of the firm to meet all contractual responsibilities? YES / NO .

2. Number of years in business providing the services/goods/equipment required under the prospective contract:

3. a) Is your firm experiencing financial distress or having difficulty securing financing? YES / NO . **b)** Does your firm have sufficient cash flow to fund day-to-day operations throughout the proposed contract period? YES / NO If "YES" on question 3.a or "NO" on question 3.b, please provide additional details.

Response:

4. Within the last 3-year period, has your firm had one or more contracts terminated for contractor default by any federal, state or local government agency, or any lawsuits filed against it by creditors or involving contract disputes? YES / NO . If "YES," please explain. (With regard to judgments, include jurisdiction and date of final judgment or dismissal.)

Response:

5. Is your firm, a major partner or major shareholder (defined as a partner or shareholder owning 10% or more of your firm), a major subcontractor (defined as receiving 10% or more of the total Contract amount), or any principal officer of your firm, major partner, major shareholder, or major subcontractor presently, or within the last 3 years has been convicted of, indicted for, or otherwise criminally or civilly charged by a governmental entity with the commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of federal or state antitrust statutes relating to the submission of bids or Proposals; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property?

YES / NO . If "YES," indicate the jurisdiction, date of indictment, charge or judgment and names and summary of charges.

Response:

6. Within the last 3-year period, has your firm filed a bankruptcy action, filed for reorganization, made a general assignment of assets for the benefit of creditors, or had an action for insolvency instituted against it? YES / NO . If "YES," indicate the filing dates, jurisdictions, type of action, ultimate resolution, and dates of judgment or dismissal, if applicable.

Response:

7. a) Within the last 3-year period, has your firm been notified of any delinquent Federal or State taxes in an amount that exceeds \$3,000 for which the liability remains unsatisfied. YES /NO .

b) Does your firm have any liquidated and delinquent debt owed to the State or any department or agency of the State? If "YES" on 7.a or 7.b or both, please explain. YES /NO

Response:

8. Does your firm have all required licenses, insurance and/or registrations, if any, and is the firm legally authorized to do business in the State of Oregon. YES /NO . If "NO," please explain.
Response:

9. Within the last 3-year period, has your firm completed previous contracts of a similar nature with a satisfactory record of performance? [For purposes of this question, a satisfactory record of performance means that to the extent that the costs associated with and time available to perform a previous contract remained within your firm's control, your firm stayed within the time and budget allotted for the procurement and otherwise performed the contract in a satisfactory manner.] YES /NO . If "NO," please explain.
Response:

AUTHORIZED SIGNATURE

By signature below, the undersigned Authorized Representative on behalf of Bidder/Proposer certifies that the responses provided on this form are complete, accurate, and not misleading.

Name of Firm:	RFP # (if applicable): Project Name:
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Authorized Signature Date

Print Name Title

SECTION 00 20 00 INSTRUCTIONS TO PROPOSERS

ARTICLE 1 -- DEFINED TERMS

- 1.01 Terms used in these Instructions to Proposers have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Proposers have the meanings indicated below which are applicable to both the singular and plural thereof:
- A. Any reference or use of the word “Bid” or “Bidder” contained in the Contract Documents shall be interpreted as “Proposal” or “Proposer.”
 - B. The City of Sandy shall act in the role of “Buyer”, “Owner”, or “City”.
 - C. The Membrane System Supplier (MSS) shall act in the role of “Seller” or “Supplier.”
 - D. The membrane element manufacturer (MEM) shall supply membrane modules to the MSS.

ARTICLE 2 -- COPIES OF PROPOSAL DOCUMENTS

- 2.01 Complete sets of the Proposal Documents shall be used in preparing Proposals including Volumes 1, 2, and 3; neither the Buyer nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.
- 2.02 Buyer and Engineer in making copies of Proposal Documents available on the above terms do so only for the purpose of obtaining Proposals for furnishing Goods and Special Services and do not confer a license or grant for any other use.
- 2.03 Reproduction and/or distribution of the Proposal Documents to another party that is not directly associated with the project is strictly prohibited.

ARTICLE 3 -- QUALIFICATIONS OF PROPOSERS

- 3.01 This request for Proposals is open only to pre-qualified Proposers. A Proposal may be rejected if the Proposer cannot meet the deadlines established in the Contract Documents.
- A. Based on the Buyer’s review, the following MSS’s are acceptable
 - 1. PALL Water
 - 2. H2O Innovation
 - B. Based on the Buyer’s review, the following MEMs and modules are acceptable:
 - 1. PALL (ASAHI) UNA-620A Microfiltration Membrane Module
 - 2. Toray HGUF2020AN Ultrafiltration Membrane Module
 - 3. No request for approved equals will be accepted for other MEMs

- 3.02 By issuing a Bid pursuant to this RFP, the Seller represents and warrants that it shall provide the goods and services requested in the RFP in accordance with the highest standards prevalent in the industry or business most closely involved in providing such goods and services.
- 3.03 If the Seller has multiple options, such as different equipment arrangements, the Seller may provide the Buyer with two Proposals. Instructions are provided in Article 11.

ARTICLE 4 -- EXAMINATION OF PROPOSAL DOCUMENTS AND POINT OF DESTINATION

- 4.01 Upon request, the Buyer will provide Proposer reasonable access to the facility location to conduct investigations, examinations, tests, and studies that Proposer deems necessary for submission of a Proposal.
- 4.02 Before submitting a Proposal, Proposers shall:
- A. Examine and carefully study the Proposal Documents, including any Addenda and the related data identified in the Proposal Documents;
 - B. Become familiar with all federal, state, and local laws and regulations that may affect cost, progress, or the furnishing of Goods and Special Services;
 - C. Carefully study and correlate the information known to Proposer, and information and observations obtained from Proposers visits, if any, to the facility location, with the Proposal Documents;
 - D. Promptly give Engineer written notice of all conflicts, errors, omissions, ambiguities, or discrepancies that Proposer discovers in the Proposal Documents and obtain written confirmation from the Engineer of the resolution of the issues; and
 - E. Determine that the Proposal Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing Goods and Special Services.

ARTICLE 5 -- PRE-PROPOSAL CONFERENCE

- 5.01 A Pre-Proposal Conference will not be held. All questions regarding the Proposal Documents shall be submitted in writing to the Buyer no later than the date indicated in Article 6 of the Instructions to Proposers. Oral statements by the Buyer or Engineer may not be relied upon and will not be binding or legally effective.

ARTICLE 6 -- INTERPRETATIONS AND ADDENDA

- 6.01 All questions about the meaning or intent of the Proposal Documents are to be submitted to the Buyer in writing. Interpretations or clarifications considered necessary by the Buyer in response to such questions will be issued by addenda mailed or delivered to all parties having received the Proposal Documents. Questions received less than ten days prior to the Proposal Closing Time will not be answered. Only answers in the Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.02 Addenda may be issued to clarify, correct, or change the Proposal Documents.
- 6.03 Right to Protest: A Proposer may protest specifications or Contract terms and conditions. Protests must be in writing and delivered to the Buyer not less than 10 days prior to the Proposal closing time.

ARTICLE 7 -- PROPOSAL SECURITY

- 7.01 A Proposal must be accompanied by Proposal security made payable to the Buyer, in an amount of 5 percent of the base Proposal Pricing and in the form of a certified bank check, irrevocable letter of credit issued by an insured institution acceptable to the State of Oregon, or a Proposal Bond, on the form attached, issued by a surety meeting the requirements of Paragraph 4.1.B of the General Conditions.
- 7.02 The Proposal security for all Proposers shall be retained until the Buyer completes the Procurement Proposal evaluation in accordance with Section 00 31 00, Proposal Evaluation. The Proposal security of the apparent successful Proposer will be retained until such Proposer has executed the agreement, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Proposal security will be returned. If the apparent successful Proposer fails to execute and deliver the agreement and furnish the required Contract security within 15 days after the Notice of Award, the Buyer may annul the Notice of Award and the Proposal security of that Proposer will be forfeited. The Proposal security of other Proposers whom the Buyer believes to have a reasonable chance of receiving the award may be retained by the Buyer until the earlier of seven days after the Procurement Proposal evaluation or 60 days after the Proposal Opening Time, whereupon the Proposal security furnished by such Proposers will be returned.
- 7.03 Proposal security of other Proposers whom the Buyer believes do not have a reasonable chance of receiving the award will be returned within seven days after the Proposal Opening Time.

ARTICLE 8 -- "OR EQUAL" ITEMS

- 8.01 The Contract, if awarded, will be on the basis of materials and equipment, (including component equipment and Proposers equipment) specified or described in the Proposal Documents without consideration of possible "or-equal" items. Whenever it is specified or described in the Proposal Documents that an "or-equal" item of material or equipment may be furnished or used by Supplier if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the agreement. The procedure for submittal of any such application by Supplier and consideration by Engineer is set forth in the Procurement General Conditions.
- 8.02 Component equipment and Proposers equipment is defined in the General Conditions.
- 8.03 For component equipment provided by the Proposer, if the manufacturer or supplier of equipment has changed the model or component part number identified in the specifications, the current model or part number shall be used. If the manufacturer or Supplier has discontinued the model identified in the specifications, the Proposer shall base the Proposal on one of the other manufacturer(s) listed. If another manufacturer or supplier is not listed, the Proposer shall request an interpretation by the Engineer.

ARTICLE 9 -- PREPARATION OF PROPOSAL

- 9.01 The Proposal Form is included with the Proposal Documents.
- 9.02 All blanks on the Proposal Form and Proposal Pricing Form shall be completed by printing in ink or by typewriter and the Proposal signed. A Proposal price shall be indicated for each Proposal item, alternative, or unit price item listed therein, or the words "No Proposal," "No Change," or "Not Applicable" entered. If a Proposer is requested to provide pricing on Alternatives requested by the Buyer and fails to provide such pricing, the Proposal shall be determined to be non-responsive, and shall be rejected.
- 9.03 A Proposal 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. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 9.04 All names must be typed or printed in ink below the signature.
- 9.05 The Proposal shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Proposal Pricing Form.
- 9.06 The person, address and telephone number for communications regarding the Proposal shall be shown.
- 9.07 Exceptions and Requests for Modifications to the Proposal Documents.
- A. Proposers shall carefully review the Agreement, the Procurement General Conditions, and Warranty Sections of the Contract Documents. Proposers "Standard Terms and Conditions of Sale" will not be accepted. The Buyer will reject any Proposal that has any exceptions to the Contract Documents or any request to modify the Contract Documents.

- B. The Proposer shall carefully review the provisions of the membrane warranty contained in the General Conditions and in Section 01 74 00, Membrane System and Module Warranty. Subject to the requirements of Article 15.01, the Buyer will reject any Proposal containing changes to the warranty provisions as a non-responsive Proposal.
- 9.08 To demonstrate Proposers Qualifications to furnish Goods and Special Services, the Proposer shall submit written evidence of the following accompanying information with the Proposal.
- A. The Proposer shall provide written evidence from the surety that it can obtain the required Bonds and Insurances required by the Contract Documents.
 - B. The Proposer shall disclose in writing if there is any legal claim regarding a patent or other intellectual property that would affect its ability to provide the Goods or Special Services required by the Contract.
- 9.09 Prices offered shall include all applicable taxes and duties.
- 9.10 The Proposer shall submit a proposed maintenance agreement for consideration by the Buyer. The maintenance agreement shall list service types, service type fees, labor fees, overhead rate, proposed profit margin, all charges and markups, reimbursements, and method for annual escalation. The proposed maintenance agreement shall be signed and ready for execution by the Buyer if acceptable until the time that “notice to commence fabrication” is issued.

ARTICLE 10 -- BASIS OF PROPOSAL; COMPARISON OF PROPOSALS

10.01 Base Proposal with Alternates

- A. The “Base Proposal” is the sum stated in the Proposal for which the Proposer offers to furnish the Goods and Special Services described in the Proposal Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Proposals. An “Alternate Proposal” (or Alternate) is an amount stated in the Proposal that may be added or deducted to the amount of the Base Proposal if the corresponding change in the Goods and Special Services, as described in the Proposal Documents, is accepted.
- B. Proposer shall submit a Proposal for the Base Proposal and indicate the amount for each Alternate described in the Proposal Documents as set forth in the Proposal Form.
- C. Discrepancies between words and figures will be resolved in favor of the words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- D. The Buyer shall only evaluate Proposals that have been determined to be responsive.

ARTICLE 11 -- SUBMITTAL OF PROPOSAL

- 11.01 The Buyer shall reject any Proposal as non-responsive if the Proposal contains any information separate or prepared as an attachment to the requested information, other than the items that have been specifically requested.
- A. The Proposal shall be submitted in two sealed envelopes – Envelope No. 1 and Envelope No. 2 – which shall contain the items of information listed in Section 00 40 00, Proposal Form, Article 6. If the Seller wishes to provide two Proposals, the Seller shall mark each envelope with Option ‘A’ or Option ‘B’, respectively.
- 11.02 Proposal must be received by the Buyer no later than the Proposal Closing Time at the place indicated in the Request for Proposals. If a Proposal is sent by mail or other delivery system, the sealed envelopes shall be enclosed in a separate envelope plainly marked on the outside with the notation “MEMBRANE PROPOSAL ENCLOSED.” Inside this sealed envelope shall be the two separate sealed envelopes clearly marked as Envelope 1 and Envelope 2. A mailed Proposal shall be addressed to Jenny Coker, Public Works Director of Engineering, City of Sandy, 39250 Pioneer Blvd., Sandy, OR 97055. For clarity's sake, the Public Works Director is authorized and designated the requisite authority to receive proposals on behalf of the City.
- 11.03 Proposals delivered in person must be turned in prior to the Proposal Closing Time.

ARTICLE 12 -- MODIFICATION OR WITHDRAWAL OF PROPOSAL

- 12.01 A Proposal may be modified or withdrawn by a document executed in the manner that a Proposal must be executed and delivered to the place where Proposals are to be submitted prior to the Proposal Closing Time.

ARTICLE 13 -- PROPOSALS TO REMAIN SUBJECT TO ACCEPTANCE

- 13.01 All Proposals will remain subject to acceptance for the period of time stated in the Proposal Form, but the Buyer may, in its sole discretion, release any Proposal and return the Proposal security prior to the end of this period.

ARTICLE 14 -- AWARD OF CONTRACT

- 14.01 Responsiveness and Buyer’s Reserved Rights
- A. Proposals received by the Buyer will be reviewed for responsiveness. The Buyer reserves the right to reject any and all Proposals, including without limitation, non-conforming, unbalanced, or conditional or otherwise nonresponsive Proposals. The Buyer may also reject the Proposal of any Proposer if the Buyer believes that it would not be in the best interest of the Buyer to make an award to that Proposer. The Buyer also reserves the right but is not obligated to waive all informalities not involving price, time or changes in the Goods and Special Services. Finally, the Buyer reserves the right to reject all Proposals.

- B. More than one Proposal for the same Goods and Special Services from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Proposer has an interest in more than one Proposal for the Goods and Special Services and shall be cause for disqualification of that Proposer and the rejection of all Proposals in which that Proposer has an interest.

14.02 Evaluation

- A. In evaluating Proposals, the Buyer will consider whether or not the Proposals comply with the prescribed requirements, prices and other data, as may be requested in the Proposal Form or may be requested from Proposers prior to a Notice of Award.
- B. The Buyer and the Engineer will evaluate responsive Proposals as described in Section 00 31 00, Proposal Evaluation. In evaluating Proposers for responsibility, consideration will be given to the financial strength and competency of the Proposer for the ability to supply the Goods and Services covered by the Contract Documents.
- C. By submitting a Proposal, each Proposer agrees that the Buyer, in determining eligibility for the award, may consider the Proposers conduct and performance under other Contracts, financial condition, and other factors, including claims against, the Proposer, which could affect the Proposers ability to provide the Goods and Special Services. The Buyer may conduct such investigations as the Buyer deems necessary to assist in the evaluation of any Proposer and to establish the responsibility qualifications and financial ability of the Proposer to provide the Goods and Special Services in accordance with the Contract Documents to the Buyer's satisfaction within the prescribed time. The Buyer may request written clarification from the Proposer to clarify the Proposal. Subject to the statutory rights of the Proposer, the Buyer shall be the sole judge of responsiveness and reserves the right to reject the Proposal of any Proposer who does not pass any such evaluation to the sole satisfaction of the Buyer.
- D. Proposers are advised that the capital cost (i.e., equipment) will be used in the evaluation of Proposals to determine the system cost.
- E. In addition to the criteria outlined in Part 3 of Section 00 31 00, Proposal Evaluation, the Buyer will consider the following elements in evaluating Proposals:
 - 1. The ability, capability and skill of the Proposer to perform the Contract or provide the service required; or
 - 2. The character, integrity, reputation, judgment, experience and efficiency of the Proposer; or
 - 3. Whether the Proposer can perform the Contract or provide the service promptly, and within the time specified without delay or interference; or
 - 4. The performance quality of previous Contracts or services; or
 - 5. Previous and existing compliance by the Proposer with laws relating to the Contract or service; or

6. The financial responsibility of the Proposer to perform the Contract or provide the service; or
7. The limitations of any license the Proposer may be required to possess; or
8. The quality, availability, and the adaptability of the product or service; or
9. The ability of the Proposer to provide future maintenance and service; or
10. Other information as may be pertinent and having a bearing on the decision to award the Contract; or
11. Compatibility and uniformity with existing equipment, services and procedures.

14.03 Intent to Award, Right to Protest

- A. Upon completion of its evaluation, the Buyer will provide written Notice of Intent to Award to all Proposers.
- B. Proposers may protest the Notice of Intent to Award. Only those who have protested the Notice of Intent to Award may protest a Notice of Award. All protests are subject to the Buyer's public Contracting rules.

14.04 Contract

- A. Contract, if awarded, will be awarded to the best responsive and responsible Proposer, consistent with the Buyer's public Contracting rules and the request for Proposals, including these instructions for Proposers.

ARTICLE 15 -- CONTRACT SECURITIES

- 15.01 Article 4 of the Procurement General Conditions sets forth the Buyer's requirements as to Performance and other bonds and insurance. When the Successful Proposer delivers the executed Agreement to the Buyer, it must be accompanied by the required Performance and other Bonds.

ARTICLE 16 -- EXECUTION OF AGREEMENT

- 16.01 The successful Proposer shall sign and deliver the required number of copies of the agreement with attached documents to the Buyer within 15 days of receipt.

ARTICLE 17 -- CONTRACT TO BE ASSIGNED

- 17.01 Paragraph 11.2 of the agreement provides for the assignment of the Contract for furnishing Goods and Special Services covered by these Proposal Documents to a Contractor designated by the Buyer to construct the facilities and install the goods. Forms for documenting the assignment and for the agreement of the Seller's surety to such assignment are included as attachments to the agreement.

END OF SECTION

SECTION 00 31 00 PROCUREMENT PROPOSAL EVALUATION

PART 1 -- NOT USED

PART 2 -- NOT USED

PART 3 -- RFP EVALUATION CRITERIA

3.01 Responsive proposals will be evaluated in accordance with the requirements stated in this solicitation and any addenda issued. Evaluation of Proposals shall be accomplished by an evaluation team, which will determine the rankings of proposals. Each proposal will initially be evaluated only considering the contents of Envelope 1 for comparison of qualifications, experience, capabilities and capacity and scored accordingly. Once all proposals are evaluated and scored on the contents of Envelope 1, the evaluation team will then examine and score the contents of Envelope 2. The composite scores of Envelope 1 and Envelope 2 will be used as the basis for award to the highest combined scoring proposal.

3.02 In general, the information contained in Envelope No. 1 will be evaluated on: parent company qualifications, membrane system supplier qualifications, membrane fiber/module qualifications, and membrane system qualifications.

3.03 Envelope No. 2 will contain the membrane system capital cost information, the additive bid items and a detailed list of exemptions, exclusions, or assumptions not included from the technical specifications.

3.04 NOTE: Scoring within these categories is not limited to review of proposal information, but shall include, prior SOQs provided by each proposer, known operational facilities, references, and balance of plant evaluation.

The Buyer, at its sole discretion, may elect to select the top-scoring Proposers for an oral presentation.

The Buyer may contact any proposer for clarification of any portion of Proposer's proposal.

3.05 Evaluation Categories:

<u>ENVELOPE 1 SCORING CRITERIA</u>		
PARENT COMPANY AND ORGANIZATION INFORMATION	=	5 POINTS
MSS COMPANY AND ORGANIZATION INFORMATION	=	15 POINTS
MEMBRANE FIBER AND MODULE INFORMATION	=	20 POINTS
MEMBRANE SYSTEM INFORMATION	=	30 POINTS
TOTAL FOR ENVELOPE 1	=	70 POINTS
<u>ENVELOPE 2 SCORING CRITERIA</u>		
TOTAL CONTRACT PRICE (ITEM 4 IN SPECIFICATION 00 41 00)	=	20 POINTS
DETAILED LIST OF EXCEPTIONS, EXCLUSIONS, OR ASSUMPTIONS	=	10 POINTS
ADDITIVE BID ITEMS	=	0 POINTS
TOTAL FOR ENVELOPE 2	=	30 POINTS
<u>TOTAL FOR PROPOSAL (ENVELOPE 1 + ENVELOPE 2)</u>	=	100 POINTS

3.06 PURCHASE ORDER AWARD CONDITIONS

- A. The information contained in Envelope No. 1 will be evaluated and utilized to rank the Proposers in order of preference before opening Envelope No. 2. The evaluation team will consist of representatives of the Buyer. Buyer will then open Envelope No. 2 and assign points for capital cost, based on the following:
1. Lowest price to receive full 20 points
 2. Mathematical difference between lowest price and another Proposer price is divided by the lowest price to arrive at a value that is then subtracted from 1.00. This resultant value will then be multiplied by the 20 points to determine the assigned points to other Proposers price.
- B. If Buyer is able to reach agreement with preferred Proposer on scope, schedule, and pricing, then Buyer will move forward with the preferred Proposer.

- C. If Buyer is unable to reach agreement with preferred Proposer on scope, schedule and pricing then Buyer will formally notify preferred Proposer of Buyer's intent to initiate discussions with second Proposer. If Buyer is able to reach agreement with second Proposer on scope, schedule, and pricing, then Buyer will move forward with second Proposer. If Buyer is unable to reach agreement with second Proposer on scope, schedule, and pricing, then Buyer may 1) reopen negotiations with one or both of the Proposers or 2) Buyer may discontinue RFP process and select neither Proposer.

END OF SECTION

SECTION 00 40 00 PROPOSAL FORM

PROPOSAL FOR:
CITY OF SANDY, OREGON. ALDER CREEK UPGRADE PROJECT

ARTICLE 1 – PROPOSAL RECIPIENT

1.01 THIS PROPOSAL IS SUBMITTED TO:

City of Sandy, OR
Attn: Jenny Coker, PE, Public Works Director.
Address: 39250 Pioneer Boulevard, Sandy, OR 97055
Phone: (503) 668-6927
Email: Jcoker@ci.sandy.or.us

ARTICLE 2 – PROPOSER’S ACKNOWLEDGEMENTS

- 2.01 The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with the Buyer, in the form included in the Proposal Documents, to furnish the Goods and Special Services as specified or indicated in the Proposal Documents for the prices and within the times indicated in this Proposal and in accordance with all other terms and conditions specified in the Proposal Documents.
- 2.02 Proposer accepts all of the terms and conditions of the Proposal Documents, including and without limitation, those dealing with the disposition of Proposal security. The Proposal will remain subject to acceptance for 90 days after the Proposal Closing Time, or for such longer period of time that Proposer may agree to in writing upon request of the Buyer.
- 2.03 Proposer accepts the provisions of the Agreement for liquidated damages in the event of its failure to furnish the Goods and Special Services in accordance with the schedule set forth in the Agreement.
- 2.04 Proposer accepts the provisions of the Agreement for assignment of the Contract for furnishing Goods and Special Services.
- 2.05 Proprietary Membrane System Proposers Acknowledgements
- A. The Proposer acknowledges that it is the intent of the Proposal Documents to allow the Buyer to select a Proposer that will provide Goods and Special Services that conforms to the requirements of the Procurement Documents.
- B. The Proposer acknowledges that they are a provider of membrane filtration equipment that incorporates proprietary design features. The Proposer recognizes that because of the inherent differences in the proprietary membrane equipment, the Proposal Documents include both equipment that is proprietary to the Proposer and requirements for equipment that is used in municipal membrane water treatment plants.

- C. The Proposer acknowledges that during the development of the Proposal Documents, the Proposer has established design (i.e., capacity, membrane flux, redundancy), operational (i.e., energy, chemicals, chemical cleaning intervals,) and equipment requirements specific to the Proposer. The Proposer recognizes that the establishment of such design criteria is based upon the results of professional judgment and treatment of other similar water with site-specific considerations of the Buyer.
 - D. The Proposer acknowledges that it has reviewed the design criteria and that the Proposal offered will meet the design and operational criteria as described in the Proposal Documents. In submitting the Proposal, the Proposer agrees to provide Goods to meet or exceed the requirements required by the Proposal Documents.
 - E. The Proposer acknowledges that in accordance with Article 14 of Section 00 20 00, Instructions to Proposers, the Buyer has reserved its rights.
 - F. The Proposer acknowledges that the selection of a proprietary membrane equipment supplier (Proposer) is the sole decision of the Buyer and such decisions are final.
- 2.06 The Proposer accepts that the Contract Price offering for Special Engineering Services is fair and reasonable.
- 2.07 The Proposer accepts that the Buyer retains the right to issue a “Notice to Commence Fabrication” for the Membrane Filtration System. The Proposer acknowledges that until the “Notice to Commence Fabrication” is issued, the Buyer is not obligated to any monetary commitment associated with this Contract beyond that which is associated with Special Engineering Services and Pilot Testing.
- A. A “Notice to Commence Fabrication” may be issued at any time for a period of 365 days after the Effective Date of the Agreement.
 - B. Upon the issuance of the “Notice to Commence Fabrication” the Contract Price for Membrane Units and Ancillary Equipment shall remain valid until 365 days after the Effective Date of the Agreement. If the Notice to Commence Fabrication is issued after 365 days of the Effective Date of the Agreement, the Contract Price will be adjusted through Change Order by the ratio of the Consumer Price Index (CPI) of the CPI of month that the Notice to Commence Fabrication is issued to the CPI of the month 365 days after the Effective Date of the Agreement.

- 2.08 The Proposer accepts that if the Proposer submits a Membrane Module Warranty Period in excess of 120-months, the Proposal shall be rejected as non-responsive with the requirements of the Proposal Documents.
- 2.09 Proposer acknowledges that their Proposal is being submitted to a public agency and that the Proposal will become public information as of the Proposal Closing Time. Additionally, the Proposer acknowledges that the Proposal and subsequent Proposal evaluation and recommendations to award a contract will become public information. In submitting this Proposal, the Proposer waives all rights pertaining to the confidentiality of documents whether or not specifically stated or implied. Exceptions will be a basis for declaring the Proposal non-responsive. If a Proposal contains any information that the Proposer believes is exempt from disclosure under the various grounds specified in the Oregon Public Records Law, the Proposer must clearly designate each such portion of its proposal as exempt at the time of proposal submission, along with a justification and citation to the legal authority relied upon. Identifying the Proposal, in whole, as exempt from disclosure is not acceptable. Failure to identify specific portions of the Proposal as exempt shall be deemed a waiver of any future claim of that information as exempt. The City will make available to any person requesting information, through the City processes for disclosure of public records, any and all information submitted as a result of this RFP not exempted from disclosure without obtaining permission from any Proposer to do so. City may also, in its sole discretion, elect to publish all such information at any time, regardless of whether or not a public records request has been received. However, if a public records request is made for material marked by the Proposer as exempt, the City will attempt to notify the impacted Proposer prior to any release of the material. Application of the Oregon Public Records Law by the City will determine whether any information is actually exempt from disclosure. The City accepts no liability for the release of any information submitted.
- 2.10 The Proposal shall be based upon design criteria, including maximum membrane flux established in the membrane procurement documents.
- 2.11 The Proposal Pricing shall include all applicable taxes and duties.

ARTICLE 3 – PROPOSER’S REPRESENTATIONS

- 3.01 In submitting this Proposal, Proposer represents, as set forth in the Agreement, that:
- A. Proposer has examined and carefully studied the Proposal Documents, the other related data identified in the Proposal Documents, and the following Addenda, receipt of which is hereby acknowledged.

ADDENDUM NO.

ADDENDUM DATE

- B. If specified, or if in Proposers judgment, any local condition may affect cost, progress or the furnishing of Goods and Special Services, Proposer has visited the Point of Destination and become familiar with and is satisfied as to the local conditions that may affect cost, progress, or the furnishing of Goods and Special Services.
- C. Proposer is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of Goods and Special Services.
- D. Proposer has carefully studied and correlated the information known to Proposer, and information and observations obtained from Proposers visits, if any, to the Point of Destination with the Proposal Documents.
- E. Proposer has given Buyer written notice of all conflicts, errors, omissions, ambiguities, or discrepancies that Proposer has discovered in the Proposal Documents, and the written resolution thereof by Buyer is acceptable to Proposer.
- F. The Proposal Documents are sufficient to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services for which this Proposal is submitted.
- G. Proposer further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any individual or entity to refrain from Proposal; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over the Buyer.

ARTICLE 4 – BASIS OF PROPOSAL

4.01 Refer to Section 00 41 00, Proposal Pricing Form.

ARTICLE 5 – TIME OF COMPLETION

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

ARTICLE 6 – ATTACHMENTS TO THIS PROPOSAL

6.01 Proposals must include submission of two sealed envelopes – Envelope No. 1 and Envelope No. 2 – as detailed below and must follow the additional requirements in Article 9 of Section 00 20 00, Instructions to Proposers to be considered responsive..

A. Sealed Envelope No. 1:

1. Required Proposer qualifications statement, accompanying information and supporting data, including:
 - a. The completed Proposal Form (Section 00 40 00, Proposal Form)
 - b. The completed Proposal Bond (Section 00 61 27, Proposal Bond)
 - c. The evidence of the authority to sign.
 - d. The draft pilot test plan, per Section 11 30 20, Performance Pilot Testing of Membrane Equipment.
2. The Seller (Membrane System Supplier or MSS) company and organization information
 - a. Provide the following information on the Seller (MSS) portion of the parent company, and the parent company itself, as appropriate:
 - 1) Parent Company:
 - a) A copy of the most recent annual report for the prospective proposer, including a certified financial statement for the most recent fiscal year.
 - b) Company background, including Organization Chart, number of employees (membrane specific, engineering, commissioning), and years in business under current name and ownership. Include same information for any affiliated companies integral to the timely manufacture, assembly, testing and delivery of the proposed membrane systems' major components (i.e. sub-assemblies, pumps, controls, etc.)
 - c) The most recent independent audit report.
 - d) Experience in the municipal water and wastewater treatment industry, both in the United States and internationally, and evidence of commitment to the municipal market.

- e) Dunn and Bradstreet reference number which can be used to access D&B records to independently determine the credit rating of the company.
- f) Approximate current annual revenue from sales of technology for municipal water and wastewater treatment, and 5-year trend.

2) Seller MSS Company:

- a) A copy of the most recent annual report for the prospective proposer, including a certified financial statement for the most recent fiscal year.
- b) Company background, including Organization Chart, number of employees (membrane specific, engineering, commissioning), and years in business under current name and ownership. Include same information for any affiliated companies integral to the timely manufacture, assembly, testing and delivery of the proposed membrane systems' major components (i.e. sub-assemblies, pumps, controls, etc.)
- c) The most recent independent audit report.
- d) Documented experience gaining approval for municipal installations through Oregon Health Authority
- e) A description of the manufacturing facilities, their current and projected capacities; and their ability to meet delivery of 2 mgd systems in 2024-2025.
- f) A minimum of three financial references with phone numbers; and, upon request of the City, each prospective proposer shall provide written authorization for such references to provide financial information to the City.
- g) Dunn and Bradstreet reference number which can be used to access D&B records to independently determine the credit rating of the company.
- h) Approximate current annual revenue from sales of technology for municipal water and wastewater treatment, and 5-year trend.

b. Membrane fiber and module information

- 1) Provide the following information on the membrane fiber and module proposed for use on this project:
 - a) Identified Membrane Element Manufacturer (MEM)
 - b) Documented experience of MEM treating surface water in western Washington and Oregon

c. Membrane system information

- 1) Provide the following information on the membrane filtration system proposed for use on this project:
 - a) A complete list of representative operational installations (with the product you have proposed for this project) within previous 10 years. Include the following information:
 - i. Plant Location
 - ii. Plant capacity
 - iii. Date of installation (equipment startup)
 - iv. Source water characteristics (i.e., secondary effluent, lake, reservoir, river, etc.). Clearly identify applications using coagulant addition for removal of phosphorus from municipal secondary effluent.
 - v. Type of pretreatment (coagulant, dose, type of pretreatment).
 - vi. Contact names, phone, e-mail. Proposer grants the City the right to contact any reference provided.
 - d. Identification and Qualifications of MSS's Project Manager and Resident Representative:
 - a) For the MSS's proposed project manager and resident representative (for Phase III – Post Operational Performance Test), provide name and resume listing applicable experience and references.
 - b) The MSS's project manager shall serve as the primary contact for the Buyer's project from receipt of Proposal through facility startup.
 - c) The MSS's project manager shall not be changed without the written consent of the Buyer and the Engineer.
 - d) Provide similar information for a designated secondary contact.
 - e. Proposed Performance Schedule: A detailed schedule meeting all of the requirements of Article 5 in Section 00 52 00, Procurement Agreement.
 - f. Project Delivery Plan:
 - 1) A detailed plan for the delivery including the following elements at a minimum:
 - a) Engineering Services as described in Section 01 01 00, Summary of Goods and Special Services:
 - i. Identify engineering staff
 - ii. Level of effort

- iii. Schedule
 - iv. Quality Assurance/Quality Control plan
 - v. Change Management Plan
 - vi. Communication Plan
- b) Fabrication
- i. Describe Proposer's plan to maintain and communicate schedule as it pertains to fabrication of the membrane system. What is Proposer's plan if fabrication schedule slips?
- c) Installation Services
- i. Describe Proposer's plan to meet the service requirements of Section 01 62 00, Installation of Membrane Equipment and Section 01 73 00, Installation, Operation and Maintenance Manuals.
- d) Training
- i. Describe Proposer's plan to meet the training requirements outlined in Section 01 73 10, Training of Operation and Maintenance Personnel.
- e) Commissioning
- i. Describe Proposer's plan to meet the commissioning requirements outlined in Section 01 66 00, Commissioning of Membrane Equipment.
- f) One-Year onsite services as specified in 01 67 00, Acceptance Testing of Membrane Equipment.
- i. Identify onsite and in office support staff
 - ii. Level of effort
 - iii. Quality Assurance/Quality Control plan
 - iv. Change Management Plan
 - v. Communication Plan
- g. Verification of Performance Requirements
- 1) Performance Requirements:
- a) Production Capacity: Confirm that the system will meet production capacity requirements for the range of feedwater quality stated in Section 11 30 00 Containerized Hollow Fiber Membrane Equipment Membrane Treatment System.

- b) Membrane System Recovery: Verify conformance with the membrane system recovery requirements of Section 11 30 00 Containerized Hollow Fiber Membrane Equipment Membrane Treatment System.
- c) Membrane Filtered Water Quality: Confirm that system will meet requirements for membrane filtered water quality stated in Section 11 30 00 Containerized Hollow Fiber Membrane Equipment Membrane Treatment System.
- d) Membrane Integrity Test System (MITS):
 - i. Describe monitoring parameters, instrumentation, and alarm thresholds for the online membrane integrity system.
 - ii. Describe verification, identification, and isolation procedures.
 - iii. Provide documentation describing the calculation of pathogen log removal values from the system based on the decay test results.
 - iv. State the time required to perform a MIT on each membrane train and the membrane system.
- e) Pretreatment System Compatibility:
 - i. Provide certification that the proposed membrane system is compatible with the addition of chemicals to the feedwater as described in Section 11 30 00 Containerized Hollow Fiber Membrane Equipment Membrane Treatment System.
 - ii. Identify any limits to the concentration, contact time, or product thereof (e.g., ppm-hours) for any of the potential pretreatment chemicals listed in Section 11 30 00 Containerized Hollow Fiber Membrane Equipment Membrane Treatment System. If no adverse impacts are expected, so state.
- h. Operations Descriptions:
 - a) Describe procedures for access, inspection, removal, repair, and replacement of membrane modules.
 - b) Describe startup and normal operation procedures, as well as methods for maintaining and recovering membrane system permeability (backwashing, maintenance cleans, CIPs, tank draining, etc., as applicable).
 - c) Shutdown/Storage/Startup:
 - i. Describe procedures for complete shutdown, storage of the membranes and related equipment, and startup.
 - ii. Detail process equipment necessary to accomplish storage of the plant.

- iii. Detail chemical(s) required and estimated annual use for storage.
 - iv. Detail chemical(s) used for membrane delivery and storage on site during construction and recommendation for chemical(s) disposal.
 - v. Detail, if necessary, minimal membrane flow requirement to preserve membrane integrity during storage.
- i. Statement of SCADA Software and Compatibility
 - a) Identify MSS's standard PLC applications software and SCS applications software.
 - b) Identify alternate SCS software systems, if any, utilized by MSS.
3. Letter from Proposer's surety company indicating Proposer is willing and able to provide the specified Payment and Performance Bonds.
 4. Letter from Proposer's surety company indicating Proposer is willing and able to provide a separate bond to cover Warranty obligations through the Warranty period.
 5. Letter from Proposer's insurance broker indicating Proposer is willing and able the specified Insurance.
 6. Letter from an officer of Proposer's firm stating that Proposer takes no exceptions to the Form of Agreement.
 7. A complete copy of the Proposal Documents, including Addenda. The front cover of each Volume of the Proposal Documents and Addenda shall be signed and dated by the individual designated in the Proposal Form. The documents shall be otherwise unaltered.
- B. Sealed Envelope No. 2:
1. The completed Proposal Pricing Form (Section 00 41 00, Proposal Pricing Form)
 2. Additive bid item for additional capacity; see Section 11 30 00, Containerized Hollow Fiber Membrane Equipment Membrane Treatment System.
 3. Additive bid item for membrane container storage pricing.
 - a. If the Buyer is unable to accept and store the membrane containers, the Seller shall provide a service for storing the containers at a secure location. Buyer shall provide a price per month of storage, for up to 6 months.

ARTICLE 7 – DEFINED TERMS

7.01 The terms used in this Proposal have the meanings indicated in the Procurement General Conditions. The significance of terms with initial capital letters is described in the Procurement General Conditions.

ARTICLE 8 – PROPOSAL SUBMITTAL

8.01 Respectfully submitted on (date) _____

This Proposal is submitted by:

Corporation

(Corporation Name)

(State of Incorporation)

(Signature of Officer Authorized to Sign)

(Printed or Typed Name and Title of Officer Authorized to Sign)

(CORPORATE SEAL)

(Signature of Attesting Party)

(Printed or Typed Name Attesting Party)

(Corporation Business Address)

(Phone No.)

Person to whom notices and correspondences regarding this Proposal should be addressed to:

(Corporation Business Address)

(Phone No.)

END OF SECTION

SECTION 00 41 00
PROPOSAL PRICING FORM

PROJECT TITLE: Alder Creek Water Treatment Plant Upgrade (Project)

THIS BID IS SUBMITTED TO:

City of Sandy (as Buyer):
39250 Pioneer Boulevard
Sandy, OR 97055
Attn: Jenny Coker
(505) 668-6927
Jcoker@ci.sandy.or.us

The undersigned Seller having carefully examined the drawings, specifications, and all addenda thereto, and other Procurement Documents for furnishing Goods and Special Services for Project, and become familiar with all local conditions including labor affecting the cost thereof, does hereby propose to furnish all labor, mechanics, superintendence, tools, materials, equipment and all utilities, fuel, transportation, applicable taxes and duties, and services necessary to perform and complete said work, and work incidental thereto, in a workmanlike manner, as described in the Procurement Documents, in accordance with the bid prices hereinafter set forth.

Note: Unit and lump sum prices must be shown in words and figures in the proposal for each item being bid and in the event of discrepancy, the words shall control.

Envelope 2 - Procurement of Membrane Filtration Equipment and Special Services:
Capital costs for complete Membrane System as specified in the procurement documents and drawings for the Project.

**CONTRACT PRICES FOR PROCUREMENT OF MEMBRANE FILTRATION
EQUIPMENT AND SPECIAL SERVICES**

Item 1: Price for Performance Pilot Test

The Contract Price for the Pilot Study has been determined by the Buyer as fair and reasonable.

Seventy-Five Thousand Dollars and no cents
(\$ 75,000.00)

Item 2: Price for Special Engineering Services

The Contract Price for Special Engineering Services has been determined by the Buyer as fair and reasonable.

One Hundred and Twenty-Five Thousand Dollars and no cents
(\$ 125,000.00)

Item 3: Contract Price for Containerized Membrane Filtration Systems including Ancillary Equipment

_____ dollars
(\$ _____)

Item 4: Total Contract Price
Add Items 1, 2, and 3.

_____ dollars
(\$ _____)

Item 5: Membrane Module Price*

Indicate the Membrane Module Price in current dollars as of the Proposal Opening Time.

_____ dollars
(\$ _____)

Item 6: Indicate the Proposer's maximum instantaneous membrane flux (see notes)

_____ Gallons/ ft2-day **(words)**

_____ Gallons/ ft2-day **(number)**

Notes:

1). Maximum membrane flux shall be calculated using the feed side of the membrane proposed by the Proposer as an instantaneous value. Any proposal with maximum membrane flux exceeding 60.0 gallons/ ft2-day will be rejected by the Buyer.

2). Maximum membrane flux does not include the contractual requirements for redundancy and reliability.

Item 7: Indicate the number of membrane modules per membrane unit proposed

_____ **(words)**

_____ **(number)**

Item 8: Membrane Module Warranty Period*

Per Paragraphs 2.08 and 2.09 of the Proposal Form, indicate the Membrane Module Warranty Period (Full and Pro-Rata Replacement) in months.

_____ 120 _____ months

Item 7: Membrane Module Pricing Mechanism*

Per Paragraph 2.08 of the Proposal Form, the Proposer shall indicate if membrane module pricing is fixed or variable with the CPI. Proposer shall indicate the method by writing the words “fixed membrane module price” or “variable with CPI membrane module price” in the space below.

Item 8: Container Monthly Storage Price – Additive Bid item

Per Paragraph 6.01 of the Proposal Form, the Proposer shall indicate pricing for monthly storage of membrane containers.

_____ dollars/month

(\$ _____)

Item 9: Additional Capacity – Additive Bid item

Per Paragraph 6.01 of the Proposal Form and Section 11 30 00, Containerized Hollow Fiber Membrane Equipment Membrane Treatment System, the Proposer shall indicate pricing for additional capacity.

_____ dollars

(\$ _____)

PERFORMANCE, PAYMENT, AND MAINTENANCE BOND

The Undersigned agrees, if awarded the Procurement Agreement, to furnish bonds as required by the Procurement Documents for the faithful performance of the furnishing of Goods and Special Services under the Procurement Agreement.

PROPOSAL SECURITY

Proposal security consisting of certified check, cashier's check, or bid bond (Section 00 61 27, Proposal Bond) and made payable to Buyer, in the amount of \$_____, which represents five (5) percent of the Total Amount Bid, is enclosed herewith.

The proposal security accompanying this proposal shall be returned to the Seller unless, in case of the Buyer's acceptance of the Proposal, the Seller fails to execute the Procurement Agreement and submit performance and payment bonds within 15 days after its acceptance. In such a case, the Proposal Security shall become the property of the Buyer and shall be considered as payment for damages due to delay and other inconveniences suffered by the Buyer on account of such failure of the Seller. It is understood that the Buyer reserves the right to reject any and all proposals.

RESPECTFULLY SUBMITTED ON (DATE) _____

This Proposal is submitted by:

Corporation

(Corporation Name)

(State of Incorporation)

(Signature of Officer Authorized to Sign)

(Printed or Typed Name and Title of Officer Authorized to Sign)

(CORPORATE SEAL)

(Signature of Attesting Party)

(Printed or Typed Name of Attesting Party)

(Corporation Business Address)

(Phone No.)

(Person to Whom Notices and Correspondence Regarding This Proposal Should Be Addressed)

(Corporation Business Address)

(Phone No. and Email Address)

END OF SECTION

SECTION 00 52 00 PROCUREMENT AGREEMENT

This agreement is between the City of Sandy ("Buyer") and _____ ("Seller").

ARTICLE 1 – RECITALS

- 1.01 The Project for which the Goods and Special Services are to be provided under the Contract Documents is generally described as follows: City of Sandy Alder Creek Water Treatment Plant Upgrade Project that will include an on-site proof of performance pilot test and furnishing a complete set of two (2) hollow fiber membrane containers each with a firm capacity of 2.0 mgd.
- 1.02 The Seller manufactures membrane filtration systems used in water treatment plants.
- 1.03 Seller shall furnish the Goods and Services as specified or indicated in the Contract Documents.

ARTICLE 2 -- GOODS AND SPECIAL SERVICES

- 2.01 The Seller shall provide and operate a membrane filtration pilot system on the buyer's Alder Creek water treatment plant site to validate the Seller's membrane filtration media and system, design parameters, and operating guarantees. If the Buyer determines that the pilot test is successful, the Buyer will provide the Seller with written notice. The Buyer reserves the right to evaluate the Seller's performance during the pilot study and use that as a basis for evaluating successful completion.
- 2.02 The Buyer will execute the Agreement, subject to Seller's exceptions herein, and administer the Contract for Special Engineering Services associated with the preparation of Shop Drawings and other Submittals required for the project.
- 2.03 The Buyer is not obligated under this Agreement beyond Special Engineering Services and pilot testing until it issues a "Notice to Commence Fabrication" to the Seller. A Notice to Commence Fabrication may be issued at any time for a period of 365 days after the effective date of the Agreement.
- 2.04 Upon "Notice to Commence Fabrication" from the Buyer to the Seller, the Seller shall then:
 - A. Fabricate and deliver membrane filtration equipment and ancillary components (the "Goods") to the Facility,
 - B. Assist during installation and commission the Goods,
 - C. Deliver operational and maintenance manuals,
 - D. Provide operations assistance for one year after installation of the Goods, and
 - E. Warranty the membrane modules and system per the Contract Documents.

- 2.05 The Buyer retains the right to assign the remaining portion of the work, which includes the production, delivery and commissioning of the goods and all associated Special Services, to a Contractor.
- 2.06 The Seller shall deliver the required Bonds and insurance certificates in accordance with Article 4 of the General Conditions.
 - A. At the time of the effective date of the Agreement, a Performance Bond shall be provided for the Special Engineering Services for the full amount stated in Proposal.
 - B. Another Performance Bond and the Payment Bond shall be provided upon issuance of the “Notice to Commence Fabrication” in the full amount of the stated amount in Proposal.
- 2.07 The Buyer retains the right to terminate this Agreement after the pilot test and contract with another entity to provide membrane filtration equipment for the Facility.

ARTICLE 3 – ENGINEER

- 3.01 The Contract Documents were prepared by Stantec Consulting Services Inc., 601 SW 2nd Ave, Suite 1400, Portland, OR 97204, Attn: Adam Odell, PE, Adam.Odell@stantec.com, 503.220.5409, hereinafter called “Engineer” and who is to assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents.

ARTICLE 4 – POINT OF DESTINATION

- 4.01 The Goods shall be delivered to the point of destination: The Alder Creek Water Treatment Plant, which contains no known address, but is accessible from a private gravel road in between Whiskey Creek Rd. and E. Terra Fern Drive 7 miles east of Sandy, OR.

ARTICLE 5 – CONTRACT TIMES

5.01 TIME IS OF THE ESSENCE

- A. All time limits for Milestones for the delivery of Goods and the furnishing of services as stated in the Contract Documents are of the essence of the Contract.

5.02 DAYS TO ACHIEVE THE PROOF OF PERFORMANCE PILOT TEST

- A. The dates for the pilot study are set forth in the following table:

Item No.	Pilot Study Contract Time	Notice to Begin Contract Times	Calendar Time (Days)
	Pilot Study		
A	Draft Work Plan	With Proposal	
B	Final Work Plan	Receipt of Engineer’s Comments	7
C	Deliver pilot equipment	Effective Date of Agreement	14
D	Have Pilot Plant Operational at site	Effective Date of Agreement	28

D	Complete pilot study program	Effective Date of Agreement	118
E	Submit Draft Pilot Summary Report	Effective Date of Agreement	118
F	Submit Final Pilot Summary Report	Receipt of Engineer's Comments	14

5.03 DAYS TO ACHIEVE SUBMITTAL OF SHOP DRAWINGS AND SAMPLES

A. All Shop Drawings and Samples required by the Contract Documents will be submitted to the Buyer for Engineer's review and approval in accordance with the following schedule.

Special Engineering Services

Item	Notice to Begin Contract Times	Calendar Time (Days)
1. First Shop Drawing Submittal	Effective Date of Agreement	45
2. First Shop Drawing Approval	Effective Date of Agreement	90
3. Second Shop Drawing Submittal	Effective Date of Agreement	75
4. Second Shop Drawing Approval	Effective Date of Agreement	120

5.04 DAYS TO ACHIEVE DELIVERY OF GOODS

A. The Goods are to be complete and ready for the Buyer's receipt of delivery at the Facility in accordance with the following schedule:

Goods

Item	Notice to Begin Contract Times	Calendar Time (Days)
1. Goods, excluding Computer Equipment, Membrane Modules, and Spare Parts	Notice to Commence Fabrication	240
2. Computer Equipment	Notice of Completed Installation	10
3. Membrane Modules	Notice of Completed Installation	14
4. Spare Parts	Notice of Completed Installation	30

1. The Seller shall not start to manufacture any Goods until the Shop Drawings have been approved and the Buyer has issued a "Notice to Commence Fabrication." The Goods, excluding the membrane modules, are to be fabricated and ready for delivery prior to 315 240 days after the "Notice to Commence Fabrication" is issued.
2. The Seller shall hold the spare parts, membrane modules and computer equipment and deliver to the Facility for installation during commissioning. The spare parts, computer equipment and membrane modules will be delivered in a timely manner as not to impede or delay the commissioning.

5.05 PROJECT MILESTONES FOR SPECIAL SERVICES AND SELLER'S WARRANTY AND GUARANTEE

A. The furnishing of Special Services to the Buyer will commence upon the execution of the Agreement between the Buyer and the Seller. The Seller shall deliver all Special Services required by the Contract Documents based upon the following milestones.

1. Special Engineering Services
 - a. Upon execution of the Agreement, the Seller will begin to provide Special Engineering Services required for Shop Drawings and Samples.

2. Special Services

- a. Upon the issue of a Notice to Commence Fabrication, the following Contract Times will commence.

Special Services		
Contract Time	Notice to Begin Contract Times	Calendar Time (Days)
1. Installation Manuals	Notice to Commence Fabrication	150
2. Commissioning	Notice of Completed Installation	30
3. Operator Training	Notice of Completed Commissioning	15
4. Preliminary O&M Manual	Notice of Completed Installation	15
5. Acceptance Testing	Notice of Completed Operator Training	45
6. Final O&M Manual	Notice of Substantial Completion	45
7. Warranty Period	Notice of Substantial Completion	365

- b. Operational and Maintenance Manuals shall be delivered at the times indicated in Section 01 73 00, Installation, Operations and Maintenance Manuals.
- c. In accordance with Section 01 62 00, Installation of Membrane Equipment, Special Services associated with the Installation of the Goods, shall commence with the delivery of the Goods and shall be completed when the “Notice of Completed Installation” is issued by the Engineer.
- d. In accordance with Section 01 66 00, Commissioning of Membrane Equipment, commissioning shall commence after the “Notice of Completed Installation” is issued and associated work has been completed. Upon completion of commissioning, a “Notice of Completed Commissioning” will be issued by the Engineer.
- e. In accordance with Section 01 73 10, Training of Operations and Maintenance Personnel, Operator Training shall commence after the “Notice of Completed Commissioning.” Upon completion of Operator Training, a “Notice of Training Completion” will be issued by the Engineer.
- f. In accordance with Section 01 67 00, Acceptance Testing of Membrane Equipment, acceptance testing shall not commence until after the prerequisite “Notice of Training Completion” is issued. Upon completion of Acceptance Testing, the “Notice of Substantial Completion” will be issued by the Engineer.
- g. In accordance with Section 01 68 00, Operations Assistance, operations assistance shall be provided in accordance with the requirements of that Section. The Correction Period shall commence on the date when the “Notice of Substantial Completion” is issued.
- B. For the purposes of Seller’s warranty and guarantee, the following Project milestones are as follows:
1. In accordance with Section 01 74 00, Membrane System and Module Warranty, the Membrane Module Warranty Period shall commence on the date when the Acceptance Testing first begins.

2. The Correction Period shall commence on the date the “Notice of Substantial Completion” is issued.

5.06 LIQUIDATED DAMAGES

- A. The Buyer and the Seller recognize that time is of the essence of this Agreement and that the Buyer will suffer damages if the Special Engineering Services are not delivered to the Buyer within the times specified in Paragraph 5.02, above. They also recognize that the timely performance of services by other parties involved in the Buyer’s Project are materially dependent upon the Seller’s specific compliance with the requirements of Paragraph 5.02 plus any extensions thereof allowed in accordance with Article 7 of the General Conditions. Further, they recognize the delays, expense, and difficulties involved in proving the actual losses or damages suffered by the Buyer if complete acceptable submittals are not delivered on time. Accordingly, and instead of requiring proof of such losses or damages, the Buyer and the Seller agree that as liquidated damages for delay (but not as a penalty), the Seller shall pay the Buyer \$2,500.00 for each day that expires after the times or dates specified in Paragraph 5.02 for deliveries of acceptable submittals. By execution of this Agreement, the Buyer and the Seller expressly agree that these liquidated damage amounts are reasonable under the circumstances existing at the time this Agreement is executed.

- B. The Buyer and the Seller recognize that time is of the essence of this Agreement and that the Buyer will suffer damages if 1) the Goods, associated with the Membrane Filtration System are not fabricated and ready for delivery to the Buyer within the time specified in Paragraph 5.03 above, or 2) if the membrane modules are not delivered in a timely manner as stated in Paragraph 5.03 above. They also recognize that the timely performance by other parties involved in the Buyer’s Project are materially dependent upon the Seller’s specific compliance with the requirements of Paragraph 5.03 plus any extensions thereof allowed in accordance with Article 7 of the General Conditions. Further, they recognize the delays, expense, and difficulties involved in proving the actual losses or damages suffered by the Buyer if complete acceptable Goods or membrane modules are not delivered on time. Accordingly, and instead of requiring proof of such losses or damages, the Buyer and the Seller agree that as liquidated damages for delay (but not as a penalty) the Seller shall pay Buyer \$2,500.00 for each day that expires after the times or dates specified in Paragraph 5.03 for delays involving delivery of the Goods. By execution of this Agreement, the Buyer and the Seller expressly agree that these liquidated damage amounts are reasonable under the circumstances existing at the time this Agreement is executed.

- C. The Buyer and the Seller recognize that time is of the essence of this Agreement and that the Buyer will suffer damages if the Special Services are not delivered in a timely manner as stated in Paragraph 5.04, above. They also recognize that the timely performance by other parties involved in the Buyer's Project are materially dependent upon the Seller's specific compliance with the requirements of Paragraph 5.04 plus any extensions thereof allowed in accordance with Article 7 of the General Conditions. Further, they recognize the delays, expense, and difficulties involved in proving the actual losses or damages suffered by the Buyer if complete acceptable Goods, membrane modules or Special Services are not delivered on time. Accordingly, the Buyer and the Seller agree that as liquidated damages for delay (but not as a penalty) the Seller shall pay Buyer \$1,000.00 for each day that expires after the times or dates specified in Paragraph 5.04 for delays involving delivery of the Special Services. By execution of this Agreement, the Buyer and the Seller expressly agree that these liquidated damage amounts are reasonable under the circumstances existing at the time this Agreement is executed.
- D. The Buyer may deduct the amount of liquidated damages from monies due the Seller under this Agreement. Liquidated damages shall not exceed five (5) percent of the contract price.
- E. The liquidated damages provided in this Section shall be Buyer's sole and exclusive remedy for Seller's late delivery of Special Engineering Services, Goods, and Special Services.
- F. If Seller is prevented from achieving the delivery times, milestone submittal dates or response times as defined in Articles 5.02A.5, 5.03D, and 5.03E, for any reason beyond Seller's reasonable control and not attributable to its actions or inactions, Seller shall not be assessed liquidated damages and shall be entitled to an adjustment of the Contract Times in an amount equal to the duration of the reason or event causing the delay in delivery.

G. Upon receipt of Buyer's Notice to Commence Fabrication of Equipment that satisfies Seller's requirements for meeting the delivery schedule, Seller shall commence fabrication of equipment. The place of delivery specified therein shall be firm and fixed, provided that Buyer may notify Seller no later than 45 days prior to the scheduled shipment date of the products of an alternate point of delivery (the "Alternate Delivery Site"). Provided the parties agree to a variation to take into account any additional cost [or delay] incurred by Seller in implementing this change, the Alternate Delivery Site shall become the agreed place of delivery for all purposes under this Agreement. In such event the following conditions shall apply: (i) title and risk of loss shall pass to the Buyer upon delivery of the products to the Alternate Delivery Site; (ii) any amounts payable to the Seller upon delivery or shipment shall become payable upon delivery of the products to the Alternate Delivery Site; (iii) any additional expenses incurred by the Seller in connection with such shipment to storage shall become payable by the Buyer upon submission of the Seller's invoice(s) (including but not limited to costs of any additional transportation, preparation for and placement into storage, handling, inspection, preservation, insurance, storage, removal charges and any applicable taxes); (iv) transportation of the products from the storage facility to their place of installation shall be the Buyer's responsibility; and, (v) if the Contract includes Services, subject to the terms and conditions in the Contract the Seller shall resume provision of Services to Buyer when instructed to do so by Buyer provided that all amounts due hereunder plus any cost incurred by Seller in delaying such Services have been paid.

5.07 LIQUIDATED DAMAGES FOR PILOT STUDY

- A. During the Pilot Study, should the results indicate system performance capabilities that are less than those defined in Sections 11 30 00, Hollow Fiber Membrane Equipment, the Seller shall modify its equipment to meet the minimum defined system performance capabilities, repeat the entire duration of the Pilot Study, and pay for liquidated damages to account for the loss suffered by the Buyer due to schedule delay. Liquidated damages shall be assessed at \$500 per day starting at the determination of Pilot Study initial attempt failure until the commencement of the Pilot Study second attempt up to a maximum amount of \$5,000. Should the second attempt of Pilot Study yield system performance results that are less than those defined herein, the Seller will be deemed non-responsive and the Buyer may begin to negotiate with the next lowest responsive Proposer.
- B. The liquidated damages provided in this Section shall be Buyer's sole and exclusive remedy for Seller's failure to meet the Pilot Study requirements of this Agreement.
- C. Liquidated damages shall be assessed per day of delay and in the event that there are multiple items where the Contract Times has been exceeded Liquidated Damages shall not be combined.

ARTICLE 6 – CONTRACT PRICE

6.01 The Buyer shall pay Seller for furnishing the Goods and Special Services in accordance with the Contract Documents in current funds as follows:

- A. The prices stated in Seller's Proposal, attached hereto as an exhibit.

- B. Seller shall pay all applicable taxes and duties.
- C. The Contract Price for membrane units and ancillary equipment shall remain valid for 180 days after the effective date of the agreement. If the “Notice to Commence Fabrication” is issued after 180 days from the effective date of the agreement (up to a maximum of 3 years), the Contract Price will be adjusted through Change Order. Contract Price adjustment will be the ratio of the Producers Price Index (PPI) of the PPI of month that the “Notice to Commence Fabrication” is issued, to the PPI of 180 days after the effective date of the agreement.
- D. Membrane modules shall be made available for purchase by the Buyer at the pricing offered in the Proposal Pricing Form and that the pricing for future membrane modules, as part of a warranty claim or replacement purchase, shall be in accordance with the methods described in 01 74 00, Membrane System and Module Warranty. Membrane Module Pricing shall remain effective for a period of 20 years after the proposal date.
- E. In the event that the City (or Contractor if the Contract is assigned) does not issue the “Notice of Completed Installation” within 500 days after the “Notice to Commence Fabrication”, 40 percent of the Contract Price shall be adjusted through Change Order by the ratio of the PPI of the month the “Notice of Completed Installation” to the month of 500 days after the “Notice to Commence Fabrication”.
 - 1. This Change Order mechanism is provided in the event that there is an unforeseen delay during construction. The above provision is provided as the sole compensation to the Seller for the delay in the delivery of membrane modules and applicable Special Services described in Paragraph 5.03.A of the Agreement.
 - 2. The applicable provisions of Paragraph 5.03.A remain contractual obligations of the Seller.
- F. By issuance of a Change Order, all Alternate Proposal pricing in the Proposal Form shall remain open and subject to acceptance by the Buyer for a period of 2 years after the proposal date.

ARTICLE 7 – PAYMENT PROCEDURES

7.01 SUBMITTAL AND PROCESSING OF PAYMENTS

- A. Seller shall submit Applications for Payment in accordance with Article 13 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

7.02 PROGRESS PAYMENTS

- A. Buyer shall make progress payments on account of the Contract Price on the basis of Seller’s Applications for Payment as follows:
 - 1. Progress Payments for Special Engineering Services:

- a. The Buyer shall pay Seventy-Five Thousand Dollars (\$75,000.00) for Pilot Testing Services provided as part Paragraph 10.01.A.1.a.1 of the General Conditions, to the Seller upon the Buyer's approval of the first Application for Payment for Pilot Testing Services, submitted in accordance with Paragraph 10.01.A.1 of the General Conditions, and accompanied by the Engineer's recommendation for payment in accordance with Paragraph 10.2.A of the General Conditions less such amounts as Engineer may determine in accordance with Paragraph 10.02.A.3 of the General Conditions.
- b. The Buyer shall pay One Hundred and Twenty Five Thousand Dollars (\$125,000.00) for Special Engineering Services provided as part, Paragraph 10.01.A.1.a.2 of the General Conditions to the Seller upon the Buyer's approval of the Application for Payment for Special Engineering Services, submitted in accordance with Paragraph 10.01.A.1 of the General Conditions, and accompanied by the Engineer's recommendation for payment in accordance with Paragraph 10.02.A of the General Conditions less such amounts as Engineer may determine in accordance with Paragraph 10.02.A.3 of the General Conditions.

2. Progress Payments for Goods and Special Services.

- a. The Buyer shall make progress payments on the Total Contract Price for Goods and Special Services in accordance with Article 10 of the General Conditions and based upon the following schedule:

Payment Schedule

Payment	Contract Milestone(s)	Percentage of Total Contract Price
First Application	Notice to Commence Fabrication	75
Second Application	Delivery of Goods	90
Final Application	Notice of Substantial Completion	100

- b. The Buyer shall pay the above percentages of the Total Contract Price provided as part Paragraph 13.01 of the General Conditions to the Seller upon the Buyer's approval of the Application for Payment, submitted in accordance with Paragraph 13.01 of the General Conditions, and accompanied by the Engineer's recommendation for payment in accordance with Paragraph 13.02 of the General Conditions less such amounts as Engineer may determine in accordance with Paragraph 13.02 of the General Conditions.
- c. The Total Contract Price is the Total Contract Price as indicated in the Proposal Pricing Form as adjusted through change order less liquidated damages assessed as part of the Contract.

7.03 FINAL PAYMENT

- A. Upon the Buyer's approval of the final Application for Payment, accompanied by the Engineer's recommendation for payment in accordance with Article 13 of the General Conditions, the Buyer shall make the final payment to bring the total payment to 100 percent of the Contract Price as adjusted for changes to the Contract Price or less any prior payments to the Seller. This payment, at the Engineer's recommendation, may be less such amounts, as Engineer shall determine in accordance with the Agreement or any applicable provisions of the General Conditions.
- B. The Final Payment shall be accompanied by a "Notice of Contract Completion" executed by both parties.

ARTICLE 8 -- INTEREST

- 8.01 Subject to the provisions of Article 13 of the General Conditions, all monies not paid within 60 days after the receipt of the Seller's Application for payment shall accrue interest at the rate of the 6 percent per annum.

ARTICLE 9 - SELLER'S REPRESENTATIONS

- 9.01 In order to induce Buyer to enter into this Agreement, Seller makes the following representations:
 - A. Seller has examined and carefully studied the Contract Documents and the other related data identified in the Proposal Documents.
 - B. If specified or if, in Seller's judgment, any local condition may affect cost, progress or the furnishing of the Goods and Special Services, Seller has visited the Facility location and become familiar with and is satisfied as to the local conditions that may affect cost, progress or the furnishing of the Goods and Special Services.
 - C. Seller is familiar with and is satisfied as to all local federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of the Goods and Special Services.
 - D. Seller has carefully studied and correlated the information known to Seller, and information and observations obtained from Seller's visits, if any, to the Point of Destination, with the Contract Documents.
 - E. Seller has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Seller has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Seller.
 - F. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing Goods and Special Services.

- G. The Seller has provided test data from either full-scale operation(s) or pilot test data from facilities of similar water quality to the Project as information and design concepts for its proprietary membrane system. In providing the information and design concepts for this Project, the Seller has considered and incorporated the concept of “linear scalability” into its design. Linear scalability means that: 1) the Seller has considered and evaluated the design and operational requirements and results of pilot or demonstration testing, and 2) that the equipment provided by the Seller is warranted to produce water in proportion to the design and operational parameters established and demonstrated during pilot testing.
- H. The concept of linear scalability relates to the surface area of the membrane and to its corresponding ability to produce water as a dependent variable on an incremental and proportional basis. Dependent variables are the parameters of specific or instantaneous design (e.g., membrane flux, process flows, temperatures, times, maximum pressures, and chemical dosages or consumption) requirements for filtration, backwashing, cleaning, and integrity testing processes that are established on a module basis during piloting and/or incorporated into the unit and system design provided by the Seller to meet the design capacity requirements established in the Contract Documents.
- I. The concept of linear scalability excludes the independent variables that involve membrane removal performance and overall system performance established in the Contract Documents. Such independent variables include the water quality removal requirements, removal efficiency, and the minimum design requirements for Maintenance/Recovery Clean interval when the membrane system is operated within its intended process design range.
- J. Seller’s relationship to the Buyer in performance of this Agreement is that of an Independent Contractor. The personnel performing services under this Agreement shall at all times be under the Seller’s exclusive direction and control and not employees of the Buyer. Seller shall pay all wages, salaries and other amounts due to its employees in connection with this agreement and shall be responsible for all applicable state, federal, and local reports and obligations respecting them such as labor wages, social security, income tax withholding, unemployment compensation and similar matters.

ARTICLE 10 – CONTRACT DOCUMENTS

10.01 CONTENTS

- A. The Contract Documents consist of the following:
 - 1. Procurement Agreement
 - 2. Exhibits to this Agreement (enumerated as follows):
 - a. Exhibit A-1 to Agreement between Buyer and Seller dated _____, Assignment of Contract; Consent to Assignment; and Acceptance of Assignment.

- b. Exhibit A-2 to Agreement between Buyer and Seller dated _____ Agreement to Assignment by Seller's Surety.
 - c. Seller's completed Proposal Form and Proposal Pricing Form.
 - d. Documentation submitted by Seller prior to Notice of Award
3. Performance Bond
 4. Payment Bond
 5. Section 00 80 50 Supplementary Conditions to EJCD Procurement General Conditions, P-200 (2000 Edition)
 6. Conceptual Design Report – Alder Creek Water Treatment Plant Upgrade Project
 7. Addenda (Numbers _____ to _____, inclusive)
 8. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Commence Fabrication
 - b. Notice of Completed Installation
 - c. Notice of Completed Commissioning
 - d. Notice of Training Completion
 - e. Notice of Substantial Completion
 - f. Final Acceptance
 - g. Written Amendment(s)
 - h. Change Order(s)
 - i. Field Order(s)
 - j. Engineer's Written Interpretation(s).
- B. The documents listed in Paragraph 10.01 A. are attached to this Agreement (except as expressly noted otherwise above).
 - C. There are no Contract Documents other than those listed above in this Article 10.
 - D. The Contract Documents may only be amended or supplemented as provided in Paragraph 3.04 of the General Conditions.

- E. In resolving inconsistencies or ambiguities between two or more components of the Contract Documents, the highest precedence shall be given to the Agreement and the order of precedence shall decrease in the following manner:
1. Agreement
 2. Addenda
 3. Section 00 80 50 Supplementary Conditions to EJCD Procurement General Conditions, P-200 (2000 Edition)
 4. Specification Section 01 74 00, Membrane System and Module Warranty
 5. Exhibits to the Agreement
 6. Performance Bond
 7. Payment Bond.
 8. Certificates of Insurance
 9. Final Acceptance(s)
 10. Change Order(s)
 11. Engineer's Written Interpretation(s)
 12. Field Order(s)
 13. Notice(s) of Substantial Completion
 14. Notice(s) of Training Completion
 15. Notice(s) of Completed Commissioning
 16. Notice(s) of Completed Installation
 17. Notice(s) to Commence Fabrication
 18. Project Specifications shall be used to govern the quality of the Goods.
 19. Submittals provided by the Seller in fulfillment of the Contract.
- F. In the event of a conflict between a schedule or a schedule update and a specific requirement of these Contract Documents, the Contract Documents shall, at all times, have precedence. Submittal or acceptance of a schedule or schedule update shall not supersede the requirements of the Contract Documents.

ARTICLE 11 – MISCELLANEOUS

11.01 DEFINED TERMS

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

11.02 ASSIGNMENT

- A. Buyer has the right to assign the Contract for furnishing Goods and Special Services hereunder and Seller shall accept such assignment. Forms documenting the assignment of the Contract, and consent of Seller's surety to the assignment are attached as exhibits to this Agreement.
 - 1. The Contract will be executed in the name of Buyer initially and may be assigned to a Construction Contractor designated by Buyer. The assignment will occur on the effective date of the agreement between Buyer and the Construction Contractor. As of the date of acceptance of assignment by the Construction Contractor, all references in the Contract Documents to Buyer shall mean the designated Construction Contractor whose responsibilities will include the installation and erection of the Goods.
 - 2. The assignment of the Contract shall relieve Buyer from all further obligations and liabilities under the Contract. After assignment, Seller shall become a subcontractor or Seller to the assignee and, except as noted herein, all rights, duties, and obligations of Buyer under the Contract shall become the rights, duties and obligations of the assignee.
 - 3. After assignment:
 - a. All performance warranties and guarantees required by the Contract Documents will continue to run for the benefit of Buyer and, in addition, for the benefit of the assignee.
 - 1) Seller shall submit Applications for Payment to the Contractor who shall forward the Application for Payment to the Engineer.
 - 2) Buyer will provide payment directly to the Seller.
 - b. Except as provided in this Paragraph 11.02.A.3.b., all rights, duties and obligations of Engineer to assignee and Seller under this Contract will cease.
 - 1) Engineer will review Seller's Applications for Payment and make recommendations to assignee for payments as provided in Paragraphs 10.02 and 10.06 of the General Conditions.

- 2) Upon the written request of either the assignee or Seller, Engineer will issue with reasonable promptness such clarifications or interpretations of the Contract Documents, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Such written clarifications and interpretations will be final and binding on assignee and Seller unless:
 - a) an appeal from Engineer's clarification or interpretation is made within the time limits and in accordance with the dispute resolution procedures set forth in Article 13 of the General Conditions; or
 - b) if no such dispute resolution procedures have been set forth, a written notice of intention to appeal is delivered by assignee or Seller to the other within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision (unless otherwise agreed to in writing by assignee and Seller), to exercise such rights or remedies as the appealing party may have with respect to such clarification or interpretation in accordance with applicable Laws and Regulations.
 - 3) When rendering a clarification or interpretation under Paragraph 11.02.A.3.b.2), Engineer will not show partiality to assignee or Seller and will not be liable in connection with any clarification or interpretation rendered in good faith.
 - c. Upon assignment, Seller shall provide Construction Contractor with revised insurance certificates listing both Construction Contractor and Buyer as additional insureds.
- B. No other assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound. Specifically, but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law). Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

11.03 SUCCESSORS AND ASSIGNS

- A. Buyer and Seller each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

11.04 CHOICE OF LAW AND VENUE

- A. The laws of the State of Oregon shall govern the formation, interpretation, and performance of this Agreement. Venue for mediation and/or actions arising out of this Agreement shall be in Clackamas County, Oregon.

11.05 ENTIRE AGREEMENT

- A. This Agreement that includes the Contract Documents contains the entire agreement, between the parties and supersedes all prior negotiations, discussions, obligations, and rights of the parties regarding the subject matter of this Agreement. There is no other written or oral understanding between the parties. No modification, amendment or alteration of this Agreement shall be valid unless it is in writing and signed by the parties hereto.

11.06 COUNTERPARTS

- A. This Agreement may be executed in counterparts, which when taken together shall constitute a single signed original as though all parties had executed the same page.

11.07 AUTHORITY TO EXECUTE AGREEMENT

- A. Each person signing on behalf of a corporation, partnership, joint venture or governmental entity hereby declares that he or she, or it has the authority to sign on behalf of his or her or its respective corporation, partnership, joint venture, entity and agrees to hold the other party or parties hereto harmless if he or she or it does not have such authority.

11.08 SELLERS TOTAL LIMITATION OF LIABILITY

- A. Notwithstanding any other provisions of the Contract Documents, the Seller's total liability for direct damages arising at any time under any of the Contract Documents or otherwise in connection with completing the Contract (whether arising under breach of contract, tort, strict liability, or any other theory of law) shall not exceed the amount of the Contract Price. In no event shall either party be liable for any indirect, penalty, incidental, special, or consequential damages. Seller's aggregate liability under the Contract (whether arising under breach of contract, tort, strict liability, or any other theory of law) shall not exceed the amount of the Contract Price.

BUYER: City of Sandy, Oregon

SELLER: _____

By: _____

By: _____

Title _____

Executed on ____/____, 20____ (month/day/year)

[Corporate Seal]

Attest By: _____

Attest: _____
Address for giving notice:

Title _____

Approved As to Form: _____

Agent for service of process:

(If Seller is a corporation or a partnership, attach evidence of authority to sign.)

EXHIBIT A-1 to Agreement Between BUYER and SELLER Dated:

ASSIGNMENT OF CONTRACT; CONSENT TO ASSIGNMENT; AND ACCEPTANCE OF ASSIGNMENT

This assignment will be effective on the Effective Date of the Agreement between the Buyer and the construction contractor "Contractor". The Contract between the City of Sandy, Oregon ("Buyer") and

("Seller" as "MSS") for furnishing Goods and Special Services under the Contract Documents entitled **Membrane Equipment Procurement – Alder Creek Water Treatment Plant Upgrade Project** is hereby assigned, transferred, and set over to _____, ("Contractor"). Contractor shall be totally responsible for the performance of Seller and for the duties, rights, and obligations of Buyer, not otherwise retained by Buyer, under the terms of the Contract between Buyer and Seller. Upon assignment of this Procurement Agreement, Seller agrees to perform its obligations and duties to Buyer under the supervision and control of and as a subcontractor or Seller to the Contractor.

ASSIGNMENT DIRECTED BY:

City of Sandy, Oregon

(Buyer)

(If Buyer is a corporation, attach evidence of authority to sign. If Buyer is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Buyer-Seller Agreement.)

By: _____

Title: _____

Executed on ____/____/____

ASSIGNMENT ACKNOWLEDGED AND ACCEPTED BY:

Seller

(If Seller is a corporation, attach evidence of authority to sign.)

By: _____

(Signature)

(Title)

ASSIGNMENT ACCEPTED BY:

Contractor

(If Construction Contractor is a corporation attach evidence of authority to sign.)

By: _____

AGREEMENT TO ASSIGNMENT BY SELLER'S SURETY

Surety hereby acknowledges and agrees that the Contract for furnishing Goods and Special Services under the Contract Documents entitled **Membrane Equipment Procurement – Alder Creek Water Treatment Plant Upgrade Project** by and between the City of Sandy, Oregon ("Buyer") and _____ ("Seller as MSS") may be assigned, transferred, and set over to _____ ("Contractor"), in accordance with Paragraph 11.02 of Agreement between Buyer and Seller.

Surety further agrees that, upon assignment of the Contract, the Contractor shall have all the rights of the Buyer under the Performance Bond.

(Corporate Seal)

Surety
Company _____

By: _____

Signature and Title
(Attach Power of Attorney)

END OF SECTION

SECTION 00 61 00 PERFORMANCE BOND FOR PROCUREMENT CONTRACT
Document A312™ – 2010
Conforms with The American Institute of Architects AIA Document 312

Bond Number: _____

Performance Bond

CONTRACTOR:
(Name, legal status, and address)

SURETY:
(Name, legal status, and principal place of business)

State of Inc: _____

OWNER:
(Name, legal status, and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date: _____

Amount _____

Description: *(Name and location)*

City of Sandy, OR, Alder Creek Water Treatment Plant Upgrade Project

39250 Pioneer Boulevard, Sandy, OR 97055

BOND

Date: _____
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name

And Title: _____
(Any additional signatures appear on the last page of this Performance Bond)

(FOR INFORMATION ONLY – Name, address, and telephone)

Signature: _____

Name

And Title: _____

AGENT or BROKER:

OWNER'S REPRESENTATIVE:
(Architect, Engineer, or other party)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3..

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after.

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract,

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject

to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for:

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____
(Corporate Seal)

SURETY

Company: _____
(Corporate Seal)

Signature: _____
Name and Title:
Address

Signature: _____
Name and Title:
Address

SECTION 00 61 27 PROPOSAL BOND FORM
Document A310™ – 2010
Conforms with The American Institute of Architects
AIA Document 310

Bond Number: _____

Bid Bond

CONTRACTOR:

(Name, legal status, and address)

SURETY:

(Name, legal status, and principal place of business)

State of Inc: _____

OWNER:

(Name, legal status, and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

BOND AMOUNT: _____

PROJECT:

(Name, location or address, and Project number, if any)

City of Sandy, Alder Creek Water Treatment Plant Upgrade Project - 2002006267
City of Sandy, c/o Jenny Coker
39250 Pioneer Blvd., Sandy, OR 97055
(503) 668-6927, Jcoker@ci.sandy.or.us

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null

SECTION 00 61 50 PAYMENT BOND FOR PROCUREMENT CONTRACT
Document A312™ – 2010
Conforms with The American Institute of Architects
AIA Document 312

Bond Number: _____

Payment Bond

CONTRACTOR:

(Name, legal status, and address)

SURETY:

(Name, legal status, and principal place of business)

State of Inc: _____

OWNER:

(Name, legal status, and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT

Date: _____

Amount _____

Description: *(Name and location)*

City of Sandy, OR, Alder Creek Water Treatment Plant Upgrade Project

39250 Pioneer Boulevard, Sandy, OR 97055

(503) 688-6927, Jcoker@ci.sandy.or.us

BOND

Date: _____

(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: None See Section 18

CONTRACTOR AS PRINCIPAL
Company: _____ (Corporate Seal)

SURETY
Company: _____ (Corporate Seal)

Signature: _____

Signature: _____

Name

Name

And Title:

And Title:

(Any additional signatures appear on the last page of this Payment Bond)

(FOR INFORMATION ONLY – Name, address, and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:
(Architect, Engineer, or other party)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 **Claim.** A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 **Claimant.** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of the Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms

of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company: _____
(Corporate Seal)

Company: _____
(Corporate Seal)

Signature: _____
Name and Title:
Address

Signature: _____
Name and Title:
Address

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE
and

Issued and Published Jointly By



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ENGINEERS COUNCIL



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This document has been approved and endorsed by

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and the

Construction Specifications Institute



EJCDC No. P-700 (2000 Edition)

These Standard General Conditions For Procurement Contracts have been prepared for use with the Suggested Instructions to Bidders For Procurement Contracts (EJCDC No. P-200 2000 Edition), the Suggested Form of Agreement Between Buyer and Seller For Procurement Contracts (EJCDC No. P520, 2000 Edition), and the Guide to Preparation of Supplementary Conditions For Procurement Contracts (EJCDC No. P-800, 2000 Edition). Their provisions are interrelated and a change in one may necessitate a change in the others. Additional information concerning the use of the EJCDC Procurement Documents may be found in the Commentary on Procurement Documents (EJCDC No. P-001).

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EJCDC STANDARD GENERAL CONDITIONS FOR PROCUREMENT CONTRACTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Whenever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to the singular or plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Those written or graphic instruments issued prior to the opening of Bids in accordance with the Bidding Requirements which clarify or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument signed by both Buyer and Seller covering the Goods and Special Services and which lists the Contract Documents in existence on the Effective Date of the Agreement.

3. *Application for Payment*--The form acceptable to Buyer which is used by Seller in requesting progress and final payments and which is accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*--An offer or proposal submitted on the prescribed form setting forth the prices for the Goods and Special Services to be provided.

5. *Bidder*--A person who submits a Bid directly to Buyer.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Form of Bid security, if any, and Bid Form with any supplements.

8. *Buyer*--The person or public entity purchasing the Goods and Special Services.

9. *Change Order*--A document recommended by Engineer which is signed by Seller and Buyer and authorizes an addition, deletion, or revision to the Contract Documents or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A written demand or assertion by Buyer or Seller seeking an adjustment of Contract Price or Contract

Times, or both, or other relief with respect to the terms of the Contract.

11. *Contract*--The entire and integrated written agreement between Buyer and Seller concerning the Goods and Special Services. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--Those items listed in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Files in electronic media format of text, data, graphics, and the like are not Contract Documents, and may not be relied on by Seller. Approved Shop Drawings and other Seller's submittals are not Contract Documents.

13. *Contract Price*-- The moneys payable by Buyer to Seller for furnishing the Goods and Special Services in accordance with the Contract Documents as stated in the Agreement.

14. *Contract Times*--The times stated in the Agreement by which the Goods must be delivered and Special Services must be furnished.

15. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, intent, and character of the Goods and Special Services to be furnished by Seller.

16. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

17. *Engineer*--The person designated as such in the Agreement.

18. *Field Order*--A written order issued by Engineer which requires minor changes in the Goods or Special Services but which does not involve a change in the Contract Price or Contract Times.

19. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

20. *Goods*--The tangible and movable personal property that is described in the Contract Documents, regardless of whether the property is to be later attached to realty.

21. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances,

codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

22. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to the Contract Times.

23. *Notice of Award*--The written notice by Buyer to the apparent Successful Bidder stating that upon timely compliance by the apparent Successful Bidder with the conditions precedent listed therein, Buyer will sign and deliver the Agreement.

24. *Notice to Proceed*-- A written notice given by Buyer to Seller fixing the date on which the Contract Times commence to run and on which Seller shall start to perform under the Contract.

25. *Point of Destination* --The specific address of the location where delivery of the Goods shall be made as stated in the Agreement.

26. *Project*--The total undertaking of which the Goods and Special Services to be provided under the Contract are a part.

27. *Project Manual*--The bound documentary information prepared for bidding and furnishing the Goods and Special Services. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

28. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Goods and which establish the standards by which such portion of the Goods or Special Services will be judged.

29. *Seller*--The person furnishing the Goods and Special Services.

30. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Seller and submitted by Seller to illustrate some portion of the Goods or Special Services.

31. *Special Services*--Services associated with the Goods to be furnished by Seller as required by the Contract Documents.

32. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards and workmanship as applied to the furnishing of the Goods and Special Services, and certain administrative details applicable thereto.

33. *Successful Bidder*--The lowest responsible Bidder submitting a responsive Bid, to whom Buyer makes an award.

34. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

35. *Written Amendment*--A written statement modifying the Contract Documents, signed by Buyer and Seller on or after the Effective Date of the Agreement and normally dealing with the administrative aspects of the Contract Documents.

1.02 Terminology

A. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Goods or Special Services. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Goods or Special Services for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing of Goods or Special Services or any duty or authority to undertake responsibility contrary to any other provision of the Contract Documents.

2. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

3. The word “non-conforming” when modifying the words “Goods” or “Special Services”, refers to Goods or Special Services that fail to conform to the Contract Documents.

4. The word “receipt” when referring to the Goods, shall mean the physical taking and possession by the Buyer under the conditions specified in Paragraph 8.01.B.3.

B. *Day*

1. The word “day” shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds

A. When Seller delivers the executed Agreements to Buyer, Seller also shall deliver such bonds as Seller may be required to furnish.

2.02 Copies of Documents

A. Buyer shall furnish Seller up to five copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Designated Representatives

A. Buyer and Seller shall each designate its representative at the time the Agreement is signed. Each representative shall have full authority to act on behalf of and make binding decisions in any matter arising out of or relating to the Contract.

2.05 Before Starting Fabrication/Assembly of Goods

A. *Seller's Review of Contract Documents:* Before commencing performance of the Contract, Seller shall carefully study and compare the Contract Documents and check and verify pertinent requirements therein and, if specified, all applicable field measurements. Seller shall promptly report in writing to Buyer and Engineer any conflict, error, ambiguity or discrepancy which Seller may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any work affected thereby.

2.06 Progress Schedule

A. Within 15 days after the Contract Times start to run, Seller shall submit to Buyer and Engineer an acceptable progress schedule of activities, including at a minimum, Shop Drawing and Sample submittals, tests, and deliveries as required by the Contract Documents. No progress payment will be made to Seller until an acceptable schedule is submitted to Buyer and Engineer.

B. The progress schedule will be acceptable to Buyer and Engineer if it provides an orderly progression of the submittals, tests, and deliveries to completion within the specified Milestones and the Contract Times. Such acceptance will not impose on Buyer or Engineer responsibility for the progress schedule, for sequencing, scheduling, or progress of the work nor interfere with or relieve Seller from Seller's full responsibility therefor. Such acceptance shall not be deemed to acknowledge the reasonableness and attainability of the schedule.

2.07 Preliminary Conference

A. Within 20 days after the Contract Times start to run, a conference attended by Seller, Buyer, Engineer and others as appropriate will be held to establish a working understanding among the parties as to the Goods and Special Services and to discuss the schedule referred to in Paragraph 2.06.A., procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT AND AMENDING

3.01 Intent

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided, whether or not specifically called for, at no additional cost to Buyer.

C. Clarifications and interpretations of, or notifications of minor variations and deviations in, the Contract Documents, will be issued by Engineer as provided in Article 9.

3.02 Laws and Regulations, Standards, Specifications and Codes

A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws and Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws and Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

B. No provision of any such standard, specification, manual or code, or any instruction of a supplier shall be effective to change the duties or responsibilities of Buyer or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be

effective to assign to Buyer or Engineer, or any of their consultants, agents, or employees any duty or authority to supervise or direct the performance of Seller's obligations or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. *Reporting Discrepancies:* If, during the performance of the Contract, Seller discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Contract or of any standard, specification, manual or code, or of any instruction of any supplier, Seller shall promptly report it to Buyer in writing for Engineer's review. Seller shall not proceed with the furnishing of the Goods or Special Services affected thereby until an amendment to or clarification of the Contract Documents has been issued. Seller shall not be liable to Buyer or Engineer for failure to report any such conflict, error, ambiguity, or discrepancy unless Seller knew or reasonably should have known thereof.

B. *Resolving Discrepancies:* Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

1. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
2. the provisions of any Laws or Regulations applicable to the furnishing of the Goods and Special Services (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Clarifying Contract Documents

A. The Contract Documents may be amended to provide for additions, deletions, and revisions to the Goods or Special Services or to modify the terms and conditions thereof by a Written Amendment or a Change Order.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Goods or Special Services not affecting Contract Price or Contract Times may be authorized, by one or more of the following ways: 1) a Field Order; 2) Engineer's approval of a Shop Drawing pursuant to Paragraph 5.06.D.2; or 3) Engineer's written interpretation or clarification.

ARTICLE 4 - BONDS AND INSURANCE

4.01 Bonds

A. Seller shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price, to Buyer. The bonds shall be delivered in accordance with Paragraph 2.01 and shall remain in effect at least one year after the date final payment is due, except as provided otherwise by Laws or Regulations.

B. The bonds shall be issued in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations and shall be executed by a surety named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on a bond is declared bankrupt or becomes insolvent or its right to do business is terminated in the state where the Project is located or it ceases to meet the requirements of Paragraph 4.01.B, Seller shall provide another bond and surety which comply with those requirements within 20 days, at Seller's expense.

4.02 Insurance

A. Seller shall provide insurance of the types and coverages and in the amounts stipulated in the Supplementary Conditions.

ARTICLE 5 - SELLER'S RESPONSIBILITIES

5.01 Supervision and Superintendence

A. Seller shall be solely responsible for the means, methods, techniques, sequences, and procedures used in performing its obligations. Seller shall be responsible to see that the completed Goods and Special Services conform to the Contract Documents.

5.02 Labor, Materials and Equipment

A. Seller shall provide competent, qualified and trained personnel in all aspects of its performance of the Contract.

B. All equipment, products and material incorporated into the Goods shall be as specified, or if not specified, shall be new, of good quality and protected, assembled, used, connected, applied, cleaned and conditioned in accordance with the original manufacturer's instructions, except as otherwise may be provided in the Contract Documents.

5.03 Compliance with Laws and Regulations, Standards, Specifications and Codes

A. Seller shall comply with all Laws and Regulations applicable to the furnishing of the Goods and Special Services.

5.04 Or Equals

A. Whenever an item of material or equipment to be incorporated into the Goods is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier or manufacturer, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or-equal” item is permitted, other items of material or equipment or material or equipment of other suppliers or manufacturers may be submitted to Buyer for Engineer’s review.

1. If in Engineer’s sole discretion, such an item of material or equipment proposed by Seller is functionally equal to that named and sufficiently similar so that no change in related work will be required, it may be considered by Engineer as an “or-equal” item.

2. For the purposes of this paragraph, a proposed item of material or equipment may be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment, Engineer determines that: 1) it is at least equal in quality, durability, appearance, strength, and design characteristics; and 2) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; and

b. Seller certifies that: 1) there is no increase in any cost including capital, installation or operating to Buyer; and 2) the proposed item will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

B. *Engineer’s Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraph 5.04.A. Engineer will be the sole judge of acceptability. No “or-equal” will be ordered, manufactured or utilized until Engineer’s review is complete, which will be evidenced by an approved Shop Drawing. Engineer will advise Buyer and Seller in writing of any negative determination. Notwithstanding Engineer’s approval of an “or-equal” item, Seller shall remain obligated to comply with the requirements of the Contract Documents.

C. *Special Guarantee:* Buyer may require Seller to furnish at Seller’s expense a special performance guarantee or other surety with respect to any such proposed “or-equal.”

D. *Data:* Seller shall provide all data in support of any such proposed “or-equal” at Seller’s expense.

5.05 Taxes

A. Seller shall be responsible for all taxes and duties arising out of the sale of the Goods and the furnishing of Special Services. All taxes are included in the Contract Price.

5.06 Shop Drawings and Samples

A. Seller shall submit Shop Drawings and Samples to Buyer for Engineer’s review and approval in accordance with the schedule required in Paragraph 2.06.A. All submittals will be identified as required and furnished in the number of copies specified in the Contract Documents. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Seller proposes to provide.

B. Where a Shop Drawing or Sample is required by the Contract Documents, any related work performed prior to Engineer’s approval of the pertinent submittal will be at the sole expense and responsibility of Seller.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Seller shall have determined and verified:

a. all field measurements (if required), quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto; and

b. that all materials are suitable with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the furnishing of Goods and Special Services.

2. Seller shall also have reviewed and coordinated each Shop Drawing or Sample with the Contract Documents.

3. Each submittal shall include a written certification from Seller that Seller has reviewed the subject submittal and confirmed that it is in compliance with the requirements of the Contract Documents. Both Buyer and Engineer shall be entitled to rely on such certification from Seller.

4. With each submittal, Seller shall give Buyer and Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both in a written communication separate from the submittal and by specific notation on each Shop Drawing or Sample.

D. Engineer’s Review

1. Engineer will provide timely review of Shop Drawings and Samples.

2. Engineer's approval of Shop Drawings or Samples will be subject to the standard of Paragraph 1.02.A.1. Engineer's approval will not relieve Seller from responsibility for any variation from the requirements of the Contract Documents unless Seller has in writing called Engineer's attention to each such variation at the time of each submittal as required by Paragraph 5.06.C.1. and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval.

E. Resubmittal Procedures

1. Seller shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. Seller shall direct specific attention in writing to any revisions other than the corrections called for by Engineer on previous submittals.

5.07 *Continuing Performance*

A. Seller shall adhere to the progress schedule established in accordance with Paragraph 2.06.A., and the Goods shall be delivered and the Special Services furnished within the Contract Times specified in the Agreement.

B. Seller shall carry on the work and adhere to the progress schedule during all disputes or disagreements with Buyer. No work shall be delayed or postponed pending resolution of any disputes or disagreements.

5.08 *Seller's Warranties and Guarantees*

A. Seller warrants and guarantees to Buyer that the title to the Goods conveyed shall be proper, its transfer rightful, and free from any security interest, lien, or other encumbrance.

B. Seller warrants and guarantees to Buyer that all Goods and Special Services will conform with the Contract Documents, including any Samples approved by Engineer, and the Goods will be of merchantable quality. Engineer shall be entitled to rely on representation of Seller's warranty and guarantee.

C. Seller's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, improper modification or improper maintenance or operation by persons other than Seller, or
2. normal wear and tear under normal usage.

D. Seller's obligation to furnish the Goods and Special Services in accordance with the Contract Documents shall be absolute. None of the following will constitute an

acceptance of Goods or Special Services that are non-conforming, or a release of Seller's obligation to furnish the Goods and Special Services in accordance with the Contract Documents:

1. observations by Buyer or Engineer;
2. recommendation by Engineer or payment by Buyer of any progress or final payment;
3. use of the Goods by Buyer;
4. any acceptance by Buyer (subject to the provisions of Paragraph 8.02.D.1) or any failure to do so;
5. the issuance of a notice of acceptance by Buyer pursuant to the provisions of Article 8;
6. any inspection, test or approval by others; or
7. any correction of non-conforming Goods or Special Services by Buyer.

E. Buyer shall within a reasonable time notify Seller of any breach of Seller's warranties or guarantees. If Buyer receives notice of a suit or claim as a result of such breach, Buyer also may give Seller notice in writing to defend such suit or claim. If Seller fails to defend such suit or claim, Seller will be bound in any subsequent suit or claim against Seller by Buyer by any factual determination in the prior suit.

5.09 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Seller shall indemnify and hold harmless Buyer, Engineer, and their officers, directors, shareholders, partners, employees, agents, consultants, contractors and subcontractors from any and all claims, costs, losses, and demands or judgments for damages for claims (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or relating to a negligent act or omission or the breach of any obligation under this Contract by Seller, or its officers, directors, shareholders, partners, employees, agents, consultants, contractors or subcontractors, or anyone for whom Seller is responsible, provided that any such claim, cost, loss, or damage;

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Goods or Special Services themselves), including the loss of use resulting therefrom; and
2. is caused in whole or in part by any negligent act or omission of Seller or any individual or entity directly or indirectly employed to furnish any of the Goods or Special Services or anyone for whose acts Seller may be liable, regardless of whether or not caused in part by any

negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. The indemnification obligations of Seller under paragraph 5.09.A shall not extend to the liability of Engineer and Engineer's consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

ARTICLE 6 - SHIPPING AND DELIVERY

6.01 Shipping

A. Seller shall select the carrier and bear all costs of packaging, transportation, insurance, special handling and any other costs associated with shipment and delivery.

6.02 Delivery

A. Seller shall deliver the Goods F.O.B. the Point of Destination in accordance with the Contract Times set forth in the Agreement, or other date agreed to by Buyer and Seller.

B. Seller shall provide written notice to Buyer at least 15 days before shipment of the manner of shipment and the anticipated delivery date. The notice shall also include any instructions concerning special equipment or services required at the Point of Destination to unload and care for the Goods. Seller shall also require the carrier to give Buyer at least 24 hours notice by telephone prior to the anticipated hour of delivery.

C. Buyer will be responsible and bear all costs for unloading the Goods from carrier.

D. Buyer will assure that adequate facilities are available to receive delivery of the Goods during the Contract Times set forth in the Agreement, or another date agreed by Buyer and Seller.

E. No partial deliveries shall be allowed, unless permitted or required by the Contract Documents or agreed to in writing by Buyer.

6.03 Risk of Loss

A. Risk of loss and insurable interests transfer from Seller to Buyer upon Buyer's receipt of the Goods.

B. Notwithstanding the provisions of Paragraph 6.03.A, if Buyer rejects the Goods as non-conforming, the risk of loss on such Goods shall remain with Seller until Seller corrects the non-conformity or Buyer accepts the Goods.

ARTICLE 7 - CHANGES: SCHEDULE AND DELAY

7.01 Changes in the Goods and Special Services

A. Buyer may at any time, without notice to any surety, make changes in the Contract Documents within the general scope of the Contract.

B. If any such change or action by Buyer affects the Contract Price or Contract Times, Seller shall notify Buyer within 15 days after the occurrence of the event giving rise thereto, and written supporting data will be submitted to Buyer within 45 days after such occurrence. If Seller fails to do so, Seller waives any Claim for such adjustment.

C. Seller shall not suspend performance while Buyer and Seller are in the process of making such changes and any related adjustments.

7.02 Changes in Laws and Regulations

A. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of furnishing the Goods and Special Services shall be the subject of an adjustment in Contract Price or Contract Times. If Buyer and Seller are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 9.06.A.

7.03 Changing Contract Price or Contract Times

A. The Contract Price or Contract Times may only be changed by:

1. a Change Order;
2. a Written Amendment; or
3. a written unilateral order of Buyer, in which case Seller shall be entitled to an equitable adjustment in Contract Price or Contract Times for any reasonable and necessary costs or delays incurred by Seller to accommodate such a change.

B. If Seller is prevented from delivering the Goods or performing the Special Services within the Contract Times for any unforeseen reason beyond its control and not attributable to its actions or inactions, then Seller shall be entitled to an adjustment of the Contract Times to the extent attributable to such reason. Such reasons include fire, floods, epidemics, abnormal weather conditions, acts of God, acts of war, directions by government authority, and other like matters. If such an event occurs and delays

Seller's performance, Seller shall notify Buyer in writing within 15 days of the beginning of the event causing the delay, stating the reason therefor.

C. Contract Times will not be modified for delays within the control of Seller, including labor strife, transportation shortages or delays at Seller's facilities. Delays attributable to and within the control of Seller's subcontractors or suppliers shall be deemed to be delays within the control of Seller.

D. If Seller is prevented from delivering the Goods or furnishing the Special Services within the Contract Times due to the actions or inactions of Buyer, Seller shall be entitled to any reasonable and necessary additional costs arising out of such delay to the extent directly attributable to Buyer.

E. Neither Buyer nor Seller shall be entitled to any damages arising from delays which are beyond the control of both Buyer and Seller, including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, acts of war, direction by government authority, and other like matters.

ARTICLE 8 - BUYER'S RIGHTS

8.01 Inspections and Testing

A. General

1. Buyer shall have the right to perform, or cause to be performed, reasonable inspections and require reasonable tests of the Goods at Seller's facility, and at the Point of Destination. Seller shall allow Buyer a reasonable time to perform such inspections or tests.

2. Seller shall bear all expenses, except for travel, lodging and subsistence expenses of Buyer's representatives, for inspections and tests at Seller's facility, but Buyer shall be entitled to reimbursement from Seller of travel, lodging and subsistence expenses of Buyer's representatives if the Goods are non-conforming.

3. Buyer shall bear all expenses, except for travel, lodging and subsistence expenses of Seller's representatives, for inspections and tests at the Point of Destination, but Buyer shall be entitled to reimbursement from Seller for Buyer's expenses for reinspection or retesting if, on the basis of an initial inspection or testing, the Goods are determined to be non-conforming.

4. Seller shall provide Buyer 30 days written notice of the readiness of the Goods for all inspections, tests, or approvals which the Contract Documents specify are to be observed by Buyer prior to shipment.

5. Buyer will give Seller timely notice of all specified tests, inspections and approvals of the Goods which are to be conducted at the Point of Destination.

6. If, on the basis of any inspections or testing, the Goods appear to be conforming, Buyer will give Seller prompt notice thereof. If on the basis of said inspections or testing, the Goods appear to be non-conforming, Buyer will give Seller prompt notice thereof and will advise Seller of the remedy Buyer elects under the provisions of Paragraph 8.02.

7. Neither payments made by Buyer to Seller prior to any tests or inspections, nor any tests or inspections shall constitute acceptance of non-conforming Goods, or prejudice Buyer's rights under the Contract.

B. Inspection on Delivery

1. Buyer or Engineer will inspect the Goods upon delivery solely for purposes of identifying the Goods and general verification of quantities and observation of apparent condition in order to provide a basis for a progress payment. Such inspection will not be construed as final or as receipt of any Goods and Special Services that, as a result of subsequent inspections and tests, are determined to be non-conforming.

2. Within ten days of such inspection, Buyer shall provide Seller with written notice of Buyer's determination regarding conformity of the Goods. In the event Buyer does not provide such notice, it will be presumed that the Goods appear to be conforming.

3. If, on the basis of the inspection specified in Paragraph 8.01.B.1, the Goods appear to be conforming, Buyer's notice thereof to Seller will acknowledge receipt of the Goods.

C. Final Inspection

1. After all of the Goods have been incorporated into the Project, tested in accordance with such testing requirements as are specified, and are functioning as intended, Buyer or Engineer will make a final inspection.

2. If, on the basis of the final inspection, the Goods are conforming, Buyer's notice thereof will constitute Buyer's acceptance of the Goods.

3. If, on the basis of the final inspection, the Goods are non-conforming, Buyer will identify the non-conformity in writing.

8.02 Non-Conforming Goods or Special Services

A. If, on the basis of inspections and testing prior to delivery, the Goods appear to be non-conforming, or if at any time after Buyer has acknowledged receipt of delivery and before the expiration of the correction period described in Paragraph 8.03, Buyer determines that the Goods are non-conforming, Seller shall promptly, without cost to Buyer and in response to written instructions from Buyer, either

correct such non-conforming Goods, or, if rejected by Buyer, remove and replace the non-conforming Goods with conforming Goods, including all work required for reinstallation.

B. Buyer's Rejection of Non-Conforming Goods

1. If Buyer elects to reject the Goods in whole or in part, Buyer's notice to Seller will describe in sufficient detail the non-conforming aspect of the Goods. If Goods have been delivered to Buyer, Seller shall promptly, and within the Contract Times, remove and replace the rejected Goods.

2. Seller shall bear all costs, losses and damages attributable to the removal and replacement of the non-conforming Goods as provided in Paragraph 8.02.E.

3. Upon rejection of the Goods, Buyer retains a security interest in the Goods or to the extent of any payments made and expenses incurred in their testing and inspection.

C. Remedying Non-Conforming Goods or Special Services

1. If Buyer elects to permit the Seller to modify the Goods to remove the non-conformance, Seller shall promptly provide a schedule for such modifications and shall make the Goods conforming within a reasonable time.

2. If Buyer notifies Seller in writing that any of the Special Services are non-conforming, Seller shall promptly provide conforming services acceptable to Buyer. If Seller fails to do so, Buyer may delete the Special Services and reduce the Contract Price a commensurate amount.

D. Buyer's Acceptance of Non-Conforming Goods

1. Instead of requiring correction or removal and replacement of non-conforming Goods discovered either before or after final payment, Buyer may accept the non-conforming Goods. Seller shall bear all costs, losses, and damages attributable to Buyer's evaluation of and determination to accept such non-conforming Goods as provided in Paragraph 8.02.E.

E. Seller shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, retesting and for any engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs arising out of or relating to the non-conforming Goods or Special Services, including the correction or removal and replacement of the non-conforming Goods and the replacement of property of Buyer and others destroyed by the correction or removal and replacement of the non-conforming Goods, or the obtaining of conforming Special Services from others.

8.03 Correction Period

A. Seller's responsibility for correcting all non-conformities in the Goods will extend for a period of one year after the earlier of the date on which Buyer has placed the Goods in continuous service or the date of final payment, or for such longer period of time as may be prescribed by Laws or Regulations or by the terms of any specific provisions of the Contract Documents.

ARTICLE 9 - ROLE OF ENGINEER

9.01 Duties and Responsibilities

A. The duties and responsibilities and the limitations of authority of Engineer are set forth in the Contract Documents.

9.02 Clarifications and Interpretations

A. Engineer will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents as Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Such written clarifications and interpretations will be binding on Buyer and Seller. If either Buyer or Seller believes that a written clarification or interpretation justifies an adjustment in the Contract Price or Contract Times, either may make a Claim therefor.

9.03 Authorized Variations

A. Engineer may authorize minor deviations or variations in the Contract Documents by: 1) issuance of approved Shop Drawings when such change or deviation was duly noted by Seller as required in Paragraph 5.06.C.4, or 2) a Field Order.

9.04 Rejecting Non-Conforming Goods and Special Services

A. Engineer will have the authority to disapprove or reject Goods or Special Services which Engineer believes to be non-conforming.

9.05 Decisions on Requirements of Contract Documents

A. Engineer will be the initial interpreter of the Contract Documents and judge of the acceptability of the Goods and Special Services. Claims, disputes and other matters relating to the acceptability of the Goods and Special Services or the interpretation of the requirements of the Contract Documents pertaining to Seller's performance will be referred initially to Engineer in writing with a request for a formal decision in accordance with this paragraph.

B. When functioning as interpreter and judge under this Paragraph 9.05, Engineer will not show partiality to Buyer

or Seller and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by Engineer pursuant to this Paragraph 9.05 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 10.07) will be a condition precedent to any exercise by Buyer or Seller of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.06 *Claims and Disputes*

A. *Notice:* Written notice of each Claim, dispute or other matter relating to the acceptability of the Goods and Special Services or the interpretation of the requirements of the Contract Documents pertaining to Seller's performance shall be delivered by the claimant to Engineer and the other party to the Agreement within 15 days after the occurrence of the event giving rise thereto, and written supporting data will be submitted to Engineer and the other party within 45 days after such occurrence unless Engineer allows an additional period of time to ascertain more accurate data.

B. *Engineer's Decision:* Engineer will render a decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. Engineer's written decision on such Claim, or dispute, or other matter will be final and binding upon Buyer and Seller unless:

1. an appeal from Engineer's decision is made within the time limits and in accordance with the dispute resolution procedures set forth in Article 13; or

2. if no such dispute resolution procedures have been set forth, a written notice of intention to appeal is delivered by Buyer or Seller to the other and to Engineer within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision (unless otherwise agreed to in writing by Buyer and Seller), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If Engineer does not render a formal decision in writing within the time stated in Paragraph 9.06.B., a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

ARTICLE 10 - PAYMENT

10.01 *Applications for Progress Payments*

A. Seller shall submit to Buyer for Engineer's review Applications for Payment filled out and signed by Seller and accompanied by such supporting documentation as is required by the Contract Documents and also as Buyer or Engineer may reasonably require. The timing and amounts of progress payments shall be as stipulated in the Agreement.

1. The first application for Payment will be submitted after review and approval by Engineer of all Shop Drawings and of all Samples required by the Contract Documents.

2. The second Application for Payment will be submitted after receipt of the Goods has been acknowledged in accordance with Paragraph 8.01.B and will be accompanied by a bill of sale, invoice or other documentation satisfactory to Buyer warranting that Buyer has rightfully received good title to the Goods from Seller and that the Goods are free and clear of all liens. Such documentation will include releases and waivers from all parties with viable lien rights. In the case of multiple deliveries of Goods, additional Applications for Payment accompanied by the required documentation will be submitted as Buyer acknowledges receipt of additional items of the Goods.

10.02 *Review of Applications for Progress Payments*

A. Engineer will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Buyer, or return the Application to Seller indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Seller may make the necessary corrections and resubmit the Application.

1. Engineer's recommendation of payment requested in the first Application for Payment will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data, that the Shop Drawings and Samples have been reviewed and approved as required by the Contract Documents and Seller is entitled to payment of the amount recommended.

2. Engineer's recommendation of payment requested in the Application for Payment submitted upon Buyer's acknowledgment of receipt of the Goods will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data Seller is entitled to payment of the amount recommended. Such recommendation will not constitute a representation that Engineer has made a final inspection of the Goods, that the Goods are free from non-conformities, acceptable or in conformance with the Contract Documents, that Engineer has made any investigation as to Buyer's title to the Goods, that exhaustive or continuous inspections have been made to check the quality or the quantity of the Goods beyond the responsibilities specifically assigned to Engineer in the Contract Documents or that there may not

be other matters or issues between the parties that might entitle Seller to additional payments by Buyer or Buyer to withhold payment to Seller.

3. Engineer may refuse to recommend that all or any part of a progress payment be made, or Engineer may nullify all or any part of any payment previously recommended if, in Engineer's opinion, such recommendation would be incorrect or if on the basis of subsequently discovered evidence or subsequent inspections or tests Engineer considers such refusal or nullification necessary to protect Buyer from loss because the Contract Price has been reduced, Goods are found to be non-conforming, or Seller has failed to furnish acceptable Special Services.

10.03 Amount and Timing of Progress Payments

A. Subject to Paragraph 10.02.A., the amounts of the progress payments will be as provided in the Agreement. Buyer shall within 30 days after receipt of each Application for Payment with Engineer's recommendation pay Seller the amount recommended; but, in the case of the Application for Payment upon Buyer's acknowledgment of receipt of the Goods, said 30-day period may be extended for so long as necessary (but in no event more than 60 days) for Buyer to examine the bill of sale and other documentation submitted therewith. Buyer shall notify Seller promptly of any deficiency in the documentation and shall not unreasonably withhold payment.

10.04 Suspension of or Reduction in Payment

A. Buyer may suspend or reduce the amount of progress payments, even though recommended for payment by Engineer, under the following circumstances:

1. Buyer has reasonable grounds to conclude that Seller will not furnish the Goods or the Special Services in accordance with the Contract Documents,

2. Buyer has requested in writing assurances from Seller that the Goods or Special Services will be delivered or furnished in accordance with the Contract Documents, and Seller has failed to provide adequate assurances within ten days of Buyer's written request.

B. If Buyer refuses to make payment of the full amount recommended by Engineer, Buyer will provide Seller and Engineer immediate written notice stating the reason for such action and promptly pay Seller any amount remaining after deduction of the amount withheld. Buyer shall promptly pay Seller the amount withheld when Seller corrects the reason for such action to Buyer's satisfaction.

10.05 Final Application for Payment

A. After Seller has corrected all non-conformities to the satisfaction of Buyer and Engineer, furnished all Special Services, and delivered all documents required by the

Contract Documents, Engineer will issue to Buyer and Seller a notice of acceptability. Seller may then make application for final payment following the procedure for progress payments. The final Application for Payment will be accompanied by all documentation called for in the Contract Documents, a list of all unsettled claims and such other data and information as Buyer or Engineer may reasonably require.

10.06 Final Payment

A. If, on the basis of the review of the final Application for Payment and accompanying documentation, Engineer is satisfied that the Goods and Special Services have been furnished in accordance with the Contract Documents, and that Seller's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, recommend in writing final payment subject to the provisions of Paragraph 10.07 and present the Application to Buyer. Otherwise, Engineer will return the Application to Seller, indicating the reasons for refusing to recommend final payment, in which case Seller shall make the necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, Buyer shall, within 30 days after receipt thereof, pay Seller the amount recommended by Engineer.

10.07 Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Buyer against Seller, except Claims arising from unsettled liens and Claims, from non-conformities in the Goods or Special Services appearing after final payment, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Seller's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Seller against Buyer other than those previously made in accordance with the requirements herein and expressly noted in writing by Seller as still unsettled in its final Application for Payment.

ARTICLE 11 - CANCELLATION, SUSPENSION, AND TERMINATION

11.01 Cancellation

A. Buyer has the right to cancel the Contract, without cause, at any time prior to delivery of the Goods by written notice. Cancellation pursuant to the terms of this paragraph shall not constitute a breach of contract by Buyer. Upon cancellation:

1. Buyer shall pay Seller for Goods, specially manufactured for the Project, plus any documented

reasonable direct and indirect costs incurred by Seller in producing such Goods not recovered by payment for the reasonable value of the Goods.

2. For Goods which are not specially manufactured for the Project, Seller shall be entitled to a restocking charge of 10 percent of the unpaid Contract Price of such Goods.

11.02 *Suspension of Performance by Buyer*

A. Buyer has the right to suspend performance of the Contract, without cause, by written notice. Upon suspension under this paragraph, Seller shall be entitled to an increase in the Contract Times and Contract Price caused by the suspension, provided that performance would not have been suspended or delayed for causes attributable to Seller.

11.03 *Suspension of Performance by Seller*

A. Subject to the provisions of Paragraph 5.07.B, Seller may suspend the furnishing of the Goods and Special Services only under the following circumstance:

1. Seller has reasonable grounds to conclude that Buyer will not perform its future payment obligations under the Contract. (“Reasonable grounds” shall not include a pending dispute or disagreement with Buyer) and,

2. Seller has requested in writing assurances from Buyer that future payments will be made in accordance with the Contract, and Buyer has failed to provide such assurances within ten days of Seller’s written request.

11.04 *Breach and Termination*

A. Buyer’s Breach

1. Buyer shall be deemed in breach of the Contract if it fails to comply with any material provision of the Contract Documents, including but not limited to:

- a. wrongful rejection or revocation of Buyer’s acceptance of the Goods,
- b. failure to make payments in accordance with the Contract Documents, or
- c. wrongful repudiation of the Contract.

2. Seller shall have the right to terminate the Contract for cause by declaring a breach should Buyer fail to comply with any material provisions of the Contract. Upon termination, Seller shall be entitled to all remedies provided by Laws and Regulations.

- a. In the event Seller believes Buyer is in breach of its obligations under the Contract, Seller shall

provide Buyer with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach has occurred. Buyer shall have seven days from receipt of the written notice declaring the breach (or such longer period of time as Seller may grant in writing) within which to cure the alleged breach.

B. Seller’s Breach

1. Seller shall be deemed in breach of the Contract if it fails to comply with any material provision of the Contract Documents, including, but not limited to:

- a. failure to deliver the Goods or perform the Special Services in accordance with the Contract Documents,
- b. wrongful repudiation of the Contract, or
- c. delivery or furnishing of non-conforming Goods or Special Services.

2. Buyer may terminate Seller’s right to perform the Contract for cause by declaring a breach should Seller fail to comply with any material provision of the Contract Documents. Upon termination, Buyer shall be entitled to all remedies provided by Laws and Regulations.

a. In the event Buyer believes Seller is in breach of its obligations under the Contract, and except as provided in Paragraph 11.04.B.2.b, Buyer shall provide Seller with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach has occurred. Seller shall have seven days from receipt of the written notice declaring the breach (or such longer period of time as Buyer may grant in writing) within which to cure the alleged breach.

b. If and to the extent that Seller has provided a performance bond under the provisions of Paragraph 4.01, the notice and cure procedures of that bond, if any, shall supersede the notice and cure procedures of Paragraph 11.04.B.2.a.

ARTICLE 12 - LICENSES AND FEES

12.01 Intellectual Property and License Fees

A. Unless specifically stated elsewhere in the Contract Documents, Seller is not transferring any intellectual property rights, patent rights, or licenses for the Goods delivered. However, in the event the Seller is manufacturing to Buyer’s design, Buyer retains all intellectual property rights in such design.

B. Seller shall pay all license fees and royalties and assume all costs incident to the use or the furnishing of the

Goods, unless specified otherwise by the Contract Documents.

12.02 Seller's Infringement

A. Subject to Paragraph 12.01.A, Seller shall indemnify and hold harmless Buyer, Engineer and their officers, directors, partners, employees, agents, consultants, contractors, and subcontractors from and against all claims, costs, losses, damages, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement or alleged infringement of any United States or foreign patent or copyright by any of the Goods delivered hereunder.

B. In the event of suit or threat of suit for intellectual property infringement, Buyer will notify Seller within a reasonable time of receiving notice thereof.

C. Upon written demand from Buyer, Seller shall be given the opportunity to defend the claim or suit, including negotiating a settlement. Seller shall have control over such claim or suit, provided that Seller agrees to bear all expenses and to satisfy any adverse judgment thereof.

1. If Seller fails to defend such suit or claim after written demand by Buyer, Seller will be bound in any subsequent suit or claim against Seller by Buyer by any factual determination in the prior suit or claim.

2. If Buyer fails to provide Seller the opportunity to defend such suit or claim after written demand by Seller, Buyer shall be barred from any remedy against Seller for such suit or claim.

D. If a determination is made that Seller has infringed upon intellectual property rights of another, Seller may obtain the necessary licenses for Buyer's benefit, or replace the Goods and provide related design and construction as necessary to avoid the infringement at Seller's own expense.

12.03 Buyer's Infringement

A. Buyer shall indemnify and hold harmless Seller, and its officers, directors, partners, employees, agents, consultants, contractors, and subcontractors from and against all claims, costs, losses, damages, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement or alleged infringement of any United States or foreign patent or copyright caused by Seller's compliance with Buyer's design of the Goods or Buyer's use of the Goods in combination with other materials or equipment in any process (unless intent of such use was known to Seller and Seller had reason to know such infringement would result).

B. In the event of suit or threat of suit for intellectual property infringement, Seller must within a reasonable time after receiving notice thereof notify Buyer.

C. Upon written demand from Seller, Buyer shall be given the opportunity to defend the claim or suit, including negotiating a settlement. Buyer shall have control over such claim or suit, provided that Buyer agrees to bear all expenses and to satisfy any adverse judgment thereof.

1. If Buyer fails to defend such suit or claim after written demand by Seller, Buyer will be bound in any subsequent suit or claim against Buyer by Seller by any factual determination in the prior suit or claim.

2. If Seller fails to provide Buyer the opportunity to defend such suit or claim after written demand by Buyer, Seller shall be barred from any remedy against Buyer for such suit or claim.

12.04 Reuse of Documents

A. Neither Seller nor any other person furnishing any of the Goods or Special Services under a direct or indirect contract with Seller shall: (1) acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions; or (2) reuse any of such Drawings, Specifications, other documents, or copies thereof on any other project without written consent of Buyer and Engineer and specific written verification or adaptation by Engineer. This prohibition will survive termination or completion of the Contract. Nothing herein shall preclude Seller from retaining copies of the Contract Documents for record purposes.

ARTICLE 13 - DISPUTE RESOLUTION

13.01 Dispute Resolution Method

A. Disputes between Buyer and Seller will be resolved as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of Paragraphs 9.05 and 9.06, Buyer and Seller may exercise such rights or remedies as they have under Controlling Law.

ARTICLE 14 - MISCELLANEOUS

14.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

14.02 Controlling Law

A. This Contract is to be governed by the law of the state in which the Point of Destination is located.

14.03 Computation of Time

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

14.04 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

14.05 Survival of Obligations

A. All representations, indemnifications, warranties and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Goods or Special Services and termination or completion of the Agreement.

**SECTION 00 80 50 SUPPLEMENTARY CONDITIONS TO EJCDC PROCUREMENT
GENERAL CONDITIONS, P-700 (2000 EDITION)**

These Supplementary Conditions amend or supplement the Standard General Conditions for Procurement Contracts No. P-700 (2019 Edition) and other provisions of the Procurement Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

Modify Article 1.01A.4 to read:

4. *Bid*--See Proposal

Modify Article 1.01A.5 to read:

5. *Bidder*--See Proposer

Modify Article 1.01A.29 to read:

29. *Seller*--The person, firm, or corporation with whom Buyer has entered into the Procurement Agreement to furnish Goods and Special Services.

Add new articles at the end of Article 1.01:

"36. *Substantial Completion*--The time at which the Work progresses to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Work can be safely and conveniently utilized for the purpose for which it is intended.

The Work will be considered Substantially Complete after successful completion of the demonstration period.

37. *Construction Contractor*-- The person, firm or corporation with whom the Buyer will enter into a Contract for the general construction of and the installation of the Seller's equipment."

38. *Backwash*--The periodic reversal of flow through a filter which may be accompanied by water in conjunction with air or oxidants at a low concentration (less than 10 mg/L of total chlorine) generally associated with the intermittent waste stream from an ultrafiltration or microfiltration membrane system used to remove particulate matter.

39. *Calendar Day*--See Day

40. *Chemical Washing*--The periodic application of a concentrated chemical solution at high concentration (i.e. more than 10 mg/L of free chlorine or the addition of an acid which results in a pH of less than 4 or the addition of a base that results in a pH of greater than 10 or a surfactant or enzymatic cleaning agent) to a membrane for a short duration of time (twice per day maximum for a total duration of less than 60 minutes) for the intended purpose of maintaining membrane permeability or reducing membrane fouling by a factor of less than 33 percent of the total amount of fouling that may be observed by the membrane

41. *Buyer*—City of Sandy.

42. *Clean In Place*--The periodic application of a concentrated chemical solution at high concentration (i.e., more than 10 mg/L of free chlorine or the addition of an acid which results in a pH of less than 4 or the addition of a base that results in a pH of greater than 10, or a surfactant or enzymatic cleaning agent) a membrane for an extended duration of time (more than 60 minutes per day) for the intended purpose of reducing membrane fouling by a factor of more than 33 percent of the total amount of fouling that may be observed by the membrane.

43. *Contractor*--See Construction Contractor.

44. *Contract Year*--A period of 365 calendar days or 366 days every 4th year beginning with year 2000.

45. *Component Equipment*--describes any item of equipment that is designed and fabricated or manufactured by others but incorporated by and supplied by the Seller in fulfillment of the Contract.

46. *Defective*--See Non-Conforming

47. *Drawing Clarification / Plan Clarification*--An answer from the Buyer or Engineer, in response to an inquiry from the Seller, intended to make the requirement(s) of the drawings or plans clearly understood. Drawing clarifications or plan clarifications may be sketches, drawings or in narrative form and will not change any requirements of the drawings or plans. Responses to the Seller's inquiries shall be as outlined in Section 9.2 of these Procurement General Conditions.

48. *Final Acceptance*--Refers to such time as the Seller has fulfilled all its obligations, other than warranties and guarantees, under the Contract Documents.

49. *MF*--Membrane Filtration.

50. *MSS*--Membrane System Supplier, see Seller.

51. *Module*--A grouping of hollow fiber membranes that are secured into a common potting compound.

52. *Notice of Acceptability*--The written notice issued by the Engineer that the Seller has furnished all Goods and Special Services, and delivered all maintenance and operating instructions, schedules, guarantees, certificates of inspection, and other documents as required by the Contract Documents.

53. *Notice to Commence Fabrication*--A written notice given by Buyer to Seller fixing the date(s) on which the Contract Times for the production and delivery of Goods commence to run and on which Seller shall start to perform under the applicable portion of the Contract.

54. *Notice of Completed Commissioning*--The written notice issued by the Engineer indicating that the Seller has completed the commissioning of the membrane system. The notice shall indicate that the Engineer has reviewed the status of membrane system commissioning to its satisfaction, identified items to be corrected, and that those items that require correction by the Seller have been successfully completed as to allow training of the Buyer's Operational and Maintenance Personnel to commence.

55. *Notice of Completed Installation*--The written notice issued by the Engineer that the Seller has reviewed the installation of the Goods and identified all item to be corrected ant that those items that require correction by the Contractor have been completed as to allow Commissioning of the membrane system to commence.

56. *Notice of Completed Training*--The written notice issued by the Engineer that the Seller has completed training of the Buyer's as a prerequisite to Acceptance Testing of the membrane system.

57. *Notice of Substantial Completion*--The written notice issued by the Engineer to the Seller that Acceptance Testing has been successfully completed.

58. *Phase*--Separate portions of the Project, each of which is subject to Buyer

obtaining funds before Seller is authorized to proceed.

59. *Proposer*--Any person, firm, or corporation submitting a Proposal for providing the Goods and Special Services.

60. *Proposal*--The offer or proposal of the Proposer submitted on the prescribed form setting forth the price(s) for furnishing the Goods and Special Services:

61. *Proposal Documents*--Request for Proposals or advertisement, if any, Procurement Instructions to Proposers, other Proposal information and requirements, Proposal forms and attachments, contract and Bond forms, and the proposed Contract Documents, including any Addenda issued prior to receipt of Proposals.

62. *Proposers Equipment*--describes equipment that has been designed by, manufactured by or fabricated specifically for and supplied by the Seller in fulfillment of the contract.

63. *Special Engineering Services*--The preparation and delivery of shop drawings and other submittals required by the Buyer.

64. *Submittal*--Any documentation specifically prepared by or for the Seller and provided to the Buyer to illustrate fulfill with the requirements of the Contract. Examples of submittals include but are not limited to Applications for Payment, Bonds, Change Orders, Certificates, Manuals, Samples, Shop Drawings, and Schedules.

65. *Successful Proposer*--The Proposer Submitting a responsive Proposal to whom the Buyer makes an award.

66. *System*--Hollow fiber membrane filtration system equipment. The System is comprised Units and ancillary equipment.

67. *Unit(s)*-- A Unit is an assembly of equipment that includes piping, valves, instrumentation, controls, ancillary equipment, appurtenances, support systems, and filtration modules required to treat the raw water.

68. *Train*--A grouping of membrane filtration units that share common ancillary equipment.

69. *Work*--A general description for providing Goods and Special Services as required by the Contract Documents.

70. *Working Days*--is used to describe traditionally accepted business workdays of Monday through Friday inclusive, exclusive of any official organizational or official government holidays for the applicable organization."

ARTICLE 2 - PRELIMINARY MATTERS

Add the following to Article 2.01:

"B. The Seller shall deliver the required Bonds and Insurance certificates in accordance with Article 4 of the General Conditions.

1. At the time of the effective date of the Agreement, a Performance Bond shall be provided for the Special Engineering Services and Pilot Testing for the amount of \$175,000 dollars.

2. Another Performance Bond and a Payment Bond for the remaining portion of the Contract Price shall be provided upon issuance of the "Notice to Commence Fabrication." The Performance Bond shall provide coverage for the performance of the Seller under this Contract until expiration and exclude any continuing obligations of the Seller under this control until expiration and

exclude any continuing obligations of the Supplier, including, but not limited to, the Seller's Membrane System Equipment and Module and Warranty, or other warranties that survive the completion of the Contract."

Delete Article 2.03 in its entirety and replace with the following:

"2.03 Commencement of Contract Times

A. The Contract Times will commence to run on the Effective Date of the Agreement."

Delete Article 2.07 in its entirety and replace with the following:

"2.07 Within 14 days after the Contract Times start to run, a conference attended by Seller, Buyer, Engineer and others as appropriate will be held in Sandy, OR to establish a working understanding among the parties as to the Goods and Special Services and to discuss the schedule referred to in Article 5 of Section 500, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records."

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT AND AMENDING

Add three new articles at the end of Article 3.02:

"C. The Specifications may vary in form, format and style. Some specification sections are written in varying degrees of streamlined or declarative style and some sections may be relatively narrative by comparison. Omissions of such words and phrases as "the Seller shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined sections. Omitted words and phrases shall be supplied by inference. Similar types of provisions may appear in various parts of a section or articles within a part depending on the format of the section. The Seller shall not take advantage of any variation of form, format or style in making claims for extra Work.

D The cross referencing of specification sections under the subarticle heading "Related Sections include but are not necessarily limited to:" and elsewhere within each specification section is provided as an aid and convenience to the Seller. The Seller shall not rely on the cross referencing provided as a complete listing of all specifications sections that may impact the Work of a particular specification section. The Seller shall be responsible to coordinate the entire work under the Procurement Documents and provide a complete Project whether or not the cross referencing is provided in each section or whether or not the cross referencing is complete or correct.

E It is the intent of the Procurement Documents that the equipment be compatible and coordinated to produce a fully integrated and operational system. It is the responsibility of the Seller furnishing any one item of equipment, or all equipment included in the Procurement Documents, to assure complete compatibility and coordination of the equipment they are furnishing.

F OSHA Requirements – All work under this Contract shall be performed in accordance with all applicable safety codes, ordinances and other regulations. Particular emphasis shall be given to the applicable regulations of the State of Oregon promulgated pursuant thereto. For purposes of this Contract neither the Buyer, nor the Engineer, nor their respective officers, employees, consultants and inspectors are to be considered experts in safety, and all safety will be the responsibility of the Seller. The Seller shall review its work for compliance with applicable safety requirements and notify the Buyer and the Engineer if there are specific requirements of the Goods that require modifications to the plans and specifications to address safety considerations of the Seller's Goods. This responsibility shall include public safety as well as workers' safety.

G Seller shall comply with the applicable State of Oregon Administrative Rules."

Add Article 3.04B.1 as follows:

“1. RFI form attached to this section is the proper instrument to be used for Engineer’s written interpretations or clarifications to the contract documents.”

ARTICLE 4 - BONDS AND INSURANCE

Delete Article 4.01A in its entirety and replace with the following:

“4.01 Bonds

A. Seller shall furnish performance and payment bonds, each in an amount equal to the Contract Price, to Buyer. The bonds shall be delivered in accordance with Article 2.1 and shall remain in effect one year after the date final payment is due to Construction Contractor, except as provided otherwise by Laws or Regulations.”

Delete Article 4.02 in its entirety and replace with the following:

“4.02 Insurance

A. Seller shall provide insurance of the types and coverages and in the amounts stipulated in the Section 00 83 17, Insurance Specifications for Seller. Seller shall, for the protection and benefit of the Buyer, procure, pay for and maintain in full force and effect, at all times during the performance of the on-site portion of the Work until final payment of the Work or for such duration as required, policies of insurance set forth in this Article, in form and substance acceptable to Buyer. Seller hereby agrees to deliver to Buyer, at least ten (10) days prior to any equipment or personnel being brought onto the site of the Work or the Project site, Certificates of Insurance in form and substance satisfactory to Buyer evidencing the required coverage below:

1. General Requirements. The insurance required to be purchased and maintained by Seller shall be as follows:

a. Include at a minimum the specific coverages and be written for not less than the limits of liability specified herein or required by laws or regulations, whichever is greater. Coverage requirements can be met with any combination of primary and excess limits.

b. Include products/completed operations coverage, which must extend for lawsuits brought in the United States to any product manufactured in the United States and shipped to any foreign country.

c. Include contractual liability insurance covering Seller’s indemnity obligations.

d. Contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least thirty (30) days prior written notice has been given to the Indemnified Parties.

2. Buyer, Engineer, and their officers, directors, shareholders, partners, employees, agents, consultants and sub-contractors.

a. Remain in effect at least until final payment and at all times thereafter when Seller may be correcting, removing, or replacing defective Work. Evidence of coverage must be provided through term of project.

b. With respect to completed operations insurance, and any other

insurance coverage written on a claims-made basis, remain in effect for at least two (2) years after final payment (and Seller shall furnish the Indemnified Parties evidence satisfactory to the Indemnified Parties of continuation of such insurance at final payment and one 1 year thereafter).

c. Contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance.

d. With respect to workers' compensation and employers' liability, comprehensive automobile liability, commercial general liability, and umbrella liability and, if applicable, transportation insurance, Seller shall require its insurance carriers to waive all rights of subrogation against the Indemnified Parties.

e. Comply with all applicable insurance laws of the country in which the Work is to be performed, including but not limited to, admitted and compulsory coverage.

3 Commercial General Liability Insurance (use ISO Commercial General Liability Policy Form 2002 Edition or equivalent). This insurance shall be occurrence type written in comprehensive form and shall protect the Seller, and the Indemnified Parties as additional insured, against claims arising from injuries, sickness, disease, or death of any person or damage to property arising out of performance of the Work. The policy shall also include personal injury liability coverage, contractual liability coverage, completed operations and products liability coverage, and contain a per project aggregate endorsement. Seller's policy must be primary, with no contribution from Buyer coverage. Seller's insurance carrier must waive subrogation against Buyer.

4. Workers' Compensation and Employers' Liability Insurance. This insurance shall protect Seller against all claims under applicable state workers' compensation laws, including coverage as necessary for the benefits provided under the United States Longshoremen's and Harbor Workers' Act and the Jones Act. Seller shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" or "other states" provision whether or not required by law (includes sole proprietors and partners). Seller's insurance carrier shall waive subrogation against Buyer. If leased workers are used, an Alternate Employer Endorsement shall be added to the U.S. Government extension endorsements as appropriate (U.S.L. & H., etc.).

5. Comprehensive Automobile Liability Insurance. This insurance shall be occurrence type written in comprehensive form and shall protect Seller and the Indemnified Parties as additional insureds, against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, either on or off the project Site whether they are owned, non-owned, or hired. Seller's insurance carrier must waive subrogation against Buyer.

6. Umbrella Liability Insurance. This insurance shall protect the Seller and the Indemnified Parties as additional insureds, against claims in excess of the limits provided under workers' compensation and employers' liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall at least follow the form of the primary insurance.

7. Equipment Insurance. Seller shall provide and maintain insurance or shall self-insure, against loss or damage to all property, whether owned or

leased by Seller, which is utilized by Seller to perform the Work and which is not permanently incorporated in the Facility, including without limitation, tools, construction equipment, protective fencing, scaffolding, and temporary structures. Seller waives any claim against the Indemnified Parties for loss or damage to such property. Seller shall include a similar requirement in its subcontracts or lower-tier purchase orders, and shall require its lower-tier Seller(s) to provide such a claim waiver for the benefit of Seller and the Indemnified Parties.

8. Seller expressly agrees that Buyer is authorized to withhold payments to Seller until Buyer receives evidence of insurance as required herein. In the event that a claim is presented against the Additional Insured Parties, and there is no insurance provided by Seller or the carrier providing such insurance disclaims or denies coverage, any such claims, loss, cost, expense, liability, damage or injury arise or are made, asserted or threatened against the Additional Insured Parties, and each of them, shall give Buyer the right to withhold from any payments due or to become due to Seller any amount the Buyer deems sufficient to protect and indemnify the Additional Insureds and each of them, from and against any and all such claims, loss cost, expense, liability, damage or injury, including legal fees and disbursements. Buyer, in its discretion, may require Seller to furnish a surety bond satisfactory to Buyer guaranteeing such protection, which bond shall be furnished by Seller within fourteen (14) calendar days after written demand has been made therefore.

9. Seller shall make this Article and these insurance requirements binding on all of its lower-tier Sellers, including, but not limited to, the duty to name the Additional Insured Parties as additional insured on the lower-tier Seller(s) insurance policy(ies) on a primary and non-contributory basis.

10. Professional Liability Insurance. In the event that any of the Work requires professional services by the Seller or its lower-tier Sellers, evidence of professional liability is required. The liability limits shall be not less than:

\$1,000,000 each occurrence \$1,000,000 general aggregate

11. Transportation Insurance. This insurance shall be of the "all risks" type and shall protect the Seller and the Buyer from all insurable risks of physical loss or damage to equipment and materials in transit to the Jobsite including, but not limited to, transit outside the United States via navigable waters, rail or truck and until the Buyer receives the equipment and materials at the Jobsite. The coverage amount shall be not less than the full amount of equipment and materials shipped. Transportation insurance shall provide for losses to be payable to the Seller and the Buyer as their interests may appear.

12. Include the following additional insureds in Articles 4.2 B.2., 3., 4., and 5. above.

City of Sandy
Stantec Consulting Services, Inc.

ARTICLE 5 - SELLERS RESPONSIBILITIES

Modify Article 5.06A to read:

"A. Replace wording "review and approval" in all Articles of 5.6 A of the General Conditions with 'review for compliance'."

Add two new Articles after Article 5.06A that read:

"1. Shop Drawings submitted as herein provided by Seller and reviewed by Engineer for conformance with the design concepts shall be executed in conformity with the Contract Documents unless otherwise required by Buyer.

2. When Shop Drawings are submitted of the purpose of showing the installation in greater detail, their review shall not excuse Seller from requirements included in the Contract Documents.”

Modify Article 5.06B:

B. Insert “and issuance of a “Notice to Commence Fabrication” after “submittal.”

Add two new Articles after 5.06C.4. that read:

“5. See Section 01340.

6. Shop Drawings and Sample submittals not conforming to requirements of this Article 5.6 and Section 01340 will be returned to Seller without action for resubmittal and the resulting delay shall be entirely the responsibility of Seller.”

Modify Article 5.06C. 6.:

6. Shop Drawings and Sample submittals not conforming to requirements of this Paragraph 5.06 and Section 01 33 03, Submittals for Membrane Procurement Contracts, will be returned to Seller without action for resubmittal.

Add new Article after 5.06D.2. that read:

“3. Engineer’s check and review of Shop Drawings and Samples, Standard Specifications and descriptive literature submitted by Seller will be only for general conformance with design concept, except as otherwise provided, and shall not be construed as:

- a. permitting any departure from the Contract Requirements;
- b. relieving Seller of the responsibility for any error in details dimensions or otherwise that may exist in such submittals;
- c. constituting a blanket approval of dimensions, quantities, or details of the material or equipment shown; or
- d. approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Seller of the full responsibility of meeting all of the requirements of the Contract Document.”

Add new Article after 5.06E.1. that reads:

“2. Engineer will review an initial shop drawing submittal and one resubmittal for any particular item requiring a shop drawing. Items requiring more than two reviews the additional review time will be at the sole expense of the Seller. Engineer will log his time and expenses which will be used by the Buyer to calculate the cost of a deductive change order for the additional review time. Buyer will deduct these costs from the amounts due Seller on the next application for payment.

Modify Article 5.06E. 2.:

2. Engineer will review an initial shop drawing submittal and one resubmittal for any particular item requiring a shop drawing. Items requiring more than two reviews the additional review time will be at the sole expense of the Seller and shall not exceed, in the aggregate, \$2,500.00. Engineer will log his time and expenses which will be used by the Buyer to calculate the cost of a deductive change order for the additional review time. Buyer will deduct these costs from the amounts due Seller on the next application for payment.

Delete Article 5.08B in its entirety and replace with the following:

“B. Seller warrants the guarantees to Buyer that all Goods and Special Services will materially conform with the Contract Documents, including any Samples approved by Engineer, and the Goods will be free from defects in material and workmanship. Engineer shall be entitled to rely on representation of Seller’s warranty and guarantee.”

Add new item 3 under Article 5.08C:

“3. for Membrane Modules, the provision of Section 01 74 00, Membrane

System and Module Warranty.”

Delete Article 5.08E in its entirety and replace with the following:

“E. Buyer shall within warranty period, notify Seller of any breach of Seller’s warranties or guarantees. If Seller provides such written notice within the Warranty Period, Seller shall, at its sole option and as Buyer’s sole remedy, repair or replace the parts or equipment that are the subject of the claimed breach or refund the purchase price therefore, if Seller determines that any claimed breach is not covered by this warranty, Buyer shall pay Seller its then customary charges for any repair or replacement made by Seller. If Buyer receives notice of a suit or claim. If Seller fails to defend such suit or claim, Seller will be bound in any subsequent suit or claim against Seller by Buyer by any factual determination in the prior suit. The warranties contained herein are conditioned upon the Buyer not being in material default of any obligation to Seller.”

Add Articles after 5.08E:

“F. The Seller shall submit to the Buyer all Membrane warranty and guarantees documentation.

G. The Seller’s warrants and guarantees to the Buyer include the concept of linear scalability as described in Article 7 of the Agreement, Article 8 of the General Conditions, Section 01 74 00, Membrane System and Module Warranty and elsewhere in the Contract Documents.

H. The provisions of the Seller’s Membrane Module Warranty, including provisions for membrane module replacement pricing, shall remain in effect as a continuing obligation.

I. All product warranties and performance guarantees shall only be enforceable if (a) all equipment is properly installed, inspected regularly and is in good working order, (b) all operations are consistent with Seller recommendations, (c) operating conditions at the Site have not materially changed and remain within anticipated specifications, and (d) no reasonably unforeseeable circumstances exist or arise.”

Delete Article 5.09A and replace with the following:

“A. Seller shall indemnify and hold harmless Buyer, Engineer, and their officers, directors, shareholders, partners, employees, agents, consultants, contractors and subcontractors from any and all claims, costs, losses, and demands or judgments for damages or claims (including but not limited to fees and charges of Engineers, Architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs), to the extent (i) caused by the negligent act or omission of Seller, or its officers, directors, shareholders, partners, employees, agents, consultants, contractors or subcontractors, or anyone for whom the Seller is responsible and (ii) any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death or damage to Buyer’s property (other than the Goods and Special Services themselves).”

Add new Articles following 5.09:

“5.10 Access to Goods in Production

A. The Seller shall provide representatives of the Buyer, testing agencies, and governmental agencies with jurisdictional interests proper and safe access to Goods in the process of production at reasonable times as is necessary for the performance of their functions in connection with the Contract Documents.

5.11 Confidentiality of Documents:

A. Subject to regulations governing Public Records in Oregon, all Special Services performed by the Seller, including but not limited to all drafts, data, correspondence, proposals, reports, and estimates compiled or composed by the Seller, pursuant to the Agreement, are for the sole use of the Buyer, its agents and employees. Neither the documents nor their contents shall be released to any third party without the prior written consent of the Buyer. This provision does not apply to information that (a) was publicly known, or otherwise known to the Seller, at the time that it was disclosed to the Seller by the Buyer, (b) subsequently becomes publicly known through no act or omission by the Seller, or (c) otherwise becomes known to the Seller other than through disclosure by the Buyer. Neither the documents nor their contents shall be released to any third party without the prior Written consent of the Buyer.

5.12 Industry Standards:

A. The Seller agrees that the Special Services rendered under this Agreement shall be performed in accordance with the standards customarily adhered to by an experienced and competent professional membrane filtration equipment supply firm using the degree of care and skill exercised by reputable professionals practicing in the same field of service. Where approval by the Buyer, the Engineer, or other representatives of the Buyer is required, it is understood to be general approval only and does not relieve the Seller of responsibility for complying with all applicable laws, codes, and good engineering practices.

5.13 Maintenance of Records:

A. The Seller shall maintain books, records, logs, documents and other evidence sufficient to record all actions taken with respect to the providing of Goods and Special Services, throughout the performance of the Agreement and for a period of ten years following completion of the obligations under the Agreement. The Seller further agrees to allow the Buyer to inspect, copy, and audit such books, records, documents and other evidence at all reasonable times. Upon request, the Seller agrees to provide the Buyer with backup copies for all electronic documents generated by the Seller in performing under the terms of this Agreement or to provide the Buyer with proof of insurance coverage for valuable papers and records. The Seller shall make available all requested data and records during normal business hours. Failure to make requested records available for audit by the date requested will result in the immediate termination of the Agreement.

5.14 Cleaning

A. The Seller, while on the Buyer's site, shall on a daily basis remove dirt, debris, waste and rubbish from its own working area and maintain desks, offices and control stations in a professional manner and dispose of used materials in an appropriate manner."

ARTICLE 6 - SHIPPING AND DELIVERY

Delete Article 6.02A in its entirety and replace with the following:

"A Seller shall deliver the Goods, excluding the membrane modules, F.O.B., the Point of Destination within a delivery window of 28 days after the Contract Times set forth in the Agreement, or other date agreed to by Buyer and Seller.

1. The membrane modules, spare parts and computer equipment (if applicable) shall be retained by the Seller at its location and will be delivered F.O.B. to the Point of Destination during the commissioning of the Goods."

Delete Articles 6.02C and 6.02D in their entirety and replace with the following:

"C The Contractor will provide facilities for receipt and unloading of the Goods at the Point of Destination. When the equipment has been received by the Contractor, title shall pass from the Seller to the Contractor. Additional costs arising from delivery

prior to or after the delivery window will be the responsibility of Seller.”

Change Article 6.03A to read:

“A Risk of loss and insurable interests transfers from Seller to Contractor upon Contractor’s receipt of the Goods. The Contractor shall be responsible for the unloading of the Goods and may reject Goods that visually appear to have been damaged during shipment.”

ARTICLE 7 - CHANGES: SCHEDULE AND DELAY

Revise Article 7.01B as follows:

Replace 15 with 10; Replace 45 with 30.

Add new Article after 7.01C:

“D. Change Orders prepared by the Engineer covering changes which are required by the Buyer, or because of any request for Change Order of the Seller for a change to the Contract Time or Contract Price, shall be in writing and shall state the dollar amount or establish the method of payment, any adjustment in contract time and when negotiated prices are involved, shall provide for the Seller’s signature indicating acceptance using the form provided.

E. If notice to the surety of any change in the Procurement Agreement is required by the provisions of any Bond, the giving of such notice will be the Seller’s responsibility, and the amount of each applicable Bond may be adjusted accordingly.”

Add new Article after 7.03A.3:

“4. CPR form attached to this section is the instrument to be used to track and document individual changes in contract time or price which will then be used as detailed documentation for a Change Order.”

Revise Article 7.03B as follows:

Replace 15 with 10.

Add new Article after 7.03E:

“F. Change Order Form: The Seller shall use the attached Change Order Form for all Change Orders associated with the Goods and Services. No additions or deletions to this form shall be allowed.”

ARTICLE 8 - BUYER’S RIGHTS

Modify Article 8.01A. 2. as follows:

Insert, “and shall not exceed, in the aggregate, \$2,500.00,” after “facility”.

Delete Article 8.01A.3 in its entirety and replace with the following:

“3. Seller shall bear all expenses, for inspections and tests at the Point of Destination, but Seller shall be entitled to reimbursement from Buyer for Seller’s expenses for re- inspection or retesting if, on the basis of an initial inspection or testing, the installation of the Goods are determined to be improper or incomplete.”

Modify Article 8.01A.4 as follows:

Replace 30 with 14.

Modify Article 8.01C.1 as follows:

Insert, “for a period of 11 months during the correction period,” after “intended”.

Modify Article 8.02A as follows:

Insert, “or for such times as provided by a warranty provision that remains in effect after final payment as a continuing obligation,” after “the expiration of the correction

period,”

Delete Article 8.02C in its entirety and replace with the following:

“C Remedying Non-Conforming Goods or Special Services

1. If Buyer notifies Seller in writing that the Goods are non-conforming, the Seller shall modify, repair or replace the Goods to remedy the non-conformance. Seller shall provide within 10 days the proposed remedy and a schedule that shall make the Goods conforming within a reasonable time.

2. If Buyer notifies Seller in writing that any of the Special Services are nonconforming or have delayed the Buyer’s Project, the Seller shall promptly provide conforming Special Services acceptable to Buyer subject to the following provisions:

a. The Seller will be assessed Liquidated Damages for the delays in the timely delivery of Special Services until they are determined to be in conformance.

3. If the Seller fails to take action as required by the Buyer or the Engineer to remedy nonconforming Goods, after 15 days written notice to the Seller, the Buyer shall at its option remedy any such deficiency instead of requiring removal or replacement. Buyer acknowledges and agrees that Buyer, by exercising this option, voids any and all warranties for the Goods. Cost for the Buyer’s remedy is subject to the provisions of Article 5.8 and Article 8.2E.

4. In an emergency where delay would cause serious risk of loss or damage, the Buyer may take such action as is necessary to avoid such risk of loss or damage without issuing prior notice or waiting for action by the Seller.

5. If the Goods are determined to be non-conforming as part of a warranty notice or claim pursuant to Article 5.8 or the warranty provisions of Section 01740, Membrane System and Module Warranty, the Seller shall be notified in writing that the applicable conditions for breach of contract or breach of warranty exist.

6. Cost of Remedy

a. If the Goods are determined to be non-conforming before the date of the Notice of Substantial Completion, and a remedy is required, the Seller shall pay for all costs of the remedy, including modification, repairs, removal, and replacement of the Goods.

b. If the Goods are determined to be non-conforming as part of a warranty claim pursuant to Article 5.8, after the date of the Notice of Substantial Completion and prior to the end of the correction period for the Goods, and the Seller’s remedy is to modify or repair the Goods.

c. If the Goods are determined to be non-conforming as part of a warranty claim pursuant to Article 5.8, after the date of the Notice of Substantial Completion and the Seller’s remedy is the replacement of existing Goods, Goods shall be delivered to the Buyer F.O.B. Point of Destination. Buyer shall provide the labor associated with the removal and replacement of the non-conforming Goods provided by the Seller as a remedy.

d. In the event that the Seller’s remedy involves a change to or addition of Seller’s equipment, the Seller shall be responsible for all costs as described in Article 8.2.E for the remedy of the non-conforming Goods and to provide Special Services required for the remedy.

Add new Article after 8.02C. 6.:

“7. Goods repaired or replaced are not covered by any warranty except to the extent repaired or replaced by Seller, an authorized representative of Seller, or under specific instructions by Seller, in which cases, the Goods will be covered under warranty up to the end of the warranty period applicable to the original Goods.”

Modify Article 8.02E as follows:

E. Seller shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, re-testing and for any engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs arising out of or relating to the non-conforming Goods or Special Services or breach of warranties, including the correction or removal and replacement of the nonconforming Goods and the replacement of property of Buyer destroyed by the correction or removal and replacement of the non-conforming Goods, to the proportionate extent caused by Seller’s breach of the warranty. In no event shall Seller be liable for any consequential, indirect, incidental, special, exemplary, or punitive damages, lost profits or revenues or diminution in value, including without limitation, remanufacturing costs and rework costs, de-installation, or re-installation costs.

Add new items under Article 8.02E:

- “1. With respect to breach of contract claim by the Buyer the following provisions apply:
 - a. In the event that the Seller’s membrane filtration system does not satisfy the conditions of linear scalability as described in the Contract Documents, and Seller’s remedy is not agreeable to the Buyer, the Buyer shall declare Seller in breach of Contract in accordance with Article 11.4.B.

2. With respect to a breach of warranty claim by the Buyer, the following provisions apply.
 - a. In the event that the membrane modules are non-conforming due to defects in materials, workmanship, membrane integrity or irreversible flux loss as described in Section 01 74 00, Membrane System and Module Warranty, and the Seller’s remedy is not agreeable to the Buyer, the Buyer shall declare a breach of warranty exists.
 - b. Buyer shall provide Seller with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach of warranty has occurred. Seller shall have ten days from receipt of the written notice declaring the breach (or such longer period of time as Buyer may grant in writing) within which to cure the alleged breach.

3. If incurred prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents and a commensurate reduction in the Contract Price. If the costs exceed the unpaid balance of the Contract Price, the costs in excess of the Contract Price shall be paid by the Seller to the Buyer. The provisions of this Article shall be in addition to all other rights and remedies available to the Buyer under the Procurement Agreement and any applicable laws.”

Delete Article 8.03 in its entirety and replace with the following:

“8.3 Correction Period

A. Seller's responsibility for correcting all nonconformities in the Goods will extend for a period of one year after the date of the Notice of Substantial Completion, or for such longer period of time as may be prescribed by Laws or Regulations or by the terms of any specific provisions of the Contract Documents."

ARTICLE 9 - ROLE OF ENGINEER

Add after Article 9.04A:

"B. The acceptance at any time of materials or equipment by or on behalf of Buyer shall not be a bar to future rejection if they are subsequently found to be defective, inferior in quality, or not equal to the material or equipment specified or are not as represented to Engineer or Buyer."

ARTICLE 10 - PAYMENT

Delete Section 10.01 in its entirety and replace with the following:

10.01 Applications for Progress Payments

"A. Seller shall submit Applications for Payment filled out and signed by Seller and accompanied by such supporting documentation as is required by the Contract Documents and also as Buyer or Engineer may reasonably require for review and approval. The timing and amounts of progress payments shall be as stipulated in the Agreement.

1. Applications for Progress Payments for Special Engineering Services
 - a. The Seller shall submit Applications for Payment to the Engineer for review, completed and signed by the Seller. The Applications for Payment shall be submitted according to the following schedule:
 - 1) The first Application for Payment shall be submitted after the Engineer has reviewed and approved all pilot testing and the report.
 - 2) The second Application for Payment shall be submitted after the Engineer has reviewed and approved all Shop Drawings (Refer to Section 01 34 00, Shop Drawing Procedures; Tables A and B) and all other related submittals as required by the Contract Documents.
2. Applications for Progress Payments for Equipment:
 - a. The Seller shall submit Applications for Payment to the Engineer for review, completed and signed by the Seller. The Applications for Payment shall be submitted according to the following schedule:
 - 1) The first Application for Payment shall be submitted following initial contract award.
 - 2) The second Application for Payment shall be submitted when the Buyer has issued a "Notice to Commence Fabrication."
 - 3) The third Application for Payment shall be submitted after the delivery of the Goods in accordance with Article 5 of the Agreement. The Application for Payment will be accompanied by a bill of sale and other documentation satisfactory to the Buyer warranting that the Contractor has received the Goods free and clear of all liens, charges, security interest, and encumbrances. Such documentation shall include releases and waivers from all parties who, during the Seller's execution of its responsibilities under the Contract Documents, might have obtained or

filed any such lien, change, security, or encumbrance.

4) The fourth Application for Payment shall be submitted after the "Notice of Substantial Completion" has been issued by the Engineer.

B. In the event of the Assignment of the Agreement from the Buyer to the Contractor, the payment procedures shall not be altered. The Buyer will provide payment directly to the Seller."

Delete Article 10.02A.1. in its entirety and replace with the following:

"1. Engineer's recommendation of payment requested in Applications for Payment for Shop Drawings will constitute a representation by Engineer, based on Engineer's review of the Application for Payment and the accompanying data that the Shop Drawings have been reviewed as required by the Contract Documents and Seller is entitled to payment of the amount recommended."

Modify Article 10.02 A. 3. as follows:

3. Engineer may refuse to recommend that all or any part of a progress payment be made, or Engineer may recommend nullifying all or any part of any payment previously recommended if, in Engineer's opinion, such recommendation would be incorrect or if on the basis of subsequently discovered evidence or subsequent inspections or tests Engineer considers such refusal or nullification necessary to protect Buyer from loss because the Contract Price has been reduced, Goods are found to be non-conforming, or Seller has failed to furnish acceptable Special Services.

Modify Article 10.03A. as follows:

A. Subject to Paragraph 10.02.A., the amounts of the progress payments will be as provided in the Agreement. Buyer shall within 30 days after receipt of each invoice from Seller pay the Seller. Buyer shall notify Seller promptly of any deficiency in the documentation and shall not unreasonably withhold payment.

Modify Article 10.04. as follows:

Neither party will have any rights to set-off hereunder except to the extent agreed to be an undisputed claim. In any action related to Buyer's election to withhold payments due to Seller, Buyer shall bear the burden of proving default by Seller. and that its election to withhold was justified.

Delete Article 10.05 and replace with the following:

10.05 Final Application for Payment

"A. After the correction period and following the completion of the Final Inspection as per Article 8.1.C, and after Seller has corrected all non-conformities to the satisfaction of Buyer and Engineer, furnished all Special Services, and delivered all documents required by the Contract Documents, Engineer will issue to Buyer and Seller a Notice of Acceptability. Seller may then make application for final payment following the procedure for progress payments. The final Application for Payment will be accompanied by all documentation called for in the Contract Documents, a list of all unsettled claims and such other data and information as Buyer or Engineer may reasonably require."

ARTICLE 11 - CANCELLATION, SUSPENSION, AND TERMINATION

Delete Article 11.01A.1 in its entirety and replace with the following:

"1. Buyer may not cancel this Agreement after Sales Confirmation unless all the details are approved in writing by the parties, including Buyer's agreement to pay a stated amount of termination charges. Unless otherwise agreed to in writing by Seller, the termination charges shall be as follows and, for certainty, such

amounts below shall include Seller's reasonable profit forming part of the Purchase Price based upon the percentages set forth.

Termination Charge	Milestone
0% of the Purchase Price	After Sales Confirmation but prior to release to purchase materials
25% of the Purchase Price	After release to purchase materials but prior to release for fabrication
75% of the Purchase Price	After release for fabrication but prior to Equipment Completion
95% of the Purchase Price	After Equipment Completion but prior to release for shipment
100% of the Purchase Price	After release for shipment

2. The Seller shall be entitled to a reasonable allowance for overhead and profit with respect to all work on the Project completed in accordance with the Contract Documents prior to cancellation by the Buyer pursuant to this Paragraph 11.01."

Add the following items after 11.04B.2.b:

"c. Buyer may terminate for the following reasons, including but not limited to:

- 1) If the Seller commences a voluntary case under any chapter of the Bankruptcy Code, as now or hereafter in effect, or if the Seller takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to bankruptcy or insolvency
- 2) If a petition is filed against the Seller: under any chapter of said Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against the Seller under any other federal or state law in effect at the time relating to bankruptcy or insolvency
- 3) If the Seller makes a general assignment for the benefit of creditors
- 4) If a trustee, receiver, custodian, or agent of the Seller is appointed under applicable law, or under contract, whose appointment or authority to take charge of property of the Seller is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of the Seller's creditors
- 5) If the Seller admits in writing an inability to pay its debts generally as they become due; or
- 6) If the Seller breaches the Procurement Agreement or any provision of the Contract Documents and such breach continues for a period of 15 days after written notice to correct the breach from the Buyer to the Seller
- 7) Fails to provide competent management and supervision, competent staff or materials or equipment meeting the requirements of the Procurement Agreement
- 8) Disregards laws or regulations of any public body having jurisdiction
- 9) Commits serious violations of approved or legislated safety requirements

10) Has assigned any part of the obligations under the Procurement Agreement without the Buyer's prior written consent

ARTICLE 12 - LICENSES AND FEES

Add after Article 12.01B:

"C. Seller grants Buyer a non-exclusive royalty free license to use any process or apparatus claimed in any patent owned by Seller but only to the extent that this license is required by Buyer to build and operate the Project described in this contract using membranes supplied by Seller. All other rights are reserved."

Modify Article 12.02A. as follows:

A. Subject to Paragraph 12.01.A, Seller shall indemnify and hold harmless Buyer, Engineer and their officers, directors, partners, employees, agents, consultants, contractors, and subcontractors from and against all claims, costs, losses, damages, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) as finally determined by a court of competent jurisdiction in any suit for infringement of any U.S. or Canadian patent (or European patent for Goods that Seller sells to Buyer for end use in a member state of the E.U.) that has issued as of the delivery date, solely by reason of the sale or normal use of any Goods sold to Buyer hereunder and from reasonable expenses incurred by Buyer in defense of such suit if Seller does not undertake the defense thereof, provided that BUYER promptly notifies Seller of such suit and offers Seller either (i) full and exclusive control of the defense of such suit when Goods of Seller only are involved, or (ii) the right to participate in the defense of such suit when products other than those of Seller are also involved. Seller's warranty as to use patents only applies to infringement arising solely out of the inherent operation of the Goods according to their applications as envisioned by Seller's specifications.

Modify Article 12.02B. as follows:

Replace "within a reasonable time of receiving notice thereof" with "promptly when receiving notice thereof."

Delete Article 12.02D and replace with the following:

"D. If determination is made that Seller has infringed upon intellectual property rights of another, Seller may, at its election, and as Buyer's sole and exclusive remedy under this indemnification provision, (i) obtain the necessary licenses for Buyer's benefit, or (ii) replace the Goods and provide related design and construction as necessary to avoid the infringement at Seller's own expense or, (iii) remove the infringing Goods and refund to the Buyer the purchase price."

ARTICLE 13 - DISPUTE RESOLUTION

Delete Article 13.01 in its entirety and replace with the following:

13.1 Dispute Resolution Method

A. Disputes between the Buyer and Seller will be resolved as set forth in Article 13.3.

13.2 Mediation – Not Used

13.3 Arbitration

A. All Claims or counterclaims, disputes, or other matters in question between Buyer and Seller arising out of or relating to the Contract Documents or the breach thereof (except for Claims which have been waived by the making or acceptance of final payment as provided by Article 10.7) will be decided by binding arbitration in

accordance with the rules of the American Arbitration Association, subject to the limitations of this Article 13.3. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. No demand for arbitration of any Claim or counterclaim, dispute, or other matter that is required to be referred to Engineer initially for decision in accordance with Article 9.5 will be made until the earlier of: (i) the date on which Engineer has rendered a written decision, or (ii) the 31st day after the parties have presented their final evidence to Engineer if a written decision has not been rendered by Engineer before that date. No demand for arbitration of any such Claim or counterclaim, dispute, or other matter will be made later than 30 days after the date on which Engineer has rendered a written decision in respect thereof in accordance with Article 9.6; and the failure to demand arbitration within said 30 day period will result in Engineer's decision being final and binding upon Buyer, and Seller. If Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned.

C. Notice of the demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the 30 day period specified in Article 13.3.B, and in all other cases within a reasonable time after the claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such Claim or other dispute or matter in question would be barred by the applicable statute of limitations.

D. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and
2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings

E. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal."

Request for Information (RFI)

Project: City of Sandy RFI No: _____
Alder Creek Water Treatment Plant Upgrade Project

Stantec Project No.: 2002006267 **Date:** _____

Owner Project No. _____ **Contractor Project No.** _____

Request:

_____ Owner _____ Contractor _____ Stantec
Engineering Signature

Reply:

Date:

_____ Owner _____ Contractor _____ Stantec
Engineering Signature

Contract Change Order Agreement

Project: City of Sandy Date: _____
Alder Creek Water Treatment Plant Upgrade Project

Change Order No. _____ Contractor: _____
 Stantec Project No.: 2002006267 Contractor Project No. _____

SUMMARY OF PROPOSED CHANGE: _____

<u>ITEM</u> <u>DECREASE</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>INCREASE OR</u>
A.			
B.			
SUBTOTAL			_____
FINAL CONTRACT PAYMENT			_____

Additional contract time for substantial completion: _____ calendar days.

The Contractor accepts the above adjustment to the contract. By accepting this change, the Contractor agrees that it shall be full payment and final settlement of all claims for contract time and for direct, indirect, and consequential costs, including costs of delays related to any work either covered or affected by the change.

SIGNATURES:

Contractor: _____ Date _____
 :
 Engineer: _____ Date _____
 :

APPROVED BY: _____ Date _____
 City of Sandy Authorized Official

Change Proposal Request (CPR)

Project: City of Sandy **CPR Date:** _____
Alder Creek Water Treatment Plant Upgrade Project

CPR No. _____

Stantec Project No.: 2002006267 **Date Sent to Contractor:** _____

Owner Project No. _____ **Date Received from Contractor:** _____

We hereby request the cost of the following proposed change in your contract on subject project and the return of this completed form. A breakdown of your costs shall be attached. Do not proceed with this work until authorized by Owner.

Description of the proposed change: _____

Proposed by: _____
Title: _____

All work shall be in accordance with the terms, stipulations, and conditions of the original Contract Documents. If the work herein provided is approved by Change Order, the time of completion will be increased by ___ calendar days.

Add: _____
Deduct: _____
Net Changed: _____
Contractor: _____
By: _____
Date: _____

Stantec Recommendation:	_____	Approval
	_____	Non Approval
By:	_____	Date: _____
Reason for Non Approval:	_____	

OWNER'S ACTION: _____ ACCEPTED _____ NOT ACCEPTED

BY: _____ Date: _____

COMMENTS: _____

Certificate of Substantial Completion

Project Name: <u>Alder Creek Water Treatment Plant Upgrade Project</u>		Stantec Project No: 2002006267
Project Owner: City of Sandy		Owner's Project No:
Project Contractor:		Date of Contract:
This Certificate of Substantial Completion Applies to:		
<input type="checkbox"/> All work under the Contract Documents <input type="checkbox"/> The following specific portions:		
Date of Substantial Completion:		

The work performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the project or portion thereof designated above is hereby declared and is also the date of commencement of warranties required by the Contract Documents, except as stated below.

A list of items to be completed or corrected, is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list will be the date of final payment unless otherwise agreed to in writing.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be provided in the Contract Documents except as amended as follows:	
<input type="checkbox"/> Amended Responsibilities	<input type="checkbox"/> Not Amended
Owner's Responsibilities:	
Contractor's Responsibilities:	
The following documents are attached to and made part of this certificate:	

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by the Engineer	Date:
Accepted by the Contractor	Date:
Accepted by the Owner	Date:

END OF SECTION

SECTION 00 83 17

INSURANCE SPECIFICATIONS FOR SELLER

GENERAL LIABILITY

- ISO Commercial General Liability Policy form, current edition.
- \$1,000,000 Per Occurrence limit.
- \$2,000,000 Products/Completed Operations Aggregate limit.
- \$2,000,000 General Aggregate limit.
- Per Project or Job Site Aggregate.
- BUYER, ARCHITECT/ENGINEER and their employees, subsidiaries, subconsultants and assigns must be designated as Additional Insureds for both Ongoing and Completed Operations.
- SELLER's policy must be Primary, with no contribution from BUYER's coverage.
- SELLER's insurance carrier must waive subrogation against BUYER.

COMMERCIAL AUTO

- \$1,000,000 Combined Single Limit of coverage.
- Coverage must be provided for all owned, non-owned, and hired vehicles.
- SELLER's insurance carrier must waive subrogation against BUYER.

WORKER'S COMPENSATION

- Statutory coverage provided for the state in which operations are undertaken, **whether or not required by law (includes sole proprietors & partners)**. Sole proprietors may substitute a minimum premium/zero payroll policy obtainable from their agent.
- Employer's Liability limits of \$500,000/\$1,000,000/\$500,000.
- CONTRACTOR's insurance carrier shall waive subrogation against BUYER.
- If leased workers are used, an Alternate Employer Endorsement shall be added.
- U S Government extension endorsements as appropriate (U.S.L. & H., etc.).

UMBRELLA OR EXCESS LIABILITY

- \$2,000,000 limit minimum.
- Must follow form with all primary policies.

OTHER

- Insurance carrier(s) providing coverage shall be rated at least A-VII by A. M. Best.
- SELLER shall provide Property Insurance (Builder's Risk) for the project. Property Insurance shall cover all BUYER-supplied materials and equipment.
- SELLER shall be responsible for any Property Insurance deductibles.
- SELLER shall bear all responsibility for loss to owned tools and equipment.
- Certificate of Insurance shall provide for 30 days' prior written notice in cancellation clause.
- Certificate of Insurance must indicate above coverage elements.
- BUYER reserves right to require certified copies of policies and/or endorsements.
- Project Management Protective and Boiler & Machinery coverage is not required.

END OF SECTION

SECTION 01 01 00 SUMMARY OF GOODS AND SPECIAL SERVICES

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Description of Work

1. The summary of the Goods and Special Services described in this Section is an overall summary of the responsibilities of the Seller and its relation to the Buyer, Engineer, and Contractor. It does not supersede the specific requirements of other Contract Documents.
2. Project Background.
 - a. The Goods and Special Services consist of designing and furnishing containerized membrane filtration equipment required for the City of Sandy's Alder Creek Water Treatment Plant (WTP). The Goods and Special Services also consist of furnishing manufacturer-trained personnel for the installation, commissioning, acceptance testing, training, and operations assistance as specified.
 - b. The following narrative is provided as a general description of the project background and goals. Design or operating parameters and proposed improvements beyond those that relate to this project are provided as information based upon the current understanding of the project and shall not constitute the basis of design and/or operation of the current or proposed facilities.
 - c. The WTP will use Alder Creek as source water. The water system will have a firm capacity of 2.0 MGD. The term 'firm capacity' means that the capacity can be achieved with the largest primary membrane unit out of service. A membrane unit shall consist of a membrane module rack, dedicated feed pump and dedicated strainer.
 - d. Water will be obtained from Alder Creek using a fixed-level intake. The raw water will be coagulated with polyaluminum chloride (PACL) or aluminum chlorohydrate (ACH), dosed with sodium hydroxide for pH control, and sodium hypochlorite added for oxidation, and will pass through a static mixer. The purpose of coagulation/flocculation is to coagulate and remove natural organic matter (NOM) and color to comply with the regulatory requirements for disinfection byproduct (DBP) control. Coagulated raw water will be stored in the MF Feed Tank outside of the containerized membrane systems and will receive a minimum of two-minute reaction time prior to entering the membrane feed pumps.
 - e. The raw water will enter the containerized membrane systems under hydrostatic pressure available from the MF Feed Tank. Membrane feed pumps located inside each containerized system, will pump water through automatic backwashable strainers that are designed to remove algae and other deleterious materials.
 - f. The membrane system will be pressure-type. Water will pass through a unit modulating influent control valve and enter the treatment unit. Water is filtered across the membrane using differential pressure. The filtered water is then discharged.

- a) The system will use a periodic Air Scour – Backwash process to remove accumulated contaminants from the membranes. The process utilizes air on the feed side of the membrane with filtered water to scour the membrane fibers. The waste from the process is then discharged to the solids drying beds.
- b) The system will be periodically cleaned using a Maintenance Clean (MC) process which is a chemical washing procedure. Citric acid or sodium hypochlorite solution is used to clean the membranes. Once the MC process is complete, the remaining solution in the filtration unit is neutralized, dechlorinated, and flushed to a CIP holding tank.
- c) The membrane system will use a Clean-In-Place (CIP) process using a citric acid, sodium hydroxide, or sodium hypochlorite solution. The solution is heated and circulated through the membrane unit and returned to the CIP Tank in each containerized system. Once the cleaning process is complete, the CIP solution is recovered in the CIP Tank and the remaining solution in the filtration unit is neutralized, dechlorinated, and flushed to the CIP holding tank.
- g. After the water is filtered, chlorinated for disinfection, pH adjusted, it will be discharged to a chlorine contact tank. The Buyer's high service pump station will pump the potable water into the distribution system for customer's use.
- h. Backwash wastewater will discharge to a collection manhole. It will flow to a backwash holding pond.
- i. Process residuals from the CIP system will be neutralized, dechlorinated, and discharged to a CIP holding tank in accordance with the requirements of the Buyer.
- j. Each membrane filtration system will incorporate a direct integrity test feature to determine that the membranes are integral and not compromised.

1.2 WORK COVERED BY PROCUREMENT DOCUMENTS

A. In general, the Goods and Special Services include:

- 1. Scope of Supply described in Section 11 30 00, Hollow Fiber Membrane Equipment.
 - a. Containerized membrane filtration units (excluding interconnecting pipework as shown on the Drawings).
 - b. Membrane filtrate monitoring system.
 - c. Process Air Compressor.
 - d. Blowers for air scour.
 - e. Feed/Backwash Pumps.
 - f. Air diaphragm chemical transfer pumps for citric acid, calcium thiosulfate, sodium hydroxide and sodium hypochlorite used in the membrane system cleanings.

- g. Strainers
 - h. Clean-In-Place (CIP) and Neutralization Pumps.
 - i. Electrical control panels for the MF equipment.
 - j. Process Logic Controllers (PLCs) for the MF equipment.
 - k. Human Machine Interface (HMI) for MF and other equipment.
 - l. Field-mounted instrumentation including:
 - 1) Switches.
 - 2) Gauges.
 - 3) Flowmeters.
 - 4) Pressure indicating transmitters.
 - 5) Turbidity meters.
 - m. Other analytical instrumentation.
2. Special Engineering Services and Drawings supplied by the Seller shall include, but are not limited to, the following:
- a. Design of the Goods provided by the Seller.
 - b. Submittal of Shop Drawings and Samples.
 - c. General arrangement drawings of membrane units and of interconnecting piping between membrane filtration treatment trains.
 - d. General arrangement drawing of Compressed Air/Aeration Equipment.
 - e. P&ID's for Seller furnished systems and systems denoted to be controlled by Seller's control system.
 - f. Electrical Drawings of Seller furnished systems.
 - g. PLC (remote I/O racks) Unit Panel Drawings for Seller furnished equipment.
 - h. Participate in meetings and assistance to the Buyer, Engineer, and Contractor during the design.
 - i. Any changes required by the Seller to coordinate the design with the Engineer for the membrane system.
3. Special Services shall include but are not limited to the following:
- a. Scheduling of equipment delivery, witnessing unloading and unpacking of Seller supplied equipment, and inspecting/inventorying equipment.

- b. Training of Contractor.
 - c. Operational and Maintenance Manuals for all equipment provided.
 - d. Oversee the setting of membrane filtration equipment.
 - e. Review of equipment installation.
 - f. Calibration of Seller supplied instrumentation.
 - g. Commissioning of the Goods.
 - h. Equipment and services for demonstration/performance testing.
 - i. Acceptance testing.
 - j. Operator training.
 - k. Correction period service visits.
 - l. Membrane Module and System Warranty.
4. Project responsibilities:
- a. Provide design support to Engineer.
 - 1) The Seller shall provide the Engineer with design assistance and review of the General Arrangement and detail drawings for the interconnecting piping between membrane units and between the membrane filtration system and support facilities (i.e., raw water supply, clearwell, backwash waste pipeline, cleaning systems, air systems, etc.).
 - b. Participation in meetings and assistance to the Buyer and the Engineer during the installation, commissioning and acceptance testing of the Goods.
 - c. Respond to requests for information (RFIs) and provide field support during construction.
 - d. Shop Drawing, Installation Manual, Operation and Maintenance (O&M) Manual and other miscellaneous submittals. Refer to Section 01 34 00, Shop Drawing Procedures.
 - e. Attend/participate in Engineering/Progress Meetings during the design, construction, commissioning, and acceptance testing of Seller provided equipment.
 - f. Any changes required by the Seller for coordination of the design with the Engineer for the membrane system.
 - g. Design and programming of the PLC and human machine interface (PLC/HMI) system for the WTP and membrane system, including but not limited to:

- 1) Design and programming of operator interface screens, data logging and reporting system.
 - 2) Coordination between Seller provided PLC and other Buyer provided PLC/SCADA systems.
 - 3) Programming of PLCs and HMIs supplied with each system.
 - 4) Factory acceptance testing of PLC system.
 - 5) Cooperation and coordination with the Engineer on development of the Seller's HMI/SCADA system.
5. The summary of the Good and Special Services described in this section is an overall summary of the responsibilities of the Seller and his relation to the Buyer.
- a. It does not supersede the specific requirements of other Procurement Documents.

B. Special Services:

1. Provide authorized representatives of the Seller, factory trained and experienced in the technical applications, installation, operation and maintenance of Goods to perform each of the Special Services required.
 - a. Sales representatives or agents of the Seller will not be accepted.
 - b. The only exception to this is that Seller's sales representative may represent Seller during delivery of Goods.
2. Representatives are subject to acceptance by Engineer.
3. Once assigned, no substitute representatives will be allowed unless prior written approval by Engineer has been given.
4. Where specific time is allocated for a particular Special Service, the time expended shall be documented by the Seller and Buyer at the time the Special Service is provided.
 - a. Provide documentation to the Buyer on a monthly basis.
 - 1) Documented hours shall be reconciled by the Buyer and Seller on a monthly basis.
 - b. At the conclusion of the Special Service, additional hours provided at the request of the Buyer or hours specified but not used shall be agreed to between the Seller and the Buyer.
 - 1) Based on the per diem rate provided in the Proposal, the contract amount will be adjusted.
5. Seller to provide one representative selected to be the most qualified to represent the Seller for the individual Special Service provided.

- a. The use of multiple representatives for any particular Special Service shall have prior approval by the Engineer.
- C. Chronological Overview of Special Services and Meetings:
- 1. Project Kick-Off Meeting:
 - a. Review project requirements, introduce team members and establish communication protocol.
 - b. Seller to include four (4) hours for one (1) virtual MS Teams meeting.
 - 2. Coordination Meeting (P&ID Submittal Review Meeting):
 - a. Review and resolve Engineer review comments provided for the P&ID Shop Drawing Submittal.
 - b. Attend virtual MS Teams meeting after Engineer review of P&ID Shop Drawing Submittal.
 - c. Seller to include cost of one (1) eight (8) hour day for one (1) meeting.
 - 3. Coordination Meeting (Single Line Piping Submittal Review Meeting):
 - a. Review and resolve Engineer review comments provided for the Single Line Piping Shop Drawing Submittal.
 - b. Attend virtual MS Teams review meeting after Engineer review of Single Line Piping Shop Drawing Submittal.
 - c. Seller to include cost of one (1) eight (8) hour day for one (1) meeting.
 - 4. Coordination Meeting (Equipment Data Technical Cut Sheet Submittal Review Meeting):
 - a. Review and resolve Engineer review comments provided for the Equipment Shop Drawing Submittal.
 - b. Attend virtual MS Teams review meeting after Engineer review of Equipment Data Technical Cut Sheet Shop Drawing Submittal.
 - c. Seller to include cost of one (1) eight (8) hour day for one (1) meeting.
 - 5. Coordination Meeting (Electrical Power, Instrumentation Power and Control Wiring, and electrical equipment data technical cut sheets Shop Drawing Submittal Review Meeting):
 - a. Review and resolve Engineer review comments provided for the Electrical Power, Instrumentation Power and Control Wiring Drawing and electrical equipment data technical cut sheet Shop Drawing Submittal.

- b. Attend virtual MS Teams review meeting after Engineer review of Electrical Power, Instrumentation Power and Control Wiring, and electrical equipment data technical cut sheets Shop Drawing Submittal.
 - c. Seller to include cost of one (1) eight (8) hour day for one (1) meeting.
6. Final Facility Design Integration:
- a. Provide information and assistance to the Buyer and Engineer to coordinate and integrate Goods provided by Seller with the remaining interrelated systems designed by the Engineer.
 - b. Attend three (3) separate virtual MS Teams meetings with the Buyer and Engineer for integration of Goods into facility design.
 - c. Seller to include cost of one (1) eight (8) hour day for each meeting.
 - d. Integration shall include review by the Seller of the membrane tank(s) and/or skids(s) and pump orientations to confirm layout protects the membranes from excessive hydraulic forces that could damage the membranes or impact warranty.
 - e. Integration shall include review by the Seller of the membrane inlet channel/piping configuration to confirm the Seller's feed water conditions to the membrane equipment are met under all standard operating scenarios.
 - f. Initial meeting will be tentatively scheduled two (2) weeks following project kickoff coordination meeting.
 - 1) The second meeting will be scheduled at the initial meeting.
 - 2) The third meeting will be scheduled at the second meeting.
7. Receipt of Goods:
- a. Verify and document that Goods are properly delivered and unloaded and that storage requirements are clearly communicated to the Contractor.
 - b. Provide construction site representation during delivery of Goods including all partial shipments.
 - c. Seller to include in the bid all the costs associated with delivery of Goods to the project site.
 - 1) Buyer will not be responsible for additional costs associated with partial shipments or delivery of goods.
8. Pre-Demonstration Period:
- a. Assist Contractor with supervision of the installation of Goods.
 - 1) Coordinate services with Contractor's overall construction schedule.

- a) Assume five (5) four (4) day trips (32 hours on site each trip) for supervision assistance along with all time required for travel to and from the site as well as expenses.
- b) Be present to supervise the assembly and/or installation of:
 - (1) Membrane Tank(s) including chemical storage and neutralization, backwash storage, and membrane tanks and/or skids.
 - (2) Membrane blowers, air compressors and pumps and/or pump skids.
 - (3) Process control valves external to the membrane tanks or skids.
 - (4) Process control valves and piping internal to the membrane tanks or skids that are not pre-piped and/or factory installed.
 - (5) Control panels and/or valve panels.
 - (6) Membrane racks.

b. Equipment Startup and Training:

- 1) Provide startup and operator training services for Seller provided equipment.
- 2) Cost of these services is included in Seller's bid price for supplying Goods.
 - a) Duration of this phase is dependent on the quality of the Seller's equipment and programming.
 - b) Seller to assume no more than one (1) piece of equipment can be started in one (1) eight (8) hour day with one (1) training session for operation and maintenance personnel in said eight (8) hour day.
- 3) Seller may utilize representatives from air compressor, blower, pump, and other bought out equipment for installation assistance of Seller's purchased equipment.
 - a) Seller remains responsible for coordination and quality of Special Services if such representatives are used.
- 4) Training
 - a) Assist Contractor in training Buyer's personnel on the operation and maintenance of Goods.

9. Functional Demonstration:

- a. Assist Contractor in demonstrating the functional integrity of the mechanical, electrical and control systems related to the Goods.

- b. Cost associated with this phase of the work is included in the Seller's price of the Goods.
- c. Duration of this phase is dependent on the quality of the Seller's equipment and programming.

10. Performance Demonstration:

- a. Demonstrate and document that the Goods provided meet the operational criteria specified and, if performance does not meet specified criteria, provide corrective action to meet those criteria.
- b. Duration of this phase is dependent on the quality of the Seller's equipment and programming.

11. Acceptance Testing:

- a. Demonstrate the Goods supplied meet the minimum performance requirements of the contract.
- b. Duration of this phase is dependent on the quality of the Seller's equipment.

12. Operations Assistance:

- a. Provide operational assistance to the Buyer over the period of one (1) year.
- b. Assume three (3), two (2) day trips (16 hours on site each trip) for operational assistance along with all time required for travel to and from the site as well as expenses.
- c. Participate in a two (2) day on-site warranty inspection at the end of the correction period.

D. The WORK is located near Boardman Oregon as described in Division 00.

1.3 WORK BY OTHERS

A. Individual Party Responsibilities:

1. Engineer's Responsibilities:

a. Facility Design:

- 1) Overall facility design.
- 2) Design/specification of yard piping (raw, potable, residuals).
- 3) Design/specification of Raw Water Supply Piping/Valves up to containerized membrane systems.
- 4) Design/specification of filtered water piping/valves from containerized membrane System Buyer's chlorine contact tank.

- 5) Design/specification of the bulk chemical feed facilities (e.g., caustic soda, sodium hypochlorite, aluminum chlorohydrate).
- 6) Design/specification of the Recovery/Maintenance clean interconnecting piping.
- 7) Design/specification of chlorination facilities.
- 8) Design/specification of service water pumps.
- 9) Design/specification of electrical motor control centers (MCCs) and conduit schedules.
- 10) Design/specification Structural Elements of Facility, including awning that containerized units will be placed under..
- 11) Preparation of bidding documents for Contractor.
- 12) Design/specification of waste washwater handling facilities.

b. Project Responsibility:

- 1) Review and approval of shop drawing submittals.
- 2) Review of Applications for Payment.
- 3) Review of Applicable Building Codes.
- 4) Assist Buyer to obtain required permits.
- 5) Observation during installation and acceptance testing.

2. Contractor's Responsibilities:

- a. Constructing the treatment facility, including any lifting/moving equipment associated with the building structure.
- b. Receiving, unloading, and storing of all equipment at the project site.
- c. Installation of all Containerized Membrane Filtration Equipment and other equipment provided by Seller.
- d. Submittal, purchase, and installation of equipment specified by the Engineer and denoted on the Drawings.
- e. Installation of all yard piping.
- f. Installation of interconnecting piping between Containerized Membrane Filtration Units.
- g. Installation of electrical systems and operator interfaces.
- h. Corrective assistance during equipment commissioning.

- i. Administer Seller's Contract, if assigned by the Buyer.
 - j. Other work as identified in the Contract Documents.
3. Buyer's Responsibilities:
- a. Provide operator(s) for training.
 - b. Obtain permits as required.
 - c. Operation of the treatment facilities in accordance with Seller's recommendations.
 - d. Payment to contracted parties.
 - e. Timely responses to RFIs and design decisions.
 - f. Provide meeting locations and attend meetings.
 - g. Provide any applicable Buyer standards.
 - h. General oversight of Contractor.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 01 08 00 IDENTIFICATION AND TAGGING

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work

1. Provide for each piece of tagged equipment supplied, provide a noncorrosive identification tag firmly attached and permanently engraved with the tag number.
2. The equipment number used by the manufacturer shall be consistent with the number used to identify the equipment in parts listings and other O&M documentation. The Seller's proposed tagging scheme shall be consistent with paragraph 2.2 and will be submitted to the Engineer per Section 01 34 00, Shop Drawing Procedures. Where possible, equipment tags shall be affixed to the equipment by the equipment manufacturer prior to delivery to the Contractor.
3. The Seller shall be responsible for providing all identification tags for equipment provided loose for installation by the Contractor.
4. For all tagged devices supplied, the Seller shall develop an "Equipment Cross Reference Schedule" that matches the tag to the equipment. Separate Schedules shall be provided for Equipment, Instruments, Valves, Motors, and Input/Output (I/O) Control Loops. The schedule shall include the pertinent information associated with the equipment including tag number, description, functional name location, component equipment model, part number, size, materials, accessories and range and other pertinent information. The Equipment Cross-Reference Schedule shall be provided in the form of a Microsoft Excel (.XLS) spreadsheet.

B. Reference Specifications

1. Section 01 34 00, Shop Drawing Procedures
2. Section 01 67 00, Acceptance Testing of Membrane Equipment
3. Section 11 30 00, Hollow Fiber Membrane Equipment

C. Coordination

1. Coordinate the tagging of all equipment provided with the Buyer's asset tagging and management system.

1.02 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC) - NOT USED

1.03 SUBMITTALS

A. Shop Drawings

1. Drawings and Samples

- a. Provide tagging information as part of the Second Shop Drawing Submittal
- b. Submit a complete listing of all equipment furnished along with both equipment manufacturer's (SKU) identification number and tag number for approval.
- c. Submit the "Cross Reference Schedule" approved equipment manufacturer's (SKU) identification number and tag number for each piece of equipment furnished in electronic format for records.

1.04 SUBMIT THE PRODUCT DELIVERY STORAGE AND HANDLING

- A. Refer to Section 01 61 00, Transportation and Handling of Goods.

PART 2 -- PRODUCTS

2.01 PROCESS SYSTEM DESIGN AND PERFORMANCE - NOT USED

2.02 EQUIPMENT DESIGN AND FABRICATION

A. General

1. Tagging

- a. Tagging is used to identify facility, location / area, process, relative position within a process, and related systems. The purpose of tagging is for operations and maintenance personnel to be able to identify the equipment in the field.
- b. Tag numbers are assigned to the placement of the equipment and remain if the actual equipment is replaced.
- c. All process equipment, valves, instruments and controls will be given a tag.
- d. Equipment numbers are assigned to a specific equipment item for the life of the item. When the equipment item is moved from the process, the equipment tag goes with the equipment item.
- e. Tag numbering example

Facility Code		Location Code			Equipment Code	
Facility	Process Area	Process Location	Unit Number	Component ID	Sequence Number	Subprocess Sequence Number
Alder Creek WTP	MF	Unit	01	P	10	30

- f. All Component, Sequence Numbers, and Sub-Process Sequence Numbers for equipment contained as part of a duplicated process shall be the same component, sequence and sub-process designation. For example, all the MF Unit feed or filtrate pump(s) shall carry the final designation as P-1030. The designator for the Unit is contained in the Unit Number.

- e. Mounting holes to be centered on width and 1/4 inch from each end.
2. Control Panel Tagging:
- a. All sensors and field 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.
 - b. Equipment Asset tagging shall be provided for instrumentation located in control panel enclosures. Equipment Information shall be located on the front of the panels.
 - c. Tagging shall also be used to denote the function of all panel enclosure electrical devices including switches, lamp indicators, potentiometers and panel mounted instruments.
 - d. Control Panel Tags shall be constructed as follows:
 - 1) 1/8-inch-thick laminated phenolic for engraving composed of core, laminated on both sides with a matte (non-glare) finish cover sheet.
 - 2) Core to be black; cover sheet to be white
 - 3) Tags shall be engraved with 3/16-inch letters, minimum
 - 4) Mounting holes to be centered on width and 1/4 inch from each end.
 - 5) Information to be permanently engraved onto the tag shall include the identifying tag number, manufacturer, model number, and part number
 - 6) The tags shall be fastened to the control panel device with self-tapping stainless steel screws. Where fastening with screws is not permitted or impractical, the tags shall be attached to the device using permanent adhesive.

PART 3 -- EXECUTION

3.01 GENERAL

- A. Verify the tagging of equipment as part of the Commissioning of the Goods, Refer to Section 01 67 00, Acceptance Testing of Membrane Equipment.
- B. Provided custom labels as required to identify equipment and piping within the facility. Coordinate colors With the Buyer, however the general rules apply.
 - 1. Feed - Green with white lettering
 - 2. Filtrate - Blue with white lettering
 - 3. Waste - Brown with white lettering

4. CIP System - Orange with black lettering
 5. Chemical Hazard - Yellow with black Lettering
 6. Compressed Air -Green with white lettering
 7. Process Air- Green with white lettering
- C. Label all piping at each membrane unit termination point. Denote direction of flow for single direction lines.
- D. Label all piping within the ancillary support facilities including:
1. Clean-in-Place equipment
 2. Compressors / Blowers
 3. Reverse Filtration/Chemically Enhanced Backwash

END OF SECTION

SECTION 01 09 10 REFERENCE STANDARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Applicable Publications: Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is indicated, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Contract is advertised for Proposals shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth in the specifications or shown on the Drawings will be waived because of any provision of or omission from said standards or requirements.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. The SELLER shall construct the Goods in accordance with the Contract Documents and the referenced portions of those referenced codes, standards, and specifications.
- B. Reference standards include, but are not necessarily limited to, the following:
1. American National Standards Institute (ANSI)
 2. American Society for Testing and Materials (ASTM)
 3. American Water Works Association (AWWA)
 4. American Welding Society (AWS)
 5. Anti-friction Bearing Manufacturers Association (AFBMA)
 6. Canadian Standards Association (CSA)
 7. Hydraulic Institute (HI)
 8. Institute of Electrical and Electronics Engineering (IEEE)
 9. National Electric Code (NEC)
 10. National Electrical Manufacturers Association (NEMA)
 11. National Sanitation Foundation (NSF)
 12. Underwriters Laboratory, Inc. (UL)
 13. International Building Code (IBC)

- C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and direction prior to ordering or providing any materials or furnishing labor. The SELLER shall bid for the most stringent requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 09 20 ABBREVIATIONS AND SYBMOLS

PART 1 -- GENERAL

1.1 DESCRIPTION

- A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear shall have the meanings indicated herein.

1.2 GENERAL ABBREVIATIONS

Common abbreviations that may be found in the Contract Documents include, but are not limited to, the following:

acrylonitrile butadiene styrene	ABS	alternating current	a-c, AC
American wire gauge	AWG	ampere	A
average	avg	brake horsepower	bhp
British thermal unit	Btu	Centigrade (or Celsius)	C
centipoise	cp	chlorinated polyvinyl chloride	CPVC
cleanout	CO	company	Co
cubic feet per minute	cfm	cubic feet per second	cfs
cubic foot	cu ft	cubic inch	cu in
cubic yard	cu yd	decibel	db
decibels, A-weighted	dBA	degree Centigrade (or Celsius)	°C
degree Fahrenheit	°F	diameter	dia
direct current	dc	dollars	\$
ductile iron	DI	each	ea
efficiency	eff	elevation	El
ethylene propylene rubber	EPDM	Fahrenheit	F
feet	ft	feet per hour	fph
feet per minute	fpm	feet per second	fps
fiberglass reinforced plastic	FRP	figure	Fig
flange	flg	foot-pound	ft-lb
gallons (U.S.)	gal	gallons (U.S.) per hour	gph
gallons (U.S.) per minute	gpm	gallons (U.S.) per second	gps

gallons (U.S.) per square foot day	gfd	galvanized	galv
gauge	ga	hand/off/automatic	HOA
Hertz	Hz	horsepower	hp
hour	hr	inch	in
inch-pound	in-lb	input/output	I/O
instrumentation and control	I&C	kilovolt	KV
kilovolt-ampere	kva	kilowatt	kw
kilowatt-hour	kw-hr	length	l
length to least radius of gyration	l/r	light emitting diode	LED
linear	lin	linear foot	LF
liter	L	liter per hour square meter	L/hr-m ²
maximum	max	mercury	Hg
Membrane System Supplier	M	Microfiltration	MF
micron	µm	milli-amp	mA or ma
milliamper DC	mADC	milligram	mg
milligrams per liter	mg/L	milliliter	mL
millimeter	mm	million gallons (U.S.)	MG
million gallons per day (U.S.)	mgd	minimum	min
motor control center	MCC	National Pipe Threads	NPT
nephelometric turbidity units	ntu	net positive suction head available	NPSHA
net positive suction head required	NPSHR	Operation and Maintenance	O&M
ounce	oz	outside diameter	OD
parts per million	ppm	Permeability	1/R
polytetrafluoroethylene	PTFE	polyvinyl chloride	PVC
pound	lb	pounds per square foot	psf
pounds per square inch	psi	pounds per square inch absolute	psia
pounds per square inch differential	psid	pounds per square inch gage	psig
Process and Instrumentation Diagrams	P&ID	random access memory	RAM
resistance	R	revolutions per minute	rpm
Silt Density Index	SDI	specific gravity	sp gr

square foot	sq ft	square inch	sq in
square yard	sq yd	stainless steel	SS
standard	std	standard cubic feet per minute	scfm
total dynamic head	TDH	totally-enclosed, fan-cooled	TEFC
totally-enclosed, non ventilated	TENV	twisted shielded	TWSH
variable frequency drive	VFD	volt	V
volts alternating current	VAC	volts direct current	VDC
water column	WC		

1.3 INSTITUTIONAL ABBREVIATIONS

Abbreviations of institutions or organizations that may be used in the Contract Documents include, but are not limited to, the following:

ABMA	American Bearing Manufacturers Association
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMPP	Association for Materials Protection and Performance
ANSI	American National Standards Institute, Inc.
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CSA	Canadian Standards Association
EI	Energy Institute
EJCDC	Engineers Joint Contract Documents Committee
EPA	Environmental Protection Agency
HI	Hydraulic Institute
IBC	International Building Code
IECC	International Energy Conservation Code
IEEE	Institute of Electrical and Electronics Engineers
IFC	International Fire Code
IFGC	International Fuel Gas Code
ISA	Instrument Society of America
ISO	Insurance Services Office
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration

SAE	Society of Automotive Engineers
SPI	Society of the Plastics Industry, Inc.
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TEMA	Tubular Exchange Manufacturers Association
IBC	International Building Code
IFC	International Fire Code
UL	Underwriters Laboratories, Inc.
USEPA	United States Environmental Protection Agency
WEF	Water Environment Federation

1.4 Symbols

- A. Refer to Drawings for symbols used on drawings.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 17 – STRUCTURAL DESIGN, SUPPORT AND ATTACHMENT

PART 1 -- GENERAL

1.01 SUMMARY

- A. The Seller shall provide calculations and details for structural and non-structural components, supports, and anchorages as required by the Contract Documents and the 2022 Oregon Structural Specialty Code (OSSC). The Seller shall furnish all such structural and non-structural components, supports, attachments, and anchorages in accordance with the calculations and details for installation by Contractor.
- B. Where a conflict exists between the requirements of the Contract Documents and the OSSC, the more stringent requirement shall apply.
- C. Design parameters used to determine Seismic and Wind design forces shall be as listed herein.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Reference Specifications:
 - 1. Section 01 34 00, Shop Drawing Procedures
- B. The edition of the standards applicable to the Work shall be those editions referenced by the 2022 OSSC. If the standard is not referenced by the OSSC-referenced standard listed below, the edition of the standard applicable to the Work shall be the edition in effect on the date of signing and sealing of the contract specifications.

OSSC	2022 Oregon Structural Specialty Code
American Society of Civil Engineers (ASCE)	
ASCE 7 -16	Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
American Concrete Institute (ACI)	
ACI 318	Building Code Requirements for Structural Concrete (2014 edition)

1.03 SUBMITTALS

- A. Furnish submittals in accordance with Section 01 34 00, Shop Drawing Procedures..
 - 1. Calculations and Details
 - 2. Calculations and details are considered a Deferred Submittal as defined in the OSSC.
 - 3. Calculations and details shall be complete, accurate, and in accordance with the requirements of the OSSC and ASCE 7 and shall be signed and sealed by a Professional Engineer registered in the State of Oregon.
 - 4. Calculations shall be clear and concise and show equipment and other non-structural component anchorage forces and the capacities of the anchorage

elements proposed by the Seller. The calculations shall substantiate a complete load path from the component or equipment being anchored into the supporting structure or foundation.

5. The calculations and details shall demonstrate a complete lateral and vertical load path and shall clearly indicate all forces imposed on the supporting structure.
6. Calculations and details are required for all Non-Structural components, supports, anchorages, and attachments.
 - a. Non-Structural components shall include all architectural, mechanical, and electrical components, equipment, piping, ductwork, and all other similar or related appurtenances necessary to produce the complete architectural, mechanical, and electrical systems.
7. When the Contract Documents require the Seller to design structures or structural components, calculations and details for those structures and structural components, and their supports, anchorages, and attachments, are required.
8. When computer generated calculations and analyses are included as part (or as the whole) of the calculations, the calculations shall include, but not be limited to, the following: derivations of all input parameters; clear indication of the applicable load combinations and building code equations; diagrams of all members, geometry, loads, forces, reactions and deflections, for all components and connections; and output results demonstrating all stress, force, deflection and other Contract Document and building code requirements have been satisfied.
9. All calculations associated with anchorage into concrete or masonry shall be done using Strength Level forces and shall be in accordance with the applicable provisions of ACI 318.
10. Refer to Part 2 below for additional requirements.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Non-Structural Component Supports and Anchors

1. Unless otherwise indicated, non-structural component supports, anchors, and restrainers shall be adequately designed for all applicable static, dynamic, operational, seismic and wind loads.
 - a. Wall-mounted equipment weighing more than 250 pounds or which is within 18-inches of the floor shall be provided with fabricated steel supports. Pedestals shall be of welded steel or engineered framing support systems. If the supported equipment is a panel or cabinet or is enclosed with removable sides, the pedestal shall match the supported equipment in appearance and dimensions.

- b. All equipment and all other non-structural components shall be supported and anchored in place by methods that satisfy the building code and the Contract Documents.
 - c. All equipment and all other non-structural components shall be supported and anchored in place by methods that satisfy the manufacturer's applicable seismic certification requirements.
 2. Component attachments shall be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
- B. Non-Building Structures
 1. Non-Building Structures shall be designed in accordance with ASCE 7 Chapter 15.
 2. Non-Building Structures, foundations, supports, anchors, and restrainers shall be adequately designed for all applicable static, dynamic, operational, seismic and wind loads.
- C. Anchors – General
 1. Anchor bolts shall be cast-in-place unless otherwise noted or approved by the Engineer.
 2. The Contractor shall determine the size, type, capacity, location, and other placement requirements of anchorage elements. Anchoring methods and leveling criteria in the manufacturer's literature shall be followed. Submit methods and criteria with the calculations and details.
 3. Anchor bolt calculations shall clearly show that the capacity of the anchor and the capacity of the concrete that the anchor is embedded in are adequate to resist all applicable load combinations, including seismic and wind loads.
 - a. The design of anchors resisting seismic forces shall satisfy the ductility requirements stated in the IBC, ASCE 7, ACI 318.
 4. Reduction factors associated with edge distance, embed length, grout and base plate thickness, and bolt spacing shall all be considered and based on the actual dimensions of the concrete or masonry that resists the anchorage forces.
 5. Where anchorage is required into or through equipment pads, the following requirements shall apply unless otherwise approved by the Engineer:
 - a. For tensile forces, the embed length and associated concrete failure zone shall be provided entirely within the structural slab. No portion of the equipment pad may be considered as effective in resisting tensile forces.
 - b. For shear forces, the edge distance and associated concrete failure zone shall be provided entirely within the equipment pad. No portion of the structural slab may be considered as effective in resisting shear forces.

6. Anchor bolt details shall include required bolt diameter, embed, spacing, and edge distances.
7. Where additional reinforcement is required to satisfy anchorage requirements, such reinforcement shall be included in the anchorage details, and shall be furnished and installed by the Contractor.

D. Mechanical and Electrical Equipment Foundations

1. The Seller, through the equipment manufacturer, shall verify the size and weight of the equipment foundation to ensure compatibility with equipment.
2. Equipment foundation dimensions shall be coordinated with the equipment base geometry and the edge distance and embed requirements of the equipment anchorage calculations.

E. Mechanical and Electrical Equipment (Housekeeping) Pads

1. General

- a. Equipment, tanks, control cabinets, enclosures, and related equipment shall be mounted on concrete equipment pads, unless otherwise indicated. The top surface of the equipment pads shall be level, unless otherwise indicated, or otherwise required by the equipment manufacturer.
- b. Equipment pads shall be sized to accommodate the bearing and anchorage requirements of the equipment, subject to the constraints listed below.
- c. Final geometry of the equipment pads shall not result in a condition that violates applicable building code provisions, including but not limited to the provisions of the National Electric Code.

2. Mechanical Equipment Pads

- a. Mechanical equipment pad heights shall be coordinated with process equipment and piping elevation requirements. Where no such elevation constraints exist, the equipment pad height shall be as shown on the drawings, or as indicated below when no specific height is provided.
 - 1) Equipment pads for mechanical equipment shall be 3.5 inches tall (maximum) at the front of the equipment.
- b. Mechanical equipment pads shall extend not more than 2 inches beyond the front, back, and sides of the equipment, except as indicated below, unless otherwise shown on the drawings.
 - 1) Where necessary to meet seismic or wind anchorage requirements, the pads may be extended beyond the 2 inch limit indicated above. The pads shall extend not more than 6 inches beyond the front, back, and sides of the equipment.

3. Electrical Equipment Pads

- a. Electrical equipment pads shall be 3.5 inches tall (maximum) at the front of the equipment.
- b. Electrical equipment pads shall extend not more than 2 inches beyond the front, back, and sides of the equipment, except as indicated below, unless otherwise shown on the drawings.
- c. Where necessary to meet seismic anchorage requirements, the pads may be extended beyond the 2 inch limit indicated above. The pads shall extend not more than 6 inches beyond the front, back, and sides of the equipment.

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 01 34 00 SHOP DRAWING PROCEDURES

PART 1 -- GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. This Section specifies the methods and requirements for submittals including Shop Drawings and Product Data. Additional requirements are contained in Article 5 of the General Conditions. Specific requirements for Shop Drawings are denoted in the applicable Sections.
- B. Submittal for each Section shall be provided with a separate transmittal form. Submittals shall be completed and organized by the Section noted in the table at the end of this Section. Each submittal shall be clearly identified by reference to applicable Section Number. Submittals shall clearly reference the Contract Number and bear the identification of the Seller. Submittals shall be clear and legible and of sufficient size for presentation of data. Each submittal shall be signed by the Seller.
- C. Failure to provide the Shop Drawings as required by this Section within the allocated time shall constitute a failure of the Seller to provide Special Engineering Services in accordance with the requirements of the Contract. The Seller shall be assessed Liquidated Damages in accordance with Article 5 of the Agreement until acceptable Shop Drawings have been provided.
- D. Reference Specifications
 - 1. Section 11 30 00, Hollow Fiber Membrane Equipment

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

- A. Shop Drawings
 - 1. Shop drawings as specified in individual Sections include, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the work.
 - 2. All shop drawings submitted by subcontractors or component equipment suppliers shall be sent directly to the Seller for checking. The Seller shall be responsible for coordination and checking their submittals before submitting to the Engineer for review and approval.
 - 3. The Shop drawing submittal shall identify a single manufacturer or provider of component equipment. Shop Drawings that identify multiple suppliers for the same item will be rejected.
 - 4. The Seller shall check all subcontractors or component equipment suppliers shop drawings regarding measurements, size of members, materials of construction and fabrication details to make sure that they conform to the Drawings and Specifications.

5. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.
6. For all tagged devices supplied, the Seller shall develop an "Equipment Cross Reference Schedule" per Section 01 08 00, Identification and Tagging, that matches the Tag to the appropriate equipment manual. The Cross Reference Schedule shall be provided for each section submitted.
 - a. The equipment schedule shall include the pertinent information associated with the equipment including tag number, description, functional name location, component equipment model, part number, size, materials, accessories and range. The Equipment Cross- Reference Schedule shall be provided in the form of a Microsoft Excel (.XLS) spreadsheet.
 - b. Provide a separate listing for all Membrane Unit Equipment, including cross-reference schedules with the Membrane Unit (Section 11 30 00, Hollow Fiber Membrane Equipment) submittal. Equipment that is not considered part of the Membrane Unit shall be submitted with the appropriate division submittal.
7. Drawings: Provide in PDF format with bookmarks.
8. Standard product data shall be clearly identified with reproducible arrows or other marking indicating the parts to be supplied with the equipment. Any parts or equipment not provided shall be marked out. In the event that an individual product data sheet has multiple items selected, refer to the Equipment Cross Reverence Schedule, to obtain the relevant model and part number.

B. Product Data

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

C. Samples

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

1.03 SELLER'S RESPONSIBILITIES

- A. Review shop drawings, product data and samples, including those by component equipment suppliers and subcontractors, prior to submission to determine and verify the following:
 - 1. Measurements
 - 2. Construction criteria
 - 3. Catalog numbers and similar data
 - 4. Conformance with related Sections
- B. Each shop drawing, sample and product data submitted by the Seller shall have affixed to it the following Certification Statement including the Seller's Company name and signed by the Seller designated Project Manager. Shop drawings and product data sheets shall be organized using bookmarks in PDF format and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package.
- C. A separate transmittal form shall be used for each section where submittal is required. Transmittal of Shop Drawings on various items using a single transmittal form shall be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole.
- D. The Seller shall utilize a 9-character submittal identification numbering system in the following manner:
 - 1. The first six digits shall be the applicable Section Number.
 - 2. The next two digits shall be the numbers 01 to 99 to sequentially number each initial separate item or drawing submitted under each specific Section Number.
 - 3. The last character shall be a letter, A to Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3rd submission, etc. A typical submittal number would be as follows:

11 30 00-01-B

- 11 30 00 = Section for hollow fiber membrane equipment
- 01 = The eighth submittal under this section
- B = The second submission (first resubmission) of that particular shop drawing.

4. Once information for a section has been prepared to completion, it may be submitted to the Engineer for review. However, if the Engineer determines that the review and approval of the section is contingent upon receipt of additional submittal information, the review of that section shall not be performed until all information has been received.
- E. Notify the Buyer and Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.
 - F. The review and approval of shop drawings, samples or product data by the Buyer and Engineer shall not relieve the Seller from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Seller and the Buyer and Engineer will have no responsibility therefor. The Buyer and the Engineer may review the conformance of all Goods and Special Services with respect to the Contract Documents at any time prior to Final Acceptance.
 - G. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.04 SUBMITTAL REQUIREMENTS

- A. Make submittals promptly in accordance with the Contract Times specified in Article 5 of the General Conditions.
- B. Schedule and Coordination Meetings
 1. The Seller shall submit Shop Drawings Table A and Table B of this Section.
 2. Within 10 days after the issuance of the First Shop Drawing the Seller shall meet with the Engineer and Buyer at the Buyers location to review and receive comment regarding the Shop Drawing Submittal.
 3. Within 10 days after the issuance of the Second Shop Drawing Submittal, the Seller shall meet with the Engineer and Buyer at the Buyers location to review and receive comment regarding the Shop Drawing Submittal.
- C. Each submittal, appropriately coded, will be returned within 15 working days following receipt of submittal by the Engineer.
- D. Number of submittals required:
 1. Shop Drawings: 1 electronic copy in PDF format.

2. Samples: Submit the number stated in the respective Sections.
 3. Drawings: 1 electronic copy in PDF format.
- E. A letter of transmittal shall accompany each submittal.
- F. At the beginning of each letter of transmittal, provide a reference heading indicating the following:

Buyer's Name	<u>City of Sandy</u>
Project Name	<u>Sandy Program Management</u>
Contract No.	<u>Alder Creek WTP</u>
Transmittal No.	_____
Section No.	_____

- G. All Shop Drawings submitted shall bear the stamp of approval and signature of the Seller as evidence that they have been reviewed by the Seller. Submittals without this stamp of approval will not be reviewed by the Buyer and will be returned to the Seller. The Seller's stamp shall contain the following information:
1. The date of submission and the dates of any previous submissions.
 2. The Project title and number.
 3. Seller identification.
 4. Name of the following:
 - a. Seller
 - b. Supplier, Distributor or Manufacturers Representative
 - c. Manufacturer (i.e. Component Equipment Manufacturer)
 5. Identification of the product, with the section number, page, and paragraph(s), drawing number.
 6. Identification of deviations from Contract Documents.
 7. Identification of revisions on resubmittals.
 8. A blank 3-inch x 4- inch space for Engineers review stamp.
 9. Where calculations are required to be submitted by the Seller, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.
- H. All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to the Buyer

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. Refer to Article 5.06 of the General Conditions.
- B. One marked up electronic PDF format copy will be returned to the Seller under one of the following notations.
1. "NO EXCEPTIONS TAKEN" is assigned when there are no notations or comments on the submittal. When returned under this code the Seller may release the equipment and/or material for manufacture, unless specifically noted in the Agreement or the General Conditions.
 2. "MAKE CORRECTIONS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Seller. The Seller may release the equipment or material for manufacture unless specifically noted in the Agreement or the General Conditions; however, all notations and comments must be incorporated into the final product without exception.
 3. "MAKE CORRECTIONS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Seller. The Seller may, at his own risk, release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Buyer and Engineer within 15 working days of the date of the Engineer's transmittal requiring the confirmation.
 4. "AMEND - RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Buyer and Engineer within 15 working days of the date of the Engineer's transmittal requiring the resubmittal.
 5. "REJECTED - RESUBMIT" is assigned when the submittal does not meet the intent of the Contract Documents. The Seller must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.
 6. "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Seller.
 7. Items 1 through 5 designate the status of the reviewed submittal with Item 6 showing there has been an attachment of additional data.
- C. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Seller shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Buyer and Engineer on the previous submission. Additionally, the Seller shall direct specific attention to any revisions made other than the corrections requested by the Buyer and Engineer on previous submissions.

- D. Partial submittals may not be reviewed. The Buyer and Engineer will be the sole judge as to the completeness of a submittal. Submittals not complete will be returned to the Seller and will be considered "Rejected" until resubmitted. The Buyer and Engineer may at his option provide a list or mark the submittal directing the Seller to the areas that are incomplete.
- E. If the Seller considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Seller shall give written notice thereof to the Buyer and Engineer at least 7 working days prior to release for manufacture.
- F. When the shop drawings have been completed to the satisfaction of the Buyer and Engineer, the Seller shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Buyer and Engineer.
- G. All Shop Drawings and Samples shall be submitted prior to the dates established in Article 5 of the Agreement. For any Shop Drawing that is submitted after the dates established in Article 5 of the Agreement, if the Shop Drawing is deemed
- H. "AMEND - RESUBMIT" or "REJECTED" the Buyer shall notify the Seller within five working days after receipt of the Shop Drawings that the shop drawings furnished were not acceptable. Upon notification, the Seller has ten working days to produce and deliver to the Buyer an acceptable Shop Drawing(s).
- I. In the event that the Seller requests an "or equal" for a previously approved item, all of the Engineer's costs in the reviewing and approval of the "or equal" will be back-charged to the Seller, unless the need for such "or-equal" is beyond the Seller's control.

1.06 DISTRIBUTION

- A. In accordance with the requirements of Section 01 73 00, Installation, Operation and Maintenance Manuals, distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Buyer and Engineer. Number of copies shall be as directed by the Buyer and Engineer.

1.07 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

- A. If specifically required in other related Sections, submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

- A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work of other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Seller's failure to transmit submittals in a timely manner.

B. Submit Shop Drawings to the Engineer(s) at the addresses indicated below:

Stantec Consulting Services, Inc.
c/o Adam Odell, P.E.
Tel:(503) 220-5409
Adam.Odell@stantec.com

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

PART 4 -- SUPPLEMENTAL INFORMATION

FIRST SHOP DRAWING SUBMITTALS -- TABLE A

SECTION	TITLE	PARAGRAPH	DATE SUBMITTED	DATE APPROVED
01 74 00	Membrane System and Module Warranty	1.03A		
09 90 00	Painting	1.03A		
11 21 10	Horizontal End Suction Pumps	1.03A		
11 24 90	Fiberglass Reinforced Plastic Tank	1.03.A.1		
11 30 00	Hollow Fiber Membrane Equipment	1.03A.2.a		
11 34 00	Automatic Self-Cleaning Strainers	1.03A		
11 37 00	Compressed Air System	1.03A		
11 37 10	Blower Positive Displacement	1.03A		
11 39 10	Diaphragm Pumps	1.03A		
11 39 50	Vertical Inline Centrifugal Booster Pumps	1.03A		
11 40 05	Strainers	1.03A		
13 32 70	Process Instrumentation General Requirements and Switches	1.03A		
13 32 80	Process Instrumentation Meters and Transmitters	1.03A		
13 32 90	Process Instrumentation Analyzers	1.03A		
15 10 00	Ball Valves	1.03A		
15 10 10	Butterfly Valves	1.03A		
15 10 40	Check Valves	1.03A		
15 10 50	Specialty Valves	1.03A		
15 10 60	Valve Actuators	1.03A		
16 48 20	Variable Frequency Drive Units	1.03A		

SECOND SHOP DRAWING SUBMITTALS -- TABLE B

SECTION	TITLE	PARAGRAPH	DATE SUBMITTED	DATE APPROVED
01 08 00	Identification and Tagging	1.03A		
01 75 00	Spare Parts	1.03A		
05 05 19	Post-Installed Concrete Anchors	1.03A		
11 24 90	Fiberglass Reinforced Plastic Tanks	1.03A.2		
11 30 00	Hollow Fiber Membrane Equipment	1.03A.2.b		
13 32 00	Instrumentation and Control System Functional Description	1.03A		
13 32 10	Instrumentation and Control System General Requirements	1.03A		
13 32 50	Programmable Logic Control Equipment	1.03A		
13 32 60	SCADA System	1.03A		
13 33 00	Control Panels, Enclosures, and Panel Instruments	1.03A		
15 06 20	Stainless Steel Pipe and Tubing	1.03A		
15 07 00	PVC and CPVC Piping Systems	1.03A		
15 07 10	HDPE Piping Systems	1.03A		
16 15 00	Manufactured Wiring Systems	1.03A		

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer registered in the [State] [Commonwealth] of _____ and that he/she has been employed by

_____ to design

(Name of Seller)

(Insert P.E. Responsibilities)

in accordance with Section _____ for the

_____.

(Name of Project)

The undersigned further certifies that he/she has performed the design of the _____, that said design is in conformance with all

(Name of Project)

applicable local, state, and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the

(Insert Name of Buyer)

or Buyer's representative within seven days following written request therefor by the Buyer.

P.E. Name

Seller's Name

Signature

Signature

Address

Title

Address

END OF SECTION

SECTION 01 61 00 TRANSPORTATION AND HANDLING OF GOODS

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work

1. The Seller shall make all arrangements for transportation and delivery of equipment and materials to the Point of Destination.
2. Shipments of materials shall be delivered to the Point of Destination only during regular working hours. Shipments shall be addressed, and delivered to the Contractor, except where otherwise directed.

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC) - (NOT USED)

1.03 SUBMITTALS

A. Shipping List

1. Prior to the delivery of the Goods, the Seller shall develop and submit to the Contractor a Bill of Materials for the contents of all shipments. This list shall detail contents, size, weights and tag numbers of each item shipped. Upon receipt of the Goods, the Bill of Materials shall be used to determine that the Goods have been received by the Contractor in accordance with Article 5 of the General Conditions.

1.04 PRODUCT DELIVERY STORAGE AND HANDLING

- A. The Seller shall arrange deliveries of products in accordance with the Contract Time requirements stipulated in the Agreement.
- B. The Seller shall coordinate deliveries that occur between specified Contract Times to accommodate the following:
 1. Work of other Contractors or Buyer
 2. Limitations of storage space
 3. Availability of equipment and personnel for handling products
- C. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment to simplify accumulation of parts and facilitate assembly.
- D. Each part within a shipment shall be clearly labeled with the reference numbers and tag numbers included in the Bill of Materials.
- E. Upon delivery, the Seller and Contractor, shall inspect shipment(s) to ensure:
 1. Product complies with requirements of approved submittals
 2. Containers and packages are intact

3. Labels are legible
 4. Products are properly protected and undamaged
- F. The Contractor will provide equipment and personnel necessary to handle products by methods designed to prevent soiling or damage.
- G. The Contractor will provide storage facilities in accordance with the Seller storage requirements to be submitted prior to delivery and along with the delivered equipment under Section 01 61 10, Protection of Goods.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 01 61 10 PROTECTION OF GOODS

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work

1. The Seller shall protect Goods in accordance with manufacturer's recommendations and the requirements of the Contract Documents.
2. The Seller shall make all arrangements and provisions necessary for the protection of Goods during delivery to the Point of Destination.
3. Manufacturer's containers may be opened for inspection and verification of the Goods in accordance with Article 8 of the General Conditions. Upon completion of inspection, the Goods shall be repackaged and remain unopened until the time of installation, unless recommended by the manufacturer or otherwise specified.
4. The Seller shall provide the Buyer and the Contractor with a list of Goods that are to be delivered prior to shipment.

B. Reference Specifications - Not Used

- C. Coordination: The Seller shall coordinate with the Buyer and Contractor for Goods that require special protection, storage or handling

1.02 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC) — NOT USED

1.03 SUBMITTALS

- A. Provide submittals required by this section, at least 30 days prior to delivery of the Goods.

- B. The Seller shall provide the Contractor with a list of pumps, motors, drives, electrical, equipment, instrumentation equipment (controls, devices, panels, etc.), and other equipment having anti-friction or sleeve bearings for storage in weather tight storage facilities, such as warehouses.

- C. The Seller shall provide the Contractor with a list of all panels, microprocessor-based equipment, and all other Goods and devices subject to damage or useful life decrease due to:

1. Temperatures below 40°F or above 120°F
2. Relative humidity above 90 percent
3. Or exposure to rain

D. Fully Protected Storage

1. The Seller shall provide the Contractor with a list. of Goods which could be damaged by low or high temperature and require temperature-controlled storage space.
2. The Seller shall provide the Contractor a list of Goods that require protection from contamination by dust, dirt, and moisture.
3. The Seller shall provide the Contractor with a list of Goods that require storage at specific humidity levels as recommended by manufacturer.

E. Seller Storage and Handling Instructions

1. The Seller shall provide specific storage and handling instruction for each loose-shipped item of equipment, instrumentation, materials and crates provided by the Seller.
2. The Seller shall identify requirements for storage and handling of the membrane modules.
3. The Seller shall identify the solution used for storage of the membrane modules.

1.04 PRODUCT STORAGE AND HANDLING

- A. Goods shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. Each container shall be clearly marked with the Seller's name, project name, and location. Goods shall be protected from exposure to the elements and shall be kept thoroughly dry at all times.
- B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged prior to acceptance shall be repainted.
 1. All parts shall be protectively wrapped and/or packaged, using materials commensurate with the weight and configuration of the part, the method of handling, and the method of transportation.
 2. Contact or pressure points shall be sufficiently protected when using steel or J elastic banding.
 3. Cabinets and equipment too heavy to be handled or transported by one man shall be adapted for handling with pallet trucks and/or forklifts.
 4. Painted surfaces which will come in contact with lifting forks or other handling equipment (such as the bottom of cabinets or skid base frame, members) shall be sufficiently padded with heavy corrugated cardboard, foam or other protective materials.

5. Small equipment and skids shall be mounted on wooden pallets designed for fork lifting. This equipment shall be bolted (using existing holes in the frame) or strapped to the pallet to prevent tipping. Equipment and skids too large to be mounted on pallets shall have wooden block damage bolted or strapped to the base foundation pads to prevent paint degradation during handling, assembly and installation.
- C. Electrical equipment, controls, and instrumentation shall be protected against moisture or water damage. Space heaters provided in the equipment will be connected by the Contractor as noted by the Seller and operated at all times until equipment is placed in operation.
 - D. Containerized Membrane Filtration Units shall be delivered to the site as assembled units to the fullest degree possible.
 - E. Notice of Enclosed Instructions: All delivered packages containing Goods shall have notices clearly visible on the exterior of the package indicating that maintenance instructions are enclosed.
 - F. Panel and Instrumentation Storage: All packages containing panels; electronic devices, and other microprocessor-based equipment shall contain a desiccant, volatile corrosion inhibitor (VCI) blocks, a moisture indicator, and maximum-minimum indicating thermometer. The Seller shall provide a spare set of such protection equipment including a desiccant, a moisture indicator, and VCI blocks for each package containing panels, electronic devices, and other microprocessor-based equipment for replacement by the Contractor during the storage period.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

SECTION 01 62 00 INSTALLATION OF MEMBRANE EQUIPMENT

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Seller shall coordinate all services and activities required by this section with the Buyer, Contractor and the Engineer.
 - 1. Upon completion of installation, the Engineer shall issue a "Notice of Completed Installation".
- B. Reference Specifications:
 - 1. Section 01 61 00 Transportation and Handling of Goods
 - 2. Section 01 61 10 Protection of Goods
 - 3. Section 01 66 00 Commissioning of Membrane Equipment
 - 4. Section 01 73 00 Installation, Operation and Maintenance Manuals
 - 5. Division 11 Equipment

1.02 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC) - NOT USED

1.03 SUBMITTALS

- A. Pre-Delivery Submittals
 - 1. In accordance with Section 01 61 00, Transportation and Handling of Goods, the Seller shall provide to the Contractor a listing of Goods to be transported to the Point of Destination.
 - 2. In accordance with Section 01 61 10, Protection of Goods, the Seller shall provide to the Contractor a listing of Goods that require protection. Special storage, protection, and handling instructions shall be provided for these items.
 - 3. In accordance with Section 01 73 00, Installation, Operation and Maintenance Manuals shall be provided.

PART 2 -- PRODUCTS – (NOT USED)

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. The Seller shall provide training to the Contractor for installation of membrane equipment. The training shall be conducted on-site by an authorized, experienced, employee of the Seller.

- B. An employee of the Seller shall be present on-site to oversee the proper placement and installation of at least one (1) Seller units and ancillary equipment supplied by the Seller including but not limited to tanks, pumps, and control panels.
- C. This representative of the Seller shall also be present to oversee the assembly installation of the associated anchor bolts for Seller-furnished equipment.
- D. Seller shall be responsible for identification of the volume and concentration of the membrane module storage solution and rinsing requirements for the membrane modules.
- E. Contractor shall be responsible for making adjustments and/or modifications to the installation process that may become necessary to ensure that the equipment is properly installed.
- F. After the installation is complete, the Seller, Contractor, and Engineer shall jointly perform a pre-commissioning inspection of the containerized membrane system. The inspection shall identify the following:
 - 1. Mechanical
 - a. Containerized Membrane units shall be completely installed and unit and interconnecting piping pressure tested.
 - b. The Process Air System piping supplying pressurized air from the containerized membrane units to the neutralization system shall be completely installed and the piping pressure tested.
 - 2. Electrical
 - a. All local control panels shall be installed and terminations completed.
 - b. All 480V, 120V, and 24VDC power supplies shall be connected and verified.
 - c. The documentation associated with the inspection of electrical terminations shall be provided by the Contractor to the Seller.
- G. Contractor shall be responsible for making adjustments and/or modifications to the installation process that may become necessary to ensure that all equipment is properly installed.
 - 1. The inspection shall identify equipment that has not been properly installed, detailing the outstanding installation issues on a “punch list”, and noting the party who shall be responsible for each correction and identify the items that require correction before commissioning can begin.
 - 2. Once the corrections identified have been made, a “Notice of Completed Installation” shall be issued by the Engineer and commissioning shall commence in accordance with the requirements of Section 01 66 00, Commissioning of Membrane Equipment.

SECTION 01 66 00 COMMISSIONING OF MEMBRANE EQUIPMENT

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Description of Work: The Seller shall commission the membrane equipment and place the system into operation. Commissioning is subject to the following provisions:
1. Commissioning shall not commence until the "Notice of Completed Installation" is issued in accordance with Section 01 62 00, Installation of Membrane Equipment.
 2. Commissioning shall be completed by the Seller within the allocated time as identified in the Agreement.
 3. The Engineer shall document the time when the facilities are substantially unavailable for use by the Seller to perform commissioning. Potential times of substantial unavailability include: 1) when the installation of membrane modules results in a delay to the Seller, 2) when the Engineer conducts its review of system operation and 3) circumstances beyond the control of the Seller including but not limited to power outages, lack of feedwater, inability to transfer product water or feedwater due to factors beyond the control of the Seller, not having adequate staff from the Contractor or the Buyer. If in the sole opinion of the Engineer the facilities are substantially unavailable to the Seller, equivalent additional commissioning time will be granted.
 4. Failure to complete the Commissioning as required by this Section within the allocated time shall constitute a failure of the Seller to provide Special Services in accordance with the requirements of the Contract. The Seller shall be assessed Liquidated Damages in accordance with Article 5 of the Agreement until commissioning is complete.
 5. Upon completion of Commissioning, the Engineer shall issue the "Notice of Completed Commissioning."
- B. The Seller shall coordinate all services and activities required by this Section with the Contractor, the Engineer and the Buyer. These activities shall be coordinated with the requirements of Section 13 32 30, Instrumentation and Control System Commissioning.
- C. The Seller shall perform all other tests required by the Specifications.
- D. Reference Specifications:
1. Section 01 73 10, Training of Operations and Maintenance Personnel
 2. Section 11 30 00, Hollow Fiber Membrane Equipment

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC) - NOT USED

1.03 SUBMITTALS

A. The Seller shall prepare a “Detailed Plan of Commissioning Activities” that will be used as a guideline for Commissioning of the Goods provided by the Seller. The Detailed Plan of Commissioning Activities shall be used to coordinate the activities of the Seller’s personnel. The “Detailed Plan of Commissioning Activities” will identify the Commissioning requirements for all Goods supplied by the Seller. The guidelines shall include the following minimum check items.

1. Pump(s), Metering Pumps, Blowers, Compressors and Other Rotating Equipment
 - a. Filled with Oil
 - b. Rotation is Proper
 - c. Aligned Properly (Mechanical Seal has been set)
 - d. Receives and responds to Process Control Command Signals (Discrete and/or Analog)
2. Instruments (Flow, Pressure, Level, Temperature and Analytical)
 - a. Electrical Supply is Connected
 - b. Software is Configured
 - c. Responds to Position and Sends Discrete and Analog Signals
 - d. Control Alarm Set Point has been established
 - e. Instrument is calibrated
3. Switches (Flow, Pressure, Level and Temperature)
 - a. Electrical Supply is Connected
 - b. Sends Signal Upon Transition of State
 - c. Are Calibrated
4. Automated Modulating Valves
 - a. Air and/or Electrical Supply is Connected
 - b. Responds to Position and Sends Feedback Signals
 - c. Control Alarm Set Point has been established
5. Manual and Automatic Valves
 - a. Air and/or Electrical Supply is Connected

- b. Responds to and sends Feedback (Limit Switch) Signals
- B. The “Detailed Plan of Commissioning Activities” will be used as a guideline for placing the facility into operation. The “Detailed Plan of Commissioning Activities” shall be coordinated with the activities of the Contractor, the Engineer and the Buyer. The guidelines shall include the following minimum check items.
- 1. Field Verification of Installed Equipment including:
 - a. Pumps, Compressors, Blowers, Tankage
 - b. Piping Systems and Temporary Connections
 - c. Electrical Control and Operator Interface Systems
 - 2. Commissioning of Equipment
 - a. Feed Pumps, Filtrate Pumps (vacuum system), Vacuum Pumps, Metering Pumps, Compressors, Blowers
 - b. Switches, Transmitters, Analyzers
 - c. Modulating Manual and Automated Valves
 - 3. Start-up Activities
 - a. Feed, Filtered Water and Backwash Flow Pressure and Level Control Sequences
 - b. Membrane Treatment Unit Operations including filtration, backwashing clean in place and membrane integrity testing.
 - c. Normal and Emergency Start Up and Shut Down Sequences.
 - d. Process Interlocks

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 COMMISSIONING

- A. No system or subsystem shall be started-up for continuous operation unless all Goods, including instrumentation and monitoring systems, of that system or subsystem have been tested and proven to be operable as intended by the Contract Documents.
- B. The Seller shall place the Goods into operation and perform tests to determine if equipment is operating properly. The purpose of these tests is to verify that both the System and each Unit are:
 - 1. Properly installed
 - 2. Operational

3. Capable of completing an operating cycles free of problems
 4. Free from pump or valve cavitation, water hammer, overheating, overloading, vibration, or other operating problems.
 5. The Seller shall verify that control programming has been configured with appropriate software time delays to avoid rapid pump or membrane flow cycling in response to transient dynamic hydraulic effects caused by backwash, or chemical washing cycles or other process cycles (e.g. start - up, shut down, membrane test). “Dead-heading” or any operation of any pump under a “zero-flow” or “flow condition below the pump manufacturers acceptable limits” is not acceptable. Interlocks shall be provided to prevent operation of the any pump under a “dead-headed” condition. The pump manufacturers “maximum number of pumps starts per hour” shall not be exceeded.
- C. The Seller shall coordinate all activities with the Contractor, Buyer and Engineer. The types of activities to be performed by the Seller will be detailed in the “Detailed Plan of Commissioning Activities” include but not necessarily limited to the following items:
1. Initial Start Up Activities
 - a. Verify Unit and Piping Installation
 - b. Verify Valve Tags
 - c. Verify temporary system interconnections
 - d. Verify Instrumentation and Control
 - 1) Verify Fiber Optic System
 - 2) Verify PLC Communication
 - 3) Verify PC or Operator Interface Communication
 2. Commissioning Activities
 - a. Verify Pumps for Rotation
 - b. Commission Compressed Air System
 - c. Commission Blower System
 - d. Test Modulating Valves
 - e. Test Chemical Feed Systems used for feed and backwash
 - f. Test Chemical Feed Systems used in Clean-In-Place
 - g. Test Level Switches in Tanks
 - h. Test Pressure Switches

- i. Set Mechanical Seals in Pumps and Flush System
 - j. Test and Calibrate Process Instruments
 - 1) Flow Meters
 - 2) Pressure Transmitters
 - 3) Level Transmitters
 - 4) Turbidity Meters
 - 5) Chlorine Residual Analyzers
 - 6) pH/ORP Meters
 - 7) Conductivity Meters
 - 8) Temperature Transmitters
 - k. Miscellaneous Equipment
 - l. Field Located Manual Valves
 - m. Field Located Automatic Valves
 - n. Manual Unit Valves
 - o. Automatic Unit Valves
 - p. Flush Piping Systems
3. Start Up Activities
- a. Complete Operational Readiness Test (ORT)
 - b. Feed Flow / Pressure / Level Control System in Manual the Automatic Mode
 - c. Filtrate Pressure Flow / Pressure / Level Control System in Manual the Automatic Mode
 - d. Backwash Flow / Pressure Level / Control System in Manual the Automatic Mode
 - e. Backwash Process Residuals Flow / Pressure Level / Control System in Manual the Automatic Mode
 - f. Filtration Units Placed into Service in Manual the Automatic Mode
 - g. Check Start Up Sequence in Normal and Emergency Modes
 - h. Check Shut Down Sequence in Normal and Emergency Modes

- i. Check Process Logic Interlocks
 - j. Remove Temporary Interconnections
 - k. Disinfect Piping (if applicable)
 - l. Install Membrane Modules
 - m. Place Membrane System in Operation
 - 1) Verify Filtration Sequence
 - 2) Verify Backwash Sequence
 - 3) Verify Membrane Test Sequence
 - 4) Verify Other Seller Process Sequences
 - n. Chemically Clean Membrane Units
 - o. Perform Functional Acceptance Test
- D. As a part of the commissioning, the Seller shall start-up and operate all support systems provided by or required by the Seller for operation of the system, including but not limited to chemical feed systems, instrumentation, air compression equipment, and electric controls. This testing shall demonstrate that there are no water or air leaks in the System, that the piping has been installed and connected properly, that the electrical system is operating correctly, and that the instrumentation has been properly calibrated.
- E. The Seller shall furnish materials (excluding chemicals and power), instruments, and incidental and expendable equipment required for commissioning / placing the equipment into operation. The Seller shall retain the services of any manufacturers representatives as required in the Contract Documents to assist with the commissioning / placing into operation of the Goods. The costs of these services shall be borne by the Seller
- F. The Seller shall oversee the installation the membrane modules by the Contractor. The location and serial number of each membrane module shall be provided using a Microsoft Excel Spreadsheet. This information will be used to document Membrane Warranty replacement. Membrane module information shall be collated and submitted to the Buyer as part of the Commissioning Test Reports Manual.
- G. Once the membrane modules have been installed, the Seller shall conduct a membrane integrity test on each Unit. The Seller shall provide the Engineer with both the integrity test results for each Unit and results documenting that each installed Unit has passed the integrity test. The Seller shall repair or replace any defective membranes.
- H. When requested by the Seller, the Engineer shall review the operation of the equipment to verify that the commissioning is complete.

1. The Engineer shall perform random tests to determine if the equipment is operating properly and witness various operational sequences.
 2. Perform and review the results of the Functional Acceptance Test (FAT)
 3. The Engineer may initiate alarm conditions to determine if the control system is functioning properly.
 4. The Engineers review shall include a review of the HMI interface and PLC SCADA system commissioning requirements
 5. The Engineers review shall identify any equipment that has not been properly installed, or operating, detailing the outstanding installation issues on a “punch list” and noting the party who shall be responsible for each correction and identify the items require that correction.
- I. Upon satisfactory completion of the review, the Engineer shall submit to the Seller a written “Notice of Completed Commissioning”.
 - J. Once the “Notice of Completed Commissioning” is issued, Training of Operation and Maintenance Personnel may commence. Refer to Section 01 73 10, Training of Operations and Maintenance Personnel.

END OF SECTION

SECTION 01 67 00 ACCEPTANCE TESTING OF MEMBRANE EQUIPMENT

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Description of Work: The Seller shall perform an Acceptance Testing of the membrane equipment. Acceptance Testing is subject to the following provisions.
1. Acceptance Testing shall not commence until the Notice of Completed Training is issued in accordance with Section 01 73 10, Training of Operations and Maintenance Personnel.
 2. Acceptance Testing shall commence within 7 days after completion of training or at a mutually agreed upon time by the Seller, Buyer, Contractor and Engineer.
 3. Acceptance Testing shall extend for a period of 30 consecutive days.
 4. Acceptance Testing shall be completed by the Seller within the allocated time identified in the Agreement.
 5. Failure to complete the Acceptance Testing as required by this Section within the allocated time shall constitute a failure of the Seller to provide Special Services in accordance with the requirements of the Contract. The Seller shall be assessed Liquidated Damages in accordance with Article 5 of the Agreement until Acceptance Testing is complete.
 6. The Engineer shall document the time when the facilities are substantially unavailable for use by the Seller to perform Acceptance Testing due to circumstances beyond the control of the Seller including but not limited to power outages, lack of feedwater, inability to transfer product water or feedwater due to factors beyond the control of the Seller, not having adequate staff from the Contractor or the Buyer. If in the sole opinion of the Engineer the facilities are substantially unavailable to the Seller, equivalent additional Acceptance Testing time will be granted.
 7. The date that the Acceptance Testing ends shall be used by the Engineer for the date of the membrane equipment "Notice of Substantial Completion". The "Notice of Substantial Completion" shall be issued by the Engineer upon completion of FINAL Operational and Maintenance Manuals.
- B. Reference Specifications
1. Section 01 73 10, Training of Operations and Maintenance Personnel
 2. Section 11 30 10, Hollow Fiber Membrane Equipment
- C. Coordination
1. The Seller shall coordinate all services and activities required by this Section with the Contractor, Buyer and the Engineer.

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC) - NOT USED

1.03 SUBMITTALS

- A. Upon completion of the Acceptance Testing, the Seller shall submit to the Buyer a written report detailing the results of the Acceptance Testing, including a copy of all field notes and test data.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 ACCEPTANCE TESTING

- A. Upon completion of the Operator Training in accordance with the requirements of Section 01 73 10, Training of Operational and Maintenance Personnel, the Seller shall perform an Acceptance Test on the System. Each UNIT shall be tested concurrently but evaluated separately for performance.
- B. The purpose of the Acceptance Testing is to demonstrate that equipment is:
1. Properly installed
 2. Ready to be placed into service by the Buyer
 3. In compliance with the service conditions, performance requirements, material specifications, and all other requirements of the Contract Documents
 4. In compliance with the requirements of Instrumentation and Control System Testing (Reliability Acceptance Test, (RAT)).
- C. The Seller shall furnish all materials, instruments, and incidental and expendable equipment required for Acceptance Testing, except where otherwise specified.
- D. Throughout the Acceptance Testing period, a representative of the Seller shall be present on site during normal working hours and available via means of a pager or cellular communication during non-working hours in case of an emergency.
- E. The Buyer or an authorized representative of the Buyer will be present to witness the Acceptance Testing.
- F. The Seller shall keep detailed notes regarding the Acceptance Testing and record all test data and results. This will be done through operation of the data logging system. Upon successful completion of the Acceptance Testing, the Seller shall submit a written report on the Acceptance Testing, as specified in Paragraph 1.03.A of this Section.
- G. The initial Acceptance Testing period will extend for 30 consecutive days with one or more Unit(s) per train of units operate at the design flow, with the other Units are equally balanced to treat the remaining raw water available for the 30- day period.

- H. After the Acceptance Testing is completed, the Engineer and Buyer will meet with the Seller to determine compliance with the Contract Documents. At that time, if it is determined that the Seller has fulfilled the requirements of the Contract Documents, the Seller will be released from its on-site obligation unless otherwise retained.
- I. If the Units do not meet the criteria of linear scalability as defined in the Agreement, or if the System does not perform in accordance with the Contract Documents, the Seller shall return or remain on site to perform all necessary corrections at the cost of the Seller until compliance with Contract Documents is demonstrated.
- J. During the Acceptance Testing, the System shall perform in accordance with the guaranteed product water quality to allow the Buyer to discharge treated water.
- K. If the Acceptance Testing is interrupted at the request of the Seller or by the non-conformance of the Seller's equipment for more than three instances or a cumulative downtime of more than six hours during the acceptance test, the Buyer or Engineer may require that Acceptance Testing be restarted from the beginning, at no cost to the Buyer.
- L. Any interruption of the Acceptance Testing caused by circumstances beyond the control of the Seller shall not require the testing to be restarted from the beginning. Such events include any activities that would result in an inadvertent or unplanned shutdown of the PLC / HMI control System or otherwise interfere with the Reliability Acceptance Test. The elapsed time of Acceptance Testing prior to the interruption will be applied to the required testing period.

END OF SECTION

SECTION 01 68 00 OPERATIONS ASSISTANCE

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work:

1. Operation Assistance to the Contractor: The Seller shall provide Operations Assistance to the Contractor for the Membrane Filtration System Equipment.
 - a. The Seller shall provide the Contractor with Operational Assistance for the membrane system during times after the "Notice of Completed Commissioning" for the Membrane System has been issued but prior to the completion of Acceptance Testing.
 - b. The Seller shall operate the membrane system as required by the Contractor to produce water that will be used for the Commissioning of the remaining facilities.
 - c. Prior to the Notice of Substantial Completion, when requested by the Contractor, Operational Assistance shall be provided to the Buyer's Personnel. Operational Assistance shall be provided for:
 - 1) Training of the Operations and Maintenance Personnel.
 - 2) Acceptance Testing.
 - 3) such times not specifically allocated as part of Training or Acceptance Testing.
 - d. Up to 2 weeks of Operational Assistance shall be provided to the Contractor. This Operational assistance is required in addition to any specific requirements associated with Operator Training or Acceptance Testing.
2. Operation Assistance to the Buyer
 - a. The Seller shall provide Operations Assistance to the Buyer during the correction period.
 - 1) Operations assistance shall consist of:
 - a) 2 - 16 hour General Operations Assistance visits during the correction period.
 - b) One 2-day Seller Training Refresher Course
 - c) Seller Services during the Final Inspection
 - b. General Operations Assistance shall consist of:
 - 1) Review of Membrane Filtration Unit Operational Logs

- 2) Review and Modification of PLC/HMI Programming Software to address system performance issues
 - 3) Review of component equipment operation
 - 4) Assistance to the Buyer's personnel during normal working hours
 - 5) Answer Buyer questions regarding performance of the Membrane System
 - 6) Respond to Warranty notices or claims.
- c. Training following two months of regular system operations:
- 1) The system supplier shall provide 3 days of operation and maintenance training covering system equipment provided.
 - 2) The training course shall be a refresher course covering the Membrane Filtration System.
 - 3) The training course shall be a refresher course covering the PLC control system and HMI stations.
- d. Final Inspection Site Visit.
- 1) The Seller shall attend and participate in the Final Inspection of the Membrane Equipment and respond to items identified by the Seller, Buyer or Engineer as being necessary to fulfill with the requirements of the Contract Documents.

B. Reference Specifications

1. Section 01 73 00, Installation, Operation and Maintenance Manuals
2. Section 01 73 10, Training of Operation and Maintenance Personnel
3. Section 11 30 00, Hollow Fiber Membrane Equipment

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC)

A. Manufacturer's Field Services

1. The representative shall be an employee of the Seller. The Seller shall provide one of the representatives associated with the Commissioning, Training and Acceptance Testing of the Membrane Pretreatment System.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 MANUFACTURERS FIELD SERVICES

- A. The Seller's Project Manager shall participate in the Final Inspection to resolve any outstanding issues. The Seller shall correct any items identified by the Buyer or the Engineer during final inspection and resolve said items prior to the issuance of the Notice of Acceptability by the Engineer.

END OF SECTION

SECTION 01 73 00 INSTALLATION, OPERATION AND MAINTENANCE MANUALS

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work:

1. Provide INSTALLATION, PRELIMINARY and FINAL Operational and Maintenance (O&M) Manuals for use by the Contractor and the Buyer.
 - a. The term "Operation and Maintenance Manual" includes all product related information and documents which are required for preparation of the Membrane Filtration System O&M Manual, and data that is required for inclusion by current regulations of any participating government agency or as a provision of a membrane system warranty.
 - b. Failure to provide the INSTALLATION, PRELIMINARY and FINAL Operational and Maintenance (O&M) Manuals as required by this Section within the allocated time shall constitute a failure of the Seller to provide Special Services in accordance with the requirements of the Contract. The Seller shall be assessed Liquidated Damages in accordance with Article 5 of the Agreement until Manuals have been received. Required Delivery for O&M Manuals are as follows:
 - 1) INSTALLATION Manuals are due 30 days before the Goods are delivered to the Point of Destination.
 - 2) PRELIMINARY O&M Manuals are due 30 days before Commissioning.
 - 3) FINAL O&M Manuals are due 30 days after the completion of Acceptance Testing.
 - c. The term component equipment supplier is used to describe a manufacturer's Goods purchased by the Seller and incorporated into the Membrane Filtration System.
 - d. The O&M Manual shall include, but not be limited to, the following:
 - 1) Equipment function, operating characteristics, limiting conditions, operating instructions and procedures for startup, normal and emergency conditions, shutdown and storage
 - 2) Safety considerations relating to installation, operation and maintenance procedures
 - 3) Installation procedures
 - 4) Calibration procedures
 - 5) Routine and preventive maintenance instructions
 - 6) Procedures for disassembly, reassembly, alignment, adjustment, and inspection instructions

- 7) Recommended spare parts list to maintain equipment in service
- 8) Special Tools:
 - a) For Seller equipment, provide list of special tools included and required for installation checking, testing, parts replacement, and maintenance
 - b) For component equipment, a list of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance with current price information
- 9) For component equipment provide name, address and telephone number for local sources of equipment and/or replacement parts
- 10) Operational log sheets and maintenance schedules
- 11) Material Safety Data Sheets (MSDSs) for any applicable item (chemicals, oils, lubricants, etc) provided by the Seller
- 12) Furnish lubricants of the type and grade necessary to meet the requirements of the equipment. Provide lubricants that are NSF Standard 61 approved as food grade and that are compatible for use in public water supplies
- 13) Warranty Information, Bond(s), and Service contract(s), if applicable
- 14) Equipment Specific and Factory Test Report information shall include:
 - a) Tag name, Model and Serial number of the equipment provided
 - b) Name, address, and phone number of manufacturer, manufacturer's local service representative
 - c) Factory Test Reports where applicable
 - d) Approved Shop Drawings (including equipment drawings, schematics, circuit diagrams)
- e. Routine and preventive maintenance instructions include all information and instructions required to keep equipment properly lubricated, adjusted, and maintained so that the item functions as intended throughout its full design life. Routine and preventive maintenance instructions shall include, but not be limited to, the following:
 - 1) Written explanations with illustrations for each preventive maintenance task
 - 2) Recommended schedule for execution of preventive maintenance tasks
 - 3) Lubrication charts shall include a table of alternative lubricants naming at least two alternate lubricant manufacturers, with applicable product numbers, for each application
 - 4) Troubleshooting instructions

5) List of required maintenance tools and equipment

B. Reference Specifications

1. Division 11, Equipment

C. Coordination

1. The Seller shall coordinate the delivery and incorporation of O&M Manuals prepared for this project by the Seller or provided from their component equipment suppliers. The Seller shall develop an O&M Manual for the equipment and systems designed and provided by the Seller under this contract.

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC) – (NOT USED)

1.03 SUBMITTALS

A. General

1. Installation, Commissioning, Training of any process, or piece of equipment shall not be permitted until the respective INSTALLATION or PRELIMINARY manuals have been received and approved by the Engineer as being sufficient in content to allow the completion of the work.
2. O&M Manuals shall be submitted in three ring binders with a table of contents and index tabs to identify the various items.
3. The table of contents shall reference the applicable specification section(s) for each item and shall be included in each volume of multi-volume manuals.
4. O&M manuals shall use dividers and indexed tabs between major categories of information such as Operating Instructions, Preventive Maintenance Instructions, etc.
5. O&M manuals shall use 8-1/2-inch by 11-inch acid free paper of high rag content and quality. All text must be legible, type-written or machine printed originals or high quality copies.
6. Each page shall have a binding margin of approximately 1-1/2 inches and be punched for placement in a three-ring “ D” style loose-leaf binder, which shall be provided by the Seller along with the submittal. Each binder shall be no more than 3 inches.
7. Drawings: Provide full size blueprints (24 x 36) and Half-size black line (11 x 17) reproductions shall be provided for all project drawings. 11-inch x 17- inch drawings shall be bound in a separate binder. 11-inch x 17-inch drawings shall not be folded and placed in any project binder designed for 8½ inch x 11 inch pages.
8. Electronic File Format for CD
 - a. All Seller O&M Manual information shall be supplied to the Buyer as electronic file format that it was originally developed and in condensed portable document format (.PDF format). The specifications for PDF generation are as follows:

- 1) The acceptable format is Portable Document Format (PDF): Adobe Acrobat or Adobe Acrobat Exchange
 - 2) The initial filename for the EOM submittal is provided with the request for final O&M manuals. The filename is posted near the top of the review form. Filenames use the "eight dot three" convention (XXXXX_YY.PDF) where XXXXX is the specification section number and YY is an ID number. If technical problems require you to break the submittal into more than one file then add a letter extension to the end of each filename. (example: 19876_01A.PDF) Keep the number of files to a minimum.
 - 3) Scan images at a resolution of 400 dpi or greater. Perform Optical Character Recognition (OCR) capture on all images. Achieve OCR with the "original image with hidden text" option (as seen in Adobe Acrobat Exchange 4.05).
 - 4) Create one PDF document (PDF file) for each equipment O&M Manual. The entire manual is converted to a single PDF file via scanning or other method of conversion. Drawing or other graphics must be converted to PDF format and made part of the one PDF document. Rotate pages that must be viewed in landscape to the appropriate position for easy reading. Word searches of the PDF document must operate successfully. (proof of OCR)
 - 5) Create a bookmark in the navigation frame, for each entry in the Table of contents. Three levels deep is usually enough (i.e. Chapter, Section, Sub-section)
 - 6) Generate thumbnails for each completed PDF file.
 - 7) Set the opening view for PDF files as follows:
 - a) Initial view: Bookmarks and page
 - b) Magnification: Fit in window
 - c) Open to the cover page of the manual, with bookmarks to the left, and the first bookmark linked to the table of contents.
 - b. All component equipment manuals shall be provided in .PDF format.
 - c. All Project drawings shall be provided in AutoCAD 2000 and .PDF format.
9. Equipment Identification
- a. Identify products and components by their Tag and descriptive names. The use of cryptic model or catalog numbers or letters for identification shall not be acceptable.
 - b. Indicate all components of the equipment on catalog pages by bold markings or some other clearly definable medium for ease of identification. All markings shall be readable if photocopied.

B. Letter of Transmittal:

- a. The Seller shall provide a Letter of Transmittal with each submittal and include the following in the letter:
 - b. Date of submittal.
 - c. Contract title and number.
 - d. Seller's name and address.
 - e. A list of the attachments and the Sections of the Manual to which they relate.
 - f. Reference to or explanation of related submittals already made or to be made at a future date.
- C. The Seller shall prepare INSTALLATION Manuals for the Installation of the Goods by the Contractor.
 1. The Seller shall submit six copies marked "INSTALLATION" of each required O&M manual to the Contractor. Each manual shall include a CD containing the information contained in the manual. Distribution by Contractor shall be as follows:
 - a. The Contractor shall retain 3 copies
 - b. The Engineer shall receive 2 copies
 - c. The Buyer shall receive 1 copy
 2. The Seller shall organize the "INSTALLATION" manuals as follows
 - a. Seller Equipment Installation Manual
 - 1) Seller Equipment Installation Instructions
 - 2) Contractor Training Information
 - 3) Painting Touch up and Repair Instructions
 - 4) Equipment Cross-Reference Schedules
 - a) For all tagged devices supplied, the Seller shall develop an "Cross Reference Schedule" that matches the Tag to the appropriate equipment manual. The equipment schedule shall include the pertinent information associated with the equipment including tag number, description, functional name location, component equipment model, part number, size, materials, accessories and range. The equipment cross-reference schedule shall be provided in the form of a Microsoft Excel (.XLS) spreadsheet.
 - b. Component Equipment O&M Manuals
 - 1) Includes all Division 5, Division 11, (excluding membrane equipment) and Division 15 approved or "as constructed by Seller" shop drawing submittals and equipment Installation, Operational and Maintenance Manuals.

- c. Instrumentation and Control Equipment Manuals
 - 1) Includes all Division 13 approved or “as constructed by Seller” Shop Drawing Submittals and Equipment Installation Operational and Maintenance Manuals.
- d. Electrical Equipment Manuals
 - 1) Includes all Division 16 approved or “as constructed by Seller” Shop Drawing Submittals and Equipment Installation, Operational and Maintenance Manuals.
- e. All “As Constructed” Project Drawings

D. PRELIMINARY O&M Manual:

1. The Seller shall submit six copies marked “PRELIMINARY” of each required O&M manual and the training plan. Each manual shall include a CD containing the information contained in the manual.
 2. The Seller shall organize the PRELIMINARY O&M Manuals as follows:
 - a. Seller Equipment O&M Manual
 - 1) Includes O&M and Preventive Maintenance Instructions
 - 2) Includes Detailed Plan of Commissioning Activities
 - 3) Includes the Equipment Cross-Reference Schedule
 - b. Component O&M Manuals
 - 1) Includes all Division 5, Division 11, (excluding membrane equipment) and Division 15 approved or “ as constructed by Seller” equipment Installation, Operational and Maintenance Manuals.
 - c. Instrumentation and Control O&M Manuals
 - d. Electrical Equipment Manuals
 - e. Equipment Specific and Factory Test Reports Manual
 - f. Seller and Component Equipment Suppliers Training Manual(s)
 - g. All “As Constructed” Project Drawings
- E. After the Acceptance Testing has been completed the Seller shall revise and resubmit the FINAL O&M Manuals for the project. Eight final copies of each of the required Operation and Maintenance Manuals shall be submitted. Each manual shall contain a CD containing the information contained in the manual.
1. FINAL O&M Manual(s):

2. The Seller shall submit six copies marked "FINAL" of each required O&M Manual. Each manual shall include a CD containing the information contained in the manual.
 - a. The Seller shall organize the FINAL O&M Manuals as follows:
 - 1) Seller Equipment O&M Manual
 - 2) This O&M Manual will be provided "as new in its entirety."
 - 3) Includes O&M and Preventive Maintenance Instructions
 - 4) Includes an equipment cross-reference schedule
 - 5) Includes a FINAL CD
 - b. Component O&M Manuals
 - 1) This Manual will include only changes from the PRELIMINARY to FINAL Versions. The Seller shall provide new Manual Covers or Binders
 - 2) Includes a FINAL CD
 - c. Instrumentation and Control O&M Manuals
 - 1) The Seller PLC/HMI Manuals will be provided "as new in its entirety."
 - 2) The component equipment manuals include only changes from the PRELIMINARY to FINAL Versions. The Seller shall provide new Manual Covers or Binders
 - 3) Includes a FINAL CD.
 - d. Electrical Equipment Manuals
 - 1) The Electrical Equipment Manuals include only changes from the PRELIMINARY to FINAL Versions. The Seller shall provide new Manual Covers or Binders
 - 2) Includes all Electrical, Shop Drawing Submittals and Component Equipment O&M Manuals
 - 3) Includes a FINAL CD
 - e. Equipment Specific and Factory Test Reports Manual
 - 1) The FINAL Factory Test Report Manual shall include only changes from the PRELIMINARY to FINAL Versions for Component Equipment. The Seller shall provide new Manual Covers or Binders.
 - f. Commissioning Test Reports Manual shall include:
 - 1) Results of all installation inspection, field calibration, and field testing reports prepared during the commissioning of the facility

- 2) Results of membrane module installation and integrity testing
 - 3) Results of Acceptance Testing
- g. All “as installed” project drawings will be provided “as new in its entirety” and include a FINAL CD.

PART 2 -- PRODUCTS - NOT USED

PART 3 -- EXECUTION - NOT USED

END OF SECTION

SECTION 01 73 10 TRAINING OF OPERATIONS AND MAINTENANCE PERSONNEL

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work

1. The Seller shall provide formal training of the Buyers' personnel. Training shall commence after the "Notice of Completed Commissioning" is issued.
 - a. Training of the Buyer's personnel shall commence within a period of 14 days after the "Notice of Completed Commissioning" has been issued as mutually agreed to by the Buyer, Engineer, Contractor and Seller.
 - b. Training shall be conducted for first shift during normal working hours.
 - c. Training shall be completed within the time allocated in the Agreement.
 - d. The Engineer shall document the time when the facilities are substantially unavailable for use by the Seller to perform training due to circumstances beyond the control of the Seller including but not limited to power outages, lack of feedwater, inability to transfer product water or feedwater due to factors beyond the control of the Seller, not having adequate staff from the Contractor or the Buyer. If in the sole opinion of the Engineer the facilities are substantially unavailable to the Seller, equivalent additional time for training will be granted.
 - e. Failure of the Seller to complete the Training as required by this Section within the allocated time, shall constitute a failure of the Seller to provide Special Services in accordance with the requirements of the Contract. The Seller shall be assessed Liquidated Damages in accordance with Article 5 of the Agreement until Training is complete.
 - f. Upon successful completion of the Training required by this Section, the Engineer will issue a "Notice of Completed Training".
 - g. The Seller shall maintain record of the individuals that have completed training and provide information required for the documentation of Professional Development Hours required for the Buyer's personnel.
2. The Seller shall provide the services of factory-trained specialists to train the Buyer's personnel in the recommended operation and the preventive maintenance procedures for all equipment provided by the Contract Documents.
3. The Seller shall provide a combination of classroom and hands-on training. All training shall be conducted at the Buyer's location.

4. The following Levels of Training Shall Be Provided.

Level of Training	Number of Shifts	Maximum Number of Participants	Classroom Training (Hours)	Hands-On Training (Hours)
Membrane System	1	8	8	16
Mechanical Equipment	1	8	8	16
Instrumentation and Control Equipment	1	4	8	16
PLC / HMI	1	4	16	16

5. Hands-On Training shall be limited to groups of 8. In the event that more than 8 personnel are to be trained, multiple hands-on training sessions shall be conducted.
6. The Seller shall be responsible for all costs associated with training and shall provide required materials, texts, and supplies.
7. Training shall be conducted in normal eight (8) hour working days until conclusion of the training course.
8. Training sessions may be video recorded by the Buyer at the Buyer's expense.
9. Training material shall be provided to the Buyer in written and electronic format.
10. Training shall be performed by the Seller and component equipment suppliers. The Seller shall be responsible for the training on the design and operation of the equipment and systems provided. This includes:
 - a. Membrane System
 - 1) Membrane Filtration Theory
 - 2) Membrane Filtration System
 - 3) Membrane Filtration Units
 - 4) Membrane Filtration Processes
 - a) Start Up, Shut Down
 - b) Filtration, Backwashing
 - c) Maintenance Cleaning, Chemical Washing, Backwash and Clean in Place

- d) Integrity Testing and Module Repair
 - 5) Routine and Non-Routine Maintenance
 - b. Component Equipment Training
 - 1) Equipment, Equipment (including pumps, compressors)
 - 2) Mechanical, Equipment (valves, actuators, and positioners)
 - c. Instrumentation and Control Component Equipment Training
 - 1) Switches
 - 2) Meters and Transmitters
 - 3) Analyzers
 - d. Instrumentation and Control Process Logic Control/HMI Training
 - 1) Process Logic Control Equipment
 - 2) HMI System Training
- 11. Component Equipment Suppliers: The Seller shall retain the services of manufacturer's representative(s) for training of the following equipment provided by the Seller.
 - a. Pumps
 - b. Compressors
 - c. Process Logic Control Equipment
 - d. HMI System Programming
 - e. Other equipment provided by the Seller where the Seller is not qualified to provide authorized factory level training

B. Reference Specifications

- 1. Section 01 66 00, Commissioning of Membrane Equipment
- 2. Section 01 67 00, Acceptance Testing
- 3. Section 01 73 00, Installation, Operation and Maintenance Manuals
- 4. Section 11 21 10, Horizontal End Suction Pumps
- 5. Section 11 30 00, Hollow Fiber Membrane Equipment

C. Coordination:

1. The Seller shall coordinate these services at times acceptable to the Buyer, with a minimum of 5 days prior notice.

1.02 QUALITY CONTROL / QUALITY ASSURANCE (QA/QC)

1. The qualifications of specialists shall meet the requirements of this Section and are subject to approval by the Engineer.

1.03 SUBMITTALS

- A. Training Manuals shall be provided with the PRELIMINARY O&M Manuals. Refer to Section 01 73 00, Installation, Operation and Maintenance Manuals.
- B. The Seller shall develop and submit to the Engineer and Buyer a Training Manual. The Training Manual Plan shall include the elements presented in this Section or as required by the Seller or component equipment supplier.
- C. The Seller shall prepare a Training Lesson Plan, provide qualified instructors, and schedule the training in an organized manner.
 1. Proposed lesson plans for scheduled instruction shall be submitted 15 days prior to the commencement of training. Lesson plans shall be approved by the Engineer a minimum of 5 days prior to scheduled instruction. All training material shall be provided to the Buyer in electronic format.
 2. Credentials for the Seller's designated instructor(s) shall be submitted thirty (30) days prior to the commencement of training. Credentials shall include a brief resume and specific details of the instructor(s) pertaining both to personal experience operating and maintaining the specified equipment and conducting operation and maintenance for the same equipment.
 3. The Seller's proposed lesson plans shall detail specific instruction topics. Training aids to be utilized in the instruction shall be referenced and attached where applicable to the proposed lesson plan. "Hands-on" demonstrations planned for the instruction shall be described in the lesson plan.
 4. The Seller shall indicate the estimated duration of each segment of the training in the lesson plan.
 5. Submit information as required by the local primacy agency in support of Professional Development Hours.

1.04 PRODUCT DELIVERY STORAGE AND HANDLING (NOT USED)

1.05 SPECIAL PROJECT CONSIDERATIONS

A. Training Aids

1. The Seller's instructor shall incorporate training aids as appropriate to assist in the instruction. As a minimum, the training aids shall include text and figure handouts. Texts shall be bound within three-ring binders. Other appropriate training aids are:

- a. Audio-visual aids (e.g., films, slides, videotapes, overhead transparencies, posters, blueprints, diagrams, catalogue sheets)
 - b. Equipment cutaways and samples (e.g., spare parts and damaged equipment)
 - c. Tools (e.g., repair tools, customized tools, measuring and calibrating instruments)
2. The Seller's instructor shall utilize descriptive class handouts during the instruction. Photocopied class handouts shall be good quality reproductions. Class handouts should accompany the instruction with frequent reference made to them. Customized handouts developed especially for the instruction are required. Handouts planned for the instruction shall be attached with the manufacturer's proposed lesson plan.
- B. "Hands-On Demonstration"
- 1. The Seller's instructor shall present "hands-on" demonstrations of operations and maintenance of the Seller supplied and component equipment. The proposed "hands-on" demonstrations should be described in the Seller's proposed lesson plan.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 OPERATOR TRAINING

A. Training: The instruction lesson plan shall include the following as a minimum:

- 1. Equipment Operation:
 - a. Describe equipment's operating (process) function
 - b. Describe equipment's fundamental operating principals and dynamics
 - c. Identify equipment's mechanical, electrical, and electronic components and features
 - d. Identify all support equipment associated with the operation of subject equipment (e.g., compressed air intake filters, valve actuators, motors)
 - e. Recommend standard operating procedures to address start-up, routine monitoring, and shut-down of the equipment
- 2. Detailed Component Description:
 - a. Identify and describe in detail each component's function
 - b. Group related components into subsystems, where applicable. Describe subsystem functions and their interaction with other subsystems

- c. Identify and describe in detail equipment safeties and control interlocks
3. Equipment Preventive Maintenance (PM):
- a. Describe PM inspection procedures required to:
 - 1) Perform an inspection of the equipment in operation
 - 2) Spot potential trouble symptoms and anticipate breakdowns
 - 3) Forecast maintenance requirements (predictive maintenance)
 - b. Define the recommended PM intervals for each component
 - c. Provide lubricant and replacement part recommendations and limitations
 - d. Describe appropriate cleaning practices and recommend intervals
 - e. Identify and describe the use of special tools required for maintenance of the equipment
 - f. Describe component removal/installation and disassembly/assembly procedures
 - g. Perform "hands-on" demonstrations of preventive maintenance procedures
 - h. Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate
 - i. Define recommended torquing, mounting, calibration, and/or alignment procedures and settings, as appropriate
 - j. Describe recommended procedures to check/test equipment following a corrective repair.
4. Equipment Troubleshooting
- a. Define recommended systematic troubleshooting procedures
 - b. Provide component specific troubleshooting checklists
 - c. Describe applicable equipment testing and diagnostic procedures to facilitate troubleshooting

END OF SECTION

SECTION 01 74 00 MEMBRANE SYSTEM AND MODULE WARRANTY

PART 1 -- GENERAL

1.01 SUMMARY

A. Section includes:

1. Membrane system and module warranty information.
2. This section covers the membrane system equipment and module warranty. This section addresses the requirements in conjunction with the provisions of Paragraphs 9.01, 9.03 and 9.04 of the General Conditions.

B. Related specification sections include but are not necessarily limited to:

1. Division 00, Procurement and Contracting Requirements.
2. Division 01, General Requirements.
3. Section 11 30 00, Hollow Fiber Membrane Equipment

1.02 QUALITY ASSURANCE

A. Referenced standards:

1. ASTM International:
 - a. D6908, Standard Practice for Integrity Testing of Water Filtration Membrane Systems.

B. Seller's Quality Assurance/Quality Control (QA/QC) Procedures

1. Submit for approval, prior to the shipment of the membrane modules, reports in letter format for each membrane module. At a minimum, the reports shall include:
 - a. The membrane module model and part number, manufacturing lot number and serial number. Indicate the nominal and absolute pore size, inside and outside fiber diameter, effective fiber length, and effective feed side surface area of the membrane module.
 - b. The membrane module normalized specific flux (permeability, gfd/psi at 20°C).
 - c. A certification by the membrane module supplier that:
 - 1) Each membrane module has passed the Seller's QA/QC (integrity) tests.

- d. Certification of wet testing for each membrane module conducted at the Seller's facilities. Seller shall certify that each membrane module has passed the QA/QC tests for membrane element integrity. Acceptable QA/QC tests include bubble point or pressure hold tests above the minimum value recommended by the Seller and approved by the Engineer.
 - e. Identify modules that have undergone pinning or repair for more than 0.1 percent of original fibers at the factory.
2. Certificates of Warranty
- a. Submit a listing of chemical constituents, concentrations and exposure times that would void the membrane warranty.

1.03 DEFINITIONS

- A. Log Reduction Value (LRV): The filtration removal efficiency expressed as \log_{10} for a target organism or surrogate.
- B. Membrane Module(s): Hollow fiber membranes arranged as a module that is a sub-assembly of a MF/UF Unit.
- C. Membrane Integrity Failure Occurrence:
 - 1. A loss of integrity (e.g., partial or complete fiber breaks) that results in less than 4-log (LRV of 4 or 99.99 percent filtration efficiency for a removal of 3 micron or larger particles) as determined by an air pressure based Direct Integrity Test such as the:
 - a. Pressure Decay Test.
 - b. Diffusive Airflow Test.
 - c. Correlated Airflow Measurement Test:
 - 1) A pressure decay test, applying Hagen-Poiseuille equation per ASTM D6908.
 - d. Other conforming integrity tests that satisfy the criteria for test resolution and sensitivity as described by any recognized independent method developed by a consortium of membrane module manufacturers or described and accepted as a method by the primacy agency.
 - 2. MF/UF System: The complete MF/UF System is comprised of multiple MF/UF Units and all ancillary equipment.
- D. MF/UF Unit(s): One (1) complete filtration unit including valves, pumps, controls, and piping capable of producing filtered water.
- E. Substantial Completion: See Division 0, General Conditions.

1.04 SUBMITTALS

- A. Shop Drawings

1. Membrane Warranty
 - a. Submit design calculations to substantiate the 4-Log Membrane LRVs for air pressure integrity testing. Perform calculations based upon a broken fiber-lumen(s) or a microporous defect of 3 microns to determine the worst-case membrane integrity defect scenario.
 - b. Provide a listing of chemical constituents, concentrations and exposure times that would result in voiding the membrane warranty.
 - c. For each of the above chemical constituents, identify the instrumentation required and alarm limits necessary to satisfy the warranty provisions of this section.
2. MF Membrane Modules:
 - a. Include module construction details.
 - 1) Materials of construction.
 - 2) Dimensions.
 - 3) Standard commercial part numbers and materials for elastomeric seals. Note that Buna-N seals are not acceptable.
 - b. Include standard performance parameters.
 - 1) Operating temperature.
 - 2) pH and oxidant tolerance (continuous and intermittent).
 - 3) Range of membrane flux.
 - 4) Clean water normalized specific flux (permeability or resistivity).
 - 5) Minimum bubble point or maximum pressure decay test parameters.
 - c. Include storage and handling requirements.
 - d. Provide standard operating and maintenance data including storage solutions (concentration and volume) used during shipment and recommended rinsing solutions (concentration and volume) and long-term/short-term storage protocols.

B. Factory Test Reports

1. Prior to delivery of the membrane modules, submit the following:
 - a. Seller shall identify each membrane module by a unique serial number and indicate the membrane lot.
 - b. Seller shall provide the membrane specification sheets that specify each membrane module's normalized specific flux (gfd/psi at 20°C), nominal pore size, and the nominal inside and outside surface area of the filter module.

- c. Certification of wet testing for each membrane module conducted at the Seller's facilities. Seller shall certify that each membrane module has passed the QA/QC tests for membrane element integrity. Acceptable QA/QC tests include bubble point or pressure hold tests above the minimum value recommended by the membrane module supplier and as approved by the Engineer.

C. Certificates of Warranty

- 1. The listing of chemical constituents, concentrations, and exposure time that would void the membrane warranty.

1.05 MEMBRANE SYSTEM WARRANTY

- A. During the Correction Period, the Seller shall furnish an equipment warranty certificate assuring the containerized membrane filtration units and system (including membrane modules) will meet the service conditions specified in Section 11 30 00, Hollow Fiber Membrane Equipment, Paragraph 2.01.
- B. Seller warrants satisfactory performance of the Goods to achieve equipment performance (e.g., design flows, water recovery, backwash, chemical washing, and Clean-In-Place (CIP) intervals) and water quality (e.g., integrity failure) objectives and complies with the concept of linear scalability as defined in the Agreement.
- C. In the event that the Buyer does not believe that the Goods meet the specifications, including the criteria of linear scalability, the Buyer shall notify the Seller that the conditions for a breach of contract exist. Seller shall provide at no cost to the Buyer pilot equipment of the type and kind evaluated during the pilot testing, if not available to the Buyer, to verify the compliance with the specifications. In the event that the Buyer determines that the equipment does not comply with the specifications including the concept of linear scalability, the Seller shall provide an acceptable remedy to the Buyer in accordance with the General Conditions. If an acceptable remedy is not obtained, the Buyer shall notify the Seller that a breach of contract exists.
- D. If the Goods are non-conforming and unable to conform to the equipment performance objectives for criteria other than linear scalability, the Buyer will notify the Seller in accordance with the procedures identified in Paragraph 9.03 of the General Conditions. Buyer shall make available to the Seller electronic records for Seller review. Seller shall be given 10 days to develop a plan to remedy the non-conformance.
- E. If within 60 days after the notification to the Seller it has become apparent to the Buyer that the remedy is not acceptable, the Buyer will provide notice to the Seller that the conditions for breach of contract exist. If within 30 days an acceptable remedy is not obtained, the Buyer shall notify the Seller that a breach of contract exists.
- F. Buyer recognizes that to remedy system warranty provisions, the Seller may need to modify operational protocols. Seller recognizes that any change to the operational protocols must be acceptable to the Buyer. Buyer recognizes that any changes to operational protocols by the Seller pursuant to this warranty provision are acceptable under the following conditions:

1. That the specified design parameters (e.g., production capacity, water quality, system recovery, and chemical cleaning interval) are obtained.
2. That the change in operational parameters and protocols (e.g., backwash, chemical washing, or chemical cleaning) will not represent an increase in operational or membrane replacement costs to the Buyer.

1.06 MEMBRANE MODULE WARRANTY

A. General:

1. Seller warrants that the membrane modules will be used for the treatment of water for drinking purposes and that in accordance with Paragraph 5.08 of the General Conditions the membrane modules are fit for the intended purpose.
2. Membrane modules and elements purchased by the Buyer or otherwise provided under the Agreement or as a future membrane replacement shall be provided with the same warranty as the membrane modules and elements provided as part of the original equipment installation.
3. Seller warrants that the membrane modules and elements will be free from non-conformance in:
 - a. Materials.
 - b. Workmanship.
 - c. Membrane integrity failure.
 - d. Irreversible flux loss.

B. Membrane Module and Element Warranty Periods

1. Seller shall warrant the performance of the supplied MF/UF membrane modules for a period of not less than ten (10) years (inclusive of the three (3) years full replacement warranty period) from the date of Substantial Completion.
 - a. The warranty shall guarantee the performance of the membrane modules so as to meet the MF/UF system design and performance criteria specified in Section 11 30 00, Hollow Fiber Membrane Equipment.
 - b. Membrane modules that within the first year become non-conforming, as defined by the requirements specified Buyer, must be replaced with new membrane modules at no cost to the Buyer.
2. Seller's membrane module and element warranty periods have been established in the Proposal.
 - a. Seller's membrane module warranty period shall commence with the date of Substantial Completion and continue until the end of the pro-rata warranty period submitted by the Seller with the Bid.
 - b. The membrane module and element warranty periods shall consist of two (2) parts: a full replacement warranty period and a pro-rata warranty period.

- 1) The full replacement warranty period shall last for a period of at least three (3) years after the date of Substantial Completion as described below:
 - a) For membrane modules or elements supplied as part of the original equipment installation, the date of Substantial Completion is when the full replacement warranty period commences.
 - b) For membrane modules or elements provided after the start of Substantial Completion, the full replacement warranty period begins the date the membrane module or element is placed into service.
 - c) Buyer shall record and maintain records of the date of installation for all membrane modules and elements.
 - 2) The pro-rata warranty period of seven (7) years shall commence with the end of the full replacement warranty period and last until the end of the pro-rata warranty period as submitted by the Seller in the Bid.
- C. In the event that the Goods do not meet the performance requirements specified, including the criteria of linear scalability, the Buyer shall notify the Seller in writing requesting warranty replacement modules.
1. Following return notification, the Seller shall have an optional 10-day period to provide on-site troubleshooting and/or repair of the defective Goods.
- D. In the event that the capacity or quality cannot be regained through these efforts, an adequate number of modules will be replaced as per the terms of the warranty to recover system performance within the parameters specified in Section 11 30 00, Hollow Fiber Membrane Equipment.
- E. If within 60 days after the notification to the Seller it has become apparent to the Buyer that the remedy is not acceptable, the Buyer will provide notice to the Seller that the conditions for breach of contract exist.
1. If within 30 days following such notice an acceptable remedy is not obtained, the Buyer shall notify the Seller that a breach of contract exists.
- F. Buyer recognizes that to remedy system warranty provisions, the Seller may need to modify operational protocols.
1. Seller recognizes that any changes to the operational protocols must be acceptable to the Buyer.
 2. Buyer recognizes that any changes to operational protocols by the Seller pursuant to this warranty provision are acceptable under the following conditions:
 - a. That the specified design parameters (e.g., production capacity, water quality and system recovery) are obtained.
 - b. That the change in operational parameters and protocols (e.g., backwash, chemical cleaning, or recovery cleaning) will not represent an increase in operational or membrane replacement costs to the Buyer.

- c. Revised protocol is subject to review and approval by the Buyer and/or Engineer.

G. Limitation of Membrane Module and Element Warranty

- 1. Buyer recognizes that the occurrence of any of the following shall void the membrane module and element warranties:
 - a. Physical damage or faulty installation of the membrane modules or elements by anyone other than Contractor, Seller, or Seller's authorized representative.
 - b. Unauthorized alteration of components manufactured by the Seller.
 - c. Catastrophic exposure to chemicals or deleterious substances not normally associated with water treatment as a result of accidents, vandalism or other acts that are outside the bounds of routine and normal water treatment plant operations.
 - d. Use of water treatment chemicals, chemical cleaning solutions or cleaning procedures other than chemicals, solutions and procedures approved by the Seller.
 - e. Exposure of the membrane modules or elements to treated water or water treatment chemicals at concentrations above levels or contact times acceptable to the Seller.
 - 1) Seller is responsible for providing the Buyer a listing of the known water treatment and cleaning chemicals and concentrations and times of exposure that could result in membrane damage.
 - 2) Operation or cleaning of any membrane module or element outside the stated chemical limits shall void the remaining portion of the membrane module or element warranty.
 - f. Improper maintenance of equipment, as defined in the Technical/O&M Manual.
 - g. Failure of the Buyer to maintain operational logs as required by the Seller.
 - 1) The maintenance of electronic logs is subject to the following conditions:
 - a) Seller is responsible for providing the Buyer a listing of the operational data points that are to be electronically logged.
 - b) Seller is responsible for the control programming of data points that are to be electronically logged.
 - c) Seller shall identify minimum frequencies of logging of all operational data points required by the Seller to maintain membrane module and element warranty provisions.
 - d) Seller shall establish the alarm and shutdown limits that would result in the operation of the equipment outside of Seller acceptable limits.

- e) Seller shall be solely responsible for the identification and programming of system interlocks that would result in the operation of the system outside of the parameters required by the Seller.
 - (a) Buyer will not be responsible for errors in Seller developed programming that would result in improper operation of the system.
- h. In the event of a warranty claim, failure of the Buyer to provide the Seller with operational logs.
- 2. Buyer will assume responsibility of maintaining a hand-written log if an occurrence develops that is totally outside the bounds of routine and normal operation or automated operation.
 - a. Such items would include obtaining water analyses, or catastrophic events (e.g., discharges of foreign objects or chemicals that are outside the normal operation of a water treatment facility).
- 3. Changes in the Seller established operational and maintenance guidelines cannot be applied retroactively to invalidate the membrane module or element warranties.
- 4. Seller is solely responsible for the identification of water quality parameters normally associated with water treatment and water treatment chemicals and cleaning solutions (for procedures approved by the Seller), and for identification of instrumentation and control programming required to satisfy and maintain membrane module and element warranty provisions for operation and cleaning.
- 5. Buyer recognizes that to satisfy warranty requirements, the Seller may provide membrane replacement modules or elements that embody changes in module or element design and construction features.
 - a. Buyer recognizes that the replacement of membrane modules or elements pursuant to this warranty with a different membrane module or element is acceptable under the following conditions:
 - 1) That the specified design and operational parameters (e.g., design flows, water quality, system recovery and chemical cleaning intervals) are obtained.
 - 2) That the change in membrane modules or elements will not represent an increase in the operational or membrane module or element replacement costs to the Buyer.
 - 3) The revised module or element must also be in compliance with regulatory requirements.

H. Membrane Module and Element Pricing

- 1. Seller shall establish the membrane module and element prices (as indicated in the Proposal Pricing Form) and guarantees that:
 - a. Membrane modules and elements have been provided to the Buyer at prices not exceeding the prevailing market price.

- b. In the Proposal Pricing Form, the Seller shall indicate the cost escalated Consumer Price Index (CPI) used to calculate the replacement price.
 - 1) The CPI adjustment is the most recent Month CPI Index divided by the CPI Index for the month of the Bid submittal.
 - c. The CPI Index to be used shall be the “CPI-U, US City Average, all Items (non-seasonally adjusted)” as compiled by the U.S. Department of Labor.
2. During the full replacement warranty period, the Seller shall provide replacement modules and elements for non-conforming modules and elements at no cost to the Buyer.
 3. Module and element prices during the pro-rata warranty period shall be calculated as follows:
 - a. $\text{Pro Rata Module Price} = (\text{Module Price} \times \text{applicable CPI adjustment} \times \text{Months of Beneficial Use}) / \text{Membrane Module Pro-Rata Warranty Period (Months)}$.
- I. Membrane Module Integrity:
1. Membrane Integrity Test Frequency:
 - a. Membrane Integrity testing shall be performed daily.
 2. LRV Determination
 - a. The operating Log Reduction Value (LRV) shall be determined at the maximum design flux and maximum Transmembrane Pressure (TMP), if calculated using the test result on an intermittent basis.
 - b. The LRV shall be determined at the operating flux and TMP, if calculated using the test result on a continuous basis using the result of the last direct integrity test.
 - c. The LRV calculation shall include the applicable adjustment for the “concentration factor” as described in the Direct Integrity Test provisions of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).
 - d. If empirical data is used for the calculation of LRV, the Seller will provide adequate evidence (e.g., results of challenge testing at the Seller membrane integrity test pressure, air and water flow/pressure drop data) to support the correlation between air pressure integrity test result and LRV based upon a “flow limiting orifice” criteria for a broken lumen at the membrane - membrane pot interface for approval by the Engineer.
 3. Membrane Integrity Failure
 - a. Membrane modules shall be considered to have non-conforming integrity failure if the number of Membrane Integrity Failure Occurrences per membrane unit exceeds three (3) occurrences in a three (3) month period or six (6) occurrences in a 12 month period.

- 1) Seller will define the number of fiber breaks per Unit that constitutes Membrane Integrity Failure Occurrence for their particular membrane module.
- b. If a Membrane Integrity Failure Occurrence is identified:
- 1) Module(s) may be isolated from service and the system retested. If isolation of the modules(s) restores Unit integrity requirements, the Unit may be placed back into service.
 - 2) The individual modules shall be pin repaired, or replaced if pin repair is not possible, and the Unit will be retested and returned to service. The membrane module serial number and number of membrane fibers repaired shall be recorded. The Membrane Integrity Failure Occurrence shall be documented by the Buyer.
 - 3) For subsequent Membrane Integrity Failure Occurrences, module(s) may be isolated from service and the Unit placed back into service unless the cumulative area isolated from the Unit reduces the MF/UF System Firm Capacity below that which is required.
 - 4) If module(s) cannot be isolated from service, then all defects in that Unit shall be repaired or replaced (if repair is not possible), and the Unit retested and placed back into service.
 - 5) The membrane module serial number and number of membrane fibers repaired shall be recorded.
- c. Individual membrane module(s) shall be considered to have integrity failure under the following conditions:
- 1) Prior to Acceptance Testing
 - a) If more than 0.05 percent of the fibers are pinned prior to commencement of the Acceptance Testing.
 - 2) After Acceptance Testing
 - a) If for a single membrane module, more than 0.05 percent of the fibers have required repair (e.g., by pinning or gluing) in any 12 consecutive months.
 - 3) Anytime
 - a) An individual membrane fiber shall be defined as requiring repair if it visually leaks during an air pressure integrity test at the integrity test pressure.
 - b) If a module assembly fails the air pressure integrity test and cannot be repaired by pinning or gluing, then the module is considered defective.
 - c) If the cumulative repairs from the date of manufacture raise the flux rate 0.1 percent above the design flux rate.

- d) If more than 0.2 percent of the fibers have required repairs over the life of the membrane module. An individual membrane fiber shall be defined as requiring repair if it visually leaks during an air pressure integrity test at the integrity test pressure.
- d. If a membrane unit exceeds the maximum amount of Membrane Integrity Failure Occurrences, all membrane modules within the membrane unit shall be replaced unless:
 - 1) Seller can demonstrate, through lot traceability, that the Membrane Integrity Failure Occurrence is attributed to a specific lot of membrane modules within a previously defined range of consecutive serial numbers.
 - 2) The lot size shall be established by the membrane module manufacturer but shall not be less than 25 modules.
 - 3) The number of membrane modules that are accountable for the Membrane Integrity Failure Occurrences are “localized” to less than 10 percent of the membrane modules located on the membrane unit.
- e. If it is demonstrated that the membrane integrity failure defect is attributed to a specific lot or localized, then all membrane modules that have had more than a single previous occurrence of repair shall be replaced, even though they may be located in another membrane unit or may not have exceeded the criteria for individual membrane module integrity failure.
- f. If more than two (2) membrane units require complete replacement within a 12 month period, the Buyer shall retain the option to replace all remaining membrane modules.
- g. After Final Acceptance, if a membrane module is determined to be non-conforming with respect to membrane integrity, the Seller will remedy in accordance with the requirements set forth in this section.
 - 1) Non-conforming membrane modules may be returned to service under the conditions outlined in this section.
 - 2) If within 60 days after the notification to the Seller it has become apparent to the Buyer that membrane modules are not able to meet the provisions of the warranty, the Buyer will provide the Seller with a breach of warranty claim.

J. Irreversible Flux Loss

- 1. Membrane modules or elements shall be considered to have non-conforming irreversible flux loss under the following condition.

Definition of “clean water” resistance: The temperature corrected membrane resistance is defined as the “clean water” membrane resistance, as indicated in the Proposal Pricing Form, taken at a minimum of one (1) hour after startup of the membrane unit after completion of the chemical cleaning process, and taken five (5) minutes after completion of the most recent backwash. The temperature correction shall be calculated at 20°C using a viscosity correction factor. The equations and units used to calculate “clean water: resistance are as follows:

$$R = \frac{\Delta P}{J\mu}$$

Where: R = Membrane Resistance (psid/gfdcp)

J = Membrane Flux (gfd)

μ = Viscosity of water (cp)

ΔP = Differential Pressure (psid)

- a. Irreversible Flux loss will be stated to have occurred if the MF/UF Units are not able to obtain a minimum of a 30-day clean-in-place (CIP) intervals respectively for 3 consecutive CIP intervals when operated at or below the temperature adjusted membrane design capacity using backwash (MF/UF Units only) and chemical washing procedures and frequencies established and demonstrated for the particular system during the Performance Testing Period.
- b. Prior to the end of the first year of operation, each unit will be tested for permeability.
 - 1) Prior to the permeability test, a CIP will be performed.
 - a) Seller will be allowed to observe the automated CIP cycle.
 - b) Bid temperature corrected flux rate will be set for each cell prior to the permeability test.
 - c) The permeability test duration will be run for a minimum of 5 minutes.
 - 2) If the permeability is not at least 95 percent of the bid permeability, the modules will be considered to have non-conforming irreversible flux loss.
2. In the event that the Seller does not believe that the feed water quality is similar to that defined as the design water quality in Section 11 30 00, Hollow Fiber Membrane Equipment, then the Seller may seek relief from its warranty obligations hereunder to the extent that its failure to meet these obligations is caused by a change in the influent water quality that is outside the range of the design influent water quality parameters.
 - a. However, relief shall require demonstration that there is a defensible water quality parameter and/or duration that is outside of the influent water quality range that caused the warranty violation.
3. Should the Buyer and the Seller fail to agree on the cause of the warranty violation that is related to influent water quality, the matter shall be sent to binding arbitration.
 - a. The Buyer and the Seller shall jointly select an arbitration panel consisting of water treatment professionals appointed by each party.
 - b. The panel will consist of two members of each party or other mutually agreed upon number.
 - c. The panel will then select 1 additional member as mutually agreed upon.

4. The Buyer recognizes that to remedy warranty provisions for irreversible flux loss, the Seller may modify operational protocols.
 - a. Seller recognizes that changes to the operational protocols must be acceptable to the Buyer.
 - b. The Buyer recognizes that the changes to operational protocols by the Seller pursuant to this warranty provision are acceptable under the following conditions:
 - 1) That the specified design parameters (e.g., production capacity, water quality, system recovery and CIP interval) are obtained.
 - 2) That the change in operational parameters and protocols (e.g., backwash, Maintenance Clean or CIP) will not represent an increase in the operational or membrane replacement cost to the Buyer.
 - c. If more than two units require membrane replacement at any time within Membrane Module Warranty Period for irreversible flux loss, the Buyer shall retain the option to replace all remaining membrane modules using the applicable membrane module price.

PART 2 -- PRODUCTS – (NOT USED)

PART 3 -- EXECUTION – (NOT USED)

PART 4 -- SUPPLEMENTAL INFORMATION

4.01 MEMBRANE LIMITS

Normal Operation

Transmembrane Pressure	-3 bar to + 3 bar (-43.5 psi to + 43.5 psi)
pH	1 to 10
Temperature	0 to 40 degrees C. Consult Pall before using any water treatment polymers

Membrane Cleaning (Includes CIP/MC Processes)

Temperature	40 degrees C. maximum
Sodium Hypochlorite	5,000 mg/L maximum
Hydrogen Peroxide	200 mg/L maximum
NaOH	40 g/L maximum
Citric Acid	300 g/L maximum

Membrane Storage

Store modules between 1 and 40 degrees C. Do Not Freeze.

Short Term Storage: If not in use, flush daily with up to 100 mg/L of free available chlorine.

Long Term Storage: First perform a Clean in Place, store wet, completely filled with 50-mg/L sodium hypochlorite solution.

END OF SECTION

SECTION 01 75 00 SPARE PARTS

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work:

1. Spare parts and materials required to be supplied in the Contract Documents shall be furnished in unopened cartons, boxes, crates, or other protective covering suitable for preventing corrosion or deterioration for the maximum length of storage which may be normally anticipated. Packages shall be clearly marked and identified as to the name of Seller, applicable equipment, part number, description, and location on the equipment.
2. Spare parts and materials shall be delivered to the Buyer at the Point of Destination or other location specified by the Buyer prior to commencing Commissioning of the membrane system.
3. When a spare percentage is listed as a minimum requirement, the fractional quantities shall be rounded up to the nearest whole number. For example, if a 5 percent spare is listed, one spare is required for every 20; therefore, if 21 items were supplied as part of the Contract, 2 spares would be provided.
4. Provide a letter of transmittal and spare parts receiver form including the following:
 - a. Date of letter and transfer of parts and material.
 - b. Contract title and number.
 - c. Seller's name and address.
 - d. Applicable Sections of the Project Manual for each set of spare parts supplied.
 - e. Acknowledgment signed by the Seller, that all spare parts and maintenance materials have been delivered.
5. The Seller shall be fully responsible for loss or damage to parts and materials until they are received by the Buyer.

1.02 QUALITY CONTROL | QUALITY ASSURANCE - NOT USED

1.03 SUBMITTALS

A. Shop Drawings

1. In accordance with the requirements of Section 01 34 00, Shop Drawing Procedures, provide, as part of the second shop drawing submittal, a detailed list of spare parts with specific models and quantities denoted unique for the Seller to be provided under this Contract for approval by the ENGINEER.

PART 2 -- PRODUCTS -- (NOT USED)

PART 3 -- EXECUTION -- (NOT USED)

SPARE PARTS LIST

1. Diaphragm Pumps
 - a. Provide one shelf spare pump for each separate pump type, size, or material provided.
2. Vertical Inline Centrifugal Booster Pumps
 - a. Provide 2 sets of spare mechanical seals of each size.
 - b. Provide one shelf spare for each pump type, including:
 - 1) CIP Circulation Pump
 - 2) CIP Drain Pump
 - 3) Neutralization Drain Pump
3. Horizontal End Suction Pumps
 - a. Provide 1 spare mechanical seal per pump or a maximum of two mechanical seals of each type.
 - b. Provide 1 complete spare acid CIP pump including baseplate, motor coupling and pump and any ancillary component equipment, if the pump is installed in a single stand-alone configuration.
 - c. Provide 1 complete spare caustic CIP pump including baseplate, motor coupling and pump and any ancillary component equipment, if the pump is installed in a single stand-alone configuration.
4. Compressed Air System
 - a. For each compressor
 - 1) 2 sets of replacement compressor intake filters for each compressor
 - 2) 2 sets of replacement oil filters
 - 3) 15-gallons of oil
 - b. For the compressed air system
 - 1) 1 pressure regulator for each type supplied
 - 2) 1 pressure relief valve for each type supplied
 - 3) 1 automatic drain valve for each type supplied
 - 4) Process Air Filters - 2 replaceable filter element for each filter supplied

5. Programmable Logic Control Equipment
 - a. Provide 1 spare card PLC or Fieldbus module of each type including
 - 1) CPU Modules
 - 2) Network / Communication Modules
 - 3) Discrete Input / Output Cards
 - 4) Analog Input / Output Cards
 - 5) Foundation Fieldbus Interface
6. Process Instrumentation General Requirements and Switches
 - a. Provide 1 spare for each type, size, and material
 - 1) Level Switches- Tank Sidewall Mounted
 - 2) Level Switches – Float Style
 - 3) Flow Indicating Vane Switches
 - 4) Flow Switches
 - 5) Pressure Switches
 - 6) Pressure Diaphragm Seals
7. Process Instrumentation Meters and Transmitters
 - a. Provide 1 spare for each type or range
 - 1) Level Transmitters
 - 2) Low-Flow Flowmeter with Controller
 - 3) Flowmeters Provide one spare for each size used
 - 4) Temperature Sensors
 - b. Provide 2 spares for each type or range
 - 1) Pressure Gauges (I-001)
 - 2) Rotameter
 - 3) Pressure Transmitters
8. Process Instrumentation Analyzers:

- a. Turbidity Meter
 - 1) Provide 1 calibration kit
 - b. pH Analyzers
 - 1) Provide 2 spare probes
 - c. ORP Analyzer
 - 1) Provide 2 spare probes
 - d. Conductivity
 - 1) Provide 2 spare probes
9. Control Panels, Enclosures, and Panel Instruments
- a. Provide spare quantities of the following:
 - 1) 6 spare bulbs for each type of bulb used in the control system.
 - 2) 6 spare fuses for each type and size of fuse used in the control system.
 - 3) 3 spare control relays of each type used in the control system.
 - 4) 1 spare type of each signal conditioner (isolator, adder-subtractor, etc.) of each type used in the control system.
10. Ball Valves, Butterfly Valves, Section, Check Valves, Specialty Valves and Valve Actuators
- a. If more than 3 valves of any type or kind are provided, the Seller will supply a valve or valve actuator of each size and type used.
 - b. Butterfly Valves
 - 1) Valve Seats - 2 for each valve size
 - c. Valve Actuators
 - 1) Seal Kit, for Type Modulating Actuators – Two for each actuator size.

END OF SECTION

**SECTION 11 30 00 – CONTAINERIZED HOLLOW FIBER MEMBRANE EQUIPMENT
MEMBRANE TREATMENT SYSTEM**

PART 1 -- GENERAL

1.01 DESCRIPTION

A. Description of Work:

1. This Section specifies the requirements for the design and fabrication of a containerized or trailer mounted membrane filtration (MF) treatment system. It describes the work to be performed by both the MF equipment manufacturer (Seller) to supply containerized membrane treatment systems to the City of Sandy (City) for future installation at the Alder Creek WTP (WTP). The WTP shall have 2 mgd firm capacity.
2. This Specification covers the containerized membrane filtration (MF) treatment system consisting of feed pumps, strainers, membrane filtration units, membrane cleaning and neutralization systems, membrane backwash pumps, excess feed recirculation equipment (if deemed necessary by the Seller for the operation of their system), air supply systems, piping, valves, controls and instrumentation for the complete system.
3. Additive Bid Item. If any container is not completely filled to meet the firm design capacity of 2 mgd, Seller should provide the additional cost for providing full buildout of all required containers. The purposed may be to increase capacity, lower the overall flux rate, or implement future backwash recycle.
4. The Special Engineering Services are to be provided under this contract and include project related activities including: shop drawings submittals and other engineering services.
5. The Special Services are provided under this contract and include project related activities including: O&M manuals, installation, commissioning and acceptance testing field services and operator training necessary for the installation of the System as described within the Contract Documents.

B. Reference Specifications

1. Section 01 08 00, Identification and Tagging
2. Section 01 33 17, Structural Design, Support and Attachment
3. Section 01 34 00, Shop Drawing Procedures
4. Section 01 61 00, Transportation and Handling of Goods
5. Section 01 61 10, Protection of Goods
6. Section 01 62 00, Installation of Membrane Equipment
7. Section 01 66 00, Commissioning of Membrane Equipment

8. Section 01 67 00, Acceptance Testing of Membrane Equipment
9. Section 01 73 00, Installation, Operation and Maintenance Manuals
10. Section 01 74 00, Membrane System and Module Warranty

C. Coordination

1. The design of a membrane filtration system requires considerable coordination between the Buyer, Engineer and Seller. The Seller will provide assistance to the Engineer and Buyer and provide the information needed to coordinate the design of the membrane filtration system and the ancillary equipment designed by the Engineer but not provided by the Seller.
2. The Seller shall provide all parts, equipment, materials, and components including instrumentation and controls. Equipment will be installed and interconnections made by the Contractor under a separate installation contract.
3. The Contractor shall be responsible for installation of equipment furnished under a separate contract and for provision of interconnecting piping and electrical power supply and connections. The Contractor shall assume responsibility for the satisfactory installation of the MF system. Upon completion of system installation will be reviewed and a Notice of Completed Installation shall be issued.

D. Special Considerations

1. Definitions

- a. Seller: Containerized Membrane Filtration System Manufacturer
- b. Hollow Fiber Membrane: an engineered self-supporting non-woven porous media of polymeric material with an outside diameter of 0.2 to 2.0 mm and an absolute pore size of less than 0.5 micron. Absolute pore size is defined as obtaining greater than 6-log removal (99.9999 percent) of particles or microorganisms of a known size.
- c. The Containerized Membrane System pertains to the fiber membrane filtration equipment. The System shall contain at a minimum the following components:
 - 1) 2 Membrane Units
 - 2) Cleaning system
 - 3) Compressed air system
 - 4) Backwash tank and pump
 - 5) Feed pumps and automatically backwashing strainers
 - 6) HVAC system
 - 7) Controls system

- d. Air Scrub (AS) – Use of air during backwashing to dislodge contaminants from the membrane module.
- e. Backwash - The periodic reversal of flow through a filter which may be accompanied by water in conjunction with air or oxidants at a low concentration (less than 10 mg/L of total chlorine) generally associated with the intermittent waste stream from an ultrafiltration or microfiltration membrane system used to remove particulate matter. Same as Reverse Filtration or Backpulse.
- f. Container – The structure that houses the containerized membrane system shall be a shipping container or shipping trailer able to be placed by crane or truck, manufactured of corten steel and contain all system components integral to the containerized unit described in this specification.
- g. Chemical Washing / Maintenance Cleaning - The periodic application of a concentrated chemical solution at high concentration (i.e. more than 10 mg/L of free chlorine or the addition of an acid which results in a pH of less than 4 or the addition of a base that results in a pH of greater than 10) to the membrane for a short duration of time (two times per day maximum for a total duration of less than 60 minutes) for the intended purpose of maintaining membrane permeability or reducing membrane fouling by a factor of less than 33 percent of the total amount of fouling that may be observed by the membrane.
- h. Clean In Place - The periodic application of a concentrated chemical solution at high concentration (i.e. more than 10 mg/L of free chlorine or the addition of an acid which results in a pH of less than 4 or the addition of a base that results in a pH of greater than 10, or a surfactant or enzymatic cleaning agent) a membrane for an extended, duration of time (more than 60 minutes per day) for the intended purpose of reducing membrane fouling by a factor of more than 33 percent of the total amount of fouling that may be observed by the membrane.
- i. Module - A membrane module is a complete unit composed of the membrane fibers, a housing, feed inlet, and filtrate outlet.
- j. Train - A group of membrane modules arranged together and that share common feed and filtrate piping. Modules arranged such that the following are performed on all modules in a Train (Backwash, Clean In Place Chemical washing / Maintenance Clean)
- k. Unit - The water production entity of a membrane system. A unit consists of a number of membrane modules that share feed and filtrate valving, and the units can usually be isolated from the rest of the system for testing, cleaning, or repair. Also called racks, trains (in conflict with the above definition), or skids

2. Design or Performance Requirements

- a. It is the intent of this Specification and the Drawings to identify major components of the System and to establish minimum equipment and quality standards for these components. It is the Seller's responsibility to provide all parts, equipment, materials, and components required for a complete and functional System.

- b. Acceptable Sellers: Based on the Buyer's review, the following MSS's have demonstrated competent and are accepted by the Buyer to propose on this project:
 - 1) PALL Water
 - 2) WesTech
 - 3) H2O Innovation
 - c. Based on the Buyer's review, the following membrane modules and membrane element manufacturers are pre-qualified are accepted by the Buyer:
 - 1) PALL (ASAHI) UNA-620A Microfiltration Membrane Module
 - 2) Toray HFUG2020AN Ultrafiltration Membrane Module
 - 3) DuPont IntegraTec XP 77 IG
 - 4) Membrane modules shall be positive-pressure type, PVDF hollow fiber construction, using an outside-in flow path. The membrane shall nominal pore size shall not exceed 0.1 micron.
3. Alternatives:
- a. Alternative Sellers, Membrane Element Manufacturers, and membrane modules will not be considered.
4. Drawings:
- a. The Seller shall furnish all components identified on the Drawings and as specified in this Section. If an item is shown to be furnished by either the Drawings or the Specifications, it shall by furnished whether or not shown on both.
 - b. The Seller shall furnish all components for complete and operatable containerized systems. The scope of supply is as follows:
 - 1) Membrane containers (includes steel supports, HVAC, insulation, and piping within container)
 - 2) Membrane modules
 - 3) Feed pumps
 - 4) Automatically backwashing strainers
 - 5) Backwash pumps
 - 6) Control and isolation valves
 - 7) Clean-in-Place equipment for each containerized membrane system

- 8) Compressed air systems
 - 9) Feed and filtrate turbidimeters
 - 10) Backwash supply tanks
 - 11) Electrical panels
 - 12) Variable Frequency Drives for feed, backwash, and CIP pumps
 - 13) Custom programming and components as needed to interface with plant feed and finished water equipment, as well as existing process equipment.
 - 14) Start-up and training services
 - 15) All other appurtenances listed herein, as required or shown on the drawings
- c. The Seller is responsible for monitoring and controlling the MF System and other equipment shown on the Process and Instrumentation drawings and for interfacing any other plant controls or systems identified.
 - d. The MSS's shall supply a remote monitoring system, which combines early detection of any issues that may arise, system optimization, remote troubleshooting and accessibility of systems, and common data storage all into one, simple platform.
 - e. Drawings have been prepared for the purpose of obtaining a Proposal for the supply of goods and special services and are presented as a suggested system layout. Exact system details may differ per manufacturer.
 - f. The equipment type shall be reviewed by the Seller to assure that it satisfies the minimum requirements deemed appropriate for the intended service.
 - g. Final pipe sizing shall be by the Seller during detailed design after the Seller has been selected.
 - h. The Seller shall review equipment and line sizing for equipment that is to be provided by the Seller for consistency with their particular process.
 - i. General Systems Drawings are shown on I-001 to I-007. These drawings may differ from the installed system depending on the selected Seller. Systems integral to each containerized unit such as the backwash system and CIP system are not shown but included in the scope of supply by the Seller.

1.02 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC)

- A. **Manufacturer's Qualifications:** All equipment furnished under this specification shall be new and shall be the standard product of a manufacturer who is fully experienced, reputable, qualified and regularly engaged for at least 5 years in the manufacture of the equipment to be furnished.
- B. **Reference Standards:** Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. American Society of Mechanical Engineers (ASME)
 - a. ASME Boiler and Pressure Vessel Code
 2. American Society for Testing and Materials (ASTM)
 - a. ASTM A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
 - b. ASTM A 36, Standard Specification for Structural Steel
 3. American National Standards Institute (ANSI)
 - a. ANSI B16.5 - Pipe Flanges and Flanged Fittings
 - b. AWS D10.9, Standard for Qualification of Welding Procedures and Welders for Piping and Tubing
 4. American Welding Society (AWS)
 - a. AWS A5.9 - Specification for Bare Stainless Steel Welding Electrodes and Rods
 - b. AWS D1.1 - Structural Welding Code - Steel
 - c. AWS D10.9 - Standard for Qualification of Welding Procedures and Welders for Piping and Tubing
 5. Institute of Electrical and Electronic Engineers (IEEE)
 6. National Electric Code (NEC) National Electrical
 7. Manufacturers Association (NEMA)
 8. Standards of National Electrical Manufacturers Association
 9. Standards of American Water Works Association (AWWA)
 10. National Electric Code (NEC)
 11. National Sanitation Foundation (NSF)
- C. Manufacturer's Quality Assurance/Quality Control Program
1. The manufacturer shall have in place a dedicated quality control/quality Assurance program.

1.03 SUBMITTALS

- A. Shop Drawings
 1. Coordination Meetings

- a. Within fourteen 14 days after execution of the Agreement, the Seller shall meet with the Engineer at the Engineer's location to address any issues related to the project. The Seller shall prepare and submit a project specific process and instrumentation diagram (P&ID) of the proposed containerized membrane systems, and neutralization system for discussion.
2. Drawings and Samples:
- a. The Seller shall submit for review and approval in accordance with the Shop Drawing Procedures the following First Shop Drawing Submittals in accordance with Section 01 34 00, Shop Drawing Procedures. All drawings shall be submitted electronically in pdf format. Electronic drawings shall also be submitted in 3-D format compatible with the Revit design model. The Seller shall submit the following information:
 - 1) Schematics Drawings:
 - a) P&IDs of the System, including hydraulic and pneumatic schematics detailing the equipment supplied by the Seller and showing equipment provided by others that will interface with the System.
 - b) Provide a P&ID of a typical membrane unit including hydraulic and pneumatic schematics detailing the equipment supplied by the Seller.
 - c) The Engineer, Buyer and Seller are responsible for establishing the P&ID tag numbering for the units and the system. The identification and tag numbering shall be in accordance with Section 01 08 00, Identification and Tagging.
 - d) Electrical schematic diagrams including motor horsepower and other electrical load information and identification of external wiring (panel) connections and for coordination with the Contractor supplied VFDs.
 - 2) Containerized System Drawings: The Seller shall coordinate production and submit each of the following Arrangement drawings for approval:
 - a) Provide plan and elevation views of containerized membrane system and all equipment to be included in container.
 - b) Clearly identify the termination points and physical location for hydraulic, pneumatic and electrical connections where interfacing of the Seller supplied equipment and equipment to be installed by the Contractor exists
 - c) Once submitted and approved the "physical envelope" of the Seller supplied equipment or termination points shall not change without approval of the Engineer
 - d) A bill of materials for all tagged devices and components supplied with the Unit including component original part numbers identifying each furnished component

- 3) Containerized Neutralization System Drawings: The Seller shall coordinate production and submit each of the following Arrangement drawings for approval:
 - a) Provide plan and elevation views of skid mounted neutralization system. The CIP tank does not need to be mounted on the skid, it will be shipped loose for installation and connection to the Neutralization skid by the contractor.
 - b) Clearly identify the termination points and physical location for hydraulic, pneumatic and electrical connections where interfacing of the Seller supplied equipment and equipment to be installed by the Contractor exists
 - c) Once submitted and approved the “physical envelope” of the Seller supplied equipment or termination points shall not change without approval of the Engineer
 - d) A bill of materials for all tagged devices and components supplied with the Unit including component original part numbers identifying each furnished component
- 4) The Seller shall attend a meeting with the Buyer within 10 days after the submittal of the first shop drawing for coordination and review.
- b. The Seller shall submit for review and approval in accordance with Section 01 34 00, Shop Drawing Procedures.
 - 1) Manufacturer’s literature, illustrations, specifications, weights, pump curves, and engineering data for project engineered equipment including dimensions, materials, sizes, and performance data.
 - 2) Piping Fabrication and Assembly Drawings: For all MF system piping, provide double-line scaled drawings showing all fittings, valves, instruments and supports.
 - a) Provide fabrication details for piping and structures elevation views of all major components and subsystems, detailing orientation of equipment, piping, fittings and valves (including valve actuators).
 - b) Identify piping materials and fabrication details as required by Section 15 06 20, Stainless Steel Pipe and Tubing.
 - c) Each support shall be identified by catalog number or shop drawing detail number.
 - 3) Containerized membrane system:

a) A bill of materials for all tagged devices and components supplied with the containerized membrane system including component original part numbers identifying each furnished component. For all tagged devices supplied, the Seller shall develop a "Cross Reference Schedule" that matches the Tag to the appropriate equipment manual. The equipment schedule shall include the pertinent information associated with the equipment including tag number, description, functional name location, component equipment model, part number, size, materials, accessories and range. The Cross-Reference Schedule shall be provided in the form of a Microsoft Excel (.XLS) spreadsheet.

4) Design Calculation:

a) Design calculations related to sizing of key components, including the overall System, pumps, valves, Units, process air system, backwash system, CIP system, chemical transfer pumps, CIP pumps, and electrical controls and instrumentation supplied by the Seller. Calculations for the piping system shall be sufficient to demonstrate that the system is hydraulically stable (balanced) under normal and backwash operation within the Seller's and/or good engineering practice limits. Submittals for pump(s) and throttling and modulating valve(s) shall also include calculations to show that cavitation does not occur over the intended minimum and maximum operating range.

b) Other submittals and/or shop drawings as required under the Contract Documents

c) Submit data as required by the applicable components of Section 11 00 00, General Equipment Provisions.

5) Information as specifically requested by the Engineer or Buyer in support of this Project.

6) The Seller shall attend a meeting with the Buyer within 10 days after the submittal of the second shop drawing for coordination and review.

B. Factory Test Reports

1. Quality Control Reports

a. Factory Test and Seller Quality Control Reports for all equipment provided including the Factory Test Report for the PLC/HMI system functional performance test reports

b. Factory Test Reports for all Control Panels

C. Installation Instructions: Refer to Section 01 62 00, Installation of Membrane Equipment.

D. Commissioning Plan: Refer to Section 01 66 00, Commissioning of Membrane Equipment.

- E. Operation and Maintenance Manuals: Refer to Section 01 73 00, Installation, Operation and Maintenance Manuals.
- F. Training Manuals: Refer to Section 01 73 10, Training of Operations and Maintenance Personnel.
- G. Record Drawings: In accordance with Section 01 73 00, Installation, Operation and Maintenance Manuals, after completion of Acceptance Testing the Seller shall revise and submit to the Buyer revised O&M Manuals using As Installed information.
- H. Certificates, Warranties and Guarantees
 - 1. Refer to Section 01 74 00, Membrane System and Module Warranty
 - 2. Seller "Acceptance of Installation" following equipment installation.
 - 3. Regulatory Agencies: The Seller shall supply hydraulic calculations and drawings for the System and any other system performance data specifically required by regulatory agencies.

PART 2 -- PRODUCTS

2.01 SYSTEM DESIGN AND PERFORMANCE REQUIREMENTS

A. Process Description

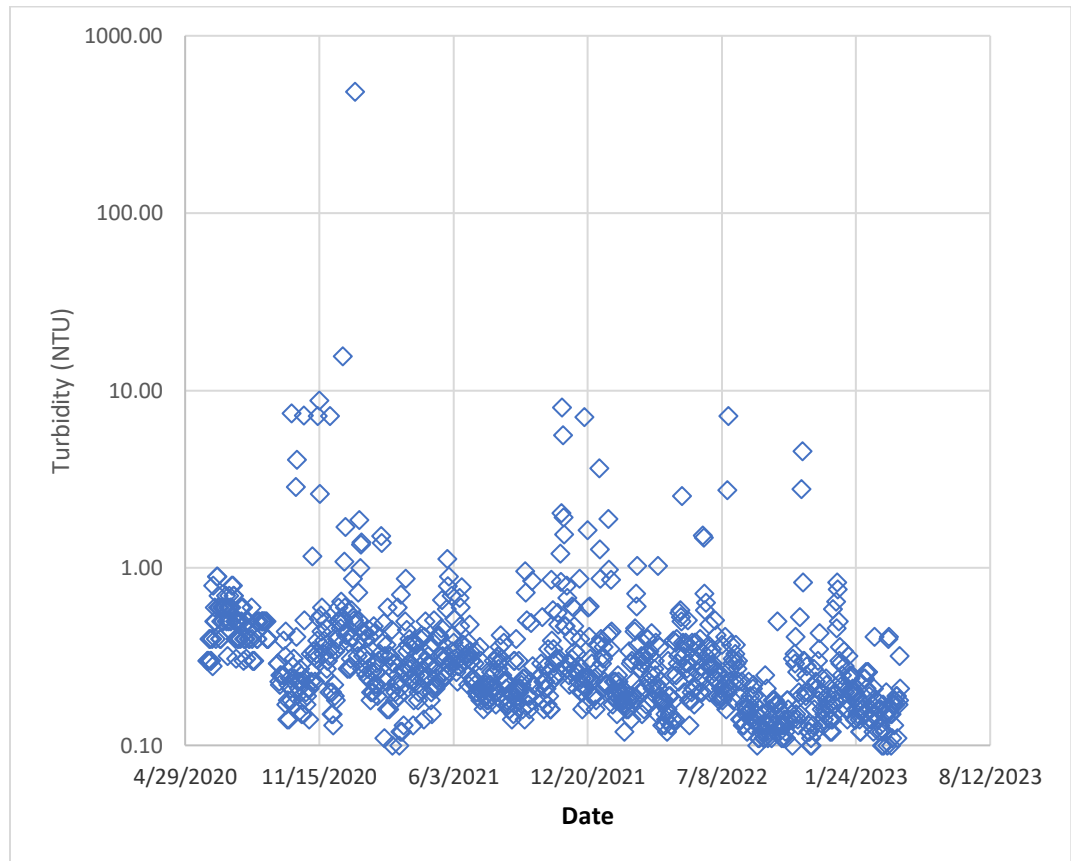
- 1. The Alder Creek Raw Water Pump Station (RWPS) intake pumps will provide source water for treatment. The feed stream will receive chemical addition by aluminum chlorohydrate coagulant, sodium hypochlorite (optional), and sodium hydroxide followed by mixing and storage in the membrane filtration feed tank. These system components can be found on Drawing I-004.
- 2. Process and Instrumentation Drawings (P&IDs) for the membrane filtration system including the associated chemical feed systems have been developed to detail the equipment to be provided. The Drawings have legend sheets that describe the symbols and abbreviations used on the P&IDs.
- 3. The requirements for the equipment type are cross-referenced in the specifications. The equipment type identified should be reviewed by the Seller to assure that it satisfies the minimum requirements deemed appropriate for the intended service.
- 4. The feed stream shown on Drawing I-001 may have undergone pre-treatment via coagulation and chlorination and pH control prior to entering the membrane feed tank. Flow from the feed tank will be split between one of two or three containerized membrane systems, as determined by the containerized system capacity.
- 5. Membrane feed pumps (located inside each containerized unit) will discharge water through automatically backwashing strainers and to the membrane filtration units, both located within the containerized unit.

6. Feed pressure will be used to backwash the automatic backwashing strainers. The feed system is controlled using the pressure transmitter located downstream of the strainers. Backwash flow from the strainers will be measured and routed to a manhole where it combines with other waste streams and then discharged to existing backwash ponds. Clarified water from the backwash ponds is not expected to be recycled to the head of the WTP at the time of installation of the containerized units but may be recycled in the future.
7. A spare or standby membrane filtration rack will provide redundancy to the membrane to achieve an (N+1) system design. A rack is considered redundant if it has the following components:
 - a. Dedicated feed pump
 - b. Dedicated strainer
8. Drawing I-002 shows the arrangement of interconnecting piping for the containerized membrane treatment units. Note that the design of the interconnecting piping is to be prepared by the Seller.
9. The feed shall be designed with an air/vacuum relief located at the highest point of the membrane unit to relieve air that may have accumulated during the air scour sequence or relieve vacuum conditions during draining of the unit. Prior to discharge, the filtrate flow is measured and the turbidity is also monitored.
10. The common filtrate discharge pipe will have chemical addition for disinfection and pH control. Filtrate discharge piping and pH control equipment will be supplied by the contractor. pH control equipment will be supplied by the plant control system and does not need to be controlled by the Sellers equipment.
11. The filtrate will enter a chlorine contact tank that will be constantly full and then will discharge to distribution through a high service pump station.
12. Water for backwashing membrane modules should be supplied by filtered water produced by the containerized units. Each containerized unit should be equipped with a filtrate tank to provide water for backwashing. The backwash pumps will be driven by VFDs for flow control.
13. The CIP system will be integral to each containerized unit and be supplied by the Seller including air diaphragm metering pumps and instrumentation for chemical addition during the CIP process.
14. Spent cleaning and chemical maintenance cleaning waste are collected, pH-neutralized, and dechlorinated in the neutralization tank prior to discharge. The neutralization system is shown on Drawing I-004. The neutralization system, shall be skid mounted and all necessary equipment including pumps, instrumentation and the neutralization tank should be supplied by the Seller. Neutralized CIP waste solution will discharge to a holding tank at the WTP site. Neutralized chemical maintenance clean solution will discharge to the Backwash pond.
15. Citric Acid (50%) will be delivered in totes or drums, located outside of the containerized membrane systems, and will be transfer-pumped to the acid CIP tank or Neutralization tank as needed by pumps supplied by the Seller.

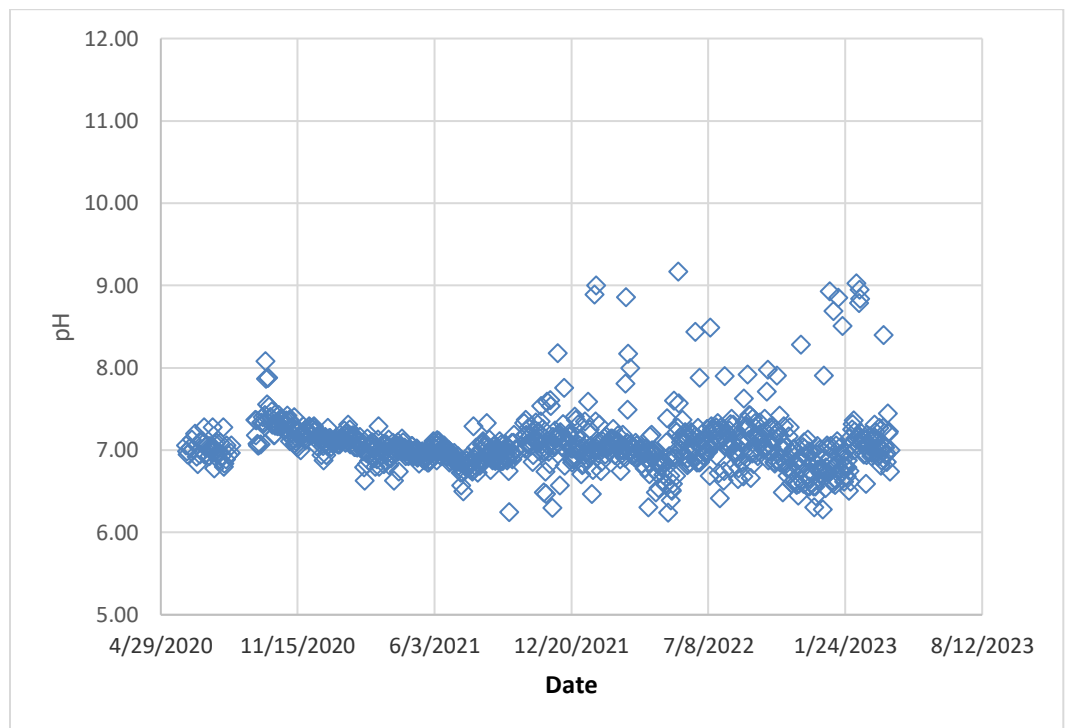
16. Sodium Hydroxide (25%) will be delivered in bulk and will be transfer-pumped to the Caustic CIP tank or Neutralization tank as needed as shown on Drawing I-005. Transfer pumps needed for containerized system operation to be provided by seller.
17. Sodium Hypochlorite (12.5%) will be delivered in bulk and will be transfer-pumped to the Caustic CIP tank as needed as shown on Drawing I-006. Transfer pumps needed for containerized system operation to be provided by seller.
18. Aluminum Chlorohydrate coagulant will be dosed to the raw water and equipped will be supplied by Contractor.
19. Calcium thiosulfate will be delivered in liquid form by 55 gal drums and will be transfer-pumped to the neutralization tank as needed as shown on Drawing I-004. Transfer pumps will be supplied by the Seller.
20. Each containerized system shall have a dedicated PLC or Remote I/O module(s) which shall report back to the centralized PLC. The seller shall also supply a master PLC to control communications between each trailer and the neutralization system.
21. The master PLC shall be complete with a secondary standby, hot-swappable PLC system that shall be capable of taking over system operation in the event of a failure to the primary PLC.
22. A compressed air system shown will supply control air including air for daily integrity testing, air scour cleanings during backwash, pneumatically controlled valves, and supply any pressurized air required by the neutralization system. Each containerized unit will be equipped with a compressor, dryer, receiver and filters.

B. Service Conditions

1. Ambient Environment. The equipment furnished under this section will be installed at the locations shown on the Drawings. The site conditions are expected to be as follows:
 - a. Ambient Air Temperatures: 25°F to 105°F
 - b. Relative Humidity: 0 to 100 percent noncondensing
 - c. Altitude: 1,078 feet above Mean Sea Level
 - d. Environment: Rural area west of the City of Sandy, approximately 38 percent sunny days, annual rainfall approximately 78 inches, winds up to 42 mph and potential for wildfire smoke.
2. Feedwater Quality: Historical Water Quality information is somewhat limited from the existing WTP but is as follows:
 - a. Turbidity:



b. pH



- c. Raw water temperature: 5 deg C to 15 deg C
- d. Additional sampling data was performed on 11/17/23 and is listed below:
 - 1) Iron – non-detect
 - 2) Manganese – non-detect
 - 3) Alkalinity – 26 mg/L as CaCO₃
 - 4) Total Organic Carbon – 0.63 mg/L
 - 5) Ammonia – non-detect
 - 6) Nitrate/Nitrite – Non-detect
 - 7) Total Suspended Solids – non-detect
- 3. Process Design Requirements: Raw water will receive coagulant injection, mixing, with reaction time in the membrane feed storage tank. Sodium hypochlorite and sodium hydroxide and could be added to the raw water for disinfection, and pH increase.
- 4. Estimated design elevations to be refined during final design:
 - a. Process Inlet Water Level
 - 1) ~1078.0 ft EL
 - b. Plant Site
 - 1) ~1076.0 ft EL
 - c. Filter Discharge Water level
 - 1) CT Tank High water level – ~1077.0 ft EL

C. Process Design Requirements

1. Overall System Design Philosophy

- a. The facility consists of coagulation, feed tank storage reaction time, containerized membrane filtration systems (including feed pumps, automatically backwashing strainers, backwash, process air, CIP and provisions for chemical maintenance cleaning), a neutralization system, Chlorine disinfection, filtered water storage, and a high service pump station. Membrane backwash waste will be coagulated and sent to a solids holding pond. CIP waste shall be pH-neutralized, dechlorinated, and discharged to a holding tank for future disposal. Chemical maintenance cleaning waste shall be pH-neutralized, dechlorinated and discharged to the solids holding ponds.

- b. The design philosophy for the facility is that the Seller shall provide enough containerized membrane systems to provide redundancy such that N+1 membrane racks are provided between all containerized units.
 - c. The membrane filtration system for the Alder Creek WTP shall be capable of producing 2.0 mgd of water (net) for drinking. The capacity shall be calculated using the net filtrate with one membrane rack out of service.
2. Membrane System Design Criteria: The Seller shall list guaranteed design and operating criteria. The selected Seller shall demonstrate the guaranteed design and operating criteria during a proof pilot test per Section 11 30 20, Performance Pilot Testing of Membrane Equipment. If design and operating criteria cannot be demonstrated, the Seller shall adjust the pilot test and full-scale system accordingly at no additional cost to the Buyer per Section 00 52 00, Procurement Agreement.
- a. Membrane Flux:
 - 1) The average membrane design flux shall not exceed 50 gfd instantaneous with one train out of service on the maximum day achieving the net filtrate capacities listed above. The flux shall be in units of gallons per day per square foot of membrane surface area using the feed side of the membrane.
 - b. Design Capacity and Design Temperature:
 - 1) Design Capacity/Temperature
 - a) 2.0 mgd @ temperatures 5 deg C and greater
 - c. Number of Containerized Membrane Systems
 - 1) Minimum: 2
 - d. For the purpose of determining membrane surface area required .and maintaining the provisions of membrane warranty for CIP interval, the maximum design capacity of 1.8 MGD for the membrane facility will not be adjusted for water temperatures above 5 deg C.
 - 1) The Buyer may operate the membrane facility at any capacity up to the amount maximum permitted by the Oregon Health Authority or at 1.5 times the maximum presented turbidity conditions without invalidating the membrane warranty.
 - e. Excess Capacity / Redundancy:
 - f. Recovery: The system shall operate at or above the Seller's design recovery at all times during operation. Design recovery values shall be calculated as follows:

$$[\text{Net filtered water (mgd)}/\text{Net feed (mgd)}] \times 100 \text{ percent}$$

Where the quantity: net filtered water (mgd) is equal to the total amount of filtered water produced (mgd) less any amount used for backwashing of the membrane filters (mgd) on a time weighted average. Net facility capacity is based on the amount of water discharged from the membrane minus water supplied to the backwash system. Net feed is the amount of water that enters the treatment facility. The facility capacity includes the amount of filtrate that is required for backwash and water that is used as part of a chemical maintenance cleaning process. Strainer losses or recovery of backwashing waste through clarification / recycle are not considered as part of the recovery calculation. Water used for CIP or CIP rinsing is not included in the calculation of recovery.

Minimum Recovery for Membrane System 95%

g. Minimum Chemical In Place Interval: 30 days*

* Refer to Section 01 74 00, Membrane System and Module Warranty for language regarding the criteria for Clean-in-Place interval

h. Minimum maintenance cleaning interval: 72 hrs frequency

i. Filtered Water Quality Requirements: Filtered water quality shall meet the following water quality requirements:

1) Turbidity

a) Maximum filtered water turbidity (ntu): 0.15

b) Maximum filtered water turbidity 95% of time (ntu): 0.10

2) Microbiological Removal Efficiency

a) Minimum *Giardia* Removal: >4-log (99.99 percent)

b) Minimum *Cryptosporidium* Removal: >4-log (99.99 percent)

2.02 EQUIPMENT DESIGN AND FABRICATION REQUIREMENTS

A. General System Requirements

1. The System shall be suitable for installation in an outdoor environment maintained between 25 degrees F and 105 degrees F.

2. Miscellaneous

a. Lifting Lugs: All equipment items or component assemblies weighing in excess of 100 pounds shall be furnished with lifting lugs.

b. Miscellaneous Fasteners: Bolts, nuts, washers, flange backing rings, and other miscellaneous metal components not specifically addressed elsewhere in these specifications shall be Type 316 stainless steel.

- c. Pumps, compressors and. Ancillary equipment shall be sized using the Seller design criteria established during pilot testing and will accommodate the maximum number of membrane modules per membrane unit assembly as indicated in the Proposal Pricing Form.
3. Cross Connection Control
- a. The Seller shall design the membrane process with cross-connection control (block and bleed) to assure that chemical solutions used as part of a Chemical Maintenance Clean or Clean in Place process do not come in contact with raw or filtered water. Any chemical solution that does not fit the criteria defined as backwash shall be deemed as a cleaning solution. If a block and bleed system is not able to be installed within the container, the Seller shall include a block and bleed system to be installed at the filtrate connection of each container to be controlled by the containerized unit.
 - b. Any cleaning process, other than backwashing, must use a cross connection control strategy. Cross connection control shall be automated.
 - c. The cross-connection control strategy shall segregate the supply of the cleaning solution (chemical maintenance clean or Clean In Place solution) from the backwash solution.
 - d. The cross-connection control strategy shall isolate the individual membrane unit from the membrane train during the chemical maintenance clean or Clean in Place process. The cleaning solution shall be adequately rinsed from the membrane unit using raw or filtered water. Analytical instrumentation shall be used to confirm that the cleaning solution has been adequately rinsed.
 - e. The cross-connection control strategy shall be structured and interlocked such that the supply or discharge of cleaning chemicals remain segregated from the backwash.
 - f. If a common manifold is used for the delivery or discharge of two or more cleaning solutions, the common manifold shall be flushed and drained before a change in chemicals is made.
 - g. As a minimum, the cross-connection control strategy shall incorporate “double block and bleed” physical isolation for the filtrate for each containerized unit and at other locations as shown on the Drawings. Backwash supply shall be protected by a check valve located on the common line to the units.
4. Piping System Design
- a. The Seller shall use piping materials that are suitable for the intended service inside the containerized units. “L” (Low carbon) grade 300 series stainless steel is required for welded pipe and fittings.
 - b. Rack Interconnecting Piping: Sch 80 PVC, HDPE, or 316 SS
 - c. All piping (including flanges), valves and components that comprise the permanent piping system on the membrane unit shall be pressure rated for a minimum of 150 psi.

- d. Unless stated otherwise or approved by the Engineer, a maximum fluid velocity of 10 feet per second shall be used for the design of the pressure piping systems.
 - e. Unit piping shall be arranged in order to assure that a straight run of pipe is used for the flow meters. If not possible, the vendor shall use OD (Zero Diameter) flow meters or submit a letter of acceptable use from manufacturer. For the purposes of determining the length of a straight run, the length is determined by the length of the spool piece of pipe used before or after the flow meter. Flow meter lay length shall comply with the flow meter manufactures installation requirements or have manufacturer acceptance of installed straight lengths. The flow from each Unit shall be measured directly or through addition or subtraction of two or more flow meters.
 - f. 2-1/2", 3-1/2" and 5" pipe sizes are not permitted unless approved in writing by the Engineer.
 - g. Unit piping of 1-inch or less in diameter may utilize SCH 80 PVC or a suitable material.
 - h. Tubing and other wetted sensing lines shall use type 316 Stainless Steel or poly tubing.
5. Pneumatic System:
- a. When used, pneumatic solenoid valves shall have a pilot indicator and a manual override.
 - b. Pneumatic lines shall be of 304 or 316 stainless steel, HDPE, or polyurethane construction.
 - c. Plastic valves, check valves and other appurtenances are not permitted on compressed air lines.
 - d. Seller shall install flow controls as required to regulate valve actuation in order to prevent hydraulic shock.
 - e. The inlet to the membrane unit process shall include a check valve to prevent contamination of the air supply.
6. The Seller shall submit calculations to the Engineer that verify that valve or pump cavitation does not occur over the intended operating range.

B. System Design Requirements

- 1. P&IDs for each system have been developed. The purpose of these Drawings is to provide the Seller information for the project and define the scope of equipment to be provided. Equipment and appurtenances not specifically shown on these Drawings but required for operation of the system shall be provided by the Seller.
- 2. The P&IDs show the process design intent for the project and provides the necessary equipment, valves, and instrument necessary to control the process based on the MF Pilot Testing.

- a. The proprietary control is not shown on the drawings and is to be developed by the Seller in accordance with the Contract Requirements. The Seller is solely responsible for establishing the control of the MF System shown on the P&IDs and for interfacing with the plant control system.
- b. The Seller shall develop P&IDs using the three-layer format identifying all I/O (analog discrete and digital) at the PLC and HMI levels as shown on the Drawings. Refer to Drawing PI-3 for the minimum typical instrumentation and control requirements. PLC and HMI operations shall be indicated on the Seller drawings and include ranges, alarms, set-points, control, primary interlocks and trending functions detailed at a sufficient level of indicate the intended operation of the system.
- c. Typical P&ID drawings will only be accepted for identical membrane filtration units.

3. Membrane Filtration Units

- a. Each unit shall consist of hollow fiber membrane modules.
- b. The modules shall be connected in manifolded blocks and supported by the MF unit framework. Modules for each block shall be tested at the factory.
- c. Each containerized system shall be provided with horizontal end suction pumps.
- d. The membrane modules shall be supported by a steel framework in a vertical orientation. The modules shall be connected to their manifolds with Victaulic and slip joint connectors. All seals shall be EPDM.
- e. Each containerized system shall be divided into identical Units. Identical consists of functionally independent (independent electrical and hydraulic control), and of the same hydraulic capacity. Differences in what appears to be unit symmetry (hand) are not acceptable. Each membrane, including the spare, shall be of identical design and shall accommodate the same maximum number of membrane modules. The spare shall be equipped with the same number of modules as the primary membrane units.
- f. Functionally independent means that each membrane unit shall be capable of independent operation for its process sequences upon initiation. It is not acceptable 1) to share valves or instrumentation that perform similar internal functions between membrane units or 2) require that all membrane units be removed from normal filtration and backwashing to perform a function or sequence.
- g. Unit support frames shall be designed to resist gravity and seismic forces of the pressure vessels, piping and other related equipment supported by the frame. These supported items shall not be considered as structural members of the support frame. The frame shall be designed in conformance with the latest edition of the International Building Code (IBC) design criteria per Section 01 33 17, Structural Design, Support, and Attachment, and signed by a Registered Professional Structural Engineer currently licensed in the State of Oregon.

4. Backwash and Air Scrub (AS) System:

- a. The backwash system shall be designed for the number of membrane Units, as shown on the Drawings. General Requirements for the backwash System are as follows:
- 1) Spent backwash water exiting the Unit shall be discharged in a controlled manner. Intermittent backwashes will be discharged to the solids handling ponds.
 - 2) The backwash sequence shall be designed so that the same volume (amount of water in gallons) of backwash water is produced per Unit backwash irrespective of the degree of membrane fouling (resistivity or permeability) or variation in water temperature (viscosity effect).
 - 3) Control programming shall be configured with appropriate software time delays to avoid rapid pump or membrane flow cycling in response to transient dynamic hydraulic effects caused by backwash; or chemical maintenance cleaning cycles. "Deadheading" or any operation of any pump under a "zero-flow" or "flow condition below the pump manufacturers acceptable limits" is not acceptable. Interlocks shall be provided to prevent operation of the any pump under a "dead-headed" condition.
 - 4) The MF units shall utilize a reverse flow back flush (backwash) to remove accumulated particulates and maintain the design filtrate production rate. Filtrate shall be introduced into the filtrate side of the fibers flushing dislodged solids to waste.
 - 5) The units shall incorporate an AS sequence to periodically agitate the exterior fiber surface. Dislodged solids shall be diverted to waste.
 - 6) The backwash and AS cycles shall be initiated through the process control system using totalized volume. The backwash and AS processes shall be carried out automatically through the PLC.
 - 7) The compressed air system supplying low-pressure air for the AS cycle will be provided by the Seller and integral to each containerized membrane system.

5. Clean-In-Place (CIP) and Chemical Maintenance Clean (MC)

- a. Each containerized membrane system shall be provided with a CIP tank and accessories. The CIP system will include a CIP circulation pump, a CIP drain pump, valving, and instrumentation as shown on the Drawings. Circulation and drain pumping can be performed by one pump if suggested by manufacturer. A single pump shall be installed in each containerized unit with one shelf spare provided for the project.
- b. The Seller shall supply equipment and appurtenances as shown on the P&ID Drawings.

- c. There shall be a shared tank for acid and caustic CIP solutions. The system shall include accessories, tank heater control panel, heaters and controls, and analyzers as shown on the Drawings.
- d. Spent CIP solution shall be discharged in a controlled manner. Intermittent CIP solutions will be discharged to the neutralization tank for pH-neutralization, dechlorination, and equalization. The neutralization system shall include a neutralized waste pump that can be used to mix the tank contents or discharge the tank contents to either the sanitary sewer for CIP wastes or the solids drying beds for maintenance clean wastes.
- e. There will be one citric acid dose transfer system, one sodium hydroxide transfer system, and one sodium hypochlorite transfer system provided to supply concentrated chemicals to the CIP tanks.
- f. Heaters shall be provided for heating of CIP solutions. The heaters shall be sized to elevate the water temperature to the desired level and maintain the temperature during the CIP cycle. Heaters shall meet the following requirements:

General	Heater with thermocouple, Type K, NEMA 4X
Sheath	Incoloy 800 / Titanium
Flange	304 SS
Gasket	Fiber
Seal type	Epoxy
Power requirements	460 V, 3 ph, 60 Hz
Minimum energy demand (kW)	80

- g. Recommended Manufacturers for Tank Heaters:
 - 1) Indeeco, or approved equal.
- h. Seller shall provide the necessary interlocking logic to assure that a Unit being chemically cleaned is isolated from the MF System as shown on the P&ID Drawings.
- i. The design of the chemical cleaning system shall incorporate automatic safety features to assure that cleaning solution is adequately rinsed from the MF System and will not contact filtered water.
- j. When not in operation, each Unit shall be capable of being stored in a CIP solution or other suitable storage solution.
- k. The cleaning pumps shall be per vertical in-line centrifugal type.

6. Chemical Maintenance Clean (MC)
 - a. General: The maintenance clean system will utilize the CIP system described above with similar control system requirements.
 - 1) The Seller shall provide the chemical transfer and solution mixing equipment and controls to batch the maintenance clean solution that is used for chemical cleaning of the Units as shown on the P&ID Drawings.
 - 2) Spent maintenance cleaning solution shall be discharged in a controlled manner. Intermittent chemical cleaning solutions will be discharged to the CIP neutralization system and then to the solids drying bed.
 - 3) Heaters shall be provided for heating of maintenance cleaning solutions. The heaters shall be sized to elevate the water temperature to the desired level and maintain the temperature during the maintenance clean cycle. Heaters shall meet the same requirements mention above for the CIP system.
 - 4) The Seller shall provide the necessary interlocking logic to assure that a Unit being cleaned is isolated from the MF System as shown on the P&ID Drawings.
 - 5) The design of the chemical cleaning system shall incorporate automatic safety features to assure that cleaning solution is adequately rinsed from the MF System and will not contact filtered water.
7. Each containerized system shall be equipped a Membrane Filtrate Monitoring System consisting of a Membrane Filtrate Sample System and a Membrane Integrity Test System.
 - a. Membrane Filtrate Sampling System
 - 1) An automatic sample valve located on the filtrate (permeate) discharge line on each membrane rack.
 - 2) The sample valve shall open when the unit is producing water. The sample line shall be connected to a turbidity meter provided by the Seller. Power for the turbidity meter will be sourced from the Unit control panel. The analog signal from the turbidity meter shall be routed into the Unit PLC or Remote I/O.
 - 3) An automatic sample valve located on the common filtrate (permeate) discharge line connecting each containerized unit and provided by the Contractor.
 - b. Membrane Integrity Test system to verify the integrity of membrane modules:
 - 1) The membrane integrity test system shall use air pressure to verify the integrity of the membranes.

- 2) The applied test pressure of the membrane integrity test system shall be established so that passage of particles greater than 3.0 microns or larger can be detected.
- 3) The un-pressurized side of the membrane unit will be vented to atmospheric pressure.
- 4) The Seller shall provide documentation of methodology used to establish the integrity test pressure.
- 5) The integrity test system shall be manually or automatically initiated and automatically sequenced by the PLC system, and complete daily in conformance with the US EPA Long Term 2 Enhance Surface Water Treatment Rule and the Membrane Filtration Guidance Manual.
- 6) The integrity test system shall verify the integrity of the membrane and upon successful completion of the integrity verification, return the Unit to service.
- 7) If the integrity test does not pass the integrity verification, the Unit shall be removed from service and an alarm shall be annunciated from the Unit PLC / Remote I/O to the System PLC.
- 8) Refer to Section 01 74 00, Membrane System and Module Warranty for additional requirements of the Membrane Integrity Test System.

C. Fabrication Requirements

1. All welding shall be in accordance with the latest applicable codes of the American Welding Society and/or ASME Boiler Code.
2. Piping
 - a. Schedule 10S Type 316L stainless steel pipe assemblies may be used.
 - b. Refer to Section 15 06 20, Stainless Steel Pipe and Tubing for stainless steel fabrication.
 - c. Threaded fittings shall not be used for pipe diameters exceeding 2 inches IPS.
 - d. Each membrane valve or piping assembly shall be tested at the Seller's facility using dummy module. This testing shall incorporate a leak check to verify the integrity of the welded and bolted connections and will be repeated in the field using the actual modules. If the Seller elects to forgo this test and a weld failure is discovered during the field rest, the Seller shall be responsible for all costs associated with the requisite repairs and associated delays.
3. Unit Frame Construction
 - a. The unit support frames and miscellaneous brackets shall be fabricated from ASTM A36 hot rolled steel structural members and ASTM-A500, Grade B welded steel structural tubing.

- 1) The method of fabrication shall be continuous fillet and bevel welds. The strength of these welds shall meet or exceed the strength of the structural shape or tubing material. All welding operators shall be qualified in accordance with the current AWS requirements. All exterior welds shall be ground flush and smooth prior to sandblasting. Metal Inert Gas (MIG) welding techniques shall not be used in the frame fabrication. Stitch and spot welding will not be accepted. Bolt holes, mounting holes, etc., shall be drilled prior to painting wherever possible.

b. Painting

- 1) Refer to Section 09 90 00, Painting.

2.03 EQUIPMENT AND COMPONENTS

A. Component Equipment Requirements

1. Component equipment provided by the Seller shall conform to the requirements of the Contract Documents.
2. The Seller may use NSF / FDA / USDA approved plastic material for module assemblies that are replaced with the membrane modules. All materials of construction shall use NSF / FDA / USDA approved materials for contact with water.
3. Centrifugal Pumps
 - a. Process Design Requirements
 - 1) Pump sizing and calculations shall be finalized with submittal drawings for the membrane system.
 - 2) Pumps shall be sized using the Seller design criteria and will accommodate the maximum number of membrane modules per membrane unit assembly as indicated in the Proposal Pricing Form.
 - b. Service Condition
 - 1) Membrane feed pumps
 - 2) Backwash pumps
 - 3) CIP recirculation pump
 - c. Design Criteria
 - 1) Process Design Requirements
 - a) Pump sizing and calculations shall be finalized with submittal drawings for the membrane system.

- b) Pumps shall be sized using the Seller design criteria and will accommodate the maximum number of membrane modules per membrane unit assembly as indicated in the Proposal Pricing Form.

d. PUMP REQUIREMENTS

- 1) Construction: Construction of centrifugal pumps shall conform to the following requirements:
- 2) All elastomeric materials such as O-rings and gaskets shall be compatible with the fluid.
- 3) Coating: Interior water passages of cast iron and ductile iron casing shall be coated with 10- to 12-mils DFT vitreous enamel or 10- to 12-mils DFT fusion bonded epoxy per Section 09 96 00, Painting. All external surfaces of cast iron and carbon steel materials shall be coated in accordance with Section 09 90 00, Painting. Stainless steels shall not be coated.

e. MOTOR

- 1) Motor shall operate on 460 VAC, 3 PH, 60 Hz power supply.
- 2) Motor shall be TEFC-type with worm gear reducer.
- 3) Motors shall have a 1.15 service factor and shall be NEMA Design B, with Class F insulation. Motors shall have space heaters to prevent condensation in the motor. Conduit boxes to be two times NEMA standard. Provide separate boxes for motor leads and for space heater and temperature switch wiring.
- 4) Each pump and motor shall be furnished with a stainless steel nameplate securely mounted to the body of the equipment which will list manufacturer and model details, and relevant design criteria.

5) VARIABLE FREQUENCY DRIVE

a) Requirements:

- (a) The power and control electronics shall be housed in a UL Type 3 enclosure and the combined motor/VFD rating shall be IP55 (protection against dust and nozzle directed water from any direction) or be NEMA 4 rated.
- (b) The VFD shall be of the PWM (Pulse Width Modulation) design using IGBT (Insulated Gate Bipolar Transistor) technology.
- (c) The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of motor. The motor current shall closely approximate a sine wave. Motor voltage shall be varied with frequency to maintain desired motor current suitable for centrifugal pump control and to eliminate the need for motor de-rating.

- (d) The VFD shall automatically reduce the switching frequency and/or the output voltage and frequency to the motor during periods of sustained ambient temperatures that are higher than the normal operating range. The switching frequency shall be reduced before motor speed is reduced.
- (e) An integral RFI filter shall be standard in the VFD.
- (f) The VFD shall have a minimum of two skip frequency bands which can be field adjustable.
- (g) The VFD shall have internal solid-state overload protection designed to trip within the range of 105-110% of rated current.
- (h) The integrated VFD motor shall include protection against input transients, phase imbalance, loss of AC line phase, over-voltage, under-voltage, VFD over-temperature, and motor over-temperature. Three-phase integrated VFD motors shall be capable of providing full output voltage and frequency with a voltage imbalance of up to 10%.
- (i) The VFD motor shall have, as a minimum, the following input/output capabilities:
 - (j) Speed Reference Signal: 0-10 VDC, 4-20mA or Ethernet
 - (k) Digital remote on/off, or Ethernet
 - (l) Fault Signal Relay (NC or NO), or Ethernet
 - (m) Fieldbus communication port (Ethernet IP)

f. APPROVED MANUFACTURER

- 1) Grundfos
- 2) Goulds ESH
- 3) or approved equal

4. Air diaphragm pumps

a. Air diaphragm pumps will be designed for the following services:

- 1) 12.5% Sodium Hypochlorite
- 2) 1% Caustic Soda
- 3) 2% Citric Acid
- 4) Calcium Thiosulfate

b. Pump Construction:

- 1) General: The pump shall be of the air-operated double diaphragm type and conform to the following requirements:

Pump base	cast iron / steel / aluminum
Pump casing (wetted)	PVDF
Pump casing (dry)	Polypropylene
Pump construction	clamped
Diaphragms	Santoprene / PTFE / Buna-N
Check valves	ball checks
Check valve material	PTFE
Valve seats	PVDF / Polypropylene
Valve seat O-rings	Santoprene / PTFE / Buna-N
Pump shaft	316 stainless steel / nitrided carbon steel
Air control valve	self-lubricated or oil-lubricated

c. MANUFACTURERS OR EQUAL

- 1) Wilden / PSG, or approved equal

5. Compressed Air System

a. Air Compressors:

- 1) Compressors shall be Oil Lubricated Rotary Screw type, direct driven complete with inlet filter / silencer, discharge check valve, motor, and automatic pressure unloader, providing no load starting.
- 2) Each compressed air module shall consist of, but not necessarily be limited to, the following: compressor, drive motor, oil system, air system; electronic regulating controls, sound attenuating enclosure, starter cubicle and integrated refrigerant air dryer.
- 3) Compressors of oil type shall use food grade lubricants if used in direct contact with potable water, such as air scour or integrity testing. The oil lubrication system installed with each module shall be of the differential pressure type consisting of an ASME approved air/oil separator unit including, but not limited to, the following: separator element; oil fill tube; oil level indicator; oil filter of the spin-on type rated at 10 microns; oil cooler; and thermostatic oil cooler bypass valve.

- 4) Air handling systems installed with each module shall consist of the following: dry type air intake filter rated at 3 microns; pneumatically operated air intake valve/unloader assembly; minimum pressure/check valve; air/oil separation system; discharge air shutoff valve; and motor driven compressor cooling fan.
 - 5) Each air compressor module shall have a compact welded aluminum combination cooler, and a moisture separator/trap including both automatic and manual drain lines.
 - 6) The compressor shall be enclosed by sound attenuated panels designed to limit noise to a maximum of 76 dB(A).
 - 7) Compressors shall use an air-cooled heat exchanger.
 - 8) Provide compressed air equipment from one of the following manufacturers:
 - (a) Atlas Copco Series GA
 - (b) Atlas Copco Series ZT
 - (c) Ingersoll Rand SSR
 - (d) Ingersoll Rand 2340L5
 - (e) Kaeser
- b. Refrigerated Air Dryers:
- 1) An integral refrigerated dryer shall be furnished with each compressor module. Each dryer shall include the following pre-cooler/reheater, refrigerant compressor; liquid separator; press-o-stat regulator of condenser fan operation; expansion valve; R22 refrigerant; and pressure dew-point indicator monitored through the control module.
 - 2) Rate air dryers in accordance with the standard rating conditions of the National Fluid Power Association for class H dryers, i.e., 33 to 39 degrees F pressure dewpoint range at the specified minimum discharge pressure and 100 degrees F inlet air with a maximum pressure drop of 5 psi.
 - 3) Under this rating, provide the dryers with a capacity not less than 20 percent above the maximum total free air delivery of each dedicated air compressor,
 - 4) Equip each refrigerated air dryer with a condensing unit, refrigerant evaporator, mechanical separator automatic condensate discharge valve, high discharge air temperature alarm light, and switch for actuating a remote alarm, prefilter, and afterfilter. The air dryer shall be integrated into the compressor design and part of the compressor enclosure.

- 5) After-filter: Equip dryers with filters to remove oil, carryover, oil aerosols and other foreign matter. Install a prefilter near the dryer inlet and install an afterfilter near the dryer discharge. Design the prefilter for mechanical removal of solid and liquid particles, equipped with a porous bronze filter element with a 5 micron rating. Provide an afterfilter of the coalescing type with a 0.5 micron rating.
 - 6) Acceptable Manufactures: Provide refrigerated air dryers from one of the following manufactures:
 - a) Atlas Copco
 - b) Ingersoll Rand
 - c) Kaeser
- c. Air Receivers and Air Surge Tank:
- 1) The air receiver shall be a vertical tank of all welded, carbon steel construction with semi-ellipsoidal heads and leg supports for mounting on a concrete base. The receiver shall be designed and constructed in accordance with the ASME Code for Unfired Pressure Vessels and shall bear a code stamp.
 - 2) Receivers shall be complete with a pressure transmitter, pressure, gage, pressure relief valve, automatic drain valve, and appurtenances. Receivers and surge tank shall be provided with an internal factory applied epoxy lining.
 - 3) The minimum receiver size is 60 gallons. The minimum pressure rating is 200 psig.
 - 4) The receiver shall be provided with piping connections for an inlet, outlet, drain, pressure relief valve, and cleanout opening.
 - 5) The receiver shall be suitable for installation outdoors on a concrete pad. The manufacturer shall submit calculations documenting compliance of vessel support and recommended anchorage according to Section 01 33 17, Structural Design, Support, and Attachment.
 - 6) Manufacturer
 - a) Hanson
 - b) Manchester
 - c) Brunner
- d. Coalescing Filters:

- 1) Coalescing type oil removal filters shall be provided. The filters shall remove 99.995% of the solids and liquids 0.3 micron or larger in size with replaceable filter elements. Filters and housings shall be sized and selected by the Seller to meet requirements of the system.
 - 2) Supply air filter assemblies shall be provided by the Seller for each compressor. Each assembly shall include the following: filters (3); filter support bracket; outlet ball valve; auto drain valve assemblies (3).
 - 3) The Seller shall provide support brackets with cutouts to the filter housings. The support brackets shall be constructed of Type 304 stainless steel and shall contain labels for the filter housings as well as inlet and outlet sides of the assemblies.
 - 4) Differential pressure indicators shall be provided for the filter assembly.
 - 5) Manufacturer
 - a) Pall - Filterite
 - b) Ingersoll Rand
 - c) Zeks
 - d) Atlas Copco
- e. Particulate or Membrane Air Filters:
- 1) For air that is in intimate contact with filtered water, hydrophobic membrane particulate filters with an absolute range of 0.02-micron removal shall be provided. The filters shall have replaceable cartridges. Filters and housings shall be sized and selected by the Seller to meet requirements of the system.
 - 2) Air filters with a 1-micron removal rating instrument air and valve actuation.
 - 3) Differential pressure indicators shall be provided for the filter assembly.
 - 4) Manufacturer
 - a) Pall - Filterite
 - b) Millipore
 - c) Parker
 - d) Zeks
 - e) Atlas Copco
- f. Air Regulator Assembly:

- 1) Provide an air regulator assembly consisting of inlet valves, pressure relief valve, air muffler, pressure indicator, and outlet valve at the receiver outlet. Provide an installed spare air regulator assembly identical to the above.
 - 2) Air regulators at each air source is acceptable in lieu of a regulator assembly.
 - 3) Individual control air regulator assemblies shall be installed as shown on the Drawings.
 - 4) Air filters shall be furnished complete with housing, support bracket, and removable filter cartridge. The support bracket and associated hardware shall be Type 304 stainless steel. Filters and housings shall be sized and selected by the Seller to meet requirements of the system.
 - 5) Manufacturer
 - a) SMC
 - b) Norgren
 - c) Cashco
 - g. Fabrication Requirements (Materials of Construction)
 - 1) All mounting hardware shall be Type 304 Stainless Steel.
6. Automatic Self-Cleaning Strainers
- a. Strainers shall be of the motorized automatic self-cleaning type. The equipment shall be designed to continuously remove suspended particles from the pumped raw water.
 - b. Construction
 - 1) Strainer shall be of the self-cleaning type, on-line style. It shall consist of an outer carbon steel with potable grade interior epoxy coating, cast-iron or ductile iron body, an internal 316 stainless steel screen element sealed with an upper and lower seal ring, and a rotating, backwash arm that discharges the backwash water through an outlet nozzle.
 - 2) The use of carbon steel for any wetted strainer surfaces is not acceptable under any circumstance.
 - 3) Backwash cleaning of the screen is accomplished by utilizing the pressure differential between strained water discharge pipe and atmospheric pressure. Backwash cycles can be initiated on an operator adjustable differential pressure set point or on a time cycle. Process flow shall remain completely uninterrupted during the backwash cycle.
 - 4) The Seller is responsible for verifying the membrane system design will have adequate backpressure to achieve the minimum backwash supply pressure as required by the selected strainer manufacturer.

- 5) The unit shall be designed so that the entire operating assembly, motor, gear reducer, cover, backwash and assembly, screen element, and bearing housing, lift from the filter body as a complete unit.
- 6) The strainer shall be rated for service at 150 psi @ 100°F and ASME code stamped. Inlet and outlet connection shall be flanged and designed and constructed in accordance with both ANSI and ASME Section VIII, Division 1.
- 7) An inspection port shall be provided to permit visual inspection of filter element without removing drum.
- 8) A drain opening shall be provided in the lower part of the strainer body to permit drainage without removing drum.
- 9) The straining element shall be 316 stainless steel with 300 micron screen size. The Seller may require a smaller retention efficiency of the strainer for protection of downstream equipment. Wedge wire or slotted screens are not acceptable.
- 10) If the raw water pressure is not sufficient to backwash the strainer, the strainer shall be modified to use filtered water for backwashing of the strainer. The design and operating capacity of the membrane system shall be increased by 1 percent to account for strainer backwash water losses.
- 11) The motor shaft shall be sealed by a drip-proof mechanical seal. The use of packing or any other sealing arrangement is not acceptable under any circumstance.

c. Motor:

- 1) Motor shall operate on 460 VAC, 3 PH, 60 Hz power supply.
- 2) Motor shall be TEFC-type with worm gear reducer.

d. Spare Parts:

- 1) The following spare parts shall be furnished:
- 2) One set of replacement filter media for strainer.

e. Manufacturers:

- 1) Amiad
- 2) Fluid Engineering.
- 3) Kinney.
- 4) Forsta

7. Containerized membrane system control system

- a. A master control panel in a NEMA 4 painted mild steel wall mounted enclosure shall be furnished by the manufacturer of the ultrafilter system for each containerized unit provided. The control panel shall be wired to accept a 120 volt power feed. The filter control system shall be manufactured in a UL508A/698 certified panel shop.
- b. The control panel shall be capable of communicating with the main Water Treatment Plant's GE/Emerson PLC system through a suitable protocol converter. All process data, alarms, operator controls, and process setpoints shall be made available to be read and written by either the Alder Creek Main PLC or the Alder Creek SCADA system.
- c. A master control panel in a NEMA 4 painted mild steel enclosure shall be furnished to provide communication between each supplied containerized unit and the neutralization system.
- d. The control panel shall incorporate an Allen Bradley CompactLogix Programmable Logic Controller (PLC) for accomplishing the control logic. The PLC shall be connected to the plant network via an Ethernet communication link. Communication protocol shall be Ethernet I/P. The panel shall have the capability to be accessed remotely via the plant Ethernet network through an integrated VPN connection.
- e. A 19" Allen Bradley AdvanTech Panel PC with Factory Talk View ME color touchscreen graphical operator interface shall be provided in the PLC panel for viewing system status and entering operator selected functions and operating variables.
- f. The PLC shall be supplied with a minimum of 20% spare I/O that is to be prewired out to the terminal strip for future for plant integration. The PLC shall incorporate the proper quantities of the following components to make a complete operational system.
- g. I/O can be from Allen Bradley, Numatics or Wago as per the vendor's preference.
- h. The control panel shall be provided with all necessary fuses, relays, circuit breakers, power distribution blocks, 24 vdc power supplies, and Ethernet VPN router to make a complete and operational system.
- i. All wiring shall be brought to a terminal strip for interface with external devices. Terminals shall be cage type with screw terminal connection. No more than two wires shall be connected to one terminal. Multi-level terminals are acceptable. Terminals shall be manufactured by Phoenix Contact or equivalent.
- j. The control system shall allow for automatic control of all functions of the ultrafilter process. There shall also be manual control of all equipment via the operator interface.
- k. The control system shall be designed to allow for integration with the existing equipment onsite and shall have the ability to interface with the existing level instrumentation and feed water supply pumps.

- I. The control panel shall be provided with a properly sized control power transformer. This transformer is to have both primary legs and one secondary leg fused.
- m. Local distributed I/O panels or NEMA 4 integrated blocks (without panel) shall be provided for the ultrafiltration trains and CIP skid. The panels/blocks shall be NEMA 4 painted mild steel and will be skid mounted. The control panels will house Allen Bradley Flex I/O or Emerson Numatics integrated racks to interface back to the master control panel. The panels will be supplied with a manifold system to distribute the required service air to the appropriate skid mounted automated valves. This manifold shall be provided with the proper quantities of solenoid valves rated for control of the skid mounted control valves. A combination regulator / filter shall be provided within the control panel to ensure that clean air is supplied to the manifold at the proper pressure.

8. Valves

a. Automated Butterfly Valves

- 1) For valves that are in locations where reliability is a consideration, or for automated valves that automatically modulate for flow control or actuate with periodic backwashing or other Seller- designated terminology describing the reversal of periodic flow through the membrane system that occur at design intervals of less than 2 hours, the Seller will provide resilient seated valves.
- 2) Valves shall provide ANSI Class VI shutoff
- 3) Materials of Construction
 - a) Body: 316 Stainless Steel
 - b) Disc: 316 Stainless Steel
 - c) Shaft: 17-4PH SS or 316 Stainless Steel
 - d) Pins: 316 Stainless Steel
 - e) Seats and Seals:
 - (a) Water Service-EPDM
 - f) Compressed Air - Teflon - PTFE
 - g) Process Air - Fluorocarbon (Viton, RTFE, or Fluorinated Hydrocarbon Elastomer - ASTM D1418) rated for 300 degrees minimum or higher if required by process.
 - h) Backing Ring: Stainless Steel
 - i) Bushing / Bearings: EPDM or RTFE
 - j) Packing: PTFE

- 4) Throttling or rate of flow control valves may be of the butterfly type. The Seller shall submit calculations to verify that valve cavitation does not occur over the operating range of the valve.
 - 5) Bolting Pattern - Lugged valves shall be used.
 - 6) Acceptable manufacturers:
 - a) Keystone - K-Loc High Performance Butterfly Valve - F362
 - b) DeZurik- High Performance Butterfly Valve
 - c) Flowseal (John Crane) - Soft Seat High Performance Butterfly Valve
 - d) Jamesbury - Wafersphere - High Performance Butterfly Valve
 - e) Fisher - PosiSeal
 - f) Masoneilon Dresser - High Performance Butterfly Val
 - g) Bray, 31 Series
- b. General Service
- 1) Service Conditions - General Service – less than 30 inches in diameter:
 - a) One Piece Body
 - (a) Unless otherwise specified or approved by the Engineer, all valves shall be lugged style.
 - (b) Body: 1 piece cast iron or ductile iron body
 - (c) Disc: 316 Stainless Steel
 - (d) Stem: 316 or 416 Stainless Steel
 - (e) Bushings: PTFE
 - (f) Pins: Stainless Steel
 - (g) Seats and Seals:
 - (i) Water Service – EPDM, Viton
 - (ii) Compressed Air - Teflon – PTFE, Viton
 - (iii) Process Air - Fluorocarbon (Viton, RTFE, or Fluorinated Hydrocarbon Elastomer - ASTM D1418) rated for 350 degrees minimum or higher if required by process.

- (h) All valves shall be furnished with two upper and one lower bearings/bushings of PTFE material. Shaft seals shall be provided to prevent leakage and to protect bearings from internal or external corrosion.
- (i) Valve seats shall be of the reinforced resilient type and shall be field replaceable. Seats shall also act as a body liner to prevent flow from contacting the body casting. Seats shall have flange sealing to provide a positive seal without use of flange gaskets.
- (j) Valves shall have a dead-end shutoff differential pressure rating equal to or greater than 50 psig (with flanges installed on each valve face). Valves to be suitable for and rated for full vacuum service.
- (k) Body wall shall exceed requirement for AWWA C504 Class 150 standard.
- (l) The disc shall be secured to the shaft using at least two Type 316 stainless steel pins or self- locking setscrews.
- (m) Valves shall have the ability to be installed with the disc in the closed position.
- (n) Valves shall be suitable for process air or vacuum service.
- (o) Factory Testing: Test shall be conducted on each valve in accordance with manufacturer's Quality Control procedures.
- (p) Acceptable Manufacturer
 - (i) DeZurik –Type BRS.
 - (ii) Centerline Model 200/225
 - (iii) Keystone 602.
 - (iv) Bray Series 70
 - (v) Bray Sries 92
- b) Two Piece Body
 - (a) Butterfly valves 2-inch to 12-inch shall be flange, lugged style, 150 psi class butterfly valves using a 2-piece cast iron body and 316 stainless steel paddle.
 - (b) Valve seats shall be of the reinforced resilient type and shall be field replaceable. Seats shall have flange sealing to provide a positive seal without use of flange gaskets.
 - (c) Valves shall be 316 stainless steel. Shaft diameter shall be suitable for 150 psi service (2 to 12 inch valves).

- (d) Discs shall be 316 stainless steel and use a thin profile disk. The disc-to-shaft connections shall be Type 316 stainless steel.
 - (e) Pins, shaft, and disc of all valves shall be individually machined and completely interchangeable.
 - (f) Valves shall be compatible with the fluids in contact with the valve at a maximum temperature of 110°F.
 - (g) Factory Testing: Test shall be conducted on each valve in accordance with manufacturer's Quality Control procedures.
 - (h) Acceptable Manufacturer
 - (i) Keystone – Resilient Seated Valve Type 920
 - (ii) Or-Equal will not be accepted (use 1 piece body valve).
- c. Type 3 Butterfly Valve
- 1) Service Conditions - Backwash chlorine solution and other concentrated chemical or cleaning solution in contact with the valve.
 - 2) Valves 1" and above in contact with chlorine solution above 50 ppm or other cleaning solution where stainless steel is not appropriate for contact shall use a flanged, lugged style, 150 psi butterfly valves using cast iron body and Teflon coated disc with a replaceable valve seat.
 - 3) Acceptable manufacturers and models.
 - a) Keystone - Resilient Seated Valve Types 920
 - b) DeZurik - Resilient Seated Valve Type BGS
 - c) Bray Series 22/23
- d. Stainless Steel Isolation Ball Valves
- 1) Stainless steel isolation ball valves are required for pressure gauges, pump casing drains and other locations as shown on the Drawings.
 - 2) The Ball Valve shall consist of a type 316 stainless steel body, a polished stainless steel ball and a Teflon seat. The valve shall be equipped with a lever type handle. The valve shall have a minimum working pressure of 800 psi WOG (Water-Oil-Gas)
 - 3) Ball valve of 2 inches or less shall have NPT threads, Ball valves used in caustic service or in applications larger than 2-inches shall have flanged end connections.
 - 4) Provide double acting pneumatic actuators using the same manufacturer of the valve, if required for valves less than 1-inch in size.

- 5) Acceptable Manufacturers
 - a) Apollo Type 76
 - b) Watts Type S-8100 and S-8000
 - c) Whitey (Swagelok) Series 40
 - d) Parker H-series
 - e) Flow-Tek
 - f) John Guest
- e. PVC Plastic Ball Valves
 - 1) PVC or CPVC Plastic Ball valves shall use a True Union Design.
 - 2) The elastomer shall be compatible with the chemical service.
 - 3) Acceptable Manufacturers
 - a) Spears
 - b) Nibco - Chemtrol
 - c) Asahi -Duo Block
- f. Brass Ball Valves
 - 1) Description: Three-piece brass ball valve, in sizes up to 2-inches
 - 2) Operating Conditions: Install where noted or shown
 - 3) Design Requirements:
 - 4) Maximum Operating Pressure: 600 psig
 - 5) Rated Operating Temperature: 200°F
 - 6) End Connections: 600 WOG, conforming to MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
 - 7) Actuator: Manual, lever type
 - 8) Materials:
 - a) Body: Brass, ASTM B30 - Standard Specification for Copper Alloys in Ingot Form
 - b) Ball: Hard Chrome plated brass ball
 - c) Stem: Brass, ASTM B30 - Standard Specification for Copper Alloys in Ingot Form

- d) Seats: Glass reinforced Durafil
- e) Seals: PTFE
- f) Bolting: Type 316 stainless steel
- 9) Manufacturers:
 - a) Watts Series B-6000
 - b) Apollo
- g. V-Notch Ball Valves
 - 1) Ball valves suitable for throttling are required for general water service as shown on the Drawings,
 - 2) Materials:
 - a) Body: 316 Stainless Steel
 - b) Ball: 316 Stainless Steel
 - c) Shaft (Stem): 17-4 PH or 316 stainless steel.
 - d) Actuator: The ball valves shall have provisions for mounting an actuator, positioner, and valve position feedback module.
 - 3) Acceptable Manufacturers
 - a) Worcester Controls V-Seat
 - b) DeZurik VPB
 - c) Fisher Vee-Ball
- h. Type 1 Check Valve – Globe Style
 - 1) Size and Extent: Membrane Raw Water Pump Discharge, as shown on Drawings.
 - 2) Working Pressure: 150 psi
 - 3) Silent operation check valves. The operation of the valve shall not be affected by the position in the pipeline. The valve disk shall be concave to the flow in the pipeline and guided by center shaft. The globe style check valve shall have an open area equal to or greater than the pipe diameter. Valves 10- inch and smaller shall be capable of mounting directly to a butterfly valve.

- 4) Check valve shall be spring loaded, normally closed by means of a heavy-duty center guided, stainless steel springs. Flow from the pumps shall cause the valve to open and upon pump shut down, the spring will shut the valve before reverse flow starts and at a point of zero velocity of non-slam closure.
- 5) Valve body shall be cast or ductile iron. Valve seat and disk will be Bronze. Seating shall be resilient and watertight. The sealing element shall be EPDM or Viton (Buna-N is not acceptable) and provide zero leakage. The torsion spring shall be stainless steel. All component parts shall be field-replaceable.
- 6) Manufacturers:
 - a) Valmatic, Type 1800
 - b) Apco, Model 600
 - c) Golden Anderson, Model 280 or 288
- i. Double Disc or Double Door Style Check Valves
 - 1) Service Conditions: Pump Discharges
 - 2) Body: 316 Stainless Steel if in contact with crp
 - 3) Body: Ductile iron if not in contact with crp
 - 4) Seat and Bushings: 316 Stainless Steel
 - 5) Spring and Screws: 316 Stainless Steel
 - 6) Seals:
 - a) Water: Viton, EPDM (Buna-N is not acceptable)
 - b) Process Air: Fluorocarbon (Viton, RTFE, or Fluorinated Hydrocarbon Elastomer ASTM D1418) rated for 350 degrees minimum or higher if required by process.
 - 7) Manufacturers:
 - a) Valmatic, Model Dual Disc
 - b) Centerline, Model 800
 - c) APCO, Model 900
- j. Check Valve
 - 1) Service: as indicated on Drawings
 - 2) Style: Plastic Ball Check Valve

- 3) Manufacturers
 - a) Nibco - Chemtrol
 - b) Asahi
 - c) Spears

- k. Check Valve
 - 1) Service: Instrumentation and Sample Lines
 - 2) Style: Diaphragm Check Viton Elastomer
 - 3) Material: PVC
 - 4) Manufacturer
 - a) Plastomatic

- l. Check Valve
 - 1) Service: Vacuum Line
 - 2) Style: Swing Check, Threaded End Connections
 - 3) Material: Stainless Steel Type 316
 - 4) Manufacturer
 - a) Truline
 - b) Sure-Flow

- m. Check Valve
 - 1) Service: Water/Air, I-inch
 - 2) Style: Poppet Check, Tube or NPT fittings
 - 3) Material: Stainless Steel Type 316
 - 4) Manufacturer
 - 5) Swagelok C Series
 - 6) Check Valve
 - 7) Service: Water/Air, I-inch
 - 8) Style: Poppet Check, Tube or NPT fitting
 - 9) Material: Brass Type 360/316

10) Manufacturer

- a) Swagelok C Series

9. Valve Actuators

a. Pneumatic Valve Actuator Operators

- 1) Service Conditions: General Service Quarter Turn Butterfly and Ball Valves
- 2) Cylinder actuators shall have working mechanism fully enclosed, and shall be sized for operation using 80 psig pneumatic supply. Cylinder actuators shall have pilot valves where indicated on the drawings. Units shall have adjustable end position stops. All valve actuators shall include proximity type limit switches. Limit switches shall be programmed to register the open and closed positions. Tubing connecting valve mounted solenoids to the actuator shall be type 316 stainless steel.
- 3) Pneumatic actuators shall be capable of producing a minimum of 1.5 times the required operating torque.
- 4) Materials of Construction:
 - a) Actuator Body and End Caps: Aluminum
 - b) Piston: Aluminum
 - c) Seals: Nitrile or EPDM
 - d) Pinion Shaft: Stainless Steel
- 5) Special Valve Actuator Finish: The exterior finish of the valve actuation shall be provided with a special corrosion resistant finish to resist unanticipated or accidental spray of acid, base or oxidants. Acceptable finishes include:
 - a) epoxy coating
 - b) electro-less nickel. Anodized aluminum shall not be used for the exterior finish of the valve actuator.
- 6) Provide valve disc position indicator on operator.
- 7) Acceptable Manufacturers
 - a) Keystone 1Morin Type MRP
 - b) DeZurik - Compak II
 - c) John Crane - Centerline Series 33000/38000
 - d) Jamesbury - Type ST or SP

e) EL-O-Matic

f) Bray Series 70

b. Electric Valve Actuator:

- 1) General: Electric motor operators shall be furnished complete with motor, extension bonnet, torque tube, position indicator, integral reversing starter, and controls specified herein. All components shall be entirely suitable for outdoor service.
- 2) Electric motor operators shall conform to AWWA C504, except as specified herein.
- 3) Electric motor operators shall be capable of producing a minimum of 1.5 times the required operating torque.
- 4) Voltage: 110 VAC, 60 Hz, 1 phase. Provide for 110 volt control power or 24VDC, 4-20 mA control signal as required and as shown on drawings.
- 5) Enclosure: NEMA 6 (IP 68)
 - a) Non-intrusive entry with no mechanical parts penetrating the control enclosure of the actuator.
 - b) Double O-ring seals
 - c) Separately sealed terminal compartment.
- 6) Mounting Hardware: Provide extension bonnet, torque tube and bonnet supported floor stand for mounting each electric operator on valve with shaft vertical in horizontal pipeline.
- 7) Controls:
 - a) Provide dry contacts for remote indication of:
 - b) Ready to operate-control voltage available, fuses and overloads intact
 - c) Valve full open
 - d) Valve full closed
- 8) Display: Provide LCD Display of valve position, calibration and diagnostics.
- 9) Starter: Provide reversing contactor III NEMA 4 enclosure integrally mounted on operator.
- 10) Thermal Protection: Provide winding thermal protection.
- 11) A feedback position transmitter shall be supplied with each modulating service valve.

12) Provide valve disc position indicator on operator

13) Manufacturer:

a) Rotork IQ

b) Limitorque MX

10. Flexible connections shall be provided at piping terminations as shown on the Drawings. Use materials approved for potable water. Buna-N elastomers are not acceptable. The stainless steel expansion retaining rings shall be supplied with stainless steel control rod assemblies.

a. Manufacturers

1) Red Valve Type J-1

2) Proco

3) Mercer Rubber

4) Uniroyal

11. NEUTRALIZATION SYSTEM

a. Neutralization Container: One neutralization system shall be provided that is sufficiently sized for neutralization of chemicals used in the maintenance clean and clean-in-place processes. The container shall include a neutralization pump, tank, chemical metering pumps, pH transmitter, electrical junction box, and all valves and piping necessary for operation. The system components shall be mounted in either a shipping container or skid mounted.

1) Neutralization Recirculation Pump: The neutralization recirculation pump shall be a vertical multi-stage centrifugal pump with a stainless steel housing impeller and shaft as manufactured by Goulds, Grundfos, or equal. The pump shall be supplied with pressure gauges and valves as required.

2) Neutralization Chemical Metering Pumps: All necessary metering pumps shall be supplied for feeding liquid sodium bisulfite and sodium hydroxide from chemical totes into the neutralization skid recirculation piping. The pumps shall be solenoid or motor driven, positive displacement pumps as manufactured by Prominent. Pumps shall be supplied with heads, diaphragms, check valves, foot-valves and isolation valves all compatible with the solution being pumped. The pumps shall be controlled by the UF electrical panel. A shelf shall be supplied on this skid to support the metering pumps above the chemical storage totes (by others).

3) Neutralization Tank: The neutralization tank shall be a closed top, white translucent HDPE tank of sufficient size to contain the chemical waste from any chemically enhanced backwashes, maintenance cleans, or clean-in-place cycles, with sufficient volume to capture and neutralize all chemical waste. The tank shall be supplied with inlet, outlet, and overflow connections. Tank shall have level transmitter and drain connections.

- b. In lieu of a containerized or skid mounted neutralization system, a neutralization system located inside the containerized unit will be also be sufficient with all components listed in 11.1.a. Those system components can also be used for other system uses when not performing neutralization of CIP and other waste streams.

2.04 SPARE PARTS

- A. Spare Parts for Membrane Filtration Equipment shall be in accordance with Section 01 75 00, Spare Parts.

2.05 SPECIAL TOOLS

- A. The Seller shall provide special tools required for disassembly and reassembly or analysis of membrane modules.
- B. The Seller shall provide all lifting assemblies, hooks, straps, cables and accessories for removing the membrane modules from the rack assemblies.

2.06 LUBRICANTS

- A. Refer to Section 01 73 00, Installation, Operation and Maintenance Manuals for Safety Data Sheet submittal requirements.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Refer to Section 01 62 00, Installation of Membrane Equipment.

3.02 COMMISSIONING

- A. The Seller is responsible for the complete commissioning of the MF system after the Notice of Completed Installation.
- B. Refer to Section 01 66 00, Commissioning of Membrane Equipment.

3.03 TRAINING

- A. Refer to Section 01 73 10, Training of Operations and Maintenance Personnel.

3.04 ACCEPTANCE TESTING

- A. Refer to Section 01 67 00, Acceptance Testing of Membrane Equipment.

3.05 OPERATIONAL ASSISTANCE

- A. Refer to Section 01 68 00, Operational Assistance.

END OF SECTION

SECTION 11 30 20 PERFORMANCE PILOT TESTING OF MEMBRANE EQUIPMENT

PART 1 -- GENERAL

1.01 SUMMARY

A. General:

1. The Seller shall provide a fully integrated and containerized water treatment pilot system that includes feed tank, feed pumps, autostrainers, a MF/UF system with cleaning systems, filtrate pumping, microprocessor controls with panelview HMI, and cellular communications for utilization during the Buyer's 90-Day Pilot Study.
2. The Seller shall provide dispersed equipment including a submersible pump for raw water pumping, a flow paced coagulant feed system, a neutralization / dechlorination system for all waste cleaning solutions.
3. Power shall be 480 volt, 3 phase.
4. Performance Testing shall be conducted per the Pilot Performance Testing Protocol by the Seller (see Exhibit A) as-approved by the Buyer.
5. Pilot results will be used to confirm the basis of design and operating guarantees submitted by the Seller in its Procurement Proposal Evaluation and to obtain OHA approval of the Membrane System.
6. Performance Testing will occur at the City of Sandy's Alder Creek Water Treatment Plant Site which does not have a formal address. The Water Treatment Plant is located 7 miles east of Sandy near Terra Fern Drive.

B. Related Sections:

1. Division 00, Bidding Requirements, Contract Forms, and conditions of the Contract.
2. Division 01, General Requirements.
3. Section 11 30 00, Hollow Fiber Membrane Equipment.
4. Section 11 30 20, Exhibit A Pilot Performance Testing Protocol - 90-Day Pilot Study.

1.02 SUBMITTALS

A. See Specification 01 34 00 for requirements for the mechanics and administration of the submittal process.

B. Operations and Maintenance Manuals:

1. Provide all pertinent operations and maintenance (O&M) manuals for the pilot test unit with the Technical Information submitted with the Proposal.

C. Miscellaneous Submittals:

1. Drawing and Schematic:
 - a. Provide an arrangement drawing and a process schematic diagram of the pilot test unit with the Technical Information submitted with the Proposal.
2. Pilot Work Plan:
 - a. Submit a Draft Pilot Work Plan that addresses all of the objectives stated in the Pilot Performance Testing Protocol to the Engineer and Buyer per the schedule listed in the Agreement.
 - 1) Engineer and Buyer will review Draft Pilot Work Plan and provide Seller with comments and revisions.
 - 2) Incorporate comments and revisions into Final Pilot Work Plan
3. Example report:
 - a. Submit for approval an example pilot test report indicating the data collection and reporting that will be performed.
4. Weekly meetings:
 - b. Conduct weekly virtual meetings including Seller project manager and Pilot leader with Buyer's team.
 - c. Provide graphical and narrative results of the pilot test with more than 24 hour lead time before the meeting to allow Buyer and Engineer review.
5. Pilot Report:
 - d. Provide draft pilot report including a description of all pilot activities and data collected for Engineer and Buyer review.
 - 1) Incorporate Buyer and Engineer comments on the report.
 - e. Produce a draft pilot report for OHA review and comment.
 - 2) Incorporate any OHA review comments on the report.
 - f. Produce a final pilot report addressing all comments received.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. See Exhibit A for product information.

PART 3 -- EXECUTION

3.01 SEE EXHIBIT A

11 30 20 EXHIBIT A

Pilot Performance Testing Protocol - 90-Day Pilot Study

November 2023

Prepared for City of Sandy

by
Stantec Consulting Services, Inc.

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PART 1 -- GENERAL

1.01 INTRODUCTION

- A. The Seller will provide all labor and materials for execution of the pilot study except as noted.
- B. The Buyer will install interconnecting piping, prepare level and gravel pads for equipment, arrange and pay for off-loading of equipment, provide all chemicals, pay for all power, provide labor for daily one-half hour checks of equipment.
- C. The pilot study shall include:
 - 1. Containerized pilot equipment including:
 - a. Feed tank / pumping
 - b. Autostrainers
 - c. Membrane Filtration
 - d. Cleaning systems
 - e. Filtrate tank / pumping
 - f. Microprocessor controls with panelview HMI
 - g. Cellular communications with remote access
 - 2. Dispersed pilot equipment:
 - a. Raw water coagulant addition (flow paced)
 - b. Cleaning solution waste pH-neutralization and dechlorination system

PART 2 -- PILOT PERFORMANCE TESTING PROGRAM

2.01 PILOT PERFORMANCE TESTING PROGRAM OBJECTIVES

The primary objectives of the *Pilot Performance Testing Program* is to confirm Seller's proposal and meet OHA's requirement for pilot testing membrane treatment systems prior to granting a construction permit.

2.02 PERFORMANCE CRITERIA

- A. At minimum, the MF/UF System shall demonstrate the following during the pilot study:
 - 1. Seller's proposal.
 - 2. Meet finished water quality requirements listed in Table 1.
 - 3. Operate at a recovery of at least 95 percent.

4. Meet criteria 1, 2, 3, and 4 while requiring clean in place (CIP) no more frequently than once every thirty days.
5. Demonstrate membrane integrity during the pilot test consistent with requirements of the Long Term 2 Enhanced Surface Water Treatment Rule.
6. Note: Feed water quality ranges to be used for MF/UF System design are summarized in Table 2 in Section 11 30 00, Hollow Fiber Membrane Equipment.

Table 1 – Finished Water Quality Requirements

Parameter	Units	Requirement
MF/UF Water Quality Requirements		
Total Iron	mg/L	≤ 0.1
Total Manganese	mg/L	≤ 0.05
Maximum Turbidity	NTU	< 0.1
Color	Pcu	<1

2.03 PROCESS DESCRIPTION

- A. See Section 11 30 00, Hollow Fiber Membrane Equipment and other Sections.

2.04 PILOT PERFORMANCE TESTING PROGRAM SCHEDULE OVERVIEW

- A. The overall pilot evaluation will commence immediately following selection of a Seller. The pilot shall be operated 24 hours per day for a minim run-time period of 90 days excluding installation, startup, maintenance, and decommissioning; but including optimization and at least two 30-day design runs with fixed operating parameters. Liquidated damages and schedule are specified in Section 00 52 00, Procurement Agreement.

B. Pilot Preparation and Coordination

1. During pilot preparation and coordination, pilot shipment and laboratory contract arrangements will be made. A *Pilot Work Plan* (see Part 4) that addresses all of the objectives stated in Article.

2.1 will be created and agreed upon by all involved parties. Specific activities and corresponding responsibilities are listed in Paragraph 3.1.1.

C. Pilot Evaluation Phase I

1. Phase I is for startup and commissioning of the pilot system. This period will provide an opportunity for tuning of control systems, calibration of instrumentation, and implementation of the data collection procedures. Training of Buyer's staff will occur during this time period. The Quality Assurance program shall be initiated, including verification of data collection and reporting systems.

D. Pilot Evaluation Phase II

1. During Phase II, the MF/UF System will be run at the conditions as bid in the Proposal. All MF/UF System Design and Performance Criteria as specified in Article 2.2 in Section 11 30 00, Hollow Fiber Membrane Equipment, all applicable conditions bid by the Seller, and all performance criteria specified herein shall be met greater than or equal to 95 percent of the time throughout the duration of this phase for the phase to be deemed successful. Should the results indicate system performance capabilities that are less than this, see Article 5.05 in Section 00 52 00, Procurement Agreement.

E. Pilot Evaluation Phase III

1. During this phase, the Seller shall repeat Pilot Evaluation Phase II for confirmation.

F. Pilot Summary Report

1. At the conclusion of the pilot, a Final Pilot Summary Report will be generated. This report shall include, but not be limited to, an introduction of the existing treatment and pilot study; description of operation; presentation and discussion of results; conclusions and recommendations drawn from the study; and associated test data, tables, and graphs. The final report shall include information listed in Part 5.

2.05 PILOT UNIT (EQUIPMENT, CHEMICAL, AND ANALYTICAL) SPECIFICATIONS

- A. **All equipment used to comprise the water treatment pilot system shall be less than 10-years old and be in good-working condition.** The overall pilot unit will include all pumps, tanks, compressors, chemicals, and other ancillary systems needed for full operation during the pilot testing. The pilot units shall be designed as self-contained systems that have their own raw water boost pump, air supply, and dryer for pneumatic valves, MF/UF chemical maintenance clean systems, control valves for adjusting production rate and recovery, pressure vessel assemblies designed for 95% recovery without backwash water recovery, instrumentation and controls for controlling the system and collecting the data on the process variable that effect performance and sample points for monitoring and collecting different process streams (Raw feed water, MF/UF filtrate, MF/UF backwash waste, final water (blended) for analysis. A PLC for automatic operation and alarm protections shall be provided. The Seller shall operate and maintain the pilot, not the Buyer.
- B. The same MF/UF membrane modules and process conditions must be used in the test unit as proposed for the full-scale system, including membrane fiber, material, chemistry, and module construction. A proposed full-scale system, which employs membrane tanks/housings containing multiple modules/elements, may use membrane tanks/housings in the performance testing which contain fewer modules/elements, so long as the configuration accurately represents the hydraulic design of the full-scale configuration.
- C. The various membrane filtration products operate in different manners, with different backwash techniques for maintaining performance. A complete description of the operation of each membrane system must be provided by the Seller in the *Pilot Work Plan* (see Part 4). These descriptions will become a part of the test data record.
- D. Pilot System Checklist

1. A Pilot System Checklist is summarized in this paragraph. This list describes the membrane equipment and other ancillary systems to be supplied and installed by the Buyer and Seller. In general, the Seller shall be responsible for providing all interfaces needed to support the operation of the pilot unit.
2. Power Supply
 - a. Seller shall furnish electrical requirements for pilot plant to Buyer.
 - b. Buyer will provide power and connections for operation of pilot system.
 - c. Buyer will install the electrical line disconnects from power source to the submersible feed pump and the pilot trailer under the direction of the Seller.
 - d. Seller shall provide cellular communications and internet services required for the installation and operation of the pilot unit.
3. Water Supply
 - a. Buyer will provide feed water at the pressure require for operation of the pilot.
 - b. Seller shall determine feed piping size configuration, pump capacity, and requested discharge pressure needed to supply feed water to pilot system and provide drawings/schematics to Buyer.
 - c. Buyer will supply the interconnecting piping for raw water supply to the pilot unit.
4. Waste Disposal
 - a. Seller shall segregate backwashing waste from chemical wastes.
 - b. Seller shall provide pH-neutralization and dechlorination system for waste cleaning solutions.
 - c. Seller shall determine waste piping size and configuration needed to dispose of all pilot system (pretreatment, MF/UF) waste and provide information to Buyer.
 - d. Buyer shall construct waste piping system.
 - e. Buyer shall purchase chemicals and arrange for disposal of all unused chemicals at the end of the pilot test.
5. MF/UF Membrane System
 - a. Seller shall supply and install an MF/UF pilot system. The MF/UF pilot unit shall:
 - 1) Produce sufficient volume of filtrate to be representative of full-scale unit performance.
 - 2) Operate at a minimum 95 percent recovery.
 - b. Seller shall provide and install a break tank with sufficient volume (if needed to control and/or regulate flow).

- c. Seller shall supply remote control and data acquisition system to operate and collect on-line data from the pilot unit using cellular service.

6. Chemicals

- a. Buyer shall provide all chemicals needed during the duration of the Pilot Performance Testing Program. Chemicals include: pretreatment chemicals (coagulant), MF/UF system cleaning chemicals, chemicals needed to neutralize waste streams.
- b. Buyer shall provide for disposal of any unused chemicals.

7. Analytical Equipment

- a. Seller shall provide the following analytical instrumentation and supporting materials:
 - 1) Handheld pH/conductivity meter with automatic temperature correction
 - 2) pH standard buffer solutions (pHs 4, 7, and 10)
 - 3) Conductivity standard solutions
 - 4) Portable spectrophotometer or colorimeter that can measure UV254, Mn, and Fe
 - 5) Reagents required to test for total and dissolved iron and manganese
 - 6) Turbidity determination device

8. Integrity Testing

- a. Integrity testing can be performed by either direct or indirect means.
 - 1) Direct integrity testing will be accomplished through a pressure decay test.
 - 2) Indirect integrity testing will be performed by monitoring permeate particle counts.
- b. A test will be performed daily and at the completion of each CIP.
- c. Damaged fiber shall be identified by the Seller to the Buyer and Engineer. After notification and examination by the Engineer, Seller shall repair damaged fibers.

PART 3 -- PERFORMANCE TESTING CONDITIONS AND STANDARD PROCEDURES

3.01 RESPONSIBILITIES

A. Pilot Study Preparation and Coordination

- 1. Seller shall submit *Draft and Final Pilot Work Plans* to the Buyer and Engineer per the schedule listed in the Agreement. See Part 4 for a list of items to be included in the *Pilot Work Plan*.

2. Engineer will review pilot proposals and request additional information as needed.
3. Seller shall provide general liability and equipment insurance for the pilot system for duration of use including shipment of pilot system to and from pilot site. Proof of liability coverage shall be provided by Seller.
4. Seller shall provide a certificate of insurance for auto and workers compensation.
5. Seller shall coordinate shipment of pilot system to site and provide any required documentation for shipment.
6. Seller will contract with laboratory as necessary for sample analyses required per the *Pilot Work Plan*.
7. Seller will pay for all sample analyses.

B. Pilot Arrival

1. Buyer will provide access to pilot site and raw water supply.
2. Buyer shall receive pilot unit, unload it, and place it in the location for study.

C. Pilot Evaluation – Phase I

1. Seller shall install and connect all necessary components at the beginning of pilot study.
2. Seller shall provide an on-site technician for startup, training, and operation of the system for the duration of the pilot study.

D. Pilot Evaluation – Phases II, III, and IV

1. Seller shall follow the *Pilot Work Plan* agreed upon prior to commencement of pilot study.
2. Seller shall collect all samples as indicated in the *Pilot Work Plan*.
3. Seller shall contract with laboratory for outside analytical services and sample containers.
4. Buyer shall collect samples and arrange sample shipment.
5. Buyer shall inspect the pilot unit daily and make up chemical solutions.
6. Seller shall collect and provide all analytical results obtained during the pilot study to the Buyer and Engineer weekly.

E. Pilot Removal

1. Seller shall decommission pilot unit, package equipment, and pay for return shipment.

2. Buyer shall load equipment (all equipment provided by Seller) onto the truck or trailer for return shipment.
3. Seller shall coordinate return shipment of pilot unit and provide any required documentation for shipment.
4. Buyer will disconnect electrical service.
5. Buyer will remove and return interconnecting piping.

F. Pilot Evaluation Reports

1. Seller shall assemble, interpret, and summarize results of all pilot operational and analytical data and provide to Buyer and Engineer on a weekly basis. A brief weekly e-mail and conference call shall be held between Seller, Buyer, and Engineer to discuss summarized results and proposed plan for the following week. See Part 5 for specific requirements.
2. Seller shall prepare a Final Pilot Summary Report at the completion of the *Pilot Performance Testing Program*. The report shall include, but not be limited to, an introduction of the existing treatment and pilot study; description of operation; presentation and discussion of results; conclusions and recommendations drawn from the study; and associated test data, tables, and graphs. Refer to Part 5 for specific information to be included.

G. Pilot Unit Operation and Maintenance

1. Seller shall provide and be responsible for the cost of an operator for daily operation and maintenance of the pilot system.
2. Seller shall set up any workspace or remote communication needed for pilot plant operator.
3. Seller shall be responsible for cost of labor and other expenses associated with purchase and installation of any replacement parts and any other maintenance associated with the pilot system.
4. Seller shall provide spare parts for typical pilot maintenance issues (e.g., flow meter fouling, faulty turbidimeters, etc.). These spare parts shall be shipped with the pilot system and remain on-site during pilot duration.
5. Buyer and/or Engineer will not be held monetarily liable for any circumstances related to pilot maintenance issues that result in the 90-Day Pilot Study time frame being exceeded (see Article 2.4). If necessary, the Buyer can do a visual check daily to look for problems. The Buyer will not operate or maintain the equipment.

H. Safety

1. Seller shall arrange for proper safety equipment to be onsite for duration of pilot study.

PART 4 -- PILOT WORK PLAN

The items listed below (at a minimum) need to be included in the *Pilot Work Plan*.

4.01 DESCRIPTION OF PILOT SYSTEM EQUIPMENT

- A. The *Pilot Work Plan* shall include a description of all equipment (pretreatment, MF/UF System, and all ancillary equipment including pumps, tanks, neutralization, etc.) to be used during pilot. Description shall include manufacturer names, operating procedures, operating flows and limitations, volumes, etc. A flow schematic description and P&ID of the pilot system shall be included.

4.02 DETAILED SCHEDULE OF ACTIVITIES

- A. Schedule shall include operational plans for all pilot Phases. The schedule shall include proposed plan and associated durations for optimization of fluxes and backwash durations for the MF/UF System. It shall also include anticipated cleaning schedules for MF/UF Systems and membrane integrity tests.

4.03 CHEMICAL DOSAGE REQUIREMENTS

- A. All chemical concentration and dosage requirements (including coagulant, etc.) shall be included in the *Pilot Work Plan*. Material Safety Data Sheets for all chemicals to be used during the pilot study shall be included as well.

4.04 OPERATING DATA REQUIREMENTS

- A. Seller shall include a daily log sheet in the *Pilot Work Plan* that incorporates minimum operating *data* requirements listed in Table 2. This sheet will be used by the pilot operator. Records of these daily log sheets will be used to compare to applicable on-line recorded operational data.

4.05 WATER QUALITY DATA REQUIREMENTS

- A. Seller shall provide an analytical sampling schedule in the *Pilot Work Plan*. Water quality *requirements* and test frequency needed to achieve the *Pilot Performance Testing Program* objectives are indicated in Table 3. All official samples to be used for USEPA monitoring and reporting purposes shall be submitted to an outside approved lab for testing. Supplemental spectrophotometer and other testing should be conducted as needed in addition to the samples listed.

Table 2 – Minimum Operating Data Requirements

Parameter	MF/UF System
Feed Flow Rate (gpm)	Continuous
Filtrate / Permeate Flow Rate (gpm)	Continuous
Waste / Concentrate Flow Rate (gpd)	Continuous
Transmembrane Pressure (TMP) (psi)	Continuous
Feed Temperature (°C)	Continuous
Permeability (specific flux) Calculation ²	Continuous

Overall Flux	Continuous
Overall Recovery	1 Times per Day
Backwash Frequency	Each Backwash Occurrence
Backwash Flow Rate (gpm), Total Flow (gal), and	Each Backwash Occurrence
Backwash Flush Flow (gpm)	Each Backwash Occurrence
Backwash Air Flow (gpm)	1 Time per Day, 5 Days per
Backwash Chemical Requirements	Each Backwash Occurrence
Process Air Flow ¹ (cfm)	1 Time per Day, 5 Days per
Markers for maintenance cleans	Each clean
Markers for recovery cleans	Each clean

¹ Excluding air used for pneumatic valves and integrity tests.

² Calculated value

Table 3 - Water Quality Parameter Monitoring Frequency performed by Buyer

Parameter	Raw Feed Water	MF/UF System	
		Filtrate	Backwash Waste
pH	Continuous	Continuous	Every 2 Weeks
Turbidity (NTU)	Continuous	Continuous	Every 2 Weeks
Color	Weekly	Weekly	NA
Temperature (°C)	NA	Continuous	NA
TOC (mg/L)	Weekly	Weekly	Every 2 Weeks
DOC (mg/L)	Weekly	Weekly	Every 2 Weeks
UV ₂₅₄ (cm ⁻¹)	Weekly	Weekly	Every 2 Weeks
Manganese (mg/L)	Weekly	Weekly	NA
Iron (mg/L)	Weekly	Weekly	NA
Ammonia (mg/L)	Weekly	Weekly	NA
Total Alkalinity (mg/L as CaCO ₃)	Weekly	Weekly	NA
Total Hardness (mg/L as CaCO ₃)	Monthly	NA	NA
Aluminum (mg/L)	NA	Weekly	NA
Silica (mg/L as SiO ₂)	Weekly	NA	NA
SDS ¹	NA	Weekly	NA

¹ SDS: THM/HAA5 samples - 5-days, 1,0 mg/l residual, pH8.0

4.06 CLEANING PROCESS REQUIREMENTS

- A. The following detailed cleaning process requirements shall be included in the *Pilot Work Plan*.
- B. Chemical cleaning procedures including frequency, chemical dosing, flows, duration, and soak times.
- C. Cleaning trigger criteria including maximum TMP and time.

- D. Submit membrane integrity test procedure.

PART 5 -- PERFORMANCE EVALUATION

5.01 PARAMETERS FOR EVALUATION OF PERFORMANCE

- A. To fulfill the objectives of the *Pilot Performance Testing Program* (Article 2.1) the data collected in Phase 3 testing, will be compiled. All items listed in this part shall be determined during the *Pilot Performance Testing Program* and summarized in the final report.
- B. Weekly Pilot Evaluation
 - 1. The Seller shall assemble, interpret, and summarize results of all pilot operational and analytical data and provide to Buyer and Engineer on a weekly basis through an email with attachments and a virtual meeting. Data shall be provided in PDF and Microsoft Excel format each week. System process changes (chemical dosage changes, flux or flow changes, etc.) shall be summarized in e-mail or Microsoft Word format. A brief weekly e-mail and/or conference call shall be held between Seller, Buyer, and Engineer to discuss summarized results and proposed plan for the following week.

5.02 WATER QUALITY

- A. All analytical data collected during the pilot study (including all samples as indicated in the *Pilot Work Plan* and those required for the temporary discharge authorization permit) shall be compiled and presented in the Final Pilot Summary Report by the Seller. Data shall be assembled in Microsoft Excel format and shall be attached as an Appendix to the report and provided electronically. Graphs for iron, manganese, hardness, and turbidity (at a minimum) shall be included in the report as well. Explanations shall be provided for all data that does not meet applicable water quality requirements presented in Table 1.

5.03 OPERATIONAL DESIGN PARAMETERS

- A. All operational data collected during the pilot study shall be compiled and presented in the Final Pilot Summary Report. Data shall be assembled in Microsoft Excel format and shall be attached as an Appendix to the report and provided electronically in PDF format. Optimum design parameters listed below shall also be included in the final report. An explanation as to how the parameters were optimized shall be included in the report.
- B. Optimum Chemical Concentrations and Dosages
 - 1. The following optimum chemical concentrations and dosages shall be included in the Final Pilot Summary Report:
 - 2. Coagulant
 - 3. MF/UF System Cleaning Chemicals
 - 4. All Waste Stream Neutralizing Chemicals.

C. Optimum Parameters

1. The following optimum parameters shall be included in the Final Pilot Summary Report:
2. Average and Maximum TMP for MF/UF Systems
3. Optimum and Maximum Recommended Recoveries for MF/UF Systems
4. Optimum and Maximum Recommended Fluxes for MF/UF Systems.

D. Recommended Operating Conditions

1. Based on the results of the pilot test, the Seller shall provide the recommended operating conditions/parameters for the full-scale treatment system in the Final Pilot Summary Report. These parameters shall include, but not limited to:
 - a. Pretreatment System
 - b. Coagulant Dosage and reaction time
 - c. MF/UF Membrane Treatment Unit
 - d. Flux and recovery
 - e. Maximum Acceptable TMP
 - f. Backwash Interval/Duration/Conditions
 - g. Maintenance Clean Interval/Duration/Conditions
 - h. Clean in Place Interval/Duration/Conditions.

5.04 REPRESENTATIVE WASTE STREAM COMPOSITIONS

- A. Representative compositions for all pilot system waste streams shall be determined and summarized in the Final Pilot Summary Report.

5.05 CLEANING REGIMES

- A. MF/UF System backwashing procedures and CIP procedures for the MF/UF System shall be established during Phases II through IV of the *Pilot Performance Testing Program*. These procedures are to be summarized in the Final Pilot Summary Report and shall contain the following specifics at a minimum:
 1. Chemical Information (Concentration and Dosage)
 2. pH, Temperature, and Flow Requirements
 3. Frequency and Duration
 4. Initiation Requirements (TMP Limit, Time, Other)

5. Ancillary Equipment Requirements.

5.06 POTENTIAL CAUSES FOR SYSTEM DEVIATION

- A. Any potential causes specific to the site that could cause the overall system to deviate from optimum performance (e.g., membrane fouling) shall be listed in the Final Pilot Summary Report.

5.07 TERMINATION CRITERIA

- A. Parameters for operation have been determined in the proposal. The system will be operated until primary termination criteria have been met. Primary termination criteria for the pilot study are as follows:
 - 1. Terminal transmembrane pressure
 - 2. Successful operation of the pilot system for 30 days at the specified conditions
- B. Additional criteria may be used to terminate a run, including:
 - 1. Exceeding maintenance clean (MC) time (60 minutes/day) or frequency >48 hour limit.
 - 2. Failure to meet water recovery criteria (95% minimum).
 - 3. If there is a shutdown due to a control logic intervention of the unit, the Buyer has the right to terminate the filter run and require a restart. The total acceptable downtime not requiring a restart due to a control logic intervention of the units is 10% (3 days) per run.
 - 4. Exceeding membrane integrity criteria may disqualify a Seller from the project. If more than one repair occurrence is required to maintain the integrity of a membrane, the Buyer reserves the right to exclude that Seller from the project.

PART 6 -- QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control of the operation of the membrane equipment and the measured water quality parameters will be maintained during the *Pilot Performance Testing Program*.

When specific items of equipment or instruments are used, the objective is to maintain the operation of the equipment or instructions within the ranges specified by the Manufacturer or by standard methods. Maintenance of strict QA/QC procedures is important, in that if a question arises when analyzing or interpreting data collected for a given experiment, it will be possible to verify exact conditions at the time of testing.

Equipment flow rates and associated signals should be documented and recorded on a routine basis. A routine daily walk-through during testing will be established to verify that each piece of equipment or instrumentation is operating properly. Particular care will be taken to confirm that any chemicals are being fed at the defined flow rate into a flow stream that is operating at the expected flow rate, such that the chemical concentrations are correct. In-line monitoring equipment such as flowmeters, etc. will be checked to confirm that the read-out matches with the actual measurement and that the signal being recorded is correct.

The items listed are in addition to any specified checks outlined in the analytical methods.

6.01 QA/QC VERIFICATIONS PERFORMED EVERY WEEK:

- A. Chemical feed pump flow rates (verified volumetrically over a specific time period).

6.02 QA/QC VERIFICATIONS PERFORMED EVERY TWO WEEKS:

- A. In-line flowmeters/rotameters (clean equipment to remove any debris or biological buildup and verify flow volumetrically to avoid erroneous readings).
- B. Online Turbidimeters

6.03 QA/QC VERIFICATIONS PERFORMED EACH MONTH:

- A. Differential pressure transmitters (verify gauge readings and electrical signal using a pressure gauge).

6.04 PH

- A. A 2-point calibration of the pH meter used in this study will be performed once per day when the instrument is in use. Certified pH buffers in the expected range will be used. The pH probe will be stored in the appropriate solution defined in the instrument manual. Transport of carbon dioxide across the air-water interface can confound pH measurement in poorly buffered waters. If this is a problem, measurement of pH in a confined vessel is recommended to minimize the effects of carbon dioxide loss to the atmosphere.

6.05 TEMPERATURE

- A. Raw water temperatures will be obtained at least once daily. The thermometer will have a scale marked for every 0.1 °C, as a minimum, and should be calibrated weekly against a precision thermometer certified by the National Institute of Standards and Technology (NIST). (A thermometer having a range of -1°C to +51°C, subdivided in 0.1 °C increments, will be appropriate for this work.)

6.06 MANGANESE AND IRON

- A. Hach spectrophotometer low range methods are acceptable.

6.07 TURBIDITY

- A. Bench top Hach model with weekly calibration.

6.08 SAMPLE HANDLING

- A. The QA/QC procedures of external labs, which are receiving samples as part of this study, should be previously verified and validated by the Buyer. All water quality samples will be shipped in coolers containing appropriate ice packs to maintain sample temperatures of 4°C or less. All sample coolers will contain a Chain of Custody form signed by the sampler, which identifies the sample contained in the cooler, the analyses to be performed, the collection time, and date of shipment. All data generated during the study will be verified, validated, checked for precision, completeness and representativeness, and also for comparability to what is known and documented.

END OF SECTION