

## ADDENDUM #1

### Lewis and Clark Caverns Upper Water System Improvements FWP #7236135

Near Cardwell, Montana  
May 8, 2026

Bidders for the above listed project are hereby notified that the following changes have been made to the bid documents:

1. *Remove a section of* **TECHNICAL SPECIFICATION 07/710, Metal Roofing, Part 3 Requirements, Section 2.C.** Concealed fasteners are not required.
2. *Add the following to* **SPECAIL PROVISION 22, Section E.52, Instrumentation, work included:**
  - Modification of existing panels, controls, and components in Upper Visitors Center Pump Station Building.
3. *Delete the following from* **Sheet C19 of the DRAWINGS, Pipe Trench Detail #2 and Pipe Trench Detail #4:**

The “fiber optic cable” call out at the bottom of both details. The “fiber optic cable” call outs that include twisted pair will remain.
4. *Modify the following from* **Sheet C27 of the DRAWINGS, Booster Pump Station Plan Detail:**

The underground pipe north of the building that drain to outlet is incorrectly called out as 2”. The correct size is 3” and the addition of a 2”x 3” reducer will be required to transition to the larger size.
5. *Add the following* **Structural Note to Sheet S1 of the Drawings:**
  5. As alternative to the EZ form system called out in Section A-A on this drawing sheet, the Contractor can provide rigid insulation that meets code. The above grade flashing detail for exposed foundation wall shall remain unchanged.

Instrumentation Addendum Items:

1. Clarification: Contractor shall provide continuous 1-1/2” (38mm) HDPE DR 9, orange colored, conduit for entire length of underground fiberoptic cable runs. Interrupt conduit at pull boxes and provide 30 feet of looped fiber optic cable in runs at each pull box. All underground raceway turns shall be minimum 36” radius. No more than 360 degrees in bends total between pull boxes.
2. Fiberoptic cable splices: Contractor shall provide splices in fiberoptic cables required for cable installation to prevent cable damage during installation. Splices are permitted only in the pull boxes shown on the plans. Splices shall be made only by trained and experienced personnel and in conformance with manufacturer’s recommendations. Splices shall be fusion type only.
3. Cable splices shall be kept to a minimum. A maximum of one cable splice per road crossing is allowed. Submit planned cable splice locations and cable pulling calculation for approval by Engineer with shop drawings – prior to ordering fiberoptic cables and splice kits.
4. Fiber Optic Cable: Refer to specification section 40.63.00 2.03 D for additional fiber optic cable requirements. Do not use part number shown on sheet I50.
5. Fiber Optic Cable Maximum Loss Criteria:

<u>OM4 Parameter</u>	<u>Value</u>	<u>Notes</u>
<u>Attenuation @ 850 nm</u>	2.3 dB/km	Primary wavelength for VCSEL-based Ethernet (10G/40G/100G). Panduit
<u>Attenuation @ 1300 nm</u>	0.6 dB/km	Used for legacy LED-based systems. Panduit
<u>Point discontinuity</u>	± 0.08 dB	Max localized loss allowed. Panduit
<u>Macrobend attenuation</u>	± 0.5 dB/km (100 turns @ 75 mm)	Indicates bend sensitivity. Panduit
<u>Numerical aperture</u>	0.200 ± 0.015	Defines light-acceptance angle. Panduit
<u>Group index @ 850 nm</u>	1.483	Used for OTDR length calculations. Panduit
<u>Group index @ 1300 nm</u>	1.479	Also used for OTDR. Panduit

## 6. Testing Requirements (TIA-568.3-D):

<u>Test Type</u>	<u>Purpose</u>	<u>Tier</u>
<u>OLTS insertion loss</u>	Pass/fail certification	Tier1
<u>Length measurement</u>	Confirms link length	Tier1
<u>Polarity test</u>	Ensures Tx/Rx mapping	Tier1
<u>Connector inspection</u>	Prevents contamination loss	Tier1
<u>OTDR characterization</u>	Event-level diagnostics	Tier2
<u>Reflectance/event analysis</u>	Identifies bad connectors/splices	Tier2
<u>VFL testing</u>	Quick fault detection	Optional

## 7. General Requirements

- All work shall comply with TIA-568.3-D, TIA-569, TIA-606-C, and NEC Article 770.
- Fiber type: OM4, 50/125  $\mu$ m laser-optimized multimode.
- All materials must be new, factory-certified, and from approved manufacturers.

## 8. Cable Installation Requirements

- Maximum Pull Tension: Do not exceed manufacturer rating (typically 100–150 lbs).
- Minimum Bend Radius:
  - During installation: 10 $\times$  cable OD
  - After installation: 5 $\times$  cable OD
- No twisting, kinking, or crushing of cable at any time.
- Avoid sharp edges.
- Maintain 40% maximum conduit fill.
- Maintain separation from power cables per TIA-569.
- Provide service loops at both ends (minimum 2 m unless otherwise specified).
- All cable pathways must be free of obstructions and comply with building codes.

- Use approved cable pulling lubricant for all cable pulls

#### 9. Handling & Protection

- Connector end faces must remain capped until inspection and mating.
- Keep cable and connectors clean, dry, and off the floor.
- Do not step on cable or place heavy objects on it.
- Protect cables from UV exposure, moisture, and construction debris.

#### 10. Termination Requirements

- Use factory-approved OM4-rated connectors (LC preferred unless otherwise specified).
- Fusion splicing is required for permanent splices; mechanical splices are not permitted unless approved.
- Maximum allowable losses:
  - Connector pair: 0.5–0.75 dB
  - Fusion splice: 0.1–0.3 dB
- All connectors must pass IEC 61300-3-35 endface inspection before mating.
- Patch panels must be labeled per TIA-606-C.

#### 11. Testing Requirements (Certification Tier 1 and 2 — REQUIRED)

- Optical Loss Testing (OLTS) at 850 nm and 1300 nm.
- Encircled Flux compliance for all multimode testing.
- Length measurement.
- Polarity verification.
- Connector inspection with pass/fail documentation.
- OTDR testing at 850 nm and 1300 nm.
- Bi-directional traces required for splice accuracy.
- Provide event tables and link maps.

#### 12. Acceptance Criteria

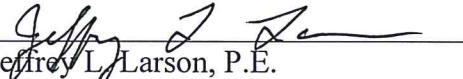
- Measured insertion loss must be  $\leq$  calculated loss budget.
- No OTDR event shall exceed:

- Connector loss: 0.75 dB
- Splice loss: 0.3 dB
- No macrobends or point discontinuities > 0.08 dB.
- All documentation must be submitted in native tester format plus PDF.

13. Documentation Requirements

- As-built drawings showing cable routes and identifiers.
- Test results labeled per TIA-606-C.
- Endface inspection images (before/after cleaning).
- OTDR traces.
- Manufacturer cut sheets for all materials.

14. Sheet C5: Provide additional pull box at pipe turn near station 5+88.

  
Jeffrey L. Larson, P.E.

**PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE DESIGNATED PLACE IN THE BID FORM AND ON THE FACE OF THE ENVELOPE.**