Discover
PENTWATER
STAY FOR A DAY, A WEEK, A LIFE

VILLAGE OF PENTWATER

COUNCIL

AGENDA PACKET

SEPTEMBER 22, 2025 @ 6 P.M.

Park Place Meeting Center

310 North Rush Street

President

Mary Marshall

President Pro Tempore

Jared Griffis

Trustees

Dave Bluhm

Dan Nugent

Kathy O'Connor

Don Palmer

Karl Schrumpf

AGENDA
VILLAGE COUNCIL – REGULAR MEETING
SEPTEMBER 22, 2025, at 6:00 P.M.
PARK PLACE MEETING CENTER
310 N. RUSH ST.
ZOOM LINK
https://us02web.zoom.us/launch/edl?muid=a981ddfe-b118-4594-89e5-3545ec593535
Meeting ID: 824 6124 4869
Passcode: 403297

1. **CALL TO ORDER – PLEDGE OF ALLEGIANCE**
2. **COUNCIL ROLL CALL**
3. **PUBLIC COMMENTS (Items on the Agenda)**
4. **APPROVAL OF THE AGENDA**
5. **CORRESPONDENCE**
   Correspondence addressed to the Village Clerk will be received, filed, and forwarded to the Village Council.
6. **COMMITTEES**
   A. None.
7. **UNFINISHED BUSINESS**
   A. None.
8. **NEW BUSINESS**
   A. Fleis & Vandenbrink DWSRF Contract 2 Change Order Water Supply Chemical Sequestration.
   B. Fleis & Vandenbrink DWSRF Contract 2 Change Order Lead Line Replacement.
   C. Village Manager Interview.
   D. Pentwater Township Mediation Agreement.
9. **DISCUSSION**
   A. Strategic Plan.
10. **PUBLIC COMMENT**
    Public comments will only be taken when the Village President opens the meeting for comment. Please state your name and address before speaking. All comments should be directed to the Village President; each speaker will have one opportunity at the microphone for a maximum of 3 minutes.
11. **COUNCIL COMMENTS**
12. **MANAGER'S COMMENTS**
13. **CLOSED SESSION**
    A. To discuss a memorandum of advice from the Village Attorney, as permitted under section 8(h) of the OMA.
14. **ADJOURNMENT**

CHANGE ORDER NO.: 02

Owner:	Village of Pentwater	Owner's Project No.:	
Engineer:	Fleis & VandenBrink	Engineer's Project No.:	864300-2
Contractor:	Cole Inc.	Contractor's Project No.:	
Project:	FY24 DWSRF Water System Improvements		
Contract Name:	Contract 2 – Water Supply		
Date Issued:	09/22/2025	Effective Date of Change Order:	09/22/2025

The Contract is modified as follows upon execution of this Change Order:

Description:
Bulletin No. 03: Chemical Sequestration

Attachments: **Bulletin No. 03 Signed by Cole Co.**

Change in Contract Price	**Change in Contract Times**
Original Contract Price: $ $1,054,070.00	Original Contract Times: Substantial Completion: 320 days Ready for final payment: 350 days
Change from previously approved Change Orders: $ 4,800.00	**Change** from previously approved Change Orders: Substantial Completion: 0 days Ready for final payment: 0 days
Contract Price prior to this Change Order: $ 1,058,870.00	Contract Times prior to this Change Order: Substantial Completion: 320 days Ready for final payment: 350 days
Increase this Change Order: $ 36,314.00	**Change** this Change Order: Substantial Completion: 0 days Ready for final payment: 0 days
Contract Price incorporating this Change Order: $ 1,095,184.00	Contract Times with all approved Change Orders: Substantial Completion: 320 days Ready for final payment: 350 days

	Recommended by Engineer	Authorized by Contractor
By:		
Title:		
Date:		
	Authorized by Owner	**Approved by Funding Agency**
By:		
Title:		
Date:		

FLEIS & VANDENBRINK

DESIGN. BUILD. OPERATE.

BULLETIN

CONTRACT FOR: **Water System Improvements: Contract 2** BULLETIN NO. 3

OWNER: **Village of Pentwater**
65 S Hancock St., P.O. Box 622
Pentwater, MI 49449

DATE: **August 22, 2025**
DUE DATE: **September 5, 2025**

CONSTRUCTION MANAGER:
Cole, Inc.
7090 S. 45 Road
Cadillac, MI 79601

ENGINEER: **Fleis & VandenBrink Engineering, Inc.**
2960 Lucerne Drive, SE
Grand Rapids, Michigan 49546

DRAWING REVISION NO.: **Bulletin No. 3**

DRAWING SHEETS ISSUED HEREWITH: **D-101, D-501, E-102, E-601**
SPECIFICATIONS ISSUED HEREWITH: **SP 26 60 03 WELL HOUSE CONTROL SYSTEMS, 43 32 69 CHEMICAL FEED SYSTEMS**

==========

The items below are being considered as possible changes to the Contract Documents for this Project. CONTRACTORS are requested to submit changes in cost, if any, for each item and indicate whether it is an addition to or deduction from the Contract Price. Include all labor, materials, overhead and profit. After reviewing the effects of those changes in the Work, ENGINEER may issue a Change Order specifying which changes are to be incorporated in the Work, if any.

This Bulletin is not a Change Order and is not to be deemed authorization to proceed with the changes listed.

Additional work or materials, where proposed, shall meet the requirements of the Contract Documents, except where noted.

CONTRACTOR will be responsible for notifying ENGINEER, in writing, concerning any revision or clarification which causes a change in the Contract Documents, but are not specifically mentioned as a cost item in this Bulletin.

CONTRACTOR shall return one (1) completed and signed copies of the Bulletin to ENGINEER on or before the due date noted above.

Each proposed change has been described briefly with additional information provided concerning detailed changes required for the major trades concerned. Only one total cost figure has been requested for each item on the Bulletin; however, a complete breakdown is required for each item as supporting documentation. This will allow OWNER to more easily evaluate the proposed cost changes. Each Bulletin item is an all-inclusive item and may concern work from several trades or Subcontractors. It is CONTRACTOR's responsibility to ensure that all work for each item has been included in the total cost figure provided to ENGINEER.

2960 Lucerne Drive SE, Suite 100
Grand Rapids, MI 49546
P: 616.977.1000
www.fveng.com

BULLETIN NO. 2

DATE: August 22, 2025

ITEM NO. 1: Phosphate Feed Addition at Well #4 for Chemical Sequestration of Iron

This item includes addition of phosphate chemical feed equipment, electrical updates and SCADA updates to allow Village of Pentwater to feed phosphate at Well #4 for iron and manganese sequestration.

- Add phosphate chemical feed equipment including one peristaltic metering pump, drum scale, chemical container, wall mount bracket, pressure relief valve, corporation stop, injection quill assembly and all appurtenances.
- Modify well discharge spool pieces to accommodate phosphate feed location.
- Include all electrical and SCADA work as shown on drawings and specifications to provide a functional phosphate chemical feed system.
- Increase sump containment depth to 8". Provide adjustable grate pedestals in lieu of beam.

See attached drawings and specifications:

D-101, D-501, E-102, E-601

SP 26 60 03 WELL HOUSE CONTROL SYSTEMS, SP 43 32 69 CHEMICAL FEED SYSTEMS

To make these changes, ADD the cost as follows:

Description:	Unit:	Quantity:	Amount
1. **Phosphate Feed Addition at Well #4**	LS	1	$ 36,314.00

Any Additional Comments if this change were implemented: _____

CONTRACTOR:

Signature

Robert T. Cole President

Name and Title of Signatory

9/8/25

Date

SECTION 26 60 03

WELL HOUSE CONTROL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. This Section includes, but is not necessarily limited to, the furnishing and the installation of the control hardware and instrumentation for the new well house. Existing SCADA system shall be reused but modified as shown on the drawings and described in the specifications. Major work items are described below:
      a. Provide instrumentation.
      b. Chemical Feed Control Panel
      c. Perform Owners Systems Integrator work.
      d. Start up new well controls.
      e. All necessary instrumentation and software to make a completely functional SCADA system.
      f. Other major items listed below and as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to:
      a. General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
      b. All pertinent Sections of Division 26 - Electrical.

1.02 OWNERS SYSTEMS INTEGRATOR (OSI) ALLOWANCE:

A. Owners Systems Integrator is responsible for all labor, programming and materials indicated in this specification associated with the existing MTU modifications, new RTU for Elevated Water Storage Tank and new Well House RTU.

B. The OSI shall provide new coax antenna cable and antennas as indicated in this specification and shown on drawings.

C. OSI shall reprogram existing SCADA System and PLC in MTU at Water Treatment Plant to bring the new Well 4 into the pump rotation and to monitor elevated tank level.

D. OSI shall provide a common alarm to the existing dialer for new Well House 4.

E. Owners Systems Integrator shall work with the CONTRACTOR to provide a completely functional SCADA system.

F. Owners Systems Integrator shall be Integrated Controls, Traverse City Michigan. Mr. Jay Norris (231) 941-1030. 930 Duell Rd., Traverse City, MI 49686.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals.

B. Shop Drawings: The CONTRACTOR and OSI shall submit to the ENGINEER, Drawings cut sheets and other documents for the ENGINEER'S approval prior to manufacture and/or assembly of the system.
Submit for all SCADA Equipment and Instrumentation:
1. General:
   a. Dimensions.
   b. Details of construction and installation.
   c. Detailed system schematic.
   d. Manufacturer's name and model number.
   e. Bill of Materials.
   f. Tank RTU, Well House 4 RTU and Chemical Feed Control Panel wiring diagrams including electrical connections to related field equipment.
   g. Proposed MTU HMI screen updates.

C. Product Data: Provide data for each component specified showing electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

E. AS-BUILT DRAWINGS
1. Prior to final payment, the Owners Systems Integrator shall submit as-built Drawings of the system that was installed. The as-built Drawings shall include connection and schematic diagrams of all panel and field wiring. The Drawings shall include schedules showing the terminal and wire number at each terminal point, both internal and external to panels.
2. The as-built Drawing shall fully and accurately reflect any and all modifications made to the system during the course of installation or start-up.

1.04 REFERENCES

A. Applicable Standards and Codes:
1. American National Standards Institute [ANSI]
2. American Water Works Association [AWWA]
3. American Society for Testing & Materials [ASTM]
4. Institute of Electrical & Electronic Engineers [IEEE]
5. Instrument Society of America [ISA]
6. National Electrical Code [NEC]
7. National Electrical Contractors "Standard of Installation" [NECA]
8. National Electrical Manufacturers Association [NEMA]
9. Factory Mutual [FM]
10. National Board of Fire Underwriters [NBFU]
11. National Fire Protection Association [NFPA]
12. Underwriters' Laboratories, Inc. [UL]
13. Occupational Safety and Health Administration [OSHA]
14. FCC Part 15.247
15. UL/CUL Standard 508 A, Industrial Control Equipment

1.05 WATER SYSTEM CONTROL SQUENCE OF OPERATIONS:

A. CONTROL SEQUENCE MODIFICATIONS: **(OSI)**

1. The existing water system control sequence shall be reused by the OSI.
2. The following changes shall be made to the existing control sequence.
   a. Add well 4 into the control sequence rotation.
   b. Add the following display icons to the HMI screens at the Water Treatment Plant.
      1) Well 4 On
      2) Well 4 HAND-OFF-AUTO
      3) Well 4 VFD in REMOTE
      4) Well 4 Amps
      5) Well 4 Flowrate
      6) Well 4 Flow Total
      7) Sodium Hydroxide Scale Weight
      8) Well House 4 Generator Running
      9) Well House 4 ATS in Normal
      10) Well House 4 ATS in Emergency
3. Provide Well House 4 RTU PLC with the following I/O:
   a. Well 4 Running (DI)
   b. Well 4 Call To Run (DO)
   c. Well 4 VFD In REMOTE (DI)
   d. Well 4 Fault (DI)
   e. Well 4 Flow Rate (AI)
   f. Well 4 Flow Total (DI)
   g. Well 4 Chlorine Feed Flow Pacing (AO)

Bulletin No. 3

   h. Well 4 Phosphate Feed Flow Pacing (AO)
   i. Scale Weight (AI)
   j. Generator Running (DI)
   k. Generator Fault (DI)
   l. ATS In Normal (DI)
   m. ATS In Emergency (DI)
   n. Phase Monitor (DI)
   o. Emergency Eye Wash Station Flow (DI)
   p. Building Low Temperature (DI)
   q. Well House 4 Flooded (DI)
4. Provide the Elevated Tank RTU PLC with the following I/O:
   a. Building Low Temperature (DI)
   b. Tank Level (AI)
5. Provide the following alarms to be displayed on the HMI at the Water Treatment Plant.
   a. Well 4 VFD Fault
   b. Well House 4 Generator Fault
   c. Well House 4 Power Failure
   d. Well House 4 Low Temperature
   e. Well House 4 Emergency Eye Wash Station In Use
   f. Well House Flooded Alarm
   g. Well House 4 Communications Failure
   h. Elevated Water Storage Tank Communications failure
6. Program the SCADA system dialer to provide a Well House 4 Common Alarm notification to the owner when any of the alarms in 5 a. through g. above.

PART 2 – PRODUCTS

2.01 CONTROL PANEL AND RTU'S: **(CONTRACTOR AND OSI)**

A. All RTU and chemical feed control cabinets shall be listed (UL508A) Industrial Control Panel or by another nationally recognized testing laboratory. RTU for Well House 4 Main Control Panel and Elevated Tank Control Panel are furnished by the OWNERS SYSTEMS INTEGRATOR. Chemical Feed Control Panel by CONTRACTOR. CONTRATORS Control panel manufacturer must have at least 5 years' experience designing and constructing control panels used in the water and wastewater fields.

2.02 RELAYS: **(CONTRACTOR AND OSI)**

A. Time Delay:
   1. Electric type.
   2. Delay on energize as necessary.
      a. Minimum contact rating 1 ampere at 120 volt A.C.
      b. Design based on Diversified Electronics TSC-100 Series or ENGINEER approved equal.

B. Control:
   1. Miniature plug-in type.
   2. Minimum contact rating 10 ampere at 120 volt A.C. with necessary contacts as shown on drawings.
   3. Design based on Square D or ENGINEER approved equal.

2.03 SELECTOR SWITCHES AND PUSHBUTTONS: **(CONTRACTOR AND OSI)**

A. All selector switches and push buttons shall be oil tight NEMA Type 13, with contacts, colors, and legend plates as indicated on Drawings. Manufacturer shall be Allen-Bradley, Bulletin 800T or ENGINEER approved equal.

B. Pilot lights shall be transformer push-to-test type. Same type and brand as push buttons.

2.04 POWER MONITOR RELAY: **(CONTRACTOR)**

A. Shall be able to monitor 3 phase, 240 or 480 volt (as required) with usually closed (closed with normal energized power) 120 volt contact the control circuit, DPDT contacts. Monitor for undervoltage, overvoltage, phase sequence and loss of phase.

B. Manufacturers: Diversified Electronics model PBD-240/480-ALE or ENGINEER approved equal.

2.05 RTU's **(OSI)**

A. OSI shall program existing MTU and new RTU's to perform the control functions described in part 1 above.

B. All control panels shall be wall mount or floor mount as shown on plans, with components, and other instrumentation necessary for the operation described on the drawings and specifications.

C. Enclosure shall be Hoffman or approved equal with NEMA 1 minimum.

D. Before painting, thoroughly clean all surfaces, grind smooth all projections. Fill and sand any imperfections on surface. Apply one coat primer to all surfaces followed by two coats of primer to exterior surfaces. Apply one finish coat, air drying white lacquer to interior

surfaces and 2 coats air drying lacquer to exterior surfaces in color to be selected by OWNER..

E. No variations in layout, dimensions or electrical design shall be allowed without prior consent of ENGINEER.

F. Nameplates shall be 3 ply, white laminated plastic with engraved black lettering.

G. All wiring installation shall be executed in a workmanlike manner, and shall be grouped, bundled, supported and routed horizontally and vertically, to provide neat appearance. All connections to devices remote from the panel shall be executed through terminal boards.

H. All internal panel wiring and terminations shall be designed in accordance with the latest applicable standards of the National Electric Code (NEC) as well as applicable state and local electrical codes. The minimum wire size is #14 AWG except for internal circuits using 5 VA or less #16 AWG is acceptable. Power circuits extending outside the control panel shall be #12. Conductors shall not be spliced and shall be continuous from terminal to terminal.

I. Signal wiring shall be segregated from control power wiring, grouped functionally and arranged neatly to facilitate circuit tracing. No combination of analog, digital input or control output wiring shall be intermixed within the same bundle or duct within a panel. DC signal wires shall be segregated from AC signal wires.

J. Plastic wiring wraps shall be used to bundle wires, except within wiring ducts. The bundles shall be securely fastened to the steel structure at suitable intervals, not exceeding 12".

K. Where lugs are required, provide locking fork [ring lugs on equipment grounds] with insulating sleeves. Lugs shall be sized according to wire size, and crimped with a ratchet type crimper.

L. Where shielding is required, shields shall be continuous foil or metalized plastic providing 100% coverage. A drain wire in continuous contact with the shield shall be included.

M. Conductors shall be stranded copper with 600 volt Type MTW insulation. Wiring from sub-panel to a hinged door or panel shall include a loop in bundle to relieve the tension and allow door to open 150° minimum.

N. Provide 1" x 6" x 1/4" copper ground bus.

O. Control panel wiring shall be identified at each termination by marking with a number to correspond with the diagrams. Wire identification shall be one piece wrap on or sleeve type with machine lettering and numbers. Conductors shall be color coded as follows:
   1. AC Line and Load Circuits: Black
   2. AC Control Circuits: Red
   3. DC Control Circuits: Blue
   4. Interlock Control Circuits on the Panel Energized from External Source: Yellow
   5. Equipment Grounding Conductors: Green
   6. Current Carrying Grounded Conductor (neutral): White
   7. Intrinsically Safe Circuits: Light Blue

2.06 FINISHES: **(CONTRACTOR AND OSI)**

A. Provide baked enamel finishes on exposed surfaces.

B. Provide galvanized finishes for damp or wet locations.

C. Touch up or refinish damaged paint.

2.07 ACCESSORIES FOR CONTROL PANEL: **(CONTRACTOR AND OSI)**

A. Nameplates: Minimum 1 inch x 3 inch white plastic with engraved black lettering.

B. Pilot and Alarm Lights: 120 volt transformer type, push to test, 60 Hertz, with plastic lens and color matched rings; furnish special tools for lamp replacement, if required.

C. Selector Switches and Push Buttons: Rated oil-tight not less than 120 volt, 10 ampere, 60 Hertz with maintained or momentary contacts as required. Provide legend plates "HAND-OFF-AUTO" or as shown on drawings.

2.08 LOW VOLTAGE, LIGHTING AND POWER CONDUCTORS: **(CONTRACTOR AND OSI)**

A. Identify each end of each conductor by wire marking tape or sleeve. This includes splice points at all junction boxes. Mark on outer cover giving loop number and/or discrete wire number.

B. Conductors provided on 120/240 and 480 volt power and control systems to be stranded per ASTM B-8 soft drawn copper.

C. Insulation system shall be type THHN for field and MTW for panel, rated 600V as defined and listed in Article 310 of NEC.

D. Minimum size conductor utilized shall be #14 AWG for control circuits and #12 for power and lighting circuits.

2.09 PLC Manufacturer: **(OSI)**

A. PLC shall have the necessary amount of I/O to meet the project requirements plus 10 percent spares. PLC communications to radio modem shall be Ethernet.

B. Manufacturers:
1. Allen Bradley 1766 CompactLogix 5370 L24. PLC communications to radio modem shall be Ethernet. All PLC's shall support remote access and programming support.

2.10 RADIO MODEM: **(OSI)**

A. Point to Multi point radio shall be 2-watt 900mhz unlicensed spread spectrum e-net radio as follows.
1. E-Net bridging with data rate shall be 1Mbs minimum.
2. Each radio shall be configurable as an access point or a remote.
3. Radio shall support military standard security levels.
4. RF network shall be able to be configured to reject all but internally configured radios on an internally configured network name.
5. Radios shall be password protected from configuration access.
6. Radio configuration shall be able to be accessed locally, remotely at the MTU, RTU or remotely through the VPN.

7. Radio transmitter power shall be configurable on each radio in compliance with FCC regulations with antenna signal strength and length of coax to be taken into consideration.
8. Radio electronics shall be rated IP68 or NEMA 12 and be hermetically sealed.

B. Radios shall be GE Orbit, Radwin or Cambium.

C. Provide a radio propagation study prior to ordering any radio equipment for the well house, Elevated Water Storage Tank and Water Treatment Plant. Provide under Part 1, Submittals.

D. Radio propagation study may be performed using radio propagation study software. Base the study on using the specified radios and the antenna heights as shown on the drawings.

B. Prior to Prior to ordering high frequency radio modems, Systems Integrator shall submit the results of their radio propagation study to the ENGINEER for their consideration. Radio propagation study shall include assessment of existing conditions suitability for reliable communications and any recommended antenna mast improvements.

2.11 RADIO MODEM RF HARDWARE **(OSI)**

A. The Elevated Water Storage Tank shall utilize an Omni 10dB gain antenna and shall be mounted on the elevated water storage tank.
1. Antenna shall be constructed and attached in such a way that it can be compression clamped at its base to a permanent structure and support up to a minimum of a 100mph wind load and ½" ice load.
2. Antenna shall be designed in an RF range of 850MHz and 950 MHz.
3. Antenna shall be supplied with a factory female "N" style connector and in such a way that proper weather proofing of the connector to the feeder coax can be performed without jeopardizing its integrity.
4. Mounting hardware of the primary Omni antenna shall be on an extended mast and shall be attached in a way to permanently support the antenna without the need for adjustment.

B. All radio masts used to support both Yagi antennas shall be at minimum two (2) inch Sch40 6061-T6 aluminum structural pipe not to exceed (20) feet in length and affixed to wood poles as shown on drawings.
1. Base mounting points of mast shall be no closer than 24" apart on mast lengths less than 10' long and 48" apart on masts longer than 10'.
2. Base mounting of mast shall support a side load of at least 200 lbs. with momentary thrust loading of up to 500 lbs.
3. A minimum of 1-5/8" U strut and strut pipe clamps shall be used to support RTU masts to control panels. Strut, mounting brackets, and bolts shall be galvanized.

C. Well RTUs and MTU shall utilize a Yagi directional antenna with a minimum of 10dB gain.
1. Each Yagi antenna shall be supplied with a weather radome housing the radiator to protect it from ice.
2. Each Yagi shall have a fixed N style female connector attached to the radome and shall not be supplied with a coax whip.
3. Antenna shall be designed in an RF range of 850 MHz and 950 MHz with best performance in the frequency range of the selected radio.

4. Acceptable manufacture shall be RFS, TerraWave, Amphenol Antel or engineer approved equal.

2.12 COAX AND RELATED HARDWARE **(OSI)**

A. For lengths under 150' minimum coax size shall be 1/2 "diameter coax with solid copper clad aluminum core and foam insulation with braided and foil shield.

B. Coax shall be equal to or less than 2.5dB/100 feet signal loss at 900 MHz and shall be outdoor rated.

C. Coax connectors shall be N style outdoor weather rated and sized for the selected brand of coax.

D. Distances exceeding 150' shall be supplied with a cable size as reviewed and approved by engineer.

E. Each coax length between radio and antenna shall be fitted with a grounding kit sized for the selected coax manufacturer and attached to the largest coax nearest the closest grounding point.

F. Grounding of RTU coax on short (under 30') shall be by means #6Awg THHN bare cu from coax to a single 8' Cu clad bonding rod located near the base of the mast.

G. Coax shall carry a 5-year warranty.

H. Acceptable manufacture: Times Microwave LMR-600 or equal.

I. Provide ice bridge when coax is spanning more than 24" between two structures or fixtures in a horizontal path, a SS ice bridge shall be implemented to support the coax. 1-5/8" SS U-Strut or equal.

2.13 ETHERNET SWITCH: **(OSI)**

A. Provide switch with 6 Ethernet 10/100 Mbps Autosensing UTP Ports.

2.14 DC POWER SUPPLY WITH BATTERY BACK-UP: **(OSI)**

A. Furnish 13.8 volt, 4 amp AC/DC power supply. Manufacturer shall be Astrodyne Model AD55-B or ENGINNEER approved equal.

B. Furnish 12 volt, 12 amp hour, rechargeable sealed lead acid battery. Manufacturer shall be Power Sonic PS-12120 or ENGINEER approved equal. Wire in Series.

C. In lieu of battery back up CONTRACTOR may provide a UPS that will power the control system for a minimum of 2 hours.

2.15 PLASTIC WIREWAY: **(CONTRACTOR AND OSI)**

A. Provide 2" x 3" or 1" x 3" slotted plastic wire way, as required for internal RTU and MTU wireway. Provide Panduit or equal.

2.16 LOW TEMPERATURE SWITCH: **(OSI)**

A. Provide a low temperature switch for the MTU, and RTU-1,2 and 3. Mount low temperature switches on side of control enclosure except for RTU-3 shall be mounted inside the RTU-3 Pressure Transmitter Enclosure as shown on drawings.

B. Low Temperature Switch Requirements:
   1. Range: 0-60 degrees F minimum. Adjustable across range. Set at 35 degrees F.
   2. Visual indication of adjustable range in 5 degree increments.
   3. 120 vac, 15 amp SPDT contacts.
   4. Deadband – fixed.

C. Manufacturers: ASCO or ENGINEER approved equal.

2.17 FLOAT SWITCHES: **(OSI)**

A. Hermetically sealed mechanical tilt with 20-foot suspension cable rated at a minimum of 13 ampere at 120 volt A.C.

B. SPST contact.

C. Corrosion resistant poly-propylene float, leakproof, shockproof, and corrosion resistant to sewage.

D. Shorter length suspension cords may be furnished provided they have sufficient length to reach junction box without splice.

E. Design based on Gems/Warrick MBLU20W and MYEL20W. ENGINEER approved, equal.

2.18 CURRENT TRANSFORMERS: **(CONTRACTOR)**

A. Furnish general use ammeter current transformer. Provide on the output of all well VFD.

B. Insulation level shall be 600 volts, 10 kV BIL full wave. 4-20 mA output.

C. Design based on Hawkeye H721 & 921 series Current Transformers or ENGINEER approved equal.

2.19 FLOW SWITCH: **(CONTRACTOR)**

A. Brass Body insertion paddle type with 316 stainless steel wetted parts and 1-1/2" process connection.

B. Electrical rating shall be NEMA 4, with 125 VAC at 10 amps, DPST normally open/normally closed contact. Set flow switch to trip at 50 GPM.

C. Tag FS-004 and FS-120.

D. Design based on Dwyer V7 series flow switch or ENGINEER approved equal.

2.20 FLOW METER: **(CONTRACTOR)**

A. Magnetic type:

1. General:
   a. Flow meters tag FIT-04.
   b. Designed for metering municipal drinking water at 70 psi.
   c. Accuracy: Within ± 0.2% of measured value for all flow velocities above 3 fps.
   d. Microprocessor based.
   e. Magnetic induction type proportional to velocity.
   f. Complete with ground rings. Grounding probes or electrodes are not acceptable.
2. Flowtube:
   a. 304 stainless steel flow tube. Epoxy coated carbon steel body housing.
3. Polyurethane liner or hard rubber liner.
4. Electrodes: Hastelloy-C
5. Connections: Flanged, ANSI Class 150.
6. Epoxy coated: 2 coats for a minimum of 7 mils.
7. Schedule
   a. See process D sheets for line sizes.

B. Transmitter
1. Provide integral transmitters for mag flow meters.
2. Microprocessor based converter.
3. Local digital flow rate indication and flow totalization with (2) 16 character LCD lighted display.
4. Inputs:
   a. Provide zero contact return.
5. Outputs:
   a. Isolated 4-20 mAdc proportional and calibrated to stated flow range.
   b. Dry contact pulse output. Program 1 pulse = 1000 gallons.
6. Converter shall have HART Smart protocol as standard.
7. Analog output.
8. Power: 120-VAC, 60 Hz.
9. Nema 4 Face.
10. Calibrate 0 – 500 gpm = 4-20 mA for FIT-04.

C. Manufacturer
1. Design base on McCrometer Ultra Mag or ENGINEER approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install controls in accordance with Drawings, approved shop drawings, and manufacturer's recommendations.

3.02 START-UP AND TRAINING:

A. Provide service technicians for 2 eight hour days (not including any system programming, debugging, or travel time) to check out the system installation at system start-up. During this time the owners systems integrator and electrical contractor will be asked to assist in fine tuning all controls for optimum operation. This will include but not be limited to making programming changes and time delay adjustments on variable frequency drives, PLC's, HMI's and SCADA Screens.

B. Provide a service technician for an additional eight (8) hours total to train the facility personnel in the operation, adjustment and maintenance of control system.

3.03 CLEANING:

A. Prior to acceptance of the work of this Section, thoroughly clean all related areas in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 43 32 69

CHEMICAL FEED SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
1. This Section includes, but is not necessarily limited to, the furnishing and installation of chemical feed equipment as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.

B. Related Sections:
1. Documents affecting work of this Section include, but are not necessarily limited to:
a. General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.02 DEFINITIONS

A. Abbreviations:
1. gph: Gallons per hour.
2. NEMA: National Electrical Manufacturers Association.
3. NTEP: National Type Evaluation Program.
4. NCWM: National Conference on Weights and Measures.

1.03 DESIGN AND PERFORMANCE REQUIREMENTS

A. Chemical feeding equipment:
1. Sodium hypochlorite feed system:
a. Metering pumps:
1) Pumped fluid: 5.25-15% NaOCl
2) Feed rate range: 0.001 – 0.44 gph.
3) Pump type: Peristaltic.
4) Operating pressure: 125 psi.
5) All wetted materials shall be compatible with the pumped fluid.
6) NSF 61 Listed.

Bulletin No. 3

2. Phosphate feed equipment:
a. Metering pumps:
1) Pumped fluid: 35% PO_4
2) Feed rate range: 0.001 – 0.44 gph.
3) Pump type: Peristaltic.
4) Operating pressure: 100 psi.
5) All wetted materials shall be compatible with the pumped fluid.
6) NSF 61 Listed.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Submittals.

B. Shop Drawings:
1. Submit for metering pumps and chemical feed accessories.

2. Required information:
   a. Name of Manufacturer.
   b. Model.
   c. Dimensions.
   d. Details of construction and installation.

C. Operation and maintenance manuals:
   1. Submit for metering pumps and chemical feed accessories.
   2. Required information:
      a. Equipment function, normal operating characteristics and limiting conditions.
      b. Assembly, installation, alignment, adjustment and checking instructions.
      c. Operating instructions for start-up, routine and normal operating, regulation and control, and shutdown and emergency conditions.
      d. Lubrication and maintenance instructions.
      e. Guide to "troubleshooting".
      f. Parts lists and predicted life of parts subject to wear.
      g. Outline, cross-sections, assembly drawings, engineering data and wiring diagrams.
      h. Test data and performance curves.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Fabrication and installation personnel:
      a. Trained and experienced in the fabrication and installation of the materials and equipment.
      b. Knowledgeable of the design and the reviewed submittals.

1.06 DELIVERY, STORAGE AND HANDLING

A. Receiving and storage:
   1. All materials shall be delivered in original, unbroken, brand marked containers or wrapping as applicable.
   2. Handle and store materials:
      a. In a manner which will prevent:
         1) Deterioration or damage.
         2) Contamination with foreign matter.
         3) Damage by weather or elements.
      b. In accordance with Manufacturer's directions.

B. Rejected material and replacements:
   1. Reject damaged, deteriorated or contaminated material and immediately remove from the Site.
   2. Replace rejected materials with new materials at no additional cost to OWNER.

PART 2 - PRODUCTS

2.01 CHEMICAL METERING PUMPS

A. Peristaltic type metering pump:
   1. Quantity: 3; 2 installed, 1 spare.
   2. Materials of construction:
      a. Wall mount bracket and hardware: 316 stainless steel.

b. Pump housing: polycarbonate.
c. Pump head rollers: HDPE.
d. Roller bushings: bronze.
e. Suction and discharge tubing: Norprene, rated at 125 psi.
f. Fasteners: stainless steel.
g. Adapter fittings: PVDF.

3. Power cord: Cord and plug, NEMA 5/15.
4. Enclosure: NEMA 4X.
5. Operator interface:
   a. VGA Graphic multi-color backlit LCD displays remote/local control status, motor speed, output rate, input signal values, service and alarm status.
   b. Digital touch pad with menu driven software.
6. Motor: Brushless DC; variable speed.
7. Control circuitry:
   a. Control circuitry shall be integral to the pump and capable of adjusting the pump motor speed from 1% to 100% in 0.1% increments (100:1 turndown ratio).
   b. The pump output shall be capable of being manually controlled via front panel user touchpad controls.
   c. The pump output shall be capable of being remotely control via 4-20mA analog input. Four values shall be user configurable to define the low and high points on the output slope; a low input value, the required pump percentage of motor speed at the low input value, a high input value, the required pump percentage of motor speed at the high input value.
   d. Provide for remote stop/start pump via non-powered contact closure loop.
8. Accessories:
   a. Injection / backflow check valve.
9. Manufacturer and model:
   a. Blue-White Industries, Flex-Pro ProSeries. M1 pump

2.02 APPURTENANCES

A. Pressure relief valves:
   1. Diaphragm-style.
   2. End connections: Threaded, NPT.
   3. Maximum temperature: 140 degrees F.
   4. Maximum operating pressure: 375 psi @ 70 degrees F.
   5. Materials of construction:
      a. Diaphragm: Molded PTFE/EPDM.
      b. Body: PVC.
   6. Manufacturers:
      a. Griffco Valve Inc.
      b. Lutz-JESCO America Corp.
      c. Primary Fluid Systems Inc.
      d. Or equal.

B. Injection quills:
   1. Injection quill shall be commercially manufactured specifically for the injection of liquid pumped via the chemical metering pump into the piping system.
   2. Rated pressure: 125 psi.
   3. Quill material: CPVC.
   4. Corporation Cock: 1" NPT Brass.

5. Safety chain that will prevent the withdrawal of the injection quill before corporation cock is secured.
6. Manufacturer:
   a. Neptune Chemical Pump Company.
   b. Or ENGINEER approved equal.

C. Scale
   1. Drum scale:
      a. Quantity: 2.
      b. Maximum platform height: 2 inches.
      c. Platform shall be sized to accept drums or carboys from 8 – 24 inches diameter.
      d. Weigh capacity: 500 pounds.
      e. Mounting plates and hardware: 316 stainless steel
         a) Contractor shall provide mounting plates and hardware necessary for mounting platform to FRP grating.
         b) Final installation and mounting shall not impact accuracy of system.
      f. Temperature stable load cell with six feet of PVC coated copper hydraulic tubing.
      g. Accuracy shall be less than 1% of full scale.
      h. Platform coating system shall be a minimum dry thickness of 80 mils and be resistant to moisture, chemicals, abrasion, impact and UV light.
      i. Weight indicator:
         1) Enclosure: NEMA 4X.
         2) Interface: Touch pad control for entry of tare and low level values. Indicator shall display net remaining, amount used, tare weight and gross weight.
         3) Shall be capable of transmitting net weight to SCADA system via 4-20mA signal.
         4) Measurement readout to nearest tenth of a pound.
      j. Manufacturers:
         1) Force Flow
         2) Or equal.

D. Chemical Container
   1. Polyethylene feed tank:
   a. General:
      1) Quantity: 2.
      2) Size: 55 gallons.
      3) Tank shall be polyethylene, one-piece seamless construction, cylindrical in cross-section and vertical with flat / sloping bottom in axis. Tank shall be marked to identify the manufacturer, date of manufacture and serial numbers must be permanently embossed into the tank.
   b. Service conditions:
      1) Chemical:
         a) 5.25-15% liquid sodium hypochlorite.
         b) 35% Polyphosphate
      2) Ambient temperature
      3) Indoors installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install metering pumps and chemical feed accessories in conformance with:
   1. The submittals reviewed by ENGINEER.
   2. The Manufacturer's recommendations.

B. Install drum scale platform in conformance with:
   1. The submittals reviewed by ENGINEER.
   2. The Manufacturer's recommendations.

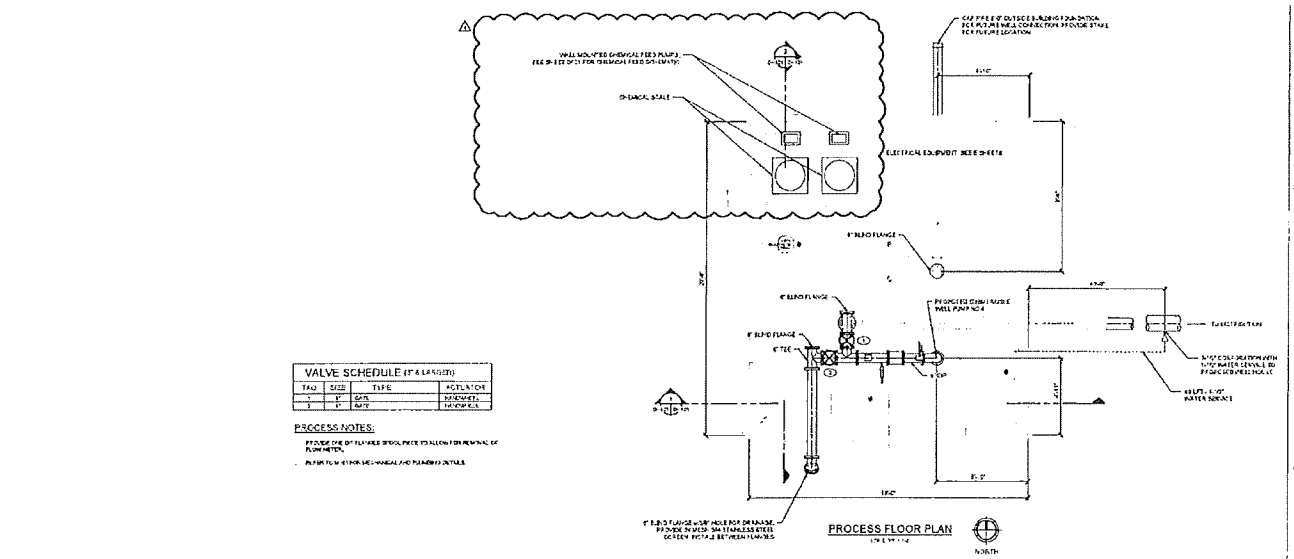
3.02 FIELD QUALITY CONTROL

A. Manufacturer's field service:
   1. Arrange and pay for Manufacturer's service representative to:
      a. Provide the services indicated below.
      b. Minimum onsite time: 1 day.
   2. Schedule the following:
      a. As soon as practicable after installation.
      b. At times approved by ENGINEER and OWNER.
   3. Manufacturer's service representative: Check work.
   4. Promptly make all changes and additions required by Manufacturer's service representative.
   5. Manufacturer's service representative:
      a. Assist in start-up.
      b. Demonstrate operation and maintenance to OWNER's personnel.
      c. Review operation and maintenance manual with OWNER's personnel.
   6. Submit Manufacturer's service representative's written approval of installation.

3.03 CLEANING

A. Thoroughly clean all installed materials and products and related areas:
   1. Prior to acceptance of the work of this Section.
   2. In accordance with Section 01 74 00 – Cleaning and Waste Management

END OF SECTION



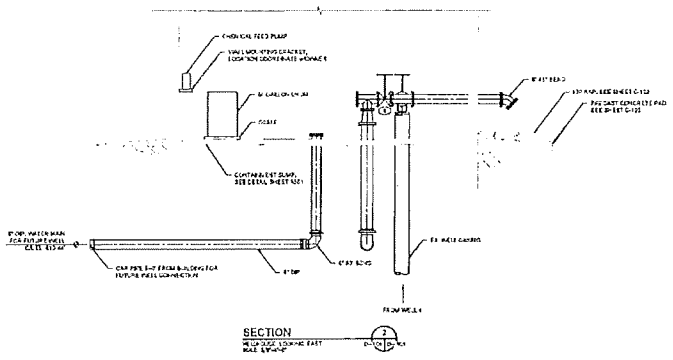
VALVE SCHEDULE (FLANGED)			
TAG	SIZE	TYPE	ACTUATOR
1	8"	GATE	MANUAL HANDWHEEL
2	8"	GATE	MANUAL HANDWHEEL

PROCESS NOTES:

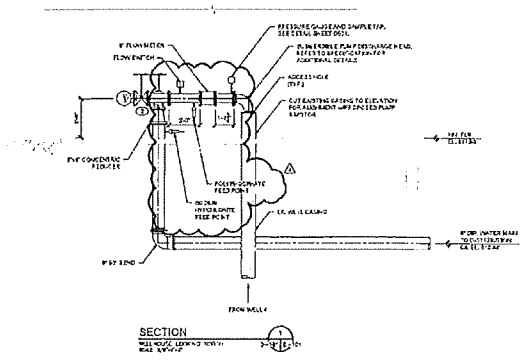
1. PROVIDE ONE 8" FLANGED STEEL PIECE TO ALLOW FOR REMOVAL OF FLOW METER.
2. REFER TO MECHANICAL AND PLUMBING DETAILS.

PROCESS FLOOR PLAN

NORTH



SECTION



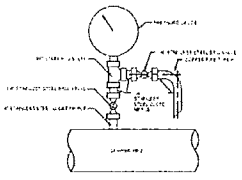
SECTION

FLEIS&VANDENBRINK

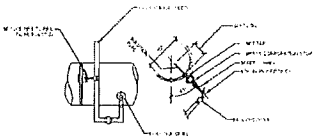
VILLAGE OF PENTWATER
OCEANA COUNTY, MICHIGAN
FY24 DWSRF WATER SYSTEM IMPROVEMENTS - CONTRACT 2

WELL HOUSE 4 PROCESS PLAN & SECTIONS

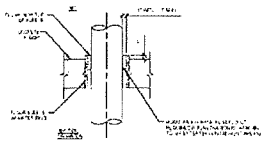
D-101



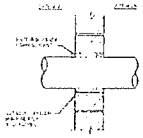
PRESSURE GAUGE/SAMPLE TAP DETAIL



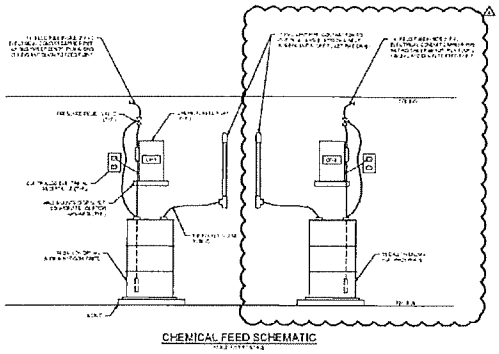
CHEMICAL FEED INJECTION QUILL DETAIL (TYP.)



FLOOR PENETRATION DETAIL



WALL PENETRATION DETAIL



CHEMICAL FEED SCHEMATIC

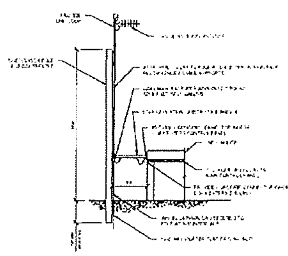
FLEIS & VANDENBRINK

VILLAGE OF PENTWATER
OCEANA COUNTY, MICHIGAN
FY24 DWSRF WATER SYSTEM IMPROVEMENTS - CONTRACT 2
PROCESS STANDARD DETAILS

D-501

WORK DESCRIPTION NOTES:

1. SEE SINGLE LINE DIAGRAM SHEET E001 FOR FEEDER AND BRANCH CIRCUIT CONDUCTOR AND CONDUIT SIZES NOT SHOWN ON THIS SHEET.
2. REFER TO ALL DIVISION 26 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. PROVIDE PVC SCH. 80 CONDUIT AND PVC OUTLET BOXES ON WALLS IN CONTAINMENT AREA.
4. INSTRUMENTATION HOME RUN CONDUIT SHOWN MAY BE COMBINED INTO THE FOLLOWING GROUPS:
   - ANALOG - 4-20MA
   - DIGITAL - DRY CONTACT 24VDC
   - CONTROL - 120VAC POWERED
   - DO NOT INTERMIX GROUPS IN SAME CONDUIT
5. COLD WEATHER BATTERY BACKUP BALLAST ONLY REQUIRED ON FIXTURE AT ENTRY DOOR.
6. [illegible]
7. [illegible]
8. [illegible]
9. [illegible]
10. [illegible]
11. MOUNT ALL CONVENIENCE RECEPTACLES AT 48" A.F.F.
12. REFER TO SHEET M-101.
13. ANTENNA AND COAX PROVIDED BY DSI.
14. FURNISHED BY OWNER INSTALLED BY CONTRACTOR.
15. [illegible]
16. [illegible]

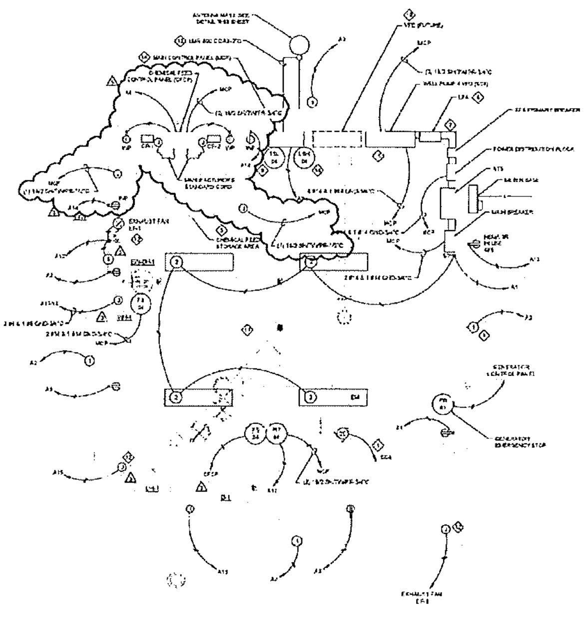


MCP ANTENNA MAST DETAIL

[illegible]	[illegible]	[illegible]	[illegible]

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	VOLTS/W	LAMP NO.	LAMP W	LAMP TYPE	MOUNTING
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



WELL HOUSE ELECTRICAL PLAN

NORTH

FLEIS & VANDENBRINK

VILLAGE OF PENTWATER
OCEANA COUNTY, MICHIGAN
FY24 DWSRF WATER SYSTEM IMPROVEMENTS - CONTRACT 2

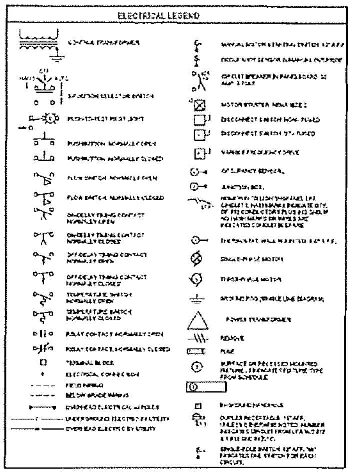
WELL HOUSE 4 ELECTRICAL PLAN & SCHEDULES

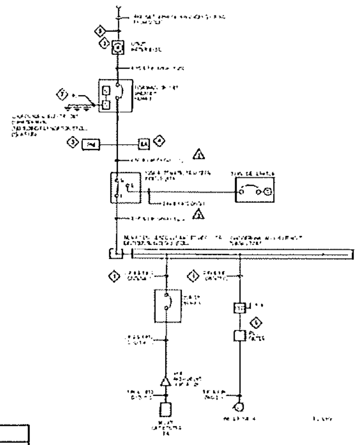
SEPTEMBER 2024

E-102

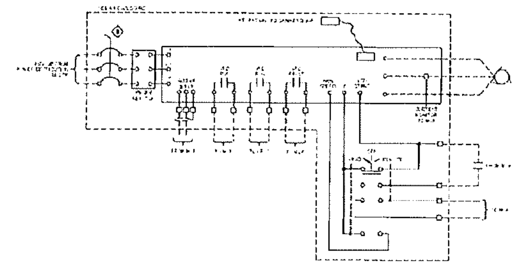
WORK DESCRIPTION NOTES:

ELECTRICAL LEGEND

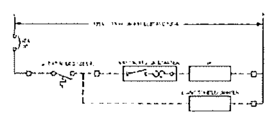




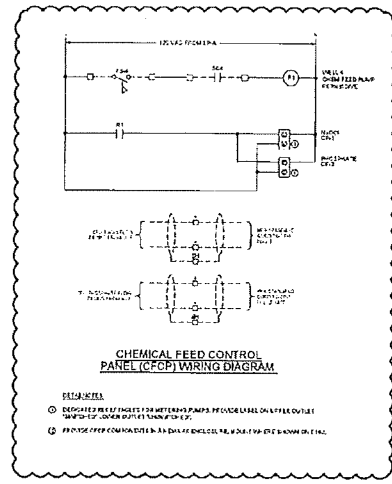
SINGLE LINE DIAGRAM



WELL PUMP 4 VFD WIRING DIAGRAM



EXHAUST FAN WIRING DIAGRAM



CHEMICAL FEED CONTROL PANEL (CFCP) WIRING DIAGRAM

VILLAGE OF PENTWATER
OCEANA COUNTY, MICHIGAN
FY24 DWSRF WATER SYSTEM IMPROVEMENTS - CONTRACT 2

WIRING DIAGRAMS & DETAILS

FLEIS & VANDENBRINK

SEPTEMBER 2024

E-601

CHANGE ORDER NO. 2

Owner:	Village of Pentwater	Owner's Project No.:	
Engineer:	Fleis & VandenBrink Engineering	Engineer's Project No.:	864300
Contractor:	Gustafson HDD LLC	Contractor's Project No.:	
Project:	FY24 DWSRF Water System Improvements		
Contract Name:	Contract 3 – Lead Service Line Replacement		
Date Issued:	9/22/2025	Effective Date of Change Order:	9/23/2025

The Contract is modified as follows upon execution of this Change Order:

Description:

1. Add additional LSLR quantity.

Attachments:

1. Change Order Breakdown Spreadsheet is attached.

Change in Contract Price	Change in Contract Times
Original Contract Price: $ 880,960	Original Contract Times: Substantial Completion: September 27, 2025 Ready for final payment: October 11, 2025
~~[Increase] [Decrease]~~ from previously approved Change Orders No. 1 $ -0-	~~[Increase] [Decrease]~~ from previously approved Change Orders No. N/A to No. N/A: Substantial Completion: September 27, 2025 Ready for final payment: October 11, 2025
Contract Price prior to this Change Order: $ 880,960	Contract Times prior to this Change Order: Substantial Completion: September 27, 2025 Ready for final payment: October 11, 2025
Increase ~~[Decrease]~~ this Change Order: $ 170,000	Increase ~~[Decrease]~~ this Change Order: Substantial Completion: 186 days Ready for final payment: 202 days
Contract Price incorporating this Change Order: $ 1,050,960.00	Contract Times with all approved Change Orders: Substantial Completion: April 1, 2026 Ready for final payment: May 1, 2026

Recommended by Engineer		Authorized by Contractor	
By:	Peter Tierney		Jeff Gustafson
Title:	Project Manager		Project Manager
Date:	09/08/2025		
	Authorized by Owner		Approved by Funding Agency
By:	James Van Ess		Sara Brown
Title:	Village Manager		EGLE SRF Project Manager
Date:			