DOWLING ARCHITECTS

ADDENDUM NO. 2

HELENA FIRE STATION #3

DATE: November 13, 2025

PROJECT: Helena Fire Station #3
Helena, Montana

BID DATE: Tuesday, November 25, 2025

ARCHITECT: DOWLING Architects
734 North Last Chance Gulch
Helena, MT 59601
406-457-5470

TO: All Planholders of Record

This Addendum forms a part of the Contract Documents and modifies them as follows:

GENERAL CLARIFICATIONS:

The Covered Parking Bid Alternative as note on A2-1 has been removed from the project completely and will not move forward as a bid alternative option.

Contradictions regarding the type of countertop in certain locations were visible in previous versions of the CD's and has been addressed in this addendum. In general: Solid surface counter tops will be used in the dayroom, bathrooms 124 & 125, as well as the classroom. All other countertops shown not in these rooms are to be P-Lam. Reference the corresponding addendum sheets for full information regarding the clarification of countertop locations.

Custom Signage for the project (Number "3", Fire station crests x2, and the cornerstone) to be CFCI (Contractor Furnished Contractor Installed) as per the CD's. Digital file for the Fire Station Crest profiles will be provided by architect.

D1 & D2 on A3-6 have both been changed to OFOI and specific products have been called out**: D1**: U-LINE LOCKER ROOM BENCH MODEL H-5554DLX. **D2:** U-LINE PNEUMATIC ADJUSTABLE HEIGHT DESK MODEL H-10242GR

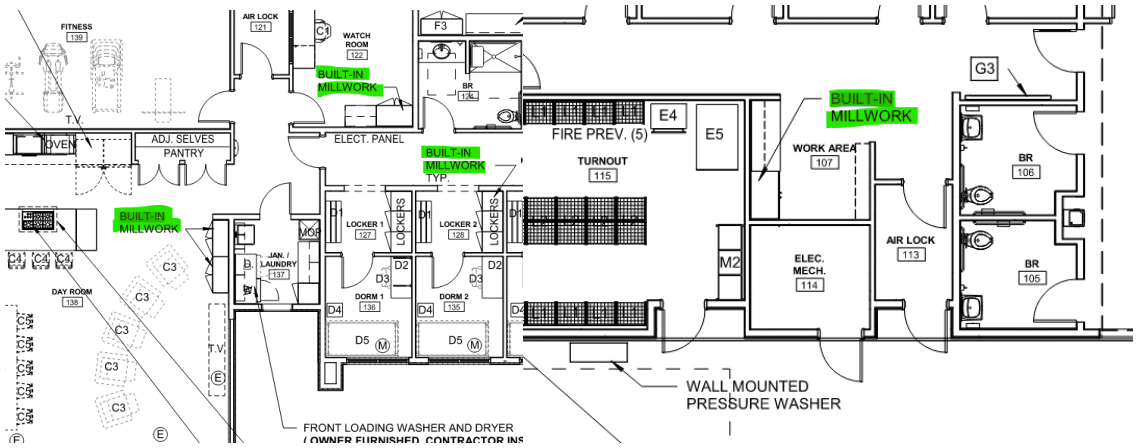
Door hardware groups 2 and 3 do not require kick plates.

DOWLING ARCHITECTS

RAISED QUESTIONS & CLARIFICATIONS (ARCHITECTURE)

1. **Question:** I was hoping we could get clarification on what these built-in millwork pieces are made of. Is there a specific species of wood or a style that you're looking for here?

   Answer: *All of the items highlighted would be typical P-lam construction, the exact color/finish of which is TBD.*



2. **Question:** Detail D8 on sheet A6-4. Please confirm that contractor is to provide this sign. If so, material specifications? Will Architect be providing a digital template for sign creation?

   Answer: *Yes, contractor to provide and install. 1/4" steel plate. Powder coated. Yes, Architect will provide a digital file.*

3. **Question:** For the ACT ceilings, the RCP calls for a 2x2 but the specs call for a 2x4, which is preferred? Also, the thickness, NRC, and CAC are conflicting with the tiles. Please provide a specific Armstrong Fine Fissured tile you would prefer because I am running into issues with the thickness, CAC, and NRC all matching the specs, I can either get CAC and NRC to match but the thickness will be different or I can get the ¾ thickness with the NRC and CAC being above spec range. I am also not really seeing a detail for the Axiom trim around the one ACT cloud, what thickness would you like us to quote for this edge detail? 4", 6", 8", etc.?

   Answer: *Acoustical Ceiling, Basis of Design. Armstrong Fine Fissured Second Look #1766. 4" for the edge detail.*

4. **Question**: Specification section 10 1100; Fire Protection Specialties. Describes fire extinguishers. I can't find where the Fire Extinguishers/Locations are called out in the plans?

   Answer: *Provide 6, locations to be determined by Fire Marshal.*

5. **Question:** Sheet A1-2; Interior wall Tags indicate an "s" to extend the wall to the underside of the deck. From sheet A3-2 it would appear that 90% of the walls are to extend to the underside of the deck, however, sections drawings A4-3, A4-4 and A4-5 do not appear to indicate this?

   Answer: *Disregard how they are shown in the wall sections. Refer to wall tags.*

6. **Question:** Sheet A1.2; Wall S1- Sound Barrier wall; Indicates Resilient Channel. Also calls for 1 5/8" screws which would penetrate to studs. Would this actually need 1" screws?

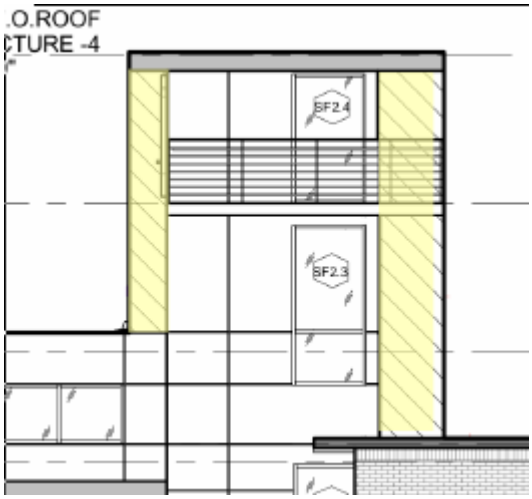
   Answer: *The GA File number calls for 1 5/8" screws which is what we used. I don't see why they have to be that long. 1" screws are fine.*

7. **Question:** Sheet A1.2; General Wall Type Notes; Calls for Tile Backer Board Type X on all walls with tile. Specification section 09 2116; 2.02C indicates Cement Board behind Tile. Which prevails?
   Answer: *Specification section***.**
8. **Question:** Sheet A4-2.1; ISO View 2 indicates railings around the Roof Hatch. Sheet A3-7, and Roof Hatch details on sheet A6-5 do not indicate any railings. Roof Hatch specification does not call out railing requirements. Please confirm that there are to be railings around the roof hatch.
   Answer: *Per the note on A4-2, disregard discrepancies that may appear on the ISO views. No railing required.*
9. **Question**: in the addendum 064100 1.05A, it looks like you removed the section about being AWI certified, so I assume that also applies to removal of section 1.05B requiring AWI labels on everything?
   Answer: *Yes, this is correct.*
10. **Question**: I see on sheet A3-6 it shows which windows will have manual shade and Electric motorized shades, but in the specs there is a section that talks about Double Roller Mounting shades (see screen shot) . Are you wanting the 2 in 1 shades where there is light filtering roller and also Room Darkening roller? If so which windows are you wanting these on?
    Answer: *The intent was to have the manual shades be both light filtering and room darkening, double roller. See Screenshot. Motorized are just light filtering***.**

    B. Interior Roller Shades - Basis of Design: Draper, Inc; Clutch Operated FlexShade NEXD: www.draperinc.com/#sle.
       1. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
          a. Drop Position: Regular roll.
          b. Mounting: Wall mounted.
          c. Size: coordinate with window schedule on drawings. Field verify..
          d. Fabric: As indicated under Shade Fabric article.
       2. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
          a. Hardware Type: Universal brackets.
          b. Double Roller Mounting: Configured for light-filtering and room-darkening shades in one opening.
             1) Light-Filtering Fabric: Room-side of opening.
             2) Room-Darkening Fabric: Glass-side of opening.
       3. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
          a. Material: Extruded aluminum or steel, with wall thickness and material selected by manufacturer.

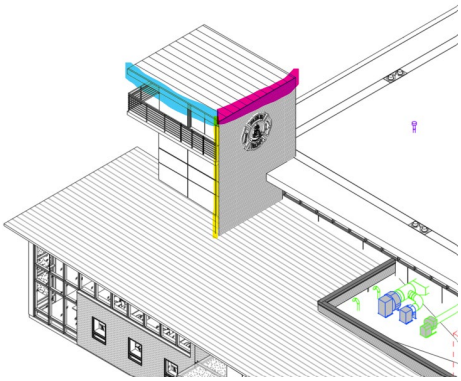
11. **Question***:* Will the salvaged beams used for the memorial benches and bell be supplied to the site?
    Answer**:** *Yes.*
    1. Will they need to be refinished?
       Answer**:** *No. The goal is to keep them historic looking*
    2. What is the extent of the contractor's scope with these items?
       Answer: *Fab and install the benches*
12. **Question**: For the section: 122400 for Window Shades, in the specs it talks about Dual Roller Shades that have both a blackout shade and a light filtering shade. Which windows are these requested for?
    Answer: *All the manual shades*.
13. **Question:** Do the window shades need Fascia to cover the headrail?
    Answer: *No*

14. **Question**: Do we have an engineers estimate for the bonding company?
    Answer: *$4,900,000*
15. **Question:** There are now two door types H shown. One for Full Glass with Half Lite, and one as the Bifold Panel Garage Door.
    Answer: *The Bi-Fold Panel Garage Door has been changed to Type J*
16. **Question**: From Signage supplier: We have found pretty much all the info we need to bid this, but there are no drawings or layouts on the interior ADA signs, and also no sizes. With out that, I am unable to bid those. Please advise.
    Answer: *Refer to spec section 10 1400*
17. **Question:** Sheet A4-1; 01/East Elevation. Hose tower wall finishes do not match finishes indicated in the Material Legend. Please confirm that these areas are to be Vertical Wood Siding.
    Answer: *Incorrect. As per the material legend the finish* ***is correctly shown*** *as 6"-V GROOVE, FAUX-METAL SIDING & TRIM.*



10. **Question**: Sheet A1-2 and sheet A7-6 indicate 'Cement Fiber Panels' in Apparatus Bay. Please provide a specification for the cement fiber panels.
    Answer: *No new specification section will be issued for Cement Fiber Panels, however the notes regarding cement fiber panel on sheet A7-6 has been revised as follows: 48" X 120" HARDIE PANEL SMOOTH CEMENT FIBER BOARD (PRIMED FOR PAINT) TO BE APPLIED UP TO 10' ON INT. OF APP. BAY WALLS AS SHOWN. REVEALS ARE 1/2". FINISH PAINT COLOR TBD*
11. **Question**: Sheet A3-3 calls out FRP for the SCBA rooms. No FRP is included in the specifications? Please provide FRP Specifications.
    Answer*: No new specification section will be issued for FRP. However, the notes regarding FRP on sheet A7-3 & A has been revised as follows: MARLITE 4'X10' SMOOTH FRP (WHITE) UP TO 4' ON ALL SCBA WALLS*
12. **Question:** Sheet A3-3; Finish Schedule lists 141 Corridor. It does not appear that there is a '141 Corridor'? Please confirm.
    Answer: *Correct, no "141" Corridor*
13. **Question**: Sheet A3-6; FF and E Plan. Furniture schedule lists D1 as Millwork- Wood Bench. Please provide details for the fabrication of these wood benches.
    Answer*: D1 has been changed to OFOI, Specifically: U-LINE LOCKER ROOM BENCH MODEL H-5554DLX*

14. **Question**: Sheet A3-6; FF and E Plan. Schedule lists D2 as Millwork- Dorm Desk. Sheet A7-5; Detail 09 only indicates 36”X24” Wall Mount Desk. Please provide details for this desk, desk top surface etc.
    ***Answer**: D2 has been changed to OFOI, Specifically: U-LINE PNEUMATIC ADJUSTABLE HEIGHT DESK MODEL H-10242GR*
15. **Question**: Sheet A3-6; FF and E Plan; Please provide window Shade requirements for upper windows types A and H in Room 139.
    ***Answer**: No Shades on those windows*
16. **Question:** Sheet A3-6; FF and E Plan; Please provide window Shade requirements for upper windows types SF3 and CW3 in Apparatus Bay 117.
    ***Answer:** No Shades on those windows*
17. **Question**: Sheet A3-6; FF and E Plan; Please provide window Shade requirements for upper windows types SF4 and SF6 in Conference Room 112.
    ***Answer**: No Shades required on those windows*.
18. **Question**: 100B & 101A are interior storefronts. Do you want standard int frames and ¼ “ glass?
    ***Answer**: Yes. Aluminum storefront with 1/4" glass.*
19. **Question:** Window type C egress. Need more information. What type?
    ***Answer**: Aluminum storefront. A 3 x 4 slider will meet egress requirements. No other considerations.*
20. **Question**: Also, the covered parking structure was taken out of the civil plan but is still in the architectural set. I’m sure it won’t be part of the bid but would be good to clean up.
    ***Answer**: Correct, this is not in the project. We will remove the reference from the site plan on A2-1.*
21. **Question**: I’m not seeing any detail on the trash enclosure ? Currently, its only mentioned on A2-1.
    Answer: *Let's do a chain link fence enclosure with white privacy slats with full gate at drive side. Refer to detail 3/C5-2 for chain link fence detail*.
22. **Question**: I have 03/A6-1 for the roof-wall connection at the tower, but that detail is probably not quite right for the rest of the length along the wall cap? The detail is the horizontal connection between standing seam roof to the horizontal corrugated metal siding (pink). The wall cap would be a vertical connection between the horizontal corrugated metal siding and 6” V Groove faux metal siding (yellow). And I don’t think they have any details showing how they want the wall capped? I could assume something similar to blue (detail 4/A6-2).
    1. ***Answer**: Detail 3/A6-11 would be similar.*



DOWLING ARCHITECTS

SHEET MODIFICATIONS:

- **Sheet A1-2 Wall Assemblies-** Changes to wall assemblies E7 & E8. E7 has been changed to includes a E7.1 assembly variation that will be 6" metal stud framing. Assembly E8 has changed from 2x6 wood framing to 6" metal stud framing. View revised sheet A3-2 for the wall locations affected by these changes.
- **Sheet A1-2 First Floor Plan Wall Tag Plan –** Shows the specific walls affected by the updates to wall assemblies E7 & E8
- **Sheet A7-3 Interior Elevations-** Revised notes to accurately reflect locations of countertop type (P-Lam or Solid Surface) &e Revised note further specifying FRP Product
- **Sheet A7-4 Interior Elevations -** Revised notes to accurately reflect locations of countertop type (P-Lam or Solid Surface)
- **Sheet A7-5 Interior Elevations -** Revised notes to accurately reflect locations of countertop type (P-Lam or Solid Surface) & Revised note further specifying FRP Product
- **Sheet A 7-6- Interior Elevations:** Revised note regarding Cement Fiber Board to more directly specify product.
- **Sheet A7-7 Casework-** Added casework detail for bathroom 124&125 to show the sink & counter top condition, as well as added typical taller casework drawings (cabinets/dorm lockers)
- **ATTN-6 –** Clarifies RCP Legend in regards to ACT tile
- **Sheet S1-2 First Floor Framing Plan-** Added call-outs to denote interior walls that are framed using 2x4 studs
- **Sheet P3-0 Underslab Plumbing Plan** – Show irrigation piping.
- **Sheet P6-1 Water Service Entrance Detail** – Revision of entrance to show irrigation meter after main meter per City of Helena's requirements.
- **Sheet E2-1 One-Line Diagram** – Clarification/ revision to building load total to correct a typo.
- **Sheet E2-6 Electrical Schedules** – Clarification/ revision to panel M1 load total to correct a type.
- **Sheet E2-6 Electrical Schedules** – Clarification/ revision to panel L1 for added loads.
- **Sheet E2-7 Electrical Schedules** – Show spare circuit on panel L2 and M2 for circuits moved to L1.
- **Sheet E3-1 Power Plan** – Change building signage circuit to panel L1
- **Sheet E3-2 Lighting Plan** – Change circuiting for outside living space to panel L1.
- **Sheet C2-1 Erosion Control Plan** – Added sheet after comments from CoH Stormwater Division
- **Sheet C2-2 Erosion Control Details** – Added sheet after comments from CoH Stormwater Division
- **Sheet C3-1 Enlarged Site and Utility Plan** – Widened drive aisle per truck turning movements, Revised area around training tower from concrete to asphalt.
- **Sheet C3-2 Enlarged Site and Utility Plan** – Added heavy duty concrete pad to Diesel Storage and Backup Generator
- **Sheet C4-1 Enlarged Grading Plan** – Regraded Training Tower adjacent asphalt, regrading area north of access drive – rim elevations for SDI-4 and SDI-5 revised, upsized storm pipe after SDI-5 from CoH Stormwater Division conveyance comments
- **Sheet C4-2 Enlarged Grading Plan** – Added SDMH 1 from Stormwater Division comment, revised size of storm line connecting at the building

DOWLING ARCHITECTS

SPECIFICATION CLARIFICATIONS

- **Section 09 5100 Acoustical Ceilings, Paragraph QUALITY ASSURANCE** Added basis of design for acoustical ceiling: Armstrong Fine Fissure Second Look #1766 and 4" Axiom trim
- **Section 08 4413 Glazed Aluminum Curtain Walls, Paragraph 2.01 Manufacturers** Clarified the curtain wall specified as Kawneer 1620UT , not Kawneer 1620 UT *System 1* as previously specified.
- **Section 06 4100 SD Architectural Wood Casework, Paragraph 1.05 B** Due to changes made to section 06 4100 paragraph 1.05 A regarding AWI Qualifications during Addendum 1, paragraph 1.05 B is no longer required and has been removed from specs.
- **Section 08 3613 Sectional Doors, Paragraph 2.01 Manufacturers, A. Basis of Design :** Thermospan Model 200-20 Thermacore: www.chiohd.com/#sle
- **Section 27 1323 Communications Optical Fiber Backbone Cabling** – New Section added to the specifications.
- **Section 28 1800 Testing, Identification, and Administration of Fiber Infrastructure** – New Section added to the specifications.

APPROVED MATERIAL SUBSTITUTIONS:

All material supplied to the project must meet or exceed the quality, performance, and have features similar and exceeding in quality of the product originally specified. It is the contractor's responsibility to ensure that the substituted equipment matches the exterior dimensions, weight, and configuration of the specified product.

- **Section 23 0910 Gas Detection Systems** Armstrong Monitoring is an acceptable manufacturer.
- **Section 23 3300 Air Duct Accessories** Greenheck is an acceptable manufacturer of backdraft and pressure relief dampers.
- **Section 23 3300 Air Duct Accessories** Greenheck is an acceptable manufacturer of manual dampers.
- **Section 23 3300 Air Duct Accessories** Greenheck is an acceptable manufacturer of control dampers.
- **Section 23 3300 Air Duct Accessories** Greenheck is an acceptable manufacturer of fire and fire/smoke dampers.
- **Section 23 3300 Air Duct Accessories** Greenheck is an acceptable manufacturer of duct mounted access doors.
- **Section 23 3330 Louvers** Greenheck is an acceptable manufacturer of louvers.
- **Section 23 3330 Louvers** Construction Specialties is an acceptable manufacturer of louvers.
- **Section 23 3113 Metal Ducts** US-Duct, Duct Inc. is an acceptable manufacturer of high pressure fume extraction ductwork.
- **Section 23 3423 HVAC Power Ventilators** Greenheck is an acceptable manufacturer of HVAC power ventilators.
- **Section 23 3525 MRP Rail Vehicle Exhaust Removal System** Monoxivent is NOT an acceptable manufacturer of vehicle exhaust removal systems.
- **Section 23 3713 Grilles, Registers & Diffusers** MetalAire (Greenheck) is an acceptable manufacturer of GRDs.
- **Section 23 5216 Condensing Boilers** IBC is an approved manufacturer of condensing boilers.

- **Section 23 5416 Gas-Fired Furnaces** Bosch is an acceptable manufacturer of furnaces.
- **Section 26 5110 Lighting**
    - Type B1
        - Columbia. Approved.
        - Metalux. Approved
    - Type B1E
        - Columbia. Approved.
        - Metalux. Approved
    - Type B2
        - Metalux. Approved
    - Type CF1
        - RP Lighting. Approved.
        - Lumencia. Approved.
    - Type D1
        - Prescolite. Approved.
        - Halo. Approved.
    - Type D2
        - Prescolite. Approved.
        - Halo. Approved.
    - Type D3
        - Portfolio. Approved.
    - Type D3E
        - Portfolio. Approved.
    - Type E1E
        - Beacon. Approved.
        - McGraw-Edison. Approved.
    - Type E2
        - Beacon. Approved.
    - Type E2E
        - Beacon. Approved.
    - Type E3
        - Prescolite. Approved.
        - Halo. Approved.
    - Type E3E
        - Prescolite. Approved.
        - Halo. Approved.
    - Type E4
        - Prescolite. Approved.
        - Halo. Approved.
    - Type E6
        - McGraw-Edison. Approved.
    - Type E7
        - Beacon. Approved.
        - McGraw-Edison. Approved.
    - Type E8

- Beacon. Approved.
- McGraw-Edison. Approved.

- Type F1
  - Columbia. Approved.
  - Metalux. Approved.
- Type F1E
  - Columbia. Approved.
  - Metalux. Approved.
- Type F2E
  - Metalux. Approved.
- Type H1
  - Columbia. Approved.
  - Metalux. Approved.
- Type H1E
  - Columbia. Approved.
  - Metalux. Approved.
- Type L1-6'
  - Lumenwerx. Approved
- Type L1E-6'
  - Lumenwerx. Approved.
- Type P1
  - Alphabet. Approved.
  - Portfolio. Approved.
- Type P2
  - Alphabet. Approved.
  - Portfolio. Approved.
- Type T1
  - Beulux. Approved.
  - ACE Illuminations. Approved.
- Type T2
  - VLT Lighting. Approved.
- Type T3
  - Beulux. Approved. Please note that a section of this fixture needs to be outdoor rated.
  - LED Scape. Approved
- Type T4
  - Beulux. Approved as wet rated.
  - ACE Illuminations. Approved.
- Type V1
  - Eurofase. Approved.
  - RCIO. Approved.
- Type X1
  - Sure-Lites. Approved.
- Type X2
  - Sure-Lites. Approved.

- **Specification Section 260923 Lighting Control Devices**
  - Intelligent. Approved.

- **Specification Section 263213 Engine Generator**
  - Blue Star. Approved as noted. Provide with LSIG 100% rated breaker.

CIVIL/ STRUCTURAL/ MECHANCIAL / PLUMBING / ELECTRICAL / FIRE SUPPRESSION/ IT/ LANSCAPING CLARIFICATIONS & NOTES

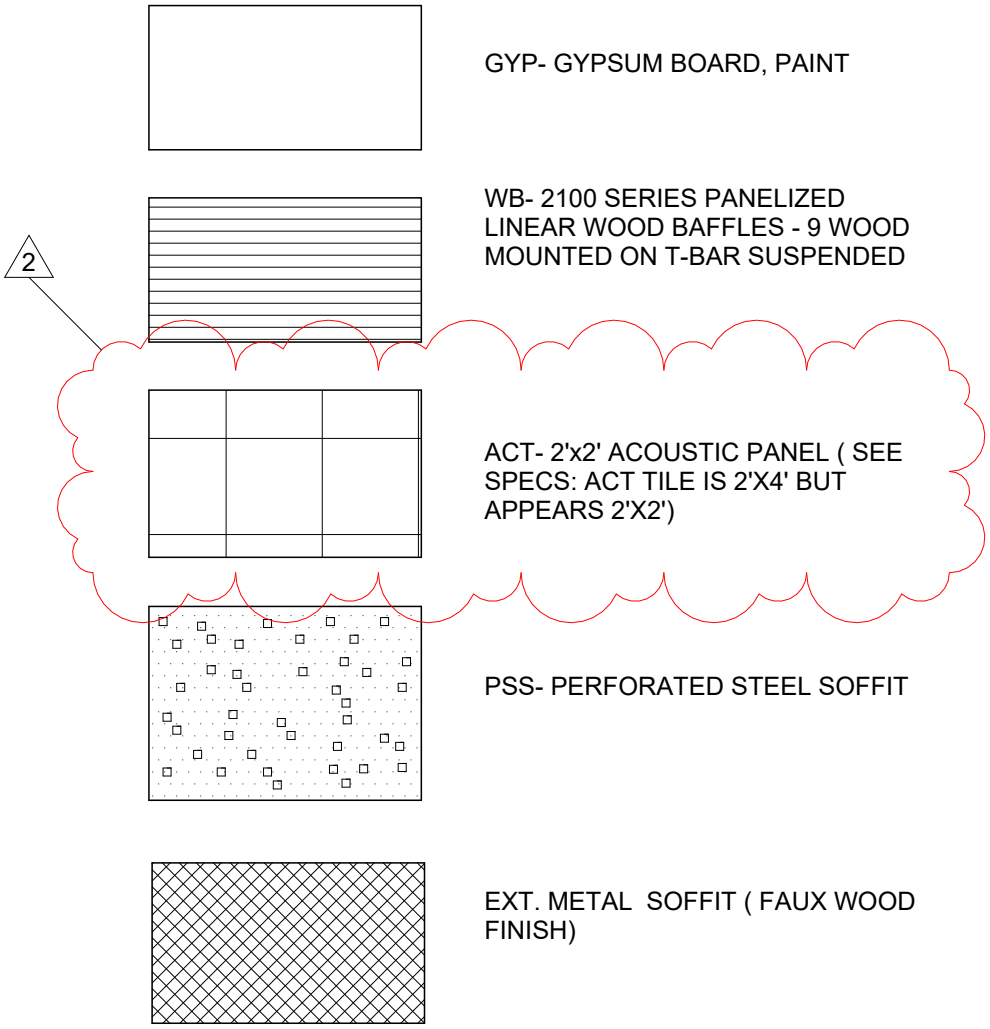
- **Structural Q&A Notes:**
  - *Sheet S1-3; Between Grid lines F and G, over the Janitor/Laundry area; Please confirm Truss ID in this area. 18" RED-L's?*
    - **Confirmed, the trusses at this location are 18" RED-L trusses.**
  - *Sheet S1.2; Shear Walls; Interior shear wall between Grid Lines H and I (Between Dorm 2 and Dorm 3) does not have a shear wall type indicator. Please provide the shear wall type.*
    - **The referenced wall is not a shear wall. This wall is a 2x4 bearing wall only to support the roof framing above.**
  - *Sheet S1.2; Shear Walls, missing Shear Wall type on Hallway wall along Grid Line J at Lobby 101.*
    - **The referenced walls along grid J adjacent to the lobby are only used for bearing. This wall is framed with 2x6 studs @ 16" oc.**
  - *Sheet S1.2; Shear Walls; East and West Walls of Apparatus Bay appear to be shear walls but no shear wall callout provided?*
    - **The referenced walls are framed with light-gauge metal studs; refer to the exterior elevations on S2-1. These walls do not provide shear resistance. The lateral system at the apparatus bay consists of Simpson Yield Link moment frames.**
  - *Sheet S1.2; Shear Walls; Please confirm shear wall type for wall at GL 1, between GL's K and Q.*
    - **The referenced wall is not a shear wall and is framed using light-gauge metal studs; refer to elevation on S2-2. The exterior face is intended to be framed with ZIP sheathing similar to other exterior walls at the wings.**

ATTACHMENTS:

- **Architectural Revision Drawings:, ATT-6, A1-2, A3-2, A7-3, A7-4, A7-5, A7-6, A7-7**
- **Specifications noted above**
- **Addendum 2- Structural**
- **Addendum 2- Civil**
- **Addendum 2- Electrical**
- **Addendum 2- Plumbing**
- **Supporting Documents**
  - **Testing, Identification, and Administration of Fiber Infrastructure**
  - **Communications Optical Fiber Backbone Cabling**

END OF ADDENDUM #2

LEGEND



GYP- GYPSUM BOARD, PAINT

WB- 2100 SERIES PANELIZED LINEAR WOOD BAFFLES - 9 WOOD MOUNTED ON T-BAR SUSPENDED

ACT- 2'x2' ACOUSTIC PANEL (SEE SPECS: ACT TILE IS 2'X4' BUT APPEARS 2'X2')

PSS- PERFORATED STEEL SOFFIT

EXT. METAL SOFFIT (FAUX WOOD FINISH)

RCP LEGEND REVISION
1/4" = 1'-0"

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470

HELENA FIRESTATION #3

DRAWN BY: CC

PROJECT#: 25-668

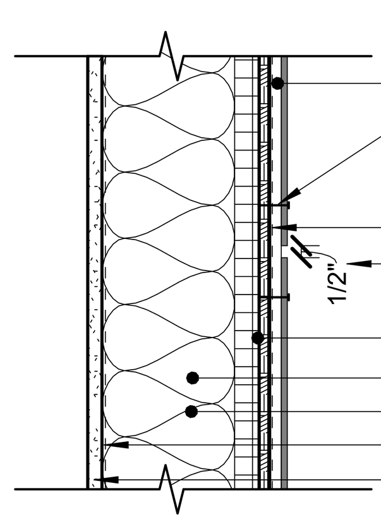
SHEET #: **ATT-6**

11/04/25

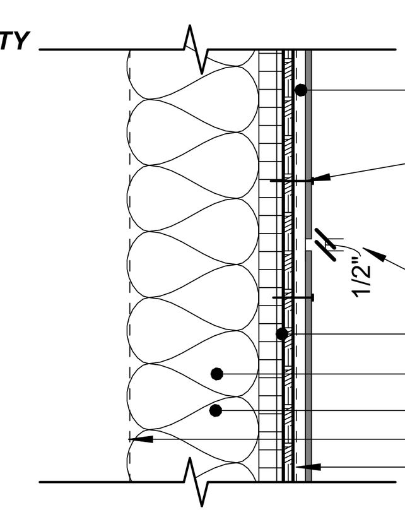
EXTERIOR (E)

EXTERIOR WALL ASSEMBLIES

E1
CITADEL PANEL & GWB



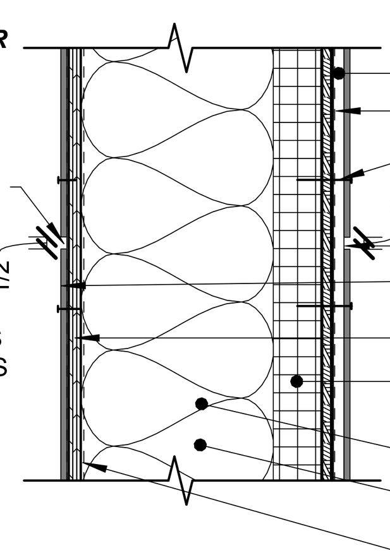
E2
CITADEL PANEL & CAVITY



SEE INT. ELEVATIONS FOR REVEAL LOCATIONS.SHEATHING TO BE PAINTED BLACK AT ALL REVEAL LOCATIONS

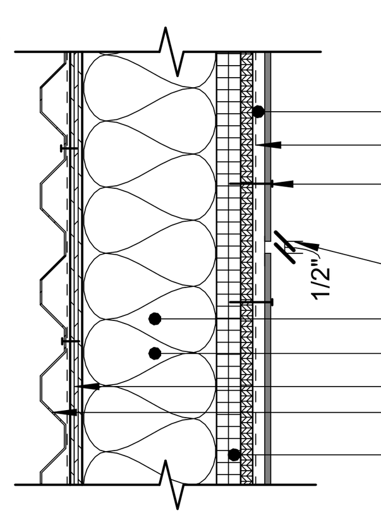
EAST & WEST WALLS OF FIRE TRUCK BAYS T.O. SLAB TO 10'

E3
CITADEL PANEL & CEMENT FIBER INSULATED



TOP FLOOR OF FIRE TOWER

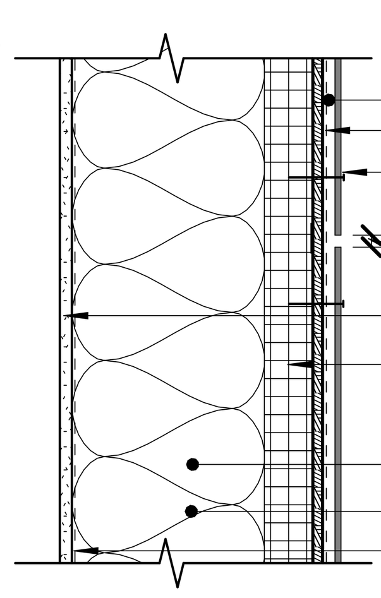
E4
CITADEL PANEL & HORIZ. CORRIGATED METAL INSULATED



EAST & WEST WALLS OF FIRE TRUCK BAYS

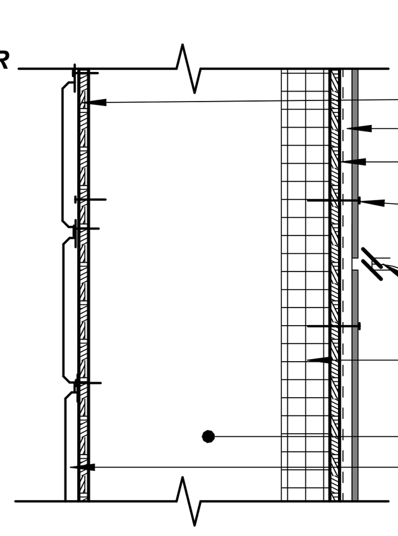
10' ABOVE T.O. SLAB TO B.O. STRUCTURE

E5
CITADEL PANEL & GWB INSULATED



EAST & WEST WALLS OF FIRE TRUCK BAYS N/S WING WALLS

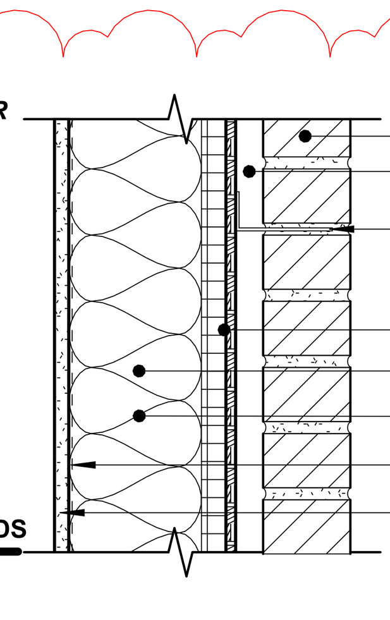
E6
CITADEL PANEL & VERTICAL FAUX WOOD ALUMINUM UNINSULATED



2

ALL WALL ASSEMBLIES WITH BRICK VENNER MUST PROVIDE TYP. WEEP VENT SPACED 24" O.C. AT BASE COURSE OF WALL

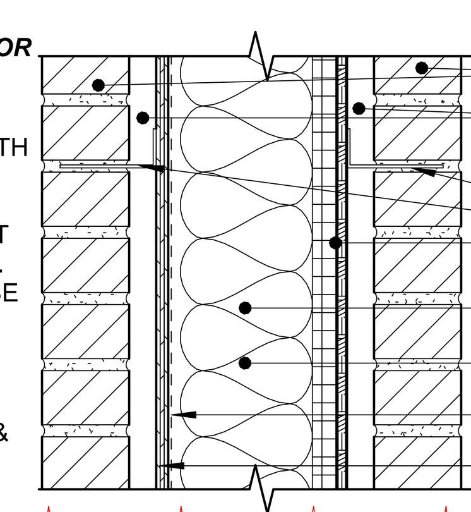
E7 : 2X6 STUDS
BRICK VENEER & GWB
E7.1 : 6" METAL STUDS
BRICK VENEER & GWB



2

ALL WALL ASSEMBLIES WITH BRICK VENNER MUST PROVIDE TYP. WEEP VENT SPACED 24" O.C. AT BASE COURSE OF WALL

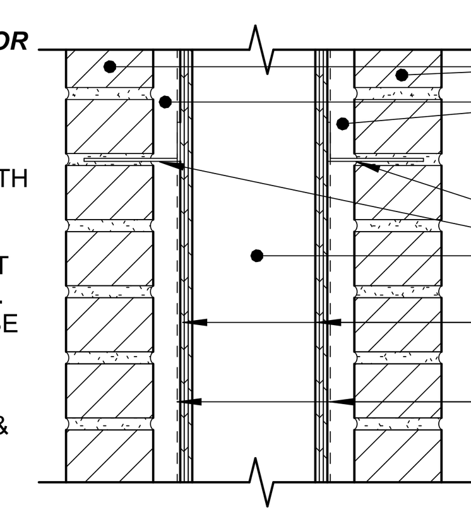
E8
BRICK VENEER & BRICK VENEER INSULATED



PATIO 1/2 WALL

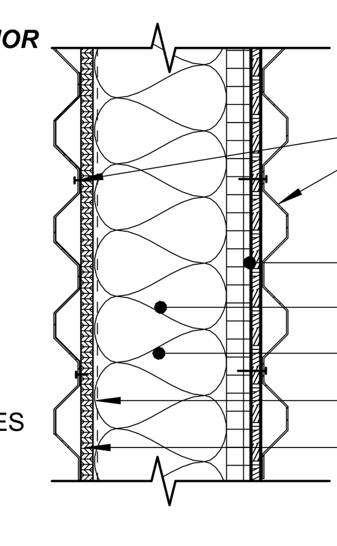
ALL WALL ASSEMBLIES WITH BRICK VENNER MUST PROVIDE TYP. WEEP VENT SPACED 24" O.C. AT BASE COURSE OF WALL

E9
BRICK VENEER & BRICK VENEER UNINSULATED



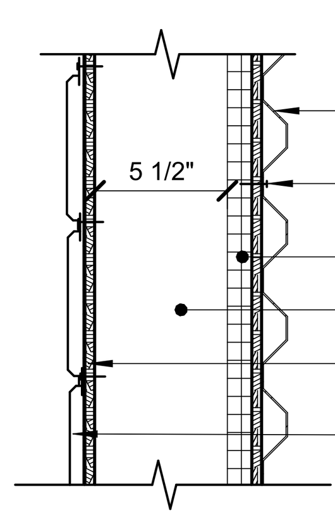
E10
HORIZ. CORRUGATED METAL

E10.1 - HCM BOTH SIDES
E10.2 - HCM EXT., 5/8" GWB ON INT

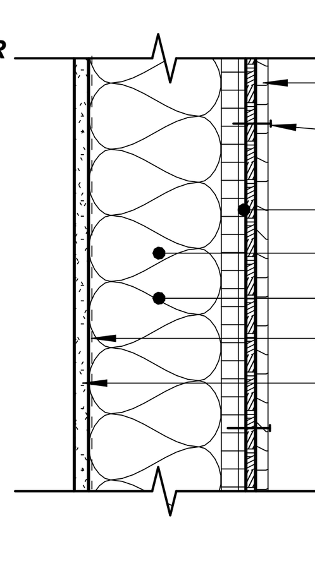


WING WALLS OF HOSE TOWER

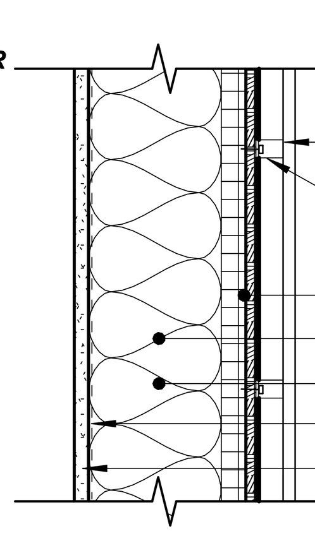
E11
HORIZ. CORRUGATED METAL & FAUX WOOD SIDING UNINSULATED



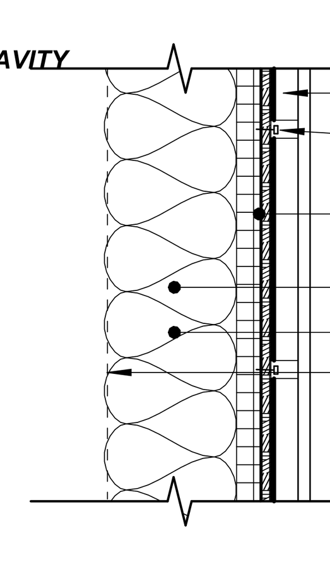
E12
VERTICAL SHOU SUGI BON W/ GWB



E13
STANDING SEAM W/ GWB

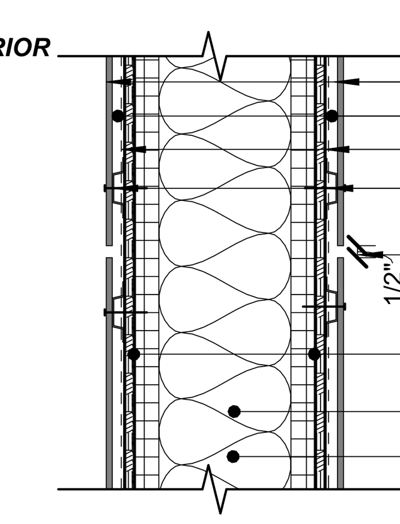


E14
BLACK STANDING SEAM W/ CAVITY



EXTERIOR WALL ASSEMBLIES

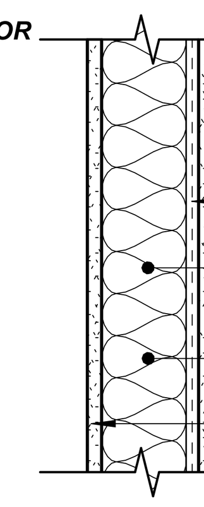
E15
CITADEL PANEL & CITADEL PANEL



EXTERIOR WALL ASSEMBLIES

INTERIOR SOUND-RATED (S)

S1
SOUND BARRIER WALL



GA FILE NO. WP 3007

45 TO 49 STC SOUND

SOUND DESIGN:
SOUND TESTED WITH RESILIENT CHANNELS 24" O.C. ON ONE SIDE, 3 1/2" GLASS FIBER INSULATION. GYPSUM BOARD APPLIED TO RESILIENT CHANNELS WITH 1-5/8" SCREWS, 12" O.C.

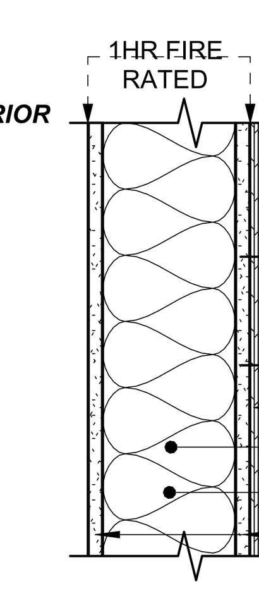
INTERIOR WALL ASSEMBLIES

INTERIOR FIRE-RATED (F)

NORTH & SOUTH WALLS OF FIRE TRUCK BAYS

CEMENT FIBER TO 10' A.F.F. PAINTED GWB ABOVE 10' TO STRUCTURE

F1
1HR FIRE WALL W/ FIBER CEMENT



GA FILE NO. WP 3661

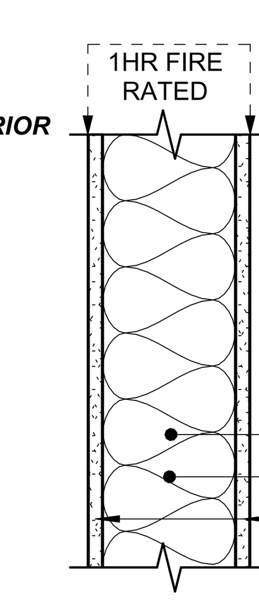
1HR FIRE

FIRE DESIGN:
ONE LAYER 5/8" TYPE X GYPSUM WALLBOARD APPLIED AT RIGHT ANGLE TO EACH SIDE OF 2X6 WOOD STUDS 16" O.C. WITH 2 1/4" TYPE S OR W SCREWS 12" O.C. 5 1/2" MINERAL FIBER INSULATION, NOMINAL 2.5 PCF, FRICTION FIT IN STUD SPACE.
VERTICAL JOINTS STAGGERED 16" O.C., HORIZONTAL JOINTS STAGGERED 24" O.C., ON OPPOSITE SIDES.

NORTH & SOUTH WALLS OF FIRE TRUCK BAYS

10' ABOVE T.O. SLAB TO B.O. STRUCTURE

F2
1HR FIRE WALL



GA FILE NO. WP 3661

1HR FIRE DESIGN:
ONE LAYER 5/8" TYPE X GYPSUM WALLBOARD APPLIED AT RIGHT ANGLE TO EACH SIDE OF 2X6 WOOD STUDS 16" O.C. WITH 2 1/4" TYPE S OR W SCREWS 12" O.C. 5 1/2" MINERAL FIBER INSULATION, NOMINAL 2.5 PCF, FRICTION FIT IN STUD SPACE.
VERTICAL JOINTS STAGGERED 16" O.C., HORIZONTAL JOINTS STAGGERED 24" O.C., ON OPPOSITE SIDES.

EXTERIOR WALL ASSEMBLIES

INTERIOR WALL ASSEMBLIES

GENERAL WALL TYPE NOTES

1. TYPE "X" GYPSUM WALL BOARD SPECIFIED THROUGHOUT. PROVIDE WATER-RESISTANT TYPE "X" GYPSUM BOARD AT WET AREAS, AND TILE BACKER BOARD TYPE "X" ON ALL WALLS WITH TILE.
2. CONFORM TO DETAILED REQUIREMENTS OF DESIGNATED TESTING AUTHORITY NUMBERS AT ALL WALLS. WALLS DESIGNATED AS "BASED ON" VARY AS NOTED IN (PARENTHESIS.) SHEATHING AT DECORATIVE PILASTER WALLS (WHERE OCCUR) MAY VARY FROM WALL TYPE ONLY AT PILASTER CONDITION. SEE ASSOCIATED DETAILS.
3. SEE STRUCTURAL SHEAR WALL SCHEDULE FOR SHEAR WALL ATTACHMENT AND EDGE BLOCKING REQUIREMENTS. STRUCTURAL SHEAR WALL SCHEDULE OVERRIDES LISTED ASSEMBLY ATTACHMENT AND BLOCKING REQUIREMENTS ONLY WHEN MORE RESTRICTIVE.
4. REFER TO CODE ANALYSIS PLANS WALL TYPE LEGEND FOR IBC DESIGNATION OF FIRE RESISTIVE WALLS WITH OPENING PROTECTION (FIRE RESISTIVE RATED DOORS AND GLAZING). SEE DOOR AND WINDOW SCHEDULES.
5. REFER TO CODE ANALYSIS PLANS WALL TYPE LEGEND FOR IBC DESIGNATION OF FIRE RESISTIVE WALLS WITH DUCTS AND AIR TRANSFER OPENING PROTECTION. SEE MECHANICAL DRAWINGS.
6. APPROVED DRYWALL SCREWS, THE SAME LENGTH AND SHAFT THICKNESS OF SPECIFIED NAILS, CAN BE SUBSTITUTED IN RATED ASSEMBLIES.
7. SEE SPECIFICATIONS FOR APPLICATION OF FINISH REQUIREMENTS.
8. PENETRATIONS OF FIRE-RESISTIVE WALLS, FLOOR-CEILING AND ROOF-CEILINGS SHALL BE PROTECTED AS REQUIRED IN IBC SECTION 713.
9. PENETRATIONS THROUGH HORIZONTAL ASSEMBLIES SHALL COMPLY WITH SECTION 712.4. PROVIDE FIRE, SMOKE AND CEILING RADIATION DAMPERS AT DUCT AND AIR TRANSFER OPENINGS IN FIRE RATED ASSEMBLIES PER IBC SECTION 716.
10. ALL SOUND CONTROL SYSTEMS (INCLUDING ALL STC-RATED WALL AND FLOOR-CEILING ASSEMBLIES) SHALL BE AIRTIGHT. RECESSED WALL FIXTURES, SUCH AS MEDICINE CABINETS OR ELECTRICAL AND LOW-VOLTAGE OUTLETS, THAT PENETRATE THE GYPSUM BOARD SHALL NOT BE LOCATED BACK-TO-BACK OR IN THE SAME STUD CAVITY. ANY OPENING FOR FIXTURES OR PIPES SHALL BE CUT TO PROPER SIZE AND SEALED. THE ENTIRE PERIMETER OF A SOUND INSULATING SYSTEM SHALL BE MADE AIRTIGHT TO PREVENT SOUND FLANKING. FLEXIBLE SEALANT OR AN ACOUSTICAL GASKET SHALL BE USED TO SEAL BETWEEN THE STC RATED SYSTEM AND ALL ADJOINING SURFACES. TAPING GYPSUM BOARD WALL AND WALL-CEILING INTERSECTIONS PROVIDES AN ADEQUATE AIR SEAL AT THESE LOCATIONS. CONSULT GWB MANUFACTURER FOR AN SPECIAL RECOMMENDATIONS.
11. NOTE THERE ARE A FEW SHEAR WALLS REQUIRING 15/32" PLYWOOD ON THE INTERIOR . REFER TO TO STRUCTURAL .

REGISTERED ARCHITECT MICHAEL W. DOWLING LIC. #2087 STATE OF MONTANA

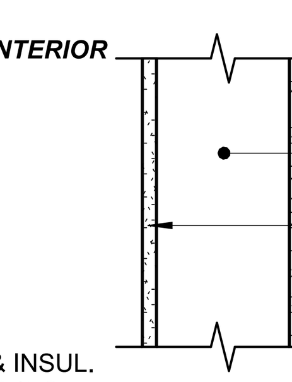
WALL TYPE TAG

WALL TYPE
WALL HEIGHT
E2s
4' - 0"
PARTIAL HEIGHT WALL

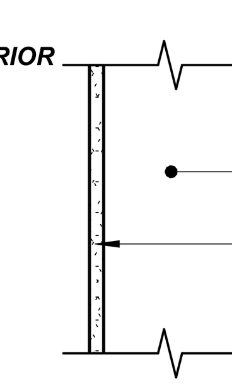
WALL HEIGHT DESIGNATION
- c EXTEND WALL TO UNDERSIDE OF CEILING
- d STUDS EXTEND TO STRUCTURE, FINISH EXTENDS TO 6" ABOVE CEILING
- p PARTIAL HEIGHT WALL, SEE PLANS & ELEVATIONS
- s EXTEND ENTIRE WALL TO UNDERSIDE OF STRUCTURE (UNDERSIDE OF ROOF SHEATHING, DECK OR SLAB AT FIRE WALLS)
- x SHAFT: WALL IS CONTINUOUS THROUGH FLOOR ASSEMBLIES

INTERIOR (I)

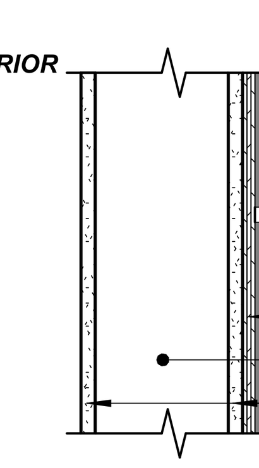
I1
I1.1 - 2X4 WD STUDS
I1.2 - 2X6 WD STUDS
I1.3 - 2x4 WD STUDS & INSUL.
I1.4 - 2X6 WD STUDS & INSUL.



I2
I2.1 - 2X4 WD STUDS
I2.2 - 2X6 WD STUDS



I3
I3.1 - 2X4 WD STUDS
I3.2 - 2X6 WD STUDS



INTERIOR WALL ASSEMBLIES

HELENA FIRESTATION #3
1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470 | www.dow-mt.com

WALL ASSEMBLIES

PROJECT #: 25-668

ISSUE DATES:

Revision 1	Date 1
ADDENDUM 2	11/14/25

DRAWN BY: JS/CC

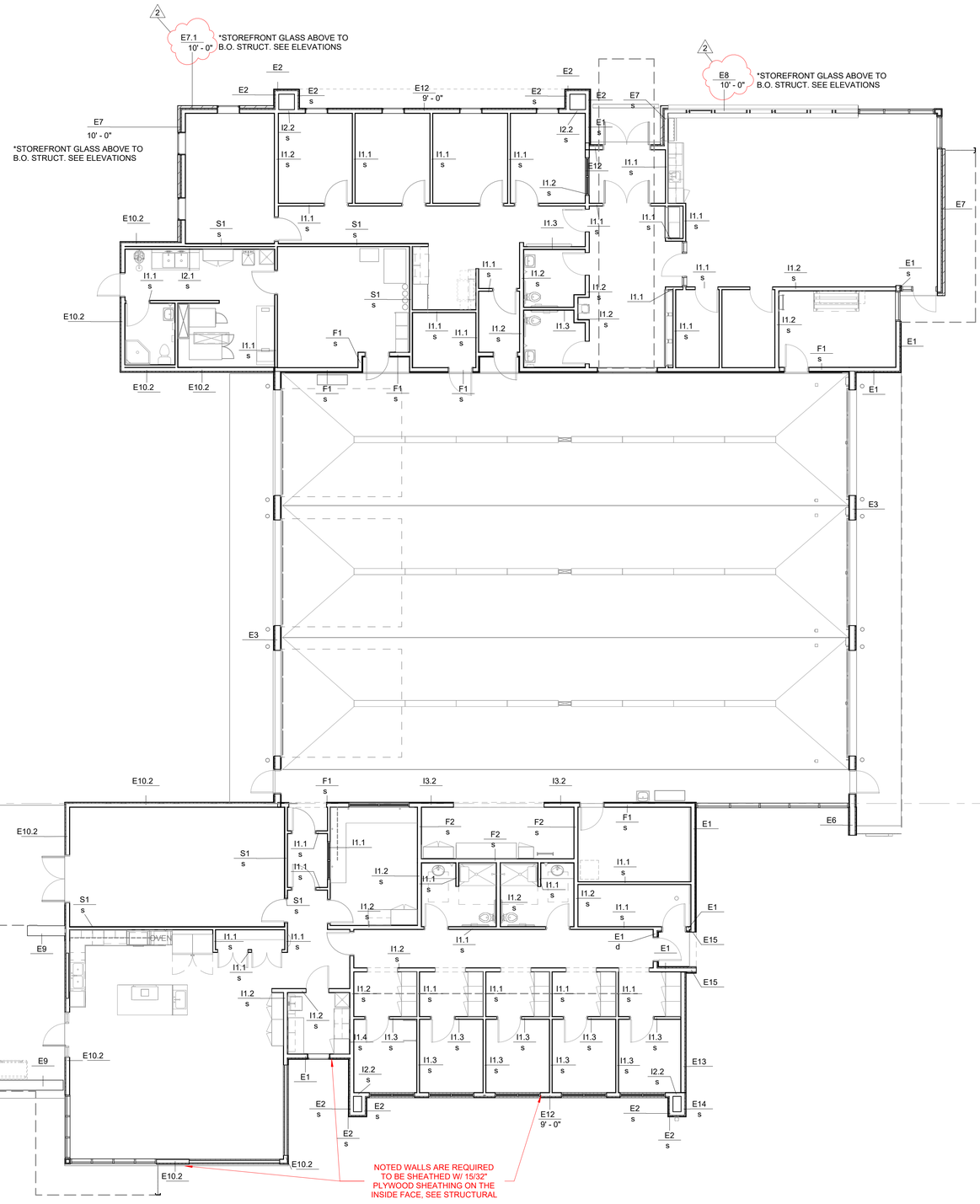
100% CONSTRUCTION SET

A1-2

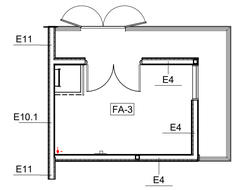
10.22.25

GENERAL NOTES:

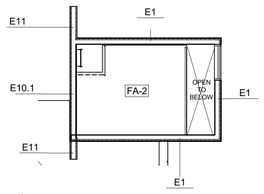
1. DIMENSIONS ARE TO GRID, FACE OF STUD, MASONRY, OR DOOR/WINDOW OPENINGS. DIMENSIONS TO OPENINGS ARE NOMINAL. VERIFY ALL OPENINGS WITH ROUGH OPENING REQUIREMENTS.
2. ALL DOOR OPENINGS PERPENDICULAR TO A WALL ARE 6" MIN. TO THE WALL FRAMING UNO.
3. SEE SHEET A1-2 FOR WALL TYPES.
4. ALL INTERIOR WALL TYPES ARE I1s UNO.
5. ALL EGRESS DOORS SHALL BE READILY OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.
6. ALL SIGNAGE TO COMPLY WITH IBC SECTION 1110 AND APPLICABLE ICC/ANSI PROVISIONS. SEE SPECIFICATIONS.



1 A3-2 FLOOR PLAN - WALL TAGS
1/8" = 1'-0"

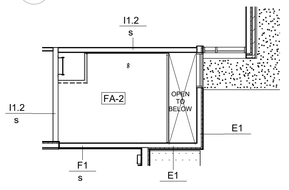


4 A3-2 HOSE TOWER - PLATFORM 'C'
1/8" = 1'-0" REF:A4-1



3 A3-2 HOSE TOWER -PLATFORM 'B'
1/8" = 1'-0" REF:A4-3

9



2 A3-2 HOSE TOWER PLATFORM 'A' WALL TAGS
1/8" = 1'-0" REF:A4-3

N

REGISTERED ARCHITECT
MICHAEL W. DOWLING
LIC. #9857
STATE OF MONTANA

HELENA FIRESTATION #3
1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING
DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5700
www.dda-mt.com

FIRST FLOOR PLAN - WALL TAG PLAN

PROJECT #: 25-668

ISSUE DATES:

ADDENDUM 2	11/14/25

DRAWN BY: JS/CC

100% CONSTRUCTION SET

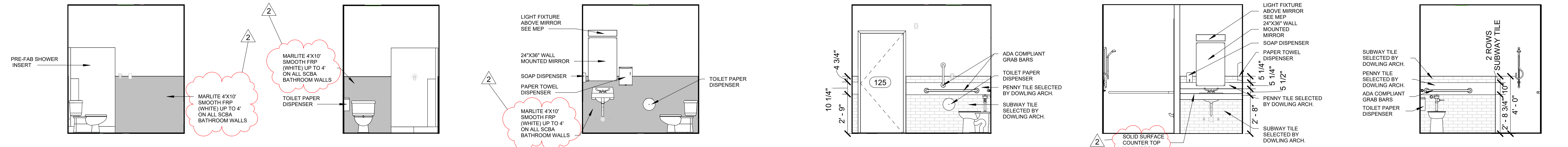
A3-2

10.22.25

GENERAL NOTES

1. SEE STANDARD FIXTURE MOUNTING HEIGHTS AND REQUIREMENTS THIS SHEET UNLESS OTHERWISE NOTED.
2. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF.
3. FLUSH CONTROLS SHALL BE OPERABLE BY AN OSCILLATING HANDLE WITH A MAXIMUM OPERATING FORCE OF 5 LBS AND SHALL BE MOUNTED ON OPEN FLOOR SIDE OF THE TOILET.
4. DIA. OR WIDTH OF THE GRAB BARS SHALL BE 1 1/4" TO 1 1/2" WITH 1 1/2" CLEARANCE BETWEEN GRAB BAR AND WALL. GRAB BAR ENDS TO BE RETURNED TO WALL. GRAB BARS SHALL HAVE STRENGTH AND ANCHORAGE TO SUSTAIN 250 LB CONCENTRATED LOAD.
5. WHERE TOWEL, WASTE RECEPTACLE AND OTHER DISPENSING AND DISPOSING FIXTURES ARE PROVIDED, AT LEAST ONE OF EACH FIXTURE IS TO BE MOUNTED WITH OPERABLE PARTS WITHIN 48" FROM FLOOR.
6. HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED.
7. PROVIDE CODE-COMPLIANT BLOCKING WITHIN WALLS AS REQUIRED FOR ALL WALL-MOUNTED ITEMS.
8. SECURELY ANCHOR HANDWASH SINKS TO WITHSTAND AN APPLIED VERTICAL LOAD OF 250 LB ON THE FRONT OF THE FIXTURE.
9. 6" SELF-COVED WALL BASE REQUIRED AT KITCHENS, SOILED UTILITY ROOMS, AND JANITOR CLOSETS.
10. EXPOSED TILE TO HAVE SCHLUTER TILE EDGE TRIM WHERE TILE DOESN'T DIE INTO ANOTHER SURFACE/ CASEWORK
11. REFER TO SHEET A3-6 F.F. & E. FOR SPECIFICATOINS ON ANY FURNITURE/EQUIPMENT SEEN IN INT. ELEVATIONS TO BE OWNER/CONTRACTOR SUPPLIED
12. EXPOSED SINK DRAINS TO BE COVERED BY ADA PROTIVE BOOT.
13. COUNTER TOPS IN DAYROOM, BATHROOMS 124 & 125, AND CLASSROOM TO BE SOLID SURFACE. EVERYWHERE ELSE, COUNTERTOPS WILL BE P-LAM

REGISTERED ARCHITECT MICHAEL W. DOWLING LIC. #2087 STATE OF MONTANA



17 A7-3 116 SCBA BATHROOM ELEVATION 1 1/4" = 1'-0"

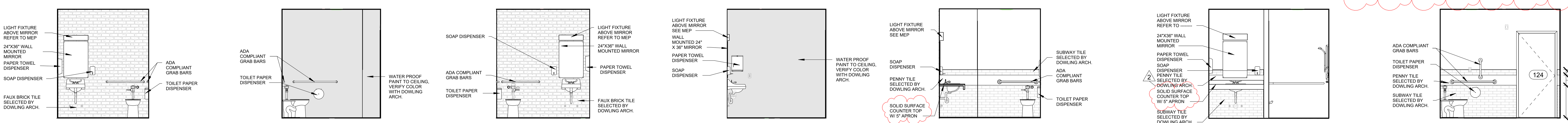
16 A7-3 116 SCBA BATHROOM ELEVATION 2 1/4" = 1'-0"

15 A7-3 116 SCBA BATHROOM ELEVATION 3 1/4" = 1'-0"

14 A7-3 125 DORM SIDE BATHROOM ELEVATION 1 1/4" = 1'-0"

13 A7-3 125 DORM SIDE BATHROOM ELEVATION 2 1/4" = 1'-0"

12 A7-3 125 DORM SIDE BATHROOM ELEVATION 3 1/4" = 1'-0"



11 A7-3 105 PUBLIC BATHROOM ELEVATION 1 1/4" = 1'-0"

10 A7-3 105 PUBLIC BATHROOM ELEVATION 2 1/4" = 1'-0"

09 A7-3 106 PUBLIC BATHROOM ELEVATION 1 1/4" = 1'-0"

08 A7-3 106 PUBLIC BATHROOM ELEVATION 2 1/4" = 1'-0"

07 A7-3 124 DORM SIDE BATHROOM ELEVATION 1 1/4" = 1'-0"

06 A7-3 124 DORM SIDE BATHROOM ELEVATION 2 1/4" = 1'-0"

05 A7-3 124 DORM SIDE BATHROOM ELEVATION 3 1/4" = 1'-0"

04 A7-3 102 CLASSROOM ELEVATION 1 1/4" = 1'-0"

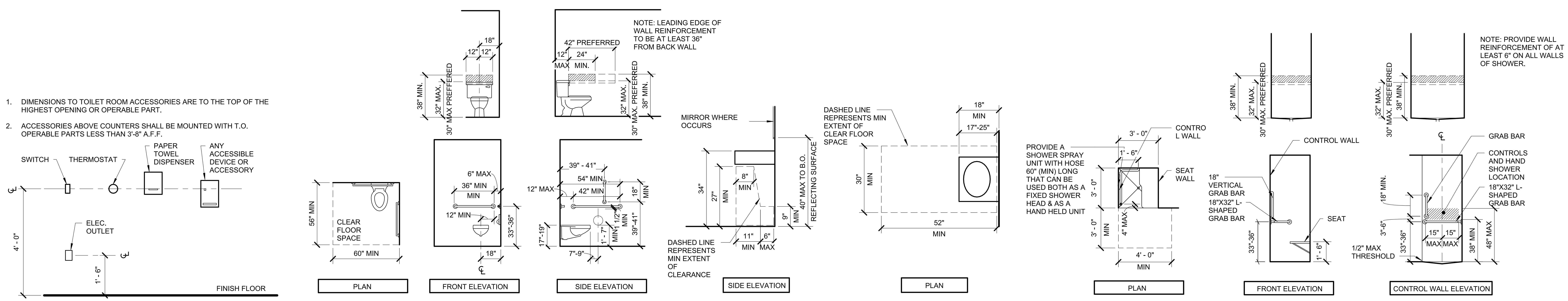
03 A7-3 102 CLASSROOM ELEVATION 2 1/4" = 1'-0"

02 A7-3 102 CLASSROOM ELEVATION 3 1/4" = 1'-0"

01 A7-3 102 CLASSROOM ELEVATION 4 1/4" = 1'-0"

STANDARD FIXTURE MOUNTING HEIGHTS AND CLEARANCE REQUIREMENTS

1. DIMENSIONS TO TOILET ROOM ACCESSORIES ARE TO THE TOP OF THE HIGHEST OPENING OR OPERABLE PART.
2. ACCESSORIES ABOVE COUNTERS SHALL BE MOUNTED WITH T.O. OPERABLE PARTS LESS THAN 3'-8" A.F.F.



TYP ACCESSIBLE MOUNTING HEIGHTS

ACCESSIBLE TOILET

SINK CLEARANCE

ACCESSIBLE SHOWER

Autodesk Docs://Helena Fire Station #3/Helena Fire Station 3.rvt

11/13/2025 1:27:24 PM

HELENA FIRESTATION #3

1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS

734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470 | www.dow-mt.com

ENLARGED PLANS, INTERIOR ELEVATIONS & DETAILS

PROJECT #: 25-668

ISSUE DATES:

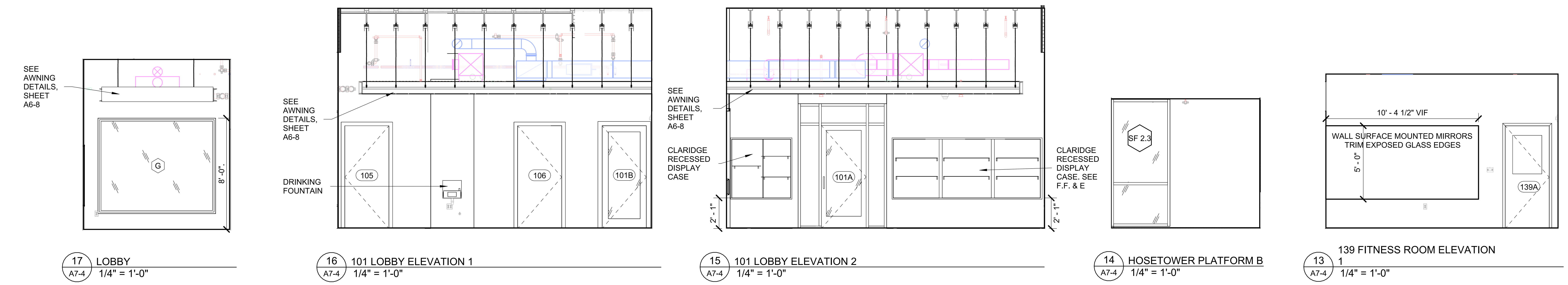
Revision 1	Date 1
ADDENDUM 2	11/14/25

DRAWN BY: JS/CC

100% CONSTRUCTION SET

A7-3

10.22.25



GENERAL NOTES

1. SEE STANDARD FIXTURE MOUNTING HEIGHTS AND REQUIREMENTS THIS SHEET UNLESS OTHERWISE NOTED.
2. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF.
3. FLUSH CONTROLS SHALL BE OPERABLE BY AN OSCILLATING HANDLE WITH A MAXIMUM OPERATING FORCE OF 5 LBS AND SHALL BE MOUNTED ON OPEN FLOOR SIDE OF THE TOILET.
4. DIA. OR WIDTH OF THE GRAB BARS SHALL BE 1 1/4" TO 1 1/2" WITH 1 1/2" CLEARANCE BETWEEN GRAB BAR AND WALL. GRAB BAR ENDS TO BE RETURNED TO WALL. GRAB BARS SHALL HAVE STRENGTH AND ANCHORAGE TO SUSTAIN 250 LB CONCENTRATED LOAD.
5. WHERE TOWEL, WASTE RECEPTACLE AND OTHER DISPENSING AND DISPOSING FIXTURES ARE PROVIDED, AT LEAST ONE OF EACH FIXTURE IS TO BE MOUNTED WITH OPERABLE PARTS WITHIN 48" FROM FLOOR.
6. HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED.
7. PROVIDE CODE-COMPLIANT BLOCKING WITHIN WALLS AS REQUIRED FOR ALL WALL-MOUNTED ITEMS.
8. SECURELY ANCHOR HANDWASH SINKS TO WITHSTAND AN APPLIED VERTICAL LOAD OF 250 LB ON THE FRONT OF THE FIXTURE.
9. 6" SELF-COVED WALL BASE REQUIRED AT KITCHENS, SOILED UTILITY ROOMS, AND JANITOR CLOSETS.
10. EXPOSED TILE TO HAVE SCHLUTER TILE EDGE TRIM WHERE TILE DOESN'T DIE INTO ANOTHER SURFACE/ CASEWORK
11. REFER TO SHEET A3-6 F.F. & E. FOR SPECIFICATOINS ON ANY FURNITURE/EQUIPMENT SEEN IN INT. ELEVATIONS TO BE OWNER/CONTRACTOR SUPPLIED
12. EXPOSED SINK DRAINS TO BE COVERED BY ADA PROTIVE BOOT.
13. COUNTER TOPS IN DAYROOM, BATHROOMS 124 & 125, AND CLASSROOM TO BE SOLID SURFACE. EVERYWHERE ELSE, COUNTERTOPS WILL BE P-LAM

2

REGISTERED ARCHITECT MICHAEL W. DOWLING LIC. #3087 STATE OF MONTANA

HELENA FIRESTATION #3

1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dow-arch.com

ENLARGED PLANS, INTERIOR ELEVATIONS & DETAILS

PROJECT #: 25-668

ISSUE DATES:

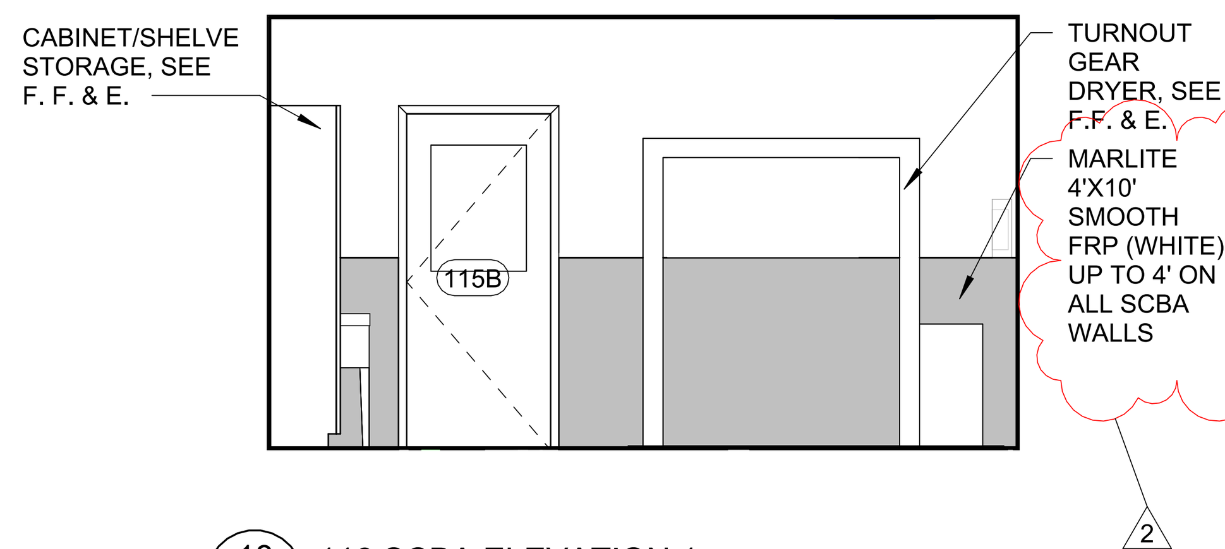
ADDENDUM 2	11/14/25

DRAWN BY: JS/CC

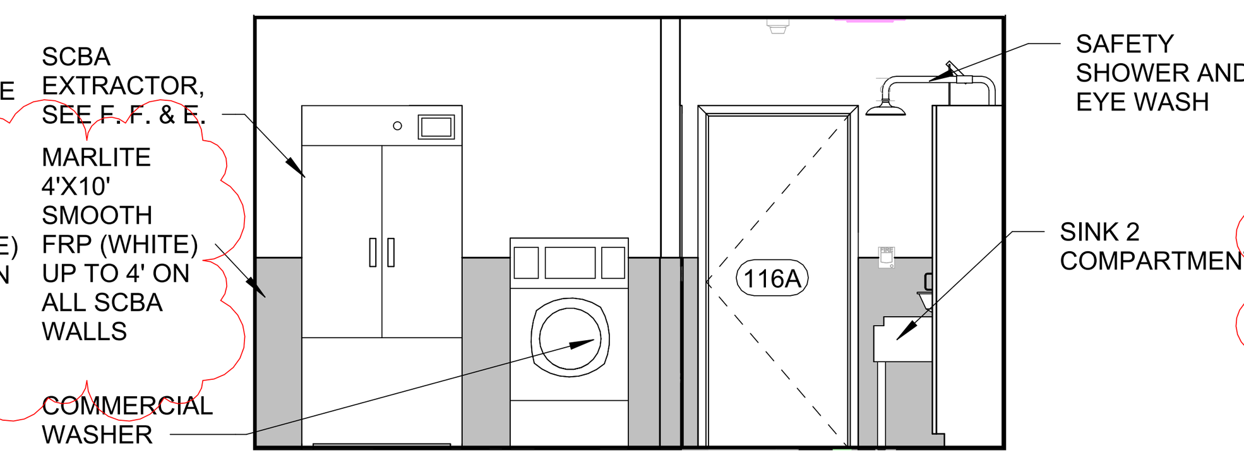
100% CONSTRUCTION SET

A7-4

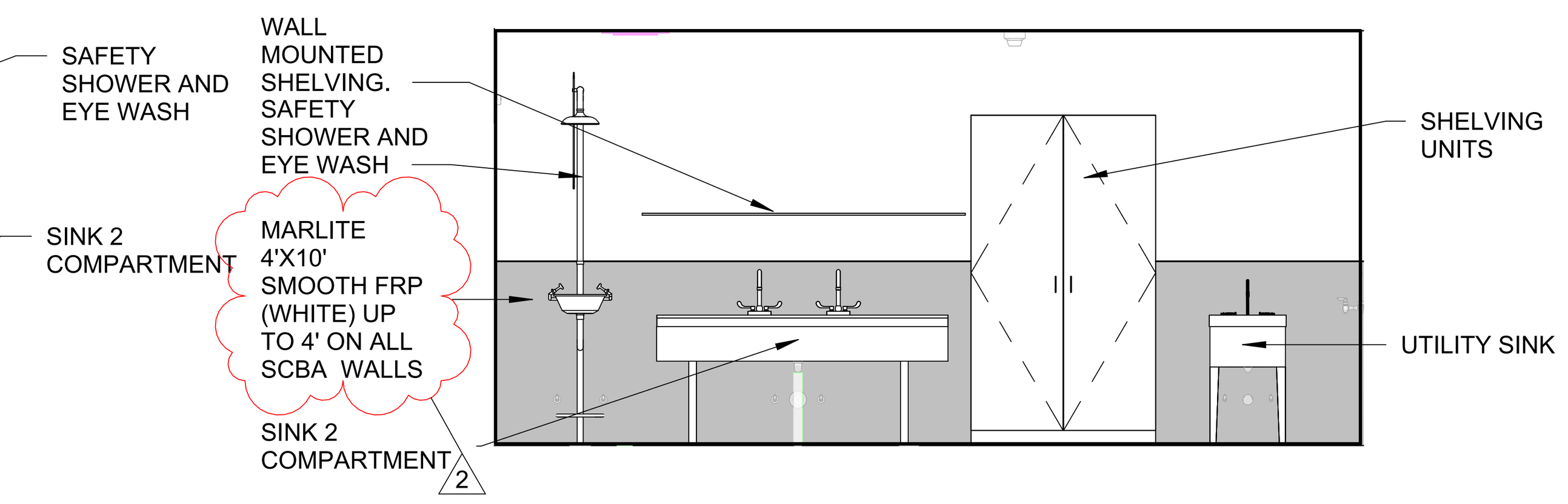
10.22.25



18 116 SCBA ELEVATION 1
A7-5 1/4" = 1'-0"



17 116 SCBA ELEVATION 2
A7-5 1/4" = 1'-0"

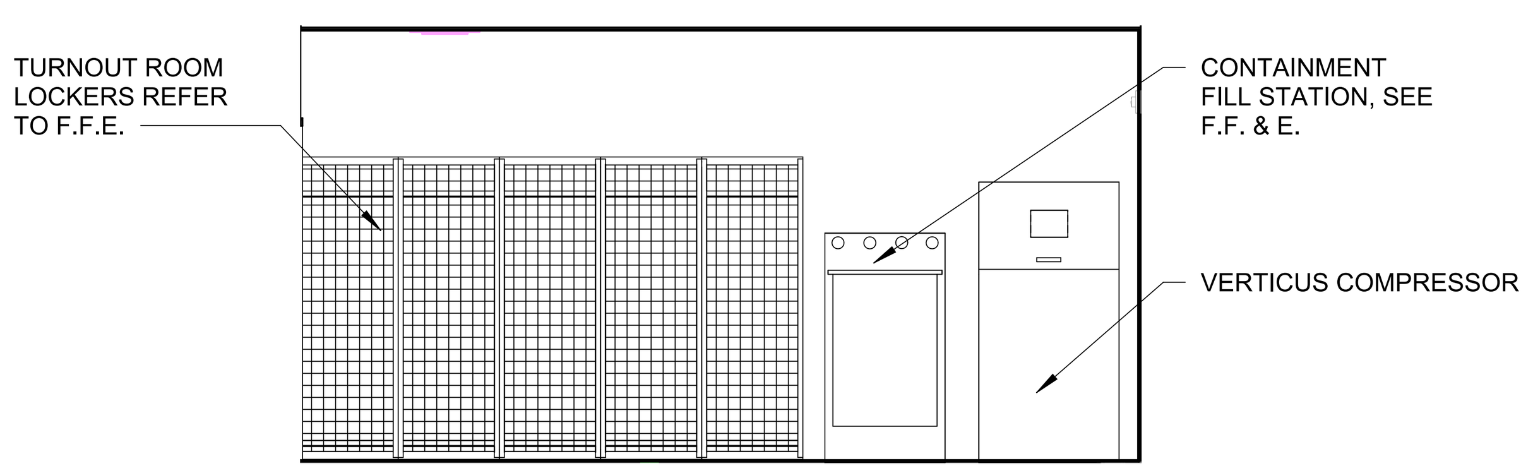


16 116 SCBA ELEVATION 3
A7-5 1/4" = 1'-0"

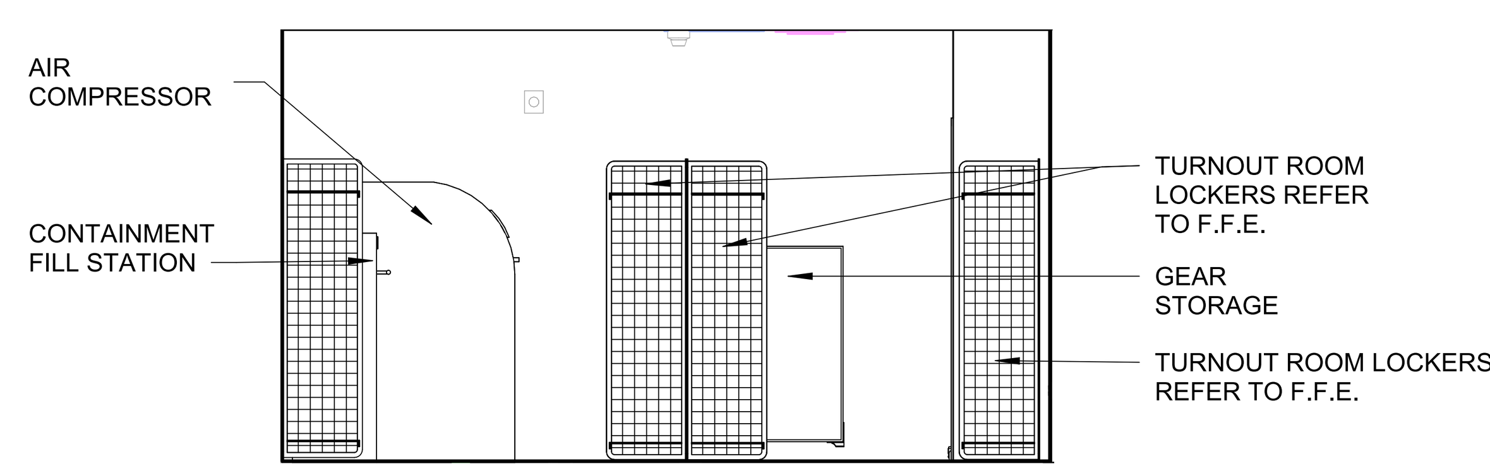
GENERAL NOTES

1. SEE STANDARD FIXTURE MOUNTING HEIGHTS AND REQUIREMENTS THIS SHEET UNLESS OTHERWISE NOTED.
2. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF.
3. FLUSH CONTROLS SHALL BE OPERABLE BY AN OSCILLATING HANDLE WITH A MAXIMUM OPERATING FORCE OF 5 LBS AND SHALL BE MOUNTED ON OPEN FLOOR SIDE OF THE TOILET.
4. DIA. OR WIDTH OF THE GRAB BARS SHALL BE 1 1/4" TO 1 1/2" WITH 1 1/2" CLEARANCE BETWEEN GRAB BAR AND WALL. GRAB BAR ENDS TO BE RETURNED TO WALL. GRAB BARS SHALL HAVE STRENGTH AND ANCHORAGE TO SUSTAIN 250 LB CONCENTRATED LOAD.
5. WHERE TOWEL, WASTE RECEPTACLE AND OTHER DISPENSING AND DISPOSING FIXTURES ARE PROVIDED, AT LEAST ONE OF EACH FIXTURE IS TO BE MOUNTED WITH OPERABLE PARTS WITHIN 48" FROM FLOOR.
6. HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED.
7. PROVIDE CODE-COMPLIANT BLOCKING WITHIN WALLS AS REQUIRED FOR ALL WALL-MOUNTED ITEMS.
8. SECURELY ANCHOR HANDWASH SINKS TO WITHSTAND AN APPLIED VERTICAL LOAD OF 250 LB ON THE FRONT OF THE FIXTURE.
9. 6" SELF-COVED WALL BASE REQUIRED AT KITCHENS, SOILED UTILITY ROOMS, AND JANITOR CLOSETS.
10. EXPOSED TILE TO HAVE SCHLUTER TILE EDGE TRIM WHERE TILE DOESN'T DIE INTO ANOTHER SURFACE/ CASEWORK
11. REFER TO SHEET A3-6 F.F. & E. FOR SPECIFICATOINS ON ANY FURNITURE/EQUIPMENT SEEN IN INT. ELEVATIONS TO BE OWNER/CONTRACTOR SUPPLIED
12. EXPOSED SINK DRAINS TO BE COVERED BY ADA PROTIVE BOOT.
13. COUNTER TOPS IN DAYROOM, BATHROOMS 124 & 125, AND CLASSROOM TO BE SOLID SURFACE. EVERYWHERE ELSE, COUNTERTOPS WILL BE P-LAM

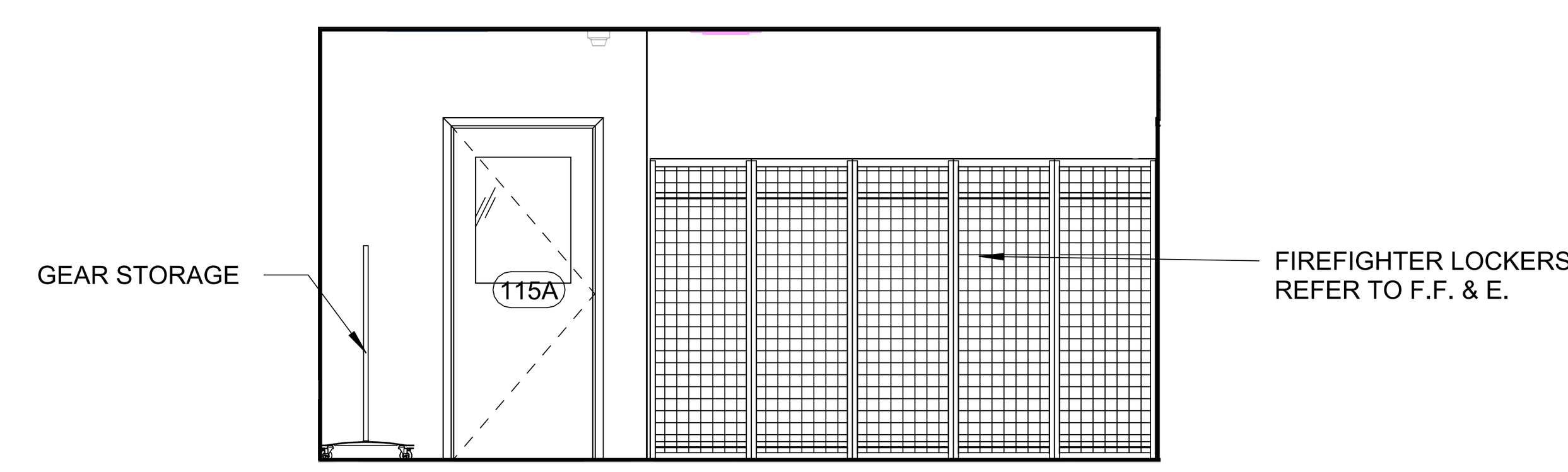
2



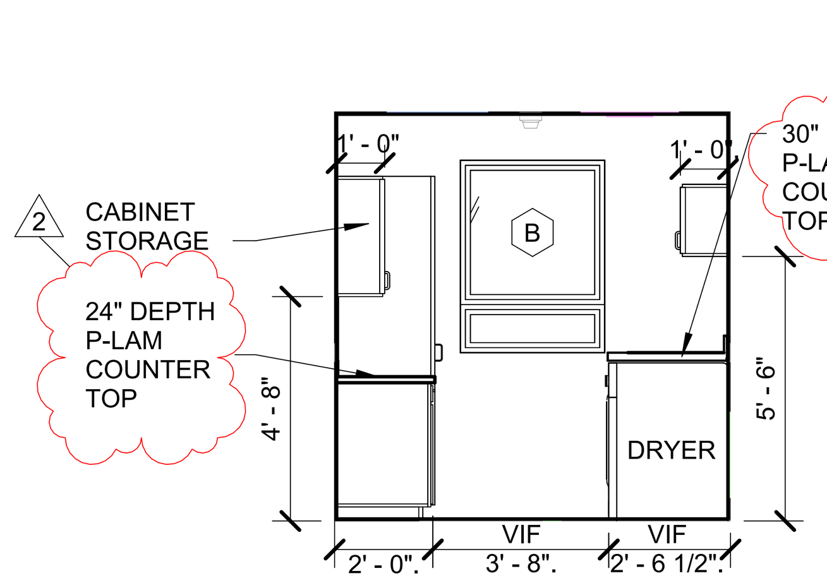
15 115 TURNOUT ELEVATION 1
A7-5 1/4" = 1'-0"



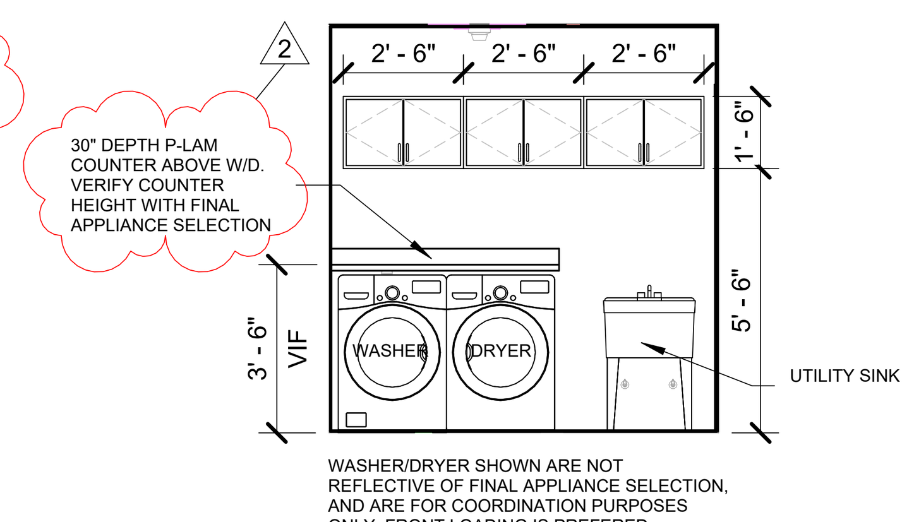
14 115 TURNOUT ELEVATION 2
A7-5 1/4" = 1'-0"



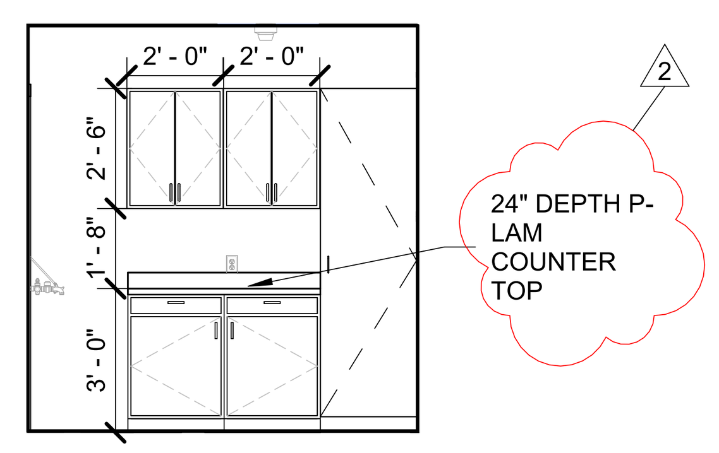
13 115 TURNOUT ELEVATION 3
A7-5 1/4" = 1'-0"



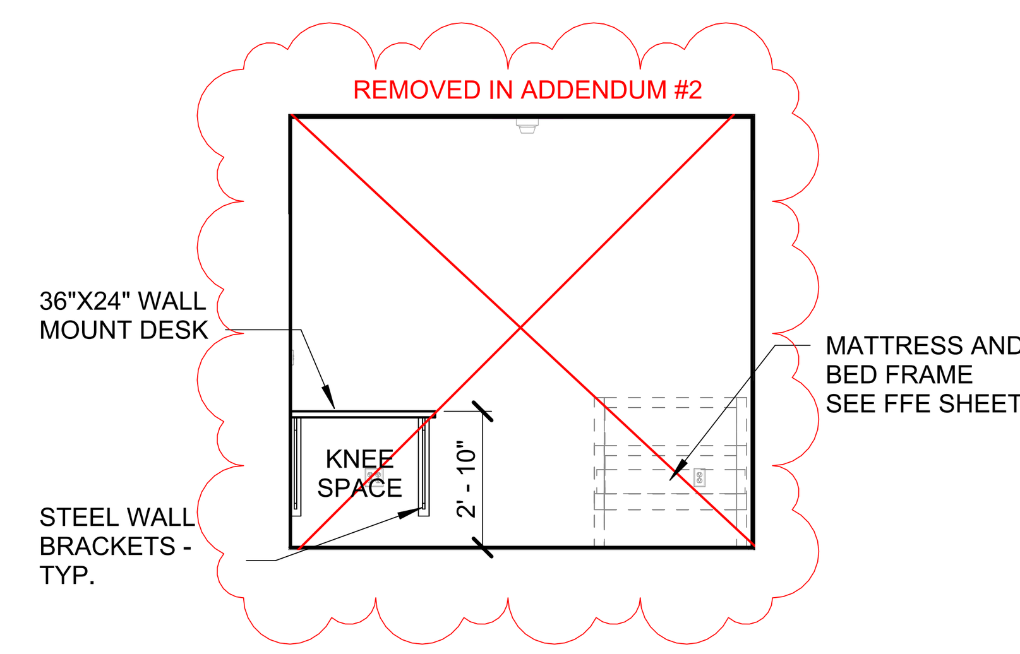
12 137 LAUNDRY ELEVATION 1
A7-5 1/4" = 1'-0"



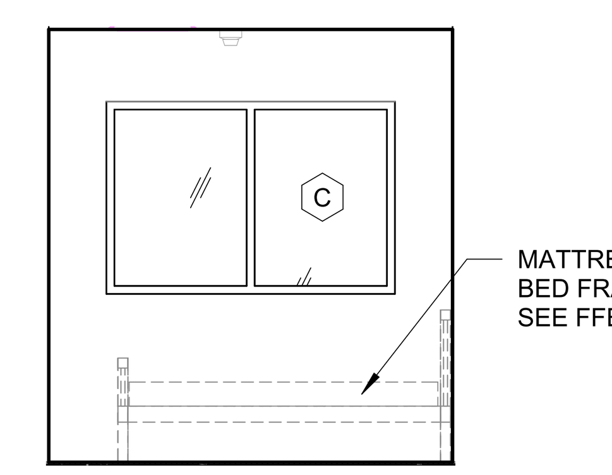
11 137 LAUNDRY ELEVATION 2
A7-5 1/4" = 1'-0"



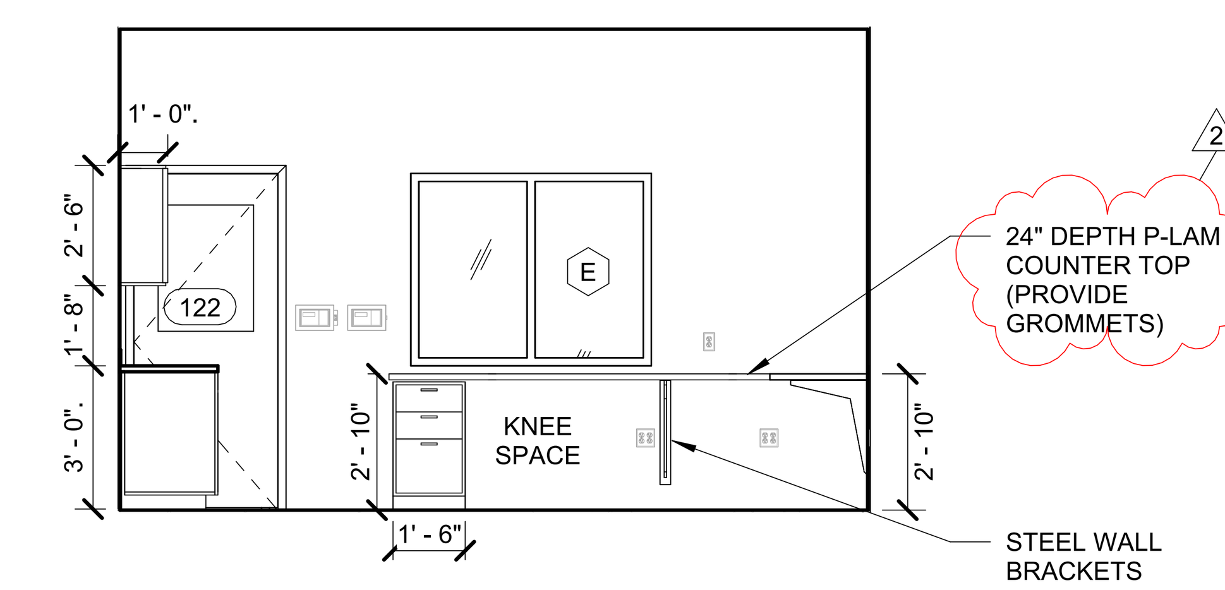
10 137 LAUNDRY ELEVATION 3
A7-5 1/4" = 1'-0"



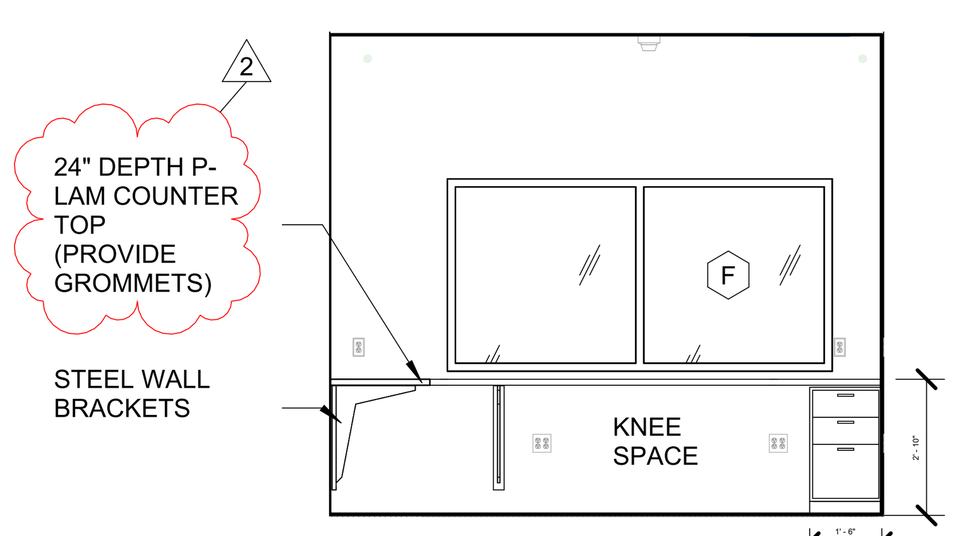
09 136 DORM 1 ELEVATION 1
A7-5 1/4" = 1'-0"



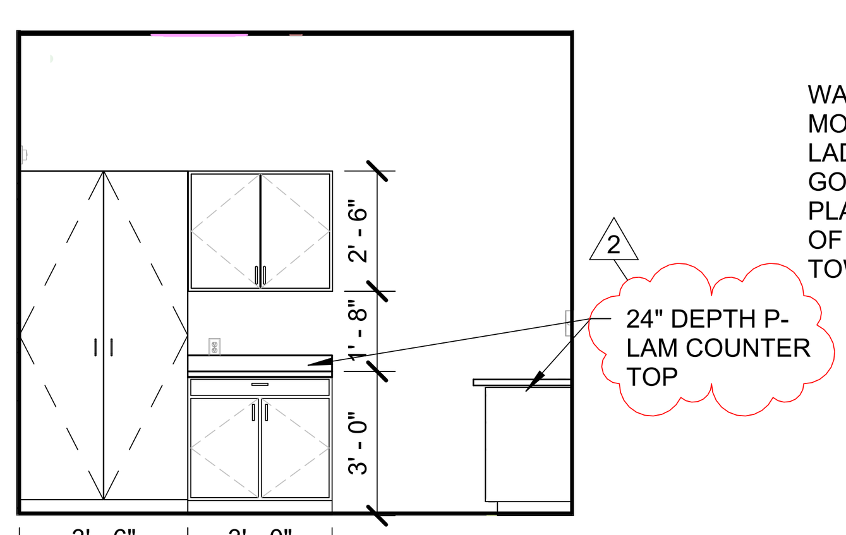
07 135 DORM 2 ELEVATION 1
A7-5 1/4" = 1'-0"



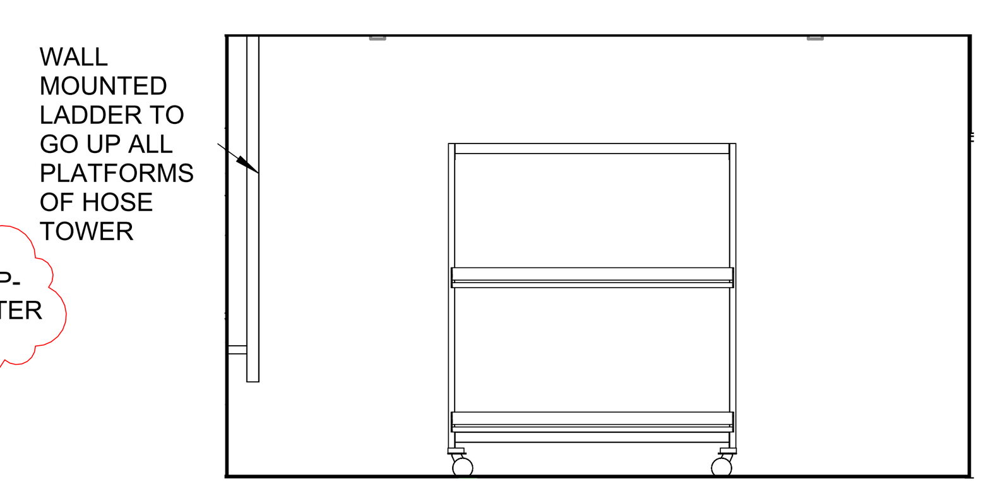
06 122 WATCH ROOM ELEVATION 1
A7-5 1/4" = 1'-0"



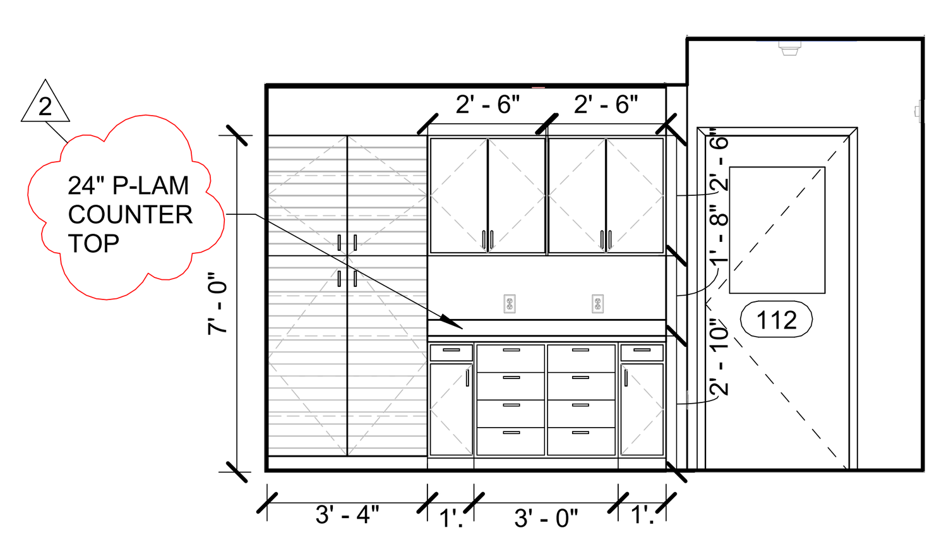
05 122 WATCH ROOM ELEVATION 2
A7-5 1/4" = 1'-0"



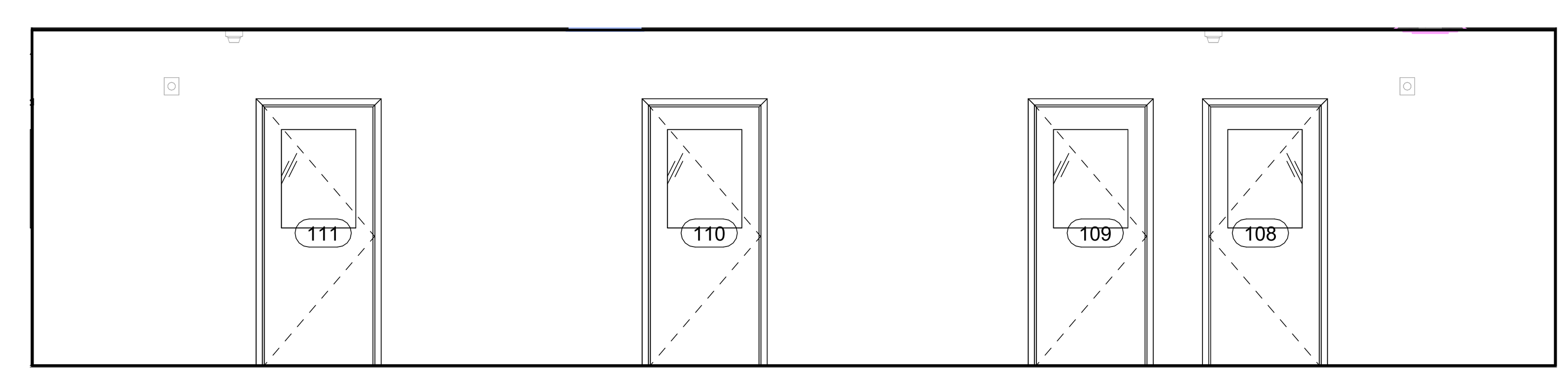
04 WATCHROOM ELEVATION 3
A7-5 1/4" = 1'-0"



03 HOSE TOWER
A7-5 1/4" = 1'-0"



02 107 WORKROOM HALLWAY ELEVATION 1
A7-5 1/4" = 1'-0"



01 107 WORKROOM HALLWAY ELEVATION 2
A7-5 1/4" = 1'-0"

REGISTERED ARCHITECT MICHAEL W. DOWLING LIC. #1987 STATE OF MONTANA

HELENA FIRESTATION #3
1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dow-mt.com

ENLARGED PLANS, INTERIOR ELEVATIONS & DETAILS

PROJECT #: 25-668

ISSUE DATES:

ADDENDUM 2	11/14/25

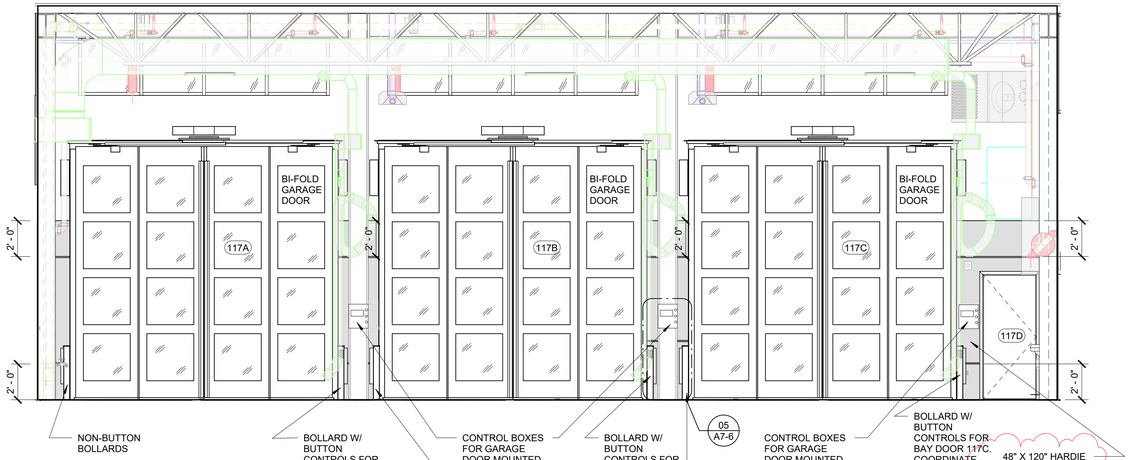
DRAWN BY: JS/CC

A7-5

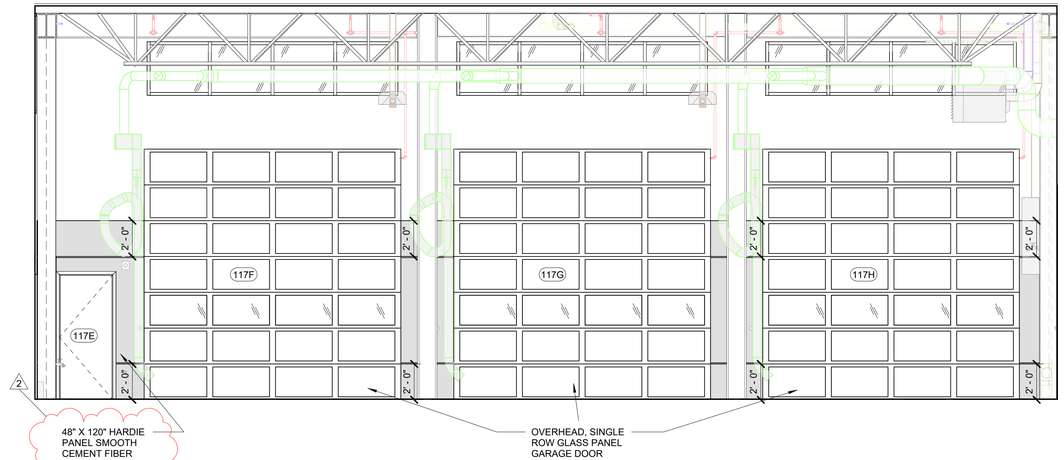
100% CONSTRUCTION SET

10.22.25

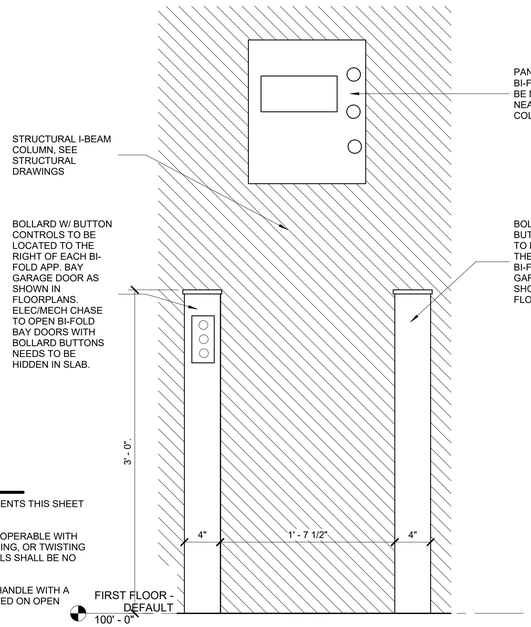
11/13/2025 2:13:31 PM
Autodesk Docs://Helena Fire Station #3/Helena Fire Station 3.rvt



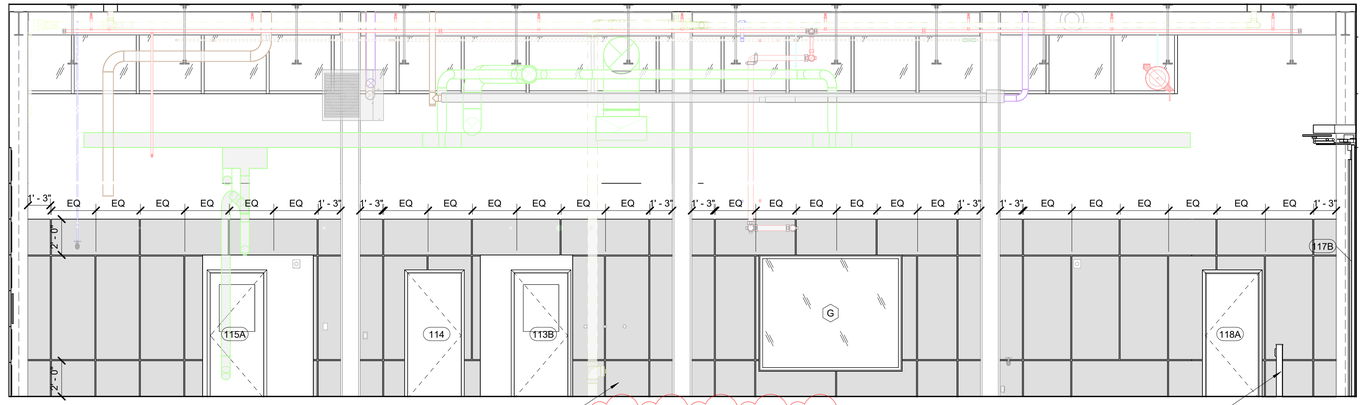
04 A7-6 117 APPARATUS BAY ELEVATION 4
1/4" = 1'-0"



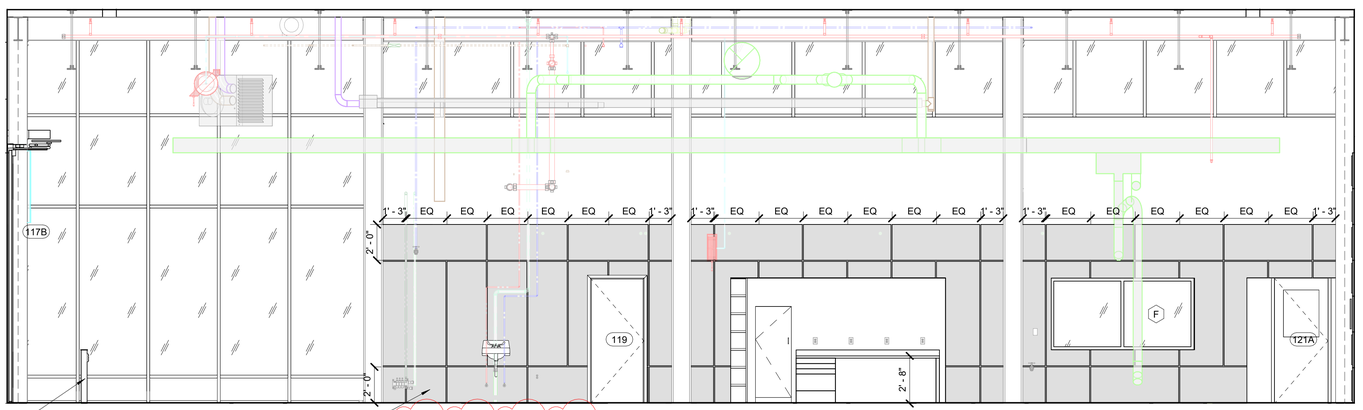
03 A7-6 117 APPARATUS BAY ELEVATION 3
1/4" = 1'-0"



05 A7-6 INT. BOLLARD APP BAY DETAIL
1 1/2" = 1'-0" REF:A7-6



02 A7-6 117 APPARATUS BAY ELEVATION 2
1/4" = 1'-0"



01 A7-6 117 APPARATUS BAY ELEVATION 1
1/4" = 1'-0"

GENERAL NOTES

1. SEE STANDARD FIXTURE MOUNTING HEIGHTS AND REQUIREMENTS THIS SHEET UNLESS OTHERWISE NOTED.
2. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF.
3. FLUSH CONTROLS SHALL BE OPERABLE BY AN OSCILLATING HANDLE WITH A MAXIMUM OPERATING FORCE OF 5 LBS AND SHALL BE MOUNTED ON OPEN FLOOR SIDE OF THE TOILET.
4. DIA. OR WIDTH OF THE GRAB BARS SHALL BE 1 1/4" TO 1 1/2" WITH 1 1/2" CLEARANCE BETWEEN GRAB BAR AND WALL. GRAB BAR ENDS TO BE RETURNED TO WALL. GRAB BARS SHALL HAVE STRENGTH AND ANCHORAGE TO SUSTAIN 250 LB CONCENTRATED LOAD.
5. WHERE TOWEL, WASTE RECEPTACLE AND OTHER DISPENSING AND DISPOSING FIXTURES ARE PROVIDED, AT LEAST ONE OF EACH FIXTURE IS TO BE MOUNTED WITH OPERABLE PARTS WITHIN 48" FROM FLOOR.
6. HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED.
7. PROVIDE CODE-COMPLIANT BLOCKING WITHIN WALLS AS REQUIRED FOR ALL WALL-MOUNTED ITEMS.
8. SECURELY ANCHOR HANDWASH SINKS TO WITHSTAND AN APPLIED VERTICAL LOAD OF 250 LB ON THE FRONT OF THE FIXTURE.
9. 6" SELF-COVED WALL BASE REQUIRED AT KITCHENS, SOILED UTILITY ROOMS, AND JANITOR CLOSETS.
10. EXPOSED TILE TO HAVE SCHLUTER TILE EDGE TRIM WHERE TILE DOESN'T DIE INTO ANOTHER SURFACE/ CASEWORK
11. REFER TO SHEET A3-6 F.F. & E. FOR SPECIFICATOINS ON ANY FURNITURE/EQUIPMENT SEEN IN INT. ELEVATIONS TO BE OWNER/CONTRACTOR SUPPLIED
12. EXPOSED SINK DRAINS TO BE COVERED BY ADA PROTIVE BOOT.
13. COUNTER TOPS IN DAYROOM, BATHROOMS 124 & 125, AND CLASSROOM TO BE SOLID SURFACE. EVERYWHERE ELSE, COUNTERTOPS WILL BE P-LAM

REGISTERED ARCHITECT
MICHAEL W. DOWLING
LIC. #9857
STATE OF MONTANA

HELENA FIRESTATION #3

1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING
DOWLING ARCHITECTS
734 N Last Chance Gulch | Helena, MT 59601 | 406.457.8457
www.dow-mt.com

ENLARGED PLANS, INTERIOR ELEVATIONS & DETAILS

PROJECT #: 25-668

ISSUE DATES:

ADDENDUM 2	11/14/25

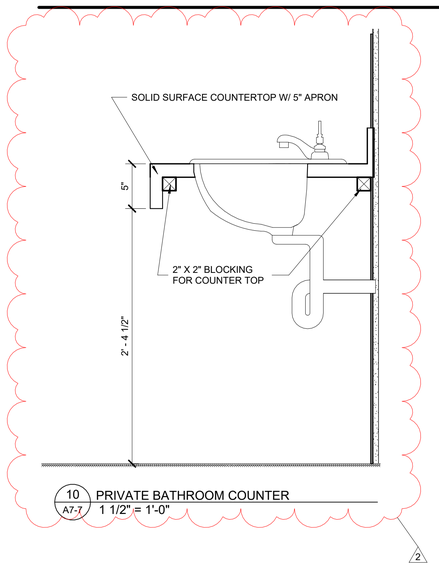
DRAWN BY: JS/CC

100% CONSTRUCTION SET

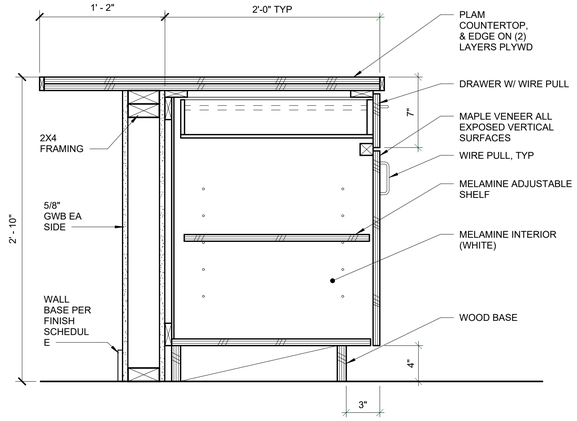
A7-6

10.22.25

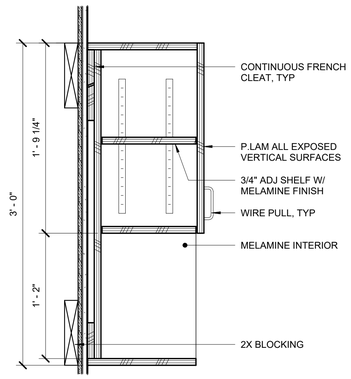
STANDARD CASEWORK DIMENSIONS



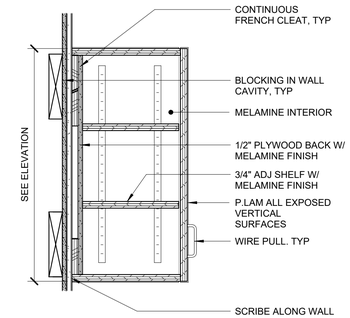
10 A7-7 PRIVATE BATHROOM COUNTER
1 1/2" = 1'-0"



09 A7-7 CASEWORK PENINSULA
1 1/2" = 1'-0"



07 A7-7 UPPER CASEWORK W/ MICROWAVE
1 1/2" = 1'-0"

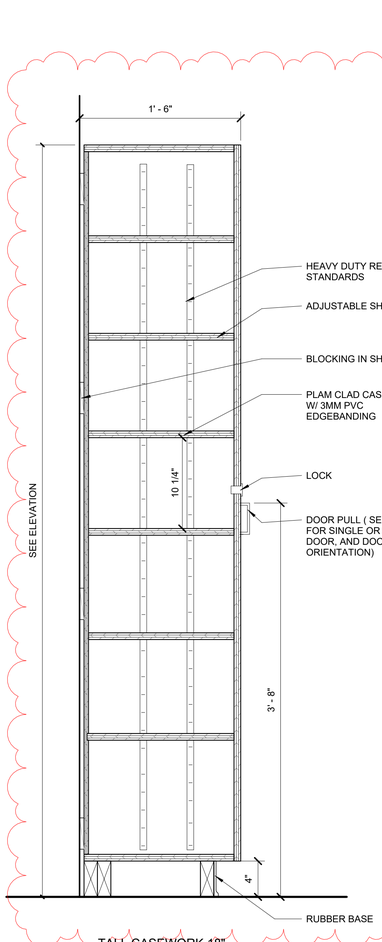


05 A7-7 UPPER CASEWORK
1 1/2" = 1'-0"

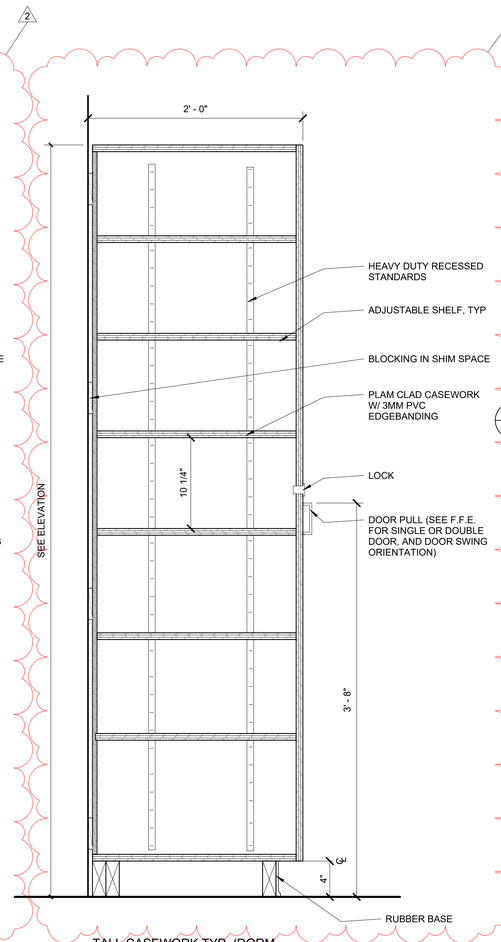
GENERAL NOTES

1. SEE STANDARD FIXTURE MOUNTING HEIGHTS AND REQUIREMENTS THIS SHEET UNLESS OTHERWISE NOTED.
2. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF.
3. FLUSH CONTROLS SHALL BE OPERABLE BY AN OSCILLATING HANDLE WITH A MAXIMUM OPERATING FORCE OF 5 LBS AND SHALL BE MOUNTED ON OPEN FLOOR SIDE OF THE TOILET.
4. DIA. OR WIDTH OF THE GRAB BARS SHALL BE 1 1/4" TO 1 1/2" WITH 1 1/2" CLEARANCE BETWEEN GRAB BAR AND WALL. GRAB BAR ENDS TO BE RETURNED TO WALL. GRAB BARS SHALL HAVE STRENGTH AND ANCHORAGE TO SUSTAIN 250 LB CONCENTRATED LOAD.
5. WHERE TOWEL, WASTE RECEPTACLE AND OTHER DISPENSING AND DISPOSING FIXTURES ARE PROVIDED, AT LEAST ONE OF EACH FIXTURE IS TO BE MOUNTED WITH OPERABLE PARTS WITHIN 48" FROM FLOOR.
6. HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED.
7. PROVIDE CODE-COMPLIANT BLOCKING WITHIN WALLS AS REQUIRED FOR ALL WALL-MOUNTED ITEMS.
8. SECURELY ANCHOR HANDWASH SINKS TO WITHSTAND AN APPLIED VERTICAL LOAD OF 250 LB ON THE FRONT OF THE FIXTURE.
9. 6" SELF-COVED WALL BASE REQUIRED AT KITCHENS, SOILED UTILITY ROOMS, AND JANITOR CLOSETS.
10. EXPOSED TILE TO HAVE SCHLUTER TILE EDGE TRIM WHERE TILE DOESN'T DIE INTO ANOTHER SURFACE/ CASEWORK
11. REFER TO SHEET A3-6 F.F. & E. FOR SPECIFICATOINS ON ANY FURNITURE/EQUIPMENT SEEN IN INT. ELEVATIONS TO BE OWNER/CONTRACTOR SUPPLIED
12. EXPOSED SINK DRAINS TO BE COVERED BY ADA PROTIVE BOOT.
13. COUNTER TOPS IN DAYROOM, BATHROOMS 124 & 125, AND CLASSROOM TO BE SOLID SURFACE. EVERYWHERE ELSE, COUNTERTOPS WILL BE P-LAM

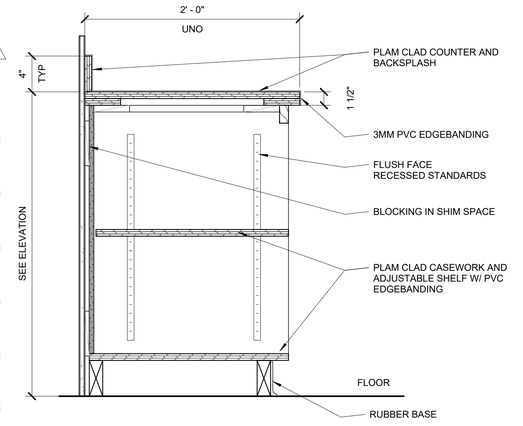
2



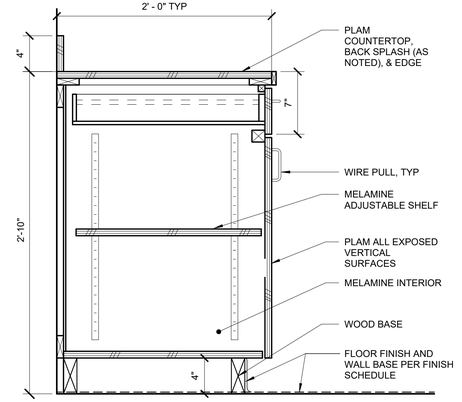
08 A7-7 TALL CASEWORK 18" (DAYROOM)
1 1/2" = 1'-0"



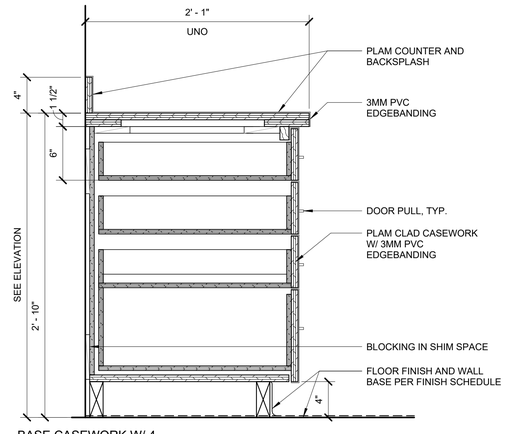
06 A7-7 TALL CASEWORK TYP. (DORM LOCKERS)
1 1/2" = 1'-0"



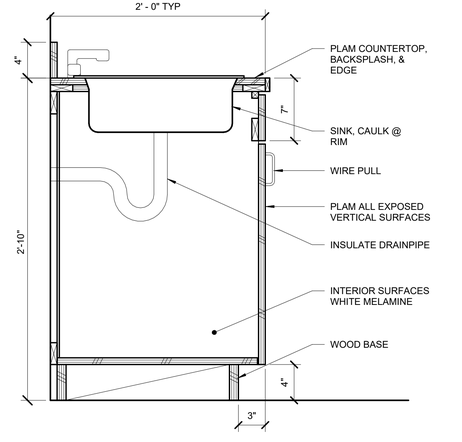
04 A7-7 BASE CASEWORK W/O DRAWER
1 1/2" = 1'-0"



02 A7-7 BASE CASEWORK
1 1/2" = 1'-0"



03 A7-7 BASE CASEWORK W/ 4 DRAWERS
1 1/2" = 1'-0"



01 A7-7 BASE CASEWORK W/ SINK
1 1/2" = 1'-0"

MICHAEL W. DOWLING LIC. #9857 REGISTERED ARCHITECT STATE OF MONTANA

HELENA FIRESTATION #3
1872 KELLEHER LANE, HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING
DOWLING ARCHITECTS 734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5700 www.dda-mt.com

CASEWORK, INTERIOR ELEVATIONS & DETAILS

PROJECT #: 25-668

ISSUE DATES:

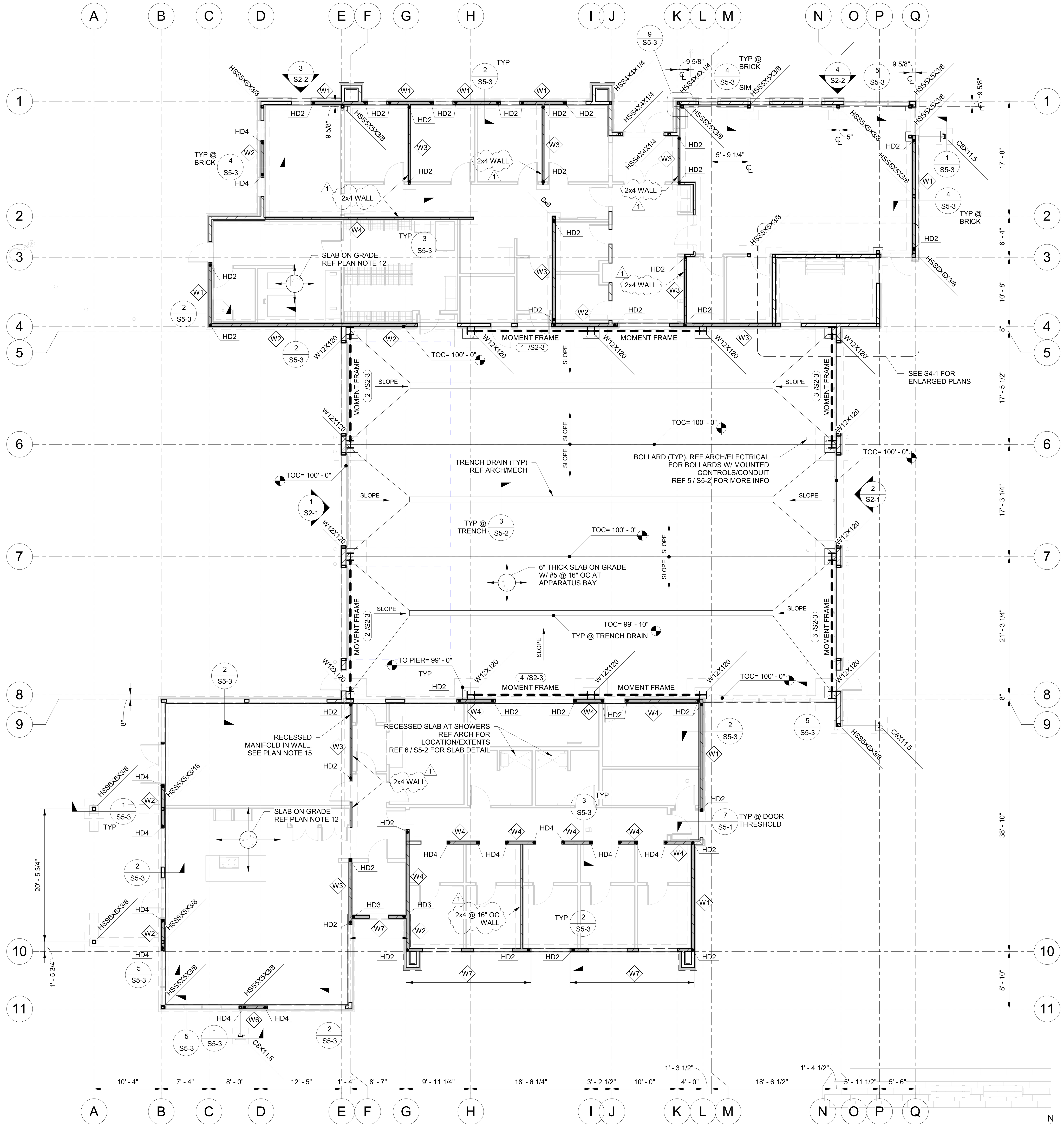
ADDENDUM 2	11/14/25

DRAWN BY: JS/CC

A7-7

10.22.25

100% CONSTRUCTION SET



1 FOUNDATION/ MAIN FLOOR PLAN
S1-2 1/8" = 1'-0"

FLOOR PLAN NOTES

1. PROJECT DATUM ELEVATION = 100' - 0" AT TOP OF SLAB ON GRADE (SEE CIVIL DRAWINGS FOR ABSOLUTE ELEVATION). ALL SPOT ELEVATIONS ARE IN REFERENCE TO THE DATUM ELEVATION.
2. VERIFY ALL DIMENSIONS AND ELEVATION WITH THE ARCHITECTURAL DRAWINGS, SEE CIVIL DRAWINGS FOR EXTERIOR SLABS AND GRADING.
3. REFER TO THE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS.
4. REFER TO THE DRAWING ANNOTATIONS & SYMBOLS FOR EXPLANATION OF DRAWING CONVENTIONS.
5. REFER TO DRAWINGS S5, S6, S7, & S-9 FOR TYPICAL CONCRETE, STEEL, WOOD, & COLD FORM DETAILS RESPECTIVELY. TYPICAL DETAILS ARE NOT NECESSARILY REFERENCED BY CALLOUTS ON PLAN; IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW THE REQUIREMENTS OF THE DETAILS AT THE LOCATION AT WHICH THEY OCCUR.
6. COORDINATE THE FOLLOWING ITEMS WITH DRAWINGS OF OTHER DISCIPLINES:
   - SUBGRADE PREPARATION REQUIREMENTS BELOW FOOTINGS AND SLABS ON GRADE AND BACKFILL REQUIREMENTS BEHIND BASEMENT AND RETAINING WALLS; SEE THE PROJECT GEOTECHNICAL REPORT.
   - SIZES AND LOCATIONS OF OPENINGS AND PENETRATIONS THROUGH WALLS AND FLOORS; SEE ARCHITECTURAL, ELECTRICAL, MECHANICAL, AND PLUMBING DRAWINGS.
   - EXTERIOR CONCRETE, INCLUDING SLABS AND SITE RETAINING WALLS; SEE ARCHITECTURAL, CIVIL, AND LANDSCAPE DRAWINGS.
   - RECESSED AND DEPRESSED FLOOR AREAS; SEE ARCHITECTURAL DRAWINGS.
   - EXTENT OF AND REQUIREMENTS FOR MASONRY VENEER; SEE ARCHITECTURAL DRAWINGS.
   - LOCATIONS AND REQUIREMENTS FOR NON-BEARING / NON-STRUCTURAL PARTITION WALLS; SEE ARCHITECTURAL DRAWINGS.
   - LOCATION, SIZE, AND ANCHORAGE OF ELECTRICAL MECHANICAL, AND PLUMBING EQUIPMENT; SEE ELECTRICAL, MECHANICAL, AND PLUMBING DRAWINGS.
7. EXTERIOR GRIDLINES ARE ALIGNED TO THE FACE OF FOUNDATION WALL AND INTERIOR GRIDLINES ARE ALIGNED TO THE CENTER OF COLUMN OR WALL, UNLESS NOTED OTHERWISE.
8. BEARING AND EXTERIOR WALL FRAMING SHALL BE 2X6 STUDS AT 16" ON CENTER, UNLESS NOTED OTHERWISE.
9. PROVIDE KING STUDS AT JAMBS OF OPENINGS IN WOOD FRAMED EXTERIOR WALLS; SEE SCHEDULE.
10. FASTEN PLIES OF WALL STUDS FOR COLUMNS, KING STUDS, AND TRIMMER STUDS AS SPECIFIED IN THE GENERAL NOTES AND/OR TYPICAL DETAILS.
11. PROVIDE SOLID BLOCKING THROUGH RIM JOIST SPACE BELOW POSTS OR BUILT-UP STUDS.
12. SLAB ON GRADE SHALL BE 4" THICK AND REINFORCED WITH #4 AT 16" ON CENTER, EA WAY UNO.
13. FOR STRUCTURAL SCHEDULES, REFER TO SHEET S0-6.
14. FOOTINGS SHOWN HALFTONE FOR CLARITY. REFER TO FOUNDATION PLAN FOR MORE INFORMATION.
15. REFER TO MECHANICAL DRAWINGS FOR EXACT SIZE AND LOCATION OF RECESSED MANIFOLD IN STRUCTURAL WALL. AT MANIFOLD LOCATION, PROVIDE HEADER TYPE 'H1' WITH BEARING AND KING STUDS DENOTED IN HEADER SCHEDULE.

MONTANA BRADLEY VASSAU No. 91516 PE LICENSED PROFESSIONAL ENGINEER

Morrison Maierle
engineers • surveyors • planners • scientists
1055 Mount Ave. Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRESTATION #3
HELENA , MT. 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dsa-mt.com

FIRST FLOOR FRAMING PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

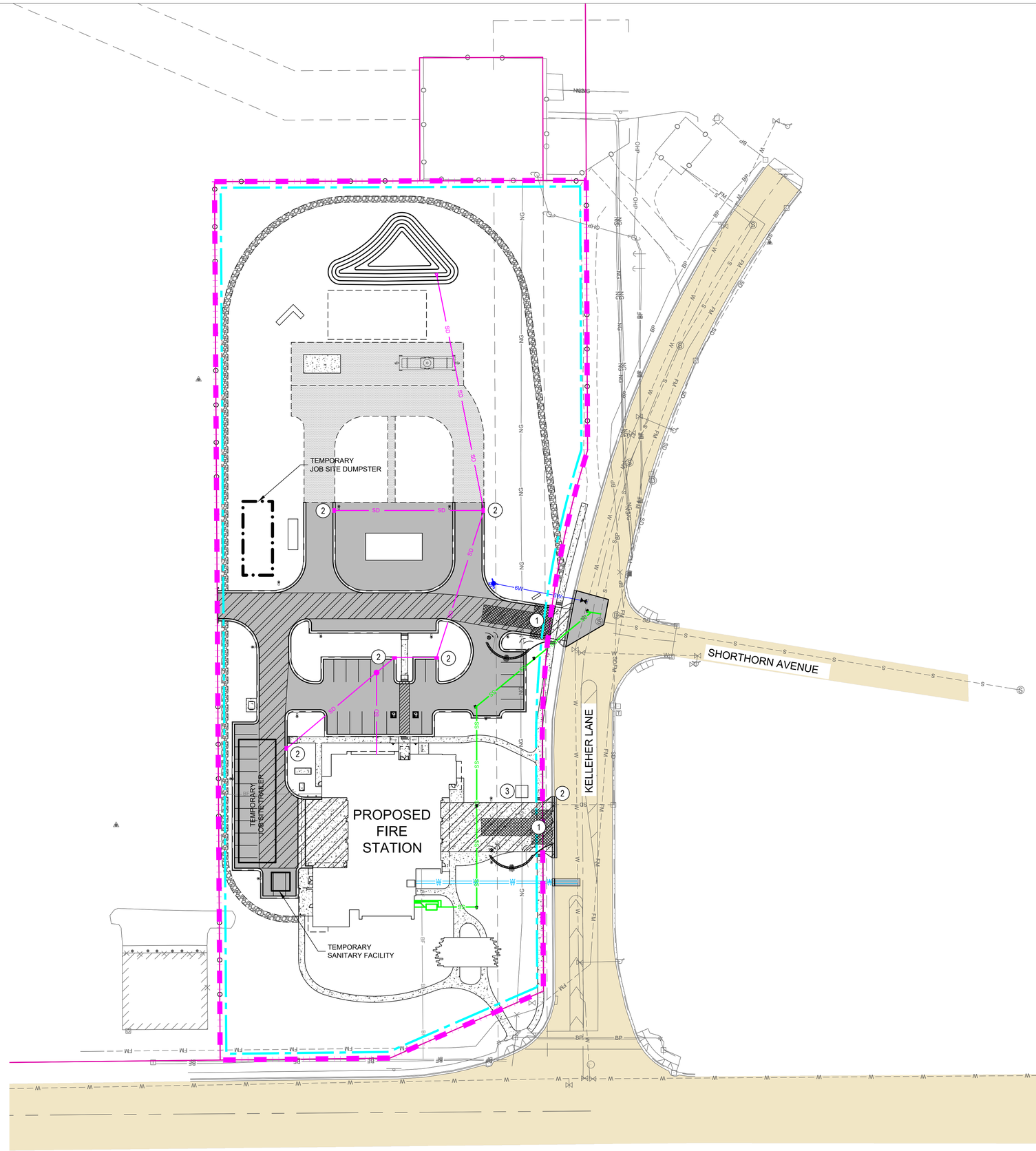
ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: MMI

S1-2

10.22.25



EROSION & SEDIMENT CONTROL NOTES:

1. EROSION AN SEDIMENT CONTROL ON THIS PROJECT SHALL BE COMPLETED IN ACCORDANCE WITH THE CITY OF HELENA'S STORMWATER MANAGEMENT PROGRAM.
2. ALL REQUIRED PERIMETER SILT AND CONSTRUCTION FENCING SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITY (STOCKPILING, STRIPPING, GRADING, ETC). ALL OTHER REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE APPROPRIATE TIME IN THE CONSTRUCTION SEQUENCE AS INDICATED IN THE APPROVED PROJECT SCHEDULE, CONSTRUCTION PLANS, AND STORMWATER MANAGEMENT PLAN.
3. AT ALL TIMES DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING AND CONTROLLING ON-SITE EROSION INCLUDING KEEPING THE PROPERTY SUFFICIENTLY WATERED SO AS TO MINIMIZE WIND BLOWN SEDIMENT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR INSTALLING AND MAINTAINING ALL EROSION CONTROL FACILITIES SHOWN HEREIN.
4. PRE-DISTURBANCE VEGETATION SHALL BE PROTECTED AND RETAINED WHEREVER POSSIBLE. REMOVAL OR DISTURBANCE OF EXISTING VEGETATION SHALL BE LIMITED TO THE AREA(S) REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS, AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
5. CONDITIONS IN THE FIELD MAY WARRANT EROSION CONTROL MEASURES IN ADDITION TO WHAT IS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL IMPLEMENT WHATEVER MEASURES ARE DETERMINED NECESSARY TO CONTROL ON-SITE EROSION.
6. ALL SOIL STOCKPILES SHALL BE PROTECTED FROM SEDIMENT TRANSPORT BY APPROPRIATE EROSION CONTROL METHODS. ANY SOIL STOCKPILE THAT WILL BE DORMANT FOR OVER THIRTY (30) DAYS SHALL BE SEEDED.
7. THE CONTRACTOR SHALL AT ALL TIMES TAKE WHATEVER MEASURES ARE NECESSARY TO ASSURE THE PROPER CONTAINMENT AND DISPOSAL OF POLLUTANTS ON THE SITE IN ACCORDANCE WITH ANY AND ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.
8. THE CONTRACTOR SHALL IMMEDIATELY CLEAN UP ANY CONSTRUCTION MATERIALS INADVERTENTLY DEPOSITED ON EXISTING STREETS OR OTHER PUBLIC RIGHTS OF WAY, AND MAKE SURE STREETS ARE CLEANED AT THE END OF EACH WORKING DAY.

NOTES BY SYMBOL:

1. INSTALL TRACKOUT CONTROL SYSTEM PER DETAIL 1 ON SHEET C2-2 OR AS RECOMMENDED BY MANUFACTURER
2. INSTALL TYPE D INLET PROTECTION FILTER PER DETAIL 3 ON SHEET C2-2 PRIOR TO THE DISTURBANCE OF ANY PORTION OF THE SITE.
3. INSTALL CONCRETE WASHOUT FACILITY PER DETAIL 2 ON SHEET C2-2

LEGEND

	AREA TO BE PAVED
	PROPOSED CONCRETE SURFACE
	STRAW WATTLE (4 / C2-2)
	CONSTRUCTION LIMITS

811 Know what's below. Call before you dig.

THIS SITE HAS BEEN DESIGNED TO BE ACCESSIBLE TO INDIVIDUALS WITH DISABILITIES IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.

N

40 20 0 40 80

SCALE IN FEET

MONTANA
CELINE SAUCIER
14499
REGISTERED PROFESSIONAL ENGINEER
10/16/2025

Morrison Maierle
engineers - surveyors - planners - scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
234 N. Last Chance Gulch | Helena, MT 59601 | 406.457.4470
www.dowlingarchitects.com

HELENA FIRE STATION #3

HELENA, MT 59602

EROSION CONTROL PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

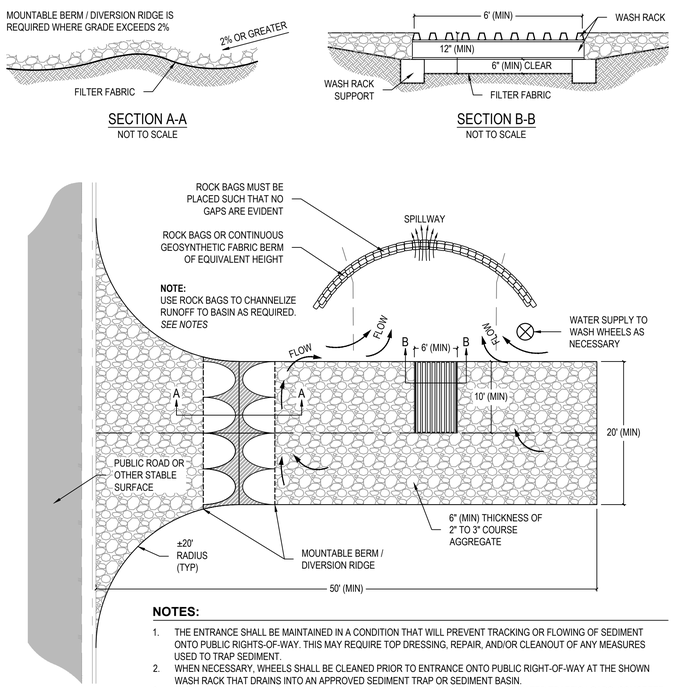
ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C2-1

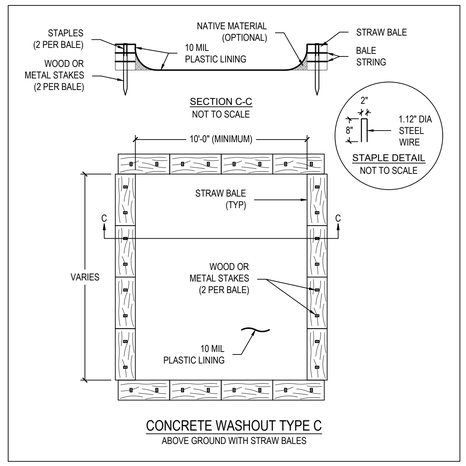
10.22.25



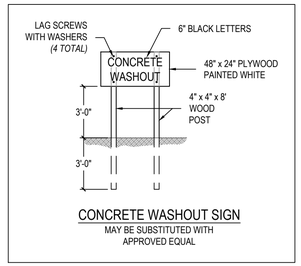
NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR, AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY AT THE SHOWN WASH RACK THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
3. USE A WASH RACK DESIGNED AND CONSTRUCTED/MANUFACTURED FOR THE ANTICIPATED TRAFFIC LOADS. CONCRETE, STEEL, OR OTHER MATERIALS ARE ACCEPTABLE. PRE-FABRICATED UNITS SUCH AS CATTLE GUARDS ARE ACCEPTABLE. USE A MINIMUM DIMENSION OF SIX FEET BY TEN FEET (6' x 10'). ORIENT DIRECTION OF RIBS AS SHOWN ON THE DETAIL.
4. INSTALL WASH RACK PRIOR TO, ALONG SIDE OF, OR AS PART OF THE TEMPORARY CONSTRUCTION ENTRANCE.
5. KEEP AREA UNDER WASH RACK FREE OF ACCUMULATED SEDIMENT. IF DAMAGED, REPAIR OR REPLACE WASH RACK.

1 TRACKOUT CONTROL MAT
NOT TO SCALE



CONCRETE WASHOUT TYPE C
ABOVE GROUND WITH STRAW BALES

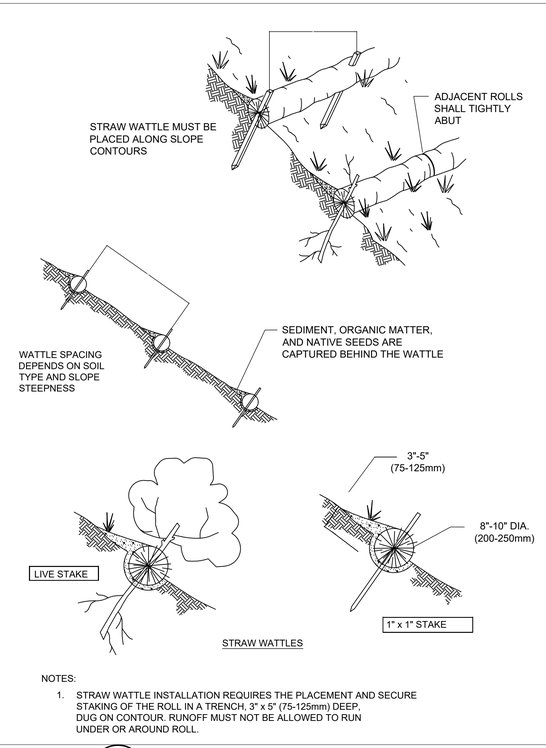


CONCRETE WASHOUT SIGN
MAY BE SUBSTITUTED WITH APPROVED EQUAL

NOTES:

1. THE ACTUAL LAYOUT OF THE CONCRETE WASHOUT FACILITY SHALL BE DETERMINED IN THE FIELD.
2. A CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN THIRTY FEET (30') OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
3. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF OR RECYCLED.
4. HOLES, DEPRESSIONS, OR OTHER GROUND DISTURBANCE CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE BACKFILLED, REPAIRED, AND STABILIZED TO PREVENT EROSION.

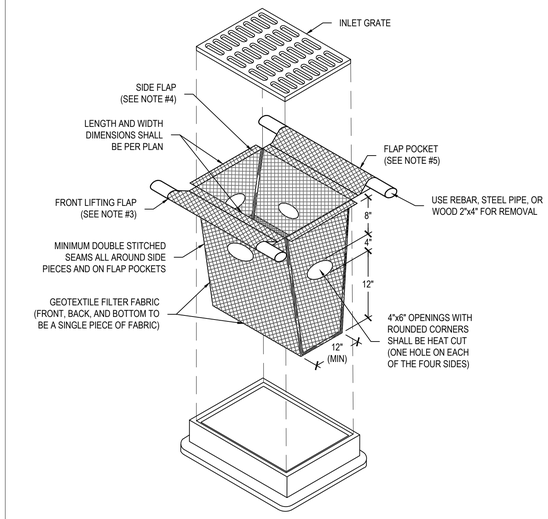
2 CONCRETE WASHOUT DETAIL
NOT TO SCALE



NOTES:

1. STRAW WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" x 5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

4 STRAW WATTLE INSTALLATION DETAIL
NOT TO SCALE



INLET PROTECT TYPE D
CAN BE INSTALLED IN INLETS
WITH OR WITHOUT CURB BOXES

NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES (3") OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FILTER FABRIC FOR FLAPS, TOP AND BOTTOM OF OUTSIDE FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES (2") LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2"x4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES:

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

3 INLET PROTECTION TYPE D
NOT TO SCALE

STATE OF MONTANA
CELINE SAUCIER
14499
REGISTERED PROFESSIONAL ENGINEER

Morrison Maierle
engineers - surveyors - planners - scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRE STATION #3
HELENA, MT 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.4700
www.dowlingarch.com

EROSION CONTROL DETAILS

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C2-2 (1)

10.22.25

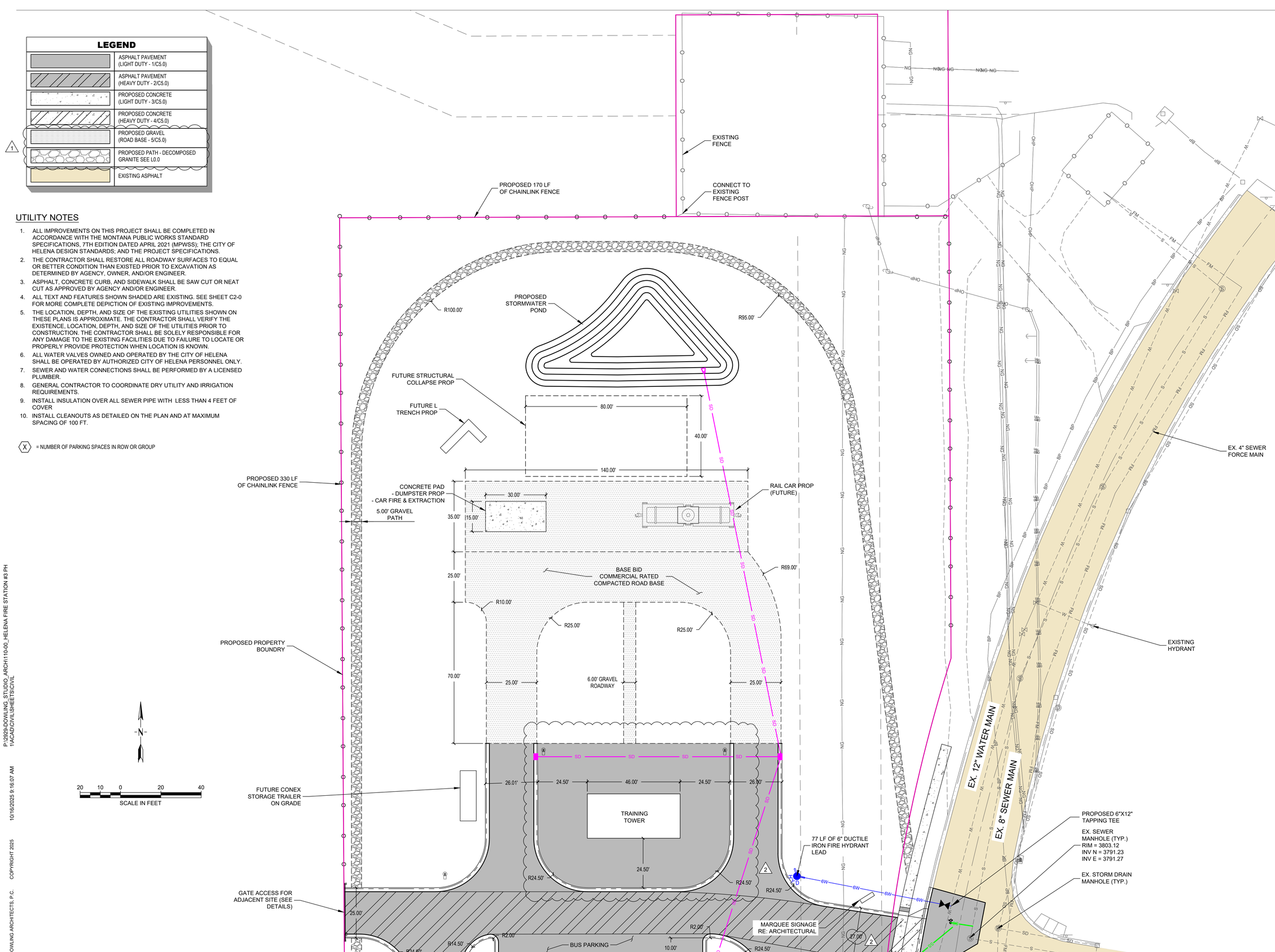
LEGEND

	ASPHALT PAVEMENT (LIGHT DUTY - 1/C5.0)
	ASPHALT PAVEMENT (HEAVY DUTY - 2/C5.0)
	PROPOSED CONCRETE (LIGHT DUTY - 3/C5.0)
	PROPOSED CONCRETE (HEAVY DUTY - 4/C5.0)
1	PROPOSED GRAVEL (ROAD BASE - 5/C5.0)
	PROPOSED PATH - DECOMPOSED GRANITE SEE L0.0
	EXISTING ASPHALT

UTILITY NOTES

1. ALL IMPROVEMENTS ON THIS PROJECT SHALL BE COMPLETED IN ACCORDANCE WITH THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, 7TH EDITION DATED APRIL 2021 (MPWSS); THE CITY OF HELENA DESIGN STANDARDS; AND THE PROJECT SPECIFICATIONS.
2. THE CONTRACTOR SHALL RESTORE ALL ROADWAY SURFACES TO EQUAL OR BETTER CONDITION THAN EXISTED PRIOR TO EXCAVATION AS DETERMINED BY AGENCY, OWNER, AND/OR ENGINEER.
3. ASPHALT, CONCRETE CURB, AND SIDEWALK SHALL BE SAW CUT OR NEAT CUT AS APPROVED BY AGENCY AND/OR ENGINEER.
4. ALL TEXT AND FEATURES SHOWN SHADED ARE EXISTING. SEE SHEET C2-0 FOR MORE COMPLETE DEPICTION OF EXISTING IMPROVEMENTS.
5. THE LOCATION, DEPTH, AND SIZE OF THE EXISTING UTILITIES SHOWN ON THESE PLANS IS APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE EXISTENCE, LOCATION, DEPTH, AND SIZE OF THE UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING FACILITIES DUE TO FAILURE TO LOCATE OR PROPERLY PROVIDE PROTECTION WHEN LOCATION IS KNOWN.
6. ALL WATER VALVES OWNED AND OPERATED BY THE CITY OF HELENA SHALL BE OPERATED BY AUTHORIZED CITY OF HELENA PERSONNEL ONLY.
7. SEWER AND WATER CONNECTIONS SHALL BE PERFORMED BY A LICENSED PLUMBER.
8. GENERAL CONTRACTOR TO COORDINATE DRY UTILITY AND IRRIGATION REQUIREMENTS.
9. INSTALL INSULATION OVER ALL SEWER PIPE WITH LESS THAN 4 FEET OF COVER
10. INSTALL CLEANOUTS AS DETAILED ON THE PLAN AND AT MAXIMUM SPACING OF 100 FT.

(X) = NUMBER OF PARKING SPACES IN ROW OR GROUP



MONTANA
CELINE SAUCIER
14499
REGISTERED PROFESSIONAL ENGINEER
10/16/25

Morrison Maierle
engineers - surveyors - planners - scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
234 N. Last Chance Gulch | Helena, MT 59601 | 406.457.4470
www.dowlingarchitects.com

HELENA FIRE STATION #3

HELENA, MT 59602

ENLARGED SITE AND UTILITY PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C3-1

10.22.25

LEGEND

	ASPHALT PAVEMENT (LIGHT DUTY - 1/C5.0)
	ASPHALT PAVEMENT (HEAVY DUTY - 2/C5.0)
	PROPOSED CONCRETE (LIGHT DUTY - 3/C5.0)
	PROPOSED CONCRETE (HEAVY DUTY - 4/C5.0)
	PROPOSED GRAVEL (ROAD BASE - 5/C5.0)
	PROPOSED PATH - DECOMPOSED GRANITE SEE L0.0
	EXISTING ASPHALT

UTILITY NOTES

1. ALL IMPROVEMENTS ON THIS PROJECT SHALL BE COMPLETED IN ACCORDANCE WITH THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, 7TH EDITION DATED APRIL 2021 (MPWSS); THE CITY OF HELENA DESIGN STANDARDS; AND THE PROJECT SPECIFICATIONS.
2. THE CONTRACTOR SHALL RESTORE ALL ROADWAY SURFACES TO EQUAL OR BETTER CONDITION THAN EXISTED PRIOR TO EXCAVATION AS DETERMINED BY AGENCY, OWNER, AND/OR ENGINEER.
3. ASPHALT, CONCRETE CURB, AND SIDEWALK SHALL BE SAW CUT OR NEAT CUT AS APPROVED BY AGENCY AND/OR ENGINEER.
4. ALL TEXT AND FEATURES SHOWN SHADED ARE EXISTING. SEE SHEET C2-0 FOR MORE COMPLETE DEPICTION OF EXISTING IMPROVEMENTS.
5. THE LOCATION, DEPTH, AND SIZE OF THE EXISTING UTILITIES SHOWN ON THESE PLANS IS APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE EXISTENCE, LOCATION, DEPTH, AND SIZE OF THE UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING FACILITIES DUE TO FAILURE TO LOCATE OR PROPERLY PROVIDE PROTECTION WHEN LOCATION IS KNOWN.
6. ALL WATER VALVES OWNED AND OPERATED BY THE CITY OF HELENA SHALL BE OPERATED BY AUTHORIZED CITY OF HELENA PERSONNEL ONLY.
7. SEWER AND WATER CONNECTIONS SHALL BE PERFORMED BY A LICENSED PLUMBER.
8. GENERAL CONTRACTOR TO COORDINATE DRY UTILITY AND IRRIGATION REQUIREMENTS.
9. INSTALL INSULATION OVER ALL SEWER PIPE WITH LESS THAN 4 FEET OF COVER
10. INSTALL CLEANOUTS AS DETAILED ON THE PLAN AND AT MAXIMUM SPACING OF 100 FT.

(X) = NUMBER OF PARKING SPACES IN ROW OR GROUP

N
20 10 0 20 40
SCALE IN FEET
GATE ACCESS FOR ADJACENT SITE (SEE DETAILS)
BUS PARKING
PROPOSED TRASH ENCLOSURE, SEE ARCHITECTURAL PLANS FOR ENCLOSURE AND SCREENING
BACKUP GENERATOR STORAGE ON 13'-6" X 5'-2" HEAVY DUTY CONCRETE PAD DIESEL STORAGE ON 6'-6"X4' HEAVY DUTY CONCRETE PAD
VAN ACCESSIBLE ADA SIGNS SEE C5-2
PROPOSED BIKE RACKS SEE LANDSCAPE PLANS
PROPOSED PROPERTY BOUNDRY
RETURN DRIVE
PROPOSED HELENA FIRE STATION #3 BUILDING FFE = 3807.50
RESPONSE DRIVE
135 LF OF 2" DOMESTIC TYPE K WATER SERVICE 6.5' COVER SEE PLUMBING PLANS FOR BUILDING CONTINUATION
135 LF OF 4" DI C151 FIRE SERVICE 6.5' COVER SEE PLUMBING PLANS FOR BUILDING CONTINUATION
9.5 LF OF 4" SEWER SERVICE @ 2% MIN SLOPE INV: 3803.00' SEE PLUMBING PLANS FOR BUILDING CONTINUATION
1,000 SAND OIL SEPARATOR INV IN: 3,802.81 INV OUT: 3,802.56
PROPOSED 340 LF OF CHAINLINK FENCE
EX. HELENA WASTEWATER MAINTENANCE BUILDING
EX. GAS METER
CONNECT TO EXISTING FENCE POST
FIREWISE DEMONSTRATION GARDEN AREAS SEE LANDSCAPE PLANS
PROPOSED CONCRETE PAVERS SEE LANDSCAPE PLANS
MONUMENT/MEMORIAL HISTORIC BELL LOCATION
EX. 4" FORCE SEWER MAIN
EX 5' SIDEWALK
EX. SIGN
EX. 20" WATER MAIN
EAST CUSTER AVENUE
4" TAP INTO 8" SEWER MAIN CONTRACTOR TO APPROXIMATELY INV: 3791.00 CONTRACTOR TO VERIFY INV ELEVATION
CLEANOUT INV: 3791.51
EX. 8" SEWER MAIN
EX. SEWER MANHOLE (TYP.) RIM = 3803.12 INV N = 3791.23 INV E = 3791.27
EX. STORM DRAIN MANHOLE (TYP.)
BOULEVARD DRIVEWAY APPROACH SEE COH STD DWG 5-5B
EX. 8" WATER MAIN
SHORTHORN AVENUE
CLEANOUT INV: 3792.46
CLEANOUT INV: 3795.58
324 LF OF 4" SEWER SERVICE @ 3.5\% MIN SLOPE
EX. 12" WATER MAIN
KELLEHER LANE
40.00' NATURAL GAS EASEMENT
EX. STORM DRAIN (TYP.)
EX. STORM DRAIN INLETS
CLEANOUT INV: 3798.50
EX. 4" FORCE SEWER MAIN
PROPOSED 2"X8" TAPPING TEE CONTRACTOR TO VERIFY EXISTING ELEVATION
PROPOSED 4"X8" TAPPING TEE CONTRACTOR TO VERIFY EXISTING ELEVATION
CLEANOUT INV: 3801.41
EX. ROAD STRIPING (TYP.)
EX. PROPERTY LINE
EX. UNDERGROUND GAS LINE
EX. HYDRANT

P:\2929-DOWLING_STUDIO_ARCH\110-00_HELENA FIRE STATION #3 PH 1\ACAD\CIVIL\SHEETS\CIVIL

10/16/2025 9:16:07 AM

MONTANA CELINE SAUCIER 44495 LICENSED PROFESSIONAL ENGINEER

Morrison Maierle
engineers · surveyors · planners · scientists
1055 Mount Ave. Missoula, MT 59801
406.542.8880
www.m-m.net

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470 | www.dow-arch.com

HELENA FIRE STATION #3
HELENA, MT 59602

ENLARGED SITE AND UTILITY PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C3-2

10.22.25

GENERAL NOTES

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, 7TH EDITION DATED APRIL 2021 (MPWSS), THE CITY OF HELENA DESIGN STANDARDS, LATEST EDITION, AND THE PROJECT SPECIFICATIONS.

2. LOCATIONS OF EXISTING OVERHEAD AND BURIED UTILITIES SHOWN ON THIS DRAWING ARE APPROXIMATE, AND SHALL BE VERIFIED AND MARKED UNDER THE DIRECTION OF THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES AND SHALL REPAIR ANY FACILITIES DAMAGED DURING PERFORMANCE OF THE WORK.

3. ALL STORM DRAIN INLETS AND MANHOLES SHALL BE THE SIZE INDICATED, AND CONSTRUCTED PER CITY OF HELENA STANDARD DETAILS: DETAIL # 4-1.

   MANHOLES INDICATING "RIM=" SHALL HAVE SOLID COVERS, THOSE INDICATING "GRATE=" SHALL HAVE SLOTTED (GRATED) COVERS, AND THOSE INDICATING "TBC=" SHALL HAVE CURB INLET TYPE SLOTTED COVERS.

   ALL PIPES LABELED "SD" (STORM DRAIN) ARE 12" DIA. OR LARGER AND SDR 35.

4. ALL ROOF/PATIO DRAINS SHALL CONNECT TO STORM DRAIN PIPING ON SITE AT 1.00% MIN. SLOPE. MINIMUM PIPE SIZE IS 6 INCH (5 FEET BEYOND BUILDING/PATIO WALL). USE SCH. 40 WITHIN 5 FEET OF BUILDING/PATIO WALL AND SDR 35 BEYOND. INSTALL CLEANOUTS AT 100-FOOT MAX. SPACING. COORDINATE PIPE LENGTHS AND LOCATIONS WITH THE ARCHITECTURAL PLANS AS REQUIRED TO COLLECT ALL DOWNSPOUTS. CONNECT TO STORM DRAIN PIPE WITH WYE FITTING.

5. SPOT ELEVATIONS ALONG CURB & GUTTER ARE TOP BACK OF CURB (TBC) ELEVATIONS FOR STANDARD (FULL HEIGHT) CURB, UNLESS INDICATED OTHERWISE. CURB FLARES, FLUSH CURBS AND TRANSITIONS MAY ALSO INCLUDE EDGE OF GUTTER (EG) ELEVATIONS. TO OBTAIN EG ELEVATION FOR STANDARD CURB SECTION, SUBTRACT 0.58' (SPILL CURB) OR 0.42' (CATCH CURB) FROM TBC ELEVATIONS ON PLAN.

7. LANDSCAPE SHALL BE GRADED TO DRAIN AWAY FROM ALL BUILDINGS. 6" OF BUILDING FOUNDATION REVEAL SHALL BE PROVIDED UNLESS OTHERWISE NOTED.

8. FOR CLARITY, SPOT ELEVATIONS HAVE BEEN TRUNCATED TO TWO DIGITS BEFORE THE DECIMAL. ADD BASE ELEVATION OF 3800.00 FEET TO REACH ACTUAL ELEVATIONS ON PROJECT DATUM.

LEGEND

- CATCH CURB
- SPILL CURB
- LAYDOWN CURB
- TRANSITION CURB (T)
- FLOW LINE
- GRADE BREAK
- XXXX — PROPOSED CONTOUR (WHOLE)
- MEG — MATCH EXISTING GRADE

KEY NOTES

1. RETENTION POND P-1
   VOLUME = 10,827 CF
   POND BOTTOM = 3795.00
   POND TOP = 3801.00
   4:1 SIDE SLOPES

811 Know what's below. Call before you dig.

THIS SITE HAS BEEN DESIGNED TO BE ACCESSIBLE TO INDIVIDUALS WITH DISABILITIES IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.

N

20 10 0 20 40
SCALE IN FEET

PROPOSED POND SPILLOVER PATH

INSTALL NEW 18" FETS AT OUTFALL WITH TRASH RACK AND RIP RAP OUTLET PROTECTION PER CITY OF HELENA DESIGN STANDARDS

194.14 LF 18" SDR 35 PVC SD PIPE @ 0.30%

118.00 LF 12" SDR 35 PVC SD PIPE @ -0.50%

125.32 LF 12" SDR 35 PVC SD PIPE @ -2.45%

TRAINING TOWER

SDI-4
NEW 3' x 2' STORM DRAIN INLET
STA 2+66.03, 115.20 LT
TBC = 3803.90
12" INV IN (E) = 3799.38
DEPTH = 6.99' (SUMP = 2.00')

SDI-5
NEW 48" DIAMETER STORM DRAIN INLET
STA 3+03.04, 0.00
TBC=3802.90
12" INV OUT (W) = 3798.79
12" INV OUT (S) = 3798.79
18" INV OUT (N) = 3798.29
DEPTH = 7.29' (SUMP = 2.00')

KELLEHER LANE

MONTANA CELINE SAUCIER 14499 REGISTERED PROFESSIONAL ENGINEER 10/22/25

Morrison Maierle
engineers - surveyors - planners - scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.4770
www.dowlingarchitects.com

HELENA FIRE STATION #3

HELENA, MT 59602

ENLARGED GRADING PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C4-1

10.22.25

GENERAL NOTES

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, 7TH EDITION DATED APRIL 2021 (MPWSS), THE CITY OF HELENA DESIGN STANDARDS, LATEST EDITION, AND THE PROJECT SPECIFICATIONS.
2. LOCATIONS OF EXISTING OVERHEAD AND BURIED UTILITIES SHOWN ON THIS DRAWING ARE APPROXIMATE, AND SHALL BE VERIFIED AND MARKED UNDER THE DIRECTION OF THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES AND SHALL REPAIR ANY FACILITIES DAMAGED DURING PERFORMANCE OF THE WORK.
3. ALL STORM DRAIN INLETS AND MANHOLES SHALL BE THE SIZE INDICATED, AND CONSTRUCTED PER CITY OF HELENA STANDARD DETAILS: DETAIL # 4-1.

   MANHOLES INDICATING "RIM=" SHALL HAVE SOLID COVERS, THOSE INDICATING "GRATE=" SHALL HAVE SLOTTED (GRATED) COVERS, AND THOSE INDICATING "TBC=" SHALL HAVE CURB INLET TYPE SLOTTED COVERS.

   ALL PIPES LABELED "SD" (STORM DRAIN) ARE 12" DIA. OR LARGER AND SDR 35.
4. ALL ROOF/PATIO DRAINS SHALL CONNECT TO STORM DRAIN PIPING ON SITE AT 1.00% MIN. SLOPE. MINIMUM PIPE SIZE IS 6 INCH (5 FEET BEYOND BUILDING/PATIO WALL). USE SCH. 40 WITHIN 5 FEET OF BUILDING/PATIO WALL AND SDR 35 BEYOND. INSTALL CLEANOUTS AT 100-FOOT MAX. SPACING. COORDINATE PIPE LENGTHS AND LOCATIONS WITH THE ARCHITECTURAL PLANS AS REQUIRED TO COLLECT ALL DOWNSPOUTS. CONNECT TO STORM DRAIN PIPE WITH WYE FITTING.
5. SPOT ELEVATIONS ALONG CURB & GUTTER ARE TOP BACK OF CURB (TBC) ELEVATIONS FOR STANDARD (FULL HEIGHT) CURB, UNLESS INDICATED OTHERWISE. CURB FLARES, FLUSH CURBS AND TRANSITIONS MAY ALSO INCLUDE EDGE OF GUTTER (EG) ELEVATIONS. TO OBTAIN EG ELEVATION FOR STANDARD CURB SECTION, SUBTRACT 0.58' (SPILL CURB) OR 0.42' (CATCH CURB) FROM TBC ELEVATIONS ON PLAN.
7. LANDSCAPE SHALL BE GRADED TO DRAIN AWAY FROM ALL BUILDINGS. 6" OF BUILDING FOUNDATION REVEAL SHALL BE PROVIDED UNLESS OTHERWISE NOTED.
8. FOR CLARITY, SPOT ELEVATIONS HAVE BEEN TRUNCATED TO TWO DIGITS BEFORE THE DECIMAL. ADD BASE ELEVATION OF 3800.00 FEET TO REACH ACTUAL ELEVATIONS ON PROJECT DATUM.

LEGEND

CATCH CURB
SPILL CURB
LAYDOWN CURB
TRANSITION CURB (T)
FLOW LINE
GRADE BREAK
XXXX — PROPOSED CONTOUR (WHOLE)
MEG — MATCH EXISTING GRADE

THIS SITE HAS BEEN DESIGNED TO BE ACCESSIBLE TO INDIVIDUALS WITH DISABILITIES IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.

811 Know what's below. Call before you dig.

PROPOSED BUILDING
FFE = 3807.50
EX. HELENA WASTEWATER MAINTENANCE BUILDING
EAST CUSTER AVENUE
KELLEHER LANE
SHORTHORN AVENUE
SDI-1
NEW 48" DIAMETER STORM DRAIN INLET
STA 0+29.06, 0.00
TBC=3806.67
12" INV OUT (NE) = 3802.96
DEPTH = 5.19' (SUMP = 2.00')
SDMH-1
NEW 48"DIAMETER STORM DRAIN MANHOLE
STA 1+24.40, 0.00
RIM = 3806.03
12" INV IN (SW) = 3802.26
8" INV IN (S) = 3802.26
12" INV OUT (NE) = 3802.26
DEPTH = 5.76' (SUMP = 2.00')
SDI-2
NEW 48" DIAMETER STORM DRAIN INLET
STA 1+43.60, 0.00
TBC=3806.17
12" INV IN (SW) = 3802.11
12" INV OUT (E) = 3802.11
DEPTH = 5.70' (SUMP = 2.00')
SDI-3
NEW 48" DIAMETER STORM DRAIN INLET
STA 1+77.72, 0.00
TBC=3805.91
12" INV IN (N) = 3801.80
12" INV IN (W) = 3801.80
DEPTH = 5.75' (SUMP = 2.00')
95.34 LF 12" SDR 35 PVC SD PIPE @ 0.77%
19.20 LF 12" SDR 35 PVC SD PIPE @ 0.90%
34.12 LF 12" SDR 35 PVC SD PIPE @ 0.96%
125.32 LF 12" SDR 35 PVC SD PIPE @ -2.45%
66.40 LF 8" SDR 35 PVC SD PIPE @ 1.92% INV: 3803.50'
MATCH EX. CURB
NEW DRIVE APPROACH AND ASPHALT RESTORATION PER CITY OF HELENA STANDARDS. SAW-CUT AND REMOVE EXISTING CURB AND ASPHALT TO PROVIDE SMOOTH TRANSITION. MATCH EXISTING ELEVATIONS AT TIE-INS
NEW DETECTABLE WARNING SURFACE (TYP.)
REPLACE EXISTING STANDARD CURB INLET GRATE WITH NEW 2'X3' RECTANGULAR LAYDOWN LID GRATE @ FL: 3805.12
NEW DRIVE APPROACH AND ASPHALT RESTORATION PER CITY OF HELENA STANDARDS. SAW-CUT AND REMOVE EXISTING CURB AND ASPHALT TO PROVIDE SMOOTH TRANSITION. MATCH EXISTING ELEVATIONS AT TIE-INS
20 10 0 20 40
SCALE IN FEET

P:\2929-DOWLING_STUDIO_ARCH\110-00_HELENA FIRE STATION #3 PH 1\ACAD\CIVIL\SHEETS\CIVIL

10/16/2025 9:16:07 AM

MONTANA CELINE SAUCIER 45499 LICENSED PROFESSIONAL ENGINEER 10/22/2025

Morrison Maierle
engineers · surveyors · planners · scientists
1055 Mount Ave. Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRE STATION #3
HELENA, MT 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dsa-mt.com

ENLARGED GRADING PLAN

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: JZ

C4-2

10.22.25

BUILDING LOAD SUMMARY

Notes:

Volts: 120/208 Wye
Phases: 3
Wires: 4
A.F.C.: 66,442
Service Rating: 800 A

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	11044 VA	100.00%	11044 VA	**Total Conn. Load:**	225793 VA
Heating	7800 VA	100.00%	7800 VA	**Total Est. Demand:**	187728 VA
Lighting	11074 VA	125.00%	13843 VA	**Total Conn. Current:**	627 A
Motor	13851 VA	101.83%	14104 VA	**Total Est. Demand Current:**	521 A
Power	89850 VA	100.00%	89850 VA		
Receptacle	92174 VA	55.42%	51087 VA		

2

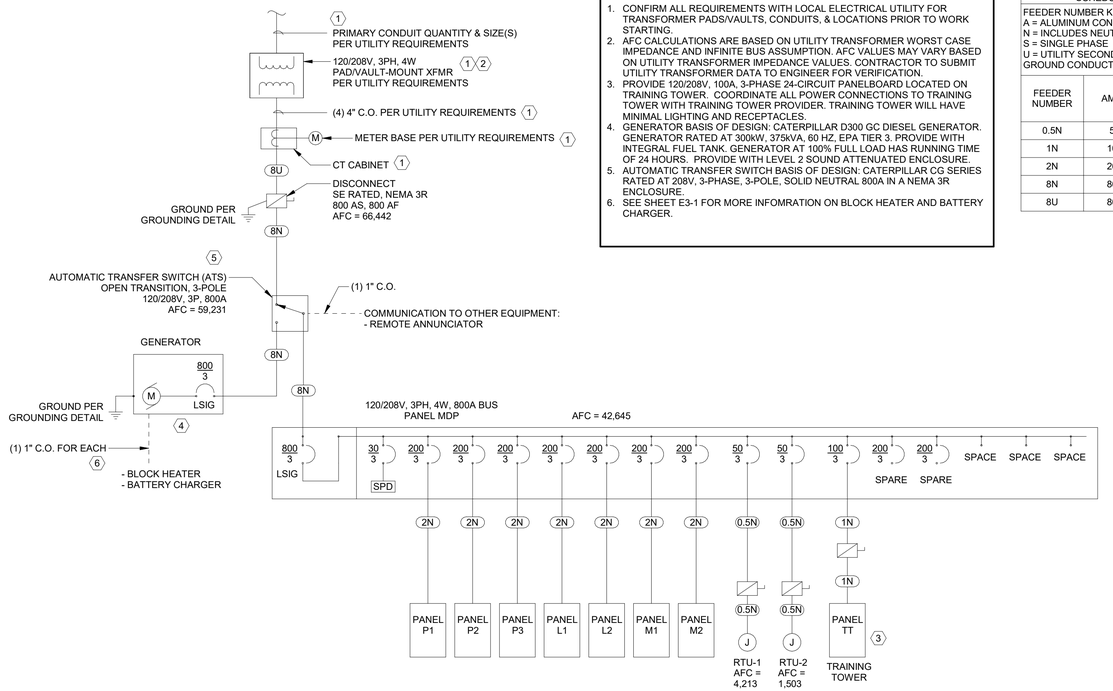
INCOMING ELECTRICAL SERVICE DIVISION OF RESPONSIBILITY

MORRISON-MAIERLE HAS CONTACTED THE UTILITY BUT HAS NOT RECEIVED FINAL REQUIREMENTS IN WRITING FROM THEM. THESE DRAWINGS INDICATE OUR BEST ESTIMATION OF THEIR REQUIREMENTS. PRIOR TO BID, CONTACT THE UTILITY AND OBTAIN THOSE REQUIREMENTS IN WRITING. NOTE THAT ALL SERVICE INSTALLATION WORK SHALL BE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE SERVING UTILITY.

UTILITY:	NORTHWESTERN ENERGY
ADDRESS:	1315 N. LAST CHANCE GULCH, HELENA, MT 59601
CONTACT:	KYLE WOODLIEF
PHONE:	(888) 467-2669
E-MAIL:	KYLE.WOODLIEF@NORTHWESTERN.COM

ITEM	EC	UTILITY	NOTES
PRIMARY TRENCH	X		7
PRIMARY CONDUIT	X		1
PRIMARY CONDUCTORS		X	
TRANSFORMER		X	
TRANSFORMER PAD/VAULT	X		2
TRANSFORMER CONNECTIONS		X	
SECONDARY TRENCH	X		7
SECONDARY CONDUIT	X		3
SECONDARY CONDUCTORS		X	
C/T ENCLOSURE	X		4
CURRENT TRANSFORMERS		X	6
METER SOCKET	X		5
METER		X	
MAIN SERVICE DISCONNECT	X		

NOTES:
1. (2) 4" CONDUIT STUBOUTS 5 FEET FROM PAD (SEE ONE LINE DIAGRAM).
2. PROVIDE TRANSFORMER GROUND MOUNTING PROVISION IN ACCORDANCE WITH UTILITY REQUIREMENTS.
3. SEE ONE LINE DIAGRAM AND FEEDER SCHEDULE.
4. WALL MOUNT WITH LUGS AND BUS BAR. SIZE ENCLOSURE, LUGS, AND BAR PER UTILITY REQUIREMENTS.
5. VERIFY PROPER METER BASE CONFIGURATION WITH UTILITY REQUIREMENTS (RING VS. RINGLESS, NO. OF TERMINALS, ETC.)
6. CURRENT TRANSFORMERS ARE FURNISHED BY UTILITY AND INSTALLED BY EC.
7. COORDINATE TRENCHING WITH UTILITY REQUIREMENTS.



1 ONE LINE DIAGRAM
N.T.S.

KEY NOTES:

1. CONFIRM ALL REQUIREMENTS WITH LOCAL ELECTRICAL UTILITY FOR TRANSFORMER PADS/VAULTS, CONDUITS, & LOCATIONS PRIOR TO WORK STARTING.
2. AFC CALCULATIONS ARE BASED ON UTILITY TRANSFORMER WORST CASE IMPEDANCE AND INFINITE BUS ASSUMPTION. AFC VALUES MAY VARY BASED ON UTILITY TRANSFORMER IMPEDANCE VALUES. CONTRACTOR TO SUBMIT UTILITY TRANSFORMER DATA TO ENGINEER FOR VERIFICATION.
3. PROVIDE 120/208V, 100A, 3-PHASE 24-CIRCUIT PANELBOARD LOCATED ON TRAINING TOWER. COORDINATE ALL POWER CONNECTIONS TO TRAINING TOWER WITH TRAINING TOWER PROVIDER. TRAINING TOWER WILL HAVE MINIMAL LIGHTING AND RECEPTACLES.
4. GENERATOR BASIS OF DESIGN: CATERPILLAR D300 GC DIESEL GENERATOR. GENERATOR RATED AT 300KW, 375kVA, 60 HZ, EPA TIER 3. PROVIDE WITH INTEGRAL FUEL TANK. GENERATOR AT 100% FULL LOAD HAS RUNNING TIME OF 24 HOURS. PROVIDE WITH LEVEL 2 SOUND ATTENUATED ENCLOSURE.
5. AUTOMATIC TRANSFER SWITCH BASIS OF DESIGN: CATERPILLAR CG SERIES RATED AT 208V, 3-PHASE, 3-POLE, SOLID NEUTRAL 800A IN A NEMA 3R ENCLOSURE.
6. SEE SHEET E3-1 FOR MORE INFOMRATION ON BLOCK HEATER AND BATTERY CHARGER.

FEEDER SCHEDULE - COPPER

SCHEDULE IS BASED ON 75 DEGREE C. COPPER CONDUCTORS IN NEC 310.16 TABLE.

FEEDER NUMBER KEY:
A = ALUMINUM CONDUCTORS
N = INCLUDES NEUTRAL CONDUCTOR
S = SINGLE PHASE
U = UTILITY SECONDARY WITH NO GROUND CONDUCTOR

NOTE: GROUNDING CONDUCTOR IS SIZED ACCORDING TO NEC 250.122 TABLE, UNLESS FEEDER NUMBER IS FOLLOWED BY AN ASTERISK (*) INDICATING THAT THE GROUNDING CONDUCTOR IS SIZED ACCORDING TO NEC 250.66 TABLE.

FEEDER NUMBER	AMPS	WIRE QTY PER CONDUIT	SETS IN PARALLEL	75 DEG COPPER			
				CONDUIT	PHASE QTY AND AWG	NEUTRAL AWG	GROUND AWG
0.5N	50	4W	1	1"	3#8	1#8	1#10
1N	100	4W	1	1-1/2"	3#2	1#2	1#8
2N	200	4W	1	2-1/2"	3#3/0	1#3/0	1#4
8N	800	4W	3	2-1/2"	3#300	1#300	1#1/0
8U	800	4W	3	2-1/2"	3#300	1#300	--

BRIAN M. MCDIVITT
59876 PE
REGISTERED PROFESSIONAL ENGINEER
MONTANA
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net
Morrison Maierle
engineers - surveyors - planners - scientists

HELENA FIRESTATION #3

HELENA, MT. 59602

SHIVEHATTERY ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
724 N. Last Chance Gulch | Helena, MT 59601 | 406.457.8400
www.dowling.com

ONE-LINE DIAGRAM

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: MMI

E2-1

10.22.25

Branch Panel: P1

Equipment Notes:

Location: Space 12 | **Supply From:** MDP | **Mounting:** Surface | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.F.C.: 32,059 | **Mains Type:** MLO | **Mains Rating:** 225 A

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A		B		C		Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	RCPT - CONFERENCE ROOM		Receptacle	20 A	1	720	360					1	20 A	Receptacle		RCPT - BATHROOM	2
3	RCPT - CONFERENCE ROOM		Receptacle	20 A	1			720	180			1	20 A	Receptacle		RCPT - HOSE TOWER	4
5	RCPT - OFFICE 4		Receptacle	20 A	1					900	360	1	20 A	Receptacle	P	RCPT - DRINKING FOUNTAIN	6
7	RCPT - OFFICE 3		Receptacle	20 A	1	900	1080					1	20 A	Receptacle		RCPT - SCBA / TURNOUT	8
9	RCPT - OFFICE 2		Receptacle	20 A	1			900	180			1	20 A	Receptacle		RCPT - BATHROOM	10
11	RCPT - OFFICE 1		Receptacle	20 A	1					900	1012	1	20 A	Motor		MTR - EF-5	12
13	RCPT - CLASSROOM		Receptacle	20 A	1	900	360					1	20 A	Receptacle		RCPT - IT ROOM	14
15	RCPT - CLASSROOM		Receptacle	20 A	1			900	360			1	20 A	Receptacle		RCPT - IT ROOM	16
17	RCPT - CLASSROOM FLOOR BOXES		Receptacle	20 A	1					1440	360	1	20 A	Receptacle		RCPT - IT ROOM	18
19	RCPT - BABY DROP BOX		Receptacle	20 A	1	180	360					1	20 A	Receptacle		RCPT - IT ROOM	20
21	RCPT - CLASSROOM COUNTER TOP		Receptacle	20 A	1			1200	900			1	20 A	Receptacle		RCPT - STORAGE	22
23	RCPT - CLASSROOM COUNTER TOP		Receptacle	20 A	1					120	720	1	20 A	Receptacle		RCPT - HOSE TOWER	24
25	RCPT - CLASSROOM COUNTER TOP		Receptacle	20 A	1	1200	500					1	20 A	Power		PWR - DOOR POWER	26
27	RCPT - CLASSROOM UIC REFRIGERATOR	P	Receptacle	20 A	1			1000	300			1	20 A	Power		Power Space 30	28
29	RCPT - VESTIBULE AND LOBBY		Receptacle	20 A	1					720	0	1	20 A	--		SPARE	30
31	RCPT - HALLWAY AND WORK AREA		Power;...	20 A	1	1130	0					1	20 A	--		SPARE	32
33	RCPT - WORK AREA PRINTER		Receptacle	20 A	1			1200	0			1	20 A	--		SPARE	34
35	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	36
37	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	38
39	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	40
41	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	42
				Total Load:		7690 VA		7840 VA		6532 VA							
				Total Amps:		66 A		67 A		54 A							

Circuit Notes:

A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	1012 VA	125.00%	1265 VA		
Power	850 VA	100.00%	850 VA	**Total Conn. Load:**	22062 VA
Receptacle	20200 VA	74.75%	15100 VA	**Total Est. Demand:**	17215 VA
				Total Conn.:	61 A
				Total Est. Demand:	48 A

Branch Panel: P2

Equipment Notes:

Location: Space 12 | **Supply From:** MDP | **Mounting:** Surface | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.F.C.: 28,520 | **Mains Type:** MLO | **Mains Rating:** 225 A

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A		B		C		Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1												1	20 A	--		SPARE	2
3	PWR - TURNOUT DRYER		Receptacle	20 A	2	1199	0					1	20 A	Receptacle		RCPT - HOSE TOWER	4
5								1199	2496			2	30 A	Receptacle		PWR - COMPRESSOR	6
7	Power Space 11		Power	20 A	2	4160	3750										8
9	PWR -ROTO-DECON		Receptacle	35 A	2			2496	3750			2	50 A	Receptacle		PWR - SCBA CYLINDER FILL	10
11										2496	0						12
13	RCPT - NORTH WALL APPARATUS BAY		Receptacle	20 A	1	540	0					2	30 A	--		SPARE	14
15	RCPT - POWER REEL APPARATUS BAY		Receptacle	20 A	1			180	0			1	20 A	--		SPARE	16
17	RCPT - POWER REEL APPARATUS BAY		Receptacle	20 A	1					180	540	1	20 A	Receptacle		RCPT - NORTH EXTERIOR	18
19	RCPT - POWER REEL APPARATUS BAY		Receptacle	20 A	1	180	540					1	20 A	Receptacle		RCPT - APPARATUS BAY EXTERIOR	20
21	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1			1012	540			1	20 A	Receptacle		RCPT - APPARATUS BAY EXTERIOR	22
23	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1					1012	0	1	20 A	--		SPARE	24
25	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1	1012	0					1	20 A	--		SPARE	26
27	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1			1012	--			1	--	--		PROVISION	28
29	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1					1012	--	1	--	--		PROVISION	30
31	MTR - OVERHEAD DOOR APPARATUS BAY		Motor	20 A	1	1012	--					1	--	--		PROVISION	32
33	RCPT - SOUTH WALL APPARATUS BAY		Receptacle	20 A	1			720	--			1	--	--		PROVISION	34
35	SPARE		--	20 A	1					0	--	1	--	--		PROVISION	36
37	SPARE		--	20 A	1	0	--					1	--	--		PROVISION	38
39	SPARE		--	20 A	1			0	--			1	--	--		PROVISION	40
41	SPARE		--	20 A	1					0	--	1	--	--		PROVISION	42
				Total Load:		12393 VA		13405 VA		11896 VA							
				Total Amps:		104 A		112 A		99 A							

Circuit Notes:

A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	6072 VA	104.17%	6325 VA		
Power	8320 VA	100.00%	8320 VA	**Total Conn. Load:**	37694 VA
Receptacle	23302 VA	71.46%	16651 VA	**Total Est. Demand:**	31296 VA
				Total Conn.:	105 A
				Total Est. Demand:	87 A

Branch Panel: L1

Equipment Notes:

Location: Space 12 | **Supply From:** MDP | **Mounting:** Surface | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.F.C.: 25,684 | **Mains Type:** MLO | **Mains Rating:** 225 A

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A		B		C		Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	LTG - APPARATUS BAY		Lighting	20 A	1	1360	312					2	20 A	Lighting		LTG - SITE POLES	2
3	LTG - APPARATUS BAY		Lighting	20 A	1			1360	312								4
5	LTG - SCBA, TURNOUT, ELEC, BATHROOM		Lighting	20 A	1					615	208	2	20 A	Lighting		LTG - SITE POLES	6
7	LTG - HALLWAY, OFFICE, WORK,...		Lighting	20 A	1	857	208										8
9	LTG - CLASSROOM, STORAGE, IT		Lighting	20 A	1			1016	156			2	20 A	Lighting		LTG - SITE POLES	10
11	LTG - LOBBY, VEST, HOSE TOWER		Lighting	20 A	1					656	156						12
13	LTG - NORTH EXTERIOR BUILDING		Lighting	20 A	1	388	78					1	20 A	Lighting		LTG - FLAG POLE COURTYARD	14
15	LTG - EXTERIOR APPARATUS BAY AND...		Lighting	20 A	1			472	156			1	20 A	Lighting		LTG - FLAG POLE	16
17	LTG - SITE ENTRANCE SIGN		Lighting	20 A	1					84	135	1	20 A	Lighting		LTG - OUTDOOR LIVING SPACE	18
19	RCPT - POLE LIGHT		Receptacle	20 A	1	360	500					1	20 A	Power		PWR - BUILDING SIGNAGE	20
21	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	22
23	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	24
25	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	26
27	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	28
29	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	30
31	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	32
33	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	34
35	PROVISION		--	--	1					--	--	1	--	--		PROVISION	36
37	PROVISION		--	--	1	--	--					1	--	--		PROVISION	38
39	PROVISION		--	--	1			--	--			1	--	--		PROVISION	40
41	PROVISION		--	--	1					--	--	1	--	--		PROVISION	42
				Total Load:		4063 VA		3472 VA		1854 VA							
				Total Amps:		36 A		31 A		15 A							

Circuit Notes:

A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Lighting	8528 VA	125.00%	10660 VA		
Power	500 VA	100.00%	500 VA	**Total Conn. Load:**	9388 VA
Receptacle	360 VA	100.00%	360 VA	**Total Est. Demand:**	11520 VA
				Total Conn.:	26 A
				Total Est. Demand:	32 A

Branch Panel: M1

Equipment Notes:

Location: Space 12 | **Supply From:** MDP | **Mounting:** Surface | **Enclosure:** Type 1
Volts: 120/208 Wye | **Phases:** 3 | **Wires:** 4
A.F.C.: 21,424 | **Mains Type:** MLO | **Mains Rating:** 225 A

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A		B		C		Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1						577	888					1	20 A	HVAC		PWR - FN-1	2
3	MTR - EF-1		HVAC	20 A	3			577	1800			1	20 A	Heating		PWR - EH-1	4
5										577	2000	2	30 A	Power		PWR - EH-3	6
7						300	2000										8
9	MTR - EF-2		HVAC	20 A	3			300	987								10
11										300	987	3	30 A	HVAC		MTR - EF-8	12
13	PWR - EH-2		Heating	20 A	1	1500	987										14
15	MTR - EF-3, EF-4		Motor	20 A	1			2024	1000			1	20 A	Power	P	PWR - TRAP PRIMERS TP-1	16
17	MTR - CU-1		HVAC	35 A	2					2163	360	1	20 A	Receptacle		RCPT - ROOF	18
19						2163	1500					1	20 A	Heating		PWR - EH-4	20
21	PWR - AUTOMATIC GATE		Power	20 A	1			1500	250			2	20 A	Power		PWR - GENERATOR BLOCK HEATER	22
23	PWR - TRUCK BLOCK HEATERS		Power	20 A	1					1000	250						24
25	PWR - TRUCK BLOCK HEATERS		Power;...	20 A	1	1180	500					1	20 A	Power		PWR - GENERATOR BATTERY CHARGER	26
27	PWR - FIRE ALARM CONTROL PANEL	R	Power	20 A	1			500	0			1	20 A	--		SPARE	28
29	PWR - LIGHTING CONTROL PANEL		Power	20 A	1					500	0	1	20 A	--		SPARE	30
31						3038	0					1	20 A	--		SPARE	32
33	PWR - PRESSURE WASHER PW-1		Power	50 A	3			3038	0			1	20 A	--		SPARE	34
35										3038	0	1	20 A	--		SPARE	36
37	PWR - UNIT HEATER UH-1		HVAC	20 A	1	120	0					1	20 A	--		SPARE	38
39	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	40
41	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	42
				Total Load:		14753 VA		11976 VA		11175 VA							
				Total Amps:		124 A		101 A		93 A							

Circuit Notes:

A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP
R: RED BREAKER FACP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	10924 VA	100.00%	10924 VA		
Heating	4800 VA	100.00%	4800 VA	**Total Conn. Load:**	37903 VA
Motor	2024 VA	112.50%	2277 VA	**Total Est. Demand:**	38156 VA
Power	19615 VA	100.00%	19615 VA	**Total Conn.:**	105 A
Receptacle	540 VA	100.00%	540 VA	**Total Est. Demand:**	106 A

MONTANA
BRIAN M. MCDIVITT
59876 PE
REGISTERED PROFESSIONAL ENGINEER

1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

Morrison Maierle
engineers - surveyors - planners - scientists

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dowlingarch.com

HELENA FIRESTATION #3
HELENA, MT. 59602

ELECTRICAL SCHEDULES

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: MMI

E2-6

10.22.25

Branch Panel: P3

Equipment Notes:

Location: Space 39 **Volts:** 120/208 Wye **A.F.C.:** 9,547
Supply From: MDP **Phases:** 3 **Mains Type:** MLO
Mounting: Recessed **Wires:** 4 **Mains Rating:** 225 A
Enclosure: Type 1

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A	A	B	B	C	C	Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	RCPT - DORM ROOM 5		Motor;...	20 A	1	945	4160					2	50 A	Receptacle		RCPT - RANGE	2
3	RCPT - DORM ROOM 4		Motor;...	20 A	1			945	4160								4
5	RCPT - DORM ROOM 3		Motor;...	20 A	1					945	1012	1	20 A	Motor		MTR - RANGE HOOD	6
7	RCPT - DORM ROOM 2		Motor;...	20 A	1	945	180					1	20 A	Receptacle	P	RCPT - KITCHEN ISLAND	8
9	RCPT - DORM ROOM 1		Motor;...	20 A	1			945	400			1	20 A	Power		PWR - MOTORIZED SHADES DAY ROOM	10
11	PWR - LOW FREQ. SMOKE DETECTOR...		Power	20 A	1					50	180	1	20 A	Receptacle		RCPT - FITNESS	12
13	RCPT - DAY ROOM		Receptacle	20 A	1	1080	180					1	20 A	Receptacle		RCPT - FITNESS	14
15	RCPT - DAY ROOM REFRIGERATOR	P	Receptacle	20 A	1			100	180			1	20 A	Receptacle		RCPT - FITNESS	16
17	RCPT - DAY ROOM REFRIGERATOR	P	Receptacle	20 A	1					1000	180	1	20 A	Receptacle		RCPT - FITNESS	18
19	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1	1000	180					1	20 A	Receptacle		RCPT - FITNESS	20
21	RCPT - DAY ROOM MICROWAVE	P	Receptacle	20 A	1			1500	180			1	20 A	Receptacle		RCPT - FITNESS	22
23	RCPT - DAY ROOM MICROWAVE	P	Receptacle	20 A	1					1500	180	1	20 A	Receptacle		RCPT - FITNESS	24
25	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1	1000	180					1	20 A	Receptacle		RCPT - FITNESS	26
27	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1			1000	180			1	20 A	Receptacle		RCPT - FITNESS	28
29	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1					1000	900	1	20 A	Receptacle		RCPT - OUTDOOR LIVING	30
31	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1	1000	720					1	20 A	Receptacle		RCPT - WATCH ROOM	32
33	RCPT - DAY ROOM DISPOSAL GD-1	P	Receptacle	30 A	1			2880	720			1	20 A	Receptacle		RCPT - WATCH ROOM	34
35	RCPT - DAY ROOM DISPOSAL GD-1	P	Receptacle	30 A	1					2880	900	1	20 A	Receptacle		RCPT - WATCH ROOM	36
37	RCPT - DAY ROOM KITCHEN COUNTER		Receptacle	20 A	1	1000	540					1	20 A	Receptacle		RCPT - WATCH ROOM	38
39	RCTP - DAY ROOM DISHWASHER	P	Receptacle	20 A	1			1200	720			1	20 A	Receptacle		RCPT - WATCH ROOM	40
41	RCPT - JAN/LAUNDRY		Receptacle	20 A	1					360	180	1	20 A	Receptacle		RCPT - BABY BOX WATCH ROOM	42
43	RCPT - WASHER	P	Receptacle	20 A	1	180	360					1	20 A	Receptacle		RCPT - RESTROOMS	44
45	RCPT - DRYER	P	Receptacle	30 A	2			1440	2024			1	20 A	Motor		MTR - EF-6, EF-7	46
47										1440	950	1	20 A	Power;...		RCPT - HALLWAY	48
49	PWR - TRUCK BLOCK HEATERS		Power	20 A	1	1000	500					1	20 A	Power		PWR - DOOR POWER	50
51	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	52
53	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	54
55	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	56
57	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	58
59	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	60
					Total Load:	15150 VA		18574 VA		13657 VA							
					Total Amps:	128 A		157 A		114 A							

Circuit Notes:
A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	3261 VA	107.76%	3514 VA		
Power	2000 VA	100.00%	2000 VA	**Total Conn. Load:**	47381 VA
Receptacle	42120 VA	61.87%	26060 VA	**Total Est. Demand:**	31574 VA
				Total Conn.:	132 A
				Total Est. Demand:	88 A

Branch Panel: L2

Equipment Notes:

Location: Space 39 **Volts:** 120/208 Wye **A.F.C.:** 9,547
Supply From: MDP **Phases:** 3 **Mains Type:** MLO
Mounting: Recessed **Wires:** 4 **Mains Rating:** 225 A
Enclosure: Type 1

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A	A	B	B	C	C	Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	LTG - DORM AND LOCKER		Lighting	20 A	1	460	0					1	20 A	--		SPARE	2
3	LTG - HALLWAY 123, RESRTOOMS 124,125		Lighting	20 A	1			304	0			1	20 A	--		SPARE	4
5	LTG - DAYROOM, AIRLOCK		Lighting	20 A	1					873	0	1	20 A	--		SPARE	6
7	LTG - WATCHROOM, FITNESS, STORAGE		Lighting; Motor	20 A	1	770	0					1	20 A	--		SPARE	8
9	LTG - FIRE RISER, MAINT, JANITOR		Lighting	20 A	1			249	0			1	20 A	--		SPARE	10
11	RCPT - FLAG POLE		Receptacle	20 A	1					180	0	1	20 A	--		SPARE	12
13	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	14
15	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	16
17	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	18
19	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	20
21	SPARE		--	20 A	1			0	--			1	--	--		PROVISION	22
23	SPARE		--	20 A	1					0	--	1	--	--		PROVISION	24
25	SPARE		--	20 A	1	0	--					1	--	--		PROVISION	26
27	PROVISION		--	--	1			--	--			1	--	--		PROVISION	28
29	PROVISION		--	--	1					--	--	1	--	--		PROVISION	30
31	PROVISION		--	--	1	--	--					1	--	--		PROVISION	32
33	PROVISION		--	--	1			--	--			1	--	--		PROVISION	34
35	PROVISION		--	--	1					--	--	1	--	--		PROVISION	36
37	PROVISION		--	--	1	--	--					1	--	--		PROVISION	38
39	PROVISION		--	--	1			--	--			1	--	--		PROVISION	40
41	PROVISION		--	--	1					--	--	1	--	--		PROVISION	42
					Total Load:	1230 VA		553 VA		1053 VA							
					Total Amps:	11 A		5 A		9 A							

2

Circuit Notes:
A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Lighting	2546 VA	125.00%	3183 VA		
Motor	110 VA	112.50%	124 VA	**Total Conn. Load:**	2836 VA
Receptacle	180 VA	100.00%	180 VA	**Total Est. Demand:**	3486 VA
				Total Conn.:	8 A
				Total Est. Demand:	10 A

Branch Panel: M2

Equipment Notes:

Location: Space 21 **Volts:** 120/208 Wye **A.F.C.:** 8,317
Supply From: MDP **Phases:** 3 **Mains Type:** MLO
Mounting: Surface **Wires:** 4 **Mains Rating:** 225 A
Enclosure: Type 1

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A	A	B	B	C	C	Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	RCPT - REPAIR / MAINT PLUG STRIP		Receptacle	20 A	1	720	1872					1	20 A	Power; Motor;...		MTR/RCPT - PP-1 / FIRE RISER	2
3	RCPT - REPAIR / MAINT PLUG STRIP		Receptacle	20 A	1			540	1500			1	20 A	Heating		PWR - EH-6	4
5	RCPT - GEN STORAGE		Receptacle	20 A	1					900	180	1	20 A	Receptacle		RCPT - VE-1	6
7	RCPT - ICE MAKER		Receptacle	20 A	1	720	576					1	20 A	Receptacle		RCPT - RTH-1	8
9									576			1	20 A	Receptacle		RCPT - RTH-2	10
11	PWR - DRINKING FOUNTAIN	P	Power	20 A	1					500	500	1	20 A	Power		PWR - MOTORIZED SHADES APPARATUS...	12
13	PWR - PRESSURE WASHER PW-2		Power	50 A	3	3038	180					1	20 A	Receptacle		RCPT - ROOF	14
15								3038	180			1	20 A	Receptacle		RCPT - BOILER B-1	16
17										3038	500	1	20 A	Power	Q	PWR - HEAT TRACE CABLE	18
19	PWR - UNIT HEATER UH-2		HVAC	20 A	1	120	360					1	20 A	Motor		MTR - P-1, P-2	20
21	PWR - EH-5		Heating	20 A	1			1500	180			1	20 A	Receptacle		RCPT - GF-1	22
23	PWR - AIR COMPRESSOR		Power	30 A	3					2102	180	1	20 A	Receptacle		RCPT - REPAIR/MAINT. BOILER SHUT OFF	24
25						2102	0					1	20 A	--		SPARE	26
27								2102	0			1	20 A	--		SPARE	28
29	PWR - WATER HEATER DWH-1		Receptacle	20 A	1					180	0	1	20 A	--		SPARE	30
31	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	32
33	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	34
35	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	36
37	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	38
39	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	40
41	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	42
					Total Load:	9688 VA		9616 VA		8080 VA							
					Total Amps:	83 A		82 A		67 A							

2

Circuit Notes:
A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	120 VA	100.00%	120 VA		
Heating	3000 VA	100.00%	3000 VA	**Total Conn. Load:**	27384 VA
Motor	1372 VA	118.44%	1625 VA	**Total Est. Demand:**	27637 VA
Power	17420 VA	100.00%	17420 VA	**Total Conn.:**	76 A
Receptacle	5472 VA	100.00%	5472 VA	**Total Est. Demand:**	77 A

Branch Panel: TT

Equipment Notes:

Location: **Volts:** 120/208 Wye **A.F.C.:** 3,702
Supply From: MDP **Phases:** 3 **Mains Type:** MCB
Mounting: Surface **Wires:** 4 **Mains Rating:** 100 A
Enclosure: 3R

CKT	Circuit Description	Circuit Notes	Load Classification	Trip	Poles	A	A	B	B	C	C	Poles	Trip	Load Classification	Circuit Notes	Circuit Description	CKT
1	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	2
3	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	4
5	SPARE		--	20 A	1					0	0	1	20 A	--		SPARE	6
7	SPARE		--	20 A	1	0	0					1	20 A	--		SPARE	8
9	SPARE		--	20 A	1			0	0			1	20 A	--		SPARE	10
11	PROVISION		--	--	1					--	--	1	--	--		PROVISION	12
13	PROVISION		--	--	1	--	--					1	--	--		PROVISION	14
15	PROVISION		--	--	1			--	--			1	--	--		PROVISION	16
17	PROVISION		--	--	1					--	--	1	--	--		PROVISION	18
19	PROVISION		--	--	1	--	--					1	--	--		PROVISION	20
21	PROVISION		--	--	1			--	--			1	--	--		PROVISION	22
23	PROVISION		--	--	1					--	--	1	--	--		PROVISION	24
					Total Load:	0 VA		0 VA		0 VA							
					Total Amps:	0 A		0 A		0 A							

Circuit Notes:
A: ARC FAULT
Q: 30mA GFCI FOR EQUIPMENT
P: 6mA GFCI FOR PERSONNEL
S: SHUNT-TRIP
L: LOCKABLE
H: HASP

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
				Total Conn. Load:	0 VA
				Total Est. Demand:	0 VA
				Total Conn.:	0 A
				Total Est. Demand:	0 A

MONTANA
BRIAN M. MCDIVITT
59876 PE
REGISTERED PROFESSIONAL ENGINEER

Morrison Maierle
engineers • surveyors • planners • scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRESTATION #3
HELENA , MT. 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
734 N. Last Chance Gulch | Helena, MT 59601 | 406.457.5470
www.dsa-mt.com

ELECTRICAL SCHEDULES

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

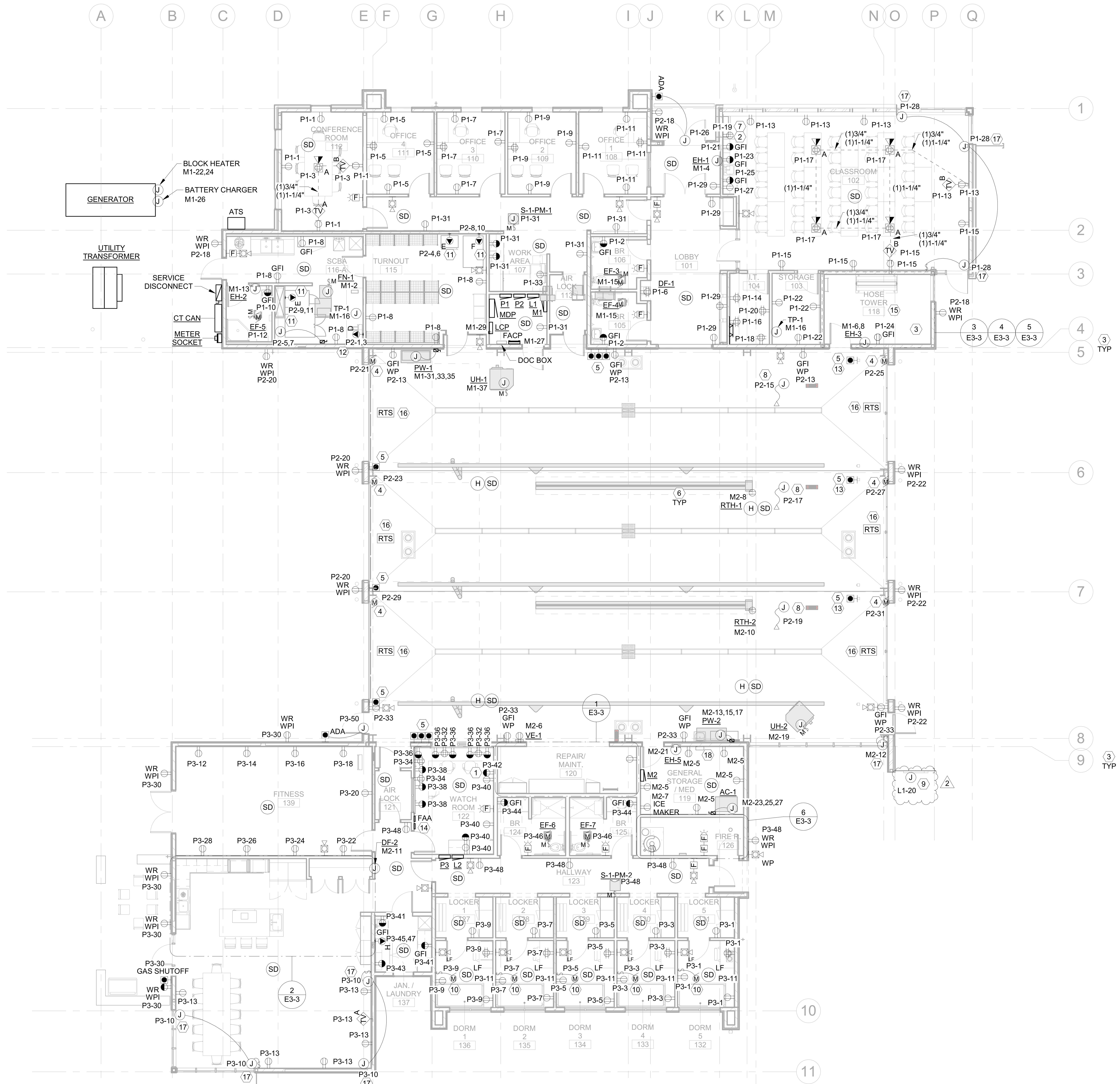
ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: MMI

E2-7

10.22.25



1 E3-1 FIRST FLOOR - POWER PLAN
1/8" = 1'-0"

POWER PLAN GENERAL NOTES

A. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INVOLVED TO COORDINATE WITH EACH OTHER AND VERIFY THAT THERE ARE NO CONFLICTS IN LOCATION OF DUCTS, CONDUITS, DIFFUSERS, BOXES, AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.
B. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING OF FLOORS, WALLS, CEILINGS, AND ROOFS TO PERFORM THE REQUIRED WORK DEPICTED IN THESE DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR ALL PATCHING OF HOLES TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
C. LOW VOLTAGE CABLES (LIGHTING CONTROLS) ABOVE ACCESSIBLE CEILINGS SHALL BE SUPPORTED USING J-HOOKS AT INTERVALS NOT TO EXCEED 48" OC, UNO.
D. ANY CONDUIT ROUTED UNDERSLAB AND TRANSITION VERTICALLY TO A DEVICE OR CONNECTION MOUNTED TO A WALL SHALL HAVE AN EXPANSION FITTING INSTALLED BETWEEN DEVICE/CONNECTION AND FLOOR.

KEY NOTES:

1. PROVIDE RECETPACLE FOR BABY DROP OFF BOX ALARM. ALARM TO HAVE 3 CONTACTS. PROVIDE REQUIRED CONDUIT AND WIRING FROM BABY BOX TO REMOVE ALARM LOCATION PER MANUFACTUERER'S REQUIREMENTS.
2. PROVIDE RECEPTACLE FOR BABY DROP OFF BOX. COORDINATE EXACT LOCATION OF RECEPTACLE WITH EQUIPMENT PROVIDER PRIOR TO ROUGH-IN.
3. PROVIDE CONDUIT SEISMIC EXPANSION JOINTS FOR UP TO 2" OF EXPANSION FOR ALL CONDUIT THAT CROSSES GRID LINE 4 AND GRID LINE 9.
4. PROVIDE POWER CONNECTION TO OVERHEAD DOOR MOTOR. VERIFY MOTOR LOCATION AND CONFIGURATION WITH INSTALLER PRIOR TO ROUGH-IN.
5. INSTALL OPEN/CLOSE/STOP BUTTON AT 48" AFF. INSTALL LOW VOLTAGE SAFETY BEAM SENSORS AT 6" AFF ON BOTH SIDES OF DOOR AND INSTALL PRESSURE SENSORS AT BOTTOM OF DOOR. COORDINATE WITH DOOR INSTALLER FOR DEVICE LOCATIONS, DETAILS AND REQUIREMENTS PRIOR TO ROUGH-IN. USING 1/2 CONDUIT PROVIDE ALL CONDUIT AND WIRING REQUIRED TO CONNECT CONTROLS AND SENSORS BACK TO DOOR OPENER PER DOOR MANUFACTURER'S STANDARDS AND AS REQUIRED TO SUPPORT A COMPLETE AND OPERATIONAL OVERHEAD DOOR SYSTEM.
6. ALL RECEPTACLES IN APPARATUS BAY SHALL BE MOUNTED AT 48" A.F.F.
7. PROVIDE RELAY FOR FIRE ALARM CONNECTION TO BABY DROP BOX. FIRE ALARM TO ACTIVATE ONCE BABY HAS BEEN DROPPED OFF.
8. SEE DETAIL 4/E2-2 FOR HOSE REEL. HOSE REEL TO BE LOCATED AT DRIVER SIDE DOOR. COORDINATE FINAL LOCATION WITH ARCHITECT AND OWNER.
9. PROVIDE POWER TO EXTERIOR SIGNAGER. CONNECT CIRCUIT INTO LIGHTING CONTROL PANEL FOR CONTROL.
10. PROVIDE DROP CEILING TILE FAN WITH WALL CONTROL. BASIS OF DESIGN IS AERO WAY, INC #ALASKA SA-398WC OAE.
11. COORDINATE EQUIPMENT CONNECTION TYPE WITH EQUIPMENT PROVIDER PRIOR TO ROUGH-IN.
12. CONTRACTOR TO PROVIDE CORD, PLUG AND RECEPTACLE FOR EQUIPMENT.
13. MOUNT DOOR CONTROLLER ON BOLLARD. ROUTE CONDUIT FROM THE BOLLARD THROUGH THE FOUNDATION WALL AND UP THE STEEL COLUMN TO THE CONTROL BOX. PROVIDE A CONDUIT EXPANSION FITTING AFTER TRANSISTION FROM BELOW SLAB TO STEEL COLUMN.
14. GENERATOR REMOTE ANNUNCIATOR. PROVIDE 1" CONDUIT WITH (2)#14 THHN AND (1) MODBUS DATA CABLE TO GENERATOR.
15. SEE SHEET E3-3 FOR HOSE TOWER FLOORS TWO THROUGH FOUR.
16. PROVIDE ROOM TEMPERATURE SWITCH (POTTER PTS, OR EQUAL) FOR SUPERVISORY ALARM UPON LOW TEMPERATURE (UNDER 40 DEG F) WITHIN THE SPACE FOR PROTECTION OF FIRE SPRINKLER LINES FROM FREEZING. WIRE TO BUILDING FIRE ALARM SYSTEM IN 3/4" RED CONDUIT AND INSTALL PER MANUFACTURER REQUIREMENTS.
17. PROVIDE POWER CONNECTION AND CONTROLS FOR MOTORIZED SHADES. COORDINATE EXACT REQUIREMENTS WITH SHADE PROVIDER.
18. HEAT TRACE CONTROLLER. SEE ROOF POWER PLAN.

MONTANA
BRIAN M. MCDIVITT
59876 PE
REGISTERED PROFESSIONAL ENGINEER

Morrison Maierle
engineers · surveyors · planners · scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRESTATION #3

HELENA , MT. 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS

POWER PLAN

PROJECT #:	25-668
ISSUE DATES:	
Addendum 2	11/13/25
DRAWN BY:	MMI

100% CONSTRUCTION DOCUMENTS

E3-1

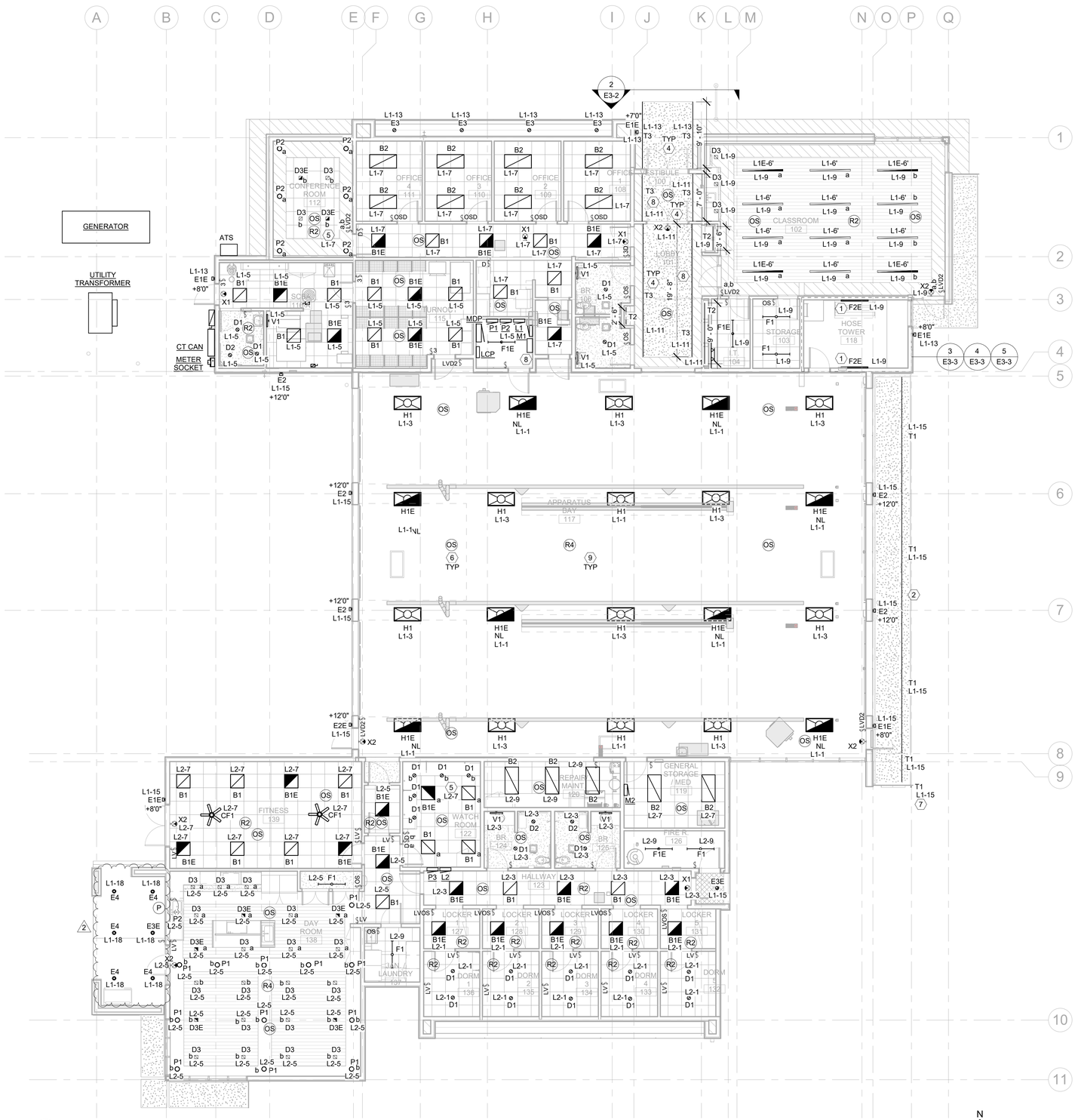
10.22.25

LIGHTING PLAN GENERAL NOTES

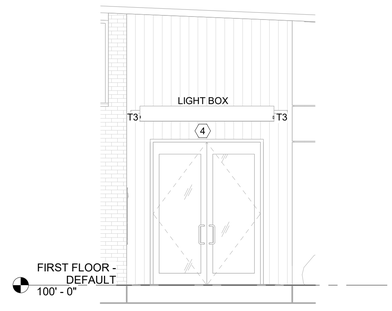
A. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INVOLVED TO COORDINATE WITH EACH OTHER AND VERIFY THAT THERE ARE NO CONFLICTS IN LOCATION OF DUCTS, CONDUITS, DIFFUSERS, BOXES, AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.
B. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING OF FLOORS, WALLS, CEILINGS, AND ROOFS TO PERFORM THE REQUIRED WORK DEPICTED IN THESE DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR ALL PATCHING OF HOLES TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
C. LOW VOLTAGE CABLES (LIGHTING CONTROLS) ABOVE ACCESSIBLE CEILINGS SHALL BE SUPPORTED USING J-HOOKS AT INTERVALS NOT TO EXCEED 48" OC, UNO.

KEY NOTES:

1. PROVIDE WALL MOUNTED STRIP FIXTURE AT +7'6" AFF AT EACH OF THE 4 LEVELS OF THE HOSE TOWER.
2. MAX FIXTURE LENGTH IS 98". PROVIDE REQUIRED NUMBER OF FIXTURES FOR THE LENGTH OF THE CANOPY. COORDINATE LAYOUT WITH STRUCTURAL FRAMING FOR CANOPY.
3. REFER TO DETAIL 2 ON SHEET E2-3 FOR MORE INFORMATION REGARDING AUXILLARY I/O INPUT FROM PHOENIX G2 SYSTEM.
4. FIXTURE TYPE T3 TO BE INSTALLED ON SIDE WALL OF "LIGHT-BOX" FOR THE LENGTH OF THE BOX. BOX TO BE PAINTED MATTE WHITE. INSTALL FIXTURE CENTERED ON VERTICAL WALL OF LIGHT BOX. LIGHT BOX TO BE FULLY ENCLOSED.
5. ALL LIGHT FIXTURES IN THIS SPACE TO BE CIRCUITED TO CIRCUIT SHOWN.
6. PROVIDE HIGH BAY, EXTENDED COVERAGE OCCUPANCY SENSORS IN APPARATUS BAY. (TYPICAL).
7. MOUNT FIXTURE VERTICALLY IN OUTTER EDGE OF STEEL CHANNEL TO ILLUMINATE THE SIGNAGE. FIXTURE LENGTH TO BE 8'-0".
8. PROVIDE IOTA IIS 750 INVERTER. CONNECT INVERTER TO LIGHTING CIRCUIT L1-11 FOR EMERGENCY LIGHTING FUNCTION. WALL MOUNT INVERTER.
9. CAREFULLY COORDINATE MOUNTING OF LIGHT FIXTURES WITH MECHANICAL AND STRUCTURAL IN THE APPARATUS BAY. FIXURE TO BE MOUNTED AT SAME ELEVATION AS BOTTOM OF STRUCTURAL.



1 E3-2 FIRST FLOOR - LIGHTING PLAN
1/8" = 1'-0"



2 E3-2 LIGHT BOX SECTION
1/4" = 1'-0" REF:E3-2

BRIAN M. MCDIVITT
59876 PE
MONTANA REGISTERED PROFESSIONAL ENGINEER
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net
Morrison Maierle
engineers - surveyors - planners - scientists

HELENA FIRESTATION #3
HELENA, MT. 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING
DOWLING ARCHITECTS
2134 N. Last Chance Gulch | Helena, MT 59601 | 406.457.8477
www.dao-mt.com

LIGHTING PLAN

PROJECT #: 25-668

ISSUE DATES:

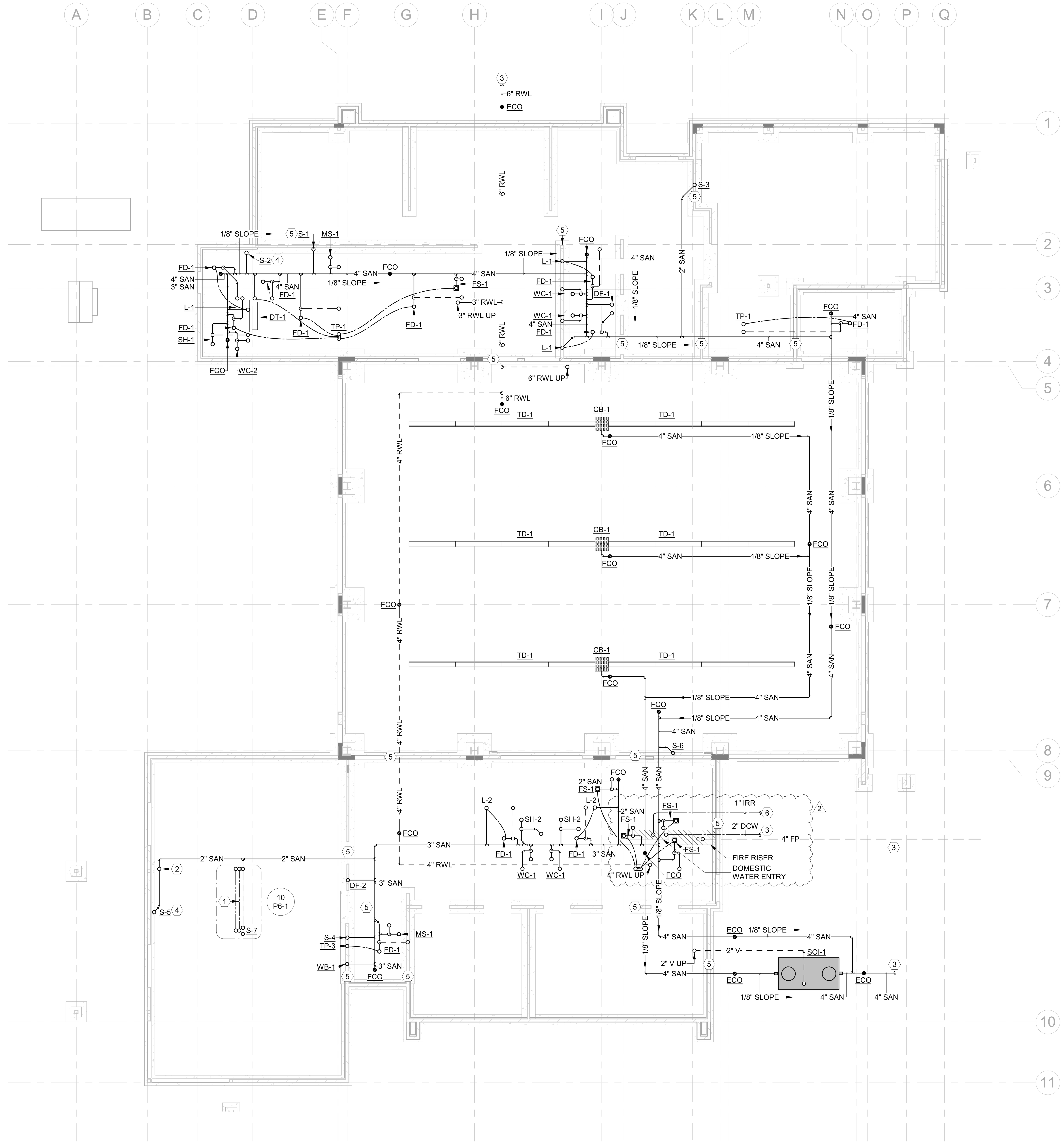
Addendum 2	11/13/25

DRAWN BY: MMI

E3-2

10.22.25

100% CONSTRUCTION DOCUMENTS



1 UNDERSLAB PLUMBING PLAN
P3-0 1/8" = 1'-0"

PLUMBING PLAN NOTES

A. PROVIDE ACCESS DOORS TO ALLOW SERVICE AND INSPECTION OF EQUIPMENT, VALVES, AND OTHER DEVICES INSTALLED IN INACCESSIBLE LOCATIONS. COORDINATE SUCH INSTALLATIONS WITH THE ARCHITECT AND ENGINEER.
B. PROVIDE TRAP SEALS AND TRAP PRIMERS FOR FLOOR DRAINS, FLOOR SINKS, AND OTHER FLOOR RECEPTORS.
C. INSTALL ACCESSIBLE PLUMBING FIXTURES IN COMPLIANCE WITH ADA REQUIREMENTS. INSULATE EXPOSED PIPING BELOW ADA ACCESSIBLE FIXTURES.
D. INSTALL FLOOR DRAIN STRAINERS AND CLEANOUT COVERS FLUSH AND LEVEL WITH FINISHED FLOOR.
E. PIPING SHALL BE IDENTIFIED WITH PIPE LABELS MARKED AT A MAXIMUM OF EVERY 25 FT. VALVES SHALL BE IDENTIFIED WITH BRASS OR ALUMINUM VALVE TAGS.
F. PROVIDE AND INSTALL PIPE GUIDES, EXPANSION JOINTS, AND HANGERS PER MANUFACTURER'S RECOMMENDATIONS.
G. PIPING WALL PENETRATIONS SHALL BE FINISHED WITH A CHROME ESCUTCHEON PLATE.
H. MAINTAIN THE INTEGRITY OF DRAFTSTOPPING WHERE PIPES PENETRATE DRAFTSTOPPING MATERIALS.
I. NO FITTINGS OR PIPING CONNECTIONS SHALL BE INSTALLED UNDERSLAB.
J. REFER TO THE PLUMBING FIXTURE SCHEDULE FOR PIPE SIZES TO INDIVIDUAL FIXTURES.
K. COORDINATE CONCRETE PENETRATIONS WITH STRUCTURAL DRAWINGS TO VERIFY HOW AND WHERE CONCRETE CAN BE CUT.
L. EXPOSED PIPING SHALL BE PAINTED PER ARCHITECTURAL OR PROVIDED WITH A PVC COATED JACKET IN THE COLOR OF THE ARCHITECT'S CHOOSING. CONTRACTOR TO CLEAN AND DRY PIPING PRIOR TO PAINTING.
M. SANITARY SEWER AND OTHER DRAIN PIPING SHALL BE INSTALLED AT A MINIMUM 1/4" PER FOOT (2%) SLOPE IN DIRECTION OF FLOW, AND RAINWATER PIPING SHALL BE INSTALLED AT A MINIMUM 1/8" PER FOOT (1%) SLOPE IN DIRECTION OF FLOW UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
N. COORDINATE UNDERGROUND FIRE RISER STUB UP LOCATION WITH FIRE SUPPRESSION SHOP DRAWINGS.

KEY NOTES:

1. 1/2" DCW/DHW TO SINK, UNDERSLAB. PROVIDE PEX PIPING IN PVC SLEEVE.
2. 2" SAN UP TO WCO.
3. SEE CIVIL FOR ELEVATION AND PIPE CONTINUATION.
4. OFFSET SANITARY PIPING TO AVOID FOOTING.
5. SEE STRUCTURAL FOR PIPE/CONDUIT TRENCH AT FOOTING DETAIL.
6. 1" IRRIGATION FOR CONTINUATION BY LANDSCAPE CONTRACTOR.

MONTANA
CHANDRA M. McCARTHY
No. 79030 PE
LICENSED
PROFESSIONAL ENGINEER

Morrison Maierle
engineers · surveyors · planners · scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

HELENA FIRESTATION #3
HELENA, MT. 59602

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS

UNDERSLAB PLUMBING PLAN

PROJECT #: 25-668

ISSUE DATES:

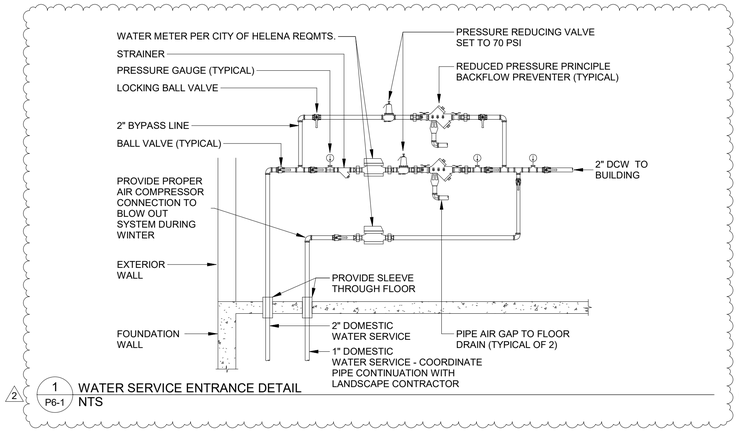
Addendum 2	11/13/25

DRAWN BY: MMI

P3-0

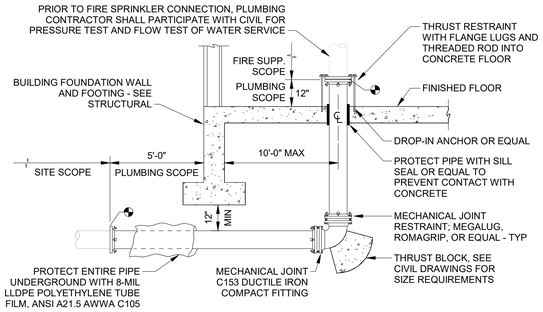
100% CONSTRUCTION DOCUMENTS

10.22.25

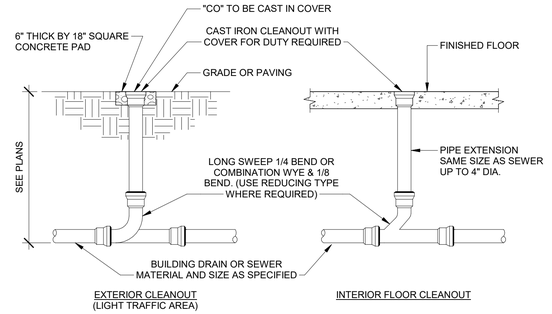


2

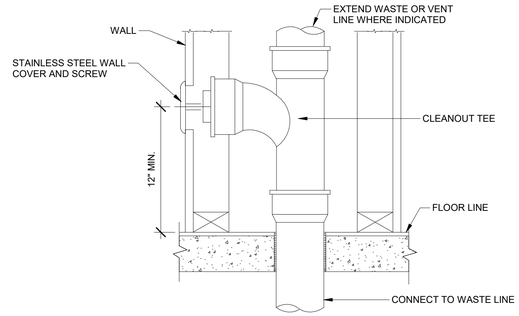
1 P6-1 WATER SERVICE ENTRANCE DETAIL
NTS

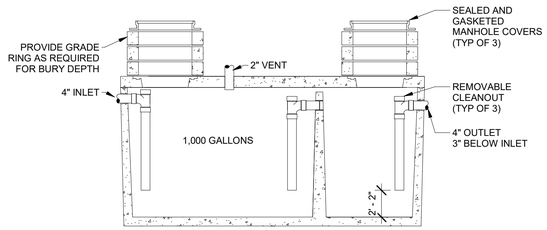


2 P6-1 FIRE SERVICE ENTRANCE
NTS

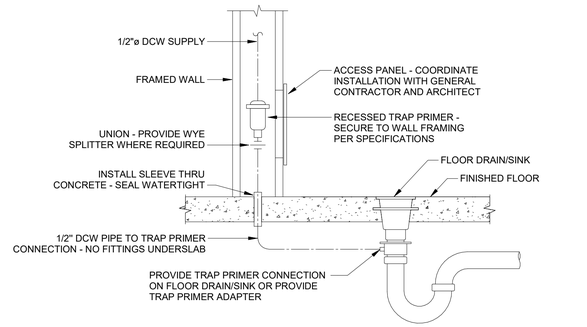


3 P6-1 SEWER LINE CLEANOUT DETAIL
NTS

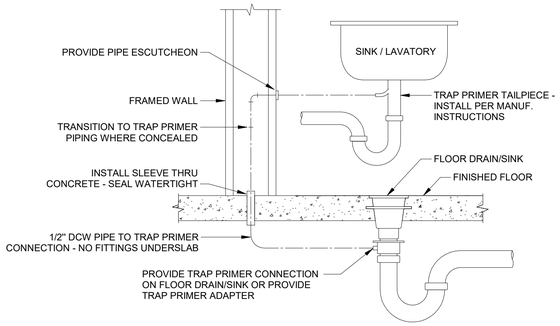




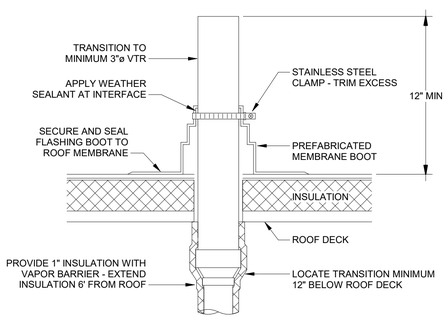
NOTES:
1. FILL TANK WITH WATER IMMEDIATELY AFTER INSTALLATION TO PREVENT FLOATING.
2. VERIFY INLET AND OUTLET ELEVATIONS WITH CIVIL PRIOR TO INSTALLATION.
3. ALL INTERIOR PIPING SHALL BE PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR.



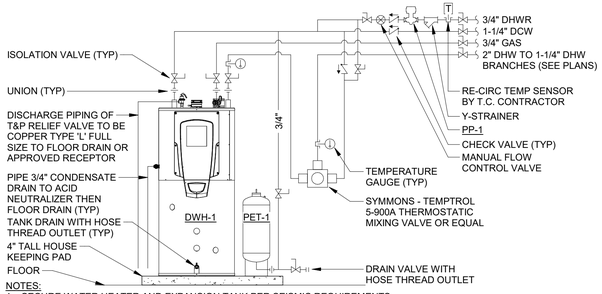
4 P6-1 SEWER LINE CLEANOUT THRU WALL DETAIL
NTS



5 P6-1 SAND OIL SEPARATOR DETAIL
NTS

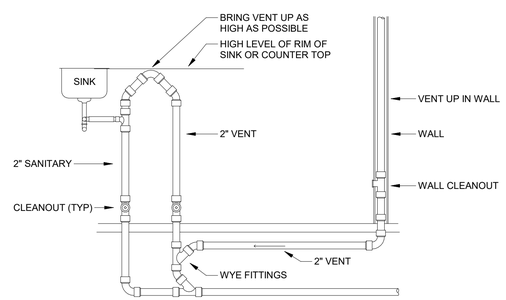


6 P6-1 RECESSED TRAP PRIMER DETAIL
NTS



NOTES:
1. SECURE WATER HEATER AND EXPANSION TANK PER SEISMIC REQUIREMENTS.
2. INSTALL PVC FLUE AND COMBUSTION AIR PIPING PER MFR'S INSTRUCTIONS - TERMINATE 24" MIN ABOVE ROOF.
3. HOUSE KEEPING PAD SHALL EXTEND 12" MINIMUM BEYOND EQUIPMENT FOOT PRINT.

7 P6-1 TAILPIECE TRAP PRIMER DETAIL
NTS



8 P6-1 VENT THRU ROOF DETAIL
NTS

9 P6-1 WATER HEATER DETAIL
NTS

10 P6-1 ISLAND FIXTURE VENTING DETAIL
NTS

MONTANA
CHANDRA M. MCCARTIN
No. 79030 PE
LICENSED PROFESSIONAL ENGINEER

Morrison Maierle
engineers - surveyors - planners - scientists
1055 Mount Ave.
Missoula, MT 59801
406.542.8880
www.m-m.net

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

DOWLING ARCHITECTS
PLUMBING
DETAILS

HELENA FIRESTATION #3
HELENA, MT. 59602

100% CONSTRUCTION DOCUMENTS

PROJECT #: 25-668

ISSUE DATES:

Addendum 2	11/13/25

DRAWN BY: MMI

P6-1

10.22.25

SECTION 27 1800
TESTING, IDENTIFICATION AND ADMINISTRATION OF FIBER INFRASTRUCTURE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.

B. In order to conform to the overall project event schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.

C. In addition to the tests detailed in this document, the contractor shall notify the Owner or the Owner's representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

1.02 SCOPE

A. This Section includes the minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.

B. This Section includes minimum requirements for:
   1. Fiber optic test instruments
   2. Fiber optic testing
   3. Identification
      a. Labels and labeling
   4. Administration
      a. Test results documentation
      b. As-built drawings

C. Testing shall be carried out in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber end faces shall also be verified.

D. Testing shall be performed on each cabling link (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is identified by the owner.
   1. Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

F. All tests shall be documented including OLTS dual wavelength attenuation measurements and OTDR traces with event tables as well as OTDR maps.
   1. Optionally, documentation shall also include optical length measurements and pictures of the connector end face.

1.03 QUALITY ASSURANCE

A. All testing procedures and field-test instruments shall comply with applicable requirements of:
   1. ANSI Z136.2, ANS For Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources
   2. ANSI/TIA 526 14-C, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant with full OTDR descriptions
   3. ANSI/TIA 526 7-A, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   4. TIA-TSB-4979, Practical Considerations for Implementation of Multimode Launch Conditions in the Field
   5. ANSI/TIA-568.0-E, Generic Telecommunications Cabling for Customer Premises
   6. ANSI/TIA-568.3-E, Optical Fiber Cabling and Components Standard

7. ANSI/TIA-606-D, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements

B. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:
   1. Manufacturer of the fiber optic cable and/or the fiber optic connectors.
   2. Manufacturer of the test equipment used for the field certification or representative.
   3. Training organization e.g. BICSI

C. The Owner or the Owner's representative shall be invited to witness and/or review field-testing.
   1. The Owner or the Owner's representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
   2. The Owner or the Owner's representative will select a random sample of 5% of the installed links. The Owner or the Owner's representative shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the representative shall repeat 100% testing at no cost to the Owner.

1.04 SUBMITTALS

A. Manufacturers catalog sheets and specifications for fiber optic field-test instruments including optical loss test sets (OLTS; power meter and source), optical time domain reflectometer (OTDR) and video microscope for the equipment used on this project.

B. A schedule (list) of all optical fibers to be tested.

C. Sample test reports.

1.05 ACCEPTANCE OF TEST RESULTS

A. Unless otherwise specified by the Owner or the Owners representative, each cabling link shall be in compliance with the following test limits:
   1. Optical loss testing
      a. Multimode and Singlemode links
         1) The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA-568.3-E.
            a) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)
            b) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)
            c) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
            d) Maximum allowable connector_loss = 0.75 dB
            e) Use of Reference Grade connectors in Test Reference Cords.
            Test Reference Cords shall use Reference Grade connectors and the mated loss budget value (first and last) for these cords for Multimode shall be 0.30 dB and for Single-Mode shall be 0.50 dB.
            f) Splice_Attn (dB) = number_of_splices * splice_loss (dB)
            g) Maximum allowable splice_loss = 0.3 dB
            h) The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 62.5/125 µm	850	3.5	1300	1.5
Multimode 50/125 µm	850	3.0	1300	1.5

Single-mode (OS2)	1310	0.5	1550	0.5

2. OTDR testing
   a. Reflective events (connections) shall not exceed:
      1) 0.75 dB in optical loss when bi-directionally averaged
      2) -35 dB Reflectance for multimode connections
      3) -40 dB reflectance for UPC singlemode connections
      4) -55 dB reflectance for APC singlemode connections
   b. Non-reflective events (splices) shall not exceed 0.3 dB.
3. Magnified end face inspection
   a. Fiber connections shall be visually inspected to IEC 61300-3-35 Edition 1.0 for end face quality.
   b. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

B. All installed cabling links and channels shall be field-tested and pass the test requirements and analysis as described in Part 3. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels shall be provided in the test results documentation in accordance with Part 3.

C. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Owner.

Note: High Bandwidth applications such as 10GBASE-SR, FC1200, and 40GBASE-SR4 impose stringent channel loss limits. Where practical, certification should consider loss length limits that meet maximum channel (transmitter to receiver) loss. 0.75 dB per connector pair loss may not support the intended application.

D. Performance specification for multimode fiber links at 850 nm.

Fiber Type		Bandwidth	10GBASE-SR		FibreChannel 1200-MX-SN-I		40GBASE-SR4	
	µm	(MHz• Km)	Length (m)	Loss (dB)	Length (m)	Loss (dB)	Length (m)	Loss (dB)
OM1	62.5	200	33	2.5	33	2.4	N/A	N/A
OM2	50	500	82	2.3	82	2.2	N/A	N/A
OM3	50	2000	300	2.6	300	2.6	100	1.9
OM4	50	4700	400	2.9	N/A	N/A	150	1.5
OM5	50	4700	400	2.9	N/A	N/A	150	1.5

PART 2 - PRODUCTS

2.01 OPTICAL FIBER CABLE TESTERS

A. The field-test instrument shall be within the calibration period recommended by the manufacturer and a copy of the calibration certificate made available.

B. Optical loss test set (OLTS)
   1. Multimode optical fiber light source
      a. Provide dual LED light sources with central wavelengths of 850 nm and 1300 nm. VCSEL sources are not permitted per ANSI/TIA-526-14-C.
      b. Output power of –20 dBm minimum.
      c. The launch shall meet the Encircled Flux launch requirements of ANSI/TIA 526-14-C.
      d. The test reference cords must demonstrate an insertion loss ≤ 0.15 dB when mated against each other, and this test shall be stored and delivered with the other test results.
      e. Acceptable manufacturers
         1) Fluke Networks

2. Singlemode optical fiber light source
    a. Provide dual laser light sources with central wavelengths of 1310 nm and 1550 nm.
    b. Output power of –10 dBm minimum.
    c. The test reference cords must demonstrate an insertion loss ≤ 0.25 dB when mated against each other, and this test shall be stored and delivered with the other test results.
    d. Acceptable manufacturers
        1) Fluke Networks
3. Power Meter
    a. Provide 850 nm, 1300 nm, 1310 nm, and 1550 nm wavelength test capability.
    b. Power measurement uncertainty of 0.25 dB.
    c. Store reference power measurements.
    d. Save at least 10,000 results to internal memory.
    e. PC interface (USB).
    f. Acceptable manufacturers
        1) Fluke Networks
4. Optional length measurement
    a. It is preferable to use an OLTS that is capable of measuring the optical length of the fiber using time-of-flight techniques.

C. Optical Time Domain Reflectometer (OTDR)
1. Shall have a bright, color LCD display with backlight.
2. Shall have rechargeable Li-Ion battery for 8 hours of normal operation.
3. Weight with battery and module of not more than 4.5 lb and volume of not more 200 in^3.
4. Internal non-volatile memory with capacity for storing at least 2,000 OTDR bi-directionally tested fiber links.
5. USB port to transfer data to a PC or thumb drive/memory stick.
6. Multimode OTDR
    a. Wavelengths of 850 nm and 1300 nm.
    b. Event dead zones not to exceed 0.7 m at 850 nm and 1300 nm.
    c. Attenuation dead zones not to exceed 2.5 m at 850 nm and 4.5 m at 1300 nm.
    d. Distance range not less than 9,000 m.
    e. Dynamic range at least 28 dB for 850 nm and 30 dB at 1300 nm.
    f. Allow bi-directional testing without moving the OTDR to the far end.
    g. Perform on-board bi-directional averaging.
7. Singlemode OTDR
    a. Wavelengths of 1310 nm and 1550 nm.
    b. Event dead zones not to exceed 0.6 m at 1310 nm and 1550 nm.
    c. Attenuation dead zones not to exceed 3.7 m at 1310 nm and 1550 nm.
    d. Distance range not less than 80 km at 1310 nm and 130 km at 1550 nm.
    e. Dynamic range at least 32 dB for 1310 nm and 30 dB at 1550 nm.
    f. Allow bi-directional testing without moving the OTDR to the far end.
    g. Perform on-board bi-directional averaging.
8. Acceptable manufacturers
    a. Fluke Networks

D. Fiber Microscope
1. Field of view 420 µm x 320 µm
    a. Video camera systems are preferred.
    b. Camera probe tips that permit inspection through adapters are required.
    c. Test equipment shall be capable of saving and reporting the end face image to IEC 613003-3-35.
2. Acceptable manufacturers

a. Fluke Networks

E. Integrated OLTS, OTDR and fiber microscope
   1. Test equipment that combines into one instrument an OLTS, an OTDR and a fiber microscope may be used.
   2. Acceptable manufacturers
      a. Fluke Networks

2.02 IDENTIFICATION

A. Labels
   1. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.
   2. Shall be preprinted using a mechanical means of printing (e.g., laser printer).
   3. Where used for cable marking, provide vinyl substrate with a white printing area and a clear “tail” that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
   4. Where insert type labels are used provide clear plastic cover over label.
   5. Provide plastic warning tape 6 inches wide continuously printed and bright colored 18” above all direct buried services, underground conduits and duct-banks.
   6. Acceptable Manufacturers:
      a. Panduit
      b. Silver Fox
      c. W.H. Brady
      d. d-Tools
      e. Brother
      f. Dymo
      g. Epson

2.03 ADMINISTRATION

A. Administration of the documentation shall include test results of each fiber link and channel.

B. The test result information for each link shall be recorded in the memory of the field-test instrument upon completion of the test.

C. The test result records saved within the field-test instrument shall be transferred into a Windows™-based and/or cloud-based database utility that allows for the maintenance, inspection and archiving of these test records.

PART 3 - EXECUTION

3.01 GENERAL

A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

3.02 OPTICAL FIBER CABLE TESTING

A. Field-test instruments shall have the latest software and firmware installed.

B. Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC and/or a cloud-based service in which the administrative documentation (reports) may be generated.

C. Fiber end faces shall be inspected using a video scope with a field of view not less than 425 µm x 320 µm.
   1. It is preferable that the end face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.

D. Testing shall be performed on each cabling segment (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.

F. Testing of the cabling shall be performed using high-quality test reference cords of the same core size as the cabling under test, terminated with reference grade connectors. Reference grade connectors are defined as having a loss not exceeding 0.1 dB for multimode and 0.2 dB for singlemode. The test reference cords for OLTS testing shall be between 2 m and 5 m in length. The length of the launch and tail fibers for multimode OTDR testing shall be at a least 100 m (328 ft.). For singlemode, the length of the launch and tail fibers will depend on the link under test. As a guide, the following table can be used for determining the length of the launch and tail fibers.

Maximum Length of Link (km)		Typical Pulse Width (ns)	Minimum Launch and Tail Cord Length (m)
1310 nm	1550 nm only		
0 to 35	0 to 50	≤ 1,000	130
35 to 45	50 to 65	3,000	400
45 to 50	65 to 75	10,000	1,000
≥ 50	≥ 75	20,000	2400

G. Optical loss testing
   1. Horizontal/Backbone link
      a. Multimode links shall be tested in one direction at 850 nm and 1300 nm in accordance with ANSI/TIA-526-14-C, one-cord reference method, with an Encircled Flux compliant launch.
      b. Singlemode backbone links shall be tested in one direction at 1310 nm and 1550 nm in accordance with ANSI/TIA-526-7-A, Method A.1 (One-cord reference method).
      c. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

H. OTDR Testing
   1. Fiber links shall be tested at these wavelengths for anomalies and to ensure uniformity of cable attenuation, connector insertion loss and reflectance.
      a. Multimode: 850 nm and 1300 nm.
      b. Singlemode: 1310 nm and 1550 nm.
   2. Each fiber link and channel shall be tested in both directions.
      a. The launch and tail fibers shall remain in place for the measurement in the opposite direction – failing to do so will result in an increase in measurement uncertainty.
      b. The use of a loop back fiber at the far end with a tail fiber at the near end on the adjacent fiber is permitted for bi-directional testing, so long as the OTDR is able to split the trace automatically into two traces for the two fibers under test.
   3. A launch cable shall be installed between the OTDR and the first link connection.
   4. A tail cable shall be installed after the last link connection.

I. Magnified End face Inspection
   1. Fibers shall be inspected using a video scope with a minimum field of view 425 µm x 320 µm to IEC 61300-3-35 Edition 1.0. The following test limits shall be used:
      a. Multimode connectors; Table 6 of IEC 61300-3-35 Edition 1.0
      b. Singlemode field polished connectors; Table 5 of IEC 61300-3-35 Edition 1.0
      c. Singlemode factory polished connectors; Table 3 of IEC 61300-3-35 Edition 1.0
      d. Angled Physical Contact (APC) connectors; Table 4 of IEC 61300-3-35 Edition 1.0

J. Length Measurement
   1. The length of each fiber shall be recorded.
   2. It is preferable that the optical length be measured using an OLTS or OTDR.

K. Polarity Testing

1. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA-568.3-E. The polarity of the paired duplex fibers shall be verified using an OLTS.

3.03 IDENTIFICATION

A. Labeling

1. Labeling shall conform to the requirements specified within ANSI/TIA-606-D or to the requirements specified by the Owner or the Owner's representative.

3.04 ADMINISTRATION

A. Test results documentation

1. The database for the complete project shall be stored and delivered in PDF Format prior to Owner acceptance of the building.
2. The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as built information.
3. The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered in an electronic format or, preferably through a cloud-based service, prior to Owner acceptance of the building in the original format used by the cabling vendors' software.
4. Circuit IDs reported by the test instrument should match the specified label ID (see 3.3 of this Section).
5. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information
   a. The identification of the customer site as specified by the end-user.
   b. The name of the test limit selected to execute the stored test results.
   c. The name of the personnel performing the test.
   d. The date and time the test results were saved in the memory of the tester.
   e. The manufacturer, model and serial number of the field-test instrument.
   f. The version of the test software and the version of the test limit database held within the test instrument.
   g. The fiber identification number.
   h. The length for each optical fiber.
   i. The index of refraction used for length calculation when using length capable OLTS.
   j. The backscatter coefficient of the fiber under test when using an OTDR.
   k. Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
   l. Test results to include OTDR link and channel traces, event tables at the appropriate wavelength(s) and a map of the link tested.
   m. The length for each optical fiber as calculated by the OTDR.
   n. The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements
   o. Optional
      1) A picture or image of each fiber end-face
      2) A pass/fail status of the end-face using IEC 61300-3-35 Edition 1.0

B. Record copy and as-built drawings

1. Provide record copy drawings periodically throughout the project as requested by the Construction Manager or Owner, and at end of the project on CD/DVD. Record copy drawings at the end of the project shall be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination point. CAD drawings are to incorporate test data imported from the test instruments.

2. The as built drawings shall include, but are not limited to block diagrams, frame and cable labeling, cable termination points, equipment room layouts and frame installation details. The as built shall include all field changes made up to construction completion:
   a. Field directed changes to pull schedule.
   b. Field directed changes to cross connect and patching schedule.
   c. Horizontal cable routing changes.
   d. Backbone cable routing or location changes.
   e. Associated detail drawings.

END OF SECTION

SECTION 27 1323
COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. 9/125 micrometer single-mode, indoor-outdoor optical fiber cable (OS2).
   2. Optical fiber cable connecting hardware, patch panels, and cross-connects.
   3. Cabling identification products.

1.02 OPTICAL FIBER BACKBONE CABLING DESCRIPTION

A. Optical fiber backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product. Separate submittal required for each specification section.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and installation supervisor.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. As-built drawings

C. Test results

D. Warranty certificate

1.06 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

1.07 INSTALLER QUALIFICATIONS

A. Installer Qualifications: Division 27 sub-contractor shall be a manufacturer certified contractor and will be required to provide a minimum 25-year performance warranty on parts and labor for all fiber optic systems. Proof of the sub-contractor’s ability to provide such a warranty shall be submitted to the General Contractor at the time of bidding and to the Owner prior to the Notice To Proceed. This warranty shall cover the patch panels, adapter plates, connectors, fiber optic cabling, and patch cords.

B. Contractor shall employ, in conjunction with construction of the project, a capable, experienced, and reliable foreperson and such skilled workers as may be required for the various classes of work to be performed. Contractor shall be required to submit evidence of foreperson's skilled experience on ANSI/TIA certified fiber optic systems. Evidence of experience shall be submitted to Owner with submittal of bid. Minimum experience for any workman involved in cabling work shall be cable pulling and termination work on projects for a minimum of 5 years and completion of training (40 hrs. minimum) which certifies the person’s work in fiber optic installations. Training can be a combination of BICSI and manufacturer training.

PART 2 - PRODUCTS

2.01 REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568.1-E, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-E.

C. Grounding: Comply with TIA-607-D.

D. All OSP cables shall grounded at both ends.

E. Indoor cables shall be interlocking armor cables or indoor or indoor/outdoor cables run in appropriately rated inner duct.

F. All non interlocking armor cables shall be run in appropriately rated inner duct if not in conduit.

2.02 9/125 MICROMETER, SINGLE-MODE, INDOOR-OUTDOOR OPTICAL FIBER CABLE (OS2)

A. Description: Single mode, 9/125-micrometer, optical fiber cable. Refer to drawings for strand count and cable type. Refer to Section 27 1800 for testing requirements.

B. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. CommScope, Inc.
   2. Corning Cable Systems.
   3. Panduit.

C. Standards:
   1. Comply with TIA-492CAAB for detailed specifications.
   2. Comply with TIA-568.3-E for performance specifications.
   3. Comply with ICEA S-104-696 for mechanical properties.

D. Armored cable shall be steel armored type.

E. Maximum Attenuation: 0.5 dB/km at 1310 nm; 0.5 dB/km at 1550 nm.

F. Jacket:
   1. Jacket Color: Yellow for indoor. Black for outdoor and indoor/outdoor.
   2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
   3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals.

G. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
   1. Riser Rated, Nonconductive: Type OFNR

2.03 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CommScope, Inc.
   2. Corning Cable Systems.
   3. Panduit.

B. Standards:
   1. Comply with Optical Fiber Connector Intermateability Standard (OFCIS) specifications of the TIA-604 series.
   2. Comply with TIA-568.3-E.
   3. Comply with TIA-607-D.

C. Fiber Optic Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors in 1U,2U, 3U, and 4U options. Each panel shall have a clear door, removable front and rear enclosures, strain relief brackets, routing clips and guides, mounting brackets, and labels. See drawings for additional details

D. Connector Type: Type LC complying with TIA-604-10-B.

E. Adapter Plates: LC Adapters Duplex, UPC, 12 Fiber. Blank all unused panels.

F. Patch Cords: Factory-made, LC-LC dual-fiber cables in 1-meter and 2-meter lengths. Check requirements in field prior to ordering.

2.04 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-D and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.01 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays..
   1. Install plenum cable in environmental air spaces, including plenum ceilings.

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

3.02 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.

B. General Requirements for Optical Fiber Cabling Installation:
   1. Comply with TIA-568.1-E and TIA-568.3-E.
   2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
   3. Terminate all cables; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
   4. Cables may not be spliced. Secure and support cables at intervals not exceeding 48 inches and not more than 12 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
   5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
   6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
   7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
   8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
   9. In the communications equipment room, provide a 10-foot long service loop on each end of cable.
   10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
   11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

C. Open-Cable Installation:
   1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
   2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Group connecting hardware for cables into separate logical fields.

3.03 FIRESTOPPING

A. Comply with TIA-569-E, Annex A, "Firestopping."

B. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.04 GROUNDING

A. Install grounding according to BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607-D.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.05 IDENTIFICATION

A. Cable and Wire Identification:
   1. Label each cable within 3 inches of each termination point with a mechanically generated label
   2. Label each patch panel with mechanically generated labels
   3. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-C.

3.06 FIELD QUALITY CONTROL

A. Perform testing per section 27 1800.

END OF SECTION