Anderson~Montgomery
CONSULTING ENGINEERS

ADDENDUM NO. 2

Project: Missoula Garden City Compost Improvements Project

Owner: City of Missoula, Montana
1345 W. Broadway
Missoula, MT 59820

Engineer: Anderson-Montgomery Consulting Engineers
1064 N. Warren
Helena, MT 59802
(406)459-8463 – Paul Montgomery, P.E.

Date of Addendum: March 8, 2025
Bid Opening Date: March 14, 2025

The following corrections, clarifications, and/or alterations to the specifications for the project are as such a part and parcel of said plans and specifications as if included therein. Removed language shall be ~~stricken~~ and new language shall be ***bold italics***.

TECHNICAL SPECIFICATIONS:

1. **Section 00 21 13 – INSTRUCTIONS TO BIDDERS**

   Article 19.11 is being added to 00 21 13 as follows:

   19.11 The Base Bid includes a deduct for Owner-furnished aeration grates. Bidders shall apply the lump sum deduct in order to calculate their Total Base Bid. If the deduct is accepted by the Owner, award will be based on the Base bid (plus affordable Alternates). If the deduct is not accepted by the Owner, award will be based on the Base bid (plus affordable Alternates) without the deduct for Bid item #118.

2. **Section 00 41 00 – BID FORM**

   Page 3 of the Bid Form in its entirety shall be replaced by page 3 of the Bid Form attached as Exhibit A to this Addendum. Note that the vBid form posted on QuestCDN has also been amended to conform with the revised bid form page 3 in Exhibit A. ***A deductive bid item 118 is being added to the Base Bid to allow the Owner the option of furnishing 1,440 aeration grates (for the composting bays) for the Contractor to install. Note: If the deduct is accepted by the Owner, award will be based on the Base Bid (plus affordable Alternates). If the deduct is not accepted by the Owner, award will be based on the Base Bid (plus affordable Alternates) without the deduct for Bid Item #118.***

3. **Section 01 27 00 – MEASUREMENT & PAYMENT**

   Part 3.01.O is being added to 01 27 00 - Measurement & Payment section. The new page 01 27 00-8, detailing the deductive bid item is attached as Exhibit B to this Addendum.

3. Section 00 73 00 – SUPPLEMENTAL GENERAL CONDITIONS

Remove SC-6.3 Item 6 regarding Contractor's Professional Liability:

5. Additional Insureds: In addition to Owner and Engineer, include as additional insureds all Engineering Subconsultants.

~~**6. Contractor's Professional Liability:**~~

~~**Each Claim**~~	~~**$1,000,000.00**~~
~~**Annual Aggregate**~~	~~**$ 3,000,000.00**~~

7. The Contractual Liability coverage required by paragraph 6.03.B.1 through 6.03.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

4. Section 09 90 02 – HIGH PERFORMANCE PAINTING & COATING

Part 3.07.M shall be modified as follows:

M. System No. 11: Concrete, Precast and Poured in Place, Immersion, High H2S

System Type	Surface Preparation	Primer Coat	Intermediate Coat	Topcoat
Fiber reinforced MP Epoxy	SSPC SP13, ICRI CSP4-6	Tnemec Series 218 MortarClad (60 to 65 mils DFT), SW ~~Core- Cote FRE~~ ***Dura-Plate 6000*** (60 to 120 mils DFT)	NA	Tnemec Series 436 (50 to 80 mils DFT), SW ~~Core- Cote SC~~ ***Dura-Plate 2300*** (15 to 20 mils DFT)

1. Prep surface in accordance with concrete surface preparation.
2. For use on walls and ceilings in areas with moderate to heavy H2S exposure.

5. Section 26 29 23 – VARIABLE FREQUENCY CONTROLLER

Add Section 26 29 23 – Variable Frequency Controller, see Exhibit C to this Addendum.

6. Section 33 11 16 – IRRIGATION WATER SUPPLY WELL

Part 2 shall be modified as follows:

2.01.B:

Provide all materials and equipment necessary for joining and installing ~~8~~ ***6***-inch diameter steel or PVC well casing.

2.02.B.1:

steel, which conforms to ASTM A-120 or better. The ~~8~~ ***6***-inch-diameter production casing shall have a wall thickness of 0.250 inches;

2.02.D:

~~D. It is anticipated that this well will be artesian with flowing water at the surface.~~

~~1. If clay or hardpan is encountered above the water bearing formation, the well must be constructed in accordance with ARM 36.21.657.~~

~~2. If a sand or gravel aquifer is overlaid only by permeable soils, the well must be constructed in accordance with ARM 36.21.656.g.~~

7. Section 40 27 00 – PROCESS PIPING - GENERAL

Part 2.05.B shall be modified as follows:

B. All HDPE pipe to have standard ~~ductile~~ iron pipe size ~~(DIPS)~~ ***(IPS)*** dimensions.

Add Part 2.05.E:

E. HDPE Electrofusion Fittings

A. Electrofusion couplings shall comply with the following:

a. ASTM D2513, ASTM F1055, ASTM D3350, AWWA C901, AWWA C906;

b. SDR17 maximum operating pressure of 160 psi.

c. Materials shall be PPI TR-4 listed, PE4710/PE100 HDPE material;

d. ***Fusible at ambient temperatures of 32°F to 115°F***

Add Section 3.14:

3.14. HDPE ELECTROFUSION FITTINGS

A. ***Installation of all electrofusion fittings shall be performed in accordance with ASTM F1290 and the manufacturer's installation manual (to be provided with the Submittal as per 01 33 00)***

Add Section 2.12:

2.12. FLEXIBLE PIPE

A. 24" Flexible Pipe – connection from 24" curing blower outlet to 24" aeration header shall be:

1. Thermoplastic flex, medium-duty duct with embedded spring steel wire helix reinforcement;

2. Minimum wall thickness of 0.02" with external wear strip;

3. Temperature range -40°F to 275°F;

4. UV, moisture and chemical resistant;

5. "Thermoplastic Flex Medium-Duty WS" rubber duct from Rubber-Cal, Inc. (800-370-9152) or equal

DRAWINGS:

1. **Civil Details – Sheet CD-5**

   Remove Note 11 from Detail 1.

2. **Civil Details – Sheet CD-13**

   Provide additional detail on the Irrigation Plumbing Diagram within the Control Building.

3. **Control Building – Sheet CB-1**

   Provide a piping penetration detail for the Control Building.

ATTACHMENTS:

Attached for the bidder's information are the following:

1. Exhibit A – Revised Bid Form Section 00 41 00 – page 3
2. Exhibit B – Revised Measurement & Payment Section 01 27 00 – page 6
3. Exhibit C – Specification Section 26 29 23 – VARIABLE FREQUENCY CONTROLLER
4. Exhibit D – Revised Sheet CD-5
5. Exhibit E – Revised Sheet CD-13
6. Exhibit F – Revised Sheet CB-1

Please Remember To Acknowledge Receipt Of This Addendum when submitting bids through QuestCDN.

Issued By: ANDERSON-MONTGOMERY, 1064 N. WARREN, HELENA, MT 59601,

Paul Montgomery, P.E., Project Manager

Office: (406)-449-3303, Fax (406)-449-3304
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END OF ADDENDUM NO. 2

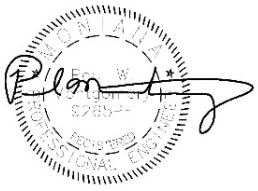


EXHIBIT A

Section 00 41 00
BID FORM

Revised Page 3

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BID FORM - Garden City Compost Facility Improvements					
BASE BID - Schedule 1					
ITEM #	**BID ITEM DESCRIPTION**	**UNITS**	**QUAN.**	**UNIT PRICE**	**LINE ITEM TOTAL**
100	Mobilization/Bonding/Insurance	LS	1	max 12% of bid	$0.00
102	Miscellaneous Work	$	100,000	$1.00	$100,000.00
104	Exploratory Excavation	Hr	120	$0.00	$0.00
106	Excavate Unsuitable Material - Compost Facility	CY	15,000	$0.00	$0.00
108	Import Engineered Fill (MPW 4" Minus) - Compost Facility	CY	22,300	$0.00	$0.00
110	Dewatering	HP•day	1,000	$0.00	$0.00
112	Compost Facility - Demolition & Civil	LS	1	$0.00	$0.00
114	Compost Facility - Mechanical & HVAC	LS	1	$0.00	$0.00
116	Compost Facility - Electrical & Controls	LS	1	$0.00	$0.00
118	***Deduct for 1,440 Owner-Furnished Aeration Grates***	***LS***	***1***	***-$0.00***	***-$0.00***
Total Base Bid Price including Deduct (in figures):				**$100,000.00**	
Total Bid Price including Deduct (in words):				_____ **dollars**	

EXHIBIT B

Section 01 27 00
MEASUREMENT & PAYMENT

Revised Page 6

2. Work required shall include: furnishing and installing: interior/exterior circuitry for the control shed, lighting, motor control system including drives; enclosures; conduit; conductor; communications; all hardware; software; startup/troubleshooting; performance testing/reporting protection; breakers; fuses; junction boxes; panels; transformers; lighting; conduit; raceways; conductor; receptacles; exhaust fan; electric heater; all methods and labor; tools; equipment; testing, troubleshooting, submittals and incidentals necessary to complete the work as specified.

3. Unit of Measurement: Lump Sum.

4. Measurement: Measurement shall be per individual electrical/controls activity completed as identified in the Contractor's Schedule of Values (see Part 1.03 of Section 01 29 00).

5. Payment: Payment shall be made in accordance with the documented amount of electrical/controls work completed, applied to the overall lump sum as specified in the Bid Form.

O. ***Bid Item 118: Deduct for Owner-Supplied Compost Aeration Grates***

1. ***Description: This item consists of a deduction from the Base Bid for the Owner furnishing 1,440 stainless steel aeration grates for the Contractor to install.***

2. ***Unit of Measurement: Lump Sum deduct for the first 1,440 grates. Additional grates would be supplied to the Contractor based on each.***

3. ***Measurement: Measurement shall be per lump sum deducted from the Base Bid. Beyond the 1,440 grates supplied, measurement will be per each supplied to the Contractor.***

4. ***Payment: Payment shall be a lump sum deduct applied to the overall Base Bid as specified in the Bid Form. Payment to the Owner for any grates beyond the 1,440 (supplied under the lump sum) would be per each supplied to the Contractor at a unit cost of:***

Unit cost = $ lump sum/1,440

END OF SECTION 01 27 00

EXHIBIT C

Section 26 29 23

VARIABLE FREQUENCY CONTROLLER

SECTION 26 29 23
VARIABLE-FREQUENCY MOTOR CONTROLLER

PART 1 - GENERAL

1.01 SUMMARY

A. The Variable Frequency Drive (VFD) system shall contain all components required to meet the performance, protection, safety and certification criteria of this specification.

1.02 RELATED SECTIONS

A. Section 26 05 00 – Common Work Results for Electrical

B. Section 26 05 53 – Identification for Electrical Systems

1.03 REFERENCES

A. National Fire Protection Association - NFPA 70 - US National Electrical Code.

B. National Electrical Manufacturers Association - NEMA 250 - Enclosures for Electrical Equipment.

C. Underwriters Laboratory Inc. – UL 508.

D. Canadian Standards Association International – CAN/CSA-C22.2 No. 14-05.

E. International Electrical Code - IEC 146.

F. Institute of Electrical and Electronics Engineers, Inc. - IEEE 519 - IEEE Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Shop Drawings - Approval

1. Elevation Drawings: Include dimensional information and conduit routing locations.

2. Unit Descriptions: Include amperage ratings, enclosure ratings, fault ratings, nameplate information, etc. as required for approval.

3. Wiring Diagrams:

a. Power Diagram: Include amperage ratings, circuit breaker frame sizes, circuit breaker continuous amp ratings, etc. as required for approval.

b. Control Diagram: Include disconnect devices, pilot devices, etc.

4. Major components list.

C. Product Data Sheets

1. VFD and Operator Interface publications.

2. Data sheets and publications on all major components including but not limited to the following:

a. Contactors

b. Circuit breaker and fuse (power and control)

c. Control power transformers

d. Pilot devices

e. Relays/Timers

D. Test procedures shall be per the manufacturer's standards.

1.05 CLOSEOUT SUBMITTALS (OPERATION AND MAINTENANCE MANUALS)

A. Submit under provisions of Section 01 33 00

B. Shop Drawings – Final as shipped

1. Elevation Drawings: Include dimensional information and conduit routing locations.

2. Unit Descriptions: Include amperage ratings, enclosure ratings, fault ratings, nameplate information, etc. as required for approval.

3. Wiring Diagrams:

a. Power Diagram: Include amperage ratings, circuit breaker frame sizes, circuit breaker continuous amp ratings, etc. as required for approval.

b. Control Diagram: Include disconnect devices, pilot devices, etc.

4. Major components list.

C. Product Data Sheets

1. VFD and Operator Interface publications.

2. Data sheets and publications on all major components including but not limited to the following:

a. Contactors

b. Circuit breaker and fuse (power and control)

c. Control power transformers

d. Pilot devices

e. Relays/Timers

D. Test procedures shall be per the manufacturer's standards.

E. Operation and Maintenance Data

1. Service and Contact information

2. VFD and Operator Interface User Manuals

3. Troubleshooting / Service Manuals

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturers:

a. The VFD and all associated optional equipment shall be UL listed or recognized and shall have a UL label attached on the inside of the enclosure cabinet.

2. Suppliers:

a. All inspection and testing procedures shall be developed and controlled under the guidelines of the Supplier's quality system and must be registered to ISO 9001 and regularly reviewed and audited by a third party registrar.

b. The VFD shall be factory pre-wired, assembled and tested as a complete package.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall coordinate the shipping of equipment with the manufacturer.

B. Contractor shall store the equipment in a clean and dry space at an ambient temperature range of -25 °C to 55 °C (-13 °F to 130 °F).

C. The contractor shall protect the units from dirt, water, construction debris and traffic.

1.08 WARRANTY

A. The manufacturer shall provide their standard parts warranty for eighteen (18) months from the date of shipment or twelve (12) months from the date of being energized, whichever occurs first.

B. This warranty applies to variable frequency drive systems.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Allen-Bradley – PowerFlex 753 VFD, or *pre-approved* equal. The City's intent is to utilize AB drives in order to be consistent with other drives implemented in its utility infrastructure projects.

2.02 VARIABLE FREQUENCY DRIVE UNIT

A. Features

1. Certifications

a. Listed to UL508C and CAN/CSA-C22.2 No. 14-05

b. In conformity with EMC Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC). Standards applied; EN 61800-3:2004, EN 61800-5-1:2007

c. Electric Power Research Institute. Certified compliant with standards SEMI F47 and IEC 61000-4-34

2. Hardware

a. Utilize diode bridge or SCR bridge on the input rectifier.

b. Utilize DC bus inductor on all six-pulse VFDs only.

c. Utilize switching logic power supply operating from the DC bus.

d. Incorporate phase to phase and phase to ground MOV protection on the AC input line.

e. Microprocessor based inverter logic shall be isolated from power circuits.

f. Utilize latest generation IGBT inverter section.

g. Battery receptacle for Lithium battery power to the Real Time Clock.

h. Additional DPI port for handheld and remote HIM options.

i. Dedicated Digital Input for hardware enable.

j. Conformal coated printed circuit boards.

k. Optional onboard 24V DC Auxiliary Control Power Supply.

3. Control Logic

a. Ability to operate with motor disconnected.

b. Provide a controlled shut down, when properly protected, with no component failure in the event of an output phase to phase or phase to ground short circuit. Provide annunciation of the fault condition.

c. Provide multiple programmable stop modes including Ramp, Coast, DC-Brake, Ramp-to-Hold, Fast Braking, and Current Limit Stop.

d. Provide multiple acceleration and deceleration rates.

e. Adjustable output frequency up to 650Hz.

4. DeviceLogix Control

a. Ability to control outputs and manage status information locally within the VFD.

b. Ability to function stand-alone or complimentary to supervisory control.

c. Ability to speed reaction time by processing in the VFD.

d. Ability to provide scaling, selector switches, or other data manipulations not already built into the VFD.

e. Ability to read inputs/write outputs and exclusively control the VFD.

f. Ability to provide an option for decision making if communication is lost with main controller.

g. Ability to control other VFDs via a peer-to-peer EtherNet/IP network.

h. Ability to write programs off-line.

5. Motor Control Modes

a. Selectable Sensorless Vector, Flux Vector, V/Hz, and Adjustable Voltage Control modes selectable through programming.

b. The drive shall be supplied with a Start-up and Auto-tune mode.

c. The V/Hz mode shall be programmable for fan curve or full custom patterns.

d. Capable of Open Loop V/Hz.

6. Current Limit

a. Programmable current limit from 20 to 160% of rated output current.

b. Current limit shall be active for all drive states: accelerating, constant speed and decelerating.

c. The drive shall employ PI regulation with an adjustable gain for smooth transition in and out of current limit.

7. Acceleration / Deceleration

a. Accel/Decel settings shall provide separate adjustments to allow either setting to be adjusted from 0 to 3600 seconds.

b. A second set of remotely selectable accel/decel settings shall be accessible through digital inputs.

8. Speed Profiles

a. Programming capability shall allow the user to produce speed profiles with linear acceleration/deceleration or "S Curve" profiles that provide changing accel/decel rates.

b. S Curve profiles shall be adjustable.

9. Adjustments

a. A digital interface can be used for all set-up, operation and adjustment settings.

b. All adjustments shall be stored in nonvolatile memory (EEPROM).

c. No potentiometer adjustments shall be required.

d. EEPROM memory for factory default values shall be provided.

e. Software must be available for trending and diagnostics, as well as online and offline programming functionality.

10. Process PID Control

a. The drive shall incorporate an internal process PI regulator with proportional and integral gain adjustments as well as error inversion and output clamping functions.

b. The feedback shall be configurable for normal or square root functions. If the feedback indicates that the process is moving away from the set-point, the regulator shall adjust the drive output until the feedback equals the reference.

c. Process control shall be capable of being enabled or disabled with a hardwire input. Transitioning in and out of process control shall be capable of being tuned for faster response by preloading the integrator.

d. Protection shall be provided for a loss of feedback or reference signal.

11. Skip Frequencies

a. Three adjustable set points that lock out continuous operation at frequencies which may produce mechanical resonance shall be provided.

b. The set points shall have a bandwidth adjustable from Maximum Reverse Speed to Maximum Forward Speed.

12. Fault Reset/Run

a. The drive shall provide up to nine automatic fault reset and restarts following a fault condition before locking out and requiring manual restart.

b. The automatic mode shall not be applicable to a ground fault, shorted output faults and other internal microprocessor faults.

c. The time between restarts shall be adjustable from 0.5 seconds to 30 seconds.

13. Run on Power Up

a. A user programmable restart function shall be provided to allow restart of the equipment after restoration of power after long duration power outages. Restart time dependent on presence of incoming signal.

14. Fault Memory

a. The last 32 fault codes shall be stored and time stamped in a fault buffer.

b. Information about the drive's condition at the time of the last fault such as operating frequency, output current, dc bus voltage and twenty-seven other status conditions shall be stored.

c. A power-up marker shall be provided at each power-up time to aid in analyzing fault data.

d. The last 32 alarm codes shall be stored and time stamped for additional troubleshooting reference.

15. Overload Protection

a. The drive shall provide internal class 10 adjustable overload protection.

b. Overload protection shall be speed sensitive and adjustable.

c. A viewable parameter shall store the overload usage.

16. Auto Economizer

a. An auto economizer feature shall be available to automatically reduce the output voltage when the drive is operating in an idle mode (drive output current less

than programmed motor FLA). The voltage shall be reduced to minimize flux current in a lightly loaded motor thus reducing kW usage.

b. When the load increases, the drive shall automatically return to normal operation.

17. Terminal Blocks
    a. Separate terminal blocks shall be provided for control and power wiring.
    b. I/O terminal blocks shall be removable with wiring in place.
18. Flying Start
    a. The drive shall be capable of determining the speed and direction of a spinning motor and adjust its output to "pick-up" the motor at the rotating speed. This feature is disabled by default.
19. Inputs and Outputs
    a. The Input / Output option modules shall consist of both analog and digital I/O.
    b. No jumpers or switches shall be required to configure digital inputs and outputs.
    c. All digital input and output functions shall be fully programmable.
    d. The control terminal blocks shall be rated for 115V AC.
    e. Inputs shall be optically isolated from the drive control logic.
    f. The control interface card shall provide input terminals for access to fixed drive functions that include start, stop, external fault, speed, and enable.
    g. The VFD shall be capable of supporting up to 7 analog inputs, 7 analog outputs, 21 digital inputs, 7 relay outputs, 7 transistor outputs, and 3 positive temperature coefficient (PTC) inputs.
    h. The Input / Output option modules shall have the following features:
        i. Analog Inputs:
            - Quantity two (2) differentially isolated, ±10V (bi-polar), 88k ohm input impedance, 11 bit plus sign.
            - Analog inputs shall be user programmable for a variety of uses including frequency command and process loop input. Analog inputs shall be user programmable for function scaling (including invert), offset, signal loss detect and square root.
        ii. Analog Outputs:
            - Quantity two (2) ±10V (bi-polar) / 11 bit & sign, 2 k□ minimum load, 4-20 mA, 11 bit plus sign, 400 □ maximum load.

- The analog output shall be user programmable to be proportional to one of fourteen process parameters including output frequency, output current, encoder feedback, output power.
- Programming shall be available to select either absolute or signed values of these parameters.

iii. Digital Inputs:

- Quantity of six (6) digital inputs rated 24V DC/115V AC.
- All inputs shall be individually programmable for multiple functions including: Start, Run, Stop, Auxiliary Fault, Speed Select, Jog and Process PI functions.

iv. Digital Outputs:

- At least one (1) relay output (N.O. or N.C.).
- For 240V AC or 24V DC, N.O. contact output ratings shall be 2 amp max., general purpose (inductive)/resistive. N.C. contact output ratings shall be 2 amp max., resistive only.
- Relays shall be programmable to multiple conditions including: Fault, Alarm, At Speed, Drive Ready and PI Excess Error.
- Timers shall be available for each output to control the amount of time, after the occurring event, that the output relay actually changes state.
- At least one (1) transistor output.
- For 24V DC, transistor output rating shall be 1 amp max, Resistive.

20. Reference Signals
    a. The drive shall be capable of using the following input reference signals:
        i. Analog inputs
        ii. Preset speeds
        iii. Remote potentiometer
        iv. Digital MOP
        v. Human Interface Module
        vi. Communication modules
21. Loss of Reference
    a. The drive shall be capable of sensing reference loss conditions.
    b. In the event of loss of the reference signal, the drive shall be user programmable to the following:
        i. Fault the drive and coast to stop.
        ii. Issue a minor fault - allows the drive to continue running while some types of faults are present.

iii. Alarm and maintain last reference.

c. When using a communications network to control the drive, the communications adapter shall have these configurable responses to network disruptions and controller idle (fault or program) conditions:

i. Fault
ii. Stop
iii. Zero Data
iv. Hold Last State
v. Send Fault Configuration

22. Metering

a. At a minimum, the following parameters shall be accessible through the Human Interface Module, if installed:

i. Output Current in Amps
ii. Output Voltage in Volts
iii. Output Power in kW
iv. Elapsed MWh
v. DC Bus Voltage
vi. Frequency
vii. Heatsink Temperature
viii. Last eight (32) faults
ix. Elapsed Run Time
x. IGBT Temperature

23. Faults

a. At a minimum, the following faults shall be accessible through the Human Interface Module:

i. Power Loss
ii. Undervoltage
iii. Overvoltage
iv. Motor Overload
v. Heat Sink Over-temperature
vi. Maximum Retries
vii. Phase to Phase and Phase to Ground Faults

24. Predictive Diagnostics

a. At a minimum, the following predictive diagnostic features shall be provided:

i. Relay Output Life Cycles based on load type and amps.
ii. Hours of Fan Life based on load and ambient temperature.
iii. Motor Bearing life based on expected hours of use.
iv. Motor Lubrication schedule based on hours of use.
v. Machine Bearing life based on expected hours of use.

25. Real-Time Clock
    a. Shall be capable of providing time stamped events.
    b. Shall have the ability to be set locally or via a remote controller.
    c. Shall provide the ability to be programmable for month, day, year and local time zones in HH:MM:SS.

2.03 VFD PACKAGED SYSTEM

A. Features
1. Ratings
    a. Voltage
        i. Capable of accepting nominal plant power of 480V AC at 60Hz.
        ii. The supply input voltage tolerance shall be ± 10% of nominal line voltage.
    b. Displacement Power Factor
        i. Six-pulse VFD shall be capable of maintaining a minimum true power factor (Displacement P.F. X Distortion P.F.) of 0.95 or better at rated load and nominal line voltage, over the entire speed range.
    c. Efficiency
        i. A minimum of 96.5% (+/- 1%) at 100% speed and 100% motor load at nominal line voltage.
        ii. Control power supplies, control circuits, and cooling fans shall be included in all loss calculations.
    d. Operating ambient temperature range without derating: 0 °C to 40 °C (32 °F to 104 °F)
    e. Operating relative humidity range shall be 5% to 95% non-condensing.
    f. Operating elevation shall be up to 1000 Meters (3,300 ft) without derating.
2. Sizing
    a. VFD Systems shall be sized for Heavy Duty loads and shall provide 150 percent overload capability for up to one minute and 180 percent for up to 3 seconds.
3. Auto Reset/Run
    a. For faults other than those caused by a loss of power or any other non-critical fault, the drive system shall provide a means to automatically clear the fault and resume operation.
4. Ride-Through
    a. The VFD system shall attempt to ride through power dips up to 20% of nominal. The duration of ride-through shall be inversely proportional to load. For outages greater than 20%, the drive shall stop the motor and issue a power loss alarm

signal to a process controller, which may be forwarded to an external alarm signaling device.

5. Run on Power Up
    a. The VFD system shall provide circuitry to allow for remote restart of equipment after a power outage. Unless indicated in the contact drawings, faults due to power outages shall be remotely resettable. The VFD system shall indicate a loss of power to a process controller, which may be forwarded to an external alarm signaling device. Upon indication of power restoration the process controller will attempt to clear any faults and issue a run command, if desired.
6. Communications
    a. VFD shall be capable of communicating on multiple networks.
    b. VFD shall be capable of supporting the following network options:
        i. DeviceNet
        ii. EtherNet/IP
        iii. ControlNet Coax
        iv. ControlNet Fiber
        v. Interbus
        vi. CANopen
        vii. Modbus/TCP
        viii. Modbus RTU
        ix. Profibus DP
        x. RS-485 DF1
        xi. RS-485 HVAC
        xii. Remote I/O
7. Enclosure Door Mounted Human Interface Module (HIM)
    a. VFD shall provide a HIM with integral LCD display, operating keys and programming keys.
    b. An enclosure door-mounted HIM, shall maintain the NEMA rating of the enclosure.
    c. An optional VFD-mounted HIM, rated NEMA/UL Type 1, may be provided and shall be capable of connecting via a separate cable for use as a handheld terminal.
    d. The HIM shall have the following features:
        i. A seven (7) line by twenty-one (21) character backlit LCD display with graphics capability.
        ii. Shall indicate drive operating conditions, adjustments and fault indications.
        iii. Shall be configured to display in the following three distinct zones:

- The top zone shall display the status of direction, drive condition, fault / alarm conditions and Auto / Manual mode.
- The middle zone shall display drive output frequency.
- The bottom zone shall be configurable as a display for either programming menus / information or as a two-line user display for two additional values utilizing scaled units.

iv. Shall provide digital speed control.

v. The keypad shall include programming keys, drive operating keys (Start, Stop, Direction, Jog and Speed Control), and numeric keys for direct entry.

B. Enclosure

1. Shall be rated NEMA/UL Type 12
2. Shall be painted per the manufacturer's standard.
3. Shall provide entry and exit locations for power cables.
4. Shall contain a label for UL508.
5. The drive system nameplate shall be marked with system Short Circuit Current Rating (SCCR).

C. Drive Enclosure Input Disconnect

1. Provide an enclosure door interlocked disconnect with thermal magnet circuit breaker.
2. Operator Handles
   a. Provide flanged-mounted, externally operated main disconnect handle.
   b. Handles shall be lockable with up to three lockout / tagout padlock positions.
   c. Handles shall be interlocked to prevent the enclosure door from being opened when the disconnect is in the ON position.

D. Branch Circuit Protection

1. Input inverse time circuit breaker shall be provided.

E. Control Power Transformer

1. Provide a control power transformer mounted and wired inside of the drive system enclosure.
2. The transformer shall be rated for 125% of the VFD power requirements.

F. Harmonic Mitigation Techniques

1. Drive Input Line Reactor
   a. Provide a drive input line reactor mounted within the drive system enclosure for drives that are less than 100 horsepower.

b. The line reactor shall meet the following specifications:

i. The construction shall be iron core with an impedance of 3 percent

ii. The winding shall be copper or aluminum wound.

iii. The insulation shall be Class H with a 115 °C rise over 50 °C ambient.

iv. The unit shall be rated for system voltage, ampacity, and frequency.

G. Auxiliary Relays

1. Provide relays for Drive Alarm, Drive Fault, Drive Run, and System Status Faults (as required).
2. The relays shall be Allen-Bradley 700-HC (2 N.O. & 2 N.C.). The relay contacts shall be rated for 115V AC/30V DC, 5.0 amp resistive, 2.5 amp inductive.

H. Control Interface

1. The control terminals shall be rated for 115V AC.
2. The control interface shall provide input terminals for access to VFD functions that include start, stop, external fault, speed select, and enable, as required.

I. Hand/Off/Auto Selector Switch

1. Provide a "Hand/Off/Auto" selector switch, mounted on the enclosure door.
2. The "Hand/Off/Auto" selector switch shall start the drive in the “Hand” mode and stop the drive in the “Off” mode.
3. In the “Auto” mode the drive shall be started and stopped from a remote “RUN” contact.
4. In all modes, Auxiliary and Enable inputs to the drive control interface board must be present before the drive will start.
5. When a HIM is present, the stop function shall always be available to stop the drive regardless of the selected mode (“Hand” or “Auto”). The HIM will be non-functional (except for the display and programming) when the switch is in “Off” mode. The HIM shall stop the drive if the switch is in the “Auto” mode with the remote start contact initiated.
6. The drive speed reference shall be controlled from the HIM when in “Hand” mode (factory default setting).
7. The drive speed reference shall be controlled by a remote 4-20 mA input when in “Auto” mode.
8. The device shall be an Allen-Bradley Bulletin 800T (30mm), NEMA Type 4/13, mounted on the drive system enclosure door.

J. Drive Disable Mushroom Push Button

1. Provide a maintained mushroom style push button, mounted on the enclosure door that when pushed, will open the drive enable input.

2. The device shall be an Allen-Bradley Bulletin 800T (30mm), NEMA Type 4/13, mounted on the drive system enclosure door.

K. Pilot Lights

1. Provide LED pilot lights, mounted on the enclosure door, for indication of the following status:
    a. Run: Red
    b. Drive Fault: Amber
    c. Control Power On: White
    d. Motor Fault: Amber
2. The device shall be an Allen-Bradley Bulletin 800T (30mm), NEMA Type 4/13, mounted on the drive system enclosure door.

L. Motor Run Time Meter

1. Provide a digital, non-resettable, door-mounted elapsed time meter.
2. The meter shall be electrically interlocked with the Drive Run relay and Bypass contactor to indicate actual motor operating hours.

PART 3 - EXECUTION

3.01 EXAMINATION

1. Verify that location is ready to receive equipment.
2. Verify that the building environment can be maintained within the service conditions required by the manufacturer of the VFD.

3.02 INSTALLATION

A. Installation shall be in compliance with all manufacturer requirements, instructions and drawings.

3.03 START-UP SERVICE

A. At a minimum, the start-up service shall include:

1. Perform pre-Power Check
2. Megger Motor Resistances: Phase-to-Phase and Phase-to-Ground
3. Verify system grounding per manufacturer’s specifications
4. Verify power and signal grounds
5. Check connections
6. Check environment

B. Drive Power-up and Commissioning:

1. Measure Incoming Power Phase-to-Phase and Phase-to-Ground

2. Measure DC Bus Voltage
3. Measure AC Current Unloaded and Loaded
4. Measure Output Voltage Phase-to-Phase and Phase-to-Ground
5. Verify input reference signal

C. All measurements shall be recorded.

D. Drive shall be tuned for system operation.

E. Drive parameter listing shall be provided.

3.04 TRAINING

A. Manufacturer to provide a quantity of 2, 4-hour sessions of on-site instruction.

B. The instruction shall include the operational and maintenance requirements of the variable frequency drive.

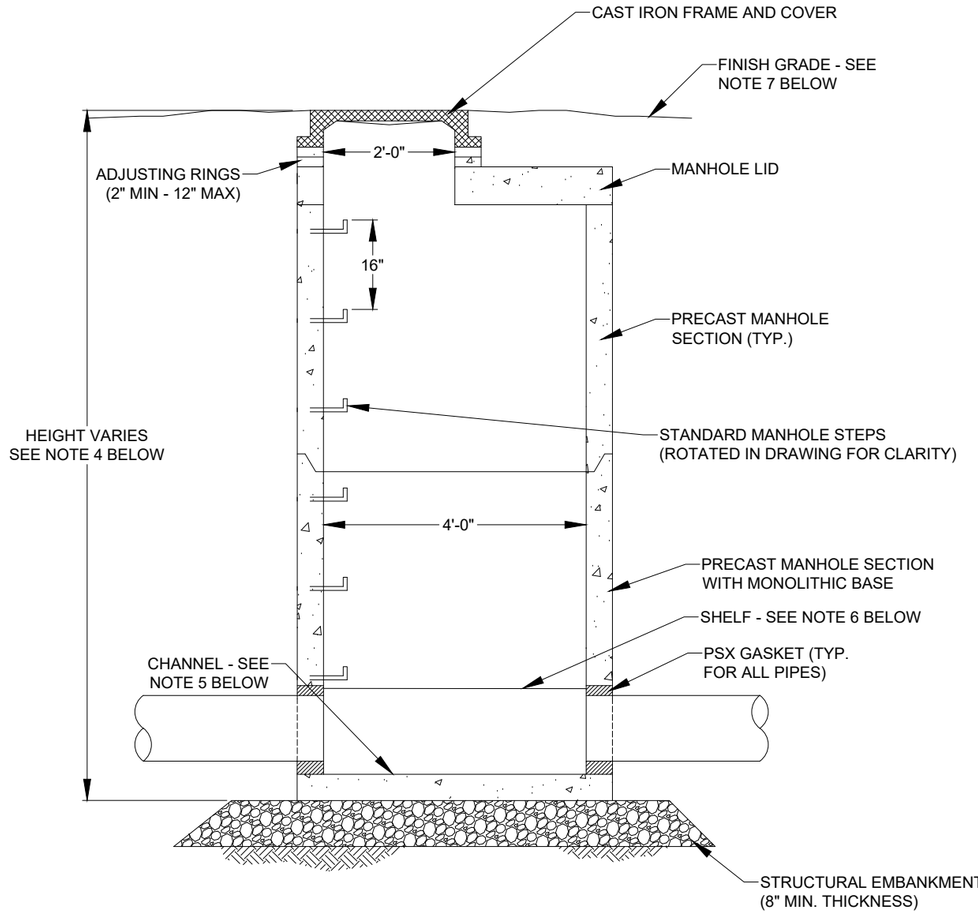
C. The basis of the training shall be the variable frequency drive, the engineered drawings and the user manual. At a minimum, the training shall:

1. Review the engineered drawings identifying the components shown on the drawings.
2. Review starting / stopping and speed control options for the controller.
3. Review operation of the Human Interface Module for programming and monitoring of the variable frequency drive.
4. Review the maintenance requirements of the variable frequency drive.
5. Review safety concerns with operating the variable frequency drive.

END OF SECTION 26 29 23

EXHIBIT D

Revised Sheet CD-5

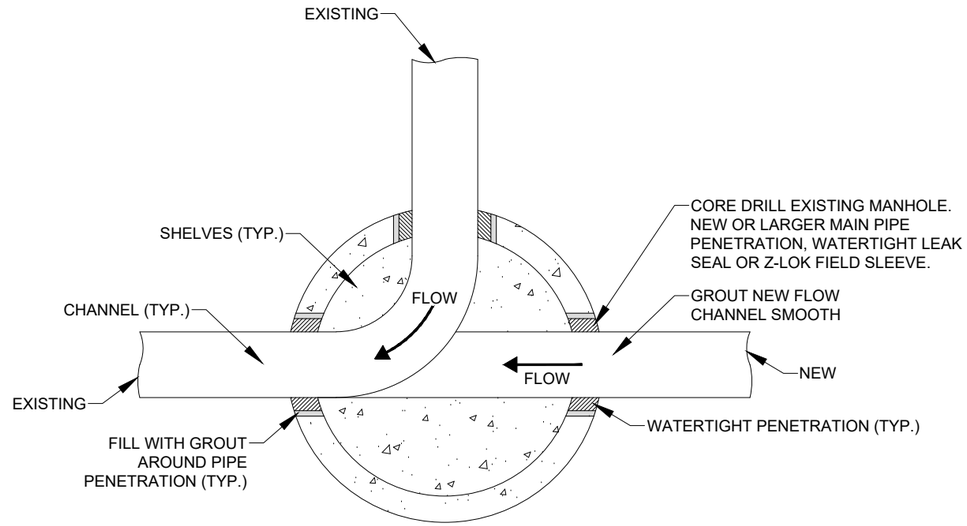


NOTES:

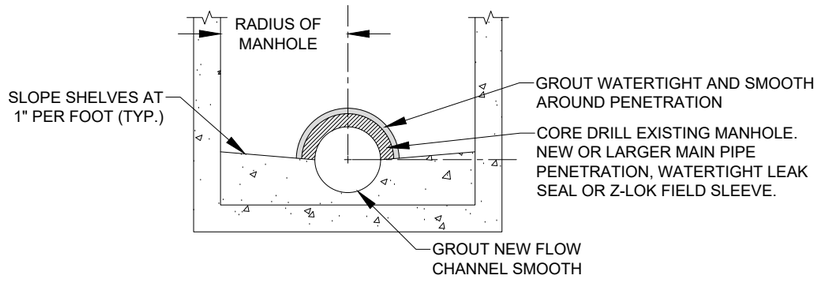
1. PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM C478.
2. ALL JOINTS SHALL BE WATERTIGHT. MATERIAL SHALL BE RUBBER-NEK OR APPROVED EQUAL.
3. MANHOLE COVER SHALL BE UNMARKED.
4. SEE PLAN AND PROFILE SHEETS FOR MANHOLE DIMENSIONS. ECCENTRIC MANHOLE SECTIONS WILL NOT BE ALLOWED. PROVIDE RISER SECTION AND COVER SLAB.
5. CHANNEL SHALL BE HALF THE DIAMETER OF THE PIPE.
6. CONCRETE SHELVES SHALL SLOPE TOWARD THE CHANNEL(S) AT 1" PER FOOT.
7. PROVIDE FILL MATERIAL, SLOPED AT 2 HORIZONTAL TO 1 VERTICAL FOR COVERS SET ABOVE EXISTING GROUND LEVEL.
8. CONSTRUCT SHELVES PER LATEST EDITION OF MPW.
9. PROVIDE 3" GROUT SPACE AROUND ALL PIPE. ALL JOINTS SHALL BE GROUTED WATERTIGHT. CONFORM TO MANHOLE LINER MANUFACTURER'S RECOMMENDATIONS.
10. NEW MANHOLES SHALL BE COATED WITH AN EXTERIOR DAMPPROOFING; BITUMINOUS COAT OR COAL TAR EPOXY.
11. ~~MANHOLES SHALL BE LINED WITH A DURA-PLATE 100 LINER SYSTEM MANUFACTURED BY A-LOK PRODUCTS, INC. OR APPROVED EQUAL. MANHOLE SHALL BE CAST WITH LINER IN PLACE AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.~~
12. FINISHED MANHOLES SHALL BE IN ACCORDANCE WITH LATEST EDITION OF MPWSS STANDARD SPECIFICATIONS.
13. STEPS SHALL BE PLACED AT 90° TO THE LINE OF SEWER PIPE WHERE APPLICABLE. STEPS ARE ROTATED IN DRAWING FOR CLARITY.
14. PROVIDE ALL SHORING NECESSARY TO PROTECT EXISTING STRUCTURES AND INFRASTRUCTURE.
15. MANHOLES SHALL EITHER UTILIZE A BARREL SECTION & A FLAT LID OR A CONICAL SECTION, SEE DRAWINGS FOR SPECIFIC MANHOLE DETAILS.

Standard Sanitary Sewer Manhole (1)

NO SCALE



CONFIGURATION MAY VARY



CHANNEL SECTION

NOTES:

- SLOPE ALL SHELVES TO CHANNEL AT 1" PER FOOT.
- ALL NEW HOLES SHALL BE CORED AND LARGE ENOUGH FOR WATERTIGHT SEAL. GROUT SEAL IN PLACE WITH NON-SHRINK GROUT.
- ROTATE CONE AND STAIRS SUCH THAT STAIRS ARE NOT ABOVE CHANNELS.
- RECONSTRUCT FLOW CHANNEL IN ACCORDANCE WITH MPWSS STANDARD DRAWING NO. 02720-7.
- MANHOLE CONFIGURATIONS MAY VARY FROM DETAIL DEPICTED ABOVE.

Modify Existing Manhole (2)

NO SCALE

Revision	Date	By
30% Draft	8/1/24	AE
60% Draft	11/18/24	AE
90% Draft	1/31/25	AE
Final	2/14/25	AE
Add. #2	3/5/25	AE

Revision: Addendum #2
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By: P.Montgomery, P.E.
Checked By: A.Eckhart, P.E.
Designed By: P.Montgomery, P.E.

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Owner: City Of Missoula

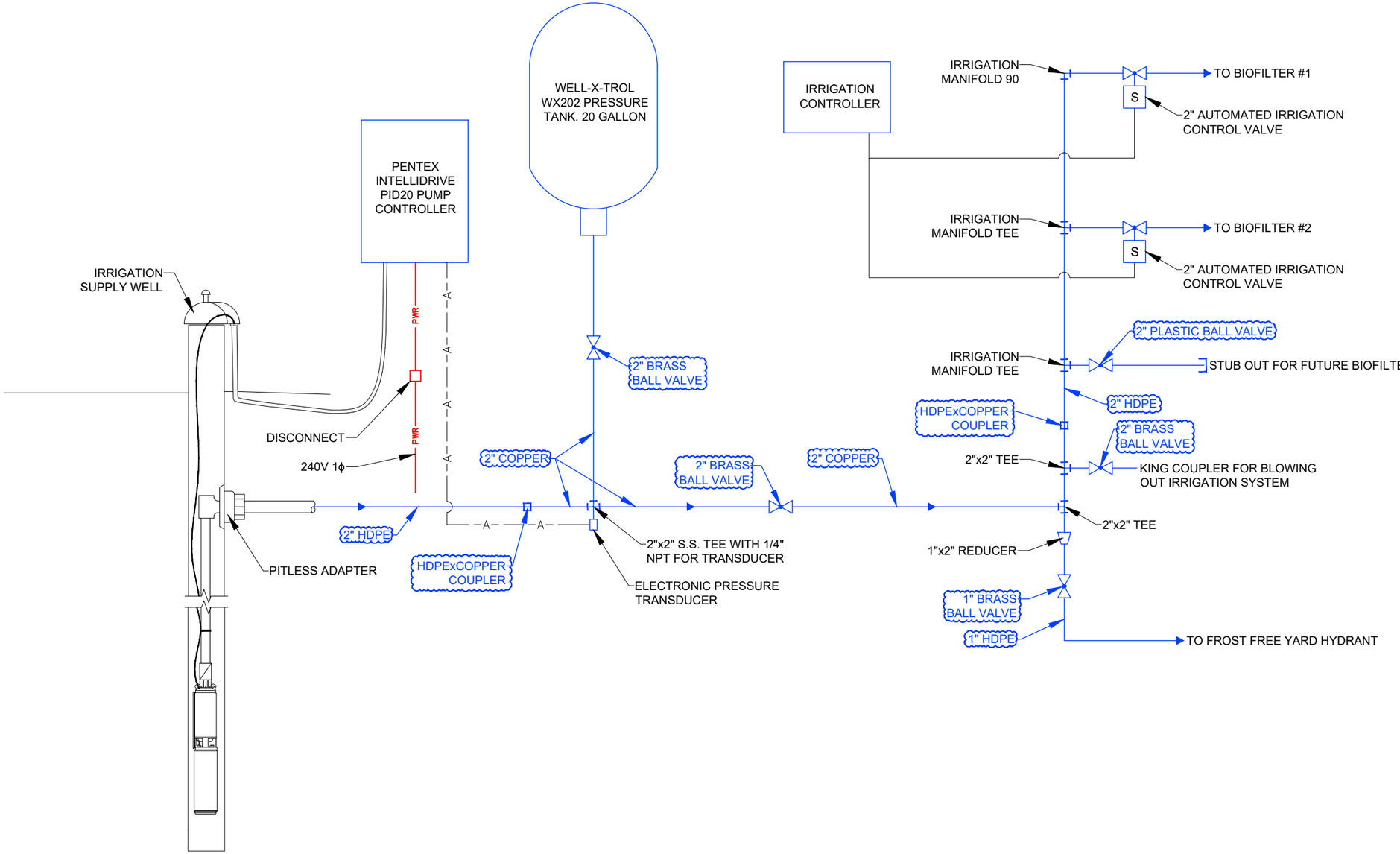
Project Title: Garden City Compost Facility Improvements

Sheet Title: **Manhole Details**

Sheet: **CD-5**

EXHIBIT E

Revised Sheet CD-13



Irrigation Plumbing Diagram 1
NO SCALE C-9

Revision	Date	By
30% Draft	8/1/24	AE
60% Draft	11/18/24	AE
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Add. #2	3/5/25	AE

Revision: Addendum #2
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By: P.Montgomery, P.E.
Checked By: A.Eckhart, P.E.
Designed By: P.Montgomery, P.E.

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Owner: City Of Missoula

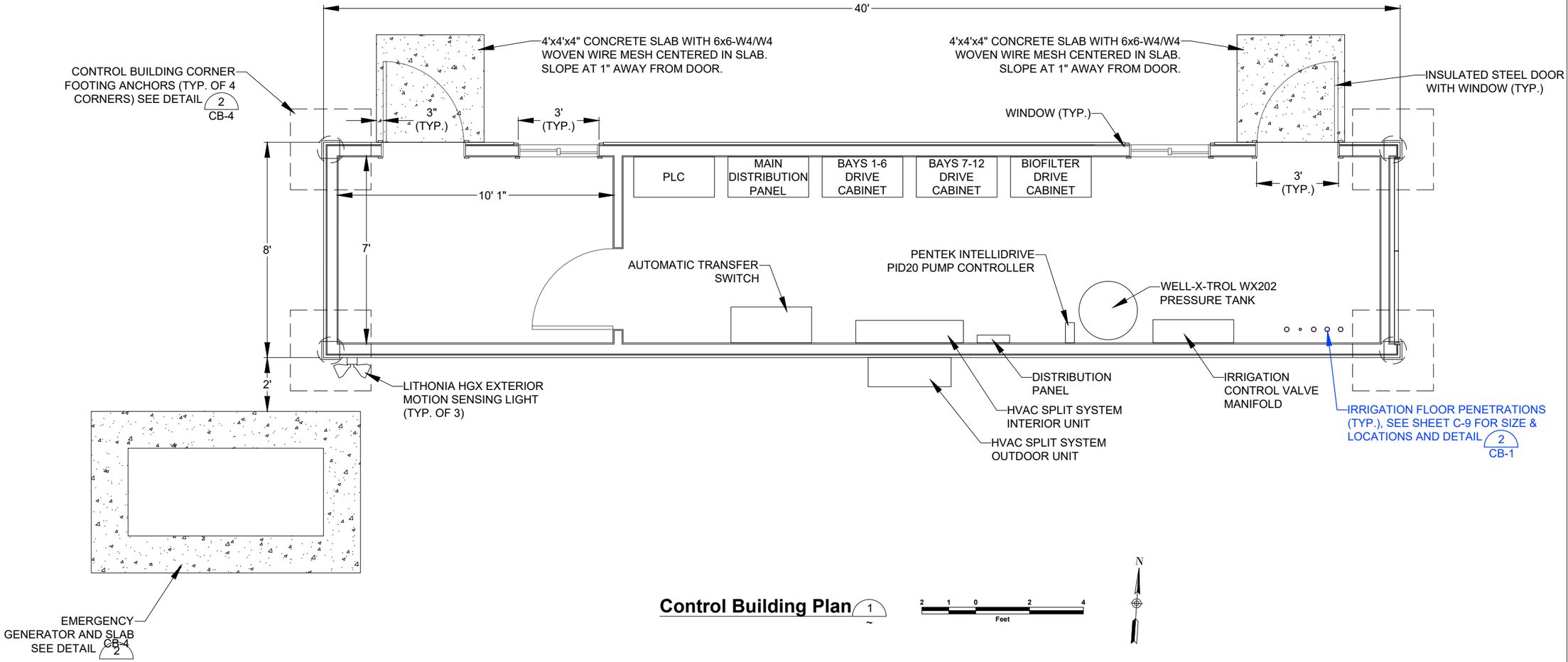
Project Title: Garden City Compost Facility Improvements

Sheet Title: **Irrigation Plumbing Diagram**

Sheet: **CD-13**

EXHIBIT F

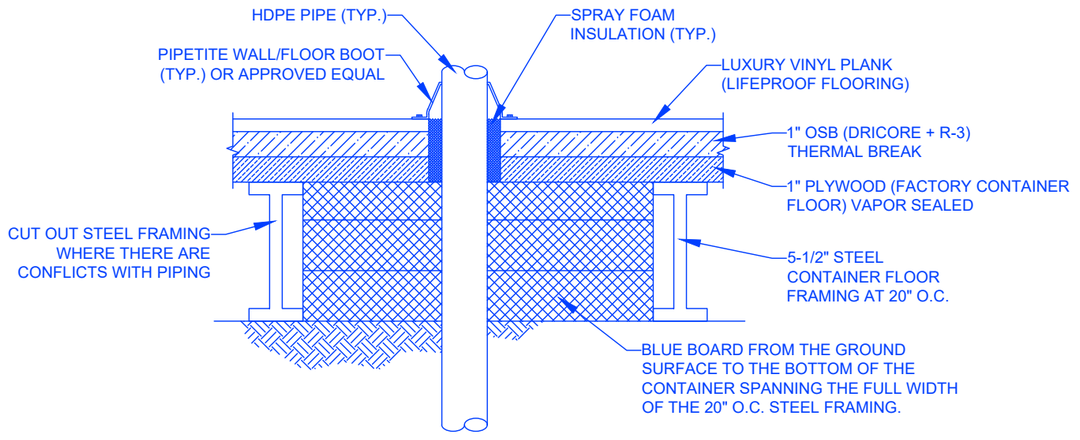
Revised Sheet CB-1



Control Building Plan 1

2 1 0 2 4
Feet

N



Control Building Floor Penetration 2 CB-1

Revision	Date	By
30% Draft	8/1/24	AE
60% Draft	11/18/24	AE
90% Draft	1/31/25	AE
Final	2/14/25	AE
Add. #2	3/5/25	AE

Revision: Addendum #2
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By: P.Montgomery, P.E.
Checked By: A.Eckhart, P.E.
Designed By: P.Montgomery, P.E.

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Owner: City Of Missoula

Project Title: Garden City Compost Facility Improvements

Sheet Title: **Control Building Plan**

Sheet: **CB-1**

X:\MISSOULA COMPOST\DESIGN\DRAWINGS\Sheets\6 - Control Building\CB-1 Addendum 2.dwg SAVED: 3/5/25 PRINTED: 3/5/25 BY: ADAM