Owen Ames Kimball
Building Since 1891

ADDENDUM NO. 02 – PORTAGE PUBLIC SCHOOLS – CENTRAL ELEMENTARY SCHOOL BP 4: CONSTRUCTION

June 15th, 2023

The following items are changes, clarifications, corrections of errors, etc., with respect to the Contract Documents previously issued. This addendum shall be a part of the Contract Documents.

Items listed below may or may not affect the cost of the Contractor's Proposal. Changes in cost shall be incorporated in the Contractor's Proposal.

ITEM No.1

DRAWING AND SPECIFICATION CHANGES AS NOTED BY TOWER PINKSTER - ATTACHED

- See Tower Pinkster write up
- Specification Sections: 07 7100, 08 1416, 08 4113, 12 3550.13, 22 0516, 22 0523, 22 1116, 23 0523, 23 2113, 26 3213, 31 3116
- Drawings: A101C, A102A, A102D, A111, A301, A321, A401, A511, A512, A521, A523, A524, I401, I423, I424, P101B, P101D, P301, E101D, E502, T101A, T402, T403, T404, T422

ITEM No.2

Pre-Bid RFI's & Bid Scope Clarifications – ATTACHED

ITEM No.3

Pre-Bid Meeting Minutes & Sign-In Sheet

ADDENDUM NO. 2 (BP4)

DATE OF ISSUANCE:	**June 15, 2023**
PROJECT:	**Central Elementary School Bid Package 4: Construction** **8422 South Westnedge Avenue** **Portage, MI 49002**
OWNER:	**Portage Public Schools**
ARCHITECT'S PROJECT NO.:	**21-237.10**
ORIGINAL BID ISSUE DATE:	**May 17, 2023**

SCOPE OF WORK

This Addendum includes changes to, or clarifications of, the original Bidding Documents and any previously issued addenda, and shall be included in the Bid. All of these Addendum items form a part of the Contract Documents. The Bidder shall acknowledge receipt of this Addendum in the appropriate space provided on the Bid Form. Failure to do so may result in disqualification of the Bid.

DOCUMENTS INCLUDED IN THIS ADDENDUM

This Addendum includes **five (5)** pages of text and the following documents:

- Bidding Documents: **None.**
- Contract Conditions: **None.**
- Specification Sections: **07 7100, 08 1416, 08 4113, 12 3550.13, 22 0516, 22 0523, 22 1116, 23 0523, 23 2113, 26 3213, 31 3116**
- Drawings: **A101C, A102A, A102D, A111, A301, A321, A401, A511, A512, A521, A523, A524, I401, I423, I424, P101B, P101D, P301, E101D, E502, T101A, T402, T403, T404, T422**

CHANGES TO PREVIOUSLY ISSUED ADDENDA

None.

CHANGES TO BIDDING REQUIREMENTS

None.

CHANGES TO CONTRACT CONDITIONS

None.

CHANGES TO SPECIFICATIONS

ADD-2 Item No. S-1 - Delete Copings

Refer to Specification Section: 07 7100 – Roof Specialties

Delete Article 2.2 Copings

ADD-2 Item No. S-2 - Add wood sliding doors and hardware, install glass in the field

Refer to Specification Section: 08 1416 – Flush Wood Doors

Add subparagraph 2.3.A.3.a "Sliding bi-pass doors 151C & 151D: 1 inch to 1-3/8 inch thick"

Modify paragraph 2.6.C: Glazing in doors shall be installed in the field.

Add Article 2.8 Sliding Door Hardware.

ADD-2 Item No. S-3 - Delete aluminum faced doors and insulated metal spandrel panels

Refer to Specification Section: 08 4113 Aluminum-Framed Entrances and Storefronts

Delete Paragraph 2.3.E, Insulated (metal) Spandrel Panels.

Delete Paragraph 2.4.A, Delete Stile and Rail Entrance Doors. All aluminum swing doors are Fiberglass reinforced polyester (FRP) skins rabbeted into extruded aluminum frames per 2.4.B.

ADD-2 Item No. S-4 - Update Manufacturer's product numbers for education casegood typicals

Refer to Specification Section: 12 3550.13 Educational Casegoods

Updated and corrected manufacturer's product numbers for education casegood typicals.

Removed references to typicals not included in scope.

ADD-2 Item No. S-5 - Grooved Piping in Expansion Fittings and Loops for Plumbing Piping

Refer to Specification Sections: 22 0516

Removed references to grooved joints. Items 1.2.A , 2.3, and 3.1.C have been removed.

ADD-2 Item No. S-6 - Grooved Valves in Plumbing Piping

Refer to Specification Sections: 22 0523

Removed references to grooved valves. Items 1.2.A.3, 1.2.A.4, 1.2.A.7, 2.1.D, 2.1.M.2, 2.4, 2.5, 2.9, 3.5.B.5, 3.5.B.1.b, and 3.5.B.2.b have been removed.

ADD-2 Item No. S-7 - Grooved Piping Valves in Domestic Water Piping

Refer to Specification Sections: 22 1116

Removed references to grooved valves. Item 3.13.B has been removed.

ADD-2 Item No. S-8 - Grooved Piping Valves in HVAC Piping

Refer to Specification Sections: 23 0523

Removed references to grooved piping. Items 2.2.J, 2.4.A.2, 2.4.E, 2.4.F, 2.6.A.2, 2.6.E, 3.2.B.5, 3.2.E.3, 3.2.E.6, and 3.4.B have been removed.

ADD-2 Item No. S-9 - Grooved Piping Systems in Hydronic Piping

Refer to Specification Sections: 23 2113

Removed references to grooved piping systems. Item 2.2.H has been removed.

ADD-2 Item No. S-10 - Diesel Generator Communication Protocol and Manufacturer

Refer to Specification Section: 26 3213

Updated to Bacnet communication protocol and added Generac as acceptable manufacturer.

ADD-2 Item No. S-11 - Termite Control

Refer to Specification Sections: 31 3116 Termite Control

Refer to attached for strike-outs and additions in multiple paragraphs. The scope is generally reduced.

CHANGES TO DRAWINGS

ADD-2 Item No. D-1 - Clarification on Chiller and Condenser Requirements

The Chiller shall have all AC compressors indoor for noise attenuation to meet the Portage noise ordinance. The outdoor condensers shall also be no more than 42" high to keep it well below the 8' high sound attenuation wall and minimize flanking noise. This is a residential neighborhood, therefore all chiller noise producing equipment shall be minimized. If there are questions, the supplier shall contact the engineer prior to bids being submitted.

ADD-2 Item No. D-2 - Mechanical Room Floor Slope and Concrete Curb Detail

Refer to Sheet(s): A102A, A102D

Added keynotes 20 and 21, and detail 1/A102D.

ADD-2 Item No. D-3 - Canopy Coping

Refer to Sheet(s): A111

Provide curved metal fascia in lieu of metal coping.

ADD-2 Item No. D-4 - Doors

Refer to Sheet(s): A101C, A511, A512, A521, A523, A524

Updated doors 107B, 112C, 114D to FRP Doors.

Updated doors 151A and 151B to Flush Doors.

Updated doors 151C and 151D in plan to show the panels on 2 tracks

Updated doors 183B, 185S, 189 to Hollow Metal Doors.

Updated door height for door M212.

Updated details H-9, J-9, S-4 to show 2 tracks.

Removed detail S-5.

ADD-2 Item No. D-5 - MCM-1 Color

Refer to Sheet(s): A301

Updated MCM-1 to be Clear Anod. to match specification.

ADD-2 Item No. D-6 - Wall Section Details

Refer to Sheet(s): A321

Provided additional structural information at 2nd floor sill detail (7/A321). Revised detail 8/A321 to a jamb detail.

ADD-2 Item No. D-7 - Mechanical Chase (Men's 119)

Refer to Sheet(s): A401, I401

Extended chase at Men's 119, and revised wall tile extents.

ADD-2 Item No. D-8 - Cubby Compact Laminate Change

Refer to Sheet(s): I423, I424

Compact Laminate to change from CL-2 to CL-3 for construction of cubbies. End panels to remain as CL-2.

ADD-2 Item No. D-9 - Sink Tag Correction

Refer to Sheet: P101D

Previously noted SK-6 in Café was corrected to SK-5.

ADD-2 Item No. D-10 - Extend Mains in Custodian 117 chase.

Refer to Sheet: P101B, P301

Extend CW, sanitary, and vent mains in newly extended chase to serve urinals in Men's 119.

ADD-2 Item No. D-11 - Mechanical Equipment Connections

Refer to Sheet(s): E101D, E502

Updated drawings to reflect equipment connections for P-12 and UH-M190A.

ADD-2 Item No. D-12 - Servery POS Keynote

Refer to Sheet(s): T101A

Updated keynote for POS device data drop.

ADD-2 Item No. D-13 - UPS Details

Refer to Sheet(s): T402, T403, & T404

Updated details of UPS. Included in contractor scope.

ADD-2 Item No. D-14 - AV7 Riser Diagram Clarification

Refer to Sheet: T422

An item in the AV7 riser diagram was shown in error and has been removed along with an associated cable.

END OF ADDENDUM.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. ~~Copings.~~
2. Roof-edge specialties.

B. Related Requirements:
1. Section 06 1000 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 07 6200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim, reglets and counterflashings.
3. Section 07 7200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
4. Section 07 9200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

D. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section Section 07 5323 “Ethylene-Propylene-Diene-Monomer (EPDM) Roofing”.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section Section 07 5323 “Ethylene-Propylene-Diene-Monomer (EPDM) Roofing”

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. SPRI Wind Design Standard: Manufacture and install ~~copings and~~ roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure: As indicated on Drawings.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

~~2.2 COPINGS~~

~~A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~
~~a. Architectural Products Company.~~
~~b. ATAS International, Inc.~~
~~c. Cheney Flashing Company.~~
~~d. Firestone Metal Products Una Clad.~~
~~e. Merchant & Evans Inc.~~

~~f. Metal-Era, Inc.~~
~~g. OMG Roofing Products. (Hickman)~~
~~h. Perimeter Systems; a division of SAF.~~
~~i. Petersen Aluminum Corporation.~~

~~2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.050 inch thick.~~
~~a. Surface: Smooth, flat finish.~~
~~b. Finish: Clear anodic.~~

~~3. Corners: Factory mitered and continuously welded.~~

~~4. Coping Cap Attachment Method: Snap-on, fabricated from coping cap material.~~
~~a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.~~

~~B. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding [**12 feet**] <**Insert dimension**>, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.~~
~~1. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.050 inch thick.~~
~~2. .~~
~~a. Surface: Smooth, flat finish.~~
~~b. Finish: Clear anodic.~~

2.3 ROOF-EDGE SPECIALTIES

A. Canted Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized-steel sheet cant, 0.028 inch thick, minimum, with extended vertical leg terminating in a drip-edge cleat. Provide matching corner units.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Architectural Products Company.
b. ATAS International, Inc.
c. Firestone Building Products
d. Merchant & Evans Inc.
e. Metal-Era, Inc.
f. OMG Roofing Products.
g. Petersen Aluminum Corporation.
2. Formed Aluminum Sheet Fascia Covers: Aluminum sheet, 0.050 inch thick.
a. Surface: Smooth, flat finish.
b. Finish: Clear anodic.

3. Corners: Factory mitered and continuously welded.
4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
5. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Architectural Products Company.
b. ATAS International, Inc.
c. Exceptional Metals.
d. Merchant & Evans Inc.
e. Metal-Era, Inc.
f. OMG Roofing Products.
g. Petersen Aluminum Corporation.

2.4 REGLETS AND COUNTERFLASHINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cheney Flashing Company.
2. Fry Reglet Corporation.
3. Hickman Company, W. P.
4. Metal-Era, Inc.

B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:

1. Zinc-Coated Steel: Nominal 0.028-inch thickness.

2. Corners: Factory mitered and continuously welded.

3. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
1. At Reglets: Zinc-coated steel, nominal 0.028-inch thickness.
2. At Through-Wall Flashing: Stainless steel, 0.025 inch thick.

D. Accessories:

1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

E. Stainless Steel Finish: ASTM A480/A480M No. 2B (bright, cold rolled, unpolished).

2.5 MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.6 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.

B. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. minimum.

2.7 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

E. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.8 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Coil-Coated Aluminum Sheet Finishes:
1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

C. Aluminum Extrusion Finishes:

1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed

water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply continuously under ~~copings~~ roof-edge specialties and reglets and counterflashings.
2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

B. Slip Sheet: Install over underlayment with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.2 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

~~3.3 COPING INSTALLATION~~

~~A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.~~

~~B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.~~

~~1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.~~

3.4 ROOF-EDGE SPECIALITIES INSTALLATION

A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.5 REGLET AND COUNTERFLASHING INSTALLATION

A. Embedded Reglets: See Section 04 2000 "Unit Masonry" for installation of reglets.

B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

C. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counterflashings tightly to base flashings.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION 07 7100

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.

2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.
4. Wood sound control doors. (Music Room)
5. **Sliding wood doors and hardware**

B. Related Requirements:
1. Section 08 8000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Door trim for openings.
6. Door frame construction.
7. Factory-machining criteria.
8. Factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.

B. Product Test Reports: For each sound control door assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4:

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

C. Sound Rating (Music Room): Provide sound control door assemblies identical to those of assemblies tested as sound-retardant units by an acoustical testing agency, and have the following minimum rating:

1. STC Rating: 42 as calculated by ASTM E413 when tested in an operable condition in accordance with ASTM E90.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Eggers Industries.
   b. Masonite Architectural.
   c. Oshkosh Door Company.
   d. VT Industries Inc.
2. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
3. Door Thickness: 1-3/4 inches unless indicated otherwise.
   a. Sliding bi-pass doors 151C & 151D: 1 inch to 1-3/8 inch thick
4. ANSI/WDMA I.S. 1A Grade: Premium.
5. Faces: Single-ply wood veneer not less than 1/50 inch thick.
   a. Species: Select white birch.
   b. Veneer Face Grade: A.
   c. Cut: Rotary cut.
   d. Match between Veneer Leaves: Book match.
   e. Assembly of Veneer Leaves on Door Faces: Running match.

f. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

6. Exposed Vertical and Top Edges: Applied wood edges of same species as faces and covering edges of crossbands - Architectural Woodwork Standards edge Type D.
   a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
   b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
   c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
      1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.

7. Core for Non-Fire-Rated Doors:
   a. ANSI A208.1, Grade LD-2 particleboard.
      1) Blocking: Provide wood blocking in particleboard-core doors as follows:
         a) 5-inch top-rail blocking, in doors indicated to have closers.
         b) 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
      2) Provide doors with WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 08 7100 "Door Hardware."
   b. WDMA I.S. 10 structural composite lumber.
      1) Screw Withdrawal, Door Face: 550 lbf.
      2) Screw Withdrawal, Vertical Door Edge: 550 lbf.
8. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
   a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as follows:
      1) 5-inch top-rail blocking.
      2) 5-inch bottom-rail blocking, in doors indicated to have protection plates.
      3) 5-inch midrail blocking, in doors indicated to have armor plates.
      4) 5-inch midrail blocking, in doors indicated to have exit devices.
9. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.
10. Adhesives: Type I in accordance with WDMA T.M. 6.

2.4 WOOD SOUND CONTROL DOORS (Music Room **Swing Doors**)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. VT Industries, Heritage STC, Basis of Design, Sound Attenuation Core
2. Masonite Architectural, Acoustic Solutions
3. AMBICO Limited.
4. Krieger Specialty Products Company.
5. Overly Door Company.

B. STC: 42 minimum for door slab and door light frame.

C. Perimeter Gasketing and Drop Seals: To achieve STC ratings, see Hardware specification section.

D. Face Veneers and Vertical Stile Edges: Match other wood doors to the greatest extent possible.

2.5 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.

2. Profile: Flush rectangular beads.

3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Metal Louvers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Activar Construction Products Group, Inc.
   b. Allegion plc.
   c. Anemostat Products; a Mestek company.
   d. ASSA ABLOY.
   e. L & L Louvers, Inc.
   f. McGill Architectural Products.

2. Blade Type: Vision-proof, inverted V.
3. Metal and Finish: Extruded aluminum with Class II, clear anodic finish, AA-M12C22A31.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.

4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated. **Mark all moldings with the door opening number in a location that will be concealed when installed.**

2. Glazing: ~~Factory install~~ glazing in doors ~~indicated to be factory finished~~ **shall be installed in the field.** Comply with applicable requirements in Section 08 8000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. WDMA I.S. 1A Grade: Premium.
2. Finish: WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
3. Staining: Match Architect's sample.

4. Sheen: Satin.

2.8 SLIDING DOOR HARDWARE

A. Provide system rated for more than the door weight, but not less than 200 lbs per door. Doors 151C and 151D.

1. Basis of Design L. E. Johnson Products Inc. 100 MD Multi-Pass Sliding Door Hardware.
2. Extruded Aluminum Track with convex rails.
3. Heavy weight
4. 3 wheel quiet nylon encapsulated ball bearing wheels, requires less than 5 lbs of force to move door: Johnson 1125.
5. Soft close/open door operation. Provide Two Johnson 1060 Soft Close Kits per door leaf.
6. ANSI/BHMA A156.14, Grade 1, D8731, D8741, D8742
7. Provide 3 tracks for 3 door panels, each door slides jamb to jamb independent of each other door.
8. 2 tracks for 4 door panels. Center of opening to jamb operation (doors do not cross center of opening). Provide 1155 Track Stops to prevent wheels from passing over center of opening
9. Provide aluminum fascia.
10. Bottom Trackless Configuration. Provide guide posts attached to floor.

11. Recessed 2-1/8 inch finger pull for door panels, 2 per door
12. No locks

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:
1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 1416

SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed storefront systems.
2. Aluminum-framed entrance door systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Delegated-Design Submittal: For aluminum-framed entrances and storefronts including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

C. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions,

arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures, including, but not limited to, excessive deflection.
   b. Noise or vibration created by wind and thermal and structural movements.
   c. Deterioration of metals and other materials beyond normal weathering.
   d. Water penetration through fixed glazing and framing areas.
   e. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

1. Obtain aluminum doors and frames through a single source. Verify that doors and frames will operate and seal properly with specified hardware.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:
   a. Thermal stresses transferring to building structure.
   b. Glass breakage.
   c. Noise or vibration created by wind and thermal and structural movements.
   d. Loosening or weakening of fasteners, attachments, and other components.
   e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.

D. Deflection of Framing Members Supporting Glass: At design wind load, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.

2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
   a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

3. Cantilever Deflection: Limited to 2l/175 at unsupported cantilevers.

E. Structural: Test according to ASTM E 330/E 330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft..

G. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Thermal Transmittance (U-factor):
   a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.35 Btu/sq. ft. x h x deg F as determined according to NFRC 100. (based on center of glass Winter Nighttime U-Factor: 0.25 maximum.)
2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than 0.35 as determined according to NFRC 200.
3. Air Leakage:
   a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested according to ASTM E283.

b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..

4. Condensation Resistance Factor (CRF):
   a. Fixed Glazing and Framing Areas: CRF for the system of not less than 62 as determined according to AAMA 1503.

H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 STOREFRONT SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. EFCO Corporation.
2. Kawneer North America, TriFab VersaGlaze 601-UT basis of design
3. Oldcastle BuildingEnvelope.
4. Special-Lite, Incorporated.
5. Tubelite.
6. Wausau Metals.
7. YKK AP America Inc.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Basis-of-Design Product: Kawneer North Armerica; Trifab 601 UT.
2. Frame Profile: 2 inches wide by 6 to 6-1/2 inches deep.
3. Exterior Framing Construction: Thermally broken.
4. Interior Vestibule Framing Construction: Nonthermal.
5. Glazing System: Retained mechanically with gaskets on four sides. Glazing Plane: Front of center.
6. Finish: Color anodic finish.
7. Fabrication Method: Field-fabricated stick system.
8. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
9. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

~~E. Insulated Spandrel Panels: Laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.~~

~~1. Basis of Design: Mapes Architectural Panels, Mapes R+ Rabbet Edge Panel, 8 ply~~
~~2. Basis of Design: Exterior Skin High Pressure Compact Laminate, Central Elementary School Trespa~~
~~a. Trespa Meteon Unicolours, Color Ochre, Finish Satin~~
~~b. Trespa Meteon Unicolours, Color Rusty Red, Finish Satin~~

c. Trespa Meteon Unicolours, Silver Grey, Finish Satin
d.

3. Overall Panel Thickness: 2 inches (includes 1 inch rabbet to insert in storefront glazing channel.
4. Finish
   a. Exterior: Custom Kynar
   b. Interior: Custom Kynar
   c. Color as selected by architect.

5. Panel Fabrication
   a. Exterior Substrate: Cement Board .0.157 inch
   b. Exterior Core: Isocyanurate
   c. Smooth Mill Aluminum
   d. Secondary Exterior Substrate: Cement Board
   e. Interior Core: Isocyanurate
   f. Interior Substrate: Cement Board .0.157 inch
   g. Tolerances - .8% of panels dimension length and width - (+/-) 1/16" thickness

6. Overall Panel Thickness - 2"
7. Glazing Leg Thickness - 1"
8. R-Value - 13
9. U-Value - 0.08

2.4 ENTRANCE DOOR SYSTEMS

A. Stile and Rail Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cross Aluminum Products, Inc.
   b. EFCO Corporation.
   c. Kawneer.
   d. Oldcastle Building Envelope.
   e. Tubelite Inc.
   f. United States Aluminum.
   g. YKK AP America Inc.
2. Door Construction: 1-3/4 inch overall thickness, with minimum 0.125 inch thick, extruded aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
   a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
   b. Thermal Transmittance (U-factor): Not more than 0.65 Btu/sq. ft. x h x deg F as determined according to NFRC 102.
   c. Condensation Resistance: Condensation rating of not less than 46 as determined according to AAMA 1503.

3. Door Design: As indicated.
4. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
   a. Provide nonremovable glazing stops on outside of door.

B. Fiberglass Reinforced Polyester Doors (FRP): Fiberglass reinforced polyester skins rabbeted into extruded aluminum frames with a poured-in-place insulation core as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Capitol Aluminum and Glass.
   b. Commercial Door Systems.
   c. Special-Lite, Incorporated.
   d. United States Aluminum.

2. Frames: Extruded 6063-T5 aluminum alloy rails and stiles, 1-3/4 inches deep and minimum 2-5/16 inches wide, with 0.125-inch) thick walls. Construct with mitered corners and provide joinery of 3/8-inch diameter full width tie rods through extruded splines top and bottom. Reinforce to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable. Extrude top and bottom rail legs for interlocking continuous rail rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum rails and stiles.

3. FRP Facing Sheets: 0.120-inch thick fiberglass reinforced polyester. Provide dark bronze color and a lighter color as selected from manufacturer's full range.
4. Core of Door Assembly: Minimum 5 lb/cu. ft. density poured-in-place polyurethane free of CFC. Minimum "R" value of 11. Meeting stiles on pairs of doors and bottom weather bars with nylon brush weatherstripping.
5. Manufacture doors with cutouts for vision lites, louvers or panels as indicated. Factory furnish and install all glass, louvers and panels prior to shipment.
6. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 7100 "Door Hardware."

B. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

C. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000 molded neoprene or ASTM D 2287 molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

D. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

E. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 GLAZING

A. Glazing: Comply with Section 08 8000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

2.7 MATERIALS

A. Sheet and Plate: ASTM B 209.

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.

D. Structural Profiles: ASTM B 308/B 308M.

E. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

B. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. Door Stops: Screw-applied or snap-in box type with minimum 3/4-inch depth.
2. At interior and exterior doors, provide compression weather stripping at fixed stops.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker. Refer to drawings for locations.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
1. Color: Dark bronze. Refer to drawings for locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 9200 "Joint Sealants," to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 08 8000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
   a. Perform a minimum of two tests in areas as directed by Architect.

C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 08 4113

SECTION 12 3550.13 - EDUCATIONAL CASEGOODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Freestanding and Mobile Plastic-laminate-clad educational casegoods.
2. Spanning Worksurfaces and Backsplashes.
3. Hutches.
4. Sliding Markerboard Units.
5. Tray storage units and associated rail system.
6. Filler and closure panels.

B. Related Requirements:

1. Section 06 1000 "Rough Carpentry" for wood blocking for anchoring casegoods.
2. Section 09 6513 "Resilient Base and Accessories" for resilient base applied to casegoods.

1.2 DEFINITIONS

A. Exposed Surfaces of Casegoods: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and visible surfaces in open cabinets or behind glass doors.

1. Ends of cabinets are defined as "exposed"[except ends are defined as "concealed" where installed directly against and completely concealed by walls or other cabinets].

B. Semiexposed Surfaces of Casegoods: Surfaces behind opaque doors, such as cabinet interiors, shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of cases 78 inches or more above floor and bottoms of cabinets more than 24 inches, but less than 48 inches above floor, are defined as "semiexposed."

C. Typical: an assembly of individually manufactured units installed together in a specific configuration defined as each “Typical” assembly.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 COORDINATION

A. Coordinate installation of educational casegoods with installation of technology.

B. Coordinate installation of educational casegoods with paint pattern application.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For educational casegoods.

1. For Each designated Typical: Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
   a. Indicate types and sizes of casegoods both for individual component units and completed Typical assembly.
   b. Indicate manufacturer's catalog numbers for individual component units that make up each designated Typical assembly.

C. Samples for Verification: For each type of casework, exposed-hardware, and countertop-material finish, and edgebanding in manufacturer's standard sizes.

1.6 QUALITY ASSURANCE

A. Bid must include letter from manufacturer indicating dealer is approved to purchase, install, and service the specified products, and has trained installers to oversee the specified work.

B. Installer must have minimum (3) years of experience installing specified products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install educational casegoods until building is enclosed, utility roughing-in and wet-work are complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Established Dimensions: Where educational casegoods are indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Field Measurements: Where educational casegoods areindicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to provide a limited lifetime warranty, to repair or replace components of casework that fail in materials or workmanship for the life of the product.

1. Failures include, but are not limited to, the following:
   a. Delamination of components or other failures of glue bond.
   b. Warping of components.

c. Failure of operating hardware.

2. Exceptions include:
   a. Normal wear and tear.
   b. Unauthorized alterations and improper maintenance.
   c. Laminates, Casters, levelers will be covered twelve years from date of substantial completion.

PART 2 - PRODUCTS

2.1 CASEGOOD MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by Fleetwood Furniture, from product lines:

1. Illusions 2.0, Freestanding Storage Units.
2. Designer 2.0, Mobile Storage Units.

2.2 EDUCATIONAL CASEGOODS

A. Construction:

1. Horizontal, Vertical Outer, and Internal Panels, toekick and shelves:
   a. ¾" Thick 45lb density particle board substrate with balanced construction of color-matched, thermally fused laminate (TFL) on both sides
   b. Except Bottom Panels; to be 1" thick 45lb density particle board

2. Worksurfaces:
   a. 1" Thick 45lb density particleboard substrate and feature balanced construction with high pressure laminate (HPL) on top and 0.028" cabinet liner backer on bottom of worksurface.
      1) Provide smooth surfaces in uniform plane, free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch.
      2) Splashes:
      3) Flat Configuration: With square edges, flat backsplashes, and flat end splashes. Finish faces and exposed edges of splashes with color-matched pvc edgebanding.

3. Panel Edges:
   a. Permanently attached color-matched or coordinating pvc edgeband that is 3mm on front edge of top panel and 1mm on all other visible edges and panels.
      1) 3mm pvc edgeband to have 1/8" radiused top edge.
      2) Edgeband bonded with hot-melt adhesive and trimmed flush on top, bottom, and sides of all visible portions of cabinets to create pry-proof edges and structural integrity.

4. Pulls:
   a. Door and Drawer pulls to be ADA compliant "Metro" style with metallic silver finish.

5. Locks:

a. Individual door and drawer cylinder type locking mechanisms on learning wall unit only.
   1) Locks to be keyed alike across each Typical unit.

6. Hinges: steel, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two for doors 48 inches high or less and three for doors more than 48 inches high.
   a. Finish to match specified door and drawer pulls.

7. Structural Reveal:
   a. ¾" x ¾" structural metal reveal integrated on the top front of all units and backs of base units to control deflections.

8. Levelers:
   a. 4 Leveling glides concealed underneath cabinet inserted into threaded steel brackets attached to the end panels and back or toekick
   b. Front levelers can be adjusted with 7/8" thin wrench at base of leveler, back levelers to be adjusted from aboe with ¼" nut driver or socket through access holes in cabinet bottom
   c. Cabinets to have an adjustment range of 1-1/4".

9. Casters (Mobile Units):
   a. Plate-mounted 100mm diameter casters with twin-wheel swivel. Non marking thermoplastic elastomer tread for quiet use on hard or carpeted flooring.
      1) Casters tested to hold 225 pounds and roll over uneven surfaces.

10. Drawers:
    a. 20-gauge cold-rolled steel drawer construction on box and file drawers mounted to 16-gauge non-binding full-extension drawer slides on drawers.

11. Tray Storage Units:
    a. Gratnells brand insertable frosted tray storage units with interchangeable, durable plastic trays in 3"x 6", and 12" heights.
    b. Nominal size of 12-1/2" wide and 17" deep.

12. Hutches:
    a. Hutch cabinets have 10-guage steel mounting plates factory installed to the bottom side of each hutch end panel.
    b. Hutches to be field installed to the top surface of the base cabinet or spanner worksurface.
    c. Connect adjacent hutches with through-bolt connectors.
    d. Coordinate cutouts in hutch with technology requirements and any required-wall attachments.

13. Sliding Markerboard Units:
    a. Sliding markerboard units must be coordinated with Learning Wall Hutches and Monitor hutches with extended top to provide mounting surface for top and bottom track of markerboard unit.
    b. Aluminum Extrusion Track System:
       1) Provide 3-track system to accommodate up to 4 sliding markerboards.
       2) Track shall be aluminum extrusions with clear satin anodized finish
       3) Top track to be one piece with integral fascia,Bottom track to be one piece with smoothly curved ends.
    c. Sliding markerboard panel surface:

1) Surface to be writanium 28-gauge steel face with porcelain enamel finish, fused to the steel sheet using a continuous coil process.
   a) Gloss of writing surface must not increase more than (3) units when subjected to testing procedures.
2) Panel core material is ½" honeycomb with 0.015" aluminum backing sheet.
3) Panel metal trim shall be 6063 aluminum alloy with a t temper and ¾" face
4) Panels must have fingerpulls, one pair per sliding panel

d. Accessories:
   1) Provide Map rail 2" High, continuous along length of track; colored-cork insert.
   2) Nylon Rollers: two per panel up to 48" wide, and three per panel up to 96" wide.
   3) Nylon glides: two per panel up to 48" wide, and three per panel up to 96" wide.

B. Colors and Patterns: Subject to compliance with requirements, provide:

1. Casegoods and Fillers: Wilsonart, Limber Maple
2. Worksurfaces and Splashes (Except for Learning Wall Typicals): Arborite Raw Denim
   a. Worksurfaces on Learning Wall typicals to match casegood finish.

3. Door and Drawer Edgebanding:
   a. Casegood and worksurface edgebanding to be pvc edgebanding, As selected by Architect from manufacturer's full range.

2.3 EDUCATIONAL CASEGOODS - TYPICALS

A. Typical Designations: Drawings indicate a reference number designated to an assembly of individual component units to complete each "Typical" Assembly. Each typical is comprised of various configurations as follows:

1. LW Learning Wall Typical Assemblies – all learning wall units must be lockable and configured as follows
   a. LW-1(L) – Learning Wall, Left-hand sided TEC or LW-1(R) - Learning Wall, Right-hand sided TEC – Components Match, coordinating technology device mounting locations vary based on hand of unit. Include face filler at wall and side filler at end of run.

      1) GHH1722047TN Illusions 2.0 Monitor Hutch Learning Wall - center
         a) 72" W, 20" D, 47" H
         b) Shop cut-out for technology mounting
      2) GHL1362047TN Illusions 2.0 Hutch Learning Wall – left, 1 adjust and 1 fixed shelf.
         a) 36" W, 20"D, 47" H
      3) GHR1362047TN Illusions 2.0 Hutch Learning Wall – right, 1 adjust and 1 fixed shelf.
         a) 36" W, 20"D, 47" H
      4) GS314447 Illusions 2.0 Sliding Markerboard Unit
         a) Option G (4) 36" Wide boards on (3) tracks.
         b) 144" W x 47" H
      5) (Quantity 2) GWSR07224 Illusions 2.0 Worksurface Spanning, no splash
         a) 72" W x 24"D
      6) (Quantity 2) GXFN2437 Illusions 2.0 Base Storage Side Filler
         a) 37"H, 4" **24" Wide**
      7) **GSS1482037LD-04337** Illusions 2.0 Base Shelf – Two adjustable shelves, locking doors.
         a) 48" W, 20"D, 37" H

b) 5-knuckle hinges

8) (Quantity 2) GTR1482037LD-04337 Illusions 2.0 Base Tray – locking doors, Gratnells' Trays interior
   a) 48" W, 20"D, 37" H
   b) Tray Configuration A - (Quantity 24) 3" Deep Trays
   c) 5-knuckle hinges

b. LW-2(L) – Learning Wall with two-adjacent locking tall cabinets, Left-hand sided TEC or LW-2(R) - Learning Wall with two-adjacent locking tall cabinets, Right-hand sided TEC – Components Match, position of left or right hand side for adjacent locking tall cabinets and coordinating technology device mounting locations vary based on hand of unit. Include face filler at wall and side filler at end of run.
   1) GHH1722047TN Illusions 2.0 Monitor Hutch Learning Wall - center
      a) 72" W, 20" D, 47" H
      b) Shop cut-out for technology mounting
   2) GHL1362047TN Illusions 2.0 Hutch Learning Wall – left, 1 adjust and 1 fixed shelf.
      a) 36" W, 20"D, 47" H
   3) GHR1362047TN Illusions 2.0 Hutch Learning Wall – right, 1 adjust and 1 fixed shelf.
      a) 36" W, 20"D, 47" H
   4) GS314447 Illusions 2.0 Sliding Markerboard Unit
      a) Option G (4) 36" Wide boards on (3) tracks.
      b) 144" W x 47" H
   5) (Quantity 2) GWSR07224 Illusions 2.0 Worksurface Spanning, no splash
      a) 72" W x 24"D
   6) (Quantity 2) GXFN2437 Illusions 2.0 Base Storage Side Filler
      a) 37"H, 4" Wide
   7) GSS148207LD-04337 Illusions 2.0 Base Shelf – Two adjustable shelves, locking doors.
      a) 48" W, 20"D, 37" H
      b) 5-knuckle hinges
   8) (Quantity 2) GTR1482037LD-04337 Illusions 2.0 Base Tray – locking doors, Gratnells' Trays interior
      a) 48" W, 20"D, 37" H
      b) Tray Configuration A - (Quantity 24) 3" Deep Trays
      c) 5-knuckle hinges
   9) (Quantity 2) GSS1362084LD Illusions 2.0 Tall Shelf – Four Adjustable Shelves, 1 fixed shelf, locking doors.
      a) 36" W, 20" D, 84" H
      b) 5-Knuckle hinges
   10) FXFN362484 Illusions 2.0 Tall Storage Side Filler
      a) 36" W, 24" D, 84" H

c. LW-3(L) and LW-3(R) – Two locking tall cabinets, abutting wall on either left or right hand side. Include face filler at wall and side filler at end of run.
   1) (Quantity 2) GSS1302084LD Illusions 2.0 Tall Shelf – Four Adjustable Shelves, 1 fixed shelf, locking doors.
      a) 30" W, 20" D, 84" H
      b) 5-Knuckle hinges
   2) FXFN3062484 Illusions 2.0 Tall Storage Side Filler
      a) 30" W, 24" D, 84" H

~~d. LW-4(L) and LW-4(R) – one locking tall cabinet, abutting wall on either left or right hand side. Include face filler at wall, and side filler at end of run.~~
~~1) GSS1302084LD Illusions 2.0 Tall Shelf – Four Adjustable Shelves, 1 fixed shelf, locking doors.~~
~~a) 30" W, 20" D, 84" H~~
~~b) 5 Knuckle hinges~~
~~2) FXFN3062484 Illusions 2.0 Tall Storage Side Filler~~
~~a) 30" W, 24" D, 84" H~~

e.

2. Learning Studio Typical Assemblies:
   a. LS-1 – two base tray cabinets and two base shelf cabinets with spanning worksurfaces and backsplash.
      1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
         a) 42" W, 20" D, 29" H
         b) Tray Configuration A - (Quantity 18) 3" Deep Trays
      2) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf
         a) 30" W, 20" D, 29" H
      3) ~~(Quantity 2)~~ **GWSR06020** Illusions 2.0 Spanning Worksurface
         a) 60" W , 20" D
      4) GWSR08420 Illusions 2.0 Spanning Worksurface
         a) 84" W, 20" D
      5) ~~(Quantity 2)~~ **GWBR04804** Illusions 2.0 Backsplash
         a) 48" W, 4" H
      6) GWBR08404 Illusions 2.0 Backsplash
         a) 84" W, 4" H

   b. LS-1(L) and LS-1(R) – two base tray cabinets and two base shelf cabinets with spanning worksurfaces, backsplash, and side splash. Include face filler at wall.
      1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
         a) 42" W, 20" D, 29" H
         b) Tray Configuration A - (Quantity 18) 3" Deep Trays
      2) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf
         a) 30" W, 20" D, 29" H
      ~~3) (Quantity 2) Illusions 2.0 Spanning Worksurface~~
      4) GWSR08420 Illusions 2.0 Spanning Worksurface
         a) 84" W, 20" D
      5) GWSR06320 Illusions 2.0 Spanning Worksurface
         a) 63" W, 20" D
      ~~6) (Quantity 2) Illusions 2.0 Backsplash~~
      7) GWBR08404 Illusions 2.0 Backsplash
         a) 84" W, 4" H
      8) GWBR04204 Illusions 2.0 Backsplash
         a) 48" W, 4" H
      ~~9)~~
      10) GWBR04804 Illusions 2.0 Backsplash- field cut for sidesplash
         a) 48"W, 1"D, 4"H – cut to fit worksurface with filler in field.
      11) GXFN1229 Illusions 2.0 Base Storage Front Filler
         a) Field-cut and assembled.

   c. LS-2 – two base tray cabinets with spanning worksurface and backsplash.
      1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
         a) 42" W, 20" D, 29" H

b) Tray Configuration A - (Quantity 18) 3" Deep Trays

2) GWSR08420 Illusions 2.0 Spanning Worksurface

a) 84" W, 20" D

3) GWBR08404 Illusions 2.0 Backsplash

a) 84" W, 4" H

d. LS-2(L) and LS-2(R) – two base tray cabinets with spanning worksurface, backsplash, and side splash. Include face filler at wall.

1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior

a) 42" W, 20" D, 29" H

b) Tray Configuration A - (Quantity 18) 3" Deep Trays

2) GWSR08720 Illusions 2.0 Spanning Worksurface

a) 87" W, 20" D

3) GWBR08704 Illusions 2.0 Backsplash

a) 87" W, 4" H

4) GXFN1229 Illusions 2.0 Base Storage Front Filler

a) 12" W, .75"D, 29" H

b) Field-cut and assembled, as indicated.

e. LS-3 – two base shelf cabinets with spanning worksurface and backsplash.

1) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf

a) 30" W, 20" D, 29" H

2) **GWBR06004** Illusions 2.0 Spanning Worksurface

a) 60" W, 20"D

3) GWBR06004 Illusions 2.0 Backsplash

a) 60" W, 4" H

f. LS-3(L) and LS-3(R) – two base shelf cabinets with spanning worksurface, backsplash, and side splash. Include face filler at wall.

1) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf

a) 30" W, 20" D, 29" H

2) **GWBR06304** Illusions 2.0 Spanning Worksurface

a) 63" W, 20"D

3) GWBR06304 Illusions 2.0 Backsplash

a) 63" W, 4" H

4) GWBR04804 Illusions 2.0 Backsplash

a) 48" W, 4" H

5) GXFN1229 Illusions 2.0 Base Storage Front Filler

a) 12" W, .75"D, 29" H

b) Field-cut and assembled, as indicated.

g. LS-4(L) and LS-4(R) – two base tray cabinets and two base shelf cabinets in L-shaped configuration (shelf-shelf | tray-tray) with spanning worksurfaces and backsplashes. Include corner filler ~~and face filler where shelf cabinet abuts Learning Wall Typical.~~

1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior

a) 42" W, 20" D, 29" H

b) Tray Configuration A - (Quantity 18) 3" Deep Trays

2) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf

a) 30" W, 20" D, 29" H

3) GNC1242029LN Illusions 2.0 Base Corner Filler

a) 24" W, 20"D, 29" H

b) Include attached worksurface

c) Include attached backsplash both sides

4) **GWSR06020** Illusions 2.0 Spanning Worksurface
   - **a) 60"W ,20"D**
   - ~~b) Extend into corner~~
5) **GWSR08420** Illusions 2.0 Spanning Worksurace
   - **a) 84"W, 20"D**
6) **GWBR06004** Illusions 2.0 Backsplash
   - **a) 60"W, 4"H**
7) **GWBR08404** Illusions 2.0 Backsplash
   - ~~a) Extend into corner~~
   - **b) 84"W, 20"D**
8) GNC1242029LN Illusions 2.0 Base Corner Filler
   - a) 24" W, 20 "D, 29 " H
9) GXFN1229 Illusions 2.0 Base Storage Front Filler
   - a) 12" W, .75"D, 29" H
   - b) Field-cut and assembled, as indicated.

~~h. LS-5(L) and LS-5(R) – two base tray cabinets and two base shelf cabinets in L-shaped configuration (shelf | shelf-tray-tray) with spanning worksurfaces and backsplashes. Include corner filler and face filler where shelf cabinet abuts Learning Wall Typical.~~
~~1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior~~
   - ~~a) 42" W, 20" D, 29" H~~
   - ~~b) Tray Configuration A - (Quantity 18) 3" Deep Trays~~
~~2) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf~~
   - ~~a) 30" W, 20" D, 29" H~~
~~3) Illusions 2.0 Spanning Worksurface~~
   - ~~a) Extend into corner~~
~~4) Illusions 2.0 Spanning Worksurace~~
~~5) Illusions 2.0 Backsplash~~
~~6) Illusions 2.0 Backsplash~~
   - ~~a) Extend into corner~~
~~7) GNC1242029LN Illusions 2.0 Base Corner Filler~~
   - ~~a) 24" W, 20 "D, 29 " H~~
~~8) GXFN1229 Illusions 2.0 Base Storage Front Filler~~
   - ~~a) 12" W, .75"D, 29" H~~
   - ~~b) Field-cut and assembled, as indicated.~~

~~i.~~ LS-6(L) and LS-6(R) – two base tray cabinets and two base shelf cabinets in L-shaped configuration (tray | tray-shelf-shelf) with spanning worksurfaces and backsplashes. Include corner filler ~~and face filler where tray cabinet abuts Learning Wall Typical.~~
1) ~~(Quantity 2)~~ GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
   - a) 42" W, 20" D, 29" H
   - b) Tray Configuration A - (Quantity 18) 3" Deep Trays
2) ~~tity 2)~~ GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
   - a) 42" W, 20" D, 29" H
   - b) Tray Configuration A - (Quantity 18) 3" Deep Trays
   - **c) Include attached worksurface**
   - **d) Include attached backsplash**
3) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf
   - a) 30" W, 20" D, 29" H
4) **GWSR10220** Illusions 2.0 Spanning Worksurface
   - ~~a) Extend into corner~~
   - **b) 102"W, 20"D**
5) ~~Illusions 2.0 Spanning Worksurface~~

6) **GWBR10204** Illusions 2.0 Backsplash
   a) 102"W, 4"H
~~7) Illusions 2.0 Backsplash~~
   ~~a) Extend into corner~~
8) GNC1242029LN Illusions 2.0 Base Corner Filler
   a) 24" W, 20 "D, 29 " H
   b) Include attached worksurface
   c) Include attached backsplash both sides
~~9) GXFN1229 Illusions 2.0 Base Storage Front Filler~~
   ~~a) 12" W, .75"D, 29" H~~
   ~~b) Field-cut and assembled, as indicated.~~

j. LS-7(L) and LS-7(R) – two base tray cabinets and two base shelf cabinets in L-shaped configuration (tray-tray | shelf-shelf) with spanning worksurfaces and backsplashes. Include corner filler ~~and face filler where tray cabinet abuts Learning Wall Typical.~~
   1) (Quantity 2) GTR1422029LN Illusions 2.0 Base Tray – Gratnells' Trays interior
      a) 42" W, 20" D, 29" H
      b) Tray Configuration A - (Quantity 18) 3" Deep Trays
   2) (Quantity 2) GSS1302029LN Illusions 2.0 Base Shelf – 1 adjustable shelf
      a) 30" W, 20" D, 29" H
   3) **GWSR06020** Illusions 2.0 Spanning Worksurface
      ~~a) Extend into corner~~
      b) 60"W, 20"D
   4) **GWSR08420** Illusions 2.0 Spanning Worksurace
      a) 84"W, 20"D
   5) **GWBR08404** Illusions 2.0 Backsplash
      a) 84"W, 4"H
   6) **GWBR06004** Illusions 2.0 Backsplash
      ~~a) Extend into corner~~
      b) 60"W, 4" H
   7) GNC1242029LN Illusions 2.0 Base Corner Filler
      a) 24" W, 20 "D, 29 " H
      b) Include attached worksurface
      c) Include attached backsplash both sides
   ~~8) GXFN1229 Illusions 2.0 Base Storage Front Filler~~
      ~~a) 12" W, .75"D, 29" H~~
      ~~b) Field-cut and assembled, as indicated.~~

3. Mobile Storage Typical Assemblies:
   a. MS-1 – one mobile tray storage cabinet, under 32" H counters
      1) DTR14220294N Designer 2.0 Gratnells' Tray
         a) 42" W, 20" D, 29" H
         b) Tray Configuration D – (Quantity 12) 3" Deep Trays,(Quantity 3) 6" Deep Trays
   b. MS-2 – one mobile tray storage cabinet, under 27" H counters
      1) DTR14820244N Designer 2.0 Gratnells' Tray
         a) 42" W, 20" D, 24" H
         b) Tray Configuration D – (Quantity 6) 3" Deep Trays, (Quantity 3) 6" Deep Trays
   c. MS-3 – one mobile drawer storage cabinet, under 32" H counters
      1) DD513627294D Designer 2.0 Drawer-Poster, 4 box/1file non-locking drawers
         a) 36" W, 27" D, 29" H
         ~~b) Tray Configuration D – (Quantity 12) 3" Deep Trays, (Quantity 3) 6" Deep Trays~~

PART 3 - EXECUTION

3.1 INSTALLATION OF CASEGOODS

A. Comply with installation requirements in SEFA 2. Install level, plumb, and true in line; Where educational casegoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:

1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet.
3. Variation of Faces of Casework from a True Plane: 1/8 inch in 10 feet.
4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.

B. Install hardware uniformly and precisely.

C. Adjust operating hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.2 INSTALLATION OF WORKSURFACES

A. Comply with installation requirements in SEFA 2. Abut top and edge surfaces true in plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints where indicated on Shop Drawings.

B. Field Jointing: Where possible, make in same manner as shop-made joints, using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Shop prepare edges for field-made joints.

1. Plastic-Laminate Countertops: Secure field-made joints using concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.

C. Dress joints smooth, remove surface scratches, and clean entire surface.

3.3 CLEANING AND PROTECTING

A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

B. Protect countertop surfaces during construction with 6-mil plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches o.c.

END OF SECTION 12 3553.16

SECTION 22 0516 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rubber union connector packless expansion joints.
2. Metal-bellows packless expansion joints.
3. Externally pressurized metal-bellows packless expansion joints.
4. Rubber packless expansion joints.
5. Flexible-hose packless expansion joints.
6. ~~Grooved-joint expansion joints.~~
7. Alignment guides and anchors.
8. Pipe loops and swing connections.

1.3 DEFINITIONS

A. BR: Butyl rubber.

B. Buna-N: Nitrile rubber.

C. CR: Chlorosulfonated polyethylene synthetic rubber.

D. CSM: Chlorosulfonyl-polyethylene rubber.

E. EPDM: Ethylene-propylene-diene terpolymer rubber.

F. NR: Natural rubber.

1.4 PERFORMANCE REQUIREMENTS

A. Compatibility: Products shall be suitable for piping system fluids, materials, working pressures, and temperatures.

B. Capability: Products shall absorb 200 percent of maximum axial movement between anchors.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Delegated-Design Submittal: For each anchor and alignment guide indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and swing connections.
2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure.
3. Alignment Guide Details: Detail field assembly and attachment to building structure.
4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each expansion joint.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of expansion joint, from manufacturer.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For expansion joints to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. NSF Compliance as required by authorities having jurisdiction:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."
3. Comply with NSF 372, "Drinking Water System Components – Lead Content"

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Compatibility: Products shall be suitable for piping service fluids, materials, working pressures, and temperatures.

B. Capability: Products to absorb 200 percent of maximum axial movement between anchors.

2.2 EXPANSION JOINTS

A. Rubber Union Connector Expansion Joints RUEJ-01:
1. Material: Twin reinforced-rubber spheres.
2. Material: Twin reinforced-rubber spheres[**with external restraining cables**].
3. Minimum Pressure Rating: 150 psig at 170 deg F, unless otherwise indicated.
4. Minimum Pressure Rating: [**150 psig at 170 deg F**] <**Insert value**>, unless otherwise indicated.
5. End Connections for NPS 2 and Smaller: Threaded.

B. Metal-Bellows Packless Expansion Joints MBEJ-01:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Standards: ASTM F 1120 and EJMA's "Standards of the Expansion Joint Manufacturers Association, Inc."
3. Type: Circular, corrugated bellows[**with external tie rods**].
4. Minimum Pressure Rating: 150 psig, unless otherwise indicated.
5. Minimum Pressure Rating: [**150 psig**] [**175 psig**] [**200 psig**] <**Insert value**>, unless otherwise indicated.
6. Configuration: [**Single joint**] [**Single joint with base**] [**and**] [**double joint with base**] class(es), unless otherwise indicated.
7. Expansion Joints for Copper Tubing: [**Single-**] [**or**] [**multi-**] ply phosphor-bronze bellows, copper pipe ends, and brass shrouds.
   a. End Connections for Copper Tubing NPS 2 and Smaller: [**Solder joint**] [**or**] [**threaded**].
   b. End Connections for Copper Tubing NPS 2-1/2 to NPS 4: Solder joint.
   c. End Connections for Copper Tubing NPS 2-1/2 to NPS 4: [**Solder joint**] [**or**] [**threaded**].
   d. End Connections for Copper Tubing NPS 5 and Larger: Flanged.

8. Expansion Joints for Steel Piping: [**Single-**] [**or**] [**multi-**] ply stainless-steel bellows, steel pipe ends, and carbon-steel shroud.
   a. End Connections for Steel Pipe NPS 2 and Smaller: Threaded.
   b. End Connections for Steel Pipe NPS 2-1/2 and Larger: [**Flanged**] [**Welded**].

C. Externally Pressurized Metal-Bellows Packless Expansion Joints:
1. Minimum Pressure Rating: 150 psig, unless otherwise indicated.
2. Description:
   a. Totally enclosed, externally pressurized, multi-ply, stainless-steel bellows isolated from fluid flow by an internal pipe sleeve.
   b. Carbon-steel housing.
   c. Drain plugs and lifting lug for NPS 3 and larger.
   d. Bellows shall have operating clearance between the internal pipe sleeves and the external shrouds.
   e. Joints shall be supplied with a built-in scale to confirm the starting position and operating movement.
   f. Joint Axial Movement: 4 inches of compression and 0.75 inch of extension.

3. Permanent Locking Bolts: Set locking bolts to maintain joint lengths during installation. Temporary welding tabs that are removed after installation in lieu of locking bolts are not acceptable.

4. End Connection Configuration: Flanged; one raised, fixed and one floating flange.

D. Flexible-Hose Packless Expansion Joints FHEJ-01:

1. Description: Manufactured assembly with inlet and outlet elbow fittings and two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose.
2. Flexible Hose: Corrugated-metal inner hoses and braided outer sheaths.
3. Expansion Joints for Copper Tubing NPS 2 and Smaller: Copper-alloy fittings with [**solder-joint**] <**Insert type**> end connections.
   a. Bronze hoses and single-braid bronze sheaths with 450 psig at 70 deg F and 340 psig at 450 deg F ratings.
4. Expansion Joints for Copper Tubing NPS 2-1/2 to NPS 4: Copper-alloy fittings with [**threaded**] <**Insert type**> end connections.
   a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 300 psig at 70 deg F and 225 psig at 450 deg F ratings.
5. Expansion Joints for Steel Piping NPS 2 and Smaller: Carbon-steel fittings with threaded end connections.
   a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 450 psig at 70 deg F and 325 psig at 600 deg F ratings.
6. Expansion Joints for Steel Piping NPS 2-1/2 to NPS 6: Carbon-steel fittings with flanged or welded end connections.
   a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 200 psig at 70 deg F and 145 psig at 600 deg F ratings.
7. Expansion Joints for Steel Piping NPS 8 to NPS 12: Carbon-steel fittings with [**flanged**] [**welded**] end connections.
   a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 125 psig at 70 deg F and 90 psig at 600 deg F ratings.
8. Expansion Joints for Steel Piping NPS 14 and Larger: Carbon-steel fittings with [**flanged**] [**welded**] end connections.
   a. Stainless-steel hoses and double-braid, stainless-steel sheaths with 165 psig at 70 deg F and 120 psig at 600 deg F ratings.

~~2.3 GROOVED-JOINT EXPANSION JOINTS~~

~~A. Description: Factory-assembled expansion joint made of several grooved-end pipe nipples, couplings, and grooved joints.~~

~~B. Standard: AWWA C606, for grooved joints.~~

~~C. Nipples: ASTM A 53/A 53M, Schedule 40, Type E or S, steel pipe with grooved ends.~~

~~D. Couplings: Five , flexible type for steel pipe dimensions. Include ferrous housing sections, ethylene-propylene-diene terpolymer rubber gasket suitable for cold and hot water, and bolts and nuts.~~

2.4 ALIGNMENT GUIDES AND ANCHORS

A. Alignment Guides AG-01:

1. Description: Steel, factory-fabricated alignment guide, with bolted two-section outer cylinder and base for attaching to structure; with two-section guiding slider for bolting to pipe.

B. Anchor Materials:

1. Steel Shapes and Plates: ASTM A 36/A 36M.

2. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel hex head.
3. Washers: ASTM F 844, steel, plain, flat washers.
4. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, with tension and shear capacities appropriate for application.
   a. Stud: Threaded, zinc-coated carbon steel.
   b. Expansion Plug: Zinc-coated steel.
   c. Washer and Nut: Zinc-coated steel.

5. Chemical Fasteners: Insert-type stud, bonding-system anchor for use with hardened portland cement concrete, with tension and shear capacities appropriate for application.
   a. Bonding Material: ASTM C 881/C 881M, Type IV, Grade 3, two-component epoxy resin suitable for surface temperature of hardened concrete where fastener is to be installed.
   b. Stud: ASTM A 307, zinc-coated carbon steel with continuous thread on stud, unless otherwise indicated.
   c. Washer and Nut: Zinc-coated steel.

PART 3 - EXECUTION

3.1 EXPANSION-JOINT INSTALLATION

A. Install metal-bellows expansion joints according to EJMA's "Standards of the Expansion Joint Manufacturers Association, Inc."

B. Install rubber packless expansion joints according to FSA-PSJ-703.

~~C. Install grooved-joint expansion joints to grooved-end steel piping.~~

D. Install manufactured, nonmetallic expansion joints according to FSA's "Technical Handbook: Non-Metallic Expansion Joints and Flexible Pipe Connectors."

E. Install expansion joints of sizes matching size of piping in which they are installed.

3.2 PIPE LOOP AND SWING CONNECTION INSTALLATION

A. Install pipe bends and loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature.

B. Install pipe loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature.

C. Connect risers and branch connections to mains with at least five pipe fittings, including tee in main.

D. Connect risers and branch connections to terminal units with at least four pipe fittings, including tee in riser.

E. Connect mains and branch connections to terminal units with at least four pipe fittings, including tee in main.

3.3 ALIGNMENT-GUIDE AND ANCHOR INSTALLATION

A. Install alignment guides to guide expansion and to avoid end-loading and torsional stress.

B. Install one guide(s) on each side of pipe expansion fittings and loops. Install guides nearest to expansion joint not more than four pipe diameters from expansion joint.

C. Attach guides to pipe, and secure guides to building structure.

D. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.

E. Anchor Attachments:

1. Anchor Attachment to Steel Pipe: Attach by welding. Comply with ASME B31.9 and ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
2. Anchor Attachment to Copper Tubing: Attach with pipe hangers. Use MSS SP-69, Type 24; U bolts bolted to anchor.

F. Fabricate and install steel anchors by welding steel shapes, plates, and bars. Comply with ASME B31.9 and AWS D1.1/D1.1M.

1. Anchor Attachment to Steel Structural Members: Attach by welding.
2. Anchor Attachment to Concrete Structural Members: Attach by fasteners. Follow fastener manufacturer's written instructions.

G. Use grout to form flat bearing surfaces for guides and anchors attached to concrete.

END OF SECTION 22 0516

SECTION 22 0523 – GENERAL DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.
2. Iron, lug type butterfly valves.

~~3. Copper, grooved-end butterfly valves.~~
~~4. Iron, grooved-end butterfly valves.~~
5. Bronze swing check valves.
6. Iron swing check valves.

~~7. Iron, grooved-end swing check valves.~~

8. Iron gate valves.

9. Lubricated plug valves.

B. Related Sections:

1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene-diene terpolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1. Certification that products comply with NSF 61 Annex G and NSF 372.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.9 for building services piping valves.

C. NSF Compliance as required by authorities having jurisdiction:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."
3. Comply with NSF 372, "Drinking Water System Components – Lead Content"

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect valve ends from damage.
3. Set ball valves open to minimize exposure of functional surfaces.
4. Set butterfly valves closed or slightly open.
5. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. Refer to valve schedule articles for applications of valves.

C. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.1 for flanges on iron valves.
3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

4. ASME B16.18 for solder joint.
5. ASME B31.9 for building services piping valves.

~~D. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.~~

E. NSF Compliance: NSF 61 and NSP 372 for valve materials for potable-water service.

F. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

G. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

H. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

I. Valve Sizes: Same as upstream piping unless otherwise indicated.

J. Valve Bypass and Drain Connections: MSS SP-45.

K. Valve Actuator Types:
1. Handwheel: For valves other than quarter-turn types.

2. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
3. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 3 plug valves, for each size square plug-valve head.

L. Valves in Insulated Piping: Valves in domestic cold water lines with more than 1/2-inch insulation shall include the following:

1. Ball Valves: Stem extensions or extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
2. Butterfly Valves: Extended neck.

M. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.

~~2. Grooved: With grooves according to manufacturer.~~

3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Flow Controls; Conbraco Industries, Inc.
   b. Crane; Crane Energy Flow Solutions.
   c. Hammond Valve.
   d. Jomar.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. WATTS.
   h. Zurn Industries, LLC.

2. Description:
   a. Standard: MSS SP-110 or MSS-145.
   b. CWP Rating: 600 psig.
   c. Body Design: Two piece, threaded.
   d. Body Material: Bronze or Dezincification Resistant Heat Treated CW511L Brass.
   e. Ends: Threaded, press, and soldered.
   f. Press Ends Connections Rating: Minimum 200 psig.
   g. Seats: PTFE.
   h. Stem: Bronze.
   i. Ball: Bronze or TEA coated brass.
   j. Port: Full.

2.3 IRON, LUG TYPE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Flow Controls; Conbraco Industries, Inc.
   b. DeZURIK.
   c. Flo Fab Inc.
   d. Legend Valve & Fitting, Inc.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. WATTS.

2. Description:
   a. Standard: MSS SP-67, Type I.
   b. CWP Rating: 200 psig.
   c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
   e. Seat: EPDM.
   f. Stem: One- or two-piece stainless steel.
   g. Disc: Aluminum bronze.

~~2.4 COPPER, GROOVED-END BUTTERFLY VALVES~~

~~A. Copper, Grooved-End Butterfly Valves:~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~
~~a. Anvil International, Inc.~~
~~b. Tyco / Grinnell.~~
~~c. Victaulic Company.~~

~~2. Description:~~
~~a. Maximum Working Pressure: 300 psig.~~
~~b. Body Material: Bronze or brass, lead free.~~
~~c. Stem: One or two-piece stainless steel.~~
~~d. Disc: Aluminum bronze or encapsulated ductile iron.~~
~~e. Seal: EPDM.~~

~~2.5 IRON, GROOVED-END BUTTERFLY VALVES~~

~~A. 175 CWP, Iron, Grooved-End Butterfly Valves:~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~
~~a. Anvil International, Inc.~~
~~b. Kennedy Valve; a division of McWane, Inc.~~
~~c. Shurjoint Piping Products.~~
~~d. Tyco / Grinnell.~~
~~e. Victaulic Company.~~
~~f. Zurn Industries, LLC.~~

~~2. Description:~~
~~a. Standard: MSS SP-67, Type I.~~
~~b. CWP Rating: 175 psig(1200 kPa).~~
~~c. Body Material: Coated, ductile iron.~~
~~d. Stem: Two-piece stainless steel.~~
~~e. Disc: Aluminum bronze.~~
~~f. Seal: EPDM.~~

2.6 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Apollo Valves.
b. Crane.
c. Hammond Valve.
d. Milwaukee Valve Company.
e. NIBCO INC.
f. WATTS.

2. Description:

a. Standard: MSS SP-139.
b. CWP Rating: 200 psig(1380 kPa).
c. Body Design: Horizontal flow.
d. Body Material: Bronze.
e. Ends: Threaded, press, or soldered. See valve schedule articles.
f. Press Ends Connection Rating: Minimum 200 psig
g. Disc: Bronze.

2.7 IRON SWING CHECK VALVES

A. Class 150, Iron Swing Check Valves with Metal Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Apollo Valves.
   b. Crane.
   c. Hammond Valve.
   d. Milwaukee Valve Company.
   e. NIBCO INC.
   f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
   a. Standard: MSS SP-136.
   b. CWP Rating: 250 psig.
   c. Body Design: Clear or full waterway.
   d. Body Material: ASTM A 395, ductile iron with bolted bonnet.
   e. Ends: Flanged.
   f. Trim: Stainless steel.
   g. Gasket: Asbestos free.

2.8 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125, Iron Swing Check Valves with Lever- and Spring-Closure Control:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Crane; Crane Energy Flow Solutions.
   b. Hammond Valve.
   c. Jenkins Valves; Crane Energy Flow Solutions.
   d. Milwaukee Valve Company.
   e. NIBCO INC.
   f. Stockham; Crane Energy Flow Solutions.
   g. WATTS.

2. Description:
   a. Standard: MSS SP-71, Type I.
   b. CWP Rating: 200 psig.
   c. Body Design: Clear or full waterway.
   d. Body Material: ASTM A 126, gray iron with bolted bonnet.
   e. Ends: Flanged.
   f. Trim: Bronze.

g. Gasket: Asbestos free.
h. Closure Control: Factory-installed, exterior lever and spring.

~~2.9 IRON, GROOVED-END SWING CHECK VALVES~~

~~A. 300 CWP, Iron, Grooved-End Swing Check Valves:~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~
~~a. Anvil International, Inc.~~
~~b. Shurjoint Piping Products.~~
~~c. Tyco / Grinnell.~~
~~d. Victaulic Company.~~

~~2. Description:~~
~~a. CWP Rating: 300 psig(2070 kPa).~~
~~b. Body Material: ASTM A 536, ductile iron.~~
~~c. Seal: EPDM.~~
~~d. Disc: Spring-operated, ductile iron or stainless steel.~~

2.10 IRON GATE VALVES

A. Class 150, NRS, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Apollo Flow Controls; Conbraco Industries, Inc.
b. Crane; Crane Energy Flow Solutions.
c. Flo Fab Inc.
d. Hammond Valve.
e. Jenkins Valves; Crane Energy Flow Solutions.
f. KITZ Corporation.
g. Legend Valve & Fitting, Inc.
h. Macomb Groups (The).
i. Milwaukee Valve Company.
j. NIBCO INC.
k. Powell Valves.
l. Red-White Valve Corp.
m. Stockham; Crane Energy Flow Solutions.
n. WATTS.
o. Zurn Industries, LLC.

2. Description:

a. Standard: MSS SP-70, Type I.
b. CWP Rating: 200 psig.
c. Body Material: Gray iron with bolted bonnet.
d. Ends: Flanged.
e. Trim: Bronze.
f. Disc: Solid wedge.

g. Packing and Gasket: Asbestos free.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Check Valves: Install check valves for proper direction of flow.

1. Swing Check Valves: In horizontal position with hinge pin level.

F. Install valve tags. Comply with requirements in Section 22 0553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 ADJUSTING

A. Adjust or replace leaking valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Pump-Discharge Check Valves:
   a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
   b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with, metal-seat check valves.

B. End Connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded or soldered or press-ends.
2. For Steel Piping, NPS 2 and Smaller: Threaded.
3. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged or threaded.
4. For Steel Piping, NPS 5 and Larger: Flanged.
5. ~~For Grooved-End Copper Tubing and Steel Piping: Grooved.~~

C. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Ball Valves:
   a. Two piece, full port, bronze with bronze trim.
   b. May be provided with solder-joint ends instead of threaded ends.

2. Check Valves:
   a. Bronze swing check valves with bronze disc, Class 125, with soldered or threaded end connections.
   b. Bronze swing check valves with press-end connections.

B. Pipe NPS 2-1/2 and Larger:

1. Butterfly Valves:
   a. Iron, Single-Flange Butterfly Valves: 200 CWP, NBR seat, aluminum-bronze disc.
   b. ~~Copper, Grooved-End Butterfly Valves: 300 psig maximum working pressure, aluminum-bronze or encapsulated disc.~~
   c. ~~Ductile-Iron, Grooved-End Butterfly Valves: 300 CWP.~~
2. Check Valves:
   a. Iron swing check valves with metal seats, Class 150, with flanged end connections.
   b. ~~Iron, grooved-end swing check valves, 300 CWP.~~

3.6 PUMPED SANITARY-WASTE VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Ball Valves: Two piece, full port, bronze with bronze trim.
2. Bronze Swing Check Valves: Class 125, bronze disc.

B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.

2. Iron Swing Check Valves with Closure Control: Class 125, outside lever and spring.
3. Iron Gate Valves: Class 125, NRS, flanged.
4. Lubricated Plug Valves: Class 125, cylindrical, flanged.

3.7 VALVE APPLICATIONS:

A. Domestic Water:

1. Shutoff Service: Ball and butterfly valves.
2. Throttling Service: Ball and butterfly valves.
3. Check Valves:
   a. NPS 2(DN 50) and Smaller: Bronze swing check valves with nonmetallic disc.
   b. NPS 2-1/2(DN 65) and Larger: Iron swing type check valves with metal seat.

B. Pumped Sanitary Waste :

1. Shutoff Service: Ball, gate, and plug valves.
2. Pump Check Valves:

   a. NPS 2(DN 50) and Smaller: Bronze swing check valves with bronze disc.
   b. NPS 2-1/2(DN 65) and Larger: Iron swing type check valves with outside lever and spring.

END OF SECTION 22 0523

SECTION 22 1116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes domestic water piping inside the building.

B. NRelated Sections include the following:
1. Division 22 Section "Facility Water Distribution Piping" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.
2. Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and fittings.
3. Division 22 Section "Domestic Water Piping Specialties" for water distribution piping specialties.

1.3 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing domestic water piping systems with 125 psig (860 kPa), unless otherwise indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Water Samples: Specified in Part 3 "Cleaning" Article.

B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

C. Comply with NSF 372, "Drinking Water System Components – Lead Content" for potable domestic water piping and components.

1.6 FIELD CONDITIONS

1.7 REGULATORY REQUIREMENTS

A. Comply with the provisions of the following:

1. Michigan Plumbing Code.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

C. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.2 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Types K (ASTM B 88M, Types A), water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

B. Hard Copper Tube: ASTM B 88, Types L (ASTM B 88M, Types B), water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.3 PEX TUBE AND FITTINGS

A. PEX Distribution System: Crosslinked polyethylene (PEX), manufactured in accordance with ASTM F876 and ASTM F877.

1. Fittings: ASTM F1960 metal cold expansion or ASTM F 1807, metal insert and crimp rings.
2. Pressure/Temperature Rating: Minimum 100 psig(690 kPa) and 180 deg F(82 deg C).
3. Provide pre-insulated PEX for underslab applications.

2.4 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:
1. Standard: ASSE 1079.

2. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:
1. Standard: ASSE 1079.
2. Factory-fabricated, bolted, companion-flange assembly.

3. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:
1. Nonconducting materials for field assembly of companion flanges.

2. Pressure Rating: 150 psig (1035 kPa).
3. Gasket: Neoprene or phenolic.
4. Bolt Sleeves: Phenolic or polyethylene.
5. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:
1. Standard: IAPMO PS 66.
2. Electroplated steel nipple complying with ASTM F 1545.

3. Pressure Rating and Temperature: 300 psig (2070 kPa) at 225 deg F (107 deg C).
4. End Connections: Male threaded ~~or grooved~~.
5. Lining: Inert and noncorrosive, propylene.

2.6 VALVES

A. General-duty valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

B. Balancing and drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

2.7 WATER METERS

A. Displacement-Type Water Meters NPS 2 (DN 50) and Smaller: AWWA C700, nutating-disc totalization meter with bronze case and 150-psig (1035-kPa) minimum working-pressure rating; with registration in gallons (liters) or cubic feet (cubic meters) as required by utility; and with threaded end connections.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB.
   b. Badger Meter, Inc.
   c. Carlon Meter Company Inc.
   d. Invensys North American Water.
   e. Mueller Company.
   f. Schlumberger Limited; Water Div.
   g. Venture Measurement.

B. Turbine-Type Water Meters: AWWA C701, totalization meter with 150-psig (1035-kPa) minimum working-pressure rating; with registration in gallons (liters) or cubic feet (cubic meters) as required by utility; and with the following end connections:

1. NPS 2 (DN 50) and Smaller: Threaded.
2. NPS 2-1/2 (DN 65) and Larger: Flanged.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB.
   b. Badger Meter, Inc.
   c. Hays Fluid Controls.
   d. Invensys North American Water.
   e. Master Meter, Inc.
   f. McCrometer.
   g. Mueller Company.
   h. Schlumberger Limited; Water Div.
   i. SeaMetrics Inc.
   j. Venture Measurement.

C. Compound-Type Water Meters NPS 3 (DN 80) and Larger: AWWA C702, totalization meter with integral main-line and bypass meters, bronze case, and 150-psig (1035-kPa) minimum working-pressure rating; with registration in gallons (liters) or cubic feet (cubic meters) as required by utility; and with flanged end connections.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ABB.
   b. Badger Meter, Inc.
   c. Invensys North American Water.
   d. Master Meter, Inc.
   e. Mueller Company.

f. Schlumberger Limited; Water Div.

D. Remote Registration System: Direct-reading type complying with AWWA C706; modified with signal transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility.

E. Remote Registration System: Encoder-type complying with AWWA C707; modified with signal transmitting assembly, low-voltage connecting wiring, and remote register assembly as required by utility.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with requirements in Section 31 2000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."

C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Pressure gages are specified in Division 22 Section "Meters and Gages for Plumbing Piping," and drain valves and strainers are specified in Division 22 Section "Domestic Water Piping Specialties."

1. Include a backflow preventer as required by local authority having jurisdiction.

E. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 1119 "Domestic Water Piping Specialties."

G. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 22 1123 "Domestic Water Pumps."

H. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 22 0519 "Meters and Gages for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

C. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

E. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

F. Joints for PEX Tubing: Join according to ASTM F 1807 for metal insert and copper crimp ring fittings and ASTM F 1960 for cold expansion fittings and reinforcing rings.

3.4 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric unions.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flanges.

D. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.5 WATER METER INSTALLATION

A. Rough-in domestic water piping for water meter connection according to utility company's requirements.

B. Water meters will be furnished and installed by utility company.

C. Install water meters according to AWWA M6 and utility's requirements.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:
   a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch (10 mm).

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 (DN 20) and Smaller: 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
2. NPS 1 and NPS 1-1/4 (DN 25 and DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
3. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
4. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
5. NPS 3 to NPS 4 (DN 80 to DN 100): 10 feet (3 m) with 1/2-inch (13-mm) rod.

F. Install supports for vertical copper tubing every 10 feet (3 m).

G. Install vinyl-coated hangers for PEX tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 (DN 25) and Smaller: 32 inches (815 mm) with 3/8-inch (10-mm) rod.

H. Install hangers for vertical PEX tubing every 48 inches (1200 mm).

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

3.8 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 22 0553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Inspect domestic water piping as follows:
   a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
   b. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2) Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Test domestic water piping as follows:
   a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
   b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
   c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
   d. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

B. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

C. Prepare reports for tests and required corrective action.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
   a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
   b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new domestic water piping before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
   a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
   b. Fill and isolate system according to either of the following:
      1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
      2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
   c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
   d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

3.12 PIPE AND FITTING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

B. Flanges may be used on aboveground piping, unless otherwise indicated.

C. Under-Building-Slab, Water-Service Piping on Service Side of Water Meter: Refer to Division 22 Section "Facility Water Distribution Piping."

D. Under Building Slab Domestic Water Piping to Island Sinks:

1. Pre-Insulated PEX Tube; fittings for PEX tube; and crimped or cold expansion joints. Joints below slab are not allowed.

E. Aboveground Domestic Water Piping: Use any of the following piping materials for each size range:

1. NPS 1/4 (6.35mm) and Smaller for Refrigerator Final Connection: Soft copper tube, Type L (Type B); copper fittings; and soldered or compression joints.
2. NPS 1 and Smaller Branch piping serving individual fixtures: PEX Tube; fittings for PEX tube; and crimped or cold expansion joints. Concealed joints are not allowed.
3. NPS 1 (DN 25) and Smaller: Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
4. NPS 1-1/4 and NPS 1-1/2 (DN 32 and DN 40): Hard copper tube, Type L (Type B); soldered joints.
5. NPS 2 (DN 50): Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
6. NPS 2-1/2 (DN 65): Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
7. NPS 3 (DN 80): Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.
8. NPS 4 (DN 100): Hard copper tube, Type L (Type B); copper pressure fittings; and soldered joints.

F. At Installer's option for aboveground domestic water piping, install Type L, drawn copper tube with mechanical joint copper press fittings for pipe sizes 4 inches and smaller.

1. Valves with bodies meeting requirements of Section “General Duty valves for Plumbing Piping” may be used in mechanical joint copper press systems

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use bronze ball valves for piping NPS 2 (DN 50) and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
2. Throttling Duty: Use bronze ball valves for piping NPS 2 (DN 50) and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.
3. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.
4. Drain Duty: Hose-end drain valves.

~~B. Cast-iron, grooved-end valves may be used with grooved-end piping.~~

C. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, on each water supply to plumbing fixtures that do not have supply stops and on each water supply to plumbing fixtures that do have supply stops but where take off from main or branch is not in the same room.

D. Use check valves to maintain correct direction of domestic water flow to and from equipment.

E. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

1. Install hose-end drain valves at low points in water mains, risers, and branches.

F. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Division 22 Section "Domestic Water Piping Specialties."

END OF SECTION 22 1116

SECTION 23 0523 – GENERAL DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following general-duty valves:

1. Copper-alloy ball valves.
2. Ferrous-alloy butterfly valves.
3. Bronze check valves.
4. Gray-iron swing check valves.
5. Bronze gate valves.
6. Cast-iron gate valves.
7. Bronze globe valves.
8. Cast-iron globe valves.

B. Related Sections include the following:

1.
2. Division 23 piping Sections for specialty valves applicable to those Sections only.
3. Division 23 Section "Identification for HVAC Piping and Equipment" for valve tags and charts.
4. Division 23 Section "Instrumentation and Control for HVAC" for control valves and actuators.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.3 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.9 for building services piping valves.

B. ASME Compliance for Ferrous Valves: ASME B16.10 and ASME B16.34 for dimension and design criteria.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.

2. Protect valve ends from damage.

3. Set gate, and globe valves closed to prevent rattling.
4. Set ball valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 2 and smaller with threaded ends.

C. Ferrous Valves: NPS 2-1/2 and larger with flanged ends, unless otherwise indicated.

D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
1. Lever Handle: For quarter-turn valves NPS 4(DN 100) and smaller.

2. Gear Drive: For quarter-turn valves NPS 5(DN 125) and larger.

3. Handwheel: For valves other than quarter-turn types.

F. Extended Valve Stems: On insulated valves.

G. Extended Valve Stems: Include the following on 1-1/2" and larger insulated valves in chilled water lines:

1. 2-inch stem extensions.
2. Extended operating handle of non-thermal-conductive material, and protective sleeves that allow operation of valves without breaking the vapor seals or disturbing insulation.

H. Memory Stops: Include memory stops that are fully adjustable after insulation is applied.

I. Valve Flanges: ASME B16.1 for cast-iron valves, ASME B16.5 for steel valves, and ASME B16.24 for bronze valves.

~~J. Valve Grooved Ends: AWWA C606.~~

K. Valve Solder Ends: Solder joint with sockets according to ASME B16.18.

1. Caution: Use solder with melting point below 840 deg F(454 deg C) for angle, check, gate, and globe valves; below 421 deg F(216 deg C) for ball valves.

L. Valve Threaded Ends: Threaded with threads according to ASME B1.20.1.

M. Valve Bypass and Drain Connections: MSS SP-45.

2.3 COPPER-ALLOY BALL VALVES

A. Manufacturers:

1. Two-Piece, Copper-Alloy Ball Valves:
   a. Apollo Valves.
   b. Crane.
   c. Hammond Valve.
   d. Jomar International, LTD.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. Watts Industries, Inc.; Water Products Div.

B. Copper-Alloy Ball Valves, General: MSS SP-110.

C. Two-Piece, Copper-Alloy Ball Valves: **Cast bronze** threaded two-piece body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig minimum CWP rating and blowout-proof stem.

D. High Performance Ball Valves, NPS 2 and Smaller: 600psi WOG pressure, 150 SWP, two piece bronze body, full port, stainless steel ball, replaceable “TFE” seats and seal, blowout proof stem, vinyl covered handle, and threaded ends.

2.4 FERROUS-ALLOY BUTTERFLY VALVES

A. Manufacturers:

1. Lug Type, Ferrous-Alloy Butterfly Valves:
   a. Apollo Valves.
   b. Crane.
   c. General Signal; DeZurik Unit.
   d. Hammond Valve.
   e. Milwaukee Valve Company.
   f. NIBCO INC.
   g. Watts Industries, Inc.; Water Products Div.

~~2. Grooved-End, Ductile-Iron Butterfly Valves:~~
   ~~a. Anvil International, Inc.~~
   ~~b. Milwaukee Valve Company.~~
   ~~c. NIBCO INC.~~
   ~~d. Victaulic Co. of America.~~

B. Ferrous-Alloy Butterfly Valves, General: MSS SP-67, Type I, for tight shutoff.

C. Flangeless, 200-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Lug type with one- or two-piece stainless steel stem, ASTM A 126 cast iron or ASTM A 536 ductile iron body, EPDM seat, aluminum bronze disc.

D. Flangeless, 200-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Wafer type with one -piece stem.

~~E. Grooved-End, Minimum 200-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Ductile-iron body with grooved ends, one- or two-piece stainless steel stem, EPDM seat, aluminum bronze disc.~~

~~F. Grooved-End, 300-psig CWP Rating, Ferrous-Alloy Butterfly Valves: Ductile-iron body with grooved or shouldered ends.~~

G. High PerformanceButterfly Valves, NPS 2-1/2 and Larger: 150 psi WCB cast steel bodies, , lug style, stainless steel disc, RTFE/stainless garter spring seats, stainless steel stem.

2.5 BRONZE CHECK VALVES

A. Manufacturers:

1. Type 4, Bronze, Swing Check Valves with Nonmetallic Disc:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

B. Bronze Check Valves, General: MSS SP-80.

C. Type 4, Class 125, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

D. Type 4, Class 150, Bronze, Swing Check Valves: Bronze body with nonmetallic disc and bronze seat.

2.6 GRAY-IRON SWING CHECK VALVES

A. Manufacturers:

1. Gray-Iron Swing Check Valves:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

~~2. Grooved-End, Ductile-Iron Swing Check Valves:~~
   ~~a. Anvil International, Inc.~~
   ~~b. Victaulic Co. of America.~~

B. Gray-Iron Swing Check Valves, General: MSS SP-71.

C. Class 125, gray-iron, swing check valves with bronze trim and asbestos-free gasket.

D. Class 250, gray-iron, swing check valves bronze trim and asbestos-free gasket.

~~E. 300-psig CWP Rating, Grooved-End, Swing Check Valves: Ductile-iron body with grooved ends, EDPM seals, and ductile iron or stainless steel disc.~~

2.7 BRONZE GATE VALVES

A. Manufacturers:

1. Type 2, Bronze, Rising-Stem, Solid-Wedge Gate Valves:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

B. Bronze Gate Valves, General: MSS SP-80, with ferrous-alloy handwheel.

C. Type 2, Class 125, Bronze Gate Valves: Bronze body with rising stem and bronze solid wedge and union-ring bonnet.

D. Type 2, Class 150, Bronze Gate Valves: Bronze body with rising stem and bronze solid wedge and union-ring bonnet.

2.8 CAST-IRON GATE VALVES

A. Manufacturers:

1. Type I, Cast-Iron, Rising-Stem Gate Valves:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

B. Cast-Iron Gate Valves, General: MSS SP-70, Type I.

C. Class 125, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

D. Class 250, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

2.9 BRONZE GLOBE VALVES

A. Manufacturers:

1. Globe Valves with Nonmetallic Disc:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

B. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy handwheel.

C. Type 1, Class 125, Bronze Globe Valves: Bronze body with PTFE or TFE disc.

D. Type 2, Class 150, Bronze Globe Valves: Bronze body with PTFE or TFE disc and union-ring bonnet.

2.10 CAST-IRON GLOBE VALVES

A. Manufacturers:

1. Type I, Cast-Iron Globe Valves with Metal Seats:
   a. Apollo Valves.
   b. Milwaukee Valve Company.
   c. NIBCO INC.
   d. Watts Industries, Inc.; Water Products Div.

B. Cast-Iron Globe Valves, General: MSS SP-85.

C. Type I, Class 125, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

D. Type I, Class 250, Cast-Iron Globe Valves: Gray-iron body with bronze seats.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:

1. For Water Systems:
   a. Shutoff Service: Ball or butterfly valves.
   b. Throttling Service: Ball or butterfly valves.
   c. Balancing Valve Service: Throttling valve with memory stop.

B. Select valves, except lug types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends.
2. For Steel Piping, NPS 2 and Smaller: Threaded ends.
3. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends.
4. For Steel Piping, NPS 5 and Larger: Flanged ends.

~~5. For Grooved-End, Steel Piping: Valve ends may be grooved.~~

C. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

D. Hydronic Water Piping: For hot water heating piping systems, use the following types of valves:

E. Hydronic Water Piping: For hot water heating[, chilled water], [condenser water,][dual temperature water,][heat recovery water] piping systems, use the following types of valves:

1. Ball Valves, NPS 2 and Smaller: Two-piece, 600-psig CWP rating, copper alloy.
2. Butterfly Valves, NPS 2-1/2 and Larger: Lug type, 200-psig CWP rating, ferrous alloy, with aluminum bronze disc and EPDM rubber seat and seals.
~~3. Grooved-End, Ductile-Iron Butterfly Valves, NPS 2-1/2 and Larger: Minimum 200-psig CWP Rating, with aluminum bronze disc and EPDM rubber seat and seals.~~

4. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125 or 150, bronze.
5. Swing Check Valves, NPS 2-1/2 and Larger: Class 125, gray iron.
6. ~~Grooved-End, Ductile-Iron, Swing Check Valves, NPS 2-1/2 and Larger: 300-psig CWP rating.~~

3.3 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem movement.

F. Install check valves for proper direction of flow.

3.4 JOINT CONSTRUCTION

A. Refer to Division 23 Section "Common Work Results for HVAC" for basic piping joint construction.

B. ~~Grooved Joints: Assemble joints with keyed coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.~~

C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 23 0523

SECTION 23 2113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:

1. Hot-water heating piping.
2. Chilled-water piping.
3. Makeup-water piping.
4. Condensate-drain piping.
5. Air-vent piping.

B. Related Sections include the following:

1. Division 23 Section "Hydronic Pumps" for pumps, motors, and accessories for hydronic piping.
2. Division 23 Section "Common Work Results for HVAC" for general piping materials and installation requirements.
3. Division 23 Section "Expansion Fittings and Loops for HVAC Piping" for pipe expansion compensating devices for hydronic piping systems.
4. Division 23 Section "Meters and Gages for HVAC Piping" for thermometers and pressure gages.
5. Division 23 Section "General Duty Valves for HVAC Piping" for general-duty ball, butterfly, and check valves.
6. Division 23 Section "Hangers and Supports for HVAC Equipment" for pipe supports, product descriptions, and installation requirements. Hanger and support spacing is specified in this Section.
7. Division 23 Section "Identification for HVAC Piping and Equipment" for labeling and identifying hydronic piping.
8. Division 23 Section "Instrumentation and Control for HVAC" for temperature-control valves and sensors.
9. Division 23 Section "HVAC Water Treatment" for pipe cleaning and water treatment for HVAC systems.
10. Division 23 Section "Radiant Heating Hydronic Piping" for radiant floor heating systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Pressure-seal fittings.
2. Calibrated Balancing Valves: Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves.
3. Air control devices.
4. Hydronic specialties.
5. Dielectric fittings.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers of Pressure-Sealed Joints: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01.

C. Comply with the provisions of the following:

1. Michigan Mechanical Code

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L(ASTM B 88M, Type B).

B. Annealed-Temper Copper Tubing: ASTM B 88, Type K(ASTM B 88M, Type A).

C. Wrought-Copper Fittings: ASME B16.22.

D. Copper or Bronze Pressure-Seal Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Viega.
   b. NIPCO Press.
   c. Apollo “Xpress”

2. Housing: Copper.
3. O-Rings and Pipe Stops: EPDM.
4. Tools: Manufacturer's special tools.
5. Minimum 200-psig(1379-kPa) working-pressure rating at 250 deg F(121 deg C).

E. Copper, Mechanically Formed Tee Option: For forming T-branch on copper water tube.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. T-DRILL Industries Inc.

F. Wrought-Copper Unions: ASME B16.22.

2.2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 "Piping Applications" Article.

B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125.

C. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150.

D. Malleable-Iron Unions: ASME B16.39; Classes 150.

E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 125, raised ground face, and bolt holes spot faced as indicated in Part 3 "Piping Applications" Article.

F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

1. Material Group: 1.1.
2. End Connections: Slip-on or butt welded.
3. Facings: Raised face.

~~H. Grooved Mechanical-Joint Fittings and Couplings:~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by the following:~~
~~a. Victaulic Company of America.~~

~~2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~

~~a. Anvil International, Inc.~~
~~b. Victaulic Company of America.~~
~~c. Tyco/Grinnell.~~
~~d. Shurjoint Piping Products.~~
~~e. S. P. Fittings; a division of Star Pipe Products.~~
~~f. Central Sprinkler Company; a division of Tyco Fire & Building Products.~~
~~g. National Fittings, Inc.~~

~~3. Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47/A 47M, Grade 32510 malleable iron; ASTM A 53/A 53M, Type F, E, or S, Grade B fabricated steel; or ASTM A 106, Grade B steel fittings with grooves or shoulders constructed to accept grooved-end couplings; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.~~
~~4. Couplings: Ductile- or malleable-iron housing and synthetic rubber gasket of central cavity pressure-responsive design; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.~~

~~5. Refer to Division 23 Section "Hydronic Pumps" for allowable mechanical joint pump accessories.~~

I. Steel Pipe Nipples: ASTM A 733, made of same materials and wall thicknesses as pipe in which they are installed.

2.3 DUCTILE IRON PIPE AND FITTINGS

A. Ductile Iron Pipe: AWWA C151/A21.51.

B. Fittings: AWWA C110/A21.10, ductile iron, standard thickness.

1. Joints: AWWA C111/A21.11, rubber gasket with 3/4 inch diameter rods.

2.4 PLASTIC PIPE AND FITTINGS

A. PVC Plastic Pipe: ASTM D 1785, Schedules 40 and 80, plain ends as indicated in Part 3 "Piping Applications" Article.

B. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D 2466 for Schedule 40 pipe; ASTM D 2467 for Schedule 80 pipe.

C. PVC Solvent Cement: ASTM D 2564.

2.5 PEX PIPE AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. HeatLink USA Inc.
2. Mr. PEX
3. Viega LLC.
4. Uponor.
5. Watts Radiant, Inc.; a division of Watts Water Technologies, Inc.
6. Zurn Plumbing Products Group.

B. Pipe Material: Crosslinked polyethylene (PEX), manufactured in accordance with ASTM F876 and ASTM F877.

C. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.10 mg per cu. m/day at 104 deg F(40 deg C) according to DIN 4726.

D. Fittings: ASTM F1960 metal cold expansion or ASTM F 1807, metal insert and crimp rings.

E. Pressure/Temperature Rating: Minimum 100 psig(690 kPa) and 180 deg F(82 deg C).

2.6 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch(3.2-mm) maximum thickness unless thickness or specific material is indicated.
   a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.

E. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

F. Solvent Cements for Joining Plastic Piping:

1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

G. Gasket Material: Thickness, material, and type suitable for fluid to be handled and working temperatures and pressures.

2.7 DIELECTRIC FITTINGS

A. Refer to Division 23 Section "Common Work Results for HVAC" for dielectric fittings.

2.8 VALVES

A. Butterfly, Check, and Ball Valves: Comply with requirements specified in Division 23 Section "General-Duty Valves for HVAC Piping."
1. Valves with factory ends meeting requirements of Section “General Duty valves for Plumbing Piping” may be used in mechanical joint copper press systems**.**

B. Automatic Temperature-Control Valves, Actuators, and Sensors: Furnished by temperature controls provider. Refer to Division 23 Section "Instrumentation and Control for HVAC."

C. Bronze, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Bell & Gossett.
   b. Tour & Andersson.

2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig(860 kPa).

10. Maximum Operating Temperature: 250 deg F(121 deg C).

D. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Bell & Gossett.
   b. Tour & Andersson.
   c. Watts Industries, Inc.; Water Products Div.

2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.
6. Seat: PTFE.
7. End Connections: Flanged ~~or grooved~~.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.
10. CWP Rating: Minimum 125 psig(860 kPa).
11. Maximum Operating Temperature: 250 deg F(121 deg C).

E. Diaphragm-Operated, Pressure-Reducing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Bell & Gossett.
2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Low inlet-pressure check valve.
8. Inlet Strainer: removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

F. Diaphragm-Operated Safety Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Bell & Gossett.
2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

G. Drain Valves:

1. Ball-Valve-Type, Hose-End Drain Valves:
   a. Standard: MSS SP-110 for standard-port, two-piece ball valves.
   b. Pressure Rating: 400-psig(2760-kPa) minimum CWP.
   c. Size: NPS 3/4(DN 20).
   d. Body: Copper alloy.
   e. Ball: Chrome-plated brass.
   f. Seats and Seals: Replaceable.
   g. Handle: Vinyl-covered steel.
   h. Inlet: Threaded or solder joint.
   i. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2. Gate-Valve-Type, Hose-End Drain Valves:
   a. Standard: MSS SP-80 for gate valves.
   b. Pressure Rating: Class 125.
   c. Size: NPS 3/4(DN 20).
   d. Body: ASTM B 62 bronze.
   e. Inlet: NPS 3/4(DN 20) threaded or solder joint.
   f. Outlet: Garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.9 AIR CONTROL DEVICES

A. Manual Air Vents:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Amtrol, Inc.
   b. Bell & Gossett.
2. Body: Bronze.
3. Internal Parts: Nonferrous.
4. Operator: Screwdriver or thumbscrew.
5. Inlet Connection: NPS 1/2(DN 15).
6. Discharge Connection: NPS 1/8(DN 6).
7. CWP Rating: 150 psig(1035 kPa).
8. Maximum Operating Temperature: 225 deg F(107 deg C).

B. Automatic Air Vents:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Amtrol, Inc.
   b. Bell & Gossett.
2. Body: Bronze or cast iron.
3. Internal Parts: Nonferrous.
4. Operator: Noncorrosive metal float.
5. Inlet Connection: NPS 1/2(DN 15).
6. Discharge Connection: NPS 1/4(DN 8).
7. CWP Rating: 150 psig(1035 kPa).
8. Maximum Operating Temperature: 240 deg F(116 deg C).

C. Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Bell & Gossett.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Armstrong Pumps, Inc.
   b. Bell & Gossett.
   c. Taco.

3. Tank: Welded steel, rated for 125-psig(860-kPa) working pressure and 375 deg F(191 deg C) maximum operating temperature, with taps in bottom of tank for tank fitting and taps in end of tank for gage glass. Tanks shall be factory tested with taps fabricated and labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
4. Air-Control Tank Fitting: Cast-iron body, copper-plated tube, brass vent tube plug, and stainless-steel ball check, 100-gal.(379-L) unit only; sized for compression-tank diameter. Provide tank fittings for 125-psig(860-kPa) working pressure and 250 deg F(121 deg C) maximum operating temperature.
5. Tank Drain Fitting: Brass body, nonferrous internal parts; 125-psig(860-kPa) working pressure and 240 deg F(116 deg C) maximum operating temperature; constructed to admit air to compression tank, drain water, and close off system.
6. Gage Glass: Full height with dual manual shutoff valves, 3/4-inch-(20-mm-) diameter gage glass, and slotted-metal glass guard.

D. Bladder-Type Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Bell & Gossett.
2. Tank: Welded steel, rated for 125-psig(860-kPa) working pressure and 375 deg F(191 deg C) maximum operating temperature. Factory test with taps fabricated and supports installed and labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
3. Bladder: Securely sealed into tank to separate air charge from system water to maintain required expansion capacity.
4. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.

E. Air Eliminators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Spirotherm Inc.
   b. Amtrol, Inc.
   c. Armstrong Pumps, Inc.
   d. Bell & Gossett.
   e. Taco.
   f. Thrush Co. Inc.

2. Description: Coalescing type air and dirt eliminator, steel fabricated, rated for 150 psig working pressure with internal coalescing bundle consisting of a copper core tube with continuous wound copper medium permanently affixed to the core. Eliminator shall have a separate venting chamber to prevent system contaminants from harming the float and venting valve operation. At the top of the venting chamber shall be an integral full port float actuated brass venting mechanism. Units shall include a valved side tap to flush floating dirt or liquids and for quick bleeding of large

amounts of air during system fill or refill. Eliminator shall include a removable bottom head with connection for use as a blow down connection for periodic cleaning.

F. Tangential-Type Air Separators:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Bell & Gossett.
2. Tank: Welded steel; ASME constructed and labeled for 125-psig(860-kPa) minimum working pressure and 375 deg F(191 deg C) maximum operating temperature.
3. Air Collector Tube: Perforated stainless steel, constructed to direct released air into expansion tank.
4. Tangential Inlet and Outlet Connections: Threaded for NPS 2(DN 50) and smaller; flanged connections for NPS 2-1/2(DN 65) and larger.
5. Blowdown Connection: Threaded.
6. Size: Match system flow capacity.
7. Strainer: Removable strainer.

2.10 HYDRONIC PIPING SPECIALTIES

A. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2(DN 50) and smaller; flanged ends for NPS 2-1/2(DN 65) and larger.
3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig(860 kPa).

B. Stainless-Steel Bellow, Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
2. End Connections: Threaded or flanged to match equipment connected.
3. Performance: Capable of 3/4-inch(20-mm) misalignment.
4. CWP Rating: 150 psig(1035 kPa).
5. Maximum Operating Temperature: 250 deg F(121 deg C).

C. Terminal Unit Stainless-Steel Flexible Connectors (RCP, VAV, etc.):

1. Tubing: CPE/EPDM inner tube with stainless steel braided cover, fire rated.
2. End Connections: Brass or plated carbon steel fittings with swivel on one end.
3. Working Pressure Rating: 150 psig(1035 kPa) minimum.
4. Maximum Operating Temperature: 230 deg F(121 deg C).

D. Pipe Cover System:

1. Description: Factory-fabricated vertical and horizontal steel cover support system with concealed surface mounted attachment for concealment of piping and its supports and insulation.
   a. Cover system shall incorporate a concealed snap-lock connection which, once assembled, renders the cover essentially irremovable with the use of ordinary tools.

2. Cover: Smooth in appearance and made of 18-gauge powder coated steel.
   a. Color: White.

3. Manufacturer: JG Innovations, Arsco Manufacturing.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Hot-water heating piping, aboveground, NPS 2(DN 50) and smaller, shall be any of the following:

1. Type L(B), drawn-temper copper tubing, wrought-copper fittings, and soldered or brazed joints.
2. Schedule 40 steel pipe; Class 125 cast-iron or Class 150 malleable-iron threaded fittings.

B. Hot-water heating piping, aboveground, NPS 2-1/2(DN 65) and larger, shall be any of the following:

1. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.

C. Hot-water heating piping installed below slabs, NPS 2(DN 50) and smaller, shall be the following:

1. Type K(A), annealed-temper copper tubing, wrought-copper fittings, and soldered or brazed joints. Use the fewest possible joints.
2. Pre-Insulated PEX Tube; fittings for PEX tube; and crimped or cold expansion joints. Joints are not allowed below the slab.

D. Chilled-water piping, aboveground, NPS 2(DN 50) and smaller, shall be any of the following:

1. Type L(B), drawn-temper copper tubing, wrought-copper fittings, and soldered or brazed joints.
2. Schedule 40 steel pipe; Class 125 cast-iron or Class 150 malleable-iron threaded fittings.

E. Chilled-water piping, aboveground, NPS 2-1/2(DN 65) and larger, shall be the following:

1. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.

F. Makeup-water piping installed aboveground, NPS 2(DN 50) and smaller, shall be the following:

1. Type L(B), drawn-temper copper tubing, wrought-copper fittings, and soldered or brazed joints.

G. Condensate-Drain Piping: Type L(B), drawn-temper copper tubing, wrought-copper fittings, and soldered joints or Schedule 40 PVC plastic pipe and fittings and solvent-welded joints.

H. Air-Vent Piping:

1. Inlet: Same as service where installed.
2. Outlet: Type L(B), annealed-temper copper tubing with soldered or flared joints.

I. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed.

3.2 VALVE APPLICATIONS

A. Install shutoff-duty valves at each branch connection to supply mains, and at supply connection to each piece of equipment.

B. Install throttling-duty valve and calibrated-orifice balancing valve at each branch connection to return main.

C. Install calibrated-orifice, balancing valves in the return pipe of each heating terminal.

D. Install check valves at each pump discharge and elsewhere as required to control flow direction.

E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; and pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 01, for installation requirements.

F. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

3.3 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

L. Install drains, consisting of a tee fitting, NPS 3/4(DN 20) drain valve, and short NPS 3/4(DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install branch connections to mains using tee fittings or where allowed, mechanically formed tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.

P. For expansion compensation at risers and terminals, install connection between piping mains and risers with at least 5 pipe fittings including tee in main. Install connections between piping risers and terminal units with at least 4 pipe fittings including tee in riser.

Q. Install valves according to Division 23 Section "General-Duty Valves for HVAC Piping."

R. Install unions in piping, NPS 2(DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

S. Install flanges in piping, NPS 2-1/2(DN 65) and larger, at final connections of equipment and elsewhere as indicated.

T. Install strainers on inlet side of each in-line pump and elsewhere as indicated. Install NPS 3/4(DN 20) nipple and ball valve in blowdown connection of strainers NPS 2(DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2(DN 50).

U. Identify piping as specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.4 HANGERS AND SUPPORTS

A. Install structural steel members between building structure members as required for upper attachment of hangers and supports. Use members of size and strength required for span and load. The use of joist or truss bridging for hanging and supporting is prohibited.

B. Hanger, support, and anchor devices are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Comply with the following requirements for maximum spacing of supports.

C. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet(6 m) long.
2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet(6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet(6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

D. Install hangers for steel piping with maximum spacing and minimum rod in accordance Michigan Mechanical Code or MSS SP-69.

E. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4(DN 20): Maximum span, 5 feet(1.5 m); minimum rod size, 1/4 inch(6.4 mm).

2. NPS 1(DN 25): Maximum span, 6 feet(1.8 m); minimum rod size, 1/4 inch(6.4 mm).
3. NPS 1-1/2(DN 40): Maximum span, 8 feet(2.4 m); minimum rod size, 3/8 inch(10 mm).
4. NPS 2(DN 50): Maximum span, 8 feet(2.4 m); minimum rod size, 3/8 inch(10 mm).

F. Support vertical runs at roof, at each floor, and at 10-foot(3-m) intervals between floors.

G. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2(DN 50) and Smaller: 48 inches(1200 mm) with 3/8-inch(10-mm) rod.

H. Install supports for vertical PVC piping every 48 inches(1200 mm).

3.5 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

H. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Nonpressure Piping: Join according to ASTM D 2855.
   a. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   b. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

I. Mechanically Formed, Copper-Tube-Outlet Joints: Use manufacturer-recommended tool and procedure, and brazed joints.

J. Pressure-Sealed Joints: Use manufacturer-recommended tool and procedure. Leave insertion marks on pipe after assembly.

3.6 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents at high points of system piping in mechanical equipment rooms only.

C. Install piping to expansion tank with a 2 percent upward slope toward tank.

D. Install tangential air separator in pump suction. Install ball valve in blowdown connection. Install blowdown piping; extend full size to nearest floor drain.

E. Install expansion tanks above the air separator. Install tank fitting in tank bottom and charge tank. Use manual vent for initial fill to establish proper water level in tank.

1. Install tank fittings that are shipped loose.
2. Support tank from floor or structure above with sufficient strength to carry weight of tank, piping connections, fittings, plus tank full of water. Do not overload building components and structural members.

F. Install diaphragm type expansion tanks below piping. Ensure tank is properly charged with air to match system fill pressure.

G. Install bladder type expansion tanks on the floor. Vent and purge air from hydronic system, and ensure tank is properly charged with air to match system fill pressure.

H. Install flexible connectors at inlet and discharge connections to base mounted pumps and other vibration-producing equipment.

I. Install flexible hose connectors at inlet and discharge connections to ceiling mounted coil connections.

J. Install pipe cover system where indicated in accordance with manufacturer's requirements. Paint cover to match surrounding area. Coordinate with Architect.

3.7 TERMINAL EQUIPMENT CONNECTIONS

A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install ports for test plugs and pressure gages at pumps and elsewhere as indicated according to Division 23 Section "Meters and Gages for HVAC Piping."

D. Install ports for pressure gages and thermometers at coil inlet and outlet connections and elsewhere as indicated according to Division 23 Section "Meters and Gages for HVAC Piping."

3.8 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Inspect air vents at high points of system and determine if all are installed and bleed air completely.
5. Set temperature controls so all coils are calling for full flow.
6. Inspect and set operating temperatures of hydronic equipment to specified values.
7. Verify lubrication of motors and bearings.

END OF SECTION 23 2113

SECTION 26 3213 - ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. Failure to consult these documents shall not relieve the Contractor of the requirements therein.

1.2 SUMMARY

A. This Section includes packaged diesel-engine generator sets with the following features and accessories:

1. Battery charger.
2. Sub-base Style Day tank.
3. Engine generator set.
4. Muffler.
5. Exhaust piping internal to set.
6. Outdoor enclosure.
7. Remote annunciator.
8. Radiator.
9. Remote stop switch.
10. Starting battery.

1.3 DEFINITIONS

A. Standby Rating: Power output rating equal to the power the generator set delivers continuously under normally varying load factors for the duration of a power outage.

B. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

C. Steady-State Voltage Modulation: The uniform cyclical variation of voltage within the operational bandwidth, expressed in Hertz or cycles per second.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator and accessory indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.5 INFORMATIONAL SUBMITTALS

A. Source quality-control test reports.

B. Field quality-control test reports.

C. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASME B15.1.

E. Comply with NFPA 37.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

I. Comply with UL 2200.

J. Comply with NFPA 70 requirements for monitoring of generator control wiring.

K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.

2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 1000 feet.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.

1.10 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators. These items are specified in Section 07 7200 "Roof Accessories."

1.11 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace packaged engine generator and auxiliary components that fail in materials or workmanship within specified warranty period. The warranty shall have no deductibles.

1. Warranty Period: Five years from date of Substantial Completion.
2. Warranty to include: parts, labor and travel time for five years.

1.12 MAINTENANCE SERVICE

A. Maintenance: Provide 1 year service agreement with cost for 1 year renewal. At Substantial Completion, begin 12 months' full maintenance by skilled employees of the manufacturer's designated service organization. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Maintenance agreements shall include parts and supplies as used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cummins Power Generation. – Preferred by the client, others may be considered.
2. **Generac Corp. – Preferred by the client, others may be considered.**
3. Caterpillar, Inc.; Engine Div.
4. Kohler Co; Generator Division.
5. MTU - Detroit Diesel.

2.2 ENGINE GENERATOR SET

A. Furnish a coordinated assembly of compatible components.

B. Safety Standard: Comply with ASME B15.1.

C. Nameplates: Each major system component is equipped with a conspicuous nameplate of component manufacturer. Nameplate identifies manufacturer of origin and address, and model and serial number of item.

D. Power Output Ratings: Nominal ratings as indicated on drawings, with capacity as required to operate as a unit as evidenced by records of prototype testing.

E. Skid: Adequate strength and rigidity to maintain alignment of mounted components without depending on a concrete foundation. Skid is free from sharp edges and corners. Lifting attachments are arranged to facilitate lifting with slings without damaging any components.

2.3 GENERATOR-SET PERFORMANCE FOR SENSITIVE LOADS

A. Oversizing generator compared with the rated power output of the engine to meet performance requirements in paragraphs below is permissible.

1. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

B. Steady-State Voltage Operational Bandwidth: 2 percent of rated output voltage from no load to full load.

C. Steady-State Voltage Modulation Frequency: Less than 1 Hz.

D. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage recovers to remain within the steady-state operating band within 0.5 second.

E. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

F. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there are no random speed variations outside the steady-state operational band and no hunting or surging of speed.

G. Transient Frequency Performance: Less than 2-Hz variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within three seconds.

H. Output Waveform: At no load, harmonic content measured line to neutral does not exceed 2 percent total with no slot ripple. The telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.

I. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, the system will supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or any other generator system component.

J. Excitation System: Performance is unaffected by voltage distortion caused by nonlinear load.

K. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.4 SERVICE CONDITIONS

A. Environmental Conditions: Engine generator system withstands the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: -15 to +50 degrees C..
2. Altitude: Sea level to 1000 feet .

2.5 ENGINE

A. Comply with NFPA 37.

B. Fuel: Fuel oil, Grade DF-2.

C. Rated Engine Speed: 1800 rpm.

D. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm .

E. Lubrication System: Pressurized by a positive-displacement pump driven from engine crankshaft. The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Controls flow in system to maintain optimum oil temperature. Unit is capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps or siphons or special tools or appliances.

F. Engine Fuel System: Comply with NFPA 37. System includes the following:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief/Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

G. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Heater shall be thermostatically controlled. Comply with NFPA 110 requirements for Level 1 equipment.

H. Provide vibration isolation between generator set and concrete pad per manufacturer recommendation (typically on larger units only), not required on units with integral vibration isolation between engine and frame rail.

2.6 GOVERNOR

A. Type: Adjustable isochronous, with speed sensing, electronic type.

2.7 ENGINE COOLING SYSTEM

A. Description: Closed loop, liquid cooled, with radiator factory mounted on engine generator-set skid and integral engine-driven coolant pump.

B.

C. Radiator: Rated for specified coolant.

D.

E. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

F. Expansion Tank: Constructed of welded steel plate and equipped with gage glass and petcock.

G. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

H. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

1. Rating: 50-psig maximum working pressure with 180 deg F coolant, and noncollapsible under vacuum.
2. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

I. Coolant piping external to engine generator set. Refer to Division 23 Section "Hydronic Piping" for materials and installation requirements for piping.

2.8 FUEL SUPPLY SYSTEM

A. Comply with Michigan DEQ, NFPA 30 and NFPA 37.

B. Day Tank: Sub-base style, factory-fabricated assembly of a duel-walled fuel tank listed by a nationally recognized testing laboratory, with the following features:

1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.
   a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.

2. Tank Capacity: Adequate to supply fuel to engine for an uninterrupted period of 48 hours' operation at 100 percent of rated power output of engine generator system without being refilled.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Unit, Including Alarm Contacts: Complies with UL 142.
5. Low-Level Alarm Sensor: Separate device operates alarm contacts at 75 percent of normal fuel level.

6. High-Level Alarm Sensor: Separate device operates alarm and redundant fuel shutoff contacts at 106 percent of normal fuel level.

7. Piping Connections: Include fuel suction and return lines to fuel storage tank; fuel supply; and return lines to engine, local fuel fill, vent line, overflow line, and tank drain line complete with shutoff valve.
8. Sub-base Day Tank shall have all options required to meet Mich DEQ Compliance.
9. Vandal-resistant fill cap in a lockable spill box.
10. Tank must be mounted on channels or have mastic coating between tank and concrete pad.

C. Interior Fuel Oil Piping: As specified in Division 23 Section "Facility Fuel-Oil Piping."

2.9 ENGINE EXHAUST SYSTEM

A. Muffler: Critical type, sized as recommended by engine manufacturer. Muffler shall reduce exhaust noise 30 dBA or better at 500Hz.

B. Condensate Drain for Muffler: Schedule 40, black steel pipe connected to muffler drain outlet through a petcock.

C. Connections from Engine to Exhaust System: Flexible section of corrugated stainless-steel pipe.

D. Connection from Exhaust Pipe to Muffler: Stainless-steel expansion joint with liners.

E. Insulation for Mufflers and Indoor Exhaust Piping: As specified in Division 23 Section “HVAC Equipment Insulation” and Division 23 Section “HVAC Piping Insulation.”

F. Supports for Muffler and Exhaust Piping: Spring hangers and all-thread rods and vibration hangers as specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" and Division 23 Section “Hangers and Supports for HVAC Piping and Equipment”; attached to building structure.

G. Exhaust Piping External to Engine: ASTM A 53, Schedule 40, welded, black steel, with welded joints and fittings. Refer to Division 23 Sections "Hydronic Piping" and " BREECHINGS, CHIMNEYS AND STACKS " for materials and installation requirements for piping.

2.10 COMBUSTION-AIR-INTAKE

A. Description: Standard-duty engine-mounted air cleaner with replaceable dry filter element and "blocked filter" indicator.

2.11 STARTING SYSTEM

A. Description: electric, with negative ground and including the following items:

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.

3. Cranking Cycle: As required by NFPA 110 for system level specified.

4. Battery: Adequate capacity within ambient temperature range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by generator set manufacturer for cable length required. Include required interconnecting conductors and connection accessories.

6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater is arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in "Environmental Conditions" Paragraph in "Service Conditions" Article above. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type with equalize charge timer. Unit complies with UL 1236 and includes the following features:
    a. Operation: Equalizing-charging rate of 10 A is initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit then automatically switches to a lower float-charging mode and continues operating in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjusts float and equalizes voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintains output voltage constant regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters indicate charging rates.
    e. Safety Functions: Include sensing of abnormally low battery voltage arranged to close contacts providing low battery voltage indication on control and monitoring panel. Also include sensing of high battery voltage and loss of ac input or dc output of battery charger. Either condition closes contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.
    g. Battery Heater: Provide battery heater for outdoor generator installations.

2.12 CONTROL AND MONITORING

A. Functional Description: When the mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic-transfer switches initiate starting and stopping of the generator set. When the mode-selector switch is switched to the on position, the generator set manually starts. The off position of the same switch initiates generator-set shutdown. When the generator set is running, specified system or equipment failures or derangements automatically shut down the generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down the generator set.

B. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages are grouped on a common control and monitoring panel mounted on the generator set. Mounting method isolates the control panel from generator-set vibration.

    1. Current and Potential Transformers: Instrument accuracy class.

C. Indicating and Protective Devices and Controls: Include those required by NFPA 110 for a Level 1 system, and the following:

D. Indicating and Protective Devices and Controls: Include the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Permanent Generator Offline for Maintenance
11. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices, and wiring required to support specified items. Locate sensors and other supporting items on engine, generator, or elsewhere as indicated. Where not indicated, locate to suit manufacturer's standard.

F. Provide connection to BAS system with a minimum of 10 points of generator status as outlined in BAS specification. Provide BACNET protocol compatible with BAS system to be coordinated with building controls contractor.

G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel. Locate audible device and silencing means where indicated.

H. Monitoring generator remote start circuits: Comply with NFPA 70, Section 700.10 to continuously monitor generator control wiring. Loss of integrity shall initiate visual and audible annunciation of the generator malfunction and local generator location and annunciator location and the loss of integrity shall start up the generator.

I. Remote Alarm Annunciator: Communications ready and installed by twisted pair wiring. Comply with NFPA 99. Labeled LEDs identify each alarm event. Common audible signal sounds for alarm conditions. Silencing switch in face of panel silences signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

J. Remote Emergency-Stop Switch: Flush wall-mounted, unless otherwise indicated and prominently labeled. Push button is protected from accidental operation.

2.13 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.

2. Trip Rating: Matched to generator rating.
3. Shunt Trip: For future use.
4. Mounting: Adjacent to or integrated with control and monitoring panel.
5. Kirk Key:
    a. Provide with auxiliary contacts to indicate if generator is offline for maintenance.
    b. Interlock with temporary generator connection switch breaker with same Kirk Key Lock.

B. Ground-Fault Indication: Comply with NFPA 70, Article 700-7(d). Integrate ground-fault alarm indication with other generator-set alarm indications.

2.14 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1 and specified performance requirements.

B. Drive: Generator shaft is directly connected to engine shaft. Exciter is rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction prevents mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Excitation uses no slip or collector rings, or brushes, and is arranged to sustain generator output under short-circuit conditions as specified.

G. Enclosure: Dripproof.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel provides plus or minus 5 percent adjustment of output- voltage operating band.

I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

J. Alternator 105C rise rated. Provide alternator heater with circuit wired to it.

2.15 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph . Multiple panels are lockable and provide adequate access to components requiring maintenance. Panels are removable by one person without tools. Instruments and control are mounted within enclosure. Provide skid bottom end plates.

B. Description: Prefabricated or pre-engineered enclosure with the following features:

1. Construction: Galvanized steel, metal-clad on steel frame.

2. Sound Attenuating Enclosure: Provide **Level 2 – (maximum 78 dBA at 7 meters)** sound attenuation.

3. Structural Design and Anchorage: Adequate to resist loads imposed by 100-mph wind.
4. Space Heater: Thermostatically controlled operating at one-half or less of rated voltage sized to prevent condensation.
5. Louvers: Equipped with insect/rodent screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust and rodents.
6. Hinged Doors: With padlocking provisions.

7. Ventilation: Louvers equipped with insect/rodent screen and filter arranged to permit air circulation while excluding exterior dust and rodents.
8. Thermal Insulation: As required to maintain winter interior temperature within limits required by components.
9. Finish: Two-coat enamel finish over cleaned and primed surfaces.

C. Muffler Location: Internal to enclosure.

D. Engine Cooling Airflow through Enclosure: Adequate to maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for two hours with ambient temperature at top of range specified in system service conditions.

E. Louvers: Fixed-engine cooling air inlet and discharge. Louvers prevent entry of rain and snow.

F. Automatic Dampers (for units 500kW or larger): At engine cooling air inlet and discharge. Dampers are fixed type.

G. Interior Lights: With switch. Factory-wired, LED vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external circuit supply.

H. Convenience Outlets: Factory wired. Arrange for external circuit supply.

I. 500kVA and above to be supplied with integral auxiliary panel to supply power to generator charger, alternator heater, block heater and all other accessories.

2.16 FINISHES

A. Indoor Enclosures and Components: Manufacturer's standard enamel over corrosion-resistant pretreatment and compatible standard primer.

B. Outdoor Enclosures: Manufacturer's standard enamel over corrosion-resistant pretreatment and compatible standard primer.

2.17 SOURCE QUALITY CONTROL

A. Factory Tests: Include prototype testing and Project-specific equipment testing (testing of equipment manufactured specifically for this Project).

B. Prototype Testing: Performed on a separate engine generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with those required for Level 1 energy converters in Paragraphs 3.2.1, 3.2.1.1, and 3.2.1.2 of NFPA 110.
2. Generator Tests: Comply with IEEE 115.
3. Components and Accessories: Items furnished with installed unit that are not identical to those on tested prototype have been tested to demonstrate compatibility and reliability.

C. Project-Specific Equipment Tests: Factory test engine generator set and other system components and accessories before shipment. Perform tests at rated load and power factor. Include the following tests.

1. Full load run.
2. Maximum power.
3. Voltage regulation.
4. Transient and steady-state governing.
5. Single-step load pickup.
6. Safety shutdown.

D.

E. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment foundations, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine roughing-in of cooling-system piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

3.2 CONCRETE BASES

A. Install concrete bases of dimensions indicated for packaged engine generators. Refer to Division 03 Section "Cast-in-Place Concrete."

3.3 INSTALLATION

A. Packaged Engine Generator sets shall be installed in accordance with NECA/EGSA 404-2000, Recommended Practice for Installing Generator Sets (ANSI).

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions, and with NFPA 110.

C. Set packaged engine generator set on concrete bases.

1. Support generator-set mounting feet on rectangular metal blocks and shims or on metal wedges having small taper, at points near foundation bolts to provide 3/4- to 1-1/2-inch gap between pump base and foundation for grouting.
2. Adjust metal supports or wedges until generator is level.

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

1. Verify that electrical wiring is installed according to manufacturers' submittal and installation requirements in Division 26 Sections. Proceed with equipment startup only after wiring installation is satisfactory.

F. The Electrical Contractor shall provide initial filling of diesel fuel tank with fresh fuel. Top off tank at substantial completion.

3.4 CONNECTIONS

A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties. The following are specific connection requirements:

1. Install piping adjacent to packaged engine generator to allow service and maintenance.
2. Connect water supply to cooling system.
3. Connect cooling-system water supply and drain piping to diesel-engine heat exchangers. Install flexible connectors at connections to engine generator and remote radiator.
4. Connect exhaust-system piping to diesel engines.

B. Electrical wiring and connections are specified in Division 26 Sections.

C. Ground equipment.

1. Provide at least (3) ground rods at generator.
2. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 IDENTIFICATION

A. Identify system components according to Division 23 Section "Identification for HVAC Piping and Equipment" and Division 26 Section "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections, and to assist in testing. Report results in writing.

B. Testing: Perform field quality-control testing under the supervision of the manufacturer's factory-authorized service representative.

C. Tests: Include the following:

1. Factory standard tests recommended by manufacturer.
2. Perform each visual and mechanical inspection and electrical and mechanical test stated in NETA ATS for emergency engine generator sets, except omit vibration baseline test
3. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110. The authority having jurisdiction (Office of Fire Safety, Michigan Department of Consumer and Industry Services) shall be given advanced notification of the time at which the final test is to be performed so that the authority can witness the test. Provide signed documentation to the authority having jurisdiction documenting that these code requirements have been met. Loadbank test to full capacity for 4 hours in addition to building load test.
4. Battery Tests: Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery. Verify acceptance of charge for each element of battery after discharge. Verify measurements are within manufacturer's specifications.
5. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
6. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
7. **Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.**
8. **Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.**
9. **Load Bank Test: Perform a four hour load bank test at generator rated capacity.**]

D. Coordinate tests with tests for transfer switches and run them concurrently.

E. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

G. Test instruments shall have been calibrated within the last 12 months, traceable to standards of the National Institute for Standards and Technology, and adequate for making positive observation of test results. Make calibration records available for examination on request.

3.7 BATTERY EQUALIZATION

A. Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

3.8 CLEANING

A. On completion of installation, inspect system components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators as specified below:

1. Coordinate this training with that for transfer switches.
2. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment.
3. Review data in maintenance manuals. Refer to Division 01 Section “Operation and Maintenance Data.”

4. Schedule training with Owner, through Architect, with at least seven days' advance notice.

5. Minimum Instruction Period: Eight hours.

END OF SECTION 26 3213

SECTION 31 3116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Soil treatment with termiticide.

~~1. [**Soil**] [**and**] [**wood**] treatment with termiticide.~~
~~2. Bait-station system.~~
~~3. Metal mesh barrier system.~~
~~4. Polymer sheet barrier system with termiticide.~~

~~5. Polymer barrier fittings with termiticide for installation around utility penetrations.~~

B. Related Sections:

1. Section 06 1000 "Rough Carpentry" for wood preservative treatment by pressure process.

~~2. Section 07 6200 "Sheet Metal Flashing and Trim" for custom-fabricated, metal termite shields.~~

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the EPA-Registered Label for termiticide products.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product certificates.

C. Soil Treatment Application Report: Include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

~~D. Wood Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:~~

~~1. Date and time of application.~~
~~2. Termiticide brand name and manufacturer.~~
~~3. Quantity of undiluted termiticide used.~~

4. Dilutions, methods, volumes used, and rates of application.
5. Areas of application.

E. Bait-Station System Application Report: Include the following:

1. Location of areas and sites conducive to termite feeding and activity.
2. Plan drawing showing number and locations of bait stations.
3. Dated report for each monitoring and inspection occurrence indicating level of termite activity, procedure, and treatment applied before time of Substantial Completion.
4. Termiticide brand name and manufacturer.
5. Quantities of [**termiticide**] [**and**] [**nontoxic termite bait**] used.
6. Schedule of inspections for one year from date of Substantial Completion.

F. Polymer Sheet Barrier System with Termiticide Application Report: After installation of polymer sheet barrier system with termiticide is completed, submit report for Owner's records and include the following:

1. Plan drawing showing extent of sheet barrier and number and locations of each type of polymer barrier fitting.
2. Termiticide brand name and manufacturer.
3. Schedule of inspections for one year from date of Substantial Completion.

G. Polymer Barrier Fittings with Termiticide Application Report: After installation of polymer barrier fittings with termiticide is completed, submit report for Owner's records and include the following:

1. Plan drawing showing number and locations of each type of polymer barrier fitting with termiticide.
2. Termiticide brand name and manufacturer.
3. Schedule of inspections for one year from date of Substantial Completion.

H. Research/Evaluation Reports: For metal mesh barrier system, from **<Insert applicable model code organization>**.

I. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

B. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located[**, and who employs workers trained and approved by manufacturer to install manufacturer's products**] [**, and who is accredited by manufacturer**].

C. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

D. Source Limitations: Obtain termite control products from single source from single manufacturer **for each product**.

E. Preinstallation Conference: Conduct conference at [**Project site**] **<Insert location>**.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

~~B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.~~

~~C. Apply wood treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.~~

~~D. Install bait station system [**during construction to determine areas of termite activity**] [**and**] [**after construction, including landscaping, is completed**].~~

~~E. Install polymer sheet barrier system with termiticide prior to placing concrete slab reinforcement and pouring concrete and after installation and inspection of footings, foundations, and plumbing and electrical pipes and conduits.~~

~~F. Install polymer barrier fittings with termiticide around utility penetrations prior to pouring concrete and after installation and inspection of plumbing and electrical pipes and conduits, slab vapor barrier, and concrete slab reinforcement.~~

1.6 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.
~~2. Warranty Period: [**Three**] [**Five**] **<Insert number>** years from date of Substantial Completion.~~

~~B. Wood Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied wood termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite damage is discovered during warranty period, repair or replace damage caused by termite infestation and treat replacement wood.~~

~~1. Warranty Period: [**12**] **<Insert number>** years from date of Substantial Completion.~~

~~C. Polymer Sheet Barrier System with Termiticide Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of installation of polymer sheet barrier system with termiticide, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat and repair or replace damage caused by termite infestation.~~

~~1. Warranty Period: [**10**] **<Insert number>** years from date of Substantial Completion.~~

~~D. Polymer Barrier Fittings with Termiticide Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of installation of polymer barrier fittings with termiticide, will prevent infestation of subterranean termites. If subterranean termite activity or~~

damage is discovered during warranty period, re-treat and repair or replace damage caused by termite infestation.

1. Warranty Period: [**Five**] <**Insert number**> years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

A. Continuing Service: Beginning at Substantial Completion, provide [**12 months'**] <**Insert number**> continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, terms for agreement period, and terms for future renewal options.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
   a. BASF Corporation, Agricultural Products; Termidor.
   b. Bayer Environmental Science; Premise 75.
   c. FMC Corporation, Agricultural Products Group; [**Dragnet FT**] [**Talstar**] [**Prevail**].
   d. Syngenta; [**Demon TC**] [**Prelude**] [**Probuild TC**].
   e. <**Insert manufacturer's name; product name or designation**>.

2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.
3. Service Life of Treatment: Soil treatment termiticide that is effective for not less than [**three**] [**five**] <**Insert number**> years against infestation of subterranean termites.

2.2 WOOD TREATMENT

A. Borate: Provide an EPA-Registered borate temiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution for spray application and a gel solution for pressure injection, formulated to prevent termite infestation in wood. Provide quantity required for application at the label volume and rate for the maximum diffusible borate concentration allowed for each specific use, according to product's EPA-Registered Label.

1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
   a. Nisus Corp.; [**Bora-Care**] [**Jecta**] [**Tim-Bor**].
   b. NovaGuard Technologies, Inc.; [**Armor-Guard**] [**Shell-Guard**].

c. **<Insert manufacturer's name; product name or designation>**.

2.3 BAIT-STATION SYSTEM

A. Provide bait stations based on the dimensions of building perimeter indicated on Drawings, according to manufacturer's EPA-Registered Label for product, manufacturer's written instructions, and the following:

1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
   a. BASF Corporation, Agricultural Products; Subterfuge.
   b. Dow AgroSciences LLC; Sentricon System.
   c. Ensystex, Inc.; Exterra System.
   d. FMC Corporation, Agricultural Products Group; First Line.
   e. Whitmire Micro-Gen Research Laboratories, Inc.; Advance TBS.
   f. **<Insert manufacturer's name; product name or designation>**.

2. No fewer than one bait station per [**8 linear feet**] [**20 linear feet**] <Insert value>.
3. No fewer than one cluster of bait stations per 20 linear feet, consisting of no fewer than three bait stations per cluster.
4. <Insert requirements>.

2.4 METAL MESH BARRIER SYSTEM

A. Stainless-Steel Mesh: 0.025-by-0.018-inch mesh of 0.08-inch- diameter, stainless-steel wire, Type 316.

1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
   a. Termimesh USA, Inc.; Termimesh System.
   b. **<Insert manufacturer's name; product name or designation>**.

2.5 POLYMER SHEET BARRIER SYSTEM

A. Polymer Sheet: 16-mil- thick, multilayered, laminated, polymer sheet with lambda-cyhalothrin termiticide sealed between two outer polymer layers.

1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
   a. Syngenta; IMPASSE Termite System.
   b. **<Insert manufacturer's name; product name or designation>**.

2.6 POLYMER BARRIER FITTINGS

A. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:

1. Syngenta; IMPASSE Termite Blockers.
2. **<Insert manufacturer's name; product name or designation>.**

B. Pipe/Conduit Fitting: Integral 2-1/2-inch- long polymer sleeve and 1-inch- wide circular flange with lambda-cyhalothrin termiticide sealed between two outer polymer layers; with fasteners.

C. Tub Trap Fitting: Integral polymer boot and 23-by-23-inch flange with lambda-cyhalothrin termiticide sealed between two outer polymer layers; with fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for[**moisture content of soil per termiticide label requirements,**] interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

C. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
3. ~~Crawlspaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.~~
4. Masonry: Treat voids.
5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

~~3.5 APPLYING WOOD TREATMENT~~

~~A. Application: Mix wood treatment solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of borate, according to manufacturer's EPA-Registered Label, so that wood framing, sheathing, siding, and structural members subject to infestation receive treatment.~~

~~1. Framing and Sheathing: Apply termiticide solution by spray to bare wood for complete coverage.~~

~~2. Wood Members More Than 4 Inches Thick: Inject termiticide gel solution under pressure into holes of size and spacing required by manufacturer for treatment.~~
~~3. Exterior Uncoated Wood Trim and Siding: Apply termiticide solution to bare wood siding. After 48 hours, apply a seal coat of [**paint**] **<Insert coating>** as specified in [**Section 09 9113 "Exterior Painting" and Section 09 9123 "Interior Painting"**] **<Insert Section title>**.~~

3.6 INSTALLING BAIT-STATION SYSTEM

A. Place bait stations according to the EPA-Registered Label for the product and manufacturer's written instructions, in the following areas that are conducive to termite feeding and activity:

1. Conducive sites and locations indicated on Drawings.
2. In and around infested trees and stumps.
3. In mulch beds.
4. Where wood directly contacts soil.
5. Areas of high soil moisture.
6. Near irrigation sprinkler heads.
7. Each area where roof drainage system, including downspouts and scuppers, drains to soil.
8. Along driplines of roof overhangs without gutters.
9. Where condensate lines from mechanical equipment drip or drain to soil.
10. At plumbing penetrations through ground-supported slabs.
11. Other sites and locations as determined by licensed Installer.

B. Inspect and service bait stations from time of their application until Substantial Completion[**unless extended by continuing service agreement**], according to the EPA-Registered Label for product and manufacturer's written instructions for termite management system and bait products.

1. Service Frequency: Inspect bait stations not less than once [**every**] [**every three**] <**Insert number**> month(s).

3.7 INSTALLING METAL MESH BARRIER SYSTEM

A. Install metal mesh barrier system where indicated to provide a continuous barrier to entry of subterranean termites according to manufacturer's written instructions.

1. Fit mesh tightly around pipe or other penetrations, and terminate at slab and foundation perimeters.
2. Install mesh under the perimeter of concrete slab edges and joints after vapor barrier and reinforcing steel are in place, and comply with manufacturer's written installation methods.

B. Inspect [**annually**] <**Insert time period**> for termite activity and effectiveness of metal mesh barrier system according to manufacturer's written instructions.

3.8 INSTALLING POLYMER SHEET BARRIER SYSTEM

A. Install polymer sheet barrier system according to manufacturer's EPA-Registered Label to provide a complete and continuous barrier to entry of subterranean termites.

B. Remove any pipe wrap material so that the polymer sheet barrier system and fittings can be applied directly to the pipe or conduit. After installing the barrier, reapply pipe wrap material both below and above the blocker to protect the pipe from contact with concrete.

C. Install polymer barrier fittings around each utility pipe and conduit penetrating concrete [**slab**] [**foundation walls**] <**Insert requirement**> according to the EPA-Registered Label for the product and manufacturer's written instructions.

~~3.9 INSTALLING POLYMER BARRIER FITTINGS~~

~~A. Remove any pipe wrap material so that the polymer barrier fittings can be applied directly to the pipe or conduit. After installing the barrier, reapply pipe wrap material both below and above the blocker to protect the pipe from contact with concrete.~~

~~B. Install polymer barrier fittings around each utility pipe and conduit penetrating concrete [**slab**] [**foundation walls**] <**Insert requirement**> according to the EPA-Registered Label for the product and manufacturer's written instructions.~~

END OF SECTION 31 3116

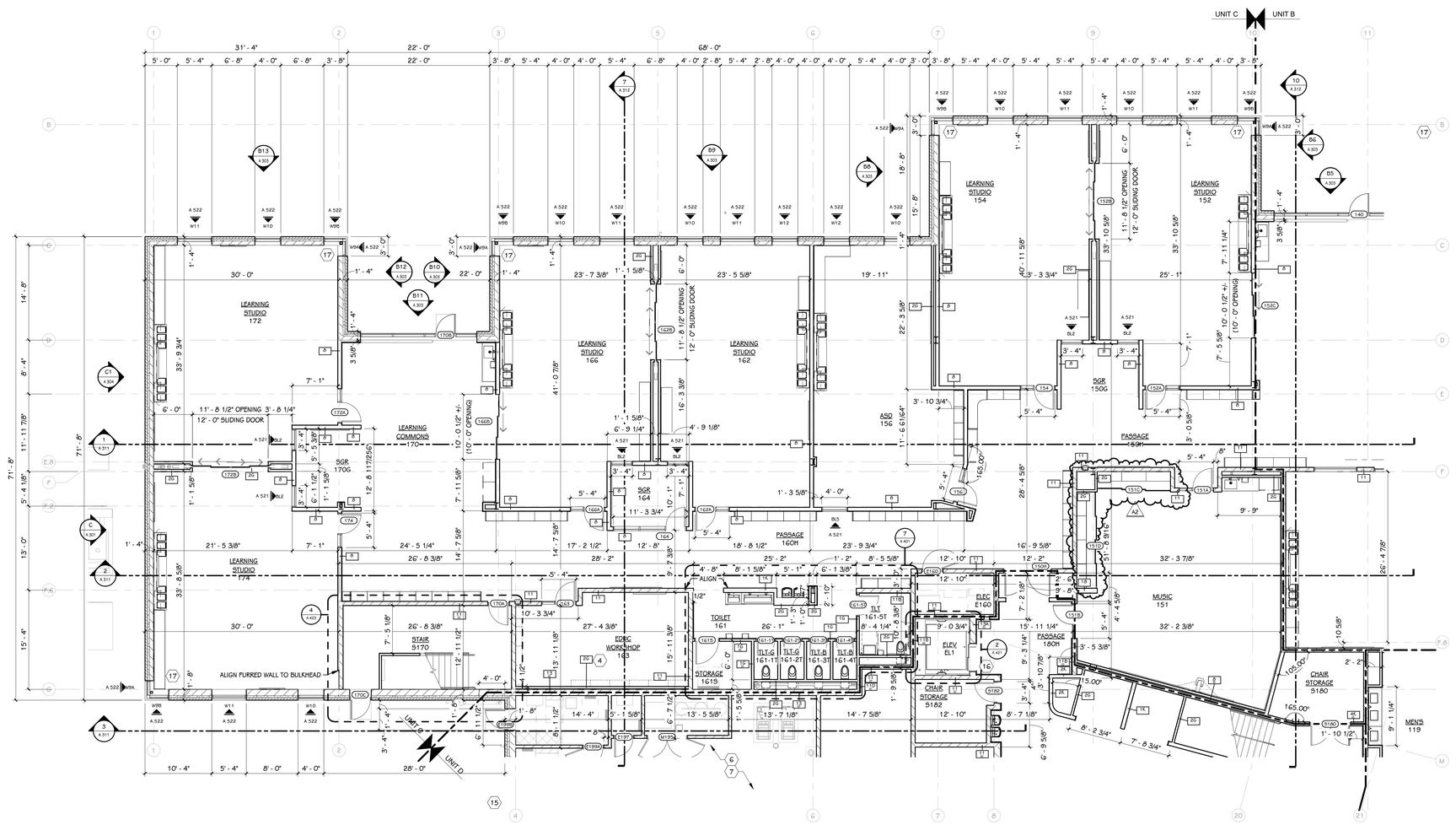
GENERAL NOTES

1. REFER TO CODE COMPLIANCE PLAN FOR WALL RATING LINES.
2. REFER TO FLOOR FINISH PLANS FOR INTERIOR ELEVATION CALLOUTS.
3. PROVIDE CEILING AND WALL ACCESS PANELS AS REQ'D. FOR MECH. AND PLUMBING, COORD WITH MECH/ELEC. AND WITH ARCHITECT. PAINT TO MATCH ADJACENT SURFACE.
4. PROVIDE EXPANSION JOINTS IN WALLS, FLOOR AND CEILING WHERE APPLICABLE, COORDINATE WITH INTERIOR FINISHES.

KEYED NOTES - NEW CONSTRUCTION

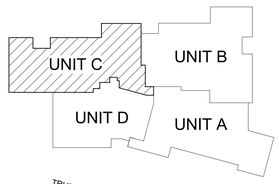
1 LOCKABLE CAB. FOR ELEV. DISCONNECT, PROVIDE BLOCKING SUPPORT FOR DISCONNECT, COORD. WITH ELECT.
2 ELEV. FIRE ALARM DISCONNECT TO BE LOCATED ABOVE CEILING, COORD. WITH ELECT. AND ELEV. MANUF.
3 (8) 12"x18"x60" SINGLE TIER METAL LOCKERS
4 SOUND STUD WALL - MAINTAIN SEPARATION FROM CMU WALL CONSTRUCTION, MUST NOT ATTACH TO CMU
5 2" DUCT LINER, FLOOR TO ROOF DECK
6 PROVIDE 4"x4" CONCRETE CURB AROUND OPENINGS THROUGH FLOOR, COORDINATE LOCATIONS WITH MECHANICAL
7 PROVIDE 4"H CONCRETE HOUSEKEEPING PAD WHERE REQUIRED BY MECH., COORD. LOCATION AND FOOTPRINT WITH MECH.
8 4"H CONCRETE CURB AT FLOOR UNDER CMU WALL, CONTINOUS THROUGH DOOR OPENING, REFER TO STRUCT.
9 STACKABLE WASHER/DRYER, OWNER FURNISHED, CONTRACTOR INSTALLED, COORD. UTILITIES WITH MECH/ELECT.
10 VOLLEYBALL SLEEVE, COORD. WITH VOLLEYBALL MANUF.
11 BB-1 - BACKWARD SWING OVERHEAD-SUPPORTED BACKSTOP (MOTORIZED)
12 BB-2 - WALL MOUNTED BACKSTOP
13 SAFETY PADS - 2'x6', MOUNT 12" A.F.F., CENTER ON BASKETBALL HOOP
14 CLIMBING WALL WITH MAT SYSTEM
15 KNOX BOX, RECESSED, 60" A.F.F. - COORDINATE LOCATION WITH AHJ, COLOR TO COORD. WITH ADJACENT DOOR/WINDOW FRAMING
16 KNOX BOX MINI ELEVATOR KEY BOX, ALUM. COORD. LOCATION WITH AHJ
17 PROVIDE METAL TRIM AT EXPOSED CORNER COLUMN, 1/A101B
18 ROOF ACCESS LADDER, REFER TO DETAIL ON A103
19 AVP-10: SOUND ABSORBING PERFORATED METALL WALL PANEL, CONT. INSIDE DIAMETER OF CONCAVE SCREEN WALL, MOUNT 2" OFF TO WALL
20 SLOPE FLOOR 1/8"=1'-0" TO FLOOR DRAINS, PROVIDE APPROPIATE SLOPE AROUND HOUSEKEEPING PADS AND OBSTRUCTIONS.
21 PROVIDE CONCRETE CURB AT STUD WALL, REFER TO DETAIL 1/A102D

A2 (cloud)



FIRST FLOOR PLAN - UNIT C
1/8" = 1'-0"

CENTRAL ELEMENTARY



KEY PLAN
SCALE: NO SCALE

ISSUED FOR	DATE
ADD. No. 2	JUN 15, 2023
ADD. No. 1	JUN 5, 2023

TowerPinkster
Architecture · Engineering · Interiors
TOWERPINKSTER.COM

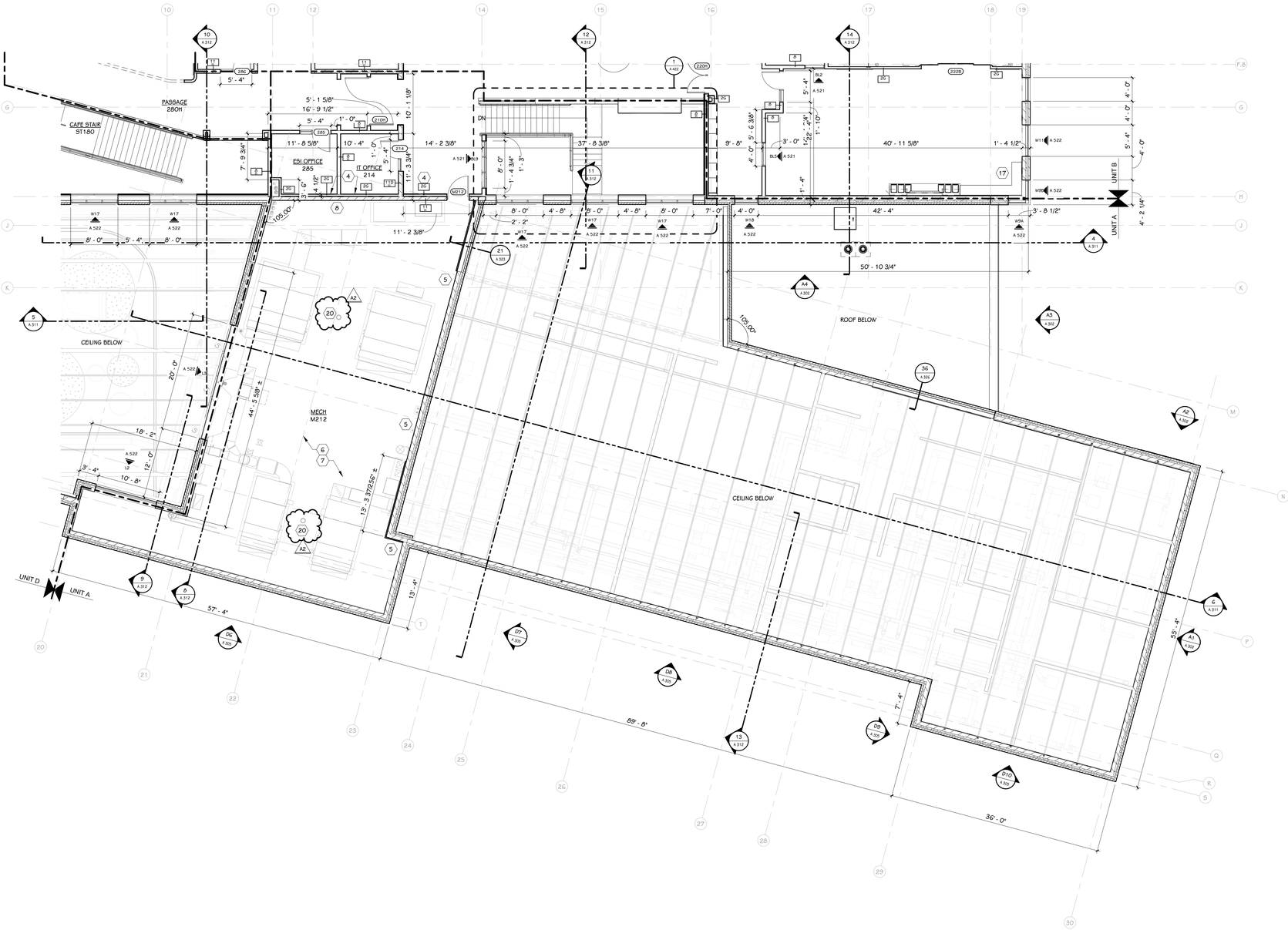
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR PLAN - UNIT C

DATE
MAY 17, 2023

SHEET NUMBER
A 101C
21-237.10



SECOND FLOOR PLAN - UNIT A
1/8" = 1'-0"

GENERAL NOTES

1. REFER TO CODE COMPLIANCE PLAN FOR WALL RATING LINES.
2. REFER TO FLOOR FINISH PLANS FOR INTERIOR ELEVATION CALLOUTS.
3. PROVIDE CEILING AND WALL ACCESS PANELS AS REQ'D. FOR MECH. AND PLUMBING, COORD WITH MECH/ELEC. AND WITH ARCHITECT. PAINT TO MATCH ADJACENT SURFACE.
4. PROVIDE EXPANSION JOINTS IN WALLS, FLOOR AND CEILING WHERE APPLICABLE, COORDINATE WITH INTERIOR FINISHES.

KEYED NOTES - NEW CONSTRUCTION

1 LOCKABLE CAB. FOR ELEV. DISCONNECT, PROVIDE BLOCKING SUPPORT FOR DISCONNECT, COORD. WITH ELECT.
2 ELEV. FIRE ALARM DISCONNECT TO BE LOCATED ABOVE CEILING, COORD. WITH ELECT. AND ELEV. MANUF.
3 (8) 12'x18'x60" SINGLE TIER METAL LOCKERS
4 SOUND STUD WALL - MAINTAIN SEPARATION FROM CMU WALL CONSTRUCTION, MUST NOT ATTACH TO CMU
5 2" DUCT LINER, FLOOR TO ROOF DECK
6 PROVIDE 4'x4" CONCRETE CURB AROUND OPENINGS THROUGH FLOOR, COORDINATE LOCATIONS WITH MECHANICAL
7 PROVIDE 4"H CONCRETE HOUSEKEEPING PAD WHERE REQUIRED BY MECH., COORD. LOCATION AND FOOTPRINT WITH MECH.
8 4"H CONCRETE CURB AT FLOOR UNDER CMU WALL, CONTINOUS THROUGH DOOR OPENING, REFER TO STRUCT.
9 STACKABLE WASHER/DRYER, OWNER FURNISHED, CONTRACTOR INSTALLED, COORD. UTILITIES WITH MECH/ELECT.
10 VOLLEYBALL SLEEVE, COORD. WITH VOLLEYBALL MANUF.
11 BB-1 - BACKWARD SWING OVERHEAD-SUPPORTED BACKSTOP (MOTORIZED)
12 BB-2 - WALL MOUNTED BACKSTOP
13 SAFETY PADS - 2'x6', MOUNT 12" A.F.F., CENTER ON BASKETBALL HOOP
14 CLIMBING WALL WITH MAT SYSTEM
15 KNOX BOX, RECESSED, 60" A.F.F. - COORDINATE LOCATION WITH AHJ, COLOR TO COORD. WITH ADJACENT DOOR/WINDOW FRAMING
16 KNOX BOX MINI ELEVATOR KEY BOX, ALUM. COORD. LOCATION WITH AHJ
17 PROVIDE METAL TRIM AT EXPOSED CORNER COLUMN, 1/A101B
18 ROOF ACCESS LADDER, REFER TO DETAIL ON A103
19 AWP-10: SOUND ABSORBING PERFORATED METAL WALL PANEL, CONT. INSIDE DIMENSION OF CONCRETE SOFFIT, MOUNT 2" OFF TO WALL
20 SLOPE FLOOR 1/8"=1'-0" TO FLOOR DRAINS, PROVIDE APPROPRIATE SLOPE AROUND HOUSEKEEPING PADS AND OBSTRUCTIONS.
21 PROVIDE CONCRETE CURB AT STUD WALL, REFER TO DETAIL 1/A102D

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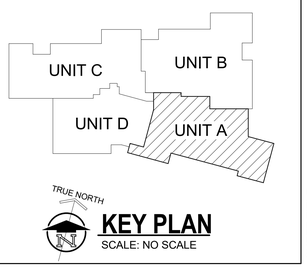
CENTRAL ELEMENTARY



KEY PLAN
SCALE: NO SCALE

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
SECOND FLOOR PLAN - UNIT A

DATE
MAY 17, 2023

SHEET NUMBER
A 102A
21-237.10

GENERAL NOTES

1. REFER TO CODE COMPLIANCE PLAN FOR WALL RATING LINES.
2. REFER TO FLOOR FINISH PLANS FOR INTERIOR ELEVATION CALLOUTS.
3. PROVIDE CEILING AND WALL ACCESS PANELS AS REQ'D. FOR MECH. AND PLUMBING, COORD WITH MECH/ELEC. AND WITH ARCHITECT. PAINT TO MATCH ADJACENT SURFACE.
4. PROVIDE EXPANSION JOINTS IN WALLS, FLOOR AND CEILING WHERE APPLICABLE, COORDINATE WITH INTERIOR FINISHES.

KEYED NOTES - NEW CONSTRUCTION

1 LOCKABLE CAB. FOR ELEV. DISCONNECT, PROVIDE BLOCKING SUPPORT FOR DISCONNECT, COORD. WITH ELECT.
2 ELEV. FIRE ALARM DISCONNECT TO BE LOCATED ABOVE CEILING, COORD. WITH ELECT. AND ELEV. MANUF.
3 (8) 12"x18"x60" SINGLE TIER METAL LOCKERS
4 SOUND STUD WALL - MAINTAIN SEPARATION FROM CMU WALL CONSTRUCTION, MUST NOT ATTACH TO CMU
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8 4"H CONCRETE CURB AT FLOOR UNDER CMU WALL, CONTINOUS THROUGH DOOR OPENING, REFER TO STRUCT.
9 STACKABLE WASHER/DRYER, OWNER FURNISHED, CONTRACTOR INSTALLED, COORD. UTILITIES WITH MECH/ELECT.
10 VOLLEYBALL SLEEVE, COORD. WITH VOLLEYBALL MANUF.
11 BB-1 - BACKWARD SWING OVERHEAD-SUPPORTED BACKSTOP (MOTORIZED)
12 BB-2 - WALL MOUNTED BACKSTOP
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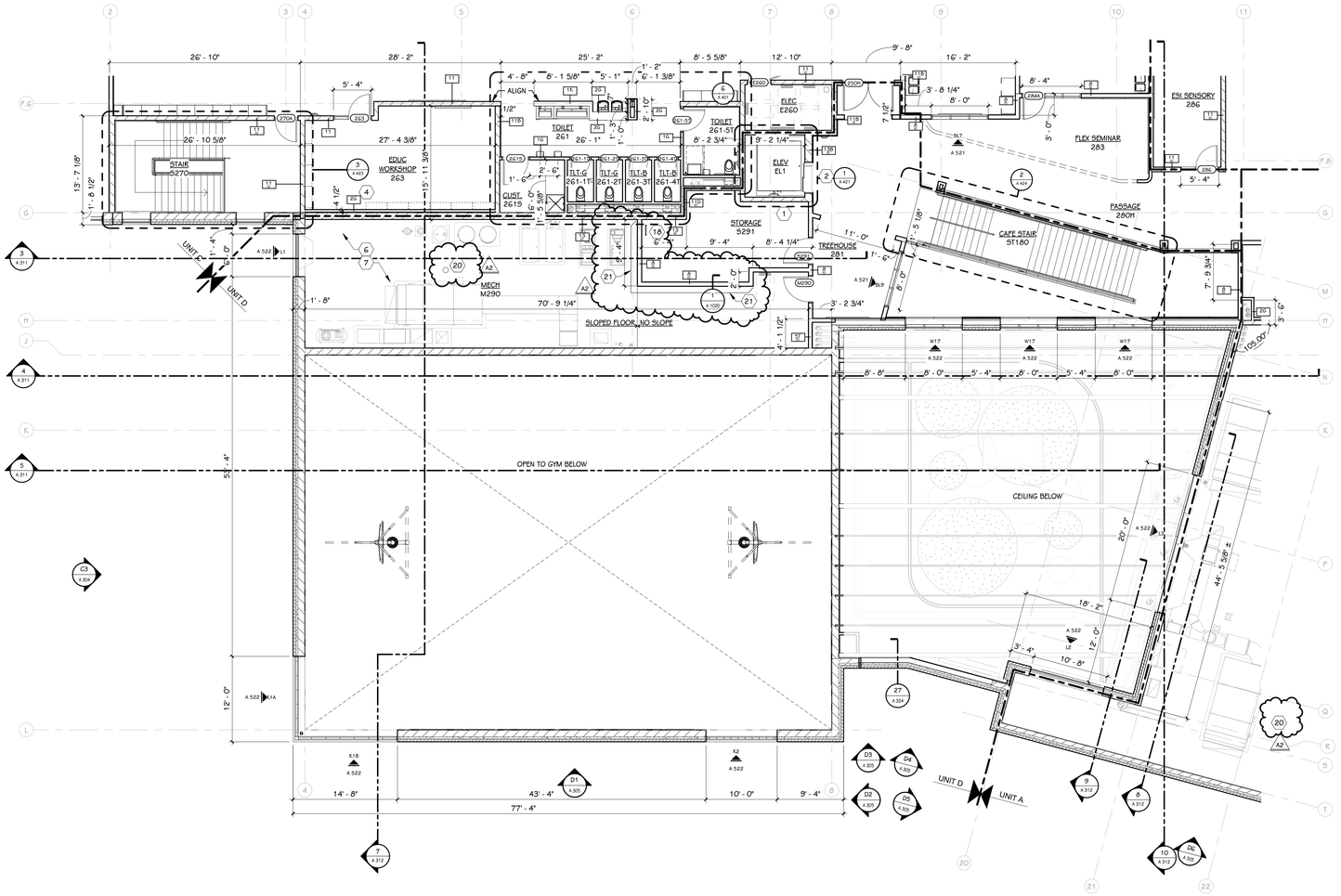
16 KNOX BOX MINI ELEVATOR KEY BOX, ALUM. COORD. LOCATION WITH AHJ
17 PROVIDE METAL TRIM AT EXPOSED CORNER COLUMN, 1/A1018
18 ROOF ACCESS LADDER, REFER TO DETAIL ON A103
19 AWP-10: SOUND ABSORBING PERFORATED METALL WALL PANEL, CONT. INSIDE PERIMETER OF CONDITIONED SPACE, MOUNT 2" AFF TO 10'-6" A.F.F.
20 SLOPE FLOOR 1/8"=1'-0" TO FLOOR DRAINS, PROVIDE APPROPIATE SLOPE AROUND HOUSEKEEPING PADS AND OBSTRUCTIONS.
21 PROVIDE CONCRETE CURB AT STUD WALL, REFER TO DETAIL 1/A102D



SECOND FLOOR PLAN - UNIT D
1/8" = 1'-0"

CONCRETE CURB/STUD WALL DETAIL
1 / A 1020 — 3/4" = 1'-0"

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

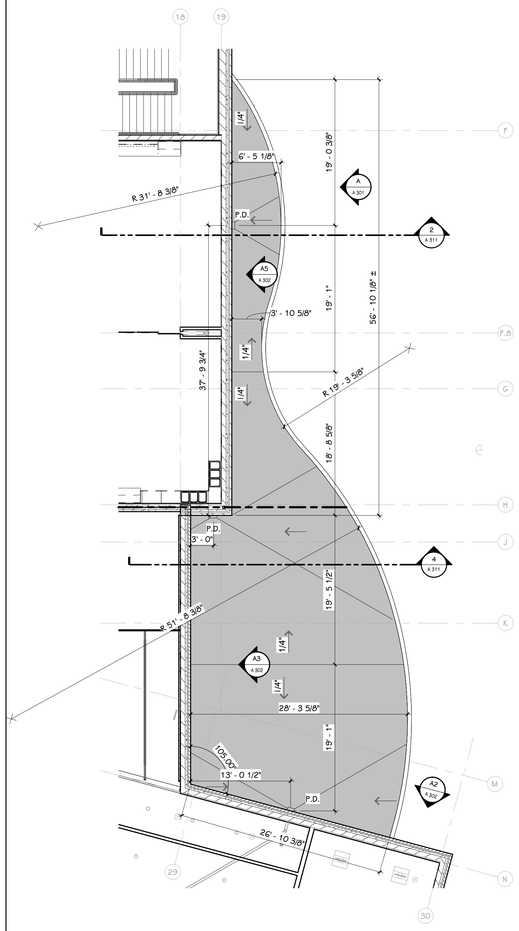
CENTRAL ELEMENTARY

KEY PLAN
SCALE: NO SCALE

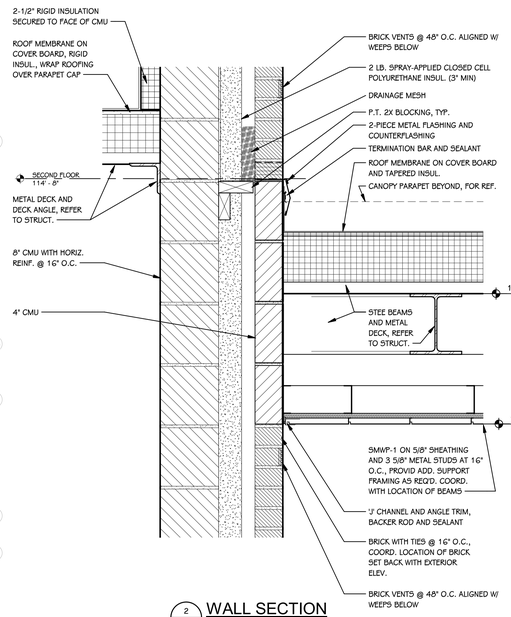
SHEET TITLE
SECOND FLOOR PLAN - UNIT D

DATE
MAY 17, 2023

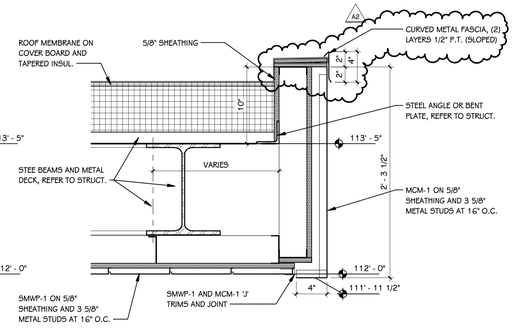
SHEET NUMBER
A 102D
21-237.10



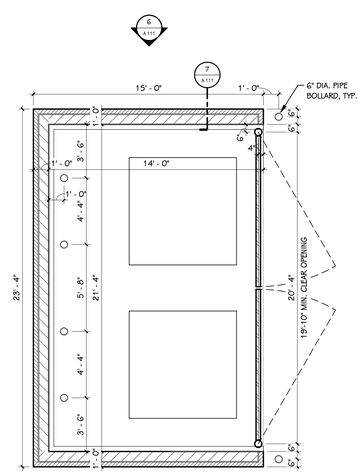
1 A111 CANOPY ROOF PLAN
1/8" = 1'-0"



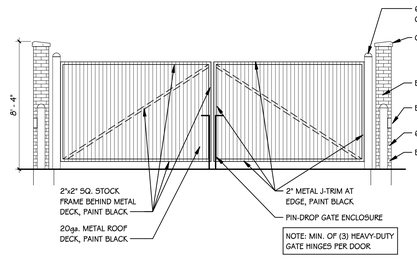
2 A111 WALL SECTION
1 1/2" = 1'-0"



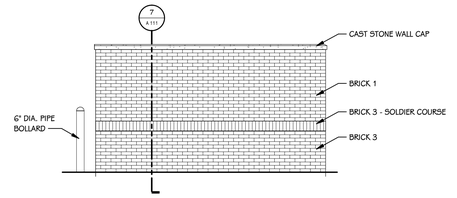
3 A111 WALL SECTION
1 1/2" = 1'-0"



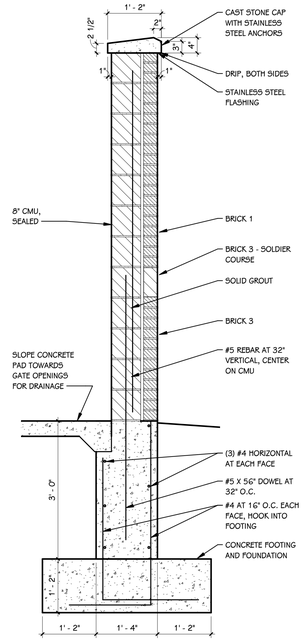
4 A111 DUMPSTER ENCLOSURE PLAN
1/4" = 1'-0"



5 A111 NORTHEAST ELEVATION
1/4" = 1'-0"



6 A111 NORTHWEST ELEVATION
1/4" = 1'-0"



7 A111 WALL SECTION
3/4" = 1'-0"

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

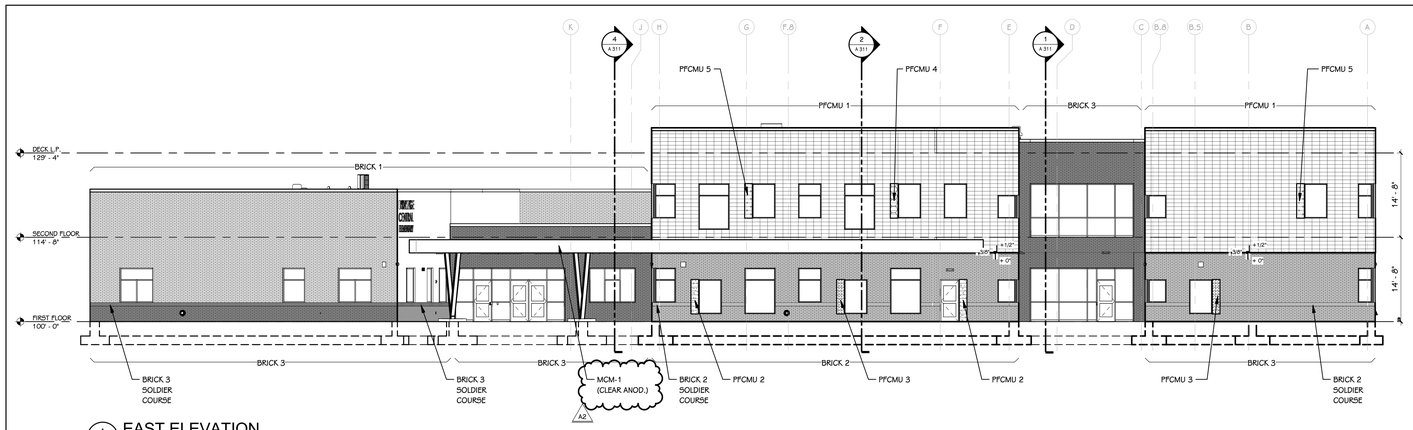
OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

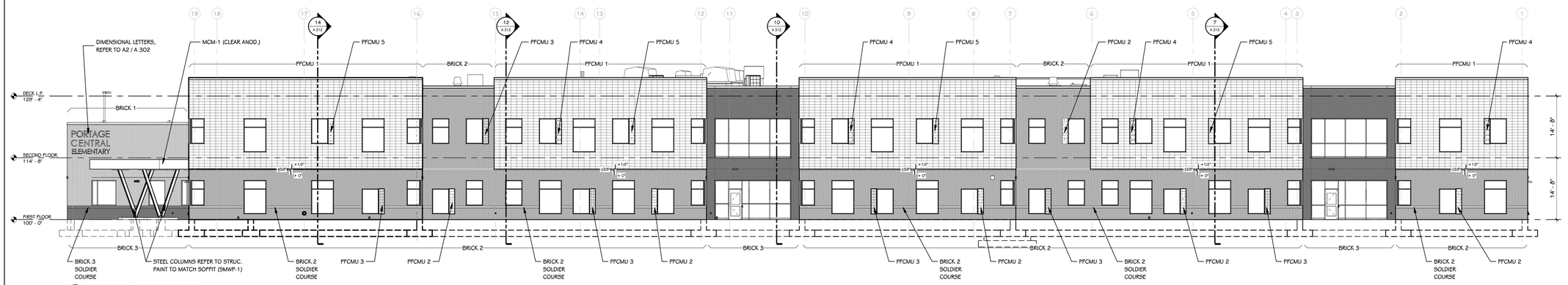
SHEET TITLE
CANOPY, DUMPSTER ENCLOSURE, MONUMENT SIGN

DATE
MAY 17, 2023

SHEET NUMBER
A111
21-237.10



A A301 **EAST ELEVATION**
3/32" = 1'-0"



B A301 **NORTH ELEVATION**
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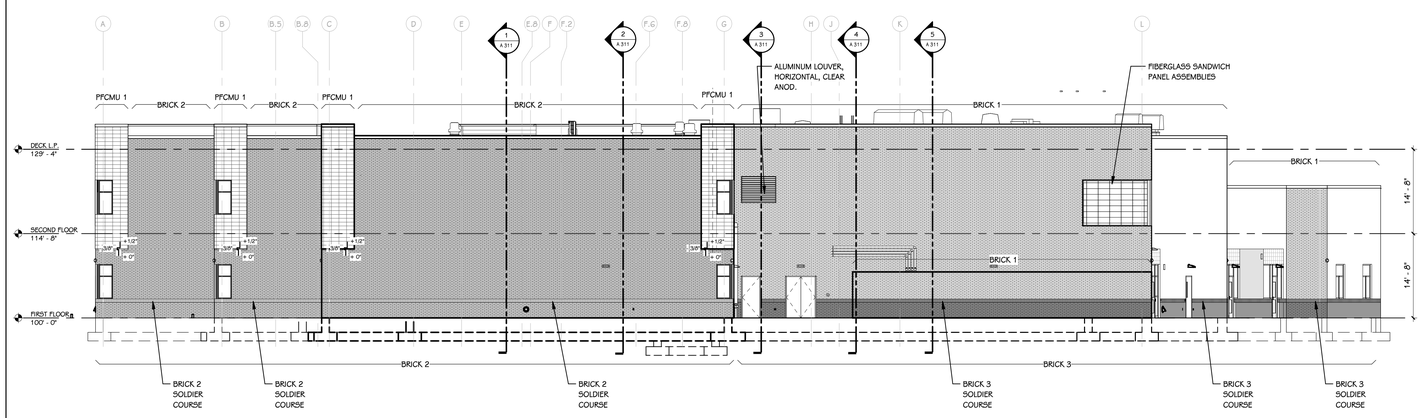
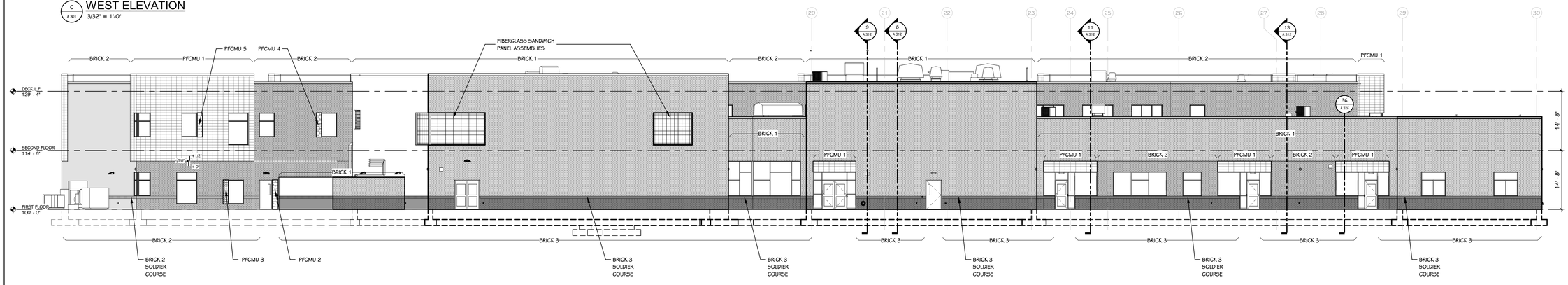


C A301 **WEST ELEVATION**
3/32" = 1'-0"



D A301 **SOUTH ELEVATION**
3/32" = 1'-0"

NOTES:

REFER TO WALL SECTIONS FOR FACADE PLANE PROJECTIONS AND REVEALS

REFER TO EXTERIOR WINDOW FRAMES FOR FRAME COLOR

REFER TO EXTERIOR ELEVATIONS FOR ACCURATE FACADE MATERIAL FINISH

EXTERIOR ELEVATION KEY

- BRICK 1
  COLOR: INDIAN FULL RANGE
  MANUFACTURER: BELDEN
- BRICK 2
  COLOR: DUTCH GRAY VELOUR
  MANUFACTURER: BELDEN
- BRICK 3
  COLOR: ANCHOR GRAY VELOUR
  MANUFACTURER: BELDEN
- PRE-FACED CMU (PFCMU 1)
  COLOR: ASTRA BLUE
  MANUFACTURER: SPECTRA GLAZE
- PRE-FACED CMU (PFCMU 2)
  COLOR: LIGHT KINGSTON
  MANUFACTURER: SPECTRA GLAZE
- PRE-FACED CMU (PFCMU 3)
  COLOR: DEEP OLIVE GREEN
  MANUFACTURER: SPECTRA GLAZE
- PRE-FACED CMU (PFCMU 4)
  COLOR: DEEP PUMPKIN
  MANUFACTURER: SPECTRA GLAZE
- PRE-FACED CMU (PFCMU 5)
  COLOR: DEEP HONEY
  MANUFACTURER: SPECTRA GLAZE

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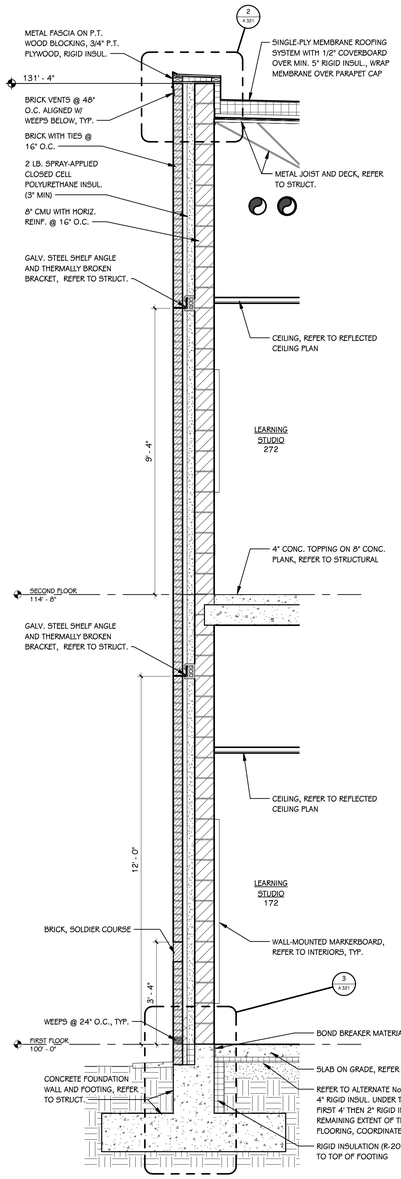
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

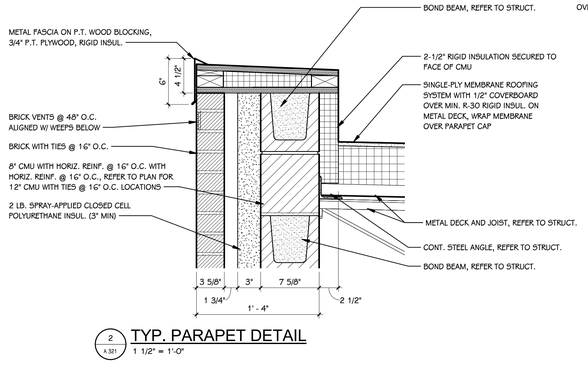
SHEET TITLE
EXTERIOR ELEVATIONS - OVERALL

DATE
MAY 17, 2023

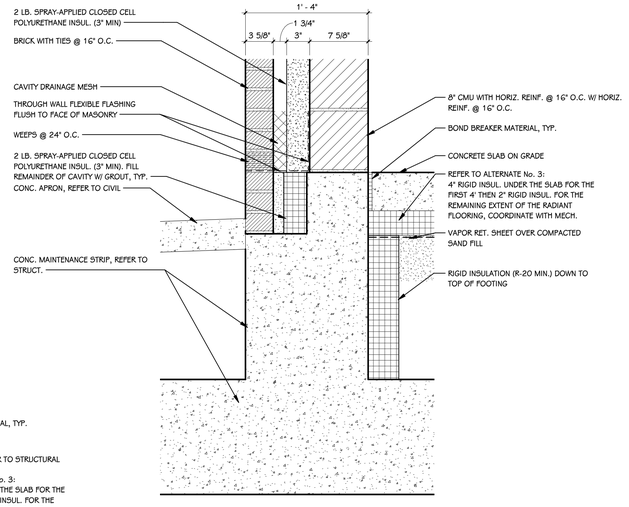
SHEET NUMBER
A 301
21-237.10



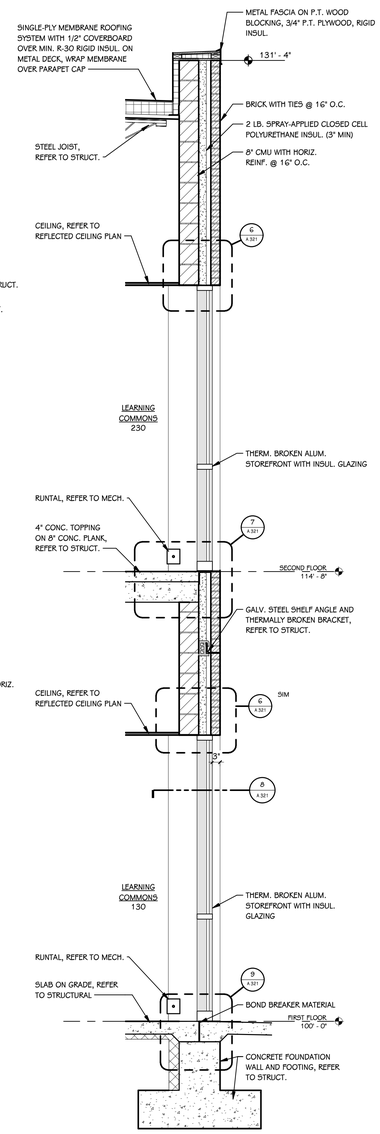
1 A321 WALL SECTION
1/2" = 1'-0"



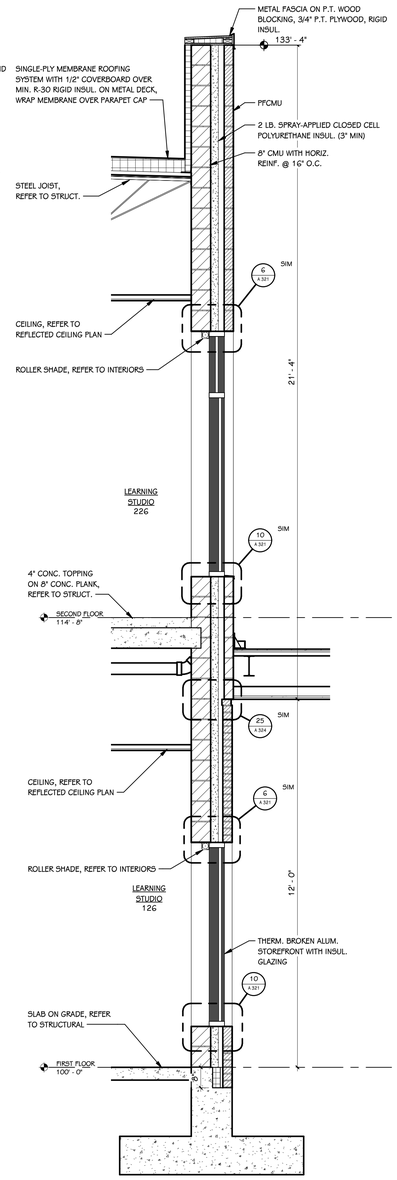
2 A321 TYP. PARAPET DETAIL
1 1/2" = 1'-0"



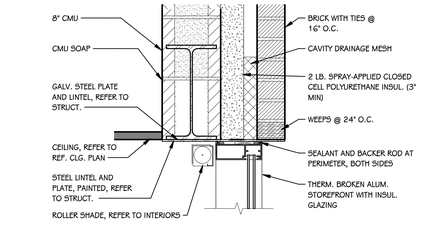
3 A321 TYP. FOUNDATION DETAIL
1 1/2" = 1'-0"



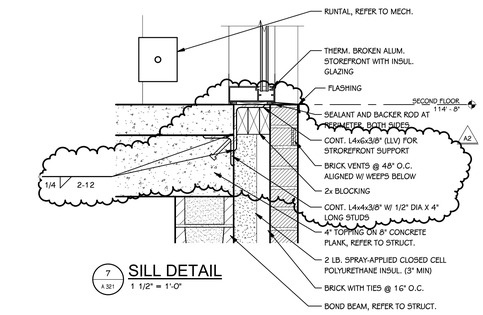
4 A321 WALL SECTION
1/2" = 1'-0"



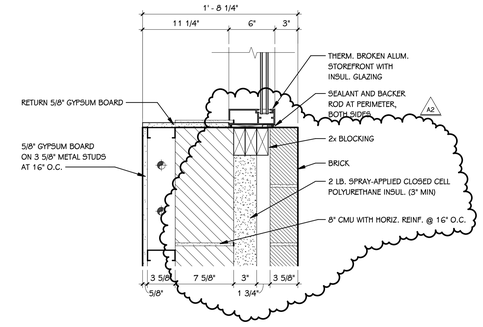
5 A321 WALL SECTION
1/2" = 1'-0"



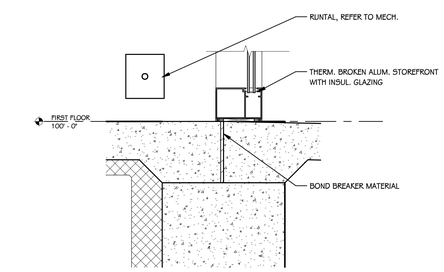
6 A321 HEAD DETAIL
1 1/2" = 1'-0"



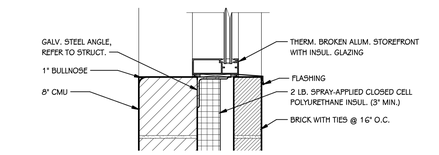
7 A321 SILL DETAIL
1 1/2" = 1'-0"



6 A321 JAMB DETAIL
1 1/2" = 1'-0"



9 A321 SILL DETAIL
1 1/2" = 1'-0"



10 A321 SILL DETAIL
1 1/2" = 1'-0"

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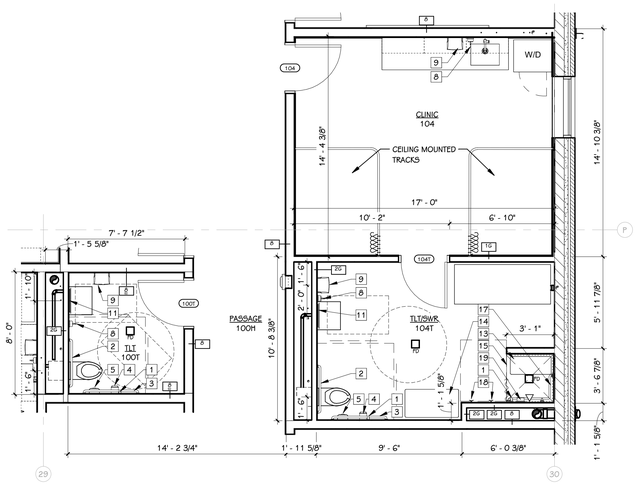
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

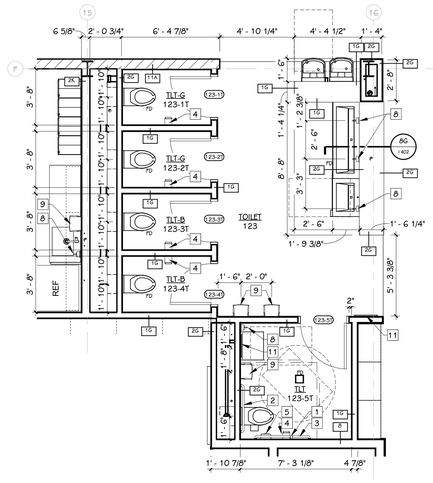
SHEET TITLE
WALL SECTIONS

DATE
MAY 17, 2023

SHEET NUMBER
A321
21-237.10



1 A.401 ENLARGED PLAN
1/4" = 1'-0"



2 A.401 ENLARGED PLAN
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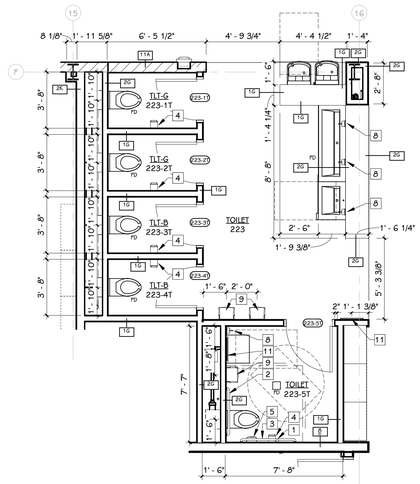
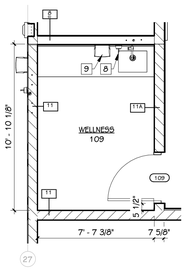


3 A.401 ENLARGED PLAN
1/4" = 1'-0"



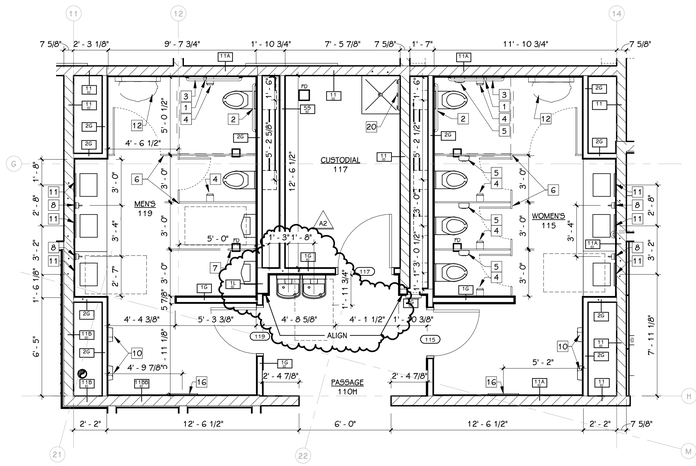
4 A.401 ENLARGED PLAN
1/4" = 1'-0"

KEYED NOTES - ENLARGED PLAN

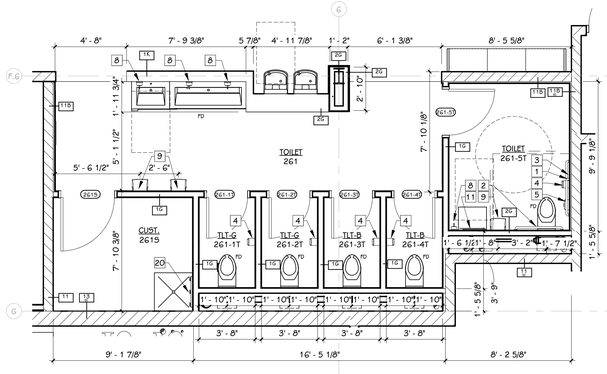
1	18" VERTICAL STAINLESS STEEL GRAB BAR
2	36" VERTICAL STAINLESS STEEL GRAB BAR
3	42" STAINLESS STEEL GRAB BAR
4	TOILET PAPER DISPENSER, OP, CI
5	SANITARY NAPKIN DISPOSAL
6	TOILET PARTITION
7	URINAL SCREEN
8	SOAP DISPENSER, OP, CI
9	PAPER TOWEL (ROLL) DISPENSER, OP, CI
10	HAND DRYER
11	STAINLESS STEEL FRAMED MIRROR (18"Wx34"H)
12	BABY CHANGING STATION
13	FOLD DOWN SHOWER SEAT (14"Wx32"L)
14	CHANGING SEAT (22"Wx42"L)
15	SHOWER ROD AND CURTAIN
16	STAINLESS STEEL FRAMED MIRROR (24"Wx60"H)
17	CONTINUOUS STAINLESS STEEL SHOWER GRAB BAR
18	ROBE HOOK
19	SOAP DISH
20	MOP AND BROOM HOLDER

ACCESSORY NOTES

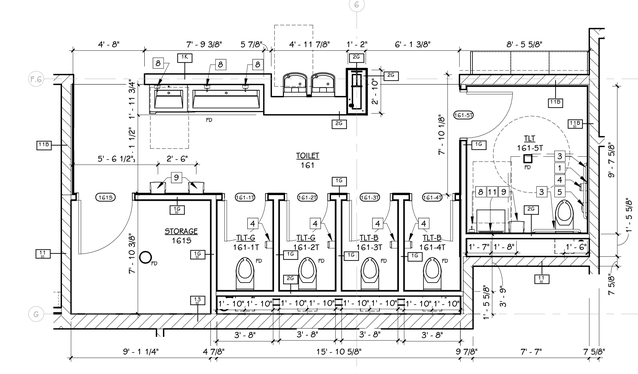
1. OP = OWNER PURCHASED, OI = OWNER INSTALLED, CP = CONTRACTOR PURCHASED, CI = CONTRACTOR INSTALLED.
2. DIMENSIONS INDICATED ARE TYPICAL UNLESS NOTED OTHERWISE ON PLANS.
3. GENERIC PLUMBING FIXTURES ARE SHOWN. REFER TO PLUMBING DRAWINGS AND SPECIFICATIONS FOR FIXTURE TYPES, MANUFACTURERS AND MOUNTING HEIGHTS.
4. CODE REQUIRED INTERIOR SIGNAGE - INCLUDES MINIMUM REQUIRED SIGN TYPES REQUIRED FOR OCCUPANCY AS DICTATED BY IBC, IFC, AND NFPA. COORDINATE WITH ANY OWNER-PROVIDED SIGNAGE.



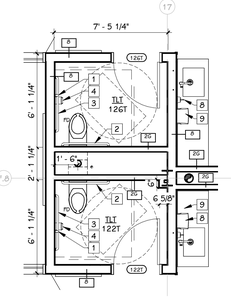
5 A.401 ENLARGED PLAN
1/4" = 1'-0"



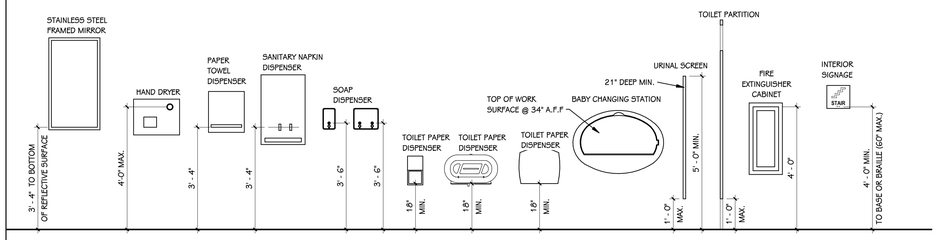
6 A.401 ENLARGED PLAN
1/4" = 1'-0"



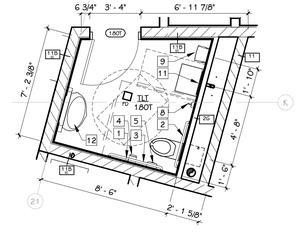
7 A.401 ENLARGED PLAN
1/4" = 1'-0"



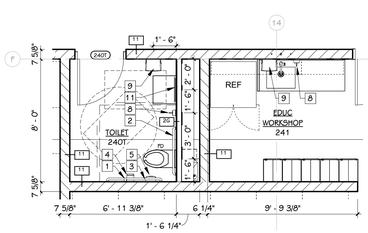
8 A.401 ENLARGED PLAN
1/4" = 1'-0"



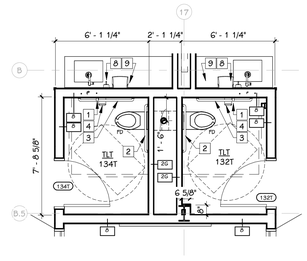
TYPICAL MOUNTING HEIGHTS
1/2" = 1'-0"



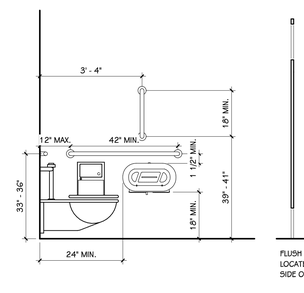
9 A.401 ENLARGED PLAN
1/4" = 1'-0"

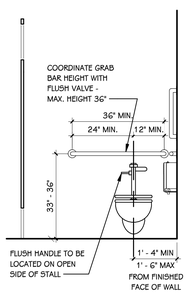


10 A.401 ENLARGED PLAN
1/4" = 1'-0"

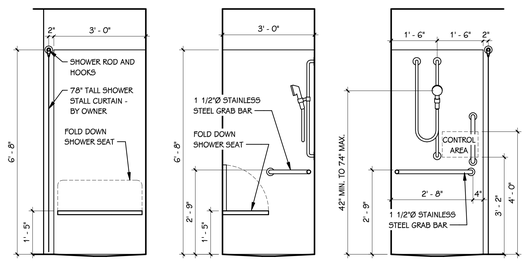


11 A.401 ENLARGED PLAN
1/4" = 1'-0"

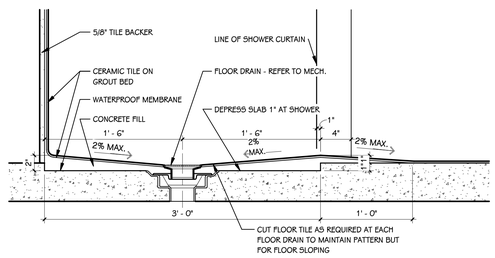




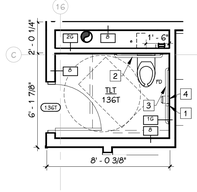
TYPICAL BARRIER-FREE MOUNTING HEIGHTS
1/2" = 1'-0"



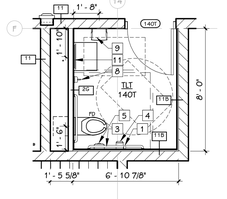
TYPICAL BARRIER-FREE SHOWER ELEVATION
1/2" = 1'-0"



TYPICAL SHOWER FLOOR DETAIL
1 1/2" = 1'-0"



12 A.401 ENLARGED PLAN
1/4" = 1'-0"



13 A.401 ENLARGED PLAN
1/4" = 1'-0"

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TOWERPINKSTER.COM

ADD. No. 2	JUN 15, 2023
ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
ENLARGED TOILET PLANS, TYPICAL MOUNTING HEIGHTS, AND BARRIER-FREE MOUNTING HEIGHTS

DATE
MAY 17, 2023

SHEET NUMBER
A 401
21-237.10

DOOR SCHEDULE - FIRST FLOOR

NUMBER			FIRE RATING		DOOR			SIZE		FRAME			DETAILS			GLASS	ACCESS CONTROLS					HW SET	REMARKS
DOOR	ROOM	ROOM NAME	DOOR	FRAME	TYPE	MAT	FIN	WIDTH	HEIGHT	ELEV	MAT	FIN	HEAD	JAMB	SILL		A-PHONE	BARRIER-FREE	CARD READER	ELEC. LOCK HDWR.	MAG HOLD		
100A	100	RECEPTION	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	9	HM	P-1&	H-1	J-3	-	FPSG-1	No	Yes	Yes	Yes	No	58.0	-
100B	100	RECEPTION	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	9	HM	P-1&	H-1	J-3	-	FPSG-1	No	Yes	Yes	Yes	No	57.0	-
100T	100T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
102	102	CONFERENCE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	
103	103	RECORDS	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	Yes	Yes	No	52.0	-
104	104	CLINIC	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	
104T	104T	TLT/SWR	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-5	J-5	-	-	No	No	No	No	No	27.0	-
106	106	PRINCIPAL	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
107A	107	TEACHER LOUNGE	-	-	FG2	A2 WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	26.0	-
107B	107	TEACHER LOUNGE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	13	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	9.0	-
108	108	OFFICE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	25.0	-
109	109	WELLNESS	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	25.0	-
110H	110H	PASSAGE	-	N	HM	P-1&	6' - 0"	7' - 2"	2	HM	P-1&	H-1	J-1	-	SG-1	No	No	No	No	No	14.0	4	
111A	111	FAMILY RESOURCE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	No	No	No	47.0	-
111B	111	FAMILY RESOURCE	-	-	F	WD	PREFIN	5' - 0"	7' - 2"	2	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	21.0	-
112A	112	ART	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	No	No	No	19.0	1
112B	112	ART	-	-	FG2	A2 WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	50.0	1
112C	112	ART	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	13	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
112K	112K	KILN	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	23.0	-
112S	112S	STORAGE	60 MIN	60 MIN	F	HM	P-1&	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	40.0	-
114A	114	LIBRARY	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	No	No	No	19.0	1	
114B	114	LIBRARY	-	-	SLIDER	AL	P-1&	16' - 0"	7' - 4"	6	AL	P-1&	2/A524	3/A524		SG-1	No	No	No	No	No		1, 2	
114C	114	LIBRARY	60 MIN	60 MIN	OHC	-	-	16' - 0"	10' - 0"	-	-	-	2/A524	3/A524		-	No	No	No	No	No	61.0	
114D	114	LIBRARY	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	13 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
115	115	WOMEN'S	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-5	J-5	-	-	No	No	No	No	No	42.0	-
116	116	LIBRARY RESOURCE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	4	HM	P-1&	H-3	J-3	5-2	SAFETY	No	No	No	No	No	41.0	-
117	117	CUSTODIAL	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1&	H-5	J-5	-	-	No	No	No	No	No	33.0	-
118	118	CUSTODIAL OFFICE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	33.0	-
119	119	MEN'S	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-5	J-5	-	-	No	No	No	No	No	42.0	-
120H	120H	PASSAGE	45 MIN	45 MIN	N	HM	P-1&	7' - 0"	7' - 2"	2	HM	P-1&	H-1	J-1	-	FPSG-1	No	No	Yes	Yes	Yes	13.0	-	
122A	122	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
122B	122	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
122T	122T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
123-1T	123-1T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-2T	123-2T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-3T	123-3T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-4T	123-4T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
123-5T	123-5T	TLT	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
124	124	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1&	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1	
126	126	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
126T	126T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
130A	5130	STAIR	60 MIN	60 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-	
130B	130	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
130C	5130	STAIR	-	-	FG2	FRP	DB. ANOD	3' - 0"	7' - 2"	1	AL	DB. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	No	No	No	8.0	-
132A	132	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
132B	132	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
132T	132T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
134	134	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
134T	134T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
136	136	Y5 / FLEX	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1	
136T	136T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	28.0	-
140	140	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
140T	140T	TLT	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	28.0	-
141	141	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1	
142A	142	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
142B	142	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
143	143	ESI WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1	
144	144	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1&	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1	
145	145	ESI SPEECH OFFICE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1	
146A	146	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
146B	146	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	10' - 0"	7' - 4"	8	AL	P-1&	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2	
147	147	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1	
150H	150H	PASSAGE	45 MIN	45 MIN	A2 N	HM	P-1&	7' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	Yes	Yes	Yes	13.0	-	
151A	151	MUSIC	-	-	A2 F	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	44.0	3	
151B	151	MUSIC	45 MIN	45 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	FPSG-3	No	No	Yes	Yes	No	36.0	3	
151C	151	MUSIC	-	-	SLIDER	WD	PREFIN	11' - 3 5/8"	7' - 4"	15	WD	PREFIN	H-9	J-9	5-4	-	No	No	No	No	No		-	
151D	151	MUSIC	-	-	SLIDER	WD	PREFIN	14' - 10"	7' - 4"	16	WD	PREFIN	H-9	J-9	5-4	-	No	No	No	No	No		-	
152A	152	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
152B	152	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
152C	152	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	10' - 0"	7' - 4"	8	AL	P-1&	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2	
154	154	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
156	156	ASD	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1	
161-1T	161-1T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-2T	161-2T	TLT-G	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-3T	161-3T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-4T	161-4T	TLT-B	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
161-5T	161-5T	TLT	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
161S	161S	STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1&	H-5	J-5	-		No	No	No	No	No	33.0	-
162A	162	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	18.0	1	
162B	162	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
163	163	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1	
164	164	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1&	H-1	J-1	-	IG-2	No	No	No	No	No	43.0	1	
166A	166	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
166B	166	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	10' - 0"	7' - 4"	8	AL	P-1&	H-8	J-8	5-3	IG-2	No	No	No	No	No	60.0	1, 2	
170A	5170	STAIR	60 MIN	60 MIN	N	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-	
170B	170	LEARNING COMMONS	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	14 OPP. HAND	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	7.0	-
170C	5170	STAIR	-	-	FG2	FRP	DB. ANOD	3' - 0"	7' - 2"	1	AL	DB. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	No	No	No	8.0	-
172A	172	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
172B	172	LEARNING STUDIO	-	-	SLIDER	AL	P-1&	12' - 0"	7' - 4"	7	AL	P-1&	H-7	J-7	5-3	IG-2	No	No	No	No	No	59.0	1, 2	
174	174	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1&	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1	
180T	180T	TLT	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	49.0	-
181A	181	SERVERY	60 MIN	60 MIN	F	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	56.0	-
181B	181	SERVERY	60 MIN	60 MIN	OHC	AL	ANOD	18' - 0"	8' - 0"	-	AL	ANOD	4/A524	5/A524	-	-	No	No	No	No	No	61.0	-
183A	183	RECEIVING	60 MIN	60 MIN	F	A2 WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	55.0	-
183B	183	RECEIVING	-	-	N	HM	P-1&	3' - 8"	7' - 2"	1	HM	P-1&	H-3	J-3	-	SAFETY	No	No	No	No	No	54.0	-
183C	183	RECEIVING	-	-	N	A2 HM	CLR. ANOD	3' - 8"	7' - 2"	1	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	No	Yes	Yes	No	9.0	-
185S	185S	DRY STORAGE	-	-	F	A2 HM	P-1&	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-		No	No	No	No	No	54.0	-
189	189	HOUSEKEEPING	-	-	F	HM	P-1&	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	23.0	-
190A	190	GYM	45 MIN	45 MIN	G	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	No	No	No	20.0	-
190B	190	GYM	45 MIN	45 MIN	G	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	FPSG-1	No	No	No	No	No	20.0	-
190C	190	GYM	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	2	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	No	Yes	Yes	No	2.0	-
190S	190S	GYM STORAGE	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	32.0	-
192	192	PE OFFICE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	FPG-1	No	No	No	No	No	38.0	-
D100	D100	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	Yes	Yes	No	30.0	-
D140	D140	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	Yes	Yes	No	29.0	-
E101	E101	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E120	E120	ELEC	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E160	E160	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	35.0	-
E197	M193	MECH	60 MIN	60 MIN	F	HM	P-1&	2' - 10"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	24.0	-
E199A	E199	ELEC	60 MIN	60 MIN	F	HM	P-1&	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	15.0	-
E199B	E199	ELEC	-	-	F	FRP	CLR. ANOD	3' - 0"	7' - 2"	1	AL	CLR. ANOD	G/A321	B/A321	9/A321	-	No	No	No	No	No	6.0	-
M193A	M193	MECH	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	32.0	-
M193B	M193	MECH	-	-	F	FRP	CLR. ANOD	5' - 0"	7' - 2"	2	AL	CLR. ANOD	G/A321	B/A321	9/A321	-	No	No	No	No	No	5.0	-
M195	M195	MECH	-	-	F	HM	P-1&	6' - 0"	7' - 2"	2	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	22.0	-
S110	S110	PRIME TIME STOR.	60 MIN	60 MIN	F	WD	PREFIN	3' - 8"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	35.0	-
S111	S111	PTO STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	33.0	-
S180	S180	CHAIR STORAGE	60 MIN	60 MIN	F	WD	PREFIN	6' - 0"	7' - 2"	2	HM	P-1&	H-5	J-5	-	-	No	No	No	No	No	53.0	-
S182	S182	CHAIR STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1&	H-3	J-3	-	-	No	No	No	No	No	33.0	-
V100A	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	3.0	4	
V100B	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	3.0	4	
V100C	V100	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	3' - 0"	7' - 2"	11	AL	CLR. ANOD	G/A321	B/A321	9/A321	IG-1	No	Yes	Yes	Yes	No	4.0	4	
V100D	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1&	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	10.0	4	
V100E	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1&	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	10.0	4	
V100F	V100	VESTIBULE	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	10	HM	P-1&	H-5	J-3	-	SG-1	No	Yes	No	Yes	No	11.0	4	
V180A	V180	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	12	AL	CLR. ANOD	G/A321	B/A321	9/A321	SG-2	No	Yes	Yes	Yes	No	1.0	4	
V180B	V180	VESTIBULE	-	-	FG2	FRP	CLR. ANOD	6' - 0"	7' - 2"	12	AL	CLR. ANOD	H-6	J-6	-	IG-1	No	Yes	No	No	No	12.0	4	

REMARKS:

1. SOUND SEAL
2. FACTORY POWDER COATED
3. ACOUSTICAL SOUND DOOR AND SOUND SEAL
4. DOORS ASSOCIATED WITH SMOKE EVAC. SYSTEM

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ADD. No. 2	JUN 15, 2023
ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
FIRST FLOOR DOOR SCHEDULE

DATE
MAY 17, 2023

SHEET NUMBER
A 511
21-237.10

DOOR SCHEDULE - SECOND FLOOR

NUMBER		ROOM NAME	FIRE RATING		DOOR			SIZE		FRAME			DETAILS			GLASS	ACCESS CONTROLS					HW SET	REMARKS
DOOR	ROOM		DOOR	FRAME	TYPE	MAT	FIN	WIDTH	HEIGHT	ELEV	MAT	FIN	HEAD	JAMB	SILL		A-PHONE	BARRIER-FREE	CARD READER	ELEC. LOCK HDWR.	MAG HOLD		
210H	210	PASSAGE	-	-	N	HM	P-1B	8' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	5G-1	No	No	No	No	No	14.0	4
214	214	IT OFFICE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	No	No	No	38.0	-
220H	220H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	6' - 0"	7' - 2"	2	HM	P-1B	H-1	J-1	-	FP5G-1	No	No	Yes	Yes	Yes	13.0	-
222A	222	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
222B	222	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
223-1T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-2T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-3T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-4T	223	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
223-5T	223	TOILET	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
224	224	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
226	226	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
232A	232	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
232B	232	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
234	234	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
236	236	FLEX STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
240T	240T	TOILET	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	28.0	-
241	241	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
242A	242	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
242B	242	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
244	244	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
246A	246	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
246B	246	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
250H	250H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	Yes	Yes	Yes	13.0	-
252A	252	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
252B	252	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
252C	252	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
254	254	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
256	256	FLEX STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	43.0	1
261-1T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-2T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-3T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-4T	261	TOILET	-	-	G1	WD	PREFIN	2' - 8"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	31.0	-
261-5T	261	TOILET	-	-	G1	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-5	J-5	-	SAFETY	No	No	No	No	No	28.0	-
2615	2615	CUST.	-	-	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-5	J-5	-	-	No	No	No	No	No	23.0	-
262A	262	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
262B	262	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
263	263	EDUC WORKSHOP	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	45.0	1
264	264	SGR	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	IG-2	No	No	No	No	No	37.0	1
266A	266	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
266B	266	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
270A	270	LEARNING COMMONS	60 MIN	60 MIN	N	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
272A	272	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
272B	272	LEARNING STUDIO	-	-	SLIDER	AL	P-1B	12' - 0"	7' - 4"	7	AL	P-1B	H-7	J-7	S-3	IG-2	No	No	No	No	No	59.0	1, 2
274	274	LEARNING STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	SAFETY	No	No	No	No	No	18.0	1
280H	280H	PASSAGE	45 MIN	45 MIN	N	HM	P-1B	7' - 0"	7' - 2"	2	HM	P-1B	H-3	J-3	-	FP5G-1	No	No	Yes	Yes	Yes	13.0	-
282	282	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	SAFETY	No	No	No	No	No	43.0	1
284A	284	ESI STUDIO	-	-	FG2	WD	PREFIN	3' - 0"	7' - 2"	5	HM	P-1B	H-1	J-1	-	FP5G-3	No	No	Yes	Yes	No	51.0	1
284B	284	ESI STUDIO	-	-	SLIDER	AL	P-1B	10' - 0"	7' - 4"	8	AL	P-1B	H-8	J-8	S-3	IG-2	No	No	No	No	No	60.0	1, 2
285	285	ESI OFFICE	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-1	J-1	-	FP5G-1	No	No	No	No	No	39.0	1
286	286	ESI SENSORY	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-3	No	No	No	No	No	46.0	1
288	288	ESI WORKSHOP	45 MIN	45 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FP5G-3	No	No	No	No	No	48.0	1
D240	D240	DATA	-	-	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	Yes	Yes	No	29.0	-
E211	E211	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	35.0	-
E260	E260	ELEC	60 MIN	60 MIN	F	WD	PREFIN	3' - 0"	7' - 2"	1	HM	P-1B	H-3	J-3	-	-	No	No	No	No	No	35.0	-
M212	M212	MECH	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-10	J-10	-	-	No	No	No	No	No	16.0	1
M290	M290	MECH	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	34.0	1
2304	5230	STAIR	60 MIN	60 MIN	FG2	WD	PREFIN	3' - 0"	7' - 2"	3	HM	P-1B	H-3	J-3	-	FRG-1	No	No	No	No	No	17.0	-
5291	5291	STORAGE	60 MIN	60 MIN	F	WD	PREFIN	3' - 6"	7' - 2"	1	HM	P-1B	H-1	J-1	-	-	No	No	No	No	No	33.0	-

X2 (7' - 2")

REMARKS:

1. SOUND SEAL
2. FACTORY POWDER COATED
3. ACOUSTICAL SOUND DOOR AND SOUND SEAL
4. DOORS ASSOCIATED WITH SMOKE EVAC. SYSTEM

REMARKS:

1. SOUND SEAL
2. FACTORY POWDER COATED
3. ACOUSTICAL SOUND DOOR AND SOUND SEAL
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ADD. No. 2	JUN 15, 2023
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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

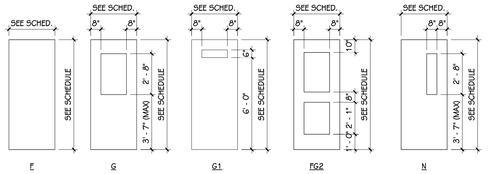
OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
SECOND FLOOR DOOR SCHEDULE

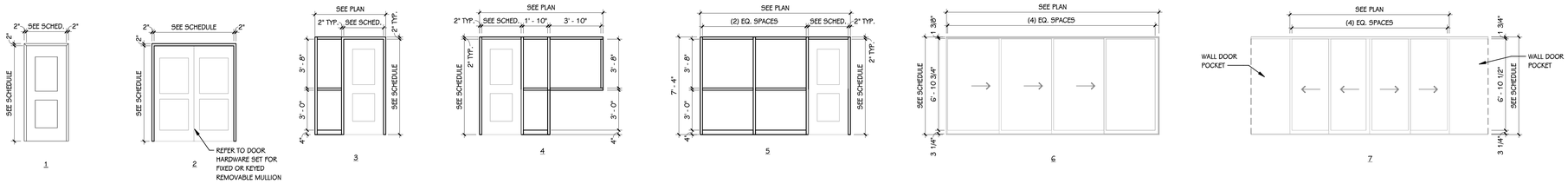
DATE
MAY 17, 2023

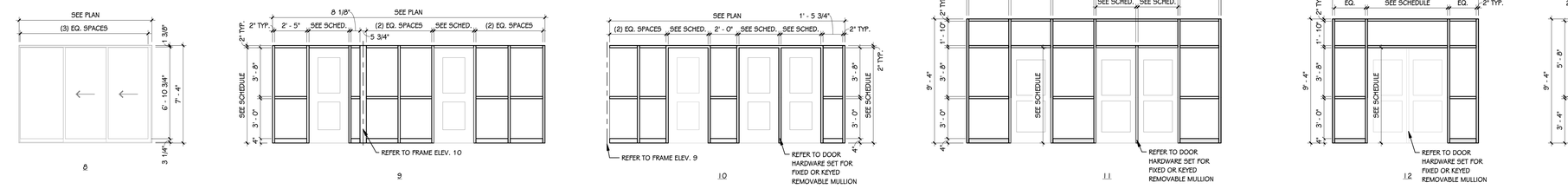
SHEET NUMBER
A512
21-237.10

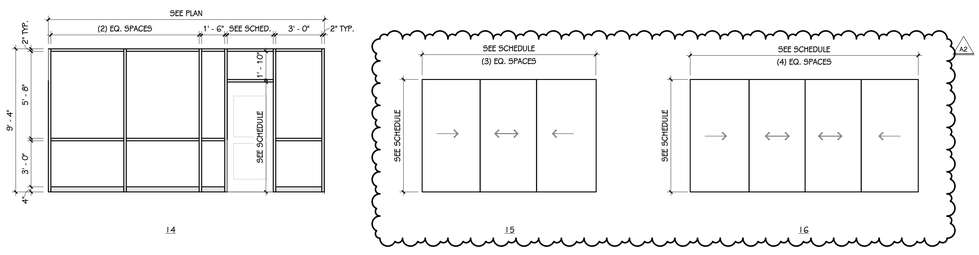


DOOR TYPES

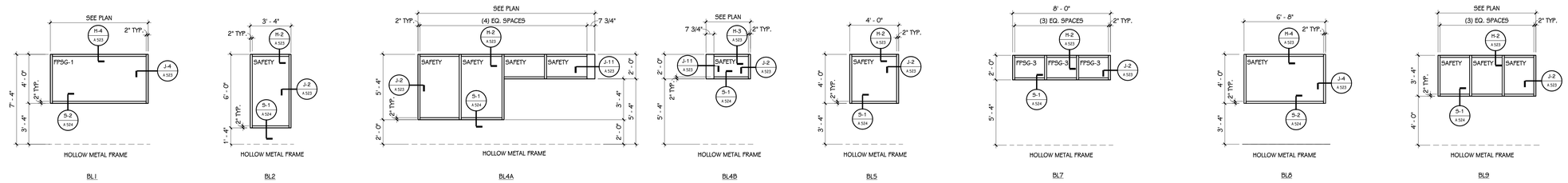
1/4" = 1'-0"







FRAME ELEVATIONS



BORROWED LITE ELEVATIONS

GLAZING KEY

IG-1:	INSULATED GLAZING
IG-2:	INSULATED LAMINATED GLAZING
SG-1:	INTERIOR SECURITY RESISTANT GLAZING
SG-2:	EXTERIOR INSULATED SECURITY RESISTANT GLAZING
SG-3:	SECURITY BULLET RESISTANT GLAZING
FPSG-1:	INTERIOR FIRE-PROTECTION SECURITY RESISTANT GLAZING
FPSG-2:	NOT USED
FPSG-3:	FIRE-PROTECTION SECURITY BULLET RESISTANT GLAZING
FPG-1:	FIRE-PROTECTION GLAZING
FRG-1:	FIRE-RESISTANCE GLAZING
SAFETY:	GL-1 / LG-1

GENERAL NOTE:

1. HARDWARE GENERAL NOTE: FIXED OR KEYED REMOVEABLE MULLION REFER TO HARDWARE SET

2. FINISH ABBREVIATIONS
   CLR. ANOD. - CLEAR ANODIZED
   DB. ANOD. - DARK BRONZE ANODIZED

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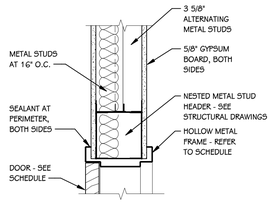
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

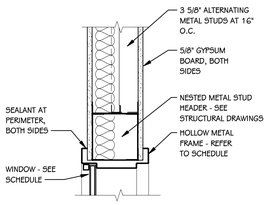
SHEET TITLE
DOOR TYPES AND FRAME ELEVATIONS

DATE
MAY 17, 2023

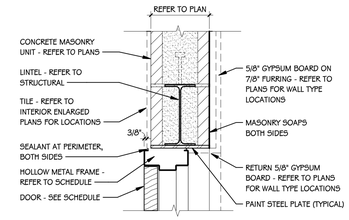
SHEET NUMBER
A 521
21-237.10



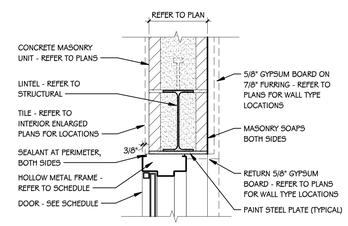
H-1 A 523 HEAD DETAIL (DOOR)
1 1/2" = 1'-0"



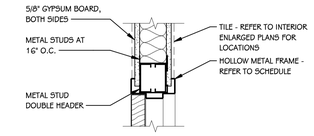
H-2 A 523 HEAD DETAIL (WINDOW)
1 1/2" = 1'-0"



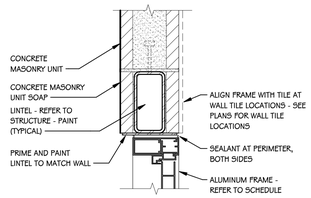
H-3 A 523 HEAD DETAIL (DOOR)
1 1/2" = 1'-0"



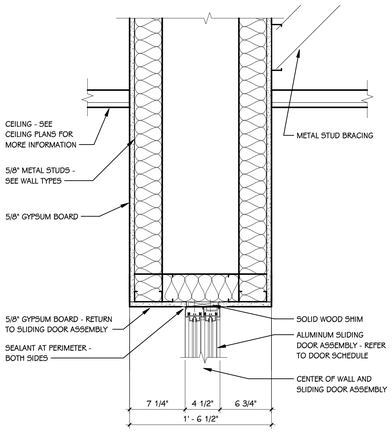
H-4 A 523 HEAD DETAIL (WINDOW)
1 1/2" = 1'-0"



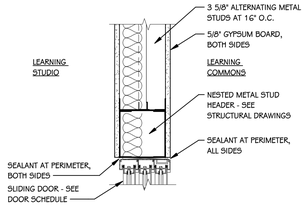
H-5 A 523 HEAD DETAIL (DOOR)
1 1/2" = 1'-0"



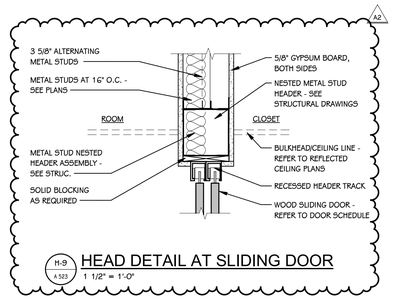
H-6 A 523 HEAD DETAIL (DOOR)
1 1/2" = 1'-0"



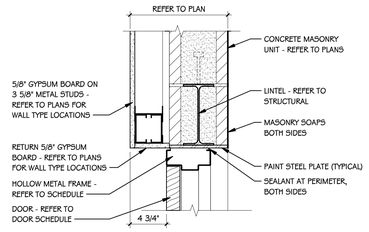
H-7 A 523 HEAD DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



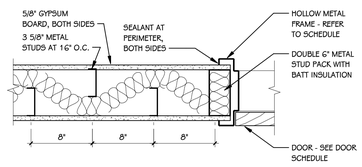
H-8 A 523 HEAD DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



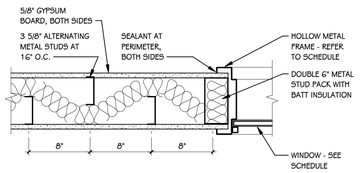
H-9 A 523 HEAD DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



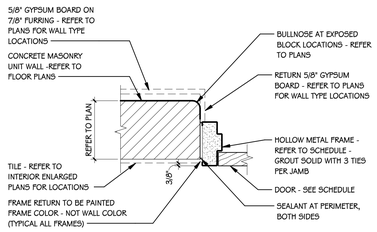
H-10 A 523 HEAD DETAIL (DOOR)
1 1/2" = 1'-0"



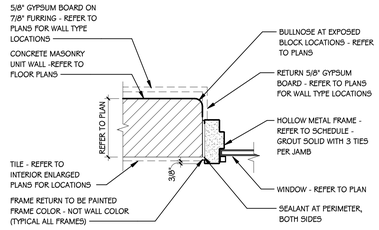
J-1 A 523 JAMB DETAIL (DOOR)
1 1/2" = 1'-0"



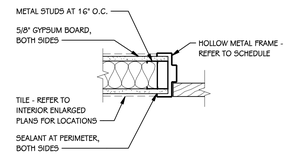
J-2 A 523 JAMB DETAIL (WINDOW)
1 1/2" = 1'-0"



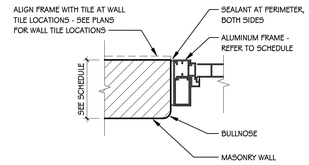
J-3 A 523 JAMB DETAIL (DOOR)
1 1/2" = 1'-0"



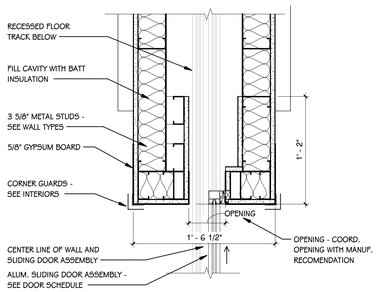
J-4 A 523 JAMB DETAIL (WINDOW)
1 1/2" = 1'-0"



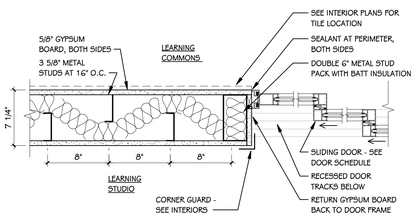
J-5 A 523 JAMB DETAIL (DOOR)
1 1/2" = 1'-0"



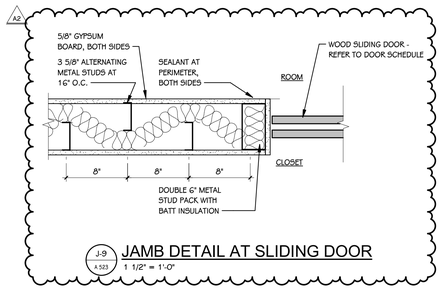
J-6 A 523 JAMB DETAIL (DOOR)
1 1/2" = 1'-0"



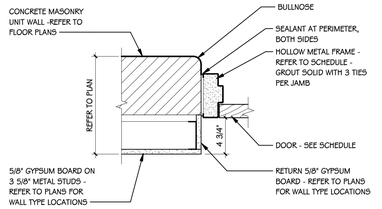
J-7 A 523 JAMB DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



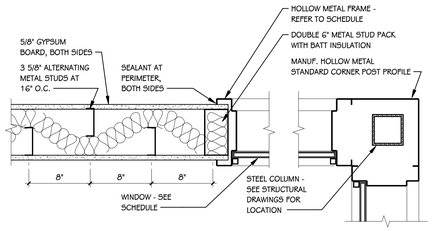
J-8 A 523 JAMB DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



J-9 A 523 JAMB DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



J-10 A 523 JAMB DETAIL (DOOR)
1 1/2" = 1'-0"



J-11 A 523 JAMB DETAIL (WINDOW)
1 1/2" = 1'-0"

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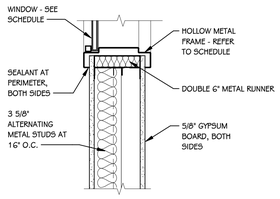
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

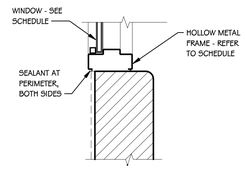
SHEET TITLE
HEAD AND JAMB DETAILS

DATE
MAY 17, 2023

SHEET NUMBER
A 523
21-237.10



3-1 / A.524 SILL DETAIL (WINDOW)
1 1/2" = 1'-0"



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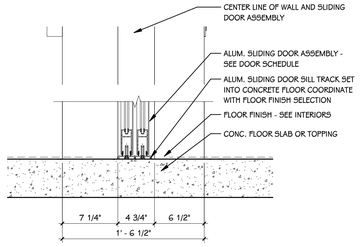
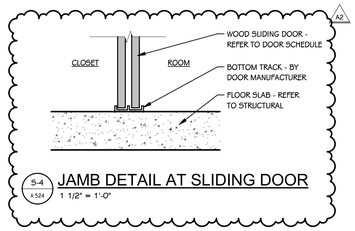
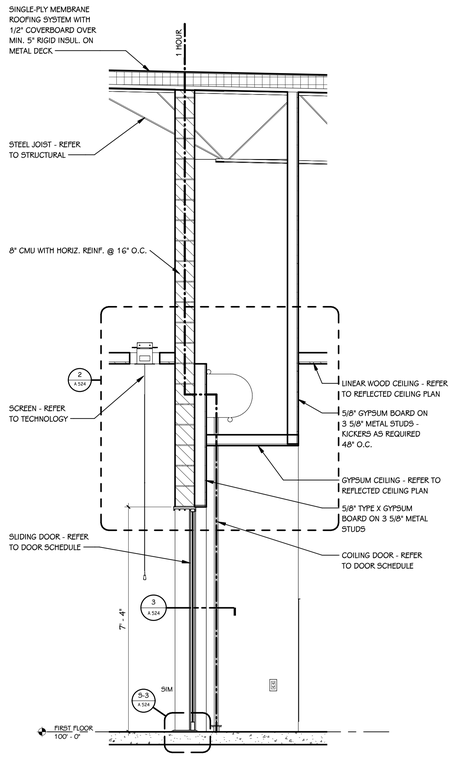
1 1/2" = 1'-0"



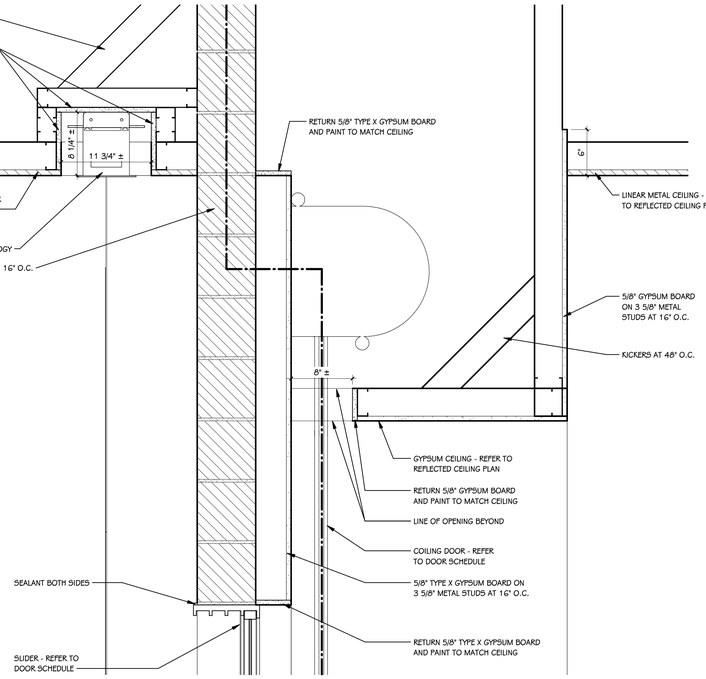
3-3 / A.524 SILL DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



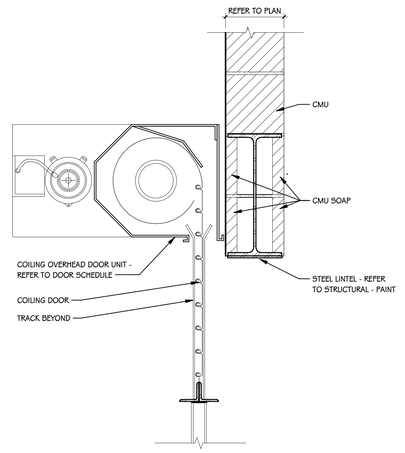
3-4 / A.524 JAMB DETAIL AT SLIDING DOOR
1 1/2" = 1'-0"



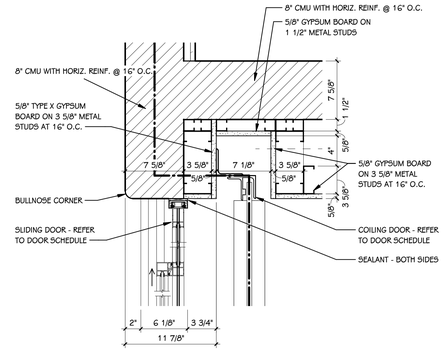
1 / A.524 WALL SECTION
1/2" = 1'-0"



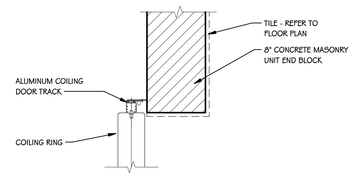
2 / A.524 WALL DETAIL
1 1/2" = 1'-0"



4 / A.524 HEAD DETAIL
1 1/2" = 1'-0"



3 / A.524 JAMB DETAIL
1 1/2" = 1'-0"



5 / A.524 JAMB DETAIL
1 1/2" = 1'-0"

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PACKAGE 4: CONSTRUCTION

OWNER
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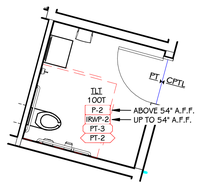
Portage, Michigan

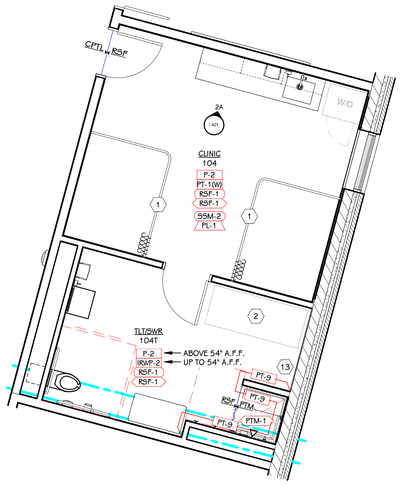
SHEET TITLE
HEAD AND JAMB DETAILS

DATE
MAY 17, 2023

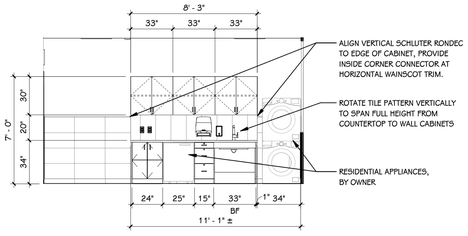
SHEET NUMBER
A 524
21-237.10



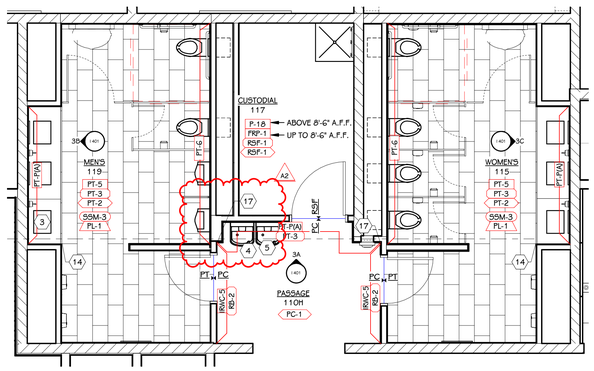
1 / 1401 TYP. STAFF TOILET ROOM 100T/140T/240T
1/4" = 1'-0"



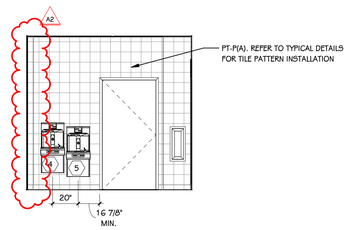
2 / 1401 CLINIC/TOILET 104/104T
1/4" = 1'-0"



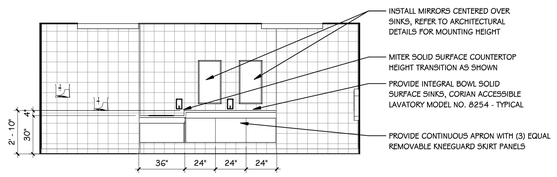
2A / 1401 CLINIC 104 - NORTH
1/4" = 1'-0"



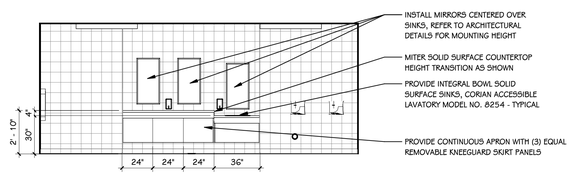
3 / 1401 PUBLIC GROUP TOILETS
1/4" = 1'-0"



3A / 1401 PASSAGEWAY 110H - NORTH
1/4" = 1'-0"



3B / 1401 MENS - PUBLIC GROUP TOILETS - WEST
1/4" = 1'-0"



3C / 1401 WOMENS - PUBLIC GROUP TOILETS - EAST
1/4" = 1'-0"

ENLARGED FINISH PLAN KEY

- X-# — INDICATES MATERIAL TYPE
- X-# — INDICATES CORRESPONDING SELECTION IN SCHEDULE
- X-# — WALL FINISH
- X-# — BASE FINISH
- X-# — FLOOR FINISH
- X-# — COUNTER FINISH
- X-# — CABINET FINISH (BASE AND UPPER)
- X-# — INDICATES EXTENT OF ATYPICAL FINISH
- X M X — INDICATES TRANSITION BETWEEN DISSIMILAR FLOOR MATERIALS
- MULTI — INDICATES MULTIPLE MATERIAL TYPES ON A SURFACE, REFER TO DETAIL OR ELEVATION
- X-P(A) — INDICATES PATTERNED INSTALLATION OF A SINGLE MATERIAL TYPE, REFER TO DETAIL OR ELEVATION
- INDICATES PATTERN INTENT, REFER TO DETAIL OR ELEVATION

GENERAL NOTES - ENLARGED FINISH PLAN

1. REFER TO MATERIAL SELECTION SCHEDULE FOR FINISH INFORMATION.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND SPECIFICATION FOR ADDITIONAL INFORMATION ON CONSTRUCTION MATERIALS.
3. REFER TO REFLECTED CEILING PLANS FOR CEILING FINISH AND HEIGHTS.
4. REFER TO DOOR SCHEDULE FOR FINISH ON DOORS AND FRAMES.
5. REFER TO ARCHITECTURAL ENLARGED PLANS FOR TOILET ACCESSORIES, PARTITIONS, BARRIER-FREE REQUIREMENTS, ETC.
6. REFER TO INTERIORS TYPICAL DETAIL SHEETS FOR TILE TRIM DETAILS, FLOORING TRANSITIONS, WAINSCOT DETAILS, AND TYPICAL TILE PATTERN REQUIREMENTS.
7. REFER TO INTERIOR ELEVATION SHEETS FOR REQUIREMENTS, GENERAL NOTES, ABBREVIATIONS, AND HARDWARE/ACCESSORY SELECTIONS FOR CASEWORK.
8. WHERE HEIGHT IS INDICATED FOR IMPACT RESISTANT WALL PANEL AND FIBERGLASS REINFORCED PLASTIC PANELING NOTED HEIGHT IS NOMINAL, CONTRACTOR TO PROVIDE FULL SHEET HEIGHT OR WIDTH ATOP SPECIFIED BASE HEIGHT PLUS ANY NECESSARY TRIMS OR ACCESSORIES.
9. DETAILS SHOWN ILLUSTRATE DESIGN INTENT, NOT ALL POSSIBLE CONDITIONS. FOR CONDITIONS NOT SHOWN, USE DETAILS CLOSEST TO CONDITION IN QUESTION.

KEYED NOTES - ENLARGED FINISH PLANS

1 CEILING-MOUNTED CUBICLE CURTAIN AND TRACK, REFER TO SPECIFICATION.
2 ADULT CHANGING TABLE, BY OWNER.
3 DO NOT PROVIDE MIRROR AT SOUTHERNMOST SINK IN MEN'S RESTROOM.
4 INSTALL LEFT DRINKING FOUNTAIN AT ADULT BARRIER-FREE HEIGHT.
5 INSTALL RIGHT DRINKING FOUNTAIN AT CHILD BARRIER-FREE HEIGHT.
6 ALIGN FLOORING TRANSITION TO CEILING BULKHEAD.
7 ALIGN FLOORING TRANSITION TO WINDOW FRAME.
8 ALIGN FLOORING TRANSITION TO CORNER.
9 ALIGN FLOORING TRANSITION TO WALL TYPE TRANSITION.
10 ALIGN FLOORING TRANSITION TO FACE OF ADJACENT WALL, TRANSITION FLOOR BASE PER TYPICAL DETAILS.
11 SOLID SURFACE CAP, SSM-3 - REFER TO DETAILS.
12 PROVIDE CONTINUOUS, MITERED FURRING STRIPS ABOVE WAINSCOT FOR FLUSH AND FLAT MIRROR INSTALLATION, CAULK ALL JOINTS AND PAINT TO MATCH WALL.
13 EXTEND PORCELAIN TILE AND TILE TRIM TO EXTERIOR WALL, COPE RESILIENT FLOOR COVE TO TILE.
14 PORCELAIN FLOOR TILE PATTERN WORK POINT.
15 ALIGN FLOORING TRANSITION BEHIND RADIUS OF BULLNOSE BLOCK.
16 LVT PLANK ORIENTATION TO RUN NORTH-SOUTH.
17 WALL BASE TRANSITION TO OCCUR AT INSIDE CORNER.

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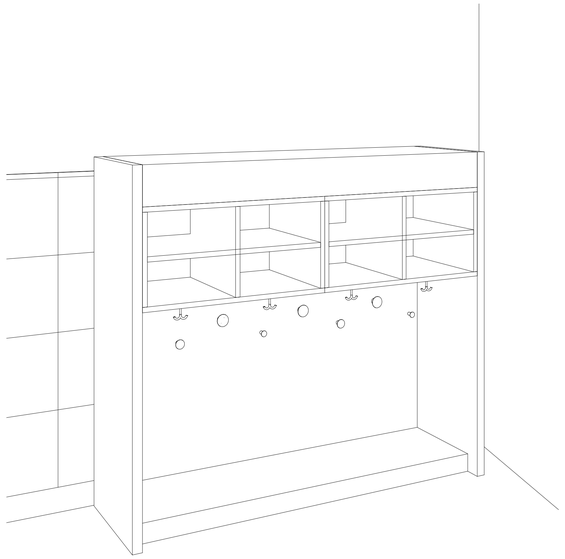
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

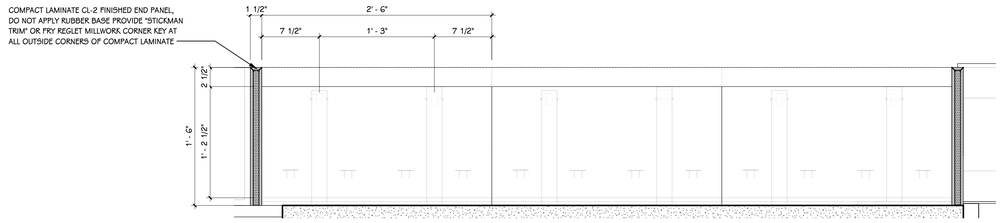
SHEET TITLE
ENLARGED FINISH PLANS - TOILET ROOMS

DATE
MAY 17, 2023

SHEET NUMBER
1401
21-237.10



15 / I 423 TYPICAL CUBBY 3D VIEW



15A / I 423 CUBBY ENLARGED PLAN
1 1/2" = 1'-0"

ENLARGED FINISH PLAN KEY

- X.# — INDICATES MATERIAL TYPE
- X.# — INDICATES CORRESPONDING SELECTION IN SCHEDULE
- X.# — WALL FINISH
- X.# — BASE FINISH
- X.# — FLOOR FINISH
- X.# — COUNTER FINISH
- X.# — CABINET FINISH (BASE AND UPPER)
- X.# — INDICATES EXTENT OF ATYPICAL FINISH
- X.# / X.# — INDICATES TRANSITION BETWEEN DISSIMILAR FLOOR MATERIALS
- MULTI — INDICATES MULTIPLE MATERIAL TYPES ON A SURFACE, REFER TO DETAIL OR ELEVATION
- X-P(A) — INDICATES PATTERNED INSTALLATION OF A SINGLE MATERIAL TYPE, REFER TO DETAIL OR ELEVATION
- INDICATES PATTERN INTENT, REFER TO DETAIL OR ELEVATION

GENERAL NOTES - ENLARGED FINISH PLAN

1. REFER TO MATERIAL SELECTION SCHEDULE FOR FINISH INFORMATION.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND SPECIFICATION FOR ADDITIONAL INFORMATION ON CONSTRUCTION MATERIALS.
3. REFER TO REFLECTED CEILING PLANS FOR CEILING FINISH AND HEIGHTS.
4. REFER TO DOOR SCHEDULE FOR FINISH ON DOORS AND FRAMES.
5. REFER TO ARCHITECTURAL ENLARGED PLANS FOR TOILET ACCESSORIES, PARTITIONS, BARRIER-FREE REQUIREMENTS, ETC.
6. REFER TO INTERIORS TYPICAL DETAIL SHEETS FOR TILE TRIM DETAILS, FLOORING TRANSITIONS, WAINSCOT DETAILS, AND TYPICAL TILE PATTERN REQUIREMENTS.
7. REFER TO INTERIOR ELEVATION SHEETS FOR REQUIREMENTS, GENERAL NOTES, ABBREVIATIONS, AND HARDWARE/ACCESSORY SELECTIONS FOR CASEWORK.
8. WHERE HEIGHT IS INDICATED FOR IMPACT RESISTANT WALL PANEL AND FIBERGLASS REINFORCED PLASTIC PANELING NOTED HEIGHT IS NOMINAL, CONTRACTOR TO PROVIDE FULL SHEET HEIGHT OR WIDTH ATOP SPECIFIED BASE HEIGHT PLUS ANY NECESSARY TRIMS OR ACCESSORIES.
9. DETAILS SHOWN ILLUSTRATE DESIGN INTENT, NOT ALL POSSIBLE CONDITIONS. FOR CONDITIONS NOT SHOWN, USE DETAILS CLOSEST TO CONDITION IN QUESTION.

KEYED NOTES - ENLARGED FINISH PLANS

1 CEILING-MOUNTED CUBICLE CURTAIN AND TRACK, REFER TO SPECIFICATION.
2 ADULT CHANGING TABLE, BY OWNER.
3 DO NOT PROVIDE MIRROR AT SOUTHERNMOST SINK IN MEN'S RESTROOM.
4 INSTALL LEFT DRINKING FOUNTAIN AT ADULT BARRIER-FREE HEIGHT.
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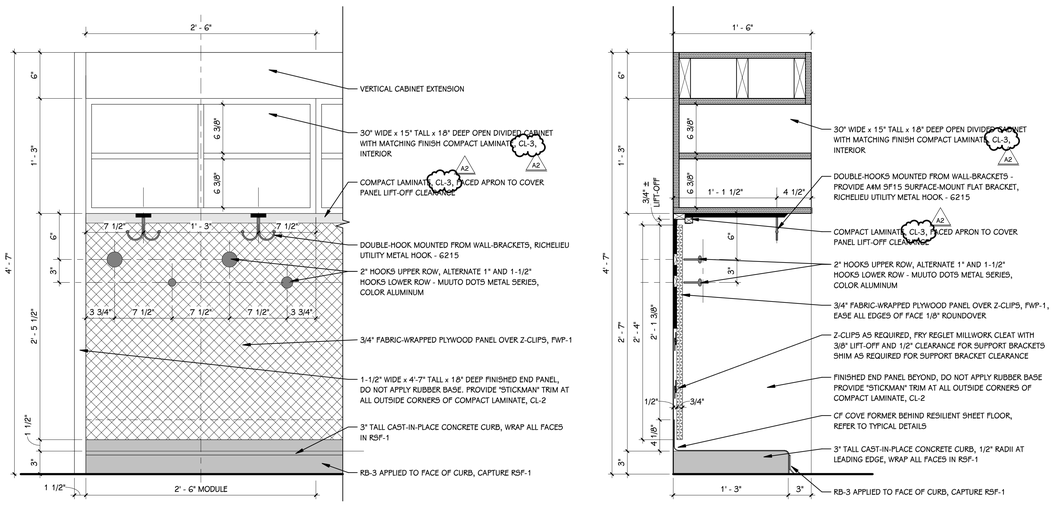
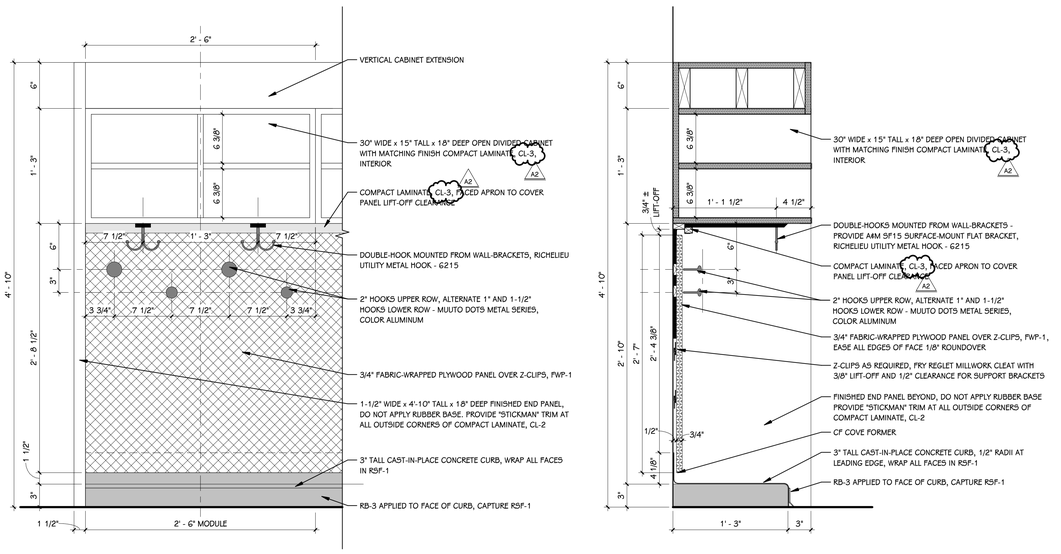
7 ALIGN FLOORING TRANSITION TO WINDOW FRAME.
8 ALIGN FLOORING TRANSITION TO CORNER.
9 ALIGN FLOORING TRANSITION TO WALL TYPE TRANSITION.
10 ALIGN FLOORING TRANSITION TO FACE OF ADJACENT WALL, TRANSITION FLOOR BASE PER TYPICAL DETAILS.
11 SOLID SURFACE CAP, SSM-3 - REFER TO DETAILS.
12 PROVIDE CONTINUOUS, MITERED FURRING STRIPS ABOVE WAINSCOT FOR FLUSH AND FLAT MIRROR INSTALLATION, CAULK ALL JOINTS AND PAINT TO MATCH WALL.
13 EXTEND PORCELAIN TILE AND TILE TRIM TO EXTERIOR WALL, COPE RESILIENT FLOOR COVE TO TILE.
14 PORCELAIN FLOOR TILE PATTERN WORK POINT.
15 ALIGN FLOORING TRANSITION BEHIND RADIUS OF BULLNOSE BLOCK.
16 LVT PLANK ORIENTATION TO RUN NORTH-SOUTH.
17 WALL BASE TRANSITION TO OCCUR AT INSIDE CORNER.

1A - FIRST FLOOR CUBBY WITHOUT UPPER CABINET STORAGE



15B / I 423 TYPICAL CUBBY DETAILS
1 1/2" = 1'-0"

2A - SECOND FLOOR CUBBY WITHOUT UPPER CABINET STORAGE



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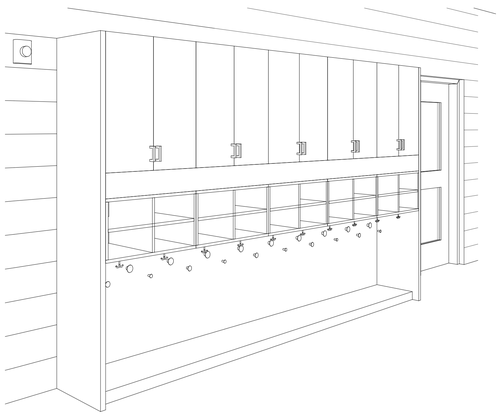
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

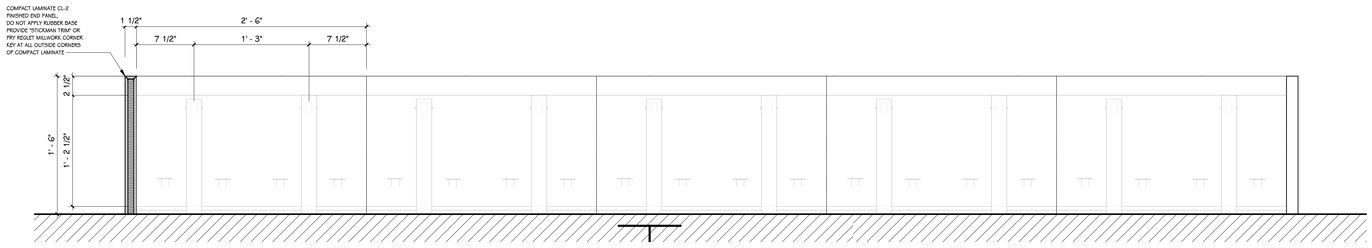
SHEET TITLE
ENLARGED FINISH PLANS AND DETAILS - CUBBIES

DATE
MAY 17, 2023

SHEET NUMBER
I 423
21-237.10



1G / 1424 TYPICAL CUBBY W. STORAGE 3D VIEW



16A / 1424 CUBBY W. STORAGE ENLARGED PLAN
1 1/2" = 1'-0"

ENLARGED FINISH PLAN KEY

- X.# — INDICATES MATERIAL TYPE
- X.# — INDICATES CORRESPONDING SELECTION IN SCHEDULE
- X.# — WALL FINISH
- X.# — BASE FINISH
- X.# — FLOOR FINISH
- X.# — COUNTER FINISH
- X.# — CABINET FINISH (BASE AND UPPER)
- X.# — INDICATES EXTENT OF ATYPICAL FINISH
- X — INDICATES TRANSITION BETWEEN DISSIMILAR FLOOR MATERIALS
- MULTI — INDICATES MULTIPLE MATERIAL TYPES ON A SURFACE, REFER TO DETAIL OR ELEVATION
- X-P(A) — INDICATES PATTERNED INSTALLATION OF A SINGLE MATERIAL TYPE, REFER TO DETAIL OR ELEVATION
- INDICATES PATTERN INTENT, REFER TO DETAIL OR ELEVATION

GENERAL NOTES - ENLARGED FINISH PLAN

1. REFER TO MATERIAL SELECTION SCHEDULE FOR FINISH INFORMATION.
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KEYED NOTES - ENLARGED FINISH PLANS

1 CEILING-MOUNTED CUBICLE CURTAIN AND TRACK, REFER TO SPECIFICATION.
2 ADULT CHANGING TABLE, BY OWNER.
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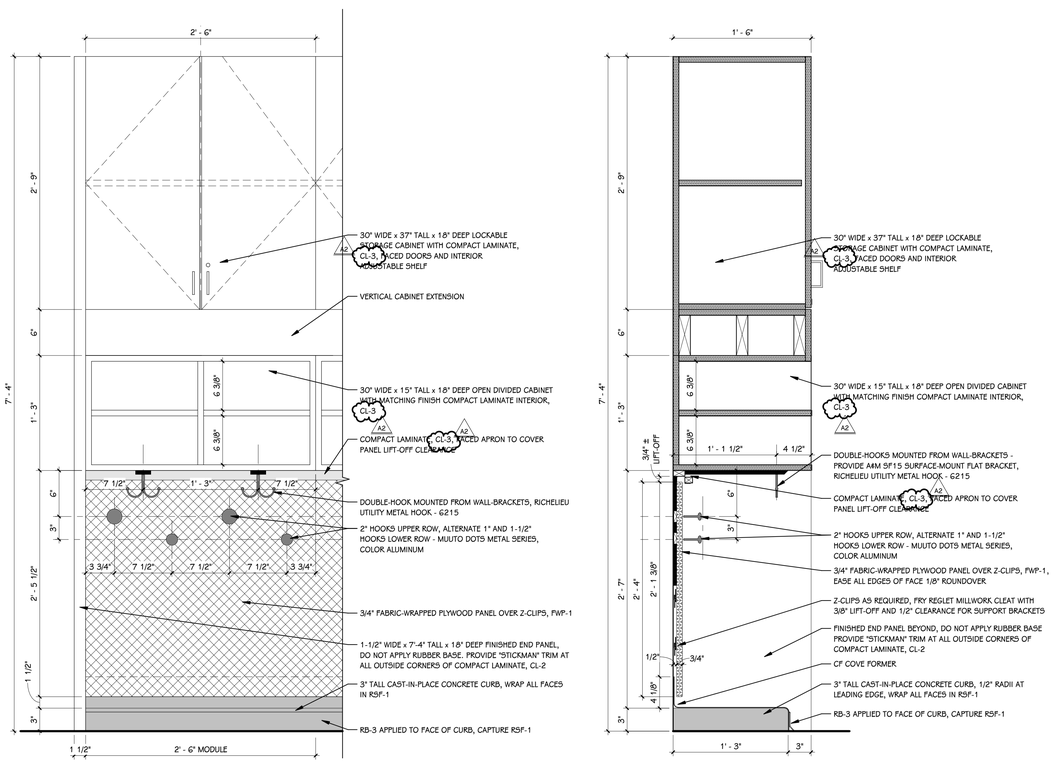
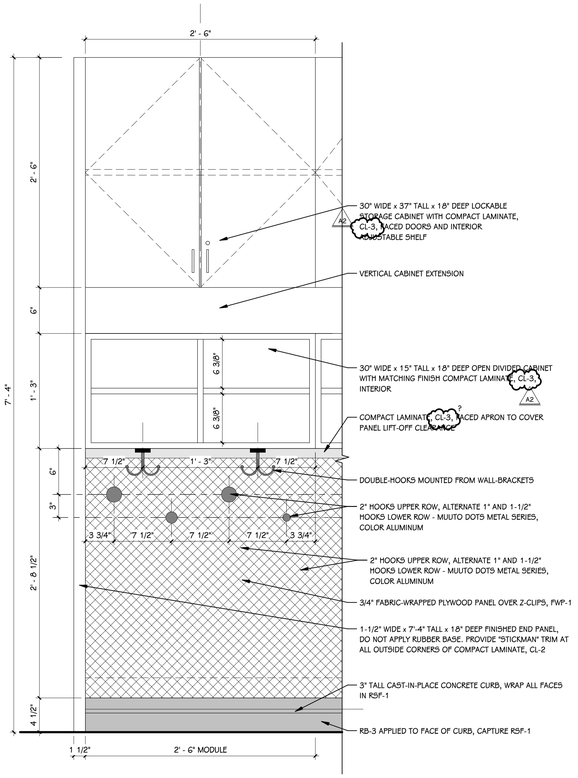
8 ALIGN FLOORING TRANSITION TO CORNER.
9 ALIGN FLOORING TRANSITION TO WALL TYPE TRANSITION.
10 ALIGN FLOORING TRANSITION TO FACE OF ADJACENT WALL, TRANSITION FLOOR BASE PER TYPICAL DETAILS.
11 SOLID SURFACE CAP, SSM-3 - REFER TO DETAILS.
12 PROVIDE CONTINUOUS, MITERED FURRING STRIPS ABOVE WAINSCOT FOR FLUSH AND FLAT MIRROR INSTALLATION, CAULK ALL JOINTS AND PAINT TO MATCH WALL.
13 EXTEND PORCELAIN TILE AND TILE TRIM TO EXTERIOR WALL, COPE RESILIENT FLOOR COVE TO TILE.
14 PORCELAIN FLOOR TILE PATTERN WORK POINT.
15 ALIGN FLOORING TRANSITION BEHIND RADIUS OF BULLNOSE BLOCK.
16 LVT PLANK ORIENTATION TO RUN NORTH-SOUTH.
17 WALL BASE TRANSITION TO OCCUR AT INSIDE CORNER.

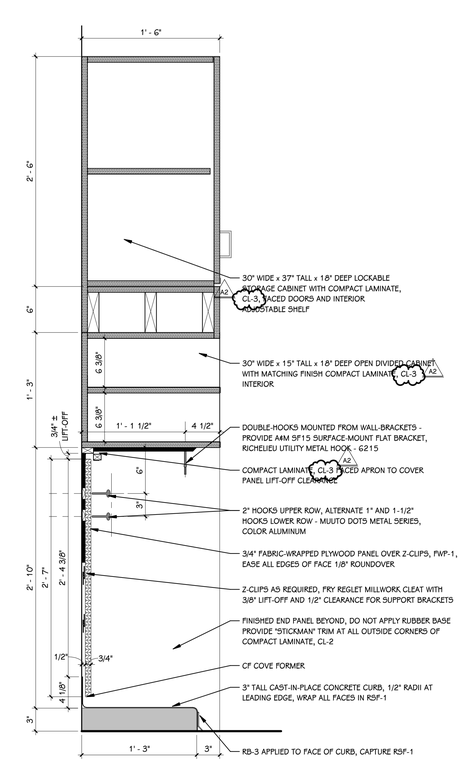
1B - FIRST FLOOR CUBBY WITH UPPER CABINET STORAGE



16B / 1424 TYPICAL CUBBY W. STORAGE DETAILS
1 1/2" = 1'-0"

2B - SECOND FLOOR CUBBY WITH UPPER CABINET STORAGE





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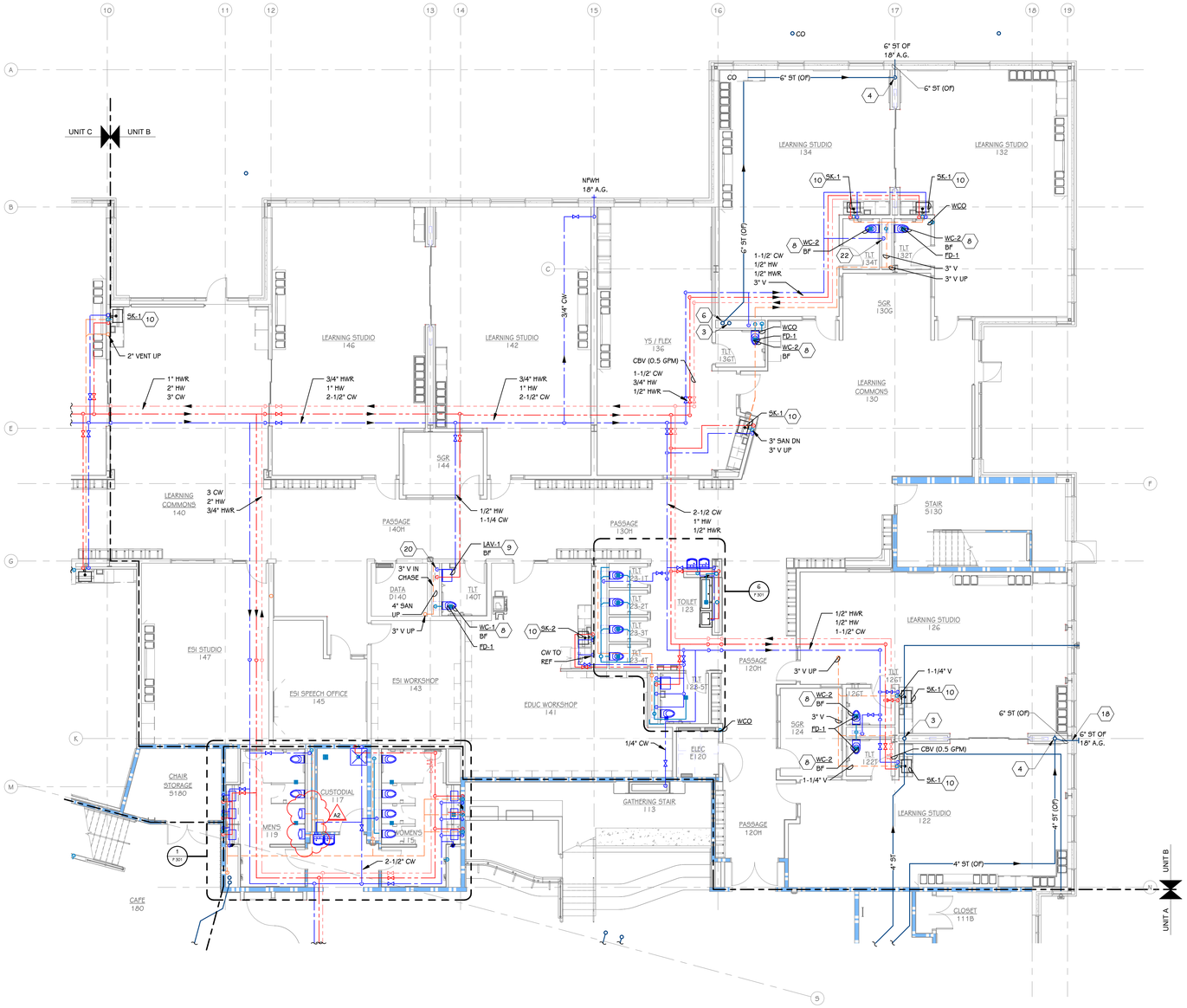
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ENLARGED FINISH PLANS AND DETAILS
- CUBBIES

DATE
MAY 17, 2023

SHEET NUMBER
A424
21-237.10



FIRST FLOOR PLUMBING PLAN - UNIT B
1/8" = 1'-0"

KEYED NOTES - PLUMBING

3 SANITARY STORM PIPING DOWN TO BELOW SLAB. CLEANOUT AT TOP OF STACK.

4 SANITARY STORM OVERFLOW PIPING DOWN. CLEANOUT AT TOP OF STACK.

5 SANITARY STORM PIPING DOWN FROM ABOVE.

6 SANITARY STORM OVERFLOW PIPING DOWN FROM ABOVE.

7 REFER TO CIVIL PLANS FOR CONTINUATION.

8 <vanes>

9 <vanes>

10 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

11 EWC; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

13 SH; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

16 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES. MOUNTING HEIGHT AT 29" AFF TO DECK. COORDINATE WITH ALL TRADES.

17 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES. MOUNTING HEIGHT AT 34" AFF TO DECK. COORDINATE WITH ALL TRADES.

18 OFFSET PIPE AS NEEDED TO AVOID STRUCTURAL COMPONENT.

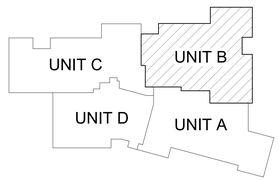
20 DROP 1-1/4" CW IN CHASE. DISTRIBUTE 1" TO WC, 1/2" TO LAV.

21 DROP 1-1/2" CW IN CHASE. DISTRIBUTE 1" TO WC, 1/2" TO LAV, 1/2" TO REFRIGERATOR.

22 DROP 1-1/2" CW IN CHASE. DISTRIBUTE TO WC'S.

THIS DRAWING SHEET IS INTENDED TO BE PLOTTED IN COLOR. IF THIS TEXT APPEARS IN BLACK AND WHITE, IT IS PLOTTED INCORRECTLY. DISCARD AND OBTAIN AN ACCURATE DRAWING

CENTRAL ELEMENTARY



TRUE NORTH

KEY PLAN
SCALE: NO SCALE

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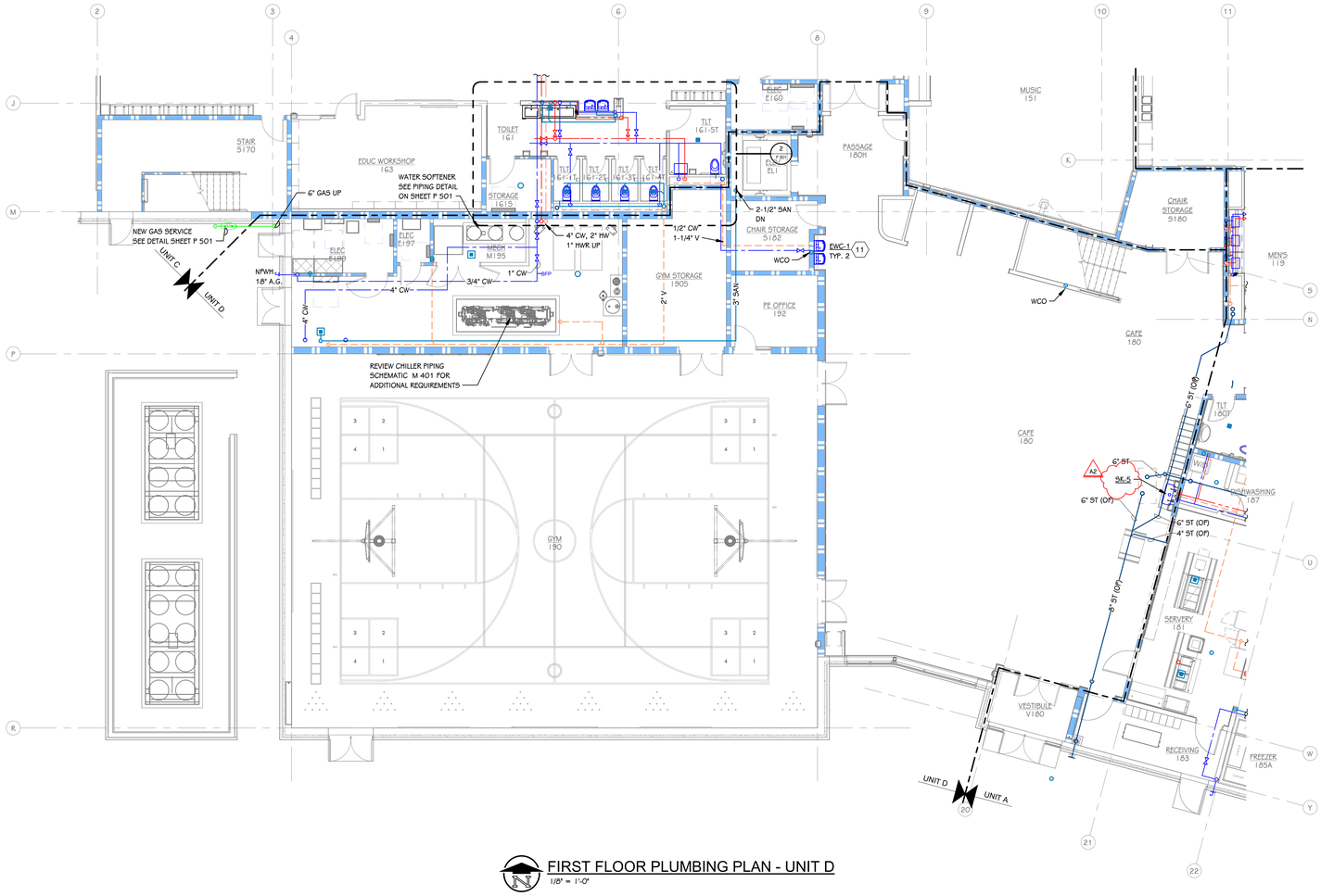
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR PLUMBING PLAN - UNIT B

DATE
MAY 17, 2023

SHEET NUMBER
P 101B
21-237.10



FIRST FLOOR PLUMBING PLAN - UNIT D
1/8" = 1'-0"

KEYED NOTES - PLUMBING

3 SANITARY STORM PIPING DOWN TO BELOW SLAB. CLEANOUT AT TOP OF STACK.

4 SANITARY STORM OVERFLOW PIPING DOWN. CLEANOUT AT TOP OF STACK.

5 SANITARY STORM PIPING DOWN FROM ABOVE.

6 SANITARY STORM OVERFLOW PIPING DOWN FROM ABOVE.

7 REFER TO CIVIL PLANS FOR CONTINUATION.

8 <vanes>

9 <vanes>

10 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

11 EWC; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

13 SH; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

16 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES. MOUNTING HEIGHT AT 29" AFF TO DECK. COORDINATE WITH ALL TRADES.

17 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES. MOUNTING HEIGHT AT 34" AFF TO DECK. COORDINATE WITH ALL TRADES.

18 OFFSET PIPE AS NEEDED TO AVOID STRUCTURAL COMPONENT.

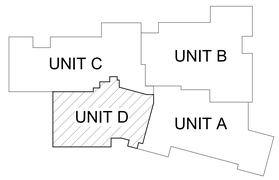
20 DROP 1-1/4" CW IN CHASE. DISTRIBUTE 1" TO WC, 1/2" TO LAV.

21 DROP 1-1/2" CW IN CHASE. DISTRIBUTE 1" TO WC, 1/2" TO LAV, 1/2" TO REFRIGERATOR.

22 DROP 1-1/2" CW IN CHASE. DISTRIBUTE TO WCS.

THIS DRAWING SHEET IS INTENDED TO BE PLOTTED IN COLOR. IF THIS TEXT APPEARS IN BLACK AND WHITE, IT IS PLOTTED INCORRECTLY. DISCARD AND OBTAIN AN ACCURATE DRAWING

CENTRAL ELEMENTARY



TRUE NORTH

KEY PLAN
SCALE: NO SCALE

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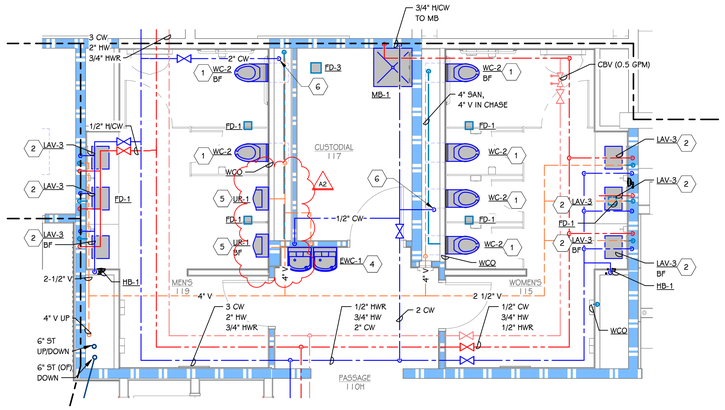
PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

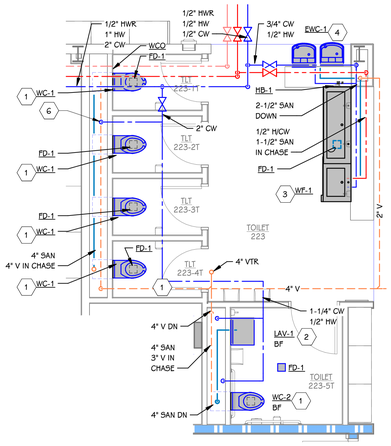
SHEET TITLE
FIRST FLOOR PLUMBING PLAN - UNIT D

DATE
MAY 17, 2023

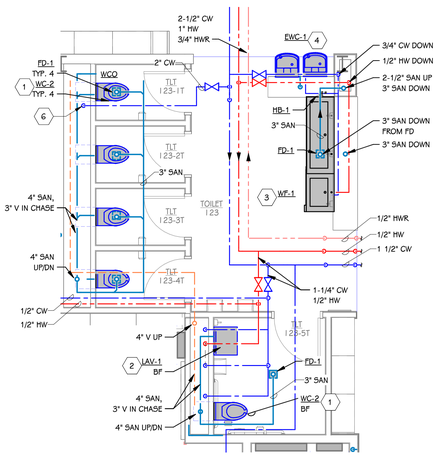
SHEET NUMBER
P 101D
21-237.10



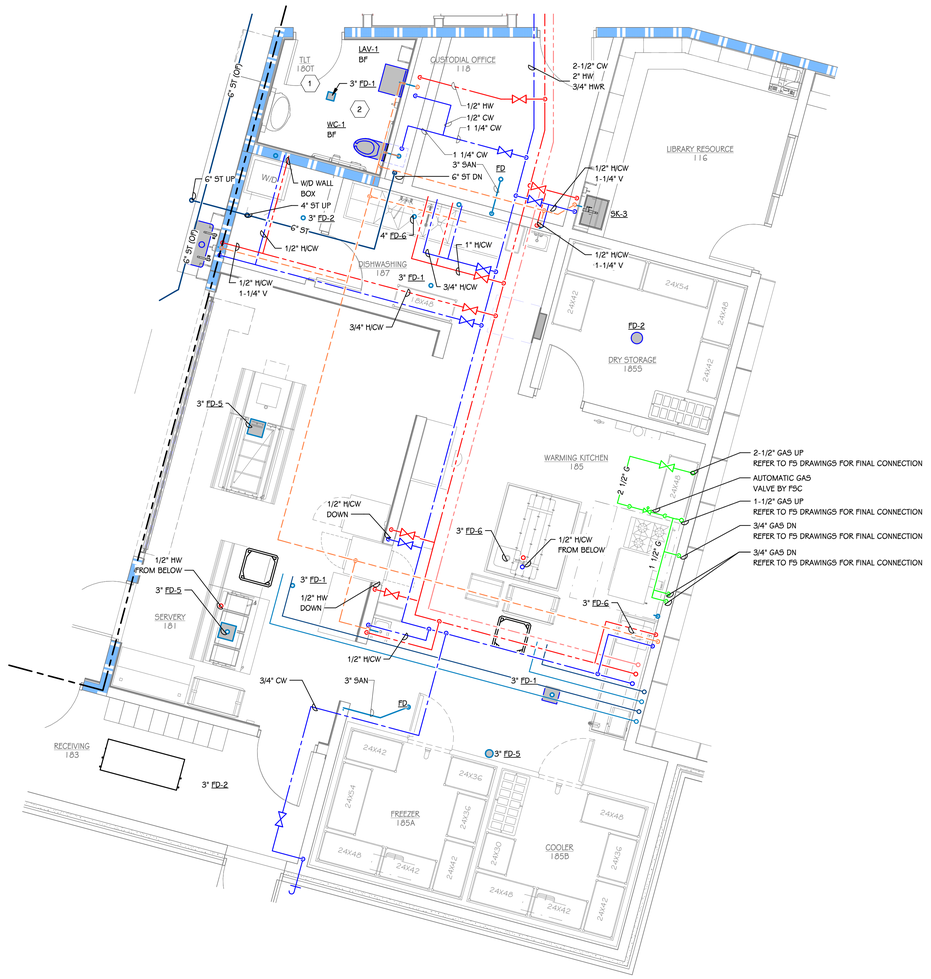
1 P 301 ENLARGED PLUMBING PLAN - TOILET ROOM 115
1/4" = 1'-0"



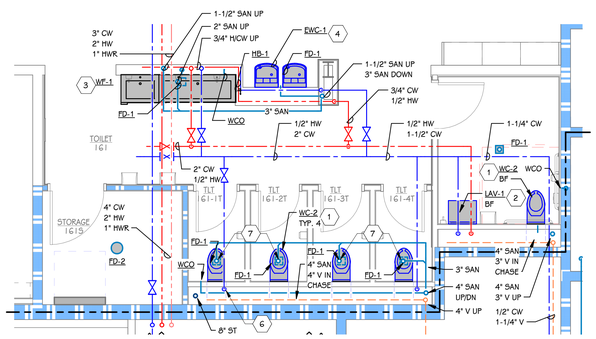
4 P 301 ENLARGED PLUMBING PLAN - TOILET ROOM 223
1/4" = 1'-0"



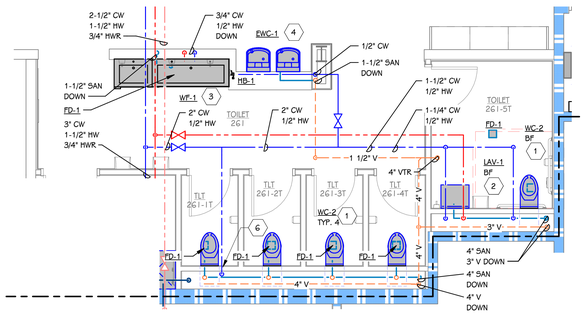
6 P 301 ENLARGED PLUMBING PLAN - TOILET ROOM 123
1/4" = 1'-0"



5 P 301 ENLARGED PLUMBING PLAN - KITCHEN
1/4" = 1'-0"



2 P 301 ENLARGED PLUMBING PLAN - TOILET ROOM 161
1/4" = 1'-0"



3 P 301 ENLARGED PLUMBING PLAN - TOILET ROOM 261
1/4" = 1'-0"

KEYED NOTES - ENLARGED PLUMBING

1 WC; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

2 LAV; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

3 SK; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

4 EWC; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

5 UR; REFER TO SPECIFICATIONS FOR PLUMBING ROUGH IN SIZES.

6 DROP 2" CW IN CHASE. ROUTE A FULL SIZE 2" HEADER IN CHASE AND DISTRIBUTE 1" TO EACH FIXTURE.

7 SANITARY SEWER PIPING DOWN FROM FLOOR DRAIN/SINK.

THIS DRAWING SHEET IS INTENDED TO BE PLOTTED IN COLOR. IF THIS TEXT APPEARS IN BLACK AND WHITE, IT IS PLOTTED INCORRECTLY. DISCARD AND OBTAIN AN ACCURATE DRAWING

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OWNER
PORTAGE PUBLIC SCHOOLS
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SHEET TITLE
ENLARGED PLUMBING PLANS

DATE
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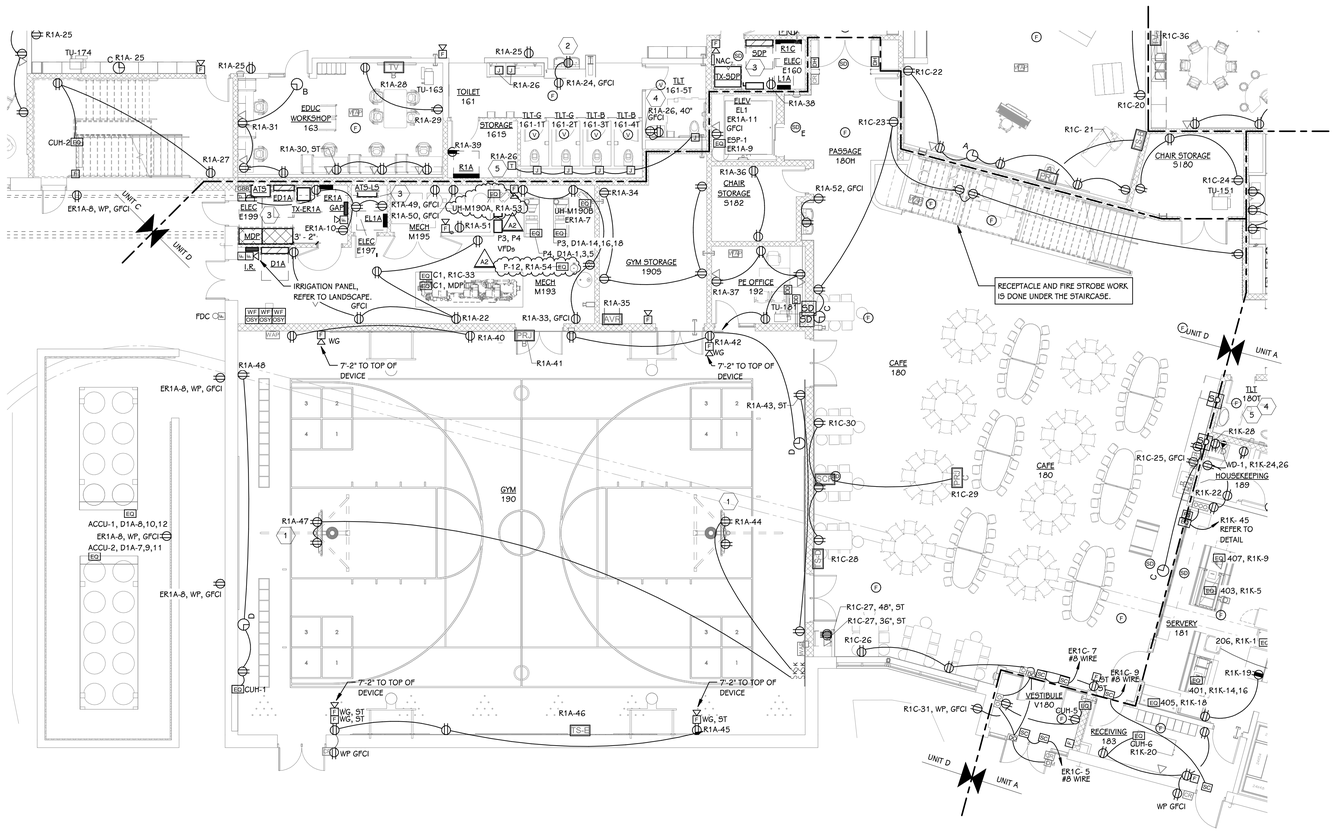
SHEET NUMBER
P 301
21-237.10



FIRST FLOOR POWER PLAN - UNIT D

1/8" = 1'-0"

POWER KEYED NOTES

1 BACKBOARD CONTROLS SHALL HAVE RAISE/LOWER SWITCH AND HEIGHT ADJUSTMENT CONTROLS.

2 OTHER OUTLETS ARE SERVED FROM LOAD SIDE OF GFCI OUTLET OR BREAKER

3 REFER TO GENERAL NOTES: PROVIDE 4" HOUSEKEEPING PADS FOR MDP, ALL TRANSFORMERS, AND ALL FLOOR MOUNTED EQUIPMENT. PROVIDE FLEXIBLE CONNECTION TO TRANSFORMERS AND SIMILAR EQUIPMENT PER SPECIFICATIONS. AREAS WITHOUT KEYNOTE DO NOT ALLEVIATE CONTRACTOR FROM GENERAL NOTE REQUIREMENTS.

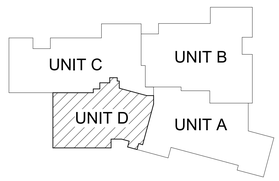
4 CONCEAL SINK SENSOR RECEPTACLES BEHIND LAV SHIELD. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF UNDER SINK RECEPTACLES WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION. FEED FROM LOAD SIDE OF ABOVE COUNTER GFCI RECEPTACLE.

5 LOW VOLTAGE TRANSFORMER AND BACKBOXES FOR FLUSH VALVES. COORDINATE LOCATION AND ADDITIONAL INSTALLATION REQUIREMENTS WITH MECHANICAL CONTRACTOR.

6 ELECTRIC ELEVATOR; CONNECT TO FIRE ALARM SYSTEM AND TELEPHONE SYSTEM WITH DEDICATED PHONE LINE. ALL DISCONNECTS SHALL HAVE AUX CONTACTS. COORDINATE FUSE SIZE FOR ELEVATOR POWER CIRCUIT WITH SHOP DRAWINGS. COORDINATE ALL INSTALLATION REQUIREMENTS WITH ELEVATOR CONTRACTOR. CONCEAL ALL DISCONNECTS IN LOCKABLE CABINET.

7 MOUNT DEVICE(S) IN TOE KICK AREA OF CASEWORK; CONCEAL ALL CONDUIT IN CAVITIES OF CASEWORK. COORDINATE WITH GENERAL TRADES.

CENTRAL ELEMENTARY



TRUE NORTH

KEY PLAN
SCALE: NO SCALE

TowerPinkster
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ADD. No. 2	JUNE 15, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

SHEET TITLE
FIRST FLOOR POWER PLAN - UNIT D

DATE
MAY 17, 2023

SHEET NUMBER
E101D
21-237.10

PANELBOARD " SDP" LOAD SCHEDULE

PANEL: SDP **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E160 / FIRST FLOOR **AMPS:** 800 A MB **FED FROM:** TX-SDP
ADDED ACCESSORIES: SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 25304 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A (VA)		B (VA)		C (VA)		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	R1C	225	3	12000	10360					3	225	R1A	2
3	--	--	--			11780	10810			--	--	--	4
5	--	--	--					12280	10342	--	--	--	6
7	R1B	225	3	19653	13976					3	225	R2B	8
9	--	--	--			18723	13262			--	--	--	10
11	--	--	--					19603	12868	--	--	--	12
13	R2C	225	3	9282	22614					3	225	R1K	14
15	--	--	--			8716	18568			--	--	--	16
17	--	--	--					9268	12228	--	--	--	18
19	R2A	225	3	6360	0					3	225	SPARE	20
21	--	--	--			4860	0			--	--	--	22
23	--	--	--					4440	0	--	--	--	24
25	SPARE	225	3	0	--					1	--	SPACE	26
27	--	--	--			0	--			1	--	SPACE	28
29	--	--	--					0	--	1	--	SPACE	30
31	SPACE	--	1	--	--					1	--	SPACE	32
33	SPACE	--	1			--	--			1	--	SPACE	34
35	SPACE	--	1					--	--	1	--	SPACE	36
37	SURGE PROTECTIVE DEVICE (SPD)	60	3	0	--					1	--	SPACE	38
39	--	--	--			0	--			1	--	SPACE	40
41	--	--	--					0	--	1	--	SPACE	42
	TOTAL LOAD:			94245 VA		86719 VA		81029 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			793 A		730 A		675 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	25284 VA	100.00%	25284 VA		
Other	2040 VA	100.00%	2040 VA	**TOTAL CONNECTED LOAD:**	261993 VA
POWER -	8800 VA	100.00%	8800 VA	**TOTAL ESTIMATED DEMAND:**	180388 VA
RECEPTACLE -	173210 VA	52.89%	91605 VA	**TOTAL CONNECTED LOAD (A):**	727 A
TECHNOLOGY -	16920 VA	100.00%	16920 VA	**TOTAL ESTIMATED DEMAND...**	501 A
KITCHEN -	32139 VA	100.00%	32139 VA		
HAND DRYER -	3600 VA	100.00%	3600 VA		

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1A" LOAD SCHEDULE

PANEL: R1A **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: STORAGE 161S / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 12222 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	RECEPTACLE - LEARNING STUDIO 174	20	1	900	540					1	20	RECEPTACLE - LEARNING STUDIO 174	2
3	RECEPTACLE - LEARNING STUDIO 174	20	1			540	780			1	20	TECHNOLOGY - LEARNING STUDIO 174	4
5	RECEPTACLE - LEARNING STUDIO 172	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 172	6
7	RECEPTACLE - LEARNING STUDIO 172	20	1	540	780					1	20	TECHNOLOGY - LEARNING STUDIO 172	8
9	RECEPTACLE - LEARNING STUDIO 166	20	1			720	900			1	20	RECEPTACLE - LEARNING STUDIO 166	10
11	TECHNOLOGY - LEARNING STUDIO 166	20	1					780	540	1	20	RECEPTACLE - LEARNING STUDIO 166	12
13	RECEPTACLE - LEARNING STUDIO 162	20	1	720	540					1	20	RECEPTACLE - LEARNING STUDIO 162	14
15	TECHNOLOGY - LEARNING STUDIO 162	20	1			780	900			1	20	RECEPTACLE - LEARNING STUDIO 162	16
17	RECEPTACLE - ASD 156	20	1					540	540	1	20	RECEPTACLE - ASD 156	18
19	RECEPTACLE - ASD 156	20	1	720	780					1	20	TECHNOLOGY - ASD 156	20
21	RECEPTACLE - LEARNING COMMONS 170	20	1			720	900			1	20	RECEPTACLE - MECH M190	22
23	RECEPTACLE - SGR 170G	20	1					540	360	1	20	RECEPTACLE - Room 160H, 161	24
25	RECEPTACLE - Room 160H, 170	20	1	600	1060					1	20	RECEPTACLE - TLT 161-5T	26
27	RECEPTACLE - STAIR S170	20	1			610	360			1	20	TECHNOLOGY - EDUC WORKSHOP 163	28
29	RECEPTACLE - EDUC WORKSHOP 163	20	1					360	540	1	20	RECEPTACLE - EDUC WORKSHOP 163	30
31	RECEPTACLE - EDUC WORKSHOP 163	20	1	600	600					1	20	RECEPTACLE - SGR 164	32
33	RECEPTACLE - MECH M190	20	1			720	720			1	20	RECEPTACLE - GYM STORAGE 190S	34
35	TECHNOLOGY - GYM STORAGE 190S	20	1					360	360	1	20	RECEPTACLE - CHAIR STORAGE S180	36
37	PE OFFICE 181	20	1	720	180					1	20	RECEPTACLE - ELEC E155	38
39	RECEPTACLE - STORAGE 161S	20	1			180	360			1	20	RECEPTACLE - GYM 190	40
41	TECHNOLOGY - GYM 190	20	1					360	420	1	20	GYM 190	42
43	RECEPTACLE - GYM 190	20	1	360	360					1	20	RECEPTACLE - GYM 190	44
45	RECEPTACLE - GYM 190	20	1			720	360			1	20	TECHNOLOGY - GYM 190	46
47	RECEPTACLE - GYM 190	20	1					360	670	1	20	RECEPTACLE - GYM 190	48
49	RECEPTACLE - WATER SOFTENER	20	1	180	180					1	20	RECEPTACLE - WATER SOFTENER	50
51	RECEPTACLE - MECH M190	20	1					180	360	1	20	RECEPTACLE - ELEC WATER COOLER 190H	52
53	HVAC - UH-M190A	20	1					1176	1176	1	20	HVAC - P-12	54
55	SPARE	20	1	0	0					1	20	SPARE	56
57	SPARE	20	1			0	0			1	20	SPARE	58
59	SPARE	20	1					0	0	1	20	SPARE	60
61	SPARE	20	1	0	0					1	20	SPARE	62
63	SPACE	--	1			--	--			1	--	SPACE	64
65	SPACE	--	1					--	--	1	--	SPACE	66
67	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	68
69	--	--	--			0	--			1	--	SPACE	70
71	--	--	--					0	--	1	--	SPACE	72
	TOTAL LOAD:			10360 VA		10810 VA		10342 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			86 A		90 A		86 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	2852 VA	100.00%	2852 VA		
Other	300 VA	100.00%	300 VA	**TOTAL CONNECTED LOAD:**	31512 VA
POWER -	700 VA	100.00%	700 VA	**TOTAL ESTIMATED DEMAND:**	24302 VA
RECEPTACLE -	24420 VA	70.48%	17210 VA	**TOTAL CONNECTED LOAD (A):**	87 A
TECHNOLOGY -	3240 VA	100.00%	3240 VA	**TOTAL ESTIMATED DEMAND...**	67 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1B" LOAD SCHEDULE

PANEL: R1B **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E120 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 7885 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	POWER - TLT 123 AUTO FLUSH / SINK	20	1	600	720					1	20	RECEPTACLE - LIBRARY 114	2
3	POWER - OVERHEAD DOOR	20	1			1200	360			1	20	RECEPTACLE - LIBRARY 114	4
5	LIBRARY 114	20	1					780	720	1	20	RECEPTACLE - LIBRARY 114	6
7	RECEPTACLE - LIBRARY 114	20	1	360	600					1	20	RECEPTACLE - LIBRARY 114	8
9	RECEPTACLE - LIBRARY 114	20	1			600	540			1	20	RECEPTACLE - LEARNING STUDIO 142	10
11	RECEPTACLE - LEARNING STUDIO 142	20	1					720	900	1	20	RECEPTACLE - LEARNING STUDIO 142	12
13	LEARNING STUDIO 142	20	1	780	460					1	20	RECEPTACLE - TLT 140T	14
15	RECEPTACLE - SGR 144	20	1			540	180			1	20	RECEPTACLE - FRIDGE	16
17	EDUC WORKSHOP 141	20	1					600	360	1	20	TECHNOLOGY - EDUC WORKSHOP 141	18
19	RECEPTACLE - EDUC WORKSHOP 141	20	1	360	540					1	20	RECEPTACLE - EDUC WORKSHOP 141	20
21	RECEPTACLE - EDUC WORKSHOP 141	20	1			600	540			1	20	RECEPTACLE - EDUC WORKSHOP 141	22
23	RECEPTACLE - EDUC WORKSHOP 141	20	1					720	540	1	20	RECEPTACLE - ART 112	24
25	RECEPTACLE - COPIER	20	1	180	1440					1	20	RECEPTACLE - ART 112 CORD REEL	26
27	RECEPTACLE - ART 112 CORD REEL	20	1			1440	360			1	20	RECEPTACLE - ART 112	28
29	RECEPTACLE - ART 112	20	1					900	4803	3	50	RECEPTACLE - KILN L15-50	30
31	RECEPTACLE - ART 112	20	1	960	4803					--	--	--	32
33	RECEPTACLE - ELEC E121	20	1			180	4803			--	--	--	34
35	HVAC - FP-1 - FIREPLACE	20	1					420	540	1	20	RECEPTACLE - Room 110, 113	36
37	RECEPTACLE - TLT 123-5T	20	1	460	540					1	20	RECEPTACLE - Y5 / FLEX 136	38
39	RECEPTACLE - Y5 / FLEX 136	20	1			900	540			1	20	RECEPTACLE - Y5 / FLEX 136	40
41	Y5 / FLEX 136	20	1					780	540	1	20	RECEPTACLE - LEARNING STUDIO 134	42
43	RECEPTACLE - LEARNING STUDIO 134	20	1	540	540					1	20	RECEPTACLE - LEARNING STUDIO 134	44
45	LEARNING STUDIO 134	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 132	46
47	RECEPTACLE - LEARNING STUDIO 132	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 132	48
49	LEARNING STUDIO 132	20	1	780	540					1	20	RECEPTACLE - Room 123, 140H, 120H	50
51	RECEPTACLE - SGR 130G	20	1			540	720			1	20	RECEPTACLE - LEARNING COMMONS 130	52
53	RECEPTACLE - Room 130H, 130	20	1					360	540	1	20	RECEPTACLE - LEARNING STUDIO 126	54
55	RECEPTACLE - STAIR S130	20	1	790	720					1	20	RECEPTACLE - LEARNING STUDIO 126	56
57	LEARNING STUDIO 126	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 122	58
59	RECEPTACLE - LEARNING STUDIO 126	20	1					540	780	1	20	LEARNING STUDIO 122	60
61	RECEPTACLE - LEARNING STUDIO 122	20	1	720	540					1	20	RECEPTACLE - GATHERING STAIR 113	62
63	RECEPTACLE - LEARNING STUDIO 122	20	1			540	360			1	20	RECEPTACLE - GATHERING STAIR	64
65	RECEPTACLE - GATHERING STAIR 113	20	1					540	360	1	20	RECEPTACLE - PASSAGE 120H	66
67	RECEPTACLE - SGR 124	20	1	540	360					1	20	RECEPTACLE - PTO STORAGE S110	68
69	FAMILY RESOURCE 111	20	1			600	540			1	20	RECEPTACLE - Room 110, S110	70
71	Room 110H, 110	20	1					1540	360	1	20	TECHNOLOGY - HEART 110	72
73	RECEPTACLE - HEART 110	20	1	600	180					1	20	RECEPTACLE -	74
75	SPARE	20	1			0	0			1	20	SPARE	76
77	SPARE	20	1					0	0	1	20	SPARE	78
79	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	0					1	20	SPARE	80
81	--	--	--			0	0			1	20	SPARE	82
83	--	--	--					0	0	1	20	SPARE	84
	TOTAL LOAD:			19653 VA		18723 VA		19603 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			165 A		156 A		164 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	670 VA	100.00%	670 VA		
Other	480 VA	100.00%	480 VA	**TOTAL CONNECTED LOAD:**	57980 VA
POWER -	2000 VA	100.00%	2000 VA	**TOTAL ESTIMATED DEMAND:**	37905 VA
RECEPTACLE -	50150 VA	59.97%	30075 VA	**TOTAL CONNECTED LOAD (A):**	161 A
TECHNOLOGY -	4680 VA	100.00%	4680 VA	**TOTAL ESTIMATED DEMAND...**	105 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1C" LOAD SCHEDULE

PANEL: R1C **MOUNTING:** SURFACE **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: ELEC E160 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: DOUBLE TUB, SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 18242 kAIR
(PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	RECEPTACLE - LEARNING STUDIO 154	20	1	720	900					1	20	RECEPTACLE - LEARNING STUDIO 154	2
3	TECHNOLOGY - LEARNING STUDIO 154	20	1			780	540			1	20	RECEPTACLE - LEARNING STUDIO 154	4
5	RECEPTACLE - LEARNING STUDIO 152	20	1					720	360	1	20	RECEPTACLE - LEARNING STUDIO 152	6
7	TECHNOLOGY - LEARNING STUDIO 152	20	1	780	900					1	20	RECEPTACLE - LEARNING STUDIO 152	8
9	RECEPTACLE - SGR 150G	20	1			540	360			1	20	RECEPTACLE - LEARNING COMMONS 140	10
11	RECEPTACLE - LEARNING COMMONS 140	20	1					540	720	1	20	RECEPTACLE - LEARNING STUDIO 146	12
13	RECEPTACLE - LEARNING STUDIO 146	20	1	900	540					1	20	RECEPTACLE - LEARNING STUDIO 146	14
15	TECHNOLOGY - LEARNING STUDIO 146	20	1			780	540			1	20	RECEPTACLE - ESI SPEECH OFFICE 145	16
17	RECEPTACLE - ESI SPEECH OFFICE 145	20	1					540	420	1	20	ESI SPEECH OFFICE 145	18
19	RECEPTACLE - Room 150H, 140, 140H	20	1	600	540					1	20	RECEPTACLE - MUSIC 151	20
21	TECHNOLOGY - MUSIC 151	20	1			720	960			1	20	RECEPTACLE - MUSIC 151	22
23	RECEPTACLE - Room 180H, 180	20	1					960	540	1	20	RECEPTACLE - CHAIR STORAGE S180	24
25	RECEPTACLE - CAFE 180	20	1	420	540					1	20	RECEPTACLE - CAFE 180	26
27	RECEPTACLE - CAFE 180	20	1			360	360			1	20	TECHNOLOGY - CAFE 180	28
29	RECEPTACLE - CAFE 180, PRJ, SCREEN	20	1					1000	540	1	20	RECEPTACLE - CAFE 180	30
31	RECEPTACLE - VESTIBULE V180, CUH	20	1	540	960					1	20	RECEPTACLE - TLT 180T	32
33	HVAC - C1 - CHILLER CTRL	20	1			500	360			1	20	RECEPTACLE - ESI STUDIO 147	34
35	RECEPTACLE - ESI STUDIO 147	20	1					720	780	1	20	ESI STUDIO 147	36
37	RECEPTACLE - ESI WORKSHOP 143	20	1	540	600					1	20	RECEPTACLE - ESI WORKSHOP 143	38
39	RECEPTACLE - CUSTODIAL OFFICE 118	20	1			600	780			1	20	RECEPTACLE - LIBRARY RESOURCE 116	40
41	RECEPTACLE - COPIER	20	1					1200	540	1	20	RECEPTACLE - GATHERING STAIR	42
43	RECEPTACLE - Room 110, 110	20	1	720	720					1	20	RECEPTACLE - WOMEN'S 115	44
45	HAND DRYER - WOMEN'S 115	20	1			900	900			1	20	HAND DRYER - WOMEN'S 115	46
47	POWER - WOMEN'S 115, MENS 119 FLUSH VALVES	20	1					1800	540	1	20	RECEPTACLE - CUSTODIAL 117	48
49	RECEPTACLE - PASSAGE 110H ELEC WATER...	20	1	360	720					1	20	RECEPTACLE - MEN'S 119	50
51	HAND DRYER - MEN'S 119	20	1			900	900			1	20	HAND DRYER - MEN'S 119	52
53	TECHNOLOGY - ESI SPEECH OFFICE 145	20	1					360	0	1	20	SPARE	54
55	SPARE	20	1	0	0					1	20	SPARE	56
57	SPARE	20	1			0	0			1	20	SPARE	58
59	SPARE	20	1					0	0	1	20	SPARE	60
61	SPACE	--	1	--	0					1	20	SPARE	62
63	SPACE	--	1			--	0			1	20	SPARE	64
65	SPACE	--	1					--	--	1	--	SPACE	66
67	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	68
69	--	--	--			0	--			1	--	SPACE	70
71	--	--	--					0	--	1	--	SPACE	72
	TOTAL LOAD:			12000 VA		11780 VA		12280 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			100 A		98 A		103 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	500 VA	100.00%	500 VA		
Other	300 VA	100.00%	300 VA	**TOTAL CONNECTED LOAD:**	36060 VA
POWER -	2400 VA	100.00%	2400 VA	**TOTAL ESTIMATED DEMAND:**	27870 VA
RECEPTACLE -	26380 VA	68.95%	18190 VA	**TOTAL CONNECTED LOAD (A):**	100 A
TECHNOLOGY -	2880 VA	100.00%	2880 VA	**TOTAL ESTIMATED DEMAND...**	77 A
HAND DRYER -	3600 VA	100.00%	3600 VA		

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

PANELBOARD " R1K" LOAD SCHEDULE

PANEL: R1K **MOUNTING:** FLUSH **VOLTAGE:** 208/120V, 3PH, 4W
LOCATION: DISHWASHING 187 / FIRST FLOOR **AMPS:** 225 A MLO **FED FROM:** SDP
ADDED ACCESSORIES: SPD **FEED-THRU LUGS...** **A.I.C. VALUE:** 8781 kAIR
STAINLESS STEEL COVER (PROVIDE 25% HIGHER A.I.C. RATING)

	CIRCUIT DESCRIPTION	TRIP (A)	POLES	A		B		C		POLES	TRIP (A)	CIRCUIT DESCRIPTION	
1	KITCHEN - 206 - HOT FOOD CABINET	20	1	1440	2136					1	30	KITCHEN - 303 - DOUBLE DECK CONVECTION...	2
3	KITCHEN - 306 - FRIDGE	20	1			588	--			1	--	----- SHUNT TRIP -----	4
5	KITCHEN - 403 - COLD FOOD TABLE	20	1					564	0	1	20	SPARE	6
7	KITCHEN - 404 - MICROWAVE	20	1	1608	0					1	20	SPARE	8
9	KITCHEN - 407 - CASH REGISTER	20	1			1200	1200			1	20	KITCHEN - 107 - FIRE PROTECTION SYSTEM	10
11	RECEPTACLE - DISHWASHING 187	20	1					540	1200	1	20	KITCHEN - 301 - HOOD	12
13	RECEPTACLE - WARMING KITCHEN 185	20	1	360	3536					2	45	KITCHEN - 401 - HOT FOOD TABLE	14
15	RECEPTACLE - WARMING KITCHEN 185, ISLAND	20	1			360	3536			--	--	--	16
17	RECEPTACLE - WARMING KITCHEN 185	20	1					180	900	1	20	KITCHEN - 405 - MILK COOLER	18
19	RECEPTACLE - SERVERY 181	20	1	360	720					1	20	RECEPTACLE - RECEIVING 183, CUH	20
21	RECEPTACLE - SERVERY 181	20	1			180	720			1	20	RECEPTACLE - HOUSEKEEPING 189	22
23	HVAC - COND. PUMP	20	1					250	3120	2	40	RECEPTACLE - WD-1	24
25	HVAC - ACCU-185	60	2	4160	3120					--	--	--	26
27	--	--	--			4160	500			1	20	RECEPTACLE - HOUSEKEEPING 189 WASHER	28
29	HVAC - SS-185A, B	15	2					250	480	1	20	RECEPTACLE - Room 185S, 181, 185	30
31	--	--	--	250	180					1	20	RECEPTACLE - ROOF MAU, EXHAUST FAN	32
33	KITCHEN - 301A - EXHAUST FAN & CURB	20	3			1201	180			1	20	RECEPTACLE - WARMING KITCHEN 185	34
35	--	--	--					1201	1741	3	20	KITCHEN - 301C - MAU CONDENSING UNIT	36
37	--	--	--	1201	1741					--	--	--	38
39	KITCHEN - 301B - MAKE-UP AIR UNIT	25	3			1801	1741			--	--	--	40
41	--	--	--					1801	0	1	20	SPARE	42
43	--	--	--	1801	0					1	20	SPARE	44
45	POWER - OVERHEAD DOOR	20	1			1200	0			1	20	SPARE	46
47	SPACE	--	1					--	0	1	20	SPARE	48
49	SURGE PROTECTIVE DEVICE (SPD)	30	3	0	--					1	--	SPACE	50
51	--	--	--			0	--			1	--	SPACE	52
53	--	--	--					0	--	1	--	SPACE	54
	TOTAL LOAD:			22614 VA		18568 VA		12228 VA					
	ADDITIONAL FEED THRU LUGS LOAD (IF APPLICABLE):			0 VA		0 VA		0 A					
	TOTAL AMPS:			197 A		163 A		102 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
HVAC -	9070 VA	100.00%	9070 VA		
POWER -	1200 VA	100.00%	1200 VA	**TOTAL CONNECTED LOAD:**	53409 VA
RECEPTACLE -	11000 VA	95.45%	10500 VA	**TOTAL ESTIMATED DEMAND:**	52909 VA
KITCHEN -	32139 VA	100.00%	32139 VA	**TOTAL CONNECTED LOAD (A):**	148 A
				TOTAL ESTIMATED DEMAND...	147 A

NOTES:

PROVIDE SPD BREAKER PER ONELINE SCHEDULE. RECEPTACLE DEMAND FACTOR = FIRST 10kVA X 100% + 50% OF REMAINDER
AIC RATING IS CALCULATED VALUE, PROVIDE IC RATING AT LEAST 25% HIGHER AS PER SPECIFICATIONS.

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ADD. No. 2	JUNE 15, 2023
ADD. No. 1	JUN 5, 2023
ISSUED FOR	DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
ELECTRICAL PANEL LOAD SHEETS

DATE
MAY 17, 2023

SHEET NUMBER
E 502
21-237.10

TECHNOLOGY KEYED NOTES

1 PROVIDE ROUGH-IN AND CABLING ONLY FOR INTERCOM LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

2 HIGH DATA DROP LOCATION FOR TIMECLOCK.

3 DATA DROP LOCATION FOR FACP. COORDINATE FINAL LOCATION WITH FIRE PROTECTION CONTRACTOR.

4 PROVIDE ROUGH-IN AND CABLING ONLY FOR DISPLAY LOCATION. NO DEVICES INSTALLED AT THIS LOCATION.

5 HIGH DATA DROP LOCATION FOR WALL MOUNT PHONE. PROVIDE SPECIALTY WALL-MOUNT FACEPLATE IN LIEU OF STANDARD FACEPLATE.

6 COIL DATA DROP FOR FUTURE TEMPERATURE MONITOR IN CEILING OF COOLER/FREEZER.

7 DATA DROP(S) FOR MECH/ELEC SYSTEMS. COORDINATE FINAL LOCATION(S) WITH MECH/ELEC CONTRACTORS.

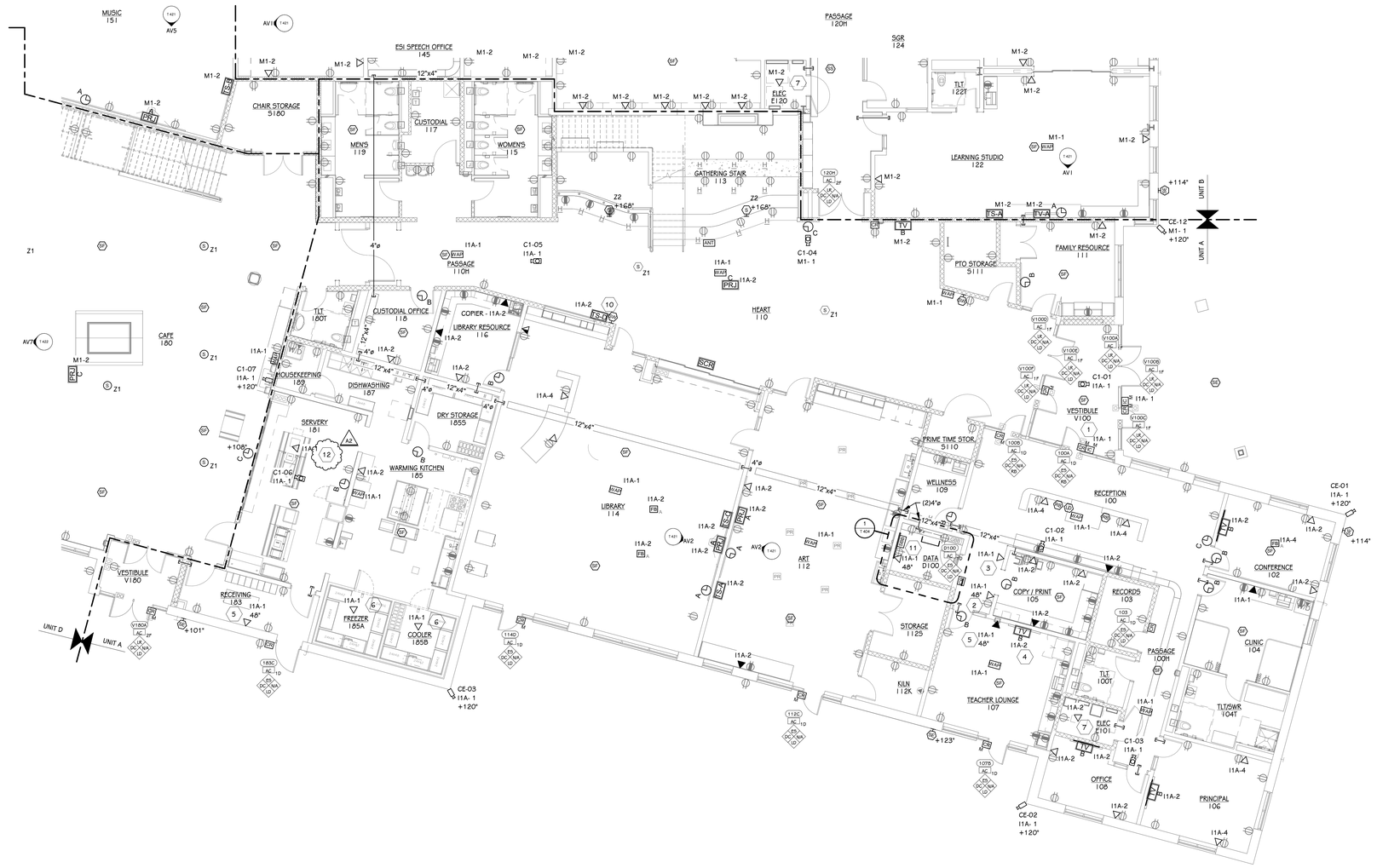
8 DATA DROP FOR ELEVATOR CALLBOX. COORDINATE FINAL LOCATION WITH ELEVATOR CONTRACTOR.

9 COIL CAMERA CABLE ABOVE CEILING IN EDUC WORKSHOP 241.

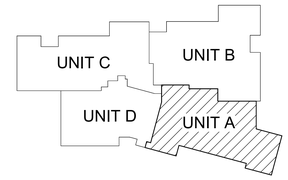
10 STACK THESE TWO DEVICES VERTICALLY AND CENTER BETWEEN EDGE OF WALL AND WINDOW.

11 DATA DROP LOCATION FOR ACP. COORDINATE FINAL LOCATION WITH THE ACCESS CONTROL CONTRACTOR.

12 DATA DROP LOCATION FOR CAFETERIA POINT-OF-SALE DEVICE. COORDINATE WITH THE ELECTRICAL CONTRACTOR AND KITCHEN EQUIPMENT CONTRACTOR.



FIRST FLOOR TECHNOLOGY PLAN - UNIT A
1/8" = 1'-0"



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ADD. No. 1	JUN 5, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

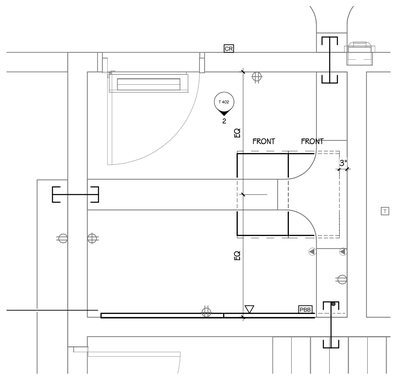
OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

SHEET TITLE
FIRST FLOOR TECHNOLOGY PLAN - UNIT A

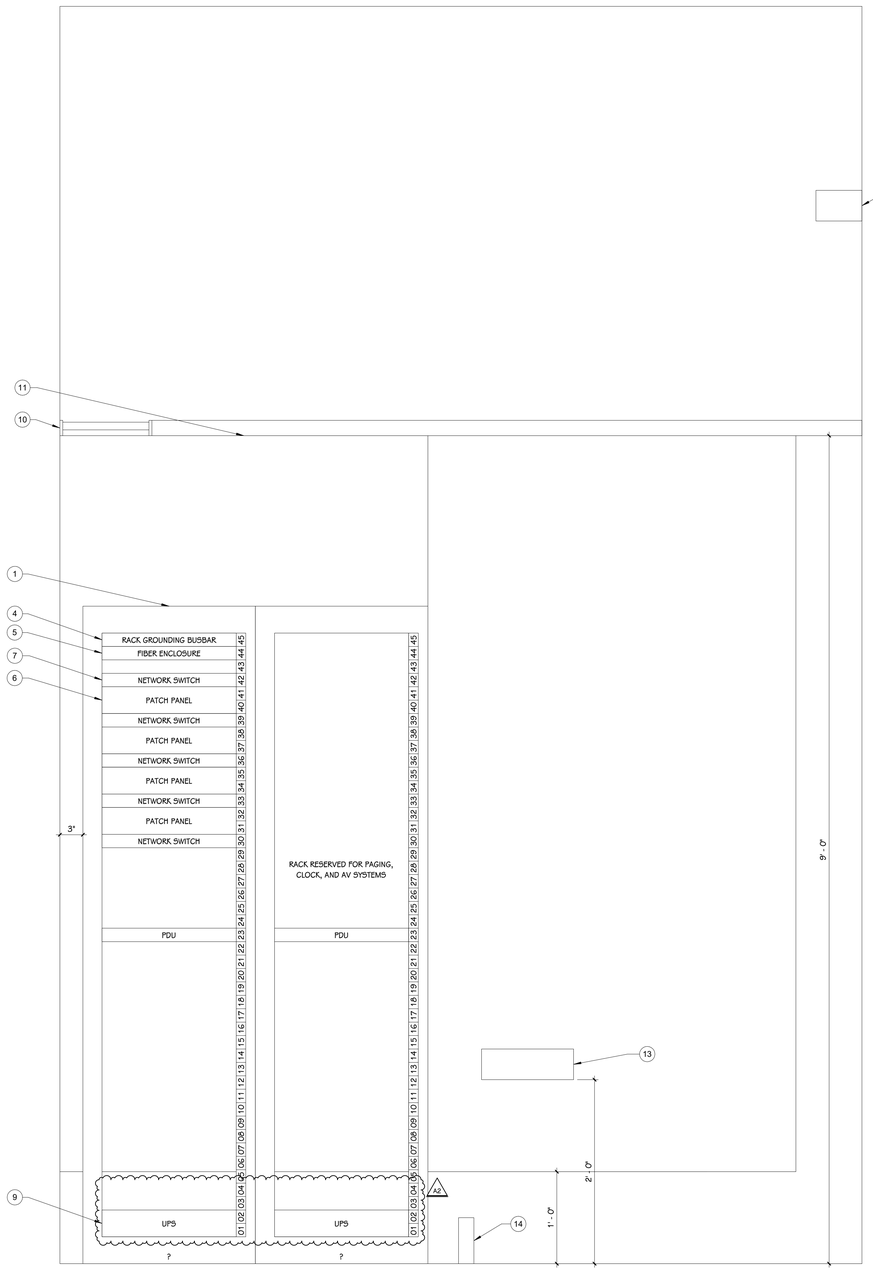
DATE
MAY 17, 2023

SHEET NUMBER
T101A
21-237.10

M1 EQUIPMENT SCHEDULE				
KEY #	DESCRIPTION	MANUFACTURER	PART #	COMMENTS
1	4-POST RACK	ORTRONICS	19-84-SSDA2132	
4	RACK GROUNDING BUSBAR	CHATSWORTH	10610-019	
5	FIBER ENCLOSURE	REFER TO BACKBONE SCHEDULE	REFER TO BACKBONE SCHEDULE	
6	PATCH PANEL	PANDUIT	CP48BLY	
7	NETWORK SWITCH	OWNER PROVIDED	N/A	
8	PDU	~~TRIPPLITE~~	~~PDU1220~~	A2
9	UPS	VERTIV	GXT5-2000LVRT2UXLN	
10	12"W LADDER RACK	~~HOFFMAN~~	~~LSS12BLK~~	
11	PLYWOOD	N/A	N/A	
12	4" CONDUIT SLEEVE	N/A	N/A	
13	GROUNDING BUSBAR	PANDUIT	GB4B0612TPI-1	
14	2" CONDUIT	N/A	N/A	



1 T 402 M1 ROOM D140 PLAN
1/2" = 1'-0"



2 T 402 M1 ROOM D140 ELEVATION
1 1/2" = 1'-0"

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PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

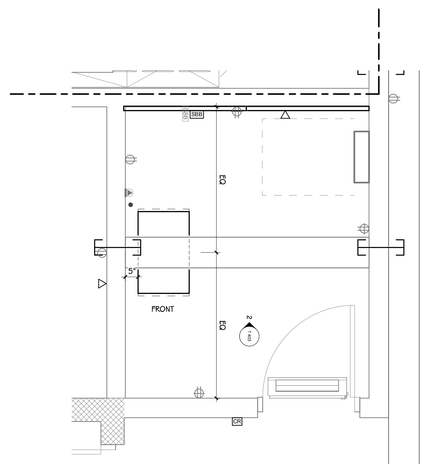
SHEET TITLE
M1 ROOM D140 DETAILS

DATE
MAY 17, 2023

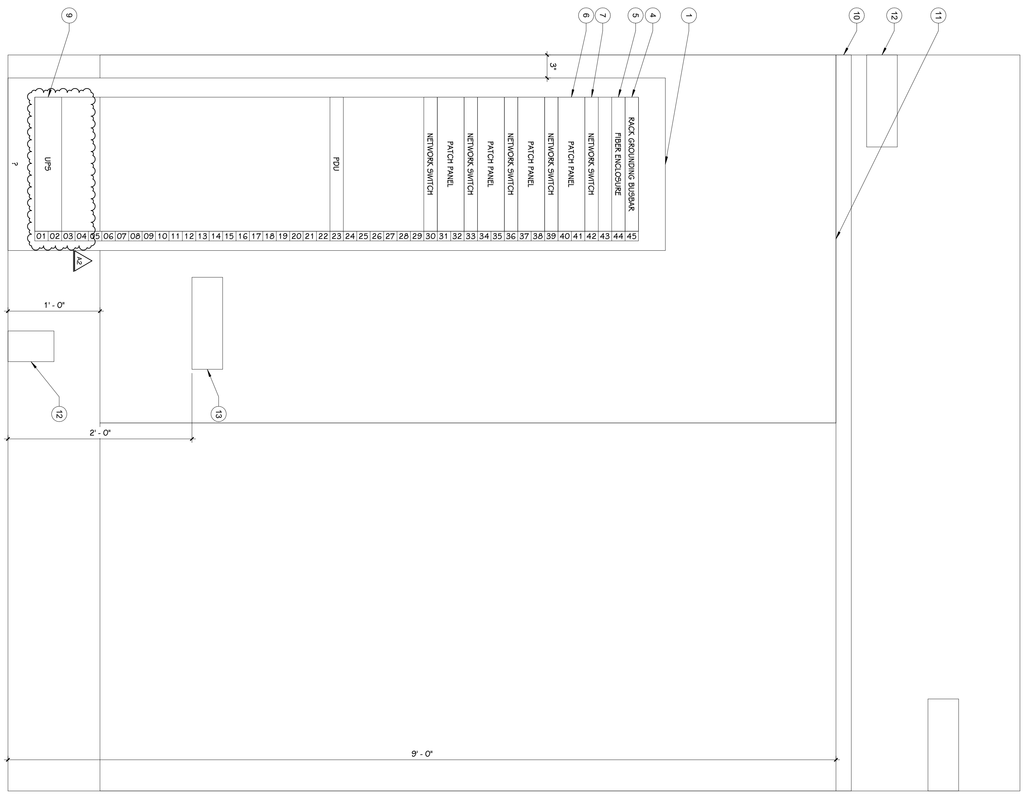
SHEET NUMBER
T 402
21-237.10

I2A EQUIPMENT SCHEDULE

KEY #	DESCRIPTION	MANUFACTURER	PART #	COMMENTS
1	4-POST RACK	ORTRONICS	19-84-SSDA2132	
5	FIBER ENCLOSURE	REFER TO BACKBONE SCHEDULE	REFER TO BACKBONE SCHEDULE	
6	PATCH PANEL	PANDUIT	CP48BLY	
7	NETWORK SWITCH	OWNER PROVIDED	N/A	
8	PDU	~~TRIPPLITE~~	~~PDU1230~~	
9	UPS	VERTIV	GXT5-2000LVRT2UXLN	4
10	12"W LADDER RACK	~~HOFFMAN~~	~~LSG12BLK~~	
11	PLYWOOD	N/A	N/A	
12	4" CONDUIT SLEEVE	N/A	N/A	
13	GROUNDING BUSBAR	PANDUIT	GB4B0612TPI-1	



1 A403 I2A ROOM D240PLAN
1/2" = 1'-0"



2 A403 I2A ROOM B222 ELEVATION
1 1/2" = 1'-0"

SHEET TITLE
I2A ROOM D240 DETAILS

SHEET NUMBER
T 403

DATE
MAY 17, 2023

21-237.10

OWNER
PORTAGE PUBLIC SCHOOLS

Portage, Michigan

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

ISSUED FOR
ADD. No. 2

DATE
JUNE 15, 2023

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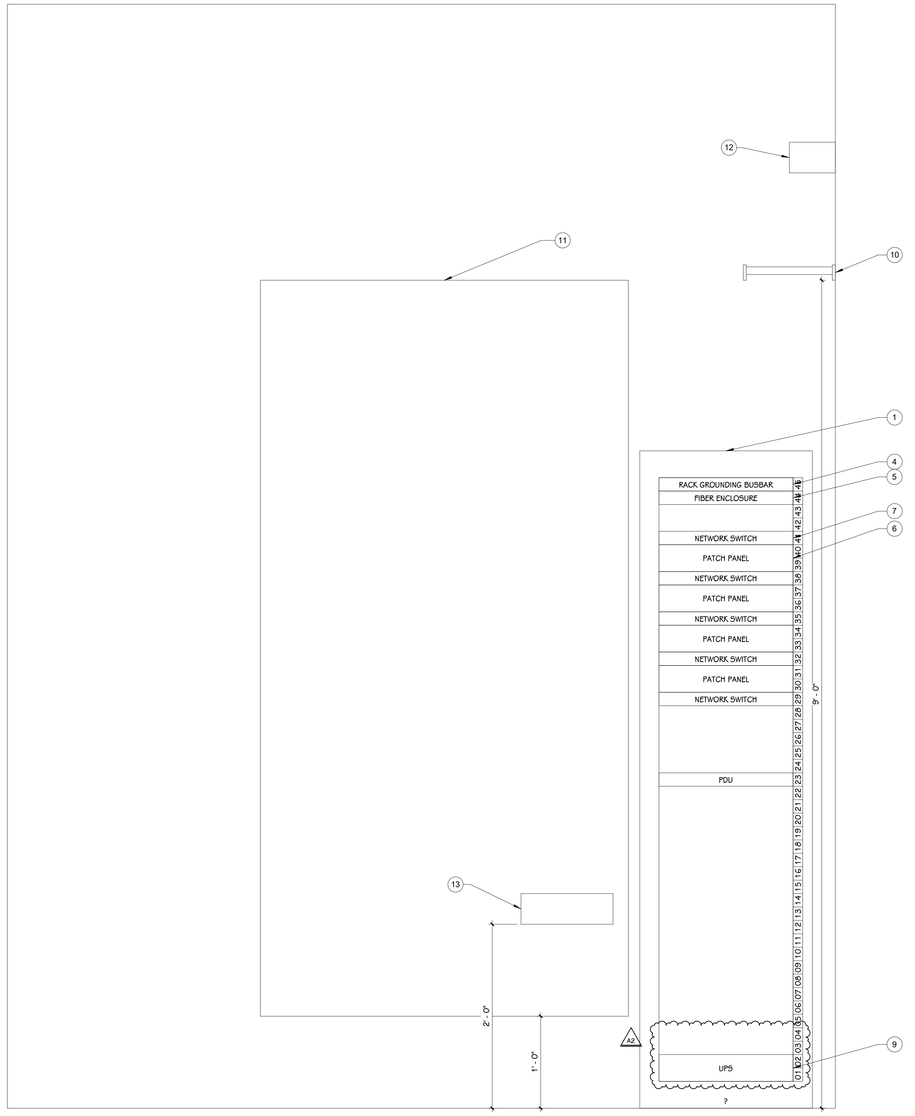
I1A EQUIPMENT SCHEDULE				
KEY #	DESCRIPTION	MANUFACTURER	PART #	COMMENTS
1	4-POST RACK	ORTRONICS	19-84-SSDA2132	
4	RACK GROUNDING BUSBAR	CHATSWORTH	10610-019	
5	FIBER ENCLOSURE	REFER TO BACKBONE SCHEDULE	REFER TO BACKBONE SCHEDULE	
6	PATCH PANEL	PANDUIT	CP48BLY	
7	NETWORK SWITCH	OWNER PROVIDED	N/A	
8	PDU	~~TRIPPLITE~~	~~PDU1220~~	
9	UPS	VERTIV	GXT5-2000LVRT2UXLN	
10	12"W LADDER RACK	~~HOFFMAN~~	~~LSS12BLK~~	
11	PLYWOOD	N/A	N/A	
12	4" CONDUIT SLEEVE	N/A	N/A	
13	GROUNDING BUSBAR	PANDUIT	GB4B0612TPI-1	

1 / T 404 I1A ROOM D100 PLAN
1/2" = 1'-0"



2 / T 404 I1A ROOM D100 ELEVATION
1 1/2" = 1'-0"

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ADD. No. 2	JUNE 15, 2023

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID
PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS

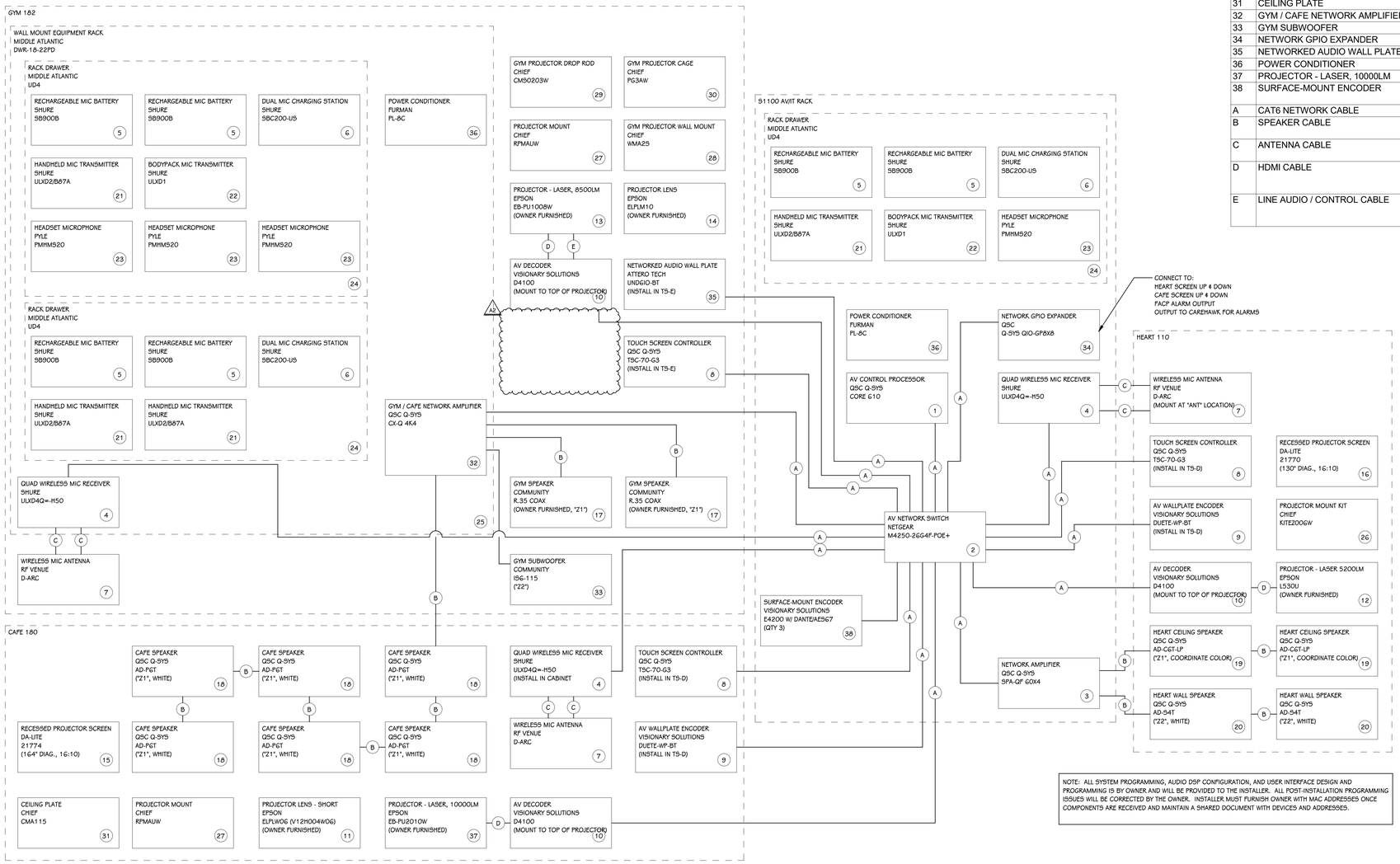
Portage, Michigan

SHEET TITLE
I1A ROOM D100 DETAILS

DATE
MAY 17, 2023

SHEET NUMBER
T 404
21-237.10

AV7 EQUIPMENT SCHEDULE				
KEY #	DESCRIPTION	MANUFACTURER	PART #	COMMENTS
1	AV CONTROL PROCESSOR	QSC Q-SYS	CORE 610	
2	AV NETWORK SWITCH	NETGEAR	M4250-26G4F-POE+	
3	NETWORK AMPLIFIER	QSC Q-SYS	SPA-QF 60X4	
4	QUAD WIRELESS MIC RECEIVER	SHURE	ULXD4Q=-H50	
5	RECHARGEABLE MIC BATTERY	SHURE	SB900B	
6	DUAL MIC CHARGING STATION	SHURE	SBC200-US	
7	WIRELESS MIC ANTENNA	RF VENUE	D-ARC	
8	TOUCH SCREEN CONTROLLER	QSC Q-SYS	TSC-70-G3	
9	AV WALLPLATE ENCODER	VISIONARY SOLUTIONS	DUETE-WP-BT	
10	AV DECODER	VISIONARY SOLUTIONS	D4100	
11	PROJECTOR LENS - SHORT	EPSON	ELPLW06 (V12H004W06)	OWNER FURNISHED, CONTRACTOR INSTALLED
12	PROJECTOR - LASER 5200LM	EPSON	L530U	OWNER FURNISHED, CONTRACTOR INSTALLED
13	PROJECTOR - LASER, 8500LM	EPSON	EB-PU1008W	OWNER FURNISHED, CONTRACTOR INSTALLED
14	PROJECTOR LENS	EPSON	ELPLM10	OWNER FURNISHED, CONTRACTOR INSTALLED
15	RECESSED PROJECTOR SCREEN	DA-LITE	21774	
16	RECESSED PROJECTOR SCREEN	DA-LITE	21770	
17	GYM SPEAKER	COMMUNITY	R.35 COAX	OWNER FURNISHED, CONTRACTOR INSTALLED
18	CAFE SPEAKER	QSC Q-SYS	AD-CAFE	
19	HEART CEILING SPEAKER	QSC Q-SYS	AD-CGT-LP	
20	HEART WALL SPEAKER	QSC Q-SYS	AD-S4T	
21	HANDHELD MIC TRANSMITTER	SHURE	ULXD2/B87A	
22	BODYPACK MIC TRANSMITTER	SHURE	ULXD1	
23	HEADSET MICROPHONE	PYLE	PMHMS20	
24	RACK DRAWER	MIDDLE ATLANTIC	UD4	
25	WALL MOUNT EQUIPMENT RACK	MIDDLE ATLANTIC	DWR-18-22PD	
26	PROJECTOR MOUNT KIT	CHIEF	KITEZ006W	
27	PROJECTOR MOUNT	CHIEF	RPMAUW	
28	GYM PROJECTOR WALL MOUNT	CHIEF	WMA2S	
29	GYM PROJECTOR DROP ROD	CHIEF	CMS0203W	
30	GYM PROJECTOR CAGE	CHIEF	PG3AW	
31	CEILING PLATE	CHIEF	CMA115	
32	GYM / CAFE NETWORK AMPLIFIER	QSC Q-SYS	CX-Q 4K4	
33	GYM SUBWOOFER	COMMUNITY	IS6-115	
34	NETWORK GPIO EXPANDER	QSC	Q-SYS QIO-GP8X8	
35	NETWORKED AUDIO WALL PLATE	ATTERO TECH	UND6IO-BT	
36	POWER CONDITIONER	FURMAN	PL-8C	
37	PROJECTOR - LASER, 10000LM	EPSON	EB-PU2010W	
38	SURFACE-MOUNT ENCODER	VISIONARY SOLUTIONS	E4200 W/ DANTE/AES67	
A	CAT6 NETWORK CABLE			REFER TO DATA CABLE SCHEDULE
B	SPEAKER CABLE	BELDEN	6500UE TO 6200UE	SELECT GUAGE AS NEEDED TO KEEP SYSTEM LOSS BELOW 2 DECIBELS
C	ANTENNA CABLE	BELDEN	89913	INCREASE CONDUCTOR GAUGE AS NEEDED TO MAINTAIN SUFFICIENT SIGNAL
D	HDMI CABLE	KRAMER	C-HM/HM/PICO/[XX]-[###]	LENGTH AS REQUIRED FOR APPLICATION WITH "###". MATCH COLOR WITH "XX". USE C-HM/HM/PRO-[##] FOR LENGTHS OVER 9'.
E	LINE AUDIO / CONTROL CABLE	BELDEN	9451P	CONNECTORS AS REQUIRED FOR APPLICATION. NEUTRIK NP[2/3]X-BAG FOR TS/TRS



NOTE: ALL SYSTEM PROGRAMMING, AUDIO DSP CONFIGURATION, AND USER INTERFACE DESIGN AND PROGRAMMING IS BY OWNER AND WILL BE PROVIDED TO THE INSTALLER. ALL POST-INSTALLATION PROGRAMMING ISSUES WILL BE CORRECTED BY THE OWNER. INSTALLER MUST FURNISH OWNER WITH MAC ADDRESSES ONCE COMPONENTS ARE RECEIVED AND MAINTAIN A SHARED DOCUMENT WITH DEVICES AND ADDRESSES.

AV7 RISER - LARGE SPACE AV

SCALE: NONE

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ADD. No. 2 — JUNE 15, 2023
ISSUED FOR — DATE

PROJECT TITLE
CENTRAL ELEMENTARY SCHOOL BID PACKAGE 4: CONSTRUCTION

OWNER
PORTAGE PUBLIC SCHOOLS
Portage, Michigan

DATE
MAY 17, 2023

SHEET TITLE
A/V DETAILS

SHEET NUMBER
T 422
21-237.10

Owen-Ames-Kimball Co.

Printed on Fri Jun 16, 2023 at 11:09 am EDT

Job #: 1090-A PPS - A - Central Elementary
8422 S Westnedge Ave
Portage, Michigan 49002
2693236100

RFI Response Report

#	Subject	Question	Official Response
ADD 1 -BP 4 - Prebid RFI 001	Substitution Request 001	Request to add Wolverine Enclosures / AAP as an approved fabricator for Section 07 4213.23. Larry Krause, Wolverine Enclosures, larry.k@panels.com	Please submit as a Voluntary Alternate. M. Rossio 6/7/23
ADD 1-BP 4 - Prebid RFI 002	Door Hardware Clarification	Specifications 087100 Door Hardware Door Hardware Specifications are incomplete and missing all Hardware Sets and Opening Assignments. With the Specifications that are currently included we are unable to begin pricing any materials; including Doors and Frames which required the correct and proper hardware preps. When will correct Hardware Specifications (087100) be issued – including complete Hardware Sets? Tom Roberts - S.A. Morman & Co., troberts@samorman.com	Hardware Specification to be included in Addendum No. 1 (OAK to have add.by June 6)M. Rossio 5/31/2023
ADD 1-BP 4 - Prebid RFI 003	Toilet Accessories - Clarification Enlarged Plans A401	Enlarged Plans A401 1/A401 Toilet/Shower 104T has Marks 16 and 17. There are no Marks 16 or 17 shown on Keyed Notes – Enlarged Plans. Please Clarify 5/A401 Women's 115 and Men's 119 have "Mark" 16. There is no Mark 16 shown on Keyed Notes – Enlarged Plans. Please Clarify Is a Shower Grab Bar required at 104T? Please clarify Tom Roberts, S.A. Morman & Co., troberts@samorman.com	Refer to Addendum No. 1Items 1 and 2:A401:Keynote 16: Stainless Steel Framed Mirror (24" x 60"). (Women's 115/ Men's 119)Keynote 17: Continuous Stainless Steel Shower Grab Bar.Removed keynote to shower head.Item 3:Yes, shower grab bar is required, refer to revised keynote 17.M. Rossio 6/2/23
ADD 1-BP 4 - Prebid RFI 004	Specification 10 2800 - Manufacturer Clarification	No Manufacturer or Model Number is provided for Mark 12 Baby Changing Station. Please Clarify No Manufacturer or Model Number is provided for Mark 14 Changing Seat. Please Clarify Tom Roberts, S.A. Morman & Co., troberts@samorman.com	Keynote 12: Baby Changing Station shall be one of the 4 manufacturers listed in section10 2800 para 2.6.A meeting the requirements of para 2.6.B.Keynote 14: Fold Down Changing Seat, see section 10 2800 para 2.4.F attached toAddendum No. 1 (American Specialties, Inc; 8209)D. Heaton 6/1/23
ADD 1-BP 4 - Prebid RFI 005	Specification 10 2800 -Plans Clarification	Specifications include Bobrick B-76727 Hooks, but none are shown on Plans. Please clarify. Specifications include Bobrick B-680 Soap Dish, but none are shown on Plans. Please clarify. Specifications include Bobrick B-223 Mop & Broom Holder, but none are shown on Plans. Please clarify. Tom Roberts, S.A., Morman & Co., troberts@samorman.com	Refer to Addendum No. 1. Robe Hooks, Soap Dish added to Shower 104T. Mop and BroomHolders added to 117, 261S.M. Rossio 6/2/2023
ADD 1-BP 4 - Prebid RFI 007	Technology Clarification	1. Print T401, under backbone equipment schedule. Fiber optic parts are listed as Corning. In the upper right corner of the print it shows Panduit fiber optic ends. The written spec also states Corning. Which is correct? The corning part number for fiber is 3X the cost of Panduit/General Cable equivalent. 2. Demo print TS101. How many strands is the existing fiber that has to be pulled back and respliced? Dave Phillips, ElectroMedia, Inc., dphillips@electromediainc.com	1. All items should be Corning brand for the base bid. Updated part numbers will be included in addendum 1. If you would like to propose another manufacturer, please do so as a voluntary alternate. 2. See addendum 1 for revised instructions and more detail on sheet TS101.
ADD 1-BP 4 - Prebid RFI 008	Scope Clarification	Demo print TS101. Who is responsible for the demo of the existing conduit? Who is responsible for the directional bore and installation of the new conduit? Dave Phillips, ElectroMedia, Inc., dphillips@electromediainc.com	1. N/A as demo of the existing building is to be bid at a later date. 2. Electrical is responsible for the directional bore and install of the new conduit.
ADD 1-BP 4 -	Scope Clarification	The specifications call for fiberglass Z girts. Who is responsible for this and where is it detailed on the drawings. Frank Wright, Advanced Construction Group Inc, frankw@acongrp.com	These would be at the canopy but none are shown on the drawings. Any "Z" girts would be provided as needed by the Metal Panel contractor.

#	Subject	Question	Official Response
Prebid RFI 011			
ADD 1-BP 4 - Prebid RFI 012	Scope Clarification	1. Is the clock contractor responsible for providing the power pigtails to the awarded Electrical contractor? Ron Mielecki, Electromedia, rmielecki@electromediainc.com	1. Yes the clock contractor is responsible for providing the pigtails for the electrical contractor.
BP 4 - Prebid RFI 006	Substitution Request 002	Request for Playcraft equipment to be approved as an equal for the Playground Equipment. Karmen Posthumus, Play Environments Design, karmenp@playenviro.com	Playcraft is approved as equal
BP 4 - Prebid RFI 009	Substitution Request 003	Request to have Victaulic couplings, fittings, and valves allowed on the hydronic piping and domestic water piping systems. Division 22 – Plumbing: 22 1116 Domestic Water Piping – I would like this verbiage added as an option under Aboveground Domestic Water Piping. “Grooved Joints: Assemble joints with grooved end pipe or grooved end tube coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer’s written instructions.” Division 23 – HVAC: 23 2113 Hydronic Piping – I would like this verbiage added as an option under Aboveground Hydronic Piping. “Schedule 40 steel pipe; grooved, mechanical joint coupling and fittings, and grooved, mechanical joints.” Blake Simon, Victaulic, Blake.Simon@victaulic.com	This is not accepted but may be presented as a voluntary alternate for review. Per client direction, grooved piping systems are notallowed on domestic water and hydronic systems.K. Beckstrom 06/08/2023
BP 4 - Prebid RFI 010	Substitution Request 004	Request approval to quote the attached as equal to, or an acceptable alternate to the specified products listed in the specifications or on the plan schedules. Dick Vredevoogd, Balfrey & Johnston, dickv@balfrey-johnston.com	Please submit as a voluntary alternate.K. Beckstrom 06/08/2023
BP 4 - Prebid RFI 013	Grooved Pipe & Fittings	Will grooved pipe and fittings be accepted on the heating and chilled water piping? The spec states 2-1/2” and larger needs to be welded. There is a mention of grooved fittings under the pipe joint construction. The valve spec allows grooved valves in the valve specification. Ken Pluta, A1 Mechanical Contractors, kpluta@a1refrig.com	This is not accepted but may be presented as a voluntary alternate for review. Per client direction, grooved piping systems are not allowed heating and chilledwater systems. Specifications will be updated to reflect this in future addendum.K. Beckstrom 06/08/2023
BP 4 - Prebid RFI 014	Substitution Request 005	Request to add Castle Metal Products as an acceptable fabricator. They have the capabilities and expertise to complete the radius MCM panels as indicated in the plans on this project. Castle Metal Products has vast experience manufacturing metal composite material wall panels with millions of square feet of wall panels fabricated. The Castle Metal Products RS-400 would provide an equal aesthetic and would be fabricated with material from the manufacturers listed in the spec with a finish to match the architect’s desired color and warranty. In addition, the Castle Metal Products RS-400 system meets and exceeds the specification by passing the following additional panel assembly performance tests: Air Leakage: ASTM E283 Structural: ASTM E330 Water Penetration - Static: ASTM E331 Water Penetration – Dynamic: AAMA 501.1 Pressure Equalization: ASTM E1233 Pressure Equalized Rainscreen: AAMA 508 Drained and Back Ventilated: AAMA 509 Fire: NFPA 285 Camryn Castle, Dynamic Enclsoure, cam@dynamicenclosure.com	Please submit as a Voluntary AlternateM. Rossio 6/12/23
BP 4 - Prebid RFI 015	Tech Cabinet	Is there a specification, model number, or product data for the tech cabinet that is called out in Café 180?	See detail on sheet T422. Middle Atlantic DWR-18-22PD Cameron Drake
BP 4 - Prebid RFI 016	Monument Sign	Drawing A111 does not contain information for a monument sign. Is the new monument sign part of this bid package? Will the existing monument sign have to be moved? Larry Gerken, Visual Entities, lgerken@visualentitiesinc.com	TowerPinkster will be working with OAK to provide an allowance for a new monument sign in thebid package. The existing concrete/masonry monument sign shown on CD 100 is to be demo'd.M. Rossio 6/12/23
BP 4 - Prebid RFI 017	Substitution Request 006	Request to add Duro-Tuff 60-Mil Membrane to the approved list. Nick Prezzato, Superior Services RSH, Inc, nick@superiorservicesrsh.com	Provide as a voluntary alternate.M. Rossio 6/12/23
BP 4 - Prebid	Interior Signage	Will the interior signage be included in this bid package? Larry Gerken, Visual Entities, lgerken@visualentitiesinc.com	Interior signage will be out at a later date.

#	Subject	Question	Official Response
RFI 018			
BP 4 - Prebid RFI 019	Steel Detail Clarification	Steel beam legend shows collector connections indicated by a large black dot. What is the expected design of collector connections at masonry bearing locations and beam to column locations? Please provide detail to follow. Scott Bruce, Van Dellen Steel, sbruce@vandellensteel.com	For steel beam to column connection, please refer to sheet note 9 in detail 1/S520, starting "At drag connections, provide additional column of bolts beyond number required per details". Similar note is provided at other details on the same sheet. For steel beam to masonry connection, please refer to detail 2/S511. TM (TT) - 6/14/2023
BP 4 - Prebid RFI 020	Glass & Glazing for Wood Doors Clarification	Specifications 081416 Flush Wood Doors note that Wood Doors are to be factory glazed. We have been informed by the Wood Door Manufacturer that several of the Glass Types (i.e. FPSG-1, FPSG-3, SG-1) is not available from the factory. Please review and clarify glass requirements for all Wood Doors as noted on the Door Schedule. If the various “special” glass is indeed required (i.e. ½” School Guard SG4, 1.125” Bullet Resistant Laminated, 1 1/8” Viracon IG Laminated, etc.) the Wood Doors cannot and will not be factory glazed. All glass and glazing will need to be supplied and installed by Bid Category #18 Aluminum, Glass & Glazing. Tom Roberts, S.A. Morman & Co., troberts@samorman.com	All glazing in the wood doors will be by BC 18 - Aluminum, Glass, and Glazing.
BP 4 - Prebid RFI 021	MCM-1 Color Clarification	The color is called out as two different things on the elevations. MCM-1 Clear Anod. & MCM-1 Dark bronze. (The Spec calls out Clear Anod.) REF sheet - A 301 Could you please let me know what color is being used? Alex Santiago, MetalTech Building Specialists, alex@metaltech.com	MCM-1 is to be Clear Anod. Elevations on A301 to be updated in Addendum No. 2.M. Rossio/AC 6/12/2023
BP 4 - Prebid RFI 022	Door Operators	Can you please clarify who is providing and installing the door operators? Matt Hazelhoff, Hazelhoff Builders Inc., matt@hazelhoffbuilders.com	All door operators are provided by BC 16: Doors, Frames and Hardware and all will be installed by BC 18: Aluminum, Glass & Glazing. Raceways and power are provided by BC 39: Electrical.
BP 4 - Prebid RFI 023	Curved Coping	The distributor of the MCM panel is unable to provide the curved coping as shown in drawing A-111 . If we sourced a curved coping from a different manufacture the metal color would likely be different. Would we be able to segment the coping cap? Cortney Chick, Advanced Construction Group Inc., cortneyc@acongrp.com	Revised detail to metal fascia in lieu of coping. Fasciato be curved.M. Rossio 6/14/23
BP 4 - Prebid RFI 024	Waterplace Fireplace	Is there a specification for the waterplace fireplace shown in detail 12/I422? Matt Hazelhoff, Hazelhoff Builders, Inc., matt@hazelhoffbuilders.com	Basis of Design - Provide NZW72F Netzero Single-Sided Firebox (AA-11-05375), Media "black glass", Liner "black Glass", Flame Color - Natural Orange, with Safety Screen. - https://netzerofire.com/netzero-resources/Waterplace Resources - Fireboxes - NZW72F Single-Sided.Coordinate with Mech (P101A/B) and Elect. (E101A - noted as FP-1).M. Rossio 6/12/23 Retailer: BUILDER'S FIREPLACE COMPANY - 521 West Main St., Lowell, MI, 49331 - 616-897-0848HEAT N SWEEP - 2041 W Grand River Avenue, Okemos, MI, 48864 - 517-349-2555
BP 4 - Prebid RFI 025	Door Hardware Clarification	Some of the hardware sets have cylinders by Owner, other sets list Sargent Cylinder and GMK Keying. Please clarify who is to supply the cylinder and keying on this project. Tim Ruster, SAHR, tjr@teamsahr.com	Exterior: ASSA cylinders provided by Portage Public Schools Interior: Sargent XC to match existing Portage Public Schools GGM System provided by hardware supplier. JC/M. Rossio 6/14/23
BP 4 - Prebid RFI 026	Substitution Request 007	Request the approval of the SL-15 aluminum storefront doors. Special-Lite is approved in the spec for the aluminum framing but the aluminum doors. Special-Lite’s SL-15 exceeds the thermal performance of the specification without being thermally broken. The spec indicates that the door construction should be made with “high-performance plastic connectors separate aluminum members”. The thermal performance of the SL-15 is superior to some of those specified as well. Craig Mester, The Eisen Group, cmester@eisengroup.com	Refer to Add. No. 2. Entrance Door Systems 08 4113 2.4 A. Stile-and-Rail Entrance Doorsto be removed from specifications. Doors 107B, 112C, and 114D to be revised to FRPEntrance Doors.M. Rossio 6/14/23
BP 4 - Prebid RFI 027	Anchor Bolt in CMU Wall	Detail 11&12/S601 show a bent anchor bolt embedded in CMU wall supporting deck relief angle. This installation method is not particularly affective. Should these anchors be bid as epoxy, wedge, or screw type anchors? Scott Bruce, Van Dellen Steel, sbruce@vandellensteel.com	Base bid drawings shall be per design intent indicated on the structural drawings. Epoxy, wedge, and screw anchors may be considered as an alternate for the purposes of pricing/ bidding. Any alternates to be fully evaluated by TT as a substitution request submitted by the awarded contractor. TM(TT) - 6/14/2023

#	Subject	Question	Official Response
BP 4 - Prebid RFI 028	Door Clarification	Opening 151A is noted on the Door Schedule as a STC42 Wood Door Type FG2. Opening 151B is also noted as a STC42 Wood Door Type FG2 with 45 Minute Fire Rating. I have been told by all of the approved manufacturers that they are unable to provide STC42 with a Type FG2 Door, they cannot provide a 45 Minute Fire Rating and they cannot provide the glass as specified. Please clarify as soon as possible how you would like these two Openings priced/manufactured? Tom Roberts, S.A. Morman & Co., troberts@samorman.com	Doors 151A and 151B - revise door type to "F" in lieu of "FG2". Maintain STC42 rating. Doors to be updated in Add. 2 as noted.M. Rossio 6/12/23
BP 4 - Prebid RFI 029	Masonry/ Miscellaneous Metals Scope Clarification	Will OAK provide a winter allowance for all masons to carry in their bids. Who is responsible for the supplying and installing of the fero fast brackets and steel angles as indicated on detail 4/S 605. Who is responsible for the supplying and installing the thermally broken support bracket called out on Detail 3/S 605. The note refers to the architectural plans, I am not seeing these on the architectural plans. Joe Wiseman, JK Masonry, Inc., joe@jkmasonryinc.com	1. No, O-A-K will carry the winter allowance. 2. BC 09 - Masonry will furnish and install the Fero Tie System. BC 11 - Miscellaneous Metals will furnish angles to the mason for install. 3. BC 09 - Masonry is responsible for supplying and installing the thermally broken support bracket.
BP 4 - Prebid RFI 030	Fero System Shelf angle thickness	Reference detail 4/S605 refers to a 3/4" continuous shelf angle. Just want to verify if that is the correct thickness?	Please use 3/8" angle for the purpose of the bid/pricing, detail will be updated. TM (TT) 6/14/2023
BP 4 - Prebid RFI 031	Joist Size	There appears to be a significant amount of 12k joists and some 14k joists on this project. Vulcraft no longer produces these sizes. The joists will be quoted as 16ks. Do we need to make any adjustments on ceiling heights and duct clearance? Caleb Hopping, Builders Iron Inc., caleb.hopping@builderiron.com	Ceiling heights and duct elevations are finalized and fully coordinated. Base bid drawings shall be per design intent indicated on the structural drawings if said joists are available by other manufacturer and meet SJI specifications. If deeper steel joists are to be considered, further cross-discipline coordination will be required. Any alternates to be fully evaluated by TT as a substitution required submitted by the awarded contractor. TM (TT) - 6/14/2023
BP 4 - Prebid RFI 032	AISC Certified	The steel spec calls for the fabricator to be AISC certified. Will this specification requirement be waived? Ron Paridee, Division 5 Metalworks, rparidee@d5m.net	No, this requirement will not be waived. Fabricator to be AISC certified. TM/M. Rossio 6/15/23
BP 4 - Prebid RFI 033	Substitution Request 008	I am submitting Alfrex FR Metal Composite Material for consideration as an acceptable equal to the specified products. We are equal to the other domestic MCM manufacturers, Alucobond, Alpolic, Reynobond, and Alucoil since: We use the same aluminum alloy, PPG paints, fire-resistant core type, and manufacturing process. We manufacture the same standard product thicknesses, widths, and lengths We provide the same finish warranties and product performance warranties We are fully tested and product compliant to the same North American building code requirements. We have passed the same required fire performance tests for the USA and Canada. We all only manufacture MCM panels and supply those panels to the same customer base. It is that customer base which supplies their own proprietary installation systems and final fabricated panel assembly. Our manufacturing plant and global headquarters is located in Buford, Georgia USA. For review I have attached a digital submittal package containing a request for substitution form and supporting documentation, including our ICC-ESR report and project references. Please note that we are typically more price competitive since we manufacture our fire-resistant core material in house, and extremely competitive on custom colors. For additional information, please visit our website at www.alfrexusa.com Camille Knezevich, Alfrex, camille@alfrexusa.com	Provide as Voluntary Alternate. M. Rossio 6/14/2023
BP 4 - Prebid RFI 034	Paging Clarification	We are requesting clarification on the reference to “…enable alert notification from each classroom…”. We interpret this to imply that each Lightspeed classroom amplifier shall provide the ability to initiate a “call-in” function and alert the system that a call has been placed from a specific classroom with system annunciation by specific room number/name either via the administrative console or the optional digital display. Please confirm that this is the intended function of the Lightspeed integration with the Carehawk system. "NOTE: INTEGRATE CONTACT CLOSURES FROM LIGHTSPEED AUDIO SYSTEM AMPLIFIER TO ENABLE ALERT NOTIFICATION FROM EACH CLASSROOM AS WELL AS LOCAL AUDIO MUTE DURING PAGES" Spec Section: 27 5123.50 Drawing #: T406-Paging & Bell Riser Diagram-Typical. Isaac McClelland, Buist Electric, imcclelland@Buistelectric.com>	Yes, this means that each Lightspeed classroom amplifiershall provide the ability to initiate a "call-in" function to theCareHawk system.Cameron Drake
BP 4 - Prebid RFI 035	Casework Scope Clarification	Can you confirm that the specialty corner bookcases are to be included in BC 31 - Casework? Terry Edewaard, Architectural Systems Group LLC., terry@asgllc.org	This is correct. This is included in BC 31 Casework scope of work.
BP 4 - Prebid RFI 036	Termite Control	Is termite control required? If so please provide a specification. John Kakoczki, Earley & Assoc., jkakoczki@earleyassoc.com	Yes - refer to specification section 31 3116 Termite Control. A revised spec section will be provided in add. no. 2 to clarify information with spec. M. Rossio 6/15/23
BP 4 -	Concrete/	1. Is Bid Category No. 6: Concrete responsible for grouting "beam pockets"? 2. Is Bid Category No. 6: Concrete responsible for calking exterior construction and control	1. BC 06 - Concrete is responsible for base leveling plates. BC

#	Subject	Question	Official Response
Prebid RFI 037	Masonry Scope Clarification	joints? 3. Is Bid Category No. 7: Polished concrete pouring their own concrete floors?	09 - Masonry is responsible for grouting beam pockets. 2. Yes, Bid Category 6: Concrete is responsible for caulking the exterior construction and control joints. 3. Yes, Bid Category 7: Polished Concrete is responsible for pouring their own concrete.
BP 4 - Prebid RFI 038	Sink Tag	It appears the sink in Learning Studio 252 is not tagged. Please update. Ken Pluta, A-1 Refrigeration, kpluta@a1refrig.com	There is no sink in Learning Studio 252. Plumbing drops in shared wall betweenLearning Studio 252 and Learning Commons 240 serve sink SK-1 located inLearning Commons 240.K. Beckstrom 06/14/2023
BP 4 - Prebid RFI 039	Waste Piping	There is no above ground waste piping shown to the 2nd floor fixtures, not in the gang restrooms P000A/P301 - The urinals in 115 do not have water or waste to them. Was the plan to have the chase wall extend further to include them? Ken Pluta, A-1 Mechanical, kpluta@a1refrig.com	1. Refer to 2/P301.2. Revised chase layout to include urinals in Men's 119. Refer to Add. No. 2.- K. Beckstrom 06/15/2023
BP 4 - Prebid RFI 040	Flooring Clarification	Can you please confirm that CPT-1 wraps down the face of the carpeted platforms? I am confused between the use of the base and not having a detail regarding termination of the carpet on the platform edges. Justin Roberts, Great Lakes Flooring Specialists, justin@greatlakesflooring.net	Yes, in the gathering stair carpet wraps tread andriser where indicated - refer to details 13A and 13BI 422 for required nosing and trims.
BP 4 - Prebid RFI 041	Plumbing Plan Clarification	On sheet P101D, there is a callout for SK-6 on the East wall of the Café. I can't find SK-6 in the specifications. Ken Pluta, A-1 Mechanical, kpluta@a1refrig.com	This sink is SK-5 in the specifications. Refer to Add. 02 for drawing correction.- K. Beckstrom 06/15/20203
BP 4 - Prebid RFI 042	LPDA/Painting Scope Clarification	It appears that the wallcovering spec is in the LPDA scope currently. Can you please confirm this is correct? Jonathan Fisk, Sobie Company Inc., jfisk@sobiecompany.com	No, Spec section 09 7200 will be removed from BC 19 - LPDA and will added to BC 20 - Painting.
BP 4 - Prebid RFI 043	Waterplace Fireplace 02	Who is responsible for suppling and installing the waterplace fireplace shown in detail 12/I422? Matt Hazelhoff, Hazelhoff Builders Inc., matt@hazelhoffbuilders.com	BC 12 - General Trades is responsible for suppling and installing the waterplace fireplace.
BP 4 - Prebid RFI 044	Caulking Clarification	1. Who is responsible for caulking drywall and masonry? 2. Who is responsible for caulking casework, countertops and solid surfaces?	1. BC 15 - Joint Sealants is responsible for caulking at transitions from drywall to masonry. 2. For casework, countertops and solid surface the respective trades are responsible for caulking their own work. (BC 12 - General Trades, BC 31 - Casework, BC 32 - Educational Casegoods)
BP 4 - Prebid RFI 046	AV7 Riser	Bid Category No. 40 – AV7 Riser on T422: A gym subwoofer is shown connected to an AV decoder, linked by a cable type “F”. I suspect that this box is a copy/paste error and is not applicable. Please clarify. Isaac McClelland, Buist Electric, imcclelland@Buistelectric.com	Yes, this is a copy/paste error. The subwoofer item and cable are removed in Addendum #2. Cameron Drake
BP 4 - Prebid RFI 049	BC 06, BC 27, BC 36 Scope Clarification	1. Please clarify who is to provide the sub slab insulation related to Alternate 3? 2. Please confirm the setting of all FSE equipment is provided by BC No. 27 (Food Service Equipment) 3. Please clarify if BC 36 (Mechanical/Plumbing) is to provide the exterior ACCU pads. Given the size and complexity of these pads, does it makes sense for BC 06 (Concrete) to provide and install this? 4. Is it acceptable for the CM to provide a temporary heating allowance for all BC 36 (Mechanical/Plumbing) bidders? Eric Camp, R.W. LaPine Inc., ecamp@rwlapine.com	1. BC 06: Concrete is to provide the sub slab insulation. 2. Yes BC 27: Food Service Equipment is setting all of their own equipment. 3. BC 06: Concrete to provide exterior ACCU pads. 4. No, BC 36: Mechanical contractor is responsible for the temporary heating cooling and ventilating as addressed in the General Requirements section 01500.1.
BP 4 - Prebid RFI 050	Substitution Request 010	Request to approve the attached product as an approved substitute. https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtQ/iWUAfEy5HsU2lHPf4bxA13ufp4lGdvJFsdZzOVyQebc https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtR/mH5KprDG.HzgrYyff8LY6SrxSsrCXdk2P794z04mftI https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtP/GvZsV5DFq7jGvnPlTqdJ8sfsLc.oOfWx20TiLyFzvYk https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtO/	Provide as a voluntary alternate. M. Rossio 6/15/23

#	Subject	Question	Official Response
		WvbLT.7QTn1x4AMVpmUrMr_vjH1B19hz2kg_LLn1wN4 https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtM/ wcWa8M56fYIOKixlN8VLMgXz85CJJPq7Y5KDv9nqR5U https://scrantonproducts.my.salesforce.com/sfc/p/#37000000PwRN/a/Ho000001ULtL/ iwV2jN9OZU1Hwh.gZVE41TUmeYhbnvkBDisYWe7ujpo Erik Muir, Scranton Products, erik.muir@azekco.com	
BP 4 - Prebid RFI 051	Substitution Request 011	Request to have Fulton condensing hydronic boilers to be added as an approved equal. Craig Mulder, Process Engineering & Equipment Company, cmulder@pecopage.com	Please submit as a voluntary alternate.K. Beckstrom 06/15/2023
BP 4 - Prebid RFI 052	Electrical Scope Clarification	1. Spec Section 20 0500-1 under Scope of work #3 Calls for a cash allowance to be included for utility installation charges. What dollar amount should be included for this allowance? 2. Spec Section 20 0500-1 Under Scope of Work #9 calls for electrical bid category to provide the fire alarm system. This differs from OAK's index of bid categories breakdown. Is the electrical bid category to provide and install the fire alarm system? 3. What bid category is to provide the Hand Dryers? 4. Alternate #2 Calls for a VESDA smoke sampling system to be provided and installed for the Gym. What bid category is to provide and install this system? Andrew Clemens, Circuit Electric, Andrew.Clemens@circuitelectric.com	1. O-A-K will carry the referenced allowance. 2. Direction in the CM Project Manual takes precedence BC 45 - Fire Alarm is responsible for fire alarm. 3. BC 26 - Toilet, Bath and Laundry Accessories is responsible for the hand dryers. 4. BC 45 - Fire Alarm is responsible for providing and installing the VESDA system.
BP 4 - Prebid RFI 056	Technology Sheet Clarification	Plan sheet T421: Connections to Carehawk alert notification will require home runs to Carehawk SS32, is the intention that the AV contractor will run these wires? Plan sheet T421: where will FACP alarm contacts be located? Plan sheet T422 shows an IS6-115 subwoofer connected to an AV Decoder, this will not work. Should this IS6-115 be deleted? Brian Rotman, Parkway Electric, brian.rotman@parkway.us	1 - The AV contractor will run wire from the TV-A location to a splice point within the room served. The homerun from classroom to SS-32 location for Carehawk notification will be part of the scope of this project. 2 - The FACP panel and contacts are located in room 'Reception 100'. 3 - Correct, this has been removed as part of Addendum #2. Cameron Drake
BP 4 - Prebid RFI 057	Substitution Request 013	Request to approve the attached United Enertech product as an equal. 23 3000: Air Duct Accessories Manual Volume Dampers Combination Fire & Smoke Dampers & 08 9119 Fixed Louvers Chris Schut, Schut Mechanical Sales, chris@schutmechanicalsales.com	Please submit as a voluntary alternate.K. Beckstrom 06/15/2023
BP 4 - Prebid RFI 058	Communications Conduit	ES 101 Will the new communications conduit that goes towards the NE run all the way into the telecom room D140 inside the building or does it stop at the outside wall? If it does run all the way into the building is it under the floor? Bob O'Brien, Parkway Electric, bob.obrien@parkway.us	Yes, this conduit runs all the way into D140 and it is underground conduit that stubs up into D140. Thank you, Eric Jones 6/16/2023
BP 4 - Prebid RFI 061	Substitution Request 014	Request to add the attached hand dryers (Speedflow Plus) as an approved equal. Samantha Layedra, Sani Flow Corp, slayedra@saniflowcorp.com	Provide as a voluntary alternate. M. Rossio 6/15/23
BP 4 - Prebid RFI 068	Scope Clarification	1. Which bid category has the casework in Café 180? 2. Which bid category has the solid surface wall cap in detail 8G/I402? Tim Lasher, Clark Contracting Services, tlasher@clarkcc.com	1. Bid Category 31 - Casework; is responsible for casework in Café 180. 2. Bid Category 12 - General Trades; is responsible for the solid surface wall cap detail in 8G/I402.

Portage Public Schools – Central Elementary School BP 4: Construction
Pre-Bid Meeting Minutes
June 12th, 2023, 2:00pm

1. **Introductions**

Steve Phelps	Portage Public Schools
Michele Rossio	TowerPinkster
Dan Rathburn	Owen-Ames-Kimball Co.
Anastasia Wojcik	Owen-Ames-Kimball Co.
Mike Hoeksema	Owen-Ames-Kimball Co.
Olivia Jensenius	Owen-Ames-Kimball Co.

2. **Safety**
   a. All roads and entrances must remain open.
   b. Contractors must follow proper safety procedures. Contractor safety manuals/books must be on-site.
   c. Contractors must provide their own first aid and fire protection equipment.
   d. Contractors are responsible for providing the necessary barricades for their work.
   e. Contractors must comply with the "Right to Know" law.
   f. Contractors are responsible for their own security.
   g. Contractors must comply with O-A-K's substance abuse policy.
   h. No Smoking on School Property.
   i. No pictures are to be taken during school hours.
   j. Contractors to stay out of occupied areas.
   k. No radios, boom boxes, I-pods, etc.… will be allowed on the construction site.

3. **Monthly Invoices**
   a. Monthly invoices must be submitted to O-A-K by the 20th of each month. Contractors must invoice on AIA forms G702 & G703.
   b. There will be a 10% retainage on invoices. Any reduction in retainage of this Contract shall be in the sole discretion of the Owner, and the Owner reserves the right to restore the retainage to its full contract amount in the event the Owner believes that retainage restoration is desirable. Once the contract is 50% or more complete the contractor may request that retainage be locked at 5% of the total contract.
   c. If contractors' invoice for stored material not stored on-site, the invoice must be accompanied with an insurance certificate for that material.
   d. Performance and payment bonds, as well as certificates of insurance, must be on file prior to receiving progress payments.

4. **Insurance**
   a. Contractors must provide insurance certificates as per specifications. Insurance certificates must indicate the Owner, Architect, and C.M. as additional insured on a per project basis.
   b. Contractors must provide a 30 days notice of cancellation.
   c. Insurance must be on file 10 days after receipt of Notice of Pending Award.

5. **Testing, Permits, Inspections**
   a. Testing will be by the Owner.
   b. All necessary permits and inspections are the responsibility of each contractor.

6. **Site Constraints**
   a. Maintaining a clean site is mandatory.
   b. Construction traffic to use designated access roads only.
   c. Construction trailers and staging will be coordinated with OAK Superintendent - Mike Hoeksema.

7. Temporary Services

a. Temporary toilet facilities will be supplied by the Owner.
b. Existing electrical services will be available for use. Contractors are to provide their own GFI protection.
c. Existing water services will also be available for use.

8. Layout

a. Each contractor is responsible for their own layout, the C.M. will assist.

9. Bid Forms

a. Contractors are reminded to fill in all required items on the bid forms.
b. If there are costs associated with an alternate, it must be listed on the bid form.
c. Voluntary Alternates are encouraged - list accordingly on the bid form.
d. Please note that there are Alternates.
e. Familial Disclosure Statement must be signed and notarized.
f. Bids shall be submitted for the complete project (all phases).

10. Shop Drawings and Submittals:

a. All correspondence must be addressed to:
Deb King
Owen-Ames-Kimball Co.
300 Ionia Ave NW
Grand Rapids, MI 49503
E-mail: debk@oakmi.com
b. Contractors are required to send and receive submittals and shop drawings electronically. All Submittals will be returned electronically.
c. Successful bidders maybe asked in the "Notice of Pending Award" to submit manpower and shop drawing schedule.

11. Document Questions

a. All questions regarding the bid documents, schedule, or procedure must be addressed to Dan Rathburn
Email: Danr@oakmi.com
b. Requests for Information must be submitted by June 15th, 2023, noon. If an RFI is received after the cutoff period, it will not be answered prior to the bid date. RFI's will be answered in Addendum #2.
c. All Pre-Bid RFI's are to be emailed to danr@oakmi.com Please do not submit RFI's through building connected.

12. Addenda

a. Addendum #2 will include the pre-bid meeting minutes.

13. Schedules / Key Topics:

a. Start date is 8/21/2023
c. Precast starting 11/6/2023
d. Masonry walls starting 10/9/2023
f. End date is 5/29/2025

14. Bid Details

a. Wednesday, June 21st until noon local time. All bids received after noon will be rejected.
b. Bids may be mailed to Owen-Ames-Kimball Co. Kalamazoo by noon.
c. If you would like to drop off bids to the offices of Owen-Ames-Kimball Co., they must be received by 12:00 PM June 21st, 2023.
d. Bids may be brought to the bid opening and delivered to an O-A-K representative.
e. FAXED, EMAILED OR UPLOADED TO BUILDING CONNECTED BIDS WILL NOT BE ACCEPTED
f. Bid Bonds / Certified Checks
g. Bids will be read publicly at 2:00 pm local time, Wednesday, June 21st, 2023 at Portage Central High School, Auditorium 8135 S. Westnedge Ave, Portage, MI 49002.

15. General Notes

a. Each bidder must submit their bid per the plans, specifications, and construction management booklet. If your bid varies from these documents, you must submit the variance as a voluntary alternate with your base bid matching the bid documents.
b. Each contractor must supply sufficient manpower.
c. Storage will be allowed on site for each phase of construction only while in construction.
d. The schedule does not change if alternates are accepted.

16. Future Projects

a. Haverhill Elementary School – Footings and Foundations are out to bid. Bids due June 21st, 2023 at noon.
b. Haverhill Elementary School – Construction package will be out to bid from July 17th – August 28th

17. Site Visit

a. Will immediately follow today's pre-bid.

18. Comments and Questions

Thank you for attending. Good luck with your bid!

Owen Ames Kimball
Building Since 1891

Pre-Bid Meeting Sign-In

Portage Public Schools
Central Elementary School BP 4: Construction
Owen-Ames-Kimball Co.
Monday, June 12, 2023

PPS

NAME	COMPANY	BID CATEGORY	PHONE NUMBER	EMAIL
Paul Childs	Snyder Recreation	playground equipment	574-612-0079	paul@cvsnider.com
JASON BERTCH	Hi-Tech Electric	CARD ACCESS	269-910-8979	jbertch@hi-techelectric.net
Doug Snyder	priesensa	Testing/staking	616 293 2642	DougS@driesensa.com
Bob Groteler	TCG	43	616-772-2772	bob.groteler@TCGroup.com
PAUL LOUNSBURY	FORMAN GLASS	ALUMINUM, GLASS & FLASHING	269 744 6813	PAUL.LOUNSBURY@FORMANGLASS.COM
Isaac McClelland	Bunst Electric	Electrical	269-321-9191	imcclelland@bunstelectric.com
Robert Lankford	Hi-tech electric	Card Access	269-615-5049	RLankford@Hi-Techelectric.net
Justin Roberts	GLA	Flooring	269 760 9161	justin@greatlakeflooring.net
MATT HIGGINS	AMCOMM	TECH	2486988868	MHIGGINS@AMCOMMINC.COM
Scott Proux	Total Energy Systems (Kohler)	Electrical	616 612 8186	SPROUX@Totalenergysystems.com

Owen Ames Kimball
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Pre-Bid Meeting Sign-In

Portage Public Schools
Central Elementary School BP 4: Construction
Owen-Ames-Kimball Co.
Monday, June 12, 2023

PPS

NAME	COMPANY	BID CATEGORY	PHONE NUMBER	EMAIL
CHRIS HAMILTON	BURST AV	CLOCKS, AV, PAGING	616-204-8650	CHAMILTON@BURSTAV.COM
Andrew Clemens	Circuit electric	Electrical	269-366-9131	Andrew.Clemens@Circuitelectric.com
Ken Pluta	A-1 Refrigeration	Mechanical	269-720-5894	kpluta@a1refrig.com
Doug Bosch	Jergens Piping	Mechanical	269 760-3544	dougbosch@jergenspiping.com
ADAM WOLTHUIS	MAC CITY MECHANICAL	MECHANICAL	269-599-2546	AWOLTHUIS@MCM-TEAM.COM
Tom Roberts	S.A. Morman	Doors, Frames, Hdw	269-383-0500	troberts@samorman.com
Kristi Vyverman	Great Lakes West	FSE	269-501-8020	Kristi@greatlakeswest.com
TOM WEISSERT	SVT	CLOCKS/PAGING	269-998-2431	tweissert@gosvt.com
Jeremy Bosman	Sinclair Recreation	Playground	616-886-1726	jeremy@sinclair-rec.com

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NAME	COMPANY	BID CATEGORY	PHONE NUMBER	EMAIL
Jason HollAND	Burst Electric	Communication	269-720-8612	JHollAnd@burstelectric.com
Keith Gillhespy	Sobie co	Flooring	616 662-3356	Kgillhespy@sobiecompany.com
Alex Seekell	MOSS	Technology/AV	6165707927	Alex.seekell@mossteve.com
Dale Peplinski	DAT	Tech/AV	616-299-1731	dpeplinski@dat-inc.us
Jeff Nichols	Hi-Tech Electric	Electrical	269-209-1451	jnichols@hi-Techelectric.net
Joe Hazelhoff	Hazelhoff Builders	General Trades	269-349-2211	Joe@Hazelhoffbuilders.com
Mike Kaiota	Wolverine Power	Generator	6116215225/	Mike.Kaiota@wolverinepower.com
Jennifer Cooley	SA Morman & Co	Doors, Frames, Hardware	269-383-0500 x1585	JCooley@samorman.com
Jason Newton	Sign Center	Signage	269-381-6869	jason@signcenter.net
John Kakocki	Earley & Assoc	Concrete	269-720-7064	jkakocki@earleyassoc.com
David Watson	SportsView Tech	AV/Projection	269-998-0053	DWatson@tsvt.com