



## RFP City of Clare Chemical Feed System Equipment Request for Proposal

Proposals Due: 4:00PM, Wednesday, November 24, 2021

Email or Fax Proposals to:

City of Clare Chemical Feed System Gourdie-Fraser 123 West Front Street Traverse City, MI 49684 <u>jennifer@gfa.tc</u> Phone: 231.946.5874 Fax: 231.946.3703

#### City Engineer:

Gourdie-Fraser, Inc. Attention: Jennifer Hodges, P.E.

#### General Scope:

We have been asked by the City to provide this request to qualified contractors and request a proposal for providing a 12.5% chlorine injection system to treat potable water capable to meet the demands of the community to provide post chlorination (disinfection) to maintain residual concentrations. Recently, there has been additional storage volume added to the system and this has reduced available chlorine residuals in the upper pressure district. This project includes the supply and installation of a wall mounted chlorine injection skid system and associated accessories at the McEwan Booster Station.

The information contained below are the specific qualifications each Contractor must comply with in order to provide an accurate proposal. The City reserves the right to accept or reject any or all proposals that are received.

#### Water Supply Background:

The City of Clare water system is a stand-alone system that includes its own supply, storage, treatment, and distribution components. It was originally constructed to serve the central downtown area of Clare and has been expanded and upgraded throughout the years to meet the need for reliable potable water for the domestic demand and fire protection. Presently the entire distribution system operates under two (2) pressure districts total, one upper and one lower. The water system major components, in existing configuration, consists of four (4) potable water supply wells, a water treatment plant containing two (2) aeration towers, two (2) air stripping towers, four (4) iron removal filters, a 62,000-gallon treatment retention tank and chemical feed including chlorine. Two elevated water storage tanks (300,000 and 500,000 gallons) are located in each district to regulate pressures with feed to the upper district provided by a booster station and associated distribution piping throughout. A schematic of the system operations is attached along with an overall water system map.





The City is currently seeking proposals for a wall mounted chlorine injection skid system to be installed at the McEwan Booster Station to allow for the distribution system to maintain the required chlorine residual in the upper pressure district. The Station operates as a booster station to feed the upper district and a bypass Pressure Reducing Valve line to feed the lower pressure district during high demands. The station is equipped with three (3) booster pumps rated at 400 gpm; the firm capacity of the booster station is 800 gpm.

#### **Design Requirements**

Existing Water Quality Entering Booster Station:

- Demand: 0.75 ppm
- Residual: 0.25 ppm

Existing Water Quality at 500,000 Gallon Water Tank:

- Demand: 0.99
- Residual: 0.01 ppm
- Water System:

Booster Station Demand

- Average Rate: 50 gpm
- Maximum Rate: 400 gpm
- System Pressure: 55 70 psi
- Available Power Supply: 480 Volt / 3 Phase Chlorine Dosage
- Average: 2.0 ppm / 1.2 gpd (12.5% Cl2)
- Maximum: 2.0 ppm / 9.2 gpd (12.5% Cl2)
- Hours of Operation
- Average: 8 hours
- Maximum: 24 hours

Standards:

- All materials and their construction and installation shall conform with applicable NSF standards for potable water usage
- PLC Based with and automatic operation, capable to provide 4-20mA signal to be configured into systems' remote telemetry system

Requirements - General:

- Work must comply with all applicable federal, state and local laws and regulations
- All equipment shall be installed compliant with manufacturers recommendations
- Contractor shall be responsible for obtaining all local regulatory permits (including fees) which may include plumbing, electrical and mechanical
- Date of completion to be within 20 days of equipment delivery as coordinated with the City Engineer and City Staff.
- Provide in addition to all other equipment factory warranties, a (1) year full labor and material warranty on all workmanship, material and equipment furnished for this project.
- Prospective bidders may conduct a site visit prior to bidding although not required. Coordinate with the City for site access:

-Dale Clark, WWTP Director - (989) 386-2321





#### Terms of Agreement:

The manufacturer shall agree to the above terms and conditions stipulated and will certify that their equipment will be able to operate under the requirements that have been stated above. The manufacturer shall include the following in addition to price with their submitted proposal:

General:

- To hold bid open for 30 consecutive calendar days from the bid due date
- To enter into and execute a contract with City of Clare
- References:

-Provide minimum of three (3) references of similar municipality projects located within the Michigan and have been completed within the last five (5) years.

Insurance:

• Contractor will have Worker's Compensation Insurance in limits required by state law and Comprehensive General Liability Insurance coverage in force for all of its operations under this contract. City and GFA shall be listed as additional insureds on policy

Bonds:

- The Contractor shall include in the proposal price the cost to provide the following:
  - Maintenance and Guarantee Bond in the amount of 50% of the proposal amount, guarantying for a period of one (1) year from final acceptance of the project work
- Letter of Surety and licensed to do business in the State of Michigan.
   Start-up and Training:
  - Provide 1 day for start-up and training services.

Design and Submittals:

- Provide four (4) copies of Shop Drawings
- Provide four (4) copies of Operations and Maintenance Manuals Warranty:
  - A minimum one (1) year from date of start-up warranty
  - Five (5) year for chemical feed pumps

#### Services / materials to be provided:

Contractor shall provide all equipment and materials necessary to complete the work described herein. The scope of work shall include but shall not be limited to the following. Refer to the attached Drawings and Technical Specifications for additional information.

- Procurement and installation of one (1) wall mount chemical injection system and associated components. Refer to attached material specifications. All equipment to be installed compliant with manufacturer recommendations, refer to specifications that are attached. Any concrete work, patching, electrical work, painting, etc. to facilitate installation shall be included.
- Existing and Proposed drawings are attached for reference. Contractor shall be responsible to field verify all conditions prior to beginning work.
  - Final location of equipment to be coordinated and approved by the DPW and Engineer prior to completing.
  - Contractor is responsible to field verify and measure in addition to completing any modifications to facilitate new installation including





but not limited to electrical service/ conduit, chemical feed conduit, etc.

- Provide and install all required or necessary NEC compliant wiring, conduit, junction boxes, terminations for a complete installation of chemical feed system.
  - Existing circuit and power supply are available to accommodate chemical feed system. Additional conduit and power supply / control wiring will be needed to accommodate operation which is based upon flow acknowledged by existing flow meter.
  - All conduit to be installed shall be corrosion resistance (PVC) and wall / ceiling mounted using S.S. brackets.
- Any wall work, coring, patching, etc., shall be included.
- Provide factory and field authorized training and start-up.
- Mobilization, site access and storage of equipment and restoration and cleanup
- Coordination of delivery and unloading of new equipment.
- Contractor shall conduct all work so as to not interfere with the existing Booster Station operations.
- Coordination with City Staff and consultants

Services / Materials Not To Be Included:

- Site accessibility, power and potable water supply (provided by owner).
- Contractor shall be responsible to coordinate and provide construction schedule and minimum 24 hour notice before completing work.

#### Contractors Proposal Form

Bidders are instructed to submit bids for this project on a unit cost per manhole t basis as stated in the Proposal. All labor, materials and equipment are considered incidental and to be included in total bid price. All work shall be performed incompliance with the terms identified in the RFP and applicable laws.

NO.	ITEM DESCRIPTION	EST QTY	ITEM UNIT	UNIT PRICE	ITEM COST
1	Mobilization	1	LS		
2	Chemical Skid including supply and install	1	EA		
3	Day Tank including supply and install	1	EA		
4	Digital Scale including supply and install	1	EA		
5	Eyewash station and associated piping, fittings	1	EA		
6	Electrical Upgrades	1	LS		
				TOTAL BID	





H	Bidders Signature
I	Printed Name:
I	Business Name:
	A 11
I	Address:
Ν	MI Contractor License No.:
]	Telephone:
(	Cell Phone:

Email:

The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any / all bids if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the work as requested.



123 West Front Street Traverse City, Michigan 49684 231.946.5874 1 231.946.3703 1

# **TECHNICAL SPECIFICATION FOR**

# BOOSTER STATION CHEMICAL FEED SYSTEM



GFA PROJECT NO.: 21147 DATE: October 2021

#### PROJECT SPECIFICATIONS TABLE OF CONTENTS

#### <u>SECTION</u> 11242

11242CHEMCIAL FEED EQUIPMENT09900PAINTING

## SECTION 11242 – CHEMICAL FEED EQUIPMENT

#### PART 1 – GENERAL

#### 1.01 SUMMARY

- A. Chemical metering pump system shall be a complete turnkey system inclusive of all necessary fluid handling and ancillary components to ensure the reliable metering of chemical into a treatment process.
- B. The key components of skid system are as follows:
  - a. Peristaltic Chemical Metering Pump
  - b. Calibration Column
  - c. Pressure Relief Valve
  - d. Discharge Pressure Gauge with Diaphragm Seal
  - e. Fabricated Polypropylene Shelf with pre-piped Back Panel in the following configuration, duplex-duty/standby.
- C. Accessories of this system are as follows:
  - a. Piping
  - b. Eyewash
  - c. Scale
  - d. Day tank

#### 1.02 RELATED SECTIONS

A. SECTION 09900 – EQUIPMENT PAINTING

#### 1.03 QUALITY ASSURANCE

- A. Chemical Metering System (skid) shall be manufactured by the chemical metering pump manufacturer and shall provide pumps and accessories as a complete turnkey system. Skids manufactured by third parties such as separate skid fabricators, pump distributors or pump representatives are not acceptable.
- B. This specification is the basis for design of peristaltic metering pumps. All pumps, whether named as an acceptable supplier or submitted as an equal shall, at a minimum, meet the following critical design requirements.
  - 1. Pump shall be 24 hr continuous duty rated and have a five-year manufacturer's warranty from date of shipment.
  - 2. For quality assurance, pumps shall be supplied and labeled by the original manufacturer. Relabeled products, even under license by manufacturer, shall not be acceptable.
  - 3. Pumps shall be manufactured in compliance with ISO 9001-2008 standards.
  - 4. Pumps shall be meet CE, NSF 61 and applicable electrical standards.
  - 5. To ensure proper function and quality, pumphead, tubing, and drive shall be manufactured by the same company. Tubing purchased by the pump manufacturer from a third party is not acceptable.

- Regulatory Requirements:
  - 1. Comply with standards of authorities having jurisdiction for potable-waterservice piping, including materials, installation, testing, and disinfection.
- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- E. NSF Compliance:

C.

- 1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
- 2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

#### 1.04 FIELD MEASUREMENTS

A. The Contractor shall become familiar with details of the work, verify all dimensions in the field, and shall advise the Engineer of any discrepancy before performing the work.

#### 1.05 DELIVERY AND STORAGE

- A. Material and equipment delivered and placed in storage shall be stored with protection from the weather, excessive humidity and excessive temperature variation, dirt, dust, or other contaminants.
- B. Shipping
  - a. Ship the Chemical Metering System completely assembled and ready for installation. Ship tubing separately for field installation and process line connection by contractor.
  - b. Pack all additional spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.
  - c. Deliver spare parts at the same time as pertaining equipment. Deliver to Owner after completion of work.
- C. Receiving
  - a. Contractor to inspect and inventory items upon delivery to site.
  - b. Contractor to store and safeguard equipment, material, instructions, and spare parts in accordance with manufacturer's written instructions.

#### 1.06 SHOP DRAWINGS

- A. Product Data: For equipment, valving, and all piping products to be used in the work.
- B. The submittals shall be submitted to the Engineer for review and approval prior to installation.

#### 1.07 AUXILLARY EQUIPMENT

- A. Concurrent with delivery and installation of the specified equipment, auxiliary equipment and spare parts shall be furnished to the owner, as follows:
  - 1. One face shield, one chemical resistant apron, one pair of chemical resistant gloves, signage compliant with MI-OSHA.

#### 2.01 CHEMCIALS

A. Disinfecting Agent: AWWA B300, "Hypochlorites". Sodium-hypochlorite (NaCl) solution with 12.5% chlorine in bulk quantity.

#### 2.02 METERING PUMP SKID

- A. Manufacturers
  - 1. Watson-Marlow, Inc.
  - 2. Or Engineer Approved Equal

#### B. Chemical Metering System Configuration

- 1. Duplex-Duty/Standby
- C. Chemical Metering System Components
  - 1. Peristaltic Chemical Metering Pump
    - a. Pumps shall be positive displacement type complete with ReNu replaceable cartridge-style peristaltic pumphead technology and self-contained variable speed drive as specified.
    - b. Pumps shall be self-priming, and shall have a maximum suction lift capability of up to 30-feet vertical water column.
    - c. Discharge Pressure Rating: 110 psi (Total Dynamic Head)
    - d. Pumps shall be capable of pumping both liquids and gases without vapor locking.
    - e. Pump shall not require the use of back pressure valves, suction foot valves, strainers, pulsation dampeners, or auto degassing valves and shall not require dynamic seals in contact with the pumped fluid. Process fluid shall be contained within pump tubing and shall not directly contact any rotary or metallic components during operation. Upon failure, the process fluid shall be completely contained within the pump head to prevent hazardous exposure to operators. Manufacturer's that do not offer a completely contained pump head are not acceptable.
    - f. Pump Process Schedule

Quantity of Chemical Metering Systems	1
Chemical Metering System Configuration	Duplex-Duty/Standby
Tag Number(s)	CMP-1 & CMP-2
Chemical	NaCl with 12.5% Chlorine
Flow Range Avg / Max (GPD)	1.2 / 9.2
Average Discharge Pressure (PSI)	55-70
Maximum Discharge Pressure (PSI)	100
Suction Head (FT)	7 +/-

2. Pump Construction

- a. Pumphead
  - 1. Technology: Provide tool-free ReNu cartridge-style peristaltic pumphead technology. For operator safety, pumphead shall be serviceable as a single replaceable component. Pumps that require an operator to open the pumphead for tube replacement, cleaning, or rebuilding or that require tools for maintenance are unacceptable.
  - 2. Housing construction: corrosion resistant and high impact resistant glass filled PPS or PPE/PS.
  - 3. Geometry: Pumphead shall consist of sealed track housing with in- line porting. Suction and discharge ports shall be 180 degrees apart with bottom suction and top discharge.
  - 4. Rotor: Pumphead rotor shall be constructed of glass filled Nylon, sealed within the track housing, and supported by its own bearings. Peristaltic occlusion level shall be factory set to ensure flow accuracy of +/- 1% and repeatability performance of +/- 0.5% and shall not require any field adjustment.
  - 5. Contact Materials: All pumphead components in the fluid path shall be NSF61 listed and shall be of materials specified by the manufacturer as compatible with the process fluid.
  - 6. Leak containment/detection: In the event of peristaltic element failure, the leak sensor shall shut the pump down immediately with all process fluid contained within the sealed pumphead.
    - a. Sensor type: Utilize non-contacting optical sensor. Sensor shall not come in contact with the process fluid, shall contain no moving parts, shall not depend on the capacitance of the process fluid, shall not require fluid to leak out of the pump housing for engagement, nor shall require any sensitivity or calibration adjustment.
    - b. Alarm: Sensor shall shut down the pump, give a visual indication on the drive controller, and if specified shall provide an output general alarm signal.
    - c. For operator and environmental safety, pumps which do not have leak containment, leak sensor, and shutdown are not acceptable. For additional overpressure safety, sealed pumphead shall have a controlled drain-to-waste port.
  - 7. Port connections: Pumphead shall utilize polypropylene compression fittings which shall mate to 10mm ID reinforced, transparent PVC interface hose. Provide polypropylene compression by 1/2-inch NPT adaptors for connecting interface hose to process line.
  - 8. Spares: Provide one (1) spare pumphead per pump supplied.
- b. Drive
  - 1. Rating: Continuous 24 hour operation, 45° C ambient.
  - 2. Voltage: Drive shall be suitable for 100-240VAC, 50-60Hz, 1- Phase with an internal switch-mode power supply. Supply nine- foot length mains power cord with standard 115VAC three-prong plug.
  - 3. Max drive power consumption: 190VA.
  - 4. Enclosure: NEMA 4X constructed out of corrosion and impact resistant engineering plastic, 20% Glass filled PPE/PS. By nature of the

environmental conditions, painted or unpainted metallic housing including 316SS are not acceptable. Enclosure shall house the drive motor and all control circuitry in one integrated unit. Separate VFDs and motors are not acceptable.

- 5. Direct coupled pumphead with fully protected drive
  - a. Pumphead shall direct couple mount to the controller via a splined drive shaft and shall be locked in place by two tool-free thumbscrews or lever mechanism.
  - b. Pumphead shall be fully sealed to prevent any contamination of the controller or drive shaft by process fluid.
  - c. Pumphead shall contain its own rotor bearings and not impart an overhung load on the pump shaft.
  - d. Pumpheads shall be supplied mounted to the left or right side of the drive enclosure as specified in the drawings. If not specified, pumpheads shall mount to right side of the enclosure.
  - e. Drive shall stop shaft rotation and give visual alarm in the event the pumphead is removed.
- 6. Drive motor: brushless DC motor with integral gearbox and closed loop tachometer feedback.
  - a. Circuitry complete with temperature and load compensation and protection.
- c. Human-Machine Interface (HMI) and Control Manual Control Interface
  - a. Flow range: .049 to .38 GPH in 0.001 GPH increments
  - b. Display: Backlit graphical TFT Display capable of up to 8 lines of text with up to 26 characters per line to display pump tag number, flow rate, and programming instructions. Display shall also provide visual indication of running status via screen color: Blue = Running, White = Stopped and Red = Warning.
  - c. Keypad: Keypad for start, stop, speed increment, speed decrement, rapid prime, and programming.
  - d. Flow units: Programmable in either ml/min or gallons/hour.
  - e. Security: Programmable keypad lock and PIN security for optional lockout of all keys except emergency start/stop.
  - f. Auto Restart: feature to resume pump status in the event of power outage interruption.
  - g. Multilingual menu: include programming menus in nine languages, including at a minimum English, Spanish, and French.
  - h. Fluid level monitor: Programmable flow totalization to advise operator when their supply tank is low.
  - 2. Remote Control I/O
    - a. Speed Control Input: Analog 4-20mA speed input with 1,600:1 turndown with incremental steps of 10 microamps. Signal shall be trimmable and speed scaleable over any part of the drive speed range. Pump shall be programmable to either increase pump speed or decrease pump speed against

an increasing Analog 4-20 mA signal.

- b. Run/Stop Input: Either 5-24V industrial logic, dry contact or powered 110 VAC contacts as shown per the process and instrumentation drawings.
- c. Run/Stop & General Alarm Status Outputs: Either 24VDC Open Collector, 24VDC Status relay, or 110VAC Status Relay
- 3. HMI, analog connections, and mains power shall be accessible from the front or side of the enclosure.
- 4. Minimum requirements: Pumps that do not meet the minimum manual and automatic control requirements as specified above are not acceptable.
- 2. Calibration Columns
  - Supply Calibration Column made of clear PVC or Acrylic cylinder materials, sealed on both ends with appropriately sized
     NPT threaded ports both top and bottom. Graduation markings shall be in fractions of gallons or milliliters in proportion to the size of the column.
  - 2. Column shall be sized to allow a minimum 30-second draw down at maximum pump speed.
- 3. Pressure Relief Valve
  - 1. Supply Pressure Relief Valve with PVC Body and PTFE/EPDM Diaphragm.
  - 2. Relief Pressure shall be adjustable from 0-150 psi.
  - 3. Connections shall be designed with unions and socket welded.
- 4. Discharge Gauge with Diaphragm Seal
  - 1. Discharge Pressure Gauge shall have a 3.5-inch dial with a liquid filled case, stainless steel tube and socket with a pressure range of 0-160 psig
  - 2. Discharge Gauge shall be assembled to a Diaphragm Seal with a Teflon Diaphragm and 1/2-inch NPT PVC process connection.
- 5. Fabricated Polypropylene Shelf with Back Panel
  - 1. HDPE Shelf with Back Panel shall be fabricated out of 1/2-inch and 3/4-inch sheet stock. The Shelf and Back Panel shall be fusion welded together maintaining a 1-inch containment lip completely around the surface in which the pump sits. Metallic Shelves & Back Panels including those that are painted or coated are not acceptable.
  - 2. All necessary piping to incorporate the above equipment into a single turnkey chemical metering system shall be secured to the Shelf and Back Panel.
  - 3. Polypropylene Shelf & Back Panel shall be designed to be wall mounted.
  - 4. Mounting Hardware & Installation shall be supplied by the Contractor
- F. Isolation Valves
  - All Ball Valves, sizes 1/2-inch to 4-inch, shall be of true union design with two-way blocking capability. All O-rings shall be EPDM or FPM based on chemical being pumped. Seats shall have elastomeric backing cushion of the same material as the valve seals. Stem shall have double O-rings and be of blowout-proof design. The SCH 80 PVC & CPVC ball valves shall have a pressure rating of 250 psi for sizes 1/2-inch to 2-inch and 235 psi for 2-1/2-inch to 4-inch at 70 degrees F. Ball Valves shall carry a two-year guarantee.

#### McEwan Booster Station Chemical Feed System

#### G. Piping

1. Polyvinylchloride (PVC) Pipe and fittings shall be manufactured of Rigid Poly Vinyl Chloride (PVC) schedule 80. Fittings shall be heavy-duty Schedule 80 molded fittings.

### H. I/O and Power Interface

- 1. The chemical feed skid manufacturer shall be responsible for providing a Nema 4x interface box with labeled terminal strips per pump for input and output control wires. The chemical feed skid manufacturer is also responsible for installing all control wiring from the pumps to the Nema 4x interface box. The electrical contractor is responsible for running conduit into the Nema 4X interface Box and installing input and output control wires on the terminal strips.
- 2. The chemical feed skid manufacturer shall be responsible for providing a prewired and piped 120V receptacle with weatherproof cover for each skid mounted pump completely independent from the control wiring. Each skid will have an electrical junction box that has been prewired from the 120V receptacle for the electrical contractor to tie into. The electrical contractor is responsible for running conduit and tying into skid mounted electrical junction box and installing 120V supply power to the skid.

#### 2.03 FLOW METER AND CONTROLLER

A. The chemical pump shall operate based upon acknowledged flow monitored by flow meter through the energized outlets. The dosage per flow unit shall be manually adjustable.

#### 2.04 ACCESSORIES

- A. General: The following accessories shall be supplied with each chemical metering pump.
  - Solution Tank: Cylindrical HDLPE tank with graduated markings and volume of 55 gallons. The tank shall be supplied with removable flat lid.

     a. NaCI: graduated marks needed
  - 2. Eyewash station: To be compliant with MIOSHA Standards and ANSI Z358. Unit shall be wall mounted constructed of ABS plastic and include self adjusting regulator to allow for constant flow under 20 psi.
  - 3. Injection Tap: Corporation stop with retractable quill shall be provided, including shut-off lever handle. Nozzles shall be <sup>3</sup>/<sub>4</sub>" NPT constructed of CPVC with 125 psi pressure rating.
  - 4. Digital Scale: Capable to provide continuous readings. Constructed of 316 SS and provide a minimum 0.1% accuracy. Display shall read to a minimum 0.2 lb increment with a weight range of up to 1,000 pounds, and capable for remote mounting.
    - a. Manufacturers:
      - 1. Force Flow
        - 2. Scaletron
        - 3. Or Engineer Approved Equal

#### 2.05 PIPING AND TUBING

A. Conduit Piping: In accordance with ASTM D 1784, SCH 40 PVC, with solvent welded joints and fittings.

#### McEwan Booster Station Chemical Feed System

- B. Flexible Tubing: Polyethylene tubing with compression fittings, rated at 150 psi, <sup>1</sup>/<sub>4</sub>" diameter.
- C. Water Service Piping: AWWA C800, Copper Type K

#### PART 3 - EXECUTION

- 3.01 INSTALLATION, GENERAL
  - A. Hard Piping: Hard piping, valves and fittings shall be used for all piping 1-inch diameter and smaller and shall be used for the transportation of chemicals. Pipe, valves and fittings shall be carefully laid to line and grade. Care shall be taken to keep the pipe clean and free from dirt and other foreign materials. Saddles, posts, wall brackets, pipe hangers, or other devices shall adequately support piping along floors, walls, or ceilings.
  - B. Flexible Tubing: Hard piping, valves and fittings shall be used for all piping <sup>1</sup>/<sub>2</sub>" diameter and smaller shall be used for the transportation of chemicals. Pipe, valves and fittings shall be carefully laid to line and grade. Care shall be taken to keep the pipe clean and free from dirt and other foreign materials. Saddles, posts, wall brackets, pipe hangers, or other devices shall adequately support piping along floors, walls, or ceilings.
  - C. Equipment and Accessories: Shall be installed per the manufacture's latest published directions.
  - D. All piping, fittings and valves shall be installed per the manufacturer's latest published directions.
  - E. Contractor shall install items in accordance with manufacturer's printed instructions and as indicated and specified.
  - F. Contractor to connect suction, discharge, vent and drain connections as required.
  - G. Contractor shall supply shielded signal wiring for wiring of the required remote input and output to the connectors.

END OF SECTION 11242

#### SECTION 09900 - PAINTING

#### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. This Section includes surface preparation and field painting of the following:
  - 1. Exposed exterior items and surfaces.
  - 2. Exposed interior items and surfaces.
  - 3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Painting includes field painting of exposed masonry, concrete, gypsum board, wood, pipes, hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

#### 1.02 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
  - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  - 2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
  - 3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
  - 4. Semi-gloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
  - 5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

#### 1.03 SUBMITTALS

- B. Product Data: For each paint system specified. Include block fillers and primers.
  - 1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
  - 2. Manufacturer's Information: Provide manufacturer's technical information, including instructions for handling, storing, and applying each coating material proposed for use.

C. Samples for Selection: Manufacturer's color charts showing the range of colors available for each type of finish-coat material indicated. Owner will supply general color scheme.

#### 1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
  - 8. VOC content.
- B. Store materials, not in use, in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

#### 1.06 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

#### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

A. Products manufactured by Benjamin Moore & Co., PPG Industries, Inc., Sherwin-Williams Co., and TNEMEC will be considered acceptable.

#### 2.02 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block filters, primers, undercoats, and finish-coat materials that are compatible with one another and the substrate and under actual service conditions, as demonstrated by manufacturer testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Colors: Provide colors as selected by the Owner from manufacturer's full range of standard colors.

#### PART 3 – EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify the Owner about anticipated problems using the materials specified over substrates primed by others.

#### 3.02 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to

manufacturer's written instructions for each particular substrate condition and as specified.

- 1. Provide barrier coats over incompatible primers or remove and re-prime.
- 2. Cementitious Materials: Prepare concrete and masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, great, and oils.
- 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
  - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
  - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood.
- 4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances.
  - a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  - b. Touch up bare areas and shop-applied coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
- 5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
  - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shad of undercoats to distinguish each separate coat.

#### 3.03 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
  - 1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  - 2. Provide finish coats that are compatible with primers used.
  - 3. Paint surfaces behind movable equipment and furniture the same as similar

exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

- 4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
- 5. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, then sand between applications.
  - 2. Omit primer on metal surfaces that have been shop primed and touchup painted.
  - 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat suffices.
  - 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
  - 1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer, or as specified herein, whichever is greater.
- E. Mechanical items to be painted include, but are not limited to, the following:
  - 1. Piping, pipe hangers, and supports.
  - 2. Motors and mechanical equipment not factory finish painted.
  - 3. Accessory items.
  - 4. Miscellaneous structural supports.
- F. Electrical items to be painted include, but are not limited to, the following:
  - 1. Conduit and fittings.
  - 2. Electrical equipment not factory finished painted.
- G. Block Fillers: apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

- H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

#### 3.04 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
  - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

#### 3.05 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Engineer.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
  - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

#### 3.06 EXTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
  - 1. Low-Luster Acrylic Finish: 2 finish coats over a rust-inhibitive primer.
    - a. Primer: Rusts-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils (0.033 mm).
    - b. First and Second Coat: Low-sheen (eggshell or satin), exterior, acryliclatex paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).

#### 3.06 INTERIOR PAINT SCHEDULE

- A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block units:
  - 1. Semi-gloss-Alkyd-Enamel Finish: 2 finish coats over an undercoat and a filled surface.
    - a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 5.0 mils (0.13 mm).

- b. Undercoat: Interior, alkyd-or latex-based, enamel undercoater, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
- c. Finish Coat: Odorless, semi-gloss alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).
- B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
  - 1. Eggshell, Alkyd-Enamel Finish: 2 finish coats over a primer.
    - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
    - b. First and Second Coats: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils (0.066 mm).
- C. Woodwork: Provide the following paint finish systems over new, interior wood surfaces:
  - 1. Semi-gloss, Alkyd-Enamel Finish: 2 finish coats over a primer.
    - a. Primer: Alkyd or latex-based, interior enamel undercoater applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
    - b. First and Second Coats: Odorless, semi-gloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils (0.061 mm).
- D. Ferrous Metal: Provide the following finish systems over ferrous metal:
  - 1. Semi-gloss, Alkyd-Enamel Finish: One finish coat over an enamel undercoater and a primer.
    - a. Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).
    - b. Undercoat: Alkyd, interior enamel undercoat or semi-gloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
    - c. Finish Coat: Odorless, semi-gloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).
- E. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
  - 1. Semi-gloss, Alkyd-Enamel Finish: One finish coat over an undercoat and a primer.
    - a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than

1.2 mils (0.031 mm).

- b. Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
- c. Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).
- d. Iron Removal Filter: Refer to manufacturers painting requirements. Submit to Engineer for approval.

#### 3.07 WATER MAIN COLOR SCHEME

- A. Piping Color Coding and Labeling for Control Valve Building piping (by Contractor). Labeling shall include name of liquid/gas on pipe and arrows indicating direction of flow.
  - 1. Water Lines: a. Finished or Potable Dark Blue
    - Chemical Lines a. Chlorine Yellow

#### END OF SECTION 09900

2.



123 West Front Street Traverse City, Michigan 49684 231.946.5874 1 231.946.3703 1

# **EXISTING WATER & PROCESS SYSTEM MAP**

## BOOSTER STATION CHEMICAL FEED SYSTEM



GFA PROJECT NO.: 21147 DATE: October 2021





**City of Clare** 



123 West Front Street Traverse City, Michigan 49684 231.946.5874 1 231.946.3703 1

# PROPOSED CHEMICAL FEED SYSTEM LAYOUT FOR

# BOOSTER STATION CHEMICAL FEED SYSTEM



GFA PROJECT NO.: 21147 DATE: October 2021



#### NOTES: 1. ALL PROCESS PIPING SHOWN IN GRAY SCALE IS EXISTING AND DUCTILE IRON UNLESS OTHERWISE NOTED. ALL MEASUREMENTS SHOWN ARE BASED UPON AVAILABLE RECORD DRAWINGS AND ARE TO BE USED FOR REFERENCE PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING AND ADJUST APPROPRIATELY AT NO ADDITIONAL COST TO THE PROJECT.

- 2. ALL PIPE PENETRATIONS 3" AND SMALLER TO BE GROUT ONLY. CORES SHALL BE OVER-BORED TO ACCOMMODATE FOR PIPING AND WATERSTOP. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING NO LEAKAGE NOR STRUCTURAL DAMAGE AT CORE LOCATIONS. IF DAMAGED OR LEAKAGE OCCURS, CONTRACTOR SHALL REPAIR AT NO ADDITION COST TO THE PROJECT.
- 3. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING TEMPORARY PIPING SUPPORTS AS NEEDED AND ADEQUATE PERMANENT SUPPORTS AND W-CO-E
- 4. SCHEMATIC SHOWN IS FOR REFERENCE ONLY. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS WITH CITY OF CLARE. ADDITIONAL PIPING AND FITTINGS MAY BE NECESSARY AND SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE PROJECT.
- 5. INSTALLATION SHALL BE IN COMPLIANCE WITH MANUFACTURERS RECOMMENDATIONS.
- 6. ALL EQUIPMENT SHALL BE PROPERLY SECURED AND MOUNTED USING BRACKETS & HARDWARE CORROSIVELY RESISTANT TO NaOCI (12.5%). -STAINLESS STEEL
- 7. ALL POLY TUBING SHALL BE RATED FOR 150 PSI.
- 8. ALL EQUIPMENT/PIPING PROPOSED TO BE INSTALLED IN CHEMICAL TANKS SHALL BE SECURELY MOUNTED TO THE LID AND PENETRATIONS TO HAVE GASKETS TO ALLOW FOR RIGID INSTALLATION.
- APPROPRIATE WALL SUPPORTS. 10. ALL PIPING SHALL BE SCH 80 PVC, 200 PSI & NSF APPROVED. ALL CONDUIT SHALL BE SCH 40 PVC.







<u>NOTE:</u> COORDINATE ORIENTATIONS WITH OWNER.

> SAMPLE TAP DETAIL SCALE: NOT TO SCALE



**DIGITAL SCALE AND TANK DETAIL** 





9. EMERGENCY EYEWASH WATER SERVICE AND CHEMICAL FEED PIPING SHALL RUN PARALLEL WITH 6 INCH VERTICAL SEPARATION WITH

EYEWASH STATION └─½" BALL VALVE

## **EYEWASH STATION DETAIL**

SCALE: NOT TO SCALE



SCALE: NOT TO SCALE

IOT	TO	SCALE

DESC	ENGINEERING	SURVEYING	TESTING & OPERATIONS		123 West Front Street	rse City, MI 49684	
DESC						Trave	
	QC REVIEW	QC REVIEW					
REV# DATE DRN	A 60% QA/(	B 90% QA/(					
CITY OF CLARF		MAEWAN ROOSTER STATION CHEMICAL FEED SYSTEM		PROPOSED CHEMICAL FEED SYSTEM		OLUTION ZU, TUWN TZ NUTTII, TANGL UT WLUT ORANT TOWNOUND OLARY OCTIVITY AMOUNDAND	GKANT TUWNSHIP, CLAKE CUUNTY, MICHIGAN

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