

CITY OF MANKATO

Quotation

Pilot Study: Membrane Treatment System



Bidder's Name

Date

City of Mankato Representative,

We, the undersigned, propose to furnish and deliver to the Department of Public Utilities, Pilot Study: Membrane Treatment System, in accordance with the specifications with the Request for Quotation for the price set forth herein:

- Pilot Study: Membrane Treatment System (3-month Rental)

Lump Sum Price \$ _____

- Pilot Study: Membrane Treatment System (additional-month Rental)

Unit Price Per Month \$ _____

We also agree that all the Pilot Study equipment will be delivered via motor transport carrier to the Water Treatment Plant at a location directed by Division of Water and Wastewater personnel. Delivery shall be scheduled with Water Treatment Plant personnel.

Firm Name

Address

By: _____

Title

SPECIFICATIONS FOR Pilot Study: Membrane Treatment

GENERAL

- A. These specifications contemplate the furnishing and delivery to the Department of Public Utilities, Division of Water and Wastewater, City of Mankato, an Ultrafiltration and Reverse Osmosis membrane pilot system for the purpose of water treatment, meeting the requirements as outlined herein.
- B. Length of pilot study: 3 months
- C. The City of Mankato, reserves the right to extend the pilot study rental month-to-month after the initial rental period as may be required.
- D. Purchase shall be made on a standard purchase order of the City.

SPECIFICATIONS

- A. Physical Characteristics – The RO & Ultrafiltration pilot equipment will include pilot-mounted instrumentation plus additional water quality sampling of the feed, membrane effluent (permeate), and membrane reject/residual (concentrate) to demonstrate successful operation of the RO membrane technology.
- B. Membrane Selection & Membrane Supplier–
 - The supplier shall review water quality characteristics and conduct a projection of the permeate recovery based on the water quality. The supplier shall recommend a membrane based on the water quality.
 - The recommended membrane supplier shall be non-proprietary to the bidder.
- C. System Design – The following design standards and assumptions are made for this project:
 - The pilot study will be conducted with a single RO process/pilot unit and a single UF process/pilot unit.
 - Follow Recommended Standards for Water Works (Ten States Standards), 2022 Edition, and applicable design standards of the Minnesota Department of Health.
- D. Timeline –
 - Pilot study will operate for 3-months, with option to extend pilot study on a month-to-month basis.
 - Planned start time is between March 1, 2026 and May 1, 2026.
- E. References –
 - Bidder shall provide references. References shall include municipal water treatment pilot study experience within the past 5 years. References may also include full-scale treatment plants that used the pilot study equipment.

EQUIPMENT

A. UF Pilot Equipment

- Provide skid mounted UF pilot unit and associated equipment and services. This includes all necessary chemical feed pumps and intermediate storage tanks. Approximately flow of 40 gpm.
- Supply pretreatment, CIP and Neutralization chemicals.
- Analytical instrumentation
 - i. Flow sensors: feed, filtrate.
 - ii. pH, Temperature: feed.
 - iii. Turbidity: feed, filtrate.
 - iv. Pressure gauges: Feed, filtrate
- Provide (1) tank for pretreatment oxidation. Provide feed pump for sodium hypochlorite for pretreatment oxidation and sodium bisulfite for dichlorination.
- Supply interconnecting piping between UF pilot and loose tanks. Supply interconnecting piping between pretreatment and UF pilot.
- Provide analytical equipment for Silt Density Index (SDI) testing.

B. RO Pilot Equipment

- Provide skid mounted RO pilot unit and associated equipment and services, including all necessary chemical feed pumps. Approximate feed rate flow of 20 gpm;
- Feed water provided from the Ultrafiltration system.
- Analytical instrumentation
 - i. Flow sensors: 1st stage permeate, total permeate, and concentrate.
 - ii. pH, ORP, Temperature: Feed water
 - iii. Conductivity: Permeate and feed
 - iv. Pressure gauges: Prefilter inlet/outlet, feed pump, membrane feed, 1st interstage, 2nd interstage, permeate and concentrate
 - v. Pressure (transmitter): Feed water, interstage, permeate and concentrate
 - vi. Pressure Switches: Feed pump high & low
 - vii. Power Usage: Power and Energy Meter (For monitoring line voltage, KWH consumed, etc.)
- Provide 4-inch membrane elements and (3) spare sets of replacement inlet filter cartridges for RO pilot plant.
- Provide equipment to conduct CIP on RO pilot unit if needed (only if significant scaling/fouling is identified).
- Supply and install interconnecting wiring between RO panel and CIP heater.
- Provide CIP chemicals and Antiscalant for duration of pilot study.
- Remove one membrane at the end of pilot study and send for autopsy (typically lag membrane in second stage).

C. Shipping, Start-up & Training

- Ship equipment to project site and direct city staff regarding utility connections.
- Start-up equipment & ensure proper operation.

- Train operators in operation of equipment and completing log sheet for data collection. Train operators in CIP of membrane units and neutralization of CIP waste.
- Assist with packing of equipment for return shipment to manufacturer's facility.

D. Report

- Prepare a final pilot study report at the conclusion of the study that includes recommendations on full-scale design for the UF and RO system equipment including an O&M analysis.

E. Owner Responsibilities: These items will be supplied by the City of Mankato.

- City of Mankato will unload delivered equipment.
- City of Mankato will provide power to operate the pilot equipment. The bidder shall provide information regarding the power requirements of the pilot equipment.
- City of Mankato will provide water connection to the blended raw water source. City of Mankato will provide the raw water piping from the blended source to the pretreatment tank.
- City of Mankato will provide connection to the sanitary sewer for disposal of the pilot study flow (anticipated to be up to 40 gpm).

F. Attachment: Pilot Protocol

- The pilot protocol is attached for the bidder's reference. This pilot protocol was reviewed by the Minnesota Department of Health.