ADDENDUM 1
TO THE CONTRACT PROVISIONS AND CONTRACT PLANS

FOR

MASON COUNTY PUD 1
SHADOWOOD WATER SYSTEM IMPROVEMENTS

G&O #21285

ISSUED THIS DATE: **MONDAY, MARCH 3, 2025**

BID SUBMITTAL: **4:00 P.M. (LOCAL TIME) ON TUESDAY, MARCH 18, 2025 MASON COUNTY PUD 1 21971 NORTH HIGHWAY 101 SHELTON WASHINGTON, 98584**

Bidder shall acknowledge receipt of this Addendum on Page P-7R of the Proposal.

TO PROSPECTIVE BIDDERS:

The attention of all prospective bidders on the above project is directed to the following additions and modifications to the Contract Provisions and Contract Plans.

I. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO THE TABLE OF CONTENTS

ITEM 1:

Page TC-1, Table of Contents

Under Part 6, Appendices, **ADD** the following:

"Appendix D – Project Apprentice Compliance Documentation"

II. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO PART 1 – BID DOCUMENTS

ITEM 1:

Page BC-1, Bidder Checklist

REVISE the REQUIRED FORMS section as shown below (added text is italicized):

"The Bidder shall submit the following forms, which must be executed in full and submitted with the Proposal.

"a. Proposal (including Statement of Bidder's Qualifications, *and Bidder List*) (Pages P-1R - P-8R)

b. Bid Deposit or Proposal Bond (PB-1)
c. Attachment 3 – Certification of Nonsegregated Facilities"

ITEM 2:

Page P-2, Proposal

DELETE the Proposal (pages P-1 through P-8) in its entirety and **REPLACE** with the attached Proposal (pages P-1R through P-8R). **Changes include:**

1. Adding or Revising the following bid items (numbers shown are based on attached proposal):

a. Base Bid, Bid Item, 7, Revise Quantity from "280 TN" to "3,030 TN"

ITEM 3:

DELETE the Pages titled "FUNDING AGENCY BIDDER'S CHECKLIST" in their entirety.

Note: Attachment 4 does not need to be submitted with this proposal but will be required to be completed by the successful Bidder.

III. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO PART 4 – SUPPLEMENTARY GENERAL CONDITIONS AND GENERAL CONDITIONS

ITEM 1:

Page SGC-1, Section 3.03.4(3.1), Apprentice Utilization

ADD the following after the first paragraph:

"Apprentice forms and documentation, specifically the Project Apprenticeship Utilization Plan and Apprentice Utilization Good Faith Efforts, can be found in Appendix D."

IV. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO THE TECHNICAL SPECIFICATIONS/SPECIAL PROVISIONS

ITEM 1:

Page 01110-2, Specification Section 01110-1.2, PROJECT INFORMATION

ADD the following after the third paragraph:

"If requested by the Contractor, the Owner may agree to suspend the counting of contract time to account for manufacturing and delivery of long lead times, provided that Contractor diligently pursues ordering of these materials and no on-site work is completed during the suspension. Any suspension of contract time shall be at no additional cost to the Owner."

ITEM 2:

Page 01110-3, Specification Section 01110-1.4 A., BOOSTER PUMP/TREATMENT BUILDING AND RESERVOIR CONSTRUCTION

REVISE Subsection A. as shown below (added text is italicized):

"A. BOOSTER PUMP/TREATMENT BUILDING AND RESERVOIR CONSTRUCTION*/WELL HOUSE*

All work associated with the construction *of the* new booster pump/treatment building and the reservoir and the furnishing of equipment and appurtenances must be complete before the existing facility can be taken offline. *The new electrical service must be in place and operational in the Booster Pump/Treatment building prior to replacing the existing well pump."*

ITEM 3:

Page 01160-1, Specification Section 01160 1.2, PERMITS AND LICENSES

REVISE Subsection D as shown below (added text is italicized, deleted text is shown as strike out):

"D. ~~Mason County Demolition~~ *Grading* Permit (applied and paid for by Owner, obtained by Contractor)"

ADD the following after Subsection D:

"The Contractor shall be responsible for scheduling all inspections required by the permits listed above."

ITEM 4:

Page 01200-4, Specification 01200-1.4 A. 7. b., Payment

REVISE subsection "b." as shown below (added text is italicized):

"b. Payment: The unit price bid per ton for BANK RUN GRAVEL FOR BACKFILL shall include all costs for the labor, material, and equipment associated with furnishing, installing, compacting and testing, and wastehaul of native material as shown on the Plans and as specified herein. Payment shall be based upon the weight of material installed. *All imported Bank Run Gravel used for backfill and regrading shall be included in this bid item.*"

ITEM 5:

Page 02820-1, Specification Section 02820-2.1, Fencing

REVISE the paragraphs as shown below (added text is italicized, deleted text is shown as strike out):

> Chain link fencing shall conform to Section 9-16 of the WSDOT Standard Specifications, and shall be a Type 3 fence per WSDOT Standard Plan, with the following exceptions. The fence shall have continuous chain link wire, *and* tension wire ~~and three strands of barbed wire supported on angled extension arms~~. The chain link shall have a 2-inch diamond mesh and 9-gauge wire, meeting ASTM 668, Class 2b. The chain link fence and all accessories shall be ~~black vinyl coated~~ galvanized. The total height of the fence shall be as shown on the Plans. The fence shall be heavy steel guard fence with top rail and bottom tension wire. Top and bottom selvages of chain link fabric are to have a twisted and barbed finish.
>
> Rails, posts, and accessories shall be galvanized with 1.8 ounces per square foot ~~and then powder coated with 3 mils of black TGIC polyester as applied by Powder Coat Northwest or equal~~.
>
> ~~The posts shall be equipped with extension arms, designed to carry three strands of barbed wire at an angle of 45 degrees. The topmost barbed wire shall be located approximately 12 inches above the fabric, and approximately 12 inches out from the fence line. Extension arms for line posts shall be of 14-gauge (minimum) pressed steel, provided with slots for securely fastening the barbed wires. Corner and fence post arms are to be of similar construction, and shall be constructed from a minimum of 12-gauge strip steel or heavy malleable iron, and shall be designed to provide sufficient strength to support the barbed wire.~~
>
> The barbed wire shall be of the 4-point pattern, each wire to be composed of two strands of No. 12-1/2-gauge wire, galvanized after weaving."

ITEM 6:

Page 06100-4, Specification Section 06100-2.7 B., SOFFITS

DELETE Subsection B. title "SOFFITS" and **REPLACE** it with the following:

"INTERIOR WALL AND CEILING PANELING"

ITEM 7:

Page 08330-4, Specification Section 08330-2.2 K., OPERATION

REVISE Subsection "K." as shown below (deleted text is shown as strike out):

> "Provide manual chain hoist ~~back up operation in the event of electric operation failure~~."

V. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO THE TECHNICAL SPECIFICATIONS/SPECIAL PROVISIONS

ADD the attached New Appendix D – Project Apprentice Compliance Documentation

VI. ADDITIONS, MODIFICATIONS, AND/OR DELETIONS TO THE CONTRACT PLANS

ITEM 1:

SHEET C-6, RESTORATION DESTAILS

On Detail 1, **DELETE** the following:

"NOTE:

1. Chain Link Fencing shall be coated with Black Vinyl."

On Detail 2, **DELETE** the following:

"NOTE:

2. Chain Link Fencing shall be coated with Black Vinyl."

ITEM 2:

ALL ELECTRICAL SHEETS EXCEPT E-1, ED-1, ED-2

For all electrical sheets except, the three mentioned above, remove the existing sheets and replace with the revised sheets included in this addendum.

Note: For contractor convenience unmodified electrical sheets are included with the revised for a single complete set.

SHADOWOOD WATER SYSTEM IMPROVEMENTS

PROPOSAL

Mason County PUD No. 1
21971 North Highway 101
Shelton, Washington 98584

The undersigned has examined the Work site(s), local conditions, the Contract, and all applicable laws and regulations covering the Work. The following unit and lump sum prices are tendered as an offer to perform the Work in accordance with all of the requirements set forth in the Contract and all applicable laws and regulations.

As required by the Contract, a postal money order, certified check, cashier's check or Proposal bond made payable to the Owner is attached hereto. If this Proposal is accepted and the undersigned fail(s) or refuse(s) to enter into a contract and furnish the required performance bond, labor and material payment bond, special guarantee bonds (if required), required insurance and all other required documentation, the undersigned will forfeit to the Owner an amount equal to five percent of the Proposal amount.

After the date and hour set for submitting the Proposals, no bidder may withdraw its Proposal, unless the Award of the contract is delayed for a period exceeding 60 consecutive calendar days.

The undersigned agrees that in the event it is Awarded the contract for the Work, it shall employ only Contractors and Subcontractors that are duly licensed by the State of Washington and remain so at all times they are in any way involved with the Work.

The undersigned agrees that the Owner reserves the right to reject any or all Proposals and to waive any minor irregularities and informalities in any Proposal.

The undersigned agrees that the Owner will Award the Contract to the lowest responsible, responsive bidder whose Proposal is in the best interest of the Owner. The Owner will determine at the time of Award of the Contract which Additive will be included in the Contract.

BASE BID:

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1.	Mobilization and Demobilization	1 LS	$_____	$_____
2.	Minor Change	1 CALC	$25,000.00	$25,000.00
3.	Temporary Erosion and Sediment Control	1 LS	$_____	$_____
4.	Trench Excavation Safety Systems	1 LS	$_____	$_____
5.	Locate Existing Utilities	1 LS	$_____	$_____
6.	Unsuitable Excavation	30 CY	$_____	$_____
7.	Bank Run Gravel for Backfill	3,030 TN	$_____	$_____
8.	Crushed Surfacing Base Course	670 TN	$_____	$_____
9.	Crushed Surfacing Top Course	230 TN	$_____	$_____
10.	Salvage and Demolition	1 LS	$_____	$_____
11.	Sitework	1 LS	$_____	$_____
12.	Filter and Booster Pump Building	1 LS	$_____	$_____
13.	Pyrolusite Filter Equipment and Backwash Assembly	1 LS	$_____	$_____
14.	Booster Pump, 15 hp	2 EA	$_____	$_____
15.	Booster Pump, 30 hp	1 EA	$_____	$_____
16.	Wellhouse Improvements	1 EA	$_____	$_____
17.	Backwash Recycle System	1 LS	$_____	$_____
18.	Piping, Valves and Appurtenances	1 LS	$_____	$_____
19.	90,000-Gallon Concrete Reservoir, Complete	1 LS	$_____	$_____

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
20.	General and Automatic Transfer Switch	1 LS	$_____	$_____
21.	Electrical, Telemetry and Instrumentation	1 LS	$_____	$_____
22.	Restoration	1 LS	$_____	$_____
23.	Apprenticeship Incentive	1 CALC	$2,000.00	$2,000.00
24.	Apprenticeship Penalty	1 CALC	$0.00	$0.00

Subtotal (Base Bid): .....$_____

Washington State Sales Tax (8.80%): .....$_____

TOTAL CONSTRUCTION COST (BASE BID): .....$_____

ADDITIVE ITEM 1: PERIMETER FENCING

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1.	Site Fencing and Gates	1 LS	$_____	$_____

Subtotal (Additive 1): .....$_____

Washington State Sales Tax (8.8%): .....$_____

TOTAL CONSTRUCTION COST (ADDITIVE 1): .....$_____

BID SUMMARY

1. TOTAL CONSTRUCTION COST (BASE BID forwarded from above): .....$_____

2. TOTAL CONSTRUCTION COST (ADDITIVE 1 forwarded from above): .....$_____

3. TOTAL CONSTRUCTION COST (BASE BID AND ADDITIVE 1) .....$_____

Note: A bid must be received on all items.

STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Firm: _____

Address: _____

Telephone No. _____ Fax No. _____

Contact Person for this Project: _____

E-mail: _____

Number of years the Contractor has been engaged in the construction business under the present firm name, as indicated above:

_____

WORK TO BE COMPLETED BY BIDDER

List the Work and the dollar amount thereof that the Bidder will complete with its forces, if awarded the contract.

Work to be Performed	Dollar Amount

PROPOSED SUBCONTRACTORS (Per RCW 39.30.060)

In accordance with RCW 39.30.060, failure to list subcontractors with whom the bidder, if awarded the contract, will directly subcontract for performance of the work of structural steel installation, rebar installation, heating, ventilation and air conditioning, plumbing, as described in Chapter 18.106 RCW, and electrical, as described in Chapter 19.28 RCW or naming more than one subcontractor to perform the same work will result in your bid being non-responsive and therefore void.

These subcontractors must be listed below along with the work to be performed. This information must be provided with the Proposal or within one hour after the published bid submittal time for the work of heating, ventilation, air conditioning, plumbing and electrical. This information must be provided with the Proposal or within 48 hours after the published bid submittal time for the work of structural steel and rebar installation.

To the extent the Project includes one or more categories of work referenced in RCW 39.30.060, and no subcontractor is listed below to perform such work, the bidder certifies that the work will either (i) be performed by the bidder itself, or (ii) be performed by a lower tier subcontractor who will not contract directly with the bidder.

Subcontractor Name _____

Work to be performed _____

_____

_____

Subcontractor Name _____

Work to be performed _____

_____

_____

Subcontractor Name _____

Work to be performed _____

_____

_____

Subcontractor Name _____

Work to be performed _____

_____

_____

Subcontractor Name _____

Work to be performed _____

_____

_____

Bidders are notified that it is the opinion of the enforcement agency that PVC or metal conduit, junction boxes, etc., are considered electrical equipment and therefore considered part of electrical work, even if the installation is for future use and no wiring or electrical current is connected during the project.

BIDDERS LIST

Per the Drinking Water State Revolving Fund Provisions and 40 CFR Part 33 Part 33.501, all bidders shall complete the form below with the requested information for all firms that bid or quote on subcontracts (including both DBE and non-DBE firms) for this project. The Bidders list shall be submitted with the bid proposal.

Name and Point of Contact	Mailing Address	Phone Number	Email Address	Item of Work Quoted	MBE/WBE (Y/N)

ADDENDA RECEIVED

Addendum No.	Date Received	Name of Recipient

NOTE: Bidder shall acknowledge receipt of all addenda. Bidder is responsible for verifying the actual number of addenda issued prior to submitting a Proposal.

Subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to substantially complete the Work required under this Contract within 150 working days (the Substantial Completion Date) and to physically complete the Work required under this contract within 160 working days (the Physical Completion Date) from when Contract Time begins.

The undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be $1,500.00 per day for each and every working day beyond the Contract Time allowed for substantial completion until the Substantial Completion Date is achieved and $500.00 for each and every working day required beyond the Contract Time for physical completion until the Physical Completion Date is achieved.

The undersigned is, and will remain in, full compliance with all Washington State administrative agency requirements including, but not limited to registration requirements of Washington State Department of Labor & Industries for contractors, including but not limited to requirements for bond, proof of insurance and annual registration fee. The undersigned's Washington State:

Dept. of Labor and Industries Workman's Compensation Account No. is _____;
Dept. of Licensing Contractor's Registration No. is _____;
Unified Business Identifier Number is _____;
Excise Tax Registration Number is _____; and
Employment Security Account Number is _____.

The undersigned has reviewed all insurance requirements contained in the Contract and has verified the availability of and the undersigned's eligibility for all required insurance. The undersigned verifies that the cost for all required insurance, has been included in this Proposal.

In relation to claims related in whole or in part to workplace injuries to employees, the undersigned waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specially negotiated by the parties, which is acknowledged by the undersigned in signing this Proposal.

By signing the proposal, the undersigned declares, under penalty of perjury under the laws of the United States and the State of Washington, that the following statements are true and correct:

1. That the undersigned person(s) or entity(ies) has(have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this Proposal is submitted.

2. The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date January 30, 2025, that the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

The undersigned agrees that the Owner is authorized to obtain information from all references included herein.

Sincerely,

_____ _____
Sign Name Date

By: _____ _____
Print Name, Title Location Executed (City, State or County)

_____
Print Company Name

Amount of Proposal deposit: $_____ Check No. _____,

or Proposal bond in the amount of $_____

_____, issued through _____
Name of Bank/Bonding Company

located at _____
Mailing Address

_____
Telephone Number of Bank/Bonding Company

Apprentice Utilization Good Faith Efforts Documentation

Project: _____Date: _____

Prime: _____

Prepared By (print name and title): _____

Requested apprentice utilization percentage (goal adjustment): _____

Contractor Statement

An adjustment to the apprentice utilization requirements for the above-named project is hereby requested. All contractors and subcontractors on the project understand the requirements, have performed the following documented good faith efforts, and have confirmed that the required apprentice utilization hours will not be able to be achieved for the ***following rationale***. _____ (initial)

Rationale. Check all that apply.

☐ Demonstrated lack of availability of apprentices (regionally or by trade). [list trades]

☐ Disproportionately high ratio of material/product/equipment cost to labor.

☐ Not enough hours available on the job to accommodate the ratio, supervision, or work process required.

☐ State approved apprentice programs unavailable for the specific work type.

☐ Warranty or specialty work requirements unable to accommodate apprentices.

☐ Funding requires federal, native American, or other employee training program that conflicts with Washington State apprentice utilization requirements.

☐ Other: _____ (fill in)

Documentation must be attached to substantiate the request. Check all that apply and attach.

☐ Emails, letters, or similar communication with appropriate state apprenticeship program confirming the assessment or denying apprentices or similar. Include, dates, time, responses, names, titles, and similar information.

☐ **Manufacturer letter** or email statement of equipment, material, or product that substantiates the cost and/or the specialty nature or the item and the requirement for certified/specific installers or similar.

☐ **Specification section**, funding requirement, or similar precluding or hindering state apprentice utilization requirements.

☐ Other: _____ (fill in)

☐ Attach a revised Apprentice Utilization Plan showing where adjustments are requested.

PROJECT APPRENTICE UTILIZATION PLAN

Project Name and No.		AUR	**15%**
Prime Contractor Name			
Initial Date Submitted		Revision No.	
Submitted By		Revision Date	

** Include labor hours and count for all trades, including those performed by Subcontractors.* ***Mark all revisions in RED.***

Part A

	Program/Trade	No.	Name	Estimated Journey Level Hours	Estimated Apprentice Hours
Prime					
	Total Estimated Hours Part A				

Part B

Subcontractor business name	Estimated Start Date	Program/Trade	Name	No.	Estimated Journey Level Hours	Estimated Apprentice Hours
Total Estimated Hours Part B						
Total Estimated Hours Part A (from above)						
Total apprentice utilization **percentage** based on planned values						

Reviewed by: _____ Date: _____

Good faith efforts needed?* ☐*yes* ☐*no*

If the estimated total apprentice utilization percentage is under 15%,* ***good faith efforts* *must be made.*

Use separate form to document. A revised Apprentice Utilization Plan is to be attached to every good faith effort AUR adjustment request.

- The owner reserves the right to request additional documentation or information to verify subcontractors, scope, trade, and/or hours of work.
- Those projects that do not meet the apprentice utilization goal (approved goal adjustments meet the goal) shall be assessed a penalty per the contract documents.

ABBREVIATIONS

A	AMPERE (AMP)
AC	ALTERNATING CURRENT
AF	BREAKER FRAME SIZE (IN AMPS)
AI	ANALOG INPUT
AIC	AMPERES-INTERRUPTING CAPACITY
AL	ALUMINUM
AM	AMMETER
AO	ANALOG OUTPUT
AT	BREAKER TRIP (SETTING IN AMPS)
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BKR	BREAKER
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CST	CONTROL STATION
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DI	DISCRETE INPUT
DIST	DISTRIBUTION
DO	DISCRETE OUTPUT
DTWV	DISCHARGE-TO-WASTE VALVE
EIOM	EXTENDED I/O MODULE
ETC	ELAPSED TIME/COUNTER METER
ETM	ELAPSED TIME METER
ENCL	ENCLOSURE
EXIST	EXISTING
FDR	FEEDER
FLA	FULL LOAD AMPS
FU	FUSE
FVNR	FULL VOLTAGE NON REVERSING
FVR	FULL VOLTAGE REVERSING
FY	FLOW COMPUTATION
G	GROUND CONDUCTOR
GEC	GROUNDING ELECTRODE CONDUCTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
H	HORN
HA	HAND-AUTO
HIM	HUMAN INTERFACE MODULE
HMI	HUMAN MACHINE INTERFACE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
JCXXX	JUNCTION BOX, CONTROL
JPXXX	JUNCTION BOX, POWER
JSXXX	JUNCTION BOX, SIGNAL
kA	KILOAMPERES
kAIC	KILOAMPERES-INTERRUPTING CAPACITY
KCM	THOUSAND CIRCULAR MILLS
kV	KILOVOLT
kVA	KILOVOLT-AMPERE
kVAh	KILOVOLT-AMPERE HOUR
kVAR	KILOVAR (REACTIVE KILOVOLT-AMPERE)
KVARh	KILOVAR-HOUR
kW	KILOWATT
kWh	KILOWATT-HOUR
LA	LIGHTNING ARRESTOR
LAN	LOCAL AREA NETWORK
LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
LINE	POWER LINE/POWER BLOCK
LV	LOW VOLTAGE
M	MAGNETIC CONTACTOR
mA	MILLIAMPERES
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MILLS
MCP	MOTOR CIRCUIT PROTECTOR
MOV	METAL OXIDE VARISTOR
MS	MOTOR STARTER
MSDS	MOTOR SAFETY DISCONNECT SWITCH
MTS	MANUAL TRANSFER SWITCH
MTU	MASTER TELEMETRY UNIT
mV	MILLIVOLT
MW	MEGAWATT
N	NEUTRAL CONDUCTOR
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOC.
NESC	NATIONAL ELECTRICAL SAFETY CODE
NFPA	NATIONAL FIRE PROTECTION AGENCY
OCPD	OVERCURRENT PROTECTION DEVICE
OE	OVERHEAD ELECTRIC
OIU	OPERATOR INTERFACE UNIT
OL	OVERLOAD, THERMAL
OLR	OVERLOAD RELAY
P	POLE
PF	POWER FACTOR
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROL
PMR	PHASE MONITOR RELAY
PMU	POWER MONITOR UNIT
POT	POTENTIOMETER
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
PVC-RGS	PVC COATED RGS
RGS	RIGID GALVANIZED STEEL CONDUIT
RVSS	REDUCED-VOLTAGE SOFT START
RTU	REMOTE TELEMETRY UNIT
s	SECOND
SHD	SHIELDED
SPD	SURGE PROTECTION DEVICE
SS	STAINLESS STEEL
SUSE	SUITABLE FOR USE AS A SERVICE ENTRANCE
TB	TERMINAL BLOCK
TDAD	TIME DELAY AFTER DE-ENERGIZATION
TDAE	TIME DELAY AFTER ENERGIZATION
TQS	TORQUE SWITCH
TP	TWISTED PAIR
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TT	TWISTED TRIAD
T/M	THERMAL MAGNETIC
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VA	VOLT-AMPERE
VFD	VARIABLE FREQUENCY DRIVE
VMR	VOLTAGE MONITORING RELAY
W	WATT
WAN	WIDE AREA NETWORK
Wh	WATT-HOUR
WP	WEATHER PROOF
XFMR	POWER TRANSFORMER

SYMBOL LEGEND

PLAN SYMBOLS

- CONDUIT DOWN
- CONDUIT UP
- CONDUIT STUB UP/END CAP
- DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH (F)
- COMMUNICATION OUTLET
- TELEPHONE OUTLET
- SPECIAL OUTLET
- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE (HIDDEN)
- QUAD RECEPTACLE
- QUAD RECEPTACLE (HIDDEN)
- FLOOR MOUNTED RECEPTACLE
- OR — LED LIGHT POLES (SINGLE / DUAL)
- #12 AWG GROUND CONDUCTOR
- #12 AWG NEUTRAL CONDUCTOR
- #12 AWG BRANCH CONDUCTOR

CROSSMARKS INDICATE QUANTITY AND USE OF CONDUCTORS

- S_X LIGHT SWITCH, X = 3 = 3-WAY K = KEY; 4 = 4-WAY M = MOTION
- SEAL OFF
- (X) MOTOR X = HORSE POWER
- (XX) XX= CV CHECK VALVE; FE FLOW ELEMENT; FI FLOW INDICATOR; FIT FLOW INDICATOR/TRANSMITTER; FS FLOW SWITCH; FT FLOW TRANSMITTER; HD HEAT DETECTOR; IS INTRUSION SWITCH; J JUNCTION BOX; L LIMIT SWITCH; LE LEVEL ELEMENT; LI LEVEL INDICATOR; LIT LEVEL INDICATOR/TRANSMITTER; LS LEVEL SWITCH/FLOAT; LT LEVEL TRANSDUCER; MDT MOTION DETECTOR; MFM MAGNETIC FLOW METER; MOV MOTOR OPERATED VALVE; PC PHOTO CELL; PE PRESSURE ELEMENT; PI PRESSURE INDICATOR; PIT PRESSURE INDICATOR TRANSMITTER; PS PRESSURE SWITCH; PT PRESSURE TRANSMITTER; SD SMOKE DETECTOR; SV SOLENOID VALVE; T THERMOSTAT

ELEMENTARY WIRING DIAGRAM SYMBOLS

- CONNECTION POINT
- TERMINAL POINT
- SCREW TERMINAL
- MOUNTED ON OUTER DOOR
- MOUNTED ON INNER DOOR
- LOCKABLE DEVICE
- NC CONTACT
- NC CONTACTOR
- NO CONTACT
- NO CONTACTOR
- SS — SOLID STATE CONTACTOR
- (ALT) ALTERNATING RELAY
- (CR) CONTROL RELAY
- (C) CONTACTOR
- (C BP) "BYPASS" CONTACTOR
- (C IC) "ISOLATION" CONTACTOR
- (C SS) SOLID STATE CONTACT RELAY
- (M) MOTOR RELAY
- (TR) TIME DELAY RELAY (TDAE)
- (TR) TIME DELAY RELAY (TDAD)
- LIGHT EMITTING DIODE
- OR — DIODE
- (X) LIGHT FIXTURE; X = REFERENCE LIGHTING SCHEDULE IF APPLICABLE
- L — (A) "PUSH TO TEST" LED PILOT LIGHT; A = AMBER, B = BLUE, G = GREEN, R = RED, W = WHITE
- OFF ON — XO — OX OR OFF ON — OX — SELECTOR SWITCHES
- OFF HAND AUTO — XOO — OXO — OOX OR OFF HAND AUTO — XOO — OOX — HAND-OFF-AUTO SWITCHES
- OFF ON RESET — XOO — OOX — ON-OFF-RESET SWITCH

- GFCI DUPLEX OUTLET
- DUPLEX OUTLET
- FUSE
- FUSED SWITCH W/ LED
- N.O. TOGGLE SPST SWITCH
- N.C. TOGGLE SPST SWITCH
- N.O. TEMPERATURE SWITCH
- N.C. TEMPERATURE SWITCH
- N.O. PRESSURE SWITCH
- N.C. PRESSURE SWITCH
- N.O. LIMIT SWITCH
- N.C. LIMIT SWITCH
- N.O. FLOW SWITCH
- N.C. FLOW SWITCH
- N.O. FLOAT SWITCH
- N.C. FLOAT SWITCH
- N.O. DIFFERENTIAL PRESSURE SWITCH
- N.C. DIFFERENTIAL PRESSURE SWITCH
- N.O. PUSHBUTTON
- N.C. PUSHBUTTON
- N.O. MUSHROOM PUSHBUTTON
- N.C. MUSHROOM PUSHBUTTON
- TDAE, N.O., TIME DELAY CLOSE, INSTANTANEOUS RE-OPEN
- TDAE, N.C., TIME DELAY OPEN, INSTANTANEOUS RE-CLOSE
- TDAD, N.O., INSTANTANEOUS CLOSE, TIME DELAY RE-OPEN
- TDAD, N.C., INSTANTANEOUS OPEN, TIME DELAY RE-CLOSE
- GROUND EQUIPMENT/CHASSIS
- GROUND, ISOLATED
- RESISTOR
- POTENTIOMETER
- SOLENOID VALVE COIL
- METAL OXIDE VARISTOR (MOV)
- TRANSFORMER WINDING/ REACTOR/CHOKE

ONE LINE SYMBOLS

- CAPACITOR
- REACTOR/CHOKE
- M — CIRCUIT BREAKER, MAGNETIC ONLY
- T/M — CIRCUIT BREAKER, THERMAL-MAGNETIC
- CONNECTION POINT
- CONTACTOR
- CURRENT TRANSFORMER
- FUSE
- FUSIBLE DISCONNECT
- AM — ANALOG AMMETER
- THERMAL OVERLOAD RELAY
- GROUND EQUIPMENT/CHASSIS
- S/N — SOLID NEUTRAL
- TRANSFORMER

GENERAL SYMBOLS

- XXXXX — CONDUIT
- XX XXXX XX — TAG LABEL
- GFCI — GFCI PANELBOARD CIRCUIT
- X — AREA ID TAG
- DEMOLITION (DEMO)
- INTRINSICALLY SAFE AREA
- CLEARANCE AREA

LINETYPES

- EXPOSED CONDUIT
- UNDERGROUND (BURIED) CONDUIT
- GROUNDING ELECTRODE CONDUCTORS
- EMBEDDED CONDUIT (WALLS, CONCRETE, ETC.)

NOTE: UNLESS NOTED OTHERWISE.

NOTE:
THIS IS A GENERAL LEDGER SHEET. ALL SYMBOLS MAY NOT APPLY.

GENERAL ELECTRICAL NOTES:

SITE AND BUILDING PLANS:

1. CONDUIT ROUTING IS SHOWN FOR CLARITY. ACTUAL ROUTING MAY BE MORE DIRECT AND IS LEFT TO THE CONTRACTOR FOLLOWING SPECIFICATIONS 16130. NON-ELECTRICAL BURIED PIPING HAS ROUTING PRIORITY OVER ELECTRICAL BURIALS.
2. ALL TRENCHING SHALL BE PER ELECTRICAL TRENCHING DETAIL, REFERENCE ED-SHEETS.
3. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO PROTECT EXISTING UTILITIES.
4. THROUGHOUT THIS DOCUMENT, THE TERMS "DEMO" AND "DEMOLISH" MEAN TO REMOVE, THEN WASTEHAUL OR RETURN TO THE OWNER, PER THE OWNER'S DIRECTION.

GENERAL CONTROL PANEL NOTES:

1. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE CONTROL PANEL DETAILS, THE FOLLOWING NOTES APPLY.
   - 1.1 ALL ENCLOSURES SHALL BE PROVIDED WITH AN ENGRAVED NAMEPLATE CORRESPONDING TO THE ASSOCIATED TAG ID NUMBER AND TAG DESCRIPTION.

     TAG DESCRIPTION (1/4" TEXT)
     [TAG NUMBER] (3/16" TEXT)

     NOTE: MOTOR STARTER NAMEPLATES SHALL BE BLACK WITH WHITE LETTERING, REFERENCE MCC PANEL DOOR NAMEPLATE SCHEDULE.
   - 1.2 WHERE PANELS CONTAIN POWER FROM MULTIPLE SOURCES, PROVIDE A YELLOW SAFETY STICKER, APPROXIMATELY 2" x 3", AS SHOWN BELOW.

     CAUTION
     THIS DEVICE IS POWERED FROM SEVERAL SOURCES
     THE DISCONNECT SWITCH WILL NOT SHUT OFF ALL SOURCES OF ELECTRICAL ENERGY

INDOOR INSTALLATIONS:

1. ALL EXPOSED PORTIONS OF CONDUITS FROM UNDERGROUND SHALL BE RGS. ALL OVERHEAD CONDUITS SHALL BE EMT.
2. EXCEPT FOR INSTRUMENTATION, NON LINEAR CIRCUITS, AND INTRINSICALLY SAFE CIRCUITS ALL PORTIONS OF CONDUITS IN THE ATTIC SHALL BE EMT.
3. PANELS MOUNTED ON INTERIOR WALLS SHALL BE SUPPORTED TO THE WALL WITH 1/2-INCH (MINIMUM) GALVANIZED UNISTRUT.

PULLBOX/VAULT/OUTDOOR INSTALLATIONS:

1. ALL MOUNTING FASTENERS (NUTS, BOLTS SCREWS, WASHERS, ETC.) SHALL BE 316 STAINLESS STEEL.
2. ALL MOUNTING BRACKETS AND BRACING SHALL BE 316L STAINLESS STEEL.
3. ALL EXPOSED PORTIONS OF CONDUITS SHALL BE PVC-COATED RGS UNLESS SPECIFICALLY NOTED OTHERWISE.
4. CONSTRUCTION PRIORITY SHALL BE TO ENTER THE BOTTOM OF ENCLOSURES. ALL CONNECTION INTO ENCLOSURES SHALL BE WATERTIGHT. WHERE SIDE OR TOP ENTRY IS USED CONNECTIONS SHALL BE MADE USING MYERS-TYPE HUBS. REFERENCE SPECIFICATION 16130.
5. PANELS MOUNTED ON VERTICAL WALLS SHALL BE SUPPORTED TO THE WALL WITH 1/2-INCH (MINIMUM) 316L STAINLESS STEEL UNISTRUT.
6. ENCLOSURE SHALL INCLUDE WELDED MOUNTING TABS. HOLES SHALL NOT BE DRILLED THROUGH ENCLOSURE SURFACES FOR MOUNTING PURPOSE.

CABLE AND CONDUIT NOTES:

1. REFERENCE SPECIFICATION 16120 FOR CONDUCTORS, INSTRUMENTATION, COMMUNICATION, AND OTHER SPECIAL CABLES AND CONDUCTORS.
2. REFERENCE SPECIFICATION 16130 FOR RACEWAYS, BOXES, AND JUNCTION BOX TYPES, AND HANDHOLE, PULLBOX, AND VAULT CONDUIT INSTALLATION METHODS.
3. CONDUIT NUMBERS ARE FORMATTED AS:

   TAANN(S) WHERE: T = TYPE (P=POWER; C=CONTROL; S=SIGNAL/INSTRUMENTATION)
   AA= AREA NUMBER (01-99)
   NN= CONDUIT NUMBER WITHIN THE AREA (01-99)
   S = SPARE CONDUIT (~ "TILDE") (IF APPLICABLE)

   P0319~ = AREA 03 POWER CONDUIT NO. 19, SPARE
   C0112 = AREA 01 CONTROL CONDUIT NO. 12
   S0521~ = AREA 05 INSTRUMENTATION CONDUIT NO. 21, SPARE
4. CABLE AND CONDUIT SCHEDULES:
   - 4.1. THE CABLE AND CONDUIT SCHEDULE PROVIDES CONDUIT NUMBER, SOURCE, DESTINATION, AND SIZE AS WELL AS CONDUCTOR AND CABLE REQUIREMENTS. REFERENCE SPECIFICATION 16130 FOR CONDUIT COMPOSITION AND COATING.
   - 4.2. CONDUITS MARKED WITH "* n" (WHERE n = 1, 2, OR 3) SHALL BE 100% CONTINUOUS PER SPECIFICATION 16130.

     SPECIFICALLY, CONDUITS MARKED WITH:

     "* 1" DENOTE NON LINEAR POWER CIRCUITS. IF THESE CONDUITS ENTER A PULLBOX, THEN THEY MUST CONNECT TO A "TYPE 1" J-BOX INSIDE THE PULLBOX.

     "* 3" DENOTE INSTRUMENTATION CIRCUITS THAT ARE NOT INTRINSICALLY SAFE. IF THESE CONDUITS ENTER A PULLBOX, THEN THEY MUST CONNECT TO A "TYPE 3" J-BOX INSIDE THE PULLBOX.
5. REGARDLESS OF THE TYPE OF CONDUIT BEING ROUTED TO A MOTOR, THE LAST 18 INCHES OF THE CONDUIT CONNECTING TO THE MOTOR SHALL BE LFMC.

READING ELECTRICAL SHEETS:

ELEMENTARY DIAGRAMS:

1. ELEMENTARY DIAGRAMS ARE SHOWN IN LADDER LOGIC FORM WITH LINE NUMBERS FORMATTED AS:

   SS.LL WHERE SS = SHEET NUMBER AND LL = LINE NUMBER
2. RELAY COIL "TYPES" ARE INDICATED INSIDE THE COIL SYMBOL AS PER THE SYMBOL SCHEDULE ON THIS SHEET. THE COIL NUMBER IS OF THE FORMAT:

   TTSS.LL.AA WHERE TT = RELAY TYPE (PER SYMBOL SCHEDULE); SS.LL = AS DESCRIBED ABOVE; AA = ASSOCIATION WITH A DRIVE, CONTROLLER, CONTROL PANEL, ETC.
3. RELAY CONTACTS ARE NUMBERED IN ASSOCIATION WITH THEIR COILS FOLLOWED BY "-X" WHERE X IS THE CONTACT POLE NUMBER.

   EXAMPLE: RELAY CONTACTS FOR A DPDT RELAY

POLE NUMBER	N.O. CONTACT REFERENCE	N.C. CONTACT REFERENCE
1:	12.40	NA\
2:	13.04	13.05\

   LINE NUMBER; SHEET NUMBER

   N.O. = NORMALLY OPEN CONTACT
   N.C. = NORMALLY CLOSED CONTACT.
4. CONTACTS AND ANALOG SIGNALS CONNECTED TO PLC I/O ARE FORMATTED AS:

   *RR:SS:CC WHERE * DENOTES A PLC I/O CONNECTION; RR = PLC RACK NUMBER; SS = RACK SLOT NUMBER; CC = SLOT CHANNEL NUMBER

   *TT:CC WHERE * DENOTES A PLC I/O CONNECTION; TT = I/O TYPE: AI = ANALOG INPUT, AO = ANALOG OUTPUT, DI = DIGITAL INPUT, DO = DIGITAL OUTPUT; CC = EMBEDDED CHANNEL NUMBER

PANELBOARD CIRCUIT ASSIGNMENTS:

1. LIGHTING FIXTURES AND RECEPTACLES ARE SHOWN WITH THEIR PANELBOARD CIRCUIT BREAKER NUMBER FOLLOWING THE FORMAT BELOW:

   PANELBOARD TAG (EX: [01 PB 02])
   CKT 02-02, 04, 06 ← 3RD CIRCUIT BREAKER POSITION NUMBER (3 POLE)
   2ND CIRCUIT BREAKER POSITION NUMBER (2 POLE)
   1st CIRCUIT BREAKER POSITION NUMBER

PLCS:

1. REFERENCE CONTROL PANEL SPECIFICATION 16940.
2. WIRE ALL PLC ANALOG AND DIGITAL INPUTS AND OUTPUTS, WHETHER ASSIGNED OR SPARE, TO TERMINAL GROUPS PER SPECIFICATION.
3. ALL PLC DIGITAL OUTPUTS SHALL BE BUFFERED THROUGH INTERPOSING RELAYS. SPARE OUTPUTS, AND OUTPUTS ASSIGNED OUTSIDE THE PANEL, SHALL BE CONNECTED TO A FUSED TERMINAL PAIR.
4. N.O. OR N.C. CONTACTS FORMATTED AS *RR:SS:CC ARE DERIVED FROM PLC DIGITAL OUTPUT BUFFER RELAYS. THE RELAY CONTACT INDICATOR *RR:SS:CC INDICATES THE RELAY'S ASSOCIATED PLC DIGITAL OUTPUT RACK, SLOT, AND CHANNEL.

CONNECTIONS TO ELECTRICAL DEVICES IN VAULTS:

1. REFERENCE SPECIFICATION 16130.

DEVICE (XX) — 316L S.S. CGB CONNECTOR — PVC-COATED RGS CONDUIT — MNFR'S CABLE

DEVICE (XX) — COUPLING — PVC-COATED RGS CONDUIT — LFMC CONDUIT

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024	DRAWN: PEB	CHECKED: JRN	APPROVED: DAC

No.	REVISION	DATE	APPD

DAVID ALAN CALKINS — STATE OF WASHINGTON — 21761 — REGISTERED PROFESSIONAL ENGINEER

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ELECTRICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

SHEET: **E-1**
OF: **22**

JOB NO.: 21285.00
DWG: E_SYM_ABBR

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_SYM_ABBR.dwg, 2/28/2025 2:01 PM, DAVID KLATT

SHEET LIST

SHEET	SHEET DESCRIPTION
E-1	ELECTRICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
E-2	SHEET LIST, TAG LIST, WORK SUMMARY AND KEY REFERENCES
E-3	MODIFIED ELECTRICAL SITE PLAN
E-4	ONE LINE DIAGRAM
E-5	ONE LINE DIAGRAM
E-6	GROUNDING ONE LINE DIAGRAM
E-7	TREATMENT AND PUMP BUILDING POWER, CONTROL AND INSTRUMENTATION PLAN
E-8	TREATMENT AND PUMP BUILDING LIGHTING AND RECEPTACLE PLAN
E-9	TREATMENT AND PUMP BUILDING HVAC ELECTRICAL PLAN
E-10	RESERVOIR ELECTRICAL AND ROOF INSTRUMENTATION PLANS
E-11	PANELBOARD [02 PB 01] SCHEDULE, SPECFICATIONS, AND LOAD DISTRIBUTION
E-12	MCC ELEVATION
E-13	MOTOR STARTER NOTES
E-14	MOTOR STARTER ELEMENTARY WIRING DIAGRAM - FVNR NET
E-15A	MOTOR STARTER ELEMENTARY WIRING DIAGRAM - VFD NET_A
E-15B	MOTOR STARTER ELEMENTARY WIRING DIAGRAM - VFD NET_B
E-16	ANALOG LOOP DIAGRAMS
E-17	ANALOG LOOP DIAGRAMS
E-18	PLC I/O
E-19	PLC I/O
EC-1	CABLE AND CONDUIT SCHEDULES
ED-1	ELECTRICAL DETAILS
ED-2	ELECTRICAL DETAILS

ELECTRICAL WORK SUMMARY:

THIS SUMMARY OF ELECTRICAL WORK IS INCLUDED AS A COURTESY AND IS INTENDED TO PROVIDE A GENERAL UNDERSTANDING OF ELECTRICAL DESIGN INTENT AND MAJOR ELECTRICAL CONSTRUCTION TASKS. IT IS NOT PROVIDED AS A COMPLETE LIST OF WORK AND SHALL NOT BE USED FOR BIDDING PURPOSES. REFER TO ALL PLANS AND SPECIFICATIONS.

1. NEW 480V, 3 PHASE ELECTRICAL SERVICE PROVIDED BY MASON COUNTY PUD #3. NOTE: THE EXISTING ELECTRICAL SERVICE SHALL REMAIN OPERATIONAL UNTIL CUTOVER TO THE NEW SYSTEM. COORDINATE WITH THE OWNER AND MASON COUNTY PUD #3.
2. PUMP HOUSE ELECTRICAL FOR PUMP MOTOR POWER AND CONTROL IN A MOTOR CONTROL CENTER (MCC), FILTER CONTROL, BALANCE OF PLANT, AND PROVISIONS FOR POWER AND CONTROL OF A FUTURE HIGH-FLOW PUMP.
3. WELL HOUSE ELECTRICAL WELL PUMP POWER AND CONTROL, AND BALANCE OF PLANT INCLUDING A NEW CHLORINE ROOM.
4. PROPANE STANDBY GENERATOR INCLUDING A CONCRETE PAD. PROPANE TANK PROIDED BY OTHERS.
5. RESERVOIR ELECTRICAL FOR TWO FLOATS (HIGH- AND LOW-LEVEL).
6. PLC PROGRAMMING PER DIVISION 13 REQUIREMENTS.
7. DEMOLITION OF THE EXISTING ELECTRICAL SYSTEM. SEE ITEM #1 ABOVE.

DEVICE TAG LIST - AREA 01

TAG ID#	TAG DESCRIPTION	VINTAGE
01 DREC 01	DEDICATED RECEPTACLE, WELL HOUSE CHLORINE PUMP	NEW
01 DREC 02	DEDICATED RECEPTACLE, WELL BUILDING HEAT TRACE	NEW
01 EF 01	EXHAUST FAN, WELL HOUSE CHLORINE ROOM	NEW
01 GADP 01	ACESSORY DEVICE PANEL, GENERATOR	NEW
01 GCB 01	CIRCUIT BREAKER - MAIN LOAD, GENERATOR	NEW
01 GCB 02	CIRCUIT BREAKER - LOAD BANK, GENERATOR	NEW
01 GCP 01	CONTROL PANEL, GENERATOR	NEW
01 GEN 01	GENERATOR	NEW
01 HT 01	HEATER, WELL HOUSE PUMP ROOM	NEW
01 HT 01	HEAT TRACE, WELL BUILDING	NEW
01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	NEW
01 MSDS 01	MOTOR SAFETY DISCONNECT SWITCH, WELL PUMP MOTOR	NEW
01 MTR 01	MOTOR, WELL PUMP	NEW
01 T 01	THERMOSTAT, WELL BUILDING HEAT TRACE	NEW
01 UT 01	UTILITY TRANSFORMER MASON COUNTY PUD #3	NEW

DEVICE TAG LIST - AREA 02

TAG ID#	TAG DESCRIPTION	VINTAGE
02 ATS 01	AUTOMATIC TRANSFER SWITCH (SUSE)	NEW
02 CB 01	CIRCUIT BREAKER - SP, MOTOR CONTROL CENTER	NEW
02 CB 02	CIRCUIT BREAKER - TRANSFORMER, MOTOR CONTROL CENTER	NEW
02 CLA 01	CHLORINE ANALYZER	NEW
02 CP 01	FE & MG FILTER CONTROL PANEL	NEW
02 CP 02	CONTROL PANEL, PLC	NEW
02 DCU 01	DC UPS, 24/24 VDC 10A, PRIMARY CONTROL	NEW
02 DCU 02	DC UPS, 24/24 VDC 10A, SECONDARY CONTROL	NEW
02 DH 01	DEHUMIDIFIER	NEW
02 DREC 01	DEDICATED RECEPTACLE, HEAT TRACE	NEW
02 EF 01	EXHAUST FAN	NEW
02 FIT 01	FLOW INDICATOR TRANSMITTER - BOOSTER BLDG	NEW
02 FIT 02	FLOW INDICATOR TRANSMITTER - WATER VAULT	NEW
02 FP 01	SODIUM HYPOCHLORITE FEED PUMP	NEW
02 HH 01	HANDHOLE, WELL NO. 2 INTERCEPT	NEW
02 HH 02	HANDHOLE, WELL NO. 2 TIE-IN	NEW
02 HT 01	HEATER	NEW
02 HT 02	HEAT TRACE	NEW
02 LS 01	LIQUID LEVEL SENSOR, BACKWASH TANKS	NEW
02 MB 01	METER BASE	NEW
02 MCC 01	MOTOR CONTROL CENTER	NEW
02 MFM 01	MAGNETIC FLOW METER, BOOSTER BUILDING	NEW

DEVICE TAG LIST - AREA 02

TAG ID#	TAG DESCRIPTION	VINTAGE
02 MFM 02	MAGNETIC FLOW METER - WATER VAULT	NEW
02 MLG 02	MAIN LUGS, MOTOR CONTROL CENTER	NEW
02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	NEW
02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	NEW
02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	NEW
02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	NEW
02 MTR 01	MOTOR, DUTY PUMP 1	NEW
02 MTR 02	MOTOR, DUTY PUMP 2	NEW
02 MTR 03	MOTOR, HIGH FLOW PUMP 1	NEW
02 MTR 04	MOTOR, BACKWASH RECYCLE PUMP	FUTURE
02 MTR 05	MOTOR, HIGH FLOW PUMP 2 (FUTURE)	FUTURE
02 PB 01	PANELBOARD, MOTOR CONTROL CENTER	NEW
02 PT 01	PRESSURE TRANSDUCER, BOOSTER PUMP DISCHARGE HEADER	NEW
02 SD 01	SMOKE DETECTOR, BOOSTER BUILDING	NEW
02 SPD 01	SURGE PROTECTION DEVICE, MOTOR CONTROL CENTER	NEW
02 SPD 02	SURGE PROTECTIVE DEVICE, MOTOR CONTROL CENTER PANELBOARD	NEW
02 T 01	THERMOSTAT, EXHAUST FAN	NEW
02 T 02	THERMOSTAT, HEAT TRACE	NEW
02 TMP 01	TEMPERATURE SENSOR, PLC CONTROL PANEL	NEW
02 XFMR 01	LOW VOLTAGE TRANSFORMER 480/277:208/120 3PH, MOTOR CONTROL CENTER	NEW

DEVICE TAG LIST - AREA 03

TAG ID#	TAG DESCRIPTION	VINTAGE
03 LS 01	HIGH LEVEL FLOAT SWITCH (RESERVOIR)	NEW
03 LS 02	LOW LEVEL FLOAT SWITCH (RESERVOIR)	NEW
03 PT 01	PRESSURE TRANSDUCER, RESERVOIR LEVEL	NEW

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

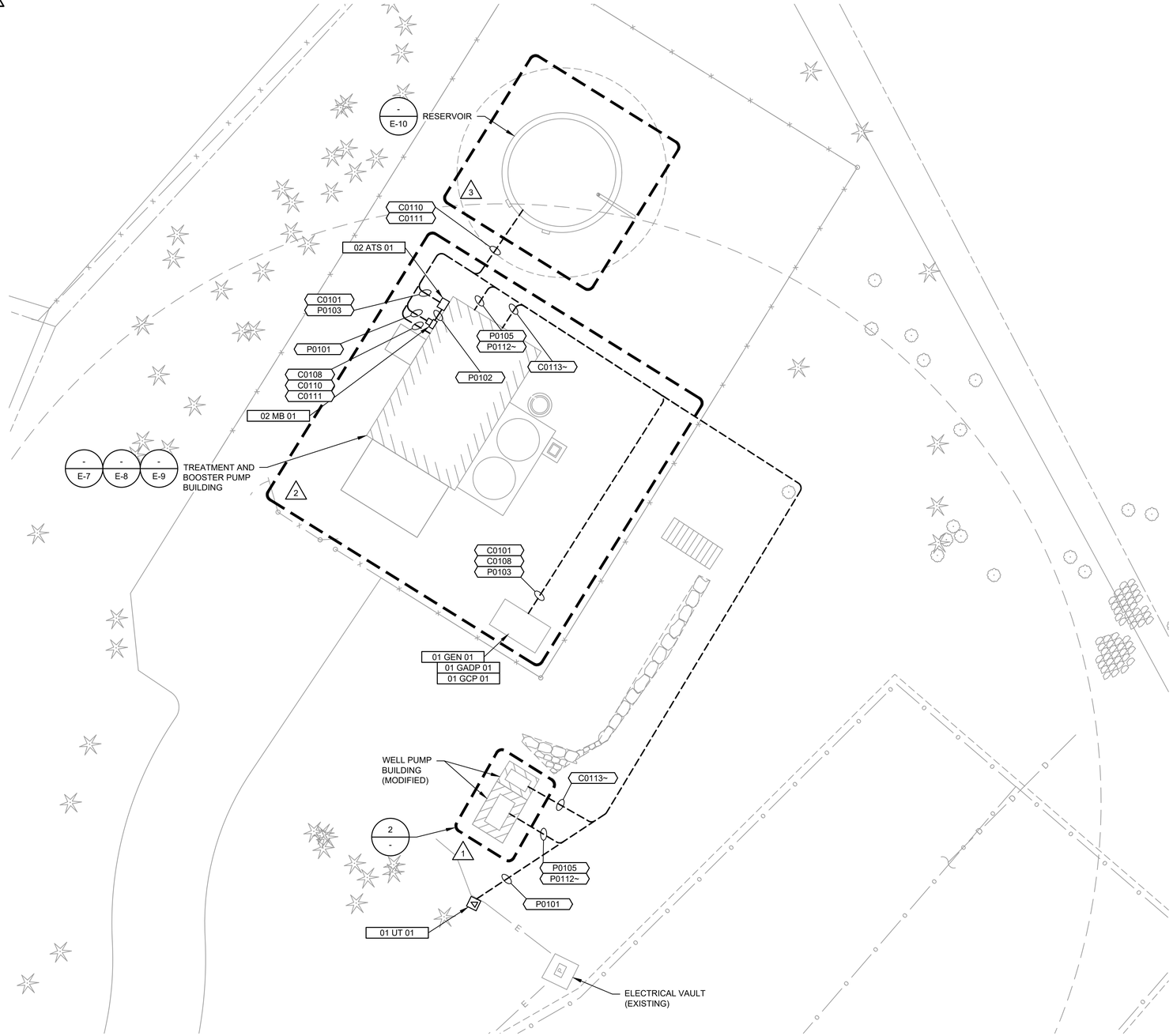
DAVID ALAN ATKINS — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 2/28/2025

MASON R. NEWQUIST — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
SHEET LIST, TAG LIST, WORK SUMMARY AND KEY REFERENCES

SHEET: E-2
OF: 22
JOB NO.: 21285.00
DWG E_SYM_ABBR

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_SYM_ABBR.dwg, 2/28/2025 2:01 PM, DAVID KLATT

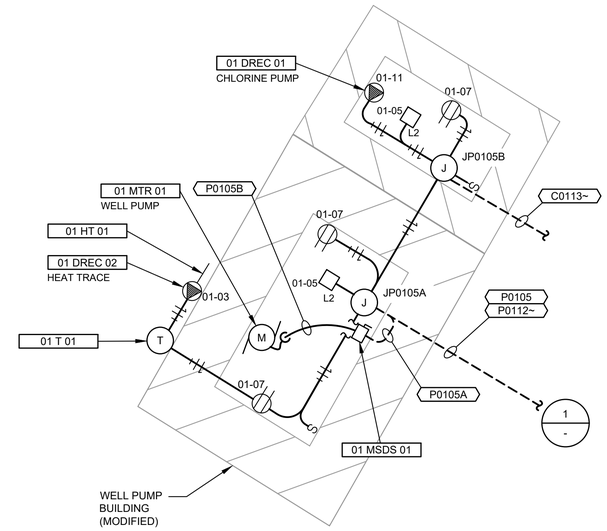


MODIFIED SITE ELECTRICAL PLAN

1 / - SCALE: 1"= 10'

NOTES:

1. POWER UTILITY COMPANY IS MASON COUNTY PUD #3.
2. CURRENT SENSING CTs AND REVENUE METER ARE PROVIDED BY THE POWER UTILITY COMPANY. THE CT ENCLOSURE AND METER BASE SHALL BE PROVIDED BY THE CONTRACTOR PER POWER UTILITY COMPANY'S SPECIFICATIONS.
3. CONDUIT ROUTING IS SHOWN FOR CLARITY ONLY. CONTRACTOR MAY USE MORE DIRECT ROUTING.
4. ALL EXPOSED CONDUITS SHALL BE RGS.



NOTES:

1. SEE ALSO 2 / E-9

AREA 1 - WELL PUMP BUILDING MODIFIED ELECTRICAL PLAN

2 / - SCALE: 1"= 2'

AREA LEGEND

1. WELL HOUSE AND SURROUNDINGS
2. FILTER AND BOOSTER PUMP BUILDING AND SURROUNDINGS
3. PROPOSED RESERVOIR

0 1" 2"

TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE:	JUNE 2024
DRAWN:	PEB
CHECKED:	JRN
APPROVED:	DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS — STATE OF WASHINGTON — 21285 — REGISTERED PROFESSIONAL ENGINEER — 2/28/2025

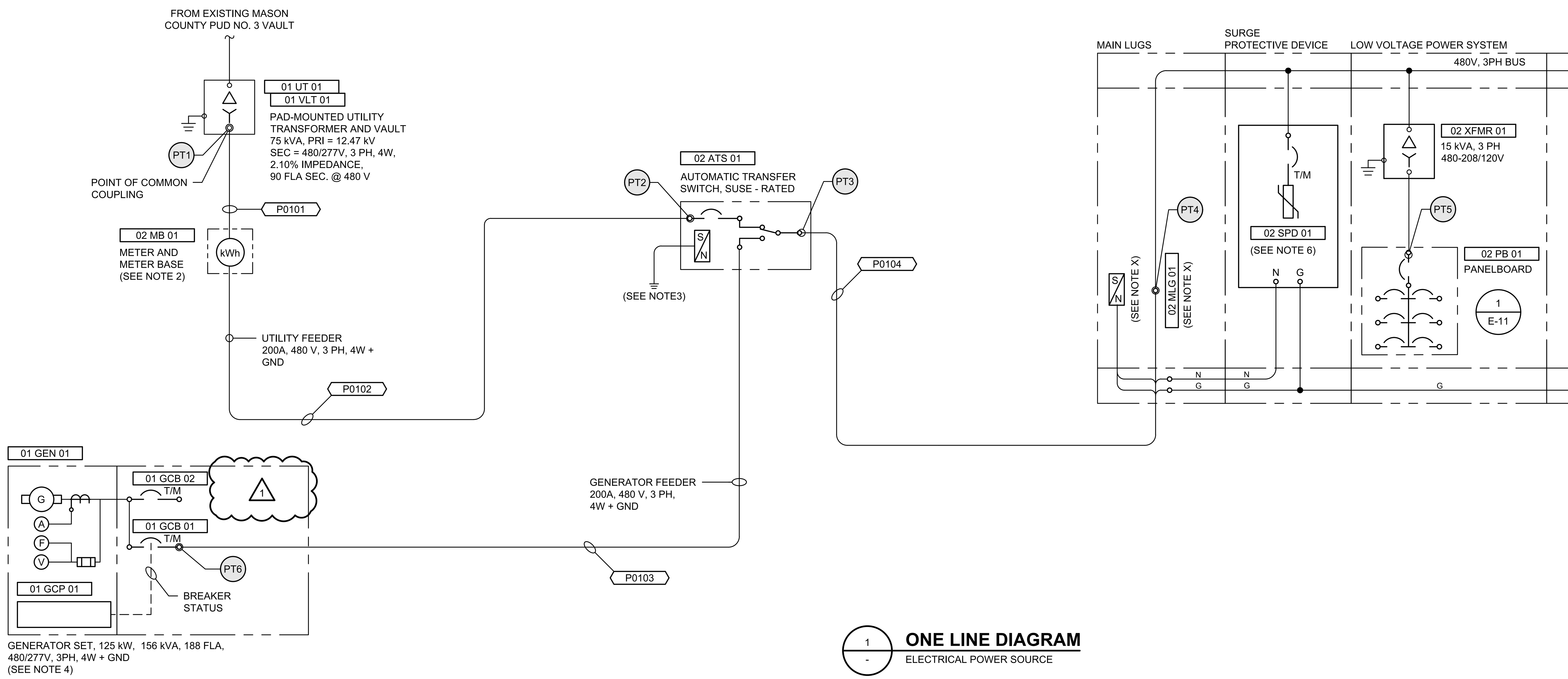
JASON R. NEWQUIST — STATE OF WASHINGTON — 43571 — REGISTERED PROFESSIONAL ENGINEER — 2/28/25

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MODIFIED ELECTRICAL SITE PLAN

SHEET: E-3
OF: 22

JOB NO.: 21285.00
DWG: E_SP

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_SP.dwg, 2/28/2025 2:01 PM, DAVID KLATT



1 / -
ONE LINE DIAGRAM
ELECTRICAL POWER SOURCE

POWER DEVICE SIZING

TAG NUMBER	RATED VOLTAGE	OPERATING VOLTAGE	POLES/ PHASES	AMPACITY	MIN. INTERRUPT AND WITHSTAND RATING	ENCLOSURE TYPE
02 ATS 01	600 V	480 V	3	200 A	22 kAIC	NEMA 3R, 304SS
02 MB 01	600 V	480 V	3	200/5 A	22 kAIC	NEMA 3R, 304 SS
02 MLG 01	600 V	480 V	3	200 A	22 kAIC	NEMA 1 GASKETED
02 MS 01, 02, 03, 04, 05	MAGNETIC ONLY, TRIP SIZED BY STARTER MANUFACTURER					

BOLTED FAULT TABLE

FAULT POINT	3PH SHORT CIRCUIT VALUES
PT1	23.6 kAIC
PT2	19.6 kAIC
PT3	19.5 kAIC
PT4	18.9 kAIC
PT5	2.6 kAIC
PT6	3.3 kAIC

(SEE NOTE 7)

MCC [02 MCC 01] LOAD SUMMARY

(CALCULATIONS BASED ON 480 V) — D.F. = DEMAND FACTOR

LOAD DESCRIPTION	CONNECTED LOADS			UTILITY LOAD DEMAND		GENERATOR LOADS	
	STARTER	HP	kVA	D.F.	kVA	D.F	kVA
[01 MTR 01] MOTOR, WELL PUMP NO. 1	FVNR	5	6.3	100%	6.3	100%	6.3
[02 MTR 01] MOTOR, DUTY PUMP NO. 1	VFD, 6 PLS	15	17.5	100%	17.5	100%	17.5
[02 MTR 02] MOTOR, DUTY PUMP NO. 2	VFD, 6 PLS	15	17.5	100%	17.5	100%	17.5
[02 MTR 03] MOTOR, HIGH FLOW PUMP NO. 1	VFD, 6 PLS	30	33.3	125%	41.6	100%	33.3
[02 MTR 04] MOTOR, BACKWASH RECYCLE PUMP NO. 1	FVNR	1 0.33	0.7	100%	0.7	100%	0.7
[02 MTR 05] MOTOR, HIGH FLOW PUMP NO. 2 (FUTURE)	VFD, 6 PLS	30	33.3	100%	33.3	100%	33.3
TOTAL kVA:			108.6		116.9		108.6
RESULTING AMPACITY AT 480 VAC, 3 PH:			130.6		140.6		130.6
SYSTEM SIZED AT: 200A		SPARE CAPACITY: 59.4A, 39.6%					

NOTES:

1. POWER UTILITY COMPANY IS MASON COUNTY PUD #3.
2. CURRENT SENSING CTs AND REVENUE METER ARE PROVIDED BY THE POWER UTILITY COMPANY. THE CT ENCLOSURE AND METER BASE SHALL BE PROVIDED BY THE CONTRACTOR PER POWER UTILITY COMPANY'S SPECIFICATIONS.
3. MAIN CIRCUIT BREAKER in [01 ATS 01] SHALL BE SUSE RATED WITH AN AUXILIARY CONTACT THAT OPENS WHEN THE BREAKER IS IN ITS OPEN/TRIPPED POSITION.
4. GENERATOR CIRCUIT BREAKER [01 GCB 01] SHALL BE PROVIDED WITH A LOCKABLE HANDLE AND AN AUXILIARY CONTACT THAT OPENS WHEN THE BREAKER IS IN ITS OPEN/TRIPPED POSITION. THIS CIRCUIT SHALL BE PREWIRED BY THE GENERATOR MANUFACTURER TO THE GENERATOR CONTROL PANEL [01 GCP 01] IN LFMC CONDUIT. REFERENCE SPECIFICATIONS.
5. POWER MONITOR UNIT [01 PMU 01] SHALL PROVIDE POWER SENSING PER SPECIFICATION AND SHALL COMMUNICATE TO THE SCADA HMI OVER AN ETHERNET/IP NETWORK. THE CONTRACTOR SHALL PROVIDE NECESSARY COMMUNICATION CARDS, INTERFACES, CONNECTORS, AND CABLES TO ASSURE A RELIABLE NETWORK CONNECTION BETWEEN THE PMU AND HMI SYSTEMS.
6. [01 SPD 01] SHALL BE 300 kA PER PHASE/150 kA PER MODE, FULL MODE, WITH NEUTRAL, WITH FILTER AND SHALL INCLUDE INTERNAL DISCONNECT WITH OVERCURRENT PROTECTION AND A FORM C CONTACT THAT OPENS WHEN THE UNIT IS FAULTED.
7. THREE PHASE SHORT CIRCUIT BOLTED FAULT CALCULATIONS ARE BASED ON INFINITE UTILITY CONTRIBUTION, +10% VARIANCE IN UTILITY VOLTAGE, -10% VARIANCE IN TRANSFORMER IMPEDANCE, AND A 300 kVA TRANSFORMER WITH 2.10% ASSUMED IMPEDANCE. FAULT CALCULATIONS ALSO INCLUDE 1,469 AIC MOTOR REGENERATIVE CONTRIBUTION FROM THE WELL, DUTY AND HIGH FLOW PUMP MOTORS ADDED TO EACH FAULT POINT. ALL CALCULATIONS ARE BASED ON 480 V.
8. REFERENCE MOTOR STARTER NOTES ON - / E-13.

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

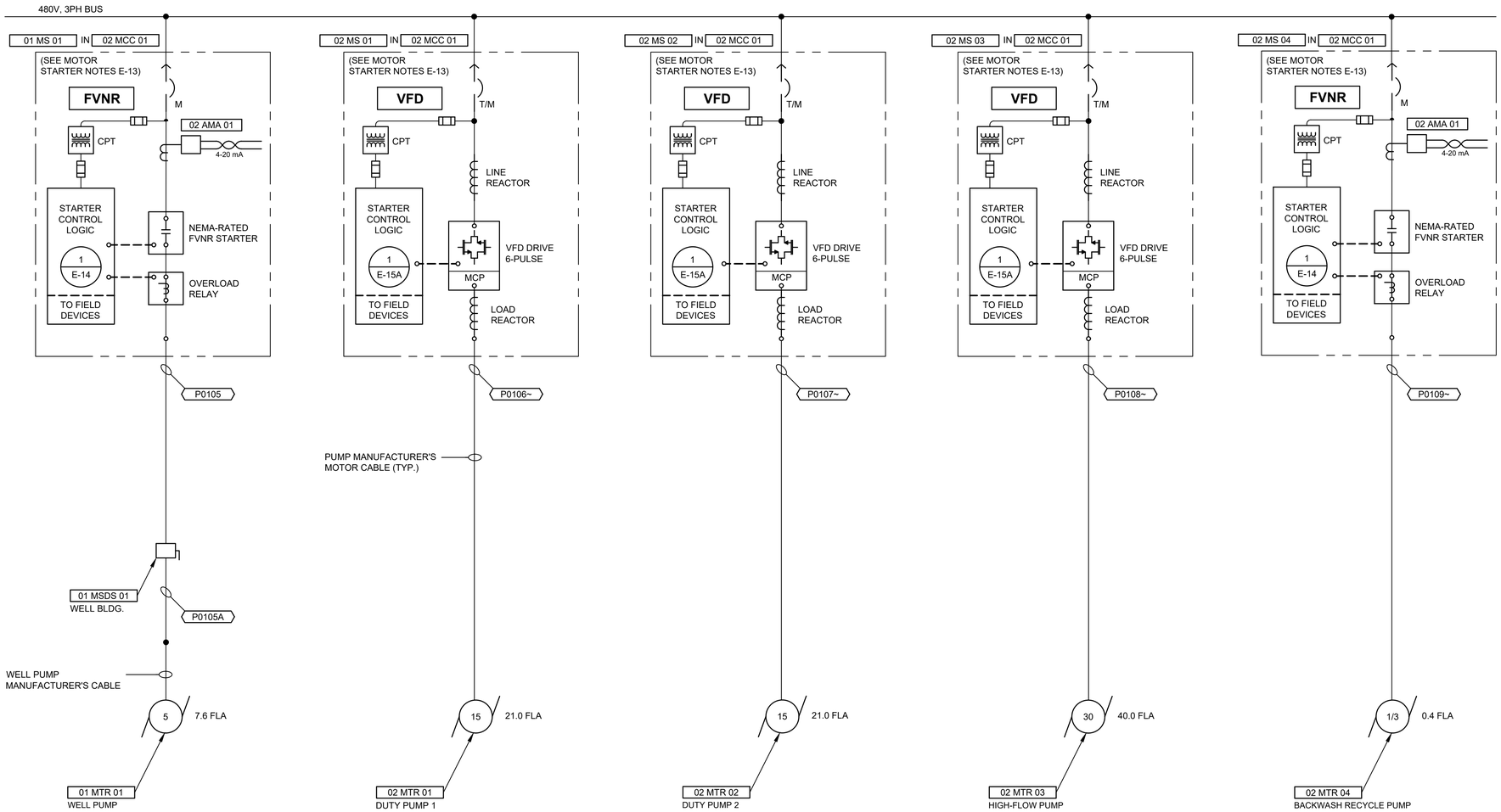
DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS, PROFESSIONAL ENGINEER — 2/28/2025
JASON R. NEWQUIST, PROFESSIONAL ENGINEER, 45311

MASON COUNTY PUD 1
MASON COUNTY, WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ONE LINE DIAGRAM

SHEET: E-4
OF: 22
JOB NO.: 21285.00
DWGE_OLD



0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE:	JUNE 2024
DRAWN:	PEB
CHECKED:	JRN
APPROVED:	DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN ATKINS — 2/28/2025

JASON R. NEQUEST — 2/28/2025

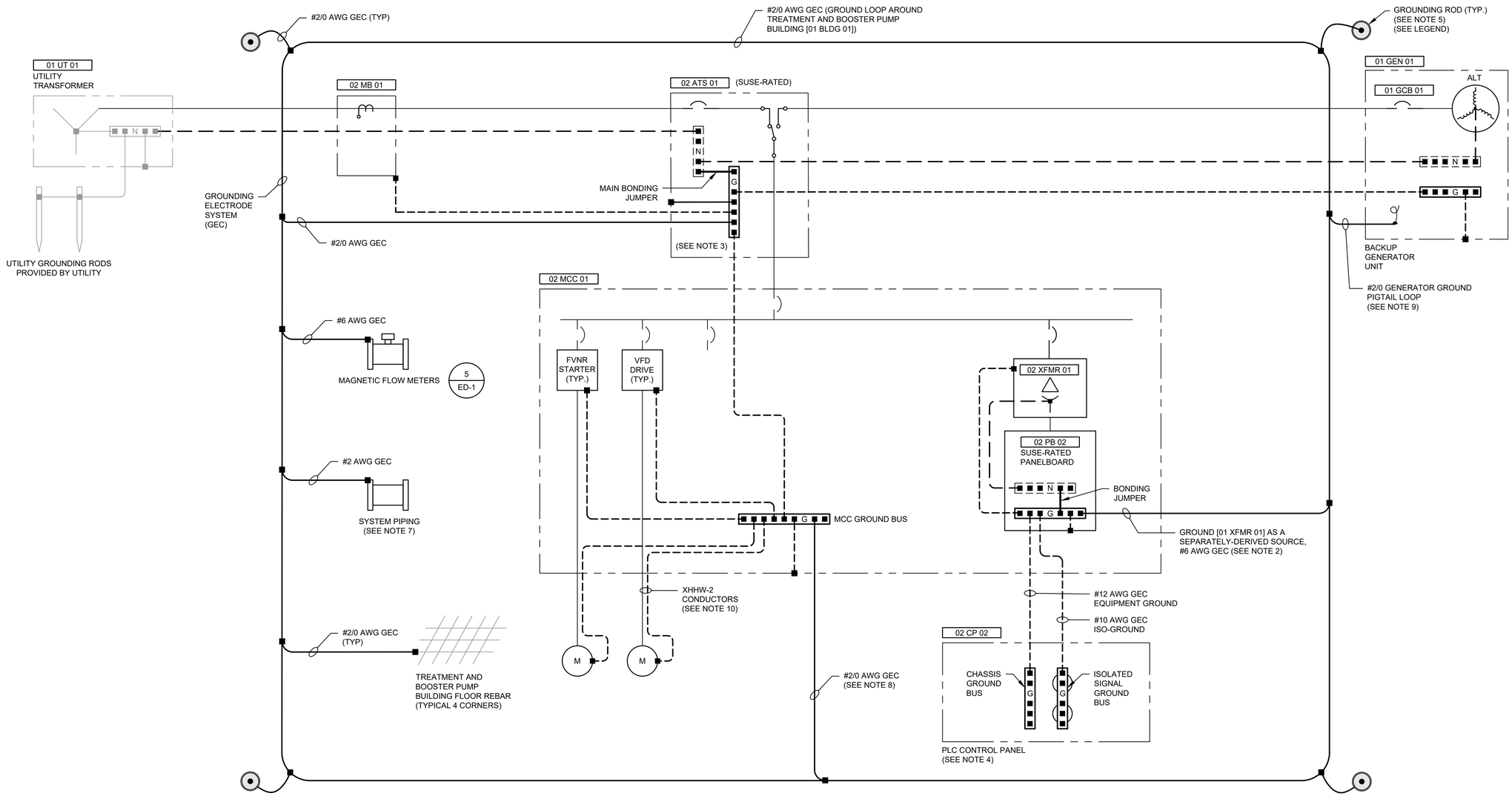
MASON COUNTY PUD 1
MASON COUNTY WASHINGTON

SHADOWOOD WATER SYSTEM IMPROVEMENTS

ONE LINE DIAGRAM

SHEET: E-5
OF: 22

JOB NO.: 21285.00
DWG: E_OLD



NOTES:

1. REFERENCE GROUNDING SPECIFICATION.
2. ALL POWER TRANSFORMERS ARE CONSIDERED SEPARATELY DERIVED SOURCES AND SHALL BE GROUNDED APPROPRIATELY. SMALL CONTROL TRANSFORMERS DEDICATED TO DRIVES AND CONTROLS ARE NOT CONSIDERED SEPARATELY DERIVED. GROUND SEPARATELY-DERIVED SOURCE [01 XFMR 01] TO THE GROUND LOOP USING AN INSULATED, GREEN, #6 AWG GEC.
3. NEUTRAL BUSES WILL NOT BE INCLUDED IN [01 MCC 01] AND [01 MCC 02]. NEUTRAL CONDUCTORS SHALL BE PROVIDED FROM THE SUSE NEUTRAL IN [01 SWBD 01] TO [01 GEN 01] THROUGH [01 ATS 01] AND [01 ATS 02]. NEUTRALS ARE NOT SWITCHED IN THE ATS UNITS.
4. THE ISOLATED GROUND BUS IN [01 CP 01] IS NOT CONNECTED TO [01 CP 01] CHASSIS GROUND BUS, BUT THEY ARE AT THE SAME POTENTIAL.
5. DRIVE 10' X 3/4" GROUND RODS AT EACH CORNER OF [01 BLDG 01]. CONNECT TO GROUND LOOP WITH #2/0 BARE COPPER GECs BURIED AT A DEPTH OF 30" MINIMUM.

   GROUND ROD CONNECTIONS SHALL BE ACCESSIBLE FROM WITHIN GROUND BOXES. (3 / ED-1)
6. BARE GROUND WIRES EMERGING FROM CONCRETE SHALL BE PROTECTED WITH PVC SCHEDULE 40 CONDUIT SLEEVES PER (2 / ED-1).
7. RUN A #2 AWG BARE COPPER GEC TO ALL METAL PROCESS PIPING GREATER THAN 6-INCH DIAMETER PENETRATING THE CONCRETE FLOOR. CONNECT THE GROUND AT THE CLOSEST BOLT NEAREST THE FLOOR. ARRANGE THE WIRE TO PREVENT A TRIP HAZARD.
8. RUN ADDITIONAL #2/0 AWG BARE COPPER GECs BETWEEN THE GROUND LOOP AND EACH MCC AND EACH HANDHOLE, PULL BOX, AND VAULT.
9. PROVIDE A GROUND PIGTAIL FROM THE GROUND LOOP JUST UNDER GENERATOR CIRCUIT BREAKER [01 GCB 01]. CONNECT TO GENERATOR GROUND BUS IF REQUIRED BY L&I INSPECTOR.
10. CONDUCTORS FROM VFD MOTOR STARTERS TO THEIR ASSOCIATED MOTORS SHALL BE XHHW-2 IN CONTINUOUS PVC-COATED RGS (NO EXCEPTION). XHHW-2 CONDUCTORS SHALL BE OVERSIZED AS PER THE CABLE AND CONDUIT SCHEDULE WITH A FULL-SIZED GROUND (NO EXCEPTION).
11. BLOWERS SUPPLIED BY AERZEN, AND INSTALLED OUTDOORS, SHALL BE CONNECTED WITH GEC AS SHOWN.

GROUNDING LEGEND

———	POWER CONDUCTORS
— — —	NEUTRAL CONDUCTORS
- - - - -	EQUIPMENT GROUND CONDUCTORS
———	GROUNDING ELECTRODE CONDUCTORS (GEC)
	GROUNDING ELECTRODE TAP
N	NEUTRAL BUS
G	GROUND BUS
	GROUNDING ROD BOX W/ 10' X ¾" GROUNDING ROD

(1 / -) **GROUNDING ONE LINE DIAGRAM**
NOT TO SCALE

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

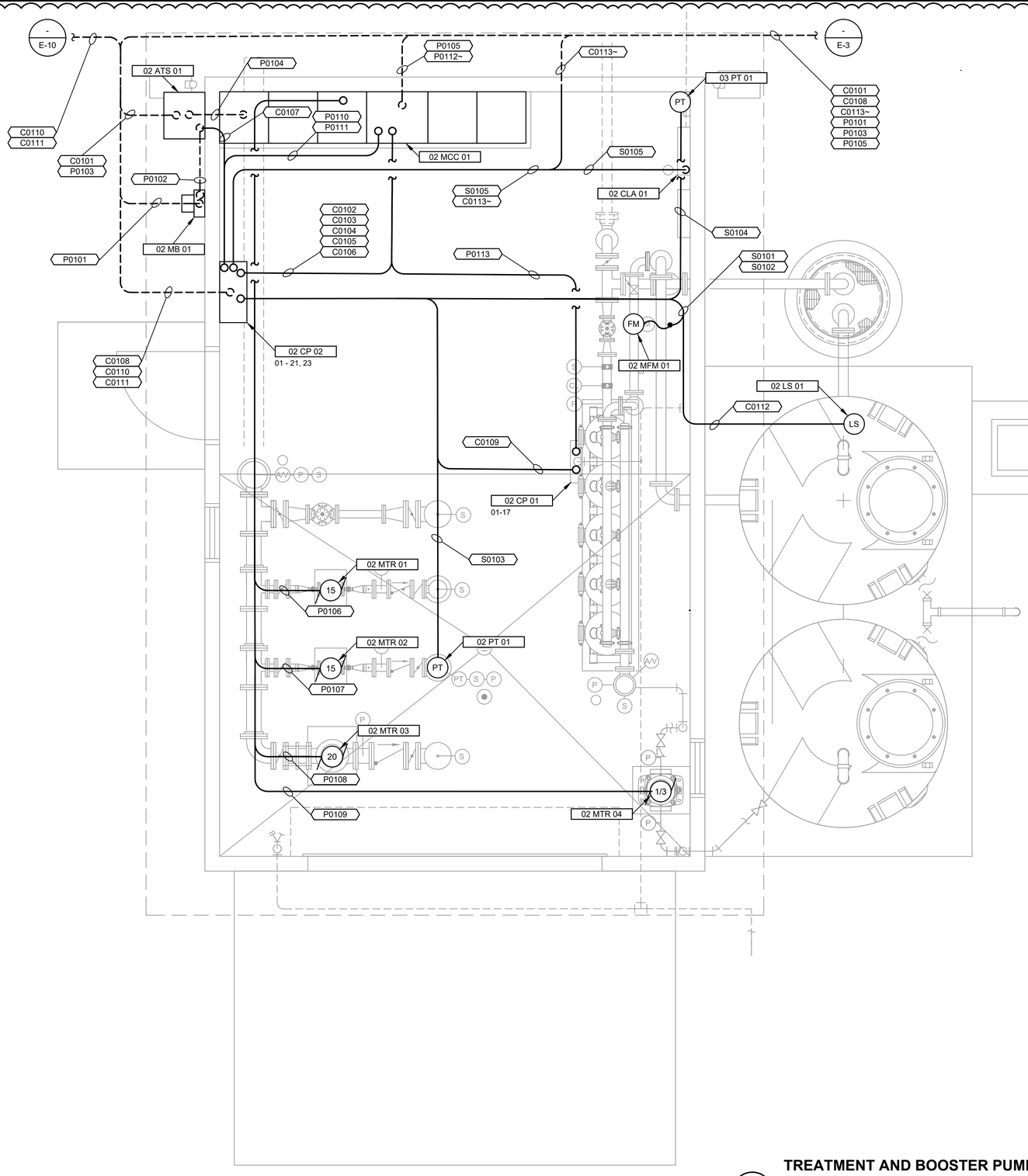
DATE:	JUNE 2024
DRAWN:	PEB
CHECKED:	JRN
APPROVED:	DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
GROUNDING ONE LINE DIAGRAM

SHEET: E-6
OF: 22
JOB NO.: 21285.00
DWG: E_OLD



NOTES:

1. ALL EXPOSED CONDUITS SHALL BE RGS. CONDUIT IN ATTIC CAN BE SCHEDULE 40 PVC.
2. CONDUIT NUMBERS FOR CONVENIENCE RECEPTACLE AND LIGHTING CIRCUITS ARE ONLY APPLIED TO THE CONDUIT LEAVING THE POWER SOURCE. CONDUITS BETWEEN DEVICES ARE REQUIRED AND ARE NOT SHOWN IN THE CABLE AND CONDUIT SCHEDULE.
3. RECEPTACLES SHALL BE SURFACE MOUNTED TO THE INTERIOR AND EXTERIOR WALLS.
4. ALL INTERIOR CONVENIENCE RECEPTACLES SHALL BE 20A, WHITE, DUPLEX, IN CAST ALUMINUM BOXES WITH WEATHERPROOF COVERS. RECEPTACLES MOUNTED TO CONCRETE OR CMU WALLS SHALL BE SURFACE-MOUNTED.
5. WHERE A CONVENIENCE RECEPTACLE (INTERIOR OR EXTERIOR) IS NOT CONNECTED TO A GFCI CIRCUIT BREAKER, AT LEAST ONE RECEPTACLE WITH INTEGRAL GFCI PROTECTION SHALL BE INSTALLED PER CIRCUIT. REFERENCE PANELBOARD SCHEDULES.
6. ALL EXTERIOR RECEPTACLES SHALL BE 20A, WHITE, DUPLEX, IN CAST ALUMINUM BOXES WITH FULL IN SERVICE COVERS, AND SURFACE-MOUNTED.
7. ALL DEDICATED RECEPTACLES SHALL BE 20A, GRAY, SIMPLEX, NON-GFCI, IN CAST ALUMINUM BOXES WITH WEATHERPROOF COVERS. THEY SHALL BE LABELED FOLLOWING SPECIFICATION 16140.
8. ALL INTERIOR RECEPTACLES SHALL BE MOUNTED 42 INCHES ABOVE THE FLOOR. EXTERIOR RECEPTACLES SHALL BE MOUNTED AT 24 INCHES ABOVE GRADE AND ALIGNED WITH SMOOTH BLOCK.
9. THE ROUTING OF CONDUITS FOR LIGHTING AND RECEPTACLES ARE SHOWN FOR CLARITY ONLY. THE CONTRACTOR MAY USE MORE DIRECT ROUTING WHERE APPROPRIATE ROUTE CONDUITS IN THE ATTIC.
10. EXPOSED CONDUITS TO CONVENIENCE RECEPTACLES AND LIGHT SWITCHES MAY BE 1/2-INCH TRADE SIZE WHERE ALLOWED BY CODE.
11. THE POWER CONDUCTORS TO EMERGENCY LIGHTS SHALL NOT BE SWITCHED.

1 / - / -

TREATMENT AND BOOSTER PUMP BUILDING POWER, CONTROL, AND INSTRUMENTATION PLAN

SCALE: 1/2"=1'-0"

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024	DRAWN: PEB	CHECKED: JRN	APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN ATKINS — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER — 2/28/2025

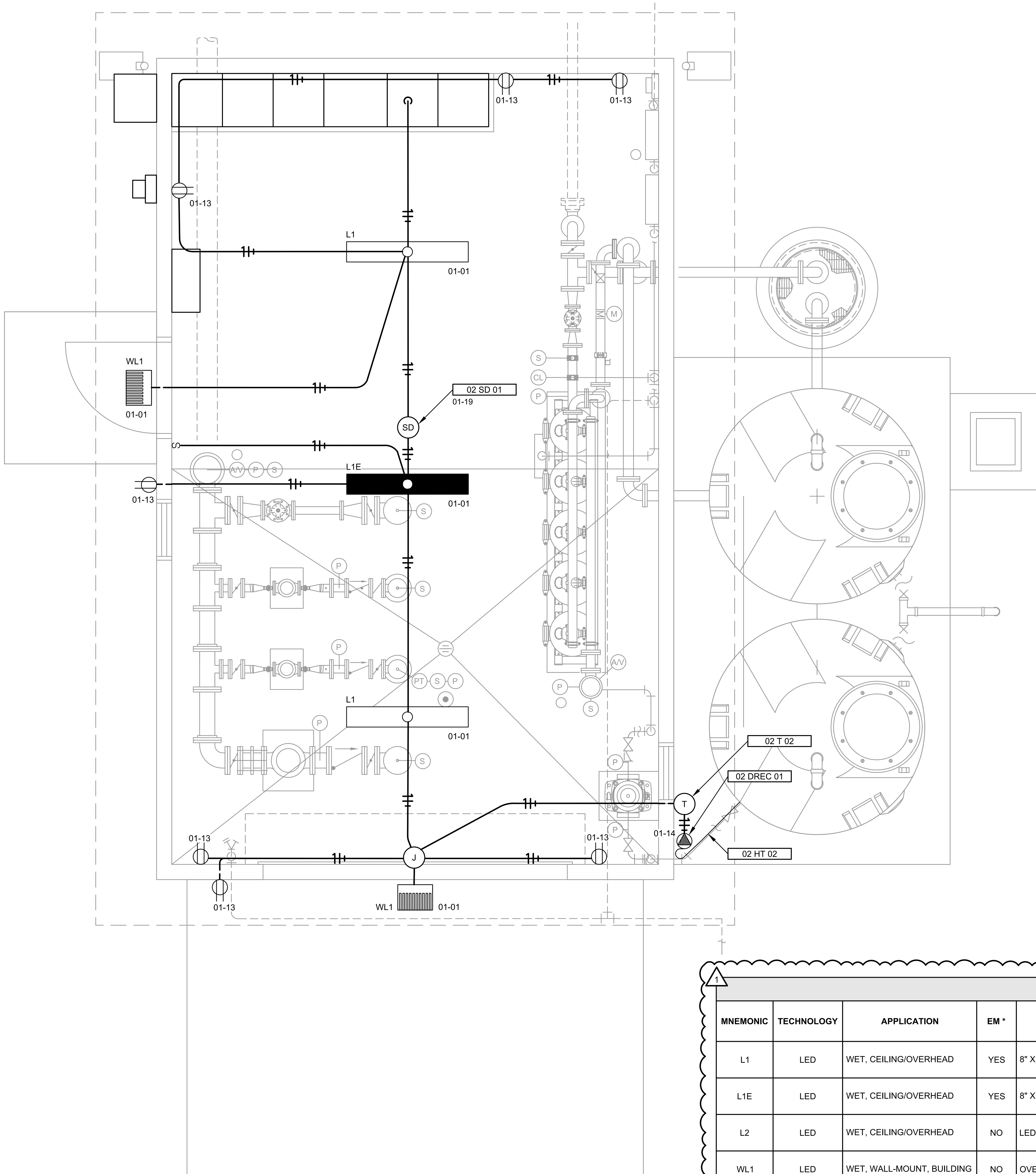
JASON R. NEWQUIST — STATE OF WASHINGTON — 21512 — REGISTERED PROFESSIONAL ENGINEER — 2/28/25

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
TREATMENT AND PUMP BUILDING POWER, CONTROL AND INSTRUMENTATION PLAN

SHEET: E-7
OF: 22

JOB NO.: 21285.00
DWG: E_BLDG

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_BLDG.dwg, 2/28/2025 2:01 PM, DAVID KLATT



TREATMENT AND BOOSTER PUMP BUILDING LIGHTING AND RECEPTACLE PLAN

1 / -

SCALE: 1/2"=1'-0"

NOTES:

1. ALL EXPOSED CONDUITS SHALL BE RGS. CONDUIT IN ATTIC CAN BE SCHEDULE 40 PVC.
2. CONDUIT NUMBERS FOR CONVENIENCE RECEPTACLE AND LIGHTING CIRCUITS ARE ONLY APPLIED TO THE CONDUIT LEAVING THE POWER SOURCE. CONDUITS BETWEEN DEVICES ARE REQUIRED AND ARE NOT SHOWN IN THE CABLE AND CONDUIT SCHEDULE.
3. RECEPTACLES SHALL BE SURFACE MOUNTED TO THE INTERIOR AND EXTERIOR WALLS.
4. ALL INTERIOR CONVENIENCE RECEPTACLES SHALL BE 20A, WHITE, DUPLEX, IN CAST ALUMINUM BOXES WITH WEATHERPROOF COVERS. RECEPTACLES MOUNTED TO CONCRETE OR CMU WALLS SHALL BE SURFACE-MOUNTED.
5. WHERE A CONVENIENCE RECEPTACLE (INTERIOR OR EXTERIOR) IS NOT CONNECTED TO A GFCI CIRCUIT BREAKER, AT LEAST ONE RECEPTACLE WITH INTEGRAL GFCI PROTECTION SHALL BE INSTALLED PER CIRCUIT. REFERENCE PANELBOARD SCHEDULES.
6. ALL EXTERIOR RECEPTACLES SHALL BE 20A, WHITE, DUPLEX, IN CAST ALUMINUM BOXES WITH FULL IN SERVICE COVERS, AND SURFACE-MOUNTED.
7. ALL DEDICATED RECEPTACLES SHALL BE 20A, GRAY, SIMPLEX, NON-GFCI, IN CAST ALUMINUM BOXES WITH WEATHERPROOF COVERS. THEY SHALL BE LABELED FOLLOWING SPECIFICATION 16140.
8. ALL INTERIOR RECEPTACLES SHALL BE MOUNTED 42 INCHES ABOVE THE FLOOR. EXTERIOR RECEPTACLES SHALL BE MOUNTED AT 24 INCHES ABOVE GRADE AND ALIGNED WITH SMOOTH BLOCK.
9. THE ROUTING OF CONDUITS FOR LIGHTING AND RECEPTACLES ARE SHOWN FOR CLARITY ONLY. THE CONTRACTOR MAY USE MORE DIRECT ROUTING WHERE APPROPRIATE ROUTE CONDUITS IN THE ATTIC.
10. EXPOSED CONDUITS TO CONVENIENCE RECEPTACLES AND LIGHT SWITCHES MAY BE 1/2-INCH TRADE SIZE WHERE ALLOWED BY CODE.
11. THE POWER CONDUCTORS TO EMERGENCY LIGHTS SHALL NOT BE SWITCHED.

1

LIGHTING SCHEDULE

MNEMONIC	TECHNOLOGY	APPLICATION	EM *	DESCRIPTION	MANUFACTURER NAME	MANUFACTURER SERIES NO.	INPUT (VA)	VOLTAGE	COMMENTS
L1	LED	WET, CEILING/OVERHEAD	YES	8" X 48" RECTANGULAR, BATTERY BACKED	HOLOPHANE	EMS LED 4L BE6WCP	38	120 VAC, 1 PH	6000 LUMENS, 4000K COLR, WET APPLICATION, MEDIUM DISTRIBUTION, FROSTED POLYCARBONATE LENS, BATTERY BACKED
L1E	LED	WET, CEILING/OVERHEAD	YES	8" X 48" RECTANGULAR, BATTERY BACKED	HOLOPHANE	EMS LED 4L BE6WCP	38	120 VAC, 1 PH	6000 LUMENS, 4000K COLR, WET APPLICATION, MEDIUM DISTRIBUTION, FROSTED POLYCARBONATE LENS, BATTERY BACKED
L2	LED	WET, CEILING/OVERHEAD	NO	LED CANOPY/CEILING	PLT SOLUTIONS	PLT-11928	35	120 VAC, 1 PH	CCT 5000K, CRI > 70, IP65 RATED
WL1	LED	WET, WALL-MOUNT, BUILDING	NO	OVER DOOR BUILDING EXTERIOR LIGHT	HOLOPHANE	HLWPC2	40	120 VAC, 1 PH	3000 LUMENS, 40K COLOR, 120V, SHORT DISTRIBUTION, FULL CUTOFF OPTICS, INTEGRAL MOTION SENSOR.

0 1 2

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

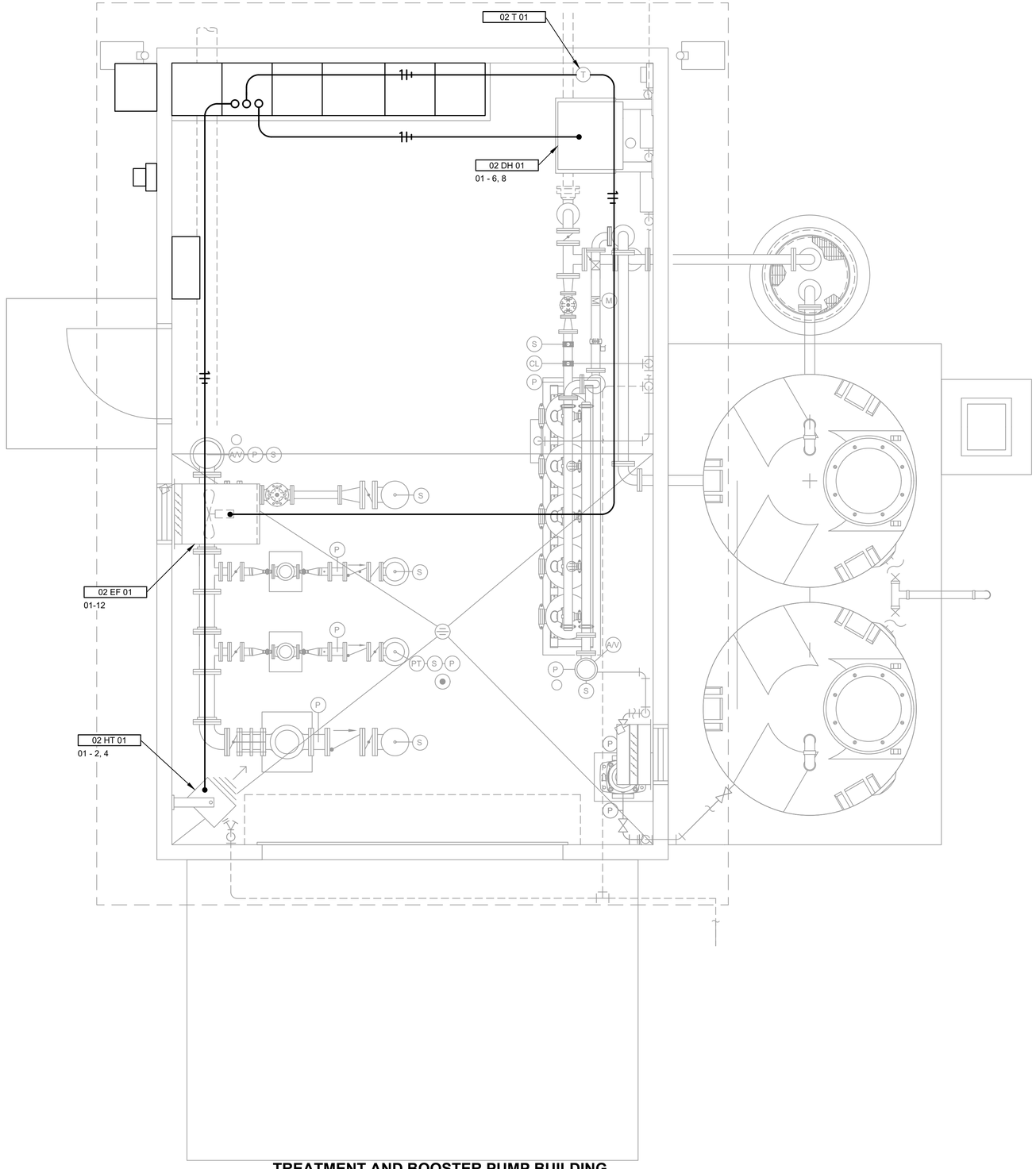
DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
TREATMENT AND PUMP BUILDING LIGHTING AND RECEPTACLE PLAN

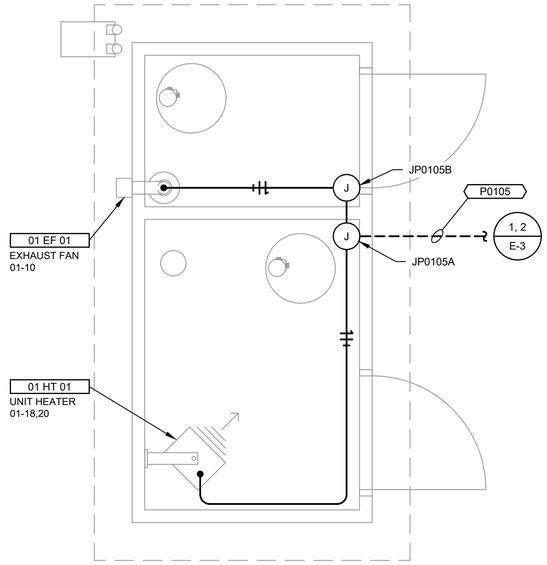
SHEET: E-8
OF: 22
JOB NO.: 21285.00
DWGE_BLDG



TREATMENT AND BOOSTER PUMP BUILDING HVAC ELECTRICAL PLAN

1 / -

SCALE: 1/2"=1'-0"



WELLHOUSE BUILDING HVAC ELECTRICAL PLAN

2 / -

SCALE: 1/2"=1'-0"

NOTES:

1. THE CONTRACTOR MAY USE MORE DIRECT ROUTING WHERE APPROPRIATE FOLLOWING SPECIFICATION 16130.
2. INTRUSION SWITCH CIRCUITS SHALL BE 24 VDC, EACH WIRED SEPARATELY TO THE MAIN CONTROL PANEL.
3. INTRUSION SWITCHES SHALL BE WIRED SUCH THAT THEY ARE OPEN-CIRCUITED WHEN THE DOOR IS OPEN, CLOSED WHEN THE DOOR IS CLOSED.
4. SMOKE DETECTORS SHALL BE 24 VDC POWERED WITH FORM C (DRY) CONTACTS. WIRE THE CONTACTS TO BE OPEN WHEN IN THE ALARM CONDITION, CLOSED UNDER NORMAL CONDITIONS.
5. HEATERS AND EXHAUST FANS SHALL INCLUDE INTEGRAL SAFETY DISCONNECT SWITCHES.

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE:	JUNE 2024
DRAWN:	PEB
CHECKED:	JRN
APPROVED:	DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

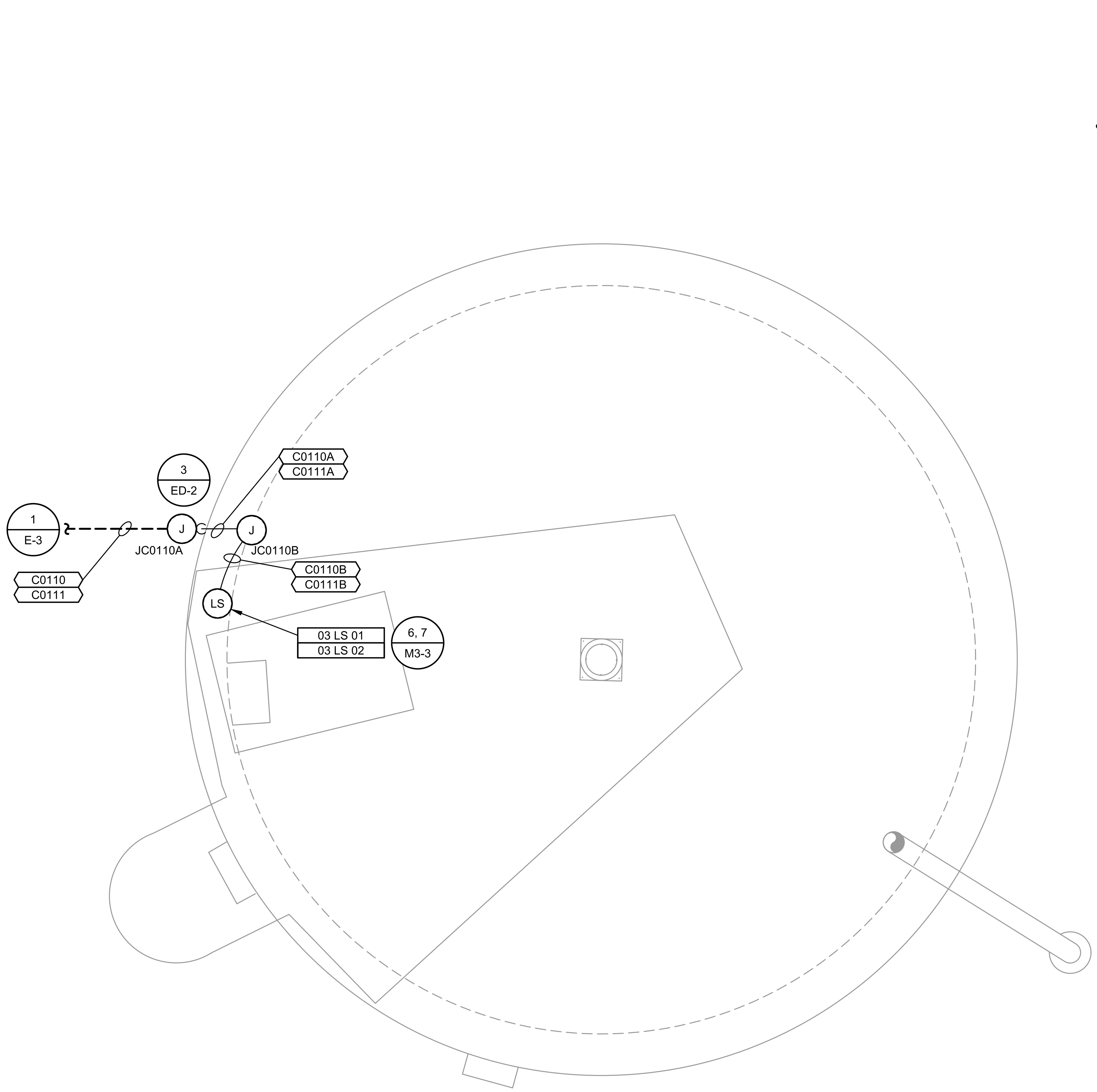
2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
TREATMENT AND PUMP BUILDING HVAC ELECTRICAL PLAN

SHEET: E-9
OF: 22

JOB NO.: 21285.00
DWG E_BLDG

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_BLDG.dwg, 2/28/2025 2:02 PM, DAVID KLATT



NOTES:

1. FOR CLARITY NOT ALL JUNCTION BOXES ARE SHOWN ON THE RESERVOIR. REFERENCE RESERVOIR MECHANICAL DETAILS.
2. CONDUIT ROUTING IS SHOWN FOR CLARITY ONLY. CONTRACTOR MAY USE MORE DIRECT ROUTING. △1

1 / -
RESERVOIR ROOF INSTRUMENTATION PLAN
SCALE: 1/2"=1'-0"

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
RESERVOIR ELECTRICAL AND ROOF INSTRUMENTATION PLANS

SHEET: E-10
OF: 22
JOB NO.: 21285.00
DWGE_RESERVOIR

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_RESERVOIR.dwg, 2/28/2025 2:02 PM, DAVID KLATT

PANELBOARD [02 PB 01] SCHEDULE

CKT. NO.	DIRECTORY	PHASE A VA	PHASE A A	PHASE B VA	PHASE B A	LOAD TYPE	BKR AMPS	BUS	BKR AMPS	LOAD TYPE	PHASE A VA	PHASE A A	PHASE B VA	PHASE B A	DIRECTORY	CKT. NO.
1	BOOSTER BUILDING LIGHTS	188	1.6			L	1/20	A	2/20	H	1,000	8.3			[02 HT 01], HEATER	2
3	[01 DREC 02], DEDICATED RECEPTACLE, WELL HOUSE HEAT TRACE			15	0.1	Z	1/20	B	|	H			1,000	8.3	[02 HT 01], HEATER	4
5	WELL HOUSE LIGHTS	70	0.6			L	1/20	A	2/20	H	1,125	9.4			[02 DH 01], DEHUMIDIFIER	6
7	WELL HOUSE RECEPTACLES			360	3.0	R	1/20	B	|	H			1,125	9.4	[02 DH 01], DEHUMIDIFIER	8
9	SPARE BREAKER	-	-			Z	1/20	A	1/20	Z	20	0.2			[01 EF 01], EXHAUST FAN, WELL HOUSE CHLORINE ROOM	10
11	[01 DREC 01], DEDICATED RECEPTACLE, WELL HOUSE CHLORINE PUMP			506	4.4	M	1/20	B	1/20	H			667	5.6	[02 EF 01], EXHAUST FAN	12
13	BOOSTER BUILDING RECEPTACLES	1,260	10.5			R	1/20	A	1/20	Z	15	0.1			[02 DREC 01], DEDICATED RECEPTACLE, HEAT TRACE BOOSTER BLDG	14
15	SPARE BREAKER			-	-	Z	1/20	B	1/20	M			506	4.4	[02 CLA 01], CHLORINE ANALYZER BOOSTER BUILDING	16
17	[02 CP 01], FE & MG FILTER CONTROL PANEL	50	0.4			Z	1/20	A	2/20	Z	500	4.2			[01 HT 01], HEATER, WELL HOUSE PUMP ROOM	18
19	[02 SD 01], SMOKE DETECTOR, BOOSTER BUILDING			10	0.1	Z	1/20	B	|	Z			500	4.2	[01 HT 01], HEATER, WELL HOUSE PUMP ROOM	20
21	[02 CP 02], CONTROL PANEL, PLC	500	4.2			Z	1/20	A	1/20	Z	-	-			SPARE BREAKER	22
23	[02 CP 02], CONTROL PANEL, PLC			1,000	8.3	Z	1/20	B	1/20	Z			-	-	SPARE BREAKER	24
	SUM OF PHASE LOADS	2,068	17.2	1,891	15.9						2,660	22.2	3,798	31.8	SUM OF PHASE LOADS	

[02 PB 01] ELECTRICAL AND CONSTRUCTION SPECIFICATIONS:

CONFIGURATION:	240/120 VAC, 1 PH, 60 Hz
POWER BUS:	100 A, COPPER
NEUTRAL BUS:	100 A (100% OF POWER BUS), ISOLATED FROM GROUND, SOLDERLESS CONNECTIONS
GROUND BUS:	PROVIDE PER UL 67
BUS BRACING:	22 kAIC, MINIMUM
MAIN BREAKER:	100 AT, 100 AF, 1 PH, 2 P, 22 kAIC, MOLDED CASE, VERTICAL MOUNTING
DISTRIBUTION BREAKERS:	BOLT-ON, MOLDED CASE, 22 kAIC, MINIMUM
GROUND BONDING:	SUITABLE FOR SERVICE ENTRY
ENCLOSURE:	NEMA 12
NUMBER OF CIRCUITS:	24
UNCOMMITTED CIRCUITS:	BLANK COVERS
POWER DERIVED FROM:	[02 XFMR 01], LOW VOLTAGE TRANSFORMER 480/277:208/120 3PH, MOTOR CONTROL CENTER
BUS BREAKERS:	2 POLE BREAKERS, 3x 20 A, 22 kAIC
	1 POLE BREAKERS, 18x 20 A, 22 kAIC

NOTES:

1. THE CONTRACTOR SHALL PROVIDE A TYPED PANELBOARD SCHEDULE FOR ALL ACTUAL LOAD ASSIGNMENTS.
2. AIC RATING OF BRANCH CIRCUIT BREAKERS MAY BE REDUCED WHEN SUBMITTED TO ENGINEERING IF THEY ARE SHOWN TO BE PART OF A TESTED AND LISTED COMBINATION WITH MAIN PANELBOARD BREAKER AND COMPLIANT TO NEC 240.86 AND MARKED PER NEC 110.22. BRANCH BREAKERS SHALL BE NO LESS THAN 10 kAIC.

LOAD DISTRIBUTION:

	AMPS	VA	%
BY PHASE:			
TOTAL LOAD, PHASE A:	39.4 A	4,728 VA	45.2%
TOTAL LOAD, PHASE B:	47.8 A	5,689 VA	54.8%
BY LOAD TYPE:			
TOTAL LIGHTING (L):		258 VA	2.5%
TOTAL MOTOR (M):		1,012 VA	9.7%
TOTAL HVAC (H):		4,917 VA	47.2%
TOTAL RECEPTACLE (R):		1,620 VA	15.6%
TOTAL OTHER (Z):		2,610 VA	25.1%
TOTAL CONNECTED LOAD:		10.42 kVA	100.0%
TOTAL CALCULATED (NEC) LOAD:		10.61 kVA	

XFMR LOADING (CONNECTED) =	10.4 kVA / 15 kVA =	69.4 %
XFMR LOADING (NEC) =	10.6 kVA / 15 kVA =	70.7 %

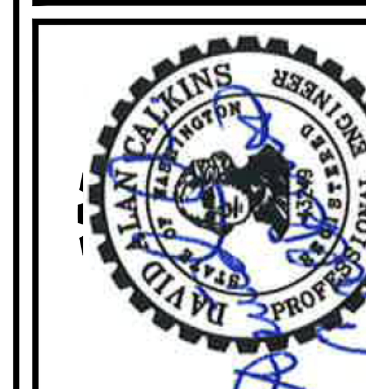
0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY.

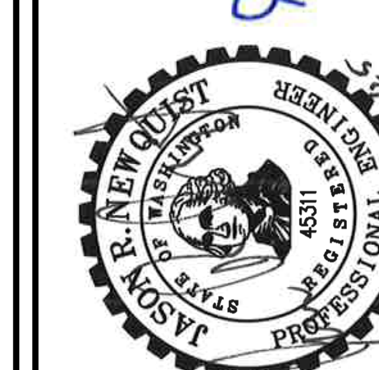
M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_PB.dwg, 2/28/2025 2:02 PM, DAVID KLATT

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

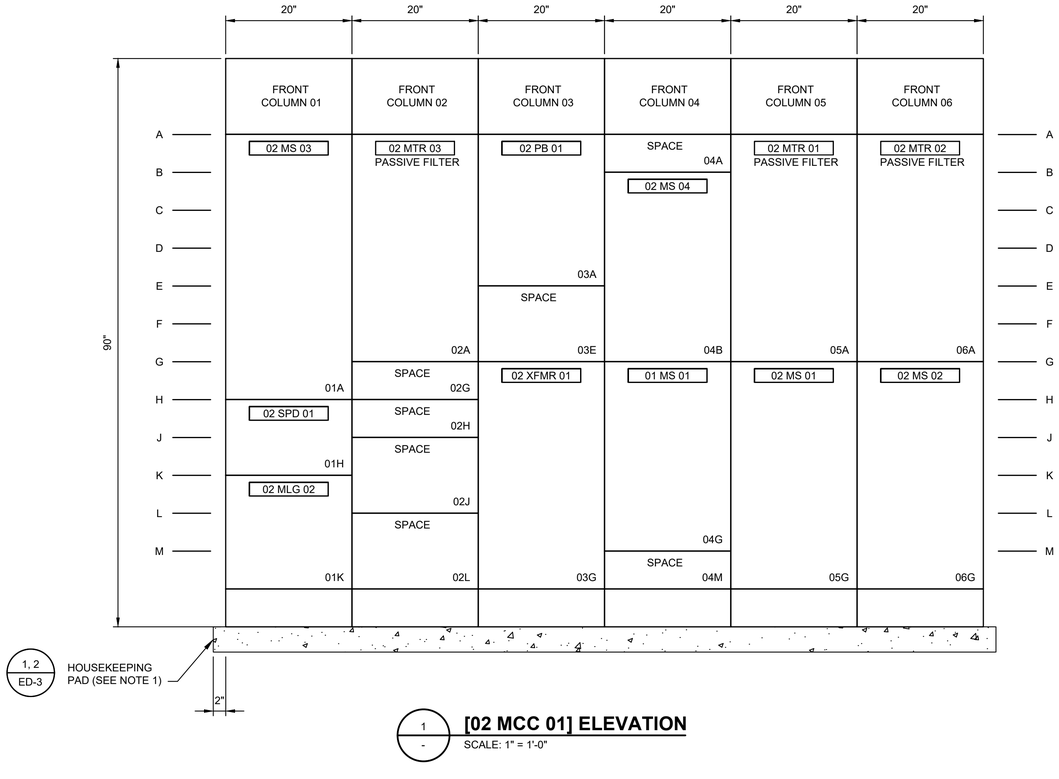
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN





MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
PANELBOARD [02 PB 01] SCHEDULE, SPECFICATIONS, AND LOAD DISTRIBUTION

SHEET: E-11
OF: 22
JOB NO.: 21285.00
DWGE_PB



1 / - **[02 MCC 01] ELEVATION**

SCALE: 1" = 1'-0"

MOTOR CONTROL CENTER [02 MCC 01]

ELECTRICAL AND CONSTRUCTION SPECIFICATION REQUIREMENTS

BUS MATERIAL:	COPPER, TIN-PLATED (ALL BUSES)
VOLTAGE RATING:	600 VAC
CONFIGURATION:	480 VAC, 3 PH, 60 Hz, 3 W + GROUND
MAIN BUS:	600 A, HORIZONTAL, SLEEVE-WRAP INSULATED
ENTRY COLUMN VERTICAL BUS:	600 A
OTHER VERTICAL BUS:	300 A (MINIMUM), SIZE FOR COLUMN LOAD
GROUND BUS:	300 A (50% OF MAIN BUS), HORIZONTAL
BUS BRACING:	65 kAIC
WIRING:	CLASS 2B
CONTROL WIRING:	#14 AWG, MTW

MCC PHYSICALS

STRUCTURE:	SINGLE SIDED, NEMA 12
SERVICE ENTRY LOCATION:	BOTTOM, LEFT COLUMN

MCC OPTIONS

NEUTRAL BUS:	NO
TVSS:	YES; 240 kA, 3 PH, WITH STATUS LIGHTS, OCPD, AND FORM A "FAULT" CONTACT
POWER MONITOR UNIT:	NO
MAIN DISCONNECT BREAKER:	YES; 200 AT, 225 AF, 480 VAC, 3 PH, 65 kAIC, 2 TERMINALS / PH, SUSE RATED
AUTOMATIC TRANSFER SWITCH:	NO

MOTOR CONTROL CENTER [02 MCC 01] SCHEDULE

SECTION	UNIT	DESCRIPTION (NAMEPLATE)	TAG ID NO.	NOTES
01	A	[02 MS 03], MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	02 MS 03	
01	H	SURGE PROTECTION DEVICE, MOTOR CONTROL CENTER	02 SPD 01	
01	K	MAIN LUGS, MOTOR CONTROL CENTER	02 MLG 02	
02	A	MOTOR, HIGH FLOW PUMP 1	02 MTR 03	~31A PASSIVE FILTER FOR [02 MS 03]
02	G	BLANK	- - - - -	BLANK
02	H	BLANK	- - - - -	BLANK
02	J	BLANK	- - - - -	BLANK
02	L	BLANK	- - - - -	BLANK
03	A	PANELBOARD, MOTOR CONTROL CENTER	02 PB 01	
03	E	BLANK	- - - - -	BLANK
03	G	LOW VOLTAGE TRANSFORMER 480/277:208/120 3PH, MOTOR CONTROL CENTER	02 XFMR 01	15 KVA
04	A	BLANK	- - - - -	BLANK
04	B	[02 MS 04], MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	02 MS 04	
04	G	[01 MS 01], MOTOR STARTER - FVNR, WELL PUMP MOTOR	01 MS 01	
04	M	BLANK	- - - - -	BLANK
05	A	MOTOR, DUTY PUMP 1	02 MTR 01	~23A PASSIVE FILTER [FOR 02 MS 01]
05	G	[02 MS 01], MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	02 MS 01	
06	A	MOTOR, DUTY PUMP 2	02 MTR 02	~23A PASSIVE FILTER [FOR 02 MS 02]
06	G	[02 MS 02], MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	02 MS 02	

NOTES:

1. SECURE [02 MCC 01] TO THE WALL WITH A SPACING AS SHOWN ON (1, 2 / ED-3).
2. [02 MCC 01] PANEL AND STARTER LAYOUTS ARE BASED ON (MANUFACTURER'S NAME, PRODUCT FAMILY) MCC DATA. IF ANOTHER MANUFACTURER IS SELECTED, THE CONTRACTOR SHALL BE RESPONSIBLE TO ASSURE THAT THE MCC OCCUPIES NO MORE THAN 100 INCHES OF WIDTH WITH 20 INCHES OF DEPTH OR LESS AND SHALL SUBMIT THE NEW DESIGN TO ENGINEERING FOR APPROVAL PRIOR TO PROCUREMENT.

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID P. KLATT — 21285 — PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 2/28/2025

JASON R. NEWQUIST — 23427 — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MCC ELEVATION

SHEET: E-12
OF: 22
JOB NO.: 21285.00
DWG:E_MCCEL

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_MCCEL.dwg, 2/26/2025 2:02 PM, DAVID KLATT

MOTOR STARTER GENERAL NOTES:

G.1. REFERENCE MOTOR STARTER AND CONTROL PANEL SPECIFICATIONS.

G.2. METAL OXIDE VARISTORS SHALL PARALLEL EACH 120 VAC CONTROL RELAY, TIMER COIL, AND SOLENOID VALVE. REVERSE-BIASED DIODES SHALL PARALLEL EACH 24 VDC CONTROL RELAY.

G.3. ALL PILOT LIGHTS SHALL BE PUSH-TO-TEST LED STYLE. REFERENCE THE "PILOT LIGHT COLOR TABLE" ON THIS SHEET.

G.4. THE "POWER-UP DELAY" TIMER DISABLES THE DRIVE FOLLOWING A POWER UP TO ALLOW DRIVES TO CHARGE UP, REBOOT, AND STABILIZE BEFORE BEING PLACED INTO OPERATION. THESE DELAYS ARE OFFSET BETWEEN DRIVES TO ELIMINATE THE POSSIBILITY OF STARTING MULTIPLE MOTORS SIMULTANEOUSLY WHEN POWERED UP IN "HAND".

G.5. PROVIDE AN ELECTRO-MECHANICAL ELAPSED TIME METER AND MOTOR START COUNTER ON A SINGLE METER PER SPECIFICATION.

G.6. SIZE STARTER CONTROL TRANSFORMERS TO HANDLE ALL DRIVE/STARTER CONTROL DEVICES AS PER REFERENCED ELEMENTARY WIRING DIAGRAMS PLUS 25%. UPSIZE FOR REMOTE PANEL HEATERS, PILOT LIGHTS, SOLENOID VALVES, INTRINSICALLY SAFE BARRIERS, COOLING FANS, AND ETC. WHERE APPLICABLE.

G.7. ALL MOTOR STARTER CONTROLLERS SHALL BE CONFIGURED TO RESET FROM A DOOR-MOUNTED STANDARD PUSHBUTTON - NOT FROM A MANUFACTURER'S CONTROL MODULE. PROVIDE A SEPARATE RESET PUSHBUTTON ON THE STARTER DOOR FOR THIS PURPOSE.

G.8. MCC MANUFACTURER SHALL SIZE AND SET MOTOR STARTER BREAKERS AND MOTOR OVERLOAD PROTECTION DEVICES BASED ON NEC AND MOTOR MANUFACTURER'S REQUIREMENTS.

G.9. PROVIDE A SELECTOR SWITCH LOCATION STICKER AS SHOWN BELOW ON THOSE MOTOR STARTER DOORS SO INDICATED IN THEIR MOTOR STARTER ELEMENTARY DIAGRAMS.

OVERLOAD RELAYS, NETWORKED:

OL.1 THE OVERLOAD RELAY SHALL BE NETWORK COMPATIBLE WITH THE MAIN PROCESS PLC. THE STARTER MANUFACTURER SHALL PROVIDE ALL HARDWARE, CABLING, AND PROGRAMMING REQUIRED TO MONITOR AND TRIP THE STARTER ON THE FOLLOWING CONDITIONS:

TRIP ON:	MONITOR ALSO:
THERMAL OVERLOAD	STALL
PHASE LOSS	UNDERLOADED
PHASE ROTATION	AVERAGE CURRENT
UNDERVOLTAGE (L-L)	AVERAGE VOLTAGE
OVERVOLTAGE (L-L)	REAL POWER (kW)
CURRENT IMBALANCE	APPARENT POWER (kVA)

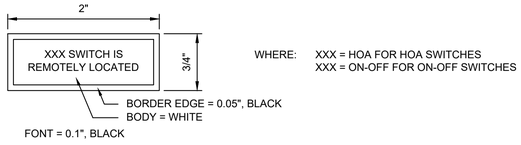
ALL LISTED STATUS AND EVENTS SHALL BE AVAILABLE OVER THE NETWORK.

OL.2 THE OVERLOAD RELAY SHALL INCLUDE A "CALL TO RUN", AND A "FAULT" OUTPUT CONFIGURED AS SHOWN ON THE "INTERNAL CONTROL LOGIC DETAIL" DIAGRAMS ASSOCIATED WITH EACH STARTER.

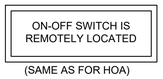
OL.3 THE OVERLOAD RELAYS SHOWN IN THESE MOTOR ELEMENTARY WIRING DIAGRAMS ARE TYPICAL AND MAY NOT REPRESENT ALL APPROVED MANUFACTURERS. SELECTED MANUFACTURERS SHALL SUBMIT ELECTRICAL WIRING DIAGRAMS SHOWING DETAILED CONNECTIONS THAT FOLLOW THE DESIGN INTENT AND OPERATION OF THOSE SHOWN HEREIN. MODIFICATIONS OR COMPROMISES TO THE DESIGN FUNCTION WILL NOT BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

OL.4 OVERLOAD RELAYS SHALL BE CONFIGURED TO RESET FROM TEMPORARY CLOSURE OF A DOOR-MOUNTED PUSHBUTTON, NOT FROM MANUFACTURER'S DOOR-MOUNTED CONTROL MODULES. PROVIDE A RESET PUSHBUTTON ON THE STARTER DOOR PER SPECIFICATION.

OL.5 IF REQUIRED, EXTENDED I/O MODULES SHALL PLUG DIRECTLY INTO THE OVERLOAD RELAYS. SEPARATE POWER AND ETHERNET CONNECTIONS SHALL NOT BE REQUIRED.



WHERE: XXX = HOA FOR HOA SWITCHES
XXX = ON-OFF FOR ON-OFF SWITCHES



(SAME AS FOR HOA)

PILOT LIGHT COLOR TABLE	
CONDITION / STATUS	**PILOT COLOR**
MOTOR RUNNING	RED
ANY FAULT OR ALARM	AMBER
STARTER "READY" STATUS	WHITE

SHADED DEVICES ON MOTOR STARTER ELEMENTARY WIRING DIAGRAMS ARE REMOTE FROM THE STARTER.

REFERS TO 120 VAC CONTROL WIRING
REFERS TO 24 VDC CONTROL WIRING

VFD SPECIFIC NOTES, NETWORKED:

V.1. THE VFD SHALL PROVIDE THE FOLLOWING STATUS CONDITIONS TO THE NETWORK:

INTERNAL PROTECTION	MOTOR/DRIVE DATA	MOTOR DATA (CONT.)
THERMAL OVERLOAD	MOTOR SPEED (Hz)	REAL POWER (kW)
DRIVE FAULT	MOTOR AVERAGE CURRENT	MOTOR POWER FACTOR
UNDER-VOLTAGE (L-L)	MOTOR AVERAGE VOLTAGE	DC BUS VOLTAGE
OVER-VOLTAGE (L-L)		

V.2. THE DRIVE SHALL BE DISABLED, AND THE FAULT STATUS OUTPUT MADE TRUE, ON ANY COMBINATION OF "INTERNAL PROTECTION" CONDITIONS LISTED IN NOTE V.1.

V.3. VFD PROGRAMMING REQUIREMENTS:

V.3.1. PROGRAM FOR AUTO RESET
V.3.2. PROGRAM RAMP RATES AND MIN/MAX SPEED LIMITS PER SPECIFICATION.
V.3.3. PROGRAM TO NOT OPERATE BELOW MINIMUM OR ABOVE MAXIMUM SPEED LIMITS.
V.3.4. PROGRAM FOR BUMPLESS TRANSFER BETWEEN AUTO AND MANUAL MODES.
V.3.5. PROGRAM FORWARD SPEED ONLY.
V.3.6. PROGRAM RUN CONTROL, SPEED CONTROL, AND "STARTER READY" LOGIC PER THE "INTERNAL LOGIC DETAIL" DIAGRAMS ASSOCIATED WITH EACH STARTER.

V4. THE HIM SHALL BE MOUNTED ON THE STARTER DOOR. PROVIDE ALL CABLING, HARDWARE, AND CONNECTORS FOR DOOR MOUNT PER SPECIFICATION. HIM CABLES SHALL BE PHYSICALLY SEPARATED FROM 120 VAC CIRCUITS BY A MINIMUM OF 6 INCHES IN ALL PLACES.

V.5. THE PIN FUNCTIONS SHOWN IN THESE MOTOR ELEMENTARY WIRING DIAGRAMS ARE TYPICAL AND MAY NOT REPRESENT ALL APPROVED MANUFACTURERS. SELECTED MANUFACTURERS SHALL SUBMIT ELECTRICAL WIRING DIAGRAMS SHOWING DETAILED CONNECTIONS AND INTERNAL LOGIC THAT FOLLOW THE DESIGN INTENT AND OPERATION OF THOSE SHOWN HEREIN. MODIFICATIONS OR COMPROMISES TO THE DESIGN FUNCTION WILL NOT BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

V.6. THE DRIVE MANUFACTURER SHALL SIZE AND PROVIDE ENCLOSURE COOLING FANS, THERMOSTAT AND ASSOCIATED CONTROL LOGIC AS SHOWN. THE ENCLOSURE THERMOSTAT SHALL BE FACTORY SET BY THE MANUFACTURER.

V.7. PROVIDE A SEPARATE DRIVE RESET PUSHBUTTON ON THE STARTER DOOR PER SPECIFICATION (DRIVE RESET SHALL NOT BE INTEGRATED INTO THE HIM).

V.8. THE DRIVE MANUFACTURER SHALL SIZE LINE AND LOAD REACTORS FOR STABLE MOTOR OPERATION AND COMPLIANCE WITH IEEE 519-2014 FOR EACH SPECIFIC MOTOR APPLICATION. REFERENCE MOTOR STARTER SPECIFICATIONS.

V.9. SPEED POTS SHALL BE SINGLE-TURN, 10k OHMS.

V.10. IF REQUIRED, EXTENDED I/O MODULES SHALL PLUG DIRECTLY INTO THE VFD DRIVES. SEPARATE POWER AND ETHERNET CONNECTIONS SHALL NOT BE REQUIRED.

FVNR SPECIFIC NOTES:

F.1. STARTER MAIN CONTACTORS SHALL BE STANDARD NEMA CONTACTOR SIZES (NEMA SIZE 1 MINIMUM).

F.2. REFERENCE OVERLOAD RELAY NOTES, OL.n.

F.3. MOTOR STARTER BREAKERS SHALL BE MAGNETIC ONLY AND SHALL INCLUDE AN AUXILIARY CONTACT THAT OPENS WHEN THE BREAKER IS TRIPPED OR MANUALLY OPENED.

F.4. FRONT PANEL DIAL-TYPE AMMETERS SHALL BE PROVIDED FOR EACH FVNR STARTER.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024	DRAWN: PEB	CHECKED: JRN	APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

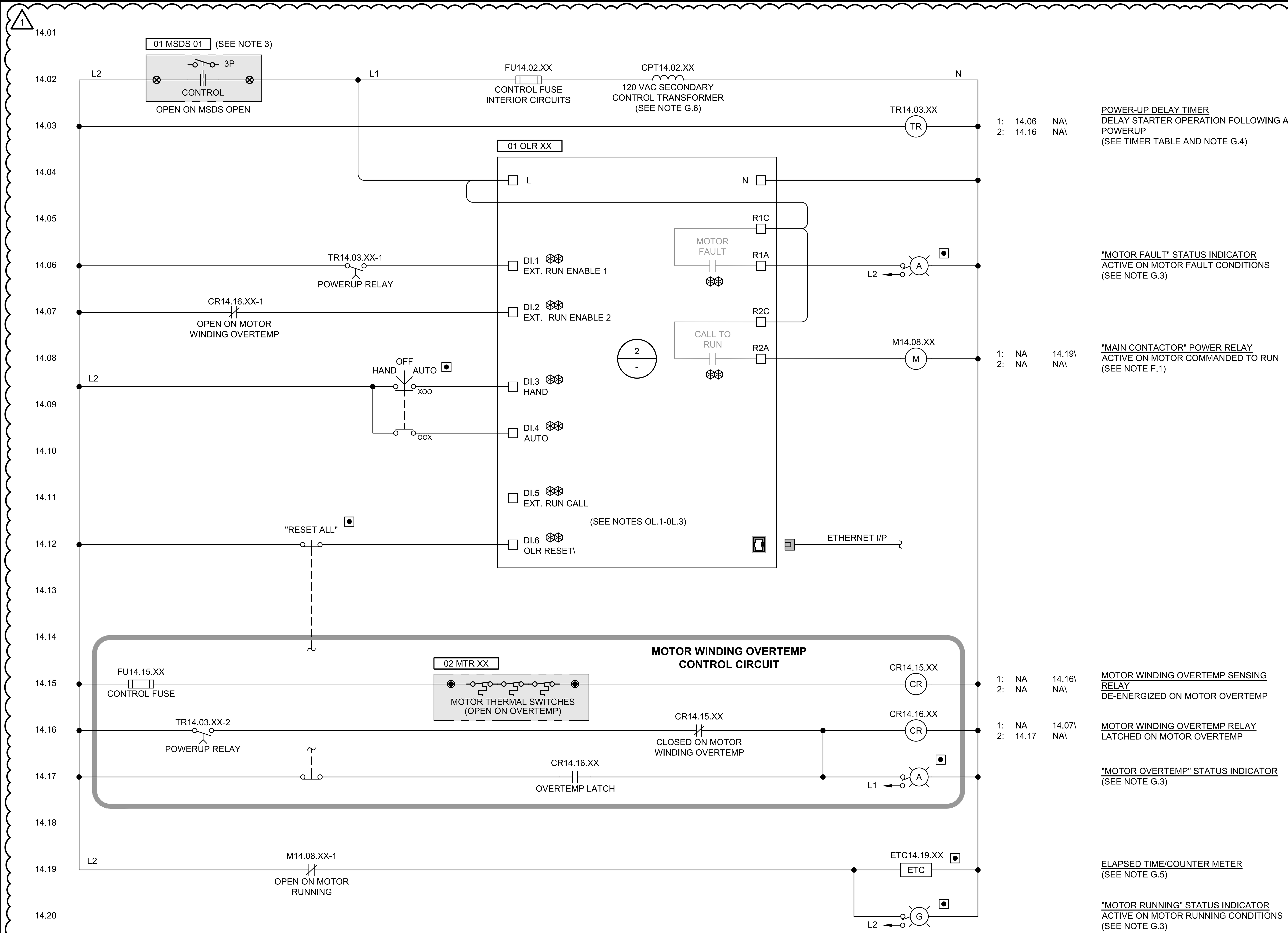
DAVID ALAN PERKINS — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 21624 — 2/28/2025

JASON ROBERT NEWQUIST — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 21624

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MOTOR STARTER NOTES

SHEET: E-13
OF: 22

JOB NO.: 21285.00
DWG:E_MSEWD



MOTOR STARTER REFERENCE TABLE		
XX	TAG	DESCRIPTION
01	[01 MS 01]	MOTOR STARTER, WELL PUMP
04	[02 MS 04]	MOTOR STARTER, BACKWASH RECYCLE PUMP

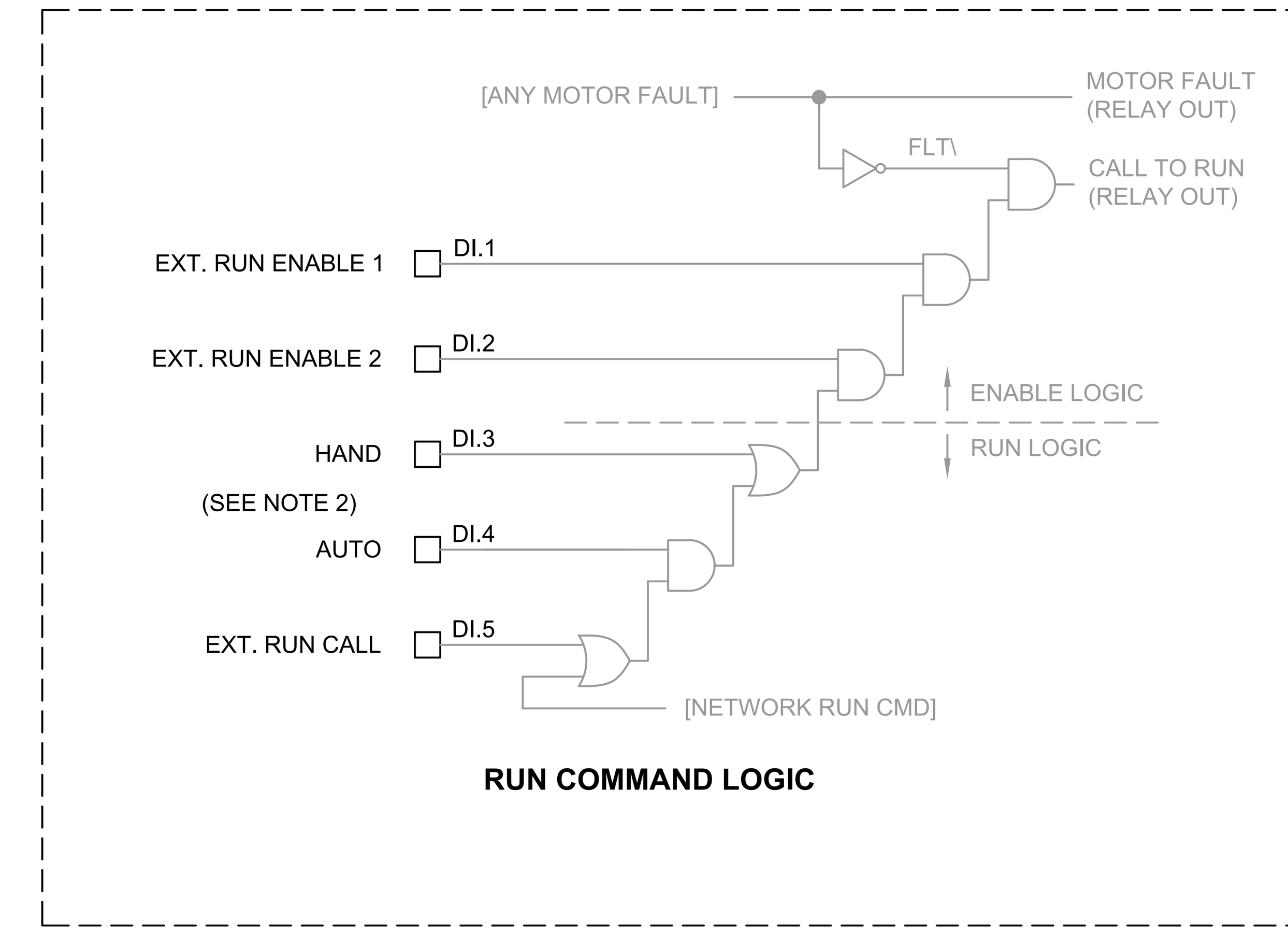
1 / - **MOTOR STARTERS [01 MS 01] AND [02 MS 04] ELEMENTARY WIRING DIAGRAM**

FVNR, NETWORK CONTROLLED

NOTES:

1. REFERENCE MOTOR STARTER NOTES ON - / E-13 WHERE:
   F.n = FVNR NOTES,
   G.n = GENERAL NOTES,
   OL.n = OVERLOAD RELAY NOTES.
2. ALL PHYSICAL RELAYS AND TIMERS SHALL BE PROVIDED AS SHOWN.
3. ONLY AREA 01 HAS A REMOTE DISCONNECT SWITCH. BACKWASH PUMP USES DOOR MOUNTED BREAKER.

= INPUTS AND OUTPUTS TO BE SENSED BY THE PLC OVER THE NETWORK.



NOTES:

1. CONFIGURE THE STARTER'S RUN COMMAND AND "STARTER OK" LOGIC AS SHOWN ABOVE. THIS FUNCTIONALITY MUST BE DEMONSTRATED DURING SHOP WITNESS TESTING.
2. "HAND" AND "AUTO" CONDITIONS ARE MUTUALLY EXCLUSIVE.
3. PLC "VALID COMMUNICATION" STATUS IS DERIVED FROM WITHIN THE OVERLOAD RELAY.

2 / - **FVNR INTERNAL CONTROL LOGIC DETAIL**

RUN COMMAND AND "READY" STATUS

TIMER TABLE					
TIMER	FUNCTION	TYPE	AKA	MINIMUM RANGE	INITIAL SETTING
TR14.03.01	POWER-UP DELAY	TDAE	ON DELAY	0-100 SECONDS	1 SECONDS
TR14.03.02	POWER-UP DELAY	TDAE	ON DELAY	0-100 SECONDS	2 SECONDS

* SET THIS TIMER WITH THE OWNER AND THE ENGINEER DURING COMMISSIONING.

FVNR

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

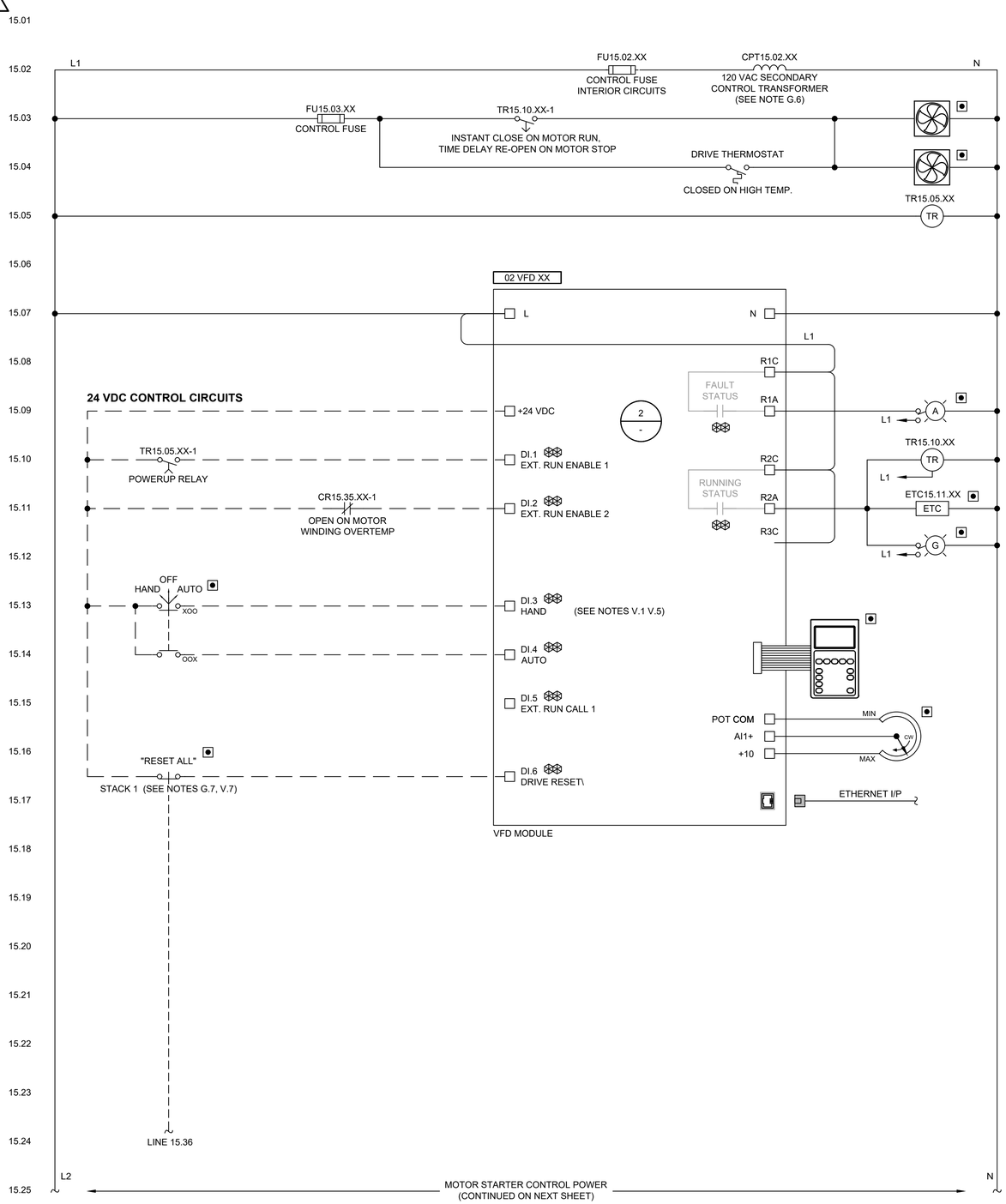
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS — 2/28/2025
JASON R. NEWQUIST — 45311

MASON COUNTY PUD 1
MASON COUNTY, WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MOTOR STARTER ELEMENTARY WIRING DIAGRAM - FVNR NET

SHEET: **E-14**
OF: **22**
JOB NO.: 21285.00
DWGE_MSEWD

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_MSEWD.dwg, 2/28/2025 2:02 PM, DAVID KLATT



1 - **MOTOR STARTERS [02 MS XX] ELEMENTARY WIRING DIAGRAM - PART A**
VFD, NETWORK CONTROLLED

STARTER ENCLOSURE COOLING FANS (TYP.)
(SEE NOTE V.6)

1: 15.10 NA\
2: 15.35 NA\
POWER-UP DELAY TIMER
DELAY STARTER OPERATION FOLLOWING A POWERUP
(SEE TIMER TABLE AND NOTE G.4)

"MOTOR FAULT" STATUS INDICATOR
ACTIVE ON DRIVE FAULT CONDITIONS
(SEE NOTE G.3)

1: 15.03 NA\
2: NA NA\
ENCLOSURE FAN CONTROL TIMER
ENERGIZED ON MOTOR RUNNING
(SEE TIMER TABLE, SEE NOTE V.6)

ELAPSED TIME/COUNTER METER
(SEE NOTE G.5)

"MOTOR RUNNING" STATUS INDICATOR
ACTIVE ON MOTOR RUNNING CONDITIONS
(SEE NOTE G.3)

"STARTER OK" STATUS INDICATOR
ACTIVE ON STARTER OK CONDITIONS
(SEE NOTE G.3)

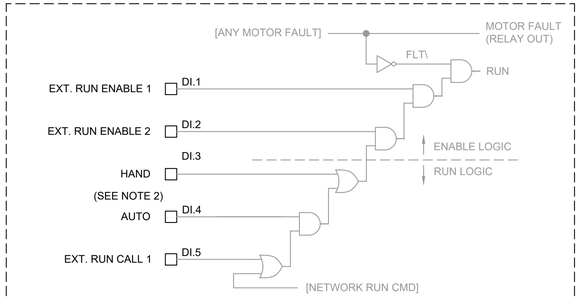
HUMAN INTERFACE MODULE (HIM)
(SEE NOTE V.4)

FRONT PANEL SPEED POT
(SEE NOTE V.9)

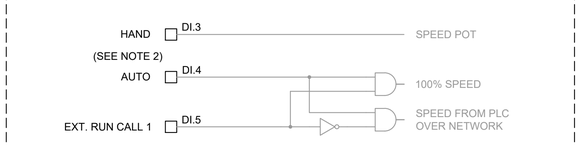
NOTES:

1. REFERENCE MOTOR STARTER SPECIFICATIONS.
2. REFERENCE MOTOR STARTER NOTES ON -/E-13 WHERE:
   G.n = GENERAL NOTES,
   V.n = VFD NOTES.
3. ISOLATION AND PASSIVE FILTER CAPACITOR-CONTROL CONTACTORS ARE NOT SHOWN. THESE CIRCUITS MAY VARY BETWEEN MANUFACTURERS. ALL OTHER PHYSICAL RELAYS AND TIMERS SHALL BE PROVIDED AS SHOWN.

⊛ = INPUTS AND OUTPUTS TO BE SENSED BY THE PLC OVER THE NETWORK.



- RUN COMMAND LOGIC -



- SPEED REFERENCE LOGIC -

NOTES:

1. CONFIGURE THE STARTER'S RUN COMMAND, SPEED REFERENCE AND "STARTER OK" LOGIC AS SHOWN ABOVE. THIS FUNCTIONALITY MUST BE DEMONSTRATED DURING SHOP WITNESS TESTING.
2. "HAND" AND "AUTO" CONDITIONS ARE MUTUALLY EXCLUSIVE.
3. PLC "VALID COMMUNICATION" STATUS IS DERIVED FROM WITHIN THE OVERLOAD RELAY.

2 - **VFD INTERNAL CONTROL LOGIC DETAIL**
RUN COMMAND, SPEED REFERENCE, AND "READY" STATUS

VFD

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

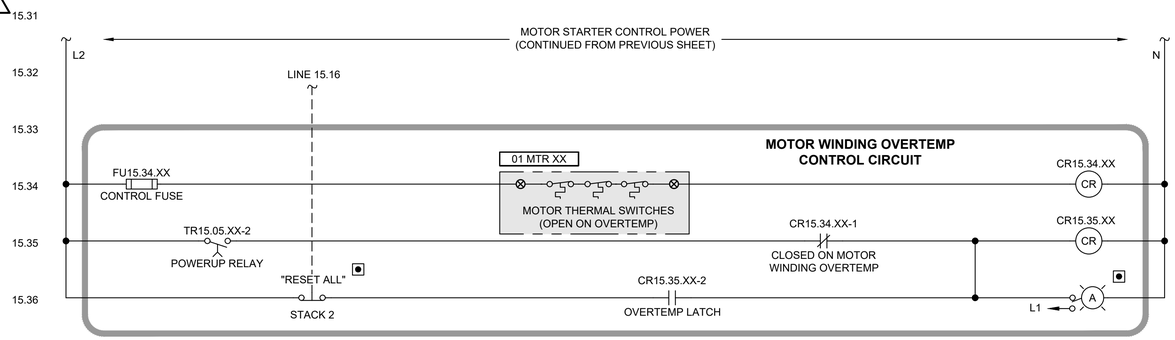
DATE: JUNE 2024	
DRAWN: PEB	
CHECKED: JRN	
APPROVED: DAC	

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MOTOR STARTER ELEMENTARY WIRING DIAGRAM - VFD NET_A

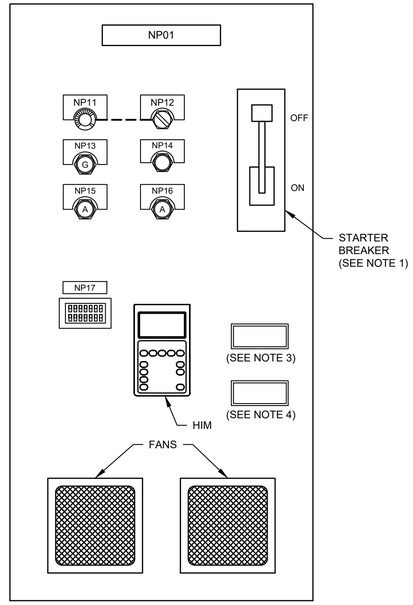
SHEET: E-15A
OF: 22
JOB NO.: 21285.00
DWG: E_MSEWD



1: NA 15.35\ MOTOR WINDING OVERTEMP SENSING RELAY
2: NA NA\ DE-ENERGIZED ON MOTOR OVERTEMP

1: NA 15.11\ MOTOR WINDING OVERTEMP RELAY
2: 15.36 NA\ LATCHED ON MOTOR OVERTEMP

"MOTOR OVERTEMP" STATUS INDICATOR
(SEE NOTE G.3)



PANEL DOOR NAMEPLATE SCHEDULE

ITEM NUMBER	ITEM FUNCTION
NP11	MANUAL SPEED POT
NP12	HOA SWITCH
NP13	MOTOR RUNNING (PILOT, GREEN)
NP14	RESET ALL (PUSHBUTTON, RED)
NP15	MOTOR FAULT (PILOT, AMBER)
NP16	MOTOR OVERTEMP (PILOT, AMBER)
NP17	ELAPSED TIME/COUNTER METER

LINE 1	LINE 2
DUTY PUMP NO. 1	[02 MS 01]
DUTY PUMP NO. 2	[02 MS 02]
HIGH FLOW PUMP NO. 3	[02 MS 03]

TIMER TABLE

TIMER	FUNCTION	TYPE	AKA	MINIMUM RANGE	INITIAL SETTING
TR15.05.01	POWER-UP DELAY	TDAE	ON DELAY	0-100 SECONDS	2 SECONDS
TR15.05.02	POWER-UP DELAY	TDAE	ON DELAY	0-100 SECONDS	5 SECONDS
TR15.05.03	POWER-UP DELAY	TDAE	ON DELAY	0-100 SECONDS	1 SECOND
TR15.10.XX	STARTER ENCLOSURE FAN DELAY	TDAD	OFF DELAY	0-100 MINUTES	10 MINUTES

MOTOR STARTER REFERENCE TABLE

XX	TAG	DESCRIPTION
01	[02 MS 01]	MOTOR STARTER, PUMP NO. 1
02	[02 MS 02]	MOTOR STARTER, PUMP NO. 2
03	[02 MS 03]	MOTOR STARTER, PUMP NO. 3

NOTES:

1. SEE NOTES ON PREVIOUS SHEET.

1 - **MOTOR STARTERS [02 MS XX] ELEMENTARY WIRING DIAGRAM - PART B**
VFD, NETWORK CONTROLLED

NOTES:

1. STARTER BREAKERS SHALL BE LOCKABLE IN THE OPEN POSITION AND SHALL BE PROVIDED WITH A DOOR LATCHING MECHANISM THAT ALLOWS THE DOOR TO OPEN UNDER POWER WITH A SPECIAL TOOL. PROVIDE AN AUXILIARY CONTACT ON BREAKERS THAT IS OPEN WHEN THE BREAKER IS OPEN AND CLOSED WHEN THE BREAKER IS CLOSED.
2. THESE DETAILS ARE INTENDED TO SHOW A GENERAL LAYOUT OF DEVICES EXPECTED ON THE STARTER DOORS AND ARE NOT INTENDED TO REPRESENT ACTUAL STARTER OR STARTER DOOR SIZES.
3. PROVIDE AN ARC FLASH WARNING LABEL ON THE DOOR.
4. PROVIDE A SELECTOR SWITCH LOCATION PLACARD ON THE STARTER DOOR PER MOTOR STARTER GENERAL NOTE G.11.

2 - **MOTOR STARTER DOOR DETAIL**
NOT TO SCALE

VFD

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

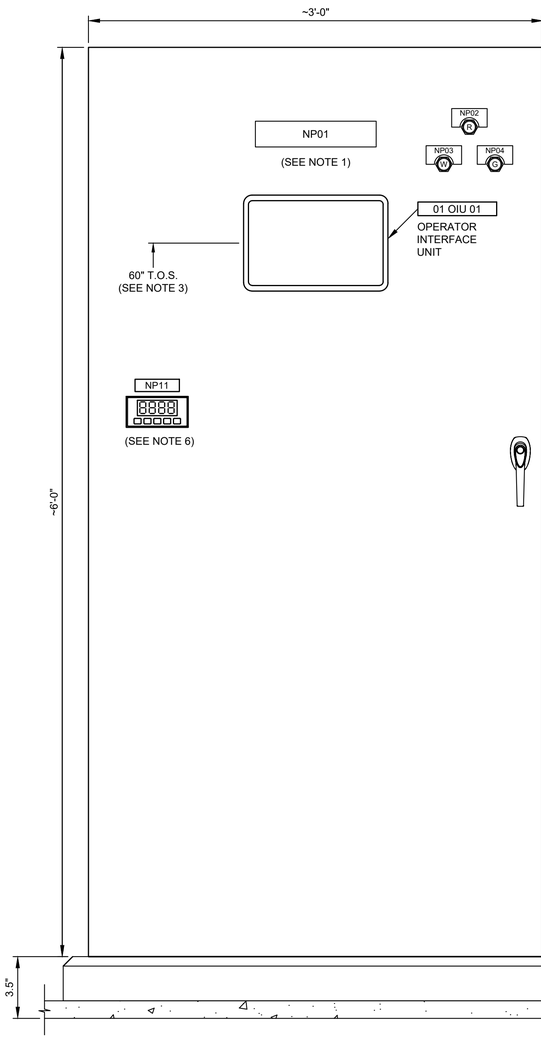
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN ATKINS — 2/28/2025
JASON R. NEWQUIST — 2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
MOTOR STARTER ELEMENTARY WIRING DIAGRAM - VFD NET_B

SHEET: E-15B
OF: 22
JOB NO.: 21285.00
DWG: E_MSEWD

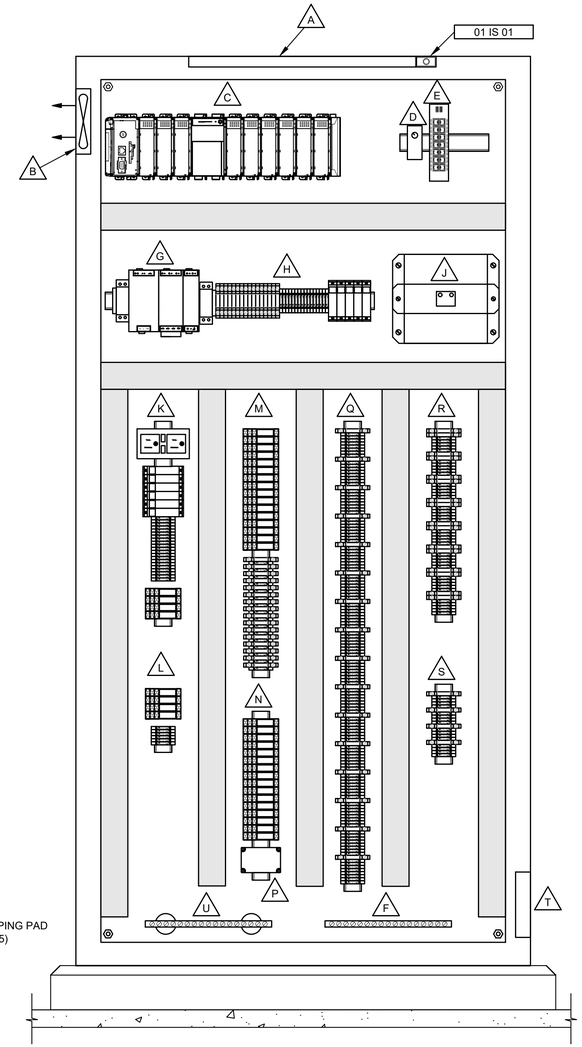
M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_MSEWD.dwg, 2/28/2025 2:02 PM, DAVID KLATT



CONTROL PANEL [01 CP 01] EXTERIOR ELEVATION

A
-

NOT TO SCALE



CONTROL PANEL [01 CP 01] INTERIOR ELEVATION

B
-

NOT TO SCALE

CONTROL PANEL [01 CP 01] DEVICE SCHEDULE	
ITEM NUMBER	**DEVICE OR FUNCTION**
A	ENCLOSURE LIGHT WITH DOOR SWITCH
B	ENCLOSURE EXHAUST FANS
C	PROGRAMMABLE LOGIC CONTROLLER [01 PLC 01]
D	EXHAUST FAN THERMOSTAT
E	ETHERNET SWITCH [01 ES 01]
F	CHASSIS GROUND BUS
G	24 VDC POWER SUPPLY AND UPS SYSTEM
H	24 VDC POWER DISTRIBUTION
J	BATTERIES [01 BAT 01], [01 BAT 02] (SEE NOTE 3)
K	ANCILLARY POWER CIRCUIT BREAKERS, RELAYS, LOUVER AND EXHAUST FAN CONTACTOR, AND TERMINALS
L	POWER MONITORING RELAYS AND TERMINALS
M	DIGITAL OUTPUT BUFFER RELAYS, FUSING AND TERMINALS
N	BACKUP LOGIC RELAYS
P	ALTERNATOR RELAY
Q	DIGITAL INPUT FUSING AND TERMINALS
R	ANALOG INPUT FUSING AND TERMINALS
S	ANALOG OUTPUT FUSING AND TERMINALS
T	INLET VENTS
U	ISOLATED SIGNAL GROUND BUS

PANEL DOOR NAMEPLATE SCHEDULE		
ITEM NUMBER	**NAMEPLATE**	**ASSOCIATED DEVICE**
NP01	MASON COUNTY PUD #1 BAY EAST IRON & MANGANESE TREATMENT PLC CONTROL PANEL	[01 CP 01]
NP02	PLC FAIL (PILOT, RED)	-
NP03	POWER TO UPS VALID (PILOT, WHITE)	-
NP04	24 VDC POWER VALID (PILOT, GREEN)	-
NP11	BACKWASH FLOW METER	[02 FIT 01]

NOTES:

1. PROVIDE A FRONT PANEL NAMEPLATE STATING:

MASON COUNTY PUD #1
SHADOWOOD WATER SYSTEM
PLC CONTROL PANEL
[01 CP 01]

2. PLC CONTROL PANEL [01 CP 01] SHALL BE 72"H X 36"W X 20"D, 12-GAUGE STEEL, NEMA 1 GASKETED, OPEN BOTTOM, WITH LEFT HAND (HINGE ON LEFT SIDE) PAD-LOCKABLE 3-POINT LATCH DOOR. PROVIDE A DOOR-CATCH ON THE HINGED SIDE TO HOLD THE DOOR IN THE OPEN POSITION.
3. DEVICE LOCATIONS ON THIS SHEET SHOW A LAYOUT INTENT AND MAY BE PLACED OTHERWISE AS REQUIRED FOR BEST FIT AND ACCESS BY THE OPERATORS. MAINTAIN 60 INCH HEIGHT FROM FLOOR TO CENTERLINE OF THE OIU. ASSUME 3.5-INCH HOUSEKEEPING PAD. PROVIDE SIDE PANEL FOR SECOND BATTERY IF REQUIRED.
4. SHADED AREAS REPRESENT WIREWAYS. PROVIDE SIDE PANEL IF MORE AREA IS REQUIRED TO MOUNT COMPONENTS.
5. THE CONTROL PANEL SHALL BE SECURED TO THE WALL WITH 5/8-INCH CHANNEL 48 INCHES ABOVE THE FLOOR. PROVIDE A SOLID HOUSEKEEPING PAD, APPROXIMATELY 3-1/2 INCHES HIGH. EXTEND THE PAD 2 INCHES OUT PAST THE FRONT AND SIDES OF THE CONTROL PANEL (AFTER SECURED TO WALL). PROVIDE 3/4-INCH CHAMFER ON THREE SIDES.
6. DISPLAY IS PANEL MOUNT STYLE, PROVIDED BY THE FILTER SKID MANUFACTURER ,FOR CONNECTION TO SKID PIPING FLOW METER.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

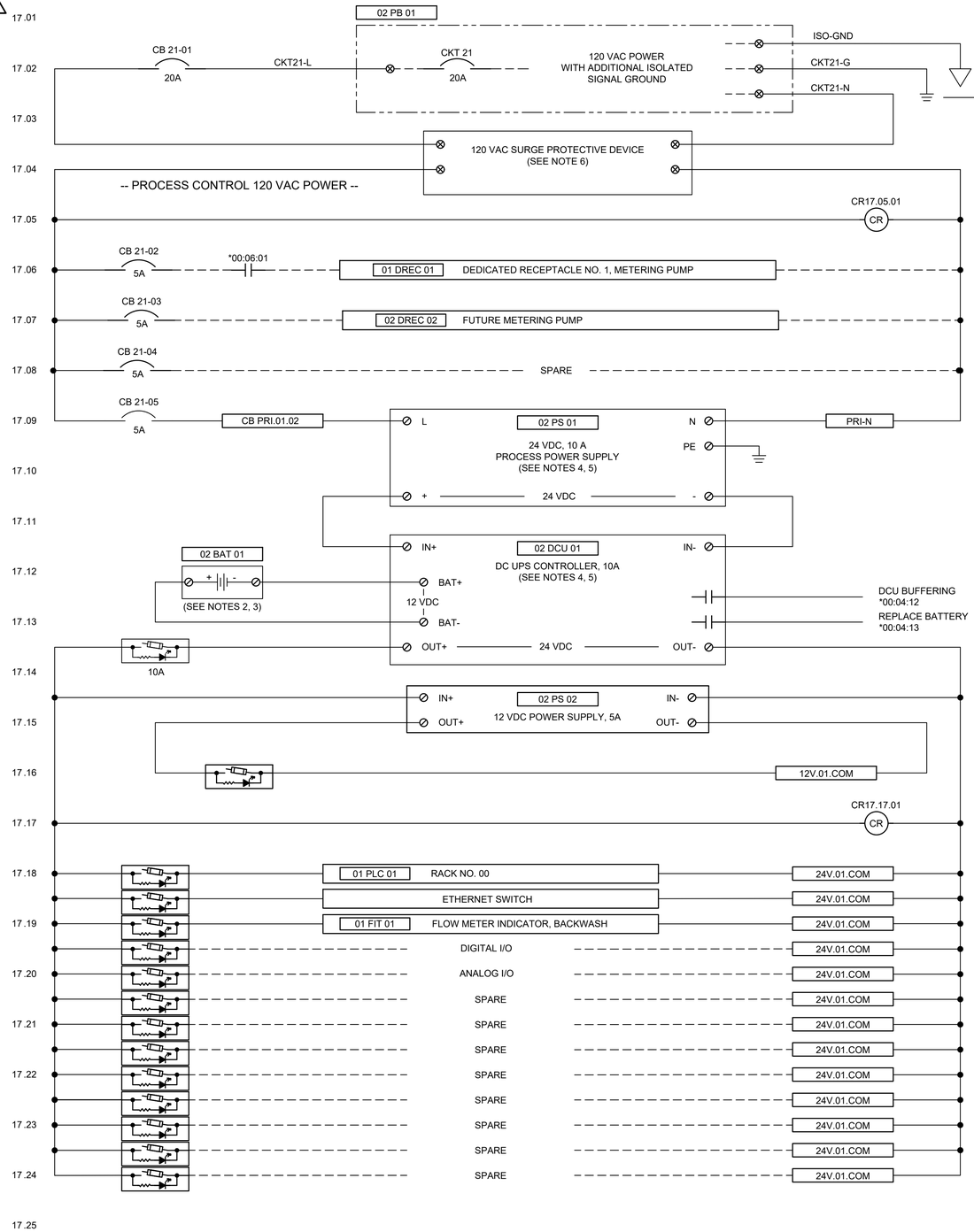
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
CONTROL PANEL ELEVATIONS

SHEET: E-16
OF: 22

JOB NO.: 21285.00
DWG E_CPEL



RELAY CONTACT ASSIGNMENTS

1:	18.08	NA\	POWER TO BATTERY BACKED 24 VDC SUPPLY VALID
2:	*00:04:11	NA\	ENERGIZED ON VALID 120 VAC POWER TO 24 VDC CIRCUIT

1:	18.09	NA\	24 VDC POWER VALID RELAY
2:	NA	NA\	ENERGIZED ON VALID 24 VDC BUS

NOTES:

1. PROVIDE A DEDICATED GROUND STRIP FOR ANALOG INPUT AND OUTPUT SHIELDS. THIS GROUND IS DERIVED FROM THE GROUND BUS OF POWER PANELBOARD [01 PB 01] AND IS RUN SEPARATELY TO [01 CP 01] THROUGH A #10 AWG STRANDED COPPER CONDUCTOR WITH GREEN INSULATION. SIGNAL GROUNDS IN [01 CP 01] ARE ISOLATED FROM CHASSIS\EQUIPMENT GROUND BUT ARE AT THE SAME POTENTIAL.
2. THIS CIRCUIT USES A BATTERY-BACKED, 10 A, 24 VDC, DC UPS SYSTEM TO ESTABLISH THE 24 VDC SYSTEM CONTROL BUS.
3. THE INTEGRATOR SHALL CALCULATE AND SIZE THE BACK-UP BATTERY FOR 4 HOURS (MINIMUM) OF 24 VDC POWER, WITH ALL CONNECTED LOADS ACTIVE. THESE CALCULATIONS SHALL BE PRESENTED TO ENGINEERING DURING SUBMITTAL.
4. ALL POWER SUPPLIES, CONVERTERS, AND UPS DEVICES SHALL BE INDUSTRIAL, PACKAGED, MANUFACTURED, UL-LISTED, DIN-RAIL DEVICES. CUSTOM-BUILT CIRCUIT BOARDS AND LOOSE ELECTRONIC DEVICES SHALL NOT BE ALLOWED.
5. THIS 24 VDC POWER SYSTEM IS DESIGNED AROUND THE FOLLOWING DEVICES:
   a. [01 PS 01] SINGLE PHASE, 120 VAC/24 VDC, 10A, POWER SUPPLY — PULS #QS10.241
   b. [01 DCU 01] 24 VDC/24 VDC, 10A, DC-UPS CONTROLLER — PULS #UB10.241

   THESE UNITS MAY BE REPLACED WITH "OR EQUAL" DEVICES.
6. SURGE PROTECTIVE DEVICE IS 120 VAC, 40 kA; INNOVATIVE TECHNOLOGY #HS-DIN-120 OR EQUIVALENT.

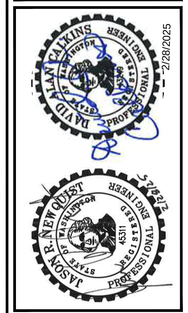
PLC AREA 01 - CONTROL PANEL [01 CP 01]
POWER SUPPLY AND DISTRIBUTION ELEMENTARY WIRING DIAGRAM

1
-
NOT TO SCALE

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3860

DATE:	JUNE 2024		
DRAWN:	PGB		
CHECKED:	JRN		
APPROVED:	DAC		

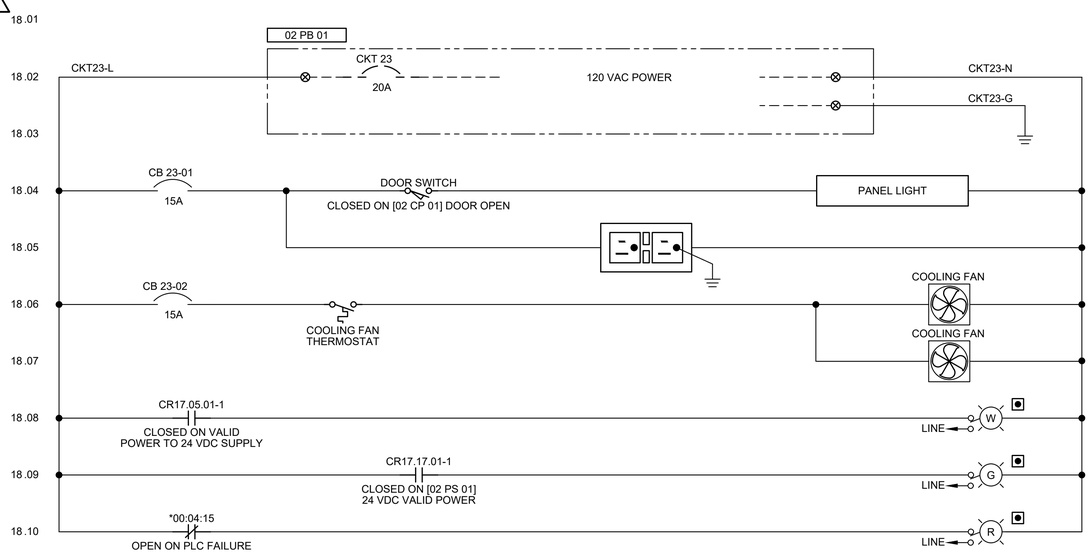
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN



MASON COUNTY PUD 1
MASON COUNTY — WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
CONTROL PANEL ELEMENTARY WIRING DIAGRAM

SHEET: **E-17**
OF: **22**

JOB NO.: 21285.00
DWG:E_CPEWD



RELAY CONTACT ASSIGNMENTS

DOOR-ACTIVATED PANEL LIGHT FOR [02 CP 01]

GFCI CONVENIENCE RECEPTACLE FOR [02 CP 01]

COOLING FAN FOR [02 CP 01]

COOLING FAN FOR [02 CP 01]
(IF REQUIRED)

"POWER TO UPS VALID" PILOT

"24 VDC SYSTEM POWER VALID" PILOT

"PLC FAILURE" PILOT

NOTES:

1. ALL PILOT LIGHTS SHALL BE LED PUSH-TO-TEST STYLE.

PLC AREA 01 - CONTROL PANEL [01 CP 01]
POWER SUPPLY AND DISTRIBUTION ELEMENTARY WIRING DIAGRAM
1
-
NOT TO SCALE

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE:	JUNE 2024
DRAWN:	PGB
CHECKED:	JRN
APPROVED:	DAC

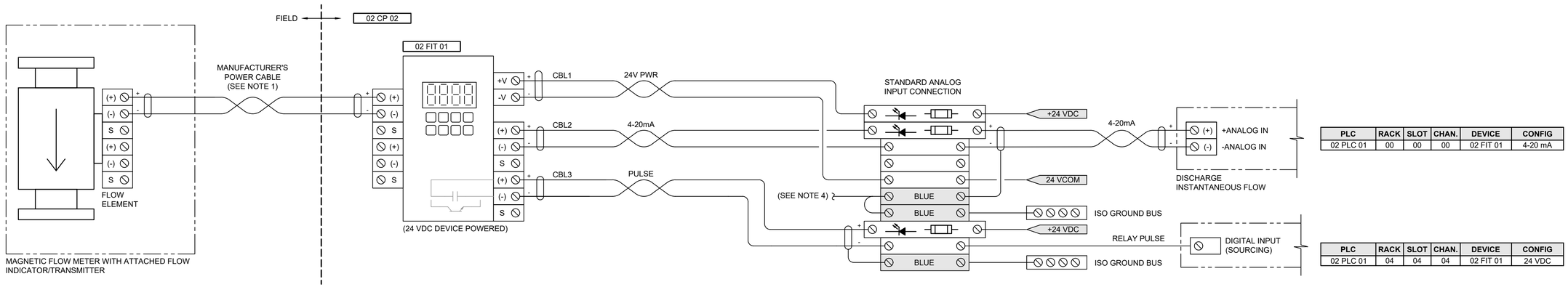
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
CONTROL PANEL ELEMENTARY WIRING DIAGRAM

SHEET: E-18
OF: 22

JOB NO.: 21285.00
DWG:E_CPEWD



PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 01	00	00	00	02 FIT 01	4-20 mA

PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 01	04	04	04	02 FIT 01	24 VDC

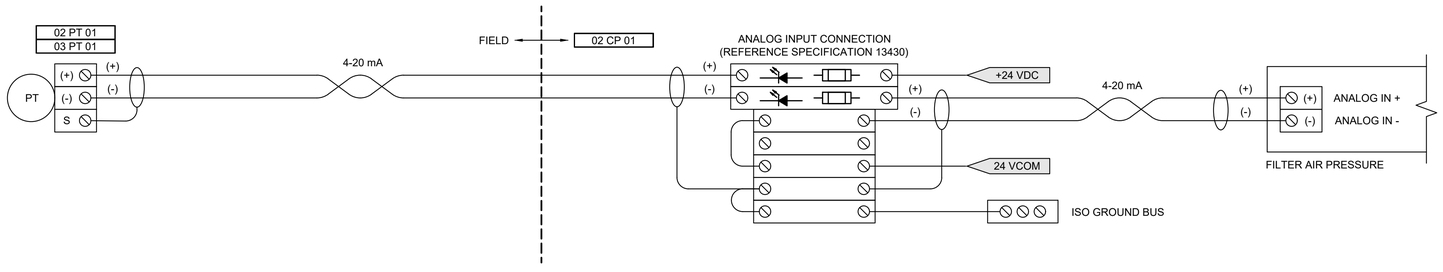
NOTES:

1. MANUFACTURER'S RECOMMENDED CABLES FOR MAGNETIC COIL POWER AND FLOW SIGNAL SHALL BE CONNECTED WITHOUT BREAK OR SPLICE BETWEEN THE FLOW METER INDICATOR/TRANSMITTER AND THE FLOW ELEMENT IN THE METER VAULT.
2. 24 VDC POWER TO THE FLOW METER SHALL BE DERIVED FROM THE METER'S STANDARD 7-TERMINAL ANALOG GROUP.
3. PROVIDE A SEPARATE FUSED 24 VDC INPUT TERMINAL PAIR JUST BELOW THE STANDARD 7-TERMINAL ANALOG GROUP FOR FLOW TOTALIZING PULSE SIGNAL.
4. FOR CLARITY, SHIELDS ARE NOT SHOWN CONNECTED ON THE FIELD SIDE OF THE STANDARD 7-TERMINAL ANALOG GROUP. CONNECT ALL SHIELDS AT THE TERMINAL SHOWN.

1 / -

INSTANTANEOUS AND TOTALIZED FLOW INSTRUMENTATION CONNECTION DIAGRAM

24 VDC, DEVICE-POWERED



PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 01	00	00	02	02 PT 01	4-20 mA
02 PLC 01	00	00	03	03 PT 01	4-20 mA

NOTES:

1. PRESSURE TRANSDUCER [02 PT 01] IS LOOP POWERED.

2 / TYP

PRESSURE TRANSDUCER INSTRUMENTATION CONNECTION DIAGRAM

TERMINAL LEGEND:

BLUE

SHADED TERMINALS ARE USED FOR SHIELD CONNECTIONS TO ISOLATED GROUND. THESE TERMINALS ARE BLUE AND ARE NOT TO BE CONNECTED TO CHASSIS GROUND.

0 1" 2"

TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

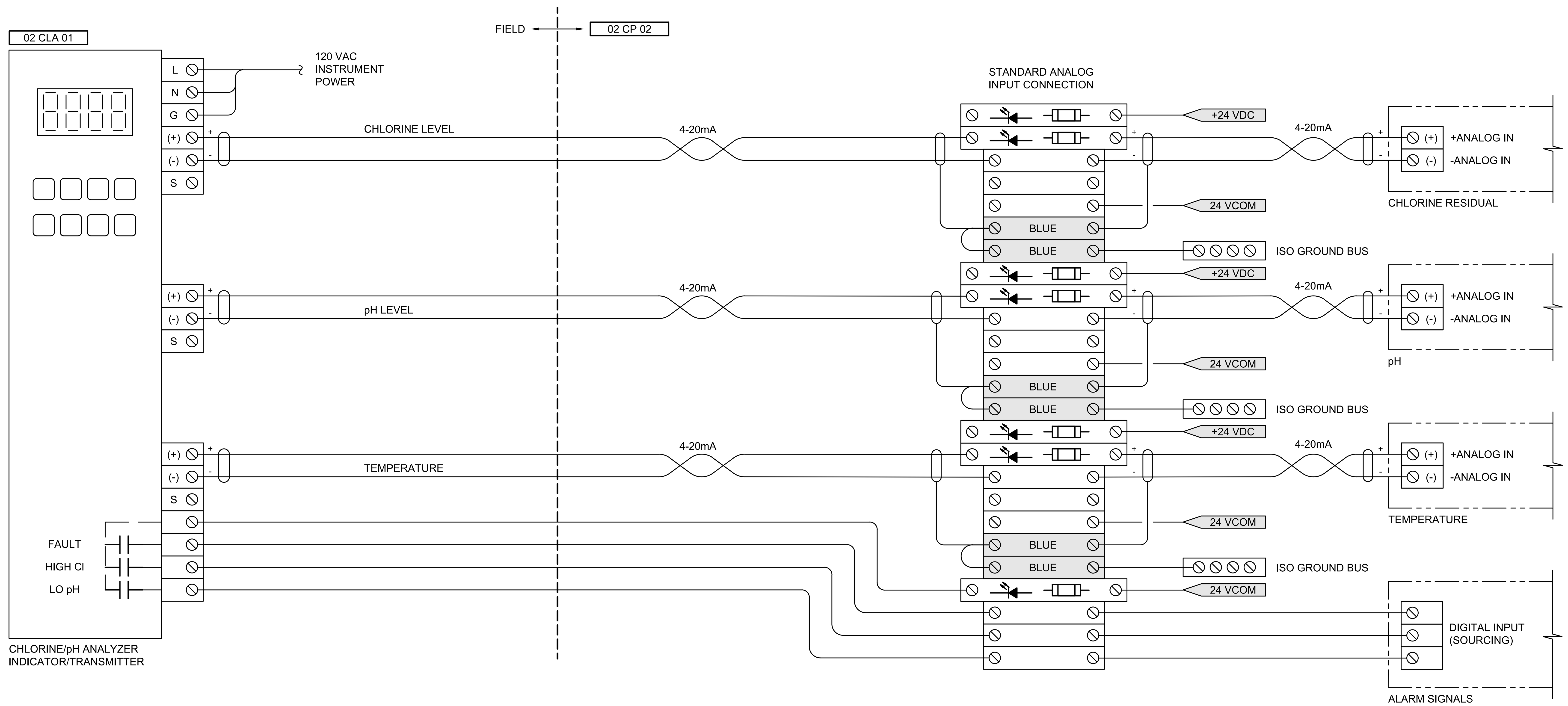
2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ANALOG LOOP DIAGRAMS

SHEET: E-19
OF: 22

JOB NO.: 21285.00
DWG:E_ALD

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Plansets\Electrical\E_ALD.dwg, 2/28/2025 2:02 PM, DAVID KLATT



PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 02	00	01	00	02 CLA 01	4-20 mA

PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 02	00	01	01	02 CLA 01	4-20 mA

PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 02	00	01	02	02 CLA 01	4-20 mA

PLC	RACK	SLOT	CHAN.	DEVICE	CONFIG
02 PLC 02	00	04	07	02 CLA 01	24 VDC
02 PLC 02	00	04	08	02 CLA 01	24 VDC
02 PLC 02	00	04	09	02 CLA 01	24 VDC

NOTES:

1. CONTRACTOR SHALL BRING 1x 24 VDC COMMON TO ALARM CONTACTS AND RETURN WITH DRY ALARM OUTPUTS FOR HIGH CHLORINE, LOW pH, AND FAULT ALARMS.

CHLORINE, pH , AND TEMPERATURE INSTRUMENTATION CONNECTION DIAGRAM

1 TYP

24 VDC, DEVICE POWERED

TERMINAL LEGEND:

BLUE — SHADED TERMINALS ARE USED FOR SHIELD CONNECTIONS TO ISOLATED GROUND. THESE TERMINALS ARE BLUE AND ARE NOT TO BE CONNECTED TO CHASSIS GROUND.

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS — PROFESSIONAL ENGINEER — 2/28/2025
JASON R. NEWQUIST — PROFESSIONAL ENGINEER — 45311

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ANALOG LOOP DIAGRAMS

SHEET: E-20
OF: 22
JOB NO.: 21285.00
DWGE_ALD

NETWORKED ANALOG INPUT

CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	NAI:00	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	MOTOR CURRENT
1	NAI:01	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	MOTOR CURRENT
2	NAI:02	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	MOTOR CURRENT
3	NAI:03	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	MOTOR SPEED
4	NAI:04	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	MOTOR CURRENT
5	NAI:05	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	MOTOR SPEED
6	NAI:06	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	MOTOR CURRENT
7	NAI:07	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	MOTOR SPEED

NETWORKED ANALOG OUTPUT

CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	NAO:00	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	MOTOR SPEED REFERENCE
1	NAO:01	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	MOTOR SPEED REFERENCE
2	NAO:02	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	MOTOR SPEED REFERENCE

NETWORKED DIGITAL INPUT

CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	NDI:00	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = HOA SWITCH IN "HAND"
1	NDI:01	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = HOA SWITCH IN "AUTO"
2	NDI:02	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = MOTOR OVERTEMP
3	NDI:03	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = MANUAL STARTER "RESET" PUSHBUTTON
4	NDI:04	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = MOTOR RUNNING
5	NDI:05	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = OLR FAULT
6	NDI:06	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = HOA SWITCH IN "HAND"
7	NDI:07	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = HOA SWITCH IN "AUTO"
8	NDI:08	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = MOTOR OVERTEMP
9	NDI:09	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = MANUAL STARTER "RESET" PUSHBUTTON
10	NDI:10	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = MOTOR RUNNING
11	NDI:11	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = OLR FAULT
12	NDI:12	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = DRIVE FAULT
13	NDI:13	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = HOA SWITCH IN "HAND"
14	NDI:14	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = HOA SWITCH IN "AUTO"
15	NDI:15	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = MOTOR OVERTEMP
16	NDI:16	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = MANUAL STARTER "RESET" PUSHBUTTON
17	NDI:17	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = MOTOR RUNNING
18	NDI:18	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = DRIVE FAULT
19	NDI:19	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = HOA SWITCH IN "HAND"
20	NDI:20	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = HOA SWITCH IN "AUTO"
21	NDI:21	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = MOTOR OVERTEMP
22	NDI:22	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = MANUAL STARTER "RESET" PUSHBUTTON
23	NDI:23	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = MOTOR RUNNING
24	NDI:24	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = DRIVE FAULT
25	NDI:25	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = HOA SWITCH IN "HAND"
26	NDI:26	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = HOA SWITCH IN "AUTO"
27	NDI:27	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = MOTOR OVERTEMP
28	NDI:28	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = MANUAL STARTER "RESET" PUSHBUTTON
29	NDI:29	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = MOTOR RUNNING

NETWORKED DIGITAL OUTPUT

CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	NDO:00	01 MS 01	MOTOR STARTER - FVNR, WELL PUMP MOTOR	TRUE = MOTOR RUN COMMAND
1	NDO:01	02 MS 04	MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	TRUE = MOTOR RUN COMMAND
2	NDO:02	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = MOTOR RUN COMMAND
3	NDO:03	02 MS 01	MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	TRUE = FORCE MANUAL SPEED REFERENCE
4	NDO:04	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = MOTOR RUN COMMAND
5	NDO:05	02 MS 02	MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	TRUE = FORCE MANUAL SPEED REFERENCE
6	NDO:06	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = MOTOR RUN COMMAND
7	NDO:07	02 MS 03	MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	TRUE = FORCE MANUAL SPEED REFERENCE

PLC I/O TABLES

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024 | DRAWN: PEB | CHECKED: JRN | APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID R. KLATT — STATE OF WASHINGTON — 21285 — REGISTERED PROFESSIONAL ENGINEER — 2/28/2025

JASON R. NEWQUIST — STATE OF WASHINGTON — 51511 — REGISTERED PROFESSIONAL ENGINEER — 2/28/25

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
PLC I/O

SHEET: E-21
OF: 22
JOB NO.: 21285.00
DWG E_PLCIO

SLOT 00		ANALOG INPUT CARD, 4 CHANNEL, ISOLATED, 16-BIT, 4-20 mA		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	00:00	02 FIT 01	FLOW INDICATOR TRANSMITTER - BOOSTER BLDG	BACKWASH FLOW METER
1	00:01	- - - -	HOT SPARE	
2	00:02	02 PT 01	PRESSURE TRANSDUCER, BOOSTER PUMP DISCHARGE HEADER	BOOSTER PRESSURE
3	00:03	03 PT 01	PRESSURE TRANSDUCER, RESERVOIR LEVEL	RESERVOIR LEVEL

SLOT 01		ANALOG INPUT CARD, 4 CHANNEL, ISOLATED, 16-BIT, 4-20 mA		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	01:00	02 CLA 01	CHLORINE ANALYZER	CHLORINE RESIDUAL
1	01:01	02 CLA 01	CHLORINE ANALYZER	PH
2	01:02	02 CLA 01	CHLORINE ANALYZER	TEMPERATURE
3	01:03	- - - -	HOT SPARE	

SLOT 02		ANALOG INPUT CARD, 4 CHANNEL, ISOLATED, 16-BIT, 4-20 mA		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	02:00	- - - -	HOT SPARE	
1	02:01	- - - -	HOT SPARE	
2	02:02	- - - -	HOT SPARE	
3	02:03	- - - -	HOT SPARE	

SLOT 03		ANALOG OUTPUT CARD, 4 CHANNEL, ISOLATED, 16-BIT, 4-20 mA		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	03:00	- - - -	HOT SPARE	
1	03:01	- - - -	HOT SPARE	
2	03:02	- - - -	HOT SPARE	
3	03:03	- - - -	HOT SPARE	

SLOT 04		DIGITAL INPUT CARD, 16 CHANNEL, 24 VDC		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	04:00	02 LS 01	LIQUID LEVEL SENSOR, BACKWASH TANKS	TRUE = ON, FALSE = OFF
1	04:01	03 LS 01	HIGH LEVEL FLOAT SWITCH (RESERVOIR)	TRUE = HIGH
2	04:02	03 LS 02	LOW LEVEL FLOAT SWITCH (RESERVOIR)	FALSE = LOW
3	04:03	- - - -	HOT SPARE	
4	04:04	02 FIT 01	FLOW INDICATOR TRANSMITTER - BOOSTER BLDG	TRUE = TOTALIZING PULSE
5	04:05	- - - -	HOT SPARE	
6	04:06	- - - -	HOT SPARE	
7	04:07	02 CLA 01	CHLORINE ANALYZER	TRUE = CONTROLLER FAULT
8	04:08	02 CLA 01	CHLORINE ANALYZER	TRUE = HIGH CHLORINE
9	04:09	02 CLA 01	CHLORINE ANALYZER	TRUE = LOW PH
10	04:10	- - - -	HOT SPARE	
11	04:11	02 CP 02	CONTROL PANEL, PLC	TRUE = 120V CONTROL POWER VALID
12	04:12	02 DCU 01	DC UPS, 24/24 VDC 10A, PRIMARY CONTROL	TRUE = UPS BUFFERING
13	04:13	02 DCU 01	DC UPS, 24/24 VDC 10A, PRIMARY CONTROL	TRUE = REPLACE BATTERY
14	04:14	02 CP 02	CONTROL PANEL, PLC	TRUE = 24VDC OUTPUT VALID
15	04:15	02 CP 02	CONTROL PANEL, PLC	PLC FAIL NORMALLY CLOSED HELD OPEN BY VALID PLC

SLOT 05		DIGITAL INPUT CARD, 16 CHANNEL, 24 VDC		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	05:00	02 ATS 01	AUTOMATIC TRANSFER SWITCH (SUSE)	TRUE = ATS IN UTILITY
1	05:01	02 ATS 01	AUTOMATIC TRANSFER SWITCH (SUSE)	TRUE = ATS FAULT
2	05:02	- - - -	HOT SPARE	
3	05:03	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = RUNNING
4	05:04	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = GENERAL ALARM
5	05:05	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = FAIL
6	05:06	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = IN AUTO
7	05:07	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = LOW BATTERY VOLTAGE
8	05:08	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = LOW OIL PRESSURE
9	05:09	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = HIGH COOLANT TEMP
10	05:10	01 GCP 01	CONTROL PANEL, GENERATOR	TRUE = LOW FUEL LEVEL
11	05:11	- - - -	HOT SPARE	
12	05:12	- - - -	HOT SPARE	
13	05:13	- - - -	HOT SPARE	
14	05:14	- - - -	HOT SPARE	
15	05:15	- - - -	HOT SPARE	

SLOT 06		DIGITAL OUTPUT CARD, 16 CHANNEL, 24 VDC		
CHANNEL NO.	CHANNEL ADDRESS	TAG NUMBER	TAG DESCRIPTION	I/O FUNCTION
0	06:00	02 CP 01	FE AND MG FILTER CONTROL PANEL	WELL 1 RUNNING STATUS TO FILTER SKID
1	06:01	01 DREC 01	DEDICATED RECEPTACLE, WELL HOUSE CHLORINE PUMP	POWER TO METERING PUMP VIA SWITCHED OUTLET
2	06:02	- - - -	HOT SPARE	
3	06:03	- - - -	HOT SPARE	
4	06:04	- - - -	HOT SPARE	
5	06:05	- - - -	HOT SPARE	
6	06:06	- - - -	HOT SPARE	
7	06:07	- - - -	HOT SPARE	
8	06:08	- - - -	HOT SPARE	
9	06:09	- - - -	HOT SPARE	
10	06:10	- - - -	HOT SPARE	
11	06:11	- - - -	HOT SPARE	
12	06:12	- - - -	HOT SPARE	
13	06:13	- - - -	HOT SPARE	
14	06:14	- - - -	HOT SPARE	
15	06:15	- - - -	HOT SPARE	

PLC I/O TABLES

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY.

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS, PROFESSIONAL ENGINEER, STATE OF WASHINGTON 2/28/2025
JASON R. NEWQUIST, PROFESSIONAL ENGINEER, STATE OF WASHINGTON 45311

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
PLC I/O

SHEET: E-22
OF: 22
JOB NO.: 21285.00
DWGE_PLCIO

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_PLCIO.dwg, 2/28/2025 2:02 PM, DAVID KLATT

POWER CABLE AND CONDUIT SCHEDULE

NUMBER	SOURCE	DESTINATION	SIZE	CONDUCTORS	E-1	NOTES
P0101	[01 UT 01], UTILITY TRANSFORMER MASON COUNTY PUD #3	[02 MB 01], METER BASE	2-1/2"	3X #4/0 AWG XHHW-2; 1X #4/0 AWG XHHW-2 N; 1X #4 AWG XHHW-2 G		
P0102	[02 MB 01], METER BASE	[02 ATS 01], AUTOMATIC TRANSFER SWITCH (SUSE)	2"	3X #4/0 AWG XHHW-2; 1X #4/0 AWG XHHW-2 N; 1X #4 AWG XHHW-2 G		
P0103	[01 GCB 01], CIRCUIT BREAKER - MAIN LOAD, GENERATOR	[02 ATS 01], AUTOMATIC TRANSFER SWITCH (SUSE)	2-1/2"	3X #4/0 AWG XHHW-2; 1X #4/0 AWG XHHW-2 N; 1X #4 AWG XHHW-2 G		
P0104	[02 ATS 01], AUTOMATIC TRANSFER SWITCH (SUSE)	[02 MLG 02], MAIN LUGS, MOTOR CONTROL CENTER	2-1/2"	3X #4/0 AWG XHHW-2; 1X #4/0 AWG XHHW-2 N; 1X #4 AWG XHHW-2 G		
P0105	[01 MS 01], MOTOR STARTER - FVNR, WELL PUMP MOTOR	J-BOX JP0105A IN WELL HOUSE	1-1/4"	5X #8 AWG XHHW-2; 3X #8 AWG XHHW-2 N; 2X #8 AWG XHHW-2 G		GND UPSIZED PER NEC 250.122B
P0105A	J-BOX JP0105A IN WELL HOUSE	[01 MSDS 01], MOTOR SAFETY DISCONNECT SWITCH, WELL PUMP MOTOR	3/4"	3X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G		
P0105B	[01 MSDS 01], MOTOR SAFETY DISCONNECT SWITCH, WELL PUMP MOTOR	[01 MTR 01], MOTOR, WELL PUMP	3/4"	3X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G		
P0106	[02 MS 01], MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	[02 MTR 01], MOTOR, DUTY PUMP 1	1"	3X #8 AWG XHHW-2; 1X #8 AWG XHHW-2 G; 4X #14 AWG XHHW-2	* 1	OVESIZED FOR VFD INCLUDES THERMAL SWITCHES AND 2 SPARES
P0107	[02 MS 02], MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	[02 MTR 02], MOTOR, DUTY PUMP 2	1"	3X #8 AWG XHHW-2; 1X #8 AWG XHHW-2 G; 4X #14 AWG XHHW-2	* 1	OVESIZED FOR VFD INCLUDES THERMAL SWITCHES AND 2 SPARES
P0108	[02 MS 03], MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	[02 MTR 03], MOTOR, HIGH FLOW PUMP 1	1"	3X #6 AWG XHHW-2; 1X #6 AWG XHHW-2 G; 4X #14 AWG XHHW-2	* 1	OVESIZED FOR VFD INCLUDES THERMAL SWITCHES AND 2 SPARES
P0109	[02 MS 04], MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	[02 MTR 04], MOTOR, BACKWASH RECYCLE PUMP	1"	3X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 G; 4X #14 AWG XHHW-2		INCLUDES THERMAL SWITCHES AND 2 SPARES
P0110	[02 PB 01], PANELBOARD, MOTOR CONTROL CENTER	[02 CP 02], CONTROL PANEL, PLC	3/4"	3X #12 AWG XHHW-2; 3X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G		POWER TO METERING PUMP DEDICATED RECEPTACLE SWITCHED BY CONTROL PANEL WITH WELL RUN. INCLUDES SPARE CIRCUITS.
P0111	[02 PB 01], PANELBOARD, MOTOR CONTROL CENTER	[02 CP 02], CONTROL PANEL, PLC	3/4"	3X #12 AWG XHHW-2; 3X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G; 1X #10 AWG XHHW-2 G		INCLUDES #10 ISO GROUND AND SPARE H, N.
P0112~	[02 MCC 01], MOTOR CONTROL CENTER	J-BOX JP0105A IN WELL HOUSE	1-1/2"	PULL WIRE		SPARE CONDUIT.
P0113	[02 MCC 01], MOTOR CONTROL CENTER	[02 CP 01], FE & MG FILTER CONTROL PANEL	3/4"	1X #12 AWG XHHW-2; 1X #12 AWG XHHW-2 N; 1X #12 AWG XHHW-2 G		

CONTROL CABLE AND CONDUIT SCHEDULE

NUMBER	SOURCE	DESTINATION	SIZE	CONDUCTORS	E-1	NOTES
C0101	[02 ATS 01], AUTOMATIC TRANSFER SWITCH (SUSE)	[01 GCP 01], CONTROL PANEL, GENERATOR	3/4"	8X #14 AWG XHHW-2		INCLUDES CALL TO RUN AND 2 SPARES
C0102	[02 CP 02], CONTROL PANEL, PLC	[01 MS 01], MOTOR STARTER - FVNR, WELL PUMP MOTOR	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #23 AWG, CAT6		#14 ARE SPARES
C0103	[02 CP 02], CONTROL PANEL, PLC	[02 MS 01], MOTOR STARTER - VFD, DUTY PUMP 1 MOTOR	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #23 AWG, CAT6		#14 ARE SPARES
C0104	[02 CP 02], CONTROL PANEL, PLC	[02 MS 02], MOTOR STARTER - VFD, DUTY PUMP 2 MOTOR	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #23 AWG, CAT6		#14 ARE SPARES
C0105	[02 CP 02], CONTROL PANEL, PLC	[02 MS 03], MOTOR STARTER - VFD, HIGH FLOW PUMP 1 MOTOR	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #23 AWG, CAT6		#14 ARE SPARES
C0106	[02 CP 02], CONTROL PANEL, PLC	[02 MS 04], MOTOR STARTER - FVNR, BACKWASH RECYCLE PUMP MOTOR	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #23 AWG, CAT6		#14 ARE SPARES
C0107	[02 CP 02], CONTROL PANEL, PLC	[02 ATS 01], AUTOMATIC TRANSFER SWITCH (SUSE)	1-1/2"	8X #14 AWG XHHW-2		ATS STATUS, INCLUDES SPARES
C0108	[02 CP 02], CONTROL PANEL, PLC	[01 GCP 01], CONTROL PANEL, GENERATOR	1-1/2"	12X #14 AWG XHHW-2		GENERATOR STATUS.
C0109	[02 CP 01], FE & MG FILTER CONTROL PANEL	[02 CP 02], CONTROL PANEL, PLC	1/2"	8X #14 AWG XHHW		WELL 1 RUNNING STATUS TO ATEC SYSTEM, INCLUDES 6 SPARES
C0110	[02 CP 02], CONTROL PANEL, PLC	J-BOX JC0110A AT BASE OF RESERVOIR	3/4"	4X #14 AWG XHHW		
C0110A	J-BOX JC0110A AT BASE OF RESERVOIR	J-BOX JC0110B AT ROOF OF RESERVOIR	3/4"	4X #14 AWG XHHW		
C0110B	J-BOX JC0110B AT ROOF OF RESERVOIR	[03 LS 01], HIGH LEVEL FLOAT SWITCH (RESERVOIR)	3/4"	4X #14 AWG XHHW		
C0111	[02 CP 02], CONTROL PANEL, PLC	J-BOX JC0110A AT BASE OF RESERVOIR	3/4"	4X #14 AWG XHHW		
C0111A	J-BOX JC0110A AT BASE OF RESERVOIR	J-BOX JC0110B AT ROOF OF RESERVOIR	3/4"	4X #14 AWG XHHW		
C0111B	J-BOX JC0110B AT ROOF OF RESERVOIR	[03 LS 02], LOW LEVEL FLOAT SWITCH (RESERVOIR)	3/4"	4X #14 AWG XHHW		
C0112	[02 CP 02], CONTROL PANEL, PLC	[02 LS 01], LIQUID LEVEL SENSOR, BACKWASH TANKS	3/4"	4X #14 AWG XHHW-2		
C0113~	[02 CP 02], CONTROL PANEL, PLC	J-BOX JP0105B IN WELLHOUSE	1"	PULL WIRE		SPARE CONDUIT.

INSTRUMENTATION CABLE AND CONDUIT SCHEDULE

NUMBER	SOURCE	DESTINATION	SIZE	CONDUCTORS	E-1	NOTES
S0101	[02 CP 02], CONTROL PANEL, PLC	[02 MFM 01], MAGNETIC FLOW METER, BOOSTER BUILDING	3/4"	MANUFACTURER'S RECOMMENDED CABLE	* 3	COIL POWER
S0102	[02 CP 02], CONTROL PANEL, PLC	[02 MFM 01], MAGNETIC FLOW METER, BOOSTER BUILDING	3/4"	MANUFACTURER'S RECOMMENDED CABLE	* 3	COIL SIGNAL. MAY BE CONBINED WITH S0101 WHERE ALLOWED BY FLOW METER MANUFACTURER.
S0103	[02 CP 02], CONTROL PANEL, PLC	[02 PT 01], PRESSURE TRANSDUCER, BOOSTER PUMP DISCHARGE HEADER	3/4"	1X 2-C, 1-TP, #18 AWG, OS	* 3	
S0104	[02 CP 02], CONTROL PANEL, PLC	[03 PT 01], PRESSURE TRANSDUCER, RESERVOIR LEVEL	3/4"	1X 2-C, 1-TP, #18 AWG, OS	* 3	
S0105	[02 CP 02], CONTROL PANEL, PLC	[02 CLA 01], CHLORINE ANALYZER	1"	4X #14 AWG XHHW-2; 1X 8-C, 4-TP, #18 AWG, IS/OS	* 3	

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024	DRAWN: PEB	CHECKED: JRN	APPROVED: DAC

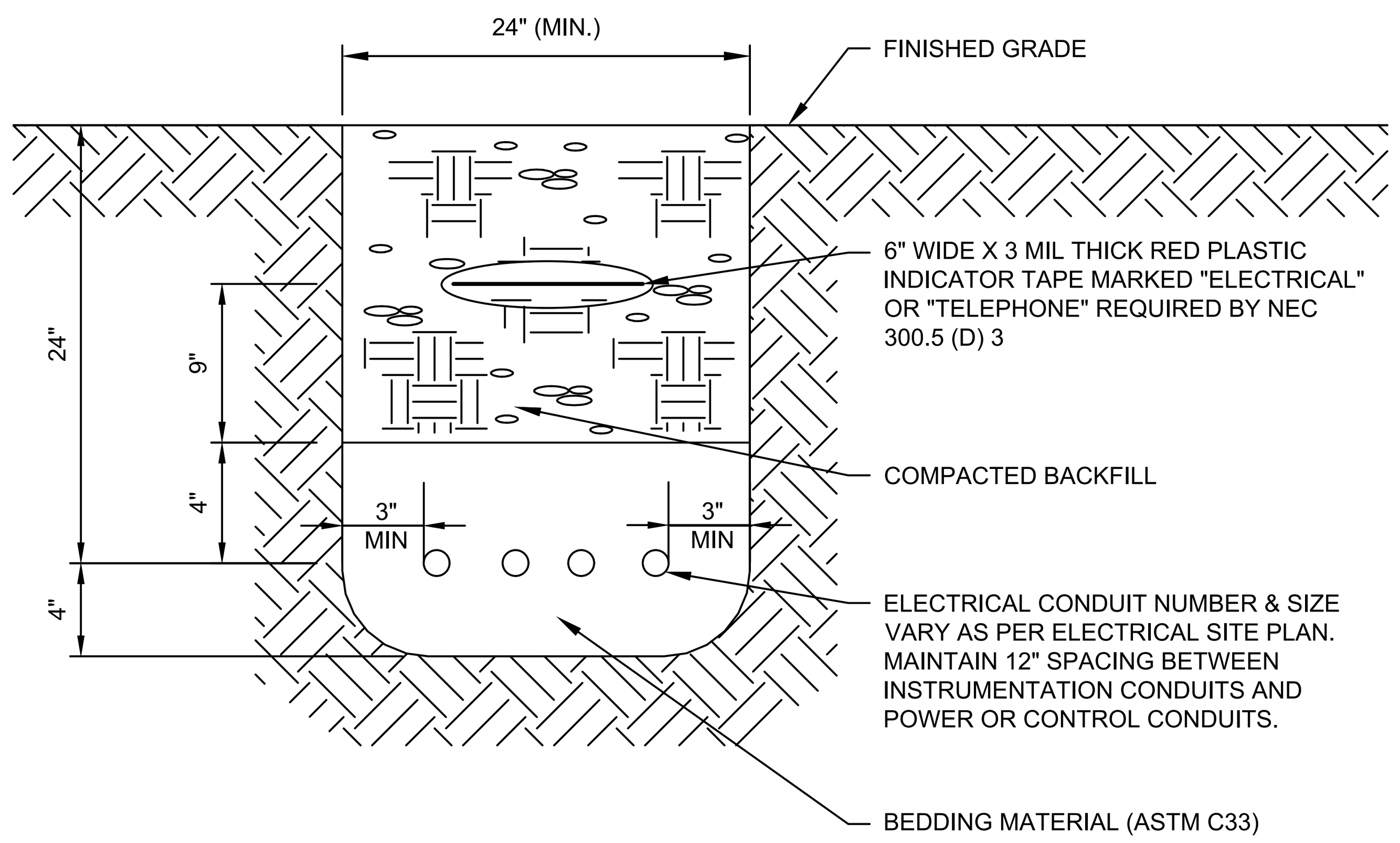
No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

2/28/2025

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
CABLE AND CONDUIT SCHEDULES

SHEET: EC-1
OF: 1

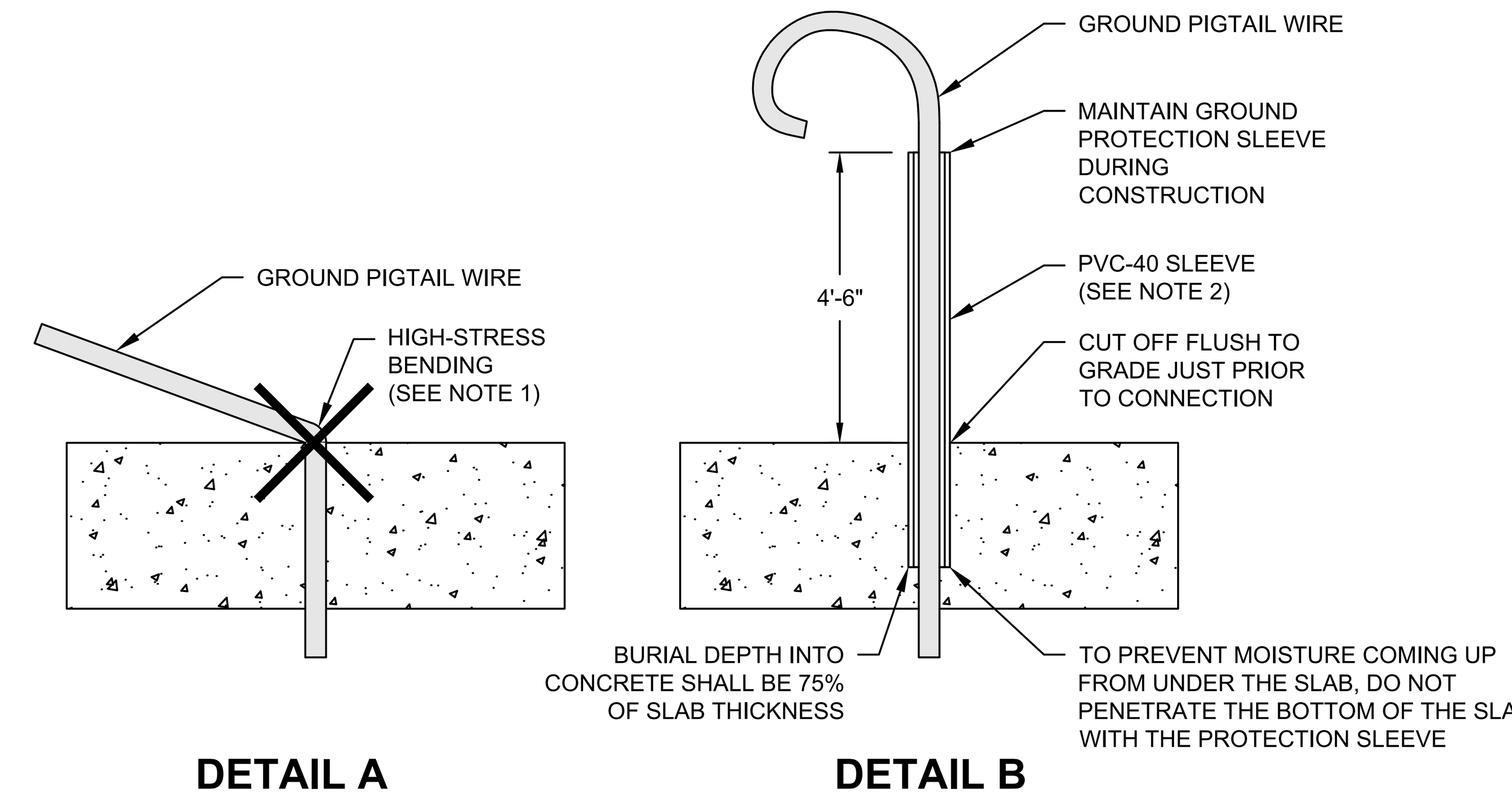
JOB NO.: 21285.00
DWG:E_CCS



NOTE:

1. SPACING BETWEEN CONDUITS AND OTHER UTILITIES SHALL BE IN COMPLIANCE WITH THE UTILITIES OR 24 INCHES MINIMUM, WHICHEVER IS THE GREATER.

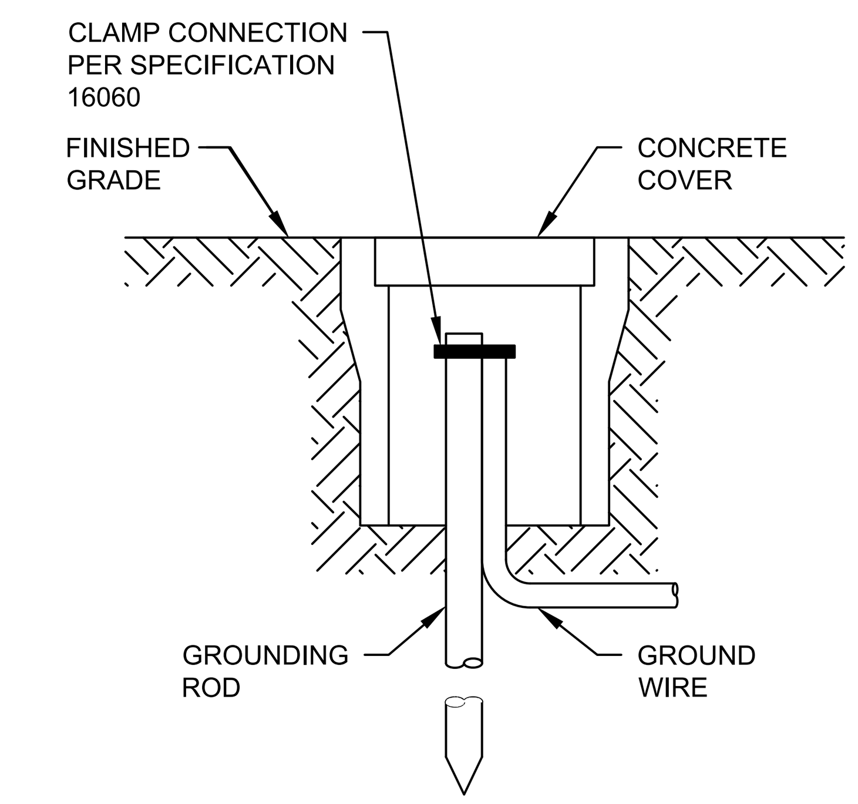
1 TYP ELECTRICAL TRENCHING DETAIL
NOT TO SCALE



NOTES:

1. BARE COPPER GROUND WIRES SHALL NOT PENETRATE DIRECTLY OUT OF CONCRETE FLOORS. CONSTRUCTION ACTIVITIES CAN CAUSE TIGHT WIRE BENDING AND POSSIBLE GROUND WIRE DEGRADATION. DETAIL "A" IS NOT ACCEPTABLE.
2. PROTECT THE GROUND PIGTAIL DURING CONSTRUCTION WITH A PVC-40 SLEEVE INSTALLED AS DESCRIBED IN DETAIL "B".
3. JUST PRIOR TO SETTING EQUIPMENT OVER, OR MAKING THE FINAL CONNECTION OF THE GROUND WIRE, CUT OFF THE SLEEVE FLUSH TO THE FLOOR TAKING CARE NOT TO CUT INTO THE GROUND WIRE.

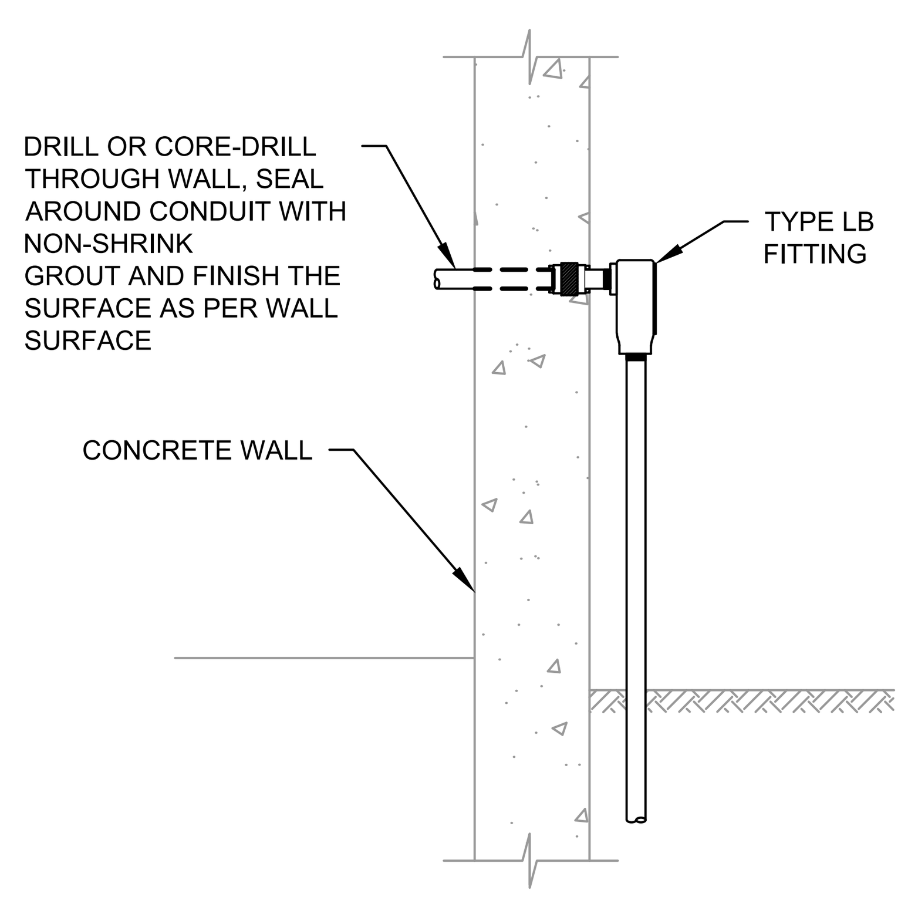
2 TYP GROUND PIGTAIL CONSTRUCTION PROTECTION SLEEVE DETAIL
NOT TO SCALE



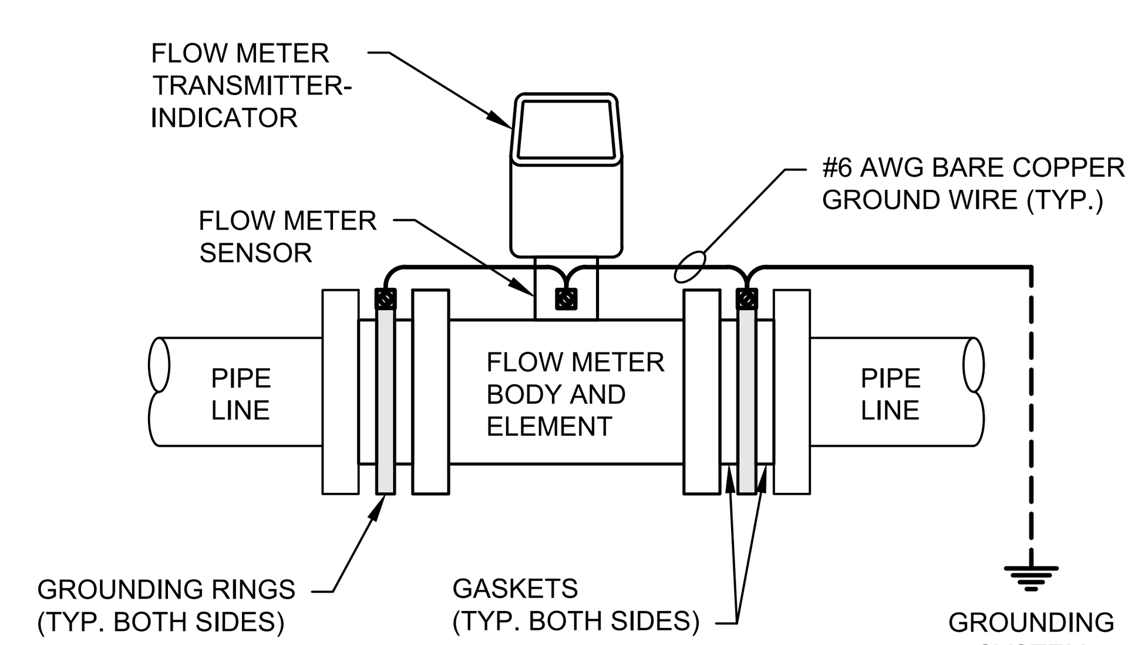
NOTES:

1. GROUND ROD BOX SHALL BE FOGTITE GROUND ROD BOX WITH ROAD RATING EQUAL TO THE DEVICE OR STRUCTURE IT SUPPORTS (H20 MINIMUM).

3 TYP GROUND ROD BOX DETAIL
NOT TO SCALE



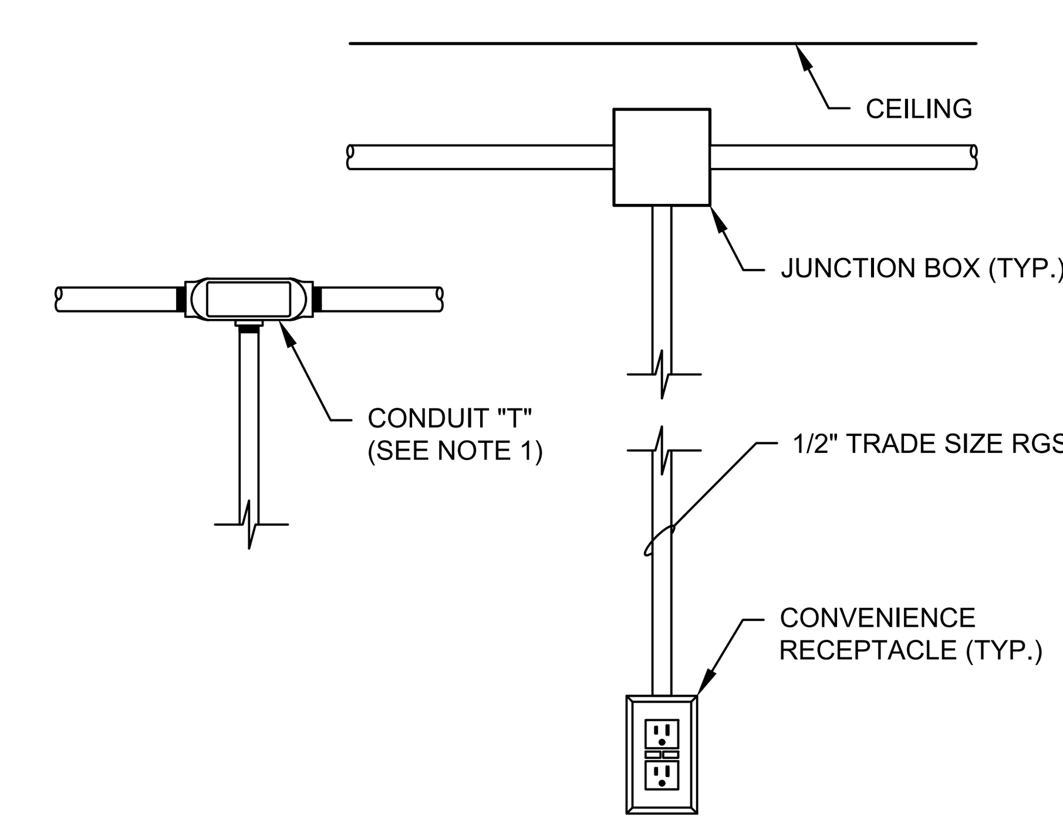
4 TYP INDOOR TO UNDERGROUND TRANSITION
NOT TO SCALE



NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL INSULATING GASKETS AND MANUFACTURER'S GROUND RINGS TO EACH SIDE OF THE FLOW METER BODY. THE GROUND RINGS AND FLOW METER SENSOR SHALL BE TIED TO THE SYSTEM GROUND WITH A #6 AWG GROUNDING WIRE. CONNECT AS SHOWN OR PER MANUFACTURER'S REQUIREMENTS.

5 TYP FLOW METER GROUNDING DETAIL
NOT TO SCALE



NOTES:

1. WHERE SPLICING FOR CONVENIENCE RECEPTACLE IS PERFORMED IN A CONDUIT BODY THE CONDUIT BODY SHALL BE SIZED PER THE NEC AND HAVE ITS VOLUME MARKED BY THE MANUFACTURER COMPLIANT TO NEC 314.16(C).

6 TYP JUNCTION BOX AND RECEPTACLE DETAIL
NOT TO SCALE

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE:	JUNE 2024
DRAWN:	PEB
CHECKED:	JRN
APPROVED:	DAC

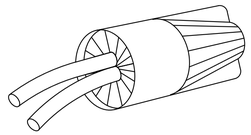
No.	REVISION	DATE	APPD

DAVID ALAN CALKINS
STATE OF WASHINGTON
43249
REGISTERED PROFESSIONAL ENGINEER

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ELECTRICAL DETAILS

SHEET: ED-1
OF: 3

JOB NO.: 21285.00
DWGE_DET

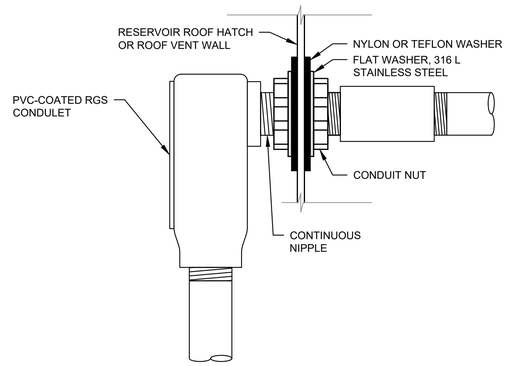


NOTES:

1. PROVIDE WATER-TIGHT CONNECTOR FOR CONTROL AND INSTRUMENTATION CONDUCTOR SPLICING. INCLUDE A STRAIN RELIEF ON CONTROL CONDUCTOR SPLICE CONNECTORS. REFERENCE SPECIFICATION 16120 FOR SPECIFIC REQUIREMENTS.
2. SUBMERGE THE SPLICE AND TEST FOR WATER-TIGHT INTEGRITY.

1 TYP — CONTROL AND INSTRUMENTATION CONDUCTOR WATER-TIGHT SPLICE DETAIL

NOT TO SCALE

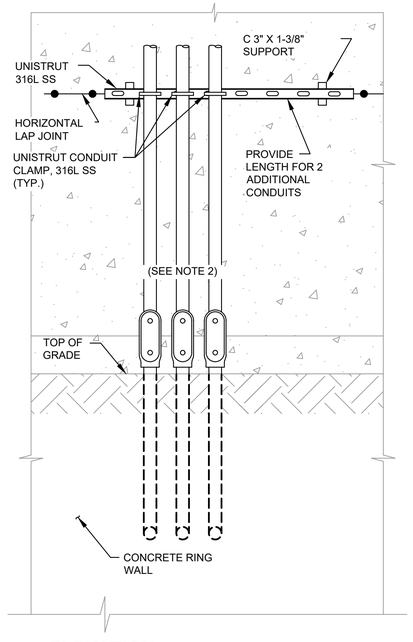


NOTES:

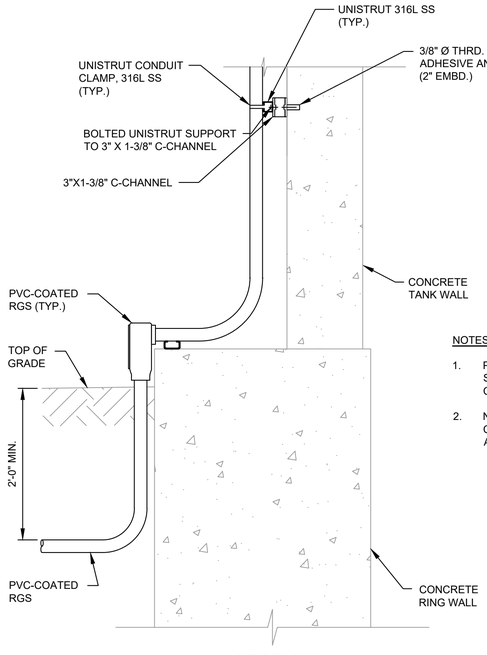
1. WITH THE EXCEPTION OF THE CONTINUOUS NIPPLE, DEVICES ON EITHER SIDE OF THE RESERVOIR WALL ARE TYPICAL FOR BOTH SIDES.
2. THIS RESERVOIR ELECTRICAL PENETRATION DETAIL IS PROVIDED FOR ROOF HATCHES AND ROOF VENTS AND SHALL NOT BE USED IN PORTIONS OF THE RESERVOIR THAT ARE BELOW THE HIGHEST POSSIBLE WATER LINE.

2 TYP — RESERVOIR ROOF HATCH AND ROOF VENT CONDUIT PENETRATION DETAIL

NOT TO SCALE



ELEVATION



SECTION

NOTES:

1. PROVIDE 1-WAY (NON-REVERSING) SCREWS IN CONDUIT EXPOSED FITTING COVERS.
2. NUMBER OF CONDUITS SHOWN IS FOR CLARITY AND NOT REFLECTIVE OF THE ACTUAL NUMBER.

3 TYP — CONCRETE RESERVOIR CONDUIT MOUNTING DETAIL

SCALE: 1"=1'-0"

0 1" 2"

TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-3880

DATE: JUNE 2024	DRAWN: PEB	CHECKED: JRN	APPROVED: DAC

No.	REVISION	DATE	APPD

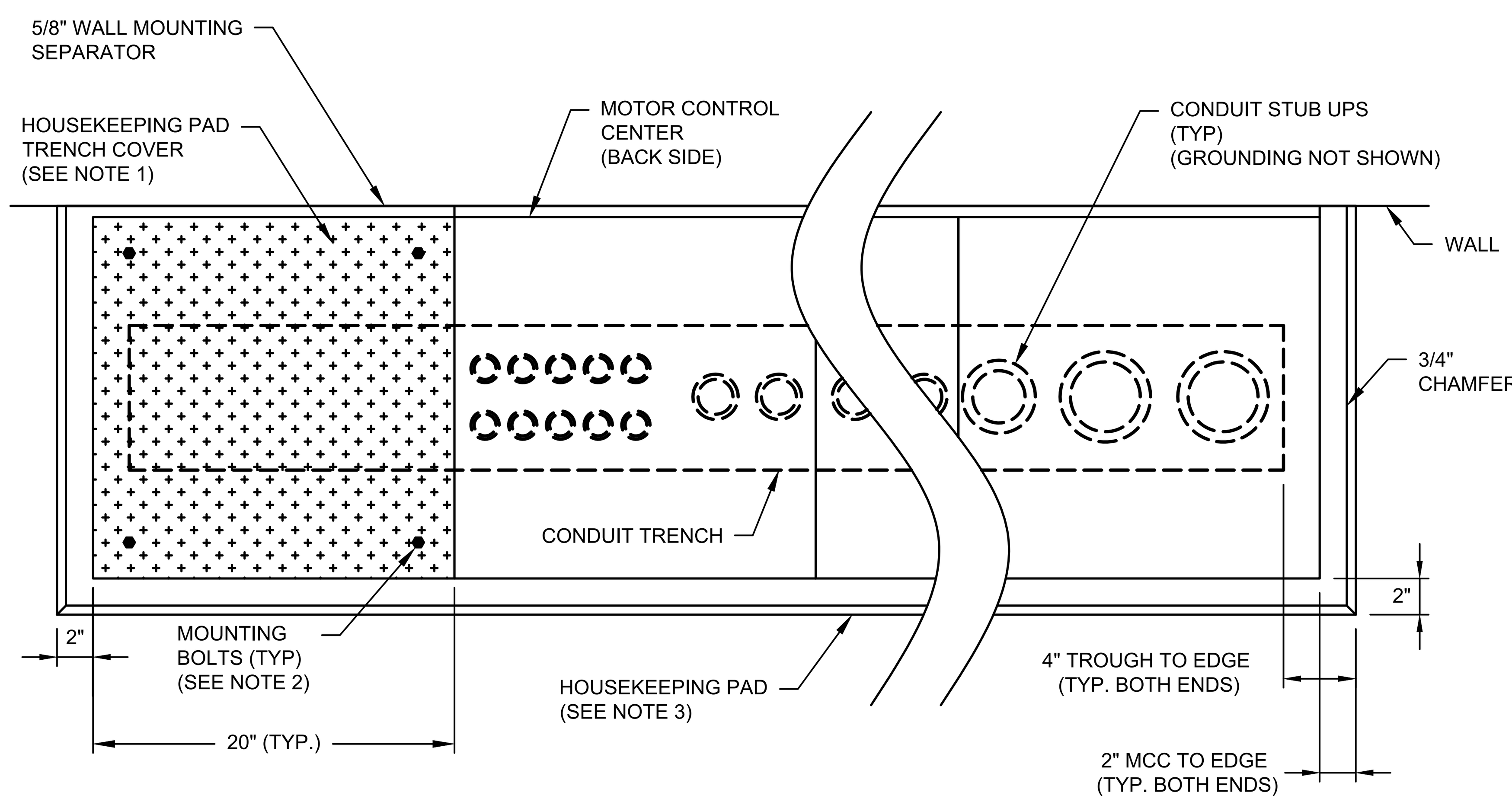
DAVID ALAN CALKINS — STATE OF WASHINGTON — 21285 — REGISTERED PROFESSIONAL ENGINEER

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ELECTRICAL DETAILS

SHEET: **ED-2**
OF: **3**

JOB NO.: 21285.00
DWG: E_DET

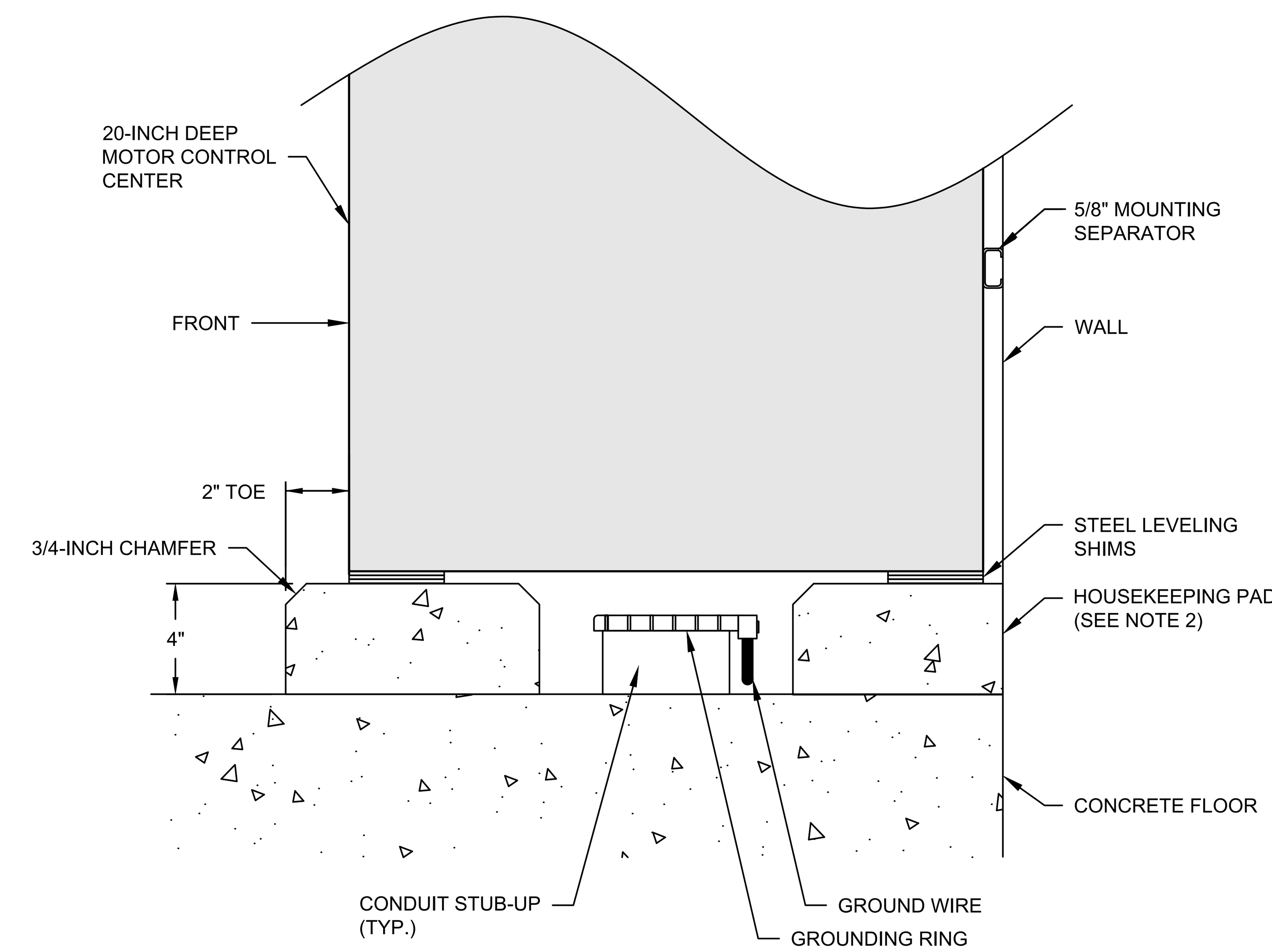
M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Plans\ett\Electrical\E_DET.dwg, 2/28/2025 2:02 PM, DAVID KLATT



NOTES:

1. ON HOUSEKEEPING PADS THAT ARE EXTENDED FOR FUTURE MCC COLUMNS, THE EXPOSED PORTION OF THE HOUSEKEEPING PAD SHALL BE COVERED WITH A 1/4" ALUMINUM OR GALVANIZED STEEL DIAMOND PLATE. IF STEEL IS USED, THEN THE CONTRACTOR SHALL PAINT THE STEEL PLATE TO MATCH THE COLOR OF THE MCC. GROUND THE DIAMOND PLATE COVER AS PER NEC.
2. BOLT THE PLATE TO THE HOUSEKEEPING PAD WITH 4 X 3/8-INCH STAINLESS STEEL LAG BOLTS MINIMUM.
3. FOR CONCRETE DIMENSIONS AND REINFORCEMENT DETAILS, REFERENCE STRUCTURAL.

1 TYP **OVERHEAD VIEW MCC HOUSEKEEPING PAD PLAN**
NOT TO SCALE



NOTES:

1. FOR MCCS DEEPER THAN 20 INCHES, EXTEND THE WIDTH OF THE FRONT CURB SUCH THAT THE 2-INCH TOE IS MAINTAINED. ALIGN THE MOUNTING CHANNEL TO THE EDGE OF THE MCC AS SHOWN.
2. FOR CONCRETE DIMENSIONS AND REINFORCEMENT DETAILS, REFERENCE STRUCTURAL.

2 TYP **MCC HOUSEKEEPING PAD DETAIL**
NOT TO SCALE

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

M:\Mason County PUD 1\21285.00 Shadowood Water System Improvements\01 Design\Planset\Electrical\E_DET.dwg, 2/28/2025 2:02 PM, DAVID KLATT

Gray & Osborne, Inc.
CONSULTING ENGINEERS
1130 RAINIER AVENUE SOUTH, SUITE 300
SEATTLE, WASHINGTON 98144 • (206) 284-0860

DATE: JUNE 2024
DRAWN: PEB
CHECKED: JRN
APPROVED: DAC

No.	REVISION	DATE	APPD
1	ADDENDUM NO. 1	02/25	JRN

DAVID ALAN CALKINS, PROFESSIONAL ENGINEER, 2/28/2025
JASON R. NEWQUIST, PROFESSIONAL ENGINEER, 45311

MASON COUNTY PUD 1
MASON COUNTY WASHINGTON
SHADOWOOD WATER SYSTEM IMPROVEMENTS
ELECTRICAL DETAILS

SHEET: ED-3
OF: 3
JOB NO.: 21285.00
DWG E_DET