



UNIVERSITY FACILITIES MANAGEMENT

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ADDENDUM NO. 3 - OUTLINE AND SUMMARY INFORMATION

Project Name: Molecular Bioscience Renovation & Maintenance PPA No.: 22-0045
Location: Montana State University Bozeman Campus Date: September 1, 2026

To: *All Plan Holders of Record*

*The Plans and Specification prepared by (**Bechtle Architects**) dated (**Jun. 03, 2026**), shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.*

The Bidders are to acknowledge the receipt of this Addendum by inserting its number and date into their Bid Forms. Failure to acknowledge may subject the Bidder to disqualification and rejection of the bid. This Addendum forms part of the Contract Documents as if bound therein and modifies them as follows:

I. PRIOR APPROVALS

- 1) 26 3213-50 – Generac Packaged Engine Generator Set.
- 2) 26 3213-50 – Kohler Packaged Engine Generator Set.

II. AMENDMENTS TO THE PROJECT MANUAL

- 1) Updated Bib Form with Allowance and Unit pricing.
- 2) 012200 – updated unit pricing
- 3) 230711 HVAC Insulation update

III. AMENDMENTS TO THE DRAWINGS

- 1) **G113** – clarification to partition assemblies.
- 2) **A022** – Lab rooms 221 & 227 No work in these areas at this time due to tenant occupancy.

IV. GENERAL INFORMATION

- 1) Access to a Matterport scan by copy & paste link:
 - a) <https://my.matterport.com/show/?m=oa7i2pgEb6a>
 - b) Password: MSU-MBB2026

V. **ATTACHMENTS**

- 1) 012200 Unit Prices.pdf
- 2) Form099SubstitutionRequest-AE Generac.pdf
- 3) Form099SubstitutionRequest-AE Kohler.pdf
- 4) 230711 HVAC Insulation.pdf
- 5) MOIR_2326_G113.pdf

SECTION 012200

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

- A. Unit price is an amount proposed by bidders, a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Unit Price List:
 - 1. Countertop replacement in Labs where damage is identified during construction.
 - 2. Base Cabinetry replacement in labs where damage is identified during construction.
 - 3. See Bid Form

END OF SECTION 012200

**SECTION 23 07 11
HVAC INSULATION**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Field applied insulation for thermal efficiency and condensation control for
 - 1. HVAC piping, ductwork and equipment.
 - 2. Re-insulation of HVAC piping, ductwork and equipment, and boiler plant piping, breeching and stacks and equipment after piping replacement.
- B. Definitions
 - 1. ASJ: All service jacket, white finish facing or jacket.
 - 2. Air conditioned space: Space having air temperature and/or humidity controlled by mechanical equipment.
 - 3. Cold: Equipment, ductwork or piping handling media at design temperature of 60 degrees F or below.
 - 4. Concealed: Ductwork and piping above ceilings and in chases, interstitial space, and pipe spaces.
 - 5. Exposed: Piping, ductwork, and equipment exposed to view in finished areas including mechanical//, Boiler Plant// and electrical equipment rooms or exposed to outdoor weather. Attics and crawl spaces where air handling units are located are considered to be mechanical rooms. Shafts, chases, interstitial spaces, unfinished attics, crawl spaces and pipe basements are not considered finished areas.
 - 6. FSK: Foil-scrim-kraft facing.
 - 7. Density: Pcf - pounds per cubic foot.
 - 8. Runouts: Branch pipe connections up to one-inch nominal size to fan coil units or reheat coils for terminal units.
 - 9. Thermal conductance: Heat flow rate through materials.
 - a. Flat surface: BTU per hour per square foot.
 - b. Pipe or Cylinder: BTU per hour per linear foot.
 - 10. Thermal Conductivity (k): BTU per inch thickness, per hour, per square foot, per degree F temperature difference.
 - 11. Vapor Retarder (Vapor Barrier): A material which retards the transmission (migration) of water vapor. Performance of the vapor retarder is rated in terms of permeance (perms). For the purpose of this specification, vapor retarders shall have a maximum published permeance of 0.1 perms and vapor barriers shall have a maximum published permeance of 0.001 perms.
 - 12. HWS: Hot water heating supply.

- 13. HWR: Hot water heating return.
- 14. CW: Cold water.
- 15. HW: Hot water.
- 16. CHWS: Chilled water supply.
- 17. CHWR: Chilled water return.
- 18. RS: Refrigerant suction.

1.2 RELATED WORK

- A. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Section 07 84 00, FIRESTOPPING.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- D. Section 23 21 13, HYDRONIC PIPING.
- E. Section 23 51 00, BREECHINGS, CHIMNEYS, and STACKS

1.3 QUALITY ASSURANCE

- A. Refer to article QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- B. Criteria:

- 1. Comply with NFPA 90A, particularly paragraphs 4.3.3.1 through 4.3.3.6, 4.3.10.2.6, and 5.4.6.4, parts of which are quoted as follows:

4.3.3.1 Pipe insulation and coverings, duct coverings, duct linings, vapor retarder facings, adhesives, fasteners, tapes, and supplementary materials added to air ducts, plenums, panels, and duct silencers used in duct systems, unless otherwise provided for in 4.3.3.1.1 or 4.3.3.1.2, shall have, in the form in which they are used, a maximum flame spread index of 25 without evidence of continued progressive combustion and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.

4.3.3.1.1 Where these products are to be applied with adhesives, they shall be tested with such adhesives applied, or the adhesives used shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when in the final dry state. (See 4.2.4.2.)

4.3.3.1.2 The flame spread and smoke developed index requirements of 4.3.3.1.1 shall not apply to air duct weatherproof coverings where they are located entirely outside of a building, do not penetrate a wall or roof, and do not create an exposure hazard.

4.3.3.2 Closure systems for use with rigid and flexible air ducts tested in accordance with UL 181, Standard for Safety Factory-Made Air Ducts and Air Connectors, shall have been tested, listed, and used in accordance with the conditions of their listings, in accordance with one of the following:

- (1) UL 181A, Standard for Safety Closure Systems for Use with Rigid Air Ducts and Air Connectors
- (2) UL 181B, Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors

4.3.3.3 Air duct, panel, and plenum coverings and linings, and pipe insulation and coverings shall not flame, glow, smolder, or smoke when tested in accordance with a

similar test for pipe covering, ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation, at the temperature to which they are exposed in service.

4.3.3.3.1 In no case shall the test temperature be below 121°C (250°F).

4.3.3.4 Air duct coverings shall not extend through walls or floors that are required to be fire stopped or required to have a fire resistance rating, unless such coverings meet the requirements of 5.4.6.4.

4.3.3.5* Air duct linings shall be interrupted at fire dampers to prevent interference with the operation of devices.

4.3.3.6 Air duct coverings shall not be installed so as to conceal or prevent the use of any service opening.

4.3.10.2.6 Materials exposed to the airflow shall be noncombustible or limited combustible and have a maximum smoke developed index of 50 or comply with the following.

4.3.10.2.6.1 Electrical wires and cables and optical fiber cables shall be listed as noncombustible or limited combustible and have a maximum smoke developed index of 50 or shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

//4.3.10.2.6.2 Pneumatic tubing for control systems shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with UL 1820, Standard for Safety Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics. //

4.3.10.2.6.4 Optical-fiber and communication raceways shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with UL 2024, Standard for Safety Optical-Fiber Cable Raceway.

4.3.10.2.6.6 Supplementary materials for air distribution systems shall be permitted when complying with the provisions of 4.3.3.

5.4.6.4 Where air ducts pass through walls, floors, or partitions that are required to have a fire resistance rating and where fire dampers are not required, the opening in the construction around the air duct shall be as follows:

- (1) Not exceeding a 25.4 mm (1 in.) average clearance on all sides
- (2) Filled solid with an approved material capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to the time-temperature fire conditions required for fire barrier penetration as specified in NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*

2. Test methods: ASTM E84, UL 723, or NFPA 255.
3. Specified k factors are at 75 degrees F mean temperature unless stated otherwise. Where optional thermal insulation material is used, select thickness to provide thermal conductance no greater than that for the specified material. For pipe, use insulation manufacturer's published heat flow tables. For domestic hot water supply and return, run out insulation and condensation control insulation, no thickness adjustment need be made.

4. All materials shall be compatible and suitable for service temperature, and shall not contribute to corrosion or otherwise attack surface to which applied in either the wet or dry state.
- C. Every package or standard container of insulation or accessories delivered to the job site for use must have a manufacturer's stamp or label giving the name of the manufacturer and description of the material.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Shop Drawings:
 1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
 - a. Insulation materials: Specify each type used and state surface burning characteristics.
 - b. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
 - c. Insulation accessory materials: Each type used.
 - d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
 - e. Make reference to applicable specification paragraph numbers for coordination.

1.5 STORAGE AND HANDLING OF MATERIAL

Store materials in clean and dry environment, pipe covering jackets shall be clean and unmarred. Place adhesives in original containers. Maintain ambient temperatures and conditions as required by printed instructions of manufacturers of adhesives, mastics and finishing cements.

PART 2 - PRODUCTS

2.1 MINERAL FIBER OR FIBER GLASS

- A. ASTM C612 (Board, Block), Class 1 or 2, density 3 pcf, $k = 0.26$ at 75 degrees F, external insulation for temperatures up to 400 degrees F with foil scrim (FSK) facing.
- B. ASTM C553 (Blanket, Flexible) Type I, Class B-3, Density 1 pcf, $k = 0.31$ for use at temperatures up to 400 degrees F with foil scrim (FSK) facing.
- C. ASTM C547 (Pipe Fitting Insulation and Preformed Pipe Insulation), Class 1, $k = 0.26$ at 75 degrees F, for use at temperatures up to 450 degrees F with an all service vapor retarder jacket with polyvinyl chloride premolded fitting covering.

2.2 INSULATION FACINGS AND JACKETS

- A. Vapor Retarder, higher strength with low water permeance ≤ 0.02 or less perm rating, Beach puncture 50 units for insulation facing on exposed ductwork, casings and equipment, and for pipe

insulation jackets. Facings and jackets shall be all service type (ASJ) or PVDC Vapor Retarder jacketing.

- B. ASJ jacket shall be white kraft bonded to 1 mil thick aluminum foil, fiberglass reinforced, with pressure sensitive adhesive closure. Comply with ASTM C1136. Beach puncture 50 units, Suitable for painting without sizing. Jackets shall have minimum 1-1/2 inch lap on longitudinal joints and minimum 3 inch butt strip on end joints. Butt strip material shall be same as the jacket. Lap and butt strips shall be self-sealing type with factory-applied pressure sensitive adhesive.
- C. Vapor Retarder medium strength with low water vapor permeance of 0.02 or less perm rating), Beach puncture 25 units: Foil-Scrim-Kraft (FSK) or PVDC vapor retarder jacketing type for concealed ductwork and equipment.
- D. Field applied vapor barrier jackets shall be provided, in addition to the specified facings and jackets, on all exterior piping and ductwork as well as on interior piping and ductwork exposed to outdoor air (i.e.; in ventilated attics, piping in ventilated (not air conditioned) spaces, etc.) in high humidity areas conveying fluids below ambient temperature. The vapor barrier jacket shall consist of a multi-layer laminated cladding with a maximum water vapor permeance of 0.001 perms. The minimum puncture resistance shall be 35 30 inch-pounds for interior locations and 80 inch-pounds for exterior or exposed locations or where the insulation is subject to damage.
- E. Factory composite materials may be used provided that they have been tested and certified by the manufacturer.
- F. Pipe fitting insulation covering (jackets): Fitting covering shall be premolded to match shape of fitting and shall be polyvinyl chloride (PVC) conforming to Fed Spec L-P-335, composition A, Type II Grade GU, and Type III, minimum thickness 0.03 inches. Provide color matching vapor retarder pressure sensitive tape.
- G. Aluminum Jacket-Piping systems: ASTM B209, 3003 alloy, H-14 temper, 0.023 inch minimum thickness with locking longitudinal joints. Jackets for elbows, tees and other fittings shall be factory-fabricated to match shape of fitting and of 0.024 inch minimum thickness aluminum. Fittings shall be of same construction as straight run jackets but need not be of the same alloy. Factory-fabricated stainless steel bands shall be installed on all circumferential joints. Bands shall be 0.5 inch wide on 18 inch centers. System shall be weatherproof if utilized for outside service.

2.3 PIPE COVERING PROTECTION SADDLES

- A. Cold pipe support: Premolded pipe insulation 180 degrees (half-shells) on bottom half of pipe at supports. Material shall be cellular glass or high density Polyisocyanurate insulation of the same thickness as adjacent insulation. Density of Polyisocyanurate insulation shall be a minimum of 3.0 pcf.

Nominal Pipe Size and Accessories Material (Insert Blocks)	
Nominal Pipe Size inches	Insert Blocks inches
Up through 5	6 long
6	6 long

- B. Warm or hot pipe supports: Premolded pipe insulation (180 degree half-shells) on bottom half of pipe at supports. Material shall be high density Polyisocyanurate for temperatures up to 300 degrees F, cellular glass or calcium silicate. Insulation at supports shall have same thickness as adjacent insulation. Density of Polyisocyanurate insulation shall be a minimum of 3.0 pcf.

2.12 ADHESIVE, MASTIC, CEMENT

- A. Class 1: Jacket and lap adhesive and protective finish coating for insulation.
- B. Class 2: Adhesive for laps and for adhering insulation to metal surfaces.
- C. Type II Class 1: Adhesive for installing flexible unicellular insulation and for laps and general use.
- D. Type I: Protective finish for outdoor use.
- E. Type II: Vapor barrier compound for indoor use.
- F. Other: Insulation manufacturers' published recommendations.

2.13 MECHANICAL FASTENERS

- A. Pins, anchors: Welded pins, or metal or nylon anchors with galvanized steel-coated or fiber washer, or clips. Pin diameter shall be as recommended by the insulation manufacturer.
- B. Staples: Outward clinching galvanized steel.
- C. Wire: 18 gage soft annealed galvanized or 14 gage copper clad steel or nickel copper alloy.
- D. Bands: 0.5 inch nominal width, brass, galvanized steel, aluminum or stainless steel.

2.14 REINFORCEMENT AND FINISHES

- A. Glass fiber fitting tape: Type II, Class 1.
- B. Tape for Flexible Elastomeric Cellular Insulation: As recommended by the insulation manufacturer.
- C. Hexagonal wire netting: one inch mesh, 22 gage galvanized steel.
- D. Corner beads: 2 inch by 2 inch, 26 gage galvanized steel; or, 1 inch by 1 inch, 28 gage aluminum angle adhered to 2 inch by 2 inch Kraft paper.
- E. PVC fitting cover: Composition A, 11-86 Type II, Grade GU, with Form B Mineral Fiber insert, for media temperature 40 degrees F to 250 degrees F. Below 40 degrees F and above (250 degrees F. Provide double layer insert. Provide color matching vapor barrier pressure sensitive tape.

2.15 FIRESTOPPING MATERIAL

Other than pipe and duct insulation, refer to Section 07 84 00 FIRESTOPPING.

2.16 FLAME AND SMOKE

Unless shown otherwise all assembled systems shall meet flame spread 25 and smoke developed 50 rating as developed under ASTM, NFPA and UL standards and specifications. See paragraph 1.3 "Quality Assurance".

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Required pressure tests of duct and piping joints and connections shall be completed and the work approved by the Engineer for application of insulation. Surface shall be clean and dry with all foreign materials, such as dirt, oil, loose scale and rust removed.
- B. Except for specific exceptions, insulate entire specified equipment, piping (pipe, fittings, valves, accessories), and duct systems. Insulate each pipe and duct individually. Do not use scrap pieces of insulation where a full length section will fit.
- C. Insulation materials shall be installed in a first class manner with smooth and even surfaces, with jackets and facings drawn tight and smoothly cemented down at all laps. Insulation shall be continuous through all sleeves and openings, except at fire dampers and duct heaters (NFPA 90A). Vapor retarders shall be continuous and uninterrupted throughout systems with operating temperature 60 degrees F and below. Lap and seal vapor retarder over ends and exposed edges of insulation. Anchors, supports and other metal projections through insulation on cold surfaces shall be insulated and vapor sealed for a minimum length of 6 inches.
- D. Install vapor stops at all insulation terminations on either side of valves, pumps and equipment and particularly in straight lengths of pipe insulation.
- E. Construct insulation on parts of equipment such as chilled water pumps and heads of chillers, convertors and heat exchangers that must be opened periodically for maintenance or repair, so insulation can be removed and replaced without damage. Install insulation with bolted 20 gage galvanized steel or aluminum covers as complete units, or in sections, with all necessary supports, and split to coincide with flange/split of the equipment.
- F. Insulation on hot piping and equipment shall be terminated square at items not to be insulated, access openings and nameplates. Cover all exposed raw insulation with white sealer or jacket material.
- G. Protect all insulations outside of buildings with aluminum jacket using lock joint or other approved system for a continuous weather tight system. Access doors and other items requiring maintenance or access shall be removable and sealable.
- H. HVAC work not to be insulated:
 - a. Internally insulated ductwork and air handling units.
 - b. Relief air ducts (Economizer cycle exhaust air).
 - c. Exhaust air ducts and plenums, and ventilation exhaust air shafts.

- d. Equipment: Expansion tanks, flash tanks, hot water pumps.
- e. In hot piping: Unions, flexible connectors, control valves, safety valves and discharge vent piping, vacuum breakers, thermostatic vent valves. Insulate piping to within approximately 3 inches of uninsulated items.
- I. K. Apply insulation materials subject to the manufacturer's recommended temperature limits. Apply adhesives, mastic and coatings at the manufacturer's recommended minimum coverage.
- J. L. Elbows, flanges and other fittings shall be insulated with the same material as is used on the pipe straights. Use of polyurethane spray-foam to fill a PVC elbow jacket is prohibited on cold applications.
- K. M. Firestop Pipe and Duct insulation:
 - 1. Provide firestopping insulation at fire and smoke barriers through penetrations. Fire stopping insulation shall be UL listed as defines in Section 07 84 00, FIRESTOPPING.
 - 2. Pipe and duct penetrations requiring fire stop insulation including, but not limited to the following:
 - a. Pipe risers through floors
 - b. Pipe or duct chase walls and floors
 - c. Smoke partitions
 - d. Fire partitions
- L. O. Provide vapor barrier jackets over insulation as follows:
 - 1. All piping and ductwork exposed to outdoor weather.
 - 2. All interior piping and ducts conveying fluids //exposed to outdoor air (i.e. in attics, ventilated (not air conditioned) spaces, etc.)// below ambient air temperature.
- M. P. Provide metal jackets over insulation as follows:
 - 1. All piping and ducts exposed to outdoor weather.
 - 2. A 2 inch overlap is required at longitudinal and circumferential joints.

3.2 INSULATION INSTALLATION

- A. Mineral Fiber Board:
 - a. Faced board: Apply board on pins spaced not more than 12 inches on center each way, and not less than 3 inches from each edge of board. In addition to pins, apply insulation bonding adhesive to entire underside of horizontal metal surfaces. Butt insulation edges tightly and seal all joints with laps and butt strips. After applying speed clips cut pins off flush and apply vapor seal patches over clips.
 - b. Plain board:

- c. Insulation shall be scored, beveled or mitered to provide tight joints and be secured to equipment with bands spaced 9 inches on center for irregular surfaces or with pins and clips on flat surfaces. Use corner beads to protect edges of insulation.
- d. For hot equipment: 1 inch mesh wire, with edges wire laced together, over insulation and finish with insulating and finishing cement applied in one coat, 1/4 inch thick, trowel led to a smooth finish.
- e. For cold equipment: Apply meshed glass fabric in a tack coat 60 to 70 square feet per gallon of vapor mastic and finish with mastic at 12 to 15 square feet per gallon over the entire fabric surface.
- f. Chilled water pumps: Insulate with removable and replaceable 20 gage aluminum or galvanized steel covers lined with insulation. Seal closure joints/flanges of covers with gasket material. Fill void space in enclosure with flexible mineral fiber insulation.
 - i. Exposed, unlined ductwork and equipment in unfinished areas, mechanical and electrical equipment rooms and attics, interstitial spaces and duct work exposed to outdoor weather:
- g. 1-1/2 inch thick insulation faced with ASJ (white all service jacket): Supply air duct unlined air handling units and after filter housing.
- h. 1-1/2 inch thick insulation faced with ASJ: Return air duct, mixed air plenums and prefilter housing.
- i. Outside air intake ducts: one inch thick insulation faced with ASJ.
- j. Exposed, unlined supply and return ductwork exposed to outdoor weather: 2 inch thick insulation faced with a reinforcing membrane and two coats of vapor barrier mastic or multi-layer vapor barrier with a maximum water vapor permeability of 0.001 perms.
 - i. Cold equipment: 1-1/2 inch thick insulation faced with ASJ.
- k. Chilled water pumps, water filter, chemical feeder pot or tank.

A. Flexible Mineral Fiber Blanket:

- i. Adhere insulation to metal with 3 inch wide strips of insulation bonding adhesive at 8 inches on center all around duct. Additionally secure insulation to bottom of ducts exceeding 24 inches in width with pins welded or adhered on 18 inch centers. Secure washers on pins. Butt insulation edges and seal joints with laps and butt strips. Staples may be used to assist in securing insulation. Seal all vapor retarder penetrations with mastic. Sagging duct insulation will not be acceptable. Install firestop duct insulation where required.

- ii. Supply air ductwork to be insulated includes main and branch ducts from AHU discharge to room supply outlets, and the bodies of ceiling outlets to prevent condensation. Insulate sound attenuator units, coil casings and damper frames. To prevent condensation insulate trapeze type supports and angle iron hangers for flat oval ducts that are in direct contact with metal duct.
 - iii. Concealed supply air ductwork.
 - b. Above ceilings at a roof level, in attics, and duct work exposed to outdoor weather: 2 inch thick insulation faced with FSK.
 - c. Above ceilings for other than roof level: 1 ½ inch thick insulation faced with FSK.
 - i. Concealed return air duct:
- B. In attics (where not subject to damage) and where exposed to outdoor weather: 2 inch thick insulation faced with FSK.
- C. Above ceilings at a roof level, unconditioned areas, and in chases with external wall or containing steam piping; 1-1/2 inch thick, insulation faced with FSK.
 - a. //c. In interstitial spaces (where not subject to damage): 1-1/2 inch thick insulation faced with FSK.
- D. Concealed return air ductwork in other locations need not be insulated.
 - i. Concealed outside air duct: 1-1/2 inch thick insulation faced with FSK.
 - b. Molded Mineral Fiber Pipe and Tubing Covering:
 - i. Fit insulation to pipe or duct, aligning longitudinal joints. Seal longitudinal joint laps and circumferential butt strips by rubbing hard with a nylon sealing tool to assure a positive seal. Staples may be used to assist in securing insulation. Seal all vapor retarder penetrations on cold piping with a generous application of vapor barrier mastic. Provide inserts and install with metal insulation shields at outside pipe supports. Install freeze protection insulation over heating cable.
 - ii. Contractor's options for fitting, flange and valve insulation:
- E. Insulating and finishing cement for sizes less than 4 inches operating at surface temperature of 61 degrees F or more.
- F. Factory premolded, one piece PVC covers with mineral fiber, (Form B), inserts. Provide two insert layers for pipe temperatures below 40 degrees F, or above 250 degrees F. Secure first layer of insulation with twine. Seal seam edges with vapor barrier mastic and secure with fitting tape.
- G. Factory molded, ASTM C547 or field mitered sections, joined with adhesive or wired in place. For hot piping finish with a smoothing coat of finishing cement. For cold fittings, 60 degrees F or less, vapor seal with a layer of glass fitting tape imbedded between two 1/16 inch coats of vapor barrier mastic.
- H. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2 inches.

- h. Nominal thickness in inches specified in the schedule at the end of this section.
 - b. Rigid Cellular Phenolic Foam:
 - i. Rigid closed cell phenolic insulation may be provided for piping, ductwork and equipment for temperatures up to 250 degrees F.
 - ii. Note the NFPA 90A burning characteristics requirements of 25/50 in paragraph 1.3.B
 - iii. Provide secure attachment facilities such as welding pins.
 - iv. Apply insulation with joints tightly drawn together
 - v. Apply adhesives, coverings, neatly finished at fittings, and valves.
 - vi. Final installation shall be smooth, tight, neatly finished at all edges.
 - vii. Minimum thickness in millimeters (inches) specified in the schedule at the end of this section.
 - viii. Exposed, unlined supply and return ductwork exposed to outdoor weather: 2 inch thick insulation faced with a multi-layer vapor barrier with a maximum water vapor permeance of 0.00 perms.
 - ix. Condensation control insulation: Minimum 1.0 inch thick for all pipe sizes.
- I. HVAC: Cooling coil condensation piping to waste piping fixture or drain inlet. Omit insulation on plastic piping in mechanical rooms.
- J. Flexible Elastomeric Cellular Thermal Insulation:
 - a. Apply insulation and fabricate fittings in accordance with the manufacturer's installation instructions and finish with two coats of weather resistant finish as recommended by the insulation manufacturer.
 - b. Pipe and tubing insulation:
 - i. Use proper size material. Do not stretch or strain insulation.
 - ii. Where possible, slip insulation over the pipe or tubing prior to connection, and seal the butt joints with adhesive. Where the slip-on technique is not possible, slit the insulation and apply it to the pipe sealing the seam and joints with contact adhesive. Optional tape sealing, as recommended by the manufacturer, may be employed. Make changes from mineral fiber insulation in a straight run of pipe, not at a fitting. Seal joint with tape.
 - iii. UV-resistant protective coating: Water-based, elastomeric protective finish specifically formulated and approved by the insulation manufacturer for continuous outdoor exposure.
 - 1. Compatible with base insulation without degrading the insulation material or adhesive bond.

2. Resistant to UV degradation, cracking, chalking, and peeling, substantiated by manufacturer's accelerated weathering data (ASTM G154 or equivalent).
 3. Capable of accommodating substrate movement and thermal expansion without loss of adhesion or cracking.
 4. Color: White, unless otherwise indicated on the Drawings or selected by the Architect from manufacturer's standard colors.
 5. VOC content: Comply with applicable federal, state, and local VOC regulations.
- iv. Minimum dry film thickness (DFT): Per manufacturer's written instructions, applied in not less than two coats to achieve full, opaque, pinhole-free coverage.
 - v. Seam and Joint Sealant: Insulation manufacturer's contact adhesive, compatible with both the insulation and the protective coating.
- c. Apply sheet insulation to flat or large curved surfaces with 100 percent adhesive coverage. For fittings and large pipe, apply adhesive to seams only.
 - d. Pipe insulation: nominal thickness in millimeters (inches as specified in the schedule at the end of this section.
 - e. Minimum 0.75 inch thick insulation for pneumatic control lines for a minimum distance of 20 feet from discharge side of the refrigerated dryer.
 - f. Use Class S (Sheet), 3/4 inch thick for the following:
 - i. Chilled water pumps

3.3 PIPE INSULATION SCHEDULE

Provide insulation for piping systems as scheduled below:

Insulation Wall Thickness Inches					
		Nominal Pipe Size Inches			
Operating Temperature Range/Service	Insulation Material	Less than 1	1 – 1¼	1½ - 3	4 and Above
		Insulation Wall Thickness Inches			
100-200 degrees F) (HWS and HWR)	Fiberglass (Above ground piping only)	1.5	1.5	2.0	2.0
100-200 degrees F (Refrigerant Piping)	Flexible Elastomeric Cellular Thermal	1.5	1.5	----	----

	(Above ground piping only)				
40-60 degrees F (CHWS and CHWR)	Fiberglass	1.5)	1.5	1.5	1.5
40-60 degrees F Outdoor (CHWS and CHWR)	Flexible Elastomeric Cellular Thermal (Above ground piping only)	1.5)	1.5	1.5	1.5

--- E N D ---

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: _____

PPA No: ____-____

Location: _____

Owner: **MONTANA STATE UNIVERSITY** Bidder (Sub-): _____

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
_____	_____	_____

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:

- What are the differences between the specified material, system, or equipment and the proposed substitution?

- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y ~~N~~)
- Does the proposed substitution require changes to the Work of other trades? (Y ~~N~~)
- Is the warranty for the proposed substitution comparable with that of the specified product? (~~Y~~ N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

SUBMITTED BY (BIDDER / SUB-BIDDER)

AUTHORIZED AGENT

DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Approved

☐ Rejected – For reasons as follows:

☐ Approved as noted:

Elizabeth Botkin

REVIEWED BY (ARCHITECT)

Eliz Botkin

AUTHORIZED AGENT

09/01/2026

DATE

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: _____

PPA No: ____-____

Location: _____

Owner: **MONTANA STATE UNIVERSITY** Bidder (Sub-): _____

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
_____	_____	_____

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:

• What are the differences between the specified material, system, or equipment and the proposed substitution?

• Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/~~N~~)

• Does the proposed substitution require changes to the Work of other trades? (Y/~~N~~)

• Is the warranty for the proposed substitution comparable with that of the specified product? (~~Y~~/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

SUBMITTED BY (BIDDER / SUB-BIDDER)

AUTHORIZED AGENT

DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☐ Approved

☐ Approved as noted:

Elizabeth Botkin

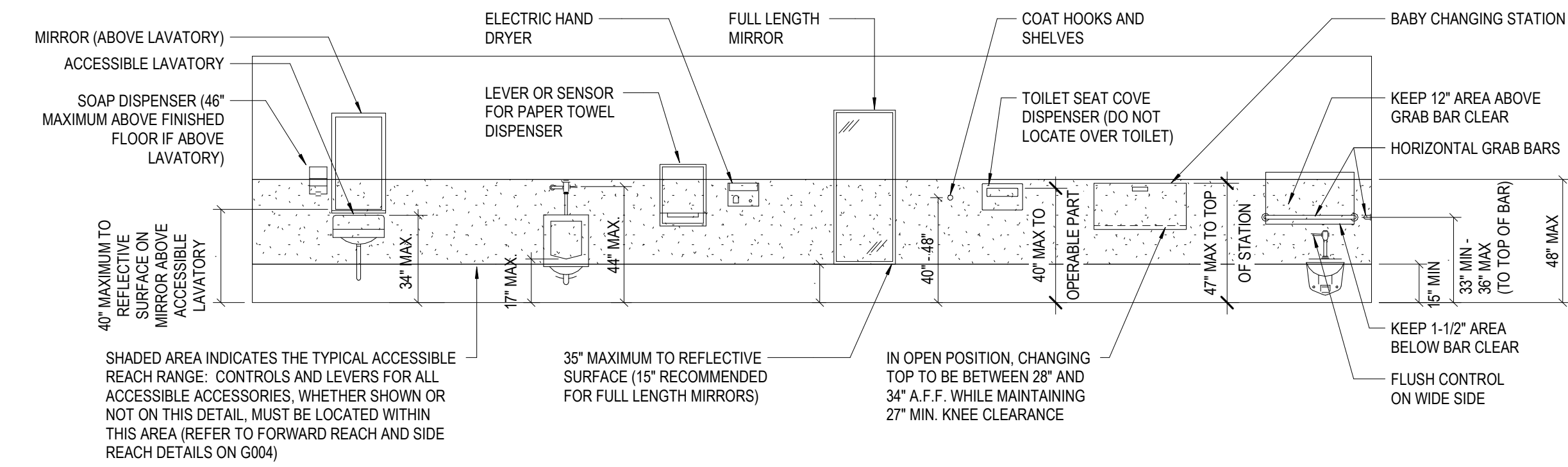
REVIEWED BY (ARCHITECT)

Eliz Botkin

AUTHORIZED AGENT

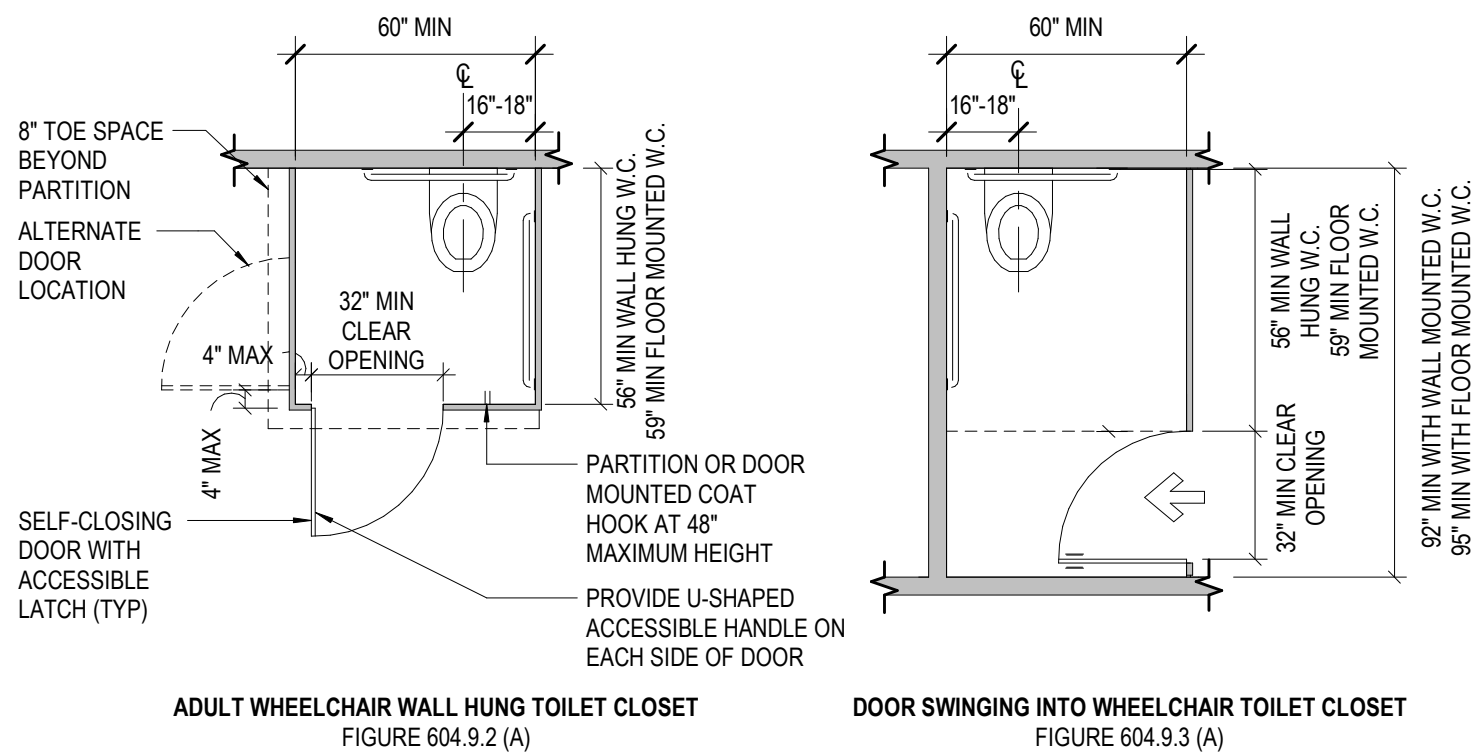
09/01/2026

DATE



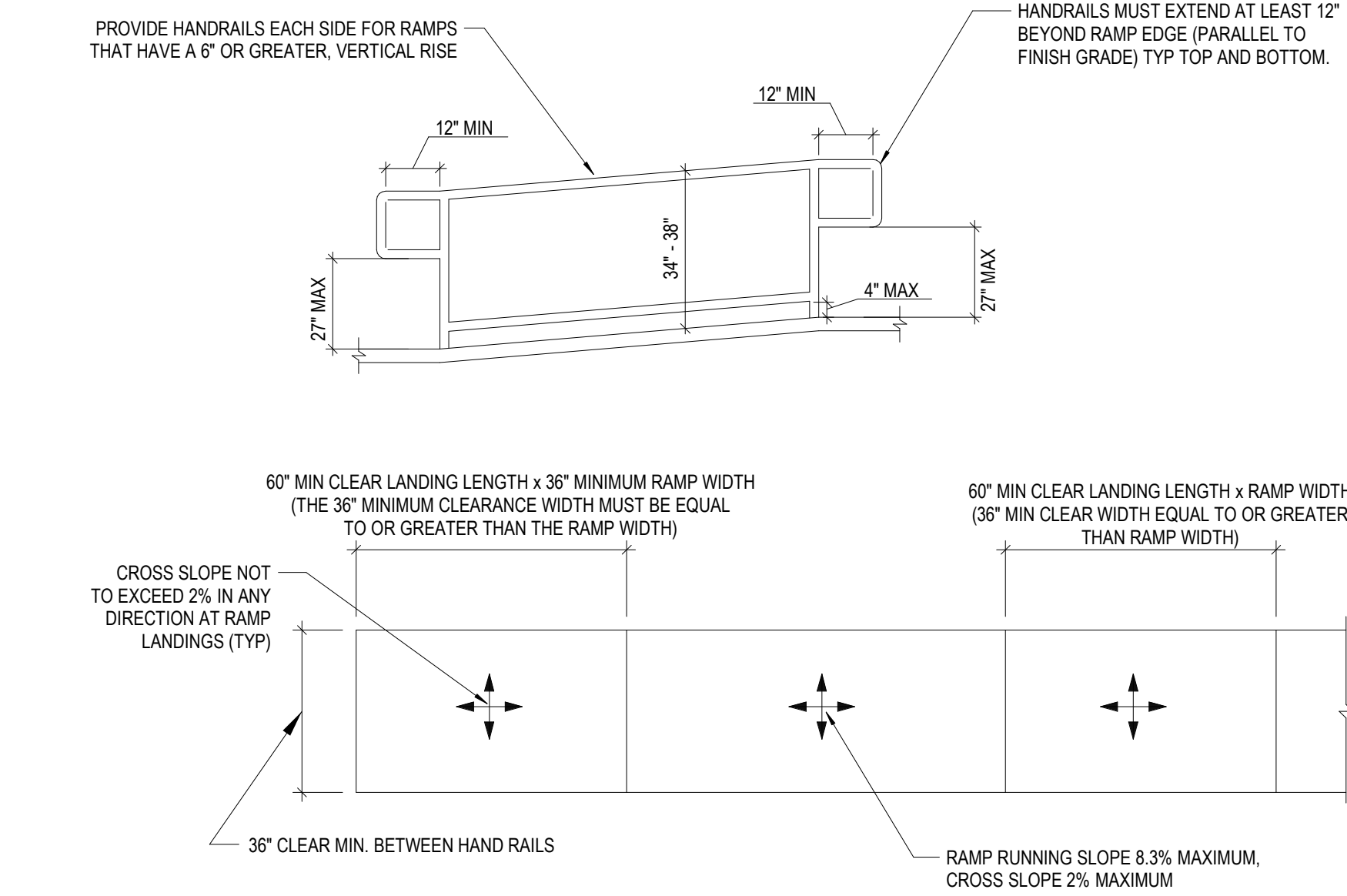
- NOTES:**
1. THE CLEAR FLOOR SPACE AT ACCESSORIES SHALL HAVE AT LEAST 30" (MINIMUM WIDTH) BY 52" (MINIMUM LENGTH).
 2. UNLESS OTHERWISE SPECIFIED, THE CLEAR FLOOR SPACE MAY BE POSITIONED FOR EITHER FORWARD OR PARALLEL APPROACH TO AN ELEMENT.
 3. OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE NO MORE THAN 5 POUNDS (MAXIMUM).
 4. TOILET AND BATH ROOM ACCESSORIES MUST BE LOCATED OR SELECTED SO THEY ARE NOT PROTRUDING OBJECTS INTO THE CIRCULATION PATH SPACE.

TOILET & BATHING ROOM ACCESSIBLE ACCESSORY MOUNTING HEIGHTS NTS

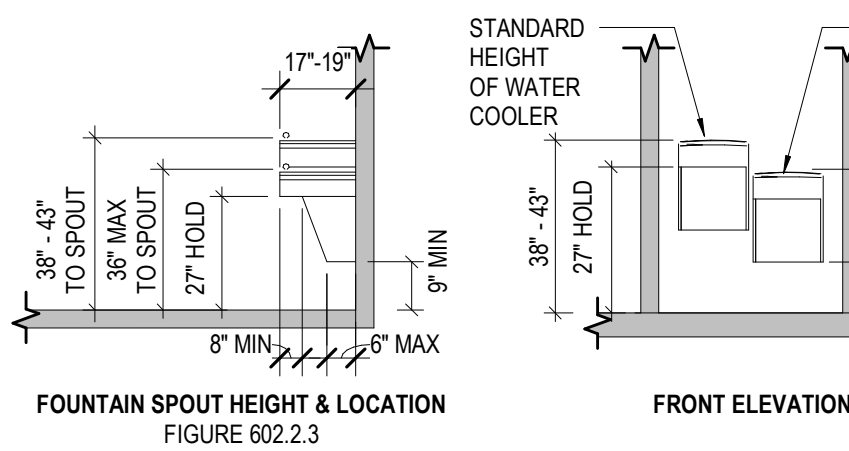
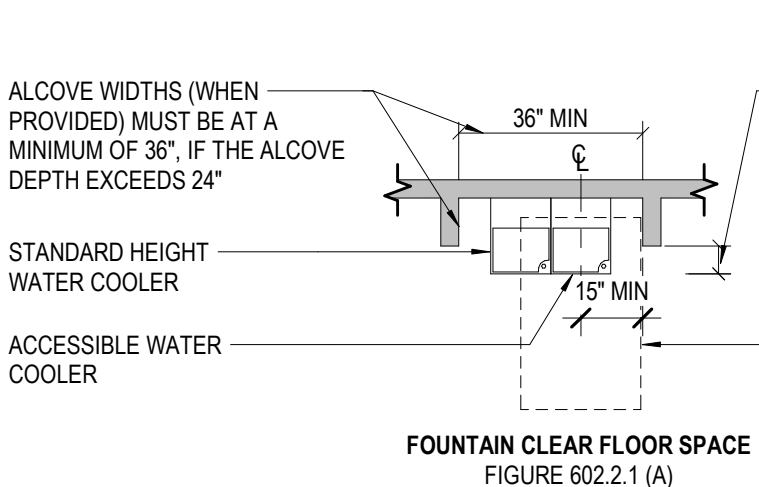


- NOTES:**
1. THE WATER CLOSET SHALL BE POSITIONED WITH A WALL OR PARTITION TO THE REAR, AND THE WATER CLOSET SHALL BE POSITIONED WITH A WALL OR PARTITION TO EITHER SIDE.
 2. FOR WALL HUNG WATER CLOSETS, WHEELCHAIR ACCESSIBLE COMPARTMENTS SHALL BE AT LEAST 60" WIDE (MINIMUM) PERPENDICULAR TO THE SIDE WALL, AND SHALL BE AT LEAST 56" DEEP (MINIMUM).
 3. FOR FLOOR MOUNTED WATER CLOSETS, MEASURED PERPENDICULAR TO THE REAR WALL, WHEELCHAIR ACCESSIBLE COMPARTMENTS SHALL BE AT LEAST 59" DEEP (MINIMUM) AND SHALL BE AT LEAST 60" WIDE (MINIMUM).
 4. DOORS SHALL BE LOCATED IN THE FRONT PARTITION OR IN THE SIDE WALL. DOORS CAN ALSO BE LOCATED ON THE PARTITION FARTHEST FROM THE WATER CLOSET. WHEN LOCATED IN THE FRONT PARTITION, THE DOOR OPENING SHALL BE 4" MAXIMUM FROM THE SIDE WALL OR PARTITION FARTHEST FROM THE WATER CLOSET.
 5. WHEN DOORS ARE LOCATED IN THE SIDE WALL OR PARTITION, THE DOOR OPENING SHALL BE 4" MINIMUM FROM THE FRONT PARTITION. THE DOOR SHALL BE SELF CLOSING. AN ACCESSIBLE DOOR PULL SHALL BE PLACED ON BOTH SIDES OF THE DOOR NEAR THE LATCH. COMPARTMENT DOORS SHALL NOT SWING INTO THE MINIMUM HEIGHT REQUIRED COMPARTMENT AREA.

ACCESSIBLE TOILET STALL & WATER CLOSET DETAIL NTS

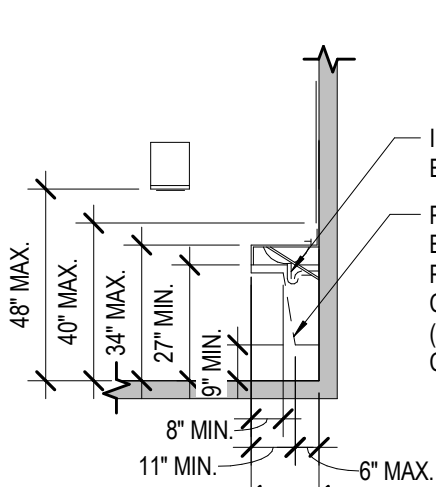
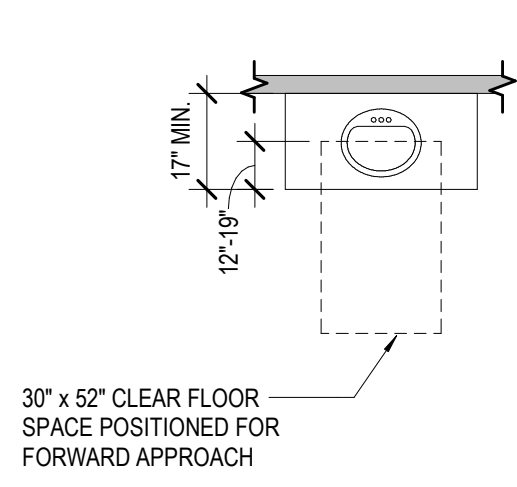


RAMP AND RAMP HANDRAIL DETAIL NTS



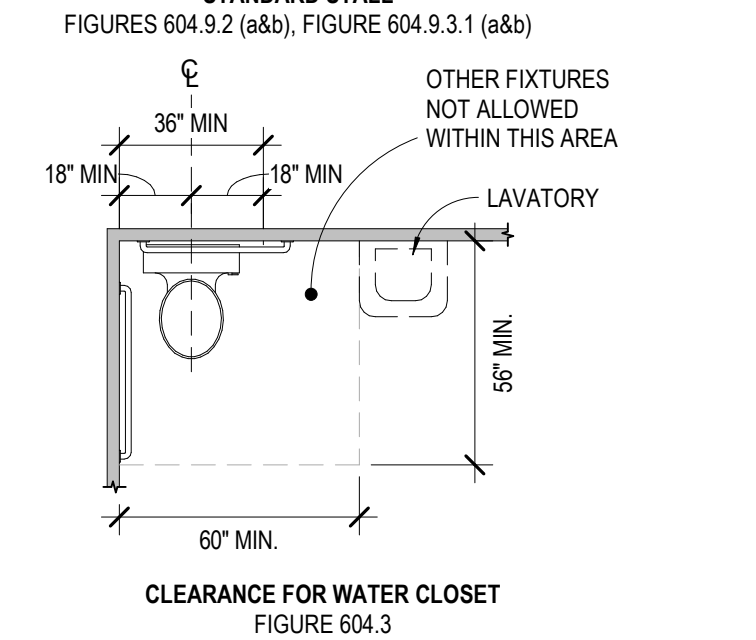
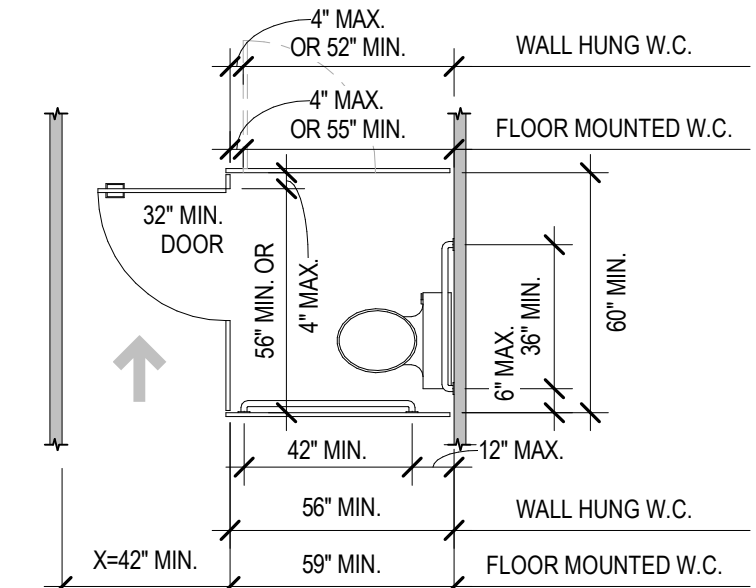
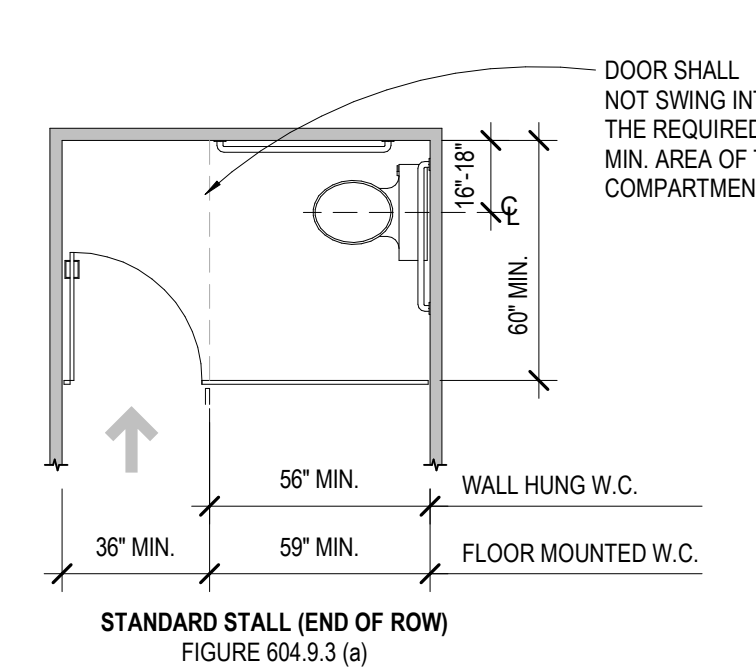
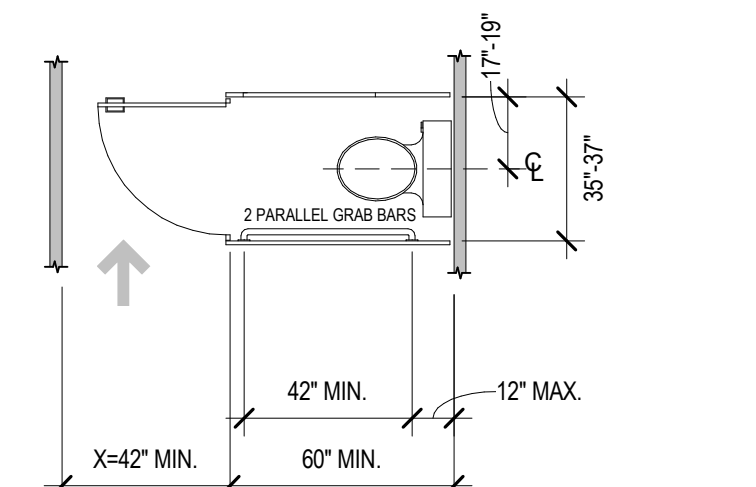
DRINKING FOUNTAIN DETAIL NTS

- NOTES:**
1. THE CLEAR FLOOR SPACE REQUIRED FOR FORWARD APPROACH SHALL BE CENTERED ON THE UNIT AND SHALL INCLUDE KNEE AND TOE CLEARANCES.
 2. OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE 5 POUNDS MAXIMUM.
 3. THE SPOUT SHALL BE LOCATED 15" MAXIMUM FROM THE VERTICAL SUPPORT AND 5" MAXIMUM FROM THE FRONT OF THE UNIT, INCLUDING BUMPERS.
 4. THE SPOUT SHALL PROVIDE A FLOW OF WATER AT LEAST 1" HIGH (MINIMUM). THE ANGLE OF THE WATER STREAM SHALL BE MEASURED HORIZONTALLY RELATIVE TO THE FRONT OF THE UNIT.
 5. WHERE SPOUTS ARE LOCATED LESS THAN 3" FROM THE FRONT OF THE UNIT, THE ANGLE OF THE WATER SHALL BE 30 DEGREES (MAXIMUM).
 6. WHERE THE SPOUTS ARE LOCATED BETWEEN 3" AND 5" MAXIMUM FROM THE FRONT OF THE UNIT, THE ANGLE OF THE WATER STREAM SHALL BE 15 DEGREES (MAXIMUM).
 7. WHEN NOT LOCATED IN AN ALCOVE, THE BOTTOM OF THE WATER COOLER MUST BE HELD AT 27" AFF OR GROUND, OR CANE DETECTION MAY BE REQUIRED AT NO MORE THAN 27" ABOVE FINISHED FLOOR OR GROUND.



- NOTES:**
1. A CLEAR FLOOR SPACE, POSITIONED FOR FORWARD APPROACH AND KNEE AND TOE CLEARANCE SHALL BE PROVIDED.
 2. THE FRONT OF SINKS SHALL BE 34" MAXIMUM ABOVE THE FLOOR, MEASURED TO THE FIXTURE RIM OR COUNTER SURFACE, WHICHEVER IS HIGHER.
 3. HAND-OPERATED, SELF-CLOSING FAUCETS SHALL REMAIN OPEN FOR 10 SECONDS MINIMUM.
 4. WATER SUPPLY AND DRAIN PIPES UNDER SINKS SHALL BE INSULATED OR OTHERWISE CONFIGURED TO PROTECT AGAINST CONTACT. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER SINKS.
 5. OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE 5 POUNDS MAXIMUM.

ACCESSIBLE SINK & COUNTERTOP NTS



TOILET CLEAR FLOOR SPACE NTS

- NOTES:**
1. THE CENTERLINE OF THE WATER CLOSET SHALL BE 17" TO 19" FROM THE SIDE WALLS OR PARTITIONS IN THE AMBULATORY ACCESSIBLE TOILET STALLS.
 2. AMBULATORY ACCESSIBLE COMPARTMENTS SHALL HAVE A DEPTH OF AT LEAST 60" (MINIMUM) AND A WIDTH OF 35" - 37".
 3. THE DOOR SHALL BE SELF-CLOSING. AN ACCESSIBLE DOOR PULL SHALL BE PLACED ON BOTH SIDES OF THE DOOR NEAR THE LATCH. TOILET COMPARTMENT DOORS SHALL NOT SWING INTO THE MINIMUM REQUIRED COMPARTMENT AREA.
 4. A 42" SIDE-WALL GRAB BAR SHALL BE PROVIDED ON BOTH SIDES OF THE COMPARTMENT.
 5. COAT HOOKS, PROVIDED WITHIN TOILET COMPARTMENTS, SHALL BE HUNG AT A 48" MAXIMUM ABOVE THE FINISHED FLOOR. WHEN PROVIDED, A FOLD-DOWN SHELF SHALL BE 40" MINIMUM AND 48" MAXIMUM ABOVE THE FLOOR.
 6. DOOR MANEUVERING CLEARANCES SHALL BE PROVIDED AT COMPARTMENT DOORS. IF THE APPROACH IS TO THE LATCH SIDE OF THE DOOR, CLEARANCE BETWEEN THE DOOR SIDE OF THE COMPARTMENT AND ANY OBSTRUCTION SHALL BE 42" MINIMUM.

AMBULATORY ACCESSIBLE TOILET STALL & WATER CLOSET DETAIL NTS

RAMP NOTES:

1. THE MAXIMUM RISE FOR ANY RAMP RUN IS 30 INCHES.
2. RAMP SHALL HAVE A LANDING AT THE TOP AND BOTTOM OF EACH RUN.
3. RAMP THAT RISE MORE THAN 30 INCHES MUST HAVE INTERMEDIATE LANDINGS AS REQUIRED TO MAINTAIN MAXIMUM 30" RISE FOR EACH RAMP.
4. RAMP THAT CHANGE DIRECTION AT LANDINGS SHALL HAVE A 60" x 60" MINIMUM LANDING.
5. OUTDOOR RAMPS AND APPROACHES TO RAMPS SHALL NOT ACCUMULATE WATER ON WALKING SURFACES.
6. PROVIDE RAMP SURFACES THAT ARE FIRM, STABLE, AND SLIP-RESISTANT.

RAMP HANDRAIL NOTES:

1. HANDRAILS SHALL BE PROVIDED ON BOTH SIDES OF THE RAMP AND HANDRAILS SHALL BE CONTINUOUS ON ALL RUNS OF RAMPS. INSIDE HANDRAILS ON SWITCH BACKS OR DOG-LEG RAMPS SHALL BE CONTINUOUS BETWEEN RUNS.
2. TOP OF HANDRAILS MUST BE BETWEEN 34" (MINIMUM) TO 38" (MAXIMUM) ABOVE THE FINISHED GRADE AT A CONSISTENT HEIGHT THROUGHOUT.
3. HANDRAILS SHALL HAVE A CIRCULAR CROSS SECTION WITH AN OUTSIDE DIAMETER BETWEEN 1 1/4" (MINIMUM) AND 2" (MAXIMUM).
4. CLEARANCE BETWEEN HANDRAIL GRIPPING SURFACES MUST BE 1 1/2" MINIMUM IF ADJACENT SURFACE (I.E. WALL) IS PRESENT. IF THIS IS THE CASE, THE ADJACENT SURFACE MUST BE FREE OF ANY SHARP OR ABRASIVE ELEMENTS.
5. RAMP HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING FOR A MINIMUM OF 12" BEYOND THE TOP AND THE BOTTOM OF THE RAMPS' RUNS. EXTENSIONS SHALL RETURN TO A WALL, GUARD, OR THE LAND SURFACE OR SHALL BE CONTINUOUS TO THE HANDRAIL OF THE NEXT ADJACENT RAMP RUN.
6. RAMPS WITH AN OVERALL RISE OF 6" OR LESS DO NOT REQUIRE HANDRAILS.

PARTITION TYPE SCHEDULE

CONSTRUCTION ASSEMBLY DETAIL	TYPE	SUBSTITUTIONS/ ADDITIONS/ OMISSIONS	NOTES
2X4 WOOD PARTITION	UL #U305 1-HR.	P1	• NONE
		P1.1	• OMIT BATT INSULATION

INTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL	MANUFACTURER	TYPE, COLOR	COMMENTS
BS-1	BACK SPLASH		3/4" X 4" PLAM BACKSPLASH, PROVIDE CLEAR SILICONE SEALANT @ JOINTS, MATCH (E) COLOR	
CAB-1	BASE CABINET		PLAM CABINETRY, MATCH (E)	
CAB-2	BASE CABINET DRAWERS		PLAM CABINETRY, MATCH (E)	
CAB-3	BASE CABINET FILLER		PLAM CABINETRY, MATCH (E)	
CAB-4	UPPER CABINET		PLAM CABINETRY, MATCH (E)	
CT-1	COUNTERTOP		PLAM COUNTERTOP W/ 3MM EDGE BAND, MATCH (E)	
CTB-1	COUNTERTOP BRACKET		STEEL BRACKET, PAINT BLACK	
FRP	FIBER REINFORCED PANEL		4X8 FRP, SMOOTH, PROVIDE MATCHING TRIM	
GWB-1	5/8" GYPSUM WALL BOARD		TEXTURE, PRIME & PAINT, COLOR: TBD	
GWB-2	5/8" TYPE 'X' GYPSUM WALL BOARD		TEXTURE, PRIME & PAINT, COLOR: TBD	
HM-1	HOLLOW METAL FRAME		(E) HOLLOW METAL FRAME, PAINTED	
PT-1	PAINT	SHERWIN WILLIAMS	EGGSHELL WALL PAINT	
PT-2	PAINT	SHERWIN WILLIAMS	SEMI-GLOSS TRIM PAINT	
TL-1	TILE SLATE		EXISTING TO REMAIN	EXISTING
TR-1	1X4 MDF TRIM		1X4 MDF TRIM, PAINTED TO MATCH WALL COLOR	

100% CONSTRUCTION DOCUMENTS

MSU-CAMPUS PLANNING,
DESIGN, AND CONSTRUCTION

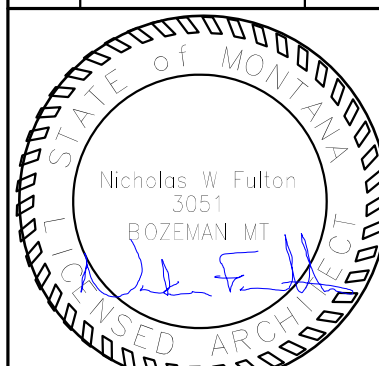
MOLECULAR BIOSCIENCE
BUILDING

BECHTLE
ARCHITECTS

DRAWN BY: **Author**
REVIEWED BY: **Checker**

REV. DESCRIPTION DATE

A Add#3 9.1.26



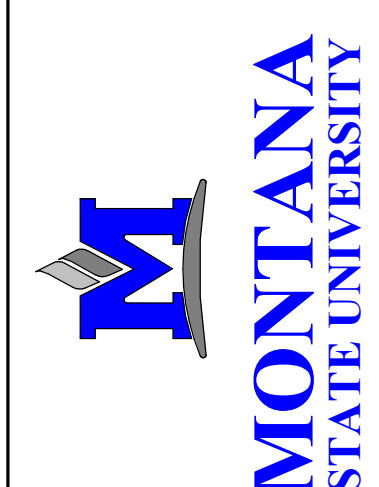
PPA#22-0045
A/E#00-00-00

BA# 2326

SHEET TITLE
ADA INFO. &
FINISH SCHED.

G113

DATE
JUN. 03, 2026



MONTANA
STATE UNIVERSITY

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