**FAYETTEVILLE PUBLIC WORKS COMMISSION**

**PROCUREMENT DEPARTMENT**

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**Bid Addendum**

| | |
|---|---|
| **PWC Number:** | PWC2223029 |
| **Bid Title :** | PO Hoffer Water Treatment Facility and Glennville Lake Water Treatment Facility Reliability Improvements Contract No. 55 |
| **Bid Opening Date and Time:** | September 19, 2023 @ 2:00 pm |
| **Addendum Number:** | 3 |
| **Addendum Date:** | September 15, 2023 |
| **Procurement Advisor:** | *Tanya Hazlett*<br>*Tanya.hazlett@faypwc.com* |

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1. Acknowledgement of this addendum must be done on the Bid Summary page listed within the bid package
2. The solicitation is hereby modified as follows:
   - M1. Addenda issued on September 15, 2023, by 5:00 pm
   - M2. Changes to technical specifications and drawings as per the attached.

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## ADDENDUM NO. 3 – TECHNICAL SPECIFICATIONS AND DRAWINGS

| | |
|---|---|
| Date: | 09/14/23 |
| Project: | P.O. Hoffer Water Treatment Facility and Glenville Lake Water Treatment Facility Reliability Improvements Contract No. 055 |
| Owner: | Fayetteville Public Works Commission |
| Engineer: | Hazen and Sawyer |

To All Bidders:

Contractors submitting Proposals for the above-named Project shall take note of the following changes, additions, deletions, clarifications, etc., in the Contract Documents, which shall become part of and have precedence over anything contrarily shown or described in the Contract Documents, and all such shall be taken into consideration and be included in the Contractor's Bid Proposal.

All other general items, conditions, drawings, and specifications shall remain the same. Please acknowledge the receipt of Addendum No. 3 with the Bid Form.

Refer to the Attached Sheets.

**The return receipt requested with the communication will be deemed evidence that the bidder has received this Addendum and has followed the instructions outlined herein. Please sign, date, clearly print company name, and email this sheet back to Hazen and Sawyer at** PWCReliability@hazenandsawyer.com


Company Name

Acknowledgement of Receipt

Date

D. Cory Hopkins, PE

HAZEN AND SAWYER

**P.O. Hoffer Water Treatment Facility and Glenville Lake Water Treatment Facility Reliability Improvements Contract No. 55**

**Addendum No. 3**

## GENERAL:

*Plan Holder List:* ***see Attachment #1***
*Site Visit No. 1 Attendee List:* ***see Attachment #2***
*Site Visit No. 2 Attendee List:* ***see Attachment #3***

## SPECIFICATIONS:

Section 01520 – Maintenance of Plant Operations During Construction

01520-5 Add the following text following the last sentence of 1.04.A:

"Contractor shall be fully responsible for any chemical line flushing and draining efforts associated with the work activities further detailed below and shall provide flushing and draining measures at no additional costs to the Owner."

01520-6 Delete 1.04.B.2.c.:

01520-8 Revise finished water valve size noted in 1.04.B.4.k and 1.04.B.5.h to "42-inch".

01520-9 Add the following text following the first sentence of 1.04.B.7.c:

"An upgraded pump shall run successfully for seven (7) consecutive days without issues prior to moving on to the next pump."

01520-12 Add the following text following 1.04.C.3.i.i:

1. Flocculation Basin Wall Repairs (Drawings S2 – S4)

    a. Flocculation basin wall repairs shall be scheduled and coordinated with the Engineer and Owner.

    b. Only one flocculation train (A or B) may be removed from service at a time to complete the wall repairs.

    c. Wall repairs must be fully completed in one train before advancing to the next.

    d. Work shall be scheduled during low flow months and shall not be scheduled concurrently with the finished water valve work associated with the Finished Water Pump No. 1 Butterfly Valve Replacement and the 42" Finished Water Valve Removal at the P.O. Hoffer facility.

Section 09900 – Painting

09900-12 In Table 9-1, delete the last entry for PVC piping.

Section 11240 – Vertical Turbine Mixers

11240-1 In 1.02.B, Mixer Schedule, edit the following rows:

| | |
|---|---|
| Upper Impeller Type | Pitched Blade or Axial |
| Lower Impeller Type | Pitched Blade or Axial |
| Maximum Motor Horsepower, HP | 15 |

11240-1 Add the following text after 1.02.B:

C. PAC Slurry Properties

| Parameter | Specification |
|---|---|
| Specific Gravity | 1.06 – 1.18 |
| Slurry Concentration | 2 pounds PAC / gallon slurry |
| Particle Size | 90% passes through 325-mesh screen |
| Level of Suspension | Uniform |

Section 13450 – Disinfection of Water Treatment Facilities

13450-1 Revise the first sentence of 1.01.A to read as follows: “The Contractor shall clean and disinfect the water treatment facilities that incorporate the filters, 4-MG Clearwell #1, …”

13450-7 Revise 3.03 to read as follows: “DISINFECTION OF FILTERED WATER STORAGE AREA, 4-MG CLEARWELL #1, …”

13450-7 Revised 3.03.A to read as follows: “Filtered Water Storage Area, 4-MG Clearwell #1, …”

13450-7 Revise 3.03.C to read as follows: “Filter Storage Tanks and 4-MG Clearwell #1 Disinfection”

Section 15000 – Basic Mechanical Requirements

15000-12 Delete 3.06 in its entirety and re-number the subsequent sections of Part 3 accordingly.

Section 15012 – Steel Pipe

15012-7 Delete reference to 18” piping in Buried Steel Piping Schedule of 2.02.E.

15012-7 Revise the 2nd sentence in 2.04.A.1 to read as follows: “The minimum thickness of the mortar lining shall be as indicated in the pipe schedule above in Buried Steel Pipe Schedule.”

15012-13 Delete reference to 18" MW piping in 3.04.A.

Section 15100 – Valve Operators and Electric Valve Actuators

1. Replace with attached specification (**see *Attachment #4***). Specification modified to define requirements for new 120V service electric actuators provided for the filter effluent valves at the Glenville Lake WTF.

Section 15390 – Schedule

15390-4 Add the following sentence to the end of Note 1in the Electrically Operated Valve Schedule:

"ADDITIONALLY, PROVIDE NEW ELECTRIC ACTUATORS FOR THE FIVE (5) EXISTING FILTER EFFLUENT VALVES NOT REPLACED IN THIS PROJECT – MOV-5302 AND MOV-5305-5308."

15390-4 Delete Note 2 from the Electrically Operated Valve Schedule.

Section 16305 – Medium Voltage Motor Control Centers

16305-6 Revise paragraph 2.02 G1 to replace the words "MV4S" with "Ampgard RVSS"

Section 16395 – Medium Voltage Variable Frequency Drive Systems

16395-1 Revise paragraph 1.01 B to be as follows: "VFD for existing high service pump no.6 shall be suitable for use with existing synchronous type motor. Provide all required additional controls and protection hardware in VFD. See Drawing E911 for important existing motor nameplate information."

Section 17635 – Rotameters

17635-1 Revise the last sentence of 2.01.D to read as follows: "The indicator shall be large, easy to read, and calibrated in gallons per minute."

APPENDIX C

Revise the motor horsepower for the mixer with Serial No. 13DEK0836 to "10hp".

**DRAWINGS (for PO Hoffer unless otherwise noted):**

Drawing C302

1. Revised PVC callouts on sheet C302 to include "SCH 80", see **Attachment #5.**

Drawing C303

1. Revised PVC callouts on sheet C303 to include "SCH 80", see **Attachment #6.**

Drawing M2

1. Add note 9 as follows:

“ALL BUTTERFLY VALVES GREATER THAN 12” IN THE YARD SHALL HAVE OPERATORS/ACTUATORS EQUIPPED WITH CONSERVATIVELY SIZED EXTENSION BONNETS, EXCEPT IN ROADWAYS WERE A STANDARD VALVE BOX WITH NUT SHALL BE PROVIDED AS SPECIFIED IN SECTION 15101. FOR MANUAL VALVES, HANDWHEEL SHALL BE 42” ABOVE FINISHED GRADE.”

Drawing M8

1. Add note 8 as follows:

“ALL BUTTERFLY VALVES GREATER THAN 12” IN THE YARD SHALL HAVE OPERATORS/ACTUATORS EQUIPPED WITH CONSERVATIVELY SIZED EXTENSION BONNETS, EXCEPT IN ROADWAYS WERE A STANDARD VALVE BOX WITH NUT SHALL BE PROVIDED AS SPECIFIED IN SECTION 15101. FOR MANUAL VALVES, HANDWHEEL SHALL BE 42” ABOVE FINISHED GRADE.”

Drawing M204

1. In Detail 1 showing the manway cover, add note 1 as follows:

“PROVIDE DAVIT ARM SIMILAR TO ARCHON INDUSTRIES ACC. DIN28124-4. ALTERNATELY, PROVIDE ONE (1) UNIVERSAL HINGE BRAND BOLT-ON HINGE PER MANWAY AND ONE (1) LEAVE-IN-PLACE KIT PER BOLT-ON HINGE. PROVIDE EPDM OR FKM MANWAY GASKETS.”

Drawing M250

1. Add note 3 as follows:

“REFER TO SPECIFICATION SECTION 11335 FOR METERING PUMP ACCESSORIES TO BE PROVIDED BY THE PUMP SUPPLIER.”

Drawing M860

1. Add note 7 as follows:

“ALL BUTTERFLY VALVES GREATER THAN 12” IN THE YARD SHALL HAVE OPERATORS/ACTUATORS EQUIPPED WITH CONSERVATIVELY SIZED EXTENSION BONNETS, EXCEPT IN ROADWAYS WERE A STANDARD VALVE BOX WITH NUT SHALL BE PROVIDED AS SPECIFIED IN SECTION 15101. FOR MANUAL VALVES, HANDWHEEL SHALL BE 42” ABOVE FINISHED GRADE.”

2. Modify standard detail callout "1509204" to "1509205" throughout.

Drawing M861

1. Modify standard detail callout "1509204" to "1509205" throughout.

Drawing B1

1. Revise note 4 as follows:

"PRIOR TO APPLICATION OF BREATHABLE MINERAL PAINT, TESTING OF THE TANK FOR WATERTIGHNESS IS REQURIED.

FILL TANKS WITH WATER AND LET SIT FOR 30 DAYS.

AFTER 30 DAYS, DRAIN WATER FROM TANK.

- IF THERE WAS NOT WATER LEAKAGE, APPLY MINERAL PAIN.
- IF THERE WAS WATER LEAKAGE, REPAIR IN ACCORDANCE WITH SPECIFICATIONS AND APPLY CRYSTALLINE WATERPROOFING TO NORTH SIDE OF CARBON SLURRY TANKS PER MANUFACTURER'S INSTRUCTIONS.
    - REFILL TANK WIH WATER AND LET SIT FOR 30 DAYS.
    - AFTER 30 DAYS, DRAIN WATER FROM TANK AND REMOVE SURFACE APPLIED CRYSTALLINE WATERPROOFING BY SAND BLASTING OR SCRAPING TO A UNIFORM SURFACE AS REQUIRED BY MINERAL PAINT MANUFACTURER, APPLY MINERAL PAINT COATING. AFTER MINERAL PAIN COATING HAS BEEN APPLIED AND CURED TANK MAY BE FILLED AND USED."

Drawing E2

1. Replace Note 1 with the following Note 1:

    "1. FOR THE CONDUITS IN DUCTBANKS 06, 10, 24, AND 25 THAT ARE IDENTIFIED TO BE PART OF THE ALTERNATE BID, ONLY THE CONDUCTORS INSIDE ARE TO BE PART OF THE ALTERNATE BID. THE CONDUITS THEMSELVES ARE PART FO THE BASE BID. IF THE ALTERNATE BID IS NOT AWARDED, ONLY A PULL ROPE WILL BE REQUIRED TO BE INSTALLED IN THE IDENTIFIED ALTERNATE BID CONDUITS WITHIN DUCTBANKS 06, 10, 24, AND 25."

2. Remove conduit I-900-004 from ductbanks 04 and 06.

Drawing E4

1. Add Note 1 as follows:

    "1. THE UTILITY TRANSFORMERS TX-TF-A AND TX-TF-B ARE ANTICIPATED TO BE INSTALLED BY THE ELECTRIC UTILITY AND OPERATION BY JUNE OF 2024"

Drawing E6

1. Replace leader arrow text that reads "DEMOLISH EXISTING RAPID MIX BUILDING" with "ABANDONED RAPID MIX BUILDING".

Drawing E8 (Glenville Lake)

1. Revise Note 1 to read as follows:

"CONTRACTOR SHALL REPLACE THE SEVEN (7) 10-INCH FILTER EFFLUENT BUTTERFLY VALVES IDENTIFIED. CONTRACTOR SHALL PROVIDE TWELVE (12) NEW ELECTRIC ACTUATORS, ONE FOR EACH OF THE FILTER EFFLUENT VALVES – NEW AND EXISTING. CONTRACTOR SHALL BE RESPONSIBLE FOR THE INTEGRATION OF THE NEW VALVES AND ACTUATORS INCLUDING, BUT NOT LIMITED TO, DIMENSIONAL COORDINATION, EFFLUENT PIPING MODIFICATIONS, CONDUIT/WIRE MODIFICATIONS AND CALIBRATION ADJUSTMENTS OF THE UPSTREAM VENTURI FLOW METER (MANUFACTURER: BIF, MODEL NO. 226) TO ENSURE INSTRUMENT ACCURACY. CONTRACTOR SHALL REFER TO SECTION 01520 FOR SPECIFIC CONSTRUCTION CONSTRAINTS CONCERNING VALVE REPLACEMENT ACTIVITIES."

2. Add Note 4 as follows:

"4. ALL OF THE AREA SHOWN ON THIS SHEET IS CONSIDERED AN INDOOR WET PROCESS AREA"

Drawing E9 (Glenville Lake)

1. Remove reference to Note 2 under the call out for "5KV SWGR/MOTOR STARTER ASSEMBLY".
2. Add Note 2 as follows:

   "2. ALL OF THE AREA SHOWN ON THIS SHEET IS CONSIDERED AN INDOOR WET PROCESS AREA"

Drawing E10 (Glenville Lake)

1. Add Note 1 as follows:

   "1. ALL OF THE AREA SHOWN ON THIS SHEET IS CONSIDERED AN INDOOR DRY NON-PROCESS AREA"

Drawing E11 (Glenville Lake)

1. Add Note 3 as follows:

   "3. ALL OF THE AREA SHOWN ON THIS SHEET IS CONSIDERED AN INDOOR DRY NON-PROCESS AREA.

Drawing E15 (Glenville Lake)

1. Add note 2 as follows:

"2. ALL OF THE AREA SHOWN IN THIS SHEET IS CONSIDERED AN INDOOR TYPE 1 CHEMICAL STORAGE/TRANSFER AREA EXCEPT FOR THE CARBON ROOM. THE CARBON ROOM IS A HAZARDOUS AREA AND THEREFORE NO WORK SHALL TAKE PLACE IN THAT ROOM UNDER THIS CONTRACT."

Drawing E403

1. Add the following to note 2:

"COATING SYSTEM SHALL BE HP URETHANE SATIN FINISH 14 MILS DFT BY SHERWIN WILLIAMS OR EQUAL.

PRIMER COAT – SHERWIN WILLIAMS RESULOR MPE @ 3 MILS DFT OR REUFLOR MVB (IF NEEDED FOR MOISTURE RESISTANCE)
BUILD COAT – SHERWIN WILLIAMS RESUFLOR MPE @ 8 MILS DFT
TOP COAT – SHERWIN WILLIAMS RESUTILE HTS 100 SATIN @ 3 MILS DFT (COLOR AS SELECTED TO MATCH EXISTING COATING OR COMPLIMENT TERRAZZO FLOORING)."

Drawing E903

1. Modify the single line diagram as shown in **Attachment #7.**

Drawing E906

1. Modify control schematic as shown in **Attachment #8.**

Drawing E907

1. Modify control schematic as shown in **Attachment #9.**

Drawing E908

1. Modify control schematic as shown in **Attachment #10.**

Drawing E910

1. Add conduit C-900-095, **see Attachment #11.**

Drawing E911

1. Add this entirely new sheet to the contract, included as **Attachment #12.**

**ATTACHMENTS**:

- Attachment #1: Plan Holder List
- Attachment #2: Site Visit No. 1 Attendee List
- Attachment #3: Site Visit No. 2 Attendee List
- Attachment #4: Section 15100 – Valve Operators and Electric Valve Actuators
- Attachment #5: Sheet C302 Figure
- Attachment #6: Sheet C303 Figure
- Attachment #7: Sheet E903 Figure
- Attachment #8: Sheet E906 Figure
- Attachment #9: Sheet E907 Figure
- Attachment #10: Sheet E908 Figure
- Attachment #11: Sheet E910 Figure
- Attachment #12: Sheet E911 (New)

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# Attachment #1 – Plan Holder List

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September 14, 2023

**Plan Holders List**

**PO Hoffer Water Treatment Facility and Glenville Lake Water Treatment Facility Reliability Improvements**

| Company | E-mails |
|---|---|
| **Brown and Morrison** | julie.booth@brownandmorrison.com<br>tj.marks@brownandmorrison.com<br>jarrod.lentz@brownandmorrison.com |
| **Crowder Construction** | PStephenson@crowderusa.com |
| **J. Cumby Construction, Inc.** | gshirley@jcumbyconstruction.com |
| **Wharton Smith** | dwalters@whartonsmith.com |

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**Attachment #2 – Site Visit No. 1 Attendee List**

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**PO Hoffer and Glenville Lake WTF Improvements Project 08/30/2023 Site Visit Attendees**

| Name | Org | Contact |
|---|---|---|
| Brad Zimmers | RoviSys | brad.zimmers@rovisys.com |
| Paul Stephensons | Crowder | pstephenson@crowderusa.com |
| Jon Anderson | Crowder | janderson@crowderusa.com |
| Jason Dudley | Crowder | jdudley@crowderusa.com |
| David Higgins | Crowder | dhiggins@crowderusa.com |

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**Attachment #3 – Site Visit No. 2 Attendee List**

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**PO Hoffer and Glenville Lake WTF Improvements Project Site Visit No. 2 Attendees**

| Name | Org | Contact |
|---|---|---|
| Jason Dudley | Crowder Construction | jdudley@crowderusa.com |
| Ken Cronch | J. Cumby Construction | kcronch@jcumbyconstruction.com |
| Eric Haiderer | Wharton-Smith | ehaiderer@whartonsmith.com |
| Joseph Dickson | Lord and Company | jdickson@lordandcompany.com |

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**Attachment #4 – Section 15100 – Valve Operators and Electric Valve Actuators**

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SECTION 15100

VALVE OPERATORS AND ELECTRIC VALVE ACTUATORS

## PART 1 -- GENERAL

### 1.01 THE REQUIREMENT

A. Equipment shall be provided in accordance with the requirements of Section 11000 – Equipment General Provisions and Section 15000 – Basic Mechanical Requirements.

B. Reference Section 15390 – Schedules for additional information on valves and operators/actuators.

C. The electric valve actuators shall meet the signal requirements described in Section 17060 – Signal Coordination Requirements, Section 17920 – Control System Input/Output Schedule, and Section 17950 – Functional Control Descriptions.

D. Valve operators and electric valve actuators shall be designed to unseat, open or close, and seat the valve under the most adverse operating condition to which the valves will be subjected.

E. Operator mounting arrangements shall be as indicated on the Drawings or as directed by the manufacturer and/or Engineer. There shall be no mounting restrictions on the electric valve actuator.

F. The valve operators and electric actuators shall be the full and undivided responsibility of the valve manufacturer (where new valves and actuators are furnished) in order to ensure complete coordination of the components and to provide unit responsibility.

### 1.02 SUBMITTALS

A. The following items shall be submitted with the Shop Drawings in accordance with, or in addition to the submittal requirements specified in Section 01300, Submittals; and Section 11000, Equipment General Provisions:

1. Certification that the force required to operate all valves is as specified herein.

## PART 2 -- PRODUCTS

### 2.01 GENERAL

A. Electric actuators shall be provided where specified in the Valve Schedule in Section 15390 – Schedules.

B. Manual operators shall be provided on all valves which do not receive electric actuators. Manual operator type shall be as specified herein and as shown on the Drawings.

042710BR

C. Quarter turn valves 8” and greater in size shall have geared operators.

D. Operators/actuators shall be furnished with conservatively sized extension bonnets, extension stems, or torque tubes, and all required appurtenances required for a complete installation. Operators furnished with extension bonnets shall include stainless steel extension stems, or stainless steel torque tubes.

2.02 MANUAL OPERATORS

A. Unless otherwise specified or shown on the Drawings, manual operator type shall be as follows:

1. Buried valves shall be equipped with nut operators, extended stems, and valve boxes.

2. Exposed valves up to 6-inch shall be lever operated.

3. Exposed valves 8-inches and larger shall be handwheel operated.

4. Valves with centerline of operator located more than 6-feet above the floor or platform from which it is to be operated shall have a chainwheel operator. unless otherwise indicated on the Drawings.

B. Manual operators shall be rigidly attached to the valve body unless otherwise specified or shown on the Drawings.

C. All operators shall turn counter-clockwise to open and shall have the open direction clearly and permanently marked.

D. Valve operators shall be designed so that the force required to operate the handwheel, lever, or chain (including breakaway torque requirements) does not exceed 80 pounds applied at the extremity of handwheel, lever, or chainwheel operator. Design pressures for sizing of valve operators shall be the piping test pressure for the piping in which the valve is to be installed as shown in the Piping Schedule in Section 15390 – Schedules.

E. Handwheels for valves operators shall not be less than 12 inches in diameter. The maximum diameter of any handwheel shall not exceed 24”.

F. Nut operators shall have standard 2-inch square AWWA operating nuts designed in accordance with AWWA C504.

G. Geared manual operators shall be of the worm gear, traveling nut or scotch yolk type except manual operators for butterfly valves 18-inch in diameter or larger which shall be worm gear, unless otherwise indicated in the individual valve specification. Gear operators shall be of the worm gear or bevel gear type. Gear box designs incorporating end of travel stops in the housing shall be equipped with AWWA input stops. Each gearbox shall require a minimum of 10 turns for 90 degree rotation or full valve stem travel and shall be equipped with a mechanical valve position indicator.

G. Manual operators on below grade (and vault installed) valves shall be permanently lubricated and watertight under an external water pressure of 10 psi.

2.03 ELECTRIC VALVE ACTUATORS

A. Electric Actuators shall be open/close service or modulating service as specified in the Valve Schedule in Section 15390 – Schedules.

1. Open/Close (non-modulating) valve actuators shall be Series 2000 as manufactured by EIM Controls.

2. Modulating valve actuators shall be Series 2000 as manufactured by EIM Controls.

B. Performance Requirements

1. The actuators shall be designed for indoor and outdoor service and shall be capable of mounting in any position.

2. Torque capacity of the actuators shall be sufficient to operate the valves with the maximum pressure differential, as indicated in the Valve Schedule in Section 15390, with a safety factor of 1.5. Actuators in modulating service will be selected such that the required dynamic valve torque is no more than 60% of the electric actuator's maximum rated breakaway of torque.

3. Operating time for full limits of travel shall be not more than 2 seconds per inch diameter of the valve, +/- 50 percent through 20 inches; +/- 30 percent for valves 24 inches and larger. Operating time shall not be less than 60 seconds for all modulating valves.

4. Actuators shall be capable of operating in ambient temperatures ranging from 0 degrees F – 160 degrees F.

5. For open/close (non-modulating) actuators, the gearing, motor and contactor shall be capable of 60 starts per hour without overheating.

6. For modulating actuators, the gearing, motor and contactor shall be capable of 1200 starts per hour without overheating.

C. The actuators shall include, in one integral housing, individual compartments for the motor, gearing, wiring terminals, and control circuits. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal. The inner seal shall protect the motor and all other internal electrical elements of the actuator from entrance of moisture and dust when the terminal cover is removed. Double cartridge shaft seals shall be provided on the hand wheel and output shafts for weatherproof protection. All external fasteners shall be stainless steel. Compartments shall be provided with moisture and dust-proof rigid cast covers meeting NEMA 6, certified to submergence in 6 ft of water for 30 minutes.

D. All gearing shall be hardened alloy steel or bronze and shall be rated at twice the output torque of the operator and shall be designed to withstand the stall torque of the motor without failure. Output drive gearing shall consist of a worm shaft and worm gear pinion operating in an oil bath. The worm gear pinion shall be alloy bronze. Worm gear drive

shall be self-locking to prevent creeping of the valve disc in an intermediate position. Heavy-duty grease shall protect gearing and sealed ball bearings of the main shaft for five years without changing. Motor reduction gearing shall be spur or planetary gearing and shall allow for field repair and change in gear ratio. For quarter turn applications, overtravel of the operator shall be prevented by internal mechanical stops cast into the actuator.

E. A mechanical dial position indicator shall be furnished to continuously indicate the position of the valve at and between the fully open and fully closed positions. The indicator shall be driven by gearing driven off of the main worm gear pinion and shall operate when the actuator is in either the electrical mode or manual mode.

F. A handwheel shall be permanently attached for manual operation. A gear assembly shall be provided between the handwheel and the worm shaft if required to reduce the force necessary to operate the handwheel to less than 80 pounds. A positive declutch mechanism shall engage the handwheel when required. When the actuator is set in the declutched position for handwheel operation, it shall return automatically to electric operation when actuator motor is energized. The handwheel shall not rotate during electric operation nor shall a fused motor prevent handwheel operation.

G. The drive motor shall be specifically designed for actuator service and shall be characterized by high starting torque and low inertia. Motors shall be 120V, single phase, 60 Hz AC or 480V 3-phase, reversible squirrel cage induction type motors and shall be specifically designed for modulating service where indicated on the Valve Schedule in Section 15390. Motor voltage shall be as indicated in the Valve Schedule in Section 15390. Motors shall be totally enclosed, non-ventilated, with NEMA Class F insulation minimum (Class H for modulating actuators) and a maximum continuous temperature rating of 120 degree C (rise plus ambient). A 120 VAC space heater shall be provided in the motor housing. The electric motor shall have a time rating of at least 15 minutes at 104°F (40°C) or twice the valve stroking time, whichever is longer, at an average load of at least 33% of maximum valve torque. Motor bearings shall be permanently lubricated by premium lubricant. The motor shall have plug and socket electrical connection to facilitate easy removal and replacement. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel with either phase sequence of the three-phase power supply connected to the actuator. The motor shall include single phase protection. A suitable thermal protection device shall be incorporated in the motor or motor starter circuits, connected to a tripping device. Fast acting fuses shall be provided to protect solid state components. The motor shall be capable of starting against the rated load in either the open or close direction when voltage to the motor terminals is plus or minus ten (10) percent of nameplate rating.

1. Open/Close actuators shall be furnished with electro-mechanical reversing starters.

2. Modulating actuators shall be furnished with solid state reversing starters utilizing thyristors.

H. Leads from the motor shall be brought to the control circuit (limit switch) compartment without external piping or conduit box. An adequately sized space heater shall be installed in the control circuit compartment to aid in the prevention of damage resulting in

from condensation. The following items shall be located in the control circuit compartment.

1. Torque limit switches shall be provided to de-energize the motor control circuit in the event of a stall when attempting to unseat a jammed valve and when torque is exceeded during valve travel. Each actuator shall have an open direction torque switch and a close direction torque switch. The torque switches shall be mechanically operated and able to be set in torque units. Torque switches shall be calibrated prior to the actuator's assembly to the valve.

2. Travel limit switches shall be provided to de-energize the motor control circuit when the actuator reaches the limits of travel in the open and close directions. The limit switch drive shall be of the counter gear type and "in step'" with the actuator output drive at all times in either the electrical or manual mode of operation. A minimum of six (6) contacts, three (3) normally open and three (3) normally closed, shall be supplied at each end of valve travel. Four (4) additional contacts shall be provided to report end of travel or any desired position between ends of travel.

I. Modulating actuators shall have a position feedback potentiometer mounted directly to the valve actuator gearing inside the gearing compartment. The potentiometer shall provide a 4-20 mA signal corresponding to valve position. Modulating valve actuators shall be designed to respond to either a 4-20mADC analog signal or a digital pulse signal as specified herein or as required to coordinate with the requirements of Division 17.

1. Modulating valve actuators designed to respond to a 4-20mADC signal shall be provided with a valve positioner which shall position the valve proportional to an externally generated 4-20mADC signal. The valve positioning control circuitry shall position the valve by comparing the command signal with the present valve position as indicated by the feedback potentiometer. The positioner shall be field adjustable to fail to the "open," "closed," or "last" position on loss of 4-20 mADC command signal.

2. Modulating valve actuators designed to respond to "pulse" open/close signals shall operate the valve during the time the open or close pulse signal is high. Modulating actuators designed to respond to "pulse" open/close signals shall have the latching circuitry described above for open/close actuators disabled.

J. The electrical terminals shall be housed in a double sealed terminal compartment isolated from the rest of the actuator components. The actuators shall be designed to operate from a single point electrical source. The actuators shall be furnished with fuses inside of the terminal compartment. A quantity of two – ¾ inch NPT conduit entries shall be furnished.

K. Actuators shall contain wiring and terminals for the following control functions. All dry contacts shall be rated for 5A at 250VAC.

1. Open, Close, and Stop commands from external dry contacts (utilizing internal 24VDC power supply) and/or from an external signal of 12V to 120V. The inputs for the open, close, stop signals shall be field selectable to be respond to either

maintained or momentary remote signals. In momentary mode, the actuator shall have internal latching circuitry that causes the operator to drive the valve to its limit of travel upon receipt of the momentary contact signal unless a stop signal is received.

2. Remote Local-Off-Remote selector switch, Open/Close pushbuttons, and Open/Closed pilot lights for a remote manual control station (see below). The remote Local-Off-Remote selector switch and Open/Close pushbuttons shall be a dry contact input to the actuator control circuitry. The Open/Closed pilot lights shall be powered from the valve actuator control power.

3. Four (4) unpowered contacts shall be provided which can be selected to indicate valve "Opened" and "Closed" position, "Remote" status of the actuator, and fail status of the actuator. The fail status contacts shall activate upon motor overtemperature and actuator overtorque as a minimum.

4. Terminals for 4-20mADC position command and 4-20mADC position feedback as described above for modulating actuators.

L. Local Controls

1. Actuators shall be furnished with a Local-Off-Remote (LOR) selector switch; Open, Close, and Stop pushbuttons for local control; a red lamp indicating closed and a green lamp indicating open. LOR switch shall be padlockable in any of the three positions.

a. When the LOR is in the "Local" position, open/close control shall be by the open and close pushbuttons on the actuator. The stop push button shall stop the actuator travel.

b. When the LOR is in the "Off" position, the actuator shall not operate.

c. When the LOR is in the "Remote" position, the actuator shall be controlled by remote inputs from the PLC or from the remote manual controls station.

2. The local controls shall be arranged so that the direction of travel can be reversed without the necessity of stopping the actuator.

2.04 ELECTRIC VALVE ACTUATORS (FILTER EFFLUENT VALVES – GLENVILLE LAKE WTF ONLY)

A. Modulating service valve actuators shall be Group 11 rotary valve drives as manufactured by Harold Beck and Sons, Inc. Operators shall be furnished with 120-volt, single phase, 60 Hz AC, TENV, permanent magnet, synchronous, inductor motors with Class H insulation, and specifically designed for modulating service as specified in the Valve Schedule in Section 15390. Motor shall be non-coasting, suitable for high duty cycle conditions, and shall be self-locking and self-releasing without the use of a separate brake winding, mechanical brake, or worm gear mechanism. The motor shall be capable of up to 60 starts/stops per minute or a temporary stall condition without

overheating. Triacs shall be utilized for solid-state switching. Torque capacity of the operators shall be sufficient to operate the valves with a maximum pressure differential indicated in the Valve Schedule in Section 15390 with a safety factor of at least 1.5. Maximum current draw of motors shall be 3.1 amperes in a fully stalled condition. Motors shall reach synchronous speed on start-up in 1.5 AC power cycles and shall also reach dead stop from full synchronous speed in 1.5 cycles. Motor shall not overheat or fail when in continuous stall condition for 72 hours. No electrical or thermal overload protection shall be required for protection of a stalled or cycling operator.

B. Control drive shall be designed to stay in place upon loss of power and shall be capable of holding a load equal to at least 200% of the model's rated output. Stall torque shall be self-limiting, not exceeding 2.5 times the rated torque. Torque switches shall not be required. Drive shall operate on an increasing signal for full 100° rotation. Control drives shall be able to operate in any mounting orientation.

C. Gear train shall have high efficiency spur gears constructed of heat-treated alloy steel or ductile iron only. Readily available gear modules shall provide for a range of torque and timing combinations within the drive's rated capacity and shall be field-interchangeable. Gears shall be rated at twice the output torque of the operator, so that a continuous stall condition of 72 hours will not create any significant wear or performance degradation. To protect against accumulative stall damage in Auto mode, the drive should automatically discontinue motor operation when the motor current is detected to be flowing in the same direction for 300 seconds. Over-travel of operator shall be prevented by internal mechanical stops cast into the operator. Operating time between full limits of travel shall be no less than 60 seconds.

D. Motor pinion and all gearing shall be lubricated with a premium, heavy-duty lithium based lubricant, and shall not require changing of the lubrication for a minimum of five years. No oil baths shall be used for lubrication purposes. Maintenance-free bearings shall be used.

E. A low-speed, disc-type motor, solid cast handwheel shall be provided, directly connected to the motor's rotor, for manual operation. A mechanical indicator of valve position shall be provided and attached to the main output shaft driving the load. No declutching mechanism shall be required for manual operation.

F. Linkage between operator and valve shall be by crank arms and connecting rod, with adjustable starting point of valve position and adjustable rod length. Operators shall stop precisely within 0.15 degrees of the desired control position. Operator output shaft shall be stainless steel. Stem shall be self-locking when the motor is de-energized. Modular construction and special lubrication shall permit the operator to be mounted in any position. Modulating operators shall be capable of operating in ambient temperatures ranging from -40°F to 185°F.

G. Operators shall be provided with four individual compartments for the motor, gearing, wiring terminals, and auxiliary switches plus position sensing device. Compartments shall be provided with moisture and dust-proof rigid cast covers. All switches, wiring, relays, etc., shall be brought to a gasketed and sealed terminal board for field connection. Two conduit entries shall be provided with the actuator, one 1/2-inch NPT for signal wiring and one 1-inch NPT for power wiring. Conduit shall be run properly to avoid water ingress to the compartments. The motor shall have electrical connections soldered directly to the wiring terminal block where appropriate. Double cartridge shaft seals shall be provided on the handwheel and output shafts for weatherproof protection.

H. Two SPDT limit switches for over-travel protection and four auxiliary SPDT limit switches (two normally open, two normally closed) shall be provided on all operators. Limit switches shall be snap-acting, SPDT, silver alloy contacts rated for 6 amperes at 120 VAC. Switches shall have lubrication-free nylon rollers, polished stainless steel roller-axle, and tempered blades. Switches shall be infinitely adjustable over the full range of valve travel. Limit switches shall be wired to a terminal board for remote output. Drive shall also have integral mechanical stops, capable of limiting travel of the drive and load, with or without the drive motor.

I. The operators for the modulating valves shall be provided with 4-20 mA output signals for valve position feedback. Continuous position sensing of valve position shall be provided. Position sensing shall require no contacting or wiping surface. The position sensing unit shall be provided integral with the operator and shall provide a linear 4-20 mA output signal, approximately proportional to valve percent open.

J. Modulating actuators shall have a position feedback potentiometer mounted directly to the valve actuator gearing inside the gearing compartment. The potentiometer shall provide a 4-20 mA signal corresponding to valve position. Modulating valve actuators shall be designed to respond to a digital pulse signal as specified herein or as required to coordinate with the requirements of Division 17.

    1. Modulating valve actuators designed to respond to “pulse” open/close signals shall operate the valve during the time the open or close pulse signal is being received. Modulating actuators designed to respond to “pulse” open/close signals shall have the latching circuitry described for open/close actuators disabled.

K. Actuators shall contain wiring and terminals for the following control functions. All dry contacts shall be rated for 6A at 120VAC.

    1. A five-position, drive-mounted electric handswitch shall be provided to permit local electrical operation of the unit for control adjustment or operation on loss of control signal.

    2. Four (4) unpowered contacts shall be provided, three of which shall be selected to indicate valve “Opened” position, valve “Closed” position, and “Auto” status of the actuator. “Fail” status of the actuator shall be monitored from a separate

terminal. In normal operation, this terminal shall not be energized. The “Fail” contact shall activate upon a stall condition, motor overtemperature, or loss of signal event.

3. Where required in the Valve Schedule in Section 15390 – Schedules, the actuator must be wired to interface with a remote manual control station to be supplied by the Electric Actuator Manufacturer.

L. Certified electrical control schematic diagrams shall be provided by the actuator Manufacturer for each service type of electric actuator. Interconnecting wiring information shall be submitted including terminal numbers, color coding, and the name and terminal numbers, for items to which the wiring is to be connected.

M. Enclosure shall be totally enclosed, cast, weatherproof, dust-tight, NEMA 4X, construction and IP68 rated. Separate conduit entrances shall be available for power and control wiring connections.

N. Local Controls

1. A five-position, drive-mounted electric handswitch shall be provided to permit local electrical operation of the unit for control adjustment or operation on loss of control signal. All switches, wiring, relays, etc. shall be brought to a terminal board for field connection.

a. When the handswitch is in the “Auto” position, the actuator shall be controlled by remote control signals. Operators for modulating service shall be provided with integral position controllers which shall receive a pulse signal and, while in "Auto" mode, shall position the valve.

b. When the handswitch is in the “CW” or “CCW” position, the actuator shall move toward the appropriate end-of-travel limit switch. Placing the selector switch in the “Stop” position shall stop the actuator travel.

## 2.05 SPARE PARTS

A. Spare parts shall be provided in accordance with Section 11000, Equipment General Provisions and shall include the following:

1. One (1) seal kit.

2. One (1) torque switch.

3. One (1) limit switch.

## PART 3 -- EXECUTION

3.01 MANUFACTURER'S FIELD SERVICES

A. The services of a qualified manufacturer's technical representative shall be provided in accordance with Section 11000, Equipment General Provisions and shall include the following site visits for the respective electric actuator applications:

Filtered Water Mixing Vault Bypass:

| Service | Number of Trips | Number of Days/Trip |
|---|---|---|
| Installation, Testing, and Start-up | 1 | 1 |
| Services after Startup | 1 | 1 |

B. At least one trip of one (1) day shall be provided for training providing instruction to the Owner's personnel in proper operation and maintenance of all equipment.

3.02 INSTALLATION

A. All valve actuators shall be installed in accordance with the manufacturer's published recommendations and the applicable specification sections for valves, and motor controls.

B. Valve actuators shall be factory coated in accordance with the manufacturer's standard paint system.

3.03 SHOP TESTING

A. Shop testing shall be in accordance with Section 11000, Equipment General Provisions and with the following additional requirements:

1. Conduct a complete functional check of each unit. Correct any deficiencies found in shop testing prior to shipment.

2. Submit written certification that:

a. Shop tests for the electrical system and all controls were successfully conducted;

b. Electrical system and all controls provide the functions specified and required for proper operation of the valve operator system.

3. Each actuator shall be performance tested and individual test certificates shall be supplied free of charge. The test equipment shall simulate each typical valve load and the following parameters should be recorded:

a. Current at maximum torque setting

b. Torque at maximum torque setting

c. Flash Test Voltage

d. Actuator Output Speed or Operating Time

e. In addition, the test certificate should record details of specification, such as gear ratios for both manual and automatic drive, closing direction, and wiring diagram code number.

f. Verification of actuator torque rating with valve.

3.04 FIELD TESTS

A. Field testing shall be in accordance with Section 11000, Equipment General Provisions and with the following additional requirements:

1. Valve actuators shall be field-tested together with the associated valves.

2. Test all valves at the operating pressures at which the particular line will be used.

3. Test all valves for control operation as directed.

4. Field testing shall include optimization of opening and closing times of the valves. Valve opening and closing times shall be adjusted based on process requirements to optimize operation of the valves. Final valve opening and closing times as determined by field tests shall be approved by the Engineer prior to final acceptance of the system.

B. Preliminary Field Tests

1. General: Preliminary field tests shall be conducted prior to start-up and shall include a functional check of the entire valve operator system and all system components.

2. Scope: Preliminary field tests shall demonstrate that the valve operator system performs according to specifications and that all equipment, valves, controls, alarms, interlocks, etc., function properly.

3. Based on results of preliminary field tests, the Contractor shall make any adjustments required to settings, etc., to achieve the required valve closing time and operation, as specified or otherwise directed.

C. Final Field Tests

1. Final field tests shall be conducted in accordance with the latest revision of AWWA C500.

2. Final field tests shall be conducted simultaneously with the start-up and field testing of the pumps.

3. Final field tests shall be conducted for the full range of operating modes and conditions specified and as directed by the Engineer. Each of the valves shall be tested at minimum, maximum, and normal head/flow conditions, and under all

specified conditions of opening and closing.

4. Certification of Equipment Compliance: After the final field tests are completed and passed, submit affidavit according to Section 11000.

- END OF SECTION -

**Attachment #5 – Sheet C302 Figure**

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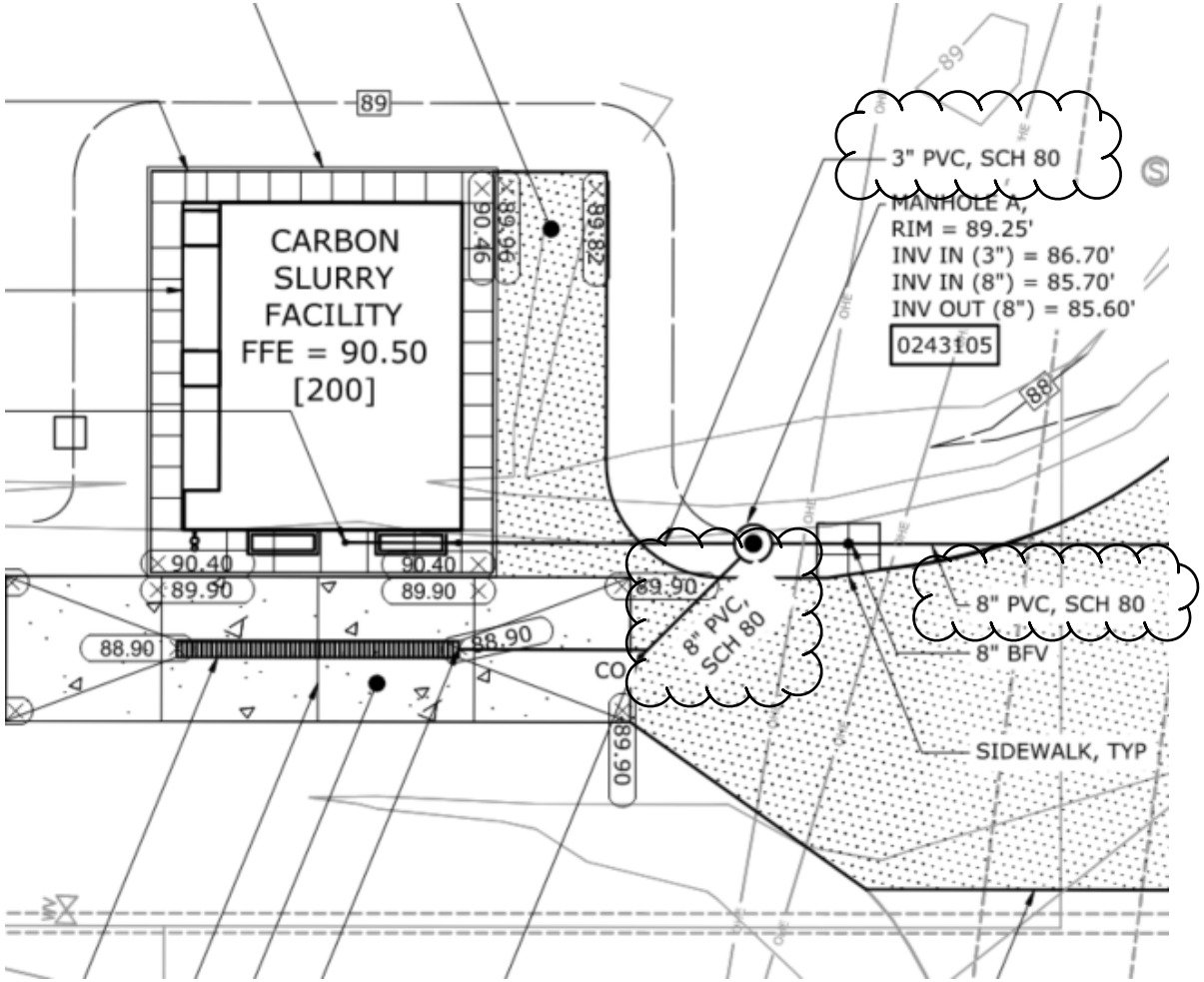


| ADDENDUM NO. | DATE | PUBLIC WORKS COMMISSION<br>CITY OF FAYETTEVILLE, NORTH CAROLINA | HAZEN JOB NUMBER | REFER TO CONTRACT DRAWING NUMBER |
|---|---|---|---|---|
| 3 | 09/2023 | | 30402-055 | C302 |
| ATTACHMENT NO. | BY | GLENVILLE LAKE WATER TREATMENT FACILITY<br>RELIABILITY IMPROVEMENTS | CONTRACT NUMBER | |
| 5 | DCH | | 55 | SHEET 1 OF 1 |

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**Attachment #6 – Sheet C303 Figure**

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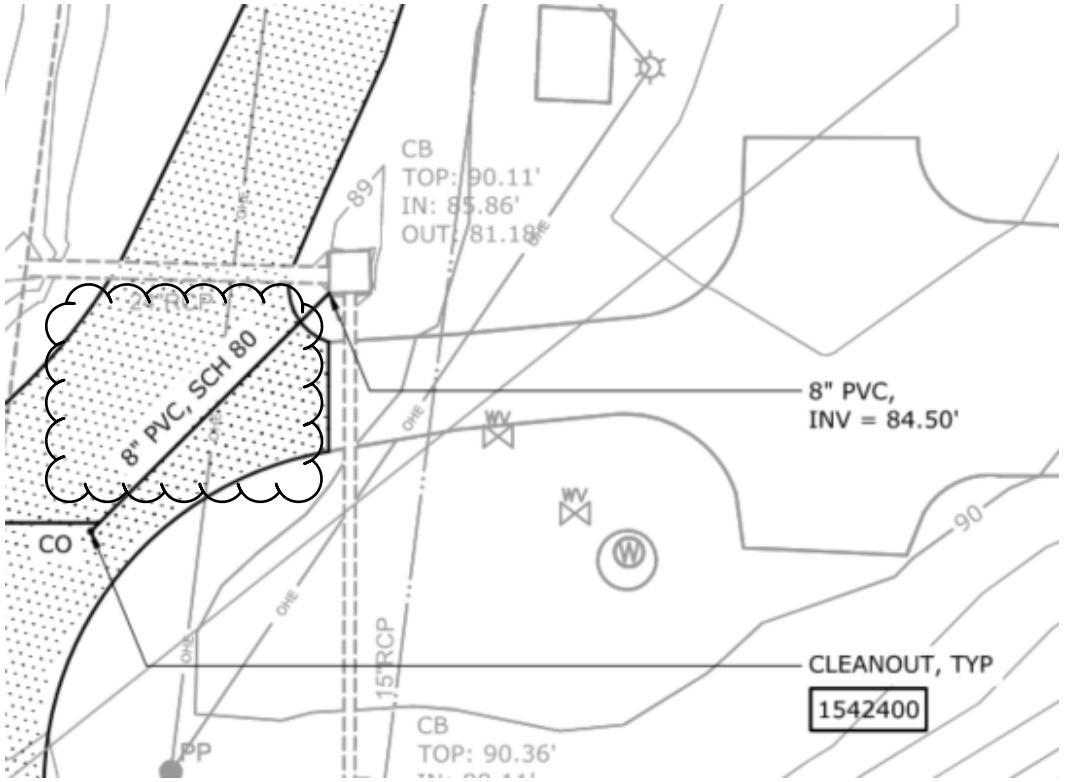


| ADDENDUM NO. | DATE | PUBLIC WORKS COMMISSION<br>CITY OF FAYETTEVILLE, NORTH CAROLINA | HAZEN JOB NUMBER | REFER TO CONTRACT DRAWING NUMBER |
|---|---|---|---|---|
| 3 | 09/2023 | | 30402-055 | C303 |
| ATTACHMENT NO. | BY | GLENVILLE LAKE WATER TREATMENT FACILITY<br>RELIABILITY IMPROVEMENTS | CONTRACT NUMBER | SHEET 1 OF 1 |
| 6 | DCH | | 55 | |

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**Attachment #7 – Sheet E903 Figure**

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## MOTOR CONTROL CENTER MCC-TF

SINGLE LINE DIAGRAM

NOTES:

1. NOT ALL DEVICES ASSOCIATED WITH THE PUMP ARE SHOWN ON THE SINGLE LINE DIAGRAM. SEE RISER DIAGRAMS ON DRAWING E905 FOR ADDITIONAL DEVICES INCLUDING WIRE AND CONDUIT INFORMATION.
2. SEE DRAWING E911 FOR IMPORTANT MOTOR DATA AND ACCESSORY INFORMATION FOR EACH MOTOR.

REFER TO CONTRACT DRAWING NUMBER E903

SHEET 1 OF 1

HAZEN JOB NUMBER 30402-055

CONTRACT NUMBER 55

PUBLIC WORKS COMMISSION
CITY OF FAYETTEVILLE, NORTH CAROLINA

P.O. HOFFER WATER TREATMENT FACILITY
RELIABILITY IMPROVEMENTS

DATE 09/2023

BY DCH

ADDENDA NO. 3

ATTACHMENT NO. 7

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**Attachment #8 – Sheet E906 Figure**

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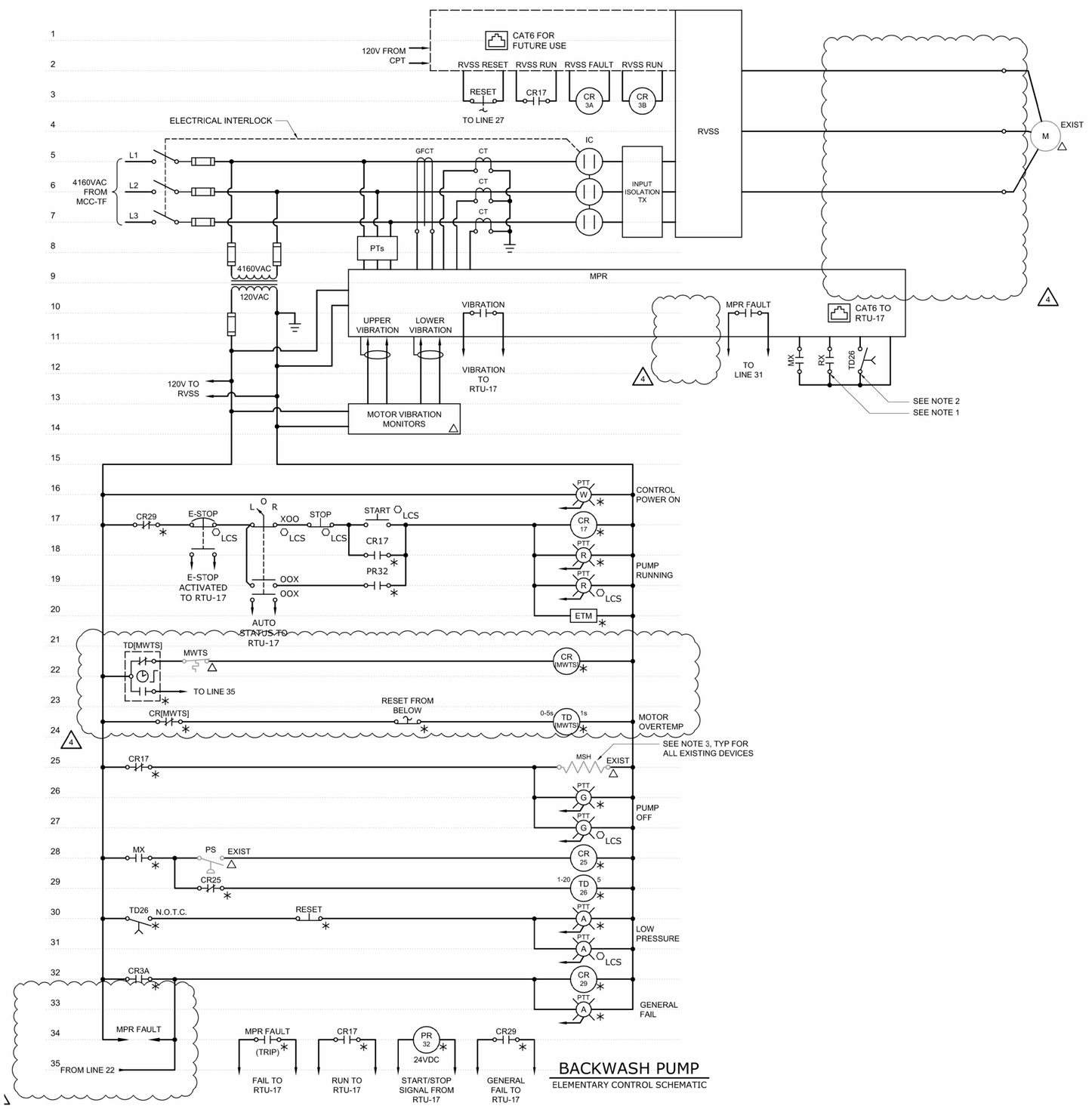


| ADDENDA NO. | DATE | PUBLIC WORKS COMMISSION<br>CITY OF FAYETTEVILLE, NORTH CAROLINA | HAZEN JOB NUMBER | REFER TO CONTRACT DRAWING NUMBER |
|---|---|---|---|---|
| 3 | 09/2023 | | 30402-055 | E906 |
| ATTACHMENT NO. | BY | P.O. HOFFER WATER TREATMENT FACILITY<br>RELIABILITY IMPROVEMENTS | CONTRACT NUMBER | SHEET 1 OF 1 |
| 8 | DCH | | 55 | |

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**Attachment #9 – Sheet E907 Figure**

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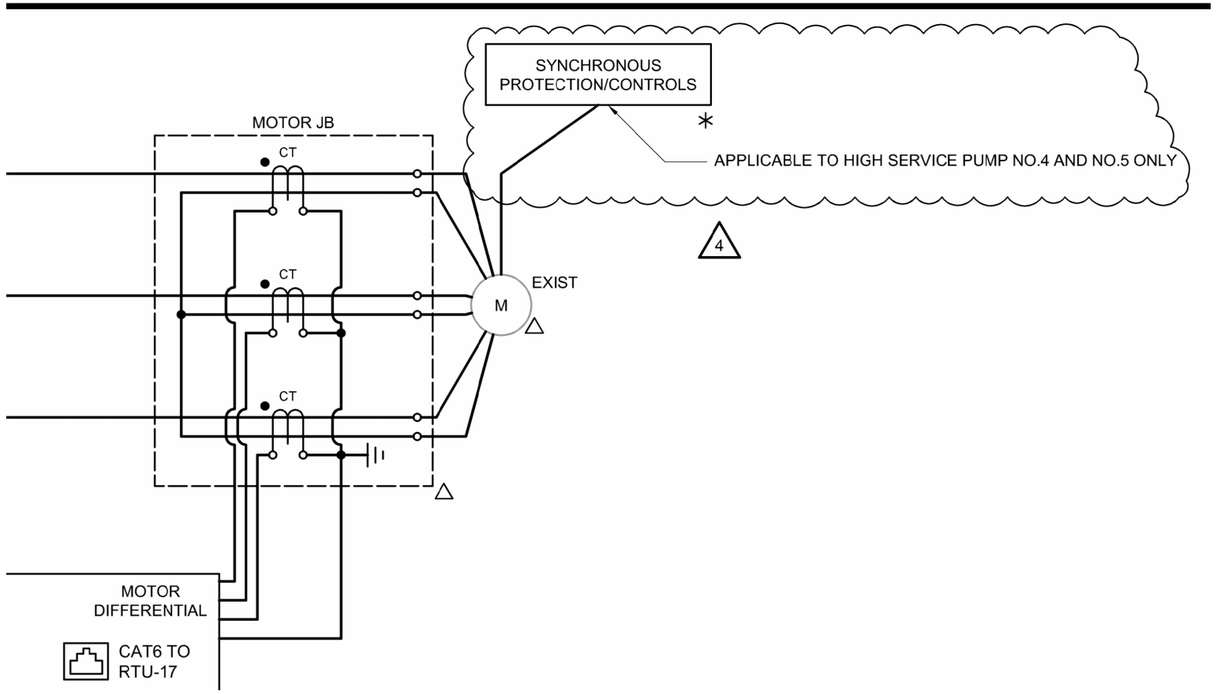


115

# HIGH SERVICE PUMPS No. 1 - No. 5 AND No. 7

ELEMENTARY CONTROL SCHEMATIC

| | | |
|---|---|---|
| REFER TO CONTRACT DRAWING NUMBER E907 | | SHEET 1 OF 1 |
| HAZEN JOB NUMBER 30402-055 | CONTRACT NUMBER 55 | |
| PUBLIC WORKS COMMISSION<br>CITY OF FAYETTEVILLE, NORTH CAROLINA | | |
| P.O. HOFFER WATER TREATMENT FACILITY<br>RELIABILITY IMPROVEMENTS | | |
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| ADDENDA NO. 3 | ATTACHMENT NO. 9 | |

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**Attachment #10 – Sheet E908 Figure**

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# HIGH SERVICE PUMPS No. 6 AND No. 8

ELEMENTARY CONTROL SCHEMATIC

| | |
|---|---|
| REFER TO CONTRACT DRAWING NUMBER E908 | SHEET 1 OF 1 |
| HAZEN JOB NUMBER 30402-055 | CONTRACT NUMBER 55 |
| PUBLIC WORKS COMMISSION<br>CITY OF FAYETTEVILLE, NORTH CAROLINA | P.O. HOFFER WATER TREATMENT FACILITY<br>RELIABILITY IMPROVEMENTS |
| DATE 09/2023 | BY DCH |
| ADDENDA NO. 3 | ATTACHMENT NO. 10 |

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**Attachment #11 – Sheet E910 Figure**

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| CIRCUIT ID | FROM | TO | CONDUCTORS | CONDUIT | TRAY ID | REMARKS |
|---|---|---|---|---|---|---|
| C-900-080 | | | NOT USED | | | |
| C-900-081 | HIGH SERVICE PUMP No. 5 RVSS - MCC-TF | CPB-TF | 34#14, #14GND | 1 1/2" | T3 | |
| C-900-082 | | | NOT USED | | | |
| C-900-083 | CPB-TF | CPB-HSP5 | 34#14, #14GND | 1 1/2" | | |
| C-900-084 | CPB-HSP5 | EXISTING HIGH SERVICE PUMP No. 5 | 2#14, #14GND | 3/4" | | MSH |
| C-900-085 | CPB-HSP5 | HIGH SERVICE PUMP No. 5 LCS | 20#14, #14GND | 1" | | |
| C-900-086 | CPB-HSP5 | SOLENOID VALVE SV-1 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-087 | CPB-HSP5 | PRESSURE SWITCH PS-1 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-088 | CPB-HSP5 | LIMIT SWITCH LS-1 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-089 | CPB-HSP5 | LIMIT SWITCH LS-2 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-090 | CPB-HSP5 | SOLENOID VALVE SV-2 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-091 | CPB-HSP5 | SOLENOID VALVE SV-3 | 2#14, #14GND | 3/4" | | HIGH SERVICE PUMP No. 5 |
| C-900-092 | | | NOT USED | | | |
| C-900-093 | | | NOT USED | | | |
| C-900-094 | | | NOT USED | | | |
| C-900-095 | HIGH SERVICE PUMP No. 6 VFD | CPB-TF | 34#14, #14GND | 1 1/2" | T3 | |
| C-900-096 | | | NOT USED | | | |
| C-900-097 | CPB-TF | CPB-HSP6 | 34#14, #14GND | 1 1/2" | | |
| C-900-098 | CPB-HSP6 | EXISTING HIGH SERVICE PUMP No. 6 | 2#14, #14GND | 3/4" | | MSH |

REFER TO CONTRACT DRAWING NUMBER E910

SHEET 1 OF 1

HAZEN JOB NUMBER 30402-055

CONTRACT NUMBER 55

PUBLIC WORKS COMMISSION
CITY OF FAYETTEVILLE, NORTH CAROLINA

P.O. HOFFER WATER TREATMENT FACILITY
RELIABILITY IMPROVEMENTS

DATE 09/2023

BY DCH

ADDENDA NO. 3

ATTACHMENT NO. 11

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**Attachment #12 – Sheet E911 (New)**

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| | EXISTING BACKWASH WATER PUMP | EXISTING HIGH SERVICE PUMP NO.1 | EXISTING HIGH SERVICE PUMP NO.2 | EXISTING HIGH SERVICE PUMP NO.3 | EXISTING HIGH SERVICE PUMP NO.4 | EXISTING HIGH SERVICE PUMP NO.5 | EXISTING HIGH SERVICE PUMP NO.6 | EXISTING HIGH SERVICE PUMP NO.7 | EXISTING HIGH SERVICE PUMP NO.8 |
|---|---|---|---|---|---|---|---|---|---|
| MOTOR TYPE | INDUCTION | INDUCTION | INDUCTION | INDUCTION | SYNCHRONOUS | SYNCHRONOUS | SYNCHRONOUS | INDUCTION | INDUCTION |
| FULL LOAD AMPS | 19.9A | 38.8A | 44.7A | 51.6A | 108A | 65A | 108A | 166A | 154A |
| NOMINAL MOTOR SPEED | 1200RPM | 1200RPM | 1200RPM | 1200RPM | 1200RPM | 1200RPM | 1200RPM | 900RPM | 900RPM |
| NEMA DESIGN | B | B | B | B | N/A | N/A | N/A | UNKNOWN | UNKNOWN |
| LOCKED ROTOR CODE LETTER | F | F | G | F | N/A | N/A | N/A | UNKNOWN | E |
| MOTOR VOLTAGE | 4160VAC | 4160VAC | 4160VAC | 4160VAC | 4160VAC | 4160VAC | 4160VAC | 4000VAC | 4160VAC |
| FIELD VOLTAGE | N/A | N/A | N/A | N/A | 125VDC | 125VDC | 125VDC | N/A | N/A |
| FIELD CURRENT | N/A | N/A | N/A | N/A | 37DCA | <44DCA | 37DCA | N/A | N/A |
| MOTOR ACCESSORIES | | | | | | | | | |
| WINDING AND BEARING RTDS | NO | FUTURE | YES | FUTURE | FUTURE | FUTURE | FUTURE | YES | YES |
| MOTOR WINDING TEMP SW | YES | NO | NO | NO | NO | NO | NO | NO | NO |
| MOTOR SPACE HEATER | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| VIBRATION SENSORS | NO | FUTURE | YES | FUTURE | FUTURE | FUTURE | FUTURE | YES | YES |
| DIFFERENTIAL CTs | NO | FUTURE | FUTURE | FUTURE | FUTURE | FUTURE | FUTURE | FUTURE | YES |

## NOTES:

1. NOT ALL MOTOR ACCESSORIES ARE THE SAME AT EACH PUMP. FOR PUMPS WITH MOTOR ACCESSORIES MARKED AS FUTURE, THE CIRCUITRY IN THE MOTOR STARTER AND ASSOCIATED CONDUIT AND WIRE SHALL BE PROVIDED UNDER THIS CONTRACT. SUCH FUTURE ACCESSORIES MAY BE INSTALLED BY THE OWNER AT SOME POINT DURING THE DURATION OF THIS CONTRACT.

File: O:\30402-RAL\30402-055\CAD_BIM\PHASE 1C\ELEC\E911 Saved by DATKINSON Save date: 9/14/2023 3:02 PM
PLOT DATE: 9/14/2023 3:02 PM BY: DATKINSON

| REV | ISSUED FOR | DATE | BY |
|---|---|---|---|
| 3 | CONSTRUCTION | 07/2023 | DCH |
| 2 | FUNDING REVIEW | 08/2021 | DCH |
| 1 | REGULATORY REVIEW | 10/2020 | DCH |

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE 0 1/2" 1"

| | |
|---|---|
| PROJECT ENGINEER: | D. C. HOPKINS |
| DESIGNED BY: | D. ATKINSON |
| DRAWN BY: | M. DREN |
| CHECKED BY: | N. MEYER |

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33531 DAVID A. ATKINSON JR. 2023.09.14 15:32:05 -04'00'

FINAL DRAWING - ISSUED FOR CONSTRUCTION

Hazen

HAZEN AND SAWYER
4011 WESTCHASE BOULEVARD, SUITE 500
RALEIGH, NORTH CAROLINA 27607
LICENSE NO. : C-0381

PUBLIC WORKS COMMISSION
CITY OF FAYETTEVILLE, NORTH CAROLINA

P.O. HOFFER WATER TREATMENT FACILITY
GLENVILLE LAKE WATER TREATMENT FACILITY
RELIABILITY IMPROVEMENTS

# TREATMENT FACILITY ELECTRICAL
# BUILDING
# ELECTRICAL
# EXISTING MOTOR DATA

| | |
|---|---|
| DATE: | JULY 2023 |
| HAZEN NO.: | 30402-055 |
| SITE: | P.O. HOFFER |
| DRAWING NUMBER: | E911 |