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& Associates, Inc.
ARCHITECTURE ENGINEERING INTERIOR DESIGN
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ADDENDUM NO. D-1

INDIANA UNIVERSITY SOUTHEAST SIDE RESIDENCE HALL
BLOOMINGTON, INDIANA
IU Project No. 20106837
MSKTD Project No. 5804
January 26, 2012

This addendum is issued as a supplement to the plans and specifications and shall be considered an integral part of the same.

ITEM	LOCATION	DESCRIPTION
D1.001	General	The Prebid Meeting Minutes are attached to this addendum and shall be incorporated into the contract documents.
D1.002	General	Clarification: Only **one** copy of the bid is required. Must be legible.
D1.003	General	There are no building permits or fees that will be issued/requested by the Monroe County, City of Bloomington or Indiana University.
D1.004	General	General Clarification: All subcontractors will be responsible for providing penetration fire stopping systems that are equal to or greater than those specified in Section 078413 whether it is specifically called out to be included or not. This includes Mechanical, Plumbing, Electrical, Telecommunications, Fire Protection, and all general trades. The intent is for this project to have one single source subcontractor for the work associated with all fire stopping.
D1.005	General All Specification Sections	All specification sections where the term "Substantial Completion" is used must be changed to "Beneficial Occupancy" as defined in the new AIA 201 (2007) General Conditions of the Contract for Construction Section 8.4.
D1.006	Specifications Section 002113	Replace Section 002113 Instructions To Bidders, in its entirety with the attached Section 002113 Instructions To Bidders.

D1.007	Specifications Section 004500	Replace the Common Construction Wage Scale in the Project Manual with the attached Common Construction Wage Scale dated January 20, 2012.
D1.008	Specifications Section 006001	Replace Section 006001 General Conditions, AIA A201 (1997), in its entirety with the attached Section 006001 General Conditions, AIA A201 (2007).
D1.009	Specifications Section 006010	Replace Section 006010 Supplementary General Conditions, in its entirety with the attached Section 006010 Supplementary General Conditions.
D1.010	Specifications Section 006010	On Page 7 of the new Section 006010 Supplementary General Conditions attached to this Addendum D-1, the project matrix should identify this project as a Category 3 project. Therefore, the design was initiated after 10/1/2009 and is estimated with a cost over $5.0 million dollars. The BIM model will be released to the successful contractor by Indiana University after contracts are signed.
D1.011	Specifications Section 006020	Replace Section 006020 Special Conditions, in its entirety with the attached Section 006020 Project Site Requirements.
D1.012	Specifications Section 007060	Add the attached Section 007060 Notice To Proceed to the Contract Documents.
D1.013	Specifications Section 012300	3.1 SCHEDULE OF ALTERNATES A. Alternate No. L1: Multipurpose Sport Court MODIFY Alternate Description as follows: "The alternate shall include…walks, **stairs, handrails** and modifications from Base Bid plan to accommodate new Sport Court." B. Alternate No. L2: Bus Stop Shelter MODIFY Alternate Description as follows: "…install a new Bus Shelter as indicated in the Civil and Landscape Drawings and Specifications. **The concrete pad shall be included in the Base Bid."**
D1.014	Specifications Section 042000-11	CAVITY-WALL INSULATION, paragraph A item 1, change CAVITYMATE to ULTRA SL. Add this additional sentence: Install ULTRA SL vertical.
D1.015	Specifications Section 044300	2.1 STONE SCHEDULE MODIFY Item C as follows: 1. Color range: Full-color blend, according to the color classification established by ILI.
D1.016	Specifications Section 074213.19-6	Paragraph B, delete CENTRIA and IPS. Add ALUMA SHIELD Inc. Add this sentence: Panel type to be vertical tongue and groove watertight joints with concealed fasteners.

D1.017	Specifications Section 081113	Part 2.1, A - The MPI Group, LLC is an approved manufacturer for the Hollow Metal Doors and Frames in the project. This manufacturer must meet or exceed the requirements set forth in the specifications.
D1.018	Specifications Section 087100	Add a door viewer equal to IVES #U698 on each sleeping unit door and two on each handicapped accessible sleeping door. On semi suite units, provide one or two viewers on the corridor door entering the semi suite in addition to the individual sleeping rooms.
D1.019	Specifications Section 088000	Part 2.2, B, 1 - Gardian Industries SunGuard Advanced Architectural Glass is an approved manufacturer for the monolithic float and insulated glazing in the project. This manufacturer must meet or exceed the requirements set forth in the specifications.
D1.020	Specifications Section 095113	2.2.A – The use of Architectural Components Group, Inc. "Linear" wood ceiling tile is an approved manufacturer to be used for ceiling type ACT-2. This manufacturer must provide ½" reveal and provide acoustical pads to achieve required NRC rating. 2.2.A – The use of Acoustigreen Linear wood panels by Acoustigreen of Delano, MN is an approved manufacturer to be used for ceiling type ACT-2. This manufacturer must provide ½" reveal and provide acoustical pads to achieve required NRC rating. The use of Decoustics' Claro-T ceiling tile is an approved manufacturer to be used for ceiling type ACT-6.
D1.021	Specifications Section 102650	Part 2, 2.2, D - Replace reference to Acrovyn 3000 and instead reference Acrovyn 4000 as basis of design.
D1.022	Specifications Section 102800	Any accessory listed in this section is to be provided and installed by the General Contractor.
D1.023	Specifications Section 104000	Interior Signage – Revisions in text on signs are as follows: B089 – Text should read, "Machine Room" B101 – Text should read, "Center Desk" B113 – Text should read, "Computer Room" B115 – Text should read, "Environmental Operations Office" B117 – Text should read, "Residential Operations Office" B119 – Text should read, "Administration Offices" B183 – Text should read, "Storage" (eliminate the word "Chair") B199J, B279, B379, B479 – Text should read, "Custodial"

D1.024	Specifications Section 104413	Add the following to Section 3.3: D. Fire Extinguisher Schedule and Notes: Note 1. Verify final locations of cabinets and wall hung extinguisher in every location with Owner and Architect. Note 2. Non-public areas include machine rooms, mechanical rooms, and similar rooms and are to be dry chemical wall hung fire extinguishers. See Section 104416. Note 3. Public space cabinets shall receive one water pressurized 2.5 pound water type fire extinguisher. See Section 104416. SCHEDULE for Public Spaces in which fire extinguisher cabinets are to be installed are as follows: Unit A – 2 per floor (five levels) = 10 cabinets Unit B – ground floor = 2 cabinets Unit B – Floors 1-4, 3 per floor = 12 cabinets Unit C – 2 per floor (four levels) = 8 cabinets SCHEDULE for Additional Non Public Spaces in which just the fire extinguisher is to be installed. Mechanical Room B089 = 1 chemical extinguisher Coffee Office B107 = 1 chemical extinguisher Mechanical Penthouses – 1 per penthouse (4 rooms) = 4 chemical extinguishers
D1.025	Specifications Section 104416	2.1 – The General Contractor shall be providing the required fire extinguishers of the specified dry chemical type in the non-public areas and then add a new type of fire extinguisher by adding sub-section C: (to be used in public areas). See schedule issued in this addendum. Stored-Pressure Water Type: UL-rated 2-A, 2.5-gal. nominal capacity, with water in stainless-steel container; with pressure-indicating gage.
D1.026	Specifications Section 122413	Part 2, E - Add Rooms B107, B199C, and B199D to the list of rooms to this section.
D1.027	Specifications Section 129300	Part 2.3 - Basketball Goals and Bike Rack Products: AALCO Manufacturing Co. is an approved manufacturer for the basketball goals and the bike racks. This manufacturer must meet or exceed the requirements set forth in the specification.
D1.028	Specifications Section 223500-3	Paragraph 2.1.A.1: Add "Ajax" as an approved manufacturer of shell and tube domestic water heaters.
D1.029	Specifications Section 224000-4	Paragraph 2.1.A.1.C: Delete "Zurn" as an approved manufacturer of lavatory faucets.
D1.030	Specifications Section 224000-5	2.4.A.1.b: Delete "Zurn" as an approved manufacturer of flush valves.

D1.031	Specifications Section 230900-12	2.9.A.1: Replace the last sentence with the following: "Use floating point control for FCU and VAV boxes. Use normally closed (NC) valves for steam service and normally open (NO) for hot water and chilled water applications."
D1.032	Specifications Section 230900-13	2.9.D.5: Replace "3 psig" with "3-5 psig."
D1.033	Specifications Section 230900	Add the attached Siemens Temperature Controls Drawings (Attachment D1.033).
D1.034	Specifications Section 238229	Add to acceptable manufacturers: Sterling
D1.035	Specifications Section 238233	Add to acceptable manufacturers: Sterling
D1.036	Specifications Section 238239	Add to acceptable manufacturers: Zehnder-Rittling
D1.037	Specifications Section 261000	2.5 B – Eliminate reference to EMT set screw fittings. Compression fittings shall be used.
D1.038	Specifications Section 261110	1.2 A: Wire basket type cable tray is acceptable for use as the cable tray system.
D1.039	Specifications Section 264800-4	Paragraph 1.10.A.1 Change "5 years" to "2 years."
D1.040	Specifications Section 264800-8	Paragraph 2.4.C.2.b: Delete: "Contacts that indicate if the VFD is in normal or bypass mode."
D1.041	Specifications Section 283111	3.3 B Fire alarm cable may be installed open cable (plenum rated) in lieu of in conduit.
D1.042	Specifications Section 312000	**Delete** the wording "Owner through the Construction Manager will employ" from Part 1.3 Quality Assurance, B, 1 of Section 312000 and **Replace** with "Contractor will employ."

D1.043 Specifications Section 312000

Delete the word "blasting" from Part 3.2, B, 3 and 3.2, B, 3, a, of Section 312000. Blasting of rock is not allowed on the project unless the following conditions apply:

1. General Contractors insurance allows blasting of rock with the conditions of project.
2. Indiana University and the Architect are notified and agree to use of the system of blasting proposed.
3. All local and state requirements and permits are obtained by the General Contractor prior to any work taking place.

D1.044 Specifications Section 312000

Replace Part 3.3 Compaction, of Section 312000, in its entirety with:

3.3 COMPACTION

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

D. Moisture Control: Where sub-grade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of sub-grade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations as recommended by Soils Engineer.

1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density as recommended by Soils Engineer.
   a. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value as recommended by Soils Engineer.

D1.045 Drawings C1.0

ADD Survey Benchmarks as shown on attached Drawing D1.C1-sk1 (Attachment D1.045).

D1.046	Drawings C2.0 & C3.0	**REVISE** Plan Note "ALTERNATE (SEE SHEET L2.1 FOR ADDITIONAL INFORMATION)" to read: "APPROXIMATE LIMITS OF ALTERNATE L1. SEE SPECIFICATION SECTION 012300 FOR DESCRIPTION."
D1.047	Drawings C3.0	**REVISE** spot elevations near west end of plaza as indicated on attached Drawing D1.C3-sk1 (Attachment D1.047).
D1.048	Drawings C4.0	**ADD** foundation drain connection notations as indicated on attached Drawings D1.C4-sk1 & D1.C4-sk2 (Attachments D1.048a & D1.048b). Also, **REVISE** invert information for Str. ST-3 as indicated on attached Drawing D1.C4-sk2 (Attachment D1.048b).
D1.049	Drawings C4.0	**Revise** invert, pipe size and trench drain information for Str. ST-8 as indicated on attached Drawing D1.C4-sk3 (Attachment D1.049).
D1.050	Drawings C5.0	Attached Drawing D1.C5-sk1 (Attachment D1.050) is provided for clarification on the location of required Silt Fence installation.
D1.051	Drawings C7.0	**REVISE** Profile of Line "A" as shown on attached Drawings D1.C7-sk1 & D1.C7-sk2 (Attachments D1.051a & D1.051b).
D1.052	Drawings C8.0	**REVISE** Note on Detail 4/C8.0 to "SEE SHEET C4.0 FOR PIPE SIZES AND INVERT ELEV." not C4.1.
D1.053	Drawings C8.0	**REVISE** ACO Drain Catch Basin, on Detail 9/C8.0, to "#630" not #603.
D1.054	Drawings C8.0	**Add** Detail 13/C8.0, TRENCH DRAIN DETAIL – ST8 to Sheet C8.0 as per attached Drawing D1.C8-sk1 (Attachment D1.054).
D1.055	Drawings C8.0	**Revise** Detail 12/C8.0, TRENCH DRAIN DETAIL – ST10 & ST11 on Sheet C8.0 as per attached Drawing D1.C8-sk2 (Attachment D1.055).
D1.056	Drawings L2.0	MODIFY the Key Plan as indicated in the attached Drawings D1.056a through D1.056f.
D1.057	Drawings L3.0	ADD the following note to the Planting Plan: "Note: The building perimeter mow strip shall be included in the Base Bid."
D1.058	Drawings 8/L6.2	CHANGE the pipe diameter note to read, "1 ½" O.D."
D1.059	Drawings 4/L6.4	ADD the following note to the Generator Enclosure Wall detail: "Note: Wall to receive a hand-rubbed finish on all exposed faces to match adjacent existing walls."

D1.060	Drawings 5/L6.4	ADD the attached Drawing D1.060, "Typical Stair Handrail."
D1.061	Drawings 6/L6.4	ADD the attached Drawing D1.061, "Courtyard Stair to Lower Level."
D1.062	Drawings S1.1	In Note #17, the concrete encased grounding rod or electrode requirements is noted on the foundation drawings so that the Concrete Contractor is aware of this requirement. The Electrical Contractor usually provides the electrode and coordinates installation with the Concrete Contractor.
D1.063	Drawings S1.2	Interior non-load bearing walls on grade shall have a thickened slab as shown in Section 21/S1.2.
D1.064	Drawings S2.1a	Four (4) section marks reference an incorrect sheet number. Foundation Sections 72, 75, and 76 are located on Sheet S3.8, not S5.4 or S5.5. Section 1: Change the compacted drainage fill thickness from 6" to 8". Change the invert elevation from "SEE PLAN" to "1'-8" BELOW FINISH FLOOR."
D1.065	Drawings S2.1b	The footing for Section 77/S3.8 shown on Line 26 in the enlarged plan extends east to the elevator footing. Omit section mark 7/S3.1 shown between Lines 6 and 7 and south of Line A. Refer to Sheet S2.1c for foundation information in this area. Room A079 (Electrical Room located in the west part of Unit B) shall have a 6" concrete floor slab with 6x6 W2.9xW2.9 welded wire fabric over 8" compacted drainage fill and vapor barrier. The remaining floor shall have a 4" concrete floor slab with 6x6 W2.1xW2.1 welded wire fabric over 8" compacted drainage fill and vapor barrier.
D1.066	Drawings S2.1c	Room B089 (East end of Ground Floor) shall have a 6" concrete floor slab with 6x6 W2.9xW2.9 welded wire fabric over 8" compacted drainage fill and vapor barrier under the area shown on Sheet P4.1 to receive a 4" housekeeping pad.
D1.067	General Foundation Info.	The following is required at all conditions where the slab on grade elevation is below the exterior foundation wall ledge elevation: 1) 3" rigid insulation from top of ledge elevation to top of footing. Insulation to be located on exterior face of foundation wall. This is represented in the drawings on the S3.x sheets. 2) Waterproofing per specifications. Extend water proofing from top of ledge elevation down to top of footing and across the top of footing. Extend waterproofing down 2" along the vertical edge of footing. 3) Install "RX" waterstop continuous in keyway and in all cold joints.

D1.068	Drawings S3.5 & S3.6	The elevator pit shown in Details 39/S3.5 and 43/S3.6 shall have complete waterproofing installed on the walls and slab for complete and watertight construction. Water stop is also to be utilized in the cold joints of the multiple pours.
D1.069	Drawings S4.4c	Revise Fourth Floor column loads as shown on Attachment D1.069.
D1.070	Drawings S4.5c	Revise roof framing as shown on Attachment D1.070.
D1.071	Drawings A0.1	Delete all 30-min. walls southeast of GN Toilet A090.
D1.072	Drawings A0.1, A0.2, A0.3, A0.4	In the "Fire Wall Legend" change the "Smoke Resistant Construction" to "Smoke Tight Construction."
D1.073	Drawings A2.1a,b – A2.2 b,c	Clarification: Waterproofing is required in all locations where the floor slab is below the exterior stone veneer ledge on the foundation wall.
D1.074	Drawings A2.1b	Mechanical B089, mechanical drawings show a louver in exterior west wall of this room. The following louver details apply: Head 7/A6.2 sim bottom of concrete 111'-6" Sill 8/A6.2 sim top of concrete 106'-6"
D1.075	Drawings A2.1b	Vestibule A003, 8" above Door A003 is a mechanical louver centered on the doors below. Install louver sim to details 7 & 8 on A6.2. See mechanical for louver size.
D1.076	Drawings A2.1b	Corridor A099F, 12" above Door A099F is a mechanical louver centered on the doors below. Install louver sim to details 7 & 8 on A6.2. See mechanical for louver size.
D1.077	Drawings A2.2c	Revise the plan to add the areaway adjacent to Rec Room B106. See Attachment D1.077. Slope the areaway concrete slab at ½" per foot to floor drain shown in plumbing plans.
D1.078	Drawings A2.3c	Add a note for the GC to provide and install a 24 inch square access panel in Restroom B290E for access to condensate air gap drain. Similar to specific plan note #1 on Sheet A2.1a.
D1.079	Drawings A2.5a, A2.5b, & A2.5c	The metal stud corridor walls on this floor, opposite of the load bearing CMU wall, are partition type 1.7D and are structural. The clear space in the corridor remains the same as the floors below. See structural drawings for further clarification.

D1.080	Drawings A2.7a	Add Roof Drain Detail 1/A2.7a to this sheet. See Attachment D1.080.
D1.081	Drawings A2.7a	Add Roof Hatch/Ladder Detail 2/A2.7a to this sheet. See Attachment D1.081.
D1.082	Drawings A2.7b	Add Building Expansion Joint Detail 1/A2.7b to this sheet. See Attachment D1.082.
D1.083	Drawings A2.7b	Add Expansion Joint Detail 2/A2.7b to this sheet. See Attachment D1.083.
D1.084	Drawings A2.7b	Add Details 3, 4, 5, & 6 to this sheet. See Attachments D1.084a, D1.084b, D1.084c, & D1.084d.
D1.085	Drawings A2.7b	Add the following note to the solar panels: See structural for steel support post penetrating through the roof. Flash all penetrations as per roof membrane manufacturer's printed recommendations.
D1.086	Drawings A2.7b	Revise portion of roof plan clouded on plan. See Attachment D1.086.
D1.087	Drawings A2.7c	Add the following note to the solar panels: See structural for steel support post penetrating through the roof. Flash all penetrations as per roof membrane manufacturer's printed recommendations.
D1.088	Drawings A3.1	Enlarged plan should show the approximate location of the Knox Box supplied in the Door Hardware Section 087100. General Contractor shall install the box at approximately 48 inches above grade along the wall just outside of Door B199T. The box is to be located north of Column Line 25 on the north exterior face of the stair tower wall.
D1.089	Drawings 1/A3.1	Refer to Vestibule B199T. The interior portion of the north limestone wing wall that sits on the elevated slab is to have metal stud backup with sheathing in lieu of the masonry as indicated.
D1.090	Drawings A3.2	Detail 7 on this sheet shall be changed to provide a vinyl edge band on the entire edge of the shelf located 1'-6" above the floor in lieu of the laminate edge band. Color to match laminate. This shall be continuous to protect the laminate edge. Detail 14 on this sheet shall be changed to provide a solid end panel with VD2 installed at 30 inches above finished floor up to 7'-0" and 6 inches from the side edges of the casework with continuous "j-trim".
D1.091	Drawings 13/A3.2	The PL3 horizontal shelves are to be adjustable. Provide (1) additional set of shelves for a total of (3) vertically.

D1.092	Drawings A3.3	The SS6 stainless steel countertop and backsplash shown in Detail Number 10 on this sheet are to be provided and installed by the owner.
D1.093	Drawings 4/A3.3	The area under the stair and between floor levels 832'-0" and 835'-0" is to be closed off with a 1-hour fire-rated metal stud and gypsum board partition to continue the continuity of the hollow core floor assemblies. This applies to the first floor at all areas where these two floor levels offset. Wall must be UL rated construction and must be complete. All penetrations must be rated.
D1.094	Drawings A4.3	Elevation 2/A4.3 – Adjust the notches in the parapet walls. See Attachment D1.094. Elevation 2/A4.3 – Add vertical smooth stone trim between window and change limestone pattern type between vertical trim to #2. See Attachment D1.094.
D1.095	Drawings A4.3	3/A4.3 – Add mechanical louver. See Attachment D1.095.
D1.096	Drawings A5.1	1/A5.1 – Partial North Elevation, the smooth limestone trim indicated just above the Fourth Floor slab show terminate at the inside corner sim to the trim shown just below the Second Floor.
D1.097	Drawings A5.2	3/A5.2 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for all floors.
D1.098	Drawings A5.3	2/A5.3 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for floors G,1,2,3, and 4.
D1.099	Drawings A5.3	Revise sill trim shown in 4/A5.3. See Attachment D1.099.
D1.100	Drawings A5.3	6/A5.3 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for First Floor only.
D1.101	Drawings A5.3	7/A5.3 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for First Floor only.
D1.102	Drawings A5.3	Revise precast trim shown in Detail 9/A5.3. See Attachment D1.102.
D1.103	Drawings A5.3	Revise dimension in 10/A5.3. See Attachment D1.103.
D1.104	Drawings A5.3	Revise dimensions in Detail 11/A5.3. See Attachment D1.104.

D1.105	Drawings A5.4	3/A5.4 – For awning detail, see 6/A5.5.
D1.106	Drawings A5.4	4/A5.4 – For awning detail, see 6/A5.5.
D1.107	Drawings A5.5	1/A5.5 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for all floors.
D1.108	Drawings A5.5	Add Detail 6 to this sheet. See Attachment D1.108.
D1.109	Drawings A5.6	2/A5.6 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for Floors 2, 3, & 4.
D1.110	Drawings A5.7	2/A5.7 – Add detail bubble 8/A6.1 where the ceiling meets the curtain wall system. Detail typical for Floors 1, 2, 3, & 4.
D1.111	Drawings 1/A5.8 & 1/A6.7	Refer to the attached Drawings D1.111a & D1.111b for further detail on the ceilings and air return at Entry Lobby B199L and Corridors B299L, B399L, & B499L.
D1.112	Drawings A5.9	Add Elevation 4 to this sheet. See Attachment D1.112.
D1.113	Drawings A5.9	1/A5.9 – Parapet detail at First Floor Entrance should be 5/A6.11 in lieu of 5/A6.1 shown.
D1.114	Drawings A6.1 thru A6.11	Add standard verbiage for all window sill details to include "Window sill - see General Notes on A12.00 for finish information."
D1.115	Drawings A6.1	Add Ceiling Detail 8 to Sheet A6.1. See Attachment D1.115.
D1.116	Drawings A6.2	1/A6.2 – Add the following note to the detail: Note: Refer to partition types on Floor Plans for rooms that require furring on interior face of block wall. Extend gyp bd. from face of furring to window jamb sim to 10/A6.2.
D1.117	Drawings A6.2	2/A6.2 – Add the following note to the detail: Note: Refer to partition types on Floor Plans for rooms that require furring on interior face of block wall. Extend gyp bd. from face of furring to window jamb sim to 10/A6.2.
D1.118	Drawings A6.2	3/A6.2 – Add the following note to the detail: Note: Refer to partition types on Floor Plans for rooms that require furring on interior face of block wall. Extend gyp bd. from face of furring to window jamb sim to 14/A6.2.

D1.119	Drawings A6.2	4/A6.2 – Add the following note to the detail: Note: Refer to partition types on Floor Plans for rooms that require furring on interior face of block wall. Extend gyp bd. from face of furring to window jamb and extend sill sim to 11/A6.2.
D1.120	Drawings A6.2	4/A6.2, 5/8" gyp bd. adhered to block as shown in partition type 2.8 is required; extend sill 5/8" to lap top of gyp bd.
D1.121	Drawings A6.5	9/A6.5 – Revise detail. See Attachment D1.121.
D1.122	Drawings A6.7	Add Details 10, 11, & 12 to this sheet. See Attachments D1.122a, D1.122b, & D1.122c.
D1.123	Drawings A6.11	5/A6.11 – Delete the MSKTD in-house notes to Kathy and Christine. The special cap shape is still required, profile shape to be finalized in shop drawings.
D1.124	Drawings A7.1	Door Schedule – Delete the fire ratings from Doors B001, B002, B003, B077, B079, B006, & B099E.
D1.125	Drawings A7.1	Clarification - The Door and Frame Schedule Remarks Note #12 states that all doors on the third and fourth floors are the same as those on second floor with a corresponding Note #12 in the remarks column.
D1.126	Drawings A7.2	Door Schedule Opening B123H, door size to be 3'-6 x 7'-0 x 1 ¾".
D1.127	Drawings A7.2	Door Schedule Opening B599EA, door size to be 3'-6 x 7'-0 x 1 ¾".
D1.128	Drawings A7.2	Door Schedule Opening B599EA, add sill detail 9/A7.3.
D1.129	Drawings A7.3	Door Details: Add Detail 9/A7.3 to this sheet. See Attachment D1.129.
D1.130	Drawings A8.2	In the North Stair, the 2'-0 x 5'-4 windows shown in the north and east walls in Plans 1,2,3, & 4 are fiberglass windows with insulated glass. Window details are as follows: Head 4/A6.1 sim Jamb 3/A6.2 sim Sill 9/A6.1 sim See floor plans for partition types.

D1.131	Drawings A8.2	The windows in the corridor south of North Stair in Plans 1,2,3,4,&5 are to be fiberglass windows with insulated glass. Details are as follows: Head 4/A6.1 sim Jamb 3/A6.2 sim Sill 9/A6.1 sim See floor plans for partition types.
D1.132	Drawings A8.3	In the East Stair, the 2'-0 x 5'-4 windows shown in the north wall in Plans 1,2,&3 are fiberglass windows with insulated glass. Window details are as follows: Head 4/A6.1 sim Jamb 3/A6.2 sim Sill 9/A6.1 sim See floor plans for partition types.
D1.133	Drawings A8.3	The windows in the corridor east of East Stair in Plans 1,2,3,&4 are to be fiberglass windows with insulated glass. Details are as follows: Head 4/A6.1 sim Jamb 3/A6.2 sim Sill 9/A6.1 sim See floor plans for partition types.
D1.134	Drawings A9.1b	This drawing did not receive the standard material finish notations in the specific rooms like other ceiling plans. Therefore, refer to the Room Finish Schedule for more clarification.
D1.135	Drawings A10 drawings	The term "ACC" is implied to mean Handicap Accessible.
D1.136	Drawings 1/A10.1	Refer to the attached Drawing D1.136 for a dimensional clarification.
D1.137	Drawings A10.3	Elevations #3 & #5 – Remove CB1 and replace PL5. Elevation #9 – Bulkhead to be painted PT1.
D1.138	Drawings A10.3	Interior Elevation Number 3 implies that a base cabinet is to be installed in this location but it should have a PL5 access panel below the sink similar to 20/A12.7a.
D1.139	Drawings 21& 22/A10.4	Reference the attached Drawing D1.139 for changes to Suite J. This affects B206, B206A, B306, B306A, B406, and B406A.
D1.140	Drawings A10.5	Toilet Accessories Schedule should include a shower seat as specified in Section 102800. This is to be provided and installed by the GC. Any item listed to be provided by the Owner will be installed by the owner. Contractor shall provide all necessary blocking.
D1.141	Drawings A10.5	Elevation #2 – Elevation title is incorrect. Revise to say, "Corridor Elevation Tacwall." Elevation #6 – Remove bulkhead "PT10" paint note and replace with PT1.

D1.142	Drawings A10.6	Details 7, 8 and 9 should mark the bulkhead to be painted PT1 in lieu of PT2 as shown. Details 16 and 20 should show the RB1 continuous around the room and the door frame painted PT10, not the wall.
D1.143	Drawings A12.00	General Note E should be corrected to read that all exterior windows noted on the First Floor Plans A2.2a, A2.2b, and A2.2c shall receive manual roller shades. See Spec Section 122413 for type.
D1.144	Drawings A12.00	The cultured marble window sills are defined in the Base Bid by Note "F" in the General Notes section. Therefore, the alternate would be to change all resident wing window sills to solid surface.
D1.145	Drawings A12.00	Change the General Notes as follows: Add the following to Note CC: Refer to elevations on A10.2. Ceiling layout and materials as selected by Architect.
D1.146	Drawings A12.1a, A12.3a, A12.3b	The material break lines for Rooms A007, A008, A020, A209, A217, A219, B203, B205, B206, B208, B279 should be at the door frame and the corridor in lieu of the location where the TS3 or TS2 line is shown.
D1.147	Drawings A12.1b	The material break line for Room A079 for the sealed concrete SC1 should occur at the two door frames. Therefore, the transition to Vestibule A003 is TS1 and the transition to Corridor A099F should be DS1. The material break line for the main stair B099A should be at the stair door frame into Elevator Lobby B099EL with DS1. Relocate the transition strip at the corridor door between Rooms B099 and B099E to the door frame.
D1.148	Drawings A12.1c, A12.2d, A12.3d, A12.6d	Change the Room Finish Schedule Remarks on all sheets as follows: Change Note #4 to read as follows: VD2 Tackable Walltalker material and trim shall be located at each resident's door entry latch side. Refer to Detail 10/A10.1. Change Note #19 to read as follows: VD1 Visual Display Board. See Drawing A10.5 Details 10 and 11 for more information. Add Note #32 to read as follows: VD2 Tackable Walltalker Material and trim located on the front side of storage unit. Reference modified detail 14/A3.2. On the Room Finish Schedules, change the Remarks in the following rooms: Room A024A....delete Note 7. Room A024B, A224B....add Note 7. Room A030, A214, B299L....delete Note 4. Room A099A, A099E....delete Note 19, add Note 4 and 32. Room A099D, A123, A199D....delete Note 19. Room A124A, A230....add Note 19. Room A190C....add Notes 1, 6 and 21. Room A109D, A290C....add Note 21.

Room A199A, A199E, A299A, A299E....delete Note 19, add Note 32.
Room A224A....delete Note 7, add Note 19.
Room A290D, A290E, A290F....add Note 16 and 21.
Room B213....delete Note 4, add Note 19.
Room B299D, B299G....add Note 32.

D1.149	Drawings A12.2a	Callout identification marker references the incorrect sheet. It should reference A12.7b.
D1.150	Drawings A12.2b	Missing transition line between Pod A and B.
D1.151	Drawings A12.2e	Terrazzo Flooring Alternate Sheet – Missing divider strips between all different flooring materials. Each location will use a DS1 divider strip to delineate materials: carpet, stained concrete, walk off mat, and rubber floor.
D1.152	Drawings A12.2f	Terrazzo Flooring Alternate Sheet – Missing divider strips between all different flooring materials. Each location will use a DS1 divider strip to delineate materials: carpet, sealed concrete, walk off mat, and vinyl composition tile.
D1.153	Drawings A12.3b	Add a reference bubble and key note around the south end of corridor room A299F near the drinking fountains for carpet pattern detail as shown on 11/A12.7b. Add VD1 to the east wall of Room B213.
D1.154	Drawings A12.3c	Delete reference to symbol or note "CG1" shown twice in Room B224A.
D1.155	Drawings A12.7a	Details #11 & #12 – Detail title should add the word, "Alternate" before the description.
D1.156	Drawings A12.7b	See new issued sheet for details and note changes.
D1.157	Drawings M2.1bc	Add a return grille RG-2 to the underside of the 16x16 return air duct in Corridor B099E, near the doors leading into Mech B089. Include enough 10x8 vertical duct (at take-off) to install a volume damper. Balance grille to 100 cfm.
D1.158	Drawings M2.1bc	Transition 54" x 16" relief air ductwork from ELECTRICAL A079 across CORRIDOR A099F to 72" x 12" after control damper CD-9, to connect to Louver L-16.
D1.159	Drawings M2.1bc	Omit Dryer Exhaust Fan EF-1, Lint Filters LF-1 and LF-2, and modify ductwork in Laundry Exhaust B006A per Attachment D1.159.

D1.160	Drawings M2.1bc	Tag the grille at the north side of TRASH/RECYCLE B077 As TG-3. Run 10x8 duct from this grille through the adjacent north wall, terminating above the ceiling of CORRIDOR B099. Include appropriate fire-stopping for this rated-wall penetration.
D1.161	Drawings M2.1bc	Provide a return grille RG-9 in the ceiling of CORRIDOR B099, approximately halfway between the far supply diffuser SD-2 of VAV-B099 and the supply diffuser SD-1 in CORRIDOR A099F. There is no ductwork associated with this grille.
D1.162	Drawings M2.3bc	Modify Convector location, Thermostat location and Exhaust Grille for Bath B206 (Attachment D1.162). Typical for B206A, B306A (M2.4bc) and B406A (M2.5bc). Modify corresponding hydronic heating piping for new convector location.
D1.163	Drawings M4.3	Enlarged Mechanical Room B089 Plan – Add Note 24, and locate by the 6" incoming steam line, steam condensate line, and chilled water lines at the penetration of the foundation wall. Note 24: "Provide end of main steam trap on incoming 6" steam main. Extend ¾" condensate line to condensate pump and tie in. Provide mechanical pipe seal (see detail on M6.2) at pipe penetrations at foundation wall for chilled water lines, steam line and steam condensate line.
D1.164	Drawings M4.4	Supplemental Detail #1, add control dampers CD-24 & CD-25, new louver tags (Attachment D1.164).
D1.165	Drawings M4.4	Supplemental Detail #3, add control dampers CD-26 & CD-27, new louver tags (Attachment D1.165).
D1.166	Drawings M4.4	Supplemental Detail #5, add control dampers CD-22 & CD-23, new louver tags, omit TCC panels for AHU-3 (AHU-3 and ERU-4 will share one pair of panels) (Attachment D1.166).
D1.167	Drawings M4.4	Supplemental Detail #7, add control dampers CD-20 & CD-21, new louver tags (Attachment D1.167).
D1.168	Drawings M5.1	Vertical High Capacity Fan Coil Unit Schedule: As a clarification to Note F: Valves are to be mounted in an accessible area, outside the FCU casing, by the M.C.
D1.169	Drawings M5.1	Horizontal Fan Coil Unit Schedule: As a clarification to Note F: Valves are to be mounted in an accessible area, outside the FCU casing, by the M.C.
D1.170	Drawings M5.1	Heat Exchanger Schedule: Replace "SU125-2" with "SU10 6.2." Replace "10" psi steam pressure with "3" psi steam pressure. Heat exchanger performance shall remain unchanged.

D1.171	Drawings M5.2	Add Louver Schedule (Attachment D1.171). Replace Duct Silencer Schedule (Attachment D1.171).
D1.172	Drawings M5.2	Replace Duct-Mounted Control Damper Schedule (Attachment D1.172).
D1.173	Drawings M5.2	Remove EF-1 from Exhaust Fan Schedule, Change Note 1 to LINE-VOLTAGE REVERSE-ACTING THERMOSTAT PROVIDED BY M.C., INSTALLED BY E.C., and change Note 2 to: NOT USED.
D1.174	Drawings M5.2	Horizontal Fan Coil Unit Schedule – Change General Note H to: MANUAL BALANCE VALVE PROVIDED BY M.C., INSTALLED IN THE FIELD.
D1.175	Drawings M5.2	Vertical High Capacity Fan Coil Schedule – Change General Note H to: MANUAL BALANCE VALVE PROVIDED BY M.C., INSTALLED IN THE FIELD.
D1.176	Drawings M5.3	All VERTICAL HI-RISE FAN COIL UNIT SCHEDULE – UNIT A (all floors): Change motor HP from 1/5 to 1/10. Change GENERAL NOTE "K" from 16 GAUGE to 14 GAUGE.
D1.177	Drawings M5.4	All VERTICAL HI-RISE FAN COILUNIT SCHEDULES – UNIT B (all floors): Change motor HP from 1/5 to 1/10. Change GENERAL NOTE "K" from 16 GAUGE to 14 GAUGE.
D1.178	Drawings M5.4	Add missing schedule information for FCU-B206, -B306 & -406 from Attachment D1.171.
D1.179	Drawings M6.1	Cabinet Heater Detail: Revise heading to say, "Convector and Cabinet Heater Detail." Note that valves are to be remote from the heater cabinet and located in an accessible location.
D1.180	Drawings M7.1	Points List and Sequence of Operation: Delete the following under "Dryer Exhaust" 1. Fan System Enable/Disable 2. Lint Collector PD 3. Fan Fault Alarm The intake dampers shall open when any one dryer is operating.
D1.181	Drawings M7.1	Sequence of Operations, Paragraph 1.8.b Add the following, "The exhaust fan shall maintain a minimum of 1,500 CFM."
D1.182	Drawings M7.1	Sequence of Operation, Paragraph 1.25.E.1 Delete the following: "The BMS shall also monitor the main building electric meter use."

D1.183	Drawings M7.1	BMS Points List, AHU-1, Demand Controlled Ventilation. Add: Alarm BMS if CO2 readings (AHU-1 return air and high occupancy spaces (4) exceed set point by 10 percent or more.
D1.184	Drawings M7.1	BMS Points List, Energy Recovery Units, Current Sensor (ERU4,5,6,7) Add: Alarm BMS if current sensor, located on fans, indicate a change in airflow of 10 percent or more.
D1.185	Drawings M7.1	BMS Points List, VAV Terminals Add: Alarm BMS if VAV terminal airflows are greater than 10 percent below minimum set point.
D1.186	Drawings P2.0a & P2.0bc	Add the note, "Inverts are approximate and should be field verified" to all sanitary and storm pipes exiting the building.
D1.187	Drawings P2.0bc	Technology Resource Room B113. 6" storm in column enclosure remains in this enclosure, but vertical moves south to avoid column base plate and pier and then runs below grade NW into Classroom B111 and ties into storm main. See attached Drawing D1.P1 (Attachment D1.187).
D1.188	Drawings P2.2b	Multipurpose B199M. Revise sanitary, vent, hot and cold water piping from restrooms above as indicated on attached Drawing D1.P3 (Attachment D1.188).
D1.189	Drawings P2.2c	Classroom B109. At Note #2, delete sanitary pipe from above. Route 1" condensate drain from FCH's above as shown on Drawing D1.P2 (Attachment D1.189). Detail 2 Enlarged Café. Include OB-2, FS-2, and FD-1 on Drawing D1.P2 (Attachment D1.189). 1" condensate drain from FCH's above shall discharge into FS-2 one inch above drain. Detail 3 Public Restrooms. Route condensate drain from FCH's above to mop basin MB-1 and terminate leaving 1" air gap above basin. See attached Drawing D1.P2 (Attachment D1.189).
D1.190	Drawings P2.3bc	Bath B206A. Revise restroom layout and piping as shown on Drawing D1.P3. ACC Toilet B290B. Change Note #10 (pointing to condensate from FCH) to read #2. ACC Toilet B290C. Change Note #12 (pointing to condensate from FCH) to read #2. ACC Toilet B290D. Change Note #12 (pointing to condensate from FCH) to read #2.
D1.191	Drawings P2.4a	Delete and replace entire sheet. Sanitary piping has been shown. See attached Drawing D1.P2.4a.
D1.192	Drawings P2.4bc	Delete and replace entire sheet. Sanitary piping has been shown. Revise restroom layout in Bath B306B as shown on Drawing D1.P2.4bc. Plumbing Plan Notes have been filled out.

D1.193	Drawings P2.5bc	Bath B406A. Revise restroom layout and piping as shown on attached Drawing D1.P4 (Attachment D1.193).
D1.194	Drawings P2.6	Main Stair Roof. Add roof drains RD-1 and RD-2 as shown on attached Drawing D1.P5 (Attachment D1.194). See architectural for piping details.
D1.195	Drawings P5.1	See the attached, revised Plumbing Fixture Schedule (Attachment D1.195).
D1.196	General Note Electrical Rooms	E.C. shall provide backing to supporting and attaching electrical panels, typical.
D1.197	Drawings C3.4	Temporary Power During Construction: Temporary power for use in construction shall come from existing switchgear in Wilkie Building C. Wilkie Building C is located east of the construction site across Rose Avenue. Temporary power shall be metered using an ION 7500 meter. E.C. shall be responsible for all boring, road cuts, etc. to bring power to the site. E.C. to install fused switch or circuit breaker in Wilkie Building C as required.
D1.198	Drawings E2.1a, E2.1b, E2.2a, E2.2b, E2.3a, E2.3b, E2.4a, E2.4b, E2.5a, E2.5b	MC cable may be used in the dorm rooms for lighting and power circuits. Home runs in the corridors shall be conduit and wire.
D1.199	Drawings E2.3b, E2.4b, E2.5b, E3.3b, E3.4b, E3.5b, E4.3b, E4.4b, E4.5b	See Attachment D1.199 for revised locations of devices in ACC Studio rooms.
D1.200	Drawings E2.6	North Penthouse – See Attachment D1.200 for partial power plan showing elimination of Temperature Control Panels.
D1.201	Drawings E3.1a, E3.1b, E3.2a, E3.2b, E3.3a, E3.3b, E3.4a, E3.4b, E3.5a, E3.5b	Wiring and conduit to light fixture and FCU shall be concealed unless otherwise noted. Wiring and conduit to light fixture and FCU should be installed in core of concrete floor slab above.
D1.202	Drawings E3.1b	Relocate light fixture type F19 to above louver at Door A003.

D1.203	Drawings E5.4	Riser Diagram – Attached partial revised riser diagram (Attachment D1.203) shows location of Panel "2EL36."
D1.204	Drawings E5.4	Riser Diagram – Add to Note #1: The existing generator is located in a parking lot on the east side of North Walnut Grove Street just north of the IRR railroad tracks on the IU campus. E.C. shall be responsible for moving the generator to the new location. Repaint exterior enclosure of generator. Generator shall have a full tank of fuel prior to turning over to owner.
D1.205	Drawings E7.1	Room B089 – See Partial Power Plan (Attachment D1.205) showing additional of Equipment "V-1."
D1.206	Drawings E9.4	Student Room Wiring – FCU relay is supplied by E.C. as part of the Occupancy Sensor/Controls.

Respectfully submitted,

MSKTD & ASSOCIATES, INC.

GARY EDWARD VOIROL REGISTERED No. 900022 STATE OF INDIANA ARCHITECT

Gary E. Voirol, Architect

Attachments: Prebid Meeting Minutes
Section 002113 – Instructions To Bidders
Section 004500 – Common Construction Wage Scale (dated January 20, 2012)
Section 006001 - General Conditions AIA A201 (2007)
Section 006010 – Supplementary General Conditions
Section 006020 – Project Site Requirements
Section 007060 – Notice To Proceed
D1.033 (Siemens TC dwgs – 161 pgs.)
D1.045 (D1.C1-sk1)
D1.047 (D1.C3-sk1)
D1.048a & D1.048b (D1.C4-sk1 & D1.C4-sk2)
D1.049 (D1.C4-sk3)
D1.050 (D1.C5-sk1)
D1.051a & D1.051b (D1.C7-sk1 & D1.C7-sk2)
D1.054 (D1.C8-sk1)
D1.055 (D1.C8-sk2)
D1.056a – D1.056f (L2.0)
D1.060 (5/L6.4)
D1.061 (6/L6.4)
D1.069 (S4.4c)
D1.070 (S4.5c)
D1.077 (A2.2c)
D1.080 (1/A2.7a)
D1.081 (2/A2.7a)
D1.082 (1/A2.7b)
D1.083 (2/A2.7b)

D1.084 a-d (A2.7b)
D1.086 (A2.7b)
D1.094 (2/A4.3)
D1.095 (3/A4.3)
D1.099 (4/A5.3)
D1.102 (9/A5.3)
D1.103 (10/A5.3)
D1.104 (11/A5.3)
D1.108 (6/A5.5)
D1.111a & b (A5.8 & A6.7)
D1.112 (4/A5.9)
D1.115 (A6.1)
D1.121 (9/A6.5)
D1.122a, D1.122b, & D1.122c (A6.7)
D1.129 (A7.3)
D1.136 (1/A10.1)
D1.139 (21 & 22/A10.4)
A12.7b
D1.159 (M2.1bc)
D1.162 (M2.3bc)
D1.164 (M4.4)
D1.165 (M4.4)
D1.166 (M4.4)
D1.167 (M4.4)
D1.171 (M5.2)
D1.172 (M5.2)
D1.187 (D1.P1 – P2.0bc)
D1.188 (D1.P3 – P2.2b)
D1.189 (D1.P2 – P2.2c)
P2.4a (D1.P2.4a)
P2.4b (D1.P2.4b)
D1.193 (D1.P4 – P2.5bc)
D1.194 (D1.P5 – P2.6)
D1.195 (P5.1)
D1.199 (E2.3b, E2.4b, E2.5b, E3.3b, E3.4b, E3.5b, E4.3b, E4.4b, E4.5b)
D1.200 (E2.6)
D1.203 (E5.4)
D1.205 (E7.1)

cc: All plan holders
File 9.2

MSKTD
& Associates, Inc.

INDIANA UNIVERSITY BLOOMINGTON
SOUTHEAST SIDE RESIDENCE HALL
IU Project No. 20106837
MSKTD Project No. 5804

PREBID MEETING MINUTES
Tuesday, January 24, 2012, 10:30 a.m.

THOSE IN ATTENDANCE:

See the attached list.

ISSUES DISCUSSED:

The following recorded items are intended to be a summary of the items discussed at the public Prebid Meeting. The items discussed were condensed from the plans and specifications and are not in any way intended to be all inclusive of the requirements by the contractors. The items discussed were intended to clarify regular items necessary during the bidding process.

INTRODUCTIONS

OWNER'S REPRESENTATIVES – UNIV. ARCHITECTS OFFICE

BOB RICHARDSON
PK PATEL
JIM KORYTA
GARY CHAMBERS

RESIDENT PROGRAM SERVICES – HOUSING

LARRY ISOM

ARCHITECTS REPRESENTATIVES – MSKTD

JON ROWE, MIKE NICHTER AND GARY VOIROL

CIVIL ENGINEERS – L'AQUIS ENGINEERS

DAVID HUFFMAN

FSC
Mixed Sources
Product group from well managed forests, controlled sources and recycled wood or fiber
Cert no. SW-COC-001530
www.fsc.org

GENERAL ITEMS

1. Contract documents available through Eastern Engineering. Deposit is required. Deposit will be returned if drawings are returned 5 days after the bid opening and only if drawings and specs are in original condition. See new addendum item.
2. Contract documents can be viewed at UAO, MSKTD, plan rooms.
3. Listing of plan holders available at Eastern Engineering online.
4. Interpretation of contract documents should be addressed to MSKTD. Send all inquiries to attention of Gary Voirol. 260-432-9337 or gev@msktd.com. Specific questions can be sent to specific members of team with cc to Gary Voirol.
5. Interpretations are official only if they are documented in an addendum or other written form from MSKTD or IU. These will be distributed to all plan holders. Interpretations taken until 7 to 10 days prior to bid date.
6. Addenda will be sent to all bid document holders of record (complete set holders only).
7. Substitutions will be evaluated if submitted to MSKTD in proper form with proper detail and data for comparison and analysis....we will not spend time printing and looking up material that is supposed to be sent to us as part of the request...these requests will remain unanswered. Last addendum will be issued no later than 5 days before bids are due...

SCOPE OF PROJECT AND WORK

1. Presentation of work and scope was given.
2. Schedule of work is start work immediately following bid award...est. end of February. Work to be complete by July 1, 2013.
3. Liquidated damages begin if work is not done on that date. $3000 per day through July 18, 2013. $10,000 per day from July 19, 2013, forward.
4. Other projects will be going on in the area: Dining Expansion at Forest, Apartment project at 3rd and Rose, Music School at Jones and Jordon.

BIDDING PROCEDURES

1. Bid opening is February 8, 2012, at the UAO at 2:00 pm.
2. Bids are due at the UAO office at 1800 North Range Road.
3. Unified bid.
4. Must be original bids and must be delivered or mailed. No faxes or email bids will be accepted. Bid form must have wet signatures.
5. Bid form must be filled in completely including unit prices, alternates, and all major subcontractors.
6. Contractor must acknowledge all addenda.

7. Supplemental forms that need to be submitted:
    a. Contractors Bid for Public Work Form 96 (Rev 2005)
    b. Current financial statement and subsequent quarterly statements
    c. Bid bond of 5%
    d. Drug testing program – must be in full compliance with Indiana code.
    e. Statement of wages to be paid.
    f. Contractor's asbestos certification
    g. MBE/WBE participation plan
8. One bid is all that is required....must be legible!!!!
9. Sealed envelope with proper title.
10. Bids shall be valid for 60 days.
11. Bids will be opened and read aloud at the time indicated...any bid received after the designated time will be returned unopened.
12. Owner has right to reject any and all bids and to waive any informality or irregularity in any bid. Any bid that is incomplete can be rejected by the owner.
13. Requested information by the architect or owner shall be submitted within 48 hours after bid time. That includes the additional information on the bid form indicated such as subcontractors and material suppliers and manufacturers.
14. Insurance, escrow, bonding, and contract agreements will follow successful negotiations.
15. Note allowances in the project's base bid..these need to be included.

CONSTRUCTION PROCEDURES AND UNDERSTANDINGS

1. Drug and smoke-free environment.
2. Apprentice employment.
3. MBE/WBE participation.
4. 100% performance bond will be required.
5. General Contractor shall hold coordination meetings.
6. Architect will hold progress meetings.
7. Testing is by General Contractor. Testing indicated in allowances is to be used by owner as needed and as directed by Architect.
8. All tap fees are by General Contractor.
9. Parking is available by permit near the stadium – Purple Lot by Mellencamp Practice Building. Shuttle services will be by General Contractor. Parking permits (if required) will be paid for by General Contractor for each vehicle parked in the purple lot.
10. Temporary facilities and utilities are identified in the specifications...see Special Conditions Section 006020 Pages 1-24 and Supplementary Special Conditions.

11. Elevator #2 shall be used by General Contractor only if properly protected and only if Owner agrees to use. General Contractor shall pay for permits and fees associated with use prior to Substantial Completion.
12. Contractor shall have required field offices and all required items for successful operations as indicated in the specifications.
13. A full- time field superintendent and a full- time office superintendent with necessary staff shall be required for this project.

LEED PROJECT

1. Project is attempting to achieve platinum rating.
2. Follow procedures.
3. Office of Sustainability is available at IU for questions as well as MSKTD.

OTHER RELATED TOPICS

1. Site staging shows first work needed to be completed is handicapped parking for School of Education.
2. Moving bus station on Rose Ave.
3. Rock excavation will be part of Base Bid.
4. Project is going to be submitted to State for review and variances have been submitted and obtained.
5. Local building permits are not required unless indicated by city officials.
6. Site is open and available for inspection.
7. Indiana University will not tolerate any sexual harassment of any kind.
8. Warranty is for 2 years after final acceptance by IU. That does not mean Substantial Completion...it means final acceptance by IU in writing.
9. Familiarize yourself with all general and supplementary conditions.
10. IU Construction Management will be on site to observe, inspect, and record progress.
11. Site photography is required.
12. Project is tax exempt.

ITEMS DISCUSSED/QUESTIONS

1. The geo-technical soils report has some specific directives regarding testing and procedures. A/E will confirm what are the responsibilities of the General Contractor regarding testing in the addendum.
2. Defining extent of soil and rock removal in Base Bid will be defined in the addendum.
3. Conflicts regarding testing responsibility will be defined in the addendum.
4. IU will attempt to define the specifics regarding what is and will be accepted for completion on July 1, 2013.
5. Applied Engineering is the owner's Facility Commissioning Agent for the project.

Respectfully submitted,

MSKTD & ASSOCIATES, INC.

Gary E. Voirol

Gary E. Voirol, Architect

GEV/jf

Attachment: Attendance List

cc: All plan holders

PREBID MEETING ATTENDANCE

Project Name	IUB Southeast Side Residence Hall
IU Project Number	20106837
Date	Tuesday, January 24, 2012

PLEASE PRINT

Name	Firm/Department	Phone #	Email
GARY VONOL	MSKTD	260 432-9337	GEV@MSKTD.COM
Mike Nichter	MSKTD	"	MDN@MSKTD.COM
JON ROWE	MSKTD	"	jdr@mskTd.com
Jeff CHRISSIKOS	WEIGAND Construction	260-490-7449	JCHRISSIKOS@WEIGANDCONSTRUCTION.COM
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PREBID MEETING ATTENDANCE

Project Name	IUB Southeast Side Residence Hall
IU Project Number	20106837
Date	Tuesday, January 24, 2012

PLEASE PRINT

Name	Firm/Department	Phone #	Email
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PREBID MEETING ATTENDANCE

Project Name	IUB Southeast Side Residence Hall
IU Project Number	20106837
Date	Tuesday, January 24, 2012

PLEASE PRINT

Name	Firm/Department	Phone #	Email
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Mike FAGG	AAA Electric	812-232-1500	AAAELMTW@AOL.com
Trenton Ramsey	Cassady Electric	812-332-7361	trent.ramsey@cassadyelectric.com
Dan Morrison	Miller-Ends Co.	317-495-6807	dmorrison@miller-ends.com
Kathy Baker-Heckard	Indiana Cut Stone	812-275-0264	kathy.baker.heckard@indystone.com
Shannon Brock	Milestone Contractors	812-330-2037	shannon.brock@milestonelp.com
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Daniel Martin	Messer Construction	317-576-1810	dmartin@messer.com
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INSTRUCTIONS TO BIDDERS

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ARTICLE 1 - DEFINITIONS

1.1 Bidding Documents include the Notice to Bidders, Instructions to Bidders, the Bid Form, other sample bidding and contract forms and the proposed Contract Documents (as defined in the General Conditions), including any Addenda issued prior to receipt of bids.

1.2 All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, ("GENERAL Conditions") and Supplementary General Conditions, Indiana University Project Site Requirements or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written or graphic instruments issued by the Owner's Representative prior to the execution of the Contract which modify or interpret the Bidding Documents by addition, deletions, clarifications or corrections. Addenda become part of the Contract Documents when the Construction Contracts are executed.

1.4 A Bid is a complete and properly signed proposal to do the Work for the sum stipulated therein supported by data called for by the Bidding Documents.

1.5 Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described as the base to which Work may be added or deducted for sums stated in Alternate Bids.

1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.

1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract Documents.

1.8 A Bidder is one who submits a Bid for a prime contract with the Owner for the work described in the proposed Contract Documents.

1.9 A Sub-bidder is one who submits a bid to a Bidder for materials or labor for a portion of the Work.

1.10 A Day means a calendar day unless otherwise specified.

1.11 Contract Documents means these Instructions to Bidders, the General Conditions of the Contract for Construction Between Owner and Contractor, Supplementary General Conditions, Indiana University Project Site Requirements, Notice to Bidders, Bid Forms, Notice to Proceed, Drawings, Specifications, Construction Agreement, Addenda issued prior to execution of the Construction Agreement, , any other documents listed in the Agreement, approved Schedules (per General Conditions §3.10.4), and Modifications issued after execution of the Construction Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) Construction Change Directive or (3) a written order for a minor change in the Work issued by the Owner's Representative.

ARTICLE 2 – MULTI-PRIME PROJECTS WITH OR WITHOUT CONSTRUCTION MANAGER AS ADVISOR

2.1 Type of Bid

2.1.1 If this Project is bid as a multiple prime project with Construction Manager as Advisor, Separate Contracts will be awarded to multiple Prime Contractors, as indicated below in Section 2.2 Division of the Work, and the requirements set forth in the remainder of this Article apply.

2.1.2 The Bid Proposals for each Prime Contract shall be on the basis of a Lump Sum Base Bid, plus furnishing supplementary information and supplementary documents as requested in the Bid Form.

2.2 Division of the Work

2.2.1 The Work of this Project has been divided into the following parts, for which Separate Contracts will be awarded:

( ) 3.1.1 General Construction Work
( ) 3.1.2 Mechanical Construction Work
( ) 3.1.3 Electrical Construction Work
( ) 3.1.4 Other _____

2.2.2 These Instructions to Bidders, Notice to Bidders, Bid Form, Agreement, Notice to Proceed, General Conditions of the Contract of Construction between Owner and Contractor, Supplementary General Conditions, Indiana University Project Site Requirements, Contract for Construction, Drawings and all the Specifications apply to each of the listed Prime Contracts. Also all Addenda issued during bidding apply to each of the listed Prime Contracts.

2.2.3 The scope of work for each Prime Contract is indicated on the Drawings and in the Specification Sections.

2.3 Assignment of Coordination and Authority to Approve Pay Applications

2.3.1 If the Owner has hired a Construction Manager as Advisor ("CM") for this Project, the Owner will assign the coordination of the work of the all Prime Contractors to the CM and each Prime Contractors shall accept assignment of coordination as a condition of its Contract.

2.3.2 Said assignment of coordination of the work of the Prime Contractors to the CM is for the purpose of placing with one entity, namely the CM, the full and complete responsibility for coordinating and expediting all the Work required for the construction of this Project.

2.3.3 Each Prime Contractor shall provide the Owner, and not to the CM, with insurance, bonds, and such other documents as may be required under the terms of its contract and

Indiana law.

2.3.4 The Owner will make monthly progress payments directly to each Prime Contractor under the terms set forth in the General Conditions and Supplementary General Conditions and Addenda thereto, and upon the written approval of the CM and Owner's Representative of each monthly payment request submitted.

2.3.5 If there is no CM for this Project, the Owner will assign the coordination of the work for all other Prime Contractors (including but not limited to the Contractors for Mechanical and Electrical Construction Work) to the General Contractor, and each Prime Contractors shall accept assignment of coordination as a condition of its Contract. The duties assigned to the CM in Sections 2.3.2 through 2.3.4 shall be assigned to the General Contractor. On a multiple-Prime Project, the General Contractor shall report to the Owner's Representative any circumstances known to it that will assist the Owner's Representative in making a determination as to whether to withhold certification of an 0Application for Payment submitted by another Prime Contractor.

ARTICLE 3 – SINGLE PRIME PROJECTS

3.1 Type of Bid

3.1.1 If this Project is bid as a single prime project, the requirements set forth in the remainder of this Article apply.

3.1.2 The Bid Proposal shall be on the basis of a Lump Sum Base Bid, plus furnishing supplementary information and supplementary documents as requested in the Bid Form.

3.2 Division of the Work and Coordination

3.2.1 The Contractor shall be responsible for performance of or the provision via subcontracts of all work (general, mechanical, electrical) necessary for the completion of the work in full and complete accordance with the Bidding documents. The Contractor shall ensure that subcontractors at every tier complies with the same requirements to which the Contractor is obligated.

3.2.2 The Contractor shall ensure that the requirements set forth in Instructions to Bidders, all Addenda issued prior to receipt of Bids, the Bid Form, Agreement, General Conditions, Supplementary Conditions, and all Sections of Division 1 - General Requirements of the Specifications apply to each subcontract for work on this Project.

3.2.3 The scope of work for each Separate Contract is indicated on the Drawings and in the Specification Sections listed below:

3.2.4 The Contractor has the full and complete responsibility for coordinating and expediting all the Work, including that of all of its subcontractors, required for the construction of this Project.

ARTICLE 4 - PROCUREMENT OF BIDDING DOCUMENTS

4.1 Bidding Documents are on file and may be examined and/or obtained for bidding purposes as stated in the Notice to Bidders.

4.2 Bidding Documents used for bidding purposes shall remain the property of the Owner. Bidding Documents should be returned to Eastern Engineering within 21 days after the date set for opening of bids or deposit will be forfeited.

ARTICLE 5 - EXAMINATION OF SITE AND BIDDING DOCUMENTS

5.1 The site shall be carefully examined prior to bidding to ascertain the location of the work, existing conditions, and all other matters which may affect the work under this Contract. Each bidder by making his bid represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.

5.2 The Bidding Documents shall be carefully examined to ascertain the character, quality and quantity of the work to be performed, of materials and items to be furnished, of equipment and facilities needed during construction, of utilities and of all other matters which may affect the work under the Contract. Each bidder by making his bid represents that he has read and fully understands the Bidding Documents.

5.3 Boring information, water levels, indications of surface and subsurface conditions and similar information given on the drawings or in the specifications are furnished only for the convenience of the Bidders. Logs of available subsurface explorations, borings and drawings of existing site conditions may be examined by arrangement with the Owner. The Owner, Owner's Representative and their Consultants make no representation regarding the character and extent of the soil data or other surface or subsurface data and conditions to be encountered during the work and assume no responsibility and make no guarantee as to the accuracy or completeness of the information.

5.4 Each Bidder by careful examination, shall inform itself as to the nature and location of the work, the conformation of the ground, subsoil and ground water conditions, the character, quality and quantity of the materials to be encountered, the character of equipment and the facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work. Each Bidder shall make its own deductions of surface and subsurface conditions which may affect methods or cost of construction of the work and Bidder agrees that, if it is awarded the Contract, it will make no claim for damages or other compensation, should it encounter conditions during the progress of the work different from those as calculated and/or anticipated by it.

ARTICLE 6 - QUALIFICATION OF BIDDERS

6.1 Each Bidder shall be thoroughly experienced in the work to be performed and capable of completing the work on schedule.

6.2 Each Bidder shall demonstrate that it is authorized to perform public works in the State of Indiana by submitting to the Owner a properly executed Contractor's Bid for Public Work

Indiana State Form 96 (Revised 2005).

6.3 Each Bidder shall demonstrate that it is financially able to complete the Contract for this Project by submitting its most recent full-year audited, or Independently Reviewed, financial statement and subsequent quarterly financial statements, if any. NOTE: This financial information is a required attachment to Indiana State Form 96.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.1 Each Bidder shall examine the Bidding Documents carefully and, not later than ten (10) days prior to the date of receipt of bids, shall make written request for interpretation or correction of any ambiguity, inconsistency or error therein which it may discover. Verbal questions will not be answered.

7.2 Request for interpretation, correction or clarification of the Bidding Documents shall be in writing to the Owner's Representative.

7.3 Interpretation of the Bidding Documents will be given by the Owner's Representative in the form of written Addenda no fewer than two (2) days before the bid opening date. Addenda will be distributed to each Bidder and shall become a part of the Bid Documents.

7.4 Bidders shall ascertain the status of Addenda two (2) days prior to the Bid opening date. Failure of any Bidder to receive any Addenda shall not relieve the Bidder from the obligations of his bid, unless Bidder acknowledges in writing, prior to Bidding that he has not received the Addenda, in which case he is not liable therefore.

ARTICLE 8 - SUBSTITUTIONS

8.1 Where one or more specific materials, trade names, or articles of certain manufacturers are mentioned, it is done to establish a basis of durability, efficiency, appearance, and simplification of maintenance, and not for the purpose of limiting competition. Other materials or articles may be used if approved in writing by Owner. Approval may be obtained during the bidding period only. After bids are opened substitutions will not be considered. However, the establishment of proof that said "equal" product is equal to the product specified, shall be the responsibility of the Contractor if said equality is questioned by the Owner.

8.2 Any proposed substitution of equipment or materials for that which is not specified shall first be approved in writing by the Owner not less than seven (7) days prior to the date established for receipt of bids by the Owner.

ARTICLE 9 - PRE-BID CONFERENCE

9.1 A pre-bid conference will be held to answer Bidders' questions regarding the Bidding Documents.

9.2 An Addendum will be issued confirming any information conveyed at pre-bid conference and no verbal response tendered during pre-bid conference shall have legal standing unless so confirmed by Addendum.

ARTICLE 10 - WAGE SCALE

10.1 Indiana Law (IC 5-16-7-1 & -2) provides that contractors and subcontractors pay common construction wages for projects estimated to be over $250,000 in construction cost. All bids must be based on the common construction wage scale set for this work, if any, by the State Appointed Common Construction Wage Committee. If the estimated construction cost for this Project is under $250,000, the remainder of this Article 10 does not apply for this Bid.

10.2 The current State Appointed Common Construction Wage Committee's determination of the common construction rate of wages for this project is included in the Specifications. The Contractor and its subcontractors shall comply with all applicable common construction wage requirements, including but not limited to providing wage scale certifications to the Owner.

10.3 If a new common construction wage scale is determined for the county in which the Project is located after bids are received and prior to contract award, the awarded Contractor will be expected to comply with the updated wage determination. Common construction wage scale determinations are available online at www.in.gov/dol/2596.htm. (Project Owner = Indiana University).

10.4 The Bidder shall submit with its Bid a completed Statement of Wages to be Paid.

ARTICLE 11 – ASBESTOS

11.1 Unless expressly included in Project Specifications, Bidder shall not include in its bid price the cost of removal of the asbestos or asbestos containing materials ("ACM").

11.2 Each Bidder is expected to familiarize itself with Section 15.B. of the Indiana University Project Site Requirements regarding the required protocol should asbestos or ACM be encountered on the Project.

ARTICLE 12 - DRUG FREE WORKPLACE; DRUG TESTING PROGRAM

12.1 Owner maintains a drug free workplace, as provided in the Drug-free Workplace Act of 1988. By entering into a Contract with Owner, Contractor acknowledges compliance with this Act and will maintain a drug-free workplace.

12.2 The laws of the State of Indiana (IC 4-13-18 as amended) contain certain special provisions regarding drug testing of employees of public works Contractors and Subcontractors. Contracts entered into between a Contractor and the Trustees of Indiana University estimated to be in excess of $150,000.00 will be governed by these provisions. These provisions require, among other things, that a written plan for a program to test the Contractor's employees for drugs, which must be in full compliance with I.C. 4-13-18 **must be submitted with the bid**.

12.3 The successful Bidder will be required to comply with all applicable provisions of I.C. 4.13.18 with respect to each Bidder's Subcontractors, as the term "Subcontractor" is defined in the statute. In particular, the successful Contractor must require each of its subcontractors to furnish Contractor with the Subcontractor's I.C. 4-13-18-6 compliant drug plan and requiring each subcontractor to implement the employee drug testing program described in the subcontractor's plan.

12.4 The successful Bidder must submit, along with each application for payment under the Contract, an affidavit, dated and signed by the Contractor, substantially as follows:

> This is to certify that in the performance of this Contract, neither the undersigned Contractor, nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "Drug Testing Program" provision of the General Conditions of the Contract.

ARTICLE 13 - RECOMMENDED EMPLOYMENT OF APPRENTICES

13.1 Owner strongly recommends that Contractor employs apprentices from each building trades craft involved in the Project to the maximum extent feasible. In doing so, the Contractor shall consider whether such apprentices are indentured into a Joint Apprenticeship Training Program or other comparable bona fide apprenticeship training program, registered and certified with the U.S. Department of Labor, Bureau of Apprenticeship and Training and shall use as a guide the Apprenticeship Standards of the Labor-Management Contract for the appropriate jurisdictional area when determining the appropriate ratio of apprentices from each respective craft.

ARTICLE 14 – MINORITY AND WOMEN'S BUS INESS ENTERPRISES

14.1 MBE/WBE Participation Plan

Indiana University is committed to diversity and non-discrimination in all aspects of its operations. The Office of the President created the University Business Diversity Department and approved the Business Diversity Initiative to ensure that certified MBEs and WBEs are included in all invitations for quotes and bids, and that all prospective bidders are notified of Indiana University's expectation for diversity, including but not limited to MBE/WBE participation in procurement contracts for professional services, materials, supplies and equipment, and in contracts for the construction, architectural services, renovation or repair of university facilities and equipment. This expectation extends to all tiers of contractor utilization. Each Prime contractor should actively solicit and include certified minority- and women-owned subcontractors in bid submissions.

The Minority and Women's Business Enterprise Participation Plan (form included in specifications) **must be submitted with the bid**. This Participation Plan will be considered during the proposal evaluation process.

Indiana University's annual MBE and WBE participation goals parallel those set by the Indiana Department of Administration for its own business diversity efforts. The State MBE/WBE participation goals may be found at http://www.in.gov/idoa/2494.htm.

14.1.1 "Minority Business Enterprise" (MBE) means an individual, partnership, corporation, limited liability company, or joint venture of any kind that is owned and controlled by (1) or more persons who are (a) United States citizens; and (b) members of a racial minority group: African American, American Indians, Hispanics, Asian Americans, or other similar minority group as defined by 13 CFR 124.103

14.1.2 "Women's Business Enterprise" (WBE) means an individual, partnership, corporation, limited liability company, or joint venture of any kind that is owned and controlled by (1) or more persons who are (a) United States citizens; and (b) whose gender is female.

In order to count toward participation goals, the MBEs and/or WBEs must be certified by the State of Indiana, the City of Indianapolis, or the Indiana Minority Supplier Development Council or other entity recognized by the state or federal government that provides certification of the sort.

Owner retains the discretion to hold payment, and/or to reject future bids submitted by the successful Contractor in the event that Contractor misrepresents either MBE/WBE participation in this Project, or its efforts to obtain MBE/WBE participation in this project, or fails to report MBE/WBE spend on this project.

14.2 Mandatory Tier II Reporting Requirement

The successful Contractor shall take all necessary and reasonable steps to ensure that MBE/WBEs have the maximum opportunity to compete for and perform work on this Contract. MBE/WBE utilization in the performance of this Contract must be reported each quarter using the IU Online Tier II reporting System. Compliance with Owner's Mandatory Tier II Reporting Requirement is a pre-condition for approval of pay applications. (For more information and training, see http://www.Indiana.edu/~busdiv and click on Tier II Reporting.)

ARTICLE 15 BID SECURITY AND FORFEITURE

15.1 Bids shall be submitted with Bid Security in the form of a Bid Bond, Certified Bank Draft, or Cashier's Check, in the amount of five (5%) percent of the Bid, made payable to: "The Trustees of Indiana University, Bloomington, Indiana."

15.2 The Bid Security will be promptly returned to the unsuccessful Bidders, without interest, after signing of a Contract or the rejection of bids.

15.3 Should the successful Bidder refuse to enter into a Contract for the performance of the Work in accordance with the terms of its Bid, the amount of the Bid Security shall be forfeited to the Owner as liquidated damages, not as a penalty.

ARTICLE 16 - BIDDING PROCEDURES

16.1 All Bids must be prepared in the format provided by the Owner and submitted in accordance with these Instructions to Bidders.

16.2 The Bid Form must include the following information:

- Alternate Proposals
- Unit Prices
- Major Subcontractors
- Completion Date
- Addenda Acknowledgment

16.3 In order to be complete, the Bid must include the following:

- ☐ Contractor's Bid for Public Work – Form 96 (Revised 2005)
- ☐ Most recent full-year audited, or Independently Reviewed, financial statement AND subsequent quarterly financial statements

- ☐ Bid Bond – 5% of Bid
- ☐ Drug Testing Program, which must be in full compliance with Indiana Code 4-13-8
- ☐ Statement of Wages to be Paid
- ☐ Contractor Asbestos Certification
- ☐ Asbestos Protocol for Contractors
- ☐ MBE/WBE Participation Plan; Certification of MBE/WBE status if Bidder is itself an MBE/WBE

Check boxes have been included above to assist the Bidder to ensure that its bid will not be rejected based on its failure meet these requirements.

16.4 One Bid Form and one copy of all other required documents shall be submitted, with all blank spaces appropriately filled in, with prices given in words and numerals, using ink or typewriter, with handwritten ink signature. The written prices shall govern where there is a discrepancy. Any modification shall be initialed.

16.5 Verbal proposals or modifications of proposals will not be considered for purposes of award of contract.

16.6 A Bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the Notice to Bidders, or prior to any extension thereof issued to the Bidders.

16.7 No Bidder shall modify, withdraw or cancel its bid or any part thereof for sixty (60) days after the time designated for the receipt of bids in the Notice to Bidders.

16.8 Bids shall be delivered by hand, registered mail, or overnight service in a sealed opaque envelope with the project title and name and address of the Bidder shall be clearly indicated on the outside of the envelope before 2 p.m. (local time) on the bid opening date to Indiana University, Office of the Vice President for Capital Planning and Facilities, 1800 North Range Road, Bloomington, IN 47408-9650.

ARTICLE 17 - BID OPENING

17.1 Bids will be opened publicly and read aloud. Bids received after the time scheduled for receipt of Bids will be returned unopened to the Bidder.

17.2 Bids shall be valid and binding for a period of not less than sixty (60) days after the bid opening date.

17.3 Bid opening date shall be as indicated in the Notice to Bidders, or as changed by Addendum. Bids shall be received no later than 2:00 p.m. local prevailing time.

ARTICLE 18 - REJECTION OF BIDS

18.1 The Bidder acknowledges the right of the Owner to reject any or all Bids and to waive any informality or irregularity in any Bid received.

18.2 The Bidder acknowledges and agrees that the Owner has the right to reject its bid if the bid is

in any way incomplete, irregular, conditional, modified or obscure, or if the Bidder fails to furnish with its Bid any of the items identified in Section 16.3.

ARTICLE 19 - SUBMISSION OF POST-BID INFORMATION

19.1 Upon request by the Owner's Representative and Owner, a selected Bidder(s) shall, within 48 hours thereafter, submit the following:

19.1.1 A statement of costs for each major item of work included in its bid.

19.1.2 A designation of the work to be performed by the Bidder with its own forces.

19.1.3 A list of names of the subcontractors (firms doing work at the site) or other persons or organizations (including those who are to furnish materials or equipment) proposed for such portions of the work as may be designated in the bidding documents or, if no portions are so designated, the names of the subcontractors proposed for the principal portions of the work. The Bidder will be required to establish to the satisfaction of the Owner's Representative and the Owner the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the Sections of the Specifications pertaining to such proposed Subcontractors' respective trades. The Owner's Representative will notify the Bidder in writing if either the Owner or the Owner's Representative, after due investigation, has reasonable and substantial objection to any person or organization on such list. If the Owner or Owner's Representative has a reasonable and substantial objection to any person or organization on such list, the Bidder shall submit the name of another person or organization, and continue to do so until all names of persons and organizations submitted are acceptable to the Owner and Owner's Representative/Engineer.

Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and the Owner's Representative must be used on the work for which they were proposed and accepted and shall not be changed except with the written approval of the Owner and the Owner's Representative.

ARTICLE 20 –PERFORMANCE & PAYMENT BOND, ESCROW AGREEMENT, AND OTHER REQUIRED DOCUMENTS

20.1 A Bidder selected as a Prime Contractor shall be required to provide a Performance Bond in the full amount (100%) of its Total Contract price. The Bond shall be made with a Surety Company with a rating of "A- "or above in the most recent edition of the "A.M. Best's Key Rating Guide." The Bond shall be written in the form provided by the Owner, "Contract Performance Bond," and shall be delivered to the Owner within thirteen (13) calendar days of the date of the Notice to Proceed. Said Bond shall remain in full force and effect for a period of at least two (2) years after date of final acceptance of the Project. The bond shall be issued in the name of The Trustees of Indiana University and filed with the Capital Projects Business Office.

20.2 The Bidder shall require the attorney in fact who executes the required Bond on behalf of the surety to affix thereto a certified and current copy of its power of attorney indicating the monetary limit of such power.

20.3 If awarded the Contract, the Bidder shall execute, along with the Construction Agreement, a formal Escrow Agreement as contemplated by Section 1 of the Supplementary Conditions.

20.4 If awarded the Contract, the Bidder shall provide to the Owner its Corporate Authority Signature Certificate and its W9 at the same time it returns the executed Construction Agreement.

ARTICLE 21 - AWARD OF CONTRACTS AND FORM OF AGREEMENT

21.1 The Owner will award the Contract(s) on the basis of the lowest and best bid(s) in accordance with Indiana law, utilizing any stated alternates accepted and shall issue to the successful Bidder(s) a Notice to Proceed.

21.2 No awards will be made on the day of opening bids.

21.3 The selected Bidder(s), upon notification, shall enter into written contracts by executing a Construction Agreement with the Owner; and, further, shall commence work within thirteen (13) days of the date of the Notice to Proceed.

21.4 The Construction Agreement shall be copy bound in with the Specifications.

COMMON CONSTRUCTION WAGE SCALE

Date: JANUARY 20TH 2012

City: BLOOMINGTON **County:** Monroe

Project Description and Scope:INDIANA UNIVERSITY BLOOMINGTON (IDOL 20112355)

1ST QUARTER PROJECTS

We the undersigned common construction wage committee, appointed pursuant to Indiana Code 5-16-7 *et seq.*, do hereby fix and determine the following common construction wage scale to apply on the above referenced project.

TYPE OF CONSTRUCTION

(X) Commercial Building
( ) Heavy / Highway
( ) Utility

Classification	Class	Hourly Rate	Fringes	Total
Asbestos Worker	Skilled	32.34	14.69	47.03
	Semiskilled	18.77	8.37	27.14
	Unskilled	13.71	8.10	21.81
Asbestos Abatement	Skilled	29.90	13.48	43.38
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A
Boilermakers	Skilled	33.43	22.48	55.91
	Semiskilled	26.74	22.48	49.22
	Unskilled	20.06	22.48	42.54
Bricklayers	Skilled	27.20	10.32	37.52
	Semiskilled	20.40	10.32	30.72
	Unskilled	13.60	10.32	23.92
Carpenters	Skilled	27.01	14.15	41.16
	Semiskilled	24.31	10.78	35.09
	Unskilled	21.61	10.67	32.28
Carpet Layers	Skilled	25.75	12.07	37.82
	Semiskilled	23.18	11.49	34.67

	Unskilled	20.60	10.92	31.52
Cement Masons	Skilled	26.90	11.13	38.03
	Semiskilled	26.40	11.13	37.53
	Unskilled	24.00	11.13	35.13
Drywall Finishers	Skilled	24.95	9.81	34.76
Drywall Finishers using automatic	Semiskilled	17.47	8.51	25.98
Tools (Ames, Tape Tech, etc) add	Unskilled	12.48	7.64	20.12
$1.00 to hourly pay.				
Drywall Installers	Skilled	26.91	13.40	40.31
	Semiskilled	24.22	12.72	36.94
	Unskilled	21.53	12.03	33.56
Electricians	Skilled	33.04	12.52	45.55
	Semiskilled	19.82	9.61	29.43
	Unskilled	16.52	8.88	25.40
Elevator Constructors	Skilled	30.28	12.12	42.40
	Semiskilled	24.22	12.12	36.34
	Unskilled	21.20	12.12	33.32
Glaziers	Skilled	25.86	11.95	37.81
	Semiskilled	18.11	10.36	28.47
	Unskilled	12.93	9.30	22.23
Iron Workers	Skilled	27.90	18.76	46.66
	Semiskilled	22.32	18.76	41.08
	Unskilled	16.74	18.76	35.50
Laborers	Skilled	22.43	11.20	33.63
	Semiskilled	21.93	11.20	33.13
	Unskilled	21.18	11.20	32.38
Laborers / Asbestos Abatement	Skilled	21.93	11.20	33.13
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A
Millwrights	Skilled	26.34	16.33	42.67
	Semiskilled	23.71	12.74	36.45
	Unskilled	21.07	12.42	33.49
Operating Engineers	Skilled	29.00	14.07	43.07
Class 1 or A	Semiskilled	25.65	14.07	39.72
	Unskilled	21.85	14.07	35.92
Painters / Brush / Roll	Skilled	25.96	9.81	35.77
	Semiskilled	18.57	8.51	27.08

	Unskilled	13.48	7.64	21.12
Painters / Spray / Sandblast	Skilled	25.95	9.81	35.76
	Semiskilled	18.57	8.51	27.08
	Unskilled	13.48	7.64	21.12
Pipefitters & Steamfitters	Skilled	32.82	14.96	47.78
	Semiskilled	21.33	14.96	36.29
	Unskilled	15.43	14.96	$30.39
Plasterers	Skilled	23.48	9.54	33.02
	Semiskilled	21.98	9.54	31.52
	Unskilled	18.78	9.54	28.32
Plumbers	Skilled	32.82	14.96	47.78
	Semiskilled	21.33	14.96	36.29
	Unskilled	15.43	14.96	30.39
Pointer / Caulker / Cleaners	Skilled	27.45	10.07	37.52
	Semiskilled	20.59	10.07	30.66
	Unskilled	13.73	10.07	23.80
Roofers	Skilled	23.78	8.61	32.39
	Semiskilled	16.65	6.01	22.66
	Unskilled	11.90	2.35	14.25
Sheet Metal Workers	Skilled	31.72	18.14	49.86
	Semiskilled	23.79	16.93	40.72
	Unskilled	15.86	15.55	31.41
Sound & Communication Workers	Skilled	27.56	11.96	39.52
	Semiskilled	23.43	10.89	34.32
	Unskilled	19.84	10.01	29.85
Sprinkler Fitters	Skilled	31.29	12.75	44.04
	Semiskilled	20.34	12.75	33.09
	Unskilled	15.65	6.81	22.46
Stone Masons	Skilled	27.20	10.32	37.52
	Semiskilled	20.40	10.32	30.72
	Unskilled	13.60	10.32	23.92
Teamsters	Skilled	25.76	10.30	36.06
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A
Technical Engineers	Skilled	25.81	7.23	33.04
	Semiskilled	25.93	7.23	33.16
	Unskilled	23.81	7.23	31.04

Tile, Marble Setters	Skilled	28.90	9.56	38.46
	Semiskilled	26.01	9.56	35.57
	Unskilled	13.00	9.56	22.56
Terrazzo Setters	Skilled	29.50	9.66	39.16
	Semiskilled	26.55	9.66	36.21
	Unskilled	13.28	9.66	22.94
Tile, Marble, Terrazzo Finishers	Skilled	19.80	5.86	25.66
	Semiskilled	17.95	5.86	23.81
	Unskilled	12.66	5.86	18.52
Truck Mechanics	Skilled	25.76	10.30	36.06
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A

TYPE OF CONSTRUCTION
( ) COMMERCIAL BUILDING
(X) HEAVY/HIGHWAY
( ) UTILITY

Classification	Class	Hourly Rate	Fringes	Total
Carpenters	Skilled	24.76	14.97	39.73
	Semiskilled	22.28	11.35	33.63
	Unskilled	19.81	11.24	31.05
Electricians	Skilled	29.63	10.78	40.41
	Semiskilled	17.78	8.53	26.31
	Unskilled	14.82	7.97	22.79
Iron Workers	Skilled	27.90	18.76	46.66
	Semiskilled	22.32	18.76	41.08
	Unskilled	16.74	18.76	35.50
Laborers	Skilled	23.62	11.21	34.83
	Semiskilled	22.92	11.21	34.13

	Unskilled	22.62	11.21	33.83
Operating Engineers	Skilled	28.95	15.31	44.26
Class 1 or A	Semiskilled	22.70	15.31	38.01
	Unskilled			
Painters	Skilled	28.10	9.70	37.80
	Semiskilled	24.70	9.70	34.40
	Unskilled	14.20	9.70	23.90
Sprinkler Fitters	Skilled	31.29	12.75	44.04
	Semiskilled	20.34	12.75	33.09
	Unskilled	15.65	6.81	22.46
Teamsters	Skilled	25.76	10.30	36.06
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A

TYPE OF CONSTRUCTION:

( ) COMMERCIAL BUILDING
( ) HEAVY/HIGHWAY
(X) UTILITY

Classification	**Class**	**Hourly Rate**	**Fringes**	**Total**
Asbestos Workers	Skilled	27.83	11.54	39.37
	Semiskilled	20.25	7.48	27.73
	Unskilled	17.72	7.36	25.08
Bricklayers	Skilled	27.20	10.32	37.52
	Semiskilled	20.40	10.32	30.72
	Unskilled	13.60	10.32	23.92
Carpenters	Skilled	24.32	14.97	39.29
	Semiskilled	21.89	11.35	33.24

	Unskilled	19.46	11.24	30.70
Electricians	Skilled	31.70	11.91	43.61
	Semiskilled	19.02	9.24	28.26
	Unskilled	15.85	8.58	24.43
Iron Workers	Skilled	27.90	18.76	46.66
	Semiskilled	22.32	18.76	41.08
	Unskilled	16.74	18.76	35.50
Laborers	Skilled	23.82	11.21	35.03
	Semiskilled	23.12	11.21	34.33
	Unskilled	22.82	11.21	34.03
Operating Engineers	Skilled	28.95	15.31	44.26
Class 1 or A	Semiskilled	22.70	15.31	38.01
	Unskilled	21.20	13.91	35.11
Pipefitters & Steamfitters	Skilled	32.82	14.96	47.78
	Semiskilled	21.33	14.96	36.29
	Unskilled	15.43	14.96	30.39
Plumbers	Skilled	32.82	14.96	47.78
	Semiskilled	21.33	14.96	36.29
	Unskilled	15.43	14.96	30.39
Pointer / Caulker / Cleaners	Skilled	27.45	10.07	37.52
	Semiskilled	20.59	10.07	30.66
	Unskilled	13.73	10.07	23.80
Sheet Metal Workers	Skilled	31.752	18.14	49.86
	Semiskilled	23.79	16.93	40.72
	Unskilled	15.86	15.55	31.41
Sprinkler Fitters	Skilled	31.29	12.75	44.04
	Semiskilled	20.34	12.75	33.09
	Unskilled	15.65	6.81	22.46
Stone Masons	Skilled	27.20	10.32	37.52
	Semiskilled	20.40	10.32	30.72
	Unskilled	13.60	10.32	23.92
Teamsters	Skilled	25.76	10.30	36.06
	Semiskilled	N/A	N/A	N/A
	Unskilled	N/A	N/A	N/A
Truck Mechanics	Skilled	25.76	10.30	36.06
	Semiskilled	N/A	N/A	N/A

	Unskilled	N/A	N/A	N/A

(ADD CLASSIFICATIONS AS REQUIRED BY PROJECT)

Definitions:

Skilled: An Individual who performs work in a classification listed on the scale of wages. It shall be presumed that an employee is a skilled worker in that classification, and entitled to receive compensation at the skilled rate, unless the worker satisfies all the criteria for being categorized as a semiskilled or unskilled worker.

Semi-skilled: An individual registered in a bona fide apprenticeship program registered with the United States Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training. Apprentices are paid pursuant to their individually warranted percentage for the classification of work that they perform as set forth in the apprentice program standards.

Unskilled: An individual with less than twelve months of cumulative experience in the construction trades and who is not registered in a bona fide apprenticeship program.

The above definitions shall not apply to workers in the classification of Laborers.

Apprenticeship Programs:

The Wage Committee determines that the common practice in the county is for contractors to participate in bona fide apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training and that the rate of pay for the classifications of labor that participate in such programs is based in part on a percentage of the journeyman's rate (skilled rate herein) depending on the individual's progress in the program.

Workers engaged in such an apprenticeship program will be permitted to work at less than the predetermined rate set out above for the work they perform. Such apprentices must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate which is the skilled hourly rate in this wage scale.

Any worker who is not registered or otherwise employed in a bona fide apprenticeship program registered with the U.S Department of Labor, Bureau of Apprenticeship and Training and has twelve or more months of cumulative experience in the construction trades shall be paid at the skilled wage rate on this wage determination for the classification of work actually performed by the worker regardless of how the employer classifies such a worker.

Disputes regarding the appropriate classification of workers and the amounts said workers should be paid may be submitted to the Indiana Department of Labor for investigation.

Indiana State AFL-CIO

Awarding Agency Representative

ABC Representative

Taxpayer Named by Appointing Agency

Taxpayer Named by County Legislative Body

01/20/2012
Date

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name, and location or address)

«THE TRUSTEES OF INDIANA UNIVERSITY»
« »

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

« »« »
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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(Topics and numbers in bold are section headings.)

Additions and deletions have been made to these General Conditions which are not reflected in this Index.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of these General Conditions of the Contract for Construction Between Owner and Contractor, Supplementary General Conditions Indiana University Project Site Requirements, Notice to Bidders, Instructions to Bidders, Bid Forms, Notice to Proceed, Drawings, Specifications, Construction Agreement, Addenda issued prior to execution of the Construction Agreement, , any other documents listed in the Agreement, approved Schedules (per §3.10.4), and Modifications issued after execution of the Construction Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Construction Change Directive or (3) a written order for a minor change in the Work issued by the Owner's Representative.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Owner's Representative or the Owner's Representative's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Owner's Representative or the Owner's Representative's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Owner's Representative shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Owner's Representative's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work also includes labor, materials and equipment necessary or identical to those tasks or activities which are not specifically described in, but are reasonably inferable from, the Drawings and Specifications. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Owner's Representative and the Owner's Representative's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER. The Initial Decision Maker for purposes of Section 14.2.2 and Article 15 shall be the Owner's Representative.

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§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of conflicts or inconsistencies within or among parts of the Contract Documents and applicable standards, codes, and ordinances, the provision granting the Owner the greater rights shall prevail and the Contractor shall either (i) provide the better quality or greater quantity of work or (ii) shall comply with the more stringent requirements; or both in accordance with the Owner's Representative's interpretation. Contractor's obligations in this regard shall in no way diminish the Contractor's obligations imposed by §3.2 or §3.7.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 On the Drawings, given dimensions shall take precedence over scaled measurements, large scale drawings over small scale drawings, and drawings of a later date over drawings of an earlier date. Unless expressly authorized, drawings shall not be scaled for dimensions. If figured dimensions are not given on the Drawings, the Contractor shall timely request the same from the Owner's Representative.

§ 1.2.5 When references to laws, codes, regulations or standards of technical associations or organizations are included in the Contract Documents, the most current edition is intended and shall govern unless otherwise specified.

§ 1.2.6 Whenever a product is specified by proprietary designations, model numbers, catalog numbers, manufacturer trade names, or similar references, no substitution may be made unless it is accepted in writing by the Owner's Representative.

§ 1.2.7 The layout of mechanical and electrical systems, equipment, fixtures, piping, ductwork, conduit, specialty items, accessories shown on the Drawings in diagrammatic, and all variations in alignment, elevation and details required to avoid interferences and satisfy all architectural and structural limitations are not necessarily shown. Actual layout of the Work shall be carried out without affecting the architectural or structural integrity and limitations of the Work and shall be performed in such sequence and manner as to avoid conflicts, provide clear access to all control points, including valves, strainers, control devices and specialty items of every nature related to such systems and equipment, obtain maximum headroom, and provide clearances as required for operation and maintenance.

§ 1.2.8 A typical or representative detail on the Drawings shall constitute the standard for workmanship and material throughout corresponding parts of the Work. Where necessary, and where reasonably inferable from the Contract Documents, the Contractor shall adapt such representative detail for application to the Work subject to the prior approval of the Owner's Representative.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Owner's Representative and the Owner's Representative's consultants shall be deemed the authors of their respective Instruments of Service, including the Drawings and Specifications. Pursuant to the contract between

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the Owner's Representative and the Owner, the Owner holds all right, title and interest, including copyright, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's or Owner's Representative's reserved rights or that of the Owner's Representative or its consultants.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, the Owner's Representative or the Owner's Representative's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is The Trustees of Indiana University and is referred to throughout the Contract Documents as singular in number. The term "Owner's Representative" shall refer to the Owner's Representative, Engineer or other licensed design professional hired by the Owner for this Project and shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization unless and until such authority is modified or a new representative is identified in writing by the Owner. Except as otherwise provided in Section 4.2.1, the Owner's Representative does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including any required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.2 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the limitations and qualifications of the Contract Documents, including but not limited to Section 3.1.4, the Contractor may reasonably rely on the accuracy of the information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.3 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.4 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Section 12, persistently fails to carry out the Work in accordance with the Contract Documents, or fails to clean up as required by Section 3.15 and Supplementary Conditions Paragraph 10, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause thereof has been eliminated. However, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. The stoppage of Work pursuant to this

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Section 2.3 shall not entitle the Contractor to an adjustment of the Contract Sum, the Contract Time or the Contract Schedule.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Owner's Representative's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Owner's Representative. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.5 OWNER'S RIGHT TO REJECT DEFECTIVE WORK

The Owner shall have the right, but not the duty, to approve all materials and workmanship incorporated, or to be incorporated, into the Work and may reject as defective any work that is not, in the judgment of the Owner and the Owner's Representative, in strict accordance with the requirements of the Contract Documents. Work so rejected shall be promptly removed and corrected by the Contractor. No Work which the Owner expressed its intention to inspect shall be closed or covered by the Contractor until it has been duly inspected and approved by the Owner. Should the Contractor close or cover uninspected Work then the Contractor shall, at its own cost and expense, uncover all such Work so that it may be inspected. After Owner's inspection is complete, Contractor shall then properly repair or replace all affected Work.

§ 2.6 OWNER'S CONFIDENTIAL INFORMATION

The Owner may designate to Contractor such information or documents that Owner wishes to be kept confidential in connection with the Work or the Project. Such designation shall be in writing. Information designated by the Owner as "Confidential" shall not be disclosed, communicated or transmitted to any person or entity other than Contractor's employees, agents or subcontractors as may be necessary for the performance of the Work. Contractor shall require its subcontractors, vendors, material suppliers and the like to comply with this requirement. Documents designated as "Confidential" (and all copies thereof) shall be immediately returned to the Owner upon request. The requirements of this Section 2.6 shall survive Owner's final acceptance of the Work or earlier termination of the Contract.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. If the Work of the Project has been divided into the following parts, each part will be performed by the separate Prime Contractor indicated below:

.1 General construction work, by the General Contractor;

.2 Mechanical construction work, by the Mechanical Contractor; and

.3 Electrical construction work, by the Electrical Contractor.

§ 3.1.2

.1 In the Instructions to Bidders, Bid Form, General Conditions, Supplementary Conditions, Indiana University Project Site Requirements, all sections of Division 1 of the Specifications, and in all addenda and modifications to the Contract Documents, the term 'Contractor' means each of them, unless specific reference is made to a particular Prime Contractor.

.2 In the Agreement for General Construction Work, the site development drawings, the architectural drawings, and all sections of the Specifications, the term 'Contractor' means the General Contractor, unless specific reference is made to another Prime Contractor.

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.3 In the Agreement for Mechanical Construction Work, the mechanical drawings, and all sections of Division 23 of the Specifications, the term 'Contractor' means the Mechanical Contractor, unless specific reference is made to another Prime Contractor.

.4 In the Agreement for Electrical Construction Work, the electrical drawings, and in all sections of Division 26 of the Specifications, the term 'Contractor' means the Electrical Contractor, unless reference is made to another Prime Contractor.

.5 In any other Agreement with any other Prime Contractor for that Prime Contractor's scope of work, and any drawings and/or specifications related thereto, the term 'Contractor' shall mean that specific Prime Contractor, unless specific reference is made to another Prime Contractor.

.6 All references in the Contract Documents to 'Contractor' and/or to third parties under contract or control of the Contractor shall be deemed to be reference to the Contractor. The relationship between the Owner and the Contractor is that of independent contractor. The Contract Documents shall not be construed to make the Contractor the agent, servant or employee of the Owner or to create any joint venture, partnership or other association between the Owner other than that of independent contractor.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner's Representative in the Owner's Representative's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.5 No later than thirteen (13) calendar days after the date of the Notice to Proceed, the Contractor shall deliver to the Owner certified as true and accurate and with no material changes as of the date of delivery: (i) Contractor's required payment and performance bond; (ii) all required Certificates of Insurance, including a Certificate of Compliance for worker's compensation insurance or, if applicable, a Worker's Compensation Exemption Certificate Clearance.

3.1.6 Contractor shall expeditiously execute the Construction Agreement with the Owner and shall, along with the executed Construction Agreement, provide the Owner with its executed Escrow Agreement, as contemplated in Section 1 of the Supplementary Conditions, and with its Corporate Authority Signature Certificate and W9, as contemplated by the Instructions to Bidders.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 By executing the Contract, the Contractor represents to the Owner that: (1) the Contractor has a high level of experience and expertise in the business administration construction, management, workplace health and safety supervision and superintendence of projects of similar size and complexity and that it will perform the Work with the care, skill and diligence of such a contractor; (2) Contractor and, to the best of its knowledge, its subcontractors are financially solvent, able to pay all debts as they mature and have sufficient working capital to complete the Work and all obligations thereunder; (3) Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work; (4) Contractor is authorized to do business in the State of Indiana; (5) Contractor's execution of the Contract and its performance thereof are within its authorized powers; (6) Contractor has (i) studied the Contract Documents, understands their provisions and confirmed that that they are sufficiently detailed and complete to permit the Contractor to perform the Work in accordance with the Contract Documents, within the Contract Time and for the Contract Sum; (ii) inspected the Project site; and (iii) investigated and satisfied itself as to: (a) the site and locality where the Work is to be performed and the conditions and difficulties to be encountered, including access thereto; (b) in accordance with the provisions of the Instructions to Bidders Article 5 and Supplementary Conditions Section 2, the type and condition of the soil including the quality and quantity of the subsurface and surface materials or obstacles to be encountered; (c) the availability of utilities and access thereto; (d) conditions affecting transportation, disposal, handling and storage of materials, supplies and equipment; (e) any materials, supplies or equipment which are to be furnished by the Owner for the Contractor's use; (f) the type and availability of tools, equipment and facilities to perform the Work; (g) the availability and adequacy of labor and trades, local common construction wage scales and, if applicable, union wage scales, benefits, working conditions,

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craft jurisdictions, area practices and collective bargaining agreements affecting the Work; (h) prevailing weather and climatological conditions; (i) all laws applicable to the Work and to the Contractor; and (j) all other factors which may affect the Contractor's performance of the Work.

§ 3.2.2 Contractor has executed the Contract based on its own examination, investigation and evaluation of the matters set forth in Section 3.2.1 above and not in reliance on any representation of the Owner, Owner's Representative or any of their respective employees or agents which is not expressly set forth in the Contract Documents. No failure by the Contractor to consider or evaluate such matters shall relieve the Contractor from its responsibility to properly estimate the difficulty, cost and expense of performing the Work. Contractor shall not be entitled to, and Owner shall not be liable for, an adjustment to the Contract Sum, Contract Time or Contract Schedule which results directly or indirectly from Contractor's failure to properly examine, investigate or evaluate the matters set forth in Section 3.2.1.

§ 3.2.2.1 Because the Contract Documents are complementary, the Contractor shall, before starting any portion of the Work, carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Owner's Representative as a request for information in such form as the Owner's Representative may require.

§ 3.2.2.2 The exactness of grades, elevations, dimensions or locations shown on Drawings issued by the Owner's Representative or Work installed by other Contractors is not guaranteed by the Owner's Representative or the Owner. Consequently, prior to ordering any materials or performing any work, Contractor shall satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations and in all cases of interconnection of its Work with existing or other Work, shall verify, at the site, all dimensions relating to such existing or other Work. If a minor change in the Work is necessary because of actual field conditions, the Contractor shall submit detailed drawings of such change to the Owner's Representative for approval before making the change. Any significant dimensional differences shall be submitted to the Owner's Representative before proceeding with the Work. Any errors resulting from Contractor's failure to so verify shall be promptly rectified by Contractor at no additional cost to the Owner. No increase in the Contract Sum or the Contract Time shall be allowed because of differences between actual dimensions and dimensions on the Drawings.

§ 3.2.3 Any design errors or omissions discovered by the Contractor during the exercise of its obligations pursuant to this Section 3.2 shall be reported promptly to the Owner's Representative in writing. The Contractor's review is made in its capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Owner's Representative issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2.1 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform its obligations pursuant to this Section 3.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided or mitigated if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Owner's Representative for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 Except for errors, omissions, or inconsistencies reported by the Contractor, and concealed or unknown conditions in Section 3.7.4, by executing the Agreement, Contractor represents that:

.1 The Contract Documents are sufficiently complete and detailed for Contractor to perform the Work required and to produce the results indicated by the Contract Documents; and

.2 The Work as specified in the Contract Documents, including without limitation, use of materials, selection of equipment, requirements of product, manufacturers and Contractor's means, methods,

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procedures and techniques utilized to perform the Work are consistent with (i) good and proper practices within the construction industry, (ii) generally accepted or prevailing laws, regulations, ordinances and/or industry standards applicable to the Work, and (iii) the requirement of any warranties applicable to the Work.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Owner's Representative and shall not proceed with that portion of the Work without further written instructions from the Owner's Representative.

§ 3.3.1.1 The General Contractor shall be responsible for scheduling, coordinating and expediting the Work of its Subcontractors and the other Prime Contractors. All Prime Contractors shall cooperate with the General Contractor and comply with the General Contractor's directions with respect to scheduling and coordination of their work with the Work as a whole. The General Contractor shall make monthly reports to the Owner and Owner's Representative regarding the performance of each Prime Contractor. If a Prime Contractor fails or refuses to comply with its obligations under this Section 3.3.1.1, the Owner's Representative may withhold certification of its application for payment and such failure or refusal shall constitute a basis for termination for cause.

§ 3.3.1.2 The General Contractor shall establish and maintain benchmarks and all other grades, lines and levels necessary for the Work, report errors, omissions or inconsistencies to the Owner and Owner's Representative before commencing the Work and, if applicable, review the placement of the building(s) and permanent facilities on the site with the Owner and Owner's Representative after all lines are staked out and before foundation work is started. If a survey reveals any encroachments by the Contractor or its Subcontractors or adjacent properties caused by construction (except for encroachments arising from errors or omissions in the Contract Documents, not reasonably discoverable by the Contractor) such encroachment shall be the sole responsibility of Contractor and Contractor shall correct such encroachment within thirty (30) days after discovery or as soon thereafter as is reasonably possible, at Contractor's sole cost and expense, either by removal of the encroachment and subsequent reconstruction on the Project Site, or agreement with the Owner if the adjacent property is owned by The Trustees of Indiana University or by agreement with any third party owner in a form and substance satisfactory to Owner.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors. Contractor shall remove or cause to be removed from the Project any person or entity for whom Contractor is responsible, that the Owner or Owner's Representative determines to be detrimental to the Project.

§ 3.3.2.1 Neither Contractor nor its employees, Subcontractors or agents shall engage in sexual harassment in violation of Title VII of the Civil Rights Act of 1964 or discrimination based on sexual orientation in violation of University policy. In addition, Contractor will ensure that Indiana University students, employees and guests are protected from lewd, offensive or harassing conduct by Contractor's employees, Subcontractors and agents. Additional requirements are set forth in Supplemental Conditions, Section 8.

§ 3.3.3 The General Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. In the event that any Subcontractor, supplier,

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design professional or other entity for whom the Contractor is responsible asserts a verified statement, bond claim, mechanic's lien, if applicable, or other payment claim against the Owner and/or the Project, the Contractor shall promptly resolve said claim and shall defend, indemnify and hold harmless the Owner from all losses, damages or costs incurred in connection therewith, except to the extent the claim arises as a result of the Owner's failure to timely make payments to the Contractor under the terms of this Agreement. Should the Contractor fail to promptly resolve and/or bond over any such claim or lien, the Contractor shall pay the attorneys' fees reasonably incurred by the Owner in connection with said claim or lien.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Owner's Representative in accordance with Sections 3.12.8 or 7.3, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Owner's Representative and in accordance with a Construction Change Directive.

§ 3.4.2.1 The Contractor has based the Contract Price on the exact materials specified in the Contract Documents. The Contract Price is not contingent upon the approval of any substitute or "equal" product, material or method. If the Contractor proposes, in writing, an alternate product, material, equipment or method then:

.1 The product, material or method called for in the Contract Documents is intended to establish the standard of quality and design; however, an 'equal' product, material, equipment or method may be used if approved in writing as "equal" by the Owner's Representative.

.2 The terms "or approved equal" is deemed to be included after all products, materials, equipment or methods described in the Contract Documents.

.3 Proposed substitutions shall be supported by appropriate certifications or other materials necessary to support the proposed substitution. All costs associated with the evaluation of a proposed substitution (including but not limited to the cost of Additional Services rendered by the Owner's Representative) shall be borne by the Contractor.

.4 The Owner's Representative shall be the sole judge of equivalency.

.5 Acceptance of a proposed substitution shall not relieve the Contractor from responsibility for compliance with all the requirements of the Contract Documents. The Contractor shall be completely responsible for it the cost of any changes to other parts of its Work or the work of other Contractors caused by such substitution, including the cost of all necessary design or redesign services.

.6 The Contract Time shall not be extended and the Contract Price shall not be increased as the result of any substitution.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among Contractor's employees, Subcontractors and other persons or entities carrying out the Work. The Contractor shall employ or contract with only persons or entities fit and skilled in tasks assigned to them. Contractor shall use its best efforts to minimize the likelihood or impact of any strike, work stoppage or other disturbance.

.1 If the Work is to be performed by trade unions, Contractor shall make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Owner's Representative or the Owner, any conflict between the requirements of the Contract Documents and any labor agreements or regulation of any kind in force among members of councils that regulate or designate the work or activities of any particular trade or craft.

.2 If the progress of the Work is affected by an undue delay in furnishing or installing an item, material or equipment specified in the Contract Documents because of a conflict involving a labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be substituted pursuant to a Construction Change Directive.

§ 3.4.4 Contractor shall not be entitled to any adjustment in the Contract Sum or the Contract Time as the result of work stoppages, slow downs, disputes or strikes which result from or are caused by a wrongful act or unlawful act of

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Contractor, a Subcontractor or other person or entity for whom Contractor is responsible.

§ 3.4.5 Except in the case of emergency, no substantial field operations shall be performed outside of regular working hours without the prior notifications of and approval by the Owner's Representative and Owner. Contractor will not be entitled to additional compensation for work performed outside of regular working hours except by the prior written approval of the Owner. Additional compensation for overtime work shall be limited to the direct cost of the premium portion of the overtime.

§ 3.5 WARRANTY

Contractor warrants to the Owner and Owner's Representative that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that for a period of not less than two years the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. Contractor's warranty excludes remedy for (i) damage or defect caused by abuse; (ii) modification not executed by the Contractor except modifications performed by the Owner pursuant to Section 2.4; and (iii) improper or insufficient maintenance, improper operation or normal wear and tear or usage. If required by the Owner's Representative, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.1 As a condition precedent to final payment, Contractor shall provide all operations and maintenance manuals to Owner and shall assign to Owner any and all manufacturers' warranties relating to materials and labor used in the Work. Contractor shall perform the Work in such a manner as to preserve all manufacturers' warranties.

§ 3.5.2 No warranty of Contractor applicable to workmanship, material, product or equipment shall be voided or in any way diminished because a manufacturer, provider, material, product or equipment was specified or required by the Contract Documents.

§ 3.6 TAXES

§ 3.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 Indiana Gross Income Tax. In accordance with Indiana Gross Income Tax, as amended, Owner is a withholding agent for the payment of Indiana Gross Income Tax on contracts with Indiana University and is required to withhold the Indiana Gross Income Tax from a Non-Resident Contractor at the current statutory rate, less an annual exemption of $1,000. The term "Non-Resident Contractor" does not include a contractor that is a corporation organized under the laws of a state other than Indiana but that is licensed, qualified and registered with the Indiana Secretary of State to do business in Indiana.

§ 3.6.3 Indiana Gross Retail Tax. Materials and equipment purchased by Owner for incorporation into the Work are not subject to the Indiana Gross Retail Tax (sales tax). A general exemption certificate must be filed with the vendor by Contractor and Owner will furnish the certificate to Contractor upon request.

§ 3.6.4 Federal Excise Tax. Owner is exempt from payment of Federal Excise Tax and will furnish Contractor an exemption certificate upon request.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for required permits, fees, licenses, and inspections by government agencies, if any, necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. All connection charges, assessments or inspection fees imposed by any governmental agency or utility company are the Contractor's responsibility and shall be included in the Contract Sum.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 7 days after first observance of the conditions. The Owner's Representative will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or extension of the Contract Time for such number of days as condition prevents Contractor from achieving Substantial Completion within the Contract Time, or both. Any adjustment in the Contract Time shall be in accordance with the provisions of Section 8.3.2. If the Owner's Representative determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Owner's Representative shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 7 days after the Owner's Representative has given notice of the decision. No adjustment in the Contract Time or Contract Sum shall be permitted for concealed or unknown conditions that do not differ materially from conditions indicated in the Contract Documents, or that reasonably should have been discovered by Contractor's prior inspections, tests, reviews, and pre-construction activities, or inspections, tests, reviews and pre-construction activities that the Contractor had the opportunity to perform, or should have performed, in connection with the Work.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Owner's Representative. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Construction Change Directive. The amount of the Construction Change Directive shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

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§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Owner's Representative the name and qualifications of a proposed superintendent. The Owner's Representative may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Owner's Representative has reasonable objection to the proposed superintendent or (2) that the Owner's Representative requires additional time to review. Failure of the Owner's Representative to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 Contractor's superintendent shall be satisfactory to the Owner's Representative and the Owner and shall not be changed without the prior written consent of the Owner. Contractor's superintendent shall remain on site until completion of the Punch List work.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 Within 13 calendar days of the date of the Notice to Proceed, the General Contractor shall prepare and submit for the Owner's and Owner's Representative's information and approval a construction schedule for the Work ('Construction Schedule') which shall incorporate the Work of other Prime Contractors. The Construction Schedule shall not exceed time limits current under the Contract Documents, shall be revised as required by the Contract Documents or at appropriate intervals as required by the conditions of the Work and Project; shall be coordinated with the entire Project to the extent required by the Contract Documents and shall provide for the expeditious and practicable execution of the Work. The Construction Schedule shall be modified only by a Construction Change Directive executed in accordance with Section 7.2. A submitted Construction Schedule not approved by the Owner and Owner's Representative that exceeds current time limits shall not relieve the Contractor of its obligation to meet those time limits, shall not make the Owner or Owner's Representative liable for any damages incurred by the Contractor as the result of extended performance or failure to meet time limits set forth in the most recent approved Construction Schedule. Similarly, a Construction Schedule showing completion of the Work prior to the date required by the Contract Documents shall not create any rights to early completion of the Work. Each Prime Contractor shall cooperate with the General Contractor in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Prime Contractors or the construction or operations of the Owner's own forces.

§ 3.10.1.1 Each Prime Contractor shall cooperate in the General Contractor's development of the Construction Schedule by providing information as to the timing and sequencing of its Work and operations to conform to the General Contactor's overall Construction Schedule requirements. Each Prime Contractor continuously shall monitor the Construction Schedule so as to be fully familiar with the timing, phasing and sequencing of its Work and other Work on the Project.

§ 3.10.2 Within 13 calendar days of the date of the Notice to Proceed, the Contractor shall prepare a submittal schedule, promptly after and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Owner's Representative's approval. The Owner's Representative's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Owner's Representative reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent approved schedules submitted to the Owner and Owner's Representative.

§ 3.10.4 The Construction Schedule shall be a detailed Critical Path Method (CPM) or other form satisfactory to the Owner and Owner's Representative and shall (i) provide graphic representation of all activities and events that will occur during the performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) show critical Milestone Dates. Upon approval by the Owner, the Construction Schedule shall be deemed a Contract Document. If not approved, the General Contractor promptly shall revise the Construction Schedule in accordance with the requirements of the Owner and the Owner's Representative and resubmit for approval. The General

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Contractor shall monitor the progress of its Work and the Work of the other Prime Contractors for conformance with the Construction Schedule and promptly submit to the Owner and the Owner's Representative a written progress report of any delays or potential delays. Compliance with the Construction Schedule is a condition precedent to receiving payment pursuant to Article 9. The Construction Schedule shall be updated to reflect actual conditions or as requested by the Owner or the Owner's Representative. If any report indicates delays or potential delays, the General Contractor with the cooperation of affected Prime Contractors shall propose a plan to correct the delay, including overtime and/or additional labor. A progress report shall not constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum.

§ 3.10.5 If the Owner determines that (i) the Work has failed to progress or reach the level of completion required by the Contract Documents, and (ii) such failure is the fault of the Contractor, the Owner may, at no cost to the Owner, order the Contractor to take necessary corrective action to expedite the progress of the Work including without limitation (1) additional shifts or overtime; (2) additional manpower, equipment and facilities; and (3) similar measures. If so ordered, such measures shall continue until the Work is in conformance with the requirements of the Contract Documents. Contractor shall not be entitled to an adjustment of the Contract Sum for the cost of such corrective action.

§ 3.10.6 The Owner may order a postponement or rescheduling of any date or time for the performance of any part of the Work that interferes with the operations of other Contractors, use of the Owner's premises by the Owner, its tenants or invitees. At the Owner's request, Contractor shall schedule or reschedule any portion of the Work which adversely affects other Contractors.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

§ 3.11.1 The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Owner's Representative and shall be delivered to the Owner's Representative for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1.1 If any portion of the Work is to be joined to existing buildings or facilities and the Owner has furnished the Contractor with "As-Built" Drawings of said existing buildings or facilities in which the Contractor finds errors, omissions or inaccuracies, then Contractor shall, at no additional cost to the Owner, mark the Owner's "As-Built" Drawings to show the true and actual conditions and locations discovered during performance of the Work.

§ 3.11.2 As to renovation projects or projects which require the Work to be joined to existing buildings or facilities, if the Owner has furnished to the Contractor "As-Built" Drawings with respect to such existing buildings or facilities and Contractor finds such As-Built Drawings to contain errors, then Contractor, at no additional cost to the Owner, shall mark such As-Built Drawings to show true and actual conditions and locations as discovered during the course of the Work.

§ 3.11.3 The Contractor shall keep at the construction site a complete set of full size bluelined prints of the Contract drawings, reproduced at Contractor's expense. During construction, these prints shall be marked to show all deviations in actual construction from the Contract drawings. The color red shall be used to indicate all additions, and green to indicate all deletions. The drawings shall show the following information, but not be limited thereto: (a) the locations and description of any utility lines and other installations of an kind or description known to exist within the construction area (the location includes dimensions to permanent features); (b) locations and dimensions of any changes within the building or structure, and the accurate location and the dimension of all underground utilities and facilities; (c) correct grade or alignment of roads, structures, and utilities if any changes were made from Contract plans; (d) correct elevations if changes were made in site grading from the Contract plans; (e) changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including, but not limited to, fabrication, erection, installation, and placing details, pipe sizes, installation material, dimensions of equipment foundations, etc.; (f) the topography and grades of all drainage installed or effected as part of the Project construction; (g) all changes or modifications from the original design and from the final inspection; and (h) where Contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the As-Built drawings. The option not used shall be deleted. These deviations shall be shown in the same general detail utilized in the Contract drawings. Marking of the prints shall be pursued continuously during construction to keep them up-to-date. This information shall be maintained in a current

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condition at all times until the completion of the Work. The resulting field marked data shall be referred to and marked as "As Built Field Data" and shall be used for no other purpose. They shall be made available for inspection by the Owner's representative whenever requested during construction and shall be jointly inspected for accuracy and completeness by the Owner's representative and responsible representative of the Contractor prior to submission of each monthly pay application. Failure to keep the As Built Field Data (including equipment and place lists) current shall be sufficient justification to withhold a retained percentage from the monthly pay application.

3.11.4 With regard to as-built, record documents and COBIE construction Data submittals, Contractor shall comply with the requirements set forth in Supplementary Conditions, Section 4.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Owner's Representative is subject to the limitations of Section 4.2.7. Informational submittals upon which the Owner's Representative is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Owner's Representative without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Owner's Representative Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Owner's Representative or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Shop Drawings shall show: (i) the job title, names of Contractor or Subcontractor, the date and the location of each item shown; (ii) the design, dimensions, connections, and other details necessary to ensure that they accurately interpret the Drawings and Specifications; and (iii) adjoining work in sufficient detail to show proper connection with the same. Where adjoining work requires Shop Drawings, they shall be coordinated and submitted at the same time so that connections can be properly received.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Owner's Representative that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Owner's Representative.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Owner's Representative's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Owner's Representative in writing of such deviation at the time of submittal and (1) the Owner's Representative has given written approval to the specific deviation as a minor change in the Work, or (2) a Construction Change Directive in accordance with Section 7.2. has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Owner's Representative's approval thereof.

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§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Owner's Representative on previous submittals. In the absence of such written notice, the Owner's Representative's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. In no event shall Contractor be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents ("Performance Specifications"), the Contract Documents shall specify all performance and design criteria that such services must satisfy. If the Contract Documents applicable to Contractor's Work include Performance Specifications, then Contractor agrees that (i) the Performance Specifications are achievable by Contractor; (ii) the Contract Sum includes all design services related to or required for achievement of Performance Specifications; (iii) unless the Owner otherwise agrees, all design services related to the Performance Specifications shall be performed by qualified design professionals selected and paid by Contractor, and in conjunction therewith, Contractor shall (a) submit to Owner and Owner's Representative the names and qualifications of each proposed design professional, (b) make no substitution of such design professional without the prior written consent of Owner and Owner's Representative, (c) if any such design professional is terminated, provide the services of another licensed design professional acceptable to Owner and Owner's Representative; and (iv) unless the Owner otherwise agrees, such design professional shall maintain professional liability insurance in amounts and upon terms and conditions satisfactory to Owner. The signature and seal of such design professional shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by design professional. Shop Drawings or other Submittals related to the Work designed or certified by others shall bear design professional's written approval when submitted to the Owner's Representative. Contractor shall provide the design professional providing the certification with full information as to the relevant performance requirements and the conditions under which the materials, systems, or equipment will be expected to operate as a part of the completed Work. This certification shall be based on performance under the operating conditions at the Project Site and as a part of the completed Work. The Owner and the Owner's Representative shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by Contractor's design professionals, provided that the Owner and Owner's Representative have specified to the Contractor all performance and design criteria that such services must satisfy. Owner's Representative's review of such submittals shall be only for the limited purpose of checking for conformance with information given and design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents, but if Contractor discovers or is informed of any error or inadequacy in such criteria then Contractor shall promptly notify the Owner and Owner's Representative in writing.

§ 3.12.11 The Electrical Contractor shall review, coordinate and approve its Shop Drawings and the Shop Drawings of its Subcontractors. The Mechanical Contractor shall review, coordinate and approve its Shop Drawings, the Shop Drawings of its Subcontractors and the mechanical Shop Drawings with the electrical Shop Drawings. The General Contractor shall review, coordinate and approve its Shop Drawings, the Shop Drawings of its Subcontractors and the Shop Drawings of the other Prime Contractors.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The General Contractor shall prepare an overlay sketch of the construction areas indicating thereon spaces assigned for field offices, trailers, storage sheds, field shops and similar facilities and storage of materials for all trades. The sketch shall be submitted to the Owner and the Owner's Representative for their information and approval prior to moving any such equipment and materials onto the Project Site. All such overlying sketches must indicate that the Construction areas shown therein are in compliance with the Americans with Disabilities Act and other applicable law.

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§ 3.13.2 Notwithstanding any designation of site limits or the indication of temporary fences or barricades, provisions of the Contract Documents governing portions or phases of the Work may require that certain operations be carried out beyond such designated limits. Trenching, utility work, site development, landscaping and other such work, if required beyond such designated limits, shall be scheduled in such manner as to cause a minimum of inconvenience, disturbance to or interference with the normal operations of the Owner, abutters, and the public. The Contractor shall obtain the Owner's Representative's prior approval for such operations, prosecute such operations expeditiously and restore the affected area and other areas needed for access to their original condition immediately upon completion of such operation unless the Contract Documents otherwise specify.

§ 3.13.3 Pumping, draining and control of surface and groundwater shall be carried out so as to avoid endangering any adjacent facility or property, or interrupting, restricting or otherwise infringing, or interfering with the use thereof. All such work shall be performed in compliance with state and federal regulations and any other authority applicable to the site with respect to surface and groundwater and shall be at no additional cost to the Owner.

§ 3.13.4 The discharge of any substance other than stormwater into any storm drain, inlet, creek, or ditch, including street gutters and curb inlets, is strictly prohibited, unless the substance is only of the following exempt discharges: water line flushing, landscape irrigation, diverted stream flows, rising groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian, habitats and wetlands, dechlorinated swimming pool discharges, street wash water, or discharges from firefighting activities. The discharge of sediment-laden runoff waters from construction sites is included as a prohibited discharge. Contractor shall pay Owner for any costs Owner incurs based upon Contractor's noncompliance with this provision, including but not limited to repair or remediation costs, fines or penalties imposed on Owner by any regulating authority, and any fees or costs paid to attorneys or consultants arising out of a prohibited discharged. Failure to comply with this provision may also, at the Owner's sole option, result in Owner's termination of this Contract. In the event that Owner terminates the Contract based on a violation of this provision, Contractor agrees that Owner shall have no further liability to Contractor, with the exception of payment of any monies for work Contractor performed prior to the date of termination.

§ 3.13.5 Only materials and equipment that are to be used in the Work shall be brought to and stored on the Project Site by the Contractor. Equipment no longer required for the Work shall be promptly removed from the Project Site. Contractor shall be solely responsible for protecting construction materials and equipment stored at the Project Site from weather, theft, damage and all other adversity. The Contractor shall ensure that at all times, the Work is performed in a manner that provides reasonable vehicular and pedestrian access to site of the Work and all adjacent areas. To the fullest extent reasonably possible, the Work shall be performed in such manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, equipment or hazardous conditions.

§ 3.13.6 Neither Contractor nor any entity for which the Contractor is responsible, shall erect any sign on the Project Site without the Owner's prior written consent. Such consent may be withheld in the Owner's sole discretion.

§ 3.13.7 Without limiting any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (i) any areas in buildings adjacent to the site of the Work and (ii) the Project itself in the event of Beneficial Occupancy, as permitted in Section 8.4. Without the Owner's prior written approval, Contractor shall not permit any workers to use any existing facilities at the Project Site, including without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner for Contractor's use.

.1 Without limiting any other provision of the Contract Documents, the Contractor shall comply with all rules and regulations promulgated by the Owner and provided by the Owner at the pre-construction meeting regarding Contractor's use and occupancy of the Project Site during performance of the Work. The Contractor shall give the Owner immediate written notice if Contractor finds compliance with any portion of such rules and regulations to be impractical. Such notice shall set forth the problems caused by such compliance and suggest alternatives through which the same results intended by such rules and regulations can be achieved. The Owner, in its sole discretion, may adopt such alternatives, develop new alternatives, or require compliance with the existing rules and regulations.

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.2 The Contractor shall comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project Site and the Work.

3.13.8 In addition to the requirements identified in this Section, Contractor shall comply with the requirements set forth in the Indiana University Project Site Requirements.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or any fully or partially completed construction of the Owner or separate contractors by excavating, cutting, patching or otherwise altering such construction. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and such contractor. Such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. All excavating, cutting and/or patching shall be performed in such a manner as to protect other structures, monuments, brick sidewalks, trees and other landscaping.

.1 Cutting and patching shall be performed by the proper trades or crafts necessary for the material involved, at the cost of the contractor requiring the cutting and patching.

.2 Patching shall mean the restoration of a surface or item to its original condition to match the existing adjoining surfaces unless otherwise indicated, noted, detailed or specified. When patching involves painting, special coating, vinyl fabric or other applied finishes, the entire surface affected (i.e. wall or ceiling) shall be refinished as a part of this requirement.

.3 Cutting and patching includes cleaning and restoration of all surfaces soiled by the cutting and patching work.

§ 3.14.3 Contractor shall locate and protect from injury utilities of all kinds, either above or below grade, inside or outside of any structure, found in the area affected by its Work. Contractor shall be responsible for all damage caused to such utility by the operation of equipment or delivery of materials or as the direct or indirect result of any of its Work and shall repair all such damage at its expense and as a part of the Work included in the Contract Documents. The Contractor shall not be entitled to any increase in the Contract Sum or the Contract Time on account of such damage to any utility. Upon discovery of any utility by Contractor, such utility shall be indicated on the As Built Drawings.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall daily keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by its operations. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish and the Contractor's tools, construction equipment, machinery and surplus materials. Additional requirements are set forth in the Supplementary Conditions, Section 10.

§ 3.15.1.1 The Contractor shall be responsible for keeping the site of the Work and adjacent premises as free from material, debris and rubbish as is practicable, and shall remove same from any portion of the Site, if, in the opinion of the Owner or Owner's Representative, such material debris or rubbish constitutes a health and safety issue, nuisance or is objectionable in any way to the Owner. The Contractor further agrees to remove all machinery, materials implements, barricades, staging, false work, debris and rubbish connected with or caused by its Work immediately upon completion of the Work and to clean all structures and Work under the Contract Documents to the satisfaction the Owner and the Owner's Representative and to leave the premises in perfect condition in so far as affected by the Work hereunder. With respect to renovation projects, the Contractor acknowledges that Owner in such cases, may continue to occupy and must maintain continuous operations in the building in which the Work is located. In such cases, it is critical that Owner's operations not suffer any significant interference, including, without limitation, any interruption in utilities or unreasonable noise, dust, odor, vibration or hazardous condition. The Contractor shall perform its Work and limit its use of the Project Site in such manner as to minimize any

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interference with Owner's occupancy and operations in the building consistent with applicable building rules and regulations.

§ 3.15.1.2 Dust control shall be effectively maintained at all times whether or not specifically ordered by the Owner's Representative or Owner. The Contractor shall provide and apply continuous internal and external dust control, including holidays and weekends, as required, to prevent the spread of dust and to avoid the creation of a nuisance at the work site or in the surrounding areas as a result of construction activities. Internal dust control shall be accomplished by barrier, vacuum, filters or other approved methods and equipment. External dust control shall be by sprinkler water or other approved means, except that no chemicals or oil shall be used. Quantities and equipment shall be sufficient to control dust effectively. When weather conditions warrant, external sprinkling equipment shall be on hand and immediately available at all times. Owner's Representative and Owner shall have the authority to order dust control Work whenever required in its opinion; however, dust control shall be effectively maintained at all times whether or not specifically ordered by the Owner's Representative and Owner. Contractor shall also take proper measures at no additional cost to Owner to prevent tracking mud into the interior of buildings or onto public streets or roads or property of third persons. Such measures shall include but are not limited to covering muddy areas on the Site with clean dry sand. All ingress/egress from the Site shall be maintained in a dry condition, and any mud tracked onto the public streets or roads or any other areas of the building or property of third persons shall be immediately removed and the affected area cleaned. Owner's Representative or Owner may order such work at any time that conditions warrant.

§ 3.15.1.3 The General Contractor shall be ultimately responsible for all daily cleanup of construction materials and debris and building dust control. Cleanup shall include removal of materials and debris from the building and placement in a debris box or other disposal. Special consideration is required for the immediate removal and/or protection of material or debris which pose a hazard to Owner's students, employees, invitees, fixtures and floor coverings (i.e. hazardous materials, broken glass, sawdust, materials that pose a tripping hazard, etc.), including utilization of protective coverings for newly installed floor covering and fixtures. Certain construction activities, including but not limited to drywall sanding, spray painting, sawing, etc., create dust which must be controlled to protect Owner's students, employees, invitees, equipment, facilities and property. Each Prime Contractor shall take steps as necessary to control the dust created by these operations, including but not limited to Visquine, ventilation, or a solid construction barrier. In addition to the requirements identified in this Section, Contractor shall comply with the requirements regarding airborne contaminants set forth in the Project Specifications.

§ 3.15.2 If the General Contractor fails to clean up as required by the Contract Documents, the Owner may do so and the cost thereof shall be charged to the General Contractor. When reasonably necessary, Owner may exercise its right to clean up during evening, weekend and holiday hours and any premium time charges associated therewith will be charged to the General Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Owner's Representative access to the Work in preparation and progress wherever located. If Work is being performed at locations other than the Project Site, Contractor shall notify the Owner's Representative of such locations, and the time such work will be ready for observation prior to its delivery to the Project Site.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Owner's Representative harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Owner's Representative. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Owner's Representative.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Owner's Representative, Owner's Representative's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to reasonable attorneys' fees, arising out of or

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resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 The Contractor's indemnity obligations under this Section 3.18 specifically include, without limitation, all fines, penalties, damages, liability, cost, expenses (including without limitation reasonable attorneys' fees), and punitive damages, if any, arising out of, or in connection with any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code, or requirement of a public authority that bears upon the performance of the Work by the Contractor, a Subcontractor or any person or entity for whom either is responsible, (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor, a subcontractor, or any person or entity for whom either is responsible.

§ 3.18.4 The Contractor shall indemnify and hold harmless all of the indemnitees from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity, and hold harmless obligations under this Contract.

§ 3.18.5 Whenever the Contract Documents entitle the Owner to recover its reasonable attorneys' fees, the term "reasonable attorneys' fees" shall inc1ude, without limitation, the following related expenses paid or incurred by the Owner: (i) attorneys' fees; (ii) paralegal fees; (iii) documentary evidence and expert witness costs; (iv) court reporter charges; (v) filing fees, recording fees, copying charges and the like; and (vi) travel, lodging and meal expense.

ARTICLE 4 OWNER'S REPRESENTATIVE

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect or engineer lawfully licensed to practice architecture or engineering or an entity lawfully practicing architecture or engineering in the jurisdiction where the Project is located. That person or entity is identified as the Owner's Representative in the Agreement and is referred to throughout the Contract Documents as if singular in number. To the extent that the Project does not involve the practice of architecture or engineering but instead involves the practice of another licensed profession, the term 'Owner's Representative,' as used herein, shall refer to such other licensed design professional.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Owner's Representative as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Owner's Representative. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Owner's Representative is terminated, the Owner shall employ a successor Owner's Representative, as defined above in Section 4.1.1, whose status under the Contract Documents shall be that of the Owner's Representative.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Owner's Representative will provide administration of the Contract as described in the Contract Documents during construction until the date the Owner's Representative issues the final Certificate for Payment, and, with the Owner's concurrence, from time to time during the two-year period for correction of the Work. The Owner's Representative will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

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§ 4.2.2 The Owner's Representative will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Owner's Representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Owner's Representative will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Owner's Representative will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Owner's Representative will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Owner's Representative will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Owner's Representative about matters arising out of or relating to the Contract. Communications by and with the Owner's Representative's consultants shall be through the Owner's Representative. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Owner's Representative's evaluations of the Contractor's Applications for Payment, the Owner's Representative will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Owner's Representative has authority to reject Work that does not conform to the Contract Documents. Whenever the Owner's Representative considers it necessary or advisable, the Owner's Representative will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Owner's Representative nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Owner's Representative to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Owner's Representative will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Owner's Representative's action will be taken in accordance with the submittal schedule approved by the Owner's Representative or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Owner's Representative's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Owner's Representative's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Owner's Representative's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Owner's Representative, of any construction means, methods, techniques, sequences or procedures. The Owner's Representative's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Owner's Representative will prepare Construction Change Directives and may authorize minor changes in the Work as provided in Section 7.3. The Owner's Representative will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

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§ 4.2.9 The Owner's Representative will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, issue Certificates of Substantial Completion pursuant to Section 9.8, receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor; and issue a final Certificate for Payment pursuant to Section 9.9.

§ 4.2.10 If the Owner and Owner's Representative agree, the Owner's Representative will provide one or more project representatives to assist in carrying out the Owner's Representative's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Owner's Representative will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Owner's Representative's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Owner's Representative shall be made in writing or in the form of drawings and will be consistent with the intent of and reasonably inferable from the Contract Documents. When making such interpretations and decisions, the Owner's Representative will endeavor to secure faithful performance by both Owner and Contactor and will show partiality to neither.

§ 4.2.13 The Owner's Representative's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Owner's Representative will review and respond to requests for information about the Contract Documents. The Owner's Representative's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Owner's Representative will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 As part of its bid documents and where required by the bid form, Contractor shall furnish to the Owner and Owner's Representative in writing the name and trade for each proposed Subcontractor of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. If this information is not required to be provided on the bid date, then it shall be furnished to Owner as otherwise required by the Contract Documents. Contractor shall not propose or utilize a Subcontractor who has been disqualified under existing federal laws and regulations from participating in federally-assisted construction projects. The Contractor shall contract only with a Subcontractor approved in writing by the Owner and, after bid opening, substitution of any Subcontractor identified in the bid shall be made only by way of the Construction Change Directive process set forth in Article 7 of this Agreement. Additionally, the Contractor may not adjust its bid price, and may not seek a refund of its bid bond, based upon Owner's rejection of any Subcontractor or of a proposed substitution. . The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Owner's Representative has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Owner's Representative or Owner requires

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additional time for review. Failure of the Construction Manager, Owner, or Owner's Representative to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 Contractor shall not contract with any Subcontractor without the Owner's and Owner's Representative's prior written approval, which shall not be granted until Contractor submits a written statement concerning the proposed award to the Subcontractor that contains such information as the Owner may require. The Owner shall issue a written approval or rejection of each proposed award within ten (10) days of the Bid Opening. The Contractor shall not contract with a proposed person or entity whom the Owner and/or Owner's Representative has timely rejected.

§ 5.2.3 If the Owner or Owner's Representative has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Owner's Representative has no reasonable objection. In the event that the Contractor is required to substitute a Subcontractor during the course of the Work, such substitution shall be made only by way of the Construction Change Directive process set forth in Article 7 of this Agreement. The Contractor may not adjust its price based upon such a substitution or upon Owner's rejection of any proposed substitute Subcontractor.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Owner's Representative makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, including but not limited to the process set forth in Section 7.2.5 by which profit and overhead on Construction Change Directives is calculated, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Contract Documents, assumes toward the Owner and Owner's Representative. Each subcontract agreement shall preserve and protect the rights of the Owner and Owner's Representative with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor will make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. The Contract Documents shall not create, or be construed to create, any contractual relationship between any Subcontractor and the Owner.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is conditionally assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 If a Subcontractor's Work has been suspended for more than thirty (30) days after termination of the Agreement by the Owner and the Owner accepts assignment of such Subcontract, the Subcontractor's compensation shall be equitably adjusted for any increase in direct costs incurred by such Subcontractor as a result of the suspension. In no event shall such adjustment include any consequential damages as that term is used in Section 15.1.6.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract, unless otherwise agreed in writing.

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ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 Except for Prime Contractors as provided in Sections 6.1.5 and 6.1.6, the Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.1.5 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for any such purchased items as if the Contractor were the original purchaser. The Contract sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all warranty and correction of the Work obligations included in the Contract Documents shall apply to any pre-purchased items.

§ 6.1.6 The Owner may elect to assign certain contractors to a single Prime Contractor or for coordination and scheduling purposes only. Such Prime Contractor as to such assigned contractors, shall be responsible, in accordance with Sections 3.3.1 and 3.10.1, for all Project scheduling, construction, coordination, general superintendence and for reviewing and approving the assigned contractor's periodic applications for payment. The Owner shall make periodic payments directly to each assigned contractor after approval of the Prime Contractor, the Owner and the Owner's Representative. Approval of assigned contractor's periodic applications for payment shall not be unreasonably withheld by the Prime Contractor.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Owner's Representative apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's damage to the Work or defective construction.

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§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner's Representative will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after the Notice to Proceed is issued, and without invalidating the Contract, by Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 When a contemplated change in the Work may affect the Contract Sum or the Contract Time, the Owner's Representative will issue a Construction Change Directive detailing the work involved in such proposed change. The Contractor shall promptly, but in no case longer than five (5) working days after receipt of such Construction Change Directive, issue a reply or Change Quotation itemizing the cost of such Construction Change Directive and any projected enlargement of the Contract Time or modification of the Project Schedule. Authorization to proceed with the Work shall be in accordance with 7.2.3.

§ 7.1.3 To expedite the review and evaluation of Contractor's Change Quotations, all Change Quotations (except those so minor that their propriety is obvious on their face) shall include a complete itemization of costs showing quantities, with unit prices of labor and materials for each such quantity, including items furnished by Subcontractors. Where major cost items are provided by Subcontractors, such items also shall be itemized and a copy of the Subcontractor's quotations, itemized as indicated above, shall be included in the Construction Change Directive. In no case shall a change involving more than Three Thousand Dollars ($3,000) be approved without such itemization.

§ 7.1.4 A Construction Change Directive requires agreement among the Owner, Contractor and Owner's Representative; an order for a minor change in the Work may be issued by the Owner's Representative alone.

§ 7.1.5 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly, unless otherwise provided in the Construction Change Directive or order for a minor change in the Work. Except as provided in Section 9.7.2, a change in the Contract Sum or Contract Time shall be accomplished only by Construction Change Directive. No course of conduct or dealing between the parties, no expressed or implied acceptance of alterations or additions to the Work, and no claim that Owner has been unjustly enriched by any alteration of or addition to the Work, whether or not there is any unjust enrichment to the Work, shall be the basis of any claim for an increase in the Contract Sum or for a change in the Contract Time in the absence of a Construction Change Directive.

§ 7.2 CONSTRUCTION CHANGE DIRECTIVES

§ 7.2.1 A Construction Change Directive is a written instrument prepared by the Owner's Representative and signed by the Owner, Contractor and Owner's Representative, directing a change in the Work including agreement on adjustment, if any, in the scope of the work, Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.2.2 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

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.2 Unit prices stated in the Contract Documents or subsequently agreed upon;

.3 Cost to be determined in a manner agreed upon by the parties in a mutually acceptable fixed or percentage fee;

.4 time and materials; or

.5 As provided in Section 7.2.5.

§ 7.2.3 Upon receipt of written confirmation of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work. An email from Owner's Vice President, Assistant Vice President or Deputy Vice President for Capital Planning and Facilities shall constitute a written confirmation for purposes of this Section.

§ 7.2.4 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately.

§ 7.2.5 Upon Agreement of the Parties, the Owner's Representative shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also in cases where the cost adjustment is undertaken pursuant to Section 7.2.2, the Contractor shall keep and present, in such form as the Owner's Representative may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.2.5 shall be limited to the following:

.1 Costs of labor calculated on the Common Construction Wage set for this Project;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others.

In accordance with Section 5.3, Subcontractors shall also be required to calculate cost adjustments attributable to the change in this manner.

§ 7.2.6 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner's Representative plus an amount equal to ten percent (10%) of such net cost to reflect Contractor's reduced overhead costs. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.2.7 The Owner shall not be obligated to make any partial payment until a Construction Change Directive has been fully executed.

§ 7.3 MINOR CHANGES IN THE WORK

The Owner's Representative will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order by the Owner's Representative and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

§ 7.4 AGREED OVERHEAD AND PROFIT RATE

§ 7.4.1 For any adjustments in the Contract Sum, Contractor shall receive as payment for overhead and profit only the following percentages of costs attributable to the change in the work:

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.1 Costs of the 1abor payroll, set for this project as of the Notice to Proceed (base wage, plus fringe benefits), not to exceed the Common Construction Wage set for this Project/region, plus twenty-five percent (25%) of the cost of the labor payroll; plus Costs of the material, including rentals, plus ten percent (10%) of the material cost.

.2 For Work by Subcontractors, or by a lower tier Contractor with Owner's consent, the Contractor performing the Work shall be permitted to mark up its costs in accordance with Section 7.4.1.1 and each succeeding Contractor, including the Prime Contractor, shall add five percent (5%).

§ 7.4.2 When specifically authorized by the Owner and not as an Extraordinary Measure, overtime shall be paid by Owner on the basis of premium costs only, plus the cost of insurance and taxes based on the premium cost. Overhead and profit will not be paid by the Owner for overtime.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work shall be no later than thirteen (13) calendar days after the date of the Notice to Proceed; provided, however, that Contractor cannot be on the Project site until the insurance requirements set forth in Section 11 and Supplementary Conditions Section 9 are met. No extension of time or adjustment to the Completion Date shall be allowed based on Contractor's failure to timely submit the required insurance documentation.

§ 8.1.3 The date of Substantial Completion is the date certified by the Owner's Representative in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 Except by written agreement or written instruction of the Owner, Contractor shall not commence operation on the site or elsewhere prior to the commencement date of the effective date of insurance required by Article 11. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 Upon receipt of a written Notice to Proceed, the Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.2.4 The number of days for Project duration as stated in the Contractor's bid shall be noted in the Notice to Proceed and shall be used to calculate the Completion Date on the initial Project Schedule. The Completion Date shall not thereafter be changed except by way of a Construction Change Directive in accordance with Article 7.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.2 If the Contractor is delayed at any time in the commencement or progress of the Work by a wrongful act or neglect of the Owner or Owner's Representative, or an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work or by labor disputes not caused by wrongful or unlawful acts of Contractor, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's reasonable control, or by delay authorized by the Owner, or by such other causes which Owner's Representative determines may justify delay ("Excusable Delay"), then the Contract Time shall be extended for a number of days equal to the duration of the Excusable Delay, provided the Work is not, was not, or would not have been delayed by a cause for which the Contractor is responsible ("Concurrent Delay"). Extensions of the Contract Time will be

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permitted only to the extent that the duration of the Excusable Delay could not have been limited, avoided or mitigated.

§ 8.3.3 Except as provided in Sections 3.7.4 and 10.3.3., an extension of time for Excusable Delay, as defined above, shall be the Contractor's exclusive remedy in the event of such a delay, no matter how or by whom caused. Contractor further specifically acknowledges that it shall have no claim for increase in contract price or damages because of any delays whatsoever to all or any part of the Work whether foreseen or unforeseen, and whether caused by any person's hindrance or active interference.

§ 8.3.4 Acceleration: In the event of an Excusable Delay which extends Schedule Completion Dates, the Owner, in its sole discretion, in lieu of granting an enlargement of the Contract Time, may direct Contractor to accelerate its performance to meet the Construction Schedule, in which case the Owner shall direct the Owner's Representative to issue a Construction Change Directive to increase the Contract Sum to include the additional costs of the Work, if any, reasonably incurred by Contractor to meet the Construction Schedule. Upon request, Contractor shall provide Owner with the options available for acceleration, including the costs and impact on the Construction Schedule. In presenting such costs, Contractor shall credit Owner for those costs which would not be incurred as the result of the Owner's willingness to invest extra funds to compress the Construction Schedule. Owner shall be responsible only for the actual premium costs of acceleration specifically authorized in advance for critical activity in order to offset an Excused Delay. Owner shall not be responsible for premium costs which do not accelerate critical path activities.

§ 8.4 BENEFICIAL OCCUPANCY

§ 8.4.1 The Owner shall have the privilege of Beneficial Occupancy and the use and benefit of designated areas, subdivisions or portions of the Work prior to completion and acceptance of the entire Work, provided that, in the opinion of the Owner's Representative, such occupancy shall not unduly interfere with the Contractor's operations or unduly delay it in completing the entire Work. Such occupancy and use shall be further subject to the provisions as set forth herein.

§ 8.4.2 In the event that the Owner desires to exercise the privilege of Beneficial Occupancy, it shall give reasonable notice to the Owner's Representative and Contractor. If the Owner's Representative determines that such proposed Beneficial Occupancy is reasonable and proper, the Contractor shall cooperate with the Owner in providing basic services and facilities reasonably required for the health, safety and comfort of the occupants and other parties lawfully present and/or entering or leaving the premises. Mutually acceptable arrangements shall be made between the Owner and the Contractor with regard to procedures, terms and conditions governing the operation and maintenance of such services and facilities as may be utilized for the benefit of the Owner, in accordance with Section 4 of the Supplementary Conditions, including but not limited to the provision of Operation and Maintenance manuals. The Owner will assume proportionate and reasonable responsibility for operation of systems, equipment and/or utilities required to provide such services, in part or in total, including proportionate and reasonable expenses of operation incidental thereto.

§ 8.4.3 The Owner's occupancy or use of such designated areas, subdivisions, or portions of the Work shall not constitute acceptance of systems, materials, or elements of the Work which are not in accordance with the requirements of the Contract Documents; nor relieve the Contractor from its obligations to complete the Work; nor for responsibility for loss or damage due to or arising out of defects in, or malfunctioning of, systems, materials, equipment, or elements of the Work; nor from other unfulfilled obligations or responsibilities of the Contractor under the Contract. If, however damage results from any act of the Owner, the Owner will assume its proportionate responsibility for such damage.

8.4.4 Notwithstanding the Owner's occupancy or use of such designated areas, subdivisions, or portions of the Work pursuant to this Article, the warranty period(s) referenced in Section 3.5 shall not begin to run until Substantial Completion and Owner will continue to hold retainage in accordance with Section 9.4.4 until Substantial Completion.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

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§ 9.2 SCHEDULE OF VALUES
Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Owner's Representative, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Owner's Representative may require. This schedule, unless objected to by the Owner's Representative, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.1 When O&M and As Built Drawings are required, they shall be listed as a separate item in the Schedule of Values with a value of 3% of Contract Sum.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, partial payment may be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment, all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.3.4 The Contractor's Application for Payment will include the MBE/WBD Tier II Reporting as required by Supplementary Conditions, Section 8.

§ 9.4 CERTIFICATES FOR PAYMENT
§ 9.4.1 The Owner's Representative will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Owner's Representative determines is properly due, or notify the Contractor and Owner in writing of the Owner's Representative's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Owner's Representative to the Owner, based on the Owner's Representative's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Owner's Representative's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Owner's Representative. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Owner's Representative has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.3 Certificate for Payment shall be issued monthly provided the work is processed diligently and to the satisfaction of the Owner's Representative and Owner and shall be in the amount 5% less than the value of the work

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completed and materials appropriately stored on the site to the date of application of the Certificate. If, upon Substantial Completion of the Work, there are any remaining uncompleted minor items and/or Punch List items, the Owner shall be entitled to retain up to two hundred percent (200%) of the dollar value of such items until those items are completed. In addition, Owner shall be entitled to retain up to one hundred percent (100%) of any unresolved claims against the project until Owner has received written notification that all claims have been resolved. Owner shall release all retainage after all items are complete and all claims are resolved.

§ 9.4.4 At the time that the Owner withholds retainage, it shall place such retainage in an escrow account, with a bank, savings and loan institution, or the State of Indiana or an instrumentality thereof to be selected by mutual agreement between the Owner and the Contractor, as escrow agent, pursuant to a written agreement which shall provide that: (1) the escrow agent shall promptly invest all escrowed principal in such obligations as shall be selected by the escrow agent in its discretion; (2) the escrow agent shall hold the escrowed principal and income until receipt of notice from the Owner and the Contractor, specifying the portion or portions of the escrowed principal to be released from the escrow account, and the person or persons to whom such portion or portions are to be released and, upon receipt of such notice, the escrow agent shall promptly remit the designated portion of escrowed principal and the same proportion of then escrowed income to such person or persons; and (3) the escrow agent shall be compensated for its services as the parties may agree upon a commercially reasonable fee commensurate with fees then being charged for the handling of escrow accounts of like size and duration, which fee shall be paid from the escrowed income of the escrow account.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Owner's Representative may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Owner's Representative's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Owner's Representative is unable to certify payment in the amount of the Application, the Owner's Representative will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Owner's Representative cannot agree on a revised amount, the Owner's Representative will promptly issue a Certificate for Payment for the amount for which the Owner's Representative is able to make such representations to the Owner. The Owner's Representative may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued or the Owner may withhold payment, to such extent as may be necessary in the Owner's Representative's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts or omissions described in §3.3.2, because of:

.1 defective Work not remedied;

.2 third party claim filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided to the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another Contractor in the event that this is a multi-prime Project;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover the Owner's damages for the anticipated delay;

.7 failure to carry out the Work in accordance with the Contract Documents;

.8 failure to comply with obligations regarding schedule and coordination under §3.3.1.1 or testing under Section 13.5.6;

.9 rejection of the Work or any part thereof by any governmental authority having jurisdiction over the Project; or

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.10 failure to defend, indemnify or hold harmless the Owner, the Owner's Representative and other required indemnitees as required by the Contract Documents.

On a multiple-Prime Project, the General Contractor shall report to the Owner's Representative any circumstances known to it that will assist the Owner's Representative in making a determination as to whether to withhold certification of an Application for Payment submitted by another Prime Contractor based on the any of the above reasons.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be in default by reason of withholding payment while any of the grounds set forth in §9.5.1 remain uncured.

§ 9.5.3 If the Owner's Representative withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Owner's Representative and the Owner's Representative will reflect such payment on the next Certificate for Payment.

§ 9.5.4 If Contractor disputes the Owner's Representative's or Owner's determination with respect to any Application for Payment, it shall make a Claim as provided in Article 15 and shall nevertheless continue to diligently prosecute the Work.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Owner's Representative has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Owner's Representative.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Owner's Representative will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner's Representative and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Owner's Representative shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 A final Certificate of Payment shall not be issued until all labor and materials required in the Contract Documents have been furnished, installed and completed, all claims have been disposed of and all claims for extra work materials and allowances for omissions have been rendered, considered, and, if agreed to, made a part of such Certificate of Payment.

§ 9.7.2 If, pursuant to the Contract Documents, the Owner is entitled to any reimbursement or payment from the Contractor, Contractor shall make such payment within ten (10) days of demand by the Owner. Notwithstanding

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anything in the Contract Documents to the contrary, if Contractor fails to timely make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of Contractor or to correct defective Work, the Owner shall have the right to either (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work: (i) when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use, (ii) the Owner has received from any governmental authority having jurisdiction thereof all certificates of occupancy and all other permits, approvals, licenses, or other documents necessary for Owner's beneficial occupancy of the Project, and (iii) Contractor submits Operating and Maintenance Manuals, As-Built Field Data Set Scans, and Interim Record Drawings.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Owner's Representative a comprehensive list of items to be completed or corrected prior to final payment ("punch list"). Failure to include an item of the punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Additional preconditions for the Substantial Completion inspection are set forth in the Supplementary Conditions, Section 10.

§ 9.8.3 Upon receipt of the Contractor's punch list and the other documentation required by Supplementary Conditions, Section 10, the Owner's Representative will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Owner's Representative's inspection discloses any item, whether or not included on the Contractor's punch list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, as defined below, complete or correct such item upon notification by the Owner's Representative. In such case, the Contractor shall then submit a request for another inspection by the Owner's Representative to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Owner's Representative will prepare an AIA Form – G704 Certificate of Substantial Completion in its then-current form (the "Certificate of Substantial Completion") that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Operating & Maintenance Manuals and As-Built Field Data Set Scans, to the extent and in such form as may be designated by the Owner, shall be submitted to the Owner at Substantial Completion.

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§ 9.9 FINAL COMPLETION AND FINAL PAYMENT

§ 9.9.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner's Representative will promptly make such inspection and, when the Owner's Representative finds the Work acceptable under the Contract Documents and the Contract fully performed, the Owner's Representative will promptly issue a final Certificate for Payment stating that to the best of the Owner's Representative's knowledge, information and belief, and on the basis of the Owner's Representative's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Owner's Representative's final Certificate for Payment will constitute a

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further representation that conditions listed in Section 9.9.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.9.2 No less than fourteen (14) days prior to Substantial Completion, Contractor shall submit the following to the to the Owner's Representative:

.1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied;

.2 a certificate evidencing that insurance required by the Contracts Documents to remain in force after final payment is currently in effect,, will remain in effect through the end of the warranty period, and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner;

.3 a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents;

.4 consent of surety, if any, to final payment;

5. the Owner's properly executed asbestos containing materials (ACM) certification form (included in front end documentation or available through Owner's Environmental Health & Safety Office);

.6 if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien or claim. If such lien or claim remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien or claim, including all costs and reasonable attorneys' fees;

.7 COBIE to the extent and in such form as may be designated by the Owner;

.8 Lock-Out/Tag-Out Manuals as required in the Project Specifications;

.9 those documents required in Supplementary Conditions, Section 10.

Neither final payment nor any remaining retained percentage shall become due until these submissions are made by Contractor.

§ 9.9.2.1 Contractor shall provide a Final Waiver of Lien (one copy to Owner and one copy to Owner's Representative as a condition to receiving Final Payment.

§ **9.9.2.2** The final Certificate for Payment shall constitute the acceptance of the Work by the Owner, except as to Work thereafter found to be defective. The date of such Certificate shall be regarded as the date of acceptance of the Work, and payment of the retained percentage shall be due sixty-one (61) days from the date of acceptance, providing that the Contractor has furnished written documentation that all claims filed with the Owner from subcontractors and materials suppliers have been resolved.

§ 9.9.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Owner's Representative so confirms, the Owner shall, upon application by the Contractor and certification by the Owner's Representative, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Owner's

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Representative prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.9.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

§ 9.9.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 HEALTH AND SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.1.1 The General Contractor shall be responsible for initiating, coordinating, maintaining and supervising all health safety precautions and programs in connection with the performance of the Contract. Each Prime Contractor acknowledges that it remains the controlling employer as to its employees and subcontractors and that it individually must comply with the applicable safety laws, including but not limited to (CFR 1926) the Occupational Safety and Health Administration (OSHA), Safety and Health Regulations for the Construction Industry and all General Industry standards applicable thereto. By executing the Contract, each Prime Contractor represents that it is knowledgeable with respect to such laws and will take all necessary measures to comply therewith. It is acknowledged that Owner does not possess expertise as to construction-related safety matters and programs and, therefore, Owner does not assume any duty to the Contractor, its Subcontractors or Suppliers, separate contractors or others involved with the Project as to the applicable safety standards or procedures with respect to their work or services.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. In the event of any conflict among the Contract Documents and any federal, state or local authorities, laws, rules, regulations or requirements, the most stringent requirement shall govern the Work.

§ 10.2.2.1 If the Contractor fails to give such notices or fails to comply with such law, ordinances, rules, regulations, and unlawful orders, it shall be liable for and shall defend, indemnify and hold harmless the Owner and the Owner's Representative and their respective employees, officers and agents, against any resulting fines, penalties, judgments or damages, including reasonable attorney fees, imposed on or incurred by the parties indemnified herein.

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§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor also shall be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements thereon or therein. Any damage to such property or improvements shall be promptly and properly repaired by the Contractor.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Owner's Representative or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a member of the Contractor's organization who is knowledgeable in the management of environmental health and safety at the site whose duty shall be the prevention of accidents and health-related risks. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Owner's Representative.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 When all or a portion of the Work is suspended for any reason, Contractor shall securely fasten down all coverings and protect the Work from injury by any cause.

§ 10.2.10 The Contractor promptly, and in no event later than required by applicable OSHA regulations, shall report in writing to the Owner and Owner's Representative all accidents arising out of or in connection with the Work that caused death, personal injury or property damage, giving full details and statements of any witnesses. Accidents causing death, serious personal injuries or serious property damage shall also be immediately reported by telephone or messenger to the Owner and Owner's Representative. Owner shall have the right, but not the duty, to investigate all accident reports.

§ 10.3 HAZARDOUS MATERIALS/REGULATED SUBSTANCES

§ 10.3.1 Regulated Substance Definition: "Regulated Substance" includes oil, petroleum or any fraction thereof, a hazardous substance, a hazardous waste, a waste containing a hazardous substance, a contaminant, a pollution or a regulated chemical, as any of those terms may be defined by the United States Environmental Protection Agency or in any one of the following laws: The comprehensive Environmental Response, Compensation and Liability Act 42 USC Section 9601, *et seq*., (CERCLA), as amended, the Resource Conservation and Recovery Act (RCRA), as amended, the Emergency Planning and Community Right to Know Act of 1986, also known as SARA Title III or EPCRA, the Toxic Substance Control Act (TSCA), as amended, the Clean Water Act, as amended, the Clean Air Act, as amended, the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, the Federal Water Pollution Control Act, as amended, the Oil Pollution Act of 1990, as amended, the Safe Drinking Water Act, as amended, the Occupational Safety and Health Act as amended or another federal state or local law rule ordinance statute regulation permit or other governmental restriction regulating environmental health or safety matters.

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§ 10.3.2 If Contractor encounters substances on the Project which Contractor reasonably believes to be polychlorinated biphenyls (PCBs) or regulated substances other than asbestos or asbestos-containing materials ("ACM") in a form, location or quantity that requires Contractor or the Owner to take action under applicable law, Contractor immediately shall stop the Work in the affected area and report the condition to the Owner and Owner's Representative by telephone followed by written report. Work in the affected area shall not resume until the substance has been ruled harmless, as defined in Subparagraph 10.3.3, or until a ruling that the Work may proceed in accordance with applicable laws.

§ 10.3.3 The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Owner's Representative the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Owner's Representative will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Owner's Representative has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Owner's Representative have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down and start-up, if any, which adjustments shall be accomplished as provided in Article 7. "Rendered harmless" shall mean that levels of asbestos, PCBs or other regulated substances are less than any applicable exposure standards set forth in OSHA regulations. In no event, however, shall the Owner have any responsibility for any substance or material brought to the Project Site by the Contractor, any Subcontractor, any material supplier, or any entity for whom any of them is responsible. The Contractor shall not use any fill or other materials to be incorporated into the Work that are hazardous, toxic, or contaminated by any Regulated Substance.

§ 10.3.4 If the Contract Documents permit the use of a Regulated Substance of a type which by law an employer must notify its employees is to be used on/the Project, then prior to exposure of any person on the Site to such Substance, Contractor shall notify the Owner's Representative in writing of the chemical composition thereof in sufficient detail and time, including, but not limited to providing a material safety data sheet for such Substance, to permit the Owner and other persons and entities to comply with any applicable laws. Contractor's activities regarding the use of any such Regulated Substance are to be coordinated with the activities of Owner and other persons or entities to avoid any cost or impact to the Owner or any other person or entity as the result of the use of such Regulated Substance.

§ 10.3.5 Contractor shall not dispose of a Regulated Substance on the Project Site. Contractor shall not commingle Regulated Substances with materials or waste of the Owner, another Prime Contractor (in the event that the Project is a multi-prime Project) or any other person or entity performing Work on the Project Site. Contractor shall provide separate disposal receptacles approved by law for the particular regulated substance(s) which will be placed in them. Such receptacles shall be used exclusively for the storage or temporary disposal of Regulated Substances for which they are approved. When storing, working with, treating or disposing of regulated substances, Contractor and its waste hauler shall strictly comply with all applicable laws. Contractor shall identify its waste haulers and provide the Owner with a copy of each manifest or other document relating to the storage, transportation or disposal of any Regulated Substance taken from the Project Site.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred; provided, however, that Owner's obligations under this Section shall be limited in substance by statutes and constitutional provisions designed to protect the exposure and liability of Indiana University as an instrumentality of the State of Indiana (e.g., actions and conditions as to which the Owner is immunized by the Indiana Tort Claims Act, dollar limits stated in such Act, exemption from punitive damages, the continued ability to defeat a claim by reason of contributory negligence or fault of claimant), so that its liability to indemnify, defend and hold harmless shall not exceed what might have been its liability to a claimant if sued directly in Indiana by the claimant and all appropriate defenses had been raised by the Owner.

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§ 10.3.7 If Contractor encounters substances on the Project which Contractor reasonably believes to be asbestos or ACM, Contractor shall act in accordance with Indiana University Project Site Requirements, Section 15. B.

§ 10.3.8 In addition to the requirements identified in this Section, Contractor shall comply with the requirements set forth in Section 15 of the Indiana University Project Site Requirements.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.5 EQUAL EMPLOYMENT OPPORTUNITY AND NON-DISCRIMINATION

§ 10.5.1 The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to all employees and applicants for employment, notices to be provided by an appropriate agency of the federal government setting forth the requirements of these non-discrimination provisions.

§ 10.5.2 The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability.

§ 10.5.3 The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the labor union or workers representative of the Contractors' commitments under Section 202 of Executive Order No. 11246 dated September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

§ 10.5.4 The Contractor shall comply with all provisions of Executive Order No. 11246 dated September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.

§ 10.5.5 The Contractor shall furnish all information and reports required by Executive Order No. 11246 dated September 24, 1965, and by the rules, regulations and order of the Secretary of Labor. or pursuant thereto, and will permit access to its books, records, and accounts by an appropriate agency of the federal government and by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulation and others.

10.5.6 In addition to the requirements identified in this Section, Contractor shall comply with the requirements set forth in Section 8 of the Supplementary Conditions.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 INSURANCE GENERAL

§ 11.1.1 The Contractor shall take out and maintain the insurance required in the Supplementary Conditions, Section 9, and as otherwise required in this Article 11 during the life of the Contract and until final acceptance of the work contemplated by this Contract.

§ 11.1.2 Workers' Compensation, Occupational Disease and Employer's Liability: Types and amounts of required worker's compensation insurance are set forth in the Supplementary Conditions, Section 9. The Owner reserves the right to purchase this coverage as part of a "wraparound program" and, if Owner so elects, Contractor shall not provide this coverage nor include the cost of such coverage in any bid.

§ 11.1.3 Liability Insurance: Types and amounts of required liability insurance are set forth in the Supplementary

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Conditions, Section 9. The Owner reserves the right to purchase coverage as part of a "wraparound program" and if Owner so elects, Contractor shall not provide this coverage or include the Cost of such coverage in any bid.

It is agreed and understood that a combination of primary and excess (or umbrella) coverage to reach limits required for general liability and auto liability is acceptable.

§ 11.1.4 [intentionally omitted]

§ 11.1.5 [intentionally omitted]

§ 11.1.6 [intentionally omitted]

§ 11.1.7 In no event shall any failure of the Owner to receive certified copies or certificates of policies required under this Article, or to demand receipt of such certified copies or certificates prior to Contractor commencing the work, be construed as a waiver by the Owner or the Owner's Representative of the Contractor's obligations to obtain insurance pursuant to this Article. The obligation to procure and maintain any insurance required by this Article is a separate responsibility of the Contractor and independent of the duty to furnish the certified copy or certificate of such insurance policies.

§ 11.1.8 If Contractor fails to purchase and maintain any insurance required under this Article, the Owner may, but shall not be obligated to, upon five (5) days written notice to the Contractor, purchase such insurance on behalf of the Contractor and deduct the cost of such insurance from any amounts due and owing to the Contractor. If amounts due and owing the Contractor are not sufficient to reimburse the Owner for the cost of such insurance, the Contractor shall reimburse the Owner for the cost of such insurance upon written demand.

§ 11.1.9 Within thirty (30) days of when any required insurance, due to the attainment of a normal expiration date or renewal date, shall expire, the Contractor shall supply the Owner with certificates of insurance and amendatory riders or endorsements that clearly evidence the continuance of all coverage in the same manner, limits of protection, and scope of coverage as was provided by the previous policy. In the event any renewal or replacement policy, for whatever reason obtained or required, is written by a carrier other than that with whom the coverage was previously placed, or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish the Owner with a certified copy of the renewal or replacement policy unless the Owner provides the Contractor with prior written consent to submit only a certificate of insurance for any such policy. All renewal and replacement policies shall be in form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.

§ 11.1.10 [intentionally omitted]

§ 11.2 BUILDER'S RISK INSURANCE

The Owner's obligation to provide Builder's Risk Insurance is identified in the Supplementary Conditions, Section 9.

§ 11.2.2 Beneficial Occupancy or use in accordance with Section 8.4 herein shall not commence until the insurance company or companies providing property insurance have consented to such Beneficial Occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall not, without mutual written consent, take any action with respect to Beneficial Occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.2.3 [intentionally omitted]

§ 11.2.4 [intentionally omitted]

§ 11.2.5[intentionally omitted]

§ 11.2.7 Waiver of Subrogation: Terms governing waiver of subrogation are set forth in the Supplementary Conditions, Section 9.

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§ 11.2.8 A loss insured under Owner's property insurance shall be adjusted by the Owner in good faith and made payable to the Owner as fiduciary in good faith for the insured, as their interest may appear, subject to requirements of bonding obligations associated with the Project. The Contractor shall pay subcontractors their just share of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.2.9 The Owner in good faith shall have power to adjust and settle a loss with insurers, unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss to the Owners exercise of this power.

§ 11.3 PERFORMANCE AND PAYMENT BOND

§ 11.3.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract documents on the date of execution of the Contract, or as required by applicable law. This bond shall be furnished using the form provided to Contractor by the Owner.

§ 11.3.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Owner's Representative's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner's Representative, be uncovered for the Owner's Representative's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner's Representative has not specifically requested to examine prior to its being covered, the Owner's Representative may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Construction Change Directive, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Owner's Representative or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Owner's Representative's services and expenses made necessary thereby, shall be at the Contractor's expense. If, prior to the date of final payment, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, or other building systems, machinery, equipment, or other mechanical device, Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner and shall not assert a claim for delay or request a Construction Change Directive on this basis.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within two years after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.8.4 , or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it within the time provided in Paragraph 2.4 after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice as provided in Paragraph 2.4 promptly after discovery of the condition. If within thirty (30) days following the two-year period for correction of Work, the Owner fails to notify the Contractor of a defective condition other than latent defects unknown to the Owner, and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of

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warranty. If the Contractor fails to correct nonconforming Work within a reasonable time after receipt of notice from the Owner or Owner's Representative, the Owner may correct it in accordance with Section 2.4.

The Contractor's responsibility to correct such work within two years of Substantial Completion shall not be affected, diminished or restricted by the limitations, restrictions or conditions of a subcontractor, manufacturer, supplier, or installer's warranty, including the expiration of any Uniform Commercial Code statute of limitations. The inability or refusal of a subcontractor, manufacturer, supplier or installer responsible for defective Work to correct or warrant such Work shall not relieve the Contractor from its obligation to correct such Work within two years of Substantial Completion.

§ 12.2.2.2 The two-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 Upon completion of any work under or pursuant to this Section 12.2, the two-year correction period in connection with the Work requiring correction shall be renewed and recommenced. The obligations under Paragraph 12.2 shall cover any repairs and replacements to any part of the Work or other property that is damaged by the defective Work.

§ 12.2.2.4 During the two-year period for correction of the Work, Contractor shall, at its own cost, repair all interior and exterior masonry or drywall cracks and provide new control joints as required.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW AND VENUE

The Contract shall be governed by the laws of the State of Indiana and the sole and exclusive venue of any claims or disputes arising out of this Agreement (including counterclaims, cross-claims, third party claims and claims for indemnity) shall be Monroe County, Indiana.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partner, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided elsewhere in the Contract Documents, the Contractor shall not assign the Contract in whole or in part, or any rights whatsoever (including the right to payment or to present or assert claims arising out of the Project) without prior written consent of the Owner. If the Contractor attempts to make such an assignment without prior written consent it shall be void and of no effect.

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§ 13.3 WRITTEN NOTICE
Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered by facsimile transmission, registered or certified mail or express carrier to persons designated in the Agreement. Email shall constitute valid notification only in those circumstances identified in Section 7.2.3.

§ 13.4 RIGHTS AND REMEDIES
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 The waiver by the Owner of any breach or default of the Contract by the Contractor shall not be construed as a waiver of any other breach or default of the same or any other terms or conditions of the Contract. Forbearance from demanding strict compliance with any term or provision of the Contract shall not operate as a waiver and shall not prevent the Owner from subsequently demanding strict compliance therewith.

§ 13.5 TESTS AND INSPECTIONS
§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Owner's Representative timely notice of when and where tests and inspections are to be made so that the Owner's Representative may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Owner's Representative, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Owner's Representative will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Owner's Representative of when and where tests and inspections are to be made so that the Owner's Representative may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Owner's Representative's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner's Representative.

§ 13.5.5 If the Owner's Representative is to observe tests, inspections or approvals required by the Contract Documents, the Owner's Representative will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5.7 The Owner reserves the right to allocate, reallocate or modify the scope of any of the testing and inspection services specified in the Contract Documents to be performed by a testing laboratory, testing agency or consultant retained by the Owner in connection with the Work if such adjustment and scope is consistent with the intent of the Contract Documents. In the event that the Contractor does not concur with such modification of scope or reallocation of such services, Contractor shall immediately notify the Owner's Representative and Owner in writing.

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§ 13.6 TIME LIMITS ON CLAIMS
The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.6.

§ 13.7 INTERPRETATION
All personal pronouns used in the Contract Documents, whether used in the masculine, feminine or neuter gender shall include all other genders; and the singular shall include the plural and vice versa. Titles of articles, paragraphs, and subparagraphs are for convenience only and neither limit nor amplify the provisions of such articles, paragraphs and subparagraphs.

§ 13.8 SEVERABILITY
Whenever possible, each provision of the Contract Documents shall be interpreted in a manner to be effective and valid under applicable law. If, however, any provision of the Contract Documents, or a portion thereof, is prohibited by law or found invalid under a new law, only such provision or portion thereof shall be ineffective, without any manner invalidating or affecting the remaining portions of the Contract Documents or valid portions of such provision, which are hereby deemed severable.

§ 13.9 FUTURE COOPERATION
Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments, as from time to time shall be reasonably required to carry out the terms and provisions of the Contract Documents.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT
§ 14.1 TERMINATION BY THE CONTRACTOR
§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped; or

.3 Because the Owner's Representative has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents.

§ 14.1.2 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven days' written notice to the Owner and Owner's Representative, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE
§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until all claims and disputes are resolved.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Owner's Representative's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed prior to the effective date of termination and for items properly and timely fabricated off the Project Site, delivered and stored in accordance with the Owner's instructions plus profit and overhead on the foregoing items not previously paid. Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits. The Owner shall be credited for (i) payments previously made to Contractor for the terminated portion of the Work, (ii) claims that the Owner has against the Contractor under the Contract and (iii) the value of the materials, supplies, equipment, or other terms that are to be disposed of by the Contractor that are part of the Contract Sum.

§ 14.5 SURVIVAL OF WARRANTIES

All warranties made to the Owner by Contractor, and all obligations of Contractor to defend, indemnify, and hold harmless the Owner, shall survive any termination of the employment of Contractor for any reason.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term 'Claim' also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Owner's Representative. Claims by either party must be initiated within 7 days after occurrence of the event giving rise to such Claim or within 7 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Owner's Representative and the other party. Once a Claim is recognized, the claimant shall use its best efforts to give the Owner's Representative and the other party notice of any such Claim as expeditiously as possible, including, without limitation, Claims in connection with concealed or unknown conditions. Claimant shall cooperate with the Owner's Representative and the party against whom the Claim is made in any reasonable effort to mitigate alleged or potential damages, delays or other adverse consequences arising out of the condition that is the subject of such Claim. Unless the other party objects, Claims may be reserved in writing within the time limits set forth in this Section 15.1.2. If a claim is reserved, procedures for the resolution of claims and disputes shall not commence until a written notice from the claimant is received by the Owner's Representative. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information not available to the claimant that will facilitate prompt verification and evaluation of the Claim. Contractor's timely written notice of Claim is a condition precedent to its entitlement to an adjustment of the Contract Sum, Contract Time or Contract Schedule.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make Claim for an increase in the Contract Sum based on extra work, written notice as provided herein shall be given before proceeding to execute such Work. Extra work performed by Contractor without prior written notice to, and authorization by, Owner shall be at Contractor's sole risk and expense. Prior written notice is not required for Claims relating to an emergency endangering life or property.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

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This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 RESOLUTION OF CLAIMS AND DISPUTES

§ 15.2.1 Decision of Owner's Representative. Claims, including those alleging an error or omission by the Owner's Representative but excluding those arising under Sections 10.3 through 10.5, shall be referred initially to the Owner's Representative for decision. An initial decision by the Owner's Representative shall be required as a condition precedent to litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Owner's Representative with no decision having been rendered by the Owner's Representative. The Owner's Representative will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Owner's Representative will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Owner's Representative is unable to resolve the Claim if the Owner's Representative lacks sufficient information to evaluate the merits of the Claim or if the Owner's Representative concludes that, in the Owner's Representative's sole discretion, it would be inappropriate for the Owner's Representative to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Owner's Representative may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Owner's Representative in rendering a decision. The Owner's Representative may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Owner's Representative requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Owner's Representative when the response or supporting data will be furnished or (3) advise the Owner's Representative that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Owner's Representative will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Owner's Representative will render an initial decision approving or rejecting the Claim, or indicating that the Owner's Representative is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefore; and (3) notify the parties and the Owner's Representative of any change in the Contract Sum or Contract Time or both.

§ 15.2.6 [intentionally omitted]

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 [intentionally omitted]

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SUPPLEMENTARY GENERAL CONDITIONS

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1. ESCROW AGREEMENT

Pursuant to IC 5-16-5.5, Contractor and Owner agree that Owner shall retain from progress payments and place in an escrow account under the control of a bank, savings and loan institution or the State of Indiana or an instrumentality thereof, selected by mutual agreement of the parties ("Escrow Agent"), for the purpose of accumulating and sharing the benefits which might accrue through normal interest payments. The parties shall execute a formal Escrow Agreement with the Escrow Agent, and the retainage shall be promptly invested with the Escrow Agent until such retainage is ordered released by the Owner or by other legal action, at which time the amount withheld plus accrued interest shall be paid to the Contractor, less service charges as specified in the Escrow Agreement. The Escrow Agreement shall be executed by the Contractor in accordance with Section 3.1.5 of the General Conditions and shall be one of the Contract Documents.

2. SUBSURFACE CONDITIONS

Cross-Reference to Instructions to Bidders, Article 5, and General Conditions, Section 3.2.1

A. Boring information, water levels, indications of surface and subsurface conditions and similar information given on the drawings or in the specifications are furnished only for the convenience of the Prime Contractors. Logs of available subsurface explorations, borings and drawings of existing site conditions may be examined by arrangement with the Owner. The Owner, Owner's Representative and their Consultants make no representation regarding the character and extent of the soil data or other surface or subsurface data and conditions to be

encountered during the work and assume no responsibility and make no guarantee as to the accuracy or completeness of the information.

B. Each Contractor by careful examination, shall inform itself as to the nature and location of the work, the conformation of the ground, subsoil and ground water conditions, the character, quality and quantity of the materials to be encountered, the character of equipment and the facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under his Contract. Each Contractor shall make its own deductions of surface and subsurface conditions which may affect methods or cost of construction of the work of its Contract and Contractor agrees that it will make no claim for damages or other compensation, should it encounter conditions during the progress of the work different from those as calculated and/or anticipated by it.

3. COMPLIANCE WITH COMMON CONSTRUCTION WAGE REQUIREMENTS

Cross-Reference to Instructions to Bidders, Article 9, and General Conditions, Section 3.1.5

Contractor and subcontractors will notify employees of the common construction wage requirements for this Project, including contacts for filing an inquiry or complaint. The university's contact for inquiries is:

Capital Projects Business Office
1800 North Range Road
Bloomington, Indiana 47408
812 855 5294

For state labor issues such as compliance with the Indiana common construction wage statue, employees may contact:

Commissioner
Department of Labor
402 West Washington Street Room W195
Indianapolis, IN 46204-2739
Phone 317-232-2378
Fax 317-793-5257

A copy of Common Construction Wage Complaint Project Data Sheet is included in the specifications and will be made available by Contractor on the job site.

For federal labor law matters covered by the Fair Labor Standards Act, employees may contact:

U.S. Department of Labor
Wage & Hour Division

Indianapolis Office: phone 317-226-6801
South Bend Office: phone 574-236-8321

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4. INDIANA UNIVERSITY AS-BUILT AND RECORD DOCUMENT DELIVERABLES

Cross-Reference to General Conditions, Section 3.11.4

BIM (Building Information Modeling) - refer to requirements in **The Indiana University Building Information Modeling (BIM) Guidelines For Owner's Representative, Engineers, and Contractors** at:
http://www.indiana.edu/~uao/iubim.html
CAD (Computer Aided Design) - refer to the Indiana University and National CAD Standards as outlined at:
http://www.indiana.edu/~uao/html/cad gis standards.html
COBie (Construction Operations Building Information Exchange) - for spreadsheets, instructions, and guidance go to:
http://www.wbdg.org/resources/cobie.php?r=om

The COBIE Construction Data submittals include only worksheets 11, 14-17

File Format Standards
BIM - Autodesk Revit .rvt - Revit version should closely be coordinated with entire team and Owner and indicated in IU BIM Execution Plan
CAD - Autodesk AutoCAD .dwg - format should be AutoCAD version 2010 .dwg format and each file named for each individual drawing sheet
PDF - Adobe pdf format should be configured to allow for text searches and printing. Pdfs should also be rotated to drawing/sheet orientation. Files should be named to match the individual sheet/drawing number.
TIF - Scanned tif files for each sheet of the original as-built field set. Format: 400 dpi/CCITT Group 4 (Black & white), each tif file should be named to match the individual sheet /drawing number.

*** all electronic data is to be submitted on DVD/CD-Rom and labeled with IU project #, IU project title, general contents, and firm name submitting. A transmittal should accompany any deliverable submittal.

Definitions

Owner's Architectural Floor Plans – Interim Record Documents – A complete current electronic CAD set of Owner's Architectural floor plan drawings with room names, room numbers, and room square footages indicated. The Owner's Representative shall not be relieved of responsibility when files are delivered if the files do not meet established requirements or are defective. Indiana University shall verify all files and the Owner's Representative shall be notified of acceptance. These are to be submitted 3 months prior to Substantial Completion.

As-Built Documents - As-built documents are the collection of paper drawings or electronic drawings that typically reside in the contractor's onsite

trailer that contain mark-ups, annotations, and comments about changes that have been made to the contract documents during the construction phase.
As-Built Model - Design Intent Models that have been updated throughout the construction process. These changes and updates have been communicated from the Contractor to the Design Team through the comments, annotations, and mark-ups from the As-Built Documents. These typically, but not always, are discipline specific models.

Building Information Model (BIM) - A digital representation of physical and functional characteristics of a facility; a shared knowledge resource for information about a facility forming a reliable basis of decisions during life-cycle, which is defined as existing conception to demolition.

BIM Execution Plan (BEP) - A plan that is created from Indiana Universities BIM Execution Plan Template that is to be submitted thirty (30) days after contract award. The BEP helps to define roles and responsibilities within a project team.

BIM Proficiency Matrix (BPM) - A matrix that was designed to measure the expertise of a firm as it relates to using a BIM process on projects. It will be used as one of the many selection criteria during the selection process.

C.O.B.i.e. – Construction Operations Building Information Exchange – the COBie spreadsheet is to replace the submission of multiple copies of paper documents delivered at the conclusion of construction. The data required by COBie is the same information as is currently required by project handover/O&M data. The contractor is to insert installed equipment data in the spreadsheet that will link into designer provided space, and installation information.

Record Drawing - The production of Record Drawings is the capturing of the As-Built Document's annotation, comments, and mark-ups in a drawing format only. This does not typically include the updating of any models.

Telecommunications Drawings – Interim As-Built Documents – A complete current electronic CAD and PDF set of as-built Telecommunication drawing for Indiana University use in coordinating selection and procurement of telecommunications/data equipment.
Indiana University has changed the As-Built and Record Document requirements to now include BIM (Building Information Modeling) as well as shift the responsibility to the A/E for the submittal of the CAD Record Documents and associated formats, or BIM As-Built Model and associated formats, for projects initiated in design as of 10/1/2009. Indiana University has also established an expectation of a BIM As-Built Model deliverable to replace CAD As-Builts by the Contractor for any projects in design prior to 10/1/2009 estimated to cost over $5 million. Finally, a new requirement for Contractors on all projects as of 10/1/2009, is to produce and submit a COBie (Construction Operations Building Information Exchange) spreadsheet that records installed equipment data. All Contractor As-Built deliverables will be

submitted to the Owner's Representative and appropriate Owner's representative for review and approval prior to the submittal of the Contractor's final payment application. If review of the preliminary As-Built drawings/BIM models(s) reveal errors and/or omissions, the drawings/BIM models will be returned to the Contractor for corrections. The Contractor shall make all corrections and return the drawings to the Owner's Representative or Owner's representative within ten (10) calendar days of receipt. If more than two reviews are required, the Owner's Representative will be compensated by the Contractor. Full compliance with this section is a condition precedent to Substantial Completion and the commencement of any warranty periods set forth in the Contract Documents, specifically including those warranties referenced in Section 9.8.4 of the General Conditions.

A. The Contractor shall keep at the construction site a complete set of full size prints of the contract drawings, reproduced at Contractor's expense. During construction, these prints shall be marked to show all deviations in actual construction from the contract drawings. The color red shall be used to indicate all additions and green to indicate all deletions. The drawings shall show the following information but not be limited thereto:

1. The locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

2. The locations and dimension of any changes within the building or structure, and the accurate location and dimension of all underground utilities and facilities.

3. Correct grade or alignment of roads, structures, and utilities if any changes were made from contract plans.

4. Correct elevations if changes were made in site grading from the contract plans.

5. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including, but not limited to, fabrication erection, installation, and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

6. The topography and grades of all drainage installed or affected as part of the project construction.

7. All changes or modifications from the original design and from the final inspection.

8. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the as-built drawings. The option not used shall be deleted.
9. These deviations shall be shown in the same general detail utilized in the contract drawings. Markings of the prints shall be pursued continuously during construction to keep them up to date. This information shall be maintained in a current condition at all times until the completion of the work. The resulting field-marked data shall be referred to and marked as "As-Built Field Data" and shall be used for no other purpose. They shall be made available for inspection by I.U.'s representative whenever requested during construction and shall be jointly inspected for accuracy and completeness by I.U.'s representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate. Failure to keep the As-Built Field Data (including Equipment-in-Place lists in the COBie spreadsheet) current shall be sufficient justification to withhold a retained percentage from the monthly pay estimate.

B. As-Built and Record Document Deliverable Matrix

The following matrix outlines the various As-Built and Record Documents deliverables that are required on four different project categories with the associated responsible parties that will be in place as of October 1, 2009.

Deliverable	Project Category	Responsible Party	Quantity	Format	Due Date
IU BIM Execution Plan	1,3	**C**	1 set	.doc/.pdf	30 days after contract is awarded
Owner's Architectural Floor Plan – Interim As-Built Drawing	1, 2,	**C**	1 set	.dwg	3 months prior to Substantial Completion
Owner's Architectural Floor Plan – Interim Record Drawing	3, 4	**A/E**	1 set	.dwg	3 months prior to Substantial Completion
Telecommunications Drawings – Interim As-Built Drawings	1, 2,	**C**	1 set	.dwg/.pdf.	3 months prior to Substantial Completion
Telecommunications Drawings – Interim Record Drawings	3, 4	**A/E**	1 set	.dwg/.pdf.	3 months prior to Substantial Completion
As-Built Field Data Set Scans	1, 2, 3, 4	**C**	1 set	.tif	At Substantial Completion
	1, 2,	**C**	1 set	paper	At Substantial Completion
Operations & Maintenance Manuals (O&M)	1, 2, 3, 4	**C**	2 sets	binders	At Substantial Completion

	1, 2, 3, 4	**C**	1 set	.pdf	At Substantial Completion
COBie Construction Data	1, 2, 3, 4	**C**	1 set	.xls	Prior to Final Payment
As-Built CAD Drawings - by Contractor	2	**C**	1 set	.dwg	Prior to Final Payment
	2	**C**	1 set	.pdf	Prior to Final Payment
	2	**C**	3 sets	paper	Prior to Final Payment
As-Built BIM Model(s) - by Contractor	1	**C**	1 set	.rvt	Prior to Final Payment
As-Built BIM Model(s) - by A/E	3	**A/E**	1 set	.rvt	Prior to Final Payment
Record Document CAD Drawings – by A/E	3,4	**A/E**	3 sets	paper	Prior to Final Payment
	3,4	**A/E**	1 set	.dwg	Prior to Final Payment
	2	**A/E**	1 set	.pdf	Prior to Final Payment

Project Categories

1. Projects under design prior to 10/1/2009 and with an estimated project cost over $5 million
2. Projects under design prior to 10/1/2009 and with an estimated project cost under $5 million
3. Projects initiated for design on or after 10/1/2009 and with an estimated project cost over $5 million
4. Projects initiated for design on or after 10/1/2009 and with an estimated project cost under $5 million

Responsible Parties

A/E = Owner's Representative (Owner's Representatives/Engineers)
C = Contractor

In addition, for those projects requiring Building Information Modeling (BIM), as indicated above in the As-Built and Record Document Deliverable Matrix, there will also be requirements for the submittal of an IU BIM Proficiency Matrix, IU BIM Execution Plan, Coordination/Fabrication/Scheduling/Phasing BIM models, NavisWorks Collision Reports, COBIE Construction Data, and other items as outlined in the Construction and Project Close-Out portions of The Indiana University Building Information Modeling (BIM) Guidelines For Owner's Representatives, Engineers, and Contractors. This document and other IU BIM templates and spreadsheets can be downloaded at the following:
http://www.wbdg.org/resources/cobie.php?r=om

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5. LABOR CONDITIONS

A. Each Contractor shall take all steps necessary to avoid any labor disputes or jurisdictional disputes, and strikes or delays resulting therefrom.

B. Each Contractor shall install in the work, and use in the prosecution of the work, only such materials, equipment and appliances as are produced and installed or applied without involvement in labor jurisdictional disputes, infractions or interferences, and strikes or delays resulting therefrom.

C. Each Contractor shall take all necessary steps to insure labor harmony on the Project and to perform work in accordance with federal, state and local labor regulations. No extra payment shall be due for doing work under this provision, or for delays or damages for failure to observe such requirements.

6. OWNER- FURNISHED MATERIALS AND EQUIPMENT

Cross-Reference General Conditions, Sections 3.2.1(6)(iii)(d) and Article 6

A. Self-Performance by Owner – Each Contractor shall permit the Owner to place and install equipment in accordance with a mutually-agreeable schedule before the completion of its work. The placing and installation of equipment shall not in any way be construed as evidence of the completion or acceptance of the work or any portion thereof.

B. Contractor Installation of Owner-Furnished Materials and Equipment – In the event that Owner elects to furnish materials or equipment to the Contractor for installation, such equipment or materials shall be noted, indicated or scheduled by the Owner and notice provided to the Contractor, and shall be carefully examined by the Contractor immediately after delivery to the site, and any and all conditions which would prohibit the proper installation or operation of this equipment shall be noted and the Owner informed thereof before acceptance of the materials or equipment for installation. The Contractor shall assume responsibility for such equipment and materials upon receipt thereof, and shall pay for any damage occurring after delivery.

7. CONTRACTOR FURNISHED MATERIALS AND EQUIPMENT

Cross-Reference General Conditions, Section 3.2.1(6)(iii)(d)

Contractor, subcontractors, manufacturers and suppliers furnishing materials and equipment under the various Prime Contracts shall identify, ship, address, consign, etc., all such materials and equipment to the appropriate Prime Contractor who may be charged therewith by giving the name of the Contractor, name of the Project, the street

or post office address and the city and under no circumstances may shipments be directed to, or in care of Indiana University. It shall be the sole responsibility of all contractors, etc., to observe this requirement, and failure to do so shall in no way be construed as a justifiable construction delay.

8. EQUAL EMPLOYMENT OPPORTUNITY AND UNLAWFUL HARASSMENT

Cross-Reference General Conditions, General Conditions, Section 3.3.2.1 and Article 10.5

A. EQUAL EMPLOYMENT OPPORTUNITY

1. During the performance of this Contract, each Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability. The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by an appropriate agency of the Federal Government setting forth the requirements of these non-discrimination provisions.

b. The Contractor will, in all solicitations or advertisements for employees placed by or on the behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin, marital status, age, sexual orientation, veteran status or disability.

c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding a notice to be provided advising the labor union or worker's representative of the contractor's commitments under Section 202 of Executive Order #11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. The Contractor will comply with all provisions of Executive Order #11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.

e. The Contractor will furnish all information and reports required by Executive Order #11246 of September 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by an appropriate agency of the Federal Government and by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

f. In the event of the Contractor's non-compliance with the Equal Opportunity conditions of this Contract or with any of such rules, regulations or orders, this Contract may be cancelled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government Contracts, in accordance with procedures, authorized in Executive Order #11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

2. The Contractor will include all of Clauses (1 thru 6 inclusive, of this article) in every subcontract of purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order # 11246 of September 24, 1965, so that such provision will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontractor or vendor as the appropriate agency of the Federal Government may direct as a means of enforcing such provisions, including sanctions for non-compliance; provided, however, in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the appropriate agency of the Federal Government, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

3. Exempted from the above Equal Employment Opportunity conditions are construction contracts and subcontracts not exceeding $10,000, suppliers, contracts, and material and equipment contracts not exceeding $10,000 for standard commercial supplies or raw materials, and contracts and subcontracts under which work is performed outside of the United States where no recruitment of workers within the United States is involved.

4. In addition to the requirements set forth in Article 14 of the Instructions to Bidders regarding the participation of Minority and Women's Business

Enterprises ("MBE/WBE"), the Contractor is required to comply with the following Mandatory Tier II Reporting Requirement:

The Contractor shall take all necessary and reasonable steps to ensure that MBE/WBEs have the maximum opportunity to compete for and perform work on this Contract. MBE/WBE utilization in the performance of this Contract must be reported each quarter using the IU Online Tier II reporting System. Compliance with Owner's Mandatory Tier II Reporting Requirement is a pre-condition for approval of pay applications. (For more information and training, see http://www.Indiana.edu/~busdiv and click on Tier II Reporting.)

The Contractor shall, upon Owner's written request, provide documentation that contracts have been entered into and payments made to Tier II MBE/WBE firms as reported by Contractor.

B. UNLAWFUL HARASSMENT

1. The Contractor will not engage in, or tolerate by its employees, subcontractors or agents, any unlawful harassment, including sexual harassment as defined in this section. Harassment on the basis of race, color, religion, sex or national origin is a violation of Section 703 of Title VII of the Civil Rights Act of 1964.

2. Sexual harassment is defined as unwelcome sexual advances-requests for sexual favors and other verbal or physical conduct of a sexual nature when:

   a. Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, or
   b. Submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual, or
   c. Such conduct has the effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile or offensive working or learning environment.

3. The Contractor will ensure dissemination of this harassment policy to its employees and agents.

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9. INSURANCE REQUIREMENTS

Cross-Reference General Conditions, Article 11

INDIANA UNIVERSITY
MINIMUM INSURANCE REQUIREMENTS
FOR CONSTRUCTION, NON-CONSTRUCTION AND PROFESSIONAL DESIGN CONTRACTS

Obligations of Contractors and Consultants

Contractors and Consultants (whether corporation, sole proprietorship or partnership) shall procure and maintain during the term of the contract and until final acceptance of the completed work under the contract, insurance of the types of coverages and minimum limits as identified here and shall provide the Owner with Certificate(s) of Insurance evidencing these coverages prior to beginning work. Contractors and Consultants shall be referred to herein as "Contractor," irrespective of their area of expertise.

- It is the responsibility of the Contractor and Subcontractors to become familiar with Owner's insurance requirements and to ensure that they can meet these requirements prior to submitting a bid to perform the work. **Please provide this exhibit to your insurance agent so the correct certificate can be issued without delay.**

- No Contractor or Subcontractor of any tier shall be on the jobsite or proceed with work, and shall not be paid for any work performed, until proper certificate(s) of insurance have been submitted to and approved by the Owner. All required insurance policies shall be written by a company(s) authorized to do business in Indiana. The Owner shall not be liable to any person for the failure of the Contractor or any Subcontractor to carry specified insurance.

- It is the responsibility of all Contractors to ensure that all of its Subcontractors also meet these insurance requirements.

- If any part of any coverage includes a deductible, self insurance, a captive insurance company or a fronting arrangement, the amount so covered must be disclosed on the certificate or in a separate letter from the Contractor. Owner reserves the right to approve of this coverage.

- NOTE: Contractor is required to meet the insurance specifications during the time of construction *and* during the warranty period, usually two years after the project is accepted by Owner.

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CERTIFICATE HOLDER:

The Trustees of Indiana University
1800 N. Range Road
Bloomington, In. 47405-2206

Insurance Requirements

1. General Liability

- **Construction Contracts**
  - Each occurrence: $1 million
  - General aggregate: $2 million
  - Products and Completed Operations: $1 million
  - The "COMMERCIAL GENERAL LIABILITY" box must be checked
  - The "OCCUR" box must be checked
  - Per Project box must be checked

- **Design/Consultant Contracts**
  - Each occurrence: $1 million
  - General aggregate: $2 million
  - The "COMMERCIAL GENERAL LIABILITY" box must be checked
  - The "OCCUR" box must be checked

2. Automobile Liability

- The box(es) that is/are checked must include a check in the box for Any Auto *or* All Owned, Hired and Non-Owned Autos
- Combined Single Limit coverage: $1 million.
- If separate Bodily Injury and Property Damage limits are purchased, each must be $1 million.

3. Excess/Umbrella

- Excess coverage *per se* is not required. However, any of the dollar amount requirements can be met by a combination of primary and excess coverage.
- Excess/umbrella coverage must be *per occurrence* coverage.

4. **Professional Liability**

Any type of design or consulting contract requires Professional Liability coverage of at least $1 million.

Owner reserves the right to require increased limits of coverage if, in the opinion of the Owner, project is hazardous in nature or poses a higher than usual risk.

5. Worker's Compensation

The Contractor shall procure and maintain a Workers' Compensation policy to cover its obligation under the applicable laws of any state or federal government to its employees employed on the jobsite or elsewhere on this project, including its liability as an employer under common law (commonly known as Employer's Liability Coverage "B") with limits of not less than that listed below. Before commencing work, Contractor shall submit to the Owner a valid State Form 41321 (Certificate of Compliance – Worker's Compensation and Occupational Diseases) or a facsimile thereof at Owner's option. **If the Contractor has no employees** (i.e., a one-person shop) then a Certificate of Exception must be obtained from the State.

Worker's Compensation:	Statutory
Employer's Liability:	$ 500,000 each accident or disease $ 500,000 policy limit $ 500,000 each employee

6. Builder's Risk Insurance

The Owner shall maintain during the course of construction Builder's Risk Insurance in an amount of not less than one hundred percent (100%) of the insurable value of the completed work, including materials, equipment, and supplies on the site and to become a part of the completed work, subject to a $25,000 deductible. The Contractor shall bear responsibility for that deductible.

The insured shall be the Owner and the Contractor(s) as their respective interests may appear. The Contractor's loss, if any, is to be adjusted with and payable to the Contractor upon written request to the Owner. The Contractor shall be responsible for and shall insure, if required by the Owner, all materials, equipment, supplies not on the site and to become a part of the completed work, Contractor's equipment, tools, scaffolding, staging, towers, forms and temporary buildings, and other materials, equipment and supplies not intended to become a part of the completed work.

This provision shall not release the Contractor from its obligation to complete, according to plans and specifications, the work covered by the Contract and the Contractor and its Surety shall be obligated to the full performance of the Contractor's undertaking.

NOTE: Prompt notice of potential claims is <u>required</u>. In the advent of a n occurrence that might be covered by Builders Risk insurance, notice must be given

to the University within one work day of the occurrence. Except for emergency repairs, no changes to damaged property will be made until an inspection is made.

Insurance Policy Endorsements

All insurance policies must provide the following endorsements to the policy and must be noted on the certificate(s):[1]

1. Additional Insured Endorsement (CG2010 10 01 and CG2037) or equivalent form required on General Liability, Automobile Liability and Excess/Umbrella Liability policies naming the Owner and/or Other Parties as defined in Owner's Contract and including coverage for completed operations. Owner shall be identified as: "The Trustees of Indiana University, its officers, agents and employees." *If additional insured status is automatically granted by the insurance form "where required by written contract" then it is sufficient to note that on the certificate with a reference to the form number. This must include information about the Excess/Umbrella coverage, e.g., "Excess coverage is following form."*

2. Aggregate Per–Project Endorsement (CG2503) to the General Liability Policy indicating that the general aggregate applies separately to each project.

3. Waiver of Subrogation on General Liability, Automobile Liability, and Employer's Liability/Workers' Compensation Policies in favor of the Owner.

4. All insurance policies shall be primary and non-contributing with respect to any insurance carried by the Owner, and shall contain a severability of interests clause in respect to liability, protecting each insured as though a separate policy had been issued to each.

5. All policies shall contain a covenant requiring (30) days written notice by the insurer to the Indiana University Office of Risk Management before cancellation, reduction or other modifications of coverage for any reason*, whenever possible.*

Certificate Details

Description of Operations

The DOO must include the Indiana University project name and project number to which this coverage applies.

Insurance Companies

All insurance carriers selected by contractor must be rated "A-" or above in the most recent edition of the "A.M. Best's Key Rating Guide."

[1] An addendum to the COI can be used if additional space is needed.

Hold Harmless Agreement

Contractor shall indemnify and save harmless the Owner from any and all losses, costs, damages, liability and expenses, including reasonable attorney fees, arising out of or in conjunction with claims or suits for damage to any property not included in the scope of work and/or injury to persons, including Contractor's employees and all Subcontractor's employees of any tier, including death, alleged or claimed to have been caused by or through the performance of the work or operations incidental to the work by the Contractor, its agents or employees, or by its Subcontractors of any tier, their agents or employees, whether through negligence or willful act; and Contractor shall, at the request of Owner, undertake to investigate and defend any and all such claims or suits against Owner.

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10. CLOSE-OUT PROCEDURES

Cross-Reference General Conditions, Section 9.8 and, 9.9

These Close-out Procedures are governed by Project Drawings, General Conditions, these Supplementary Conditions and provide the administrative and procedural requirements for contract closeout.

At Substantial Completion

A. Before requesting inspection for determining date of Substantial Completion, Contractor shall complete the following:

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Furnish to the Owner a pdf version, searchable and printable, of the Maintenance and Operating Instructions and parts lists for all operating, general, mechanical, electrical, and control equipment and all other manufactured items installed by the Contractor. The operating instructions shall integrate each piece of equipment in any one system in to a numbered step by step sequence of operation. The parts listed shall consist of exploded views or parts listing, with all component parts numbered, for each piece of operating or expandable equipment. These operating instructions and parts lists must be furnished to the Owner prior to the time when the equipment is checked out and turned over to the Owner for operation or before the final payment on the Contract will be processed.
4. Submit As-Built Field Data Set Scans.
5. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
6. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner.
8. Label with manufacturer's name and model number where applicable.
9. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
10. Complete startup testing of systems.
11. Submit testing, adjusting and balancing records.
12. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
13. Advise Owner of changeover in heat and other utilities.

14. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
15. Complete final cleaning requirements.
16. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects, including touchup painting.

B. Submit a written request for inspection for Substantial Completion. On receipt of request, Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner may assign its own staff to accompany Owner's Representative on the inspection and may require Owner's Representative and Consultants to provide additional inspections. Owner's Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner's Representative that must be completed or corrected before certificate will be issued.

C. Reinspection: Contractor shall request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

D. Results of completed inspection will form the basis of requirements for Final Completion.

<u>List of Incomplete Items (Punch List)</u>

A. Preparation: Submit one (1) copy of list in PDF format. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for sitework, building exterior, roof, ceiling, individual walls, floors, equipment, and building systems.
3. Include date for completion of each incomplete item.
4. Include the following information at the top of each page:
   a. Project name.
   b. Date.
   c. Indiana University Project Number:
   d. Name of Owner's Representative.
   e. Name of Contractor.
   f. Page number.

B. All Punch List items shall be complete within sixty (60) days from original date of punch list inspection.

C. Do not use extra materials required by Contract Documents to be delivered to Owner to repair or correct Punch List items.

Prior to Final Completion and Final Payment

Before requesting final inspection for determining date of Final Completion, Contractor shall complete the following:

A. Submit a final Application for Payment.

B. Prepare and submit Project Record Documents, Record Drawings, Record Specifications, Final Completion construction photographs, damage or settlement surveys, and similar final record information.

C. Orient and instruct the maintenance personnel designated by the Owner in the operation and maintenance of all equipment installed by the Contractor.

D. Submit the following:
   2. Final approved Lock-Out/Tag-Out manuals as identified in the Project Specifications.
   3. Certified copy of Owner's Representative's Substantial Completion inspection list Punch List items, endorsed and dated by Owner's Representative. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   4. Evidence of final, continuing insurance coverage complying with insurance requirements.
   5. Pest-control final inspection report and warranty.
   6. Demonstration and training DVDs.
   7. Evidence of completion of Contractor documentation submittals for LEED credits that involve Contractor input.

E. Submit a written request for final inspection for acceptance. On receipt of request, Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner's Representative will conduct the inspection to verify that construction is in compliance with Contract Documents and authorities having jurisdiction. Owner may assign its own staff to accompany Owner's Representative on the inspection and may require Owner's Representative and Consultants to provide additional inspections. Owner's Representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

F. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

Warranties

A. Submit written warranties in pdf form on request of Owner's Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Provide warranty documents in pdf form in an orderly sequence based on the table of contents of the Project Manual.

1. Table of Contents: Include the following information:
    a. Product or work item, including scope.
    b. Name, responsible principal, address, and telephone number of Contractor.
    c. Beginning date of warranty or bond.
    d. Proper procedure in case of failure.
    e. Events which may affect validity of warranty.
    f. Cross-referenced to Specification Section number in Project Manual.

Final Cleaning

A. Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

B. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

C. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

D. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
4. Remove tools, construction equipment, machinery, and surplus material from Project site.
5. Remove snow and ice to provide safe access to building.

6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, tunnels, chases, crawlspaces, equipment rooms, and similar spaces.
8. Sweep concrete floors broom clean in unoccupied spaces.
9. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
10. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
11. Remove labels that are not permanent.
12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration
13. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
14. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
15. Replace parts subject to unusual operating conditions.
16. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
17. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
18. Clean ducts, blowers, and coils if units were operated without filters during construction.
19. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
20. Leave Project clean and ready for occupancy.
21. Remove temporary protection, including protective covering, protective film, etc.
22. Remove marks, stains, fingerprints, and other soil or dirt from painted, decorated, and natural finished walls, ceilings, soffits, woodwork, and other work.
23. Remove spots, mortar, plaster, soil, and paint from ceramic tile, marble, and other finish materials and wash or wipe clean.
24. Clean fixtures, cabinetwork, and equipment to remove stains, paint, dirt, dust, and leave in undamaged, new condition.

25. Clean stainless steel, aluminum, bronze, brass, chrome, and other metallic finishes in accordance with recommendations of the manufacturer.
26. Clean resilient floors thoroughly with a well-rinsed mop containing only enough moisture to clean off any surface dirt or dust and buff dry by machine to bring the surfaces to sheen.
27. Clean chases, equipment rooms and closets, and equipment access areas to remove construction related materials, dirt and dust.

E. Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

F. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

Indiana University Project Site Requirements

Index to Sections

1. Temporary Structures, Signs, Fences, Field Offices and Phones.
2. Temporary Hoists, Chutes, Derricks, Scaffold, Stairs, Etc.
3. Temporary Services (General)
4. Temporary Toilets
5. Temporary Water and Fire Protection
6. Temporary Light and Power
7. Temporary Heating/Cooling
8. Temporary Use of Elevators
9. Temporary Enclosures and Ventilation
10. Protective Coverings and Measures
11. Temporary Material Storage
12. Existing Utilities
13. Construction Loads on Building Structures
14. Site Drainage, Pumping and Storm Water Management
15. Waste Disposal and Asbestos Handling
16. Mandatory Environmental Health and Safety Training
17. Temporary Access to Site and Parking

The following Site Requirements shall be observed on all Indiana University Projects. These requirements are articulated as if the project is a multi-prime project. In the event that this is a single Prime project, all references to "Each Contractor" shall be construed to mean the "General Contractor."

1. TEMPORARY STRUCTURES, SIGNS, FENCES, FIELD OFFICES AND PHONES

A. Structures – Each Contractor shall construct and maintain, in locations approved by the Owner's Representative, all temporary structures, material sheds, storage sheds, or other similar enclosed structures required for the performance of this Contract. All temporary structures are to be removed from the site by the Contractor upon completion of the Project, or sooner, if so requested by Owner's Representative.

B. Construction Sign – The General Contractor shall construct and maintain one construction sign 4' high by 8' long, or 32 square feet, constructed of plywood properly mounted and framed. The information appearing on this sign shall be as directed by the Owner's Representative and will, in general, include the following:

Owner's Name	Consultant's Name
Name of Project	General Contractor's Name
Owner's Representative's Name	Mechanical Contractor's Name
Engineer's Name	Electrical Contractor's Name

1. No additional signs will be permitted without the written consent and approval of the Owner and Owner's Representative.

2. Signs shall be provided with treated wood posts and 3/4" thick exterior grade (A-C faces) plywood panels, all substantially constructed and adequately braced.

3. All lumber, plywood and bracing shall be painted two coats of exterior paint on all exposed surfaces, in colors designated by the Owner's Representative.

4. All lettering, graphics and colors shall be in accordance with the designs furnished by the Owner's Representative.

5. General Contractor shall remove construction sign from site when directed by Owner's Representative.

C. Construction Fence – The General Contractor shall furnish, erect and properly maintain a temporary "chain link fence", 6' 0" high, complete with privacy fabric, top and bottom horizontal support, man and vehicle gates as appropriate for the project conditions, which shall remain in place until such time as directed by the Owner to be removed. The fence shall be located on the Contract Limit Line or where the progress of work dictates.

D. Contractors' Field Offices – Each Contractor shall provide at all times, for his own use, an adequate, weather tight temporary field office, located on the site in a location approved by the Owner's Representative.

E. Owner's Representative's and Owner's Field Offices – The General Contractor shall provide late model field office trailers of not less than 600 total square feet, for the use of the Owner's Representative, Owner, and their representatives. These spaces shall be heated (thermostatically controlled), air conditioned, and lighted. Each shall be provided with clean and adequate toilet facilities, including water and sanitary services. When directed, the Contractor shall move the Owner's Representative's and Owner's Field Offices into suitable space in the building.

1. The General Contractor shall provide a desk with chair and 8-foot long plan table, two plan racks, one 4-drawer legal size file with locks, one table adequate for seating 12 persons and 12 folding chairs, a telephone, and fire extinguishers.

2. The General Contractor shall supply and pay for all maintenance, janitorial services in connection with the Owner's Representative's & Owner's Field Offices. The General Contractor shall provide and pay for the installation of telephones, using the Owner's telephone system, where possible, for use by the representatives of the Owner and the Owner's Representative. The Owner will pay for the use of the telephones to be used by the Owner and the Owner's Representative.

F. Temporary Phones – Telephone services are available in the vicinity of the construction site, and each Contractor shall deal directly with the local telephone company for its individual needs. The General Contractor shall have installed and maintained one or more field telephones for the use of its personnel during the entire construction period.

G. Internet Access – The Contractor is required to have internet access, as well as printing capabilities, on site at all times during construction operations.

2. TEMPORARY HOISTS, CHUTES, DERRICKS, SCAFFOLD, STAIRS, ETC.

A. Contractor to Provide – Each Contractor shall furnish and maintain all equipment such as temporary hoists, chutes, derricks, scaffolds, staging, stairs, ramps, runways, ladders, and similar items required for the proper execution of its work, and shall provide or arrange for the use of such facilities by all its subcontractors or trades as required to carry out its work, and shall remove or arrange for the removal of all such items when no longer required.

B. Legal Requirements – All such apparatus, equipment and construction shall meet the requirements of the labor laws and regulations applicable thereto and of the authorities having jurisdiction over same.

C. Removal of Rubbish--General – No materials, rubbish or debris will be permitted to drop free, but shall be removed by use of the material hoist, rubbish chute (closed, dust-tight type) or other method approved by the Owner's Representative. Rubbish shall be removed frequently; daily from the building, weekly from the site. Specific requirements related to waste disposal and stormwater management are set forth in Section 17.

D. Protection of the Work – No materials will be permitted to be passed through the finished openings of the exterior walls without proper protection of the openings in a manner approved by the Owner's Representative. Hoists and chutes shall be so protected as to prevent damage, staining or marring of any permanent work.

E. Temporary Stairs – Permanent stairs shall be erected as soon as possible and the General Contractor shall provide same with temporary protective treads, risers, handrails and shaft protection. The General Contractor shall provide safe, convenient access from floor to floor as the construction progresses. Permanent ladders and stairs may be used when available, providing same shall be safely prepared for such use. All devices so used shall conform to the Standards prescribed in the Safety Code for the Construction Industry, State of Indiana, to OSHA, and such other codes as are applicable.

F. Temporary Sidewalks –The General Contractor shall erect temporary sidewalks as required where existing sidewalks are rendered inadequate by work on the Project site. Temporary sidewalks shall be complete with all necessary timber uprights, braces, crossbeams, plank walk, railings and the like, all installed in such manner so

as not to interfere with the execution of the work, or safety and convenience of all persons using walks.

G. Temporary Sidewalk and Materials Bridges – The General Contractor shall erect temporary sidewalks and materials bridges, if required, where building operations are conducted within 30 feet of public sidewalks in order to provide adequate protection to the public and the Owner during the execution of the work of all Prime Contracts. The General Contractor shall construct bridges complete with necessary up-rights, braces, cross beams, plank top and screened guard rails on all sides and ends, and with watertight ceiling, lighting, signs and safety barricades, all in strict accordance with the requirements of local ordinances and regulations.

3. TEMPORARY SERVICES (GENERAL)

On projects for new construction, the General Contractor shall arrange for and pay all costs in connection with the furnishing and maintaining of all temporary toilets, water supply, light and power, heating, cooling, natural gas, chilled water, steam and local telephone service as required for the proper and expeditious prosecution of the work of all Prime Contracts. The General Contractor shall provide metering for temporary water and electrical utilities. The General Contractor shall make all connections to existing services and sources of supply, shall provide all necessary installations, labor, materials, and the like, in a manner subject to the approval of the Owner's Representative and shall remove the temporary installations and connections when no longer required, or when so directed by the Owner's Representative.

4. TEMPORARY TOILETS

A. The General Contractor shall provide, erect, service and maintain temporary toilets of an approved type at convenient locations on the premises, and through the building as construction progresses, for use by all Contractors and their workers on the Project. The General Contractor shall connect same to existing sanitary sewer lines or to the building sanitary sewers as completed. Toilets shall be maintained in a sanitary condition and equipped for the use of all workers.

B. When permanent toilet facilities can be provided within the building, the temporary structures and facilities shall be removed and disposed of by the General Contractor, closing all temporary openings in an acceptable permanent manner. Workers on-site after the temporary toilet facilities are removed may use those permanent toilet facilities identified by the Owner. These permanent toilet facilities shall be serviced regularly and returned to the Owner in first class condition when the Project is completed.

5. TEMPORARY WATER AND FIRE PROTECTION

A. The General Contractor shall provide and pay for the installation, maintenance and removal of a 2-1/2" combination temporary fire protection and service water stand pipe at 1/4 points of the building - total of four stand pipes, for use by all

Contractors on the Project. Each stand pipe, at each floor, shall be equipped with 1 1-1/2" valve, 100 ft. of fire hose in an enclosure painted red, plainly marked for fire only, plus two 3/4" hose bibs not enclosed. The fire hose shall be maintained in operable condition at all times and shall be used only for fire protection. Any Contractor requiring water at points other than those identified in this Paragraph shall be responsible for, and pay for any extension necessary.

B. The stand pipes shall be installed as quickly as construction permits and shall be extended floor by floor as the building construction progresses.

C. In addition to the fire hose, the General Contractor shall provide, install and pay for one ABC type fire extinguisher and one CO2 type fire extinguisher at each fire hose location. The extinguishers shall be in an enclosure, painted red, and plainly marked for fire only.

D. In addition to the fire protection described above, wherever and whenever any soldering, cutting, burning or welding operations are in progress or any equipment is in use, or any work is being performed that involves a fire hazard, the Prime Contractor that is responsible for such operation shall be responsible for maintaining an acceptable fire extinguisher within five feet of such an operation. At all times when any of the previously described operations are being performed that might result in flying sparks, hot slag, etc., the Contractor responsible for the operator's performance shall furnish a fire blanket of sufficient size to prevent the sparks, hot slag, etc., from coming in contact with combustible material. In particular, guard against passing of sparks, heated slag, etc., through pipe sleeves, duct openings, conduit openings or similar apertures by the use of an asbestos blanket.

E. The General Contractor shall pay for all service deposits and water used for construction, and shall furnish and install all materials and equipment necessary for a metered water service, for use by all Contractors on the Project. Further, the General Contractor shall fully inform itself as to connection point or points and water pressure available.

F. Contractor shall comply with owner's hot work permitting requirements, which will be addressed in the mandatory Environmental Health and Safety training required by Section 16 of these Project Site Requirements.

G. <u>Temporary Fire Alarm The General Contractors shall install, maintain and remove a temporary wireless fire detection system to be provided by the Owner as quickly as construction permits and in accordance with guidance from the local Authority Having Jurisdiction. Temporary devices shall be located in the same general locations as indicated for permanent devices. The system shall be returned to the Owner after removal. The fire detection system must be connected through the MDF Room and report to the local Indiana University Police Department.</u>

H. The permanent fire detection and controls equipment associated with the HVAC systems must be completely installed and programmed 120 days before substantial

completion. The permanent fire detection system throughout the building must be operating 90 days prior to substantial completion.

I. Temporary Building Data Network The General Contractor shall be responsible for furnishing and installing sufficient facilities to provide access to the IU data network. This network access is required to serve alarm systems such as fire and security during construction. IU will provide a network switch in the MDF of buildings under construction. The room housing the temporary service (this can be the MDF) must be secured with the key lock, it must contain a UPS with 4-hour run time, line power must be available, and the space must be conditioned with AC and filtered air to prevent dust entrainment. Permanent pathways from the source of the IU network to the MDF is preferred, and may be used for temporary network access. Temporary pathways from the source of the IU network to the temporary room is allowed, and must be removed and replaced with permanent pathways as part of the project.

6. TEMPORARY LIGHT AND POWER

A. The General Contractor shall arrange for and pay for all metered temporary electric light and power for the work of all Prime Contractors and their trades and subcontractors as required throughout the work by the Prime Contractors. The General Contractor shall pay all costs for the installation, maintenance and use of equipment for such temporary light and power, including metering of temporary electrical power.

1. The General Contractor shall make all necessary arrangements to provide temporary electrical power, to arrange for its distribution, to continue its service throughout construction, to remove same, and to pay for all costs incidental thereto, all as identified herein.

2. Electrical power at 120/208/480 volts - 3 phase, 4 wire capability is available within convenient reach of the project.

3. Temporary lighting that complies with applicable federal and state codes shall be continuously provided in all stairways, corridors, and in all other work areas for all Contractors on the project. The General Contractor shall also provide as needed; area flood lights, guard lights at barricades, obstructions in streets, drives, walks and at all trenches or pits adjacent to public areas within the area of construction by any Contractor on this project.

4. The service entrance shall terminate in a minimum of two 400 ampere fused NEMA 3R rain tight main switches. From the service entrance location there shall be a minimum of two 400 ampere feeders to a minimum of two fused distribution panel boards on each floor. Such distribution panel boards shall be located at third points of the building and shall contain proper fusing for all temporary wiring extensions.

Transformers required for the service outlined shall be provided as a part of the service entrance.

5. Temporary distribution from these panels shall provide single phase, 120 volt, 20 ampere service to outlets within 50 feet of any portion of the building, and a single phase, 208 volts, for a 10 horsepower maximum capacity within 200 feet of any portion of the building. Outlets and bulbs shall be provided by the General Contractor to produce not less than 1/5 watt per square foot of floor area throughout the building.

6. All temporary wiring shall include a green equipment grounding conductor and the entire temporary system shall have equipment grounding continuity. All outlets for the connection of portable electrical equipment shall be of the grounding type. All elements of the temporary electric service shall conform to the regulations of the National Electric Code, the National Electric Safety Code, the Safety Code for the Construction Industry, and O.S.H.A., which shall include such ground fault service as required to protect operating personnel.

7. Each Contractor and/or subcontractor shall furnish any necessary wiring and extension cords to reach from the nearest outlet to its point of operation. All such devices shall conform to the above provisions or be rejected for use by the Owner's Representative or Owner.

8. No permanent power from permanent sources shall be used without the Owner's written permission indicating the conditions whereby it may be used. Consideration will not be given for the use of lights, wiring devices or other electric equipment until the building is in the finishing stages or unless it is in the Owner's interests.

9. The General Contractor shall maintain strict supervision over the use of the temporary electric service and shall be responsible for damages caused by misuse of same. Violation of safe practices, abuse of the service, or failure to conform to the above standards shall be sufficient cause for the Owner's Representative or Owner to take such action as will correct the condition.

10. Upon completion of the Project or when directed by the Owner's Representative, all temporary light and power equipment shall be removed by the General Contractor.

7. TEMPORARY HEATING/COOLING

A. The General Contractor shall be responsible for furnishing and installing and subsequent removal of a temporary metered heating/cooling system for use by all Contractors on the Project, within the new building as weather and construction conditions demand, and as required for the installation of any material or for working conditions required by any trade or trades within the building. Temporary heat shall be provided to prevent freezing within the building, to provide suitable working conditions, to assure progress of the operation within the established schedule time, and to conform to specific requirements of the Contract Documents. In areas where finishing trades are working or have completed their work, temporary heat shall be maintained at a uniform temperature of 70° F until the completion of the Project.

B. The General Contractor shall provide and pay for all materials, labor, water, tools, electric wiring, fuel, and electric power, operating services and any items incidental and required for a complete and operable system of temporary heat, so long as any system of temporary heating/cooling is in operation and required by any trade or crafts within the building.

C. The General Contractor shall maintain a system of temporary heating/cooling until total completion and final acceptance by the Owner, even if the Owner exercises its right, pursuant to Section 4.5.2 of the General Conditions to take Beneficial Occupancy of some or all of the building. The entire cost of providing temporary heating/cooling shall be the responsibility of the General Contractor until substantial completion.

D. Equipment shall be oil or gas fired, electric blower operated, and shall not require a vent from the heated/cooled space. Open flame type units similar to Salamanders shall not be used.

E. All spaces where temporary heating/cooling is required shall be maintained at a minimum of 50° F. during working hours and at a minimum of 40° F. during non-working hours, or as required for building construction or any trade requirements. Also, for a minimum of seven days prior to any interior finishing, (wood, painting, varnishing, resilient tile, acoustical ceilings, etc.) and until final acceptance by Owner or during partial occupancy by Owner, spaces shall be maintained according to design conditions on a 24 hour, 7 days basis.

F. None of the permanent heating/cooling systems nor any of their component parts shall be available for temporary heating/cooling until the building is in the finishing stages, (finish painting, varnishing, paneling, wood, resilient tile, acoustical ceiling, etc.). At the point at which the permanent heating/cooling system is completely installed as designed, including permanent wiring connections to a permanent power source, the Contractor may make a request, in writing, to the Owner to use the permanent heating/cooling systems to supply temporary heating/cooling for the remainder of the Project. The Owner shall be sole judge of building conditions and heating/cooling system conditions concerning the permission to use the permanent

heating/cooling systems for supplying temporary heating/cooling. Furthermore, if Owner grants permission for Contractor to use the permanent heating/cooling systems for temporary heating/cooling, the warranty on such permanent heating/cooling systems, including their component parts, shall not start to run until Contractor ceases its use of the permanent heating/cooling systems.

G. The General Contractor shall be responsible for all phases of operation, maintenance, and items of like nature during the time the permanent heating/cooling system is used to furnish temporary heating/cooling. The General Contractor shall assume all responsibility of coordination among other Contractors and/or trades concerning the installation of their permanent systems for use for temporary heating/cooling and extension of the warmth/cooling.

H. At the termination of the use of the permanent systems as a temporary heating system, the systems shall be cleaned, equipped with new filters, equipped with new belts if required, etc., and any damage repaired or replaced at the expense of the General Contractor.

8. TEMPORARY USE OF ELEVATORS

A. Temporary Use – The General Contractor may arrange for the temporary use of elevators by all Prime Contractors, if required, during the construction period, to transport equipment and materials only during the finishing stages of the Project.

B. Temporary Cars – The General Contractor shall furnish the required cars with car switch, gate contact, and all necessary operating and safety devices, city and state tests and certificates.

C. Temporary Cab Enclosures, Etc. – The General Contractor shall provide the required cab enclosures, temporary hoistway entrances and hoistway doors, temporary protection of hoistway openings, protection of permanent hoistway entrances or other installed finished work, and such other items as are necessary to permit temporary operation in accordance with local, state and national codes. The General Contractor shall provide all necessary maintenance of the elevators during the period of temporary operation. The General Contractor shall restore elevators to their original perfect condition and furnish guarantee as specified. All costs in connection with operation of the temporary elevators shall be paid by the General Contractor. The General Contractor shall extend all guarantees and warranties for two (2) years from date of acceptance of the Project by the Owner.

9. TEMPORARY ENCLOSURES AND VENTILATION

A. The General Contractor shall provide temporary enclosures for all exterior openings, as soon as the building structure is erected and otherwise made weather-tight, or whenever necessary in order to provide suitable working conditions within the building. The General Contractor shall provide suitable means for ventilation of the building and to permit the exit of water vapor from the building at all times. The

permanent door enclosures shall not be used as temporary enclosures, but temporary doors with proper hardware to make them self-closing shall be provided.

10. PROTECTIVE COVERINGS AND MEASURES

A. Finished Surfaces – The General Contractor shall protect all finished surfaces, including the jambs and soffits of all openings used as passageways or through which materials are handled, against any possible damage resulting from the conduct of work by all Prime Contractors and their trades and subcontractors.

1. The finished surfaces shall be clean and not marred upon delivery of the Project to the Owner. The General Contractor shall, without extra compensation, replace, repair or refinish (as determined by the Owner's Representative) all such spaces where painted or finished surfaces prove to have been inadequately protected and are damaged.

B. Materials Stored on Finished Surfaces – The General Contractor shall provide tight, non-staining wood sheathing under any materials that are stored on finished surfaces and shall provide planking on finished surfaces before moving any materials over those finished areas.

C. Roof and Waterproof Surfaces – Roof and waterproof surfaces shall not be subjected to traffic, nor shall they be used for storage of material. Where some activity must take place in order to carry out the work of the Prime Contracts, adequate protection, subject to approval by the Owner's Representative, shall be provided by the General Contractor.

D. Glass – All glass shall be protected and kept clean during the entire construction period by the General Contractor. All damaged, etched, defaced or broken glass shall be replaced at the General Contractor's expense.

11. TEMPORARY MATERIAL STORAGE

A. The General Contractor shall be responsible for and shall cooperate and coordinate with other Contractors requiring storage at the site.

B. All Contractors on this Project shall be restricted to the "Contract Limit Lines" of the construction site and/or to any additional area as shown on the Site Plan and shall verify locations with the Owner's Representative prior to storing any materials.

C. All Contractors on this Project shall confine equipment, storage of materials, and the operations of workers to limits indicated on the drawings. Any area indicated on drawings or designated elsewhere by the Owner for storage of materials shall be returned to its original condition upon completion of the Project at no cost to the Owner.

D. Should any Contractor require additional storage area, acquisition of such additional storage shall be at that Contractor's expense, shall not be on Owner's property and shall not be invoiced or otherwise charged to Owner on monthly pay applications.

12. EXISTING UTILITIES

A. Notification of Utility Companies – The General Contractor, in accordance with local laws and ordinances, shall notify appropriate utilities, with copy to the Owner's Representative and Owner, not less than 48 hours in advance of any excavation or work in, around or on utility lines.

B. Protection and Maintenance of Existing Utilities – Existing utilities are shown in the Contract Documents in their approximate locations from available information. The General Contractor shall ascertain exact locations of utilities that may be affected by the work of all Prime Contractors on this Project, and shall be responsible for the protection and maintenance of such utilities, and shall be responsible for any damage or injury that may result from working on or near these utilities.

C. Utilities Not Indicated – If existing utilities are encountered which are not indicated on the drawings, the General Contractor shall protect such utilities and notify the Owner's Representative and the Owner of their presence. If any such utilities not indicated on the drawings which are to remain in service are damaged by any of the Prime Contractors, the General Contractor shall take such action as reasonably required to minimize the damage and shall promptly restore the system to operating condition as directed by the Project Engineer and the Owner's Representative.

D. Owner-Provided Systems -- The Contractor shall in no circumstances tap into Owner-provided systems, including but not limited to steam, without prior notice to the Owner. Upon obtaining the Owner's consent, the Contractor shall schedule the tap-in at a time when Owner's personnel can be present. If Contractor fails to comply with this provision, Contractor shall be reimburse the Owner for all costs incurred, including but not limited to all damages incurred and not covered by Builders Risk insurance for any reason, whether to property included or not included within the original scope of work.

13. CONSTRUCTION LOADS ON BUILDING STRUCTURES

The structure is designed to support the loads of the finished building. No provision is included for stresses or loads imposed by construction operations. If the Contractor desires to place such loads in excess of the design load (shown on drawings), it shall submit drawings and calculations prepared by, and bearing the seal of a Professional Engineer of the proposed method for supporting such loads for the Owner's Representative's review and approval. No loading of any kind in excess of design loads shall be placed on any part of the building structure prior to Owner's Representative's approval of submitted drawings and calculations. The costs of the Owner's Representative's review shall be borne by the Contractor.

14. SITE DRAINAGE, PUMPING, STORM WATER MANAGEMENT

A. Site Drainage – The General Contractor shall take over the responsibility for site drainage upon entering the premises and shall maintain such drainage during the term of all Prime Contracts in a manner approved by the Owner's Representative and so as not to adversely affect the construction, the building during various stages and the adjacent areas.

B. Pumping – The General Contractor shall, during the progress of the work of all Prime Contracts, provide and maintain all required pumps, suction and discharge lines, power, etc., in sufficient number, capacity, and configurations to keep all excavations, pits, trenches, footings, foundations, and the entire property area free from accumulation of water from any source whatsoever, and also keep the Project dry and free of water, at all times and under any and all circumstances and contingencies that may arise.

C. Stormwater Management – The Contractor shall be responsible for the management of storm water run-off from the worksite in accordance with Indiana Administrative Code Rule 5, "Storm Water Run-Off Associated with Construction Activity, " 327 IAC 15-5 et seq. The Contractor shall use the Indiana Storm Water Quality Manual published by the Indiana Department of Environmental Management, www.in.gov/IDEM /4988.htm, as a guidance document when choosing best management practices for sediment and erosion control at the site.

D. Contractor shall pay Owner for any costs Owner incurs based on Contractor's non-compliance with this Section, including but not limited to repair or remediation costs, fines or penalties imposed on Owner by any regulating authority, and any fees or costs paid to attorneys or consultants arising out of a prohibited stormwater discharge..

15. WASTE DISPOSAL AND ASBESTOS HANDLING

A. Waste Disposal – The Contractor shall be responsible for disposal, recycling or reclamation of all solid or hazardous waste generated by its performance of the Work. The Contractor shall comply with all applicable state and federal regulations in handling, storing, transporting and disposing of solid or hazardous waste.

1. The Contractor acknowledges its recognition and understanding that "clean fill" is defined by 329 IAC 12-3-1(1) to consist only of uncontaminated rocks, brick, concrete, road demolition waste materials or dirt, and expressly does not include painted material and treated wood. Contractor shall dispose of any waste that contains painted materials and treated wood as solid waste.

2. Prior to the removal from the site of any solid waste or clean fill, the Contractor shall inform the Owner's Representative of the intended disposal site for the material. The Owner has the right, but not the responsibility, to reject a site as suitable for the disposal of the material, and the Contractor

shall bear any cost or expense associated with identifying an appropriate alternative disposal site.

3. The Contractor shall provide the Owner's Representative with a copy of all transport and material acceptance documents related to the disposal of solid waste or clean fill, such as tare weights and bills of lading, upon receipt by the Contractor.

4. Within 10 days of shipment off-site of any hazardous waste, the Contractor shall provide the Owner's Representative with a copy of all hazardous waste manifests. The Contractor shall provide Owner's Representative with a copy of the manifest signed by the TSD (Treatment Storage and Disposal) company within 10 days of receipt by the Contractor.

B. Asbestos Handling – Contractor is expected to be familiar with the appearance and likely locations of asbestos and asbestos containing materials ("ACM"), even if demolition and/or asbestos abatement is not a contracted-for part of the Work.

1. Technical specifications prepared by the Owner or the Owner's Representative may identify the nature and extent of asbestos to the extent known at the time of issuance of the specifications, but site conditions as of the time of the preparation of specifications may prevent complete and accurate identification the exact nature and extent of asbestos or ACM at the Project site.

2. Contractor may encounter asbestos or ACM during the course of the work. In the event that Contractor observes material that is suspected to be asbestos or ACM, Contractor shall stop work immediately and notify the Owner's Representative, who shall direct next steps in terms of testing, removal and disposal. If the suspicious material is determined to be asbestos or ACM, Contractor may be directed to undertake the removal and disposal of the material by way of a Construction Change Directive or, at the Owner's discretion, a third party may be hired to undertake this work.

C. Contractor shall pay Owner for any costs Owner incurs based on Contractor's non-compliance with this Section, including but not limited to repair or remediation costs, fines or penalties imposed on Owner by any regulating authority, and any fees or costs paid to attorneys or consultants arising out of a prohibited storm water discharge or improper disposal of solid or hazardous waste, including but not limited to asbestos or ACM.

16. MANDATORY ENVIRONMENTAL HEALTH AND SAFETY TRAINING

The Contractor shall ensure that appropriate personnel, preferably at least two, attend and participate in Environmental Health and Safety training conducted through the Owner's Office of Environmental Health & Safety. The Assistant Director of

Environmental Health & Safety at IUPUI coordinates this training for projects on all campuses, and the Contractor should call 317-274-2829 to schedule this mandatory training.

17. TEMPORARY ACCESS TO SITE AND PARKING

A. Existing Roadways, Temporary Roadways

1. Access to the project site shall be identified on a per project basis.

2. As required, the Contractor shall provide access to the building by temporary roads and walks in the area indicated by the Owner. The Contractor shall maintain the temporary roads and walks in continuous serviceable and clean condition throughout the course of the project. The main roads must remain open to vehicle and pedestrian traffic at all times. Materials so used for the temporary roads and walks shall be removed from the site, and the location of same shall revert to the schedule of construction in such a manner as may provide for completion of the work on schedule, unless same are a portion of the permanent construction and completed later.

3. The Contractor shall keep adjacent city streets free from mud or debris deposited thereon as a result of operations under this Contract. Contractor shall maintain and restore such streets to their original condition.

B. Parking

1. Owner shall either identify parking facilities that may be used by the Contractor for its equipment, personnel, and workmen or shall notify Contractor that is no project-related parking available on University property.

2. In general, parking of cars shall be restricted to the limits of the site or on streets where public parking is permitted. Parking of cars will not be permitted on other parking lots, drives or roads of academic or residential buildings.

3. On IUPUI projects, free shuttle service is provided from the designated Contractor parking area at 1302 N. Indiana Avenue. , Contractors are prohibited from parking in any IUPUI campus visitor facility.

4. On Bloomington projects, Contractor's employees are to park at the Purple Lot at the Athletics complex. A fee for parking at this lot will be charged to Contractor. Unless otherwise agreed by the parties, Contractor is responsible for transporting its employees from the Purple Lot to the jobsite.

5. On projects at all other campuses, free parking areas will be designated for Contractor's employees and hang tags will be provided to Contractor by campus parking operations.

SECTION 007060 - NOTICE TO PROCEED

NOTICE TO PROCEED DATE

To whom it may concern:

We are pleased to advise you that Indiana University has approved awarding you a contract for the above-referenced project on the following basis:

[PARTICULARS]

Project completion date will be the earlier of _____, or ____ calendar days after date of this Notice to Proceed. No project schedule extensions will be allowed unless approved by Indiana University via a CCD.

Subcontractors on the project shall be as listed on the bid form and the consultant approved post-bid subcontractor list. No changes to the subcontractor list, including additions, will be allowed unless approved by Indiana University via a CCD.

Contract and Escrow Agreement forms in triplicate are attached for your execution. All copies of the contract must be signed by the corporate official authorized to bind the corporation and that person's signature attested by the corporate officer authorized to so do. Please type under all written signatures the name and title of the signer. Also, when returning these documents to us, provide us with a certified copy of your by-law authorizing such execution and attestation. If this requirement creates a problem for you, I am sending a copy of a Corporate Authority, Incumbency and Signature Certificate from our legal counsel, which clearly indicates the sort of document required. The corporate seal must be imprinted on all copies of the contract.

We are also enclosing the Contract Performance Bond form in duplicate. This form must be executed by you in the same manner as the contract. Additionally, it must be executed by your surety and the surety's seal affixed thereto. Please be sure to insert the name and the address of the surety in the space provided on page 1 of the bond. If a power of attorney is required of the surety, it must be dated the same date as the bond.

All copies of the contract are to be returned to the University for execution to the Capital Projects Business Office at 1800 N. Range Road, Bloomington, IN 47408. Two original copies of the bond must also be returned to us; one copy retained in your file and one copy given to your surety.

As soon as the documents are executed by the University, one copy will be returned to you together with your bid security. A construction order number will then be assigned to the project.

On the basis of this letter, you are now at liberty to protect yourself on prices and quotations incidental to this project. A member of our Construction Management team will be contacting you to arrange scheduling the work. In this regard, you are reminded that you cannot enter the project site until we have received and approved certificates verifying the fact that the insurance coverages detailed in the specifications are in effect.

Sincerely yours,

Thomas A. Morrison, Ed.D.
Vice President for Capital Planning and Facilities

Enclosures

cc:	Ms. L. Hunt	Mr. J. Kaden	Mr. M. Medley	Ms. L. Mimms
	Ms. J. Stephens	Mr. L. Stephens	Mr. J. Stuff	Archives
	C.D. Office	Finance Office		

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1/25/12

FOR INFORMATION CONTACT
Martin Dawson

100% DRAWINGS FOR
CONSTRUCTION DOCUMENTATION

ENGINEERING DATA FOR
IU SE Residence Hall

IU# 20106837
Bloomington, IN
USA

44OP099145

MSKTD & Associates
ARCHITECT

Ross & Baruzzini
ENGINEER

Indiana University
CONTRACTOR

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REVISION HISTORY

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IU SE Residence Hall
Bloomington, IN

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
WLH	WLH			01/19/12

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440P099145
IU PROJ #20106837

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Siemens Industry Inc.
Building Technology Division

Valve Submittal - Steam

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 3
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (lb/hr)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: HWS							**HW CONTROL SYSTEM**						
V-1	1	274-03079	1.50	2 Way	Globe	25.00	NC-SR	12.00	1,094.00	15.00	8.54	155 304	HX-1 1/3 STEAM V
V-2	1	291-06050	2.50	2 Way	Globe	63.00	NC-SR	12.00	2,189.00	15.00	5.04	155 304	HX-1 2/3 STEAM V
V-3	1	274-03079	1.50	2 Way	Globe	25.00	NC-SR	12.00	1,094.00	15.00	8.54	155 304	HX-2 1/3 STEAM V
V-4	1	291-06050	2.50	2 Way	Globe	63.00	NC-SR	12.00	2,189.00	15.00	5.04	155 304	HX-2 2/3 STEAM V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 4
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: AHU1							**AHU-1 CONTROL SYSTEM**						
V-1	1	291-03170	2.00	2 Way	Globe	40.00	NO-SR	5.00	57.00	--	2.03	154006	AHU-1 CLG COIL V
Mechanical System: AHU2							**AHU-2 CONTROL SYSTEM**						
V-1	1	274-03166	0.75	2 Way	Globe	6.30	NO-SR	5.00	10.00	--	2.52	154 006	AHU-2 CLG COIL V
Mechanical System: AHU3							**AHU-3 CONTROL SYSTEM**						
V-1	1	274-03165	0.50	2 Way	Globe	4.00	NO-SR	5.00	7.00	--	3.06	154 006	AHU-3 CLG COIL V
Mechanical System: AHU9							**AHU-9 (FCU-A079) CONTROL SYSTEM**						
V-1	1	274-03164	0.50	2 Way	Globe	2.50	NO-SR	5.00	5.20	--	4.33	154 006	AHU-9 CLG COIL V
Mechanical System: CHWS							**CHW CONTROL SYSTEM**						
V-1	1	RECA06DJJST/RCS	6.00	2 Way	Ball	1,260	N/A-Body	0.00	520.00	--	0.17	N/A	CHW LOOP VALVE
Mechanical System: CUH							**CABINET UNIT HEATER**						
V-1	1	171H-10303	0.50	2 Way	Ball	1.60	NO-SR	3.00	2.50	--	2.44	154038	CUH A099B HTG COIL V
V-2	1	171H-10301	0.50	2 Way	Ball	0.63	NO-SR	3.00	1.00	--	2.52	154038	CUH A099F HTG COIL V
V-3	1	171H-10303	0.50	2 Way	Ball	1.60	NO-SR	3.00	2.50	--	2.44	154038	CUH B199B HTG COIL V
V-4	1	171H-10301	0.50	2 Way	Ball	0.63	NO-SR	3.00	1.00	--	2.52	154038	CUH B199G HTG COIL V
V-5	1	171H-10301	0.50	2 Way	Ball	0.63	NO-SR	3.00	1.00	--	2.52	154038	CUH B199L HTG COIL V
V-6	1	171H-10303	0.50	2 Way	Ball	1.60	NO-SR	3.00	2.50	--	2.44	154038	CUH B199M HTG COIL V
V-7	1	171H-10303	0.50	2 Way	Ball	1.60	NO-SR	3.00	2.50	--	2.44	154038	CUH B199T HTG COIL V
V-8	1	171H-10303	0.50	2 Way	Ball	1.60	NO-SR	3.00	2.00	--	1.56	154038	CUH B199V HTG COIL V
Mechanical System: ERU4B							**ERU-4 CONTROL SYSTEM**						
V-1	1	274-03167	1.00	2 Way	Globe	10.00	NO-SR	5.00	18.00	--	3.24	154 006	ERU-4 HTG COIL V
V-2	1	274-03169	1.50	2 Way	Globe	25.00	NO-SR	5.00	38.00	--	2.31	154 006	ERU-4 CLG COIL V
Mechanical System: ERU5B							**ERU-5 CONTROL SYSTEM**						

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 5
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: ERU5B							**ERU-5 CONTROL SYSTEM**						
V-1	1	274-03168	1.25	2 Way	Globe	16.00	NO-SR	5.00	23.00	--	2.07	154 006	ERU-5 HTG COIL V
V-2	1	274-03169	1.50	2 Way	Globe	25.00	NO-SR	5.00	44.00	--	3.10	154 006	ERU-5 CLG COIL V
Mechanical System: ERU6B							**ERU-6 CONTROL SYSTEM**						
V-1	1	274-03166	0.75	2 Way	Globe	6.30	NO-SR	5.00	12.00	--	3.63	154 006	ERU-6 HTG COIL V
V-2	1	274-03168	1.25	2 Way	Globe	16.00	NO-SR	5.00	23.00	--	2.07	154 006	ERU-6 CLG COIL V
Mechanical System: ERU7B							**ERU-7 CONTROL SYSTEM**						
V-1	1	274-03166	0.75	2 Way	Globe	6.30	NO-SR	5.00	14.00	--	4.94	154 006	ERU-7 HTG COIL V
V-2	1	274-03168	1.25	2 Way	Globe	16.00	NO-SR	5.00	28.00	--	3.06	154 006	ERU-7 CLG COIL V
Mechanical System: ERU8							**ERU-8 CONTROL SYSTEM**						
V-1	1	274-03167	1.00	2 Way	Globe	10.00	NO-SR	5.00	17.00	--	2.89	154 006	ERU-8 HTG COIL V
V-2	1	274-03168	1.25	2 Way	Globe	16.00	NO-SR	5.00	34.00	--	4.52	154 006	ERU-8 CLG COIL V
Mechanical System: FCH							**HORIZONTAL FAN COIL UNIT**						
V-1	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A090A HTG COIL V
V-2	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A090A CLG COIL V
V-3	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A090C HTG COIL V
V-4	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A090C CLG COIL V
V-5	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A090D HTG COIL V
V-6	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A090D CLG COIL V
V-7	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A090E HTG COIL V
V-8	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A090E CLG COIL V
V-9	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A090F HTG COIL V
V-10	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A090F CLG COIL V
V-11	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A101B HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 6
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCH							**HORIZONTAL FAN COIL UNIT**						
V-12	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A101B CLG COIL V
V-13	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A190 HTG COIL V
V-14	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A190 CLG COIL V
V-15	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A190C HTG COIL V
V-16	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A190C CLG COIL V
V-17	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A190D HTG COIL V
V-18	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A190D CLG COIL V
V-19	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A190E HTG COIL V
V-20	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A190E CLG COIL V
V-21	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A190F HTG COIL V
V-22	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A190F CLG COIL V
V-23	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290A HTG COIL V
V-24	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290A CLG COIL V
V-25	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290B HTG COIL V
V-26	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290B CLG COIL V
V-27	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290C HTG COIL V
V-28	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290C CLG COIL V
V-29	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290D HTG COIL V
V-30	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290D CLG COIL V
V-31	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290E HTG COIL V
V-32	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290E CLG COIL V
V-33	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A290F HTG COIL V
V-34	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A290F CLG COIL V
V-35	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390A HTG COIL V
V-36	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 7
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCH							**HORIZONTAL FAN COIL UNIT**						
V-37	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390B HTG COIL V
V-38	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390B CLG COIL V
V-39	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390C HTG COIL V
V-40	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390C CLG COIL V
V-41	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390D HTG COIL V
V-42	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390D CLG COIL V
V-43	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390E HTG COIL V
V-44	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390E CLG COIL V
V-45	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A390F HTG COIL V
V-46	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A390F CLG COIL V
V-47	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490A HTG COIL V
V-48	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490A CLG COIL V
V-49	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490B HTG COIL V
V-50	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490B CLG COIL V
V-51	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490C HTG COIL V
V-52	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490C CLG COIL V
V-53	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490D HTG COIL V
V-54	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490D CLG COIL V
V-55	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490E HTG COIL V
V-56	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490E CLG COIL V
V-57	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH A490F HTG COIL V
V-58	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH A490F CLG COIL V
V-59	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.00	--	2.52	154 010	FCH A588 HTG COIL V
V-60	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.40	--	2.25	154 010	FCH A588 CLG COIL V
V-61	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.00	--	2.52	154 010	FCH A599 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 8
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCH							**HORIZONTAL FAN COIL UNIT**						
V-62	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.40	--	2.25	154 010	FCH A599 CLG COIL V
V-63	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.25	--	1.98	154 010	FCH B199A HTG COIL V
V-64	1	259-02038	0.50	2 Way	Globe	2.50	NO-NSR	5.00	4.02	--	2.59	154 010	FCH B199A CLG COIL V
V-65	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B290C HTG COIL V
V-66	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B290C CLG COIL V
V-67	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B290D HTG COIL V
V-68	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B290D CLG COIL V
V-69	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B290E HTG COIL V
V-70	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B290E CLG COIL V
V-71	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B290G HTG COIL V
V-72	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B290G CLG COIL V
V-73	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B390B HTG COIL V
V-74	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B390B CLG COIL V
V-75	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B390C HTG COIL V
V-76	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B390C CLG COIL V
V-77	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B390D HTG COIL V
V-78	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B390D CLG COIL V
V-79	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B390E HTG COIL V
V-80	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B390E CLG COIL V
V-81	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.25	--	1.98	154 010	FCH B399A HTG COIL V
V-82	1	259-02038	0.50	2 Way	Globe	2.50	NO-NSR	5.00	4.02	--	2.59	154 010	FCH B399A CLG COIL V
V-83	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B490B HTG COIL V
V-84	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B490B CLG COIL V
V-85	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B490C HTG COIL V
V-86	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B490C CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 9
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCH							**HORIZONTAL FAN COIL UNIT**						
V-87	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B490D HTG COIL V
V-88	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B490D CLG COIL V
V-89	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	FCH B490E HTG COIL V
V-90	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.80	--	4.00	154 010	FCH B490E CLG COIL V
V-91	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.25	--	1.98	154 010	FCH B499A HTG COIL V
V-92	1	259-02038	0.50	2 Way	Globe	2.50	NO-NSR	5.00	4.02	--	2.59	154 010	FCH B499A CLG COIL V
V-93	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.00	--	2.52	154 010	FCH B588 HTG COIL V
V-94	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.40	--	2.25	154 010	FCH B588 CLG COIL V
V-95	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.00	--	2.52	154 010	FCH B589 HTG COIL V
V-96	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.40	--	2.25	154 010	FCH B589 CLG COIL V
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-1	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A005 HTG COIL V
V-2	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A005 CLG COIL V
V-3	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A006 HTG COIL V
V-4	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A006 CLG COIL V
V-5	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A007A HTG COIL V
V-6	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A007A CLG COIL V
V-7	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A007B HTG COIL V
V-8	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A007B CLG COIL V
V-9	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A008A HTG COIL V
V-10	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A008A CLG COIL V
V-11	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A008B HTG COIL V
V-12	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A008B CLG COIL V
V-13	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A009 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 10
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-14	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A009 CLG COIL V
V-15	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A010 HTG COIL V
V-16	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A010 CLG COIL V
V-17	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A011 HTG COIL V
V-18	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A011 CLG COIL V
V-19	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A012 HTG COIL V
V-20	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A012 CLG COIL V
V-21	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A013 HTG COIL V
V-22	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A013 CLG COIL V
V-23	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A014 HTG COIL V
V-24	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A014 CLG COIL V
V-25	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A015 HTG COIL V
V-26	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A015 CLG COIL V
V-27	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A016 HTG COIL V
V-28	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A016 CLG COIL V
V-29	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A017A HTG COIL V
V-30	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A017A CLG COIL V
V-31	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A017B HTG COIL V
V-32	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A017B CLG COIL V
V-33	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A018 HTG COIL V
V-34	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A018 CLG COIL V
V-35	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A019A HTG COIL V
V-36	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A019A CLG COIL V
V-37	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A019B HTG COIL V
V-38	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A019B CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 11
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-39	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A020A HTG COIL V
V-40	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A020A CLG COIL V
V-41	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A020B HTG COIL V
V-42	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A020B CLG COIL V
V-43	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A021A HTG COIL V
V-44	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A021A CLG COIL V
V-45	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A021B HTG COIL V
V-46	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A021B CLG COIL V
V-47	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A022A HTG COIL V
V-48	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A022A CLG COIL V
V-49	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A022B HTG COIL V
V-50	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A022B CLG COIL V
V-51	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A023 HTG COIL V
V-52	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	3.00	1.50	--	2.25	154 010	FCU A023 CLG COIL V
V-53	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A024 HTG COIL V
V-54	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A024 CLG COIL V
V-55	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A025A HTG COIL V
V-56	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A025A CLG COIL V
V-57	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A025B HTG COIL V
V-58	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A025B CLG COIL V
V-59	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A026 HTG COIL V
V-60	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A026 CLG COIL V
V-61	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A027 HTG COIL V
V-62	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A027 CLG COIL V
V-63	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A028 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 12
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-64	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A028 CLG COIL V
V-65	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A029 HTG COIL V
V-66	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A029 CLG COIL V
V-67	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A030 HTG COIL V
V-68	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A030 CLG COIL V
V-69	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A031 HTG COIL V
V-70	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A031 CLG COIL V
V-71	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A032 HTG COIL V
V-72	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A032 CLG COIL V
V-73	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A033 HTG COIL V
V-74	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A033 CLG COIL V
V-75	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A034 HTG COIL V
V-76	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A034 CLG COIL V
V-77	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A101A HTG COIL V
V-78	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A101A CLG COIL V
V-79	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A103 HTG COIL V
V-80	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A103 CLG COIL V
V-81	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A105A HTG COIL V
V-82	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A105A CLG COIL V
V-83	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A105B HTG COIL V
V-84	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A105B CLG COIL V
V-85	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A106 HTG COIL V
V-86	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A106 CLG COIL V
V-87	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A107A HTG COIL V
V-88	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A107A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 13
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-89	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A107B HTG COIL V
V-90	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A107B CLG COIL V
V-91	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A108A HTG COIL V
V-92	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A108A CLG COIL V
V-93	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A108B HTG COIL V
V-94	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A108B CLG COIL V
V-95	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A109 HTG COIL V
V-96	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A109 CLG COIL V
V-97	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A110 HTG COIL V
V-98	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A110 CLG COIL V
V-99	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A111 HTG COIL V
V-100	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A111 CLG COIL V
V-101	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A112 HTG COIL V
V-102	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A112 CLG COIL V
V-103	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A113 HTG COIL V
V-104	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A113 CLG COIL V
V-105	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A114 HTG COIL V
V-106	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A114 CLG COIL V
V-107	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A115 HTG COIL V
V-108	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A115 CLG COIL V
V-109	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A116 HTG COIL V
V-110	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A116 CLG COIL V
V-111	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A117A HTG COIL V
V-112	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A117A CLG COIL V
V-113	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A117B HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 14
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-114	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A117B CLG COIL V
V-115	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A118 HTG COIL V
V-116	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A118 CLG COIL V
V-117	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A119A HTG COIL V
V-118	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A119A CLG COIL V
V-119	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A119B HTG COIL V
V-120	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A119B CLG COIL V
V-121	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A120A HTG COIL V
V-122	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A120A CLG COIL V
V-123	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A120B HTG COIL V
V-124	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A120B CLG COIL V
V-125	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A121A HTG COIL V
V-126	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A121A CLG COIL V
V-127	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A121B HTG COIL V
V-128	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A121B CLG COIL V
V-129	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A122A HTG COIL V
V-130	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A122A CLG COIL V
V-131	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A122B HTG COIL V
V-132	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A122B CLG COIL V
V-133	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A123 HTG COIL V
V-134	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU A123 CLG COIL V
V-135	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A124 HTG COIL V
V-136	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A124 CLG COIL V
V-137	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A125A HTG COIL V
V-138	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A125A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 15
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-139	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A125B HTG COIL V
V-140	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A125B CLG COIL V
V-141	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A126 HTG COIL V
V-142	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A126 CLG COIL V
V-143	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A127 HTG COIL V
V-144	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A127 CLG COIL V
V-145	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A128 HTG COIL V
V-146	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A128 CLG COIL V
V-147	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A129 HTG COIL V
V-148	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A129 CLG COIL V
V-149	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A130 HTG COIL V
V-150	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A130 CLG COIL V
V-151	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A131 HTG COIL V
V-152	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A131 CLG COIL V
V-153	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A132 HTG COIL V
V-154	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A132 CLG COIL V
V-155	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A133 HTG COIL V
V-156	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A133 CLG COIL V
V-157	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A134 HTG COIL V
V-158	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A134 CLG COIL V
V-159	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A201 HTG COIL V
V-160	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A201 CLG COIL V
V-161	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A203 HTG COIL V
V-162	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A203 CLG COIL V
V-163	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A205A HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 16
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-164	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A205A CLG COIL V
V-165	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A205B HTG COIL V
V-166	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A205B CLG COIL V
V-167	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A206 HTG COIL V
V-168	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A206 CLG COIL V
V-169	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A207A HTG COIL V
V-170	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A207A CLG COIL V
V-171	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A207B HTG COIL V
V-172	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A207B CLG COIL V
V-173	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A208A HTG COIL V
V-174	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A208A CLG COIL V
V-175	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A208B HTG COIL V
V-176	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A208B CLG COIL V
V-177	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A209 HTG COIL V
V-178	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A209 CLG COIL V
V-179	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A210 HTG COIL V
V-180	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A210 CLG COIL V
V-181	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A211 HTG COIL V
V-182	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A211 CLG COIL V
V-183	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A212 HTG COIL V
V-184	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A212 CLG COIL V
V-185	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A213 HTG COIL V
V-186	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A213 CLG COIL V
V-187	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A214 HTG COIL V
V-188	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A214 CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 17
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-189	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A215 HTG COIL V
V-190	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A215 CLG COIL V
V-191	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A216 HTG COIL V
V-192	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A216 CLG COIL V
V-193	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A217A HTG COIL V
V-194	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A217A CLG COIL V
V-195	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A217B HTG COIL V
V-196	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A217B CLG COIL V
V-197	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A218 HTG COIL V
V-198	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A218 CLG COIL V
V-199	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A219A HTG COIL V
V-200	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A219A CLG COIL V
V-201	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A219B HTG COIL V
V-202	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A219B CLG COIL V
V-203	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A220A HTG COIL V
V-204	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A220A CLG COIL V
V-205	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A220B HTG COIL V
V-206	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A220B CLG COIL V
V-207	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A221A HTG COIL V
V-208	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A221A CLG COIL V
V-209	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A221B HTG COIL V
V-210	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A221B CLG COIL V
V-211	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A222A HTG COIL V
V-212	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A222A CLG COIL V
V-213	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A222B HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 18
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-214	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A222B CLG COIL V
V-215	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A223 HTG COIL V
V-216	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU A223 CLG COIL V
V-217	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A224 HTG COIL V
V-218	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A224 CLG COIL V
V-219	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A225A HTG COIL V
V-220	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A225A CLG COIL V
V-221	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A225B HTG COIL V
V-222	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A225B CLG COIL V
V-223	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A226 HTG COIL V
V-224	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A226 CLG COIL V
V-225	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A227 HTG COIL V
V-226	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A227 CLG COIL V
V-227	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A228 HTG COIL V
V-228	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A228 CLG COIL V
V-229	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A229 HTG COIL V
V-230	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A229 CLG COIL V
V-231	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A230 HTG COIL V
V-232	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A230 CLG COIL V
V-233	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A231 HTG COIL V
V-234	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A231 CLG COIL V
V-235	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A232 HTG COIL V
V-236	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A232 CLG COIL V
V-237	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A233 HTG COIL V
V-238	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A233 CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 19
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-239	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A234 HTG COIL V
V-240	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A234 CLG COIL V
V-241	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A301 HTG COIL V
V-242	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A301 CLG COIL V
V-243	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A303 HTG COIL V
V-244	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A303 CLG COIL V
V-245	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A305A HTG COIL V
V-246	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A305A CLG COIL V
V-247	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A305B HTG COIL V
V-248	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A305B CLG COIL V
V-249	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A306 HTG COIL V
V-250	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A306 CLG COIL V
V-251	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A307A HTG COIL V
V-252	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A307A CLG COIL V
V-253	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A307B HTG COIL V
V-254	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A307B CLG COIL V
V-255	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A308A HTG COIL V
V-256	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A308A CLG COIL V
V-257	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A308B HTG COIL V
V-258	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A308B CLG COIL V
V-259	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A309 HTG COIL V
V-260	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A309 CLG COIL V
V-261	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A310 HTG COIL V
V-262	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A310 CLG COIL V
V-263	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A311 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 20
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-264	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A311 CLG COIL V
V-265	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A312 HTG COIL V
V-266	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A312 CLG COIL V
V-267	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A313 HTG COIL V
V-268	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A313 CLG COIL V
V-269	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A314 HTG COIL V
V-270	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A314 CLG COIL V
V-271	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A315 HTG COIL V
V-272	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A315 CLG COIL V
V-273	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A316 HTG COIL V
V-274	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A316 CLG COIL V
V-275	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A317A HTG COIL V
V-276	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A317A CLG COIL V
V-277	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A317B HTG COIL V
V-278	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A317B CLG COIL V
V-279	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A318 HTG COIL V
V-280	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A318 CLG COIL V
V-281	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A319A HTG COIL V
V-282	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A319A CLG COIL V
V-283	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A319B HTG COIL V
V-284	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A319B CLG COIL V
V-285	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A320A HTG COIL V
V-286	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A320A CLG COIL V
V-287	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A320B HTG COIL V
V-288	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A320B CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11

Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-289	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A321A HTG COIL V
V-290	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A321A CLG COIL V
V-291	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A321B HTG COIL V
V-292	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A321B CLG COIL V
V-293	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A322A HTG COIL V
V-294	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A322A CLG COIL V
V-295	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A322B HTG COIL V
V-296	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A322B CLG COIL V
V-297	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A323 HTG COIL V
V-298	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU A323 CLG COIL V
V-299	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A324 HTG COIL V
V-300	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A324 CLG COIL V
V-301	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A325A HTG COIL V
V-302	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A325A CLG COIL V
V-303	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A325B HTG COIL V
V-304	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A325B CLG COIL V
V-305	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A326 HTG COIL V
V-306	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A326 CLG COIL V
V-307	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A327 HTG COIL V
V-308	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A327 CLG COIL V
V-309	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A328 HTG COIL V
V-310	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A328 CLG COIL V
V-311	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A329 HTG COIL V
V-312	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A329 CLG COIL V
V-313	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A330 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 22
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-314	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A330 CLG COIL V
V-315	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A331 HTG COIL V
V-316	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A331 CLG COIL V
V-317	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A332 HTG COIL V
V-318	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A332 CLG COIL V
V-319	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A333 HTG COIL V
V-320	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A333 CLG COIL V
V-321	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A334 HTG COIL V
V-322	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A334 CLG COIL V
V-323	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A401 HTG COIL V
V-324	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A401 CLG COIL V
V-325	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A403 HTG COIL V
V-326	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A403 CLG COIL V
V-327	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A405A HTG COIL V
V-328	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A405A CLG COIL V
V-329	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A405B HTG COIL V
V-330	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A405B CLG COIL V
V-331	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A406 HTG COIL V
V-332	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A406 CLG COIL V
V-333	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A407A HTG COIL V
V-334	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A407A CLG COIL V
V-335	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A407B HTG COIL V
V-336	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A407B CLG COIL V
V-337	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A408A HTG COIL V
V-338	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A408A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 23
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-339	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A408B HTG COIL V
V-340	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A408B CLG COIL V
V-341	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A409 HTG COIL V
V-342	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A409 CLG COIL V
V-343	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A410 HTG COIL V
V-344	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A410 CLG COIL V
V-345	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A411 HTG COIL V
V-346	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A411 CLG COIL V
V-347	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A412 HTG COIL V
V-348	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A412 CLG COIL V
V-349	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A413 HTG COIL V
V-350	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A413 CLG COIL V
V-351	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A414 HTG COIL V
V-352	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A414 CLG COIL V
V-353	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A415 HTG COIL V
V-354	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A415 CLG COIL V
V-355	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A416 HTG COIL V
V-356	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A416 CLG COIL V
V-357	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A417A HTG COIL V
V-358	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A417A CLG COIL V
V-359	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A417B HTG COIL V
V-360	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A417B CLG COIL V
V-361	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A418 HTG COIL V
V-362	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A418 CLG COIL V
V-363	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A419A HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 24
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-364	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A419A CLG COIL V
V-365	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A419B HTG COIL V
V-366	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A419B CLG COIL V
V-367	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A420A HTG COIL V
V-368	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A420A CLG COIL V
V-369	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A420B HTG COIL V
V-370	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A420B CLG COIL V
V-371	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A421A HTG COIL V
V-372	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A421A CLG COIL V
V-373	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A421B HTG COIL V
V-374	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A421B CLG COIL V
V-375	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A422A HTG COIL V
V-376	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A422A CLG COIL V
V-377	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A422B HTG COIL V
V-378	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A422B CLG COIL V
V-379	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A423 HTG COIL V
V-380	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU A423 CLG COIL V
V-381	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A424 HTG COIL V
V-382	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A424 CLG COIL V
V-383	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A425A HTG COIL V
V-384	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A425A CLG COIL V
V-385	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A425B HTG COIL V
V-386	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A425B CLG COIL V
V-387	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A426 HTG COIL V
V-388	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A426 CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 25
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-389	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A427 HTG COIL V
V-390	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A427 CLG COIL V
V-391	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A428 HTG COIL V
V-392	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A428 CLG COIL V
V-393	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A429 HTG COIL V
V-394	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A429 CLG COIL V
V-395	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU A430 HTG COIL V
V-396	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU A430 CLG COIL V
V-397	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A431 HTG COIL V
V-398	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A431 CLG COIL V
V-399	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A432 HTG COIL V
V-400	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A432 CLG COIL V
V-401	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A433 HTG COIL V
V-402	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A433 CLG COIL V
V-403	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU A434 HTG COIL V
V-404	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU A434 CLG COIL V
V-405	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B123 HTG COIL V
V-406	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B123 CLG COIL V
V-407	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B125 HTG COIL V
V-408	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B125 CLG COIL V
V-409	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B201 HTG COIL V
V-410	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B201 CLG COIL V
V-411	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B203 HTG COIL V
V-412	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B203 CLG COIL V
V-413	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B205A HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 26
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-414	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B205A CLG COIL V
V-415	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B205B HTG COIL V
V-416	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B205B CLG COIL V
V-417	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B206 HTG COIL V
V-418	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B206 CLG COIL V
V-419	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B207A HTG COIL V
V-420	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B207A CLG COIL V
V-421	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B207B HTG COIL V
V-422	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B207B CLG COIL V
V-423	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B208A HTG COIL V
V-424	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B208A CLG COIL V
V-425	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B208B HTG COIL V
V-426	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B208B CLG COIL V
V-427	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B209 HTG COIL V
V-428	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B209 CLG COIL V
V-429	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B210 HTG COIL V
V-430	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B210 CLG COIL V
V-431	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B211 HTG COIL V
V-432	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B211 CLG COIL V
V-433	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B212 HTG COIL V
V-434	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B212 CLG COIL V
V-435	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B213 HTG COIL V
V-436	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B213 CLG COIL V
V-437	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B214 HTG COIL V
V-438	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B214 CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 27
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-439	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B215 HTG COIL V
V-440	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B215 CLG COIL V
V-441	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B216 HTG COIL V
V-442	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B216 CLG COIL V
V-443	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B217 HTG COIL V
V-444	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B217 CLG COIL V
V-445	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B218A HTG COIL V
V-446	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B218A CLG COIL V
V-447	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B218B HTG COIL V
V-448	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B218B CLG COIL V
V-449	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B219A HTG COIL V
V-450	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B219A CLG COIL V
V-451	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B219B HTG COIL V
V-452	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B219B CLG COIL V
V-453	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B221A HTG COIL V
V-454	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B221A CLG COIL V
V-455	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B221B HTG COIL V
V-456	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B221B CLG COIL V
V-457	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B223 HTG COIL V
V-458	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B223 CLG COIL V
V-459	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B224 HTG COIL V
V-460	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B224 CLG COIL V
V-461	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B225A HTG COIL V
V-462	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B225A CLG COIL V
V-463	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B225B HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 28
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-464	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B225B CLG COIL V
V-465	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B226A HTG COIL V
V-466	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B226A CLG COIL V
V-467	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B226B HTG COIL V
V-468	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B226B CLG COIL V
V-469	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B227A HTG COIL V
V-470	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B227A CLG COIL V
V-471	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B227B HTG COIL V
V-472	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B227B CLG COIL V
V-473	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B228 HTG COIL V
V-474	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B228 CLG COIL V
V-475	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B229 HTG COIL V
V-476	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B229 CLG COIL V
V-477	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B230 HTG COIL V
V-478	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B230 CLG COIL V
V-479	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B231 HTG COIL V
V-480	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B231 CLG COIL V
V-481	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B232 HTG COIL V
V-482	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B232 CLG COIL V
V-483	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B233 HTG COIL V
V-484	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B233 CLG COIL V
V-485	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B234 HTG COIL V
V-486	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B234 CLG COIL V
V-487	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B235 HTG COIL V
V-488	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B235 CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 29
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-489	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B236 HTG COIL V
V-490	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B236 CLG COIL V
V-491	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B237 HTG COIL V
V-492	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B237 CLG COIL V
V-493	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B301 HTG COIL V
V-494	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B301 CLG COIL V
V-495	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B303 HTG COIL V
V-496	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B303 CLG COIL V
V-497	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B305A HTG COIL V
V-498	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B305A CLG COIL V
V-499	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B305B HTG COIL V
V-500	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B305B CLG COIL V
V-501	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B306 HTG COIL V
V-502	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B306 CLG COIL V
V-503	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B307A HTG COIL V
V-504	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B307A CLG COIL V
V-505	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B307B HTG COIL V
V-506	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B307B CLG COIL V
V-507	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B308A HTG COIL V
V-508	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B308A CLG COIL V
V-509	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B308B HTG COIL V
V-510	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B308B CLG COIL V
V-511	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B309 HTG COIL V
V-512	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B309 CLG COIL V
V-513	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B310 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 30
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-514	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B310 CLG COIL V
V-515	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B311 HTG COIL V
V-516	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B311 CLG COIL V
V-517	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B312 HTG COIL V
V-518	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B312 CLG COIL V
V-519	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B313 HTG COIL V
V-520	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B313 CLG COIL V
V-521	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B314 HTG COIL V
V-522	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B314 CLG COIL V
V-523	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B315 HTG COIL V
V-524	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B315 CLG COIL V
V-525	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B316 HTG COIL V
V-526	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B316 CLG COIL V
V-527	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B317 HTG COIL V
V-528	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B317 CLG COIL V
V-529	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B318A HTG COIL V
V-530	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B318A CLG COIL V
V-531	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B318B HTG COIL V
V-532	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B318B CLG COIL V
V-533	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B319A HTG COIL V
V-534	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B319A CLG COIL V
V-535	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B319B HTG COIL V
V-536	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B319B CLG COIL V
V-537	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B321A HTG COIL V
V-538	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B321A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 31
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-539	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B321B HTG COIL V
V-540	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B321B CLG COIL V
V-541	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B323 HTG COIL V
V-542	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B323 CLG COIL V
V-543	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B324 HTG COIL V
V-544	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B324 CLG COIL V
V-545	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B325A HTG COIL V
V-546	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B325A CLG COIL V
V-547	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B325B HTG COIL V
V-548	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B325B CLG COIL V
V-549	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B326A HTG COIL V
V-550	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B326A CLG COIL V
V-551	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B326B HTG COIL V
V-552	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B326B CLG COIL V
V-553	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B327A HTG COIL V
V-554	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B327A CLG COIL V
V-555	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B327B HTG COIL V
V-556	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B327B CLG COIL V
V-557	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B328 HTG COIL V
V-558	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B328 CLG COIL V
V-559	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B329 HTG COIL V
V-560	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B329 CLG COIL V
V-561	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B330 HTG COIL V
V-562	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B330 CLG COIL V
V-563	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B331 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 32
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-564	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B331 CLG COIL V
V-565	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B332 HTG COIL V
V-566	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B332 CLG COIL V
V-567	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B333 HTG COIL V
V-568	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B333 CLG COIL V
V-569	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B334 HTG COIL V
V-570	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B334 CLG COIL V
V-571	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B335 HTG COIL V
V-572	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B335 CLG COIL V
V-573	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B336 HTG COIL V
V-574	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B336 CLG COIL V
V-575	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B337 HTG COIL V
V-576	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B337 CLG COIL V
V-577	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B401 HTG COIL V
V-578	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B401 CLG COIL V
V-579	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B403 HTG COIL V
V-580	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B403 CLG COIL V
V-581	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B405A HTG COIL V
V-582	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B405A CLG COIL V
V-583	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B405B HTG COIL V
V-584	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B405B CLG COIL V
V-585	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B406 HTG COIL V
V-586	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B406 CLG COIL V
V-587	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B407A HTG COIL V
V-588	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B407A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 33
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-589	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B407B HTG COIL V
V-590	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B407B CLG COIL V
V-591	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B408A HTG COIL V
V-592	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B408A CLG COIL V
V-593	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B408B HTG COIL V
V-594	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B408B CLG COIL V
V-595	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B409 HTG COIL V
V-596	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B409 CLG COIL V
V-597	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B410 HTG COIL V
V-598	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B410 CLG COIL V
V-599	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B411 HTG COIL V
V-600	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B411 CLG COIL V
V-601	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B412 HTG COIL V
V-602	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B412 CLG COIL V
V-603	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B413 HTG COIL V
V-604	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B413 CLG COIL V
V-605	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B414 HTG COIL V
V-606	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	3.00	0.90	--	2.04	154 010	FCU B414 CLG COIL V
V-607	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B415 HTG COIL V
V-608	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B415 CLG COIL V
V-609	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B416 HTG COIL V
V-610	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B416 CLG COIL V
V-611	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B417 HTG COIL V
V-612	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B417 CLG COIL V
V-613	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B418A HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 34
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-614	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B418A CLG COIL V
V-615	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B418B HTG COIL V
V-616	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B418B CLG COIL V
V-617	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B419A HTG COIL V
V-618	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B419A CLG COIL V
V-619	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B419B HTG COIL V
V-620	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B419B CLG COIL V
V-621	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B421A HTG COIL V
V-622	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B421A CLG COIL V
V-623	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B421B HTG COIL V
V-624	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B421B CLG COIL V
V-625	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B423 HTG COIL V
V-626	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B423 CLG COIL V
V-627	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B424 HTG COIL V
V-628	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B424 CLG COIL V
V-629	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B425A HTG COIL V
V-630	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B425A CLG COIL V
V-631	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B425B HTG COIL V
V-632	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B425B CLG COIL V
V-633	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B426A HTG COIL V
V-634	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B426A CLG COIL V
V-635	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B426B HTG COIL V
V-636	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B426B CLG COIL V
V-637	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B427A HTG COIL V
V-638	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B427A CLG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 35
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU							**VERTICAL HI-RISE FCU**						
V-639	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B427B HTG COIL V
V-640	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B427B CLG COIL V
V-641	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B428 HTG COIL V
V-642	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B428 CLG COIL V
V-643	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B429 HTG COIL V
V-644	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B429 CLG COIL V
V-645	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B430 HTG COIL V
V-646	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B430 CLG COIL V
V-647	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B431 HTG COIL V
V-648	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B431 CLG COIL V
V-649	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.30	--	0.56	154 010	FCU B432 HTG COIL V
V-650	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCU B432 CLG COIL V
V-651	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B433 HTG COIL V
V-652	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B433 CLG COIL V
V-653	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B434 HTG COIL V
V-654	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B434 CLG COIL V
V-655	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B435 HTG COIL V
V-656	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B435 CLG COIL V
V-657	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B436 HTG COIL V
V-658	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B436 CLG COIL V
V-659	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.20	--	0.25	154 010	FCU B437 HTG COIL V
V-660	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	3.00	0.60	--	2.25	154 010	FCU B437 CLG COIL V
Mechanical System: FCU (ALTERNATE BID M6)							**VERTICAL HI-RISE FCU (ALT M6)**						
V-1	309	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	5.00	0.20	--	0.25	154038	FCU ALT HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 36
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FCU (ALTERNATE BID M6)							**VERTICAL HI-RISE FCU (ALT M6)**						
V-2	309	172H-10300	0.50	2 Way	Ball	0.40	NC-SR	5.00	0.60	--	2.25	154038	FCU ALT CLG COIL V
Mechanical System: FCV							**VERTICAL HIGH CAPACITY FCU**						
V-1	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCV B299L HTG COIL V
V-2	1	259-02041	0.50	2 Way	Globe	4.00	NO-NSR	5.00	6.79	--	2.88	154 010	FCU B299L CLG COIL V
V-3	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCV B399L HTG COIL V
V-4	1	259-02041	0.50	2 Way	Globe	4.00	NO-NSR	5.00	6.79	--	2.88	154 010	FCU B399L CLG COIL V
V-5	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.00	--	4.00	154 010	FCV B499L HTG COIL V
V-6	1	259-02041	0.50	2 Way	Globe	4.00	NO-NSR	5.00	6.79	--	2.88	154 010	FCU B499L CLG COIL V
Mechanical System: FTR							**FIN TUBE RADIATION**						
V-1	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A014 FTR HTG V
V-2	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU A023 FTR HTG V
V-3	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A030 FTR HTG V
V-4	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A114 FTR HTG V
V-5	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU A123 FTR HTG V
V-6	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A130 FTR HTG V
V-7	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A214 FTR HTG V
V-8	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU A223 FTR HTG V
V-9	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A230 FTR HTG V
V-10	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A314 FTR HTG V
V-11	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU A323 FTR HTG V
V-12	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A330 FTR HTG V
V-13	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A414 FTR HTG V
V-14	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU A423 FTR HTG V
V-15	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.35	--	0.77	154 010	FCU A430 FTR HTG V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 37
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: FTR							**FIN TUBE RADIATION**						
V-16	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.01	--	4.04	154 010	VAV B199L FTR HTG V1
V-17	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.32	--	2.10	154 010	VAV B199L FTR HTG V2
V-18	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	1.90	--	3.61	154 010	VAV B199M FTR HTG V
V-19	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.60	--	2.25	154 010	FCU B223 FTR HTG V
V-20	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.33	--	0.68	154 010	FCU B232 FTR HTG V
V-21	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.01	--	4.04	154 010	FCV B299L FTR HTG V1
V-22	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.32	--	2.10	154 010	FCV B299L FTR HTG V2
V-23	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU B323 FTR HTG V
V-24	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.33	--	0.68	154 010	FCU B332 FTR HTG V
V-25	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.01	--	4.04	154 010	FCV B399L FTR HTG V1
V-26	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.32	--	2.10	154 010	FCV B399L FTR HTG V2
V-27	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.64	--	2.56	154 010	FCU B423 FTR HTG V
V-28	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.33	--	0.68	154 010	FCU B432 FTR HTG V
V-29	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.01	--	4.04	154 010	FCV B499L FTR HTG V1
V-30	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.32	--	2.10	154 010	FCV B499L FTR HTG V2
Mechanical System: HWS							**HW CONTROL SYSTEM**						
V-5	1	BV2W04UG2LOXAXX	4.00	2 Way	Butterfly	647.0	NO-SR	1.00	210.00	--	0.11	0504brc001	HX-1 ISOLATION VALVE
V-6	1	BV2W04UG2LOXAXX	4.00	2 Way	Butterfly	647.0	NO-SR	1.00	210.00	--	0.11	0504brc001	HX-2 ISOLATION VALVE
Mechanical System: RAD							**CONVECTOR**						
V-1	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B125B HTG COIL V
V-2	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B206A HTG COIL V
V-3	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B237A HTG COIL V
V-4	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B306A HTG COIL V
V-5	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B337A HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 38
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: RAD							**CONVECTOR**						
V-6	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B406A HTG COIL V
V-7	1	171H-10300	0.50	2 Way	Ball	0.40	NO-SR	3.00	0.40	--	1.00	154038	CV B437A HTG COIL V
Mechanical System: UH							**UNIT HEATER**						
V-1	1	171H-10307	0.50	2 Way	Ball	10.00	NO-SR	3.00	13.30	--	1.77	154038	UH B006A HTG COIL V
V-2	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B077 HTG COIL V
V-3	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B087 HTG COIL V
V-4	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.70	--	2.89	154038	UH B089B HTG COIL V
V-5	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B089C HTG COIL V
V-6	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B279A HTG COIL V
V-7	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B379A HTG COIL V
V-8	1	171H-10302	0.50	2 Way	Ball	1.00	NO-SR	3.00	1.30	--	1.69	154038	UH B479A HTG COIL V
Mechanical System: VAV1							**VAV W/ REHEAT**						
V-1	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.77	--	3.71	154 010	VAV B001 HTG COIL V
V-2	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.25	--	3.94	154 010	VAV B006 HTG COIL V
V-3	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.31	--	0.60	154 010	VAV B079 HTG COIL V
V-4	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.58	--	2.10	154 010	VAV B085 HTG COIL V
V-5	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.70	--	3.06	154 010	VAV B099 HTG COIL V
V-6	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.66	--	2.72	154 010	VAV B099E HTG COIL V
V-7	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	0.93	--	2.18	154 010	VAV B101 HTG COIL V
V-8	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.31	--	0.60	154 010	VAV B101A HTG COIL V
V-9	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.35	--	4.59	154 010	VAV B105 HTG COIL V
V-10	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.60	--	2.25	154 010	VAV B106 HTG COIL V
V-11	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.79	--	3.90	154 010	VAV B107 HTG COIL V
V-12	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.87	--	3.22	154 010	VAV B109 HTG COIL V

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Siemens Industry Inc.
Building Technology Division

Valve Submittal - Water

Revision Date: 01/25/12
Submittal Date: 12/22/11
Page: 39
Engineer: WLH

Job Name: IU SE Residence Hall
Job Number: 44OP099145

Device Number	Qty	Product Number	Valve Size (in)	Config	Body Style	Cv	Failsafe	Design P. Drop (psi)	Flow (gpm)	Inlet Press (psi)	Press Drop (psi)	Document Number	Comment
Mechanical System: VAV1							**VAV W/ REHEAT**						
V-13	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	2.87	--	3.22	154 010	VAV B111 HTG COIL V
V-14	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.00	--	2.52	154 010	VAV B113 HTG COIL V
V-15	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.30	--	0.56	154 010	VAV B115 HTG COIL V
V-16	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.32	--	0.64	154 010	VAV B117 HTG COIL V
V-17	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.40	--	1.00	154 010	VAV B118 HTG COIL V
V-18	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.31	--	0.60	154 010	VAV B119 HTG COIL V
V-19	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.21	--	3.69	154 010	VAV B120 HTG COIL V
V-20	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.42	--	1.10	154 010	VAV B121 HTG COIL V
V-21	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.36	--	0.81	154 010	VAV B122 HTG COIL V
V-22	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.55	--	1.89	154 010	VAV B124 HTG COIL V
V-23	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.28	--	4.13	154 010	VAV B126 HTG COIL V
V-24	1	259-02030	0.50	2 Way	Globe	0.40	NO-NSR	5.00	0.55	--	1.89	154 010	VAV B190 HTG COIL V
V-25	1	259-02036	0.50	2 Way	Globe	1.60	NO-NSR	5.00	3.31	--	4.28	154 010	VAV B199L HTG COIL V
V-26	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	0.98	--	2.42	154 010	VAV B199LE HTG COIL
V-27	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.37	--	4.73	154 010	VAV B199M-1 HTG COIL
V-28	1	259-02032	0.50	2 Way	Globe	0.63	NO-NSR	5.00	1.24	--	3.87	154 010	VAV B199M-2 HTG COIL
V-29	1	259-02034	0.50	2 Way	Globe	1.00	NO-NSR	5.00	2.23	--	4.97	154 010	VAV B199M-3 HTG COIL

NOTES: All control valves and wells shall be installed by the heating contractor.
Failsafe: NSR - No Spring Return SR - Spring Return NO - Normal Open NC - Normal Close

Building Technology Division | **Damper Submittal** | **Revision Date:** 01/25/12

Job Name: IU SE Residence Hall | **Job Number:** 44OP099145 | **Submittal Date:** 12/22/11

Damper Manufacturer: RUSKIN | **Eng:** | **Page:** 40

Dev	Qty	Damper Model	Duct Width (in)	Duct Height (in)	Bld Cnf	Blade Width (in)	Seals E	Seals B	Nrm Pos	Act Mnt	Act Model	Act Qty	Actuator Description	Comments	Siemens Ordered
System:		**AHU1**				**AHU-1 CONTROL SYSTEM**									
2	1	CDTI-50	46.00	30.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	ECON OA DAMPER (EOAD)	N
3	1	CDTI-50	36.00	28.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	RELIEF DAMPER (READ)	N
4	1	CDTI-50	26.00	15.00	Opp	6.00	N	N	NC	Ext	GMA	1	0/10 VDC	MIN OA DAMPER (MOAD)	N
5	1	CD36	22.00	12.00	Opp	6.00	N	N	NC	Ext	GMA	1	0/10 VDC	MIN EA DAMPER (MEAD)	N
System:		**AHU2**				**AHU-2 CONTROL SYSTEM**									
1	1	CD36	30.00	12.00	Opp	6.00	N	N	NO	Ext	GCA	1	0/10 VDC	RETURN AIR DAMPER	N
2	1	CDTI-50	14.00	30.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	OUTDOOR AIR DAMPER	N
3	1	CDTI-50	14.00	20.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	RELIEF AIR DAMPER	N
System:		**AHU3**				**AHU-3 CONTROL SYSTEM**									
1	1	CD36	18.00	12.00	Opp	6.00	N	N	NO	Ext	GCA	1	0/10 VDC	RETURN AIR DAMPER	N
2	1	CDTI-50	22.00	12.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	OUTDOOR AIR DAMPER	N
3	1	CDTI-50	18.00	12.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	RELIEF AIR DAMPER	N
System:		**AHU9**				**AHU-9 (FCU-A079) CONTROL SYSTEM**									
1	1	CD36	30.00	16.00	Opp	6.00	N	N	NO	Ext	GCA	1	0/10 VDC	RETURN AIR DAMPER	N
2	1	CDTI-50	54.00	16.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	OUTDOOR AIR DAMPER	N
3	1	CDTI-50	54.00	16.00	Opp	6.00	N	N	NC	Ext	GCA	1	0/10 VDC	RELEIF AIR DAMPER	N
System:		**EF1**				**DRYER EXHAUST CONTROL SYST**									
1	1	CDTI-50	50.00	30.00	Par	6.00	N	N	NC	Fra	GCA	1	24 VAC 2POS	LAUNDRY INTAKE DMPR 1	N
2	1	CDTI-50	50.00	30.00	Par	6.00	N	N	NC	Fra	GCA	1	24 VAC 2POS	LAUNDRY INTAKE DMPR 2	N
System:		**ERU4B**				**ERU-4 CONTROL SYSTEM**									
1	1	CDTI-50	35.00	19.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-4 OA DAMPER	N
2	1	CDTI-50	24.00	20.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-4 EA DAMPER	N
System:		**ERU5B**				**ERU-5 CONTROL SYSTEM**									
1	1	CDTI-50	35.00	19.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-5 OA DAMPER	N
2	1	CDTI-50	24.00	20.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-5 EA DAMPER	N

NOTES: Duct size shown, deduct 1/4 in. for fabrication.
All shaft dimensions horizontal unless otherwise noted.

Blade Configuration:	OPP - Opposed	PAR - Parallel	
Seals:	E - Edge	B - Blade	
Actuator Mounting:	FRA - Framed	EXT - Extended	JAC - Jackshaft

Approved By: Date: / /

Building Technology Division | **Damper Submittal** | **Revision Date:** 01/25/12

Job Name: IU SE Residence Hall | **Job Number:** 44OP099145 | **Submittal Date:** 12/22/11

Damper Manufacturer: RUSKIN | **Eng:** | **Page:** 41

Dev	Qty	Damper Model	Duct Width (in)	Duct Height (in)	Bld Cnf	Blade Width (in)	Seals E	Seals B	Nrm Pos	Act Mnt	Act Model	Act Qty	Actuator Description	Comments	Siemens Ordered
System:		**ERU6B**				**ERU-6 CONTROL SYSTEM**									
1	1	CDTI-50	35.00	19.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-6 OA DAMPER	N
2	1	CDTI-50	24.00	20.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-6 EA DAMPER	N
System:		**ERU7B**				**ERU-7 CONTROL SYSTEM**									
1	1	CDTI-50	35.00	19.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-7 OA DAMPER	N
2	1	CDTI-50	24.00	20.00	Par	6.00	N	Y	NC	Ext	GCA	1	120 VAC 2POS	ERU-7 EA DAMPER	N
System:		**ERU8**				**ERU-8 CONTROL SYSTEM**									
1	1	CDTI-50	18.00	30.00	Par	6.00	N	Y	NC	Ext	GCA	1	24 VAC 2POS	ERU-8 OA DAMPER	N
2	1	CDTI-50	13.00	17.00	Par	6.00	N	Y	NC	Ext	GCA	1	24 VAC 2POS	ERU-8 EA DAMPER	N
System:		**MISC**				**MISC MONITORING SYSTEM**									
1	1	CDTI-50	12.00	8.00	Par	6.00	N	N	NC	Ext	GMA	1	120 VAC 2POS	EF-2 EXHAUST DAMPER	N

NOTE: AHU-1 RETURN AIR DAMPER TO BE PROVIDED BY UNIT MANUFACTURER.

NOTES: Duct size shown, deduct 1/4 in. for fabrication.
All shaft dimensions horizontal unless otherwise noted.

Blade Configuration:	OPP - Opposed	PAR - Parallel	
Seals:	E - Edge	B - Blade	
Actuator Mounting:	FRA - Framed	EXT - Extended	JAC - Jackshaft

Approved By: Date: / /

SCHEDULE			MOTOR DATA			DRIVE DATA			OPTIONS		
ITEM	QTY.	TAG/ EQUIPMENT ID	HP	FLA	VOLTAGE	HP	OUTPUT AMPS	VOLTAGE	INTEGRAL FUSED DISCONNECT SWITCH, NO BYPASS	INTEGRAL BYPASS & FUSED DISCONNECT SWITCH	BASE DRIVE, NO DISCONNECT SWITCH, NO BYPASS
1	1	HWP-1 PUMP (VFD-1)	15		460/3/60	15	23A	460/3/60	•		
2	1	HWP-2 PUMP (VFD-2)	15		460/3/60	15	23A	460/3/60	•		
3	1	CHWP-1 PUMP (VFD-1)	20		460/3/60	20	31A	460/3/60	•		
4	1	CHWP-1 PUMP (VFD-2)	20		460/3/60	20	31A	460/3/60	•		
5	1	AHU-1 SUP FAN (VFD-1)	20		460/3/60	20	31A	460/3/60	•		
6	1	AHU-1 RET FAN (VFD-2)	5		460/3/60	5	8.8A	460/3/60	•		
7	1	AHU-2 SUP FAN (VFD-1)	3		460/3/60	3	6.9A	460/3/60	•		
8	1	AHU-2 RET FAN (VFD-2)	1.5		460/3/60	1.5	3.3A	460/3/60	•		
9	1	AHU-3 SUP FAN (VFD-1)	3		460/3/60	3	6.9A	460/3/60	•		
10	1	AHU-3 RET FAN (VFD-2)	0.75		460/3/60	1.5	3.3A	460/3/60	•		
(1) 11	1	ERU-4 HEAT WHEEL (VFD-1)	FBUM		460/3/60	FBUM	FBUM	460/3/60			
(1) 12	1	ERU-5 HEAT WHEEL (VFD-1)	FBUM		460/3/60	FBUM	FBUM	460/3/60			
(1) 13	1	ERU-6 HEAT WHEEL (VFD-1)	FBUM		460/3/60	FBUM	FBUM	460/3/60			
(1) 14	1	ERU-7 HEAT WHEEL (VFD-1)	FBUM		460/3/60	FBUM	FBUM	460/3/60			
15	1	ERU-8 SUP FAN (VFD-1)	5		460/3/60	5	8.8A	460/3/60	•		
16	1	ERU-8 EXH FAN (VFD-2)	3		460/3/60	3	6.9A	460/3/60	•		
(1) 17	1	ERU-8 HEAT WHEEL (VFD-3)	FBUM		460/3/60	FBUM	FBUM	460/3/60			

(1) VFD'S FOR ERU HEAT WHEELS ARE TO BE FURNISHED BY AHU MANUFATURER,

REVISION HISTORY

SIEMENS

Siemens Industry Inc.
Building Technology Division

6200 Technology Center Dr.
Indianapolis, IN 46278
USA
Phone: (317)293-8880
Fax: (877)810-2758

IU SE Residence Hall
Bloomington, IN

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
WLH	WLH	SBT	12/22/11	01/25/12

VFD SCHEDULE

440P099145
IU PROJ #20106837

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AFMS SCHEDULE

FLOW STATION TAG No.	SYSTEM SERVED	DUCT SIZES (IN.) W x H / FAN INLET DIAMETER	CONFIGURATION			AREA (SQ.FT.)	DESIGN MAX			DESIGN MIN			NOTES
			C	R	O		MAX CFM	FPM	Vp	MIN CFM	FPM	Vp	
AFMS-1	AHU-1 SUPPLY FAN		•										TO BE PROVIDED BY AHU MANUFACTURER
AFMS-2	AHU-1 RETURN FAN		•										TO BE PROVIDED BY AHU MANUFACTURER
AFMS-1	AHU-2 SUPPLY FAN		•										TO BE PROVIDED BY AHU MANUFACTURER
AFMS-2	AHU-2 RETURN AIR	20 X 20		•									
AFMS-1	AHU-3 SUPPLY FAN		•										TO BE PROVIDED BY AHU MANUFACTURER
AFMS-2	AHU-3 RETURN AIR	18 X 20		•									
AFMS-1	ERU-8 SUPPLY FAN		•										TO BE PROVIDED BY AHU MANUFACTURER
AFMS-2	ERU-8 RETURN FAN		•										TO BE PROVIDED BY AHU MANUFACTURER

C = CIRCULAR
R = RECTANGLE
O = OVAL

NOTES:

1. ALL DIMENSIONAL AND CALCULATION INFORMATION ARE APPROXIMATE.
   INLET DIMENSIONS TO BE DETERMINED WITH INFORMATION FROM THE APPROVED AHU SUBMITTAL.
   OR FROM FIELD MEASURING INLET SIZE WHEN AHU'S ARE ON SITE.
   DELIVERY TYPICALLY TAKES 4 TO 6 WEEKS AFTER ORDERING.

REVISION HISTORY

SIEMENS
Siemens Industry Inc.
Building Technology Division
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IU SE Residence Hall
Bloomington, IN

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
WLH	WLH	SBT	12/22/11	01/18/12

AFMS SCHEDULE

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GENERAL NOTES FOR CONTROLS INSTALLATION CONTRACTOR (CIC)

All work shall be performed in accordance with the contract documents and all applicable codes and standards.

Provide and install all wiring, conduit, circuit breakers, mounting hardware to install control devices/panels (brackets, extensions, stands, etc.) for a complete installation.

Mount, wire and pipe (control pneumatics) all devices including air compressor, air dryer, panels, sensors, relays, actuators, switches, thermostats, etc. for a complete installation. All installation of the energy management system and components is by the CIC unless noted otherwise.

Indiana University, through Siemens Industry, Inc., will provide all system controllers, relays, transformers, sensors, prefabricated auxiliary component panels and devices unless otherwise noted. The CIC will provide all installation materials necessary to mount, install, and wire all control devices.

CIC shall receive, handle and store, as needed, all material to be installed under their contract. CIC shall be responsible for verification of quantity received. Any discrepancies shall be reported in writing to Siemens Industry, Inc. within 48 hours of delivery. The CIC is responsible for the security of all materials received and stored. The CIC will replace, at their expense, any materials missing or damaged.

All devices to be installed according to manufacturer's recommendations and the contract documents. Field verify exact locations of all devices/equipment and insure access where required for service of equipment.

Variable Frequency Drives (VFD) will be provided by Siemens Industry, Inc. and installed by the CIC. CIC. shall be responsible for interlock wiring between VFDs and local disconnect switches, where applicable.

CIC shall coordinate their work with all Contractors, other Subcontractors, and the Owner.

All control devices and panels that require 120V power that are not powered by the division 26 contractor shall require a dedicated circuit from its own breaker. Provide breakers and power wiring where required. Mount panels on racks when wall space is not available. Actual panel locations are to be coordinated with the contractors and owner.

All line voltage wiring shall be installed in conduit.

All wiring in mechanical rooms, concealed and inaccessible locations shall be installed in conduit. Minimum conduit size: 3/4".

Open cable and poly shall be installed only where space is concealed and accessible. In these cases, both cable and poly shall be rated for space they occupy.

Any conductor carrying voltage greater than 24VAC shall not occupy the same conduit as low voltage wiring. Pneumatic tubing and electrical conductors shall not occupy the same length of conduit.

All pneumatic tubing in mechanical rooms and in inaccessible places shall be installed in conduit or piped in hard copper in a neat and workmanlike manner. Air main supply to auxiliary panels shall be 1/2" O.D. Air branch lines shall be no less than 1/4" O.D.

Exposed conduit shall be EMT with steel compression fittings unless specified differently. Conduits installed outdoors or encased in concrete shall be rigid.

Refer to the project specifications and IU Control Design Standards document for conduit use and installation requirements.

CIC shall use control wire according to the following schedule and from the following vendor only. This wiring has special labeling and must be used for identification purposes:

Plenum Cables

Description	Cable P/N	Application	Jacket
HVAC CBL 18AWG,STR,1TP,CMP	H-TP18-CMP	DI, DO, AI, AO low voltage	Blue
HVAC CBL 20AWG,STR,1TP,CMP	H-TP20-CMP	DI, DO, AI, AO low voltage	Blue
HVAC CBL 18AWG,STR,3COND,CMP	H-3C18-CMP	TEC actuators, transducers	Blue
HVAC CBL 20AWG,STR,3COND,CMP	H-3C20-CMP	TEC actuators, transducers	Blue
HVAC CBL 14AWG,STR,2COND,CL3P	H-2C14-CL3P	Low Voltage Power	Drk Blue
HVAC BLN24AWG,STR,TSP,LOCAP,CMP	H-B-TSP24LC-CMP	BLN	Orange
HVAC BLN24AWG,STR,TSP,LOCAP,CMP	H-F-TSP24LC-CMP	FLN	Org/Blu Strp

Contact: Anixter, Inc.
1471 Business Center Drive
Mount Prospect, IL 60056

Phone: (888) 479-3830
Fax: (888) 479-3834

Alisa Corsi (Account Manager) - ext. 24711
Hours: 7AM - 7PM (Central), Monday - Friday

Provide as built record drawings of installation of the system. Record drawings shall include routing and sizing of main air runs, communications and power trunk runs, transformer locations, field device locations.

REVISION HISTORY

SIEMENS
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IU SE Residence Hall
Bloomington, IN

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GENERAL NOTES

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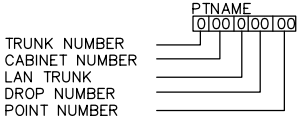
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
AC	AIR COMPRESSOR
AD	AIR DRYER
AE	ACTUATOR ELECTRIC
AEM	APOGEE ETHERNET MICROSERVER
AF	AIR FILTER
AFS	AIR FLOW STATION
AOP	ANALOG OUTPUT, PNEUMATIC
AP	ACTUATOR PNEUMATIC
APS	AUX. POWER SUPPLY
AT	AUTOMATIC TRAP
ATD	AUTO TANK DRAIN
ATEC	ACTUATOR TEC
AZM	AUTOZERO MODULE
BELL	BELL
BIM	BUS INTERFACE MODULE
BOIL	BOILER
CBL	CABLES
CKV	CHECK VALVE
CM	CONSTRUCTION MATERIALS
CP	COMPONENT PANEL
CPU	CENTRAL PROCESSING UNIT
CRT	CATHODE RAY TUBE
CS	CURRENT SWITCH
CT	CURRENT TRANSDUCER
CVC	CONSTANT VOLUME CONTROLLER
D	DAMPER
DDC	DUAL DUCT CONTROLLER
DEM	DEMAND ENERGY MONITOR
DP	DEW POINT TRANSMITTER
DPR	DIFFERENTIAL PRESS. REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DPTE	DIFF. PRESS. TRANSMITTER ELEC.
DPTP	DIFFERENTIAL PRESSURE PNEUMATIC
DPU	DIGITAL POINT UNIT
EC	ENTHALPY COMPARITOR
EP	ELECTRO-PNEUMATIC VALVE
ES	END SWITCH
ET	ENTHALPY TRANSMITTER
EXP	EXPANSION PANEL
FAN	FAN
FHC	FUME HOOD CONTROLLER
FM	FLOW MTR. (FLOW METER STATION)
FMS	FIRE MGMT. SYSTEM
FS	FLOW SWITCH
FTP	FLOW TRANSMITTER PNEU.
G	GAUGE

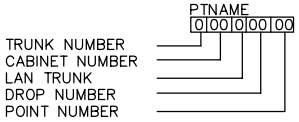
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
GD	GAS DETECTOR
HE	HUMIDIFIER ELECTRIC
H	HYGROSTATS
HHC	HAND-HELD OPERATOR'S TERMINAL
HL	HIGH LIMIT
HOA	HAND-OFF-AUTO SWITCH
HORN	HORN
HPC	HEAT PUMP CONTROLLER
HTD	HIGH TEMPERATURE DETECTOR
HTE	HUMIDITY TRANSMITTER ELECTRIC
HTP	HUMIDITY TRANSMITTER PNEUMATIC
INT	INTERCOM
KWM	ELECTRIC KILOWATT METER
LC	LIMIT CONTROLLER (LIMITEM)
LLS	LIQUID LEVEL SWITCH
LLT	LIQUID LEVEL TRANS.
LPR	POWER SUPPLY 24VAC/24VDC
LTDE	LOW TEMP. DETECTOR ELECTRIC
LTDP	LOW TEMP. DETECTOR PNEUMATIC
LUI	LOCAL USER INTERFACE
MBC	MODULAR BUILDING CONTROLLER
MDM	MODEM
ME	ELECTRONIC ACTUATOR
MEC	MODULAR EQUIPMENT CONTROLLER
MG	MAGNEHELIC GAUGE
MPU	MULTI-POINT UNIT
MS	MOTOR STARTER
OBS	OBSOLETE
ODP	OPERATOR DATA PANEL
P	PUMP
PA	PULSE ACCUMULATOR
PCT	PROGRAMMABLE CLOCK TIMER
PE	PRESSURE ELECTRIC SWITCH
PL	PILOT LIGHT
PM	POWER MONITOR
PNL	PANEL
PPM	POINT PICKUP MODULE
PRC	PRESSURE REG. CONTROLLER
PRV	PRESSURE REDUCING VALVE
PS	POSITIONING SWITCH
PSE	POSITION SENSOR ELECTRIC
PST	PULL STATION
PT	PITOT TUBE
PTE	PRESSURE TRANSMITTER ELECTRIC
PTP	PRESSURE TRANSMITTER PNEUMATIC
PTR	PRINTER
PV	PILOT VALVE
PXCC	PX COMPACT CONTROLLER

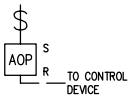
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
PXCM	PXC-MODULAR CONTROLLER
RBC	REMOTE BUILDING CONTROLLER
RC	RECEIVER CONTROLLER
RCU	REMOTE CONTROL UNIT
RE	RELAY ELECTRIC
RP	RELAY PNEUMATIC
RS	RESTRICTOR
RV	RELIEF VALVE
S/W	SOFTWARE
SC	STEP CONTROLLER
SCU	STAND ALONE CONTROL UNIT
SD	SMOKE DETECTOR
SE	SWITCH ELECTRIC
SPKR	SPEAKER
SPP	STATIC PRESSURE PROBE
SPR	STATIC PRESSURE REGULATOR
SV	SOLENOID VALVE
SW	SWITCH PNEUMATIC
T	ROOM THERMOSTAT, PNEUMATIC
TBC	TERMINAL BOX CONTROLLER
TC	TEMPERATURE CONTROLLER(S200)
TCU	TERMINAL CONTROL UNIT
TDR	TIME DELAY RELAY
TE	THERMOSTAT, ELECTRIC
TEC	TERMINAL EQUIPMENT CONTROLLER
TH	THERMOMETER
TI	TRUNK INTERFACE
TIE	TRUNK ISOLATOR EXTENDER
TIU	TELCOM INTERFACE UNIT
TMR	TIMER, TIME CLOCK
TTE	TEMPERATURE TRANSMITTER ELECTRIC
TTP	TEMPERATURE TRANSMITTER PNEUMATIC
TXIO	TX-I/O FAMILY CONTROLLER MODULES
UC	UNITARY CONTROLLER
UCC	UNIT CONDITIONER CONTROLLER
UVC	UNIT VENT CONTROLLER
V	VALVE
V*	VALVE SERVICE PARTS
VA	TEC VALVE ACTUATOR
VAC	VIBRATION ISOLATOR
VB	VARIABLE AIR VOLUME CONTROLLER
VTE	VELOCITY TRANSMITTER ELECTRICAL
W	WELL
XDR	TRANSDUCER
XFMR	TRANSFORMER

DDC ELECTRICAL POINT



DDC PNEUMATIC POINT

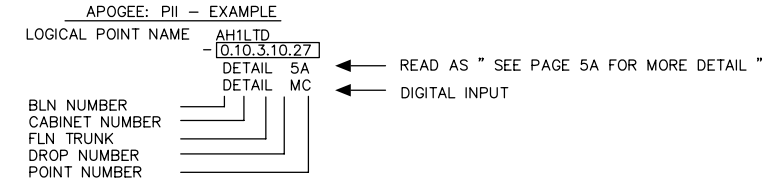




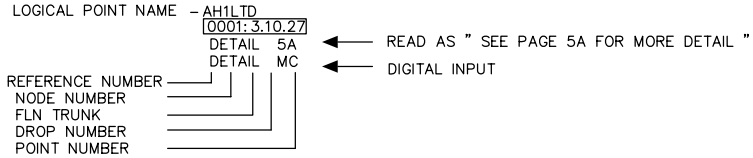
DETAILS

▭	ELECTRICAL TERMINATION
⬭	PNEUMATIC TERMINATION
DETAIL XX	STANDARD DDC TERMINATION
△	NOTE OR REVISION
DETAIL XX	PAGE REFERENCE

APOGEE: PII – EXAMPLE



APOGEE: ETHERNET – EXAMPLE



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Legend & Abbreviations

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TEC – ELECTRONIC OUTPUT WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1A

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING
INPUT POWER	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DIGITAL OUTPUT	2	CHECK LOCAL CODES	150ft (46 m)	CHECK LOCAL CODES
DIGITAL INPUT	2	#18–22 TP #20 AWG TP	150ft (46 m)	CLASS 1 & 2 CHECK LOCAL CODES
ANALOG INPUT	2	#18–22 TP	100ft (30.5 m)	CLASS 2
ANALOG INPUT THERMISTOR	2	#20 TP	100ft (30.5 m)	CLASS 1 & 2 CHECK CODES
ROOM TEMP. SENSOR	2	6–WIRE RJ11	100ft (30.5 m)	CLASS 2
LAN TRUNK [1]	2	#18–22 AWG TSP	4kft (1220 m)	CLASS 2 ONLY

TEC – PNEUMATIC OUTPUT WIRING TYPE AND GAUGE REQUIREMENTS

TBBLE 1B

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING
POWER TRUNK (LOW VOLTAGE)	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
POWER TRUNK (HIGH VOLTAGE)	1	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DAMPER OUTPUT (LOW VOLTAGE)	2	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DAMPER OUTPUT (HIGH VOLTAGE)	1	CHECK LOCAL CODES	AS REQUIRED	CHECK LOCAL CODES
DIGITAL INPUT	2	#18–22 TP	100ft (30.5 m)	CLASS 1 & 2 CHECK LOCAL CODES
ANALOG INPUT	2	#18–22 TP	100ft (30.5 m)	CLASS 2
ROOM TEMP. SENSOR	2	6–WIRE RJ11	100ft (30.5 m)	CLASS 2
LAN TRUNK [1]	2	#18–22 AWG TSP	4kft (1220 m)	CLASS 2 ONLY

TABLE 1A & 1B NOTES:

1. DISTANCE WILL DEPEND ON TRANSFORMER LOCATION.

TEC POWER SOURCE REQUIREMENTS

TEC TYPE	VOLTAGE	LINE FREQUENCY	MAX. POWER
ELECTRONIC OUTPUT	24 VAC +15% –20%	50 / 60 Hz	5.2 VA TO 43.5 VA[1]
PNEUMATIC OUTPUT (LOW VOLTAGE)	24 VAC +15% –20%	50 / 60 Hz	17 VA PLUS DAMPER VA
PNEUMATIC OUTPUT (HIGH VOLTAGE)	115/230 VAC +10% –15%	50 / 60 Hz	17 VA PLUS DAMPER VA

NOTES:

1. VA DEPENDS ON TEC APPLICATION.

DI, AI, AO WIRE SPECIFICATIONS

TABLE 2

SPECIFICATION	WIRE TYPE	
	SHIELDED	UNSHIELDED
CAPACITANCE WIRE TO WIRE	NOT SPECIFIED	NOT SPECIFIED
CAPACITANCE BETWEEN ONE CONDUCTOR WITH OTHER CONDUCTOR CONNECTED TO SHIELD	NOT SPECIFIED	N/A
WIRE LAY	2" MAX.	2" MAX.
AWG	18–22	18–22

LAN TRUNK WIRE

TABLE 3

SPECIFICATION	LENGTH OF TRUNK SECTION	
	4000 FT	10,000 FT
CAPACITANCE WIRE TO WIRE	60pF MAX.	24pF MAX.
CAPACITANCE BETWEEN ONE CONDUCTOR WITH OTHER CONDUCTOR CONNECTED TO SHIELD	100pF MAX.	44pF MAX
WIRE LAY	2" MAX.	2" MAX.
AWG	24	18 MIN.

TABLE 2 & 3 NOTES:

1. OPTIMAL NOISE REDUCTION IS ACHIEVED WITH TIGHTER WIRE LAYS (E.G. 1/2").

GENERAL NOTES:

- COMPLY WITH LOCAL BUILDING CODES.
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- PLENUM WIRING MAY BE USED IN PLACE OF ANY LOW VOLTAGE WIRING WITHOUT CHANGES TO LENGTH EXCEPT FOR PMD OR LAN TRUNK. IN CASES WHERE PLENUM WIRE (#18 OR #20 AWG) IS USED FOR PMD OR LAN TRUNK, USE THE REDUCED LENGTHS OF #20 AWG CABLE.
- THE LAN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN TEC'S. NO SPLICES ALLOWED.

TEC (ELECTRONIC OUTPUT) DO CONTACT RATING

24 VAC HOT @ 0.5 AMPS

WARNING: DO IS NOT A DRY CONTACT!

TEC (PNEUMATIC OUTPUT) DO CONTACT RATING

DO CONTACT RATING NOT SPECIFIED

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TECTERM

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PXCC WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING [2]
AC LINE POWER [1]	POWER	#12–14 THHN	REFER TO NEC	CHECK LOCAL CODES
DIGITAL OUTPUT	1 & 2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 100K/10K Thermistor	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 1K Ni OR RTD	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 0–10 V	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 4–20 mA	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 0–10 V	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 4–20 mA	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ETHERNET ALN	2	#24 (4) TP[6] CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES

1. WHEN DAISY–CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE.

2. CONDUIT SHARING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON–JACKETED UL LISTED 75°C(167°F) AND 300V, CABLE CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED.TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END.

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA–568–B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXES. USE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

MAXIMUM DO WIRE RUN LENGHTS

TABLE 3

NOMINAL INRUSH	STARTER SIZE	WIRE SIZE		
		#18	#16	#14
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)
1500 VA	4	70ft (21m)	100ft (30m)	200ft (61m)

TABLE 3 NOTES:

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAGE DROP ACROSS THE WIRE FOR A TYPICAL STARTER.
2. PXCC DO CONTACT RATINGS
   4A @ 250VAC & 30VDC
   SIZE 4 MOTOR STARTER

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNK

TABLE 4

SPEED	1200 BAUD	4800 BAUD	9600 – 38.4K BAUD	57.6K – 115.2K BAUD
SERIES TIE'S	10	7	6	6
ALN TRUNK DISTANCE	4000ft (1.2km)	4000ft (1.2km)	4000ft (1.2km)	3280ft (1km)

- TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCC CONNECTED TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF THE ALN CABLE THAT EXITS BUILDING.
- THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE TIE.

GENERAL NOTES:

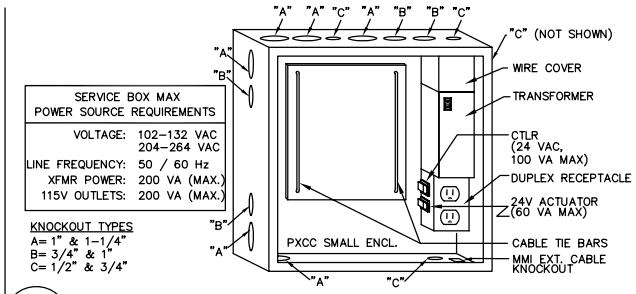
- COMPLY WITH LOCAL BUILDING CODES
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN CABINETS. NO SPLICES ALLOWED.
- CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1 CIRCUITS.
- FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

PXCC WIRE SPECIFICATIONS

TABLE 2

	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	MM, MMP
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC [2]	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED

1. UL RECOGNIZED WIRE (LABELED WITH A BACKWARDS 'RU') IS NOT FIELD INSTALLABLE. USE ONLY UL–LISTED WIRE.
2. 300 VAC WIRE CAN BE USED IN FIELD PANELS CONTAINING VOLTAGES BELOW 150 VAC.



SERVICE BOX MAX POWER SOURCE REQUIREMENTS

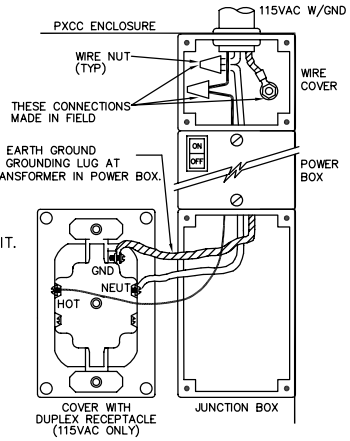
VOLTAGE:	102–132 VAC 204–264 VAC
LINE FREQUENCY:	50 / 60 Hz
XFMR POWER:	200 VA (MAX.)
115V OUTLETS:	200 VA (MAX.)

KNOCKOUT TYPES
A= 1" & 1–1/4"
B= 3/4" & 1"
C= 1/2" & 3/4"

P1 00 PXCC CONDUIT PENETRATIONS

PXCC FAMILY VA RATINGS & SENSOR SUPPLY

PRODUCT	24VAC VA RATING	24VDC mA
PX COMPACT 16	18	100
PX COMPACT 24	20	100
PX COMPACT 36	35	200



NOTES:

1. NO MORE THAN SEVEN (7) FULLY LOADED PXCC CABINETS ALLOWED ON A SINGLE 3–WIRE CIRCUIT.
2. RECEPTACLE IS PRE–WIRED AND MOUNTED IN FACTORY, FOR 115VAC SERVICE BOX ONLY.

P2 00 PXCC POWER WIRING

NOTES:

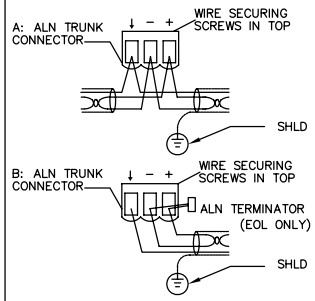
1. COMMUNICATION CONNECTORS PLUG INTO PXCC.
2. ALN MUST BE DAISEY–CHAINED WHEN RUNNING 19.2 k BAUD OR FASTER AND TRUNK TERMINATORS USED AT BOTH ENDS OF LINE P3C.
3. TERMINATE SHIELD AT LEAVING END OF ALN TRUNK ONLY.
4. USE ALN SHIELD TERMINATION P3A WHEN 24VAC E TERMINAL IS EARTH GROUNDED.
5. USE ALN SHIELD TERMINATION P3B WHEN 24VAC E TERMINAL IS OPEN.

PXCC ON ETHERNET CONNECTOR

E: EALN ETHERNET CONNECTOR
RJ–45 SHIELDED JACK
FOR ETHERNET PATCH CABLE

H: PXCC – HMI[7]
RJ45 JACK FOR RS232 SERVICE MODE
SERIAL PRINTER OR PXCC

7. DO NOT INSERT RJ–11 6 PIN PLUG WITHOUT PIN 1 AND 8 VOIDS



NOTE:
REFER TO "APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS (125–3002)" FOR FLN WIRING CONFIG'S.

G: USB DEVICE CONNECTOR

FOR LAPTOP

P3 00 PXCC COMMN TERMINATIONS

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PXCCWIRE

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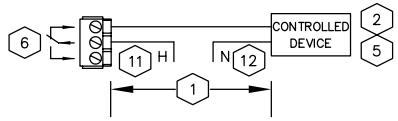
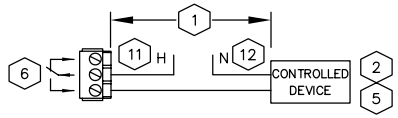
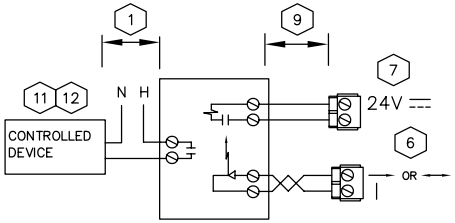


A 00 DIGITAL OUTPUT (DO) NC
PULSED OR LATCHED

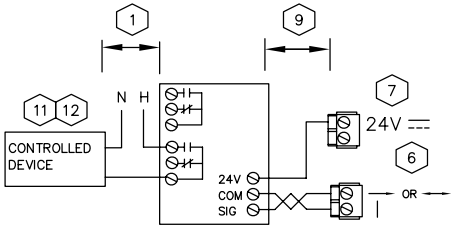


B 00 DIGITAL OUTPUT (DO) NO
PULSED OR LATCHED



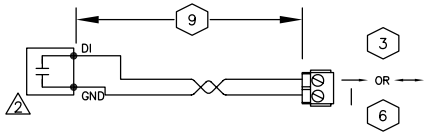
NOTES:
1. 0 VDC ON CABINET FAILURE

C 00 DIGITAL OUTPUT (AO,U,X) LATCHED
VOLTAGE TO SOLID STATE RELAY

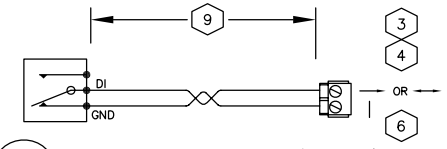


NOTES:
1. 0 VDC ON CABINET FAILURE
2. MAY BE MULTI-STAGE

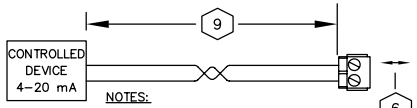
D 00 DIGITAL OUTPUT (AO,U,X) SEQUENCED
VOLTAGE TO SEQUENCING MODULE



E 00 DIGITAL INPUT (DI,UI,U,X)
DRY CONTACT

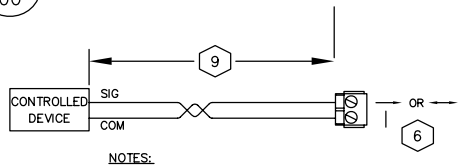


F 00 DIGITAL INPUT (UI,U,X)
PULSE ACCUMULATOR



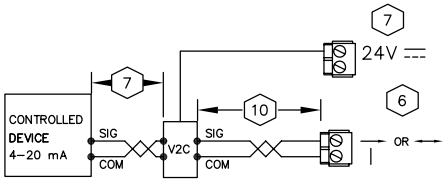
NOTES:
1. 0 mA ON CABINET FAILURE
2. THIS POINT TYPE CANNOT SHARE A MODULE WITH A SELF-POWERED TYPE INPUT POINT.

H 00 ANALOG OUTPUT (X) 4-20 mA

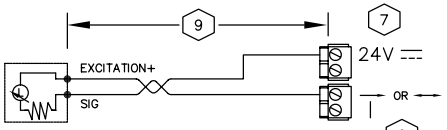


NOTES:
1. 0 VDC ON CABINET FAILURE

I 00 ANALOG OUTPUT (AO,U,X) 0-10VDC

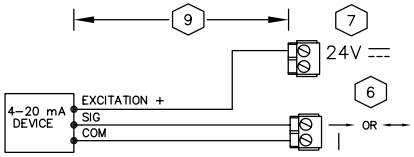


J 00 ANALOG OUTPUT (AO,U,X) 0-10VDC
VOLTAGE TO CURRENT CONVERTER

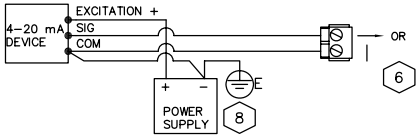


NOTES:
1. COMMON NOT CONNECTED

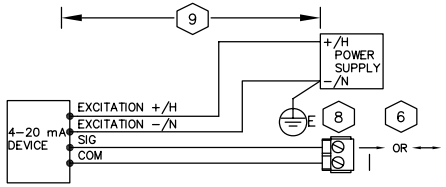
M 00 ANALOG INPUT (UI,U,X) 4-20 mA
2-WIRE INTERNAL POWERED



N 00 ANALOG INPUT (UI,U,X) 4-20mA
3-WIRE INTERNAL POWERED



O 00 ANALOG INPUT (UI,U,X) 4-20mA
3-WIRE EXTERNAL POWERED



Q 00 ANALOG INPUT (UI,U,X) 4-20mA
4-WIRE EXTERNAL POWERED

NOTES:

1. MAXIMUM WIRE RUN LENGTHS ARE BASED ON THE CURRENT DRAW AND WIRE GAGE. SEE DRAWING PWIR.
2. SEE CONTROL DRAWINGS FOR NORMAL DE-ENERGIZED CONTACT STATE
3. MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND
   DI EXCITATION = 24VDC, 10mA
   UI, U EXCITATION = 24VDC, 6mA, 150ms, 1mA
4. DI CANNOT BE USED FOR PULSE ACCUMULATION.
   UI, U, X MAXIMUM PULSE RATE = 20HZ (25ms PER STATE, 50ms PRE PULSE.
5. PXCC DO CONTACT RATINGS
   AC OPERATION:
   4A @ 240VAC (RESISTIVE)
   3A @ 240VAC (INDUCTIVE)
   SIZE 4 MOTOR STARTER
   DC OPERATION:
   40W @ < 50VDC
   20W @ > 50VDC
6. REFER TO PXCC TERMINATION TABLES FOR ACTUAL POINT ADDRESSES. COMMON TERMINAL MAY BE SHARED BY 2 POINTS. AND ORDER MAY BE REVERSED ON ADJACENT POINTS.
7. REFER TO DRAWING P2 ON PWIR FOR MAXIMUM CURRENT PROVIDED BY THE PXCC 24VDC SENSOR SUPPLY.
8. EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC COMPACT COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125-3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
9. 50mA OR LESS - 750ft/230m
   50mA TO 100mA - 375ft/115m
10. 100mA TO 150mA - 250ft/76m
    150mA TO 200mA - 187ft/57m
    200mA TO 250mA - 150ft/46m
11. WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY A NEC APPROVED MEANS. NOT A FUSE.
12. WHERE REQUIRED, NEUTRAL TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BA A NEC APPROVED MEANS.

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PXCCTERM

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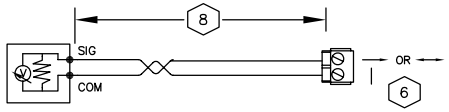
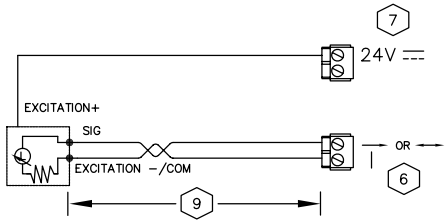
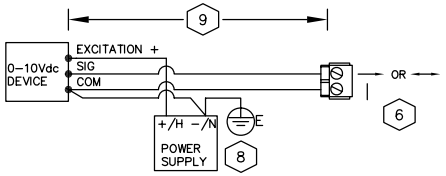


NOTES:
1. TRANSDUCER POWERED FROM INPUT
2. TRANSDUCER OUTPUT VOLTAGE

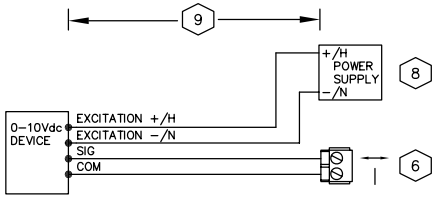
R 00 ANALOG INPUT (UI,U,X) 0–10 Vdc
SELF POWERED TRANSDUCER



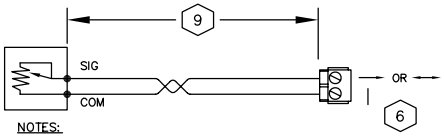
S 00 ANALOG INPUT (UI,U,X) 0–10VDC
3–WIRE INTERNAL POWERED



T 00 ANALOG INPUT (UI,U,X) 0–10VDC
3–WIRE EXTERNAL POWERED

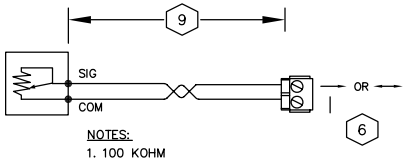


U 00 ANALOG INPUT (UI,U,X) 0–10VDC
4–WIRE EXTERNAL POWERED



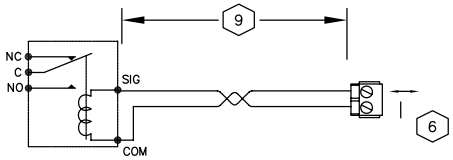
NOTES:
1. 1000 OHM PLATINUM (375)
2. 1000 OHM PLATINUM (385)
3. 1000 OHM NICKEL
4. CUSTOM

V 00 ANALOG INPUT (UI,U,X) RTD



NOTES:
1. 100 KOHM
2. 10 KOHM
3. CUSTOM

W 00 ANALOG INPUT (UI,U,X) THERMISTOR



AB 00 DIGITAL OUTPUT (X) 24 VDC
RELAY DRIVE 22 mA MAX.

Point Address Table for the PXC16.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Universal Input (UI) ⟶	UI1	25	26	1
	UI2	27	26	2
	UI3	28	29	3
Universal Input/Output (U) ⟷	U4	30	29	4
	U5	31	32	5
	U6	33	32	6
	U7	34	35	7
	U8	36	35	8
Analog Output (AO) ⟵	A09	53	54	9
	A010	55	56	10
	A011	57	56	11
Digital Input (DI) ⟶	DI12	58	59	12
	DI13	60	59	13
Digital Output (DO)	DO14	4, 5, 6		14
	DO15	7, 8, 9		15
	DO16	10, 11, 12		16

Point Address Table for the PXC24.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Universal Input (UI) ⟶	UI1	25	26	1
	UI2	27	26	2
	UI3	28	29	3
Universal Input/Output (U) ⟷	U4	30	29	4
	U5	31	32	5
	U6	33	32	6
	U7	34	35	7
	U8	36	35	8
	U9	41	42	9
	U10	43	42	10
	U11	44	45	11
	U12	46	45	12
Super Universal Input/Output (X)[1] ⟷	X13 (U13)[1]	47	48	13
	X14 (U14)[1]	49	48	14
	X15 (U15)[1]	50	51	15
	X16 (U16)[1]	52	51	16
Analog Output (AO) ⟵	A017	53	54	17
	A018	55	56	18
	A019	57	56	19
Digital Output (DO)	DO20	4, 5, 6		20
	DO21	7, 8, 9		21
	DO22	10, 11, 12		22
	DO23	13, 14, 15		23
	DO24	16, 17, 18		24

Point Address Table for the PXC36.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Super Universal Input/Output (X) ⟷	X1	30	31	1
	X2	32	31	2
	X3	33	34	3
	X4	35	34	4
	X5	36	37	5
	X6	38	37	6
Universal Input/Output (U) ⟷	U7	39	40	7
	U8	41	40	8
	U9	50	51	9
	U10	52	51	10
	U11	53	54	11
	U12	55	54	12
	U13	56	57	13
	U14	58	57	14
	U15	59	60	15
	U16	61	60	16
	U17	62	63	17
	U18	64	63	18
	U19	65	66	19
	U20	67	66	20
	U21	68	69	21
	U22	70	69	22
	U23	71	72	23
	U24	73	72	24
Digital Input (DI) ⟶	DI25	74	75	25
	DI26	76	75	26
	DI27	77	78	27
	DI28	79	78	28
Digital Output (DO)	DO29	4,5,6		29
	DO30	7,8,9		30
	DO31	10,11,12		31
	DO32	13,14,15		32
	DO33	16,17,18		33
	DO34	19,20,21		34
	DO35	22,23,24		35
	DO36	25,26,27		36

Notes:
1. FOR PRE–PXC24.2 CONTROLLERS, POINTS 13–16 WERE UNIVERSAL I/O POINTS INSTEAD OF THE CURRENT SUPER UNIVERSAL I/O POINTS.

2. FOR THE APPROPRIATE TERMINAL SYMBOL, PLEASE REFER TO THE RESPECTIVE POINT TYPE COLUMN.

3. THE Common TERMNAL IS ALWAYS THE FOLLOWING SYMBOL: |

4. SEE BELOW FOR DIGITAL OUTPUT SYMBOL:

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PXC MODULAR WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING [2]
AC LINE POWER [1]	POWER	#12–14 THHN	REFER TO NEC	CHECK LOCAL CODES
DIGITAL OUTPUT	1 & 2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 100K/10K Thermistor	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 1K Ni OR RTD	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 0–10 V	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 4–20 mA	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 0–10 V	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 4–20 mA	2	#18–#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ETHERNET ALN	2	#24 (4) TP[6] CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES

1. WHEN DAISY–CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE.

2. CONDUIT SHARTING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON–JACKETED UL LISTED 75°C(167°F) AND 300V, CABLE CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED.TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END.

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA–568–B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXES. USE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

MAXIMUM DO WIRE RUN LENGHTS

TABLE 3

NOMINAL INRUSH	STARTER SIZE	WIRE SIZE #18	WIRE SIZE #16	WIRE SIZE #14
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)
1500 VA	4	70ft (21m)	100ft (30m)	200ft (61m)

TABLE 3 NOTES:

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAGE DROP ACROSS THE WIRE FOR A TYPICAL STARTER.
2. PXCM DO CONTACT RATINGS
   4A @ 250VAC & 30VDC
   SIZE 4 MOTOR STARTER

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNK

TABLE 4

SPEED	1200 BAUD	4800 BAUD	9600 – 38.4K BAUD	57.6K – 115.2K BAUD
SERIES TIE'S	10	7	6	6
ALN TRUNK DISTANCE	4000ft (1.2km)	4000ft (1.2km)	4000ft (1.2km)	3280ft (1km)

- TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCM CONNECTED TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF THE ALN CABLE THAT EXITS BUILDING.
- THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE TIE.

GENERAL NOTES:

- COMPLY WITH LOCAL BUILDING CODES
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN CABINETS. NO SPLICES ALLOWED.
- CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1 CIRCUITS.
- FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

PXCM WIRE SPECIFICATIONS

TABLE 2

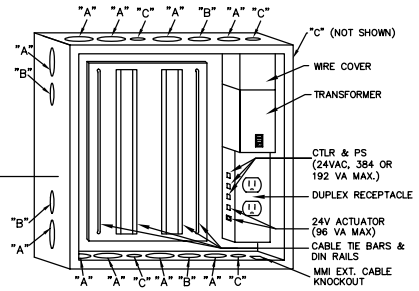
	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	MM, MMP
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC [2]	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED

1. UL RECOGNIZED WIRE (LABELED WITH A BACKWARDS 'RU') IS NOT FIELD INSTALLABLE. USE ONLY UL–LISTED WIRE.
2. 300 VAC WIRE CAN BE USED IN FIELD PANELS CONTAINING VOLTAGES BELOW 150 VAC.

ENCLOSURE H x W x D (IN)
PXA–ENC–19 19 x 22 x 5 3\4
PXA–ENC–34 34 x 22 x 5 3\4
PXA–ENC–18 18 x 22 x 6

KNOCKOUT TYPES
A= 1" & 1–1/4"
B= 3/4" & 1"
C= 1/2" & 3/4"

T1 00 PXCM CONDUIT PENETRATIONS



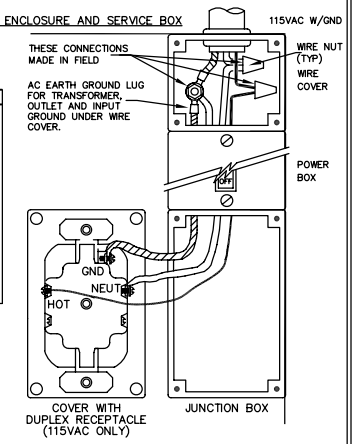
PXA–ENC19 ENCLOSURE & PXA–SB115V384VA SERVICE BOX

SERVICE BOX MAX POWER SOURCE REQUIREMENTS	
VOLTAGE:	102–132 VAC 204–264 VAC
LINE FREQUENCY:	50 / 60 Hz
115V OUTLETS:	200 VA (MAX.)
PXA–SB115V384VA [2]	440 VA (MAX.)
PXA–SB115V192VA [2]	220 VA (MAX.)
PXA–SB230V384VA	440 VA (MAX.)
PXA–SB230V192VA	220 VA (MAX.)

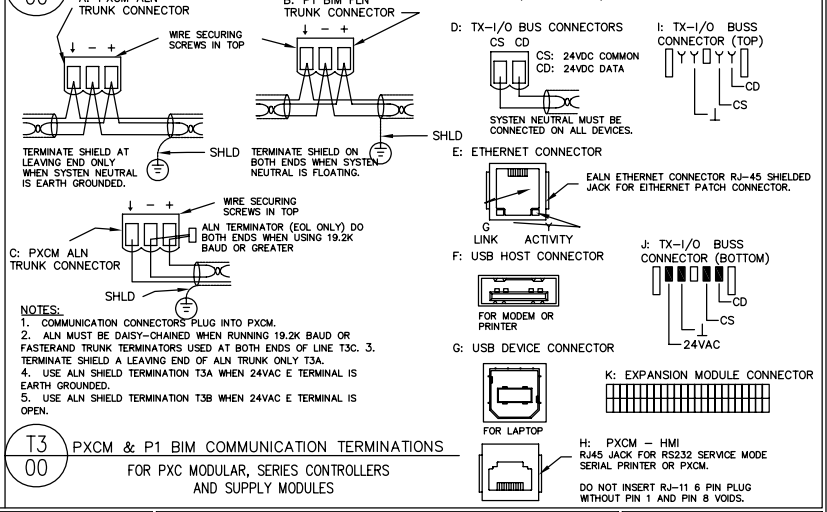
PXCM FAMILY VA RATINGS & SENSOR SUPPLY			
PRODUCT	24VDC (W)	24VAC INPUT VA	24VAC OUTPUT VA
PXC00–X	0	24	0
PXC100–X	0	24	0
TXB1.P1	14.4	125	96
TXS1.12F4	28.8	150	96
TXS1.EF4	0	96	96
TX–I/O MODULE	24VDC LOAD (W) MAX.		
TXM1.8D	1.1		
TXM1.16D	1.4		
TXM1.8U	1.5		
TXM1.8U–ML	1.8		
TXM1.8X	2.2		
TXM1.8X–ML	2.3		
TXM1.6R	1.7		
TXM1.6R–M	1.9		

NOTES:
1. NO MORE THAN THREE (3) 384VA OR FIVE (5) 192VA FULLY LOADED PXA CABINETS ALLOWED ON A SINGLE 3–WIRE 115V, 15A CIRCUIT.
2. RECEPTACLE IS PREWIRED AND MOUNTED IN FACTORY, FOR 115VAC SERVICE BOX ONLY.
3. DC INPUT/OUTPUT ONLY AVALABLE ON BUSS CONNECTION MODULES.

PXA ENCLOSURE AND SERVICE BOX



T2 00 PXCM POWER WIRING



NOTES:
1. COMMUNICATION CONNECTORS PLUG INTO PXCM.
2. ALN MUST BE DAISY–CHAINED WHEN RUNNING 19.2K BAUD OR FASTERAND TRUNK TERMINATORS USED AT BOTH ENDS OF LINE T3C. 3. TERMINATE SHIELD A LEAVING END OF ALN TRUNK ONLY T3A.
4. USE ALN SHIELD TERMINATION T3A WHEN 24VAC E TERMINAL IS EARTH GROUNDED.
5. USE ALN SHIELD TERMINATION T3B WHEN 24VAC E TERMINAL IS OPEN.

T3 00 PXCM & P1 BIM COMMUNICATION TERMINATIONS

FOR PXC MODULAR, SERIES CONTROLLERS AND SUPPLY MODULES

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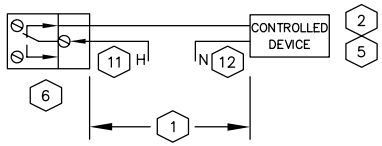
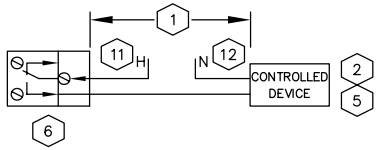
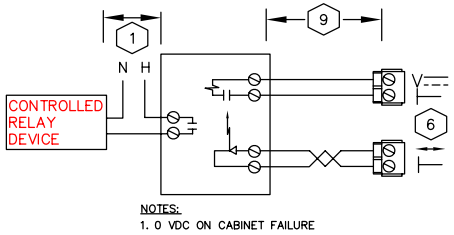


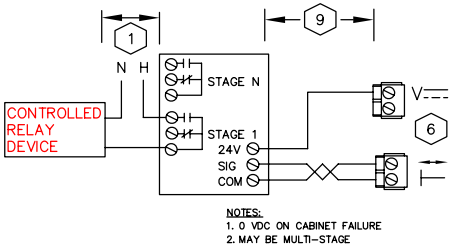
A 00 DIGITAL OUTPUT (6R) NC
PULSED OR LATCHED



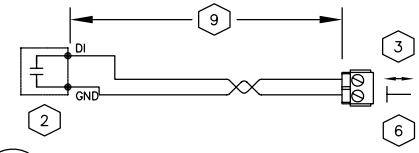
B 00 DIGITAL OUTPUT (6R) NO
PULSED OR LATCHED



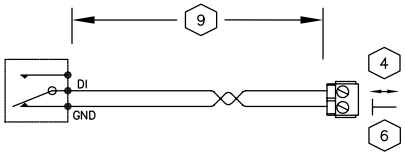
C 00 DIGITAL OUTPUT (8U,8X) Latched
VOLTAGE TO SOLID STATE RELAY



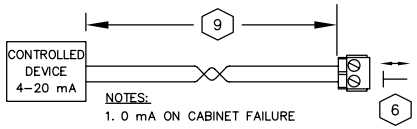
D 00 DIGITAL OUTPUT (8U,8X) Sequenced
VOLTAGE TO SEQUENCING MODULE



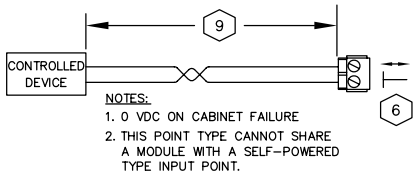
E 00 DIGITAL INPUT (8D,16D,8U,8x)
DRY CONTACT



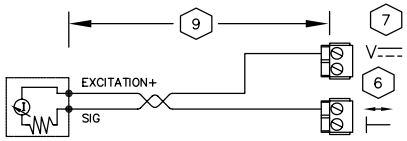
F 00 DIGITAL INPUT (8D,16D,8U,8X)
PULSE ACCUMULATOR



H 00 ANALOG OUTPUT (8X) 4–20 mA

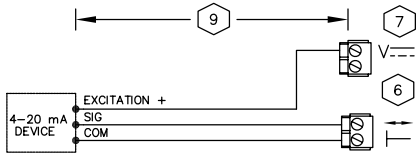


I 00 ANALOG OUTPUT (8U,8X) 0–10VDC

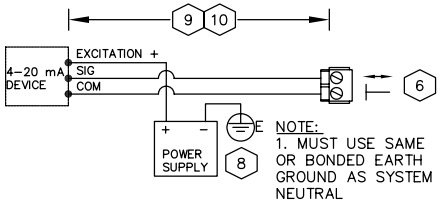


NOTES:
1. COMMON NOT CONNECTED

M 00 ANALOG INPUT (8X) 4–20 mA
2–WIRE INTERNAL POWERED



N 00 ANALOG INPUT (8X) 4–20mA
3–WIRE INTERNAL POWERED



O 00 ANALOG INPUT (8X) 4–20mA
3–WIRE EXTERNAL POWERED

NOTES:

1. MAXIMUM WIRE RUN LENGTHS ARE BASED ON THE CURRENT DRAW AND WIRE GAGE. SEE DRAWING TWIR.
2. SEE CONTROL DRAWINGS FOR NORMAL DE–ENERGIZED CONTACT STATE
3. MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND
   8D, 16d EXCITATION = 24VDC, 8mA
   8U, 8X EXCITATION = 24VDC, 8mA, 20ms, 100mA
4. 8D, 16D MAXIMUM PULSE RATE = 10Hz (50ms PER STATE, 100ms PER PULSE)
   8U, 8X MAXIMUM PULSE RATE = 20Hz (25ms PER STATE, 50ms PER PULSE)
5. PXC MODULAR DO CONTACT RATINGS
   AC OPERATION:
   4A @ 240VAC (RESISTIVE)
   3A @ 240VAC (INDUCTIVE)
   SIZE 4 MOTOR STARTER
   DC OPERATION:
   40W @ < 50VDC
   20W @ > 50VDC
6. REFER TO PXC MODULAR PANEL FOR ACTUAL POINT ADDRESSES. REFER TO TXMI TERMINATION TABLES FOR ACTUAL TERMINALS FOR EACH PANEL ADDRESS. COMMON TERMINAL MAY BE SHARED BY 2 POINTS.
7. REFER TO DRAWING P1 ON TWIR FOR MAXIMUM CURRENT PROVIDED BY THE 24VDC SENSOR SUPPLY ON P1 BIM OR BUS POWER SUPPLY
8. EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC MODULAR COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125–3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
9. 50mA OR LESS – 750ft/230m
   50mA TO 100mA – 375ft/115m
10. 100mA TO 150mA – 250ft/76m
    150mA TO 200mA – 187ft/57m
    200mA TO 250mA – 150ft/46m
11. WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY AN NEC APPROVED MEANS. NOT A FUSE.
12. WHERE REQUIRED, N TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BY AN NEC APPROVED MEANS.

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TXIOTERM

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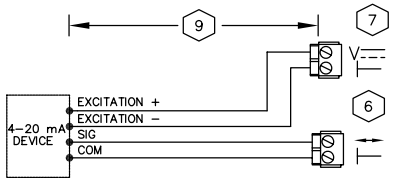
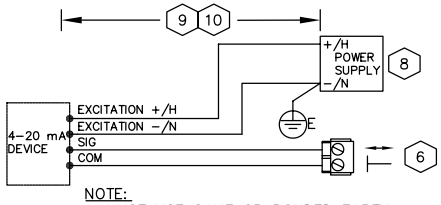
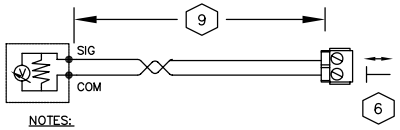


P 00 ANALOG INPUT (8X) 4–20mA
4–WIRE INTERNAL POWERED



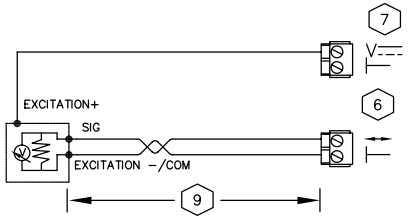
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

Q 00 ANALOG INPUT (8X) 4–20mA
4–WIRE EXTERNAL POWERED

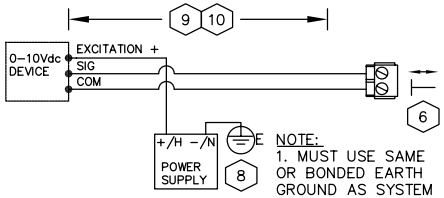


NOTES:
1. TRANSDUCER POWERED FROM ISOLATED INPUT
2. TRANSDUCER OUTPUT VOLTAGE

R 00 ANALOG INPUT (8U,8X) 0–10 Vdc
SELF POWERED TRANSDUCER

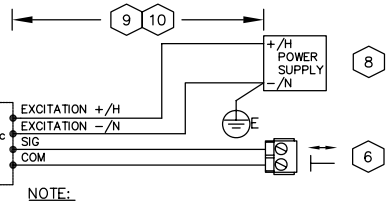


S 00 ANALOG INPUT (8U,8X) 0–10VDC
3–WIRE INTERNAL POWERED



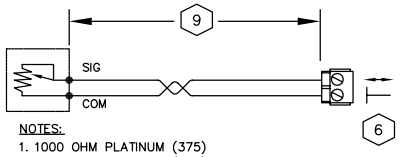
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

T 00 ANALOG INPUT (8U,8X) 0–10VDC
3–WIRE EXTERNAL POWERED



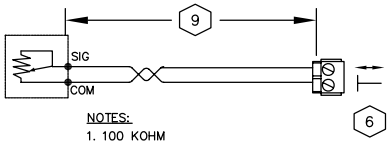
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

U 00 ANALOG INPUT (8U,8X) 0–10VDC
4–WIRE EXTERNAL POWERED



NOTES:
1. 1000 OHM PLATINUM (375)
2. 1000 OHM PLATINUM (385)
3. 1000 OHM NICKEL
4. CUSTOM

V 00 ANALOG INPUT (8X,8U) RTD



NOTES:
1. 100 KOHM
2. 10 KOHM
3. CUSTOM

W 00 ANALOG INPUT (8X,8U) THERMISTOR

TXM1 TERMINATION TABLES

1. ALL TXM1 TERMINALS (MEASURING, NEUTRAL, RELAY, SUPPLY) ARE CONNECTED IN THE PLUG–IN I/O MODULE, NOT IN THE TERMINAL BUS.

	TXM1.8D, TXM1.16D							
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL[1] ⊥ (–)	1	3	5	7	9	11	13	15
DIGITAL INPUT (+)	2	4	6	8	10	12	14	16

1. NEUTRAL CAN BE CONNECTED TO ANY NEUTRAL TERMINAL ON SAME MODULE AND SEVERAL CAN SHARE SAME NEUTRAL TERMINAL.

	TXM1.16D							
I/O POINT	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
SYSTEM NEUTRAL ⊥ (–)	18	20	22	24	26	28	30	32
DIGITAL INPUT[1] (+)	19	21	23	25	27	29	31	33

1. NO PULSE ACCUMULATOR

	TXM1.8U, TXM1.8U–ML							
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL ⊥ (–)	2	6	10	14	19	23	27	31
UNIVERSAL I/O (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY[1] ≂		7		15		24		32

1. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

	TXM1.8X, TXM1.8X–ML							
I/O POINT	(1)	(2)	(3)	(4)	(5)[1]	(6)[1]	(7)[1]	(8)[1]
SYSTEM NEUTRAL ⊥ (–)	2	6	10	14	19	23	27	31
UNIVERSAL I/O (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY[2] ≂		7		15		24		32
24V DC SENSOR SUPPLY[3] ⎓	3		11		20		28	

1. 4–20 mA OUTPUT AVAILABLE ON POINTS 5–8 ONLY.

2. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

3. MAY POWER EXTERNAL SENSORS 0.6w (25mA) OR 1.2w (50mA) PER TERMINATION UP TO 2.4w (100mA) MAXIMUM FOR ALL TERMINATIONS.

	TXM1.6R, TXM1.6R–M					
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)
COMMON[1] (C)	3	9	15	20	26	32
NORMALLY CLOSED (NC)	4	10	16	19	25	31
NORMALLY OPEN (NO)	2	8	14	21	27	33

1. COMMONS ARE NOT INTERNALLY CONNECTED.

NOTE: REFER TO TERMINATION SHEET #1 FOR INSTALLATION DETAILS.

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TXIOTERM2

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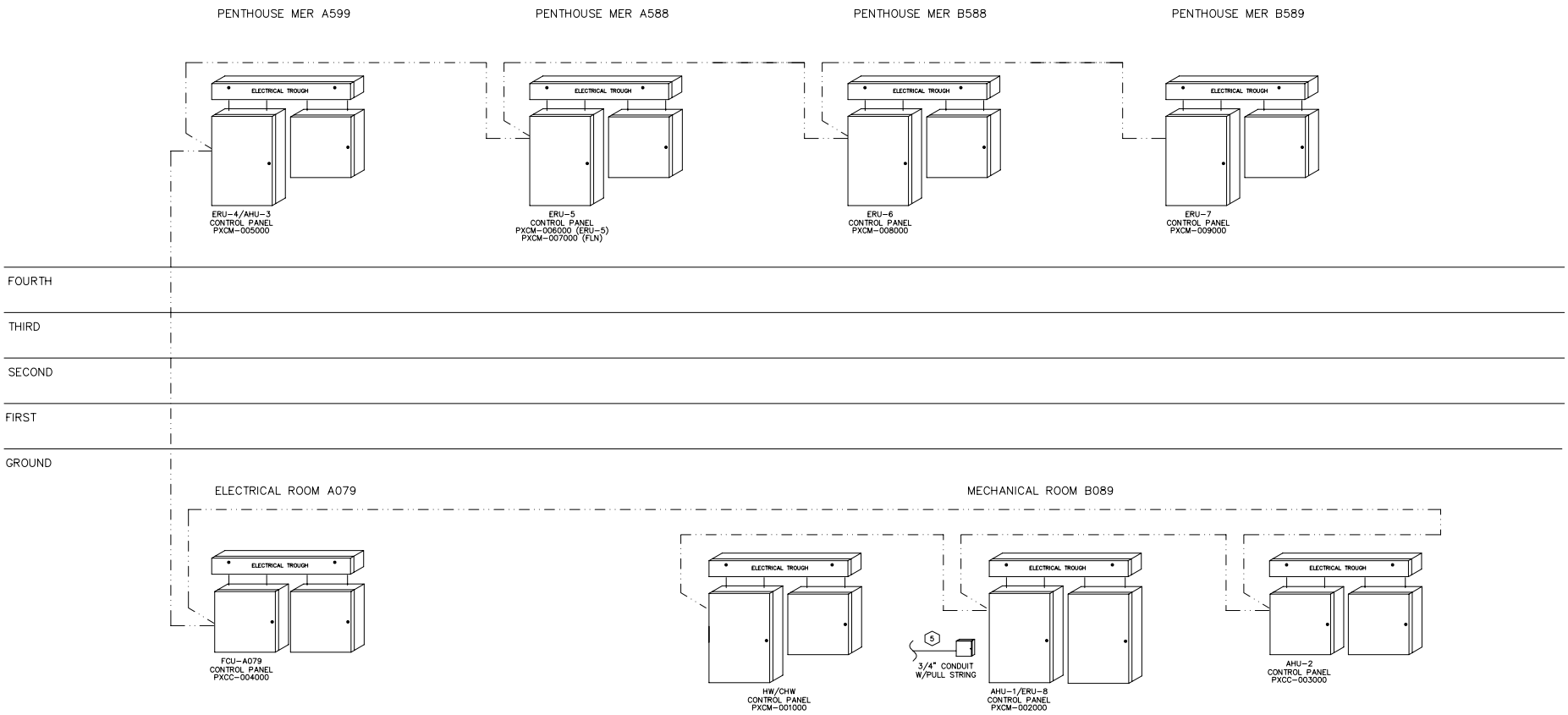
INSTALLATION NOTES:

1. REFER TO PLANS FOR MORE DETAIL ON CONTROL PANEL LOCATIONS.
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (CIC).
3. CIC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR FOR PXCM COMMUNICATION TERMINATION DETAILS.
5. CIC TO PROVIDE A DEDICATED 3/4" CONDUIT WITH PULL STRING FROM IDF/MDF ROOM TO A JUNCTION BOX (MINIMUM 6"X6"X4") LOCATED NEXT TO SIEMENS PANEL WITH A RACEWAY FOR PATCH CABLE CONNECTION TO PXCM CONTROLLER. COORDINATE WITH IU FOR LOCATION OF IDF/MDF ROOM.
6. ALL CONDUIT TO BE A MINIMUM OF 1". CIC RESPONSIBLE FOR ALL REQUIRED CONDUIT.



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SYSTEM ARCHITECTURE

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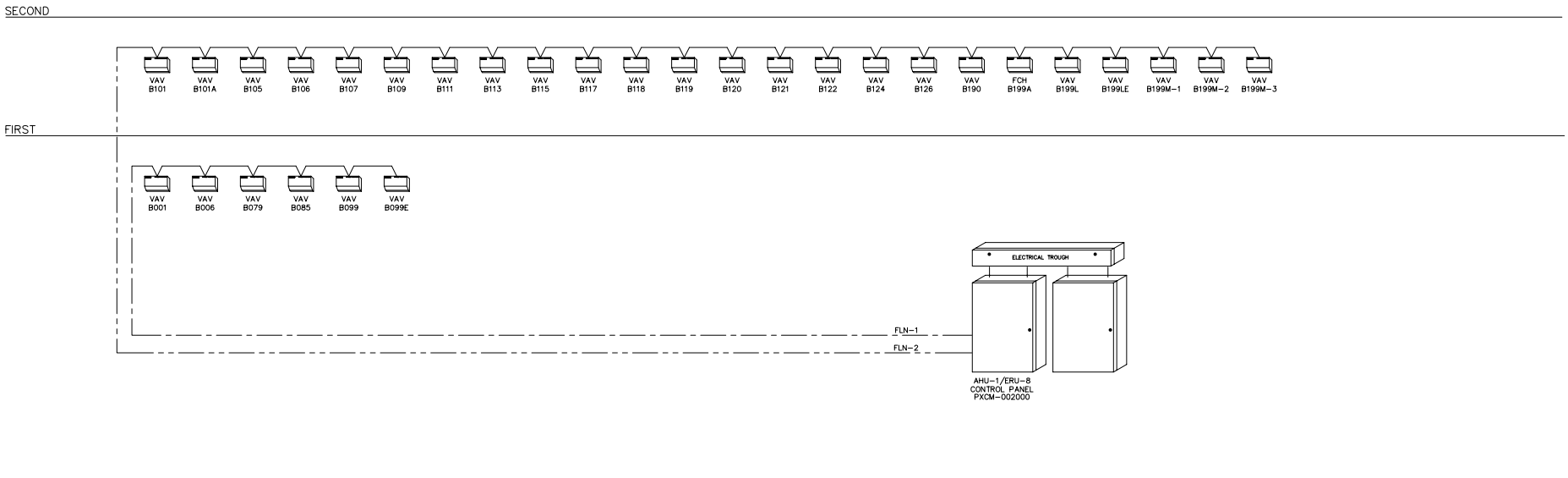
INSTALLATION NOTES:

1. REFER TO PLANS FOR MORE DETAIL ON CONTROL PANEL LOCATIONS.
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (CIC).
3. CIC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR FOR PXCM COMMUNICATION TERMINATION DETAILS.



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PXCM-2 FLN LAYOUT

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INSTALLATION NOTES:

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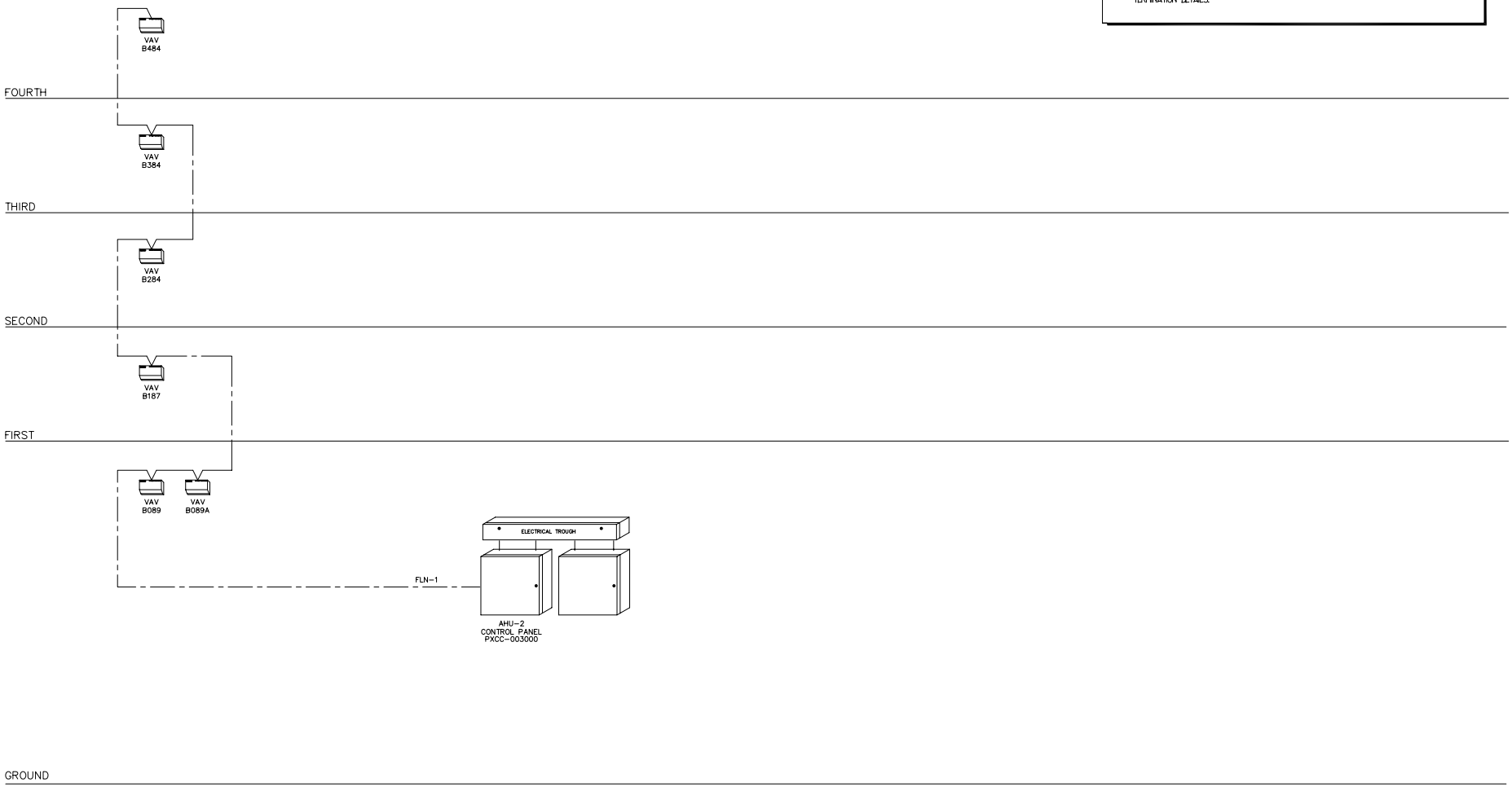
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR FOR PXCM COMMUNICATION TERMINATION DETAILS.



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PXCM-3 FLN LAYOUT

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INSTALLATION NOTES:

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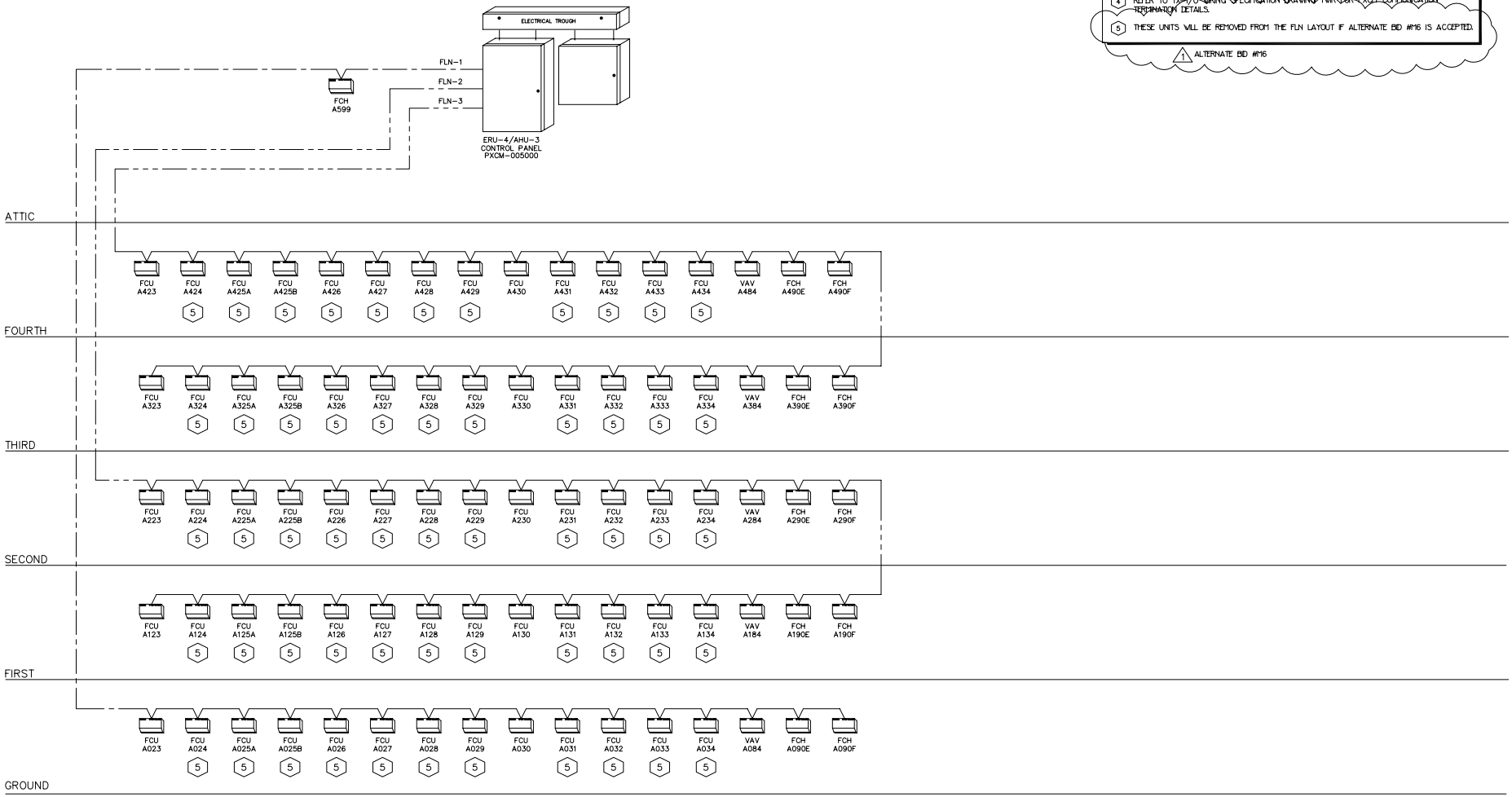
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (CIC).
3. CIC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR-EGR-PXCM COMMUNICATION TERMINATION DETAILS.
5. THESE UNITS WILL BE REMOVED FROM THE FLN LAYOUT IF ALTERNATE BID #16 IS ACCEPTED.

1 ALTERNATE BID #16



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PXCM-5 FLN LAYOUT

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INSTALLATION NOTES:

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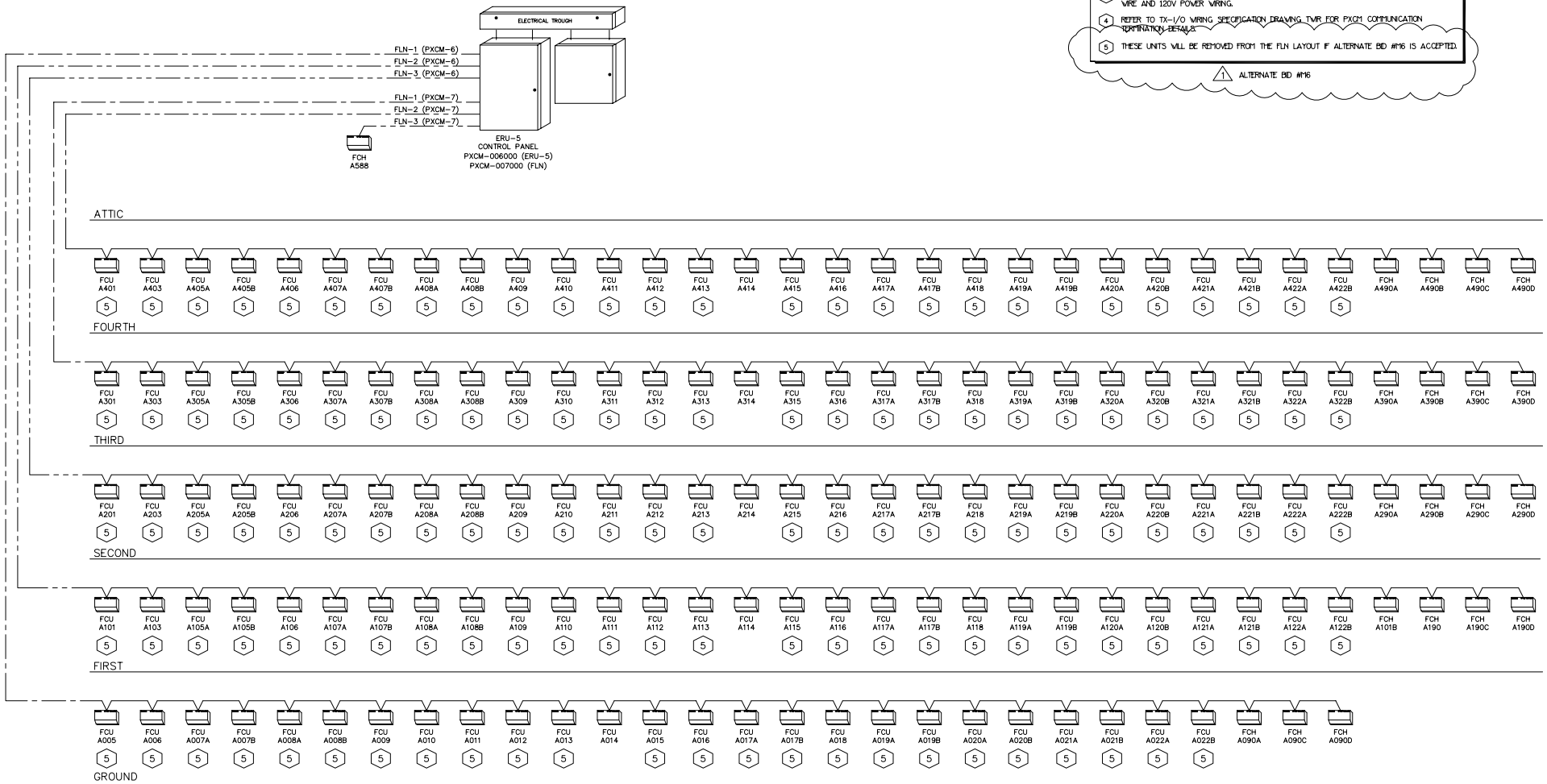
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (GC).
3. GC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR FOR PXCM COMMUNICATION TERMINATION DETAILS.
5. THESE UNITS WILL BE REMOVED FROM THE FLN LAYOUT IF ALTERNATE BID #16 IS ACCEPTED.

1 ALTERNATE BID #16



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PXCM-6 & 7 FLN LAYOUT

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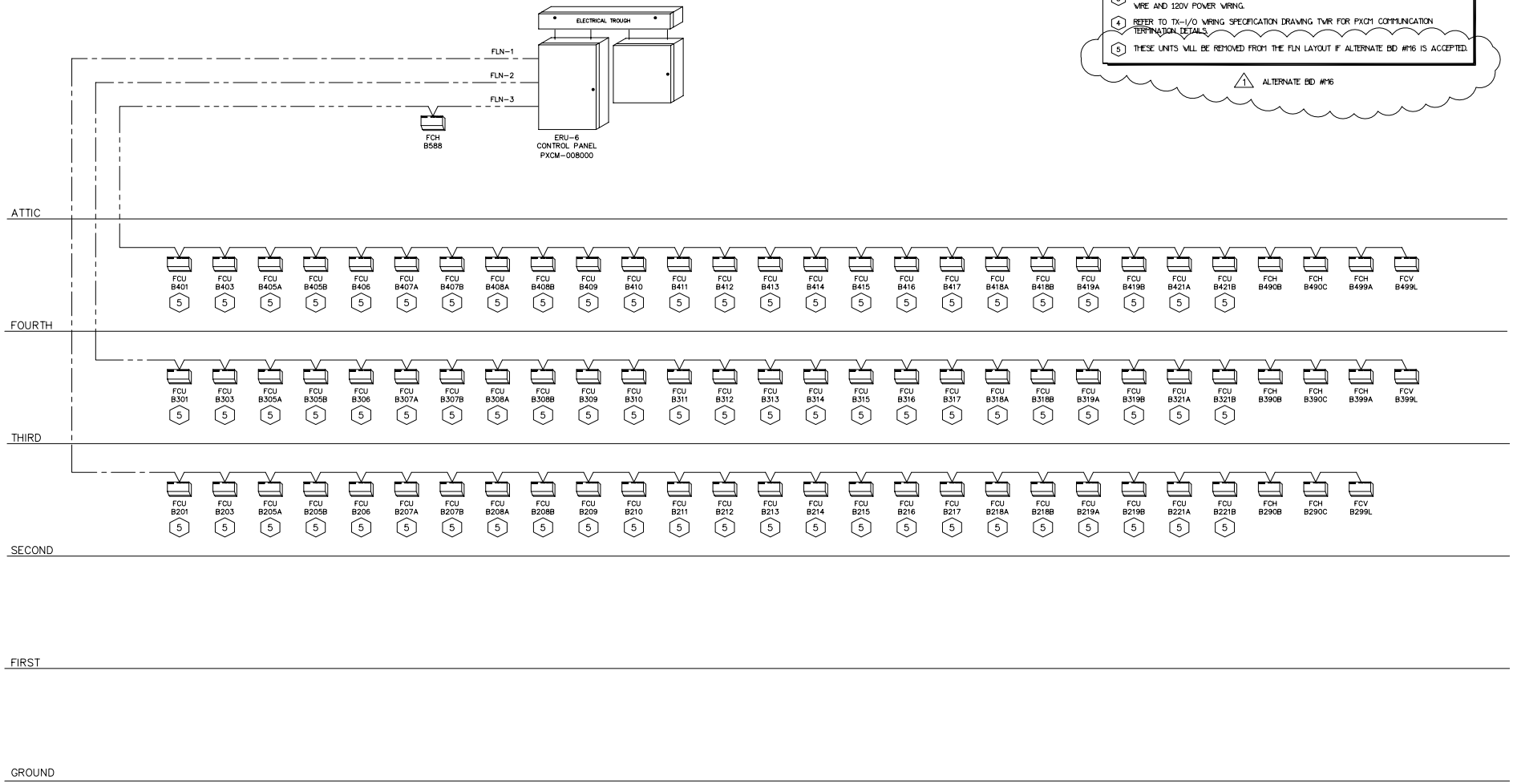
INSTALLATION NOTES:

1. REFER TO PLANS FOR MORE DETAIL ON CONTROL PANEL LOCATIONS.
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (CIC).
3. CIC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWR FOR PXCM COMMUNICATION TERMINATION DETAILS.
5. THESE UNITS WILL BE REMOVED FROM THE FLN LAYOUT IF ALTERNATE BID #M6 IS ACCEPTED.

1 ALTERNATE BID #M6



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PXCM-8 FLN LAYOUT

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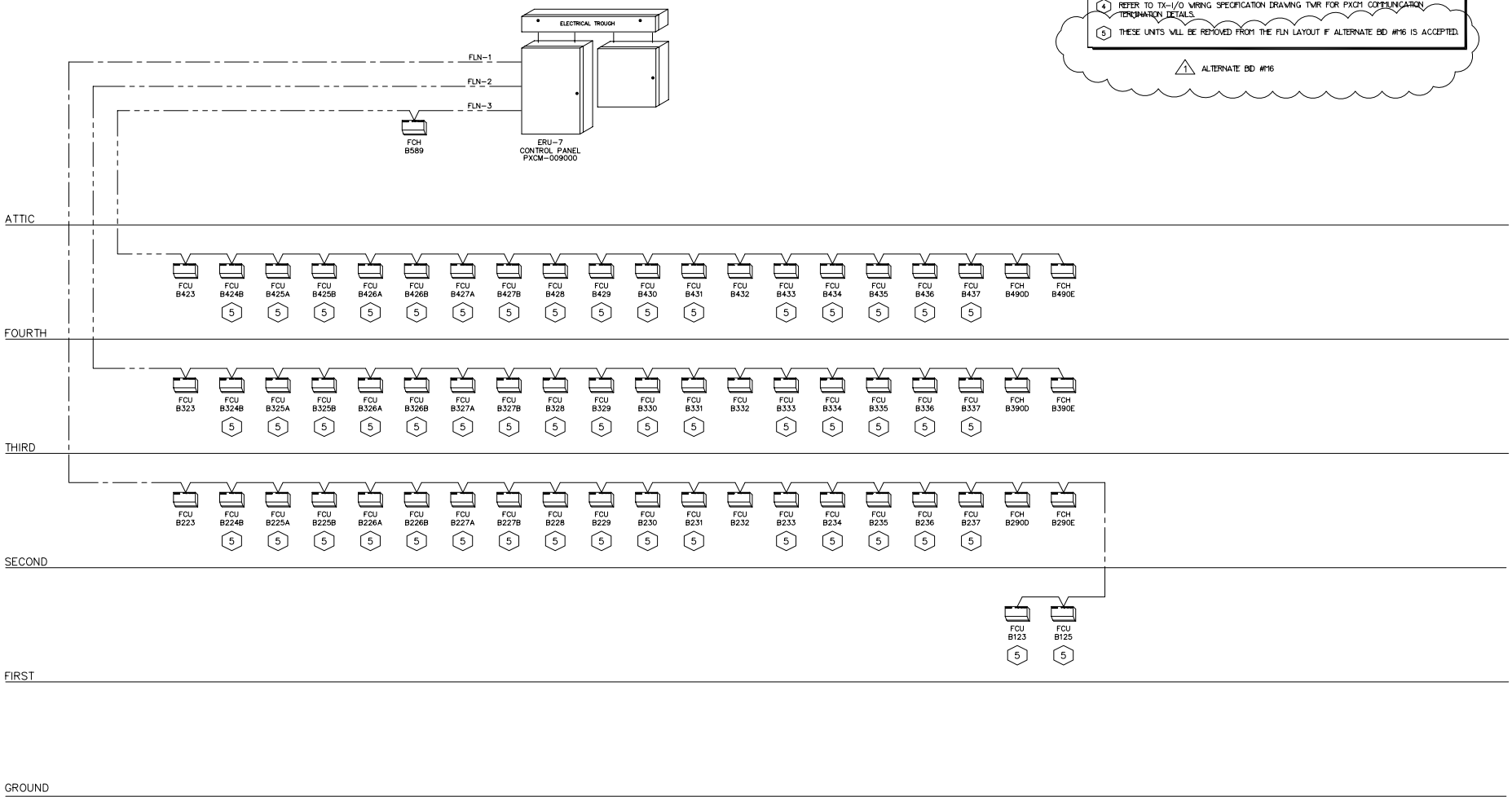
INSTALLATION NOTES:

1. REFER TO PLANS FOR MORE DETAIL ON CONTROL PANEL LOCATIONS.
2. POWER TO DDC PANELS BY DIVISION 26 ELECTRICAL AS STATED IN CONTRACT DOCUMENTS. POWER THAT IS NOT INDICATED IN CONTRACT DOCUMENTS BUT IS REQUIRED FOR BUILDING AUTOMATION SYSTEM (BAS) SHALL BE THE RESPONSIBILITY OF THE CONTROLS INSTALLATION CONTRACTOR (CIC).
3. CIC TO PROVIDE BARRIER FOR SEPARATION WITHIN THE ELECTRIC TROUGH OF LOW VOLTAGE WIRE AND 120V POWER WIRING.
4. REFER TO TX-I/O WIRING SPECIFICATION DRAWING TWIR FOR PXCM COMMUNICATION TERMINATION DETAILS.
5. THESE UNITS WILL BE REMOVED FROM THE FLN LAYOUT IF ALTERNATE BID #16 IS ACCEPTED.

1 ALTERNATE BID #16



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PXCM-9 FLN LAYOUT

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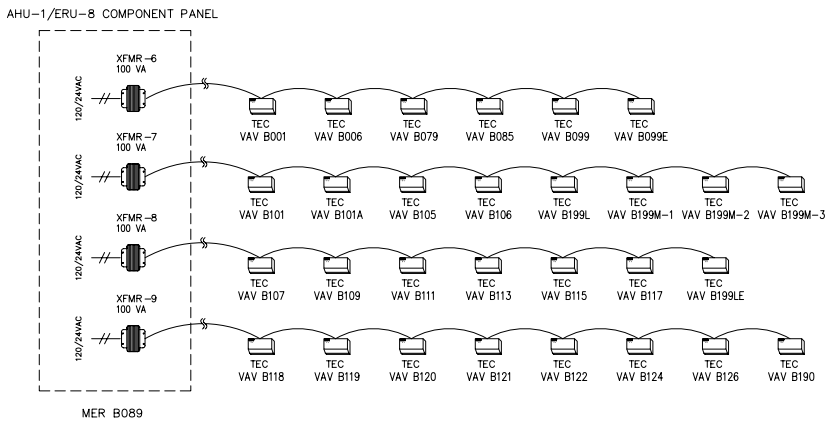

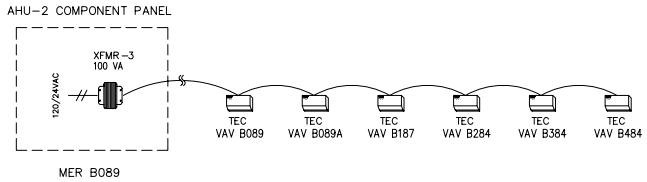

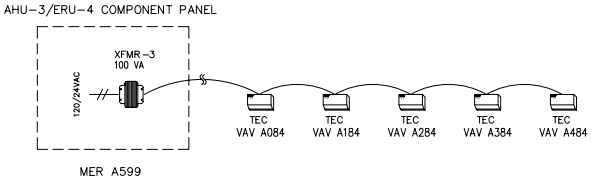

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POWER TRUNK LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CT 1	1	FBO	N/A	N/A	FURNISHED BY OTHERS
DPTE 1	1	2301050PB3V11B	SETRA	0608cut002	DP TRAN,WET+/-50P,4-20MA,W/MAN
FM 2	1	SEE CHWS KEYSHEET	N/A	N/A	N/A
RE 1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 1-3	4	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
TTE 4	1	544-578	SIEMENS	149 261	O/AIR TEMP SENS (-40/240F)
V					SEE VALVE SUBMITTAL
VFD 1-2	2	SEE VFD SCHEDULE	N/A	N/A	N/A
XFMR 1-2	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

OUTSIDE AIR TEMPERATURE:

THE BMS SHALL MONITOR OUTSIDE AIR TEMPERATURE IN ONE NORTH FACING LOCATION. THE FOLLOWING SEQUENCES SHALL REFERENCE THESE INPUTS WHERE REQUIRED.

HEATING HOT WATER HEAT EXCHANGER (HX-1 AND HX-2):
THE BMS SHALL OPEN THE LEAD HEAT EXCHANGER WATER ISOLATION VALVE (V-2, V-3) AND MODULATE THE STEAM CONTROL VALVES AT THE LEAD HEAT EXCHANGER TO MAINTAIN THE HEATING HOT WATER SUPPLY TEMPERATURE BETWEEN 140-180 DEG F. THE TWO STEAM CONTROL VALVES FOR THE LEAD HEAT EXCHANGER SHALL BE STAGED ON AND OFF BASED ON DEMAND.
30 DEGF AMBIENT = 180 DEGF HWS.
50 DEGF AMBIENT = 140 DEGF HWS.
30 DEGF - 50 DEGF AMBIENT = VARY 140 TO 180 DEGF HWS.

SHOULD THE LEAD HEAT EXCHANGER BE UNABLE TO SATISFY THE SUPPLY WATER TEMPERATURE SETPOINT WITH BOTH OF ITS STEAM VALVES FULLY OPEN, THE BMS SHALL AUTOMATICALLY ACTIVATE THE LAG HEAT EXCHANGER, ACCORDING TO THE SAME SEQUENCE ABOVE. THE BMS SHALL ALTERNATE THE LEAD AND LAG HEAT EXCHANGER DESIGNATIONS TO MAINTAIN ROUGHLY EQUAL RUN TIMES OF BOTH HEAT EXCHANGERS. PROVIDE A MINIMUM TIME DELAY BEFORE STARTING AND STOPPING THE LAG HEAT EXCHANGER TO PREVENT SHORT CYCLING. ALTERNATE LEAD AND LAG EVERY 750 HRS OF OPERATION.

CONDENSATE RETURN PUMP - PACKAGED (CRP-1):

THE BMS SHALL MONITOR A DRY CONTACT ALARM POINT PROVIDED BY THE CONDENSATE RETURN PUMP PACKAGE.

BUILDING HEATING WATER PUMPS (HWP-1&2):

VARIABLE SPEED PUMPING SHALL BE UTILIZED TO CIRCULATE CHILLED AND HEATING WATER TO THE ENERGY RECOVERY UNITS, AIR HANDLING UNITS, AND FAN COIL UNITS IN THE BUILDINGS. THE VARIABLE SPEED PUMPING SHALL BE UNDER THE CONTROL OF THE BUILDING MANAGEMENT SYSTEM (BMS).

THE PUMP WITH THE LOWEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LEAD PUMP. THE PUMP WITH THE GREATEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LAG PUMP. AFTER 750 RUN-TIME HOURS (ADJ), THE LEAD AND LAG PUMP DESIGNATIONS SHALL BE SWITCHED.

UPON A CALL TO START, THE LEAD PUMP SHALL START AT MINIMUM SPEED. UPON PROOF OF PUMP OPERATION, THE BMS SHALL MODULATE THE SPEED OF THE PUMP AS REQUIRED TO MAINTAIN THE SYSTEM PRESSURE SETPOINT. WHEN THE LEAD PUMP SPEED REACHES 95% OF FULL SPEED, THE BMS SHALL START THE LAG PUMP. THE LEAD PUMP SHALL REMAIN UNDER CONTROL OF THE PRESSURE SIGNAL WHILE THE LAG PUMP SPEED RAMPS UP. WHEN BOTH PUMPS ARE RUNNING AT THE SAME SPEED, THE BMS SHALL PLACE BOTH PUMPS UNDER THE CONTROL OF THE PRESSURE SIGNAL. BOTH PUMPS SPEED SHALL MODULATE IN UNISON UNTIL THE LOAD DROPS BELOW 35% OF THE COMBINED CAPACITY OF BOTH PUMPS. UPON A DECREASE IN LOAD BELOW 35% OF THE COMBINED CAPACITY OF BOTH PUMPS, THE LAG PUMP SHALL BE TAKEN OUT OF SERVICE AS FOLLOWS: WHILE THE LEAD PUMP REMAINS UNDER CONTROL OF THE PRESSURE SIGNAL, THE SPEED OF THE LAG PUMP SHALL BE RAMPED DOWN TO THE MINIMUM, AND THE LAG PUMP SHALL STOP.

UPON FAILURE OF THE LEAD PUMP, AS DETERMINED BY THE PUMP'S CURRENT SENSOR OR A FAILURE TO CONFIRM OPERATION OF LEAD PUMP WITHIN 60 SECONDS OF A START COMMAND, THE BMS SHALL AUTOMATICALLY START THE LAG PUMP.

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HW CONTROL SYSTEM

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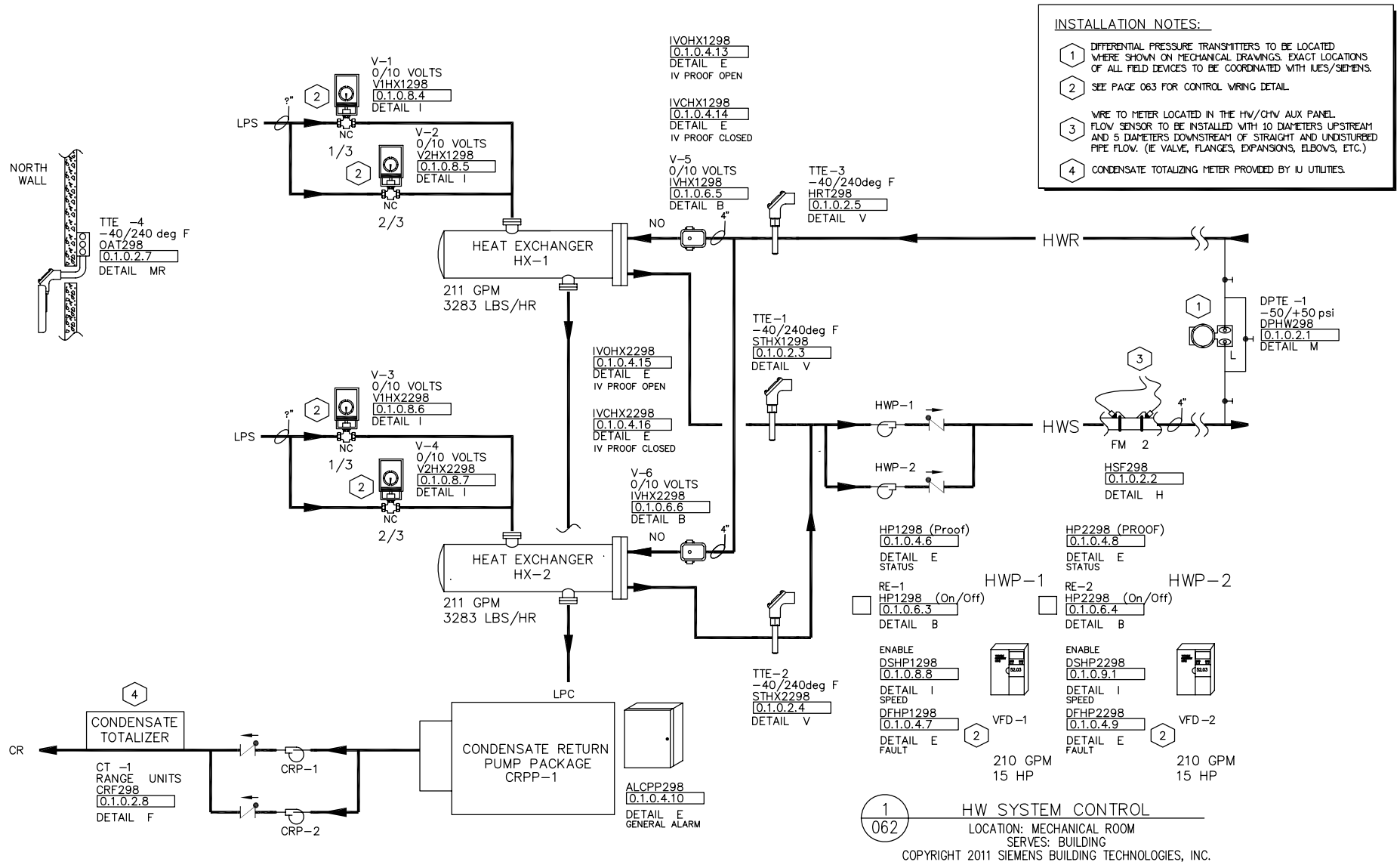

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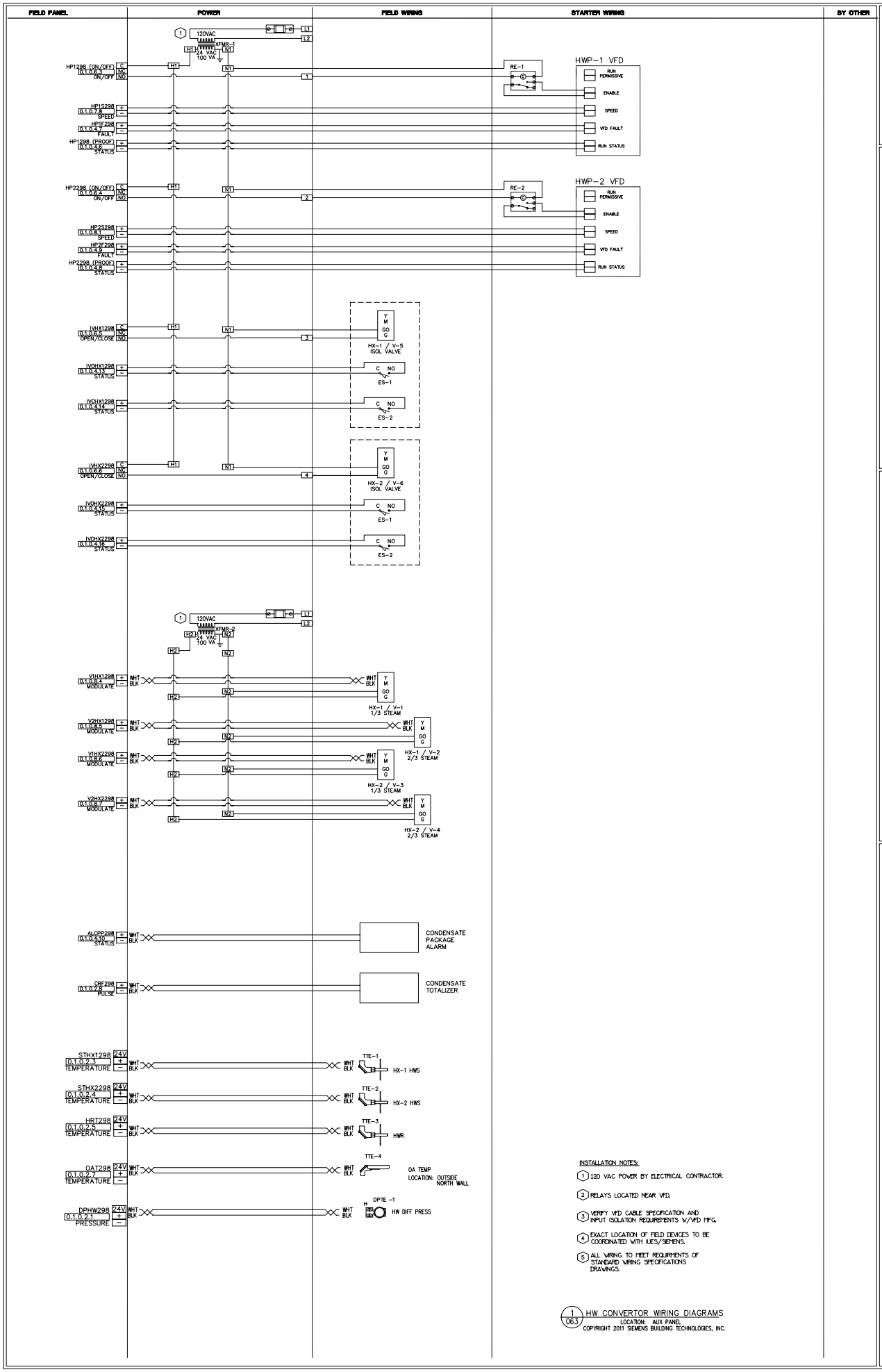

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HW SYSTEM WIRING

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
DPTE 1	1	2301050PB3V11B	SETRA	0608cut002	DP TRAN,WET+/-50P,4-20MA,W/MAN
HPC 1	1	P170KA-1C	N/A	N/A	N/A
PTE 1-2	2	2091250PG2M11A1	SETRA	0608cut004	PRES TRANS,250PSI,4-20MA,COND
RE 1-4	4	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 1-3	3	544-577-40	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375), 4" LGTH
V					SEE VALVE SUBMITTAL
VFD 1-2	2	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
FM 1	1	AT868-2-1-1	GE	N/A	AT868-2-1-1,ULTRASONIC 2-CH. FLOWMETER
	2	C-150-N2-0-0	GE	N/A	PAIR COAX CBL, BNC CONNECTION 150'
	2	C-RS-402-00-0	GE	N/A	PAIR CLAMP ON HIGH PREF TRANSDUCERS
	1	CF-ES-R-SR-6.0-0	GE	N/A	CLAMPING FIXTURE, 6" PIPE
	1	CF-ES-R-SR-4.0-0	GE	N/A	CLAMPING FIXTURE, 4" PIPE
PNL 1	1	567-352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
PNL 2	1	567-351	SIEMENS	155 272	#1 PNEU PANEL 19X16X5.7
PS 1-2	2	DCP-1.5-W-12	KELE	N/A	24VAC/12VDC POWER SUPPLY 1.5W
WDS 1-3	3	470-12	HONEYWELL	N/A	470-12,WATER SENSOR, 12VDC
XFMR 3	1	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

CHILLED WATER PUMPING CONTROL

BUILDING CHILLED WATER CONTROL VALVE:
PRIOR TO STARTING A BUILDING CHILLED WATER PUMP, THE BMS SHALL FIRST MODULATE THE BUILDING CHILLED WATER CONTROL VALVE TO MAINTAIN THE BUILDING CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT. SETPOINT SHALL BE DETERMINED DURING BALANCING. IF THE BUILDING CHILLED WATER CONTROL VALVE IS FULLY OPEN AND THE DIFFERENTIAL PRESSURE CONTINUES TO DROP, THE BMS SHALL, AFTER A MINIMUM TIME DELAY, START AND RUN THE LEAD CHILLED WATER PUMP, PER THE SEQUENCE BELOW.

VALVE SHALL ALSO BE COMMANDED CLOSED FOR STOPPING FLOW DURING AN EMERGENCY.

BUILDING CHILLED AND HEATING WATER PUMPS (CWP-1 & 2, HWP-1&2)
VARIABLE SPEED PUMPING SHALL BE UTILIZED TO CIRCULATE CHILLED AND HEATING WATER TO THE ENERGY RECOVERY UNITS, AIR HANDLING UNITS, AND FAN COIL UNITS IN THE BUILDINGS. THE VARIABLE SPEED PUMPING SHALL BE UNDER THE CONTROL OF THE BUILDING MANAGEMENT SYSTEM (BMS).

THE PUMP WITH THE LOWEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LEAD PUMP. THE PUMP WITH THE GREATEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LAG PUMP. AFTER 750 RUN-TIME HOURS (ADJ), THE LEAD AND LAG PUMP DESIGNATIONS SHALL BE SWITCHED.

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UPON FAILURE OF THE LEAD PUMP, AS DETERMINED BY THE PUMP'S CURRENT SENSOR OR A FAILURE TO CONFIRM OPERATION OF LEAD PUMP WITHIN 60 SECONDS OF A START COMMAND, THE BMS SHALL AUTOMATICALLY START THE LAG PUMP.

ENERGY SAVINGS SEQUENCE TO BE ATTEMPTED: THE CHILLED WATER LOOP CONTROL IS TO BE DISABLED BELOW 55 DEG F. UNLESS ONE OF THE THREE (3) VERTICAL HIGH CAPACITY FCU'S IS CALLING FOR COOLING.

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CHW CONTROL SYSTEM

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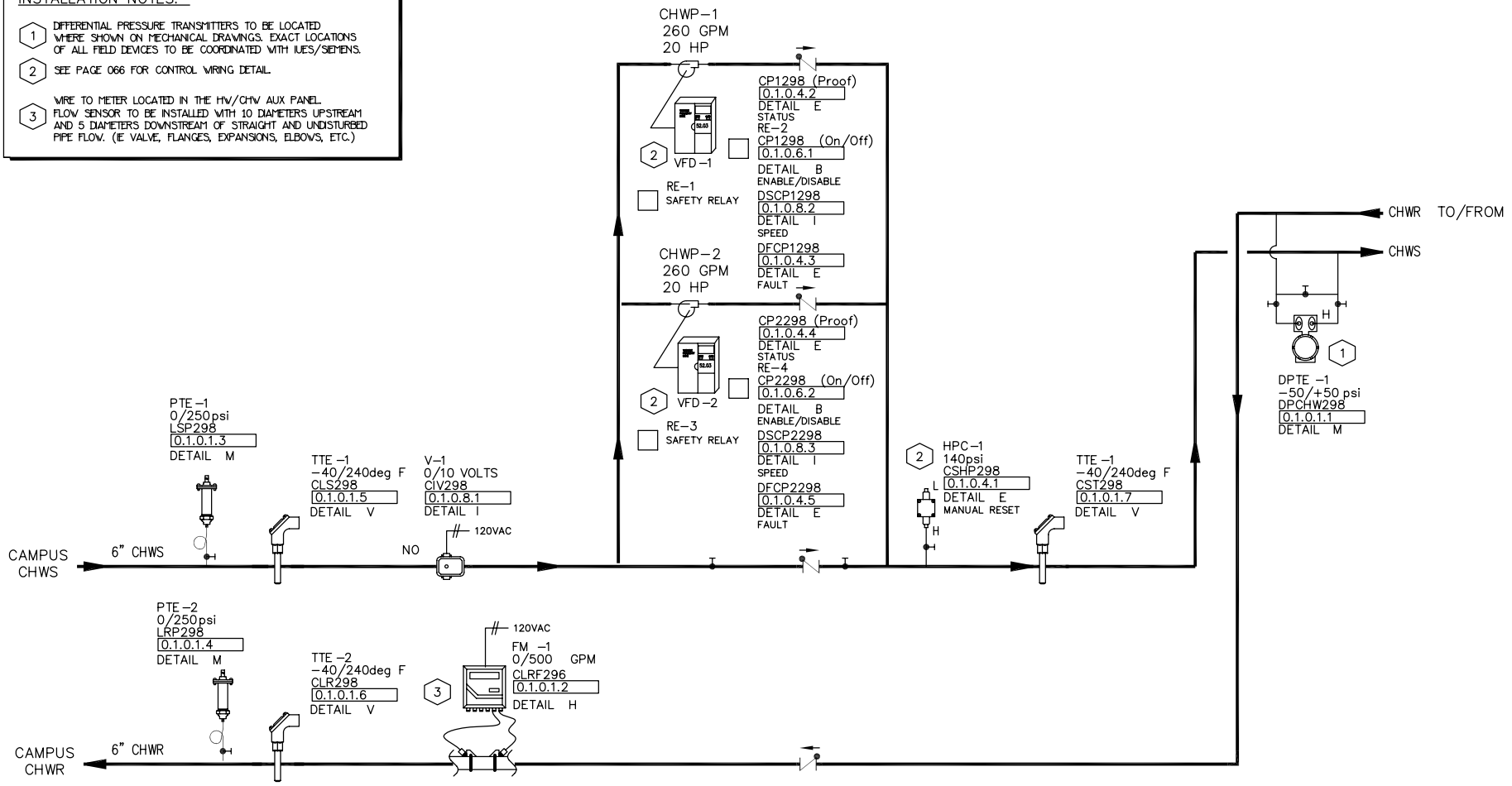
INSTALLATION NOTES:

1. DIFFERENTIAL PRESSURE TRANSMITTERS TO BE LOCATED WHERE SHOWN ON MECHANICAL DRAWINGS. EXACT LOCATIONS OF ALL FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
2. SEE PAGE 066 FOR CONTROL WIRING DETAIL.
3. WIRE TO METER LOCATED IN THE HW/CHW AUX PANEL. FLOW SENSOR TO BE INSTALLED WITH 10 DIAMETERS UPSTREAM AND 5 DIAMETERS DOWNSTREAM OF STRAIGHT AND UNDISTURBED PIPE FLOW. (IE VALVE, FLANGES, EXPANSIONS, ELBOWS, ETC.)



1 / 065 CHILLED WATER FLOW DIAGRAM
LOCATION: MECHANICAL ROOM

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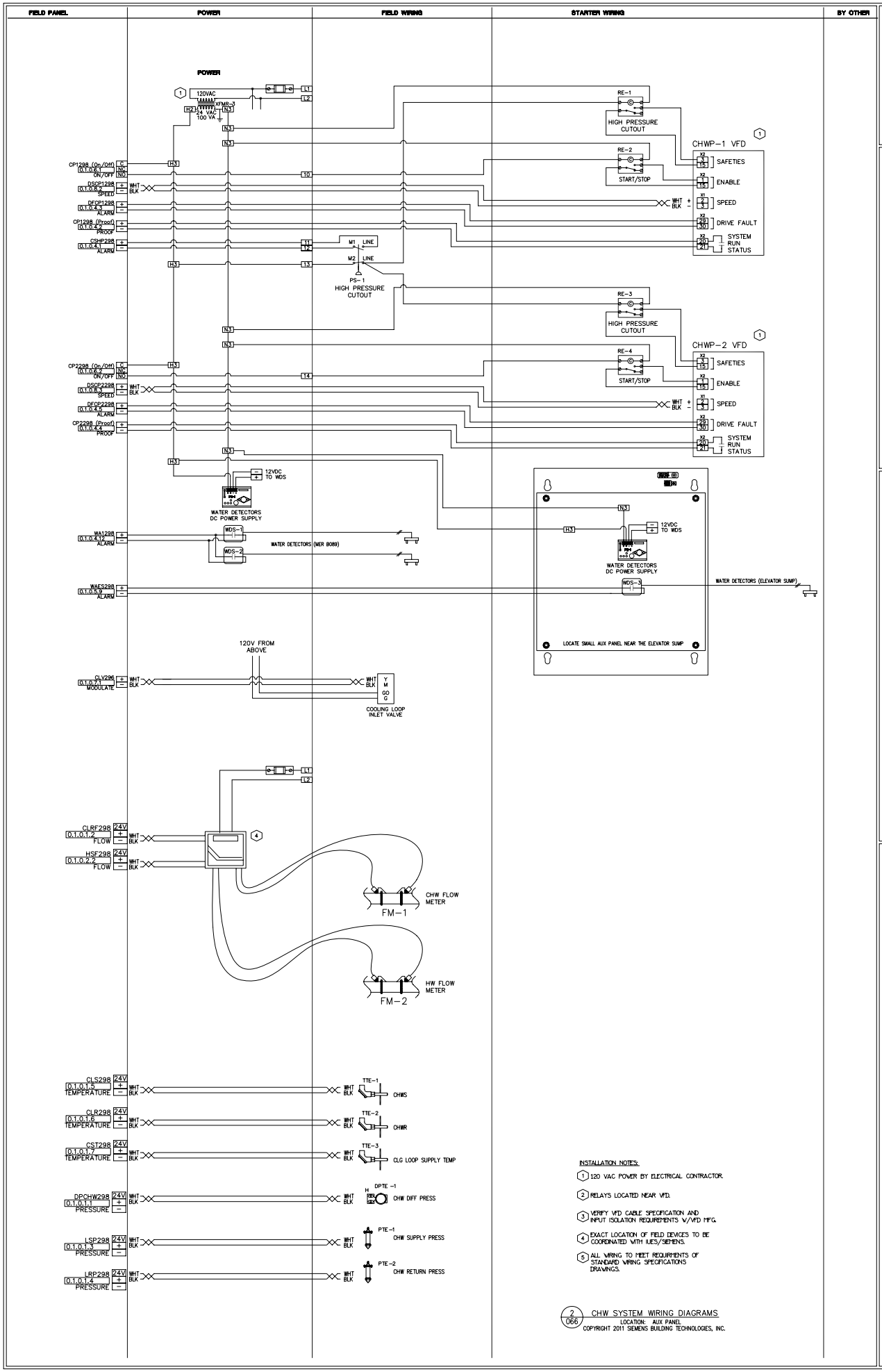

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

2 / 066 CHW SYSTEM WIRING DIAGRAMS
LOCATION: AUX PANEL

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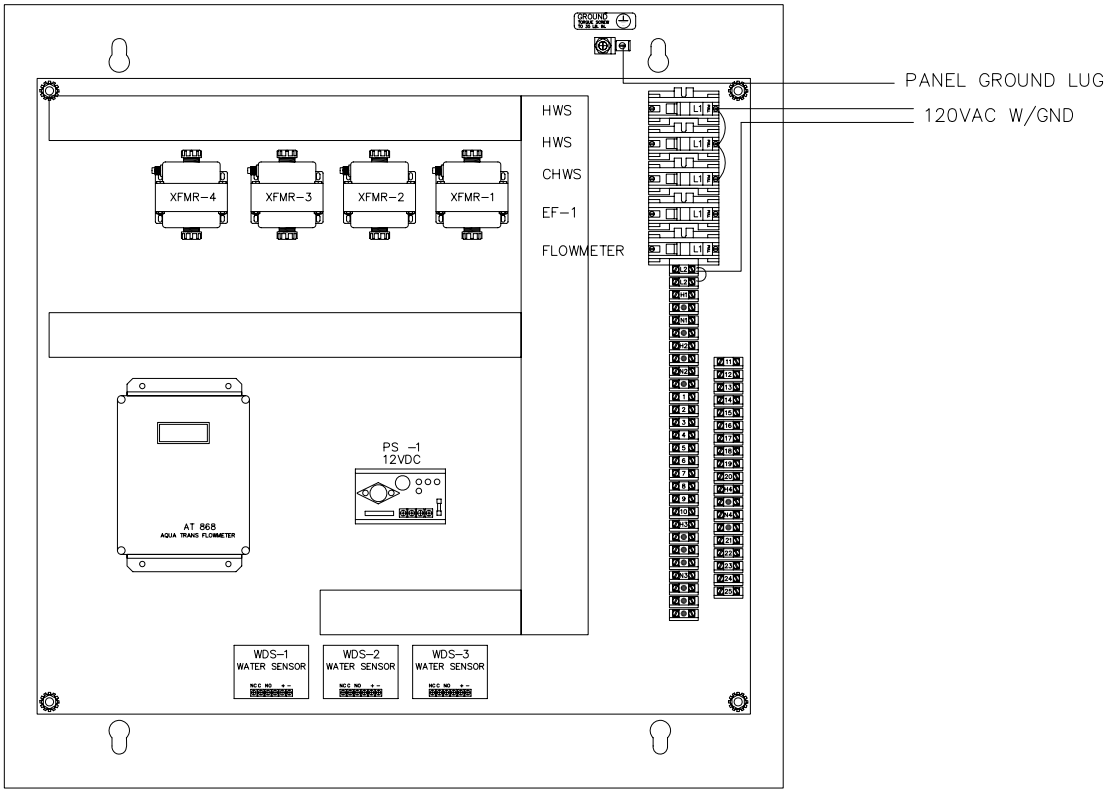

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HW/CHW AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 001000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	3	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	2	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	2	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	2	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCM-1 HWS/CHWS

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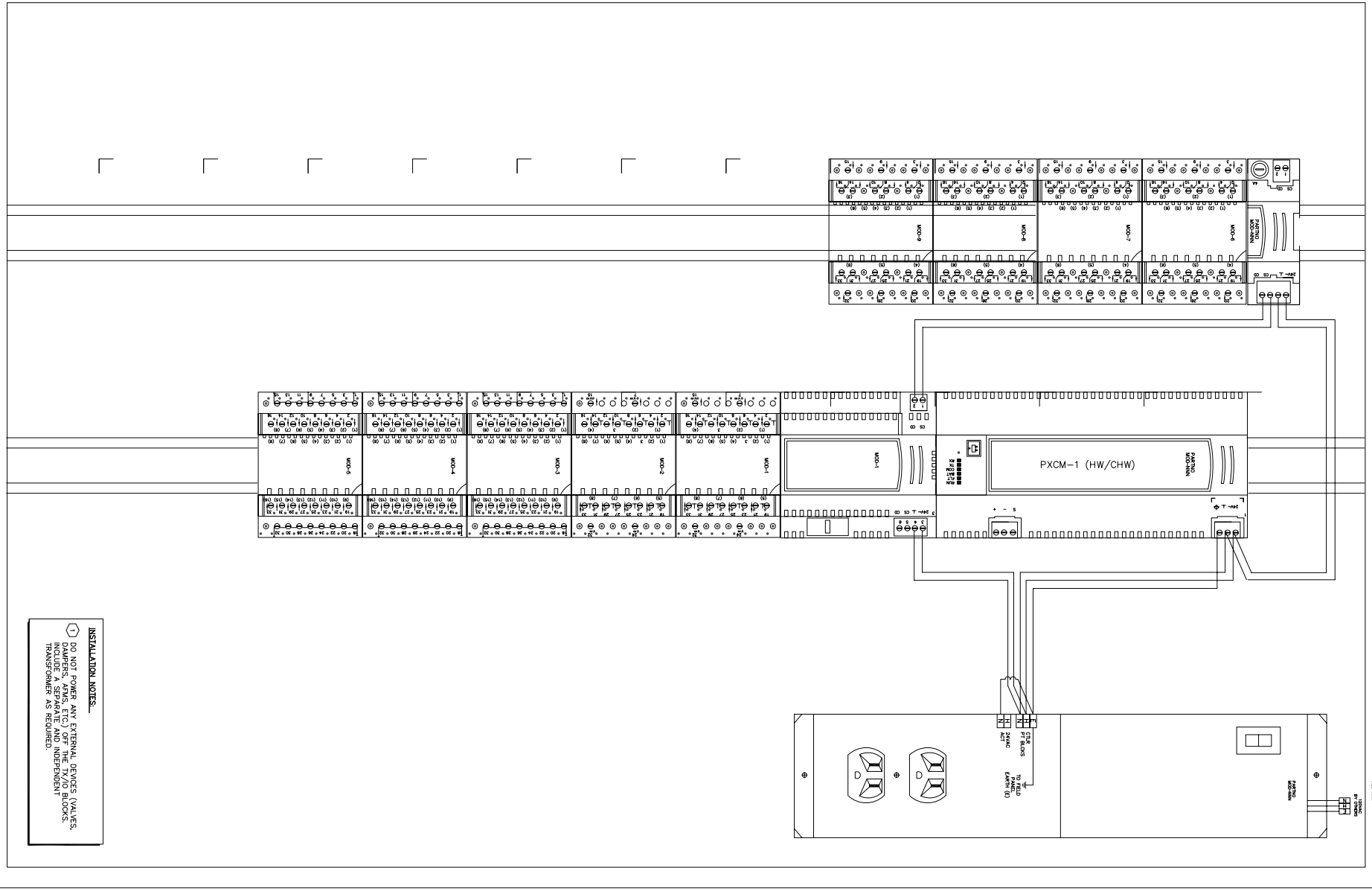

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SBT	HDF	SBT	12/22/11	01/16/12

PXCM-1 HWS/CHWS

440P099145
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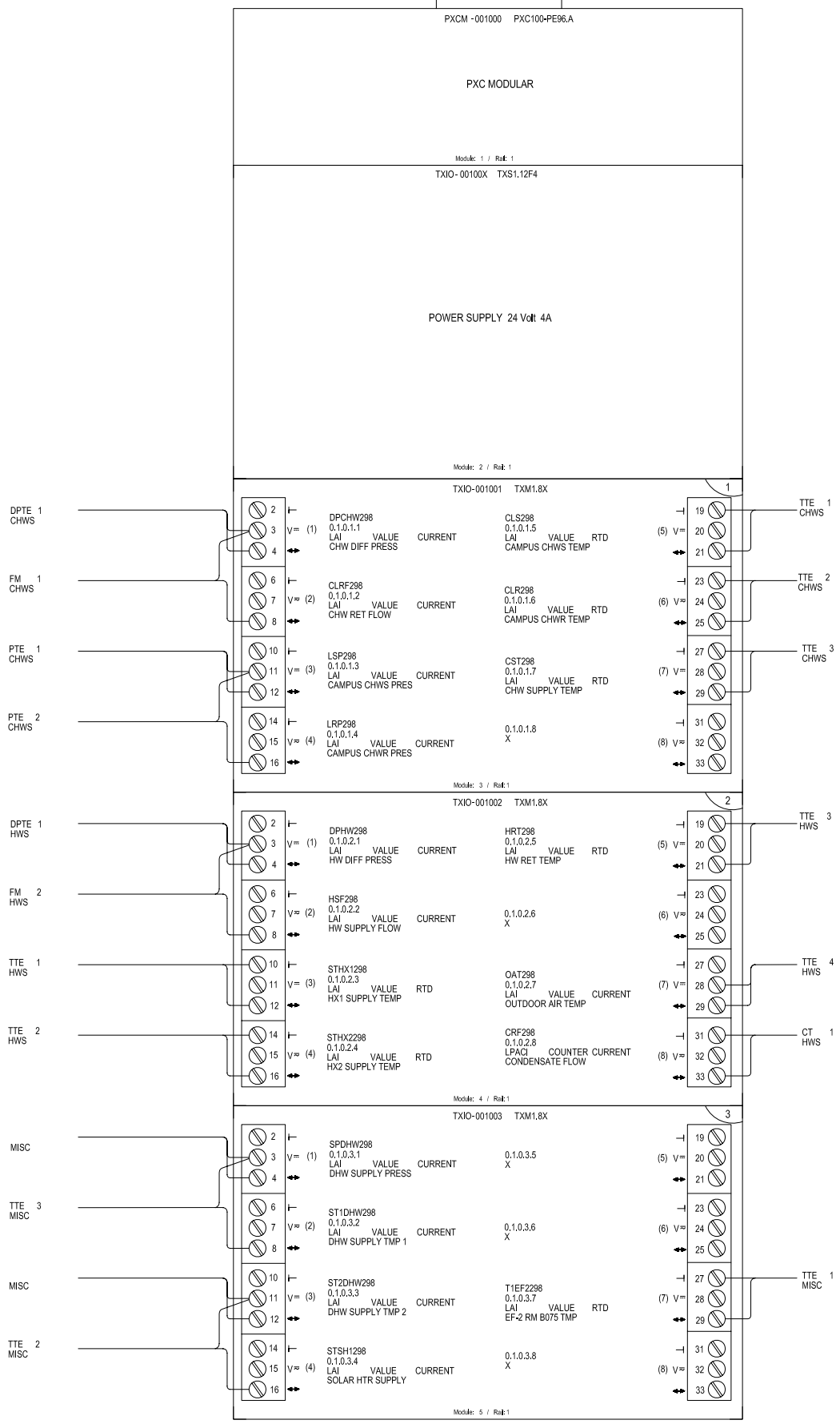

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PXCM-1 CONTROLLER LAYOUT 1

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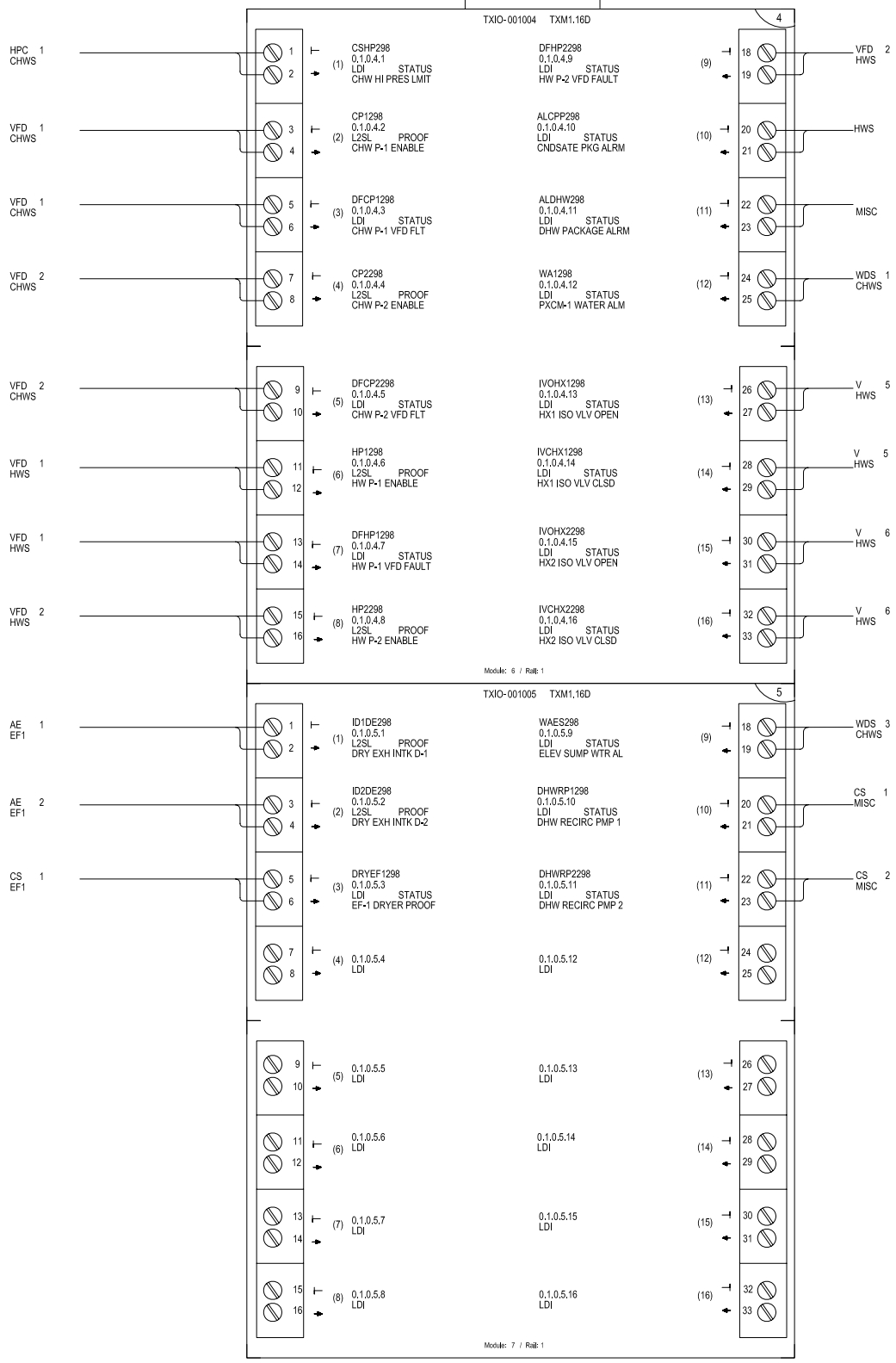

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PXCM-1 CONTROLLER LAYOUT 2

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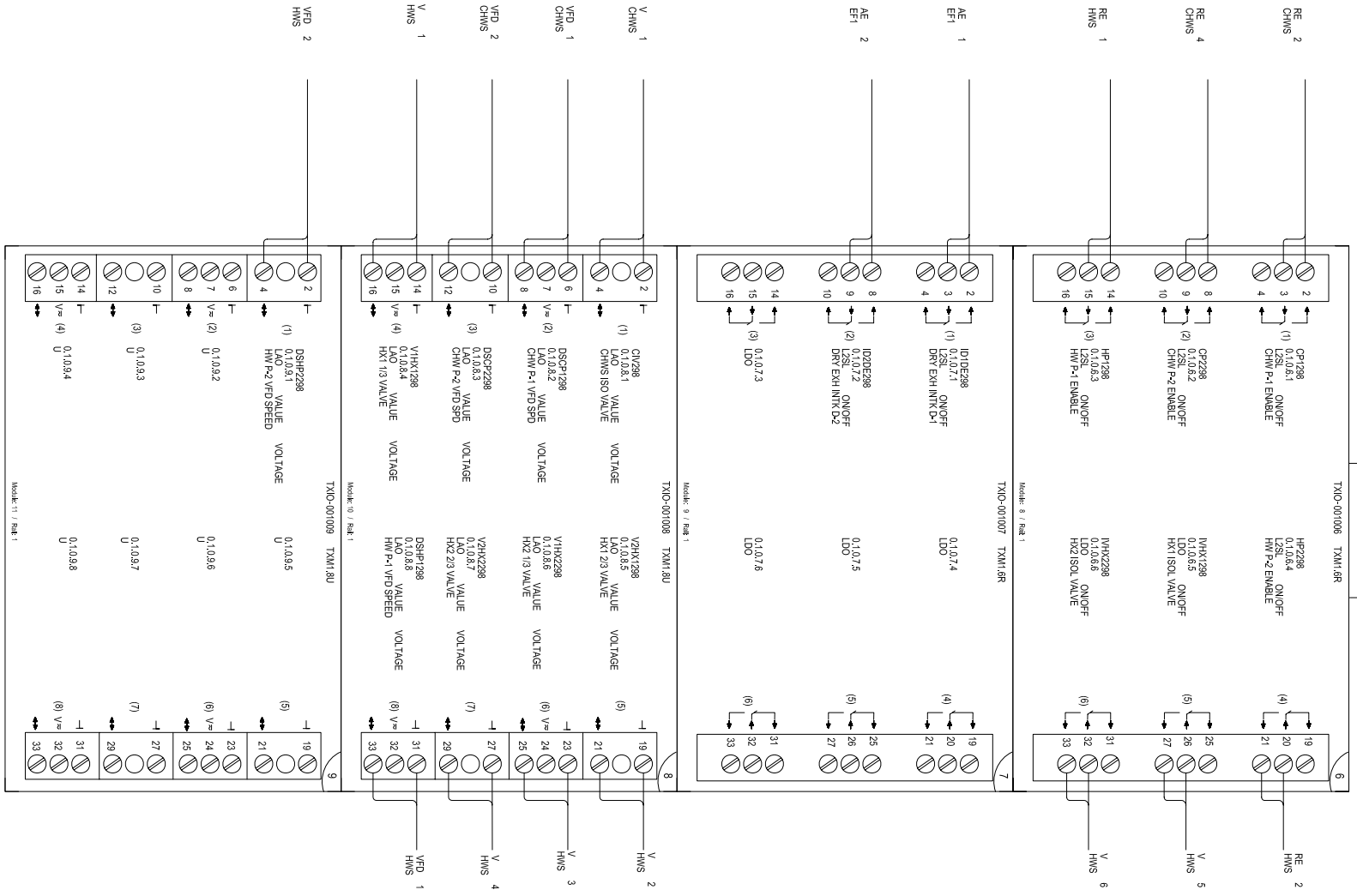

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PXCM-1 CONTROLLER LAYOUT 3

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1-3	3	GCA161.1U	SIEMENS	154001	MOD(V) SR,24V, MED.
AE 4-5	2	GMA161.1P	SIEMENS	154004	MOD SR 24V,62LBIN,PLM
AFMS 1-2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
CO2 1	1	QPM2100	SIEMENS	149909	SENSOR, CO2, DUCT, 0-10V, SENSING ONLY
CO2 2A-2D	4	QPA2000	SIEMENS	149910	SENSOR, CO2, ROOM, 0-10V, SENSING
D					SEE DAMPER SUBMITTAL
DPS 1-2	2	AFS-460-DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1-2	2	2641010WD11A1C	SETRA	0608cut003	DP TRAN AIR,1%,10" ENC
DPTE 3	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/-5" ENC
LTDE 1	2	134-1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1-4	4	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1-2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1-3	3	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1	1	544-342-24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 2-3	2	544-339-18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 4	1	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1-2	2	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567-353	SIEMENS	155 272	#4 PNEU PANEL 36X24X9
RE 5	1	RH3B-ULAC24V-KIT	LECTRO COM	N/A	(1) RH3B-ULAC24V and (1) SH3B-05 socket
XFMR 1-2	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U
XFMR 6-9	4	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

AIR HANDLING UNIT - COMMON AREA UNIT (AHU-1):

THE AIR HANDLING UNIT SHALL BE UNDER THE CONTROL OF THE BMS. VARIABLE SPEED FANS SHALL BE UTILIZED TO SUPPLY AIR TO THE BUILDING SPACES SERVED BY THE AIR HANDLING UNIT.

UPON RECEIVING A SIGNAL FROM THE BMS TO BEGIN OPERATION, THE SUPPLY FAN IN THE AIR HANDLING UNIT SHALL BE ACTIVATED. THE BMS SHALL THEN READ THE STATIC PRESSURE IN THE SUPPLY DUCTWORK VIA A STATIC PRESSURE SENSOR, COMPARING THE SIGNAL TO THE PREDETERMINED SETPOINT. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE (VFD) SHALL VARY THE SPEED OF THE SUPPLY FAN MOTOR TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SET POINT. WHEN THE SETPOINT IS SATISFIED, THE SPEED OF THE SUPPLY FAN SHALL REMAIN CONSTANT. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SENSOR SIGNAL TO ITS RESPECTIVE SETPOINT, AND SHALL CONTROL THE SUPPLY FAN TO ITS PREDETERMINED CONDITION.

THE SUPPLY AIR STATIC PRESSURE SET POINT SHALL BE ESTABLISHED AT THE TIME OF SYSTEM AIR BALANCING. THE BMS SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINALS AND SHALL RESET THE SUPPLY AIR STATIC PRESSURE SETPOINT LOWER AS REQUIRED TO MAINTAIN AT LEAST ONE VAV TERMINAL AT 90% OPEN. CONVERSELY, THE BMS SHALL RESET THE SUPPLY AIR STATIC PRESSURE SETPOINT HIGHER TO MAINTAIN NO MORE THAN TWO VAV TERMINALS AT THEIR 100% OPEN POSITION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F, THE BMS SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

RETURN FAN OPERATION: THE BMS SHALL START THE RETURN FAN WHEN THE AHU SUPPLY FAN HAS BEEN ACTIVATED. THE BMS SHALL THEN READ THE SUPPLY AIRFLOW AND RETURN AIR AIRFLOW, VIA AIRFLOW MEASURING STATIONS, AND CONTROL THE SPEED OF THE RETURN FAN TO MAINTAIN A NET POSITIVE OFFSET BETWEEN SUPPLY AIRFLOW AND RETURN AIRFLOW. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SUPPLY AIRFLOW AND RETURN SIGNALS AND CONTROL THE RETURN FAN SPEED TO ITS RESPECTIVE SETPOINT. (NOTE: RA CFM = SA CFM - OA CFM. THE OFFSET WILL BE THE OUTSIDE AIR REQUIRED PER THE AIR HANDLING UNIT SCHEDULE.)

ECONOMIZER OPERATION: WHEN OUTSIDE DRY-BULB IS LESS THAN 65 DEG F (ADJUSTABLE) - MODULATE THE ECONOMIZER OUTSIDE AIR (EOAD), RETURN AIR (RAD), AND RELIEF (READ) DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. WHEN OUTSIDE AIR DRY-BULB IS GREATER THAN 65 DEG F (ADJUSTABLE) - CLOSE THE ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF DAMPER. ECONOMIZER OA AND RELIEF AIR DAMPER SHALL MODULATE INVERSELY WITH THE RETURN AIR DAMPER. AS THE ECONOMIZER OA AND RELIEF AIR DAMPERS OPEN, THE RETURN AIR DAMPER CLOSES. DURING NORMAL OPERATION ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER ARE CLOSED.

MINIMUM OUTSIDE AIR DAMPER (MOAD) AND MINIMUM EXHAUST AIR DAMPER (MEAD) OPERATION: THE NORMALLY OPEN MINIMUM OUTSIDE AIR DAMPER AND NORMALLY OPEN MINIMUM EXHAUST AIR DAMPER SHALL BE UNDER THE CONTROL OF THE BMS. WHEN THE AHU SUPPLY FAN IS ON, THE BMS SHALL MODULATE THE DAMPERS AS DESCRIBED BELOW UNDER "DEMAND CONTROLLED VENTILATION". THE MOAD SHALL OPERATE PROPORTIONALLY WITH THE MEAD DAMPER.

DEMAND CONTROLLED VENTILATION:
FIRST STAGE: INCREASE VAV BOX PRIMARY AIR: SEE VAV SEQUENCE
SECOND STAGE: MODULATE THE MOAD AND THE MEAD TO MAINTAIN THE SPACE AND RETURN AIR CO2 LEVELS BETWEEN 800 PPM AND 1100 PPM CO2.

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED TO STOP THE SUPPLY FAN AND RETURN FAN WHEN ACTIVATED, AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT).
DUCT-MOUNTED SMOKE DETECTOR (FURNISHED AND INSTALLED AS WORK OF DIVISION 26).
SUPPLY AND RETURN HIGH STATIC ALARM.
WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND RETURN FAN, AND CLOSE THE OUTSIDE AIR DAMPER.

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AHU-1 CONTROL SYSTEM

440P099145
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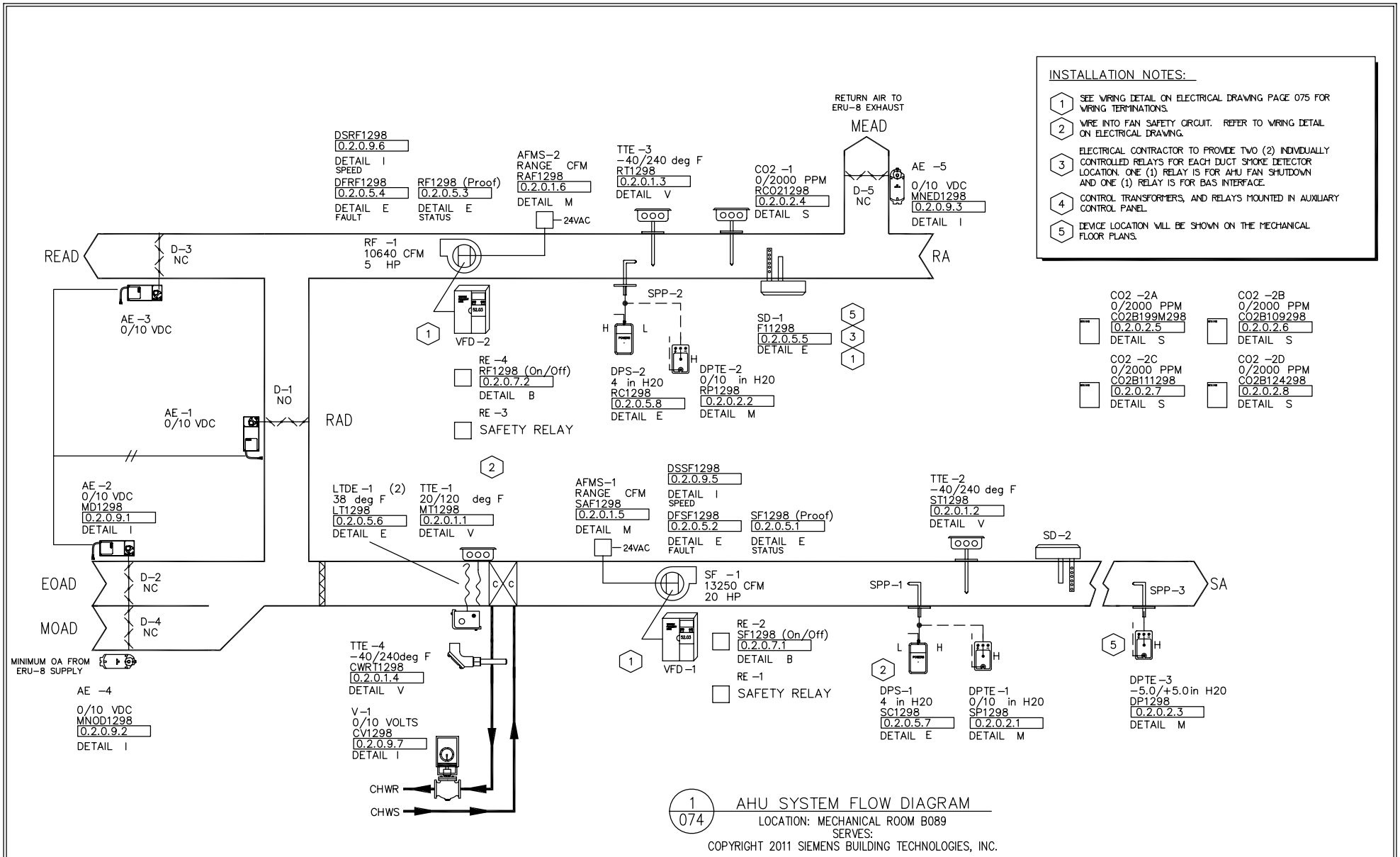

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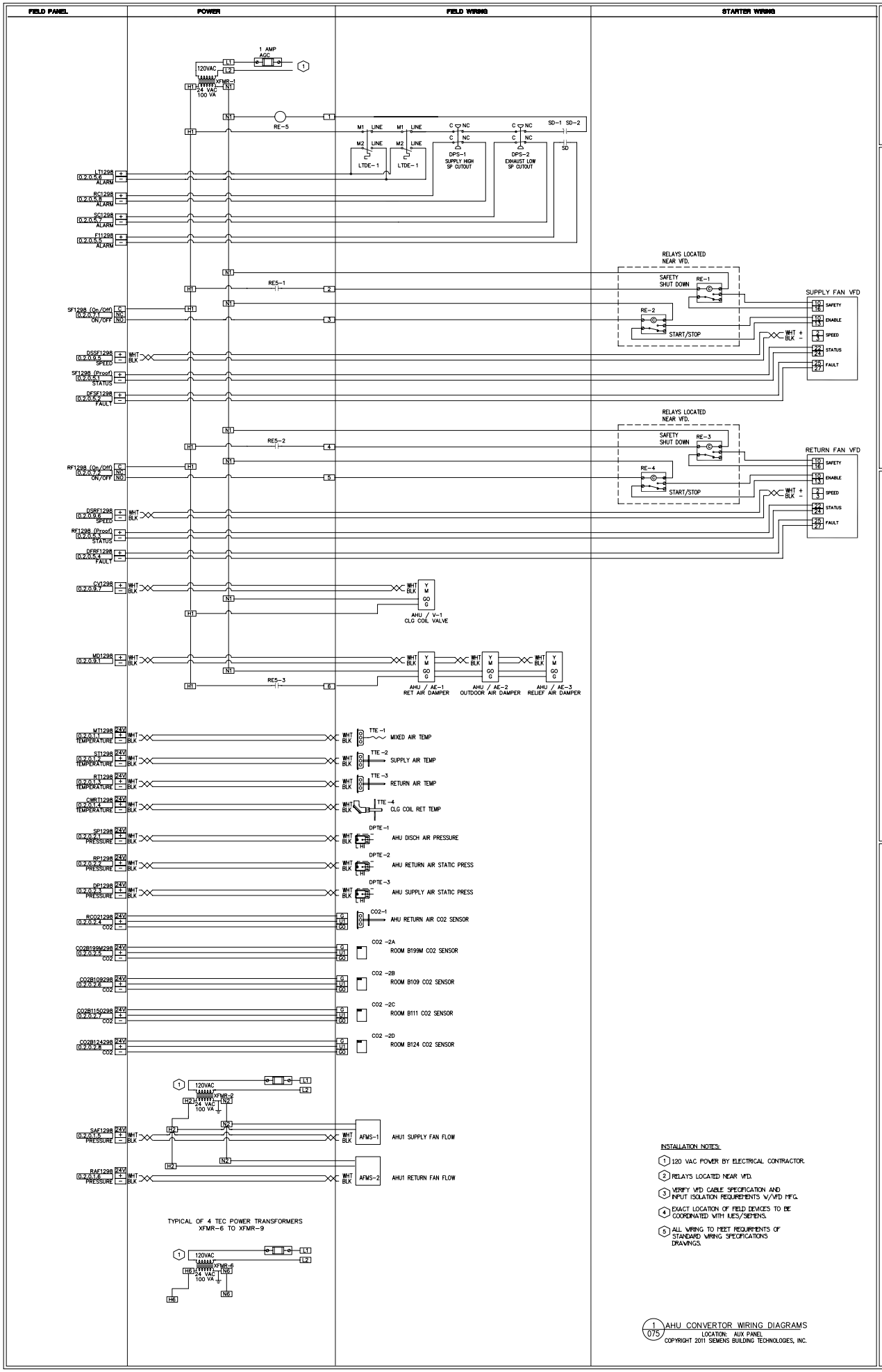

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AHU-1 SYSTEM WIRING

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1-2	2	GCA126.1U	SIEMENS	154001	2 PT SR,24V,MED/S
AFMS 1-2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
CS 1	1	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
D					SEE DAMPER SUBMITTAL
DPS 1-2	2	AFS-460-DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/-5" ENC
DPTE 2-4	3	2641010WD11A1C	SETRA	0608cut003	DP TRAN AIR,1%,10" ENC
LTDE 1	2	134-1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1-6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1-2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1-4	5	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1-4	4	544-342-24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 5	1	544-339-18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 6-7	2	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1-3	3	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
RE 7	1	RH3B-ULAC24V-KIT	LECTRO COM	N/A	(1) RH3B-ULAC24V and (1) SH3B-05 socket
RE 8-9	2	RH2B-UL-AC24VKIT	IDEC	1202cut016	RELAY&SOC,GP DPDT AC24V W/LED
XFMR 3-5	3	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

ENERGY RECOVERY UNITS (ERU-8) - BASE BID:

ENERGY RECOVERY UNITS SHALL BE UNDER THE CONTROL OF THE BMS. VARIABLE SPEED FANS SHALL BE UTILIZED TO SUPPLY 100% OUTSIDE AIR AND EXHAUST AIR DIRECTLY TO/FROM THE COMMON AREA AIR HANDLER AND SELECT ROOMS IN THE BUILDING. UNIT FANS SHALL OPERATE ONLY WHEN BOTH THE NORMALLY CLOSED OUTSIDE AIR AND EXHAUST AIR DAMPERS ARE PROVEN OPEN VIA END SWITCH ON BOTH DAMPERS.

DURING OCCUPIED PERIODS, THESE FANS SHALL OPERATE CONTINUOUSLY. THE SUPPLY AND EXHAUST FAN SPEED SHALL BE CONTROLLED BASED ON STATIC PRESSURE IN THE SUPPLY AND EXHAUST DUCTWORK.
DURING UN-OCCUPIED PERIODS, THESE FANS SHALL OPERATE CONTINUOUSLY. THE SUPPLY AND EXHAUST FAN SPEED SHALL BE CONTROLLED BASED ON STATIC PRESSURE IN THE SUPPLY AND EXHAUST DUCTWORK, TO MAINTAIN A CONSTANT AIRFLOW RATE (UNOCCUPIED CFM; AS DETERMINED BY 24/7 OCCUPIED SPACES).

ENTHALPY RECOVERY WHEEL: VARIABLE SPEED CONTROL SHALL BE UTILIZED TO MODULATE THE ROTATIONAL SPEED OF THE ENTHALPY WHEEL TO MAINTAIN A 55 DEGREE F SUPPLY AIR TEMPERATURE LEAVING THE WHEEL. THE ENTHALPY WHEEL SHALL BE DEACTIVATED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F AND BELOW 75 DEGREES F.

WHEEL DEFROST CYCLE: THE BMS SHALL MONITOR THE EXHAUST AIR TEMPERATURE LEAVING THE WHEEL. THE SPEED OF THE ENTHALPY WHEEL SHALL SLOW DOWN AS REQUIRED TO MAINTAIN A MINIMUM EXHAUST AIR TEMPERATURE LEAVING THE WHEEL OF 0 DEG F (ADJUSTABLE PER MANUFACTURER'S RECOMMENDATION). THIS CYCLE SHALL OVERRIDE NORMAL ENTHALPY WHEEL OPERATION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

HEATING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE). WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35 DEGREES THE HOT WATER COIL CIRCULATING PUMP (RP-X) SHALL BE ACTIVATED AND OPERATE CONTINUOUSLY AT CONSTANT SPEED.

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED TO STOP THE SUPPLY AND EXHAUST FANS WHEN ACTIVATED, AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT).
DUCT-MOUNTED SMOKE DETECTOR (FURNISHED AND INSTALLED AS WORK OF DIVISION 16).
DUCT HIGH STATIC LIMIT (SUPPLY AIR DUCT).
LOW STATIC PRESSURE (EXHAUST AIR DUCT).

WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND EXHAUST FAN, CLOSE THE OUTSIDE AIR AND EXHAUST AIR DAMPER, AND OPEN THE HEAT COIL CONTROL VALVE TO ITS FULL OPEN POSITION.

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ERU-8 CONTROL SYSTEM

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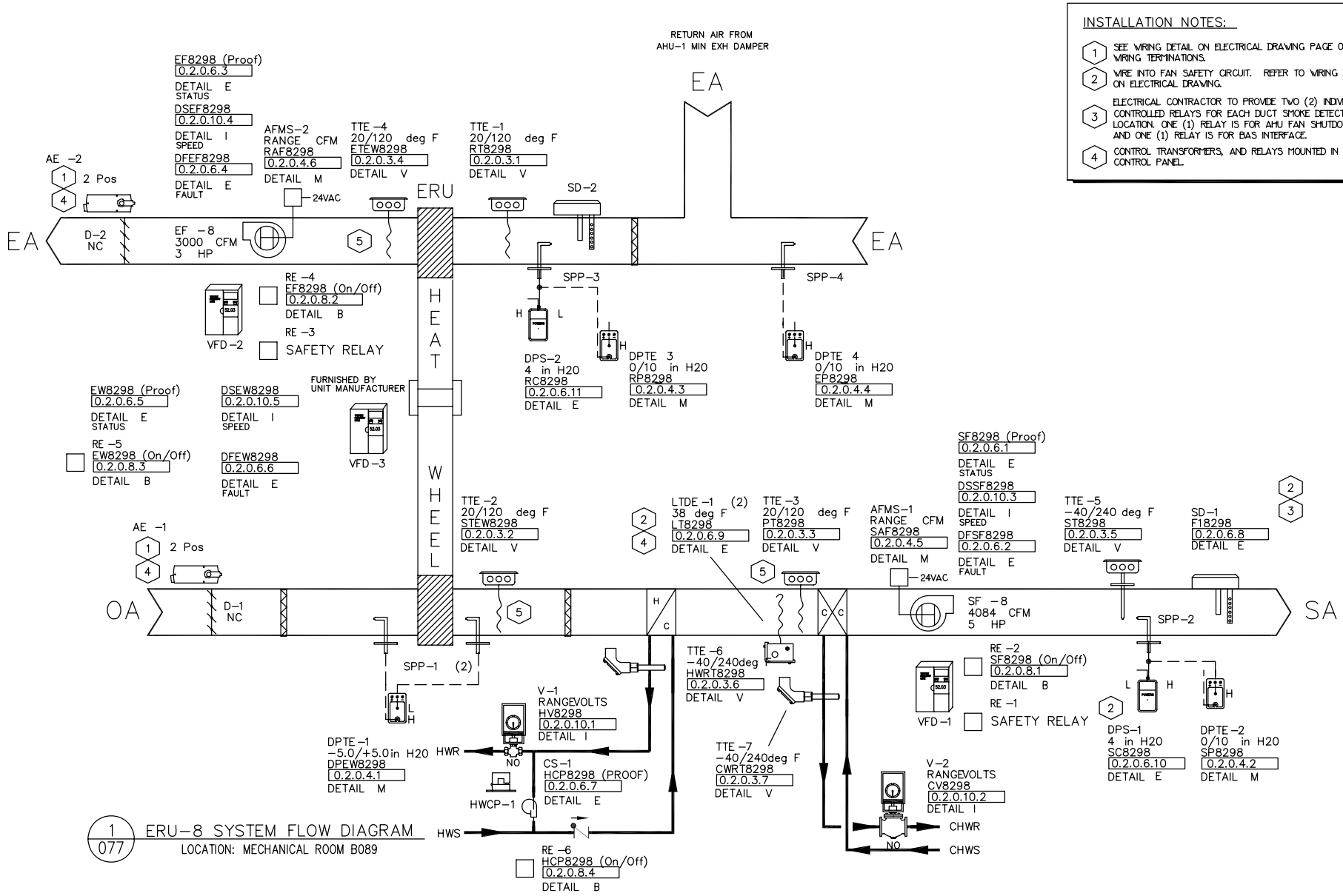

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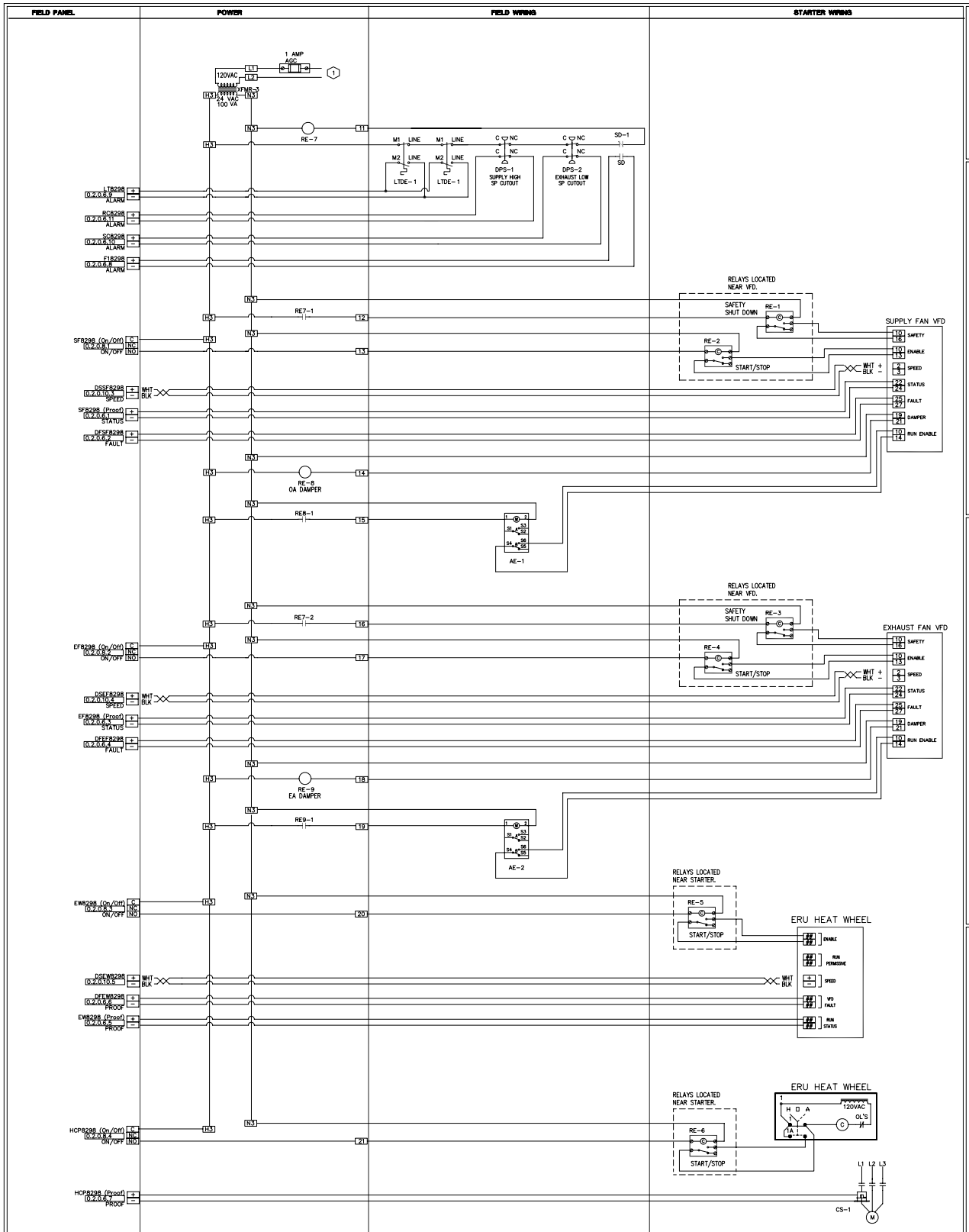

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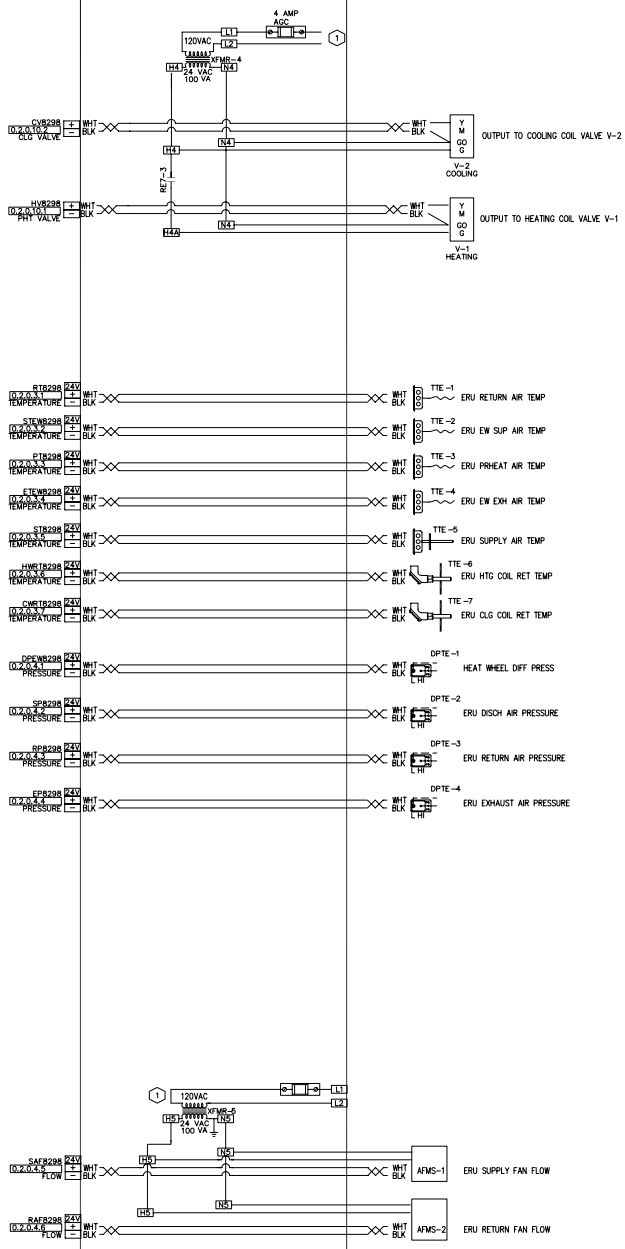
FIELD PANEL	POWER	FIELD WIRING	STARTER WIRING	BY OTHER



INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 / 079 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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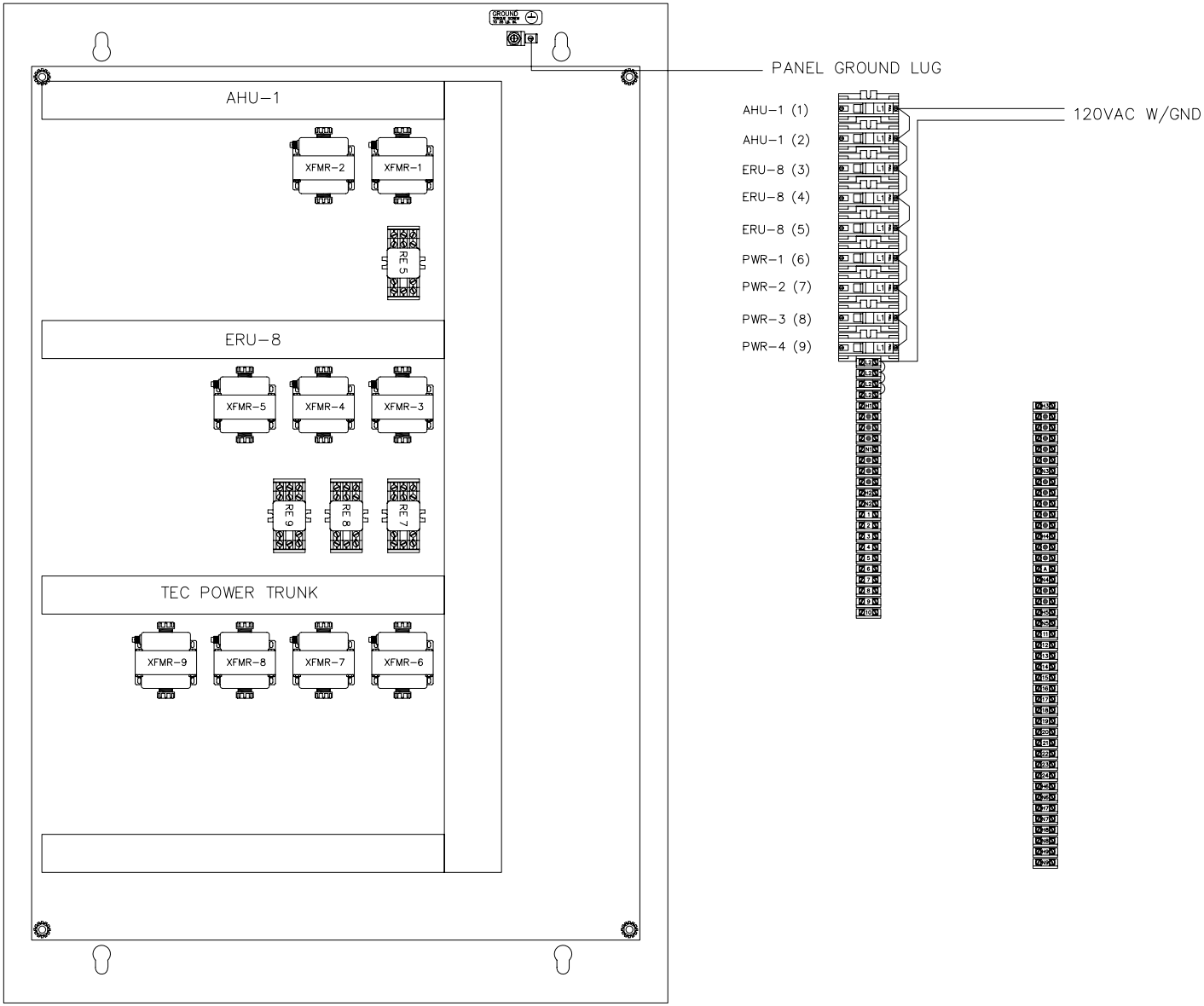

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AHU-1/ERU-8 AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 002000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	LSM-VAEM	SIEMENS	N/A	VIRTUAL AEM (LICENSE MANAGER)
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	4	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	2	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	2	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	2	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCM-2 AHU-1/ERU-8

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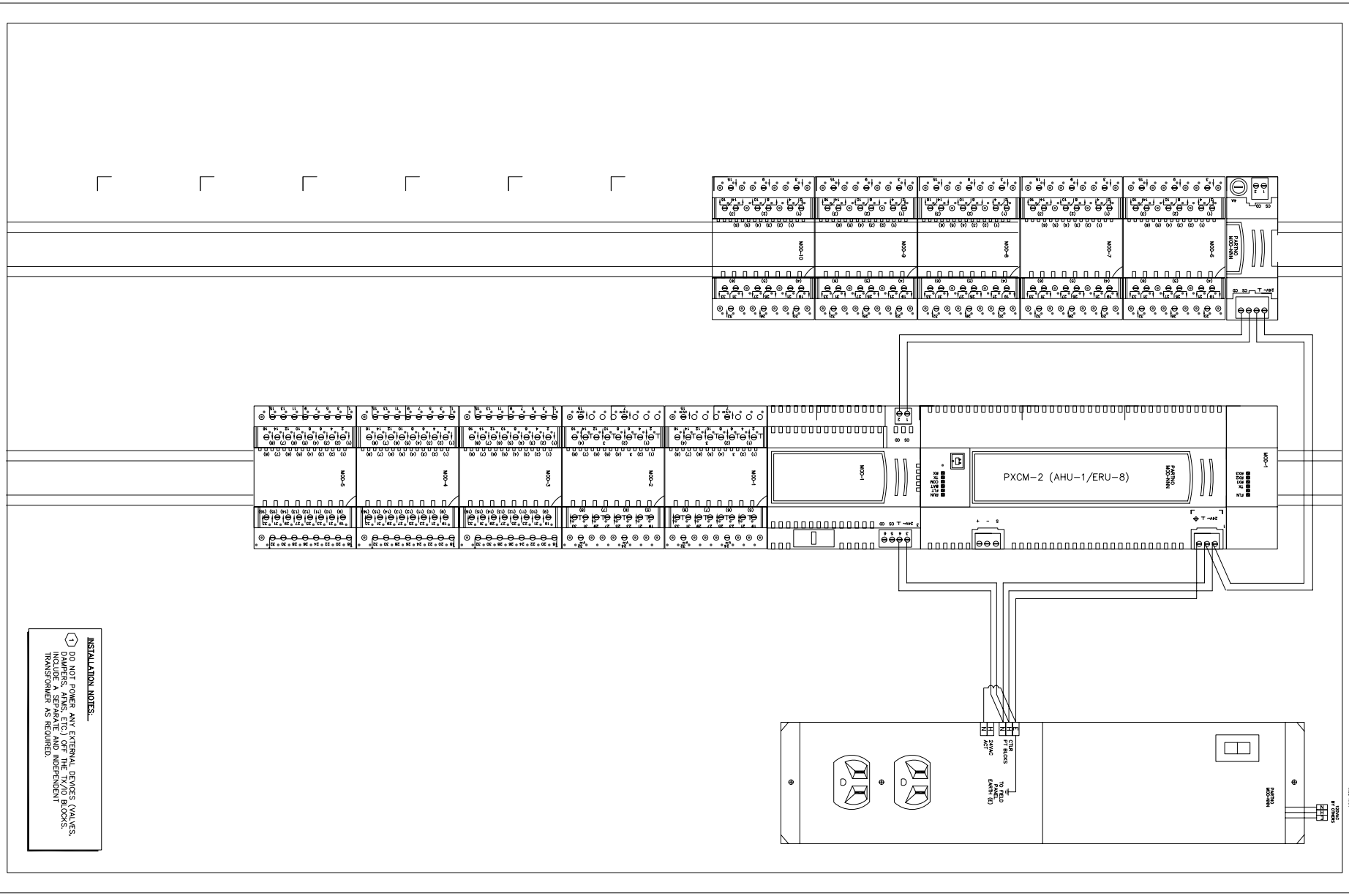

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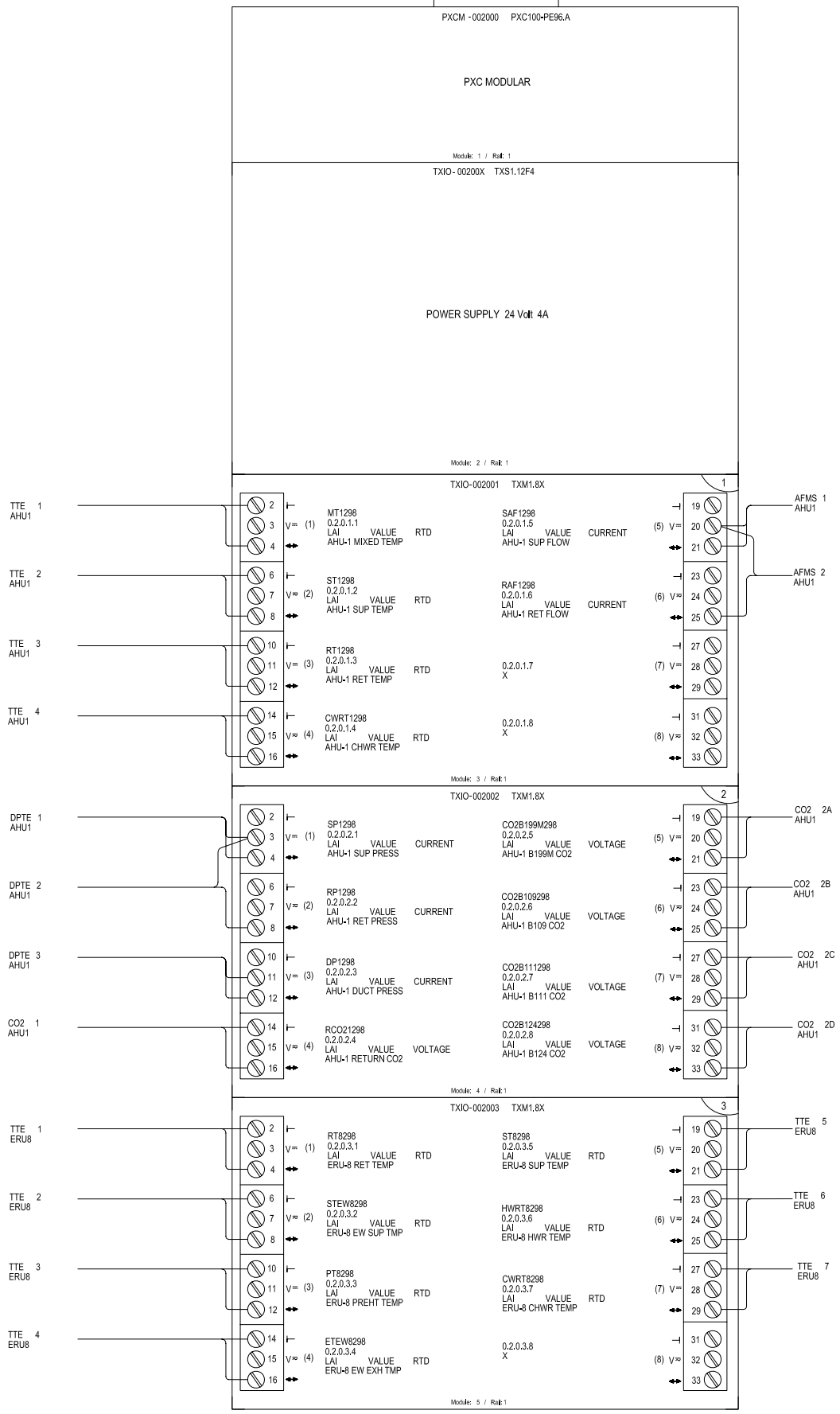

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PXCM-2 CONTROLLER LAYOUT 1

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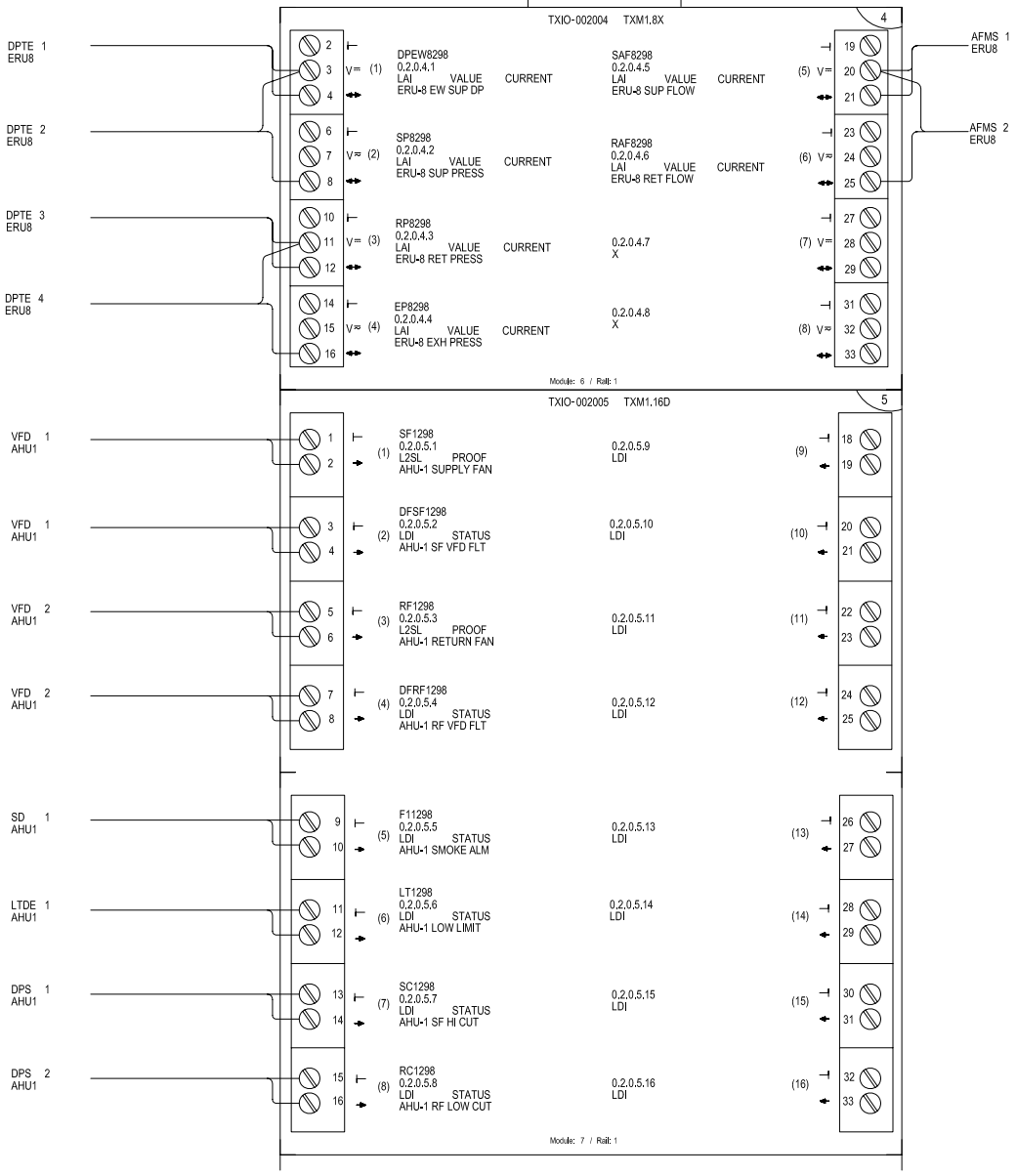

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PXCM-2 CONTROLLER LAYOUT 2

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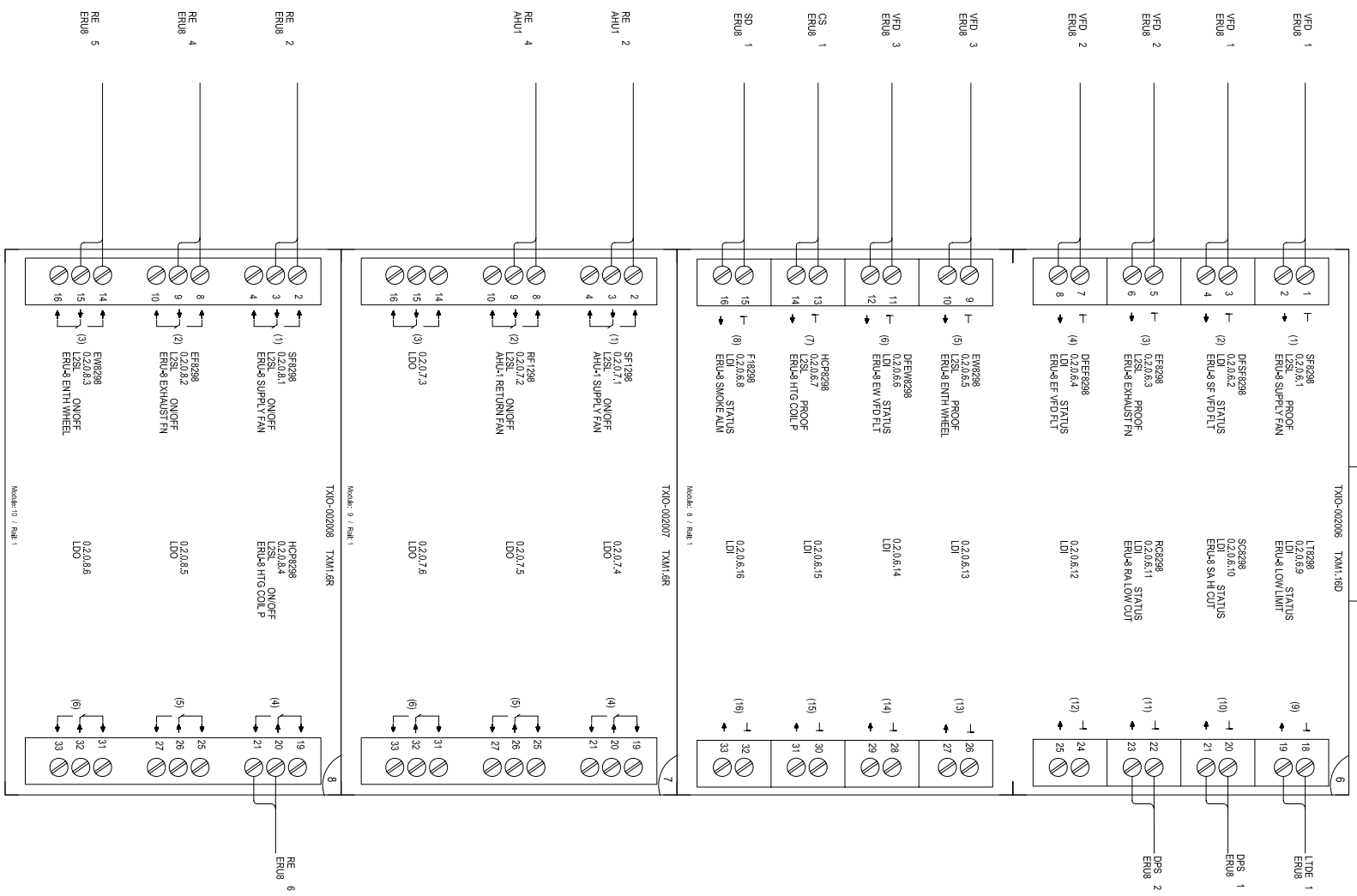

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PXCM-2 CONTROLLER LAYOUT 3

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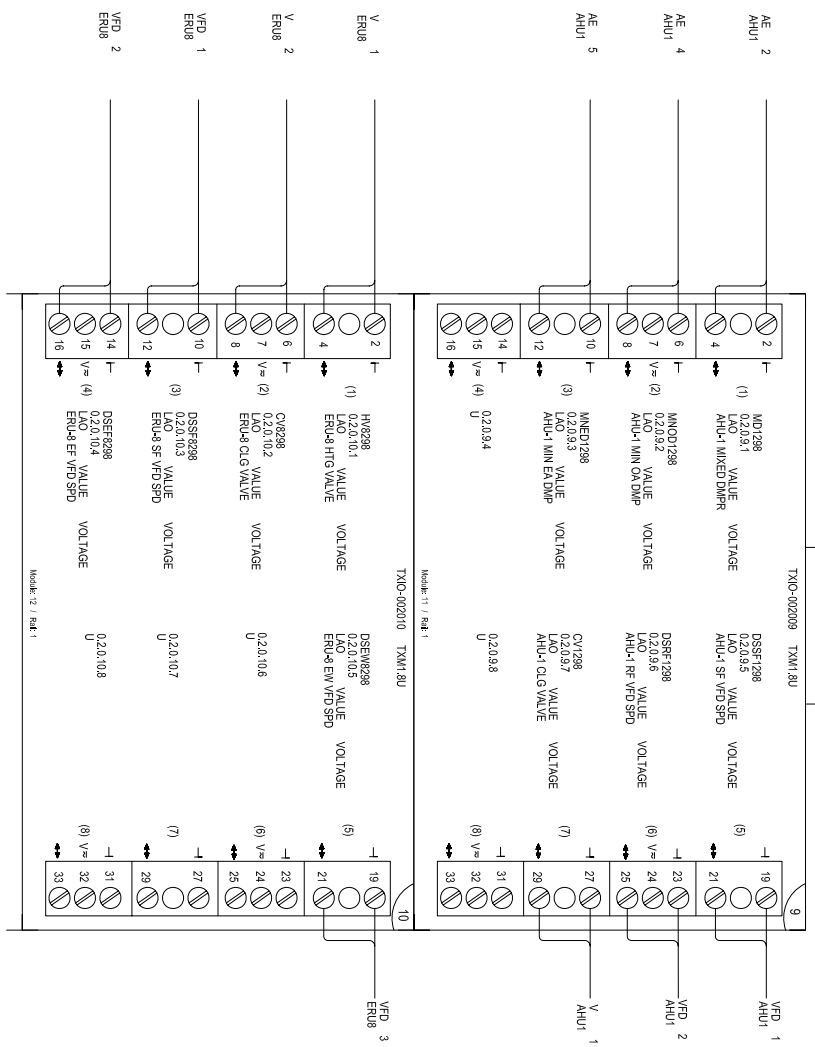

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PXCM-2 CONTROLLER LAYOUT 4

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1-3	3	GCA161.1U	SIEMENS	154001	MOD(V) SR,24V, MED.
AFMS 1	1	FBO	N/A	N/A	FURNISHED BY OTHERS
AFMS 2	1	HTA-104-P	N/A	N/A	N/A
D					SEE DAMPER SUBMITTAL
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/-5" ENC
LTDE 1	2	134-1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1-4	4	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1-2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1	1	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1	1	544-342-24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 2	1	544-339-18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 3	1	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1-2	2	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567-352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
RE 5	1	RH3B-ULAC24V-KIT	LECTRO COM	N/A	(1) RH3B-ULAC24V and (1) SH3B-05 socket
XFMR 1-3	3	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

AIR HANDLING UNITS - MDF/IDF UNITS (AHU-2):
THE AIR HANDLING UNIT SHALL BE UNDER THE CONTROL OF THE BUILDING MANAGEMENT SYSTEM (BMS). VARIABLE SPEED FANS SHALL BE UTILIZED TO SUPPLY AIR TO THE MDF/IDF ROOMS SERVED BY THE AIR HANDLING UNITS.

UPON RECEIVING A SIGNAL FROM THE BMS TO BEGIN OPERATION, THE SUPPLY FAN IN THE AIR HANDLING UNIT SHALL BE ACTIVATED. THE BMS SHALL THEN READ THE STATIC PRESSURE IN THE SUPPLY DUCTWORK VIA A STATIC PRESSURE SENSOR, COMPARING THE SIGNAL TO THE PREDETERMINED SETPOINT. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE (VFD) SHALL VARY THE SPEED OF THE SUPPLY FAN MOTOR TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SET POINT. WHEN THE SETPOINT IS SATISFIED, THE SPEED OF THE SUPPLY FAN SHALL REMAIN CONSTANT. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SENSOR SIGNAL TO ITS RESPECTIVE SETPOINT, AND SHALL CONTROL THE SUPPLY FAN TO ITS PREDETERMINED CONDITION.

THE SUPPLY AIR STATIC PRESSURE SET POINT SHALL BE ESTABLISHED AT THE TIME OF SYSTEM AIR BALANCING. THE BMS SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINALS AND SHALL RESET THE SUPPLY AIR STATIC PRESSURE SETPOINT LOWER AS REQUIRED TO MAINTAIN AT LEAST ONE VAV TERMINAL AT 90% OPEN. CONVERSELY, THE BMS SHALL RESET THE SUPPLY AIR STATIC PRESSURE SETPOINT HIGHER TO MAINTAIN NO MORE THAN TWO VAV TERMINALS AT THEIR 100% OPEN POSITION.

THE BMS SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

VAV TERMINAL SHALL BE UNDER THE CONTROL OF THE BMS. VAV TERMINAL UNITS SHALL UTILIZE DDC MICROPROCESSOR BASED LOGIC TO ACHIEVE ALL CONTROL FUNCTIONS. DURING COOLING MODE, EACH VAV UNIT CONTROLLER SHALL MODULATE ITS AIR DAMPER BETWEEN ITS MINIMUM AND MAXIMUM POSITION TO MAINTAIN THE SPACE TEMPERATURE SETPOINT (80 DEG F, ADJUSTABLE).

ECONOMIZER OPERATION: WHEN OUTSIDE DRY-BULB IS LESS THAN 65 DEG F (ADJUSTABLE) - MODULATE THE ECONOMIZER OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. WHEN OUTSIDE AIR DRY-BULB IS GREATER THAN 65 DEG F (ADJUSTABLE) - CLOSE THE ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF DAMPER. ECONOMIZER OA AND RELIEF AIR DAMPER SHALL MODULATE INVERSELY WITH THE RETURN AIR DAMPER. AS THE ECONOMIZER OA AND RELIEF AIR DAMPERS OPEN, THE RETURN AIR DAMPER CLOSES. DURING NORMAL OPERATION OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER ARE CLOSED.

ECONOMIZER LOW LIMIT: IF THE MIXED AIR TEMPERATURE (MAT) DROPS BELOW 50 DEG F (ADJ), THE SYSTEM SHALL ALARM AND THE DISCHARGE AIR CONTROL AND THE ECONOMIZER DAMPER OPERATION SHALL HALT UNTIL THE MAT IS ABOVE SETPOINT.

RETURN FAN OPERATION: THE BMS SHALL START THE RETURN FAN WHEN THE AHU SUPPLY FAN HAS BEEN ACTIVATED. THE BMS SHALL THEN READ THE SUPPLY AIRFLOW AND RETURN AIR AIRFLOW, VIA AIRFLOW MEASURING STATIONS, AND CONTROL THE SPEED OF THE RETURN FAN TO MATCH THE SUPPLY AIRFLOW. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SUPPLY AIRFLOW AND RETURN SIGNALS AND CONTROL THE RETURN FAN SPEED TO ITS RESPECTIVE SETPOINT.

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.
TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT-MOUNTED SMOKE DETECTOR (RETURN AIR STREAM, DIVISION 26)
WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND RETURN FAN AND CLOSE THE OUTSIDE AIR DAMPER.

REVISION HISTORY

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AHU-2 CONTROL SYSTEM

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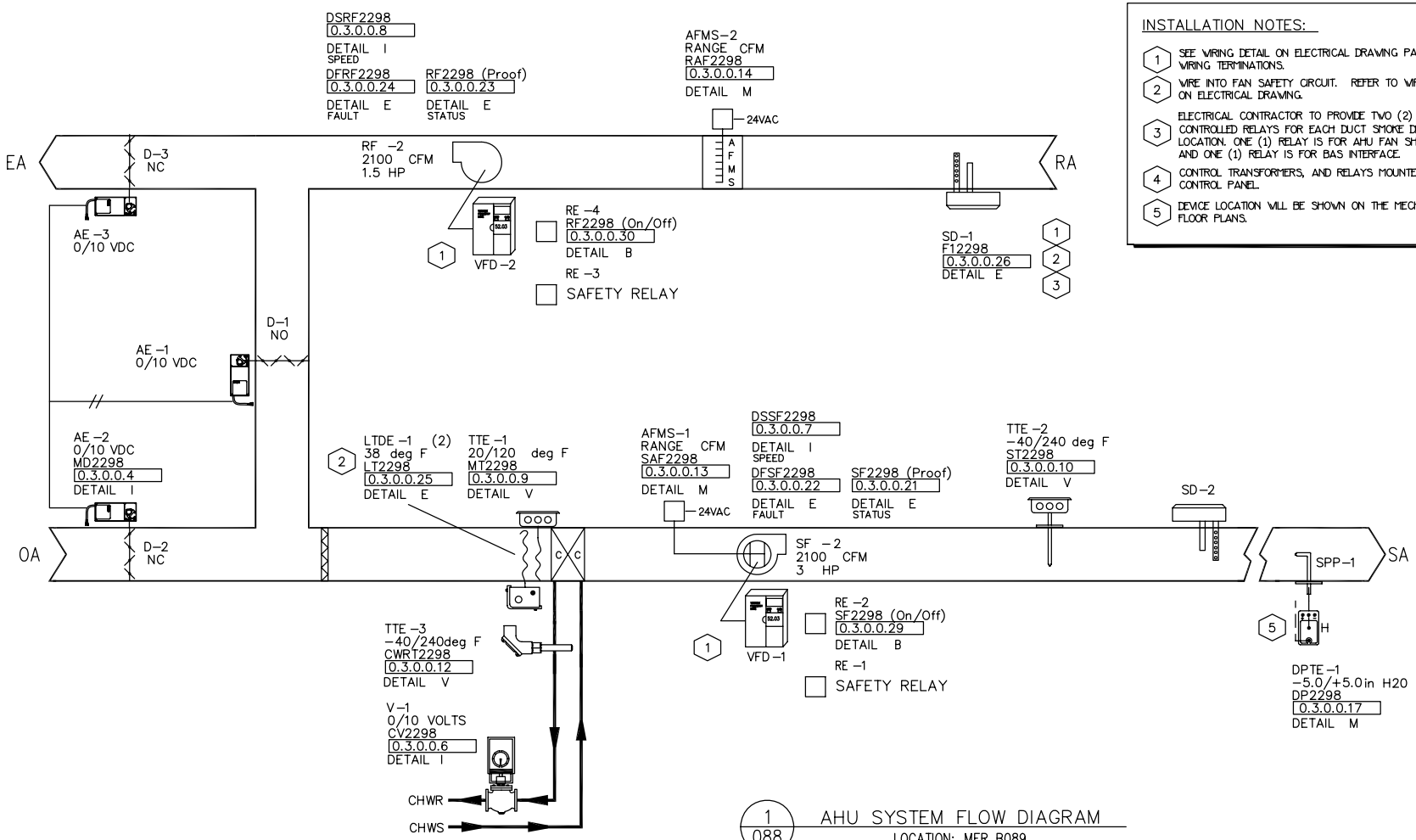

INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 089 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.

1 / 088 AHU SYSTEM FLOW DIAGRAM

LOCATION: MER B089
SERVES: MDF/IDF ROOM

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AHU-2 CONTROL SYSTEM

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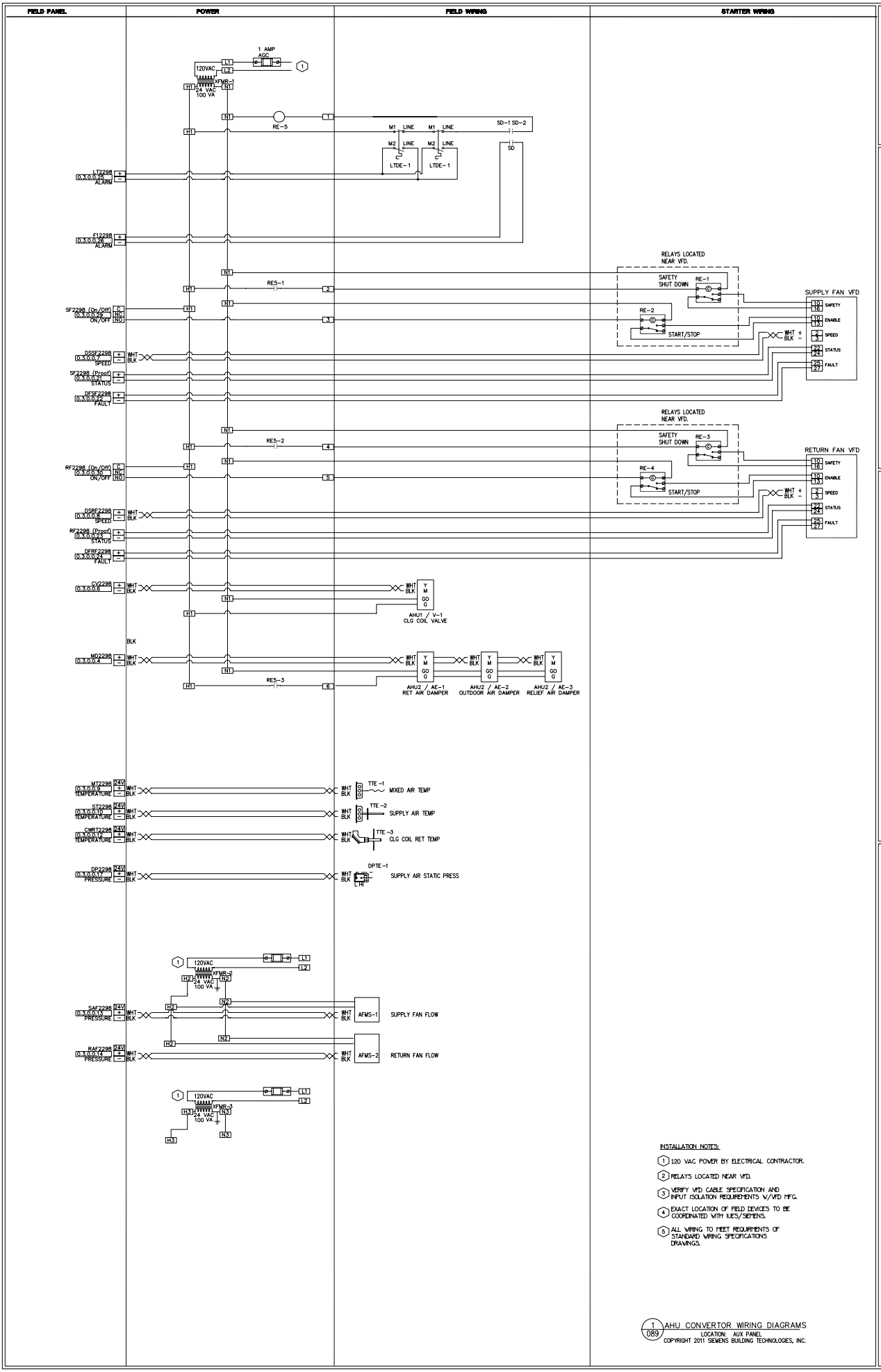

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/089 AHU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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AHU-2 SYSTEM WIRING

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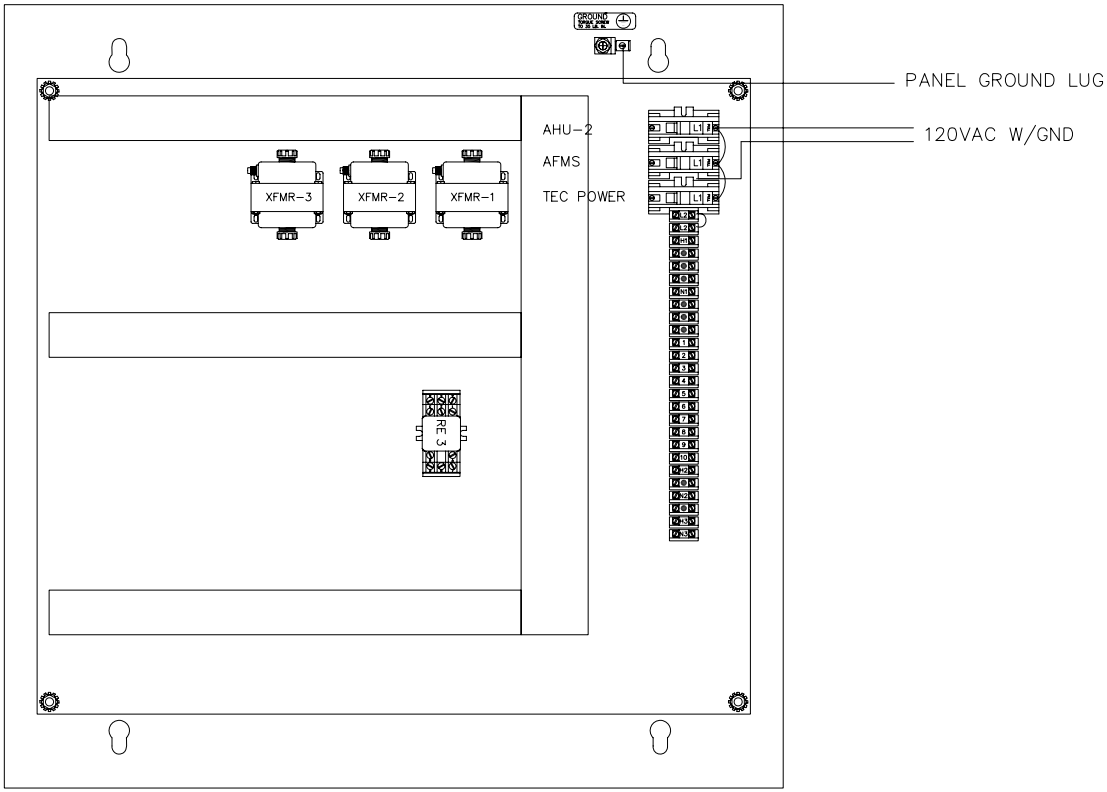

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AHU-2 AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCC 003000	1	PXC36-PE.A	SIEMENS	149454	APOGEE P2 Ethernet, RS-485 ALN
	1	LSM-FLN36.A	SIEMENS	N/A	FLN SUPPORT FLN ONLY (LICENSE MANAGER)
	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCC-3 AHU-2

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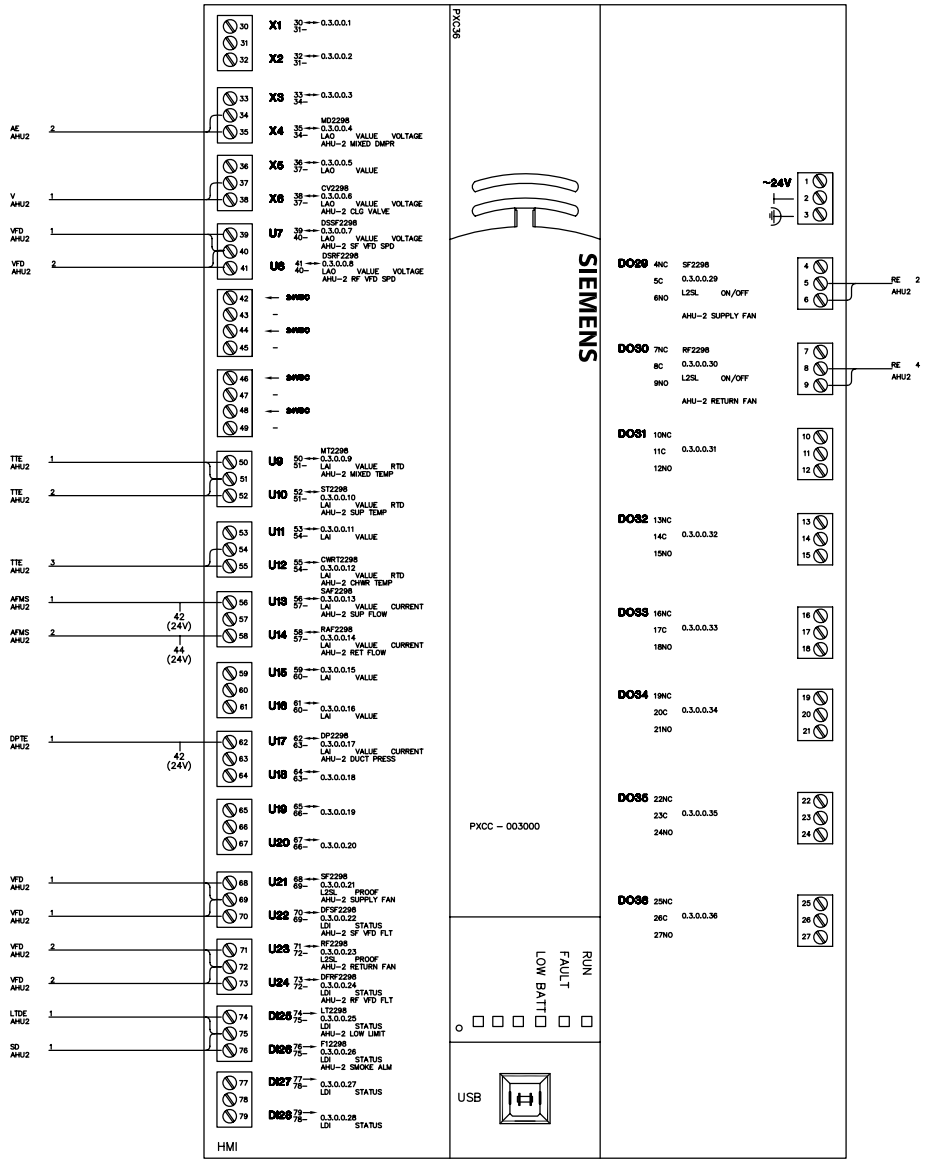

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PXCC-3 CONTROLLER LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1–3	3	GCA161.1U	SIEMENS	154001	MOD(V) SR,24V, MED.
AFMS 1	1	FBO	N/A	N/A	FURNISHED BY OTHERS
AFMS 2	1	HTA–104–P	N/A	N/A	N/A
D					SEE DAMPER SUBMITTAL
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/–5" ENC
LTDE 1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1–4	4	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1–2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1	1	269–062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1	1	544–342–24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 2	1	544–339–18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 3	1	544–577–25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1–2	2	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
RE 5	1	RH3B–ULAC24V–KIT	LECTRO COM	N/A	(1) RH3B–ULAC24V and (1) SH3B–05 socket
XFMR 1–3	3	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120–24V,single hub,ClassII U

AIR HANDLING UNITS – MDF/IDF UNITS (AHU–3):
THE AIR HANDLING UNIT SHALL BE UNDER THE CONTROL OF THE BUILDING MANAGEMENT SYSTEM (BMS). VARIABLE SPEED FANS SHALL BE UTILIZED TO SUPPLY AIR TO THE MDF/IDF ROOMS SERVED BY THE AIR HANDLING UNITS.

UPON RECEIVING A SIGNAL FROM THE BMS TO BEGIN OPERATION, THE SUPPLY FAN IN THE AIR HANDLING UNIT SHALL BE ACTIVATED. THE BMS SHALL THEN READ THE STATIC PRESSURE IN THE SUPPLY DUCTWORK VIA A STATIC PRESSURE SENSOR, COMPARING THE SIGNAL TO THE PREDETERMINED SETPOINT. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE (VFD) SHALL VARY THE SPEED OF THE SUPPLY FAN MOTOR TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SET POINT. WHEN THE SETPOINT IS SATISFIED, THE SPEED OF THE SUPPLY FAN SHALL REMAIN CONSTANT. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SENSOR SIGNAL TO ITS RESPECTIVE SETPOINT, AND SHALL CONTROL THE SUPPLY FAN TO ITS PREDETERMINED CONDITION.

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THE BMS SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

VAV TERMINAL SHALL BE UNDER THE CONTROL OF THE BMS. VAV TERMINAL UNITS SHALL UTILIZE DDC MICROPROCESSOR BASED LOGIC TO ACHIEVE ALL CONTROL FUNCTIONS. DURING COOLING MODE, EACH VAV UNIT CONTROLLER SHALL MODULATE ITS AIR DAMPER BETWEEN ITS MINIMUM AND MAXIMUM POSITION TO MAINTAIN THE SPACE TEMPERATURE SETPOINT (80 DEG F, ADJUSTABLE).

ECONOMIZER OPERATION: WHEN OUTSIDE DRY–BULB IS LESS THAN 65 DEG F (ADJUSTABLE) – MODULATE THE ECONOMIZER OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. WHEN OUTSIDE AIR DRY–BULB IS GREATER THAN 65 DEG F (ADJUSTABLE) – CLOSE THE ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF DAMPER. ECONOMIZER OA AND RELIEF AIR DAMPER SHALL MODULATE INVERSELY WITH THE RETURN AIR DAMPER. AS THE ECONOMIZER OA AND RELIEF AIR DAMPERS OPEN, THE RETURN AIR DAMPER CLOSES. DURING NORMAL OPERATION OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER ARE CLOSED.

ECONOMIZER LOW LIMIT: IF THE MIXED AIR TEMPERATURE (MAT) DROPS BELOW 50 DEG F (ADJ), THE SYSTEM SHALL ALARM AND THE DISCHARGE AIR CONTROL AND THE ECONOMIZER DAMPER OPERATION SHALL HALT UNTIL THE MAT IS ABOVE SETPOINT.

RETURN FAN OPERATION: THE BMS SHALL START THE RETURN FAN WHEN THE AHU SUPPLY FAN HAS BEEN ACTIVATED. THE BMS SHALL THEN READ THE SUPPLY AIRFLOW AND RETURN AIR AIRFLOW, VIA AIRFLOW MEASURING STATIONS, AND CONTROL THE SPEED OF THE RETURN FAN TO MATCH THE SUPPLY AIRFLOW. THE BMS SHALL CONTINUOUSLY READ AND COMPARE THE SUPPLY AIRFLOW AND RETURN SIGNALS AND CONTROL THE RETURN FAN SPEED TO ITS RESPECTIVE SETPOINT.

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.
TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT–MOUNTED SMOKE DETECTOR (RETURN AIR STREAM, DIVISION 26)
WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND RETURN FAN AND CLOSE THE OUTSIDE AIR DAMPER.

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AHU-3 CONTROL SYSTEM

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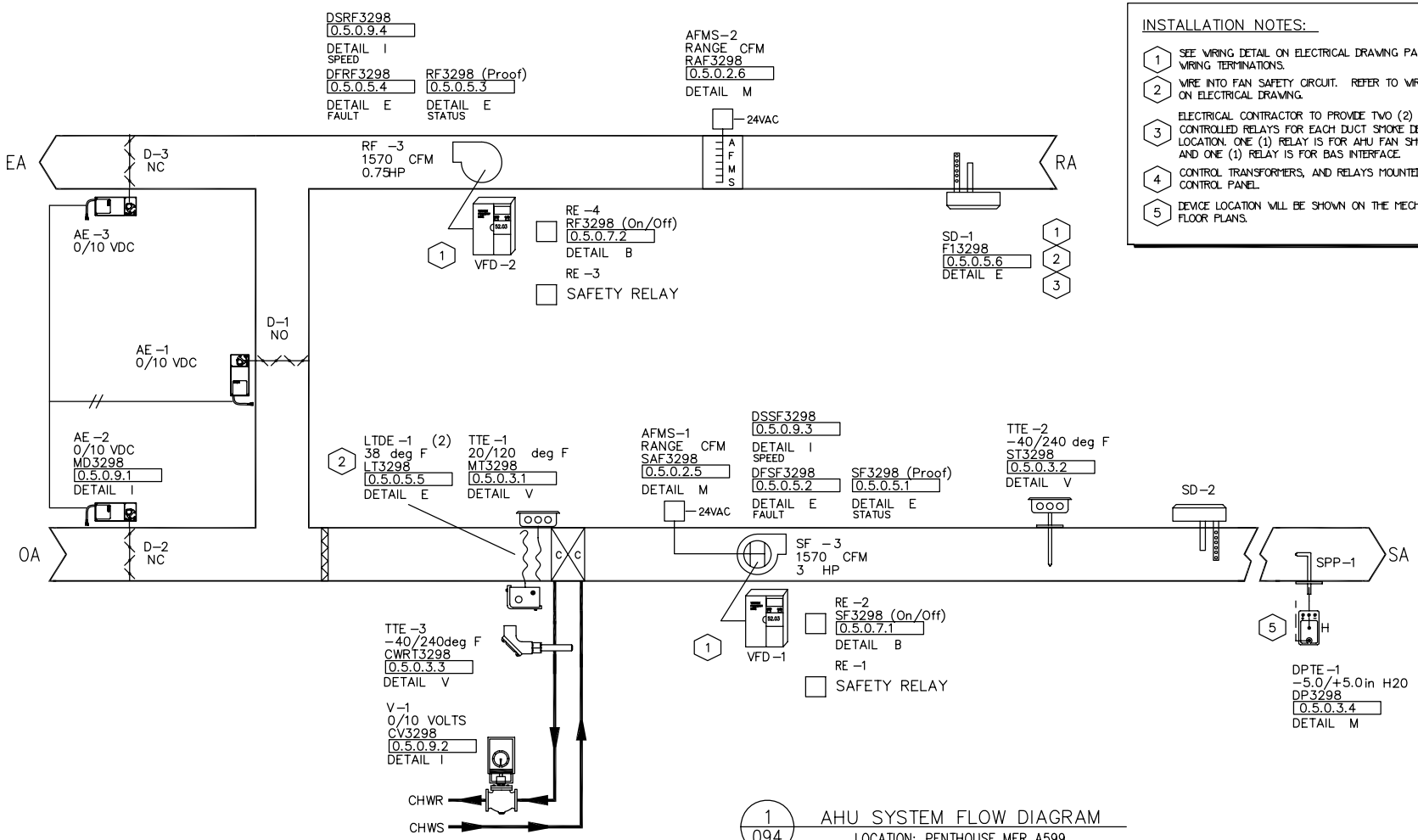

INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 095 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.

1 / 094 AHU SYSTEM FLOW DIAGRAM

LOCATION: PENTHOUSE MER A599
SERVES: MDF/IDF ROOM

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REVISION HISTORY

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Building Technology Division

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Fax: (877)810-2758

IU SE Residence Hall
Bloomington, IN

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
WLH	WLH	SBT	12/22/11	01/16/12

AHU-3 CONTROL SYSTEM

440P099145
IU PROJ #20106837

094

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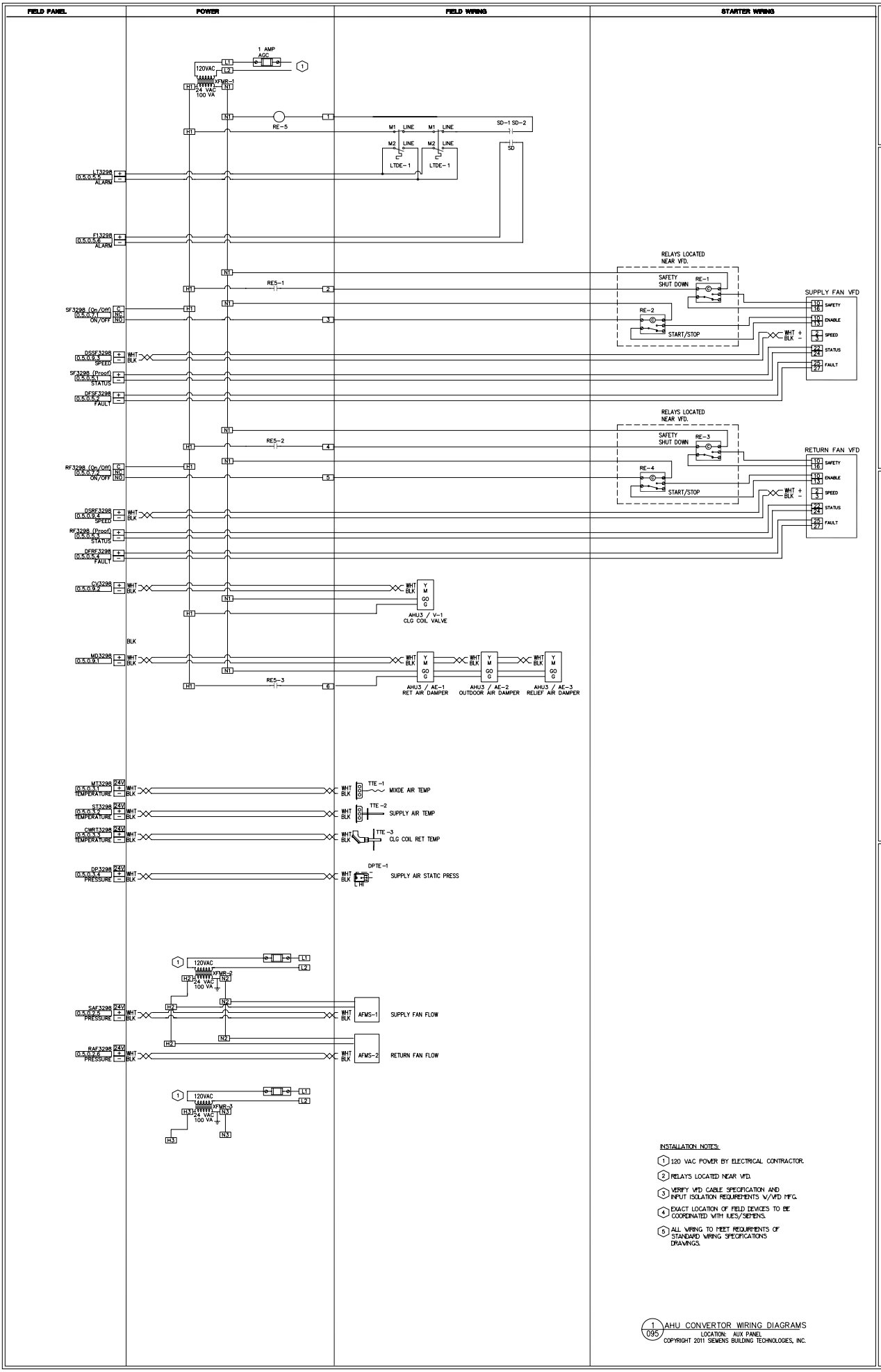

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 / 095 AHU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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REVISION HISTORY

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1–2	2	GCA226.1U	SIEMENS	154001	2 PT SR,115V,MED/S
CS 1–3	3	H608	VERIS	1006cut016	CUR SW SPLTCOR–ADJ SETPT W/LED
CT 1–2	2	H921	VERIS	1006cut007	LOOP–POWRED 4–20MA CURR SNSR
D					SEE DAMPER SUBMITTAL
DPS 1–2	2	AFS–460–DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/–5" ENC
LTDE 1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1–6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1–2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1–3	4	269–062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1–4	4	544–342–24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 5	1	544–339–18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 6–7	2	544–577–25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1	1	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567–352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
PS 1	1	DCP–1.5–W–12	KELE	N/A	24VAC/12VDC POWER SUPPLY 1.5W
RE 7	1	RH3B–ULAC24V–KIT	LECTRO COM	N/A	(1) RH3B–ULAC24V and (1) SH3B–05 socket
WDS 1	1	470–12	HONEYWELL	N/A	470–12,WATER SENSOR, 12VDC
XFMR 4–5	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120–24V,single hub,ClassII U

ENERGY RECOVERY UNITS – RESIDENTIAL AREAS (ERU–4, 5, 6, 7):

ENERGY RECOVERY UNITS SHALL BE UNDER THE CONTROL OF THE BMS. CONSTANT SPEED FANS SHALL BE UTILIZED TO SUPPLY 100% OUTSIDE AIR AND EXHAUST AIR DIRECTLY TO/FROM ROOMS IN THE BUILDING. THESE FANS SHALL OPERATE CONTINUOUSLY (24 H/D, 7 D/WK) AT CONSTANT SPEED. UNIT FANS SHALL OPERATE ONLY WHEN BOTH THE NORMALLY CLOSED OUTSIDE AIR AND EXHAUST AIR DAMPERS ARE PROVEN OPEN VIA END SWITCH ON BOTH DAMPERS.

ENTHALPY RECOVERY WHEEL: VARIABLE SPEED CONTROL SHALL BE UTILIZED TO MODULATE THE ROTATIONAL SPEED OF THE ENTHALPY WHEEL TO MAINTAIN A 55 DEGREE F SUPPLY AIR TEMPERATURE LEAVING THE WHEEL. THE ENTHALPY WHEEL SHALL BE DEACTIVATED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F AND BELOW 75 DEGREES F.

WHEEL DEFROST CYCLE: THE BMS SHALL MONITOR THE EXHAUST AIR TEMPERATURE LEAVING THE WHEEL. THE SPEED OF THE ENTHALPY WHEEL SHALL SLOW DOWN AS REQUIRED TO MAINTAIN A MINIMUM EXHAUST AIR TEMPERATURE LEAVING THE WHEEL OF 0 DEG F (ADJUSTABLE PER MANUFACTURER'S RECOMMENDATION). THIS CYCLE SHALL OVERRIDE NORMAL ENTHALPY WHEEL OPERATION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

HEATING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (70 DEGREES F, ADJUSTABLE). WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35 DEGREES F, THE HOT WATER COIL CIRCULATING PUMP (RP–X) SHALL BE ACTIVATED AND OPERATE CONTINUOUSLY AT CONSTANT SPEED.

AN INITIAL AMPERAGE READING SHALL BE DETERMINED AFTER THE SYSTEM HAS BEEN BALANCED. THE INITIAL AMPERAGE READING SHALL BE USED AS A BASELINE AND AN ALARM SHALL BE GENERATED IF THE ACTUAL READING DEVIATES FROM THE BASELINE BY 20% (ADJ.) FOR A PERIOD OF 5 MINUTES (ADJ.).

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT–MOUNTED SMOKE DETECTOR (SUPPLY AND EXHAUST AIR STREAM, DIVISION 26)
DUCT HIGH STATIC LIMIT (SUPPLY AIR – DOWNSTREAM OF FAN)
DUCT LOW STATIC LIMIT (EXHAUST AIR – UPSTREAM OF FAN)

WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND EXHAUST FAN, CLOSE THE OUTSIDE AIR AND EXHAUST AIR DAMPER, AND OPEN THE HEAT COIL CONTROL VALVE TO ITS FULL OPEN POSITION.

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WLH	WLH		12/22/11	01/16/12

ERU-4 CONTROL SYSTEM

44OP099145
IU PROJ #20106837
096

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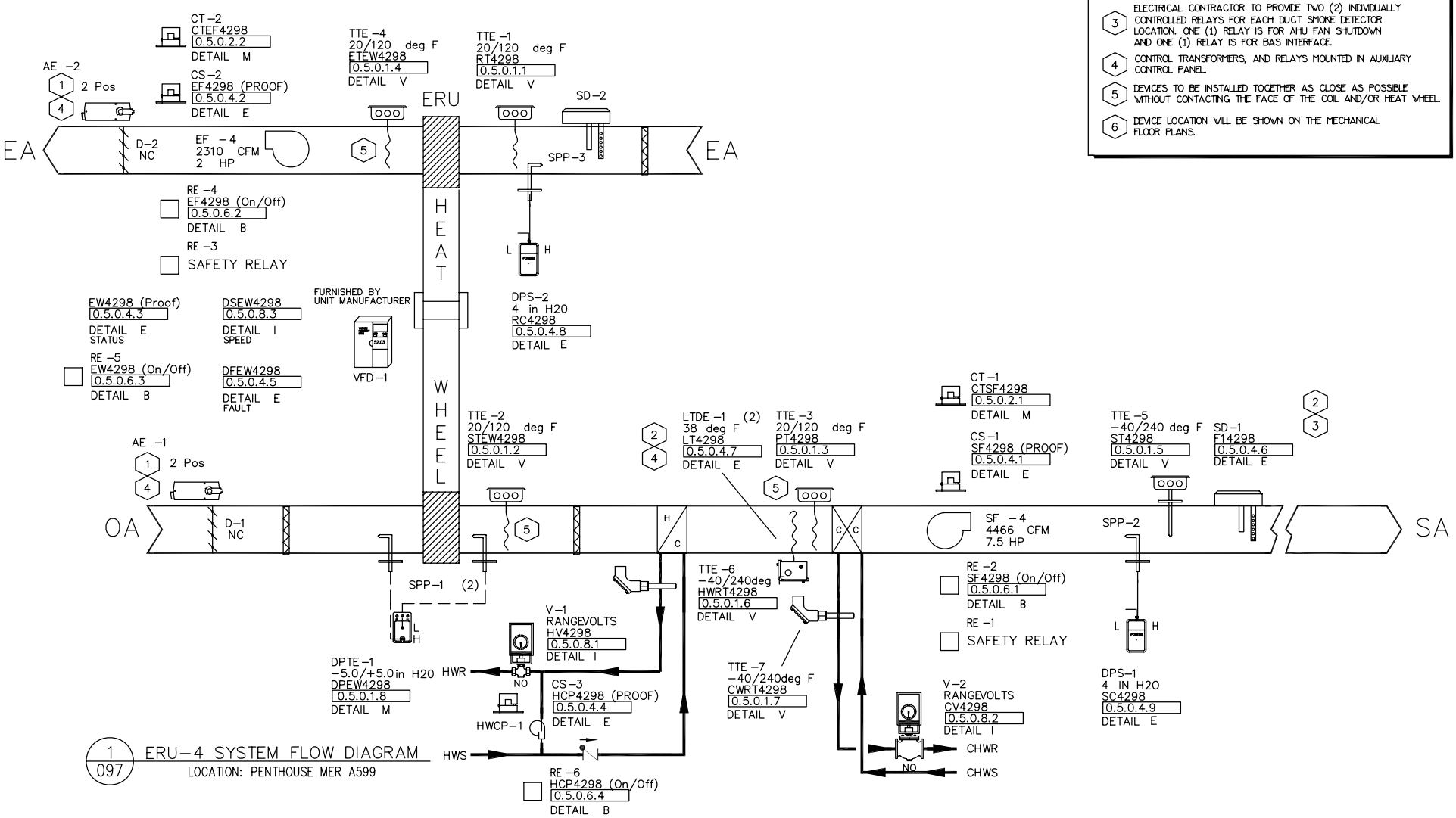
INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 098 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICES TO BE INSTALLED TOGETHER AS CLOSE AS POSSIBLE WITHOUT CONTACTING THE FACE OF THE COIL AND/OR HEAT WHEEL.
6. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.



1/097 ERU-4 SYSTEM FLOW DIAGRAM
LOCATION: PENTHOUSE MER A599

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	Siemens Industry Inc. Building Technology Division 6200 Technology Center Dr. Indianapolis, IN 46278 USA Phone: (317)293-8880 Fax: (877)810-2758	ENGINEER: WLH · DRAFTER: WLH · CHECKED BY: SBT · INITIAL RELEASE: 12/22/11 · LAST EDIT DATE: 01/16/12 ERU-4 CONTROL SYSTEM	097

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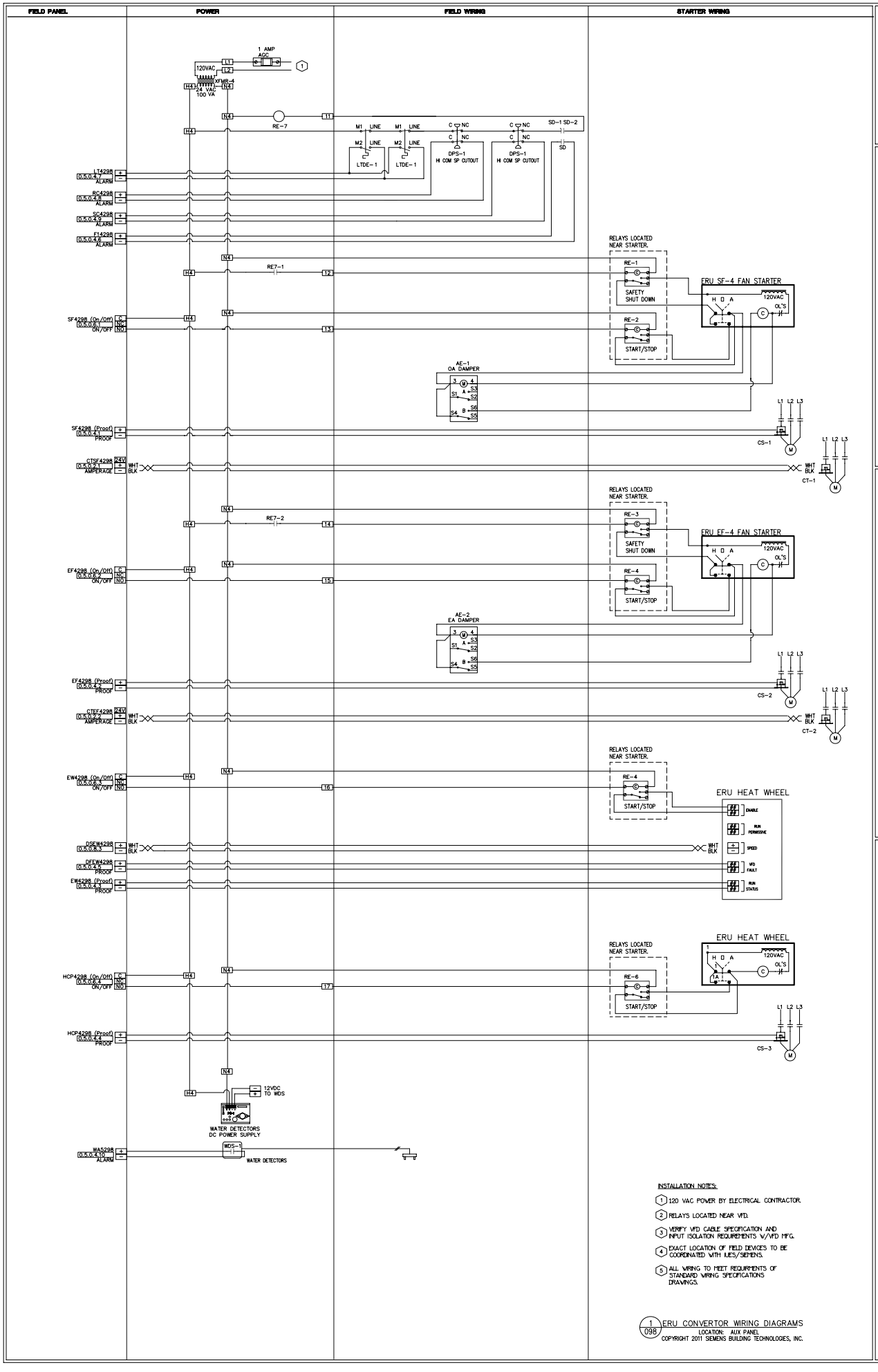

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ERU-4 SYSTEM WIRING

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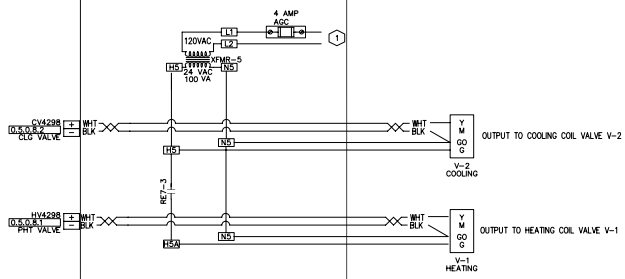
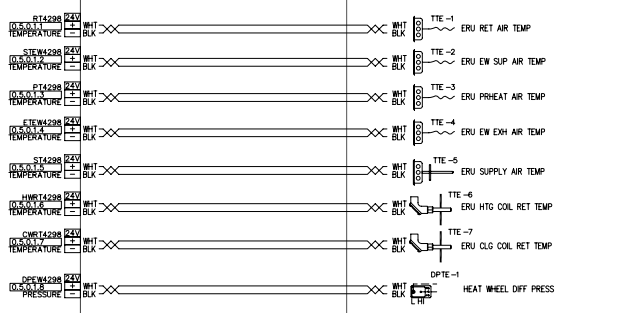
FIELD PANEL	POWER	FIELD WIRING	STARTER WIRING	BY OTHER





INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 / 099 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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ERU-4 SYSTEM WIRING

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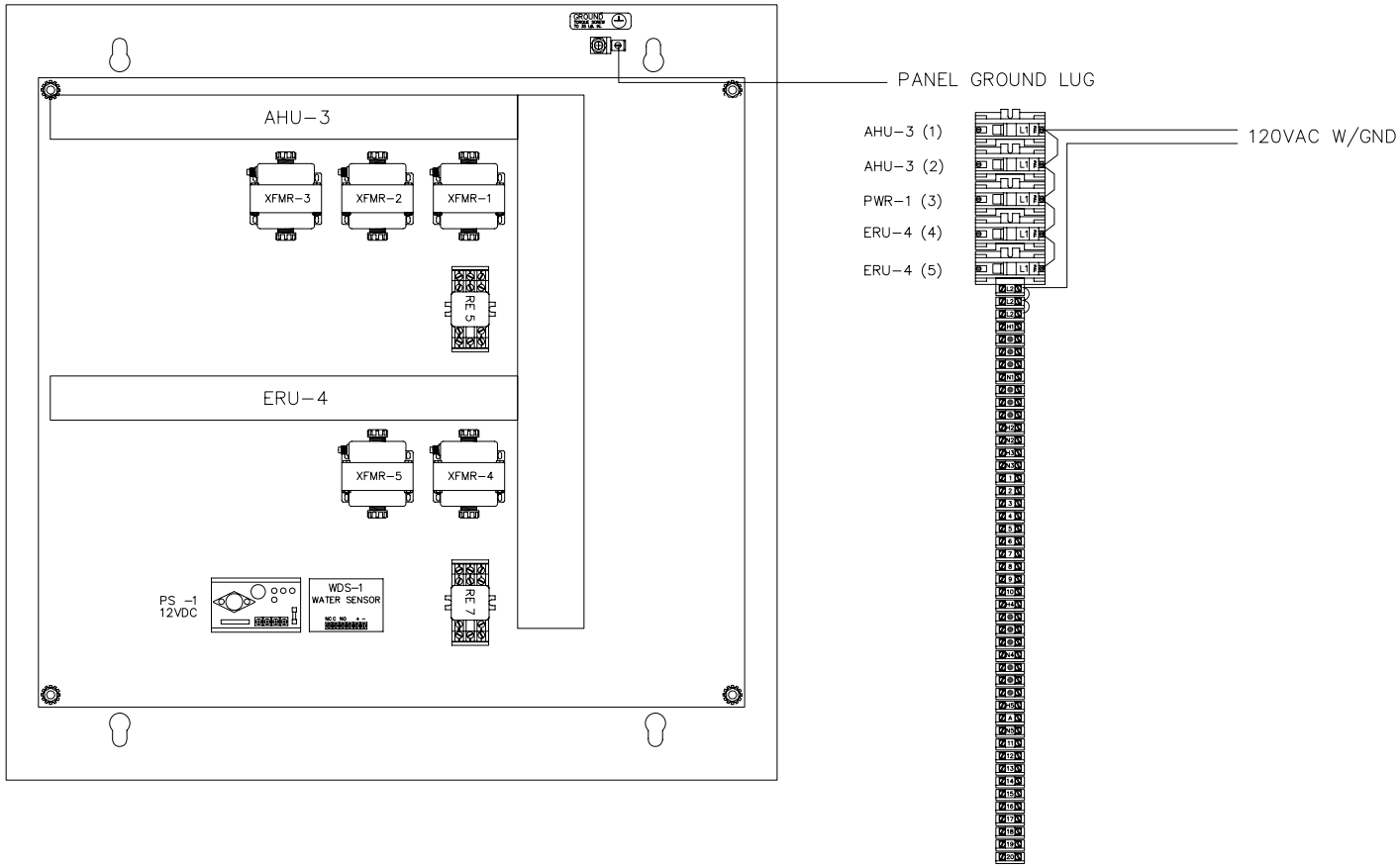

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AHU-3/ERU-4 AUX PANEL LAYOUT

440P099145
IU PROJ #20106837

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 005000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	3	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	2	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	2	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	2	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCM-5 AHU-3/ERU-4

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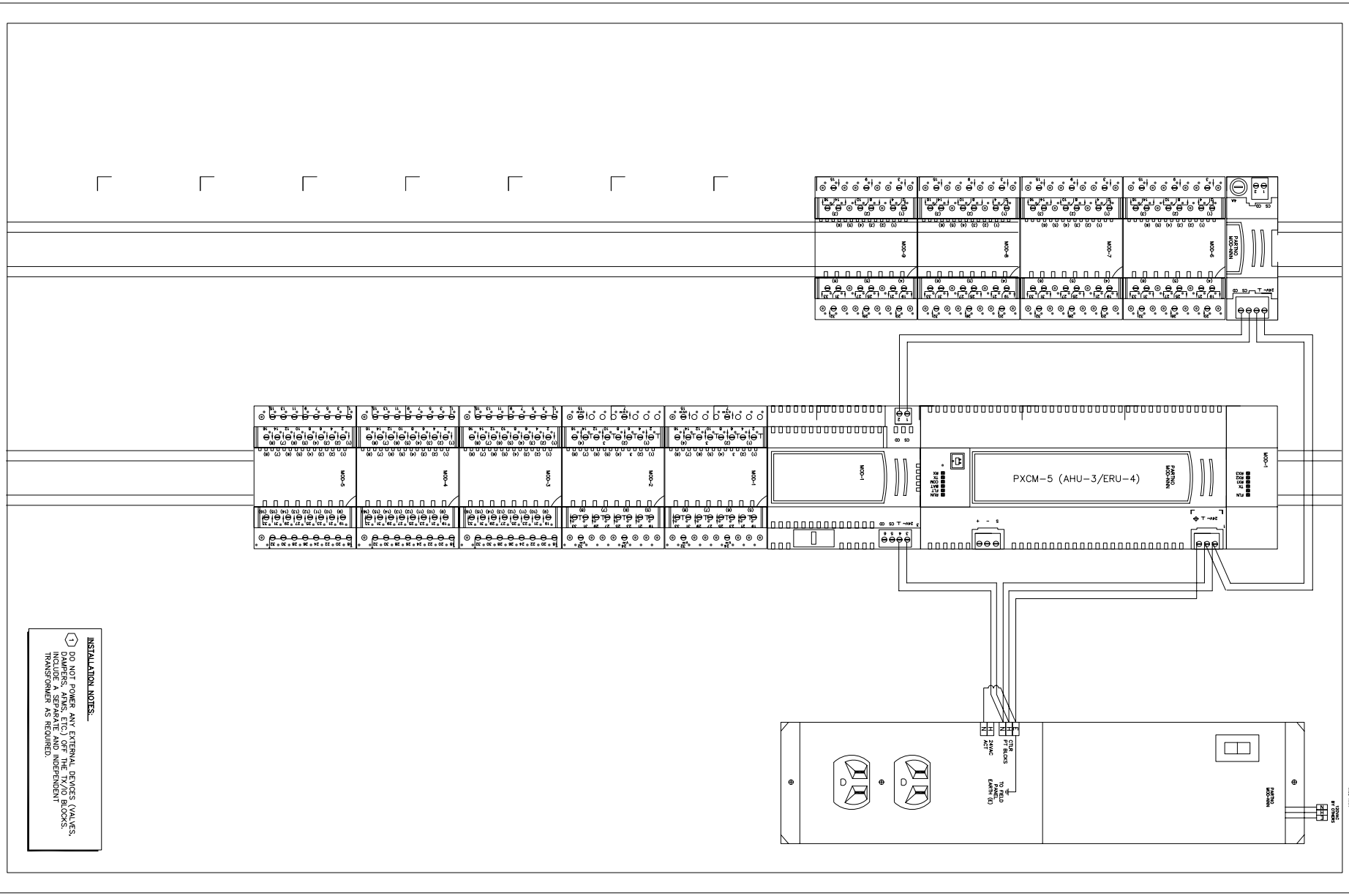

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PXCM-5 AHU-3/ERU-4

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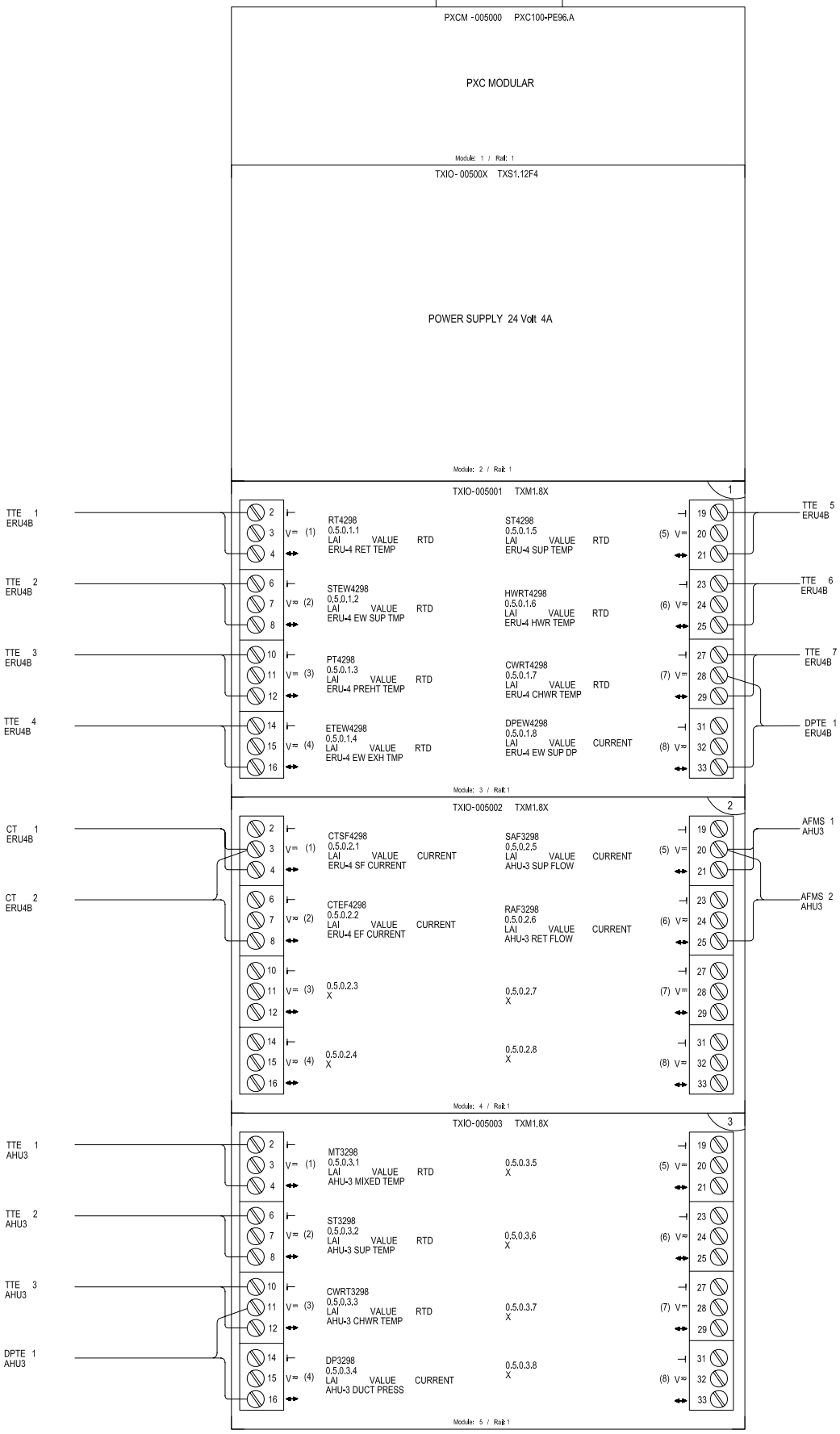

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PXCM-5 CONTROLLER LAYOUT 1

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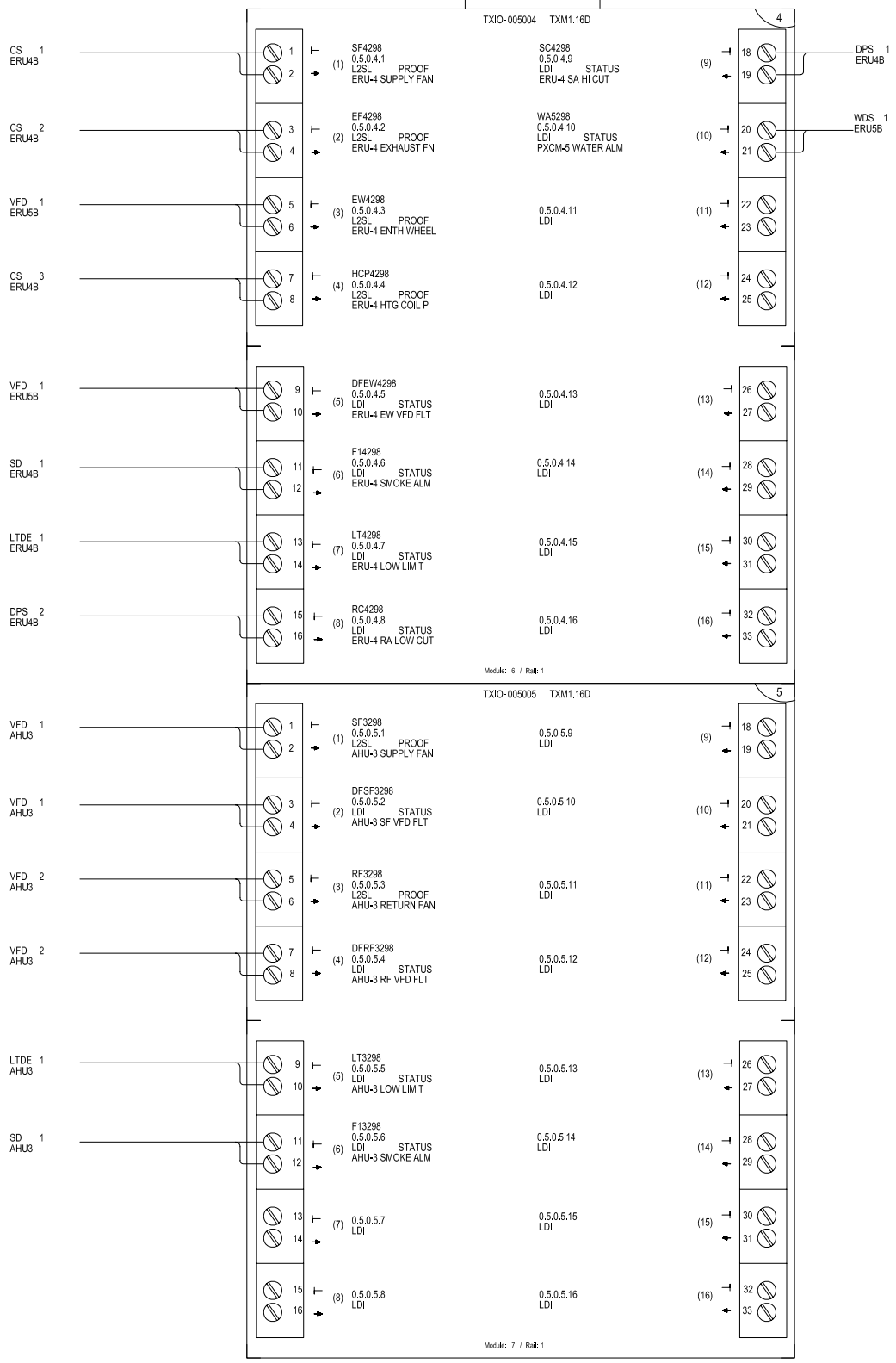

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PXCM-5 CONTROLLER LAYOUT 2

440P099145
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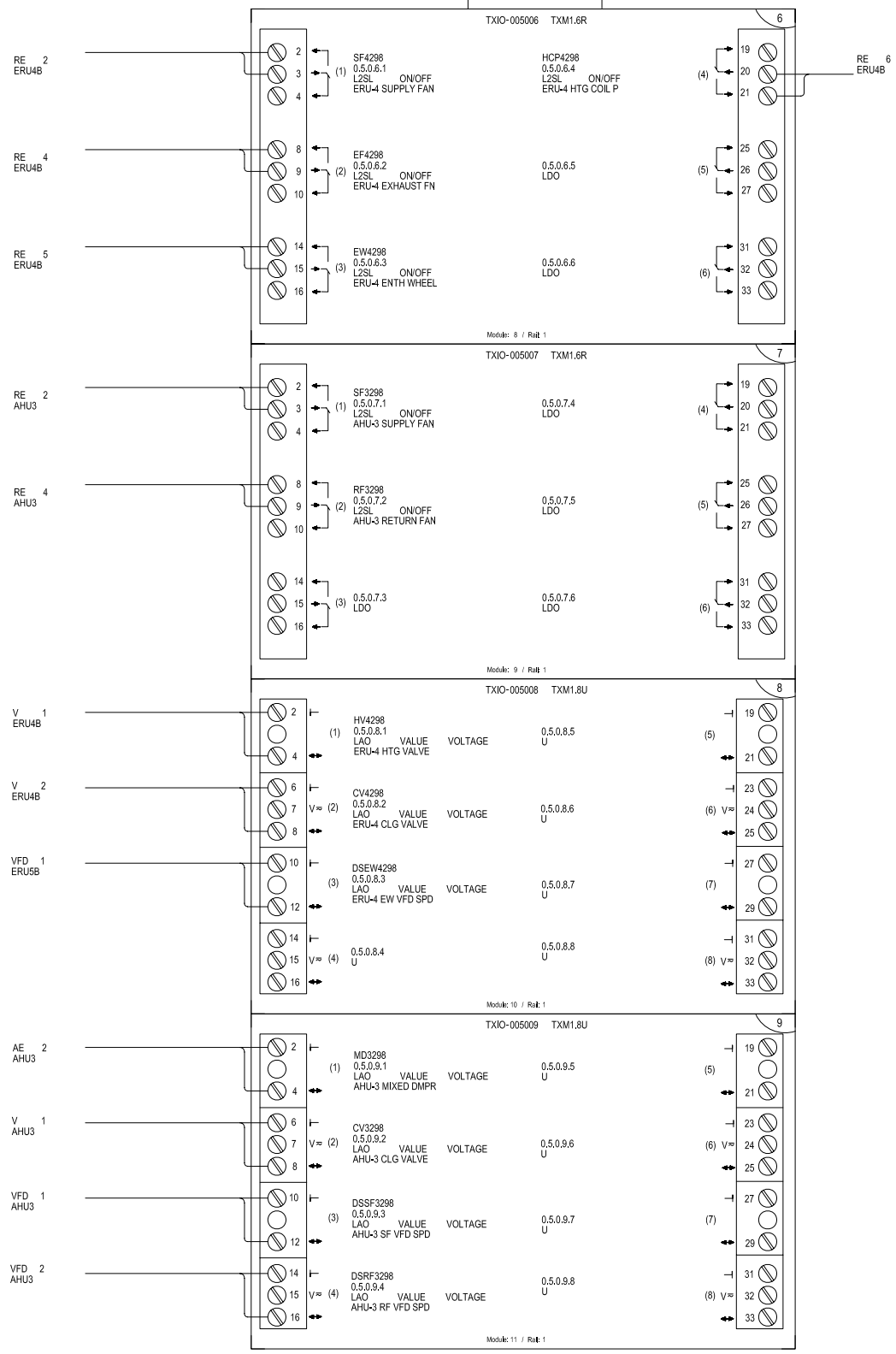

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PXCM-5 CONTROLLER LAYOUT 3

440P099145
IU PROJ #20106837

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1–2	2	GCA226.1U	SIEMENS	154001	2 PT SR,115V,MED/S
CS 1–3	3	H608	VERIS	1006cut016	CUR SW SPLTCOR–ADJ SETPT W/LED
CT 1–2	2	H921	VERIS	1006cut007	LOOP–POWRED 4–20MA CURR SNSR
D					SEE DAMPER SUBMITTAL
DPS 1–2	2	AFS–460–DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/–5" ENC
LTDE 1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1–6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1–2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1–3	4	269–062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1–4	4	544–342–24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 5	1	544–339–18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 6–7	2	544–577–25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1	1	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567–352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
PS 1	1	DCP–1.5–W–12	KELE	N/A	24VAC/12VDC POWER SUPPLY 1.5W
RE 7	1	RH3B–ULAC24V–KIT	LECTRO COM	N/A	(1) RH3B–ULAC24V and (1) SH3B–05 socket
WDS 1	1	470–12	HONEYWELL	N/A	470–12,WATER SENSOR, 12VDC
XFMR 1–2	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120–24V,single hub,ClassII U

ENERGY RECOVERY UNITS – RESIDENTIAL AREAS (ERU–4, 5, 6, 7):

ENERGY RECOVERY UNITS SHALL BE UNDER THE CONTROL OF THE BMS. CONSTANT SPEED FANS SHALL BE UTILIZED TO SUPPLY 100% OUTSIDE AIR AND EXHAUST AIR DIRECTLY TO/FROM ROOMS IN THE BUILDING. THESE FANS SHALL OPERATE CONTINUOUSLY (24 H/D, 7 D/WK) AT CONSTANT SPEED. UNIT FANS SHALL OPERATE ONLY WHEN BOTH THE NORMALLY CLOSED OUTSIDE AIR AND EXHAUST AIR DAMPERS ARE PROVEN OPEN VIA END SWITCH ON BOTH DAMPERS.

ENTHALPY RECOVERY WHEEL: VARIABLE SPEED CONTROL SHALL BE UTILIZED TO MODULATE THE ROTATIONAL SPEED OF THE ENTHALPY WHEEL TO MAINTAIN A 55 DEGREE F SUPPLY AIR TEMPERATURE LEAVING THE WHEEL. THE ENTHALPY WHEEL SHALL BE DEACTIVATED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F AND BELOW 75 DEGREES F.

WHEEL DEFROST CYCLE: THE BMS SHALL MONITOR THE EXHAUST AIR TEMPERATURE LEAVING THE WHEEL. THE SPEED OF THE ENTHALPY WHEEL SHALL SLOW DOWN AS REQUIRED TO MAINTAIN A MINIMUM EXHAUST AIR TEMPERATURE LEAVING THE WHEEL OF 0 DEG F (ADJUSTABLE PER MANUFACTURER'S RECOMMENDATION). THIS CYCLE SHALL OVERRIDE NORMAL ENTHALPY WHEEL OPERATION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

HEATING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (70 DEGREES F, ADJUSTABLE). WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35 DEGREES F, THE HOT WATER COIL CIRCULATING PUMP (RP–X) SHALL BE ACTIVATED AND OPERATE CONTINUOUSLY AT CONSTANT SPEED.

AN INITIAL AMPERAGE READING SHALL BE DETERMINED AFTER THE SYSTEM HAS BEEN BALANCED. THE INITIAL AMPERAGE READING SHALL BE USED AS A BASELINE AND AN ALARM SHALL BE GENERATED IF THE ACTUAL READING DEVIATES FROM THE BASELINE BY 20% (ADJ.) FOR A PERIOD OF 5 MINUTES (ADJ.).

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT–MOUNTED SMOKE DETECTOR (SUPPLY AND EXHAUST AIR STREAM, DIVISION 26)
DUCT HIGH STATIC LIMIT (SUPPLY AIR – DOWNSTREAM OF FAN)
DUCT LOW STATIC LIMIT (EXHAUST AIR – UPSTREAM OF FAN)

WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND EXHAUST FAN, CLOSE THE OUTSIDE AIR AND EXHAUST AIR DAMPER, AND OPEN THE HEAT COIL CONTROL VALVE TO ITS FULL OPEN POSITION.

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ERU-5 CONTROL SYSTEM

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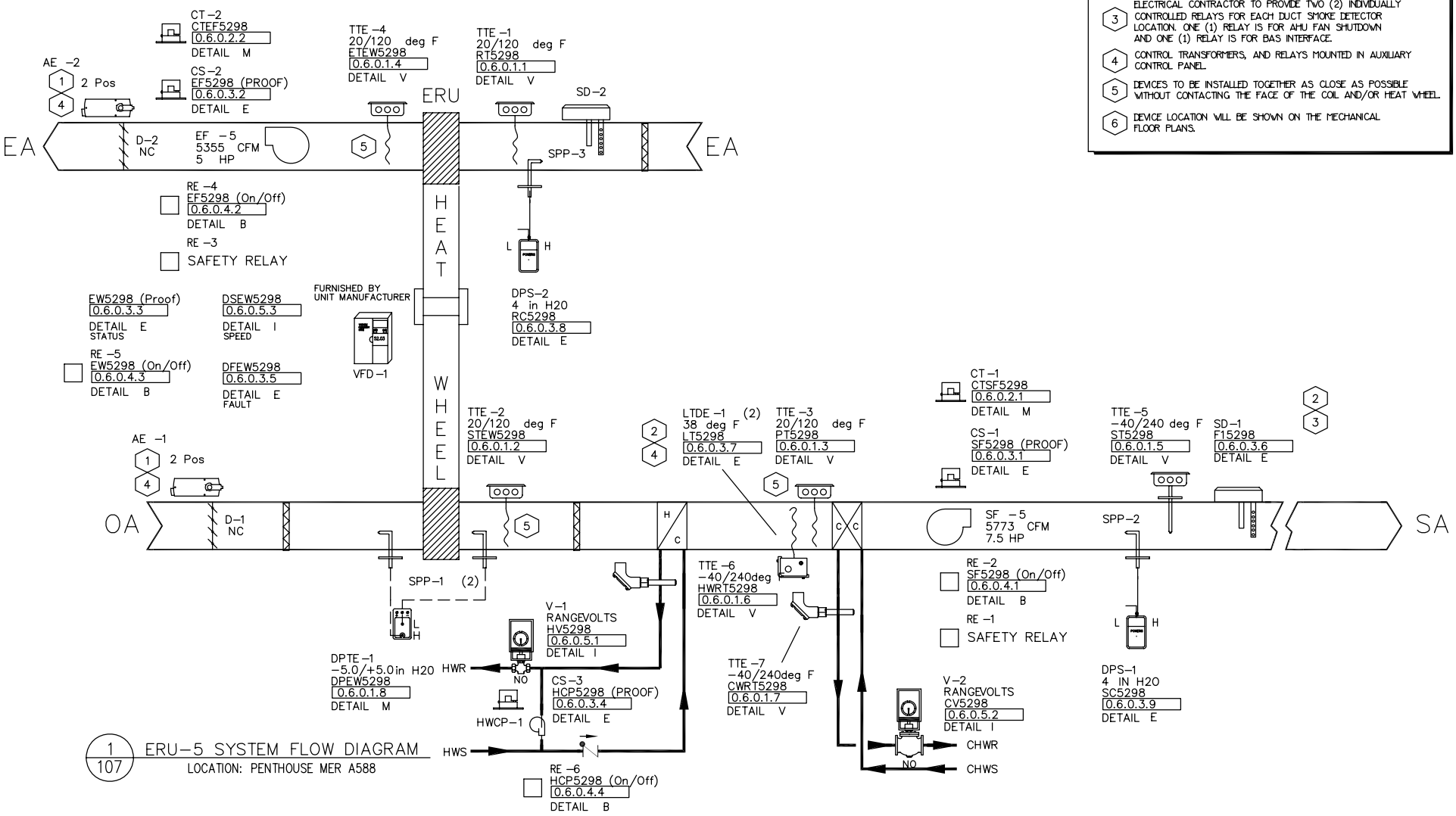
INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 108 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICES TO BE INSTALLED TOGETHER AS CLOSE AS POSSIBLE WITHOUT CONTACTING THE FACE OF THE COIL AND/OR HEAT WHEEL.
6. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.



1/107 ERU-5 SYSTEM FLOW DIAGRAM
LOCATION: PENTHOUSE MER A588

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ERU-5 CONTROL SYSTEM

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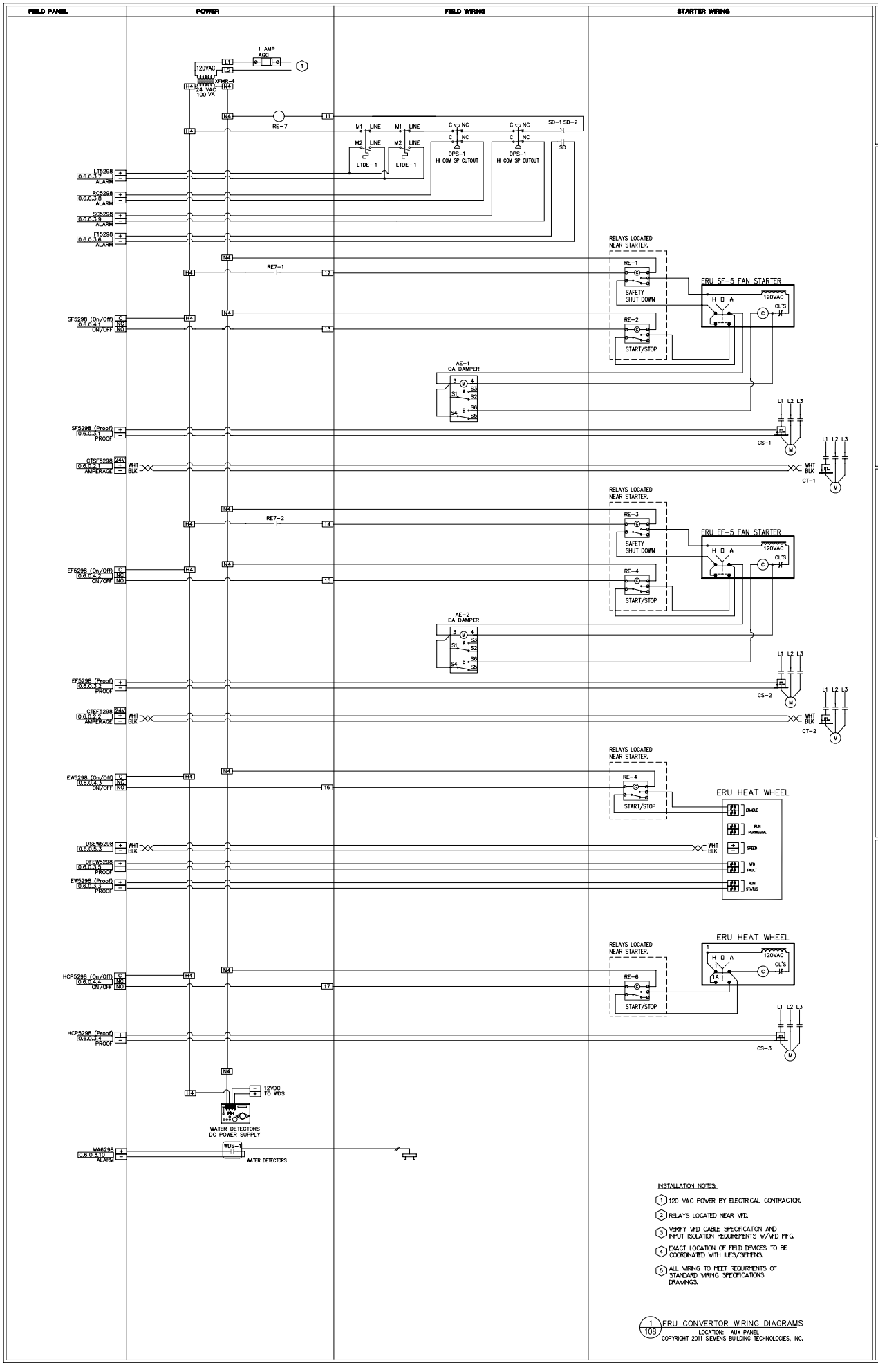

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ERU-5 SYSTEM WIRING

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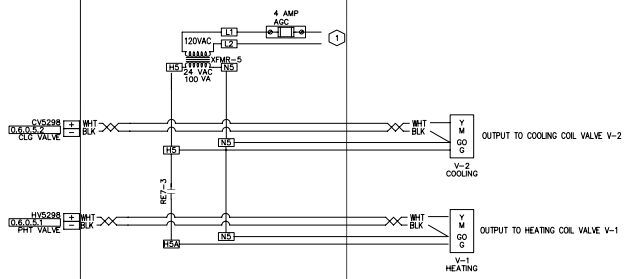
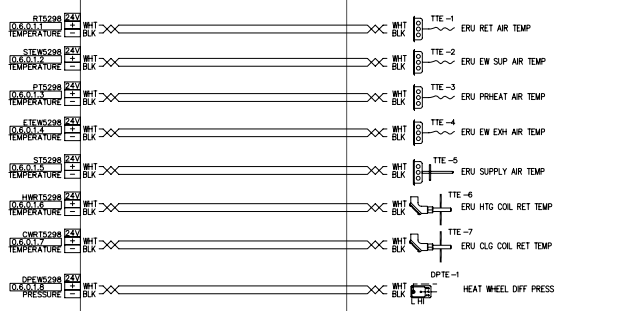
FIELD PANEL	POWER	FIELD WIRING	STARTER WIRING	BY OTHER





INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/109 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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ERU-5 SYSTEM WIRING

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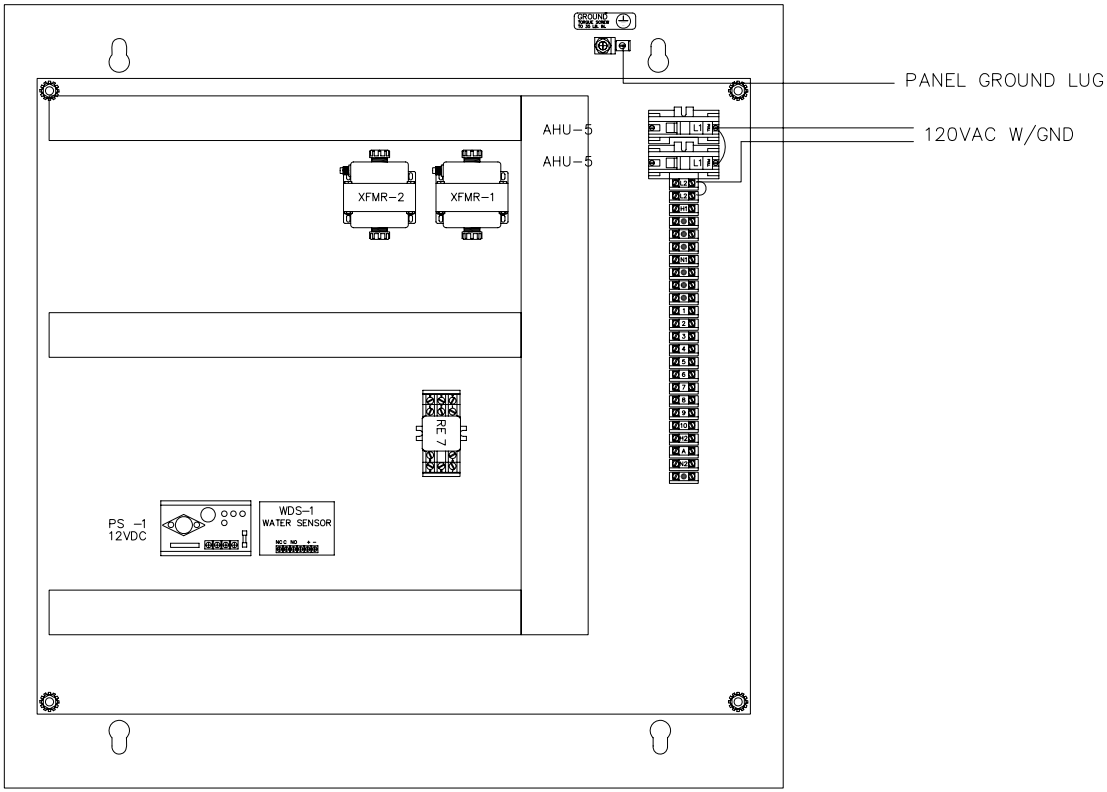

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ERU-5 AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 006000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	2	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	1	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	1	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	1	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA
PXCM 007000	1	PXC00-PE96.A	SIEMENS	149478	PXC MOD, P2, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485

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PXCM-6 ERU-5/PXCM-7 FLN

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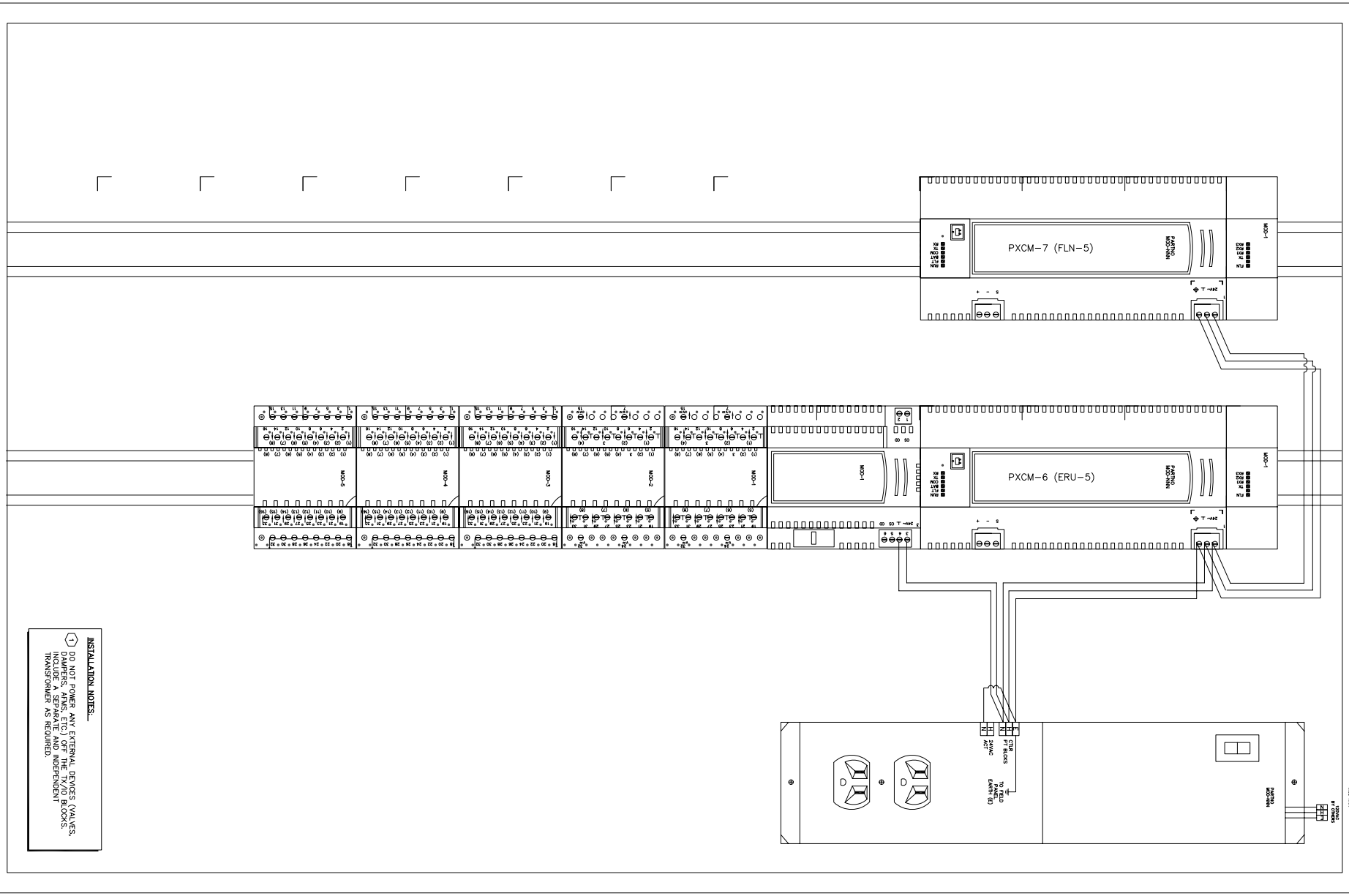

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PXCM-6 ERU-5/PXCM-7 FLN

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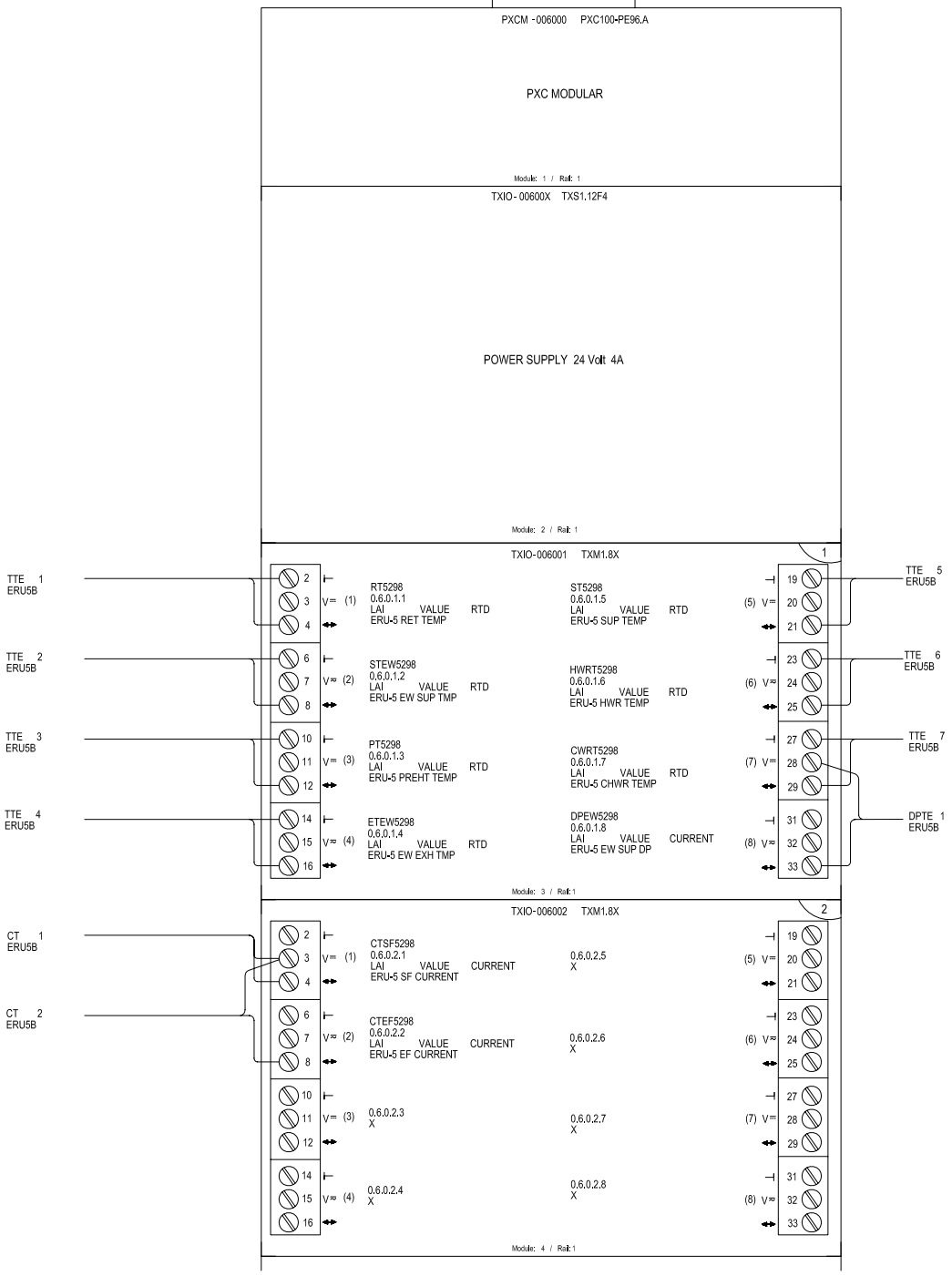

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PXCM-6 CONTROLLER LAYOUT 1

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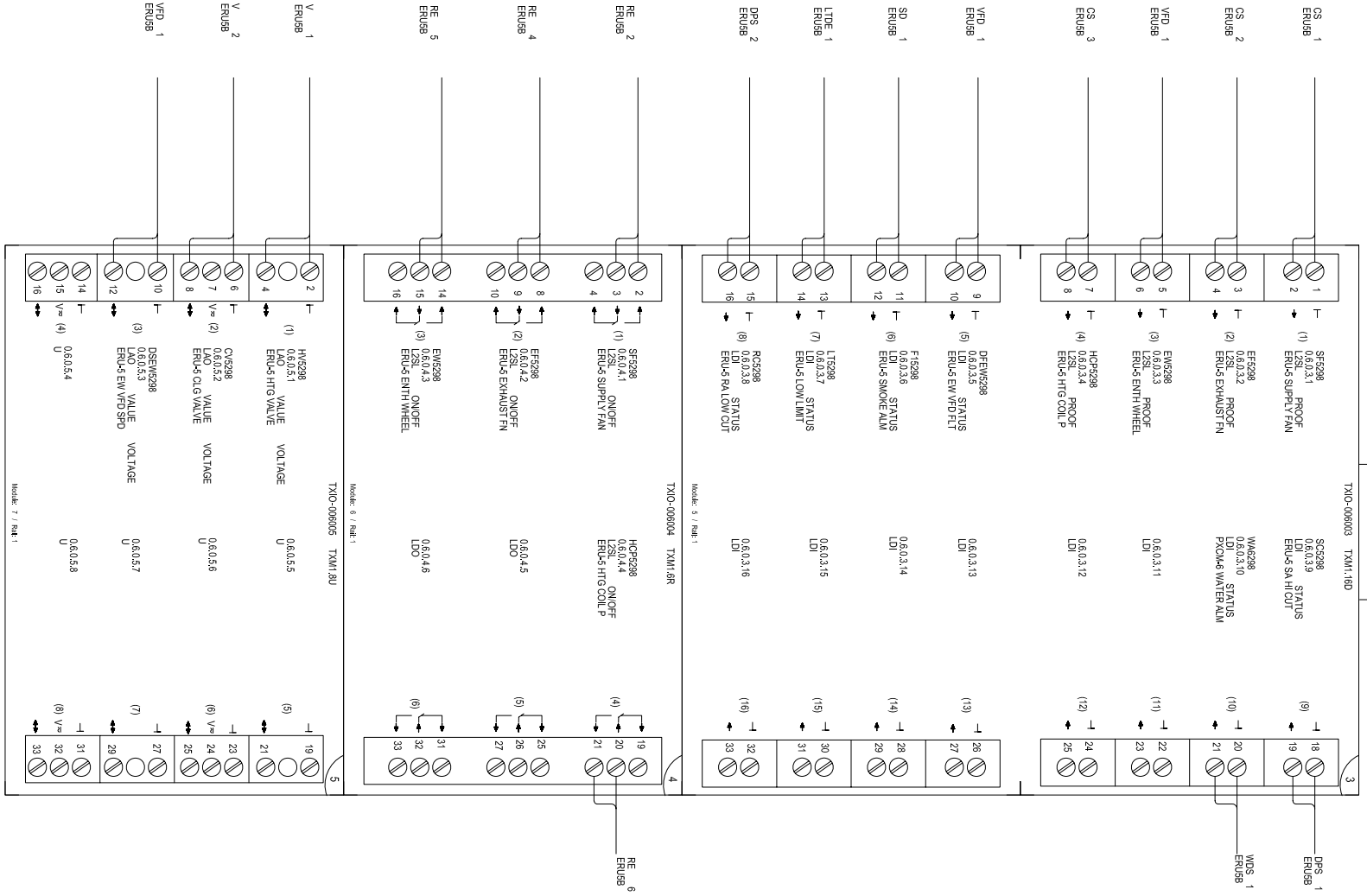

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PXCM-6 CONTROLLER LAYOUT 2

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1–2	2	GCA226.1U	SIEMENS	154001	2 PT SR,115V,MED/S
CS 1–3	3	H608	VERIS	1006cut016	CUR SW SPLTCOR–ADJ SETPT W/LED
CT 1–2	2	H921	VERIS	1006cut007	LOOP–POWRED 4–20MA CURR SNSR
D					SEE DAMPER SUBMITTAL
DPS 1–2	2	AFS–460–DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/–5" ENC
LTDE 1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1–6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1–2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1–3	4	269–062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1–4	4	544–342–24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 5	1	544–339–18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 6–7	2	544–577–25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1	1	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567–352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
PS 1	1	DCP–1.5–W–12	KELE	N/A	24VAC/12VDC POWER SUPPLY 1.5W
RE 7	1	RH3B–ULAC24V–KIT	LECTRO COM	N/A	(1) RH3B–ULAC24V and (1) SH3B–05 socket
WDS 1	1	470–12	HONEYWELL	N/A	470–12,WATER SENSOR, 12VDC
XFMR 1–2	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120–24V,single hub,ClassII U

ENERGY RECOVERY UNITS – RESIDENTIAL AREAS (ERU–4, 5, 6, 7):

ENERGY RECOVERY UNITS SHALL BE UNDER THE CONTROL OF THE BMS. CONSTANT SPEED FANS SHALL BE UTILIZED TO SUPPLY 100% OUTSIDE AIR AND EXHAUST AIR DIRECTLY TO/FROM ROOMS IN THE BUILDING. THESE FANS SHALL OPERATE CONTINUOUSLY (24 H/D, 7 D/WK) AT CONSTANT SPEED. UNIT FANS SHALL OPERATE ONLY WHEN BOTH THE NORMALLY CLOSED OUTSIDE AIR AND EXHAUST AIR DAMPERS ARE PROVEN OPEN VIA END SWITCH ON BOTH DAMPERS.

ENTHALPY RECOVERY WHEEL: VARIABLE SPEED CONTROL SHALL BE UTILIZED TO MODULATE THE ROTATIONAL SPEED OF THE ENTHALPY WHEEL TO MAINTAIN A 55 DEGREE F SUPPLY AIR TEMPERATURE LEAVING THE WHEEL. THE ENTHALPY WHEEL SHALL BE DEACTIVATED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F AND BELOW 75 DEGREES F.

WHEEL DEFROST CYCLE: THE BMS SHALL MONITOR THE EXHAUST AIR TEMPERATURE LEAVING THE WHEEL. THE SPEED OF THE ENTHALPY WHEEL SHALL SLOW DOWN AS REQUIRED TO MAINTAIN A MINIMUM EXHAUST AIR TEMPERATURE LEAVING THE WHEEL OF 0 DEG F (ADJUSTABLE PER MANUFACTURER'S RECOMMENDATION). THIS CYCLE SHALL OVERRIDE NORMAL ENTHALPY WHEEL OPERATION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

HEATING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (70 DEGREES F, ADJUSTABLE). WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35 DEGREES F, THE HOT WATER COIL CIRCULATING PUMP (RP–X) SHALL BE ACTIVATED AND OPERATE CONTINUOUSLY AT CONSTANT SPEED.

AN INITIAL AMPERAGE READING SHALL BE DETERMINED AFTER THE SYSTEM HAS BEEN BALANCED. THE INITIAL AMPERAGE READING SHALL BE USED AS A BASELINE AND AN ALARM SHALL BE GENERATED IF THE ACTUAL READING DEVIATES FROM THE BASELINE BY 20% (ADJ.) FOR A PERIOD OF 5 MINUTES (ADJ.).

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT–MOUNTED SMOKE DETECTOR (SUPPLY AND EXHAUST AIR STREAM, DIVISION 26)
DUCT HIGH STATIC LIMIT (SUPPLY AIR – DOWNSTREAM OF FAN)
DUCT LOW STATIC LIMIT (EXHAUST AIR – UPSTREAM OF FAN)

WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND EXHAUST FAN, CLOSE THE OUTSIDE AIR AND EXHAUST AIR DAMPER, AND OPEN THE HEAT COIL CONTROL VALVE TO ITS FULL OPEN POSITION.

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ERU-6 CONTROL SYSTEM

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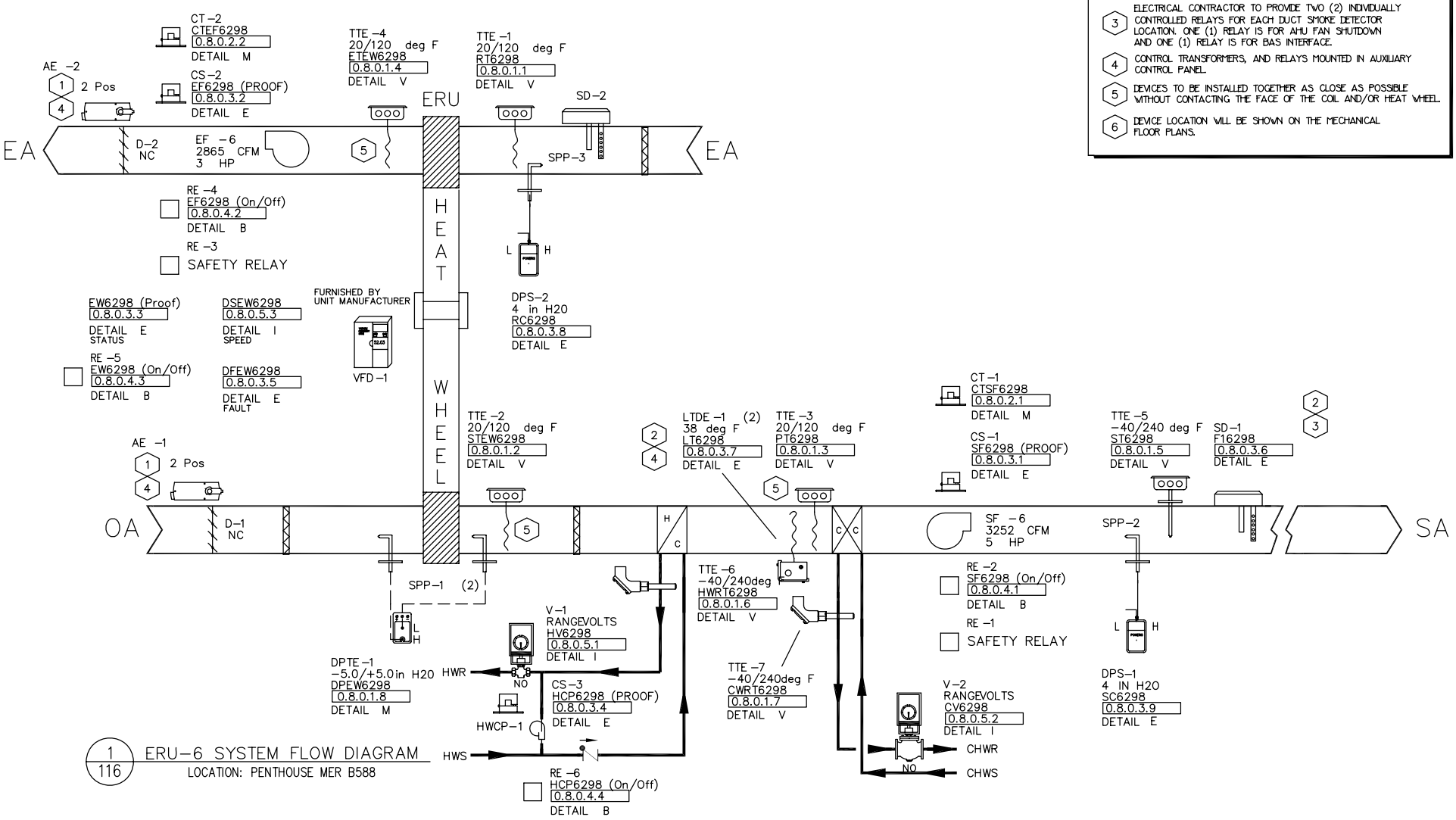
INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 117 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICES TO BE INSTALLED TOGETHER AS CLOSE AS POSSIBLE WITHOUT CONTACTING THE FACE OF THE COIL AND/OR HEAT WHEEL.
6. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.



1/116 ERU-6 SYSTEM FLOW DIAGRAM
LOCATION: PENTHOUSE MER B588

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	Siemens Industry Inc. Building Technology Division 6200 Technology Center Dr. Indianapolis, IN 46278 USA Phone: (317)293-8880 Fax: (877)810-2758	ENGINEER: WLH · DRAFTER: WLH · CHECKED BY: SBT · INITIAL RELEASE: 12/22/11 · LAST EDIT DATE: 01/16/12 ERU-6 CONTROL SYSTEM	116

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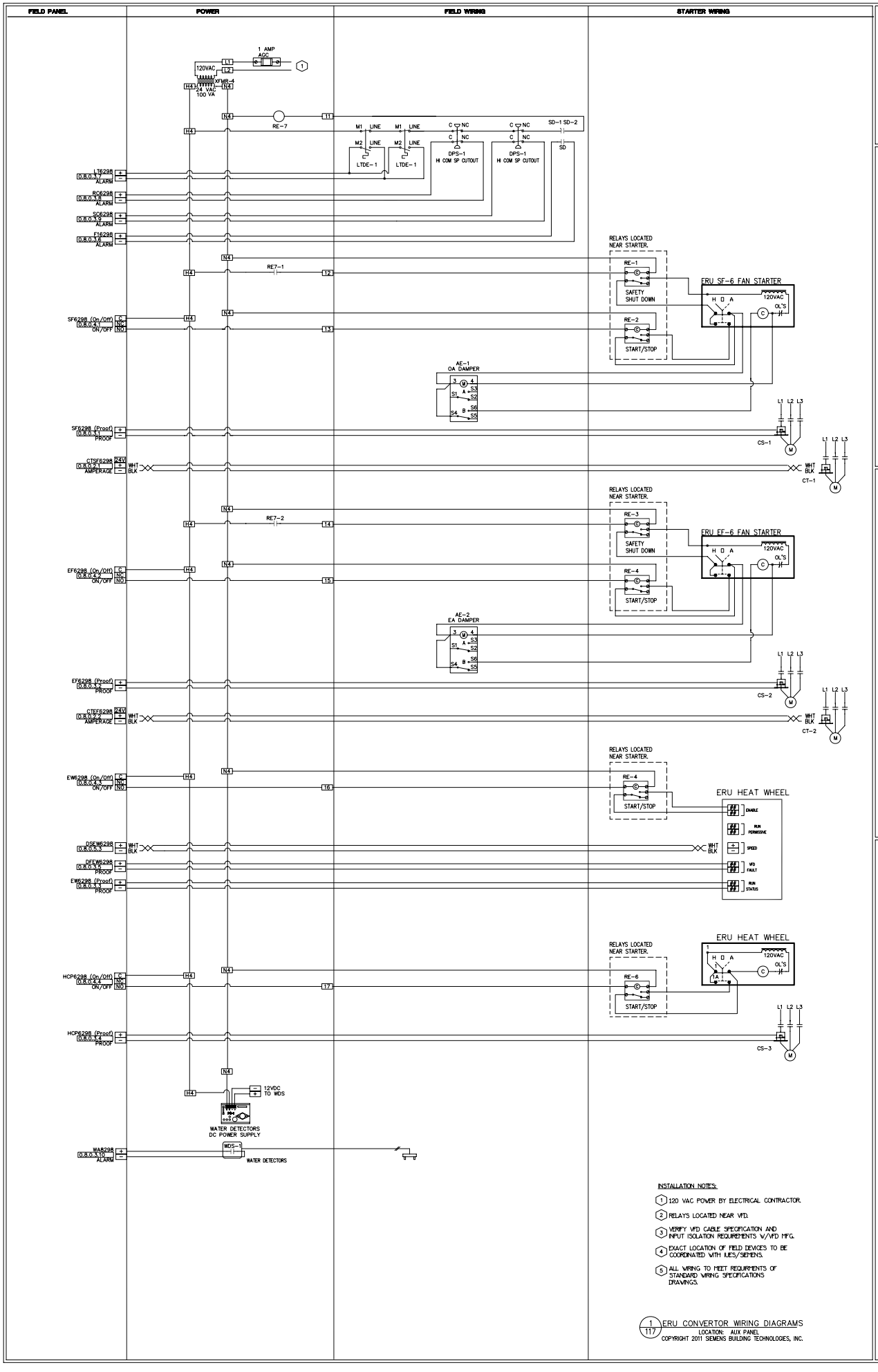

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/117 ERU CONVERTOR WIRING DIAGRAMS

LOCATION: AUX PANEL

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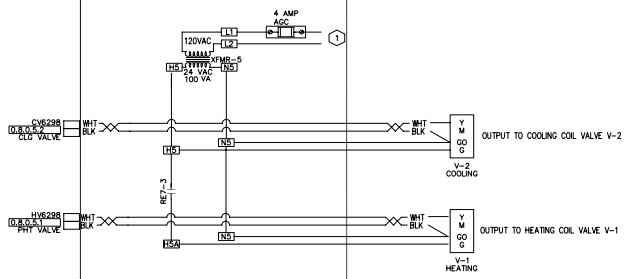
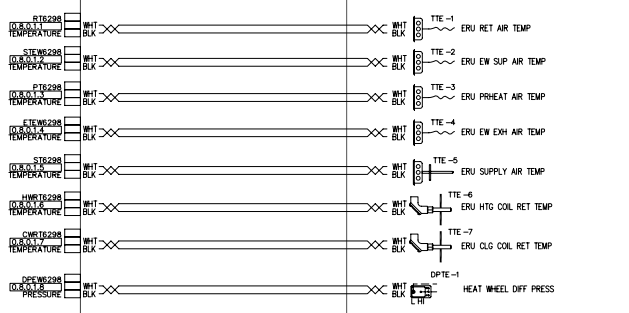
FIELD PANEL	POWER	FIELD WIRING	STARTER WIRING	BY OTHER





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1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1 / 118 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL

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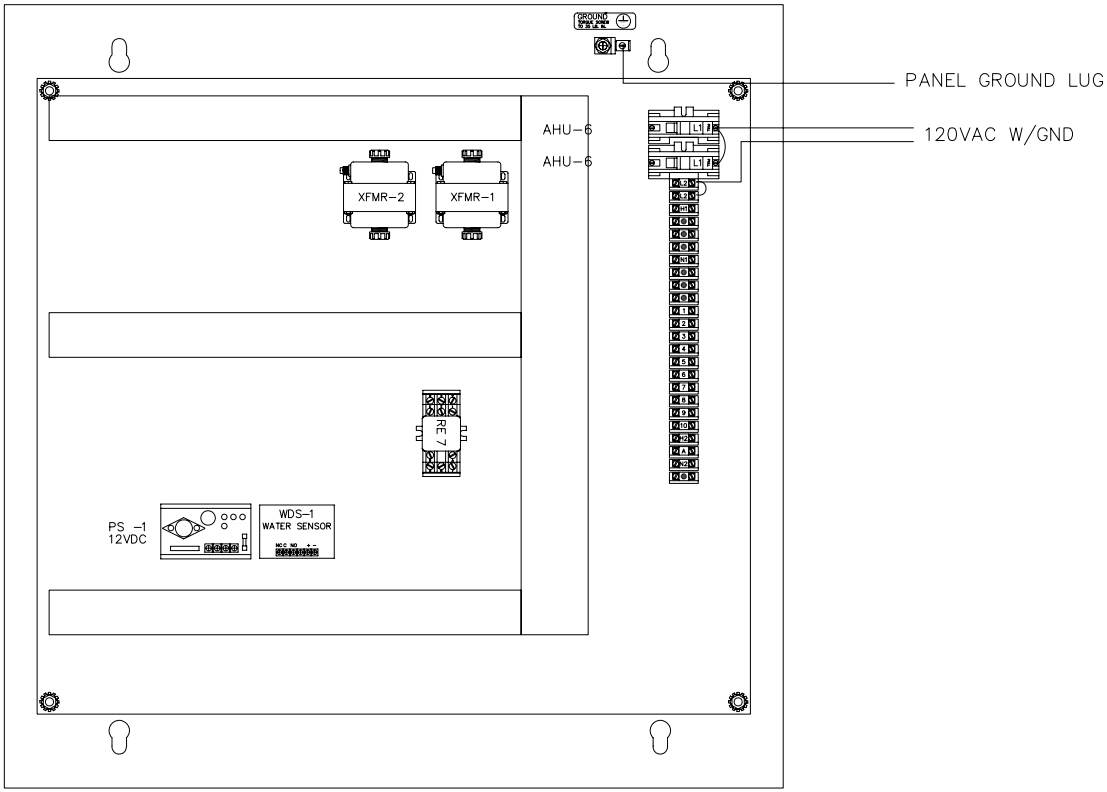

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ERU-6 AUX PANEL LAYOUT

440P099145
IU PROJ #20106837

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 008000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	2	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	1	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	1	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	1	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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WLH	WLH		12/22/11	01/16/12

PXCM-8 ERU-6

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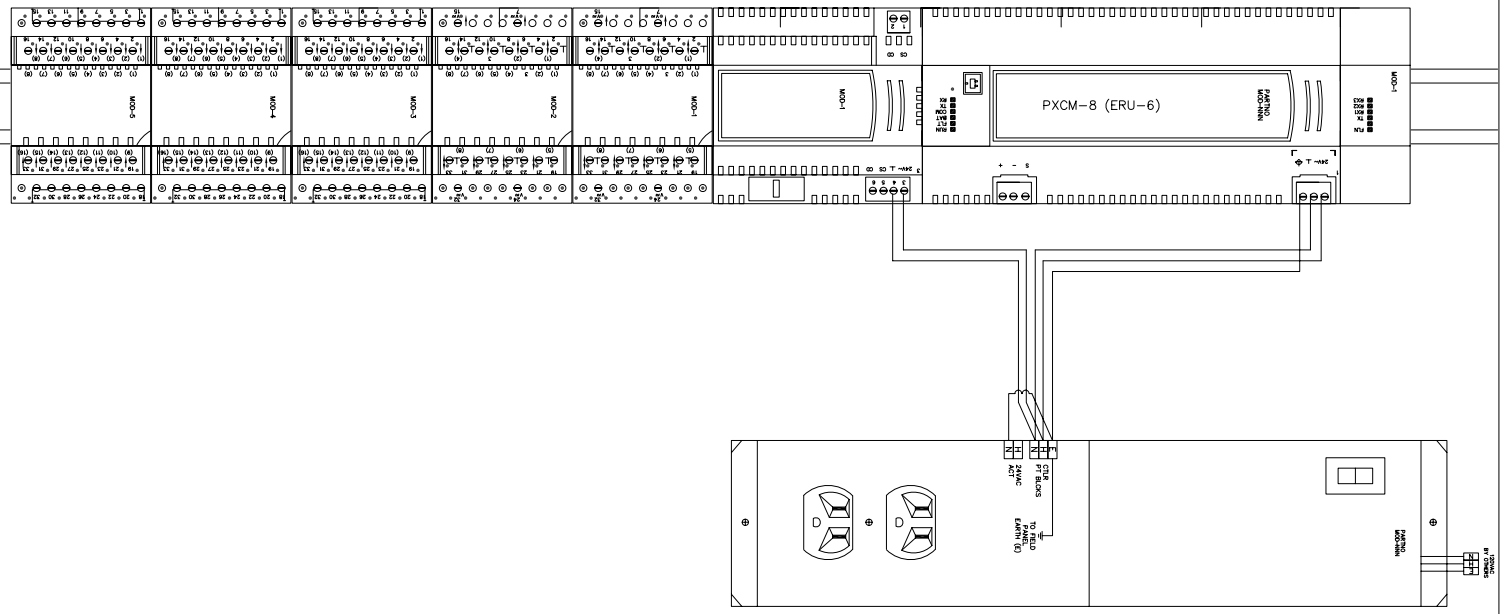

INSTALLATION NOTES:

1. DO NOT POWER ANY EXTERNAL DEVICES (VALVES, DAMPERS, ACTUATORS) THROUGH THIS BLOCKS. INCLUDE A SEPARATE AND INDEPENDENT TRANSFORMER AS REQUIRED.

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PXCM-8 ERU-6

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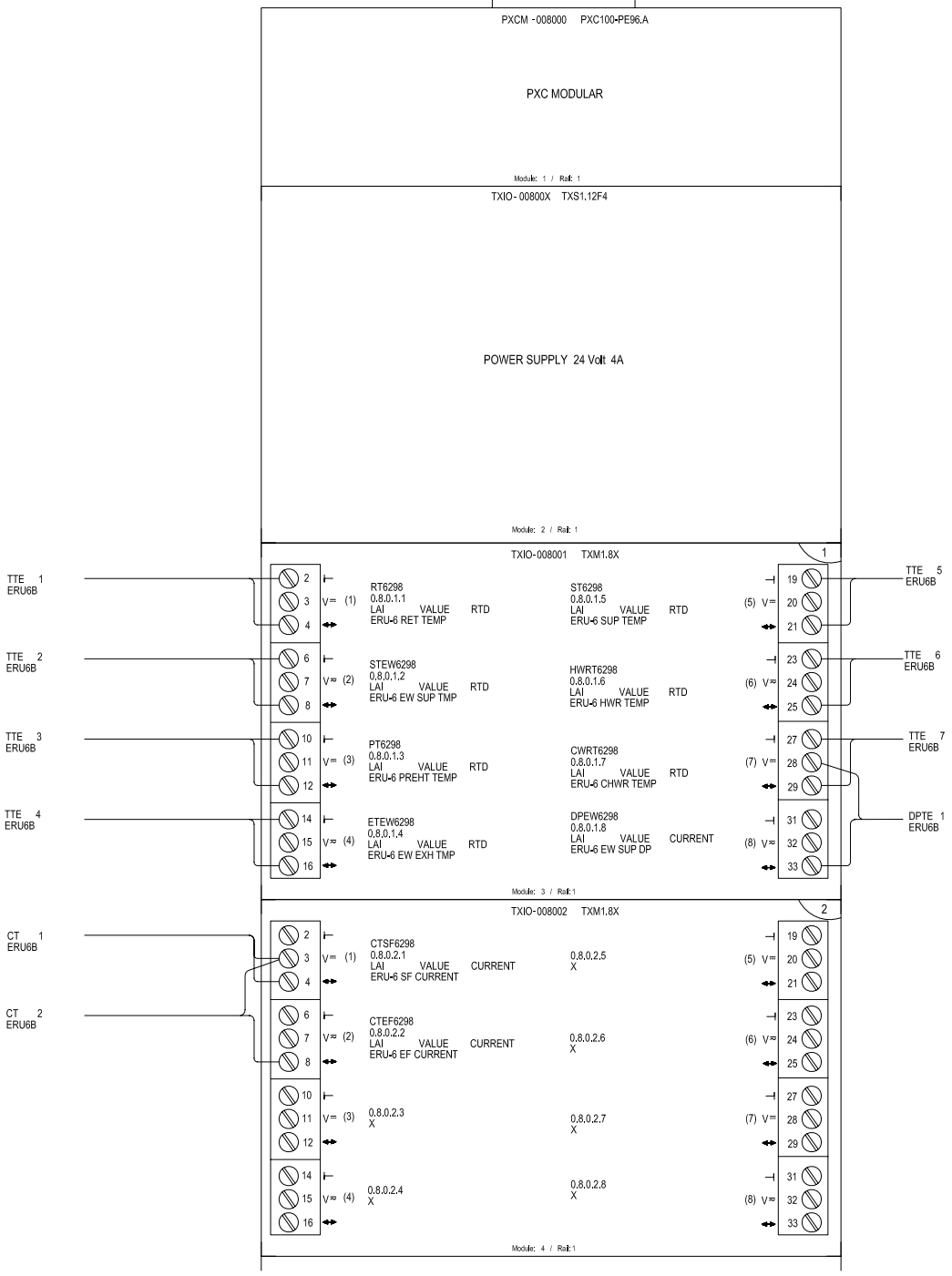

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PXCM-8 CONTROLLER LAYOUT 1

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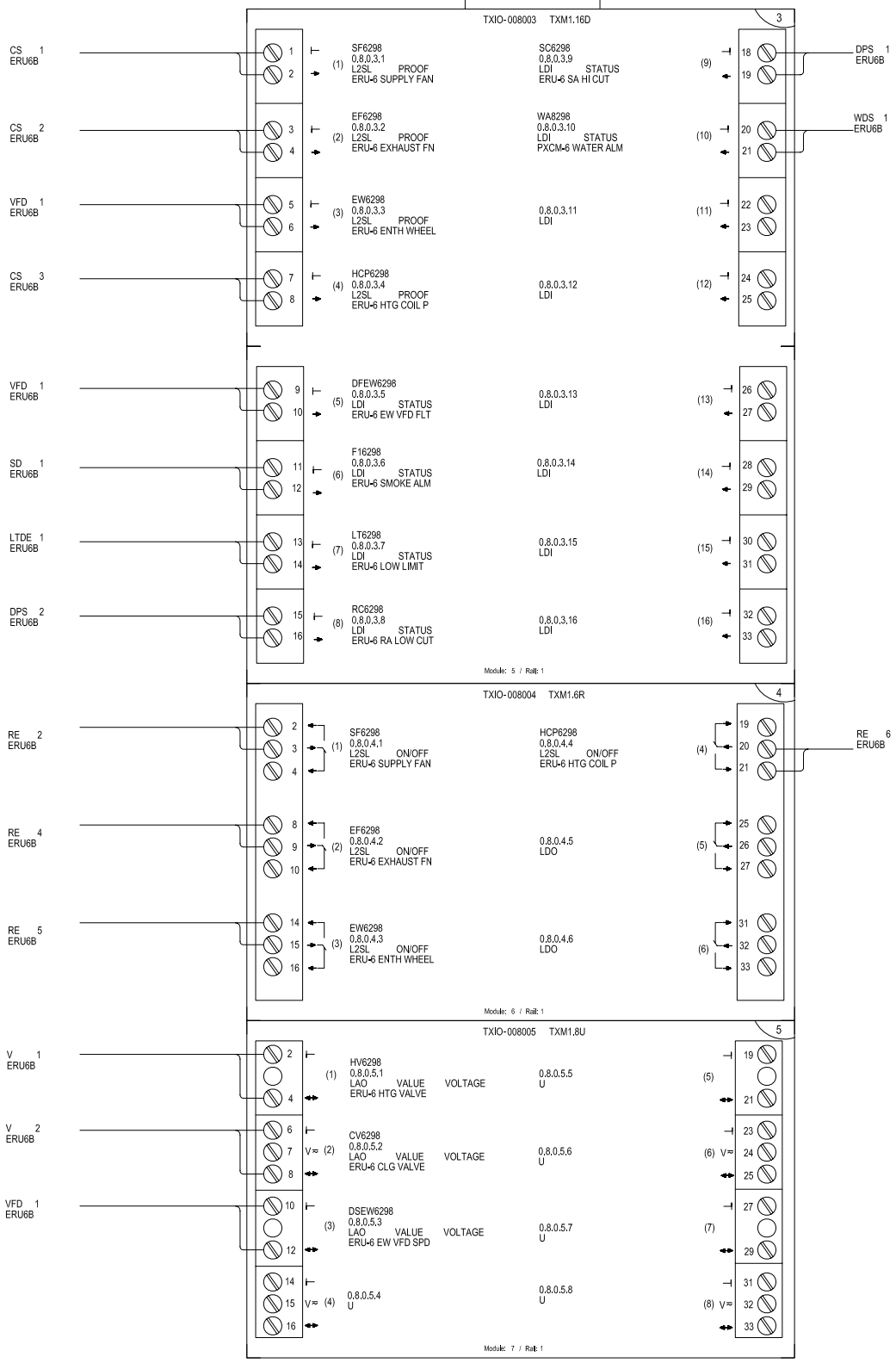

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PXCM-8 CONTROLLER LAYOUT 2

440P099145
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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1–2	2	GCA226.1U	SIEMENS	154001	2 PT SR,115V,MED/S
CS 1–3	3	H608	VERIS	1006cut016	CUR SW SPLTCOR–ADJ SETPT W/LED
CT 1–2	2	H921	VERIS	1006cut007	LOOP–POWRED 4–20MA CURR SNSR
D					SEE DAMPER SUBMITTAL
DPS 1–2	2	AFS–460–DSS	CLEVELAND CONTROLS	N/A	DIFF PRESS SW MNL RESET 2SPST
DPTE 1	1	2641005WB11A1C	SETRA	0608cut003	DP TRAN AIR,1%,+/–5" ENC
LTDE 1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1–6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
SD 1–2	2	FBO	N/A	N/A	FURNISHED BY OTHERS
SPP 1–3	4	269–062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TTE 1–4	4	544–342–24	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 24FT PROBE
TTE 5	1	544–339–18	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 18" PROBE
TTE 6–7	2	544–577–25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
VFD 1	1	SEE VFD SCHEDULE	N/A	N/A	N/A
Panel Mounted Devices					
PNL 1	1	567–352	SIEMENS	155 272	#3 PNEU PANEL 24X24X9
PS 1	1	DCP–1.5–W–12	KELE	N/A	24VAC/12VDC POWER SUPPLY 1.5W
RE 7	1	RH3B–ULAC24V–KIT	LECTRO COM	N/A	(1) RH3B–ULAC24V and (1) SH3B–05 socket
WDS 1	1	470–12	HONEYWELL	N/A	470–12,WATER SENSOR, 12VDC
XFMR 1–2	2	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120–24V,single hub,ClassII U

ENERGY RECOVERY UNITS – RESIDENTIAL AREAS (ERU–4, 5, 6, 7):

ENERGY RECOVERY UNITS SHALL BE UNDER THE CONTROL OF THE BMS. CONSTANT SPEED FANS SHALL BE UTILIZED TO SUPPLY 100% OUTSIDE AIR AND EXHAUST AIR DIRECTLY TO/FROM ROOMS IN THE BUILDING. THESE FANS SHALL OPERATE CONTINUOUSLY (24 H/D, 7 D/WK) AT CONSTANT SPEED. UNIT FANS SHALL OPERATE ONLY WHEN BOTH THE NORMALLY CLOSED OUTSIDE AIR AND EXHAUST AIR DAMPERS ARE PROVEN OPEN VIA END SWITCH ON BOTH DAMPERS.

ENTHALPY RECOVERY WHEEL: VARIABLE SPEED CONTROL SHALL BE UTILIZED TO MODULATE THE ROTATIONAL SPEED OF THE ENTHALPY WHEEL TO MAINTAIN A 55 DEGREE F SUPPLY AIR TEMPERATURE LEAVING THE WHEEL. THE ENTHALPY WHEEL SHALL BE DEACTIVATED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F AND BELOW 75 DEGREES F.

WHEEL DEFROST CYCLE: THE BMS SHALL MONITOR THE EXHAUST AIR TEMPERATURE LEAVING THE WHEEL. THE SPEED OF THE ENTHALPY WHEEL SHALL SLOW DOWN AS REQUIRED TO MAINTAIN A MINIMUM EXHAUST AIR TEMPERATURE LEAVING THE WHEEL OF 0 DEG F (ADJUSTABLE PER MANUFACTURER'S RECOMMENDATION). THIS CYCLE SHALL OVERRIDE NORMAL ENTHALPY WHEEL OPERATION.

COOLING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS ABOVE 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (55 DEGREES F, ADJUSTABLE).

HEATING SEASON: WHEN OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, THE BMS SHALL MONITOR THE UNIT SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL CONTROL VALVE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT (70 DEGREES F, ADJUSTABLE). WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35 DEGREES F, THE HOT WATER COIL CIRCULATING PUMP (RP–X) SHALL BE ACTIVATED AND OPERATE CONTINUOUSLY AT CONSTANT SPEED.

AN INITIAL AMPERAGE READING SHALL BE DETERMINED AFTER THE SYSTEM HAS BEEN BALANCED. THE INITIAL AMPERAGE READING SHALL BE USED AS A BASELINE AND AN ALARM SHALL BE GENERATED IF THE ACTUAL READING DEVIATES FROM THE BASELINE BY 20% (ADJ.) FOR A PERIOD OF 5 MINUTES (ADJ.).

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT)
DUCT–MOUNTED SMOKE DETECTOR (SUPPLY AND EXHAUST AIR STREAM, DIVISION 26)
DUCT HIGH STATIC LIMIT (SUPPLY AIR – DOWNSTREAM OF FAN)
DUCT LOW STATIC LIMIT (EXHAUST AIR – UPSTREAM OF FAN)

WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND EXHAUST FAN, CLOSE THE OUTSIDE AIR AND EXHAUST AIR DAMPER, AND OPEN THE HEAT COIL CONTROL VALVE TO ITS FULL OPEN POSITION.

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ERU-7 CONTROL SYSTEM

44OP099145
IU PROJ #20106837

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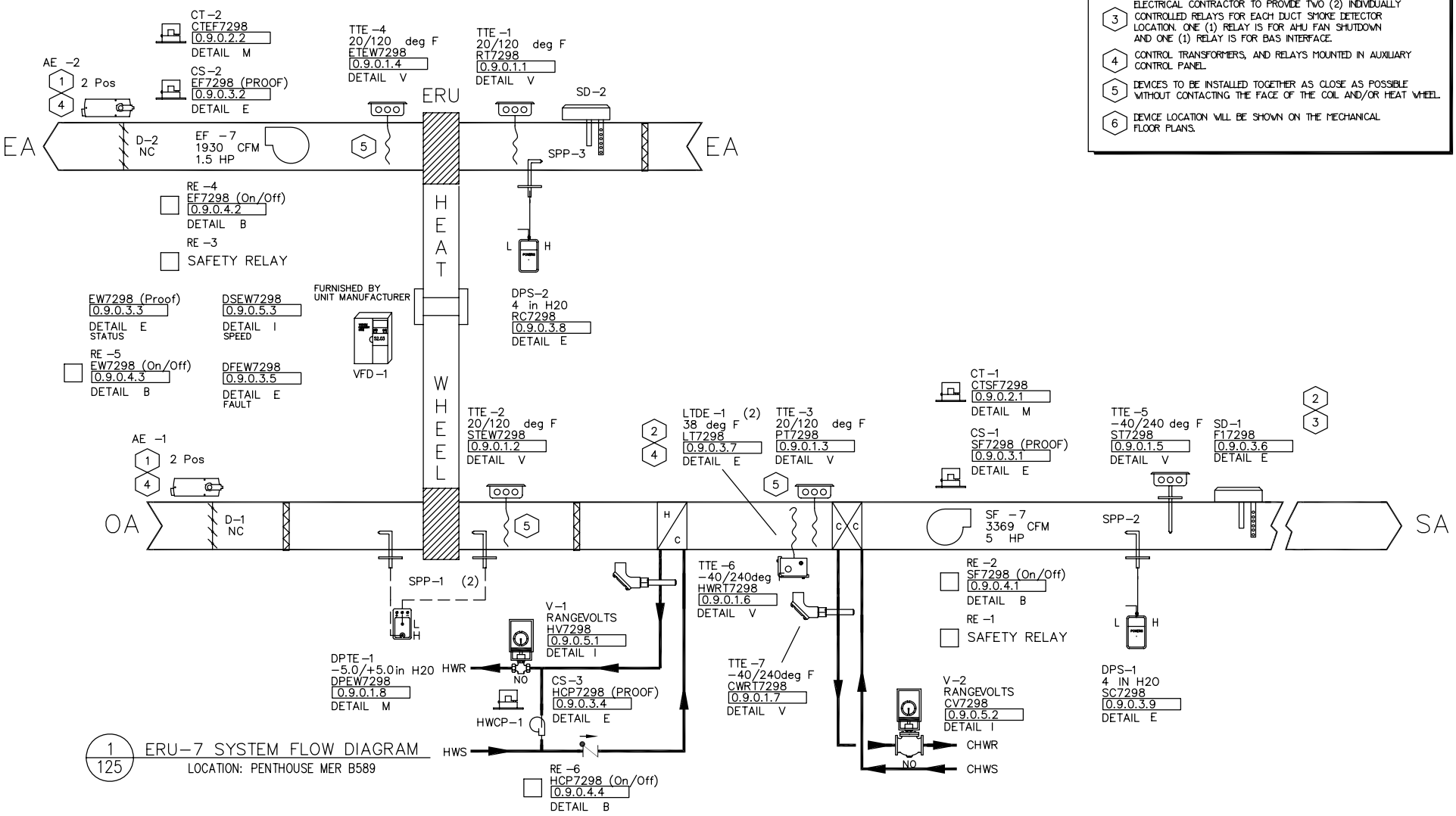
INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 126 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. ELECTRICAL CONTRACTOR TO PROVIDE TWO (2) INDIVIDUALLY CONTROLLED RELAYS FOR EACH DUCT SMOKE DETECTOR LOCATION. ONE (1) RELAY IS FOR AHU FAN SHUTDOWN AND ONE (1) RELAY IS FOR BAS INTERFACE.
4. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.
5. DEVICES TO BE INSTALLED TOGETHER AS CLOSE AS POSSIBLE WITHOUT CONTACTING THE FACE OF THE COIL AND/OR HEAT WHEEL.
6. DEVICE LOCATION WILL BE SHOWN ON THE MECHANICAL FLOOR PLANS.



1/125 ERU-7 SYSTEM FLOW DIAGRAM
LOCATION: PENTHOUSE MER B589

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ERU-7 CONTROL SYSTEM

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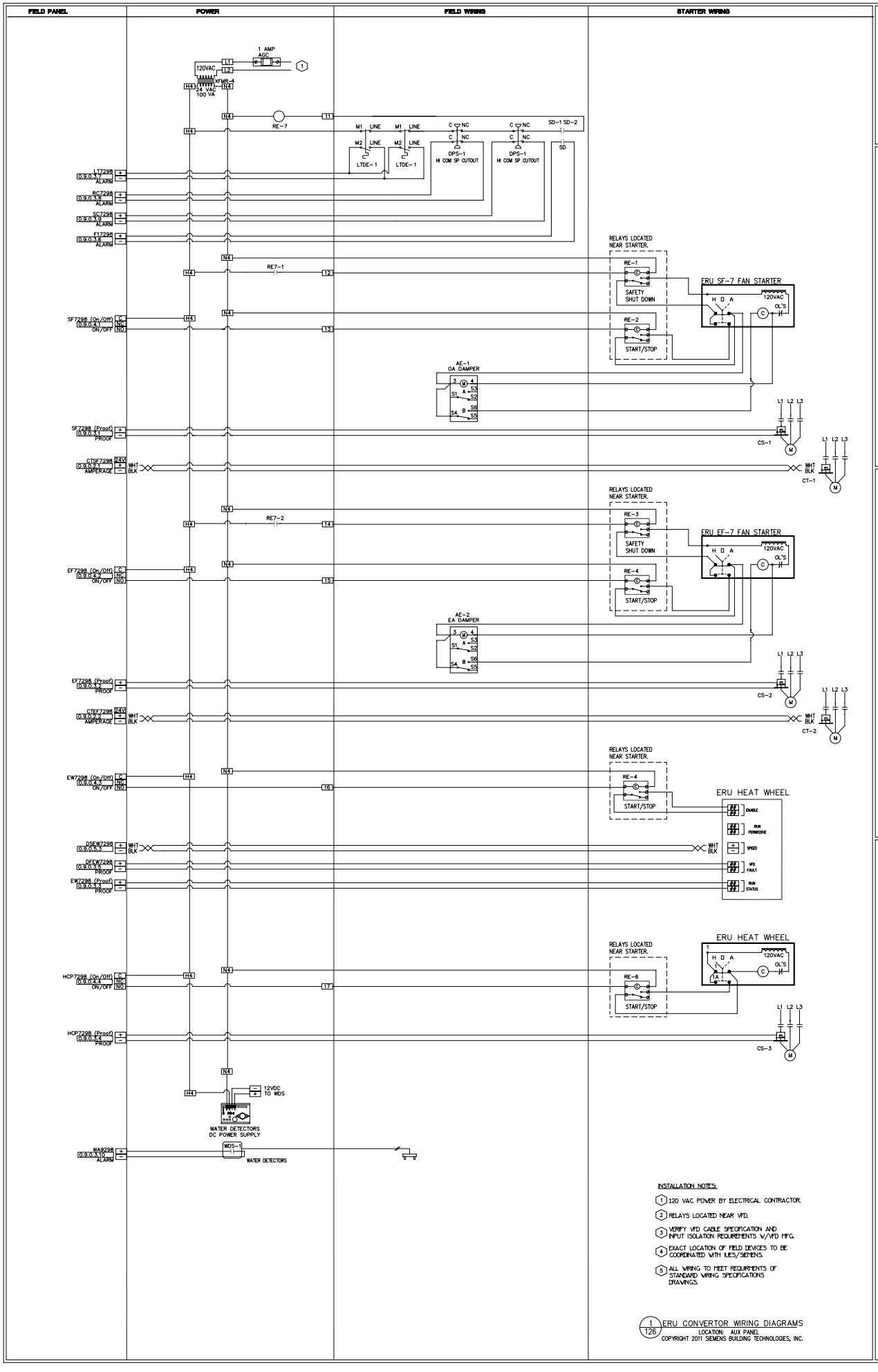

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/126 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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ERU-7 SYSTEM WIRING

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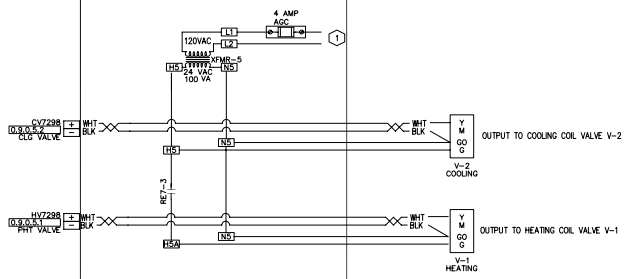
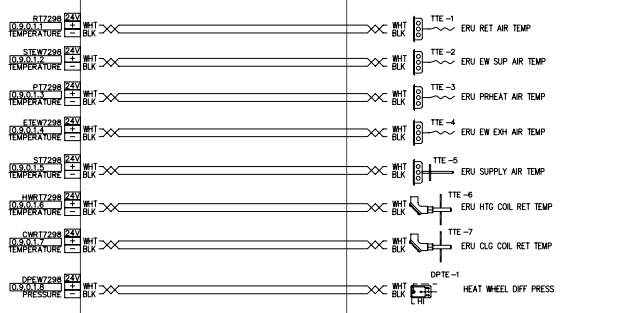
FIELD PANEL	POWER	FIELD WIRING	STARTER WIRING	BY OTHER





INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/127 ERU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL
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ERU-7 SYSTEM WIRING

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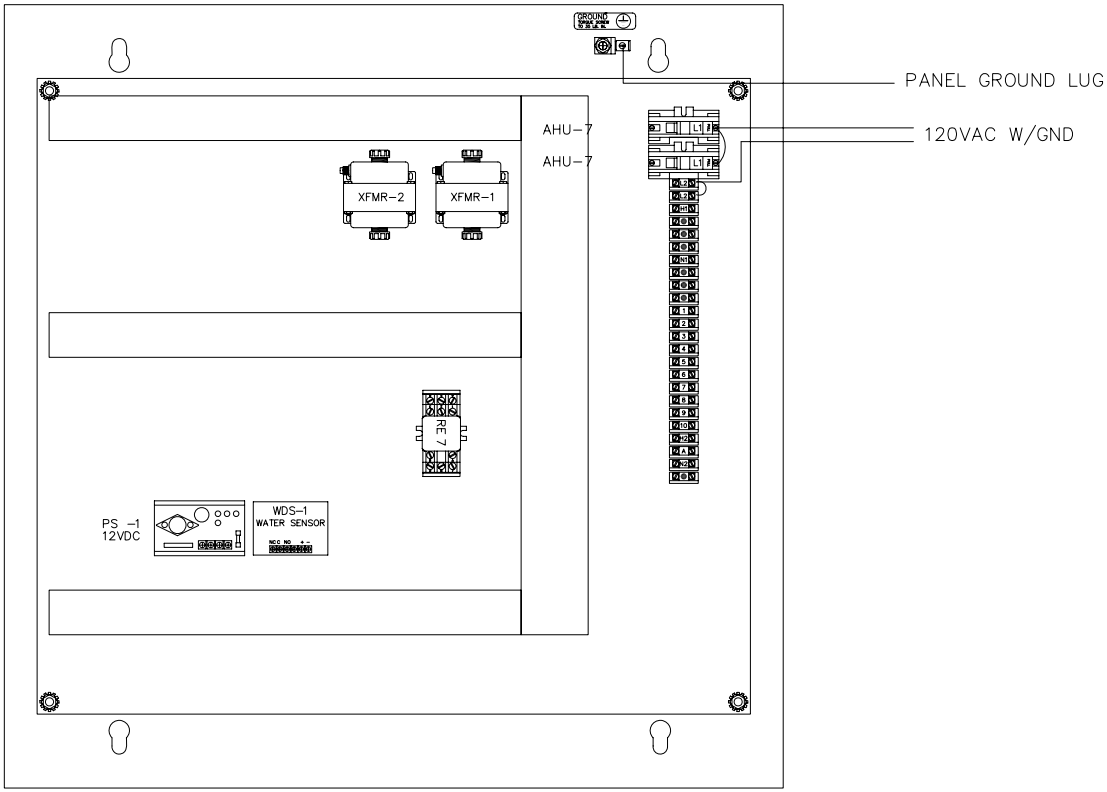

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ERU-7 AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCM 009000	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
	1	TXA1.K24	SIEMENS	149476	ADDRESS KEY 1-24
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	2	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	1	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE
	1	TXM1.6R	SIEMENS	149476	6 RELAY OUTPUT MODULE
	1	TXM1.8U	SIEMENS	149476	8 UNIVERSAL I/O MODULE
	1	PXA-ENC34	SIEMENS	149475	ENCLOSURE ASSY 34
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCM-9 ERU-7

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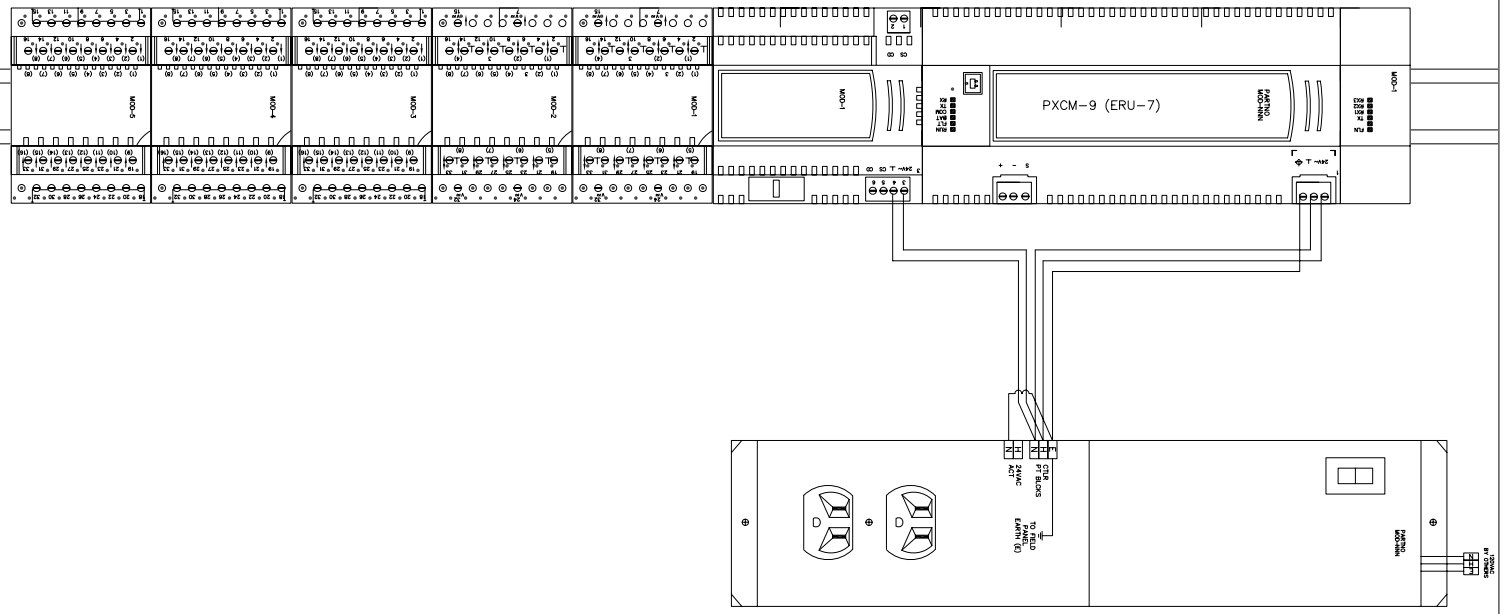

INSTALLATION NOTES:

1. DO NOT POWER ANY EXTERNAL DEVICES (VALVES, DAMPERS, ETC.) FROM THE MOD BLOCKS. INCLUDE A SEPARATE AND INDEPENDENT TRANSFORMER AS REQUIRED.

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PXCM-9 ERU-7

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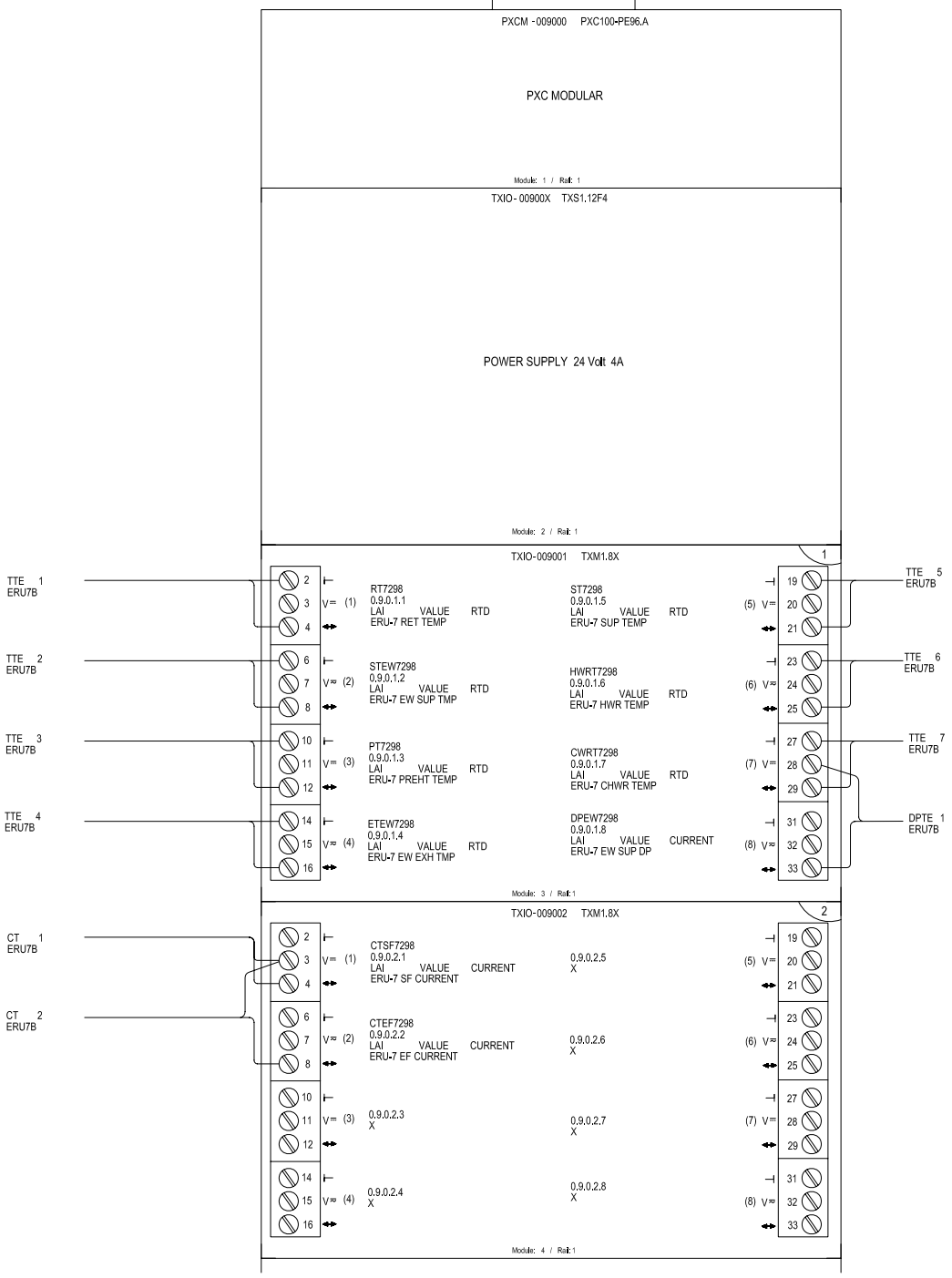

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PXCM-9 CONTROLLER LAYOUT 1

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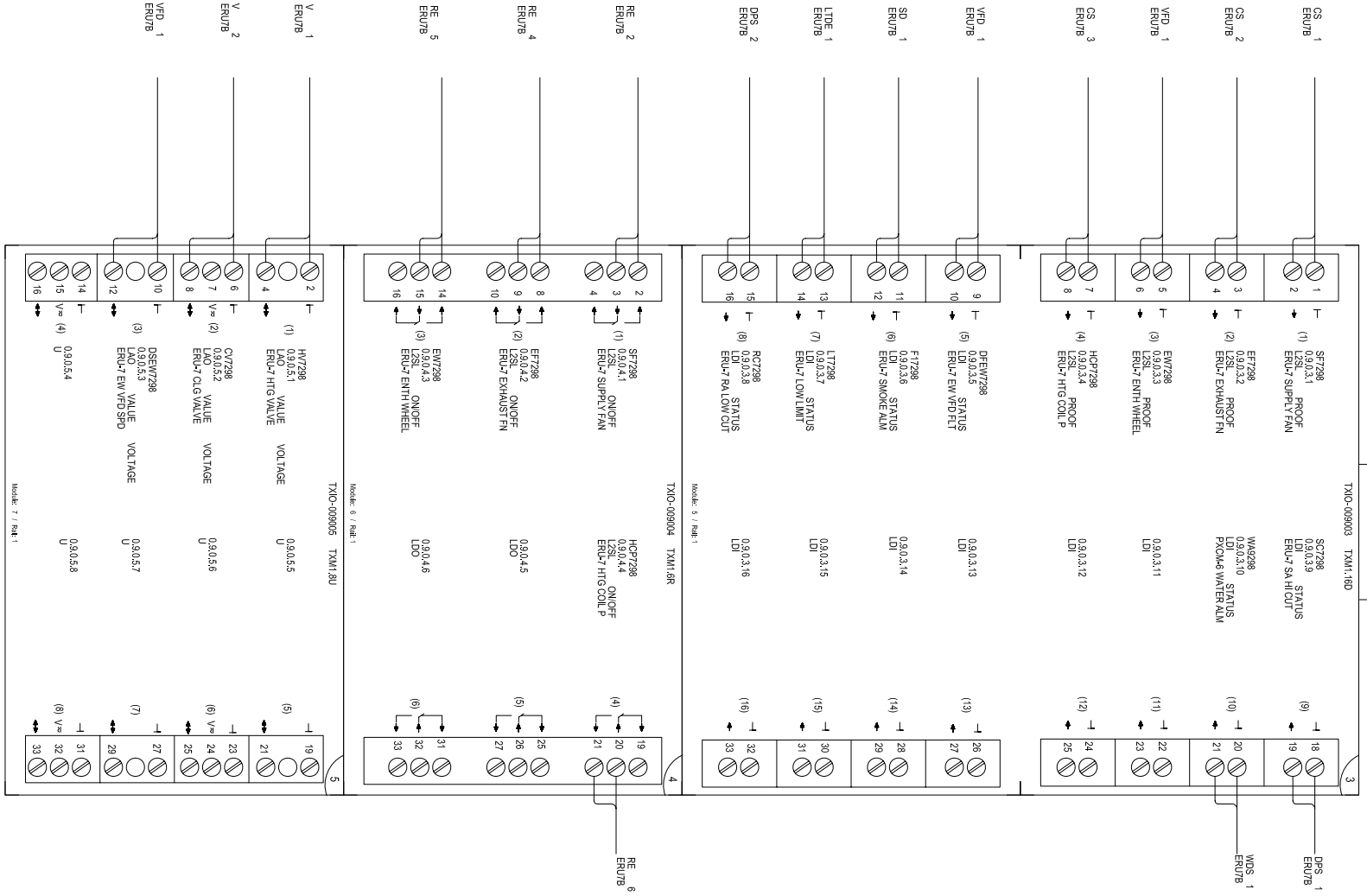

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PXCM-9 CONTROLLER LAYOUT 2

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1-3	3	GCA161.1U	SIEMENS	154004	MOD(V) SR,24V, MED
CS 1	1	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
D					SEE DAMPER SUBMITTAL
LTDE 1	2	134-1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL
RE 1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 1	1	544-342-8	SIEMENS	149261	FLEX AVER SNSR, PT 1K OHM, 8FT PROBE
TTE 2	1	544-339-8	SIEMENS	149261	DCT PT SNSR, PT 1K OHM, (375), 8" PROBE
TTE 3	1	QAA2212.EWSN	SIEMENS	N/A	RTS, BAU HSNG, PT1K , 385A, NC
TTE 4	1	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL
Panel Mounted Devices					
PNL 1	1	567-351	SIEMENS	155 272	#1 PNEU PANEL 19X16X5.7
RE 3	1	RH2B-UL-AC24VKIT	IDEC	1202cut016	RELAY&SOC,GP DPDT AC24V W/LED
XFMR 1	1	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

BLOWER COIL UNIT – MAIN ELECTRIC ROOM (FCU A079):

THE BLOWER COIL UNIT SHALL BE UNDER THE CONTROL OF THE BUILDING MANAGEMENT SYSTEM (BMS). CONSTANT SPEED FANS SHALL BE UTILIZED TO SUPPLY AIR TO THE MAIN ELECTRIC ROOMS.

UPON RECEIVING A SIGNAL FROM THE BMS ON A CALL FOR COOLING, THE SUPPLY FAN IN THE AIR HANDLING UNIT SHALL BE ACTIVATED AND OPERATE AT A CONSTANT SPEED. THE FAN SHOULD CYCLE ON/OFF AND THE COOLING COIL CONTROL VALVE SHALL MODULATE AS REQUIRED TO MAINTAIN ROOM TEMPERATURE SETPOINT.

ECONOMIZER OPERATION: WHEN OUTSIDE DRY-BULB IS LESS THAN 65 DEG F (ADJ) – MODULATE THE ECONOMIZER OUTSIDE AIR, RETURN AIR, AND RELIEF DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT. WHEN OUTSIDE AIR DRY-BULB IS GREATER THAN 65 DEG F (ADJ)-CLOSE THE ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF DAMPER. ECONOMIZER OA AND RELIEF AIR DAMPER SHALL MODULATE INVERSELY WITH THE RETURN AIR DAMPER. AS THE ECONOMIZER OA AND RELIEF AIR DAMPERS OPEN, THE RETURN AIR DAMPER CLOSES. DURING NORMAL OPERATION OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER ARE CLOSED.

ECONOMIZER LOW LIMIT- IF THE MIXED AIR TEMPERATURE (MAT) DROPS BELOW 50 DEG F (ADJ), THE SYSTEM SHALL ALARM AND THE SPACE TEMPERATURE CONTROL AND THE ECONOMIZER DAMPER OPERATION SHALL HALT UNTIL THE MAT IS ABOVE SETPOINT.

SAFETIES: THE FOLLOWING DEVICES SHALL BE HARDWIRED TO STOP THE SUPPLY FAN AND RETURN FAN WHEN ACTIVATED, AND SHALL REQUIRE A MANUAL RESET AT THE DEVICE FOR A RETURN TO NORMAL OPERATION.

TEMPERATURE LOW LIMIT (FREEZE STAT)
WHEN ANY OF THE ABOVE SAFETY DEVICES ARE TRIPPED, THE HARDWIRED SAFETY CIRCUIT SHALL STOP THE SUPPLY FAN AND RETURN FAN, AND CLOSE THE OUTSIDE AIR DAMPER.

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AHU-9 (FCU-A079) CONTROL SYSTEM

44OP099145
IU PROJ #20106837

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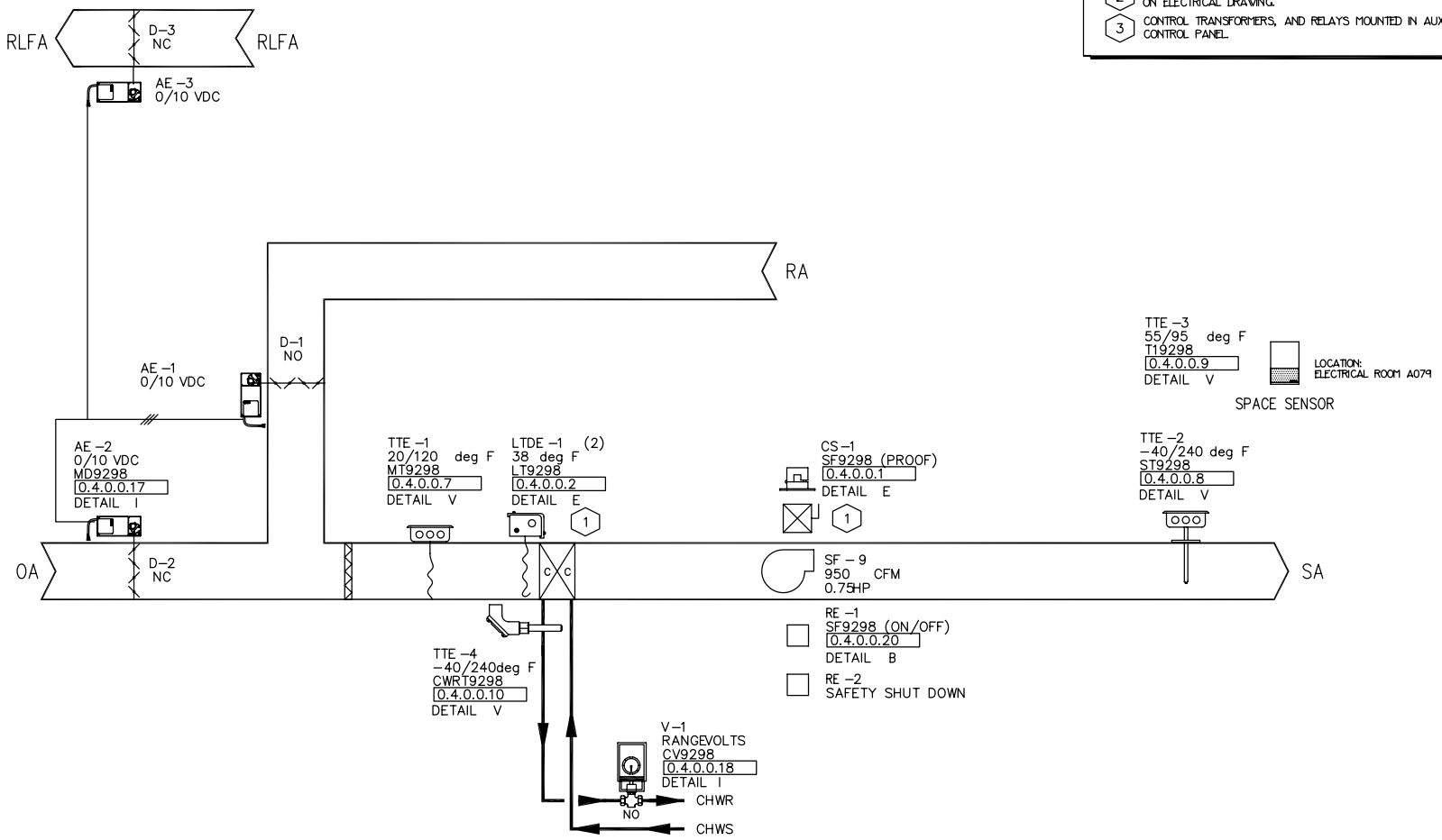
INSTALLATION NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING PAGE 135 FOR WIRING TERMINATIONS.
2. WIRE INTO FAN SAFETY CIRCUIT. REFER TO WIRING DETAIL ON ELECTRICAL DRAWING.
3. CONTROL TRANSFORMERS, AND RELAYS MOUNTED IN AUXILIARY CONTROL PANEL.



1/134 AHU-9 SYSTEM FLOW DIAGRAM

LOCATION:
SERVES: ELECT ROOM A079

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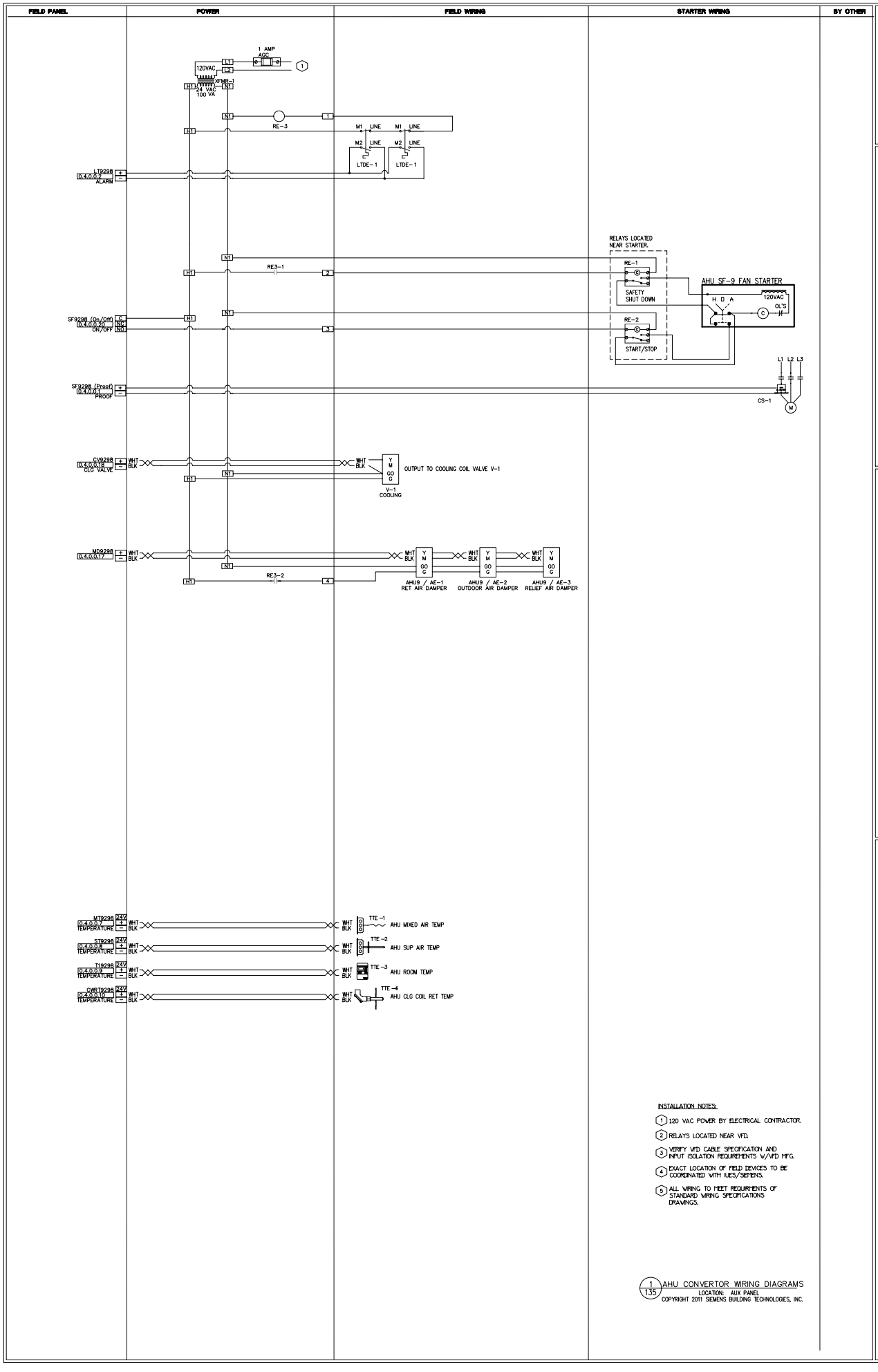

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/135 AHU CONVERTOR WIRING DIAGRAMS
LOCATION: AUX PANEL

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AHU-9 SYSTEM WIRING

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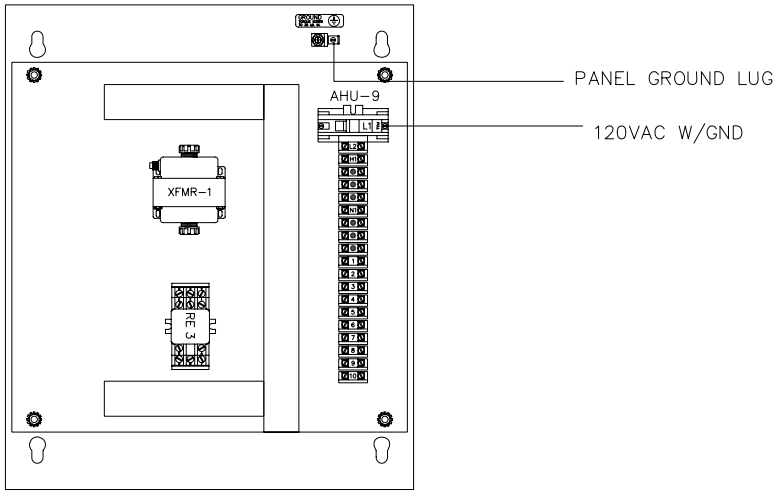

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AHU-9 AUX PANEL LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Panel Mounted Devices					
PXCC 004000	1	PXC24.2-P.A	SIEMENS	149454	APOGEE 24PT, RS-485 ALN
	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
	1	PXA-SB115V192VA	SIEMENS	N/A	SERVICE BOX 115V, 24VAC, 192VA

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PXCC-4 AHU-9 (FCU-A079)

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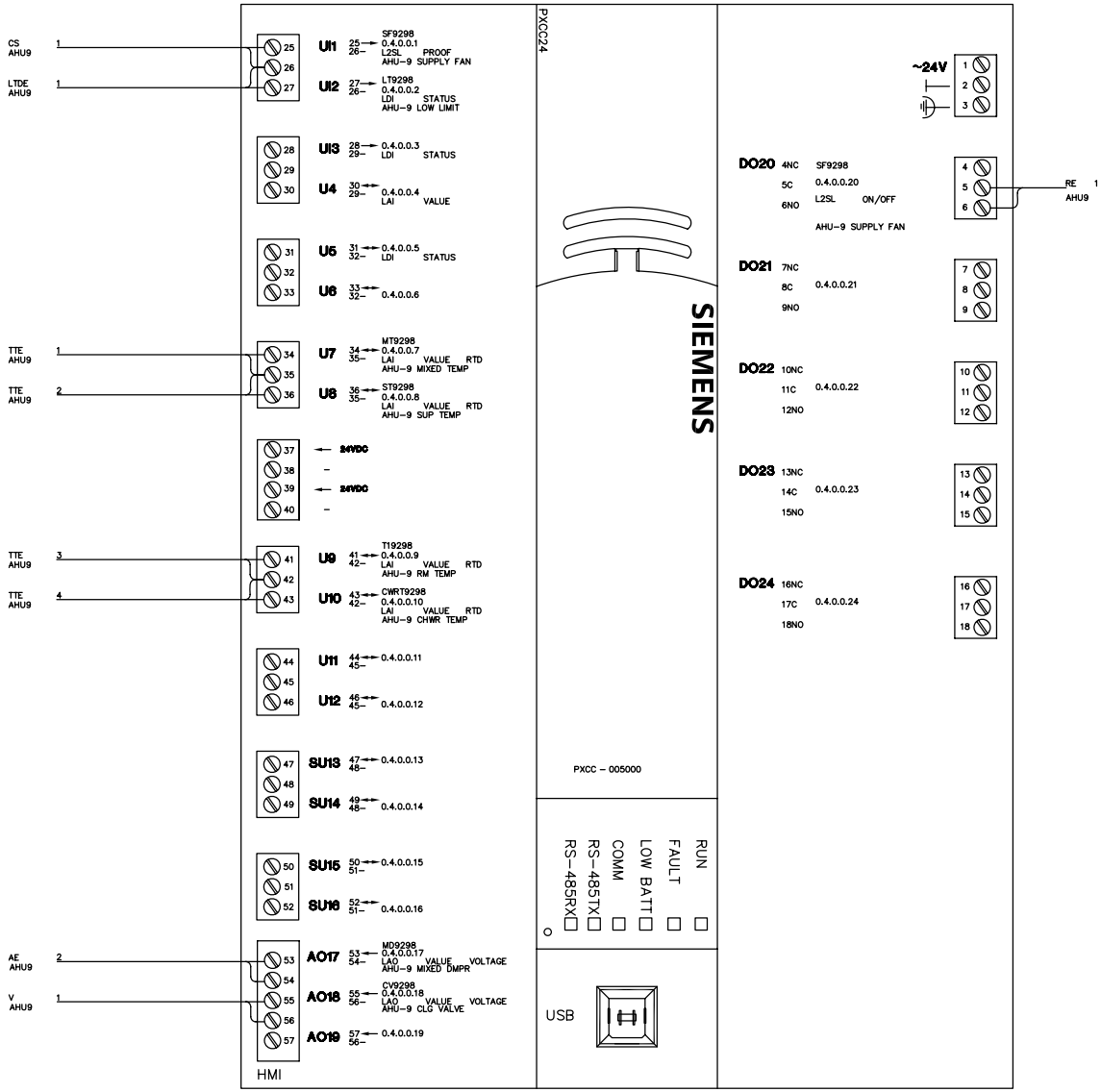

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PXCC-4 CONTROLLER LAYOUT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1	29	GDE131.1P	SIEMENS	154 011	ACT NSR PLENUM 24/108L 5NM
CBL 1	29	588-100B	SIEMENS	N/A	6-WIRE 2-RJ11 RS CABLE 50'PLMN
OS 1	4	FBO	N/A	N/A	FURNISHED BY OTHERS
TEC 1	29	540-100	SIEMENS	149 171	TERM BOX CTLR ELEC OUT
TTE 1	29	QAA2280.FWSC	SIEMENS	N/A	RTS, TEC DIG., F-F, SL
TTE 2	29	536-811	SIEMENS	149 134	100K OHM DUCT TEMP SENSOR
V					SEE VALVE SUBMITTAL

VAV TERMINAL UNITS

VAV TERMINAL SHALL BE UNDER THE CONTROL OF THE BMS. VAV TERMINAL UNITS SHALL UTILIZE DDC MICROPROCESSOR BASED LOGIC TO ACHIEVE ALL CONTROL FUNCTIONS. DURING COOLING MODE, EACH VAV UNIT CONTROLLER SHALL MODULATE ITS AIR DAMPER BETWEEN ITS MINIMUM AND MAXIMUM POSITION TO MAINTAIN THE SPACE TEMPERATURE SETPOINT (75 DEG F, ADJUSTABLE). DURING HEATING MODE, THE AIR DAMPER SHALL BE AT ITS MINIMUM POSITION, AND THE VAV UNIT CONTROLLER SHALL MODULATE THE TWO-WAY VALVE ON THE UNIT'S HEATING HOT WATER REHEAT COIL TO MAINTAIN THE SPACE TEMPERATURE SETPOINT (70 DEG F, ADJUSTABLE). INCREASE CFM INCREMENTALLY, TO THE HEATING CFM, IF ADDITIONAL HEATING IS REQUIRED. (IE IF THE HW VALVE IS FULLY OPEN, AND THE SPACE NEEDS MORE HEAT, THEN INCREASE THE VAV CFM 20% APPROX. THEN CONTINUE TO MODULATE THE HW VALVE, IF MORE HEAT IS NEEDED, THEN INCREASE THE CFM AGAIN?OUP TO THE HEATING CFM)

DEMAND CONTROLLED VENTILATION: MONITOR SPACE CO2 LEVELS IN HIGH OCCUPANCY AREAS (CLASS B111, CONFERENCE B124, MULTI-PURPOSE B109M, AND CLASS B109)). IF CO2 LEVELS INCREASE ABOVE SETPOINT, THEN INCREASE PRIMARY AIR VOLUME TO SPACE AS THE FIRST STAGE. SEE AHU SEQUENCE FOR STAGE TWO OPERATIONS.

OCCUPANCY SENSORS: A CONTROL CIRCUIT SHALL BE CONNECTED TO ALL AUXILIARY RELAYS OF OCCUPANCY SENSORS (PROVIDE BY THE E.C) FOR HIGH OCCUPANCY AREAS (CLASS B111, CONFERENCE B124, MULTI- PURPOSE B109M, AND CLASS B109) . A CONTROL SIGNAL SHALL BE RELAYED TO THE VAV TERMINAL UNIT THAT SERVES THAT SPACE. IF OCCUPANCY SENSOR ASSOCIATED WITH THE VAV TERMINAL INDICATE THE ZONE IS UNOCCUPIED, THE BMS SHALL RESET THE MINIMUM AIRFLOW TO ZERO CFM AND RESET SPACE TEMPERATURE SETPOINT 5 DEG F LOWER (ADJUSTABLE) FROM THE "OCCUPIED" SETPOINT TO MINIMIZE REHEAT.

ALTERNATE BID M5: FINNED TUBE RADIATORS
STATE COST ADD TO PROVIDE THE FOLLOWING: PROVIDE FINNED TUBE RADIATION UNITS WHERE SHOWN ON THE MECHANICAL DRAWINGS. INCLUDE ALL THE RELATED PIPING, TRIM PIECES, CONTROL VALVES AND RELATED INTEGRATION INTO THE CONTROLS SYSTEM, VALVES AND INSULATION.

MODULATE THE RESPECTIVE TWO WAY CONTROL VALVE SERVING THE FTR IN THE SAME PROPORTION AS THE VAV BOX HEATING COIL OR FAN COIL AIR HANDLING ALSO SERVING THE SPACE.

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VAV CONTROL SYSTEM

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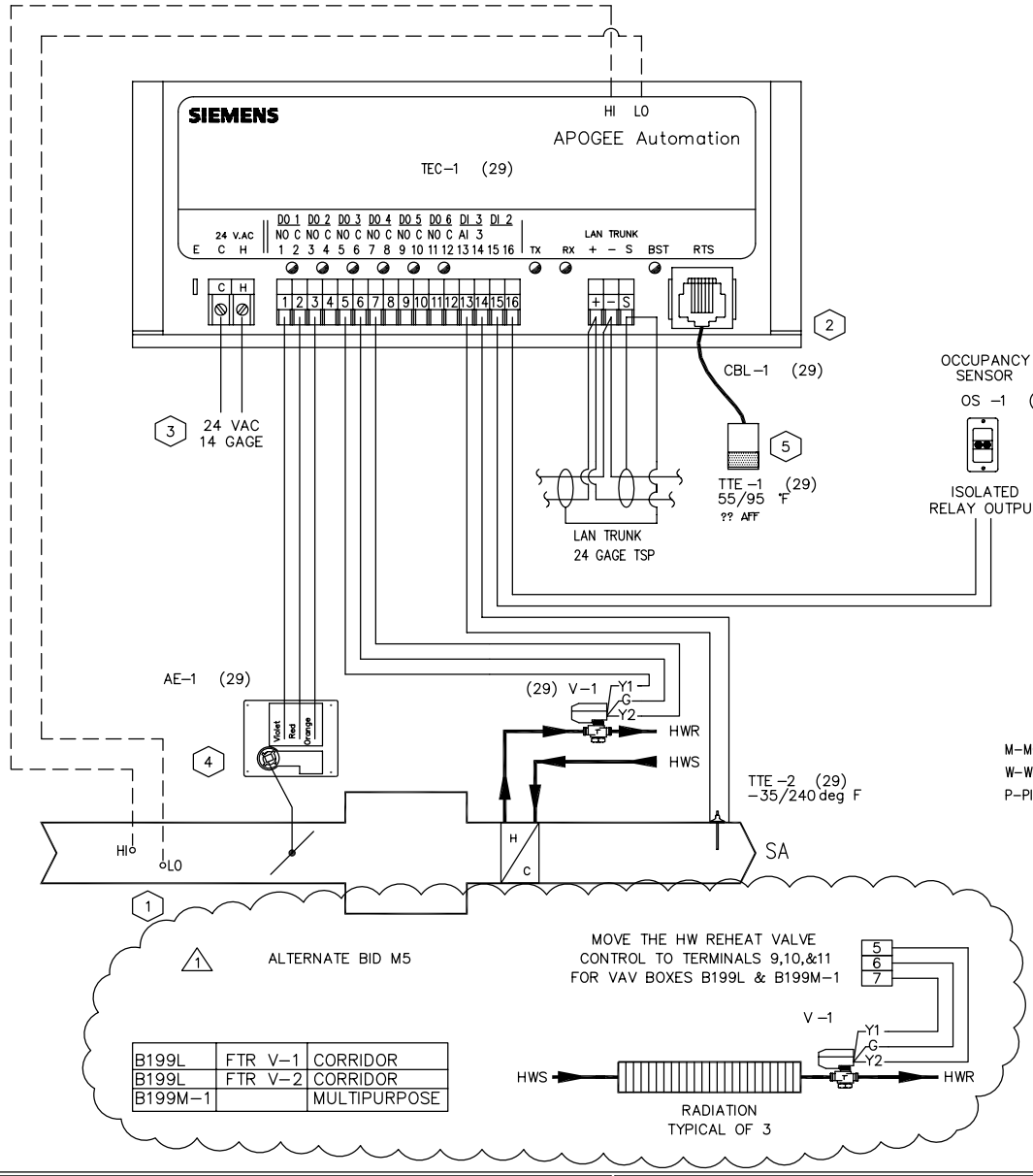
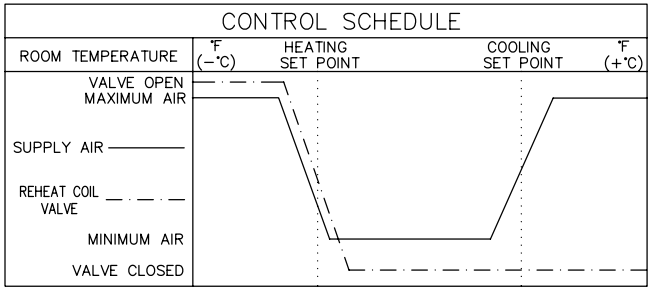


B199L	FTR V-1	CORRIDOR
B199L	FTR V-2	CORRIDOR
B199M-1		MULTIPURPOSE

INSTALLATION NOTES:

1. VAV BOX INSTALLED BY MECHANICAL CONTRACTOR WITH 3 TO 5 STRAIGHT DUCT DIAMETERS UPSTREAM OF BOX TO PROVIDE PROPER FLOW SENSING
2. TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
3. REFER TO BUILDING POWER TRUNK DRAWING FOR 24 VAC POWER
4. MOUNT ACTUATOR WITH DAMPER IN FULL OPEN POSITION. VERIFY TEC-1 AND ACTUATOR REQUIREMENT WITH THE BOX MANUFACTURER
5. LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS

CONTROL SCHEDULE



DEVICE	CIC FITTER	CIC ELEC.	MANUFACTURER	DIVISION 16	DIVISION 15
TTE-1		M,W			
AE-1			M,W		
TEC-1			M,W,P		
V-1		W			M
LAN TRUNK		W			
POWER (24VAC)		W			

M-MOUNTED
W-WIRED
P-PIPED

1/140 VAV WITH REHEAT COIL (#2023)

LOCATION:
SERVES:

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VAV W/ REHEAT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1	11	GDE131.1P	SIEMENS	154 011	ACT NSR PLENUM 24/108L 5NM
CBL 1	11	588-100B	SIEMENS	N/A	6-WIRE 2-RJ11 RS CABLE 50'PLMN
TEC 1	11	540-100	SIEMENS	149 171	TERM BOX CTLR ELEC OUT
TTE 1	11	QAA2280.FWSC	SIEMENS	N/A	RTS, TEC DIG., F-F, SL

VAV TERMINAL UNITS

VAV TERMINAL SHALL BE UNDER THE CONTROL OF THE BMS. VAV TERMINAL UNITS SHALL UTILIZE DDC MICROPROCESSOR BASED LOGIC TO ACHIEVE ALL CONTROL FUNCTIONS. THE VAV UNIT CONTROLLER SHALL MODULATE ITS AIR DAMPER BETWEEN ITS MINIMUM AND MAXIMUM POSITION TO MAINTAIN THE SPACE TEMPERATURE SETPOINT (75 DEG F, ADJUSTABLE).

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VAV COOLING ONLY

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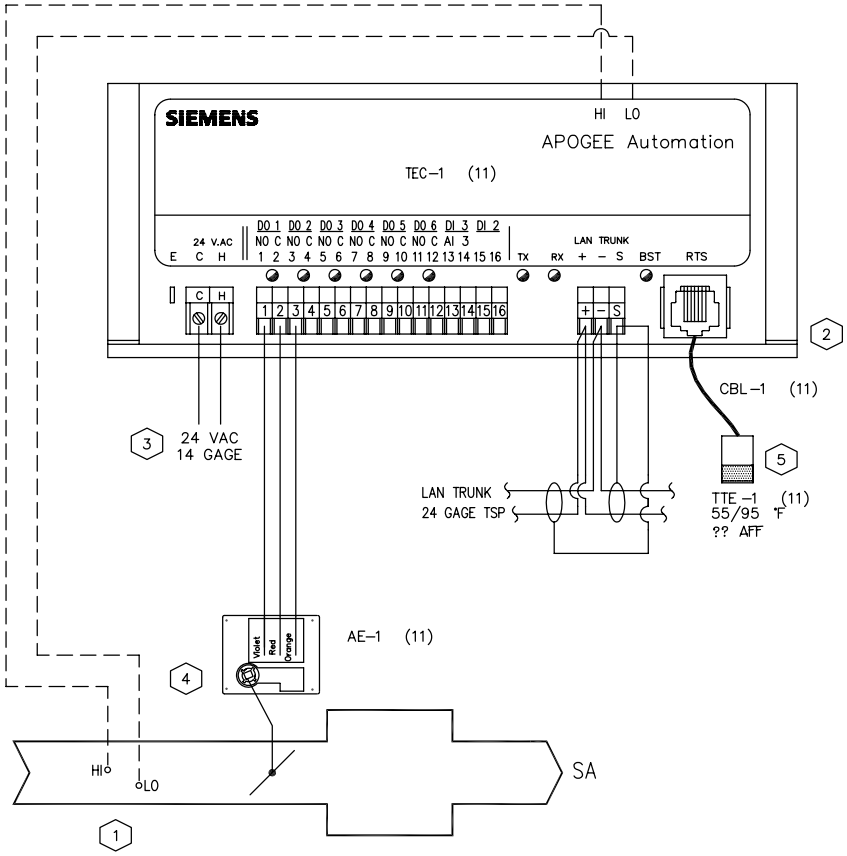
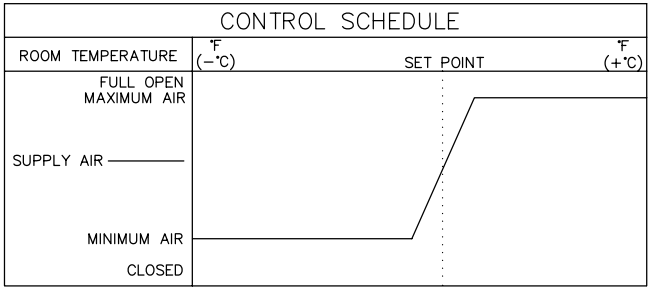


INSTALLATION NOTES:

1. VAV BOX INSTALLED BY MECHANICAL CONTRACTOR WITH 3 TO 5 STRAIGHT DUCT DIAMETERS UPSTREAM OF BOX TO PROVIDE PROPER FLOW SENSING
2. TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
3. REFER TO BUILDING POWER TRUNK DRAWING FOR 24 VAC POWER
4. MOUNT ACTUATOR WITH DAMPER IN FULL OPEN POSITION. VERIFY TEC-1 AND ACTUATOR REQUIREMENT WITH THE BOX MANUFACTURER
5. LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS



DEVICE	SIEMENS FITTER	SIEMENS ELEC.	MANUFACTURER	DIVISION 16	DIVISION 15
TTE-1		M,W			
AE-1			M,W		
TEC-1			M,W		
LAN TRUNK		W			
POWER (24VAC)		W			

M-MOUNTED
W-WIRED
P-PIPED

VAV-A084	IDF	VAV-B089	MECH. RM
VAV-A184	SECURITY	VAV-B089A	MDF
VAV-A284	IDF	VAV-B187	SECURITY
VAV-A384	SECURITY	VAV-B284	IDF
VAV-A484	IDF	VAV-B384	SECURITY
		VAV-B484	IDF

1/142 VARIABLE VOLUME BOX (#2020)

LOCATION:
SERVES:

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VAV COOLING ONLY

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CBL 1	48	588-100B	SIEMENS	N/A	6-WIRE 2-RJ11 RS CABLE 50'PLMN
PNL 1	48	550-002	SIEMENS	N/A	ENCLOSURE ASSY,TEC
RE 1	48	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TEC 1	48	540-110	SIEMENS	149 181	UNIT COND CTLR ELEC OUT
TTE 1	48	QAA2280.FWSC	SIEMENS	N/A	RTS, TEC DIG., F-F, SL
TTE 2	48	536-811	SIEMENS	149 134	100K OHM DUCT TEMP SENSOR
V					SEE VALVE SUBMITTAL
XFMR 1	48	TR40VA004	FUNCTIONAL	N/A	Xfrmr 40VA,277/240/208/120-24V,2 hub,Cla

FAN COIL UNITS – NON RESIDENTIAL AREAS:

FAN COIL UNITS SHALL BE UNDER THE CONTROL OF THE BMS.

THE FAN COIL UNIT SUPPLY FAN SHALL CYCLE ON/OFF AT ONE OF THREE FIXED MANUALLY SET SPEEDS (LOW, MEDIUM, AND HIGH) ON A CALL FOR HEATING OR COOLING.

COOLING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

HEATING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

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HORIZONTAL FAN COIL UNIT

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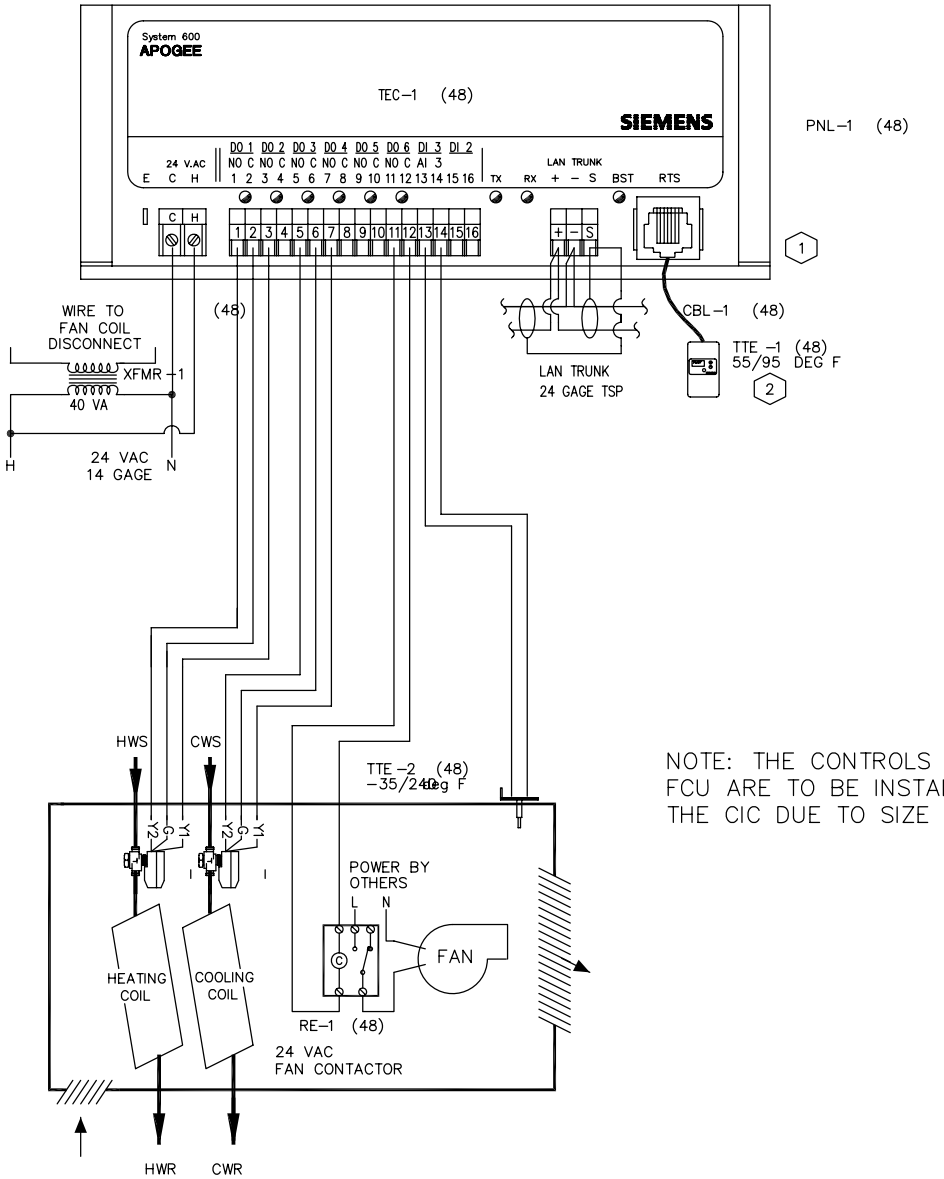
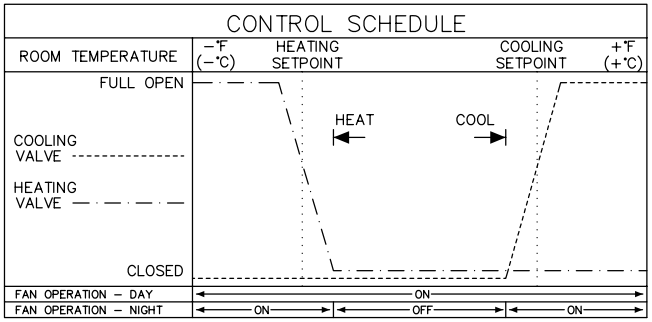


INSTALLATION NOTES:

1. TEC-1 TO BE MOUNTED SIEMENS SUPPLIED CONTROLLER ENCLOSURE
2. MOUNT THERMOSTAT WHERE SHOWN ON FLOOR PLANS.



NOTE: THE CONTROLS FOR THE HORIZONTAL FCU ARE TO BE INSTALLED IN THE FIELD BY THE CIC DUE TO SIZE CONSTRAINTS.

	DEVICE	CIC FITTER	CIC ELEC.	MANUFACTURER	DIVISION 26	DIVISION 23
	XFMR-1		M,W			
	TTE-1		M,W			
	TTE-2		M,W			
	TEC-1		M,W			
	V-1,2		W			M
M-MOUNTED	RE-1		M,W			
W-WIRED	LAN TRUNK		W			
P-PIPED	POWER			W		

1/144

FCH CONTROL (#2051)

LOCATION: VARIOUS
SERVES: VARIOUS

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HORIZONTAL FAN COIL UNIT

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CBL 1	330	588-100B	SIEMENS	N/A	6-WIRE 2-RJ11 RS CABLE 50'PLMN
RE 1	330	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TEC 1	330	540-110	SIEMENS	149 181	UNIT COND CTLR ELEC OUT
TTE 1	330	QAA2280.FWSC	SIEMENS	N/A	RTS, TEC DIG., F-F, SL
TTE 2	330	536-811	SIEMENS	149 134	100K OHM DUCT TEMP SENSOR
V					SEE VALVE SUBMITTAL
XFMR 1	330	TR40VA004	FUNCTIONAL	N/A	Xfrmr 40VA,277/240/208/120-24V,2 hub,Cla

FAN COIL UNITS – RESIDENTIAL AREAS:

FAN COIL UNITS SHALL BE UNDER THE CONTROL OF THE BMS.

THE FAN COIL UNIT SUPPLY FAN SHALL CYCLE ON/OFF AT ONE OF THREE FIXED MANUALLY SET SPEEDS (LOW, MEDIUM, AND HIGH) ON A CALL FOR HEATING OR COOLING.

COOLING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

HEATING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

ALTERNATE BID M5: FINNED TUBE RADIATORS
STATE COST ADD TO PROVIDE THE FOLLOWING: PROVIDE FINNED TUBE RADIATION UNITS WHERE SHOWN ON THE MECHANICAL DRAWINGS. INCLUDE ALL THE RELATED PIPING, TRIM PIECES, CONTROL VALVES AND RELATED INTEGRATION INTO THE CONTROLS SYSTEM, VALVES AND INSULATION.

MODULATE THE RESPECTIVE TWO WAY CONTROL VALVE SERVING THE FTR IN THE SAME PROPORTION AS THE VAV BOX HEATING COIL OR FAN COIL AIR HANDLING ALSO SERVING THE SPACE.

REVISION HISTORY

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IU SE Residence Hall
Bloomington, IN

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WLH	WLH		12/22/11	01/19/12

VERTICAL HI-RISE FCU

44OP099145
IU PROJ #20106837

145

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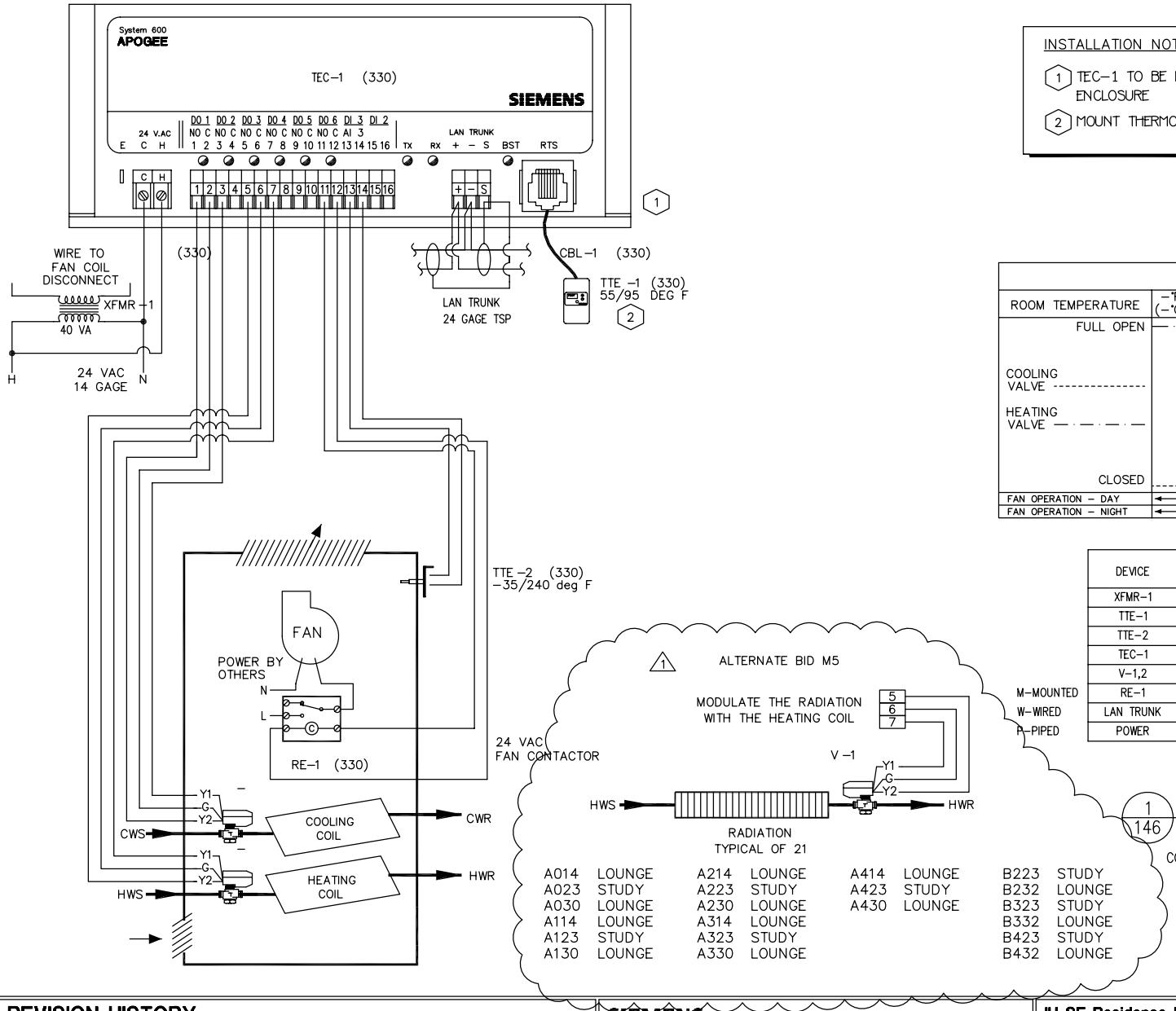
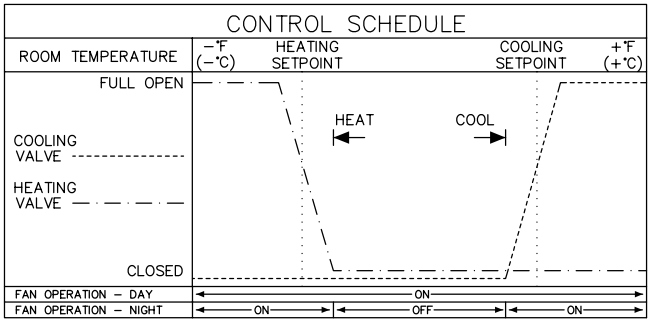


INSTALLATION NOTES:

1. TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
2. MOUNT THERMOSTAT WHERE SHOWN ON FLOOR PLANS.



DEVICE	CIC		MANUFACTURER	DIVISION 26	DIVISION 23
	FITTER	ELEC.			
XFMR-1			M,W		
TTE-1		M,W			
TTE-2			M,W		
TEC-1			M,W		
V-1,2			M,W		
RE-1			M,W		
LAN TRUNK		W			
POWER			W		

M-MOUNTED
W-WIRED
P-PIPED

1/146

FCU CONTROL (#2051)

LOCATION: VARIOUS
SERVES: VARIOUS

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VERTICAL HI-RISE FCU

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CBL 1	3	588-100B	SIEMENS	N/A	6-WIRE 2-RJ11 RS CABLE 50'PLMN
RE 1	3	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TEC 1	3	540-110	SIEMENS	149 181	UNIT COND CTLR ELEC OUT
TTE 1	3	QAA2280.FWSC	SIEMENS	N/A	RTS, TEC DIG., F-F, SL
TTE 2	3	536-811	SIEMENS	149 134	100K OHM DUCT TEMP SENSOR
V					SEE VALVE SUBMITTAL
XFMR 1	3	TR40VA004	FUNCTIONAL	N/A	Xfrmr 40VA,277/240/208/120-24V,2 hub,Cla

FAN COIL UNITS – HIGH CAPACITY:

FAN COIL UNITS SHALL BE UNDER THE CONTROL OF THE BMS.

THE FAN COIL UNIT SUPPLY FAN SHALL CYCLE ON/OFF AT ONE OF THREE FIXED MANUALLY SET SPEEDS (LOW, MEDIUM, AND HIGH) ON A CALL FOR HEATING OR COOLING.

COOLING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

HEATING SEASON: THE UNIT'S TWO-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

ALTERNATE BID M5: FINNED TUBE RADIATORS
STATE COST ADD TO PROVIDE THE FOLLOWING: PROVIDE FINNED TUBE RADIATION UNITS WHERE SHOWN ON THE MECHANICAL DRAWINGS. INCLUDE ALL THE RELATED PIPING, TRIM PIECES, CONTROL VALVES AND RELATED INTEGRATION INTO THE CONTROLS SYSTEM, VALVES AND INSULATION.

MODULATE THE RESPECTIVE TWO WAY CONTROL VALVE SERVING THE FTR IN THE SAME PROPORTION AS THE VAV BOX HEATING COIL OR FAN COIL AIR HANDLING ALSO SERVING THE SPACE.

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VERTICAL HIGH CAPACITY FCU

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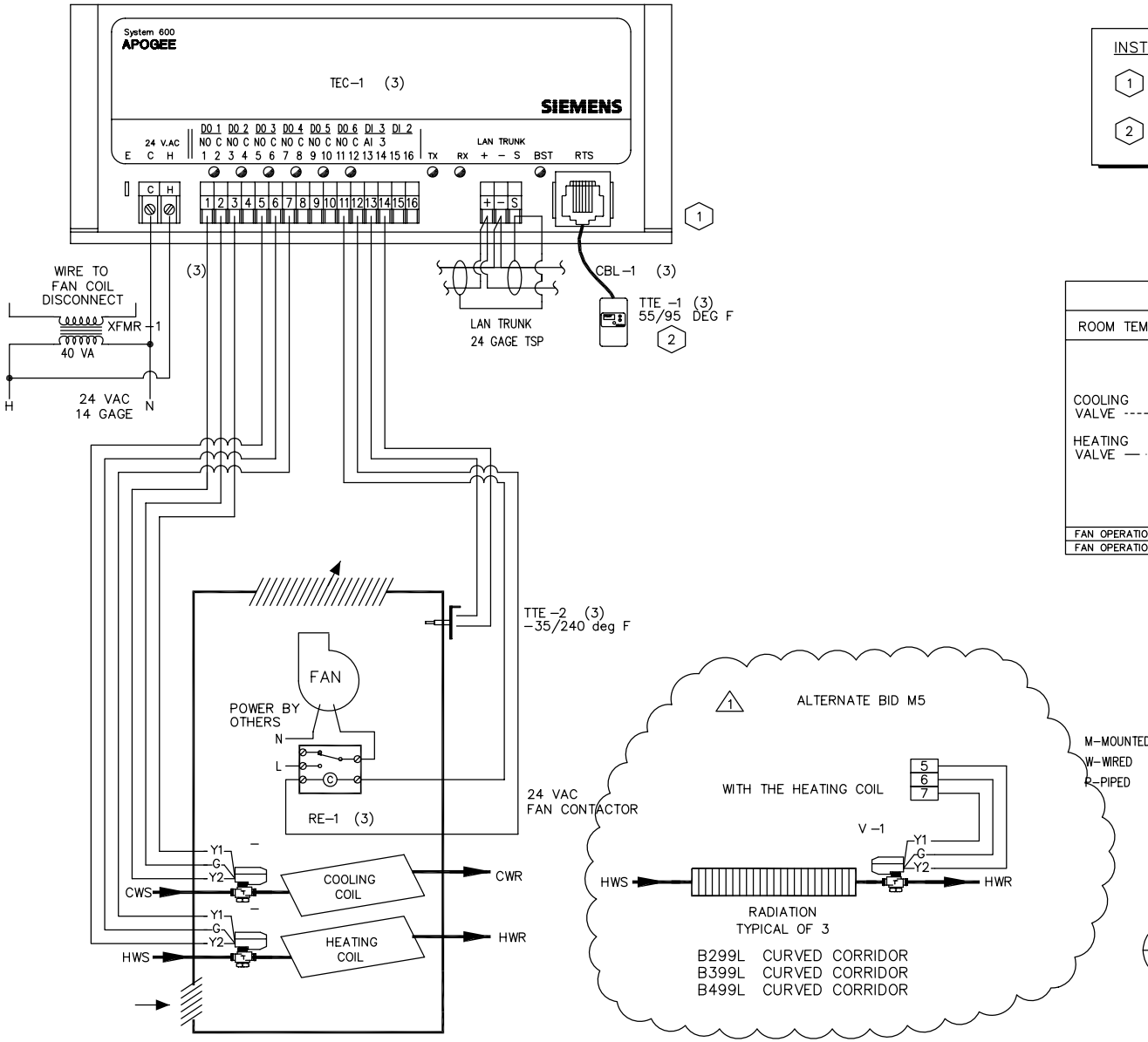
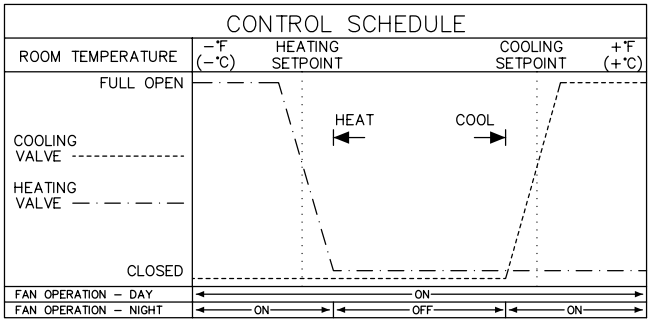


INSTALLATION NOTES:

1. TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
2. MOUNT THERMOSTAT WHERE SHOWN ON FLOOR PLANS.



DEVICE	CIC		MANUFACTURER	DIVISION 26	DIVISION 23
	FITTER	ELEC.			
XFMR-1			M,W		
TTE-1		M,W			
TTE-2			M,W		
TEC-1			M,W		
V-1,2			M,W		
RE-1			M,W		
LAN TRUNK		W			
POWER			W		

1/148 FCU CONTROL (#2051)

LOCATION: VARIOUS
SERVES: VARIOUS

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VERTICAL HIGH CAPACITY FCU

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TE 2	309	RDX42.22U	SIEMENS	154059	RM CONTRL 24V 2-P W/ FAN SW
	309	ARG70	SIEMENS	149399	T'STAT WALL PLATE ESCUTCHEON
V					SEE VALVE SUBMITTAL

ALTERNATE BID M6: USE THERMOSTAT FAN COIL CONTROL VS. DDC CONTROLLER IN RESIDENT ROOMS.

STATE COST DEDUCT TO USE THERMOSTATS (BY SEIMENS) TO CONTROL THE HIGH RISE FAN COIL UNITS IN LIEU OF PROVIDING A DIGITAL CONTROLLER AS SPECIFIED. THIS APPLIES TO HIGH RISE FAN COIL UNITS THAT SERVE THE RESIDENT ROOMS ONLY.

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VERTICAL HI-RISE FCU (ALT M6)

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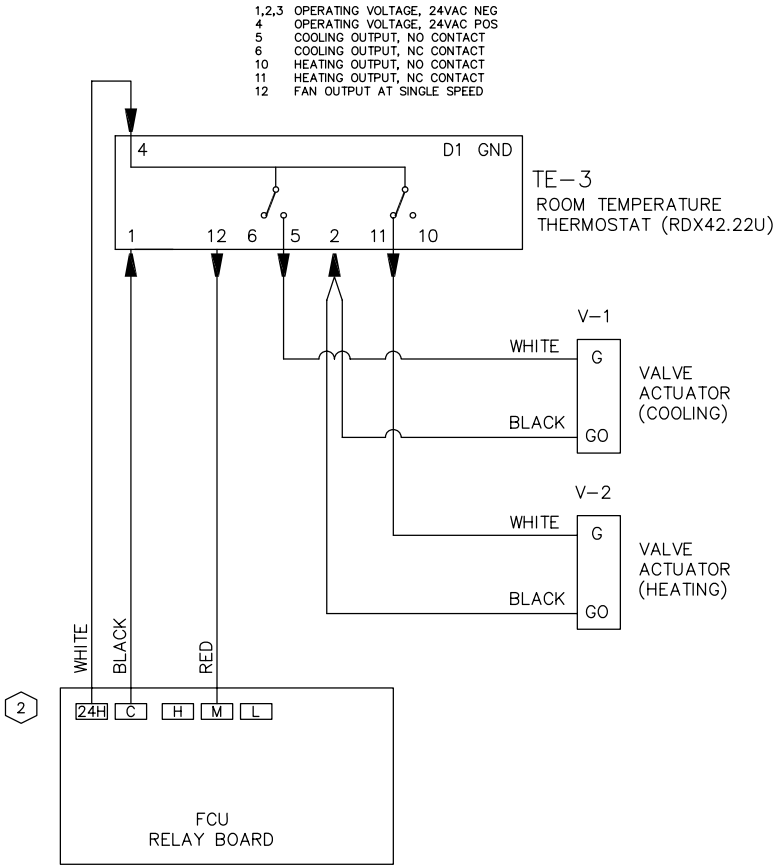
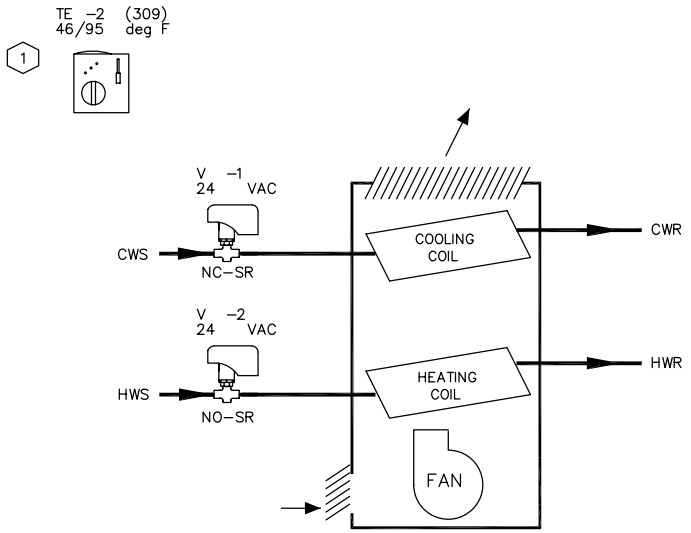
INSTALLATION NOTES:

1. LOCATE AS SHOWN ON MECHANICAL DRAWINGS.
2. CIC TO WIRE FROM THERMOSTAT CONTROLLER TO MANUFACTURER PROVIDED RELAY BOARD. WIRING FROM BOARD TO FAN COIL BY UNIT MANFACTURER.





1/150 FAN COIL UNIT CONTROL

TYPICAL OF 309
LOCATION: VARIOUS
SERVES: VARIOUS

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	Siemens Industry Inc. Building Technology Division 6200 Technology Center Dr. Indianapolis, IN 46278 USA Phone: (317)293-8880 Fax: (877)810-2758	ENGINEER: WLH · DRAFTER: WLH · CHECKED BY: SBT · INITIAL RELEASE: 12/22/11 · LAST EDIT DATE: 01/17/12 VERTICAL HI-RISE FCU (ALT M6)	150

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1	1	GCA126.1U	SIEMENS	154001	2 PT SR,24V,MED/S
	1	ASK71.2U	SIEMENS	N/A	FRAME MOUNT KIT
	1	338-044	SIEMENS	155 032	24"DAMPER PUSHROD
AE 2	1	GCA126.1U	SIEMENS	154001	2 PT SR,24V,MED/S
	1	ASK71.2U	SIEMENS	N/A	FRAME MOUNT KIT
	1	338-044	SIEMENS	155 032	24"DAMPER PUSHROD
CS 1	1	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
D					SEE DAMPER SUBMITTAL

DRYER EXHAUST (EF-1) AND MAKE-UP AIR SYSTEM:

UPON ACTIVATION OF ANY ONE DRYER (DRYER STATUS ON) THE DRYER MAKE-UP AIR INTAKE DAMPERS SHALL BE OPENED. IF A DRYER INTAKE DAMPER FAILS TO OPEN AN ALARM SHALL BE GENERATED. THE MAKE-UP INTAKE DAMPERS SHALL BE OPEN WHILE ONE OR MORE DRYERS ARE OPERATING BASED ON STATUS FROM THE CURRENT SENSOR.

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DRYER EXHAUST CONTROL SYST

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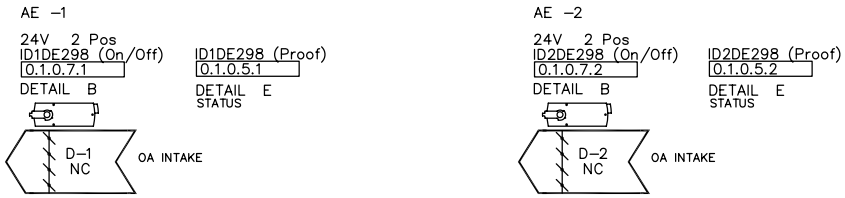
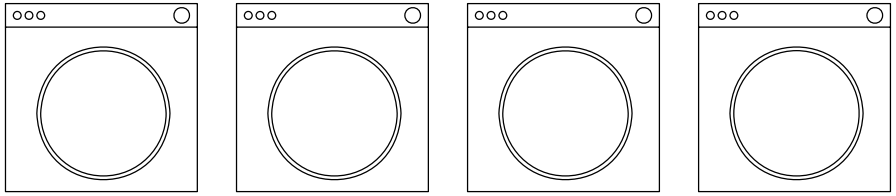
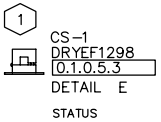
INSTALLATION NOTES:

1. INSTALL SENSOR INSIDE ELECTRICAL ENCLOSURE SUPPLIED BY ELECTRICAL CONTRACTOR NEXT TO DRYER ELECTRICAL PANEL.







1 / 152 DRYER EXHAUST CONTROL

TYPICAL OF 10 DRYERS

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	Siemens Industry Inc. Building Technology Division 6200 Technology Center Dr. Indianapolis, IN 46278 USA Phone: (317)293-8880 Fax: (877)810-2758	ENGINEER: WLH · DRAFTER: WLH · CHECKED BY: SBT · INITIAL RELEASE: 12/22/11 · LAST EDIT DATE: 01/25/12 DRYER EXHAUST CONTROL SYST	152

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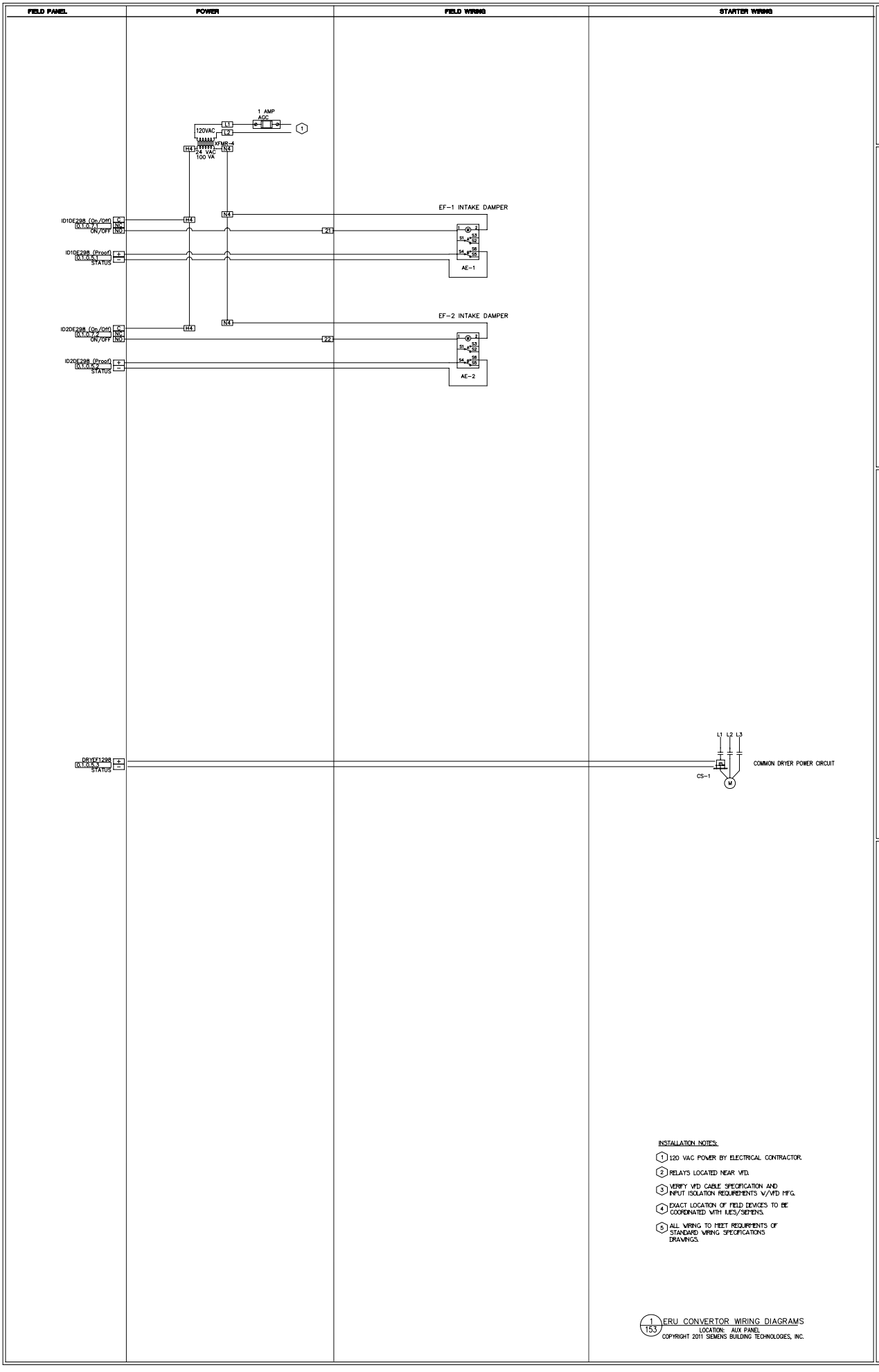

INSTALLATION NOTES:

1. 120 VAC POWER BY ELECTRICAL CONTRACTOR.
2. RELAYS LOCATED NEAR VFD.
3. VERIFY VFD CABLE SPECIFICATION AND INPUT ISOLATION REQUIREMENTS W/VFD MFG.
4. EXACT LOCATION OF FIELD DEVICES TO BE COORDINATED WITH IUES/SIEMENS.
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

1/153 ERU CONVERTOR WIRING DIAGRAMS

LOCATION: AUX PANEL

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DRYER EF-1 SYSTEM WIRING

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
AE 1	1	GMA221.1U	SIEMENS	154004	2PT SR,120V,62LBIN
CS 1-2	2	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
D					SEE DAMPER SUBMITTAL
TE 1	1	134-1084	SIEMENS	155 017	T'STAT,H/C,LINE VOLT CON/EXP
TTE 1	1	QAA2212.EWSN	SIEMENS	N/A	RTS, BAU HSNG, PT1K , 385A, NC
TTE 2-3	2	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH

MISC. MONITORING AND CONTROL

DOMESTIC WATER HEATING:
THE DOMESTIC WATER HEATERS AND MIXING VALVE ASSEMBLY WILL OPERATE INDEPENDENTLY USING FACTORY CONTROLS. THE BMS SHALL MONITOR THE MIXING VALVE ASSEMBLY LEAVING WATER TEMPERATURE AS NOTED IN THE BMS POINTS LIST AND DISPLAY ON THE GRAPHICS.

THE BMS SHALL MONITOR THE DOMESTIC WATER RECIRC PUMP STATUS AND PROVIDE AN ALARM IF THE PUMP IS OFF FOR A PRESET TIME.

DOMESTIC BOOSTER PUMP SYSTEM:
THE BMS SHALL MONITOR THE ALARM/FAULT STATUS FOR THE PACKAGED DOMESTIC WATER BOOSTER SYSTEMS AND DISPLAY ON THE GRAPHICS. THE DOMESTIC WATER BOOSTER SYSTEM WILL OPERATE INDEPENDENTLY USING FACTORY CONTROLS.

WATER DETECTION:
PROVIDE WATER LEAK DETECTORS. SEE DRAWINGS. PROVIDE TWO SENSORS IN THE MAIN LOWER LEVEL MECHANICAL ROOM, ONE SENSOR IN EACH PENTHOUSE, AND ONE SENSOR IN THE ELEVATOR PIT.
ELEVATOR CONTROL ROOM
THE ELEVATOR CONTROL ROOM SHALL BE VENTILATED USING AN INDEPENDENT EXHAUST SYSTEM. THE BMS SHALL MONITOR THE SPACE TEMPERATURE AND ALARM ABOVE 95 DEG F, ADJ. PROVIDE LINE VOLTAGE STAT AND 110V MOTORIZED DAMPER.

CALCULATE BUILDING COOLING TONNAGE AND HEATING MBH.

ALTERNATE BID M1: SOLAR WATER HEATING SYSTEM:
STATE THE ADDITIONAL COST TO PROVIDE THE FOLLOWING: THIS INCLUDES, BUT IN NOT LIMITED TO THE FOLLOWING SCOPE. SOLAR PANELS, SOLAR PANEL SUPPORTS, RELATED CIRCULATING PUMP, INTERIOR AND EXTERIOR PIPING, HOT WATER STORAGE TANKS, SENSORS AND OPERATING CONTROLS, UPGRADED STRUCTURAL FRAMING SYSTEM AND ALL POWER AND LOW VOLTAGE WIRING FOR A FULLY FUNCTIONING SYSTEM. REFER TO PLUMBING, ELECTRICAL AND STRUCTURAL DRAWINGS AND SOLAR HEATING SPECIFICATIONS FOR COMPLETE REQUIREMENTS.

PROVIDE TEMP SENSOR IN SOLAR PIPING LOOP AND CONNECT TO BMS (ALTERNATE M1).

REVISION HISTORY

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MISC MONITORING SYSTEM

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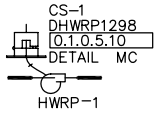
TTE -3
-40/240deg F
ST1DHW298
0.1.0.3.2
DETAIL MR
1/2" X 3 1/2" NPT

DOMESTIC HW SENSOR
LOCATED AFTER MIXING VALVE



CS-1
DHWRP1298
0.1.0.5.10
DETAIL MC
HWRP-1

CS-2
DHWRP2298
0.1.0.5.11
DETAIL MC
HWRP-2

SPDHW298
0.1.0.3.1
DETAIL M
PRESSURE

ALDHW298
0.1.0.4.11
DETAIL E
ALARM

POINTS PROVIDED FROM
BOOSTER PUMP PACKAGE

1
155
DOMESTIC WATER SYSTEM

WA1298
0.1.0.4.12
DETAIL E
HW/CHW MECH ROOM

WAES298
0.1.0.5.9
DETAIL E
ELEVATOR SHAFT

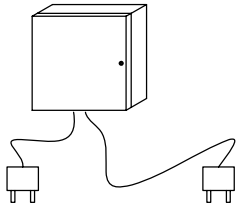
WA5298
0.5.0.4.10
DETAIL E
ERU-4 PENTHOUSE MER

WA6298
0.6.0.3.10
DETAIL E
ERU-5 PENTHOUSE MER

WA8298
0.8.0.3.10
DETAIL E
ERU-6 PENTHOUSE MER

WA9298
0.9.0.3.10
DETAIL E
ERU-7 PENTHOUSE MER

WATER DETECTION SYSTEM
TYPICAL OF THREE

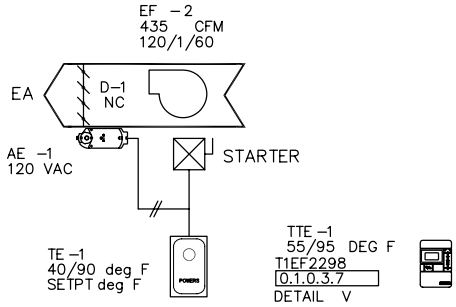


3
155
WATER DETECTION
TYPICAL OF 6
COORDINATE FINAL SENSOR LOCATION
WITH OWNER PRIOR TO INSTALLATION

1 ALTERNATE BID M1

TTE -2
-40/240deg F
STSH1298
0.1.0.3.4
DETAIL MR
1/2" X 3 1/2" NPT

2
155
SOLAR WATER HEATER
SEE DRAWING P4.1 FOR LOCATION
ALTERNATE M1



4
155
ELEVATOR CONTROL ROOM

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			ENGINEER: WLH · DRAFTER: WLH · CHECKED BY: SBT · INITIAL RELEASE: 12/22/11 · LAST EDIT DATE: 01/25/12	155
			MISC MONITORING SYSTEM	

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
RE 1	8	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TE 1	8	134-1084	SIEMENS	155 017	T'STAT,H/C,LINE VOLT CON/EXP
V					SEE VALVE SUBMITTAL
XFMR 1	8	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U

UNIT HEATERS AND CABINET UNIT HEATERS

CONTROL OF THE UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE ACCOMPLISHED LOCALLY BY A 24V STAT PROVIDED BY THE BMS CONTRACTOR. DO NOT TIE INTO THE DDC SYSTEM.

THE HEATER THERMOSTAT SHALL CYCLE THE FAN AND OPEN/CLOSE THE HEATING COIL TWO-WAY CONTROL VALVE SIMULTANEOUSLY TO MAINTAIN SPACE TEMPERATURE SETPOINT (55 DEG F, ADJUSTABLE).

REVISION HISTORY

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CABINET UNIT HEATER

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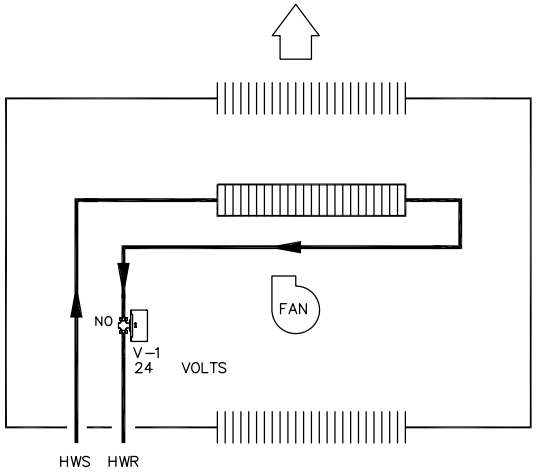

1 / 157 CABINET UNIT HEATER CONTROL

LOCATION:
SERVES:

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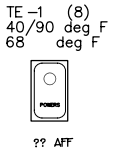
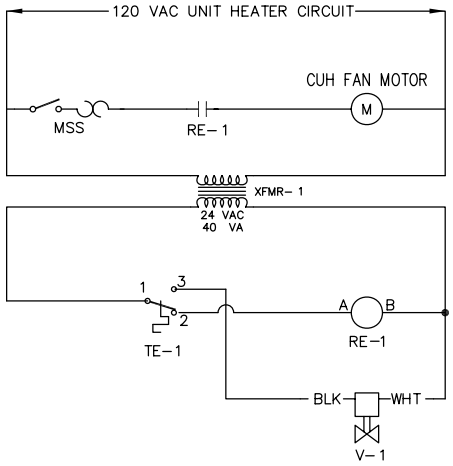
ETHC2X03 REV 7 03/25/08





2 / 157 CABINET UNIT HEATER WIRING

LOW VOLTAGE CONTROL

CUH A099B	NORTH STAIR
CUH A099F	UNIT A COURTYARD
CUH B199B	EAST STAIR
CUH B199G	NE ENTERANCE
CUH B199L	UNIT B COURTYARD
CUH B199M	S EXIT
CUH B199T	W VEST
CUH B199V	E VEST

REVISION HISTORY

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Fax: (877)810-2758

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Bloomington, IN

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
WLH	WLH		12/22/11	01/25/12

CABINET UNIT HEATER

44OP099145
IU PROJ #20106837

157

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TE 1	8	134-1084	SIEMENS	155 017	T'STAT,H/C,LINE VOLT CON/EXP
V					SEE VALVE SUBMITTAL
XFMR 1	8	TR100VA001	FUNCTIONAL	N/A	Xfrmr 100VA,120-24V,single hub,ClassII U
Panel Mounted Devices					
RE 1	8	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT

UNIT HEATERS AND CABINET UNIT HEATERS

CONTROL OF THE UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE ACCOMPLISHED LOCALLY BY A 24V STAT PROVIDED BY THE BMS CONTRACTOR. DO NOT TIE INTO THE DDC SYSTEM.

THE HEATER THERMOSTAT SHALL CYCLE THE FAN AND OPEN/CLOSE THE HEATING COIL TWO-WAY CONTROL VALVE SIMULTANEOUSLY TO MAINTAIN SPACE TEMPERATURE SETPOINT (55 DEG F, ADJUSTABLE).

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UNIT HEATER

440P099145
IU PROJ #20106837

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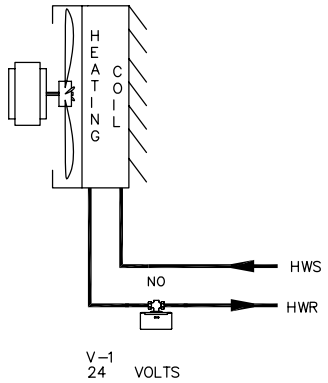

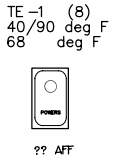

1/159 UNIT HEATER CONTROL

LOCATION:
SERVES:

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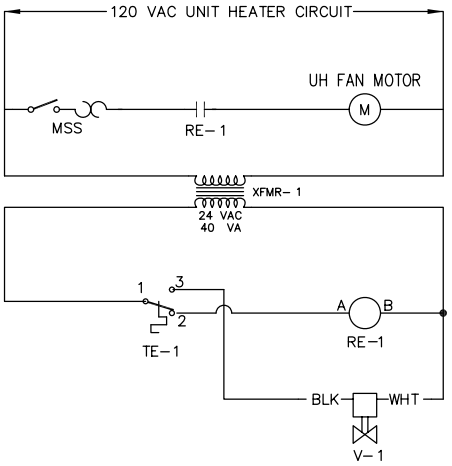

2/159 UNIT HEATER WIRING

LOW VOLTAGE CONTROL

UH B006A	LAUNDRY EXHAUST
UH B077	TRASH/RECYCLE
UH B087	FIRE PUMP/WATER SVC
UH B089B	MECHANICAL
UH B089C	MECHANICAL
UH B279A	ELECTRIC
UH B379A	ELECTRIC
UH B479A	ELECTRIC

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UNIT HEATER

440P099145
IU PROJ #20106837

159

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
TE 1	7	RAA20UW	SIEMENS	154013	H OR C 2P DEG F WP
	7	ARG70	SIEMENS	149399	T'STAT WALL PLATE ESCUTCHEON
V					SEE VALVE SUBMITTAL

CONVECTORS

CYCLE TWO WAY CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE.

DO NOT TIE INTO DDC SYSTEM. USE 24V STAT, AND WIRING PROVIDED BY BMS CONTRACTOR.

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CONVECTOR

44OP099145
IU PROJ #20106837

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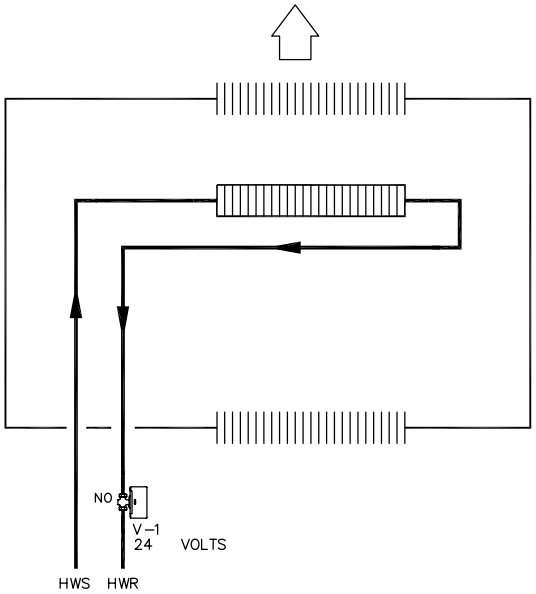

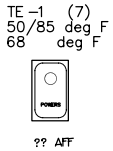

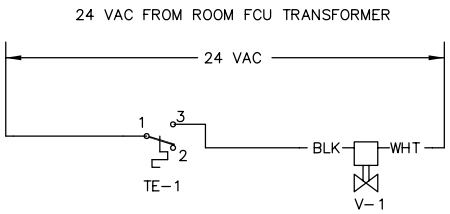

1 / 161 CONVECTOR CONTROL

LOCATION:
SERVES:

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2 / 161 CONVECTOR WIRING

LOW VOLTAGE CONTROL

CV B125B	RESTROOM	24V FROM FCU B125
CV B206A	RESTROOM	24V FROM FCU B206
CV B237A	RESTROOM	24V FROM FCU B237
CV B306A	RESTROOM	24V FROM FCU B306
CV B337A	RESTROOM	24V FROM FCU B337
CV B406A	RESTROOM	24V FROM FCU B406
CV B437A	RESTROOM	24V FROM FCU B437

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WLH	WLH		12/22/11	01/25/12

CONVECTOR

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IU PROJ #20106837

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BENCHMARKS

DESCRIPTION

POINT #	IDENTIFICATION	NORTHING	EASTING	ELEV.
25	REBAR/RED CAP	1427009.58	3115432.47	856.14
402	SURVEY NAIL	1426950.59	3115323.78	853.58
403	SURVEY NAIL	1426834.51	3115444.30	854.04
404	SURVEY NAIL	1427128.13	3115339.07	848.63
706	SURVEY NAIL	1426964.73	3115244.25	853.49
861	SURVEY NAIL	1426825.47	3115241.38	850.55
1034	SURVEY NAIL	1426833.45	3115083.89	849.11
1400	SURVEY NAIL	1426967.56	3115025.42	847.94
1401	SURVEY NAIL	1426901.69	3115095.29	851.25

HORIZONTAL DATUM NAD 83 STATE PLANE COORDINATES,
INDIANA WEST ZONE VERTICAL DATUM– 1929

D1.045

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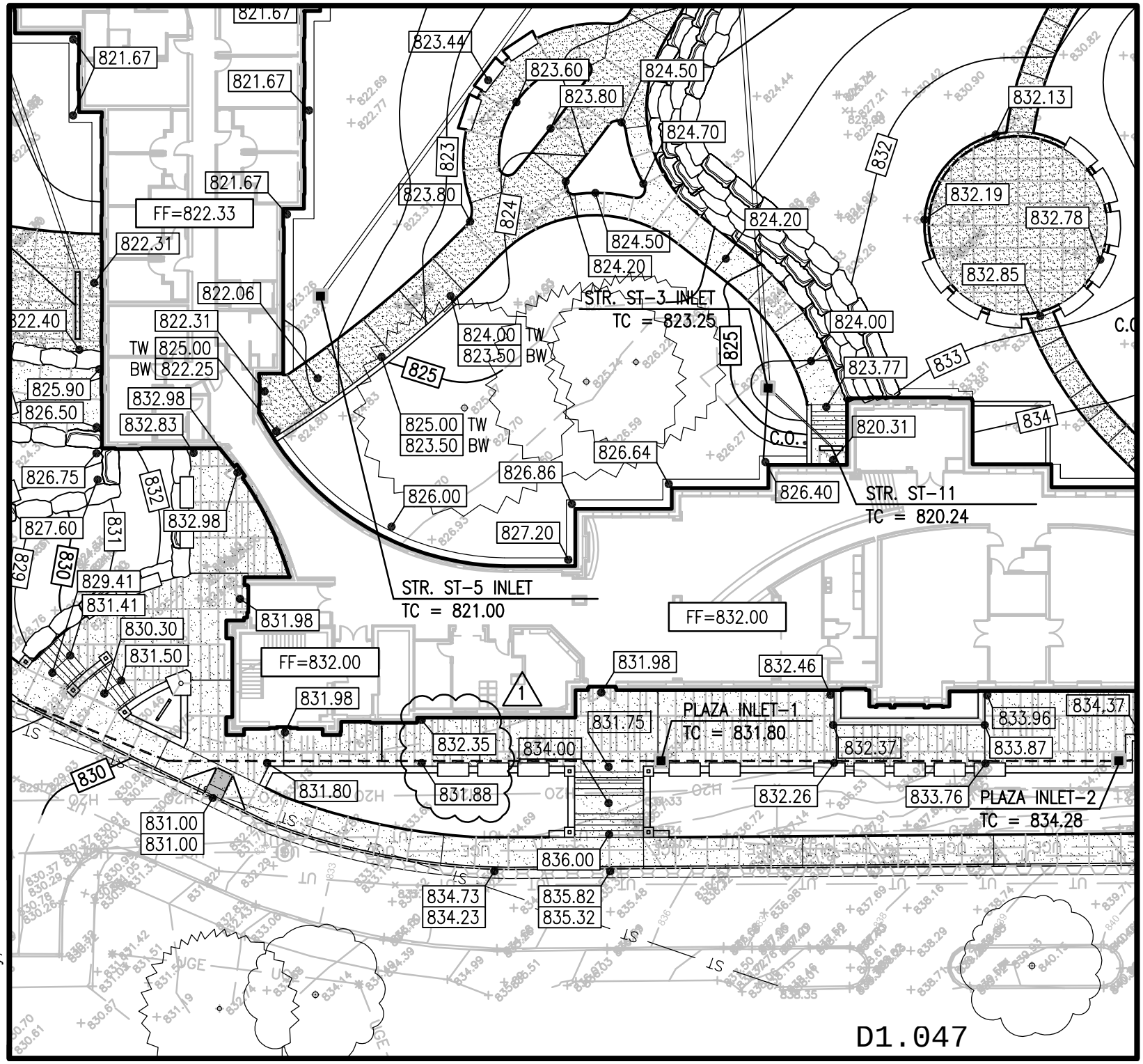
SHEET NUMBER

D1.C1-sk1



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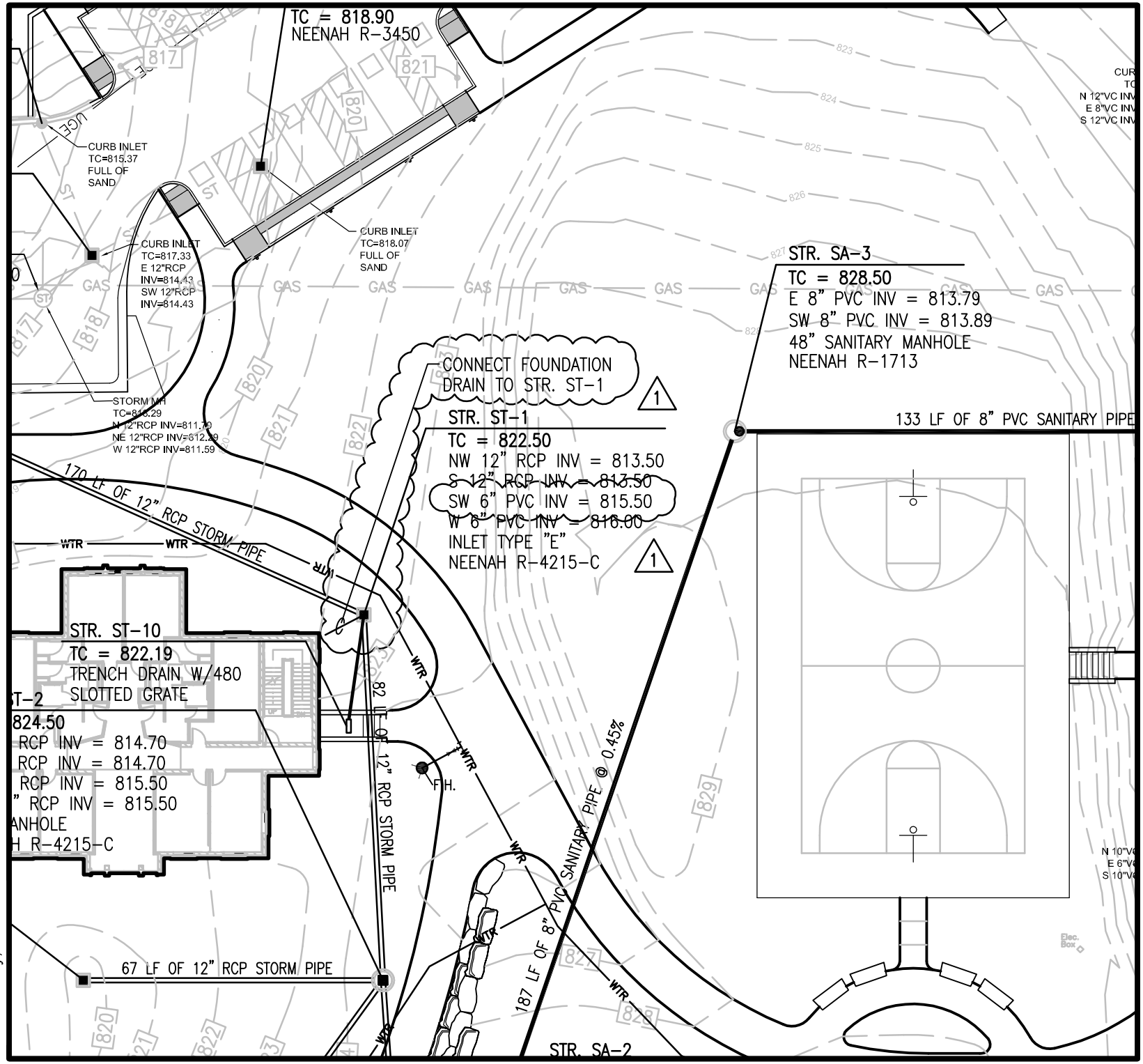
SHEET NUMBER	D1.C3-sk1



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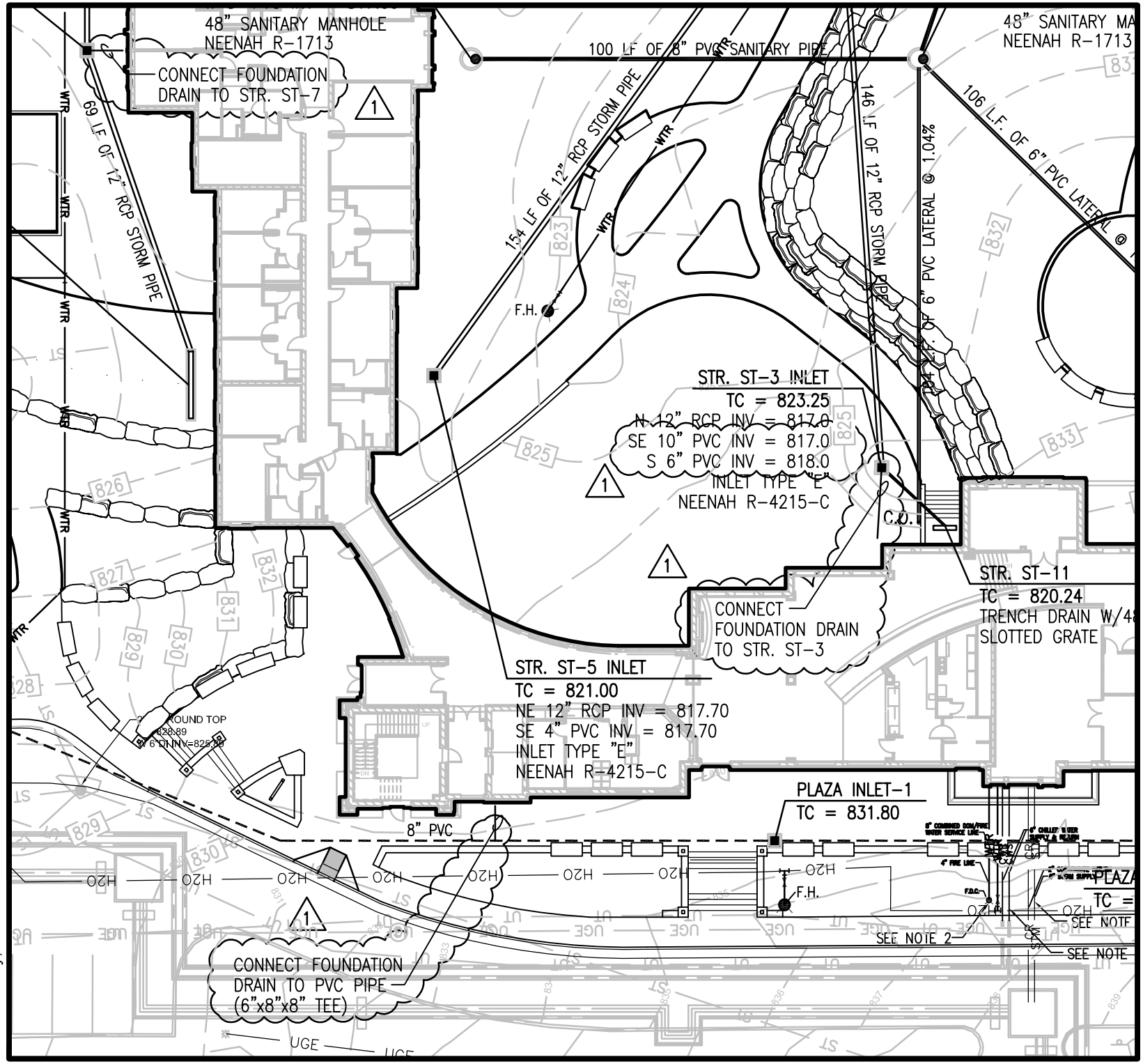
SHEET NUMBER	D1.048a

D1.C4-sk1



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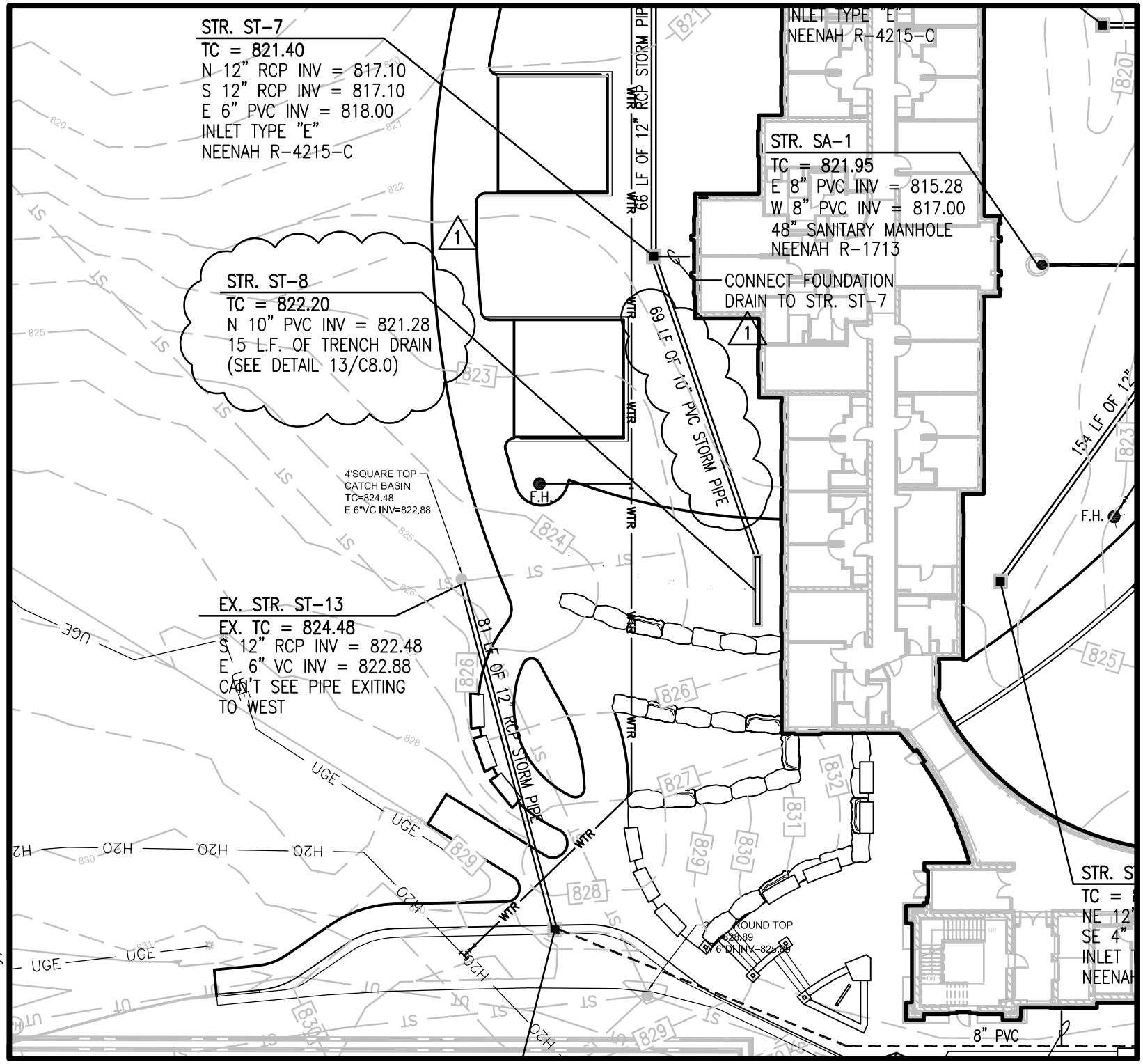
DATE	1-26-12
COMMISSION NUMBER	5804
SHEET NUMBER	D1.048b

D1.C4-sk2



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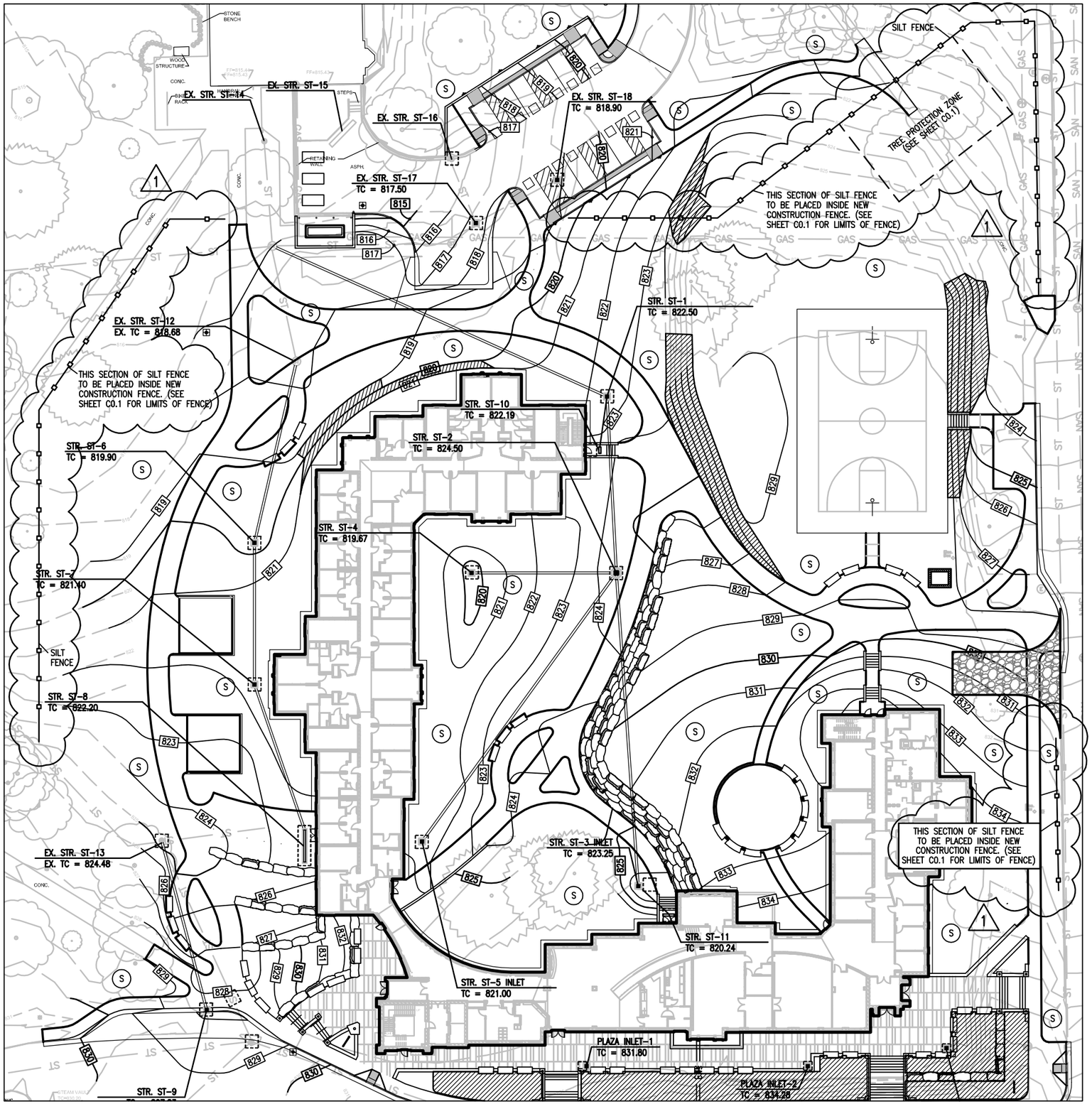
D1.C4-sk3



EROSION CONTROL LEGEND

- SILT FENCE (SEE DETAIL ON SHEET C5.1)
- EROSION CONTROL BLANKET (SEE DETAIL ON SHEET C5.1)
- INLET SILT PROTECTION (SEE DETAILS ON SHEET C5.1)
- CONCRETE WASHOUT (SEE DETAIL ON SHEET C5.1)
- SEEDING (SEE DETAIL ON SHEET C5.1)
- CONSTRUCTION ENTRANCE (SEE DETAIL ON SHEET C5.1)

EROSION CONTROL PLAN

SCALE: 1" = 50'

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D1.C5-sk1

D1.050

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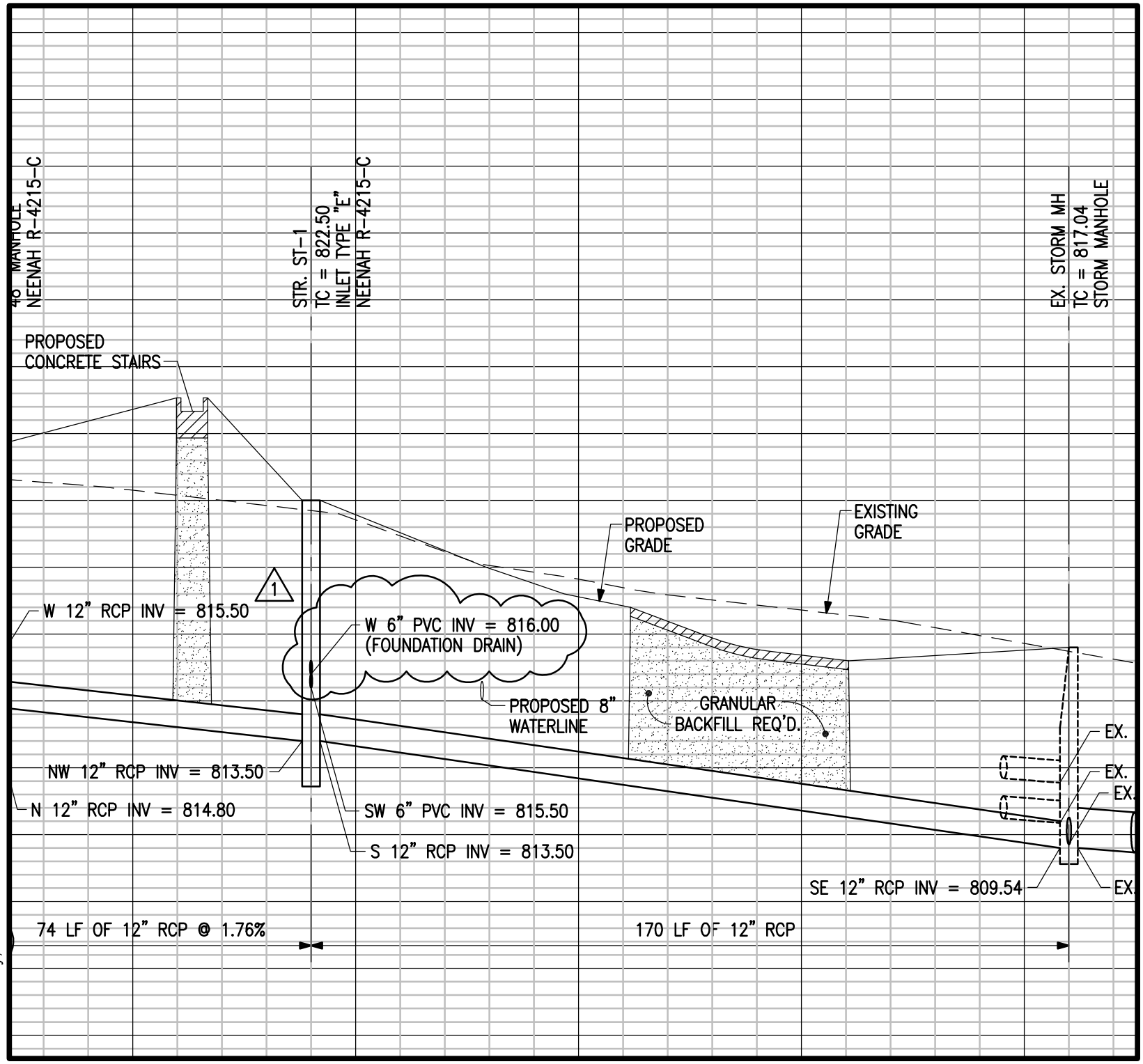

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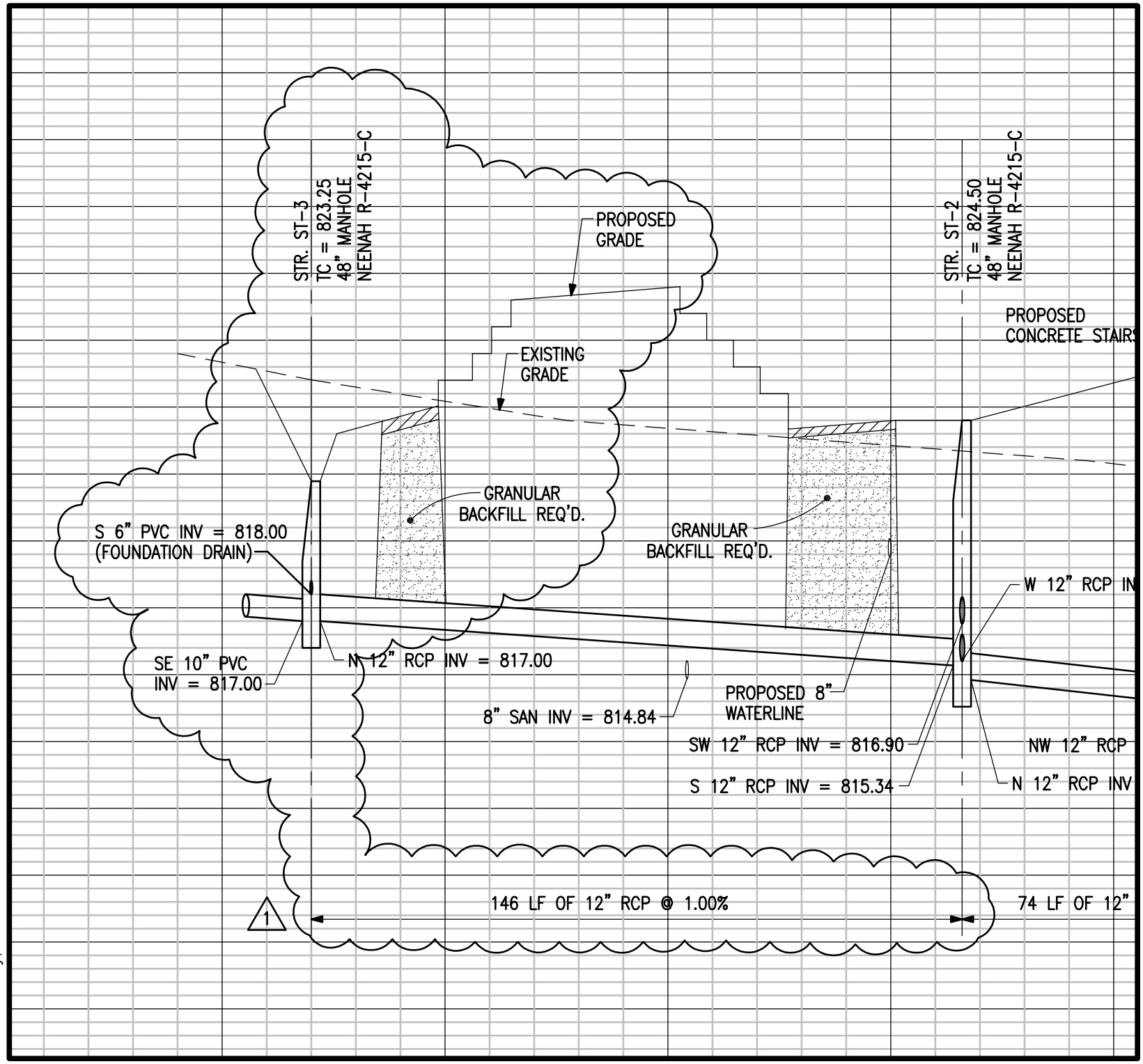
COMMISSION NUMBER	5804
SHEET NUMBER	D1.051a

D1.C7-sk1



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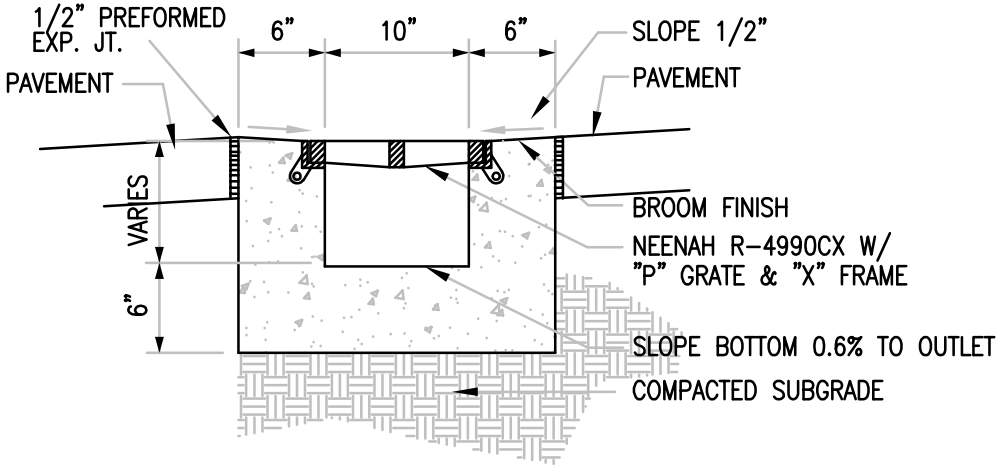
DATE	1-26-12
COMMISSION NUMBER	5804
SHEET NUMBER	D1.051b

D1.C7-sk2



TRENCH DRAIN DETAIL - ST8

NO SCALE

13
C8.0

D1.054

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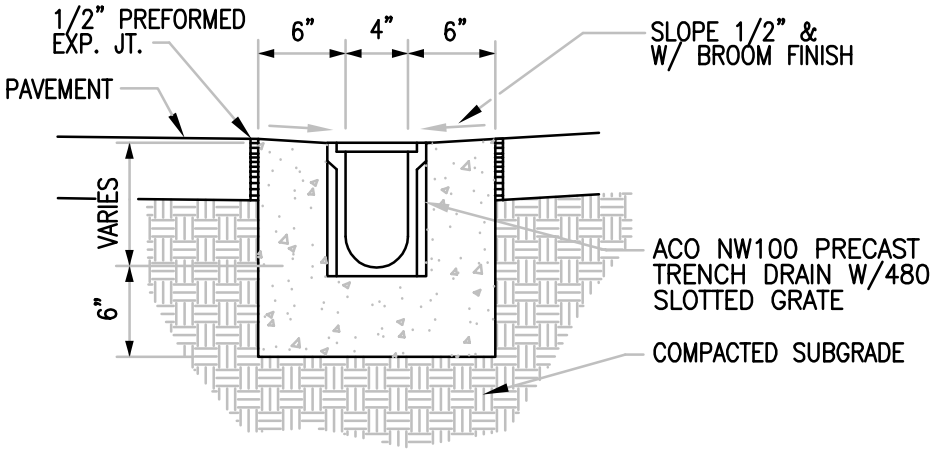
SHEET NUMBER	D1.C8-sk1



TRENCH DRAIN DETAIL - ST10 & ST11

NO SCALE

12
C8.0

D1.055

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SHEET NUMBER	D1.C8-sk2

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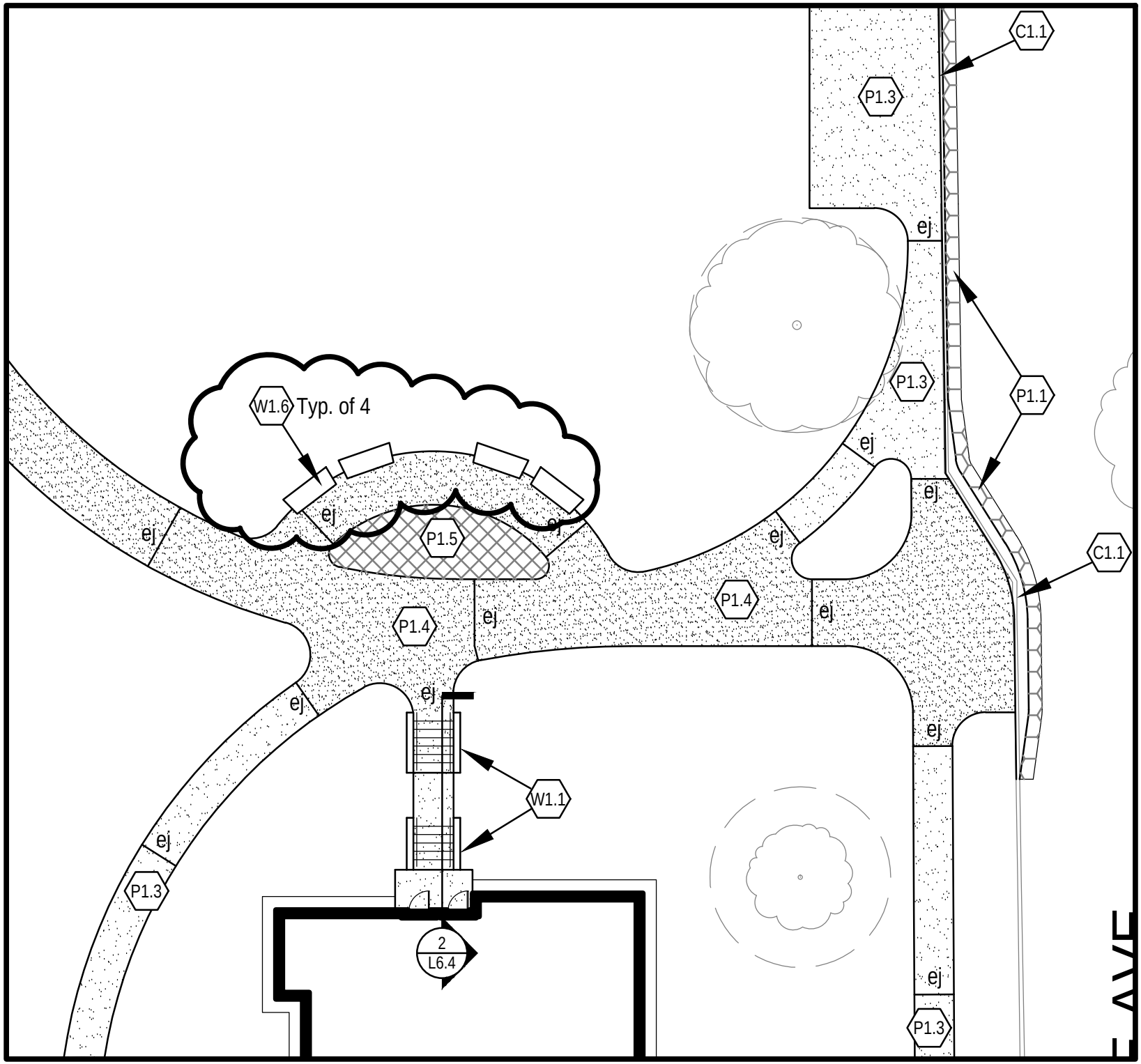

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DATE	1.26.2012
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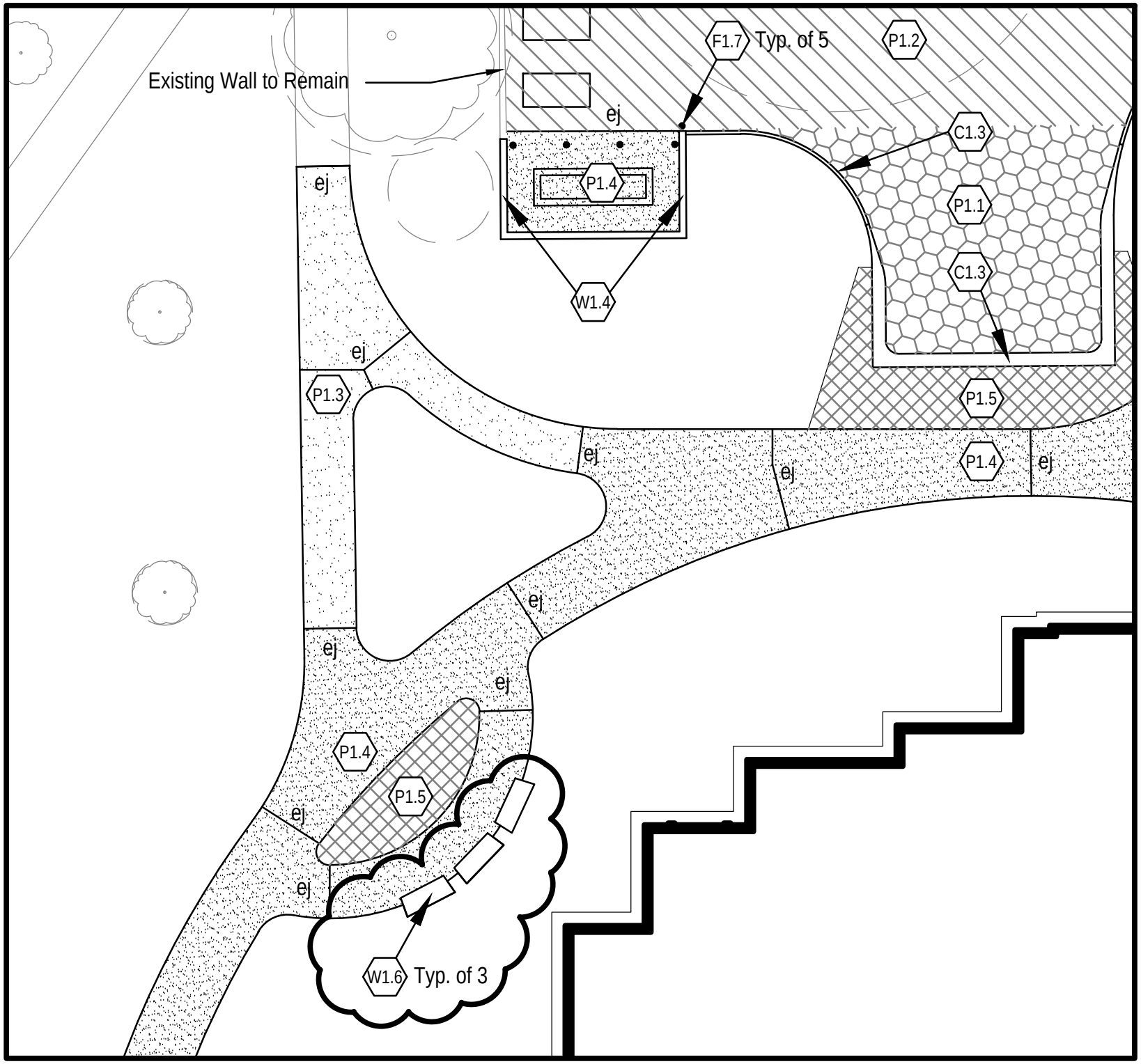
SHEET NUMBER	D1.056a
	L2.0



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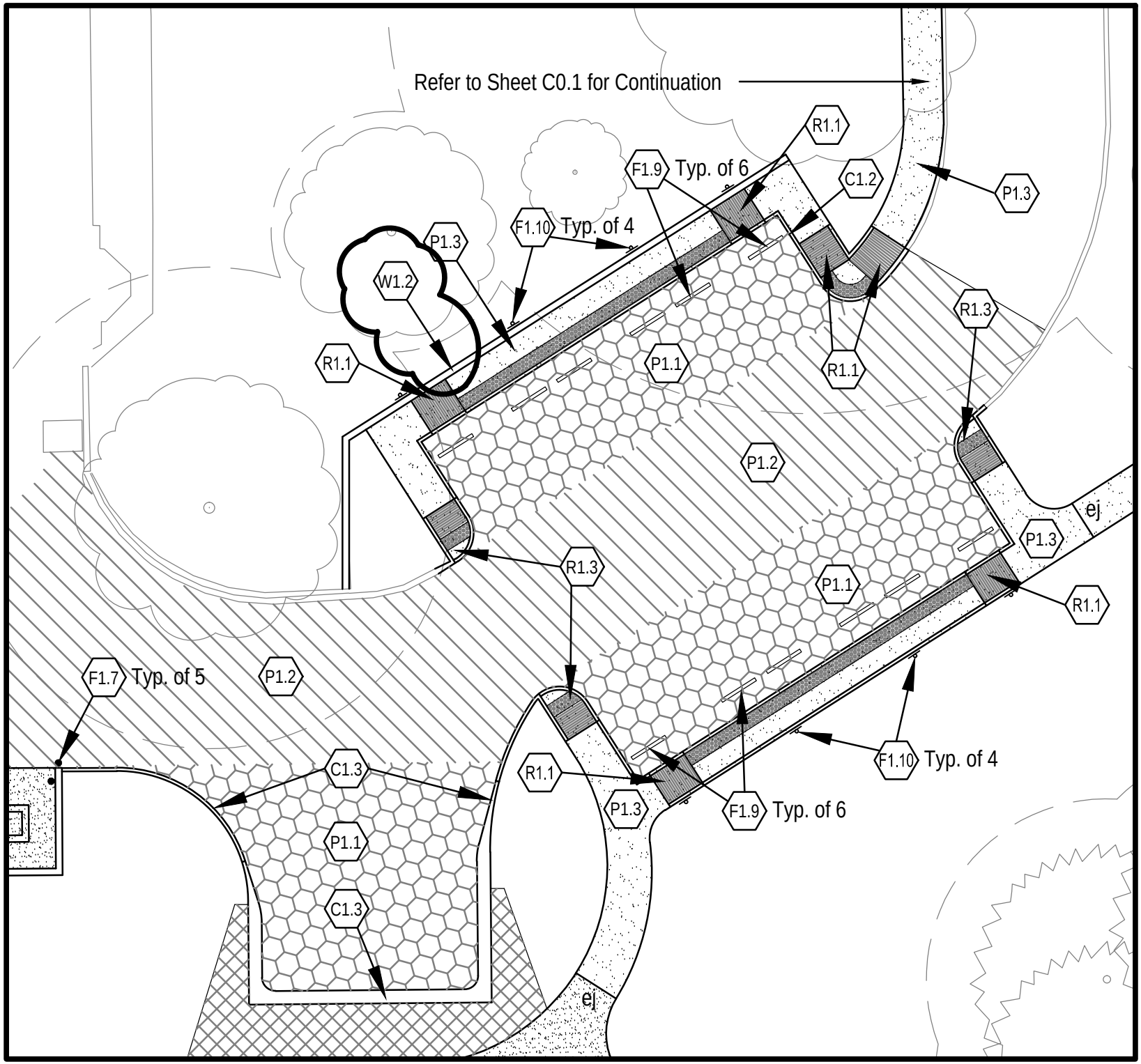
L2.0



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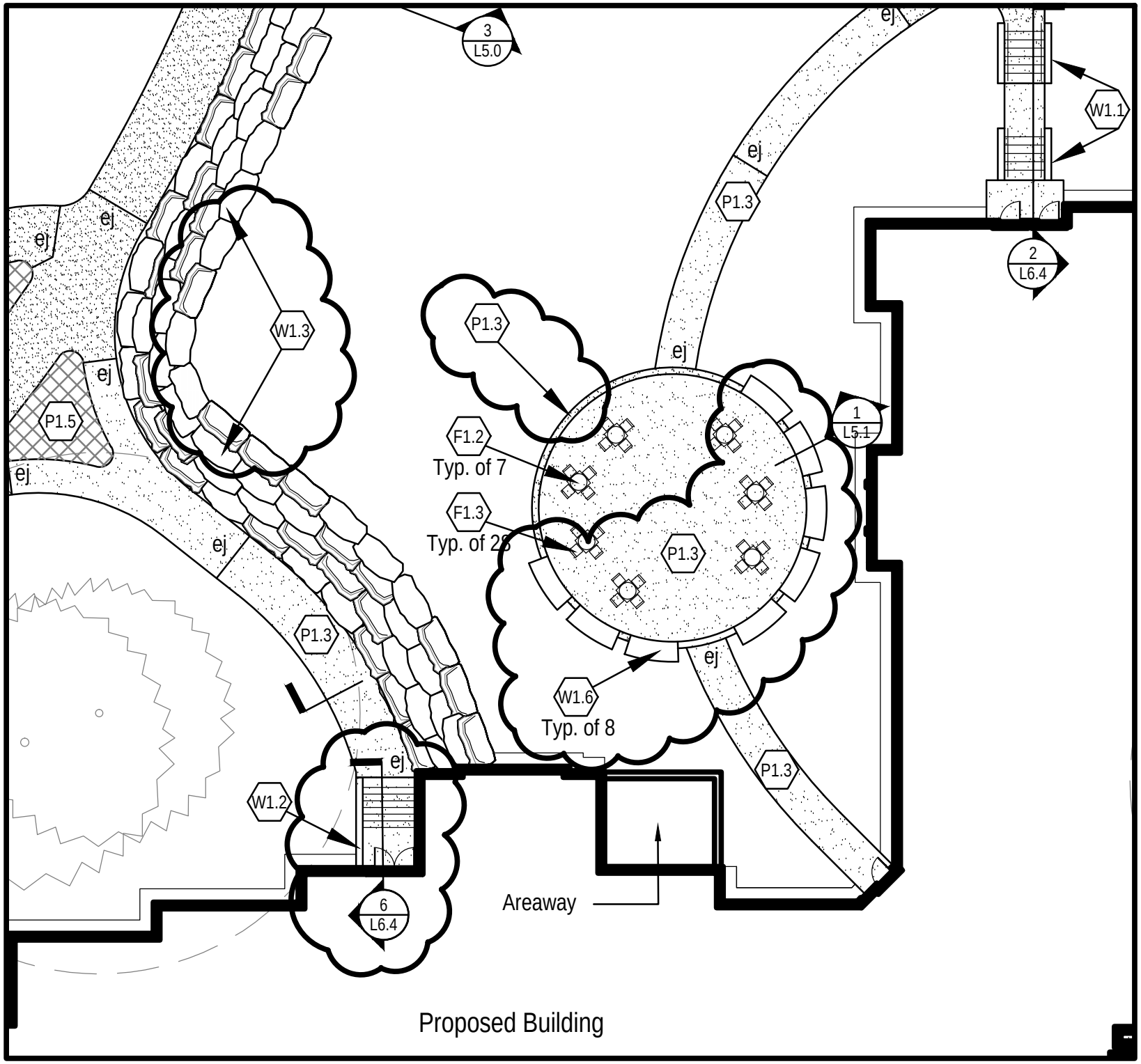

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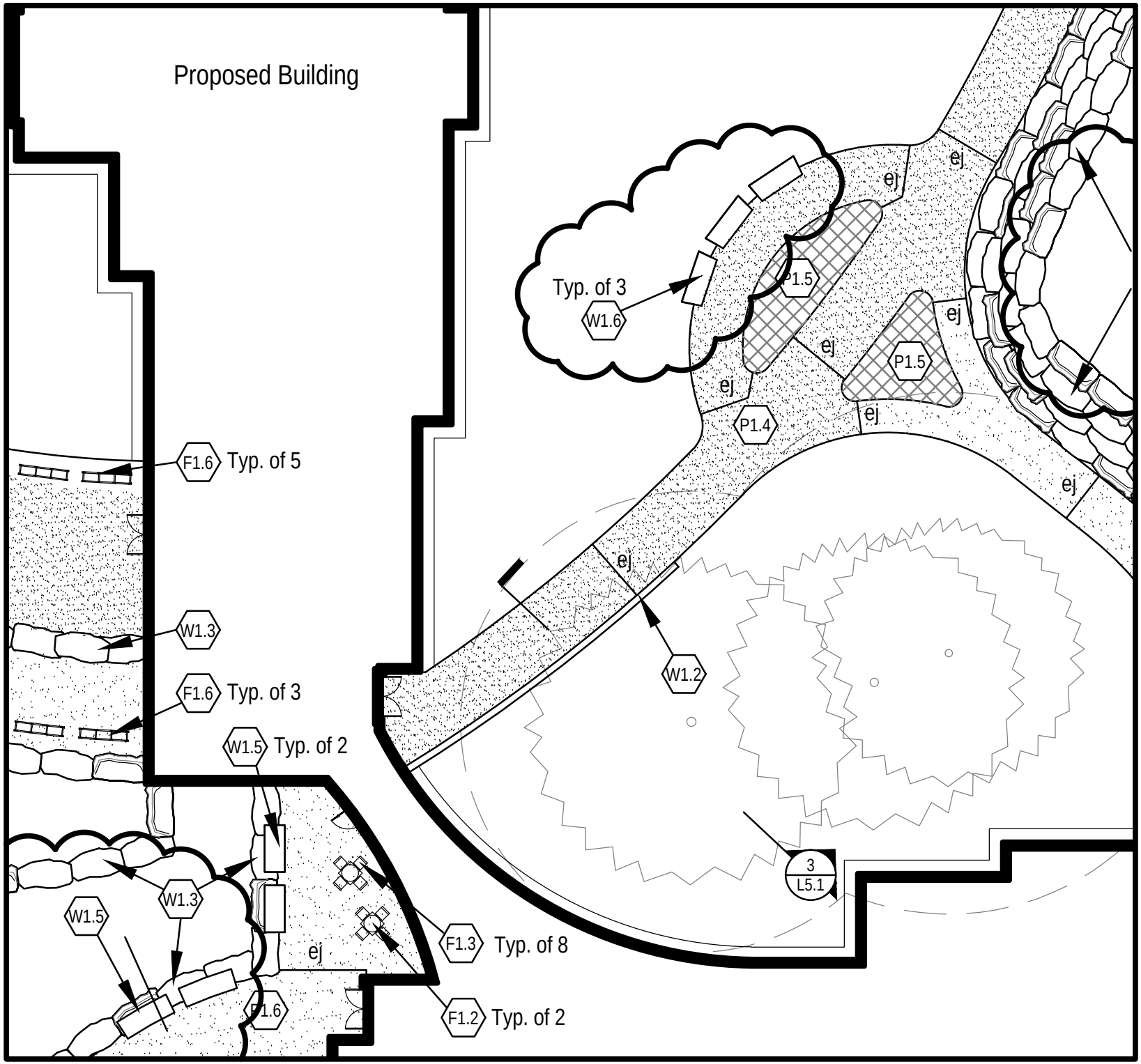
SHEET NUMBER	D1.056d L2.0



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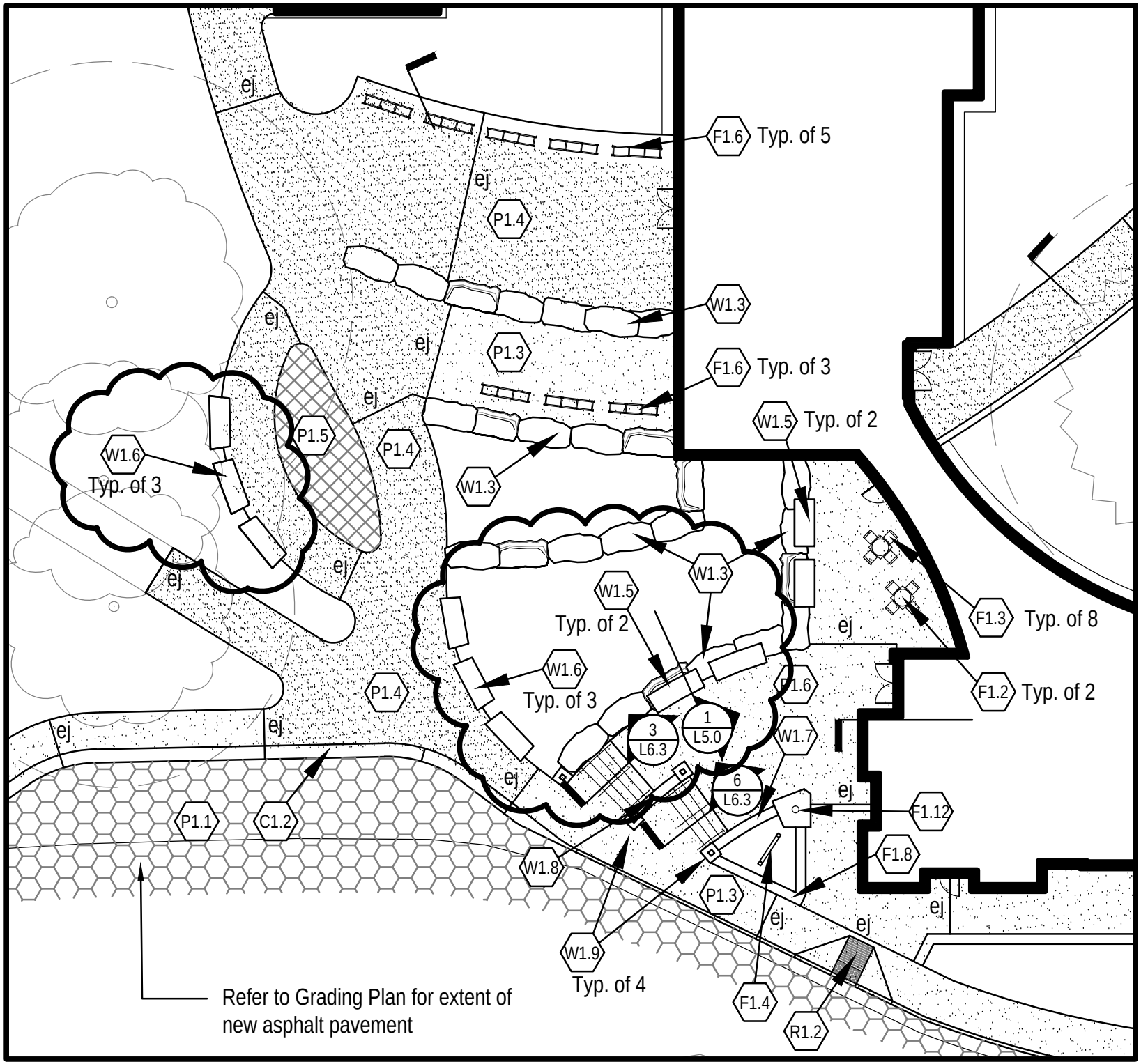
voice 260.432.9337
930 NORTH MERIDIAN
INDIANAPOLIS, IN 46204
voice 317.917.1190
http://www.msktd.com

Indiana University SouthEast Side Residence Hall

IU # 20106837
1801 East Jones Avenue
Bloomington, Indiana

DATE	1.26.2012
COMMISSION NUMBER	5804
SHEET NUMBER	D1.056e L2.0



26 January, 2012

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1715 MAGNAVOX WAY
FORT WAYNE, IN 46804
voice 260.432.9337

930 NORTH MERIDIAN
INDIANAPOLIS, IN 46204
voice 317.917.1190

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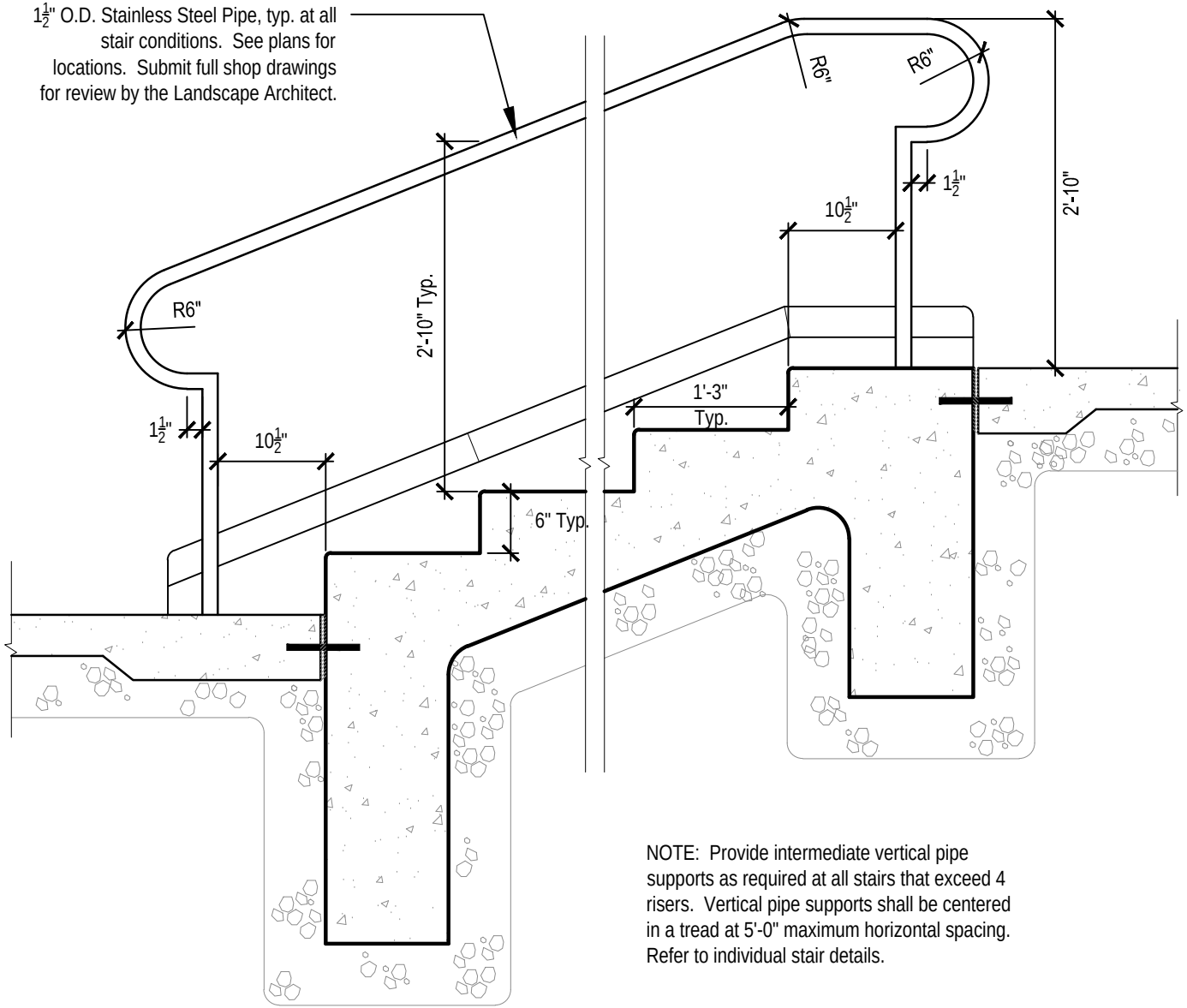

NOTE: Provide intermediate vertical pipe supports as required at all stairs that exceed 4 risers. Vertical pipe supports shall be centered in a tread at 5'-0" maximum horizontal spacing. Refer to individual stair details.

5 TYPICAL STAIR HANDRAIL

Scale: 3/4"=1'-0"

26 January, 2012

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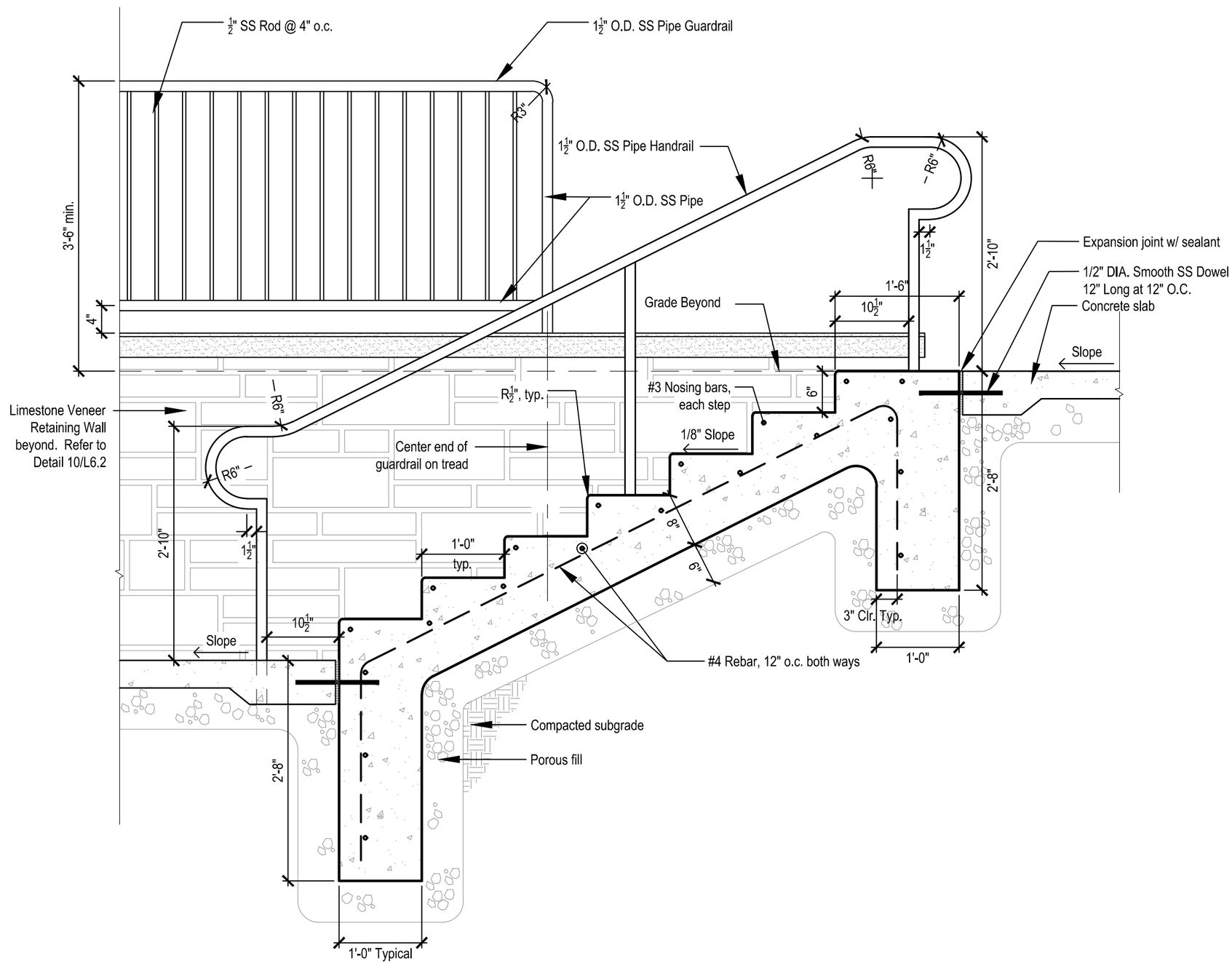
Bloomington, Indiana

DATE	1.26.2012
COMMISSION NUMBER	5804
SHEET NUMBER	D1.060
	L6.4



6 COURTYARD STAIR TO LOWER LEVEL

Scale: 3/4"=1'-0"

D1.061

26 January, 2012

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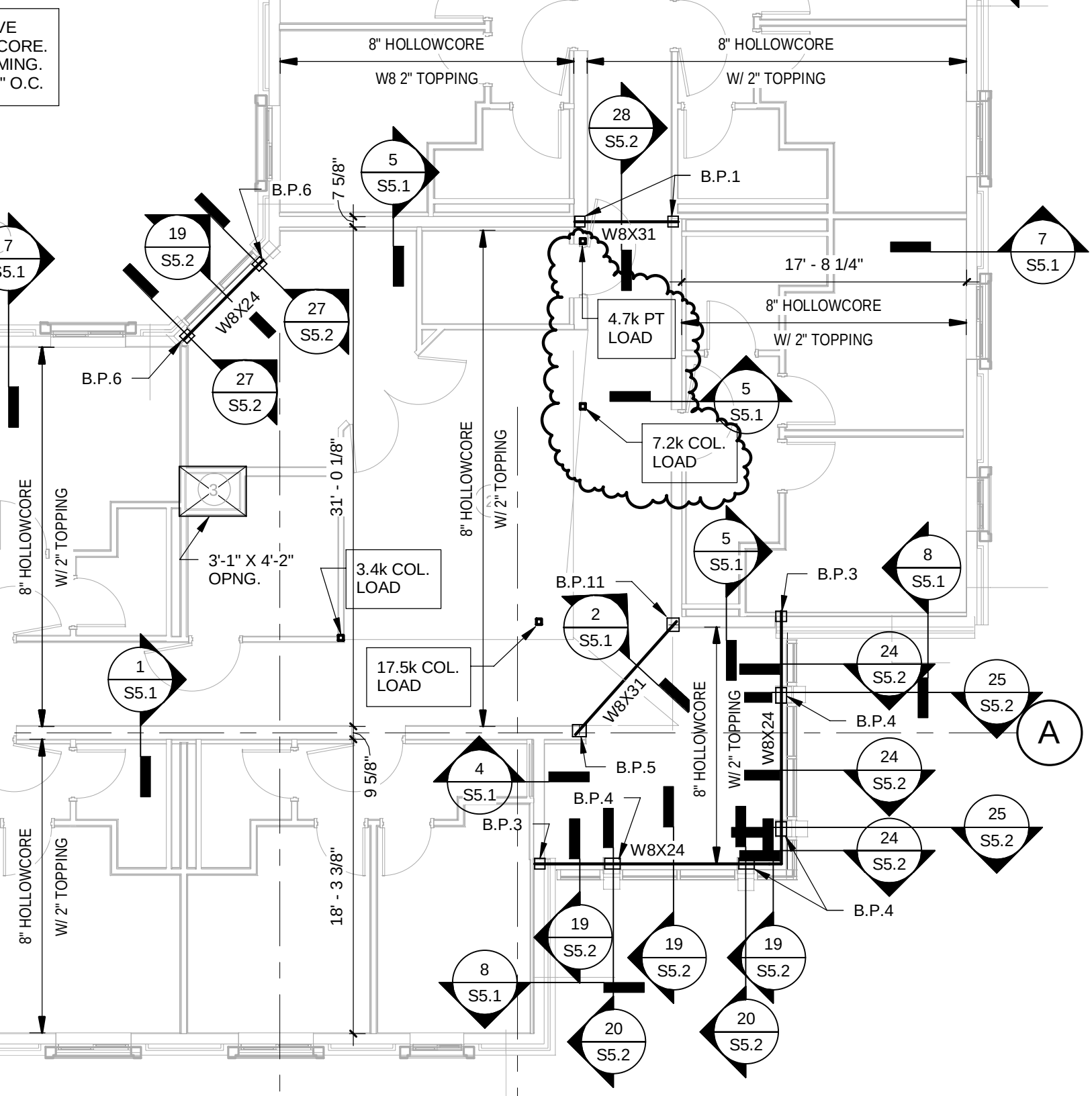
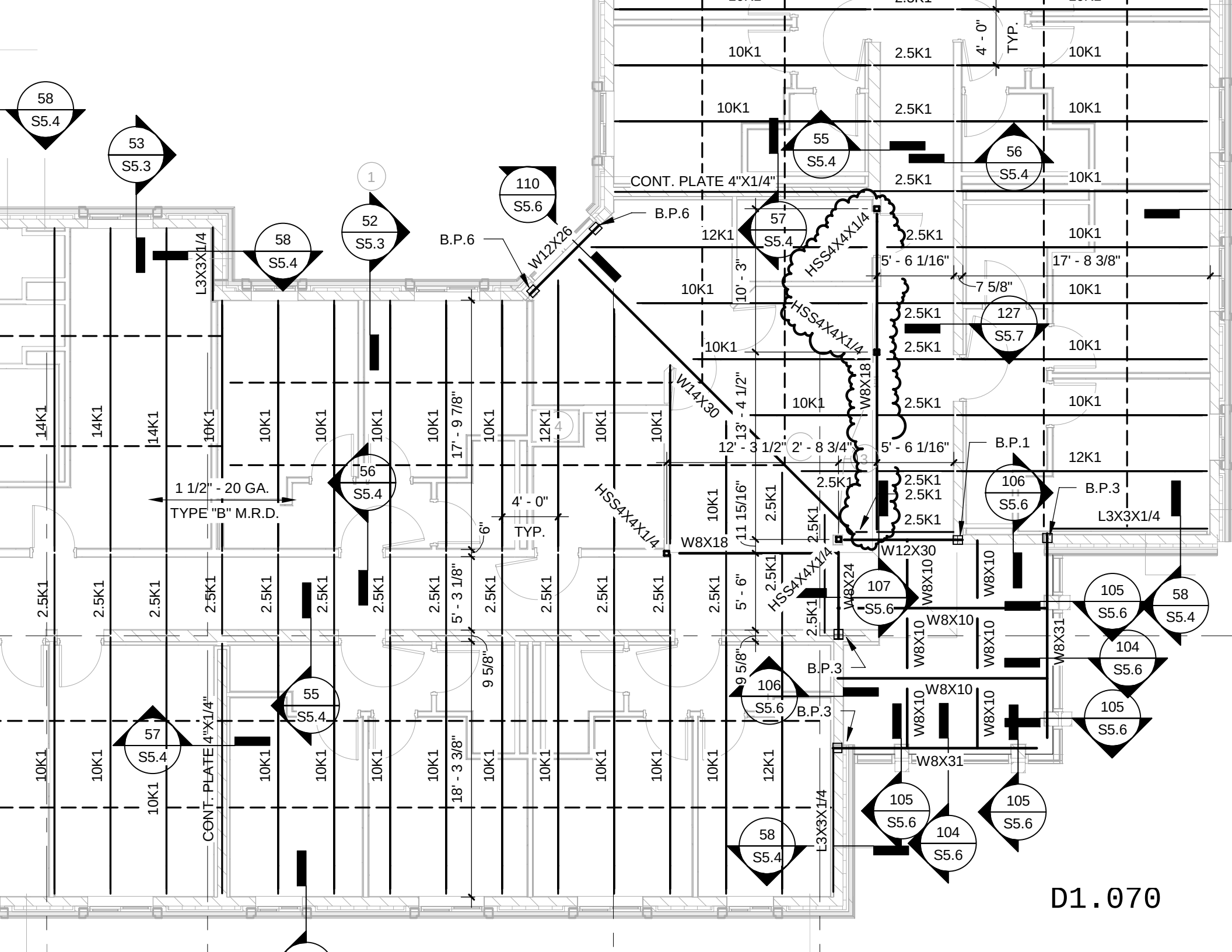
Indiana University
SouthEast Side Residence Hall
IU # 20106837
1801 East Jones Avenue
Bloomington, Indiana

DATE	1.26.2012
COMMISSION NUMBER	5804

L6.4

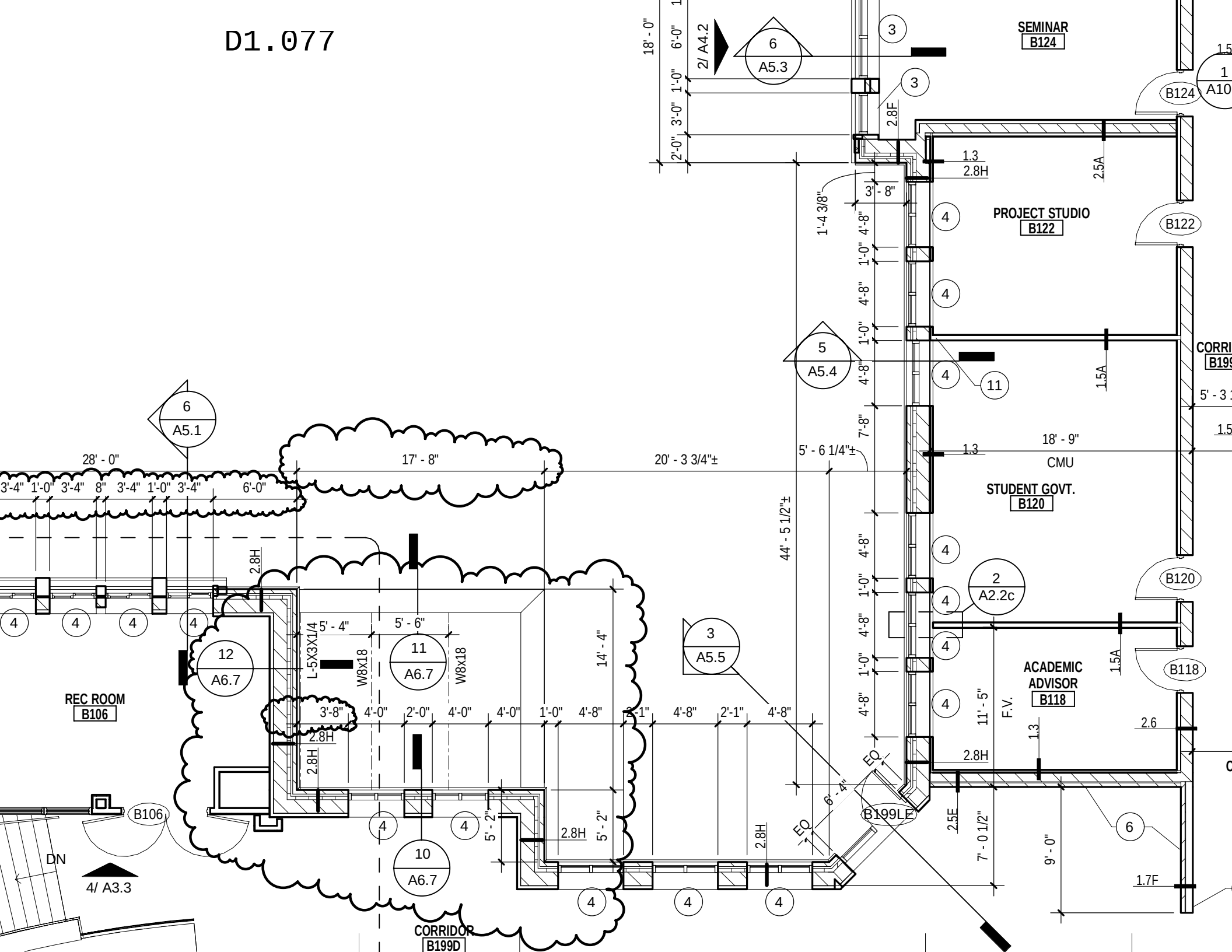

VE
CORE.
MING.
" O.C.
8" HOLLOWCORE
W8 2" TOPPING
8" HOLLOWCORE
W/ 2" TOPPING
28
S5.2
5
S5.1
B.P.1
B.P.6
7 5/8"
W8X31
19
S5.2
7
S5.1
17' - 8 1/4"
8" HOLLOWCORE
W/ 2" TOPPING
4.7k PT
LOAD
W8X24
27
S5.2
B.P.6
27
S5.2
5
S5.1
7.2k COL.
LOAD
31' - 0 1/8"
8" HOLLOWCORE
W/ 2" TOPPING
8" HOLLOWCORE
W/ 2" TOPPING
3
3'-1" X 4'-2"
OPNG.
3.4k COL.
LOAD
5
S5.1
8
S5.1
B.P.3
B.P.11
2
S5.1
17.5k COL.
LOAD
1
S5.1
W8X31
24
S5.2
25
S5.2
B.P.4
A
8" HOLLOWCORE
W/ 2" TOPPING
W8X24
9 5/8"
4
S5.1
B.P.5
24
S5.2
B.P.4
B.P.3
25
S5.2
W8X24
24
S5.2
18' - 3 3/8"
B.P.4
8" HOLLOWCORE
W/ 2" TOPPING
19
S5.2
19
S5.2
19
S5.2
8
S5.1
20
S5.2
20
S5.2

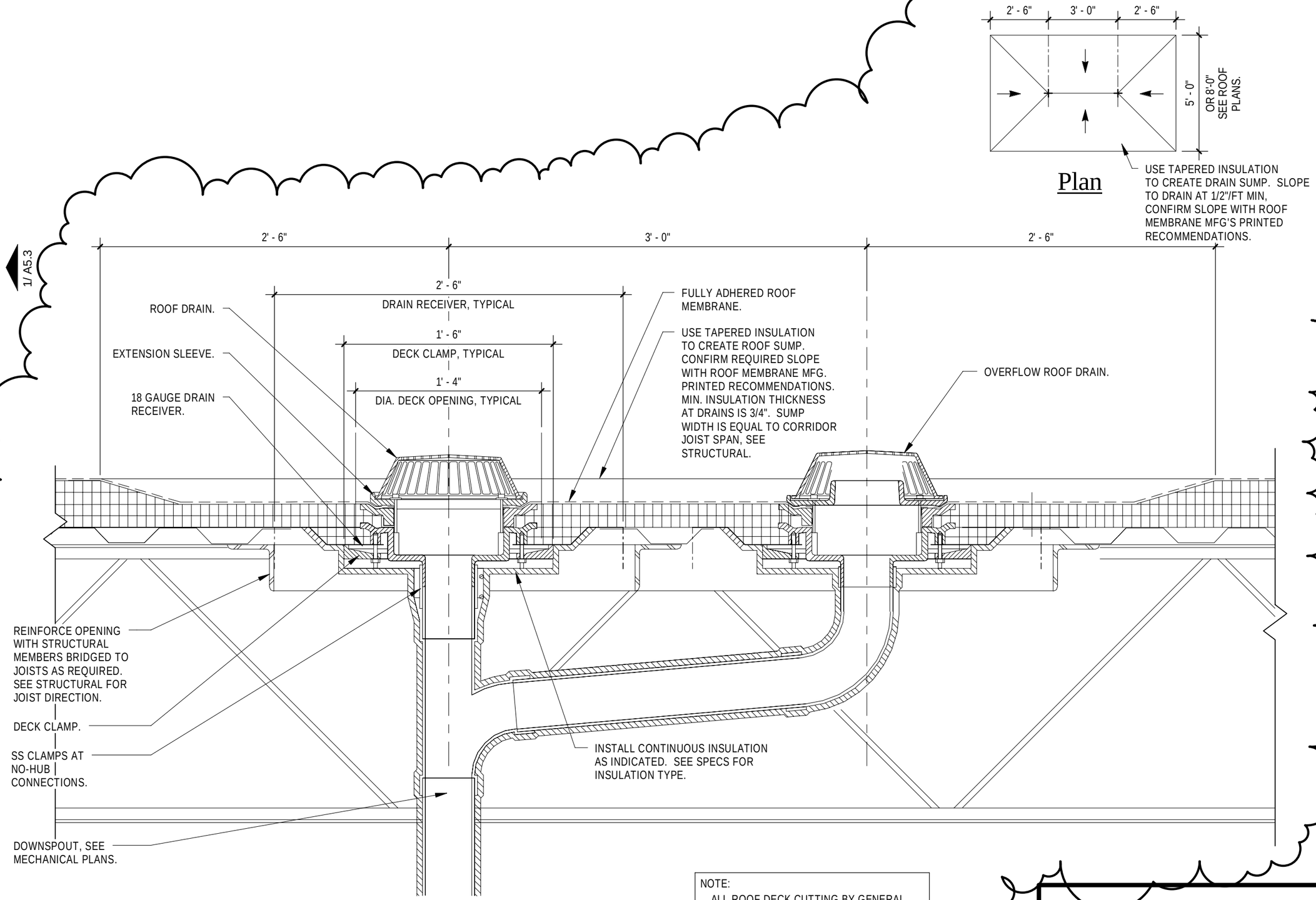
D1.069


58
S5.4
53
S5.3
52
S5.3
110
S5.6
55
S5.4
56
S5.4
57
S5.4
127
S5.7
106
S5.6
107
S5.6
105
S5.6
104
S5.6
CONT. PLATE 4"X1/4"
B.P.6
B.P.1
B.P.3
W12X26
W14X30
HSS4X4X1/4
W8X18
W12X30
W8X24
W8X10
W8X31
L3X3X1/4
1 1/2" - 20 GA.
TYPE "B" M.R.D.
4' - 0"
TYP.
10K1
2.5K1
12K1
14K1
5' - 6 1/16"
17' - 8 3/8"
7 5/8"
10' - 3"
13' - 4 1/2"
12' - 3 1/2"
2' - 8 3/4"
11 15/16"
17' - 9 7/8"
5' - 3 1/8"
5' - 6"
9 5/8"
18' - 3 3/8"
6"

D1.070

D1.077


SEMINAR
B124
PROJECT STUDIO
B122
STUDENT GOVT.
B120
ACADEMIC ADVISOR
B118
REC ROOM
B106
CORRIDOR
B199D
B199LE
CMU
18' - 9"
28' - 0"
17' - 8"
20' - 3 3/4"±
5' - 6 1/4"±
44' - 5 1/2"±
18' - 0"
6' - 0"
1' - 0"
3' - 0"
2' - 0"
3' - 8"
1'-4 3/8"
4' - 8"
7' - 8"
14' - 4"
5' - 2"
5' - 4"
5' - 6"
6' - 4"
11' - 5"
7' - 0 1/2"
9' - 0"
2/ A4.2
6
A5.3
5
A5.4
6
A5.1
3
A5.5
2
A2.2c
12
A6.7
11
A6.7
10
A6.7
4/ A3.3
DN
EQ
F.V.
L-5X3X1/4
W8x18
2.8H
2.8F
2.5A
1.5A
2.5E
1.3
2.6
1.7F

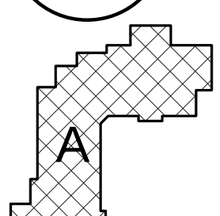


NOTE:
ALL ROOF DECK CUTTING BY GENERAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL COORDINATE WORK WITH GENERAL AND ROOFING CONTRACTORS. ALL FLASHING AND SEALING BY ROOF OPENINGS TO BE THE RESPONSIBILITY OF THE ROOF CONTRACTOR.

1 Typ. Roof Drain Detail

1 1/2" = 1'-0"

KEY PLAN



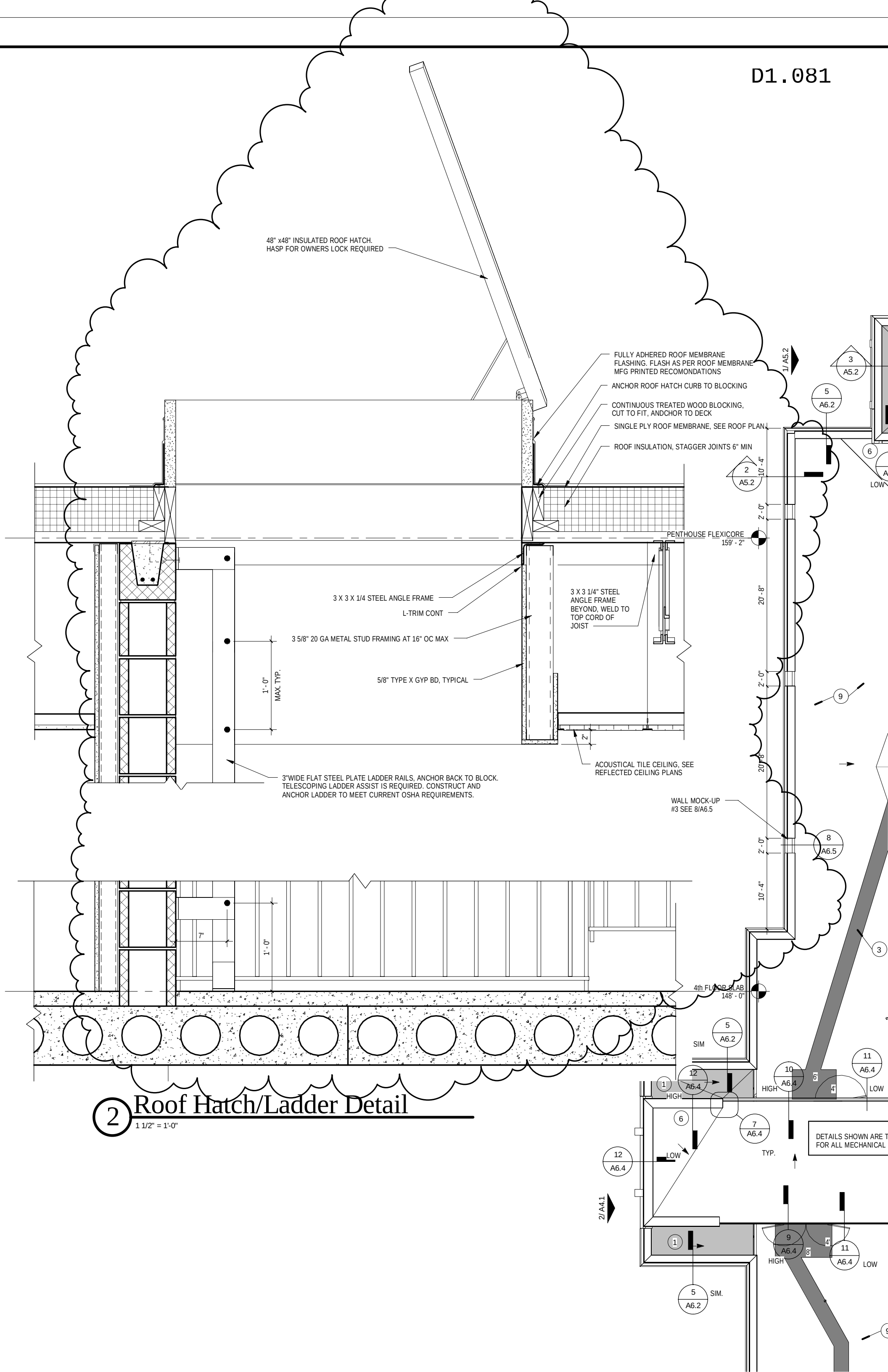
Indiana University SouthEast Side Residence

Revisions:
1 Addendum

SHEET TITLE
Roof Plan

D1.080

D1.081



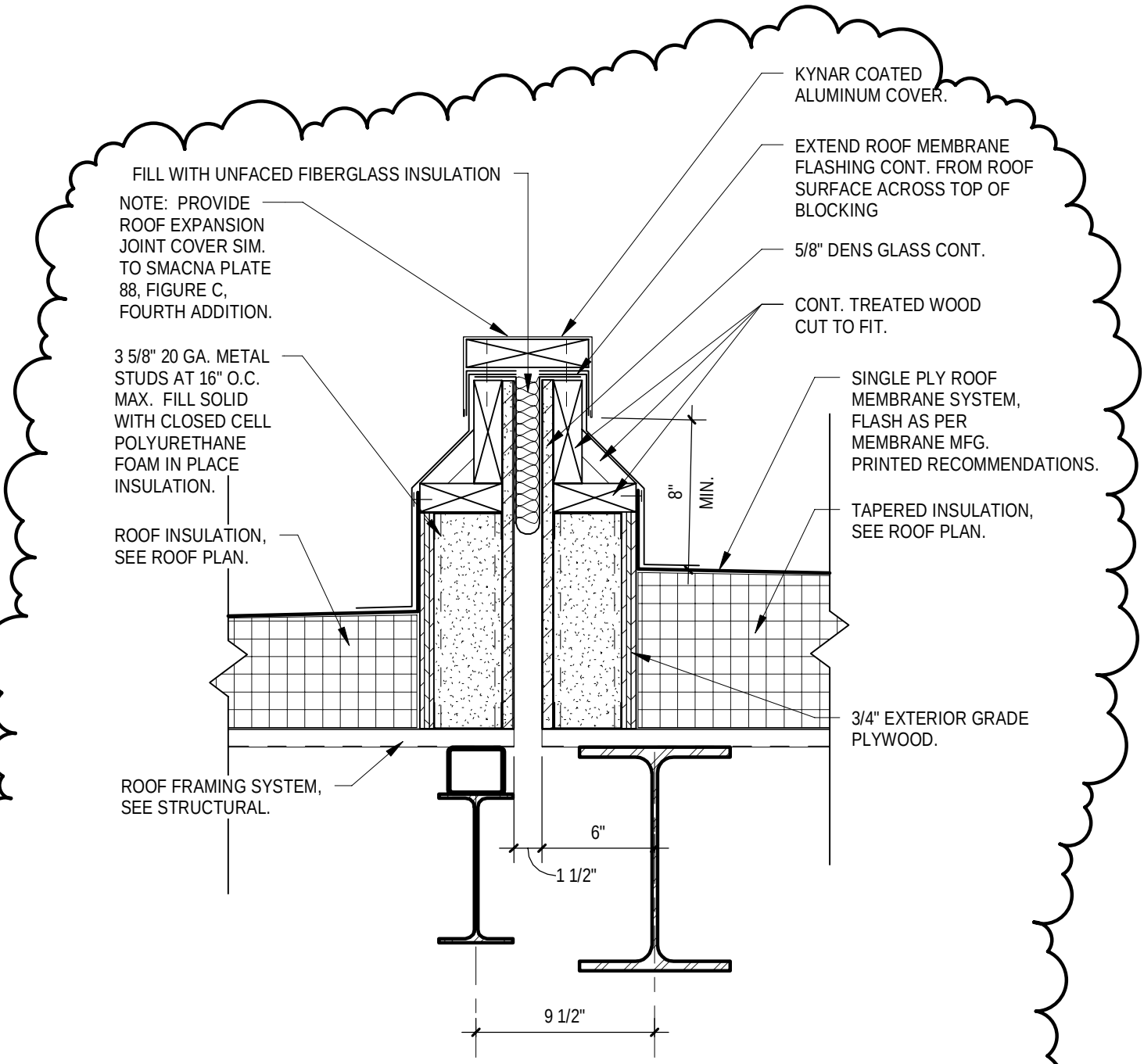
2 Roof Hatch/Ladder Detail

1 1/2" = 1'-0"

27.8 28

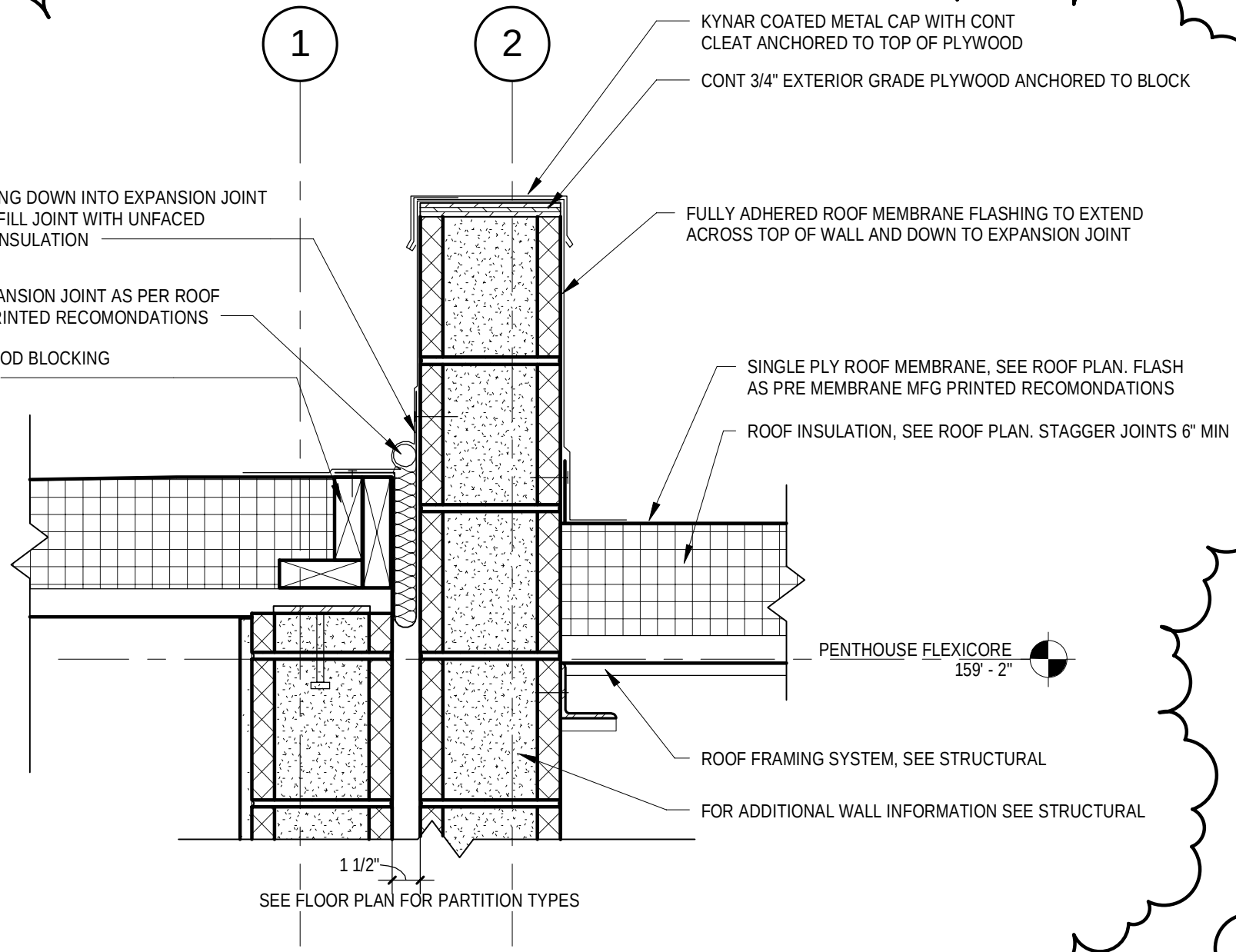
Roof Plan - Unit B

1/8" = 1'-0"



1 Building Expansion Joint Detail

1 1/2" = 1'-0"



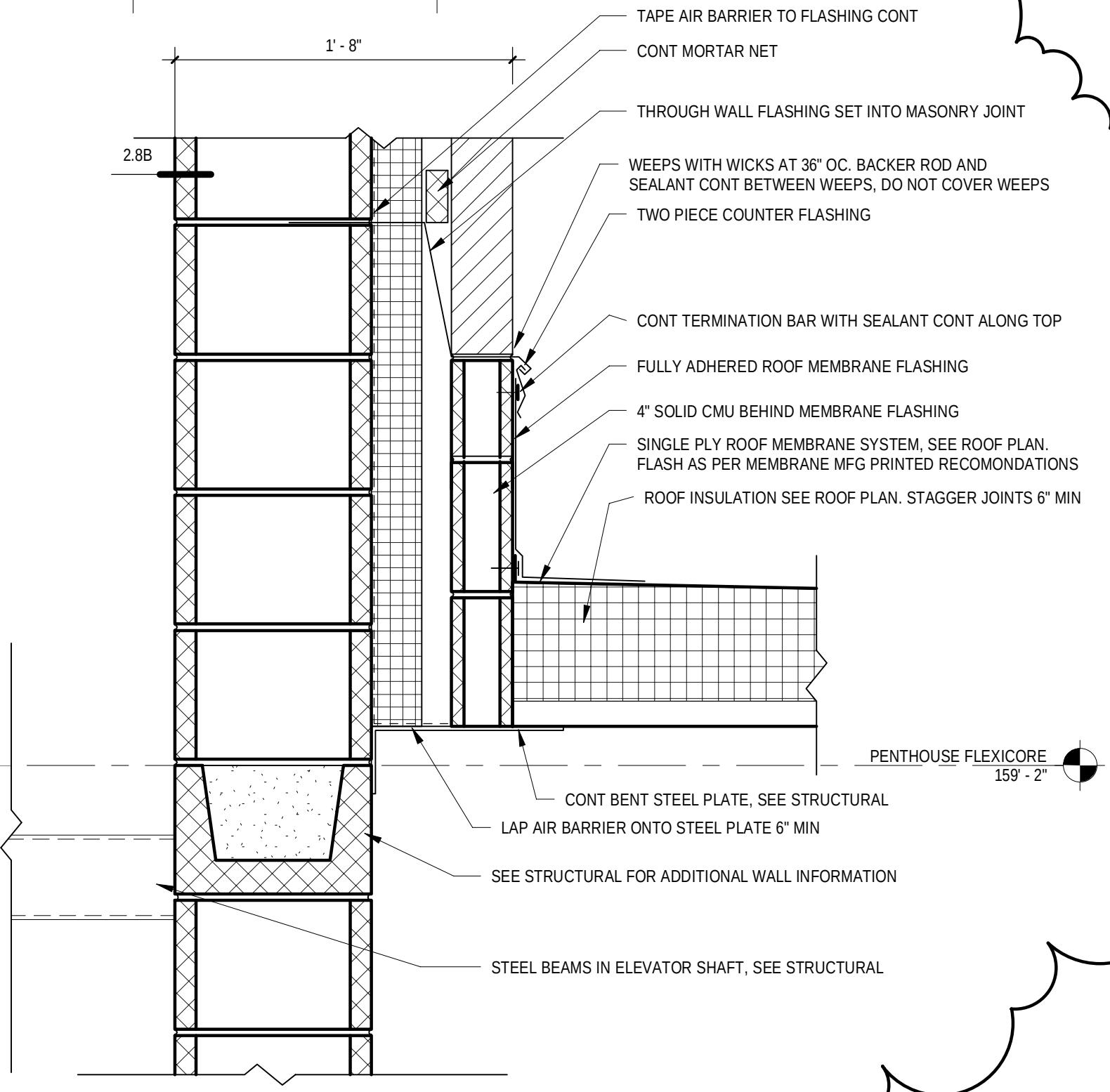
2 Expansion Joint Detail

1 1/2" = 1'-0"

4 Roof Detail

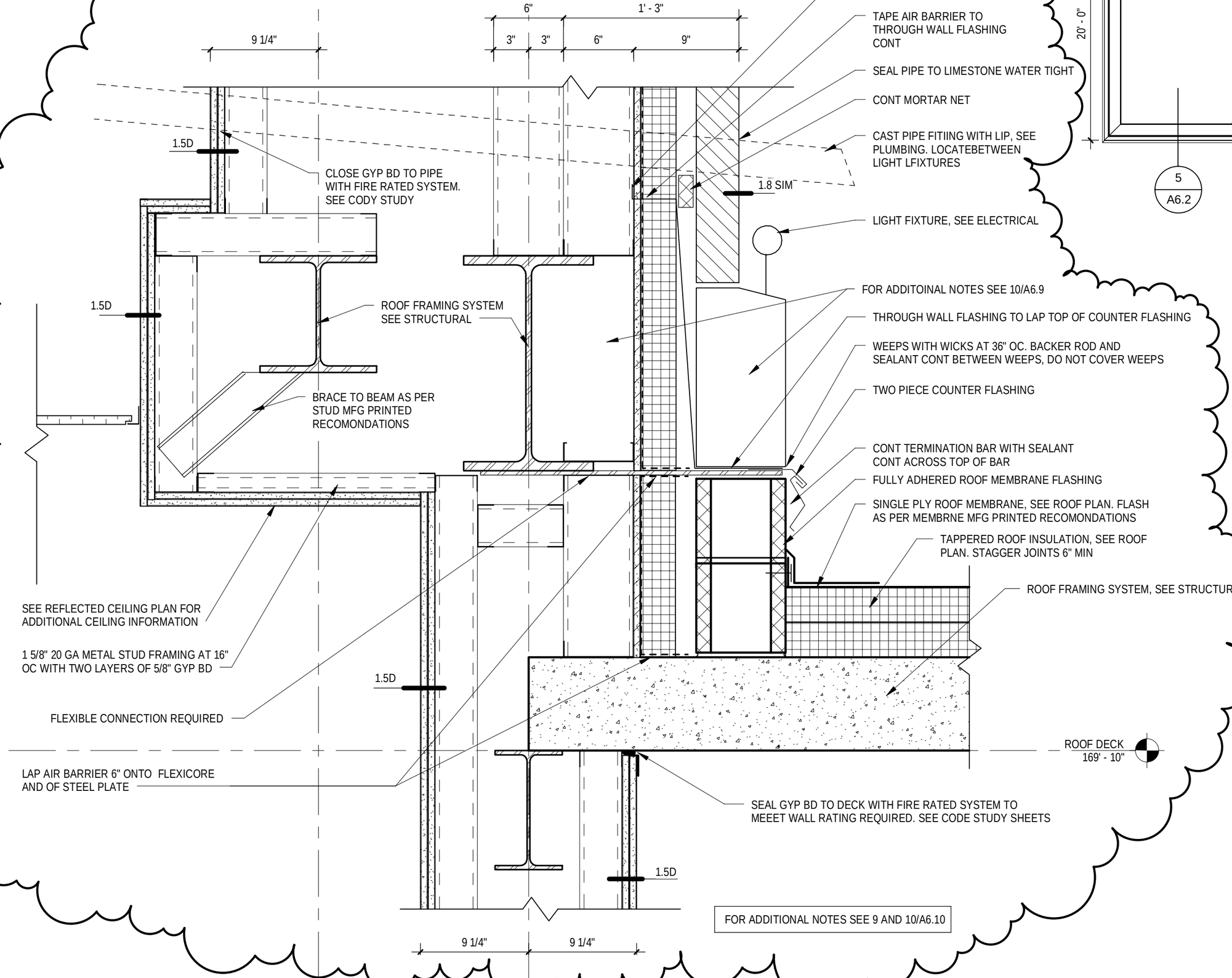
1 1/2" = 1'-0"

D1.084a



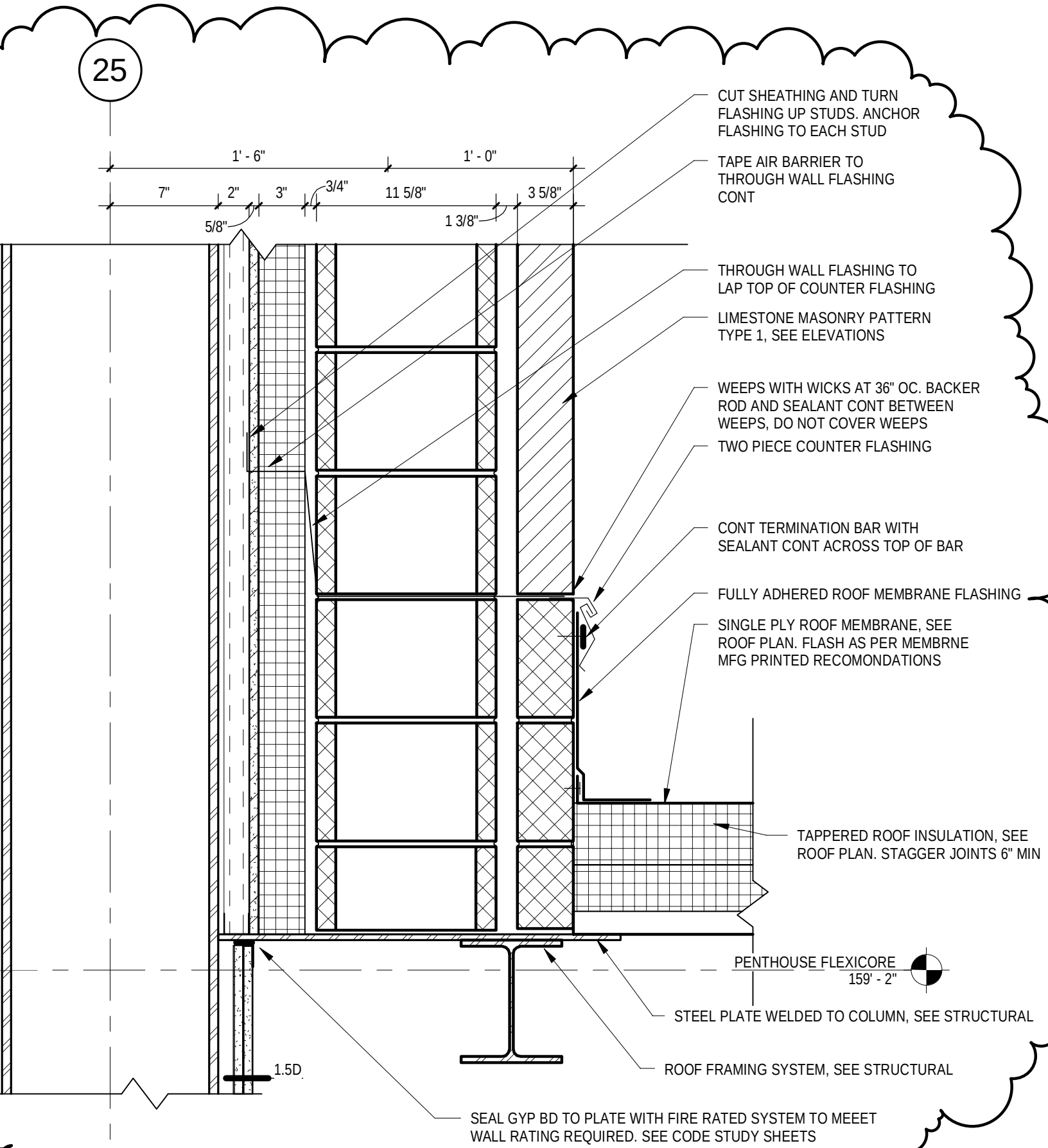
3 Roof Detail

1 1/2" = 1'-0"



4 Roof Detail

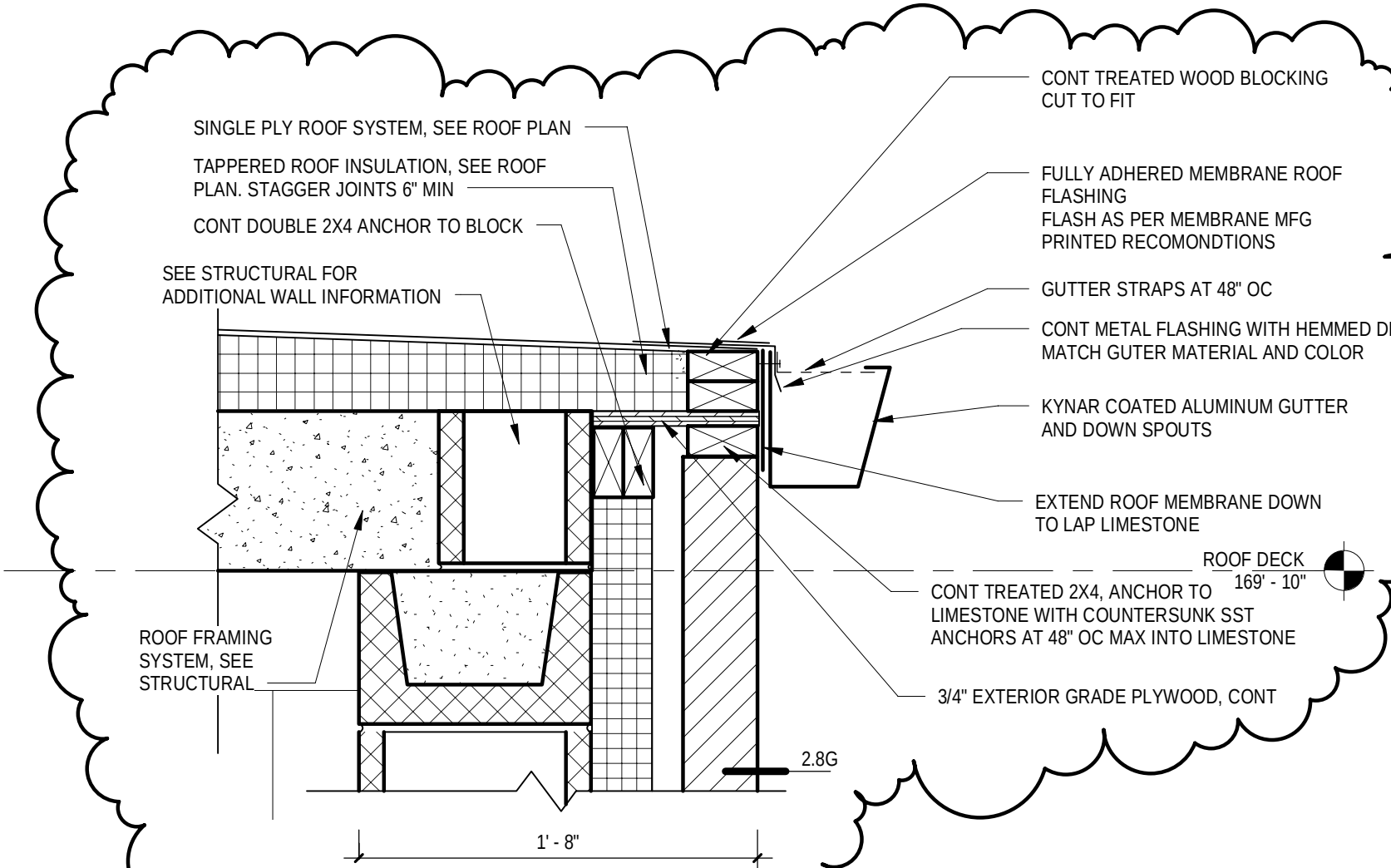
D1.084b



5 Roof Detail

1 1/2" = 1'-0"

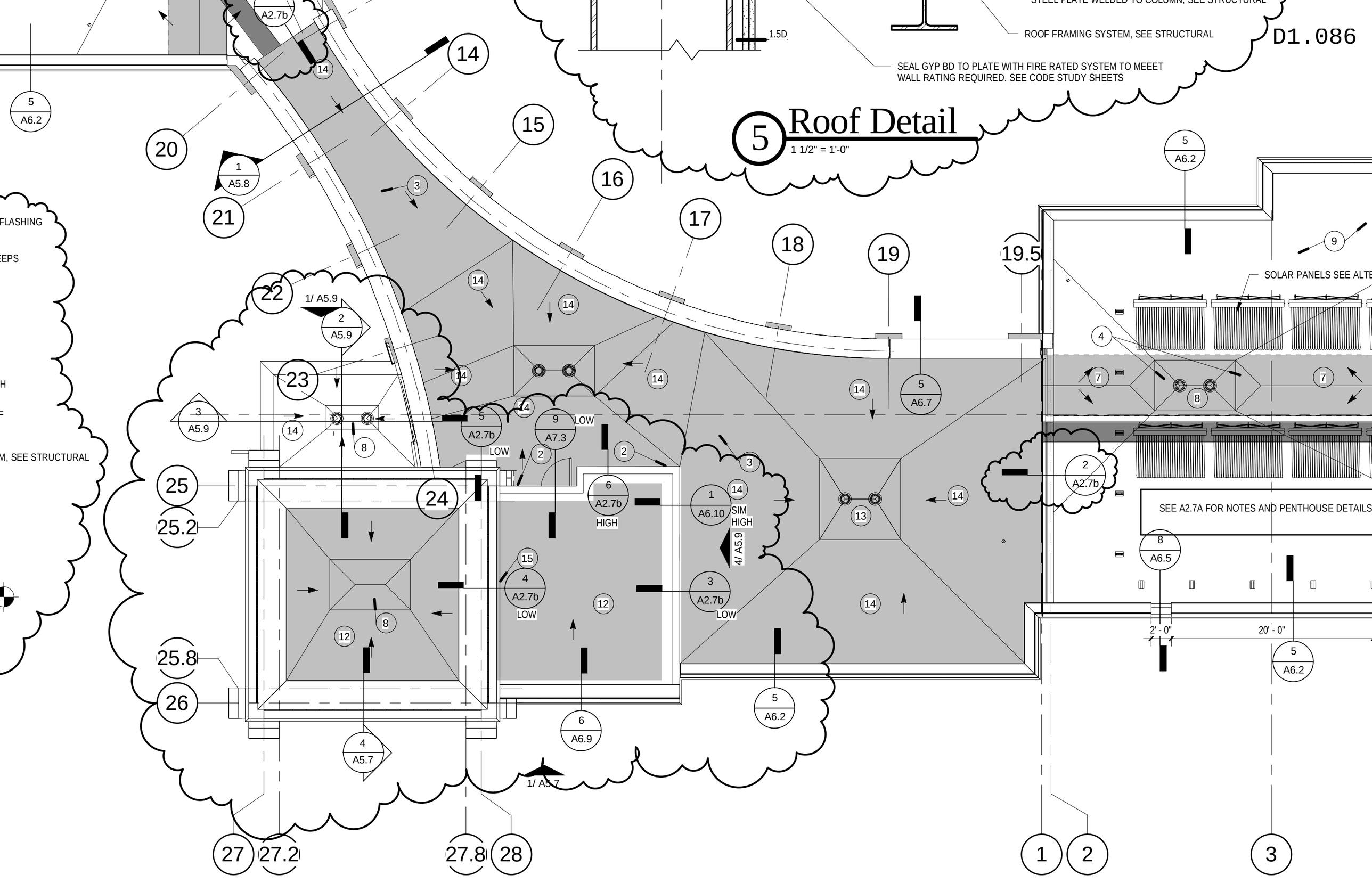
5
A6.2

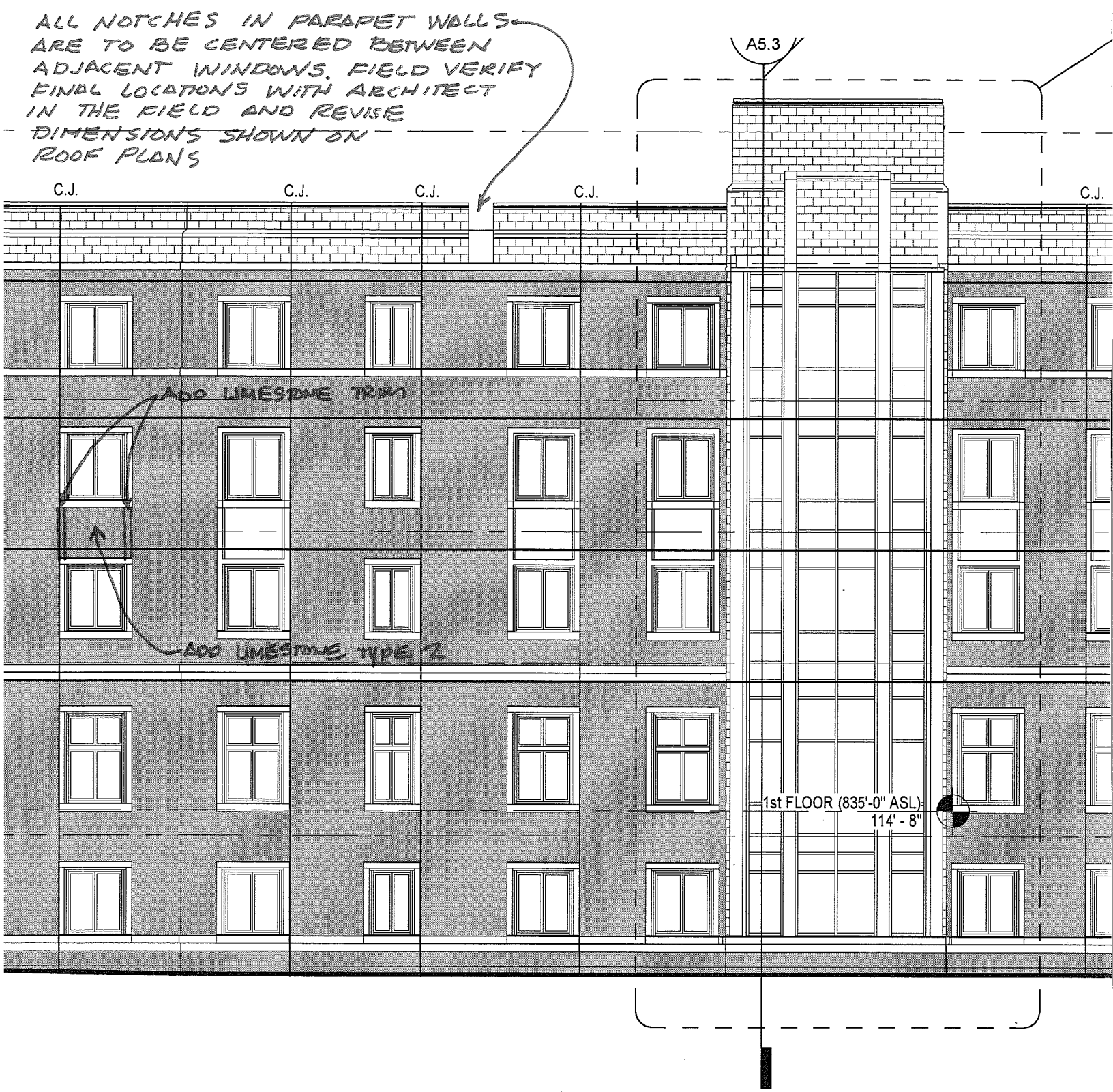


UNIT A
UNIT B

6 Gutter Detail

1 1/2" = 1'-0"


STEEL PLATE WELDED TO COLUMN, SEE STRUCTURAL
ROOF FRAMING SYSTEM, SEE STRUCTURAL
SEAL GYP BD TO PLATE WITH FIRE RATED SYSTEM TO MEEET
WALL RATING REQUIRED. SEE CODE STUDY SHEETS
1.5D
D1.086
5 Roof Detail
1 1/2" = 1'-0"
FLASHING
EEPS
H
M, SEE STRUCTURAL
SOLAR PANELS SEE ALTE
SEE A2.7A FOR NOTES AND PENTHOUSE DETAILS
2' - 0"
20' - 0"
LOW
HIGH
SIM
HIGH
1/ A5.9
4/ A5.9
1/ A5.7

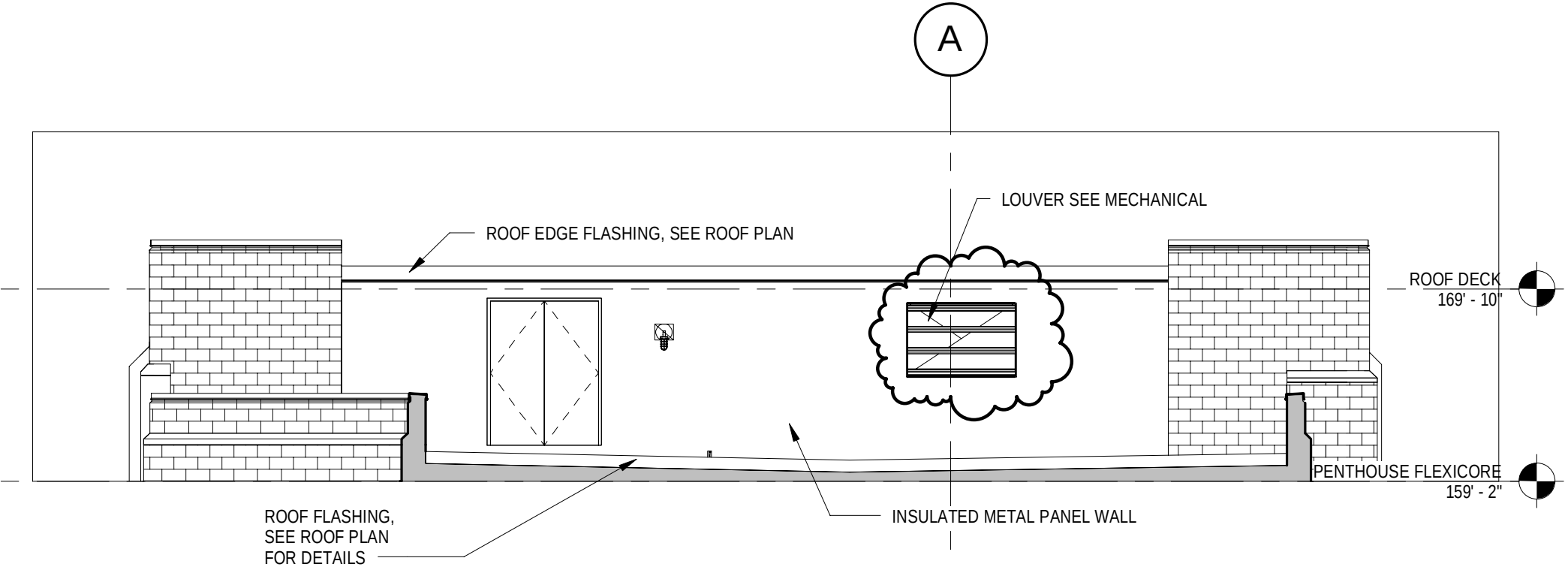


2 Partial East Elevation

3/32" = 1'-0"

A4.3

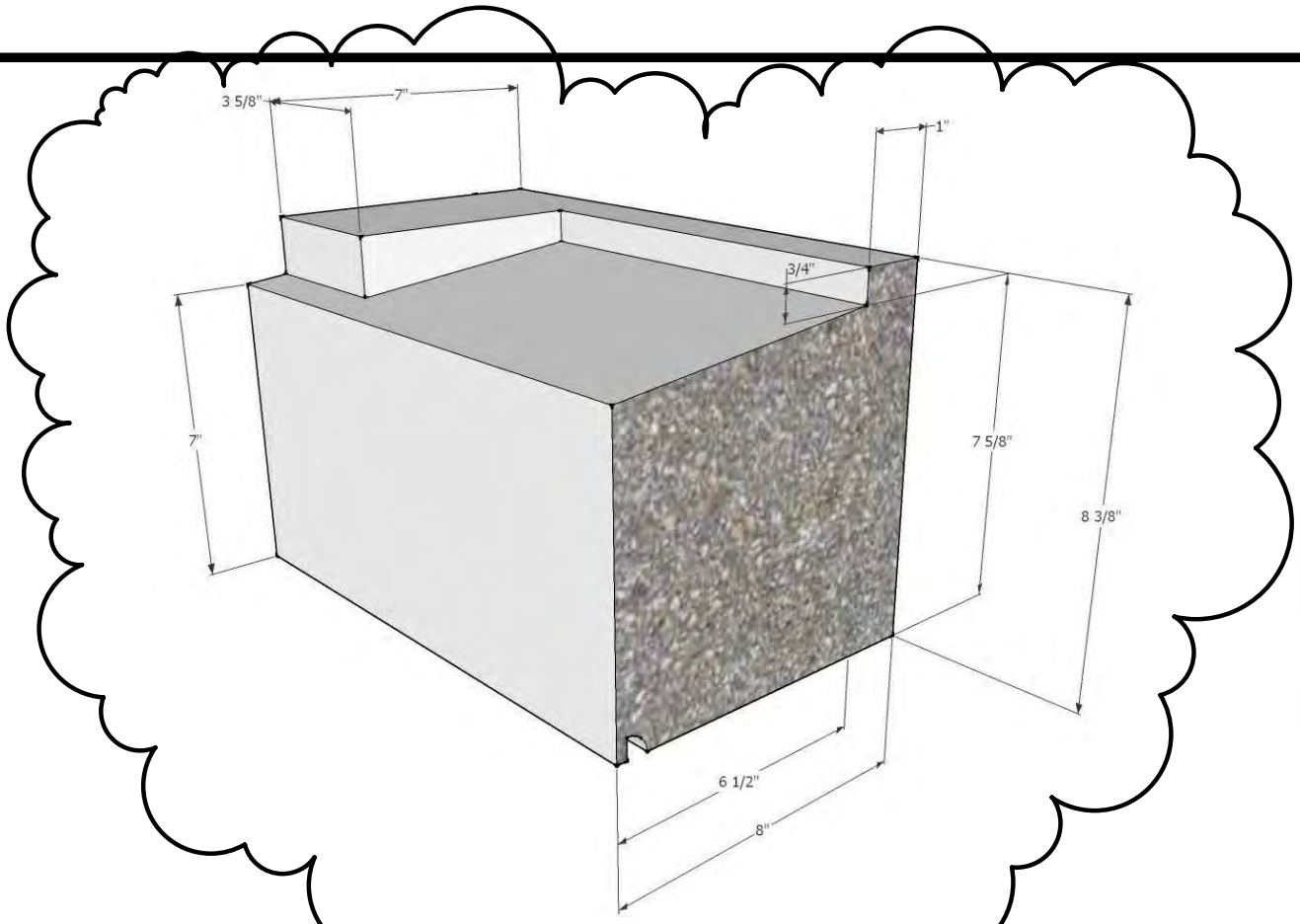
D1.094

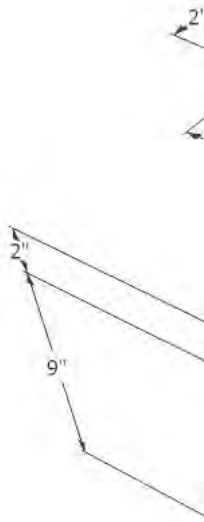


3 Typical Penthouse Elevation 1

1/8" = 1'-0"

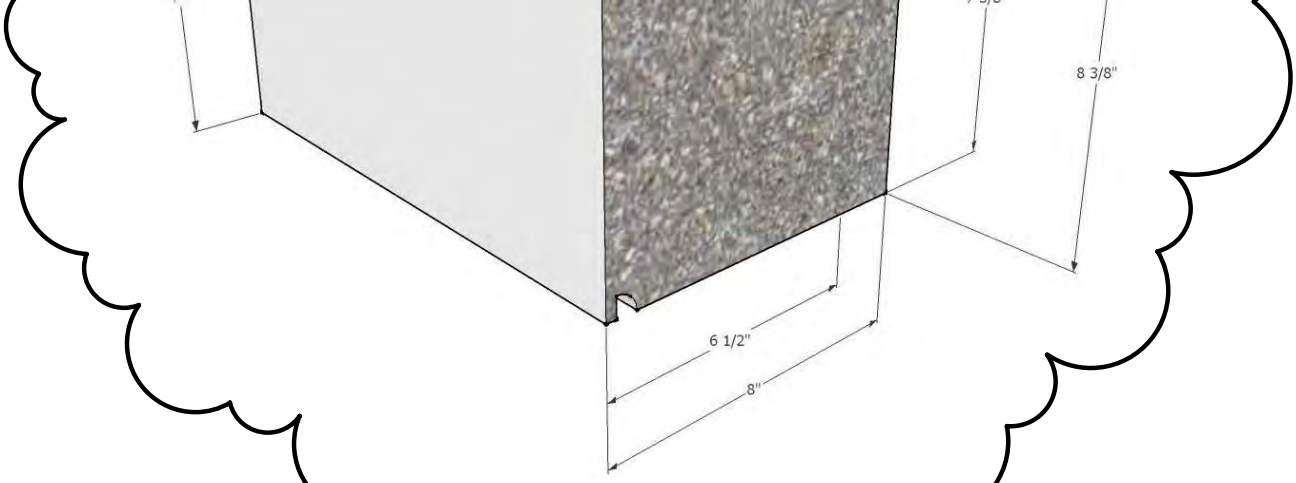
D1.095





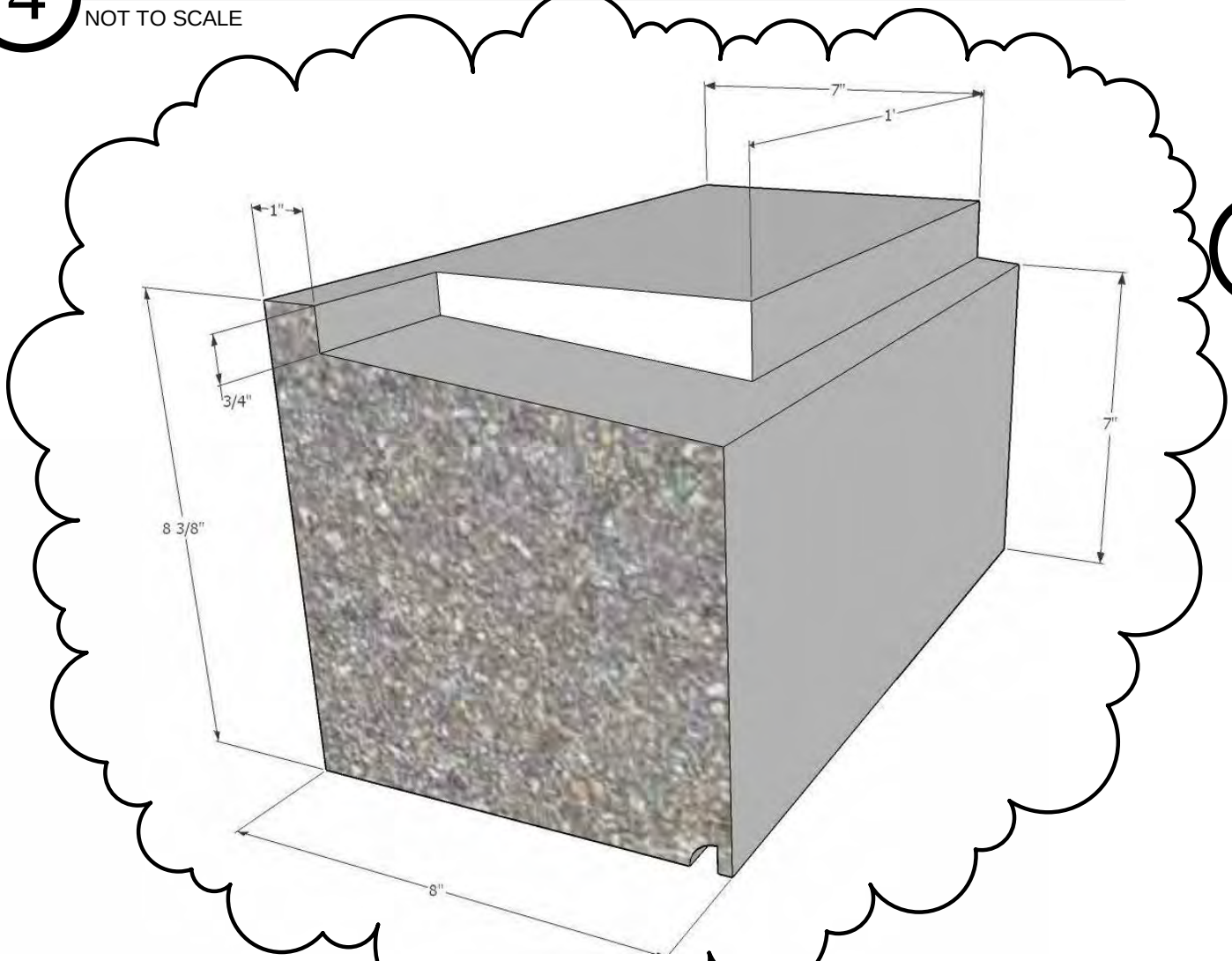
4 Partial Sill Trim

NOT TO SCALE



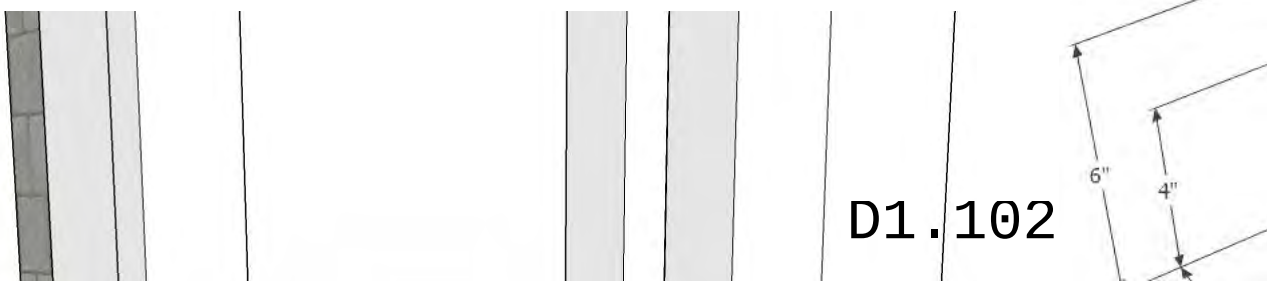
4 Partial Sill Trim

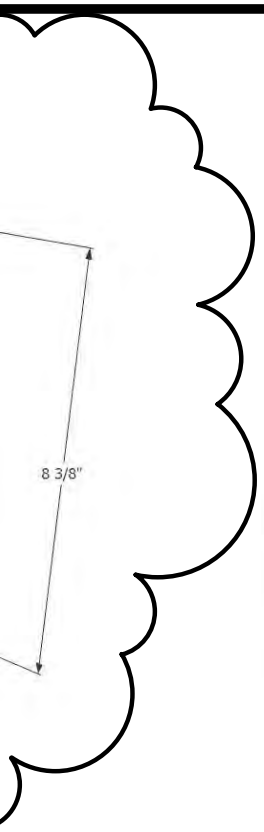
NOT TO SCALE

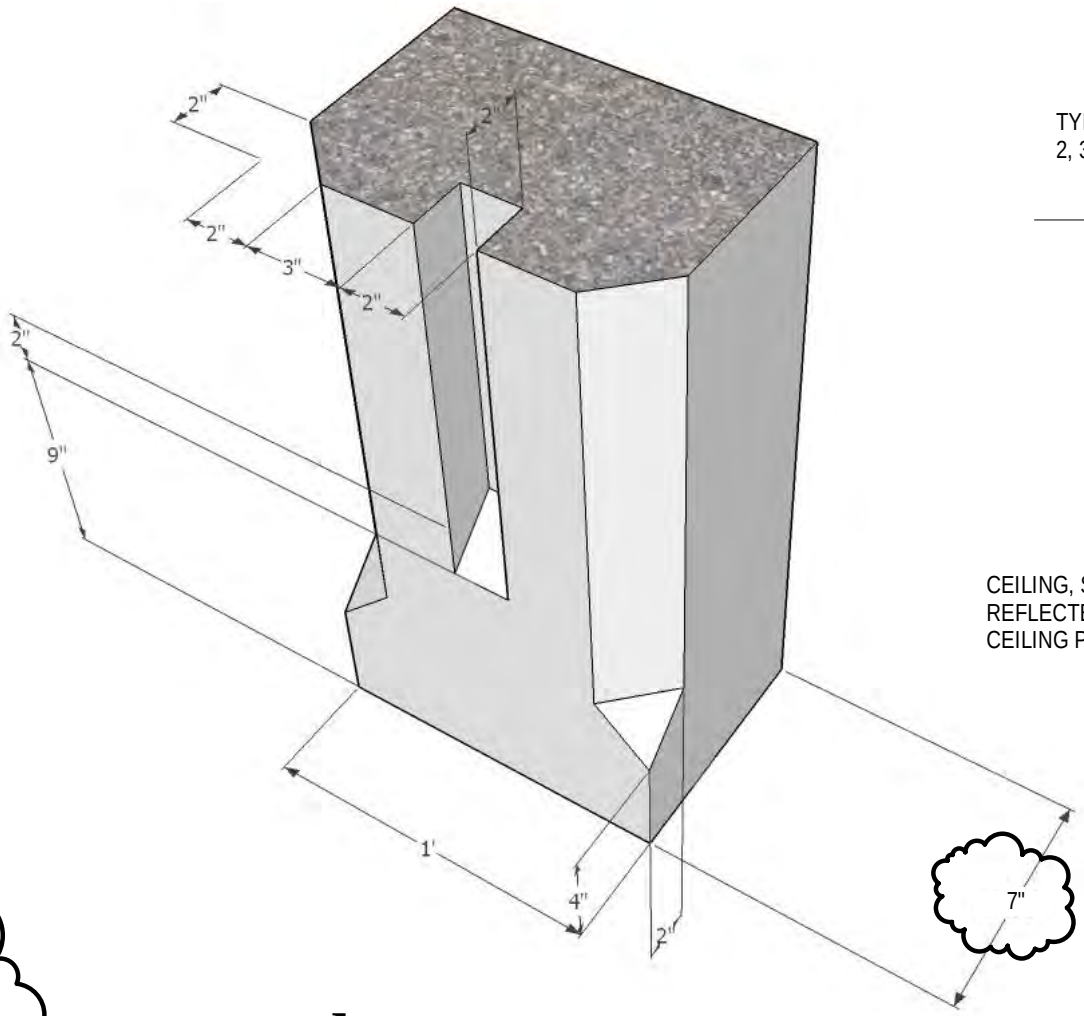


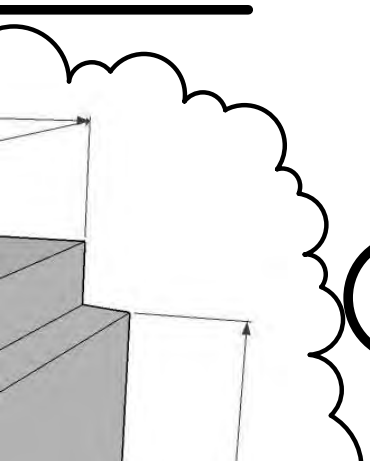
9 Partial Sill Trim

NOT TO SCALE



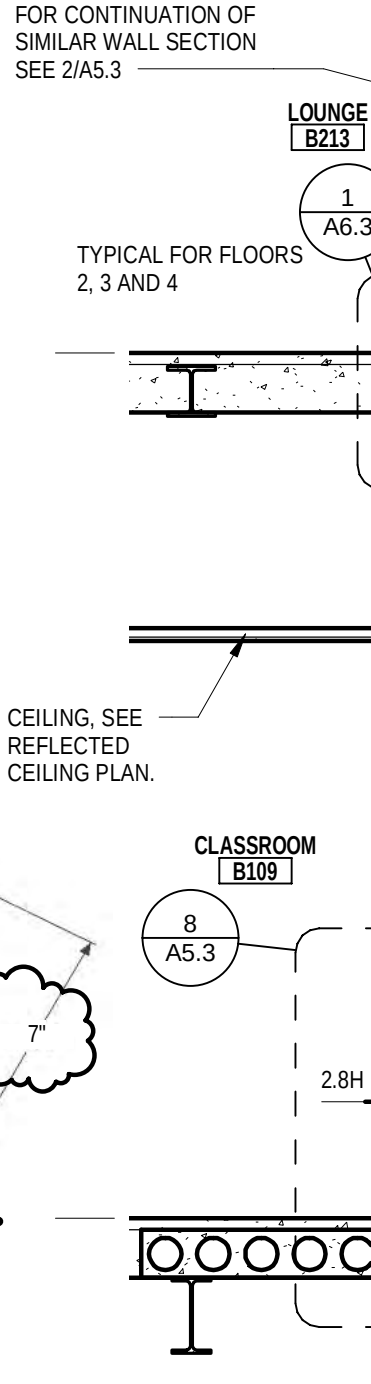


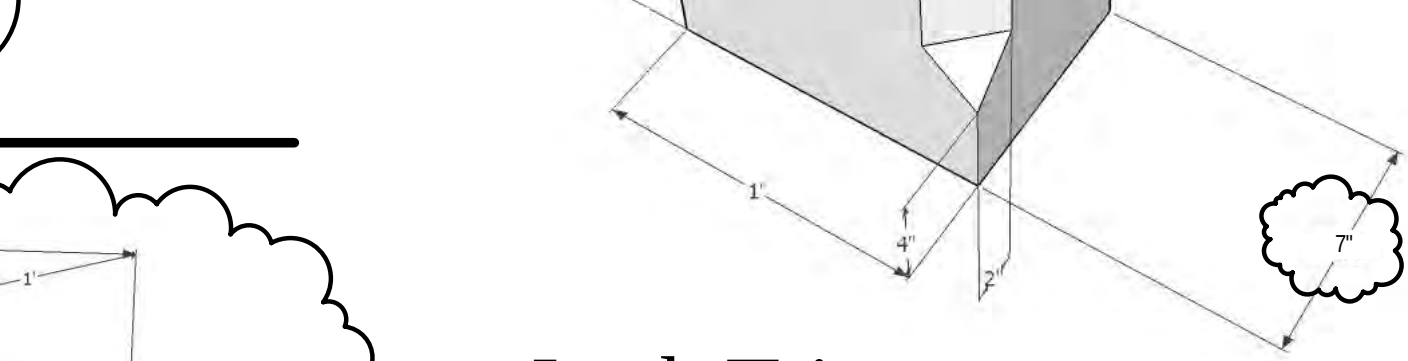


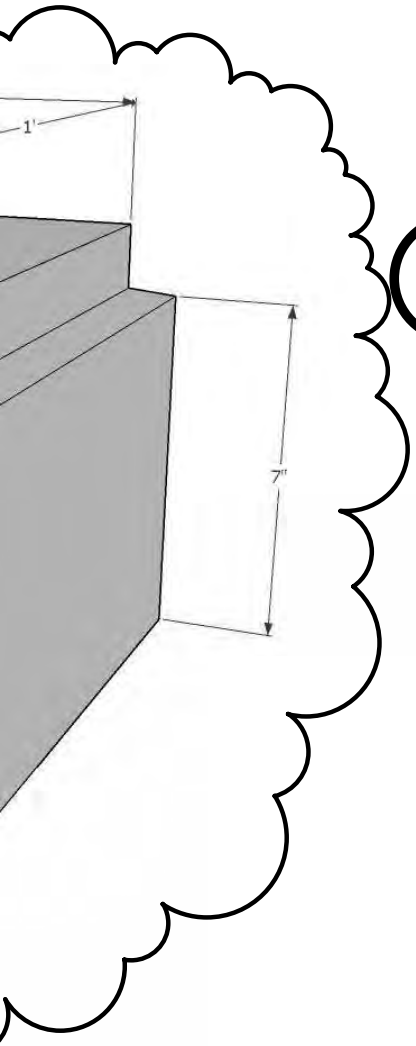


10 Jamb Trim

NOT TO SCALE

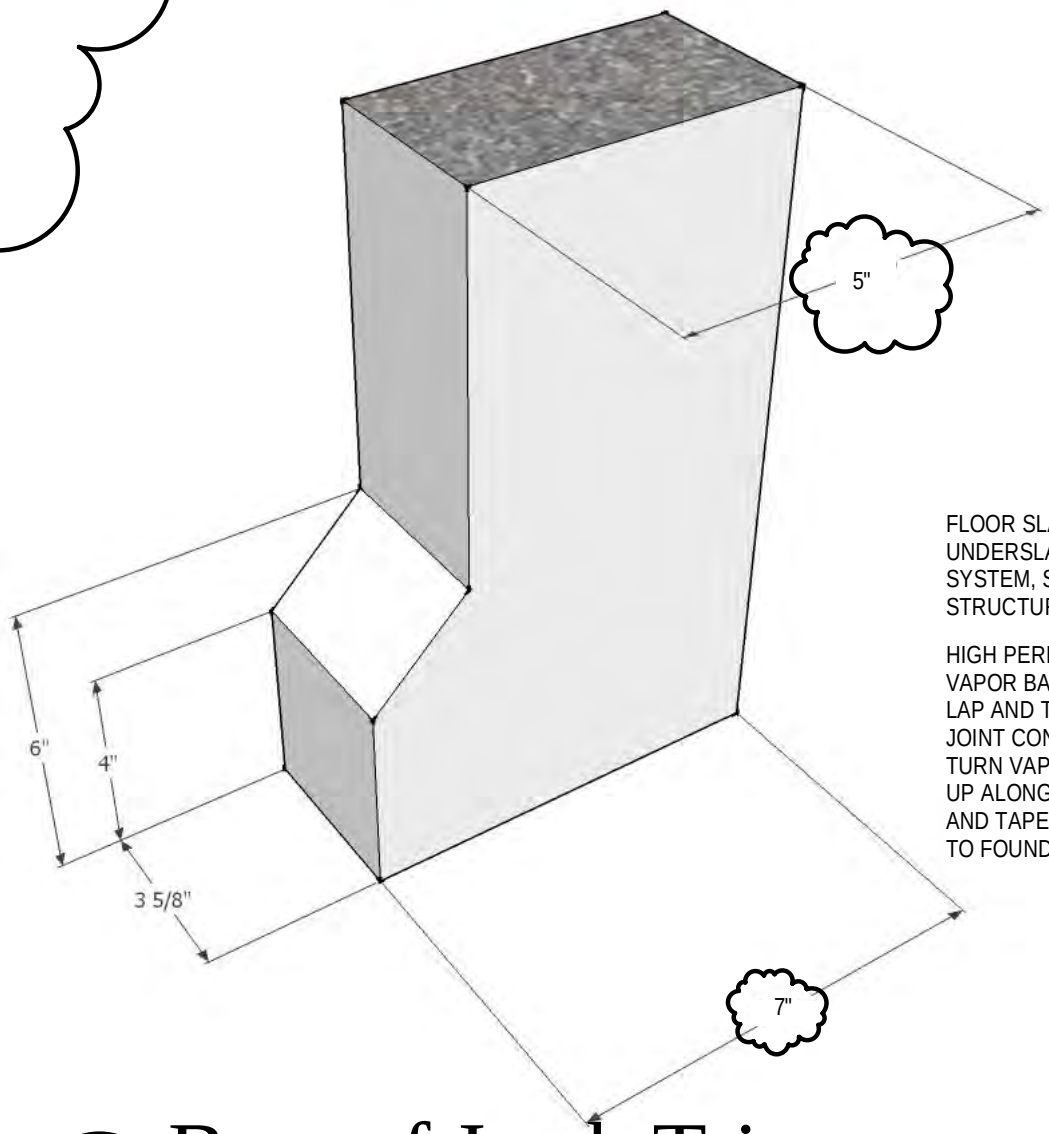






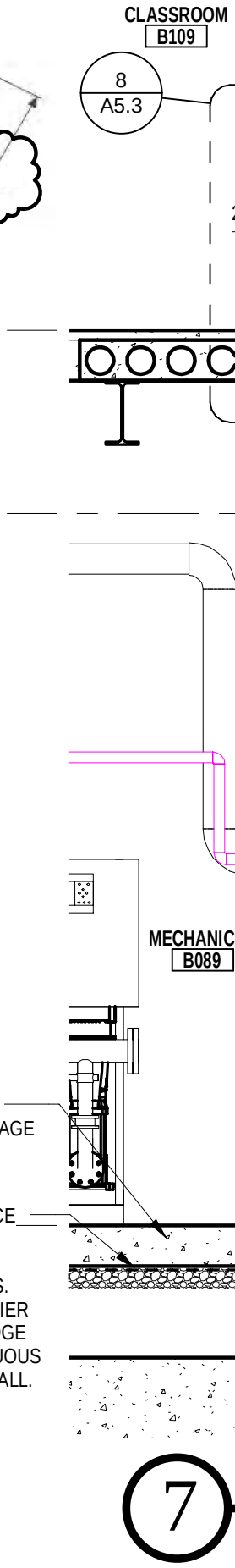
10 Jamb Trim

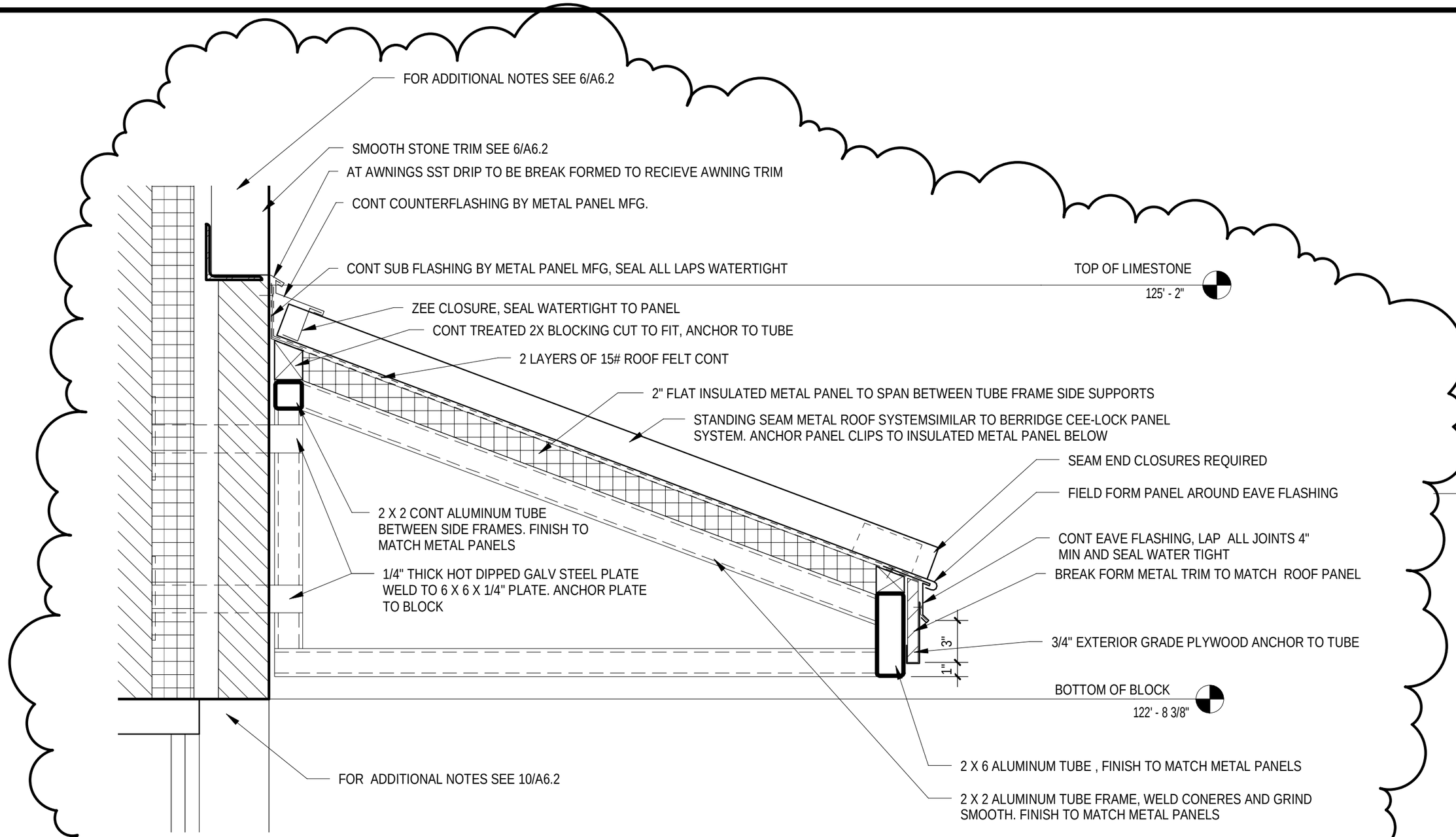
NOT TO SCALE



11 Base of Jamb Trim

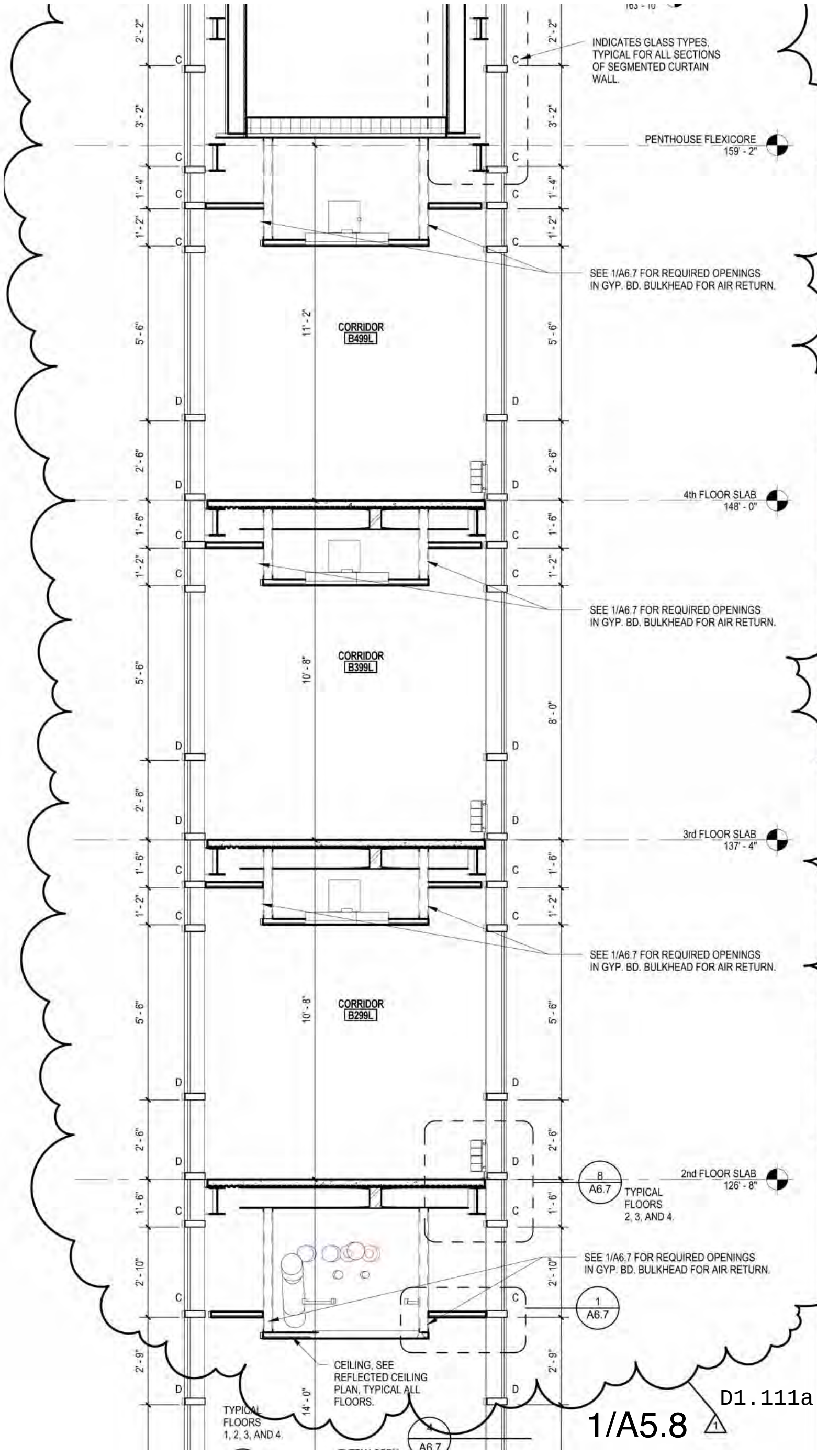
NOT TO SCALE





6 Awning Detail

1 1/2" = 1'-0"

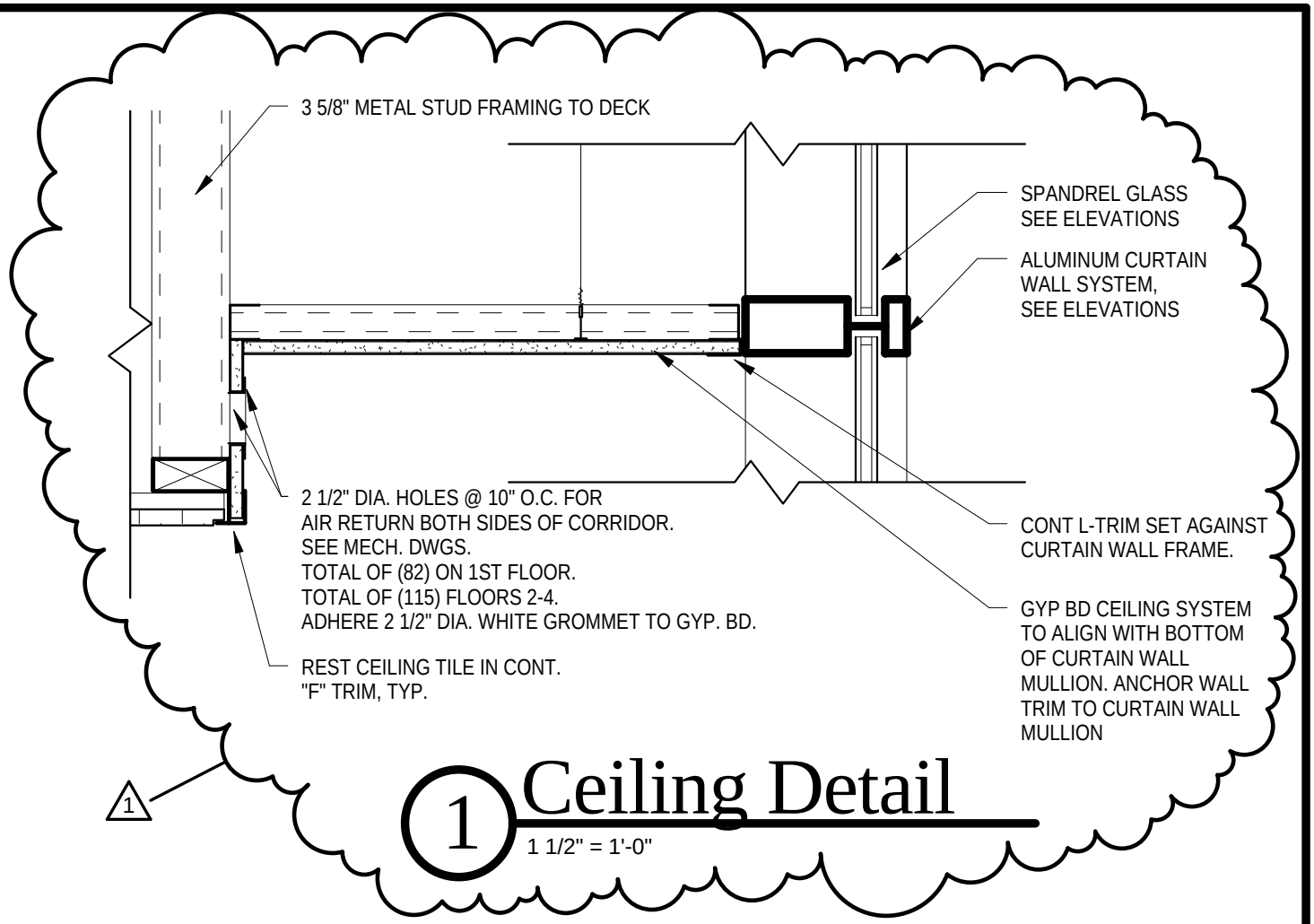

INDICATES GLASS TYPES, TYPICAL FOR ALL SECTIONS OF SEGMENTED CURTAIN WALL.
PENTHOUSE FLEXICORE
159' - 2"
SEE 1/A6.7 FOR REQUIRED OPENINGS IN GYP. BD. BULKHEAD FOR AIR RETURN.
CORRIDOR
B499L
4th FLOOR SLAB
148' - 0"
SEE 1/A6.7 FOR REQUIRED OPENINGS IN GYP. BD. BULKHEAD FOR AIR RETURN.
CORRIDOR
B399L
3rd FLOOR SLAB
137' - 4"
SEE 1/A6.7 FOR REQUIRED OPENINGS IN GYP. BD. BULKHEAD FOR AIR RETURN.
CORRIDOR
B299L
2nd FLOOR SLAB
126' - 8"
8
A6.7
TYPICAL FLOORS 2, 3, AND 4.
SEE 1/A6.7 FOR REQUIRED OPENINGS IN GYP. BD. BULKHEAD FOR AIR RETURN.
1
A6.7
CEILING, SEE REFLECTED CEILING PLAN, TYPICAL ALL FLOORS.
TYPICAL FLOORS 1, 2, 3, AND 4.
A6.7

D1.111a

1/A5.8

ATIONS

PLYWOOD



1 Ceiling Detail

1 1/2" = 1'-0"

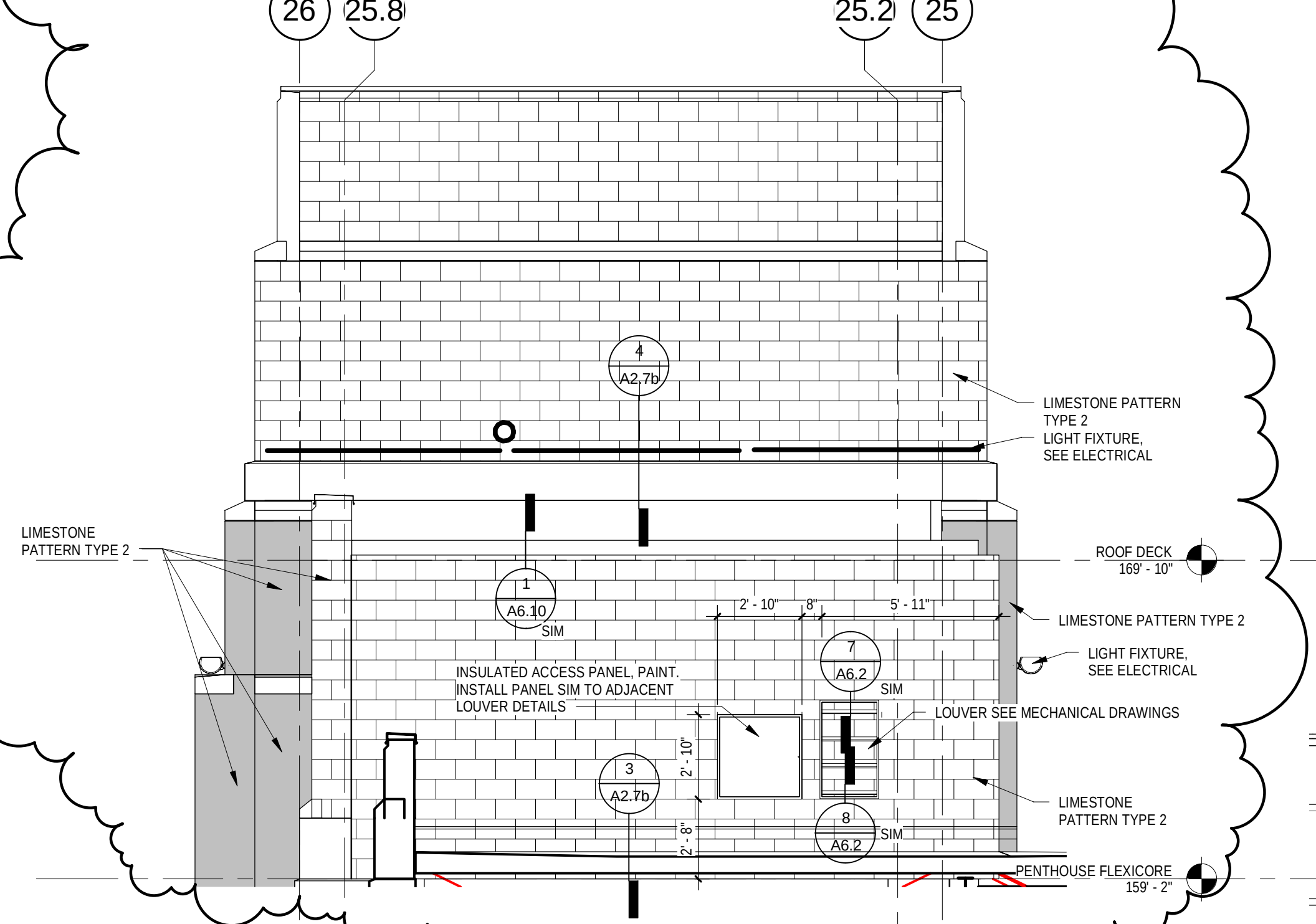
SAW CUT A REGLET INTO THE CONCRETE

MSKT
& Associate
ARCHITECTURE • ENGINEERING •

1715 MAGNAVOX WAY 93
FORT WAYNE, IN 46804 INDI
voice 260.432.9337
fax 260.436.2402
http://www.mskto

CERTIFICATION

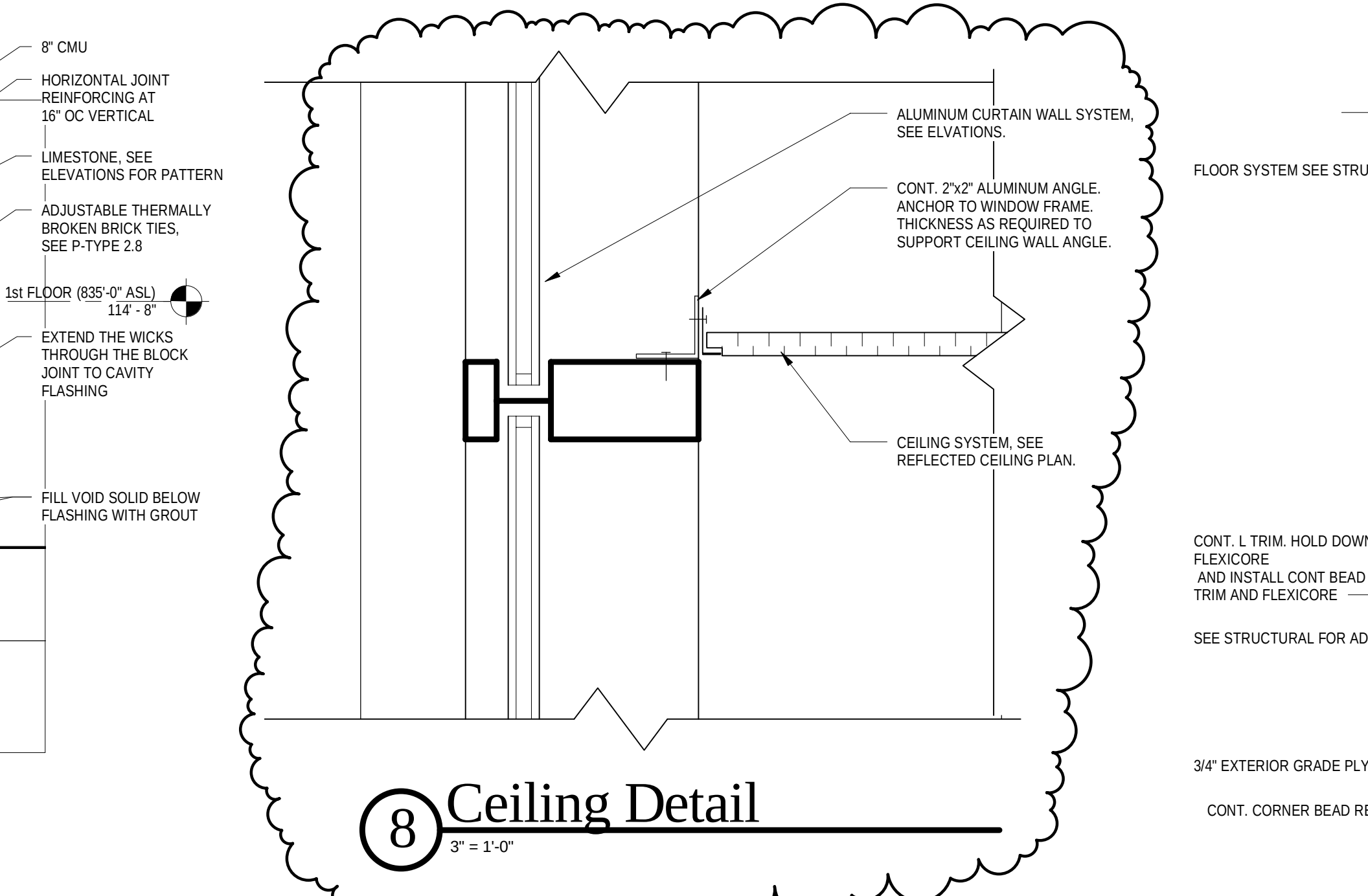
D1.111b



4 Partial East Elevation

1/4" = 1'-0"

D1.112

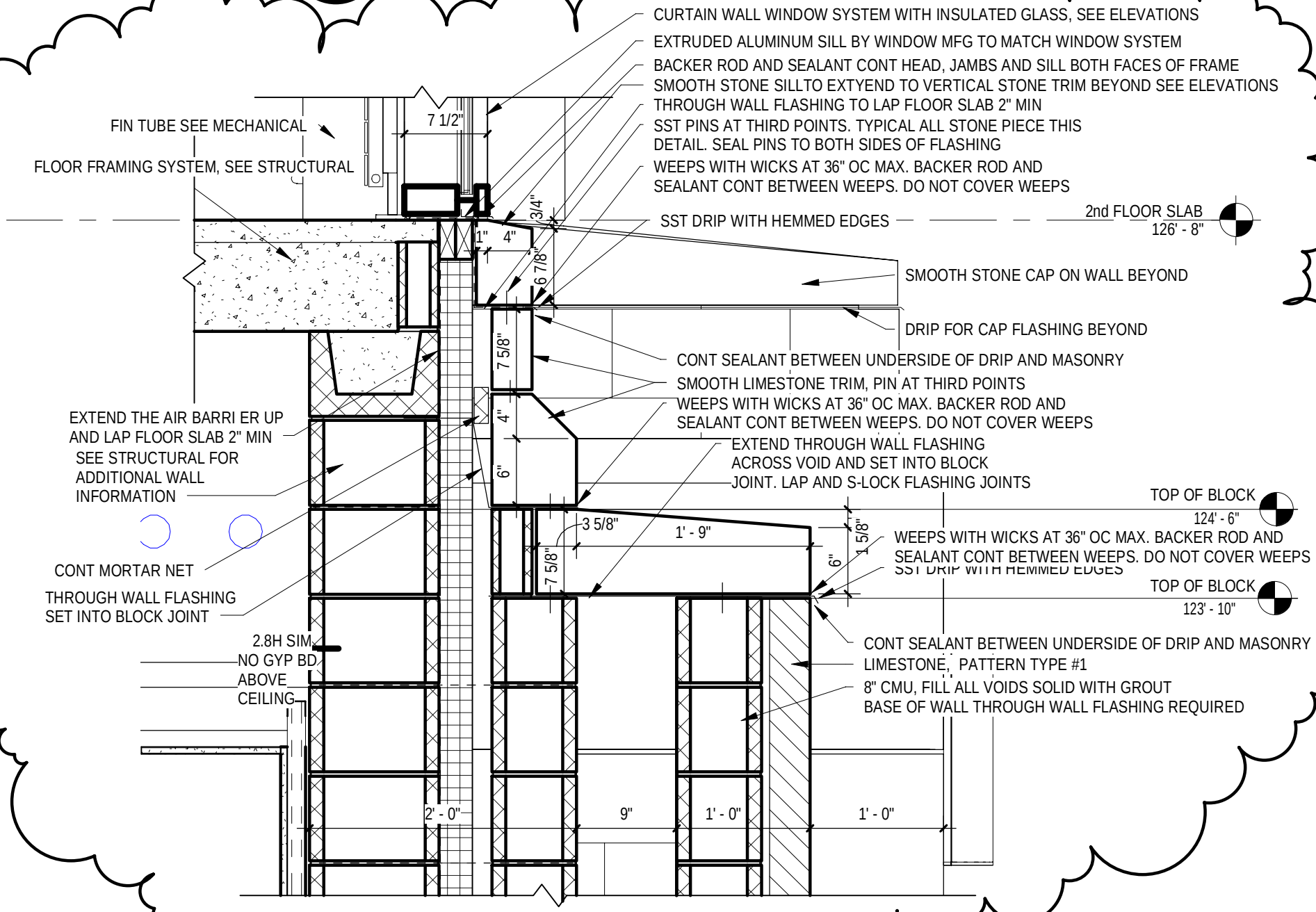


8 Ceiling Detail

3" = 1'-0"

6 Head Detail

1 1/2" = 1'-0"



9 Sill Detail

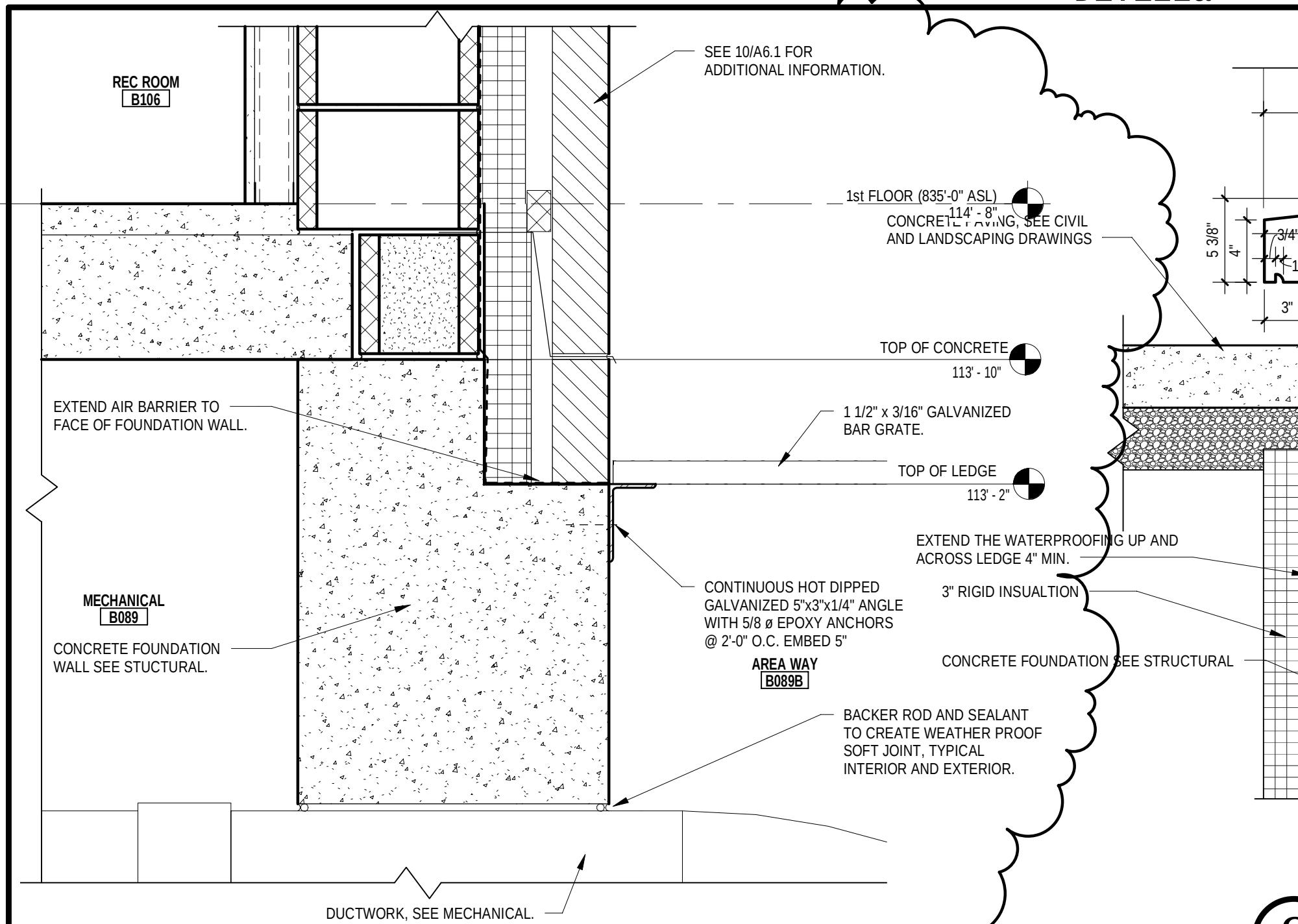
1" = 1'-0"

METAL PARAPET CAP, SEE 5/A6.2
EXTEND THE CAP FULL THICKNESS OF PARAPET NOTCH

D1.121

1.3

D1.122a



12 Areaway Detail

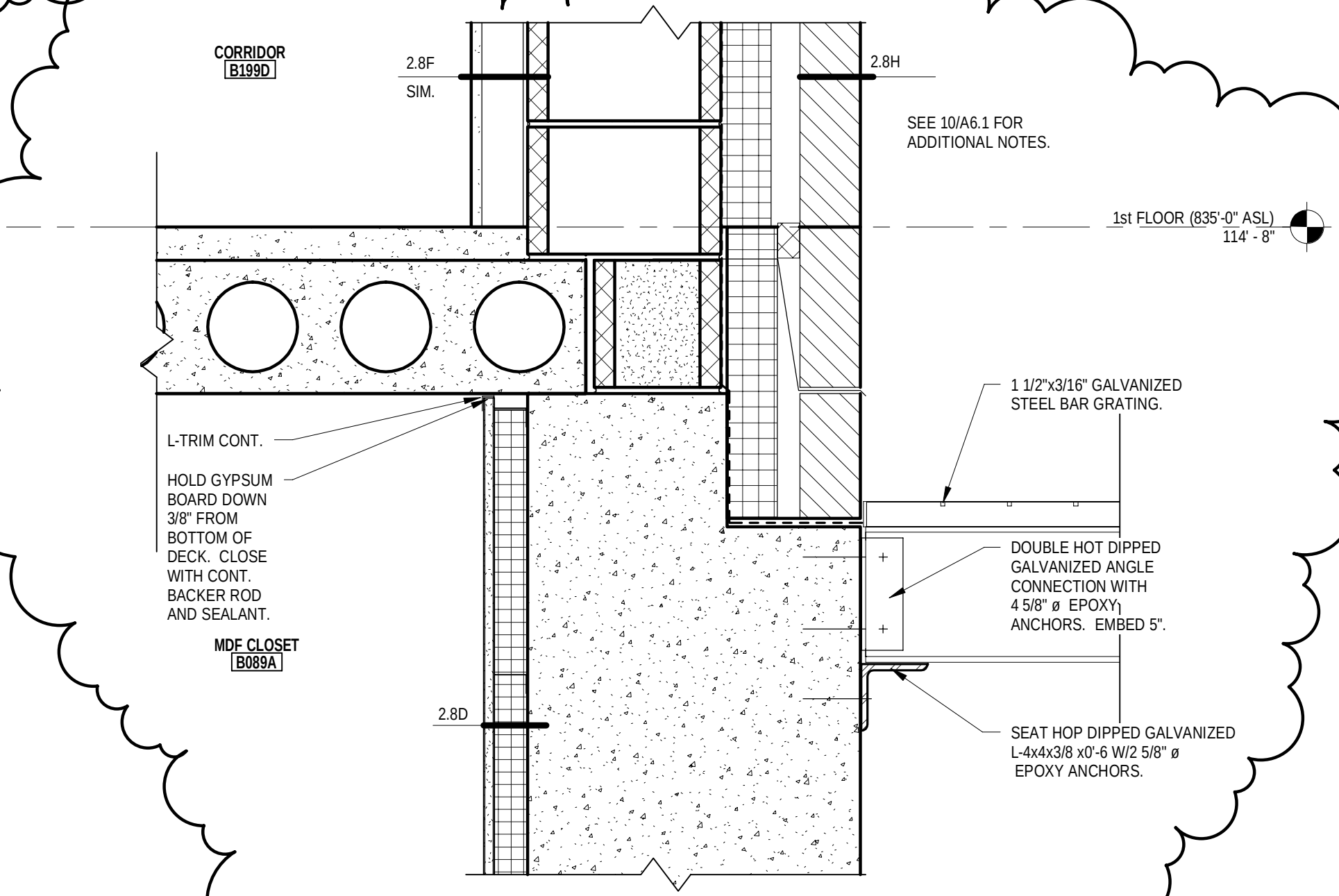
1 1/2" = 1'-0"

9 Sill Detail

1 1/2" = 1'-0"

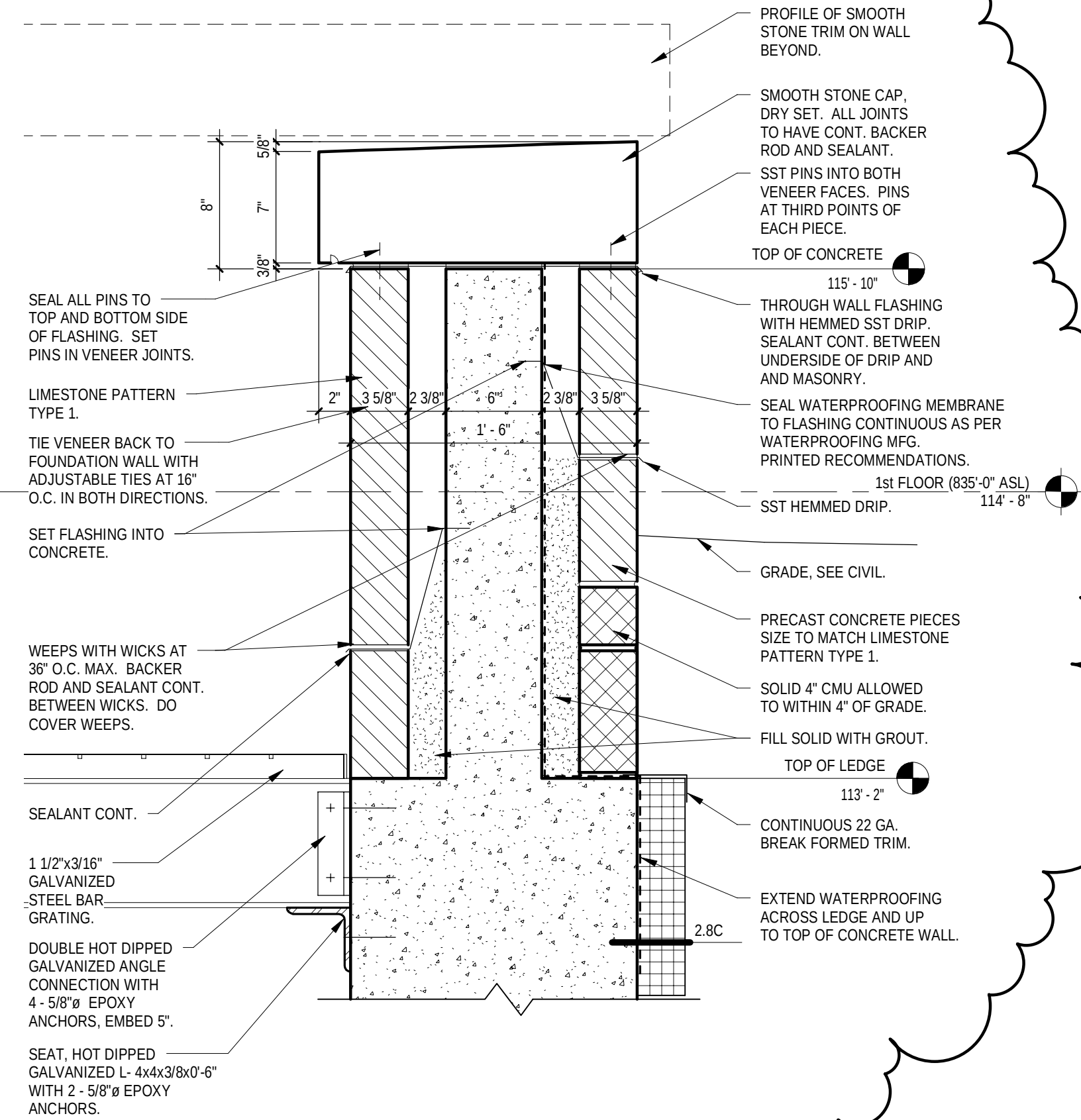
D1.122b

PER MI
RECOM



10 Areaway Detail

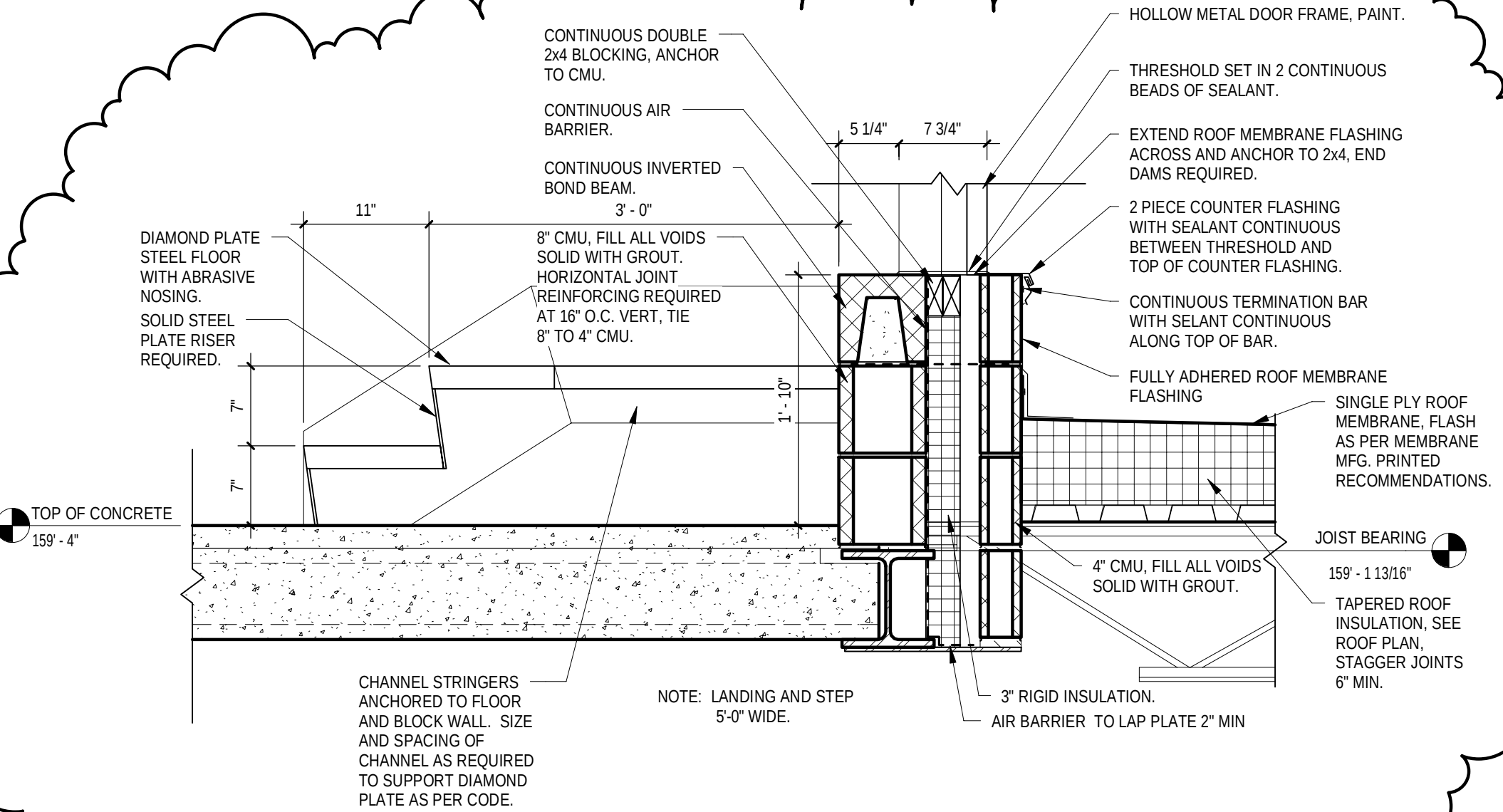
1 1/2" = 1'-0"



11 Areaway Detail

1 1/2" = 1'-0"

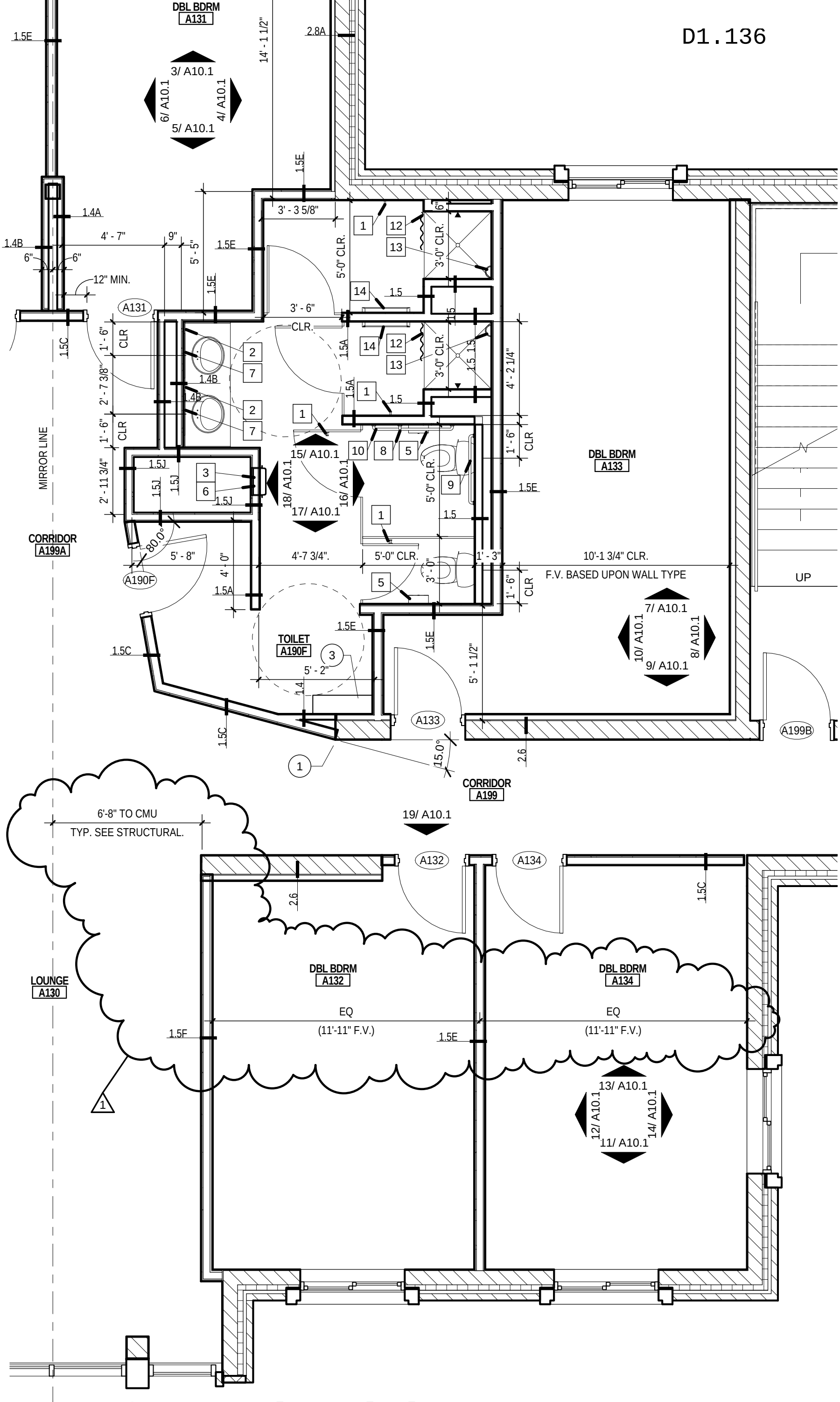
D1.122c



9 Sill Detail

1" = 1'-0"

D1.129



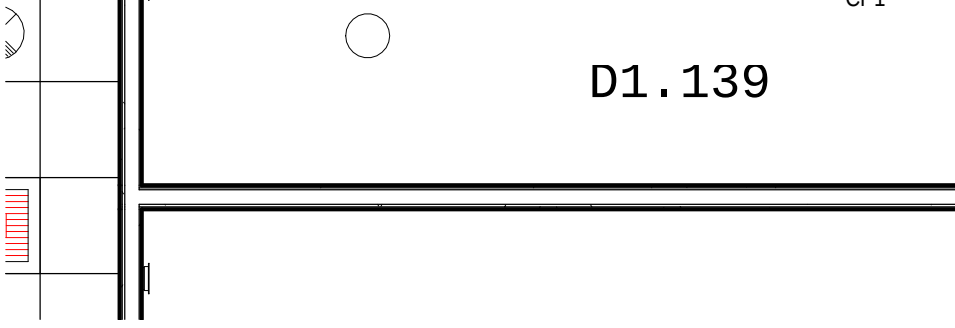
1 Enlarged Plan @ POD - SUITE A

1/4" = 1'-0"

NOTE: REFER TO A10.5 FOR TOILET ACCESSORY SCHEDULE

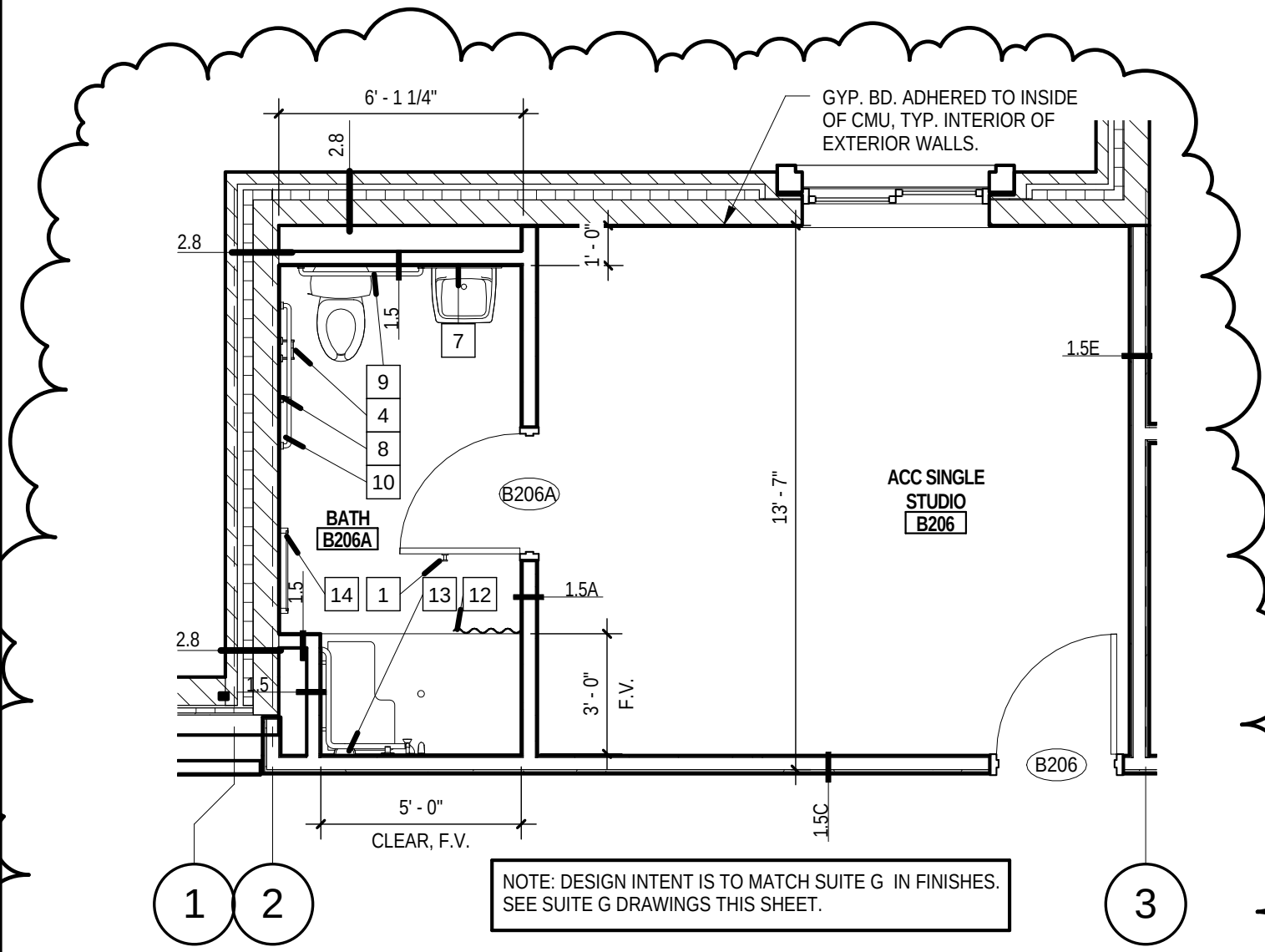
1/A10.1

(SUITE B IS SIMILAR. SEE PLANS)



12 Single Studio Ceili

1/4" = 1'-0"



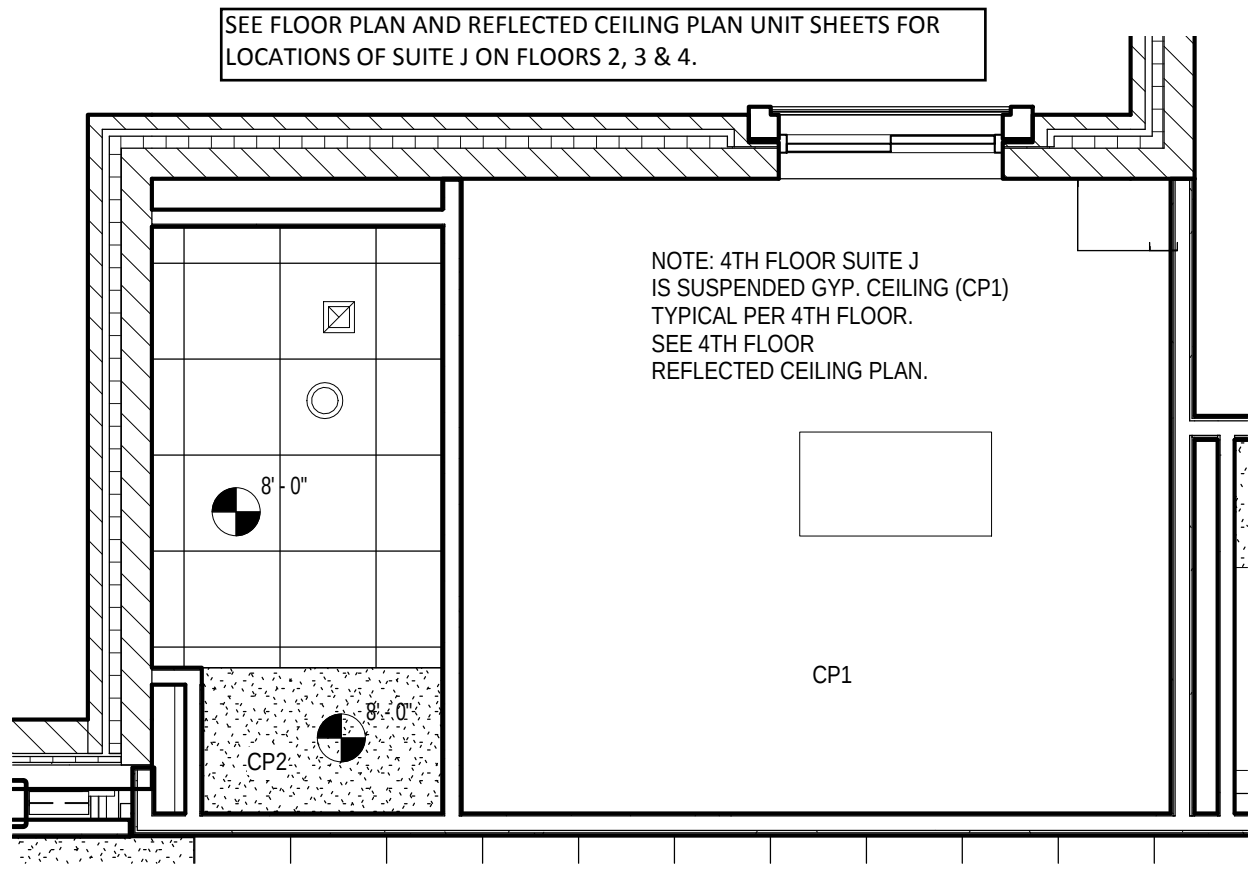
NOTE: DESIGN INTENT IS TO MATCH SUITE G IN FINISHES.
SEE SUITE G DRAWINGS THIS SHEET.

21 Enlarged Plan - SUITE J

1/4" = 1'-0"

NOTE: REFER TO A10.5 FOR TOILET ACCESSORY SCHEDULE

SEE FLOOR PLAN AND REFLECTED CEILING PLAN UNIT SHEETS FOR LOCATIONS OF SUITE J ON FLOORS 2, 3 & 4.

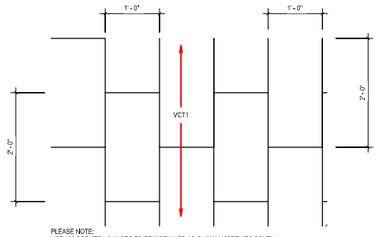


22 Enlarged Reflected Ceiling Plan - S

1/4" = 1'-0"

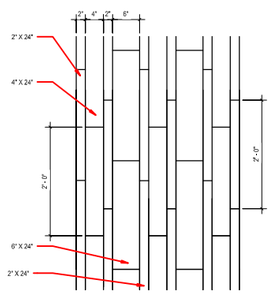
21 & 22/A10.4

1

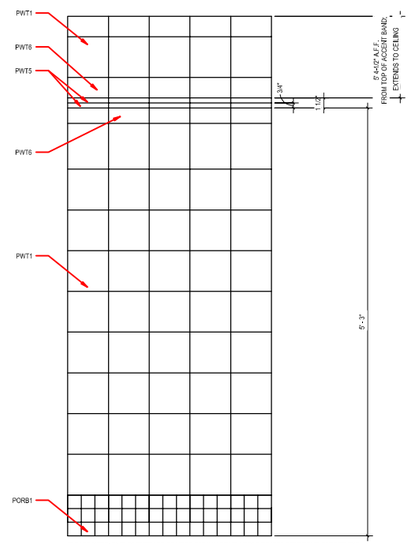


PLEASE NOTE:
VCT1 IN CORNER LOUNGES TO BE INSTALLED AS SHOWN NORTH TO SOUTH.
VCT1 IN SEMI-SUITES TO BE INSTALLED LENGTHWISE DEPENDING ON ORIENTATION OF ROOM.

8 VCT Directional Pattern
1" = 1'-0"

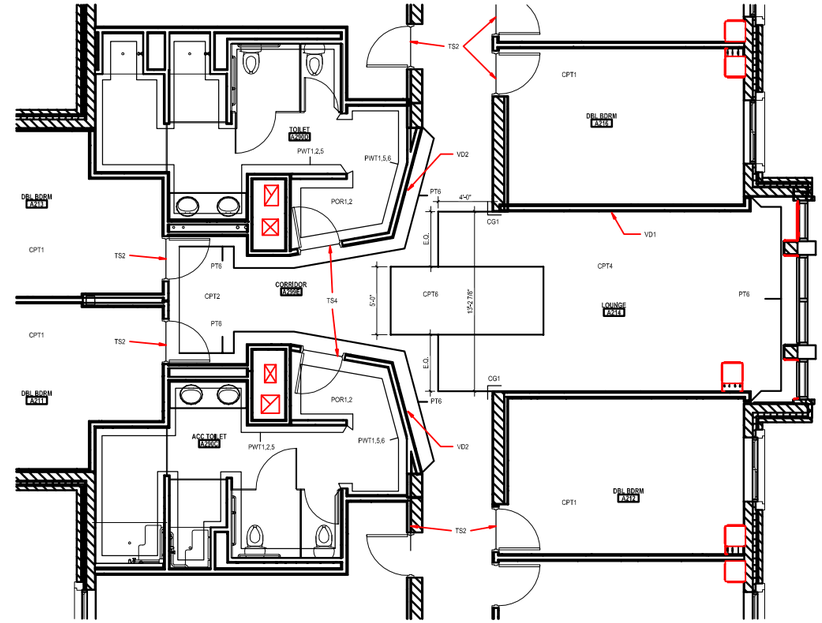


9 PWT4 Detail
1" = 1'-0"



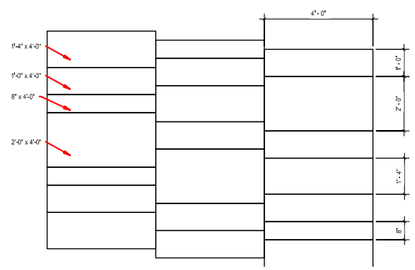
PLEASE NOTE: THIS PATTERN TO BE USED ONLY IN SOME AREAS OF "TOILET" ROOMS IN RESIDENT WINGS; NOT TO BE USED IN INDIVIDUAL SUITE "BATH" ROOMS. REFERENCE FINISH PLANS FOR LOCATION OF PATTERN.

5 Restroom Wall Tile Pattern
1 1/2" = 1'-0"

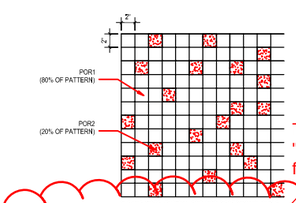


PLEASE NOTE: PLACEMENT OF TILE IN RESTROOMS A209D AND A209C. PLACEMENT TYPICAL OF ALL. SIMILAR POD RESTROOMS. PWT1,2,5 TO BE INSTALLED ON WET WALLS; PWT1,5,6 TO BE INSTALLED ON WING AND ENTRY WALLS. REFERENCE FINISH ELEVATIONS FOR PATTERN. ANY DISCREPANCY IS TO BE BROUGHT TO THE ARCHITECT'S ATTENTION. IN UNIT B, CPT6 IS TO BE REPLACED WITH CPT7.

1 Pod Detail of Typical Wall & Carpet Finishes - Unit A
1/4" = 1'-0"



6 POR3 Detail
1/2" = 1'-0"

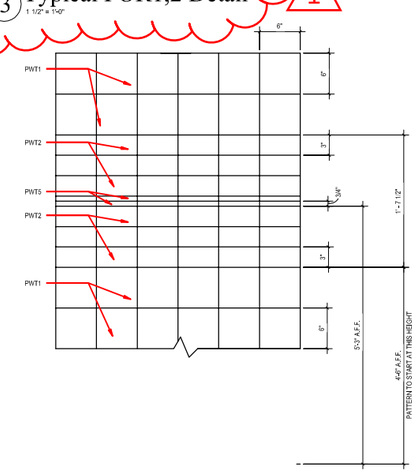


PLEASE NOTE: TYPICAL FOR POD RESTROOMS, SUITE BATHS, AND ALTERNATE #13.

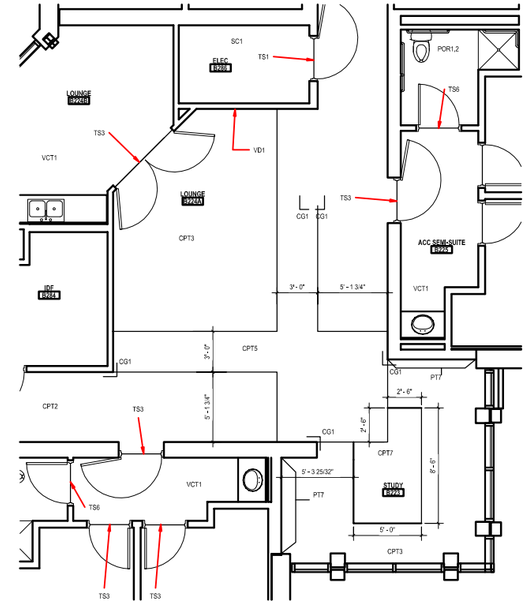
Text changed to read "Typical" and note added for locations.

3 Typical POR1,2 Detail
1 1/2" = 1'-0"

1

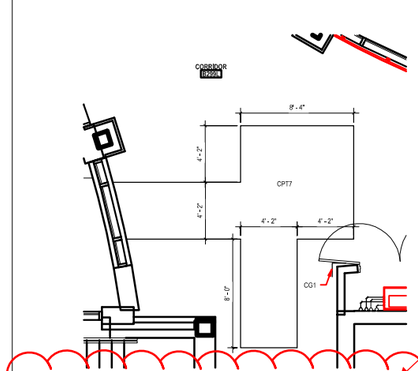


4 Restroom Wall Tile Pattern
1 1/2" = 1'-0"



PLEASE NOTE: IN UNIT A, CPT 7 IS TO BE SUBSTITUTED FOR CPT6.

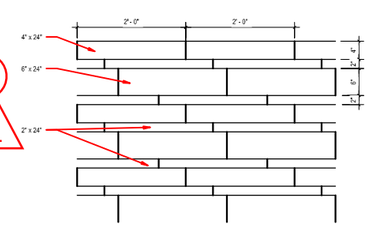
2 Study/Lounge Carpeting Detail - Unit C
1/4" = 1'-0"



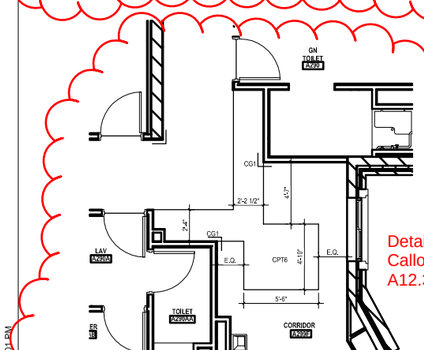
Detail title changed.

10 2nd-4th Floor Carpet Detail - Unit B
1/4" = 1'-0"

1



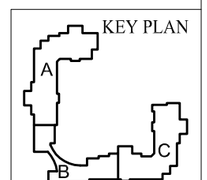
7 PWT3 Detail
1" = 1'-0"



Detail added. Callout on A12.3b.

11 2nd-4th Floor Carpet Detail - Unit B
1/4" = 1'-0"

1



D1.156

1/23/2012 9:25:50 PM

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Indiana University SouthEast Side Residence Hall

IU # 20106837

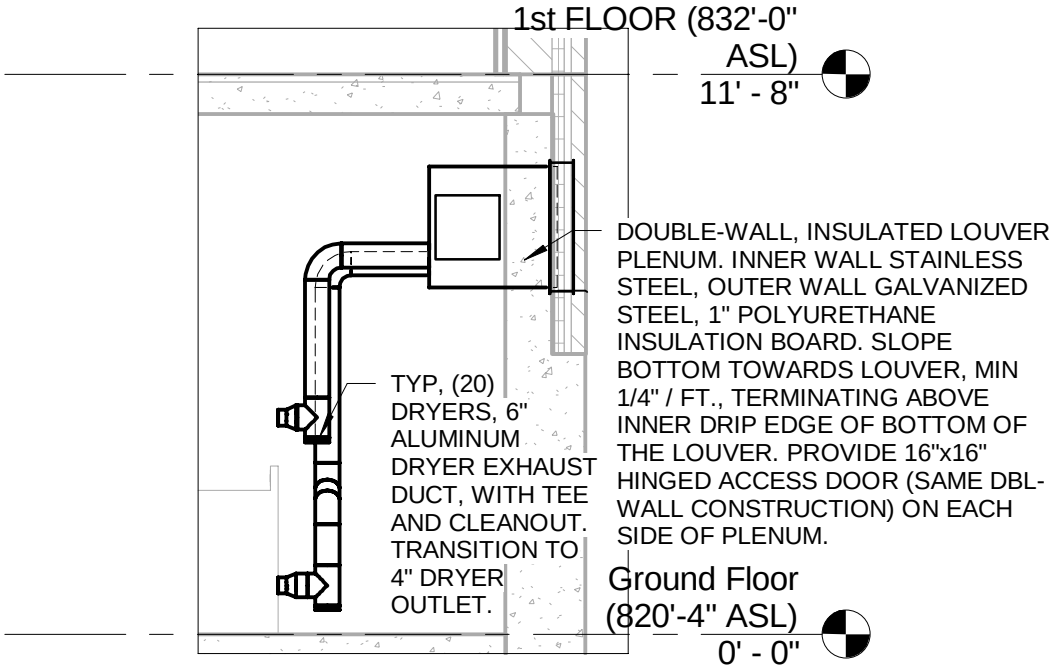
1801 East Jones Avenue
Bloomington, Indiana

Revisions:	Date:	By:
Addendum #1	1-23-12	ido

SHEET TITLE
Interior Details

COMMISSION NUMBER	DATE
5804	01/11/2012

SHEET NUMBER
A12.7b



2 Dryer Exhaust Plenum

1/4" = 1'-0"

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

REVISION TO SHEET M2.1bc

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DATE	1/26/12
COMMISSION NUMBER	5804
SHEET NUMBER	D1.159

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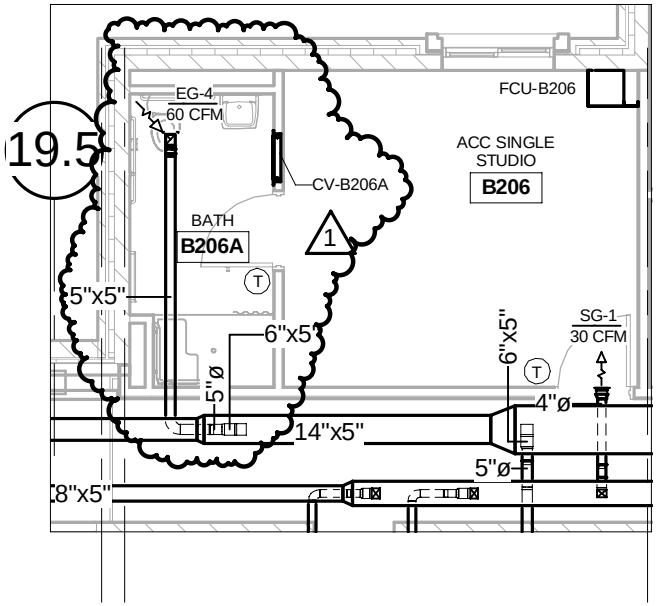

Typical for B206A, B306A and B406A.

12

3

Second Floor HVAC Plan - Unit B

1/8" = 1'-0"

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

REVISION TO SHEET M2.3bc

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DATE 1/26/12

COMMISSION NUMBER 5804

SHEET NUMBER D1.162

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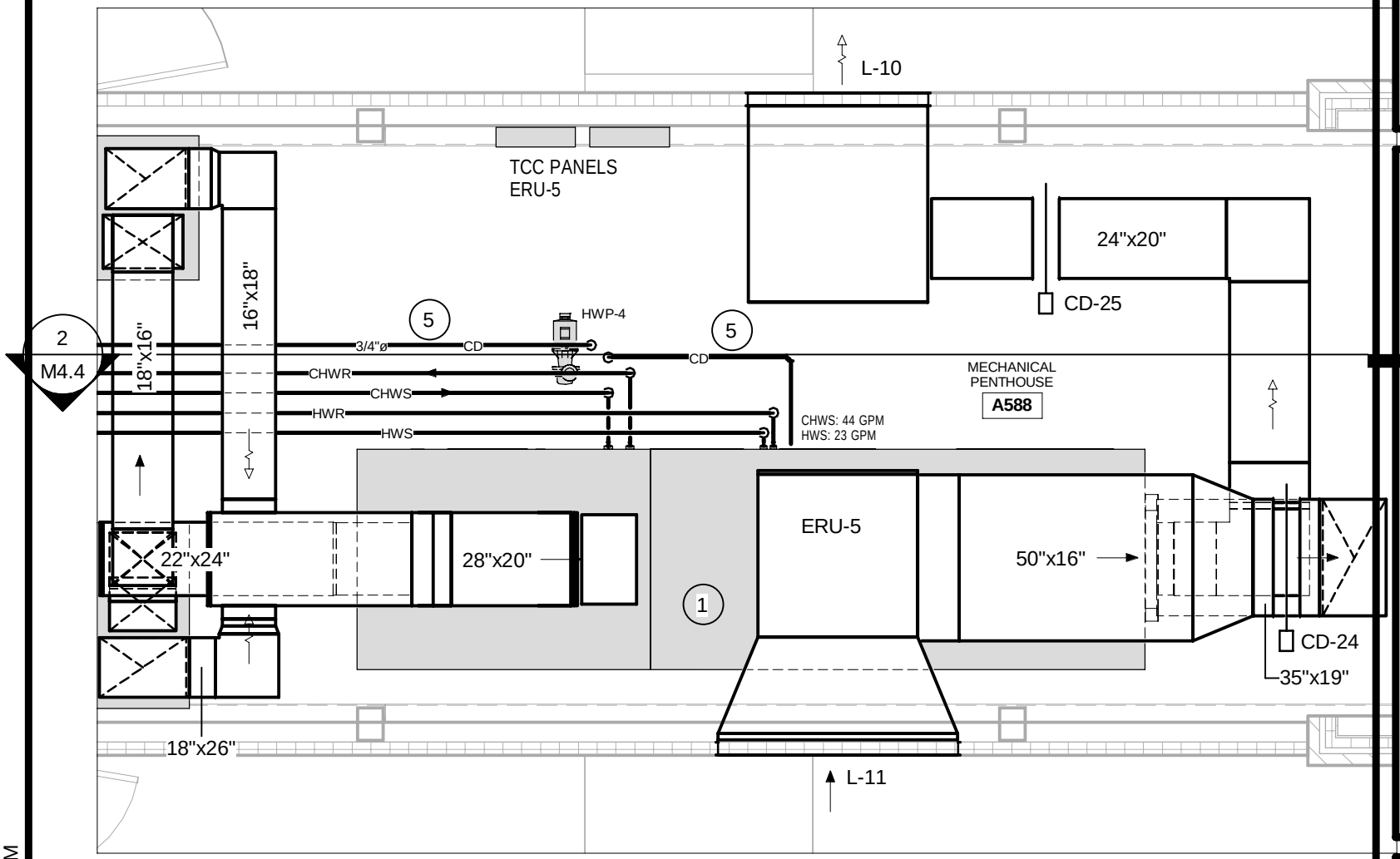

1 Parial Enlarged Penthouse A588 Plan

1/4" = 1'-0"

REVISION TO SHEET M4.4, DETAIL #1
ADDED CD-24 & CD-25, NEW LOUVER TAGS.

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

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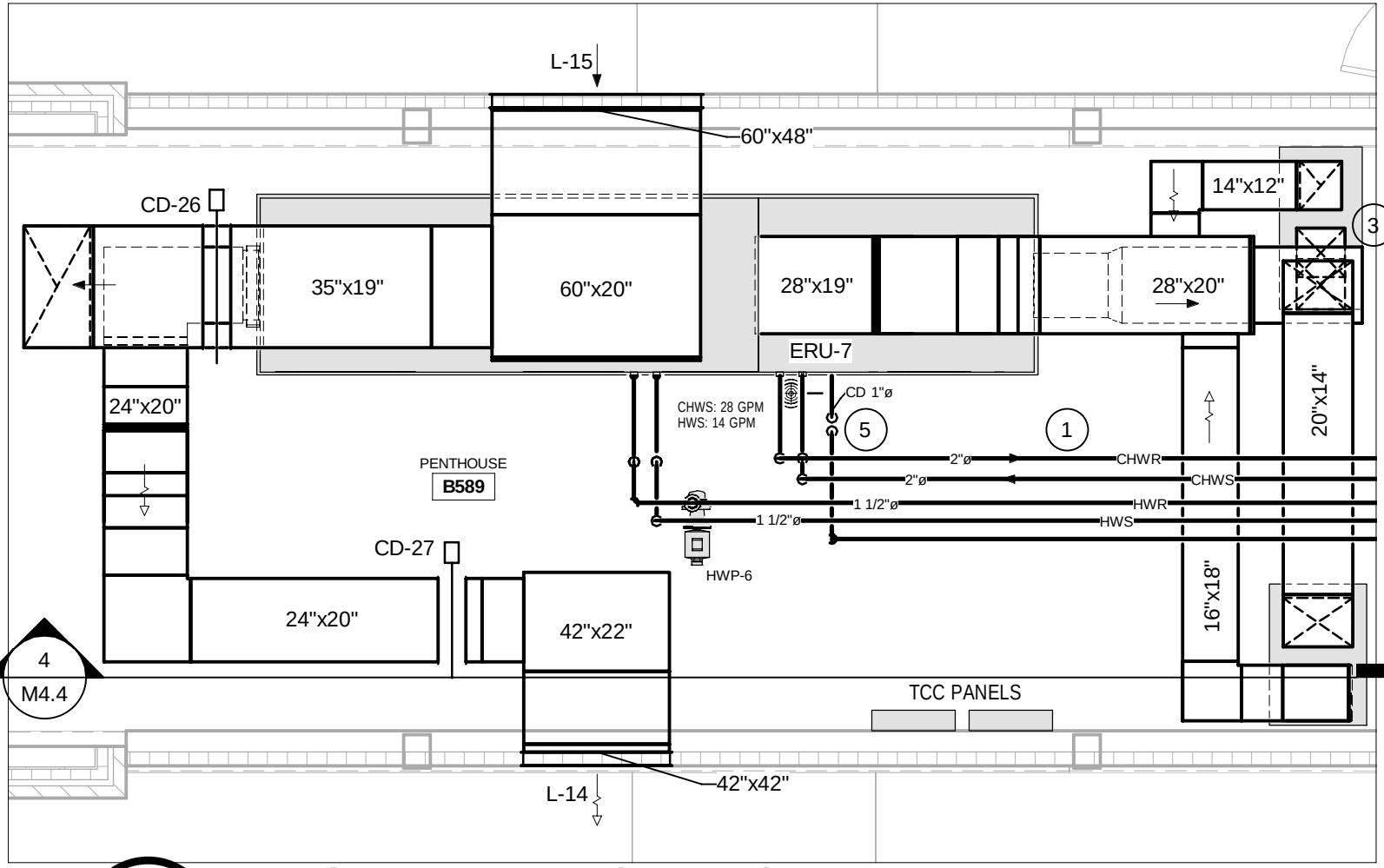
COMMISSION NUMBER 5804

SHEET NUMBER D1.164

1/26/2012 11:21:52 AM



3 Partial Enlarged Penthouse B589 Plan

1/4" = 1'-0"

REVISION TO SHEET M4.4, DETAIL #3
ADDED CD-26 & CD-27, NEW LOUVER TAGS.

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

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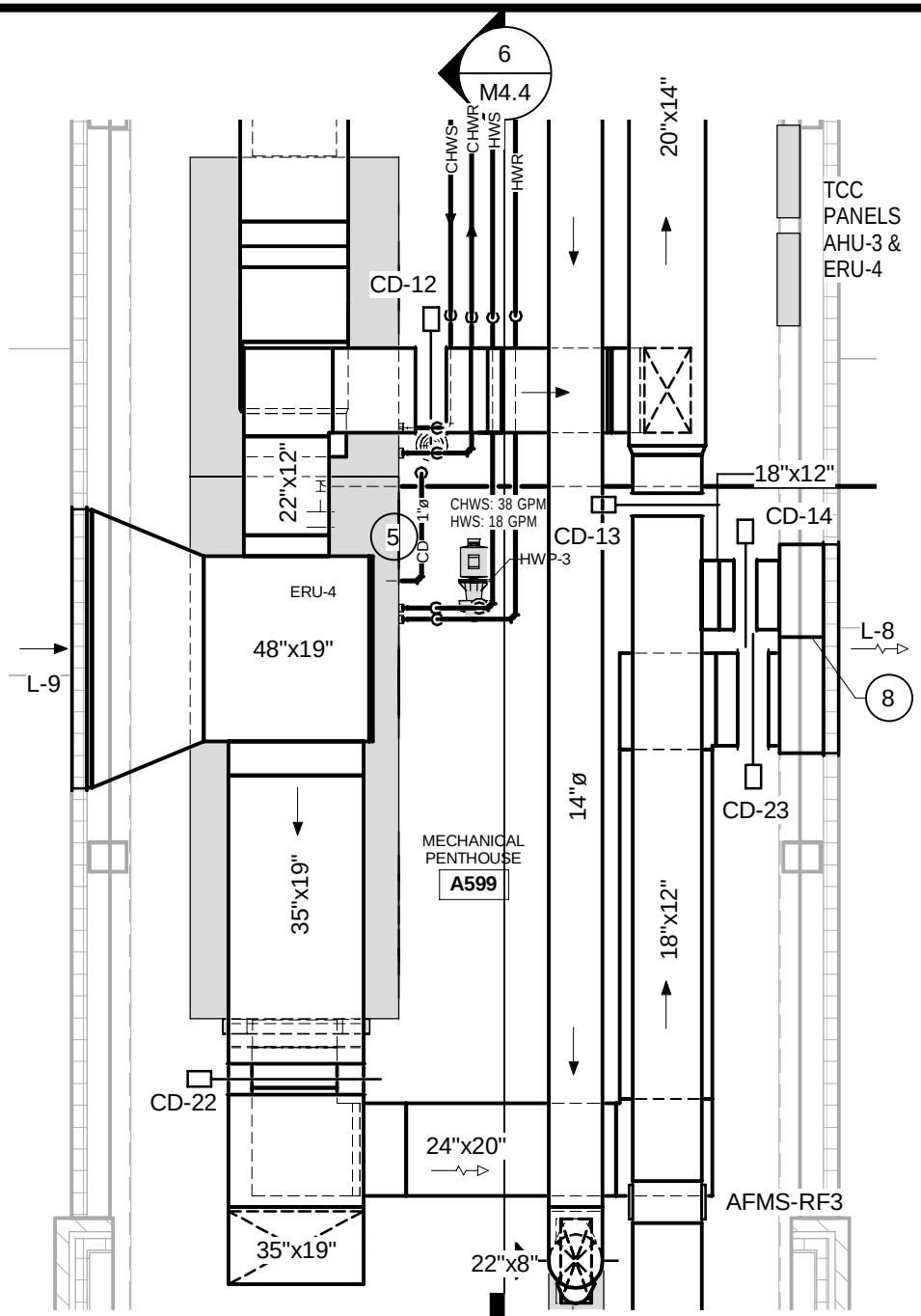

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

REVISION TO SHEET M4.4, DETAIL #5
ADDED CD-22 & CD-23, NEW LOUVER TAGS.

5 Partial Enlarged Penthouse A599 Plan

1/4" = 1'-0"

1/26/2012 11:21:53 AM

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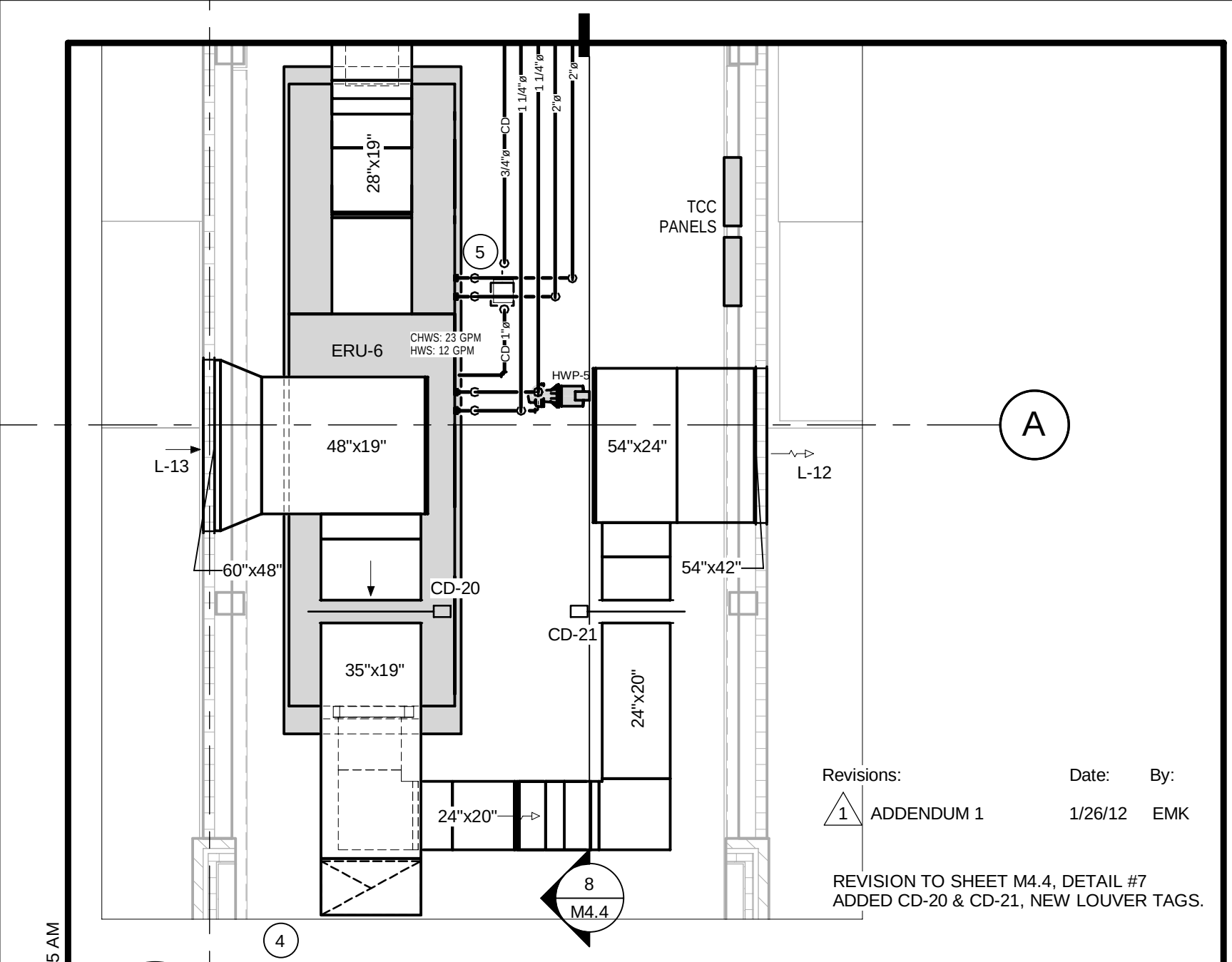

Revisions:

	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

REVISION TO SHEET M4.4, DETAIL #7
ADDED CD-20 & CD-21, NEW LOUVER TAGS.

7 Partial Enlarged Penthouse B588 Plan

1/4" = 1'-0"

6

1/26/2012 11:21:55 AM

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SHEET NUMBER D1.167

LOUVER SCHEDULE

TAG	MANUF.	MODEL	SIZE	MATERIAL	FLOW (CFM)	FREE AREA (SF)	FPM	IN. WG.	BLADE TYPE	FRAME	USE	NOTES
L-1	RUSKIN	ELF6375DX	52 x 32	EXTRUDED ALUMINUM	1,100	6.15	179	0.01	6" DRAINABLE STATIONARY	STANDARD	LAUNDRY INTAKE	1,2,3,5
L-2	RUSKIN	ELF6375DX	52 x 32	EXTRUDED ALUMINUM	1,100	6.15	179	0.01	6" DRAINABLE STATIONARY	STANDARD	LAUNDRY INTAKE	1,2,3,5
L-3	RUSKIN	ELF6375DX	52 x 32	EXTRUDED ALUMINUM	1,870	6.15	358	0.02	6" DRAINABLE STATIONARY	STANDARD	LAUNDRY EXHAUST	1,3,4,5
L-4	RUSKIN	ELF6375DX	52 x 32	EXTRUDED ALUMINUM	985	6.15	160	0.02	6" DRAINABLE STATIONARY	STANDARD	EF-2 EXHAUST / LAUNDRY EXHAUST	1,3,4,5,6
L-6	RUSKIN	ELF6375DX	96 x 60	EXTRUDED ALUMINUM	16,024	23.71	676	0.05	6" DRAINABLE STATIONARY	STANDARD	MECHANICAL B093 RELIEF	1,2,3,5,7
L-7	RUSKIN	ELF6375DX	24 x 40	EXTRUDED ALUMINUM	0				6" DRAINABLE STATIONARY	STANDARD	ELEVATOR SHAFT VENTILATION	1,2,3
L-8	RUSKIN	ELF375DX	54 x 42	EXTRUDED ALUMINUM	4,220	8.30	508	0.06	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE A599 RELIEF / ERU-4 & AHU-3	1,2,5,7
L-9	RUSKIN	ELF375DX	72 x 48	EXTRUDED ALUMINUM	6,036	13.05	463	0.05	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE A599 INTAKE / ERU-4 & AHU-3	1,2,5,7
L-10	RUSKIN	ELF375DX	54 x 54	EXTRUDED ALUMINUM	5,895	11.09	532	0.06	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE A588 RELIEF / ERU-5	1,2,5
L-11	RUSKIN	ELF375DX	72 x 48	EXTRUDED ALUMINUM	5,773	13.05	442	0.05	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE A588 INTAKE / ERU-5	1,2,5
L-12	RUSKIN	ELF375DX	54 x 42	EXTRUDED ALUMINUM	3,285	8.30	396	0.04	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE B588 RELIEF / ERU-6	1,2,5
L-13	RUSKIN	ELF375DX	60 x 48	EXTRUDED ALUMINUM	3,252	10.82	301	0.02	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE B588 INTAKE / ERU-6	1,2,5
L-14	RUSKIN	ELF375DX	42 x 42	EXTRUDED ALUMINUM	2,224	6.39	348	0.03	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE B589 RELIEF / ERU-7	1,2,5
L-15	RUSKIN	ELF375DX	60 x 48	EXTRUDED ALUMINUM	3,369	10.82	311	0.02	4" DRAINABLE STATIONARY	STANDARD	PENTHOUSE B589 INTAKE / ERU-7	1,2,5
L-16	RUSKIN	ELF6375DX	72 x 12	EXTRUDED ALUMINUM	920	2.14	430	0.03	6" DRAINABLE STATIONARY	STANDARD	ELECTRICAL A079 RELIEF	1,2,3,5
L-17	RUSKIN	ELF6375DX	54 x 16	EXTRUDED ALUMINUM	920	2.45	375	0.02	6" DRAINABLE STATIONARY	STANDARD	ELECTRICAL A079 ECONOMIZER	1,2,3,5

LOUVER NOTES:

1. STANDARD KYNAR COLOR, TO BE SELECTED BY ARCHITECT.
2. STANDARD 3/4" EXPANDED, FLATTENED ALUMINUM BIRDSCREEN.
3. EXTENDED SILL (4").
4. BIRDSCREEN TO BE 1/2" x 1/2" STAINLESS STEEL WIRE CLOTH.
5. PRESSURE DROPS ARE ROUNDED UP, SUBMITTED LOUVERS NOT TO EXCEED SCHEDULED VALUE.
6. SHEET METAL CONTRACTOR TO FABRICATE SEPRATE PLENUMS FOR EXHAUST FAN AND DRYERS.
7. SHEET METAL CONTRACTOR TO FABRICATE BAFFLE(S) IN PLENUM FOR SEPRATION OF AHU & ERU DUCT CONNECTIONS TO LOUVER PLENUM.

DUCT SILENCER SCHEDULE

TAG	MANUFACTURER	MODEL	SIZE (WxH)	LENGTH (FT)	FLOW (CFM)	FACE VELOCITY	PD (IN.W.G.)	DYNAMIC INSERTION LOSS (dB) 63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	NOTES
DS-1	VIBRO-ACOUSTICS	RD-LV-F7	18"x12"	5	610	407 FPM	0.070	7	11	25	42	44	43	29	20	
DS-2	VIBRO-ACOUSTICS	RD-HV-F7	34"x22"	5	6500	1251 FPM	0.084	3	5	13	26	29	22	15	11	
DS-3	VIBRO-ACOUSTICS	RD-HV-F8	27"x20"	5	4005	1068 FPM	0.077	4	4	13	25	32	24	18	14	

NOTES:

1. "FORWARD FLOW", NOISE AND AIRFLOW MOVE IN THE SAME DIRECTION.
2. RECTANGULAR DISSIPATIVE LOW-VELOCITY SILENCER (<750 FPM).
3. RECTANGULAR DISSIPATIVE HIGH-VELOCITY SILENCER (<2000 FPM).

REVISION TO SHEET M5.2

D1. VERTICAL HI-RISE FAN COIL UNIT SCHEDULE - UNIT B

	TAG	COIL ROWS	SIZE	HP	FAN SPEED	AIR FLOW	COOLING TOTAL BTUH	SENS BTUH	EDB	EWB	LAT	GPM	EWT	LWT	WPD (FT)	HEATING TOTAL BTUH	EDB	LDB	GPM	EWT	LWT	WPD	LOCATION	NOTES
FCU	B206	3+1	03	1/10	STM	180	5963	4237	75	62.5	52.6	0.6	42	62	0.4	7911	70.0	110.9	0.2	180.0	99.6	0.1	ACC SINGLE STUDIO	2
FCU	B306	3+1	03	1/10	STM	180	5963	4237	75	62.5	52.6	0.6	42	62	0.4	7911	70.0	110.9	0.2	180.0	99.6	0.1	ACC SINGLE STUDIO	2
FCU	B406	3+1	03	1/10	STM	180	5963	4237	75	62.5	52.6	0.6	42	62	0.4	7911	70.0	110.9	0.2	180.0	99.6	0.1	ACC SINGLE STUDIO	2

REVISION TO SHEET M5.4

Revisions:	Date:	By:
1 ADDENDUM 1	1/26/12	EMK

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D1.171

1/26/2012 11:23:32 AM

DUCT-MOUNTED CONTROL DAMPER SCHEDULE			
MARK	**SIZE**	**LOCATION / FUNCTION**	**NOTES**
CD-1	36"x28"	MECH B0989 / AHU-1 RELIEF	
CD-2	13"x17"	MECH B089 / ERU-8 RELIEF	
CD-3	46"x30"	MECH B089 / AHU-1 ECONOMIZER OA INTAKE	
CD-4	22"x12"	MECH B089 / AHU-1 MIN EXHAUST (AIR TO ERU-8)	
CD-5	14"x20"	MECH B089 / AHU-2 RELIEF	
CD-6	30"x12"	MECH B089 / RETURN AIR TO AHU-2	
CD-7	50"x30"	LAUNDRY B006A / DRYER INTAKE	1,2
CD-8	50"x30"	LAUNDRY B006A / DRYER INTAKE	1,2
CD-9	54"x16"	CORRIDOR A099F / FCH-A079 RELIEF AIR	
CD-10	54"x16"	ELECTRICAL / FCH-A079 ECONOMIZER AIR	
CD-11	30"x16"	ELECTRICAL / FCH-A079 RETURN AIR	
CD-12	22"x12"	PENTHOUSE A599 / AHU-3 OUTDOOR AIR	
CD-13	18"x12"	PENTHOUSE A599 / AHU-3 RETURN AIR	
CD-14	18"x12"	PENTHOUSE A599 / AHU-3 RELIEF	
CD-15	18"x30"	MECH B089 / ERU-8 OUTDOOR AIR	
CD-16	14"x30"	MECH B089 / AHU-2 ECONOMIZER OA	
CD-17	26"x15"	MECH B089 / ERU-8 OA TO AHU-1 MIN OA	
CD-19	12"x8"	LAUNDRY B006A / EF-2 EXHAUST	3
CD-20	35"x19"	PENTHOUSE B588 / ERU-6 OUTDOOR AIR	
CD-21	24"x20"	PENTHOUSE B588 / ERU-6 RELIEF AIR	
CD-22	35"x19"	PENTHOUSE A599 / ERU-4 OUTDOOR AIR	
CD-23	24"x20"	PENTHOUSE A599 / ERU-4 EXHAUST AIR	
CD-24	35"x19"	PENTHOUSE A588 / ERU-5 OUTDOOR AIR	
CD-25	24"x20"	PENTHOUSE A588 / ERU-5 EXHAUST AIR	
CD-26	35"x19"	PENTHOUSE B589 / ERU-7 OUTDOOR AIR	
CD-27	24"x20"	PENTHOUSE B589 / ERU-7 RELIEF AIR	

DUCT-MOUNTED CONTROL DAMPER GENERAL NOTES (APPLIES TO ALL SELECTIONS, UNLESS NOTED OTHERWISE):

A. PROVIDED BY SIEMENS, INSTALLED BY M.C.
B. 24V POWER TO THE DAMPER TO BE BY SIEMENS.
C. M.C. TO COORDINATE FINAL DUCT SIZE WITH SIEMENS.
D. CONTROL DAMPER CD-18 NOT USED.

SPECIFIC NOTES:

1. DAMPER WILL REMAIN EXPOSED (INSTALLED AT END OF DUCT). ACTUATOR TO BE MOUNTED INSIDE DUCT INSTEAD OF ON EXTERIOR SHAFT.
2. SEQUENCED WITH DRYERS
3. 110V; INTERLOCKED WITH EF-2 BY E.C.
4. NOT USED.

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1 ADDENDUM 1	1/26/12	EMK

REVISION TO SHEET M5.2

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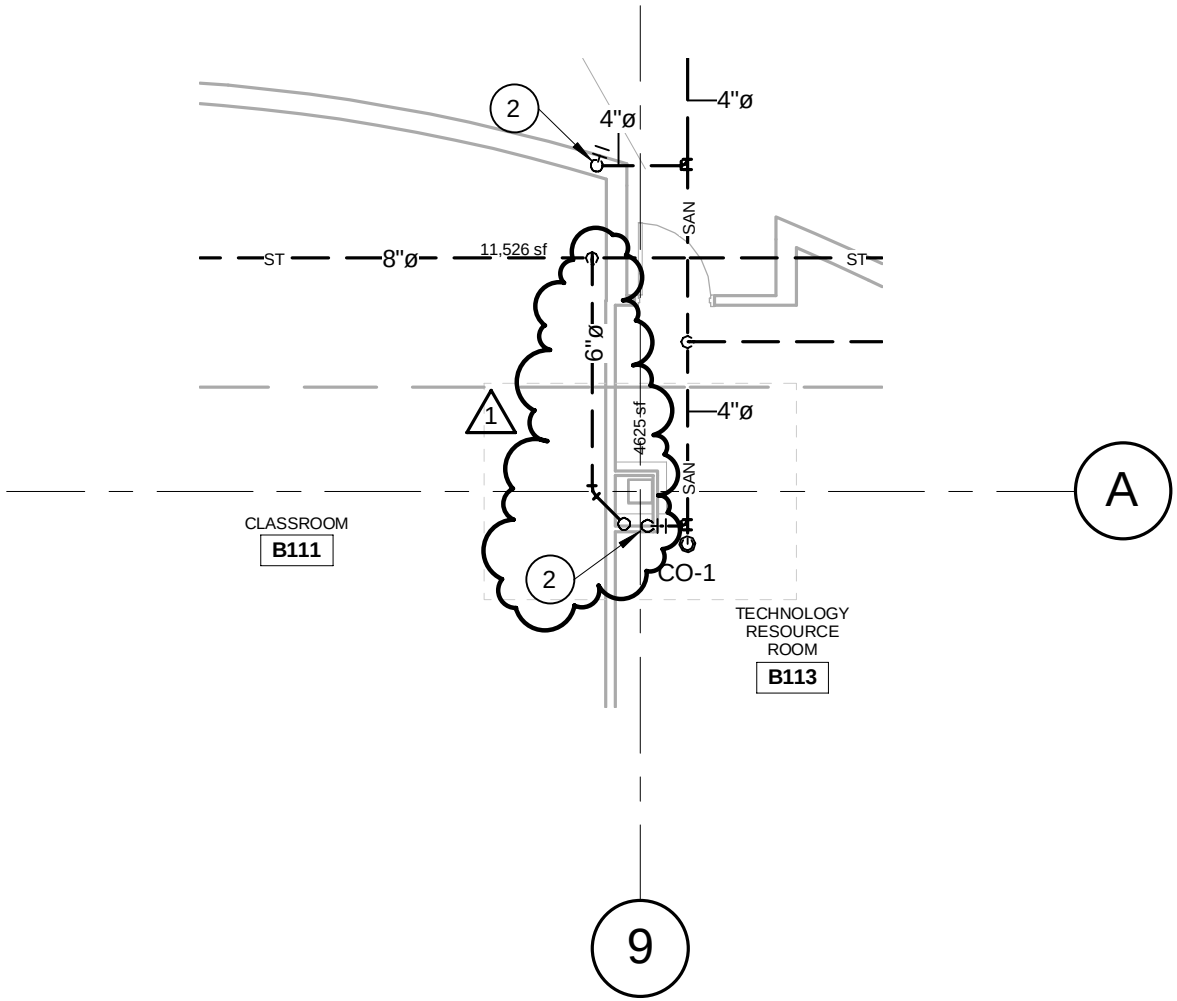

Underground - Unit C

1/8" = 1'-0"

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D1.P1

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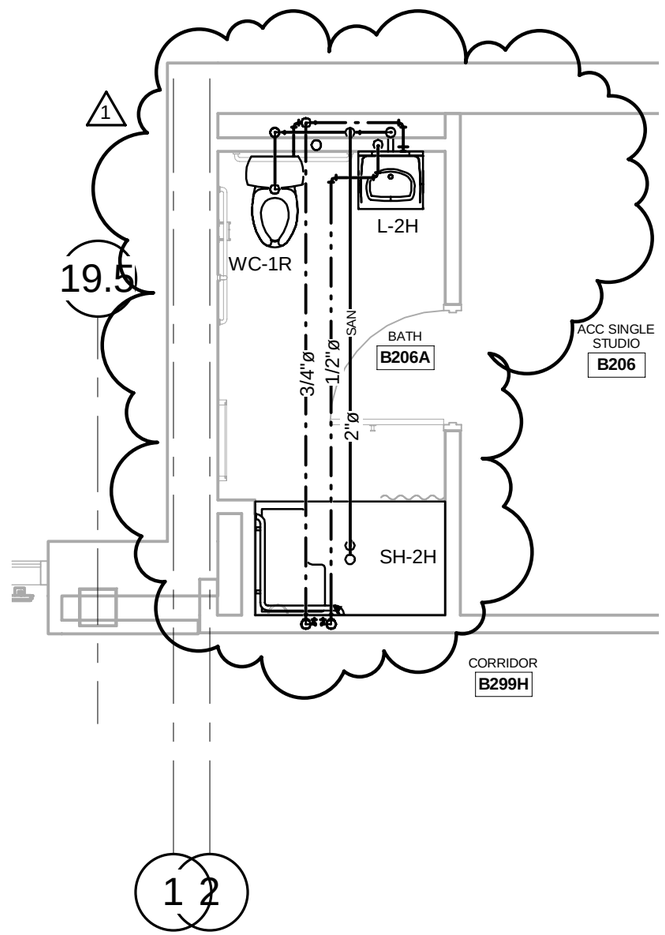
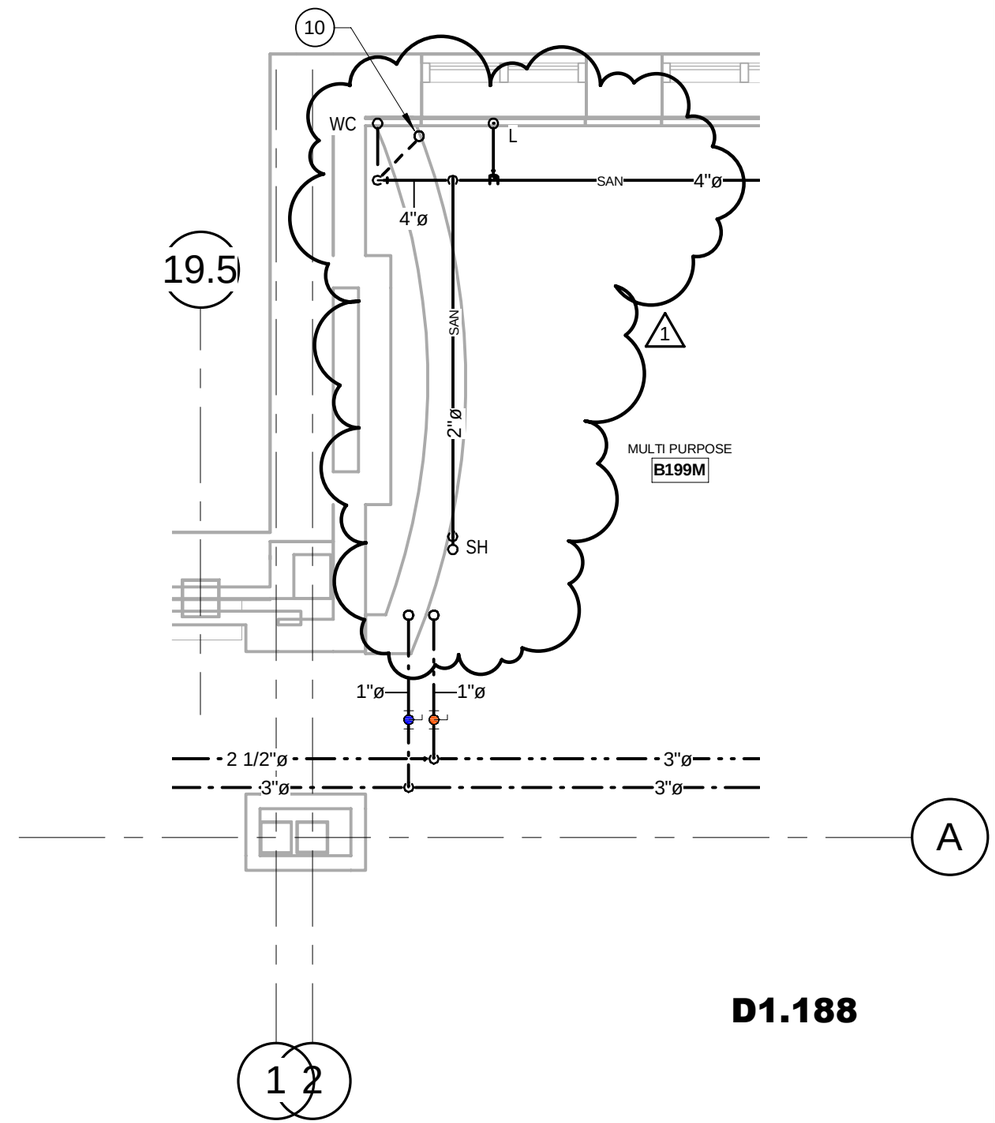


Second Floor Bath

1/4" = 1'-0"



D1.188

First Floor Multipurpose

1/4" = 1'-0"

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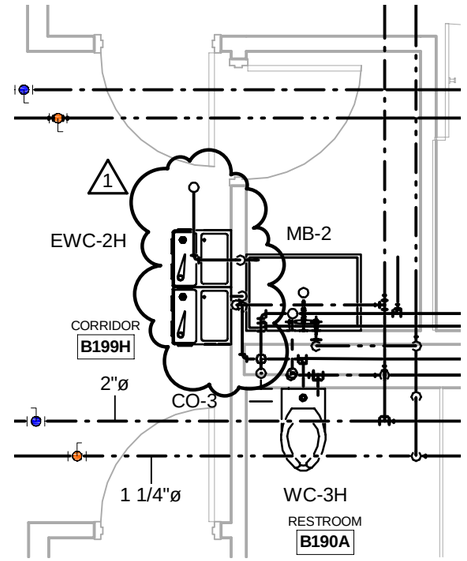
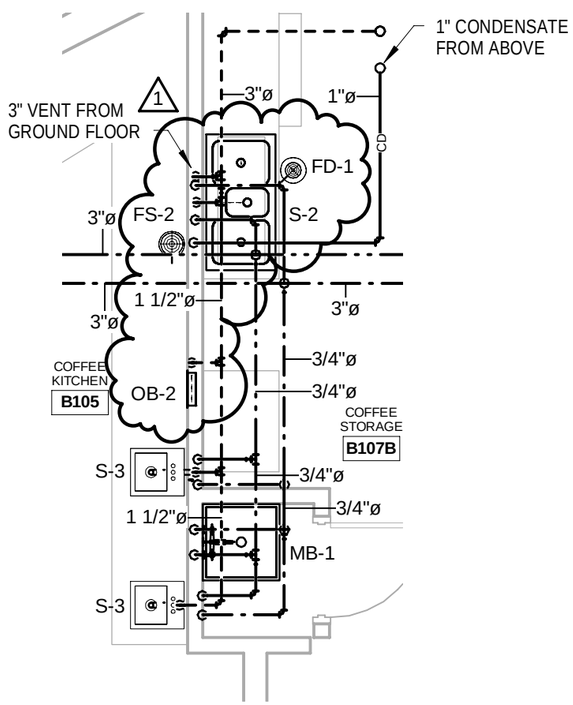
Revisions:		Date:	By:
1	ADDENDUM 1	1/26/12	ALC



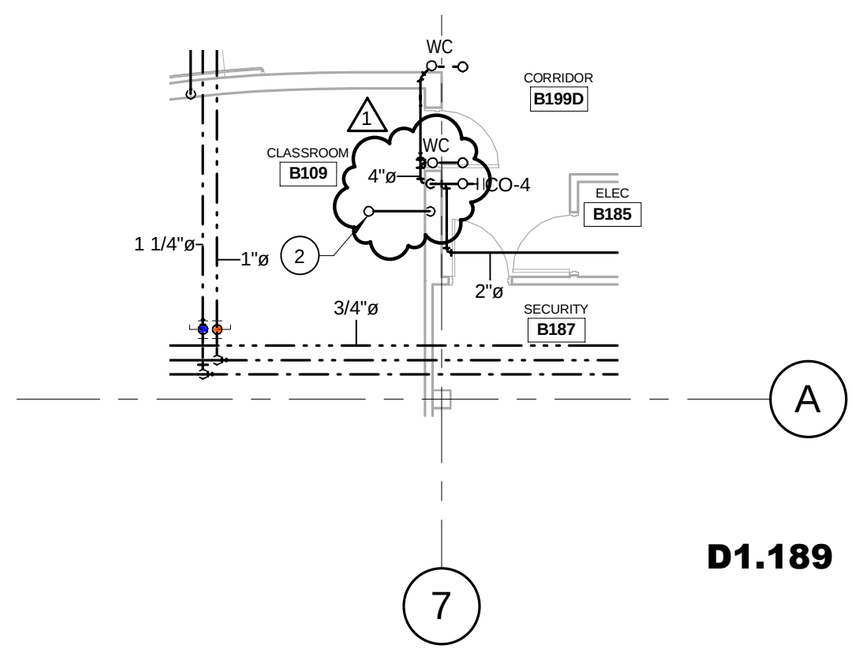
Public Restrooms

1/4" = 1'-0"



1st Floor Cafe

1/4" = 1'-0"



D1.189

First Floor Condensate

1/8" = 1'-0"

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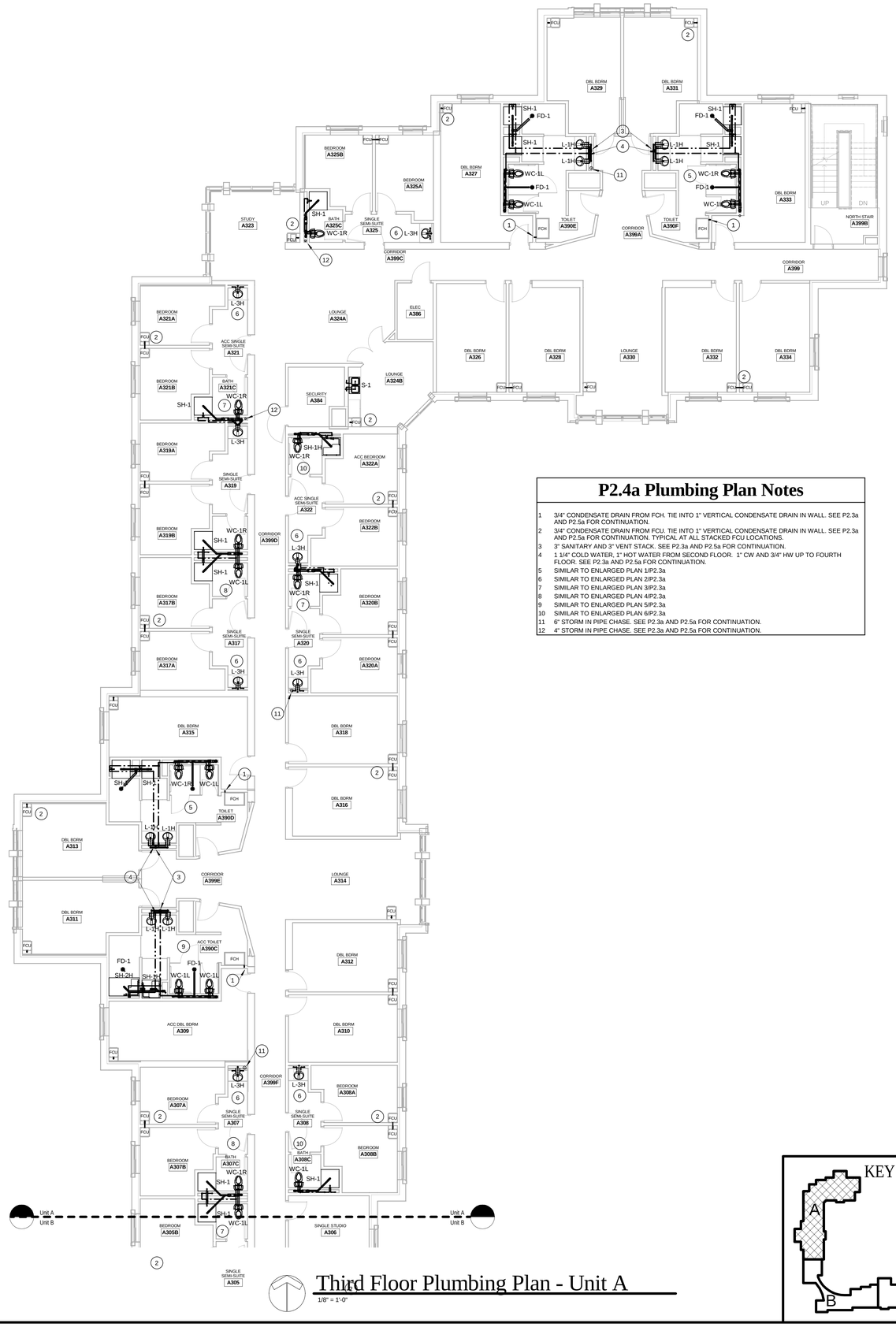
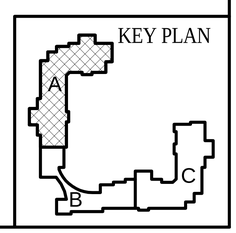


Third Floor Plumbing Plan - Unit A

1/8" = 1'-0"

P2.4a Plumbing Plan Notes

1	3/4" CONDENSATE DRAIN FROM FCH. TIE INTO 1" VERTICAL CONDENSATE DRAIN IN WALL. SEE P2.3a AND P2.5a FOR CONTINUATION.
2	3/4" CONDENSATE DRAIN FROM FCU. TIE INTO 1" VERTICAL CONDENSATE DRAIN IN WALL. SEE P2.3a AND P2.5a FOR CONTINUATION. TYPICAL AT ALL STACKED FCU LOCATIONS.
3	3" SANITARY AND 3" VENT STACK. SEE P2.3a AND P2.5a FOR CONTINUATION.
4	1 1/4" COLD WATER, 1" HOT WATER FROM SECOND FLOOR. 1" CW AND 3/4" HW UP TO FOURTH FLOOR. SEE P2.3a AND P2.5a FOR CONTINUATION.
5	SIMILAR TO ENLARGED PLAN 1/P2.3a
6	SIMILAR TO ENLARGED PLAN 2/P2.3a
7	SIMILAR TO ENLARGED PLAN 3/P2.3a
8	SIMILAR TO ENLARGED PLAN 4/P2.3a
9	SIMILAR TO ENLARGED PLAN 5/P2.3a
10	SIMILAR TO ENLARGED PLAN 6/P2.3a
11	6" STORM IN PIPE CHASE. SEE P2.3a AND P2.5a FOR CONTINUATION.
12	4" STORM IN PIPE CHASE. SEE P2.3a AND P2.5a FOR CONTINUATION.



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SHEET TITLE
Third Floor Plumbing Plan - Unit A

COMMISSION NUMBER	DATE
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SHEET NUMBER
P2.4a

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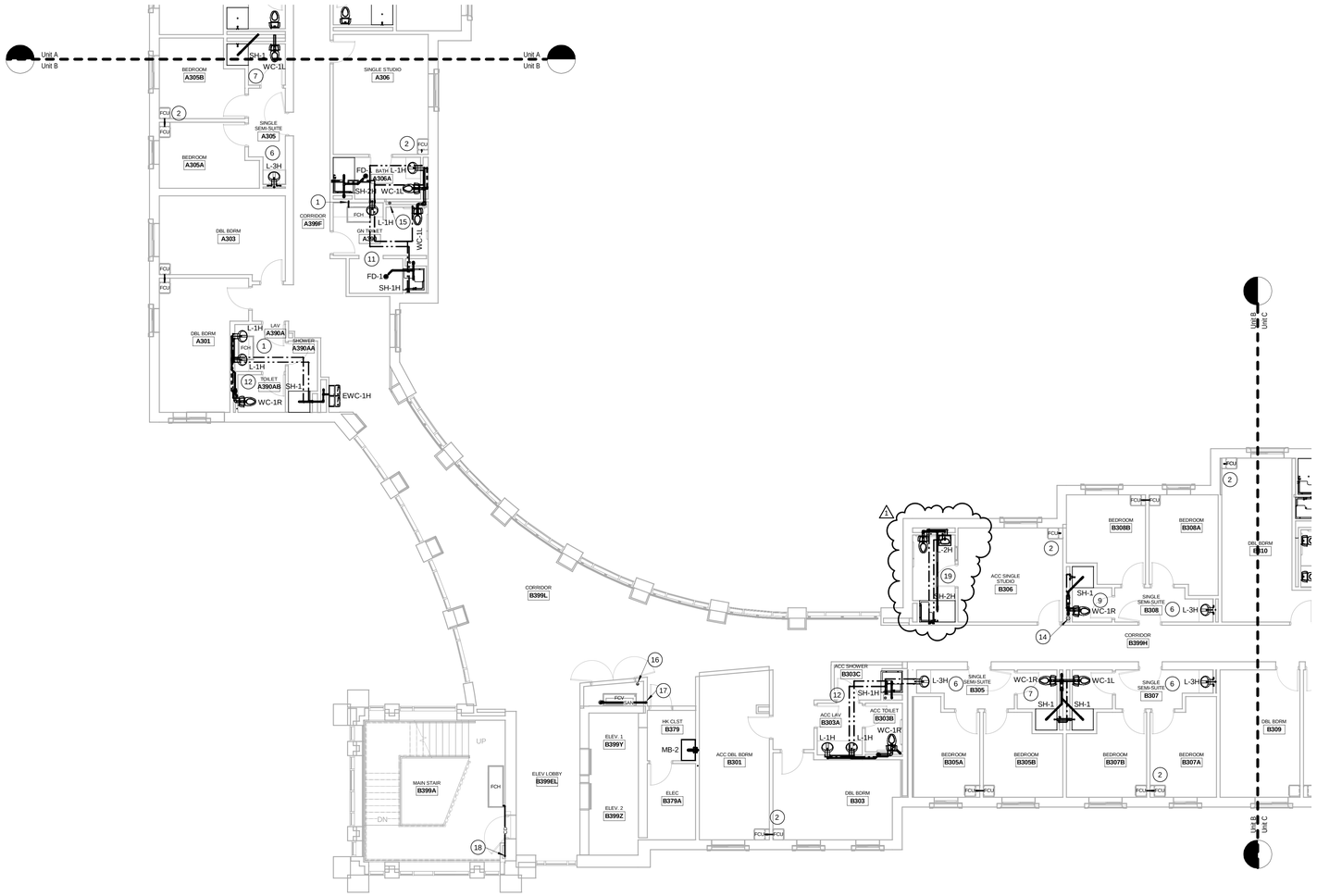
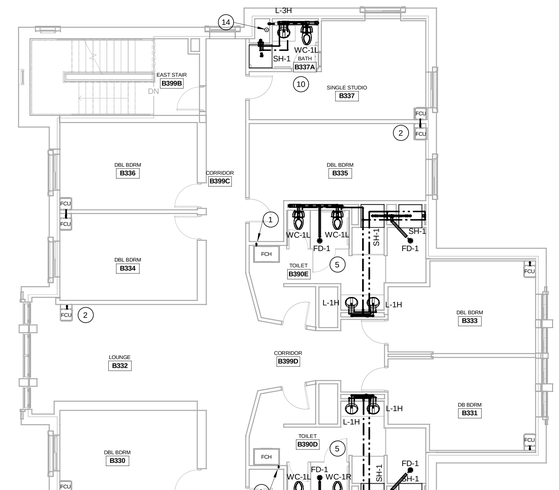


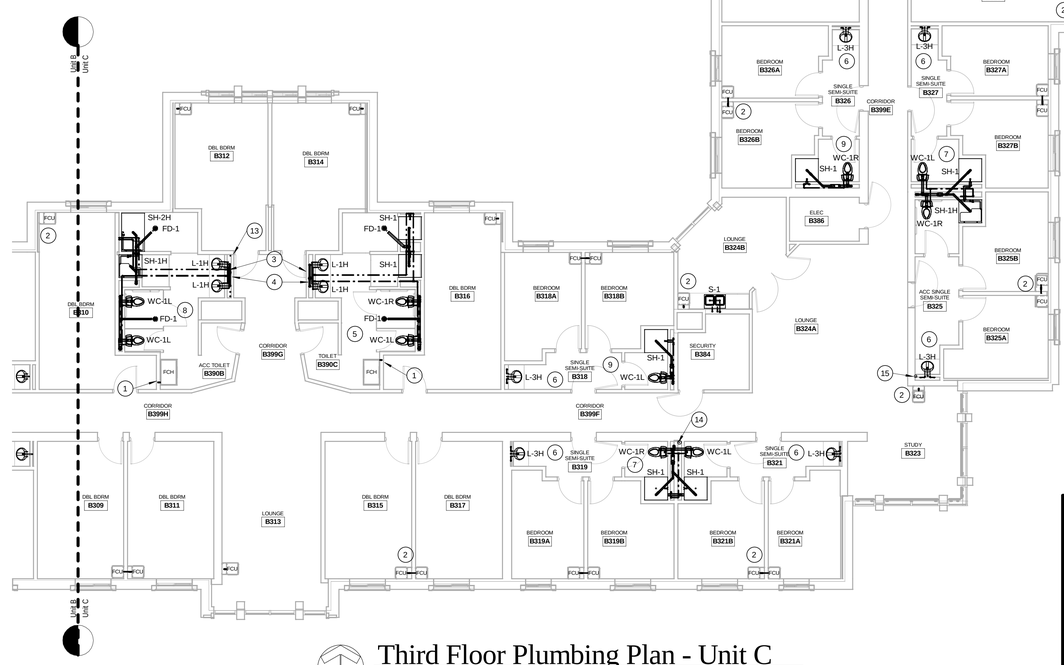
Third Floor Plumbing Plan - Unit B

1/8" = 1'-0"

P2.4bc Plumbing Plan Notes

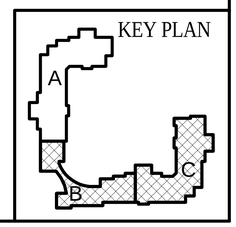
1	
2	3/4" CONDENSATE DRAIN FROM FCU. TIE INTO 1" VERTICAL CONDENSATE DRAIN IN WALL. SEE P2.3bc AND P2.5bc FOR CONTINUATION. TYPICAL AT ALL STACKED FCU LOCATIONS.
3	3" SANITARY. SEE P2.3bc/P2.5bc AND 2.5ba FOR CONTINUATION.
4	1 1/4" COLD WATER, 1" HOT WATER FROM SECOND FLOOR. 1" CW AND 1" HW UP TO FOURTH FLOOR. SEE P2.3bc AND P2.5bc FOR CONTINUATION.
5	SIMILAR TO ENLARGED PLAN 1/P2.3a.
6	SIMILAR TO ENLARGED PLAN 2/P2.3a.
7	SIMILAR TO ENLARGED PLAN 4/P2.3a.
8	SIMILAR TO ENLARGED PLAN 5/P2.3a.
9	SIMILAR TO ENLARGED PLAN 6/P2.3a.
10	SIMILAR TO ENLARGED PLAN 1/P2.3bc.
11	SIMILAR TO ENLARGED PLAN 2/P2.3bc.
12	SIMILAR TO ENLARGED PLAN 3/P2.3bc.
13	2" HOT WATER RECIRC UP TO FOURTH FLOOR. SEE P2.3bc AND P2.5bc FOR CONTINUATION.
14	6" STORM IN PIPE CHASE. SEE P2.3bc AND P2.5bc FOR CONTINUATION.
15	4" STORM IN PIPE CHASE. SEE P2.3bc AND P2.5bc FOR CONTINUATION.
16	4" STORM IN MECHANICAL CHASE. SEE P2.3bc AND P2.5bc FOR CONTINUATION.
17	2" SANITARY FROM FLOOR DRAIN ABOVE. ROUTE TO VERTICAL 2" SANITARY IN WALL. SEE P2.3bc FOR CONTINUATION.
18	1" CONDENSATE FROM FCH'S. SEE P2.3bc AND 2.5bc FOR CONTINUATION.
19	SIMILAR TO ENLARGED PLAN 4/P2.3bc.





Third Floor Plumbing Plan - Unit C

1/8" = 1'-0"



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SHEET TITLE
Third Floor Plumbing Plans - Units B & C

COMMISSION NUMBER	DATE
5804	01/11/2012

SHEET NUMBER
P2.4bc

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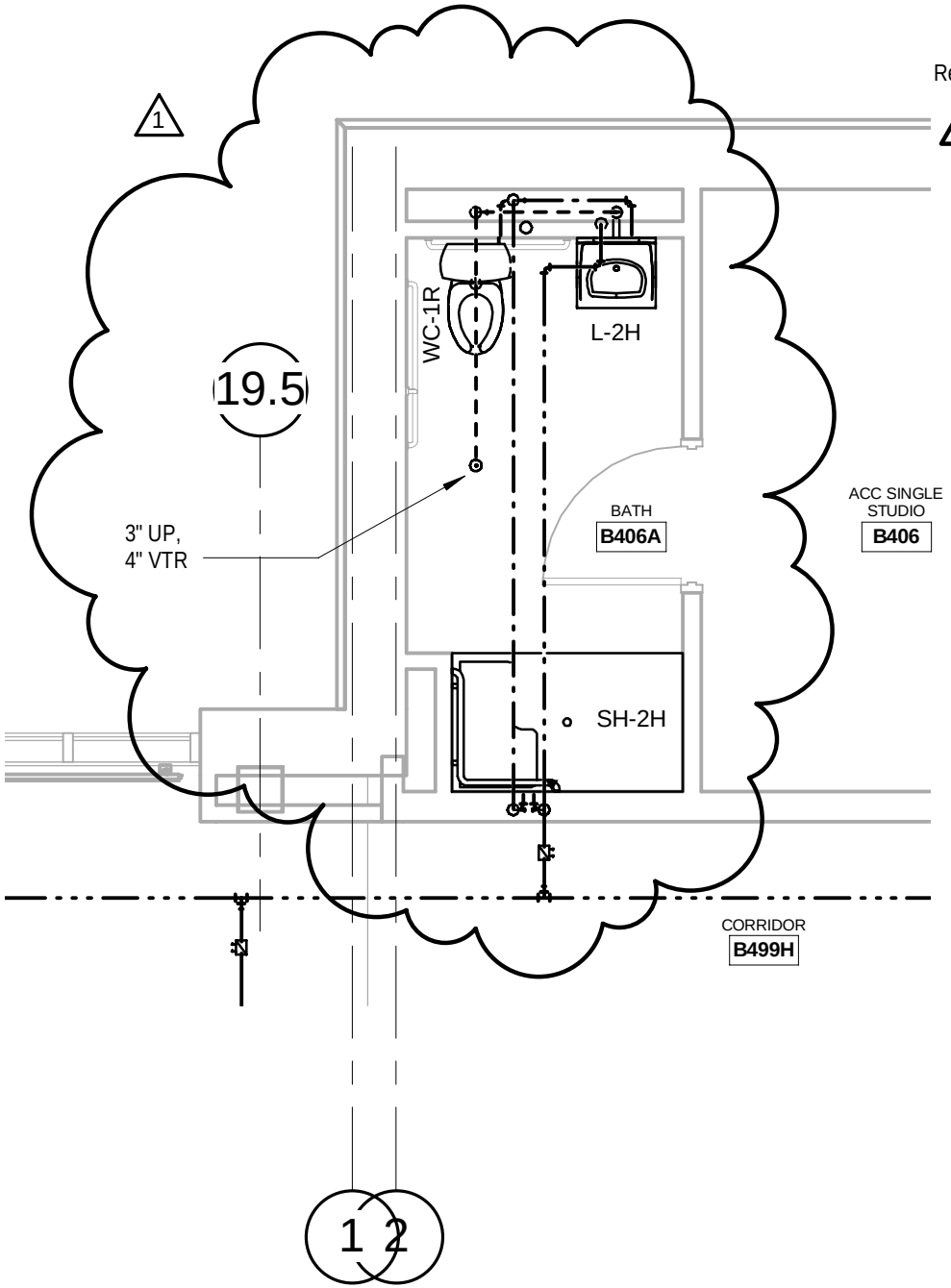

Fourth Floor Bath

1/4" = 1'-0"

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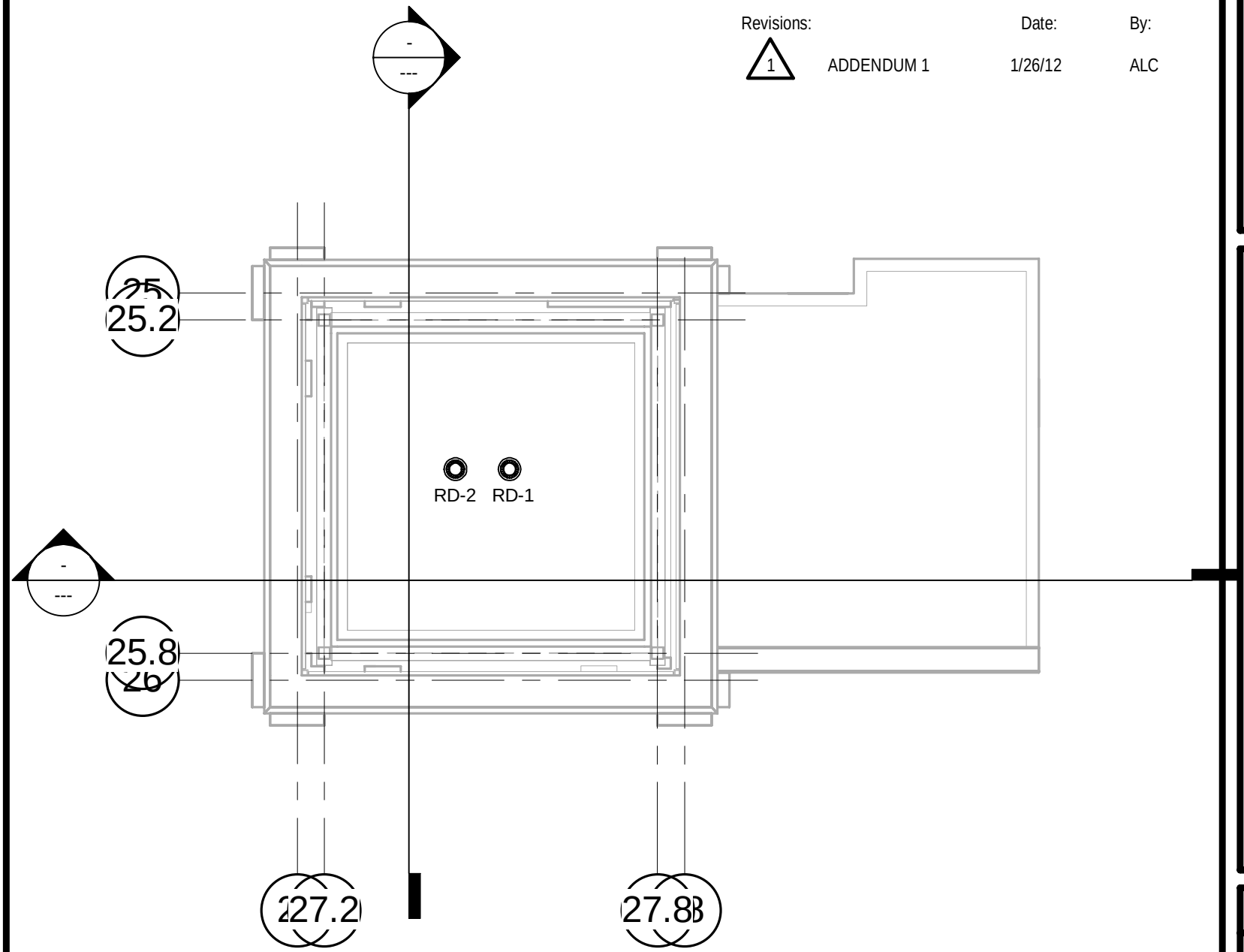

Main Stair Roof Plan

1/8" = 1'-0"

D1.194

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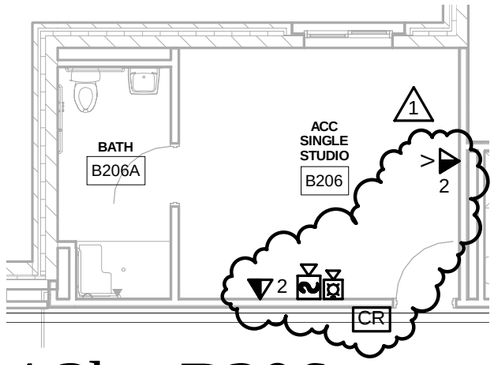
PLUMBING FIXTURE SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL	TRIM	DRAIN/TRAP	SUPPLIES	CARRIER	FINISH/COLOR	LOCATION USED	NOTES
AD-1	AREA DRAIN	JAY R. SMITH	2350Y	-	CAST IRON BODY, ADJUSTABLE TOP, SEDIMENT BUCKET	-	-	NICKEL BRONZE	AREAWAY	-
CO-1	CLEANOUT - FLOOR	JAY R. SMITH	4023S	-	-	-	-	NICKEL BRONZE	GENERAL	-
CO-2	CLEANOUT - EXTERIOR	JAY R. SMITH	4400C	-	-	-	-	NICKEL BRONZE	GENERAL	-
CO-3	CLEANOUT - WALL	JAY R. SMITH	4400C	PROVIDE STAINLESS STEEL COVER WITH SCREW	-	-	-	CAST IRON & STAINLESS STEEL	GENERAL	-
CO-4	CLEANOUT - OVERHEAD	JAY R. SMITH	4402C	-	-	-	-	CAST IRON		-
EWC-1H	ELECTRIC WATER COOLER - SPLIT LEVEL	OASIS	P8ACSL	-	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH #0830 CONCEALED ARM CARRIER	STAINLESS STEEL	NORTH OF CURVED GLASS CORRIDOR	-
EWC-2H	ELECTRIC WATER COOLER - SPLIT LEVEL, BOTTLE FILLER	OASIS	PV8SBFSL	-	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH #0830 CONCEALED ARM CARRIER	STAINLESS STEEL	CORRIDOR AT PUBLIC RESTROOMS	BARRIER-FREE SPLIT LEVEL WATER COOLER WITH BOTTLE FILLER
FD-1	FLOOR DRAIN	JAY R. SMITH	2005Y	-	CAST IRON, PROVIDE DEEP SEAL TRAP	-	-	NICKEL BRONZE	GENERAL	-
FD-2	FLOOR DRAIN	JAY R. SMITH	2005Y	-	CAST IRON, PROVIDE DEEP SEAL TRAP	-	-	GALVANIZED CAST IRON	PENTHOUSES	-
FD-3	FLOOR DRAIN	JAY R. SMITH	2010A	-	EXTENDED RIM, GALVANIZED CAST IRON, PROVIDE DEEP SEAL TRAP	-	-	GALVANIZED CAST IRON	FCU DRAINS	-
FS-1	FLOOR SINK	JAY R. SMITH	2450Y	-	CAST IRON, PROVIDE DEEP SEAL TRAP	-	-	CAST IRON	MECHANICAL ROOM	-
FS-2	FLOOR DRAIN	JAY R. SMITH	3421	-	ACID RESISTANT CAST IRON, DEEP SEAL TRAP	-	-	ACID RESISTANT CAST IRON	CAFE	ACID RESISTANT
HB-1	HOSE BIBB	JAY R. SMITH	5519	-	-	3/4" SUPPLY	-	NICKEL BRONZE	EXTERIOR	FREEZE PROTECTED
HB-2	HOSE BIBB	JAY R. SMITH	5673-BFP	-	-	3/4" SUPPLY	-	ROUGH BRASS	PENTHOUSES	INDOOR
L-1H	LAVATORY - FAUCET ONLY	SOLID SURFACE BY OTHERS	-	DELTA #520LF-HGMHFDF 0.5 GPM SINGLE LEVER	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	POLISHED CHROME	GENERAL	POP-UP DRAIN.
L-2H	LAVATORY - WALL HUNG	AMERICAN STANDARD	0195.073	DELTA #520LF-HGMHFDF 0.5 GPM SINGLE LEVER	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	POLISHED CHROME	GENERAL	POP-UP DRAIN.
L-3H	LAVATORY - FAUCET ONLY	SOLID SURFACE BY OTHERS	-	DELTA #520LF-HGMHFDF 0.5 GPM SINGLE LEVER	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	POLISHED CHROME	GENERAL	POP-UP DRAIN.
L-4H	LAVATORY - FAUCET	SOLID SURFACE BY OTHERS	-	DELTA #523LF-HGMHFDF 0.5 GPM SINGLE LEVER	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	POLISHED CHROME	PUBLIC RESTROOMS AT CLASSROOMS	GRID DRAIN.
LT-1	LAUNDRY TUB	FIAT	FL-1	FIAT A-1	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	WHITE/POLISHED CHROME	LAUNDRY ROOM	-
MB-1	MOP SINK - 24"x36"	FIAT	MSB-2436	FIAT #830-AA	CAST IRON	-	-	WHITE/POLISHED CHROME	HOUSEKEEPING	PROVIDE FIAT PRODUCTS: #889-CC (CENTERLINE OF HANGER AT 60" AFF), #832-AA (CENTERLINE OF BRACKET AT 18" AFF), AND #MSG-2424
MB-2	MOP SINK - 24"x24"	FIAT	MSB-2424	FIAT #830-AA	CAST IRON	-	-	WHITE/POLISHED CHROME	HOUSEKEEPING	PROVIDE FIAT PRODUCTS: #889-CC (CENTERLINE OF HANGER AT 60" AFF), #832-AA (CENTERLINE OF BRACKET AT 18" AFF), AND #MSG-2424
OB-1	OUTLET BOX - WASHING MACHINE	GUY GREY	B200	-	CAST IRON	1/2" QUARTER TURN SUPPLIES	-	STAINLESS STEEL	LAUNDRY	-
OB-2	OUTLET BOX - COLD WATER	GUY GREY	BIM875QTS	-	CAST IRON	1/2" QUARTER TURN SUPPLIES	-	STAINLESS STEEL	CAFE	-
RD-1	ROOF DRAIN - PRIMARY	JAY R. SMITH	1010Y	-	CAST IRON	-	-	CAST IRON	PRIMARY ROOF DRAIN	CAST IRON DOME
RD-2	ROOF DRAIN - OVERFLOW	JAY R. SMITH	1080Y	-	CAST IRON	-	-	CAST IRON	OVERFLOW ROOF DRAIN	CAST IRON DOME, 2 1/2" WATER DAM
S-1	SINK - DOUBLE BOWL	ELKAY	LR3321	AMERICAN STANDARD #4205.001.F15, 1.5 GPM	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	POLISHED CHROME	APARTMENTS, LOUNGES	-
S-2	SINK - TRIPLE BOWL	BY OTHERS	-	FAUCET PROVIDED BY OTHERS, INSTALLED BY PLUMBING CONTRACTOR.	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	STAINLESS STEEL	CAFE	P.C. SHALL MAKE CONNECTIONS.
S-3	SINK - SINGLE	BY OTHERS	-	FAUCET PROVIDED BY OTHERS, INSTALLED BY PLUMBING CONTRACTOR.	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	STAINLESS STEEL	CAFE	P.C. SHALL MAKE CONNECTIONS.
S-4	SINK - SINGLE	ELKAY	DI-1-35	AMERICAN STANDARD #4205.001.F15, 1.5 GPM	18 GAUGE 1 1/4" x 1 1/2" CHROME PLATED P-TRAP	BRASS CRAFT #HSR1712A-C HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	STAINLESS STEEL	MAINTAINENCE	-
SH-1	SHOWER FAUCET, DRAIN	FIXTURE BY OTHERS	-	AMERICAN STANDARD #1660.733 1.5 GPM/2 GPM, CHROME	DRAIN PROVIDED BY OTHERS. PROVIDE PIPING FROM DRAIN.	WALL SUPPLY WITH 1/2" NPT FEMALE INLET AND 1/2" NPSM MALE OUTLET, 3-FUNCTION SHOWER	-	POLISHED CHROME	SHOWERS	FAUCET DEFAULTS TO 1.5 GPM, END USER ADJUSTS UP TO 2.0 GPM AS NEEDED.
SH-1H	HANDHELD FAUCET, DRAIN	FIXTURE BY OTHERS	-	AMERICAN STANDARD #1660.743 1.5 GPM/2 GPM, CHROME, HAND-HELD SHOWER, SLIDE BAR, VACUUM BREAKER.	DRAIN PROVIDED BY OTHERS. PROVIDE PIPING FROM DRAIN.	WALL SUPPLY WITH 1/2" NPT FEMALE INLET AND 1/2" NPSM MALE OUTLET, 59" METAL SHOWER HOSE, VACUUM BREAKER, 3-FUNCTION WATER-SAVING PERSONAL SHOWER AND A 36" SLIDE BAR	-	POLISHED CHROME	SHOWERS	FAUCET DEFAULTS TO 1.5 GPM, END USER ADJUSTS UP TO 2.0 GPM AS NEEDED.
SH-2H	HANDHELD FAUCET, DRAIN	FIXTURE BY OTHERS	-	AMERICAN STANDARD #1660.743 1.5 GPM/2 GPM, CHROME, HAND-HELD SHOWER, SLIDE BAR, VACUUM BREAKER.	DRAIN PROVIDED BY OTHERS. PROVIDE PIPING FROM DRAIN.	WALL SUPPLY WITH 1/2" NPT FEMALE INLET AND 1/2" NPSM MALE OUTLET, 59" METAL SHOWER HOSE, VACUUM BREAKER, 3-FUNCTION WATER-SAVING PERSONAL SHOWER AND A 36" SLIDE BAR	-	POLISHED CHROME	SHOWERS	FAUCET DEFAULTS TO 1.5 GPM, END USER ADJUSTS UP TO 2.0 GPM AS NEEDED.
U-1	URINAL - MANUAL FLUSH VALVE	AMERICAN STANDARD	6590.503	PINT FLUSH VALVE	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH #0614	WHITE	PUBLIC RESTROOMS AT CLASSROOMS	WASHBROOK, 0.125 GPF
U-1H	URINAL - MANUAL FLUSH VALVE	AMERICAN STANDARD	6590.503	PINT FLUSH VALVE	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH #0614	WHITE	PUBLIC RESTROOMS AT CLASSROOMS	WASHBROOK, 0.125 GPF
WC-1L	WATER CLOSET - TANK	AMERICAN STANDARD	2835.128	LEFT HAND TRIP LEVER	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	WHITE	GENERAL	1.28 GPF, BEMIS OR OLSONITE OPEN FRONT SEAT WITH LID
WC-1R	WATER CLOSET - TANK	AMERICAN STANDARD	2835.128	RIGHT HAND TRIP LEVER	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	WHITE	GENERAL	1.28 GPF, BEMIS OR OLSONITE OPEN FRONT SEAT WITH LID
WC-2R	WATER CLOSET - TANK, REAR DISCHARGE	AMERICAN STANDARD	2878.100	RIGHT HAND TRIP LEVER	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	-	WHITE	GENERAL	1.1 GPF, PRESSURE ASSIST, BEMIS OR OLSONITE OPEN FRONT SEAT WITH LID
WC-3	WATER CLOSET - WALL MOUNT, FLUSH VALVE	AMERICAN STANDARD	2859.128	SLOAN REGAL #111-1.28, 1.28 GPF, MANUAL	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH	WHITE	PUBLIC RESTROOMS AT CLASSROOMS	1.28 GPF MANUAL FLUSH VALVE, BEMIS OR OLSONITE OPEN FRONT SEAT LESS LID
WC-3H	WATER CLOSET - WALL MOUNT, FLUSH VALVE	AMERICAN STANDARD	2859.128	SLOAN REGAL #111-1.28, 1.28 GPF, MANUAL	INTEGRAL TRAP	BRASS CRAFT #HSR1712DLC HEAVY PATTERN LOOSE KEY SUPPLY STOPS	J.R. SMITH	WHITE	PUBLIC RESTROOMS AT CLASSROOMS	1.28 GPF MANUAL FLUSH VALVE, BEMIS OR OLSONITE OPEN FRONT SEAT LESS LID



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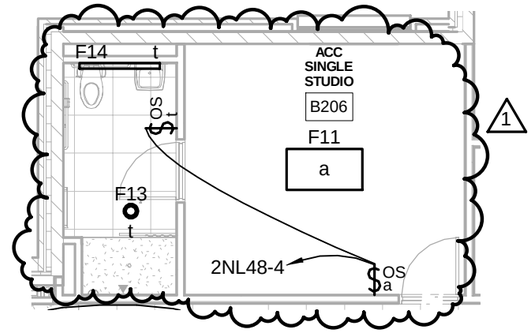

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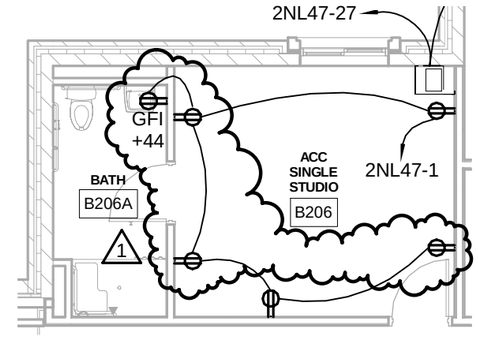

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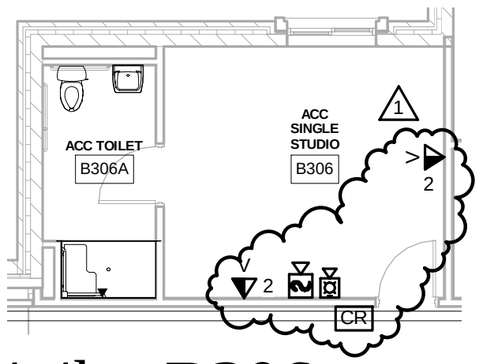

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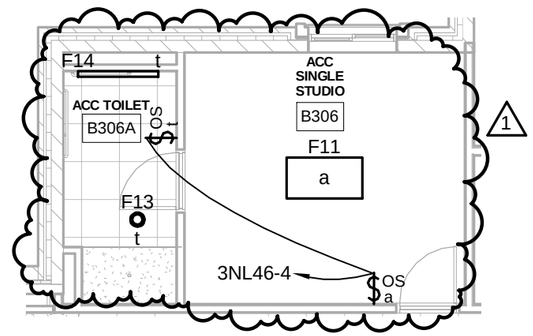

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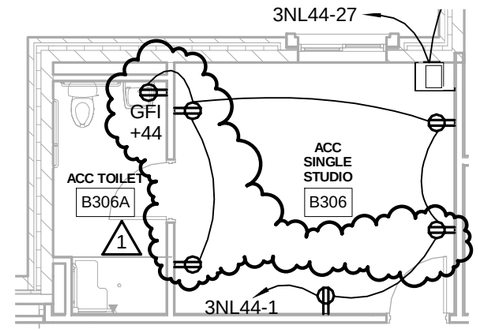

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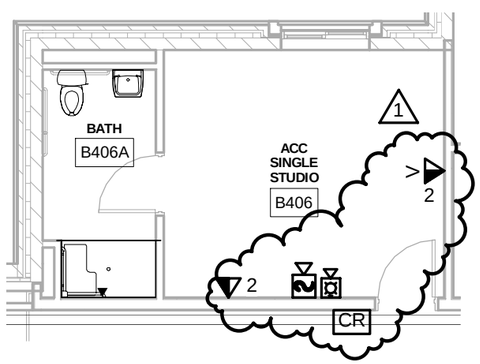

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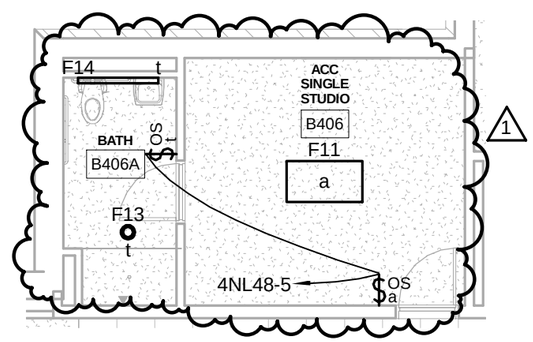

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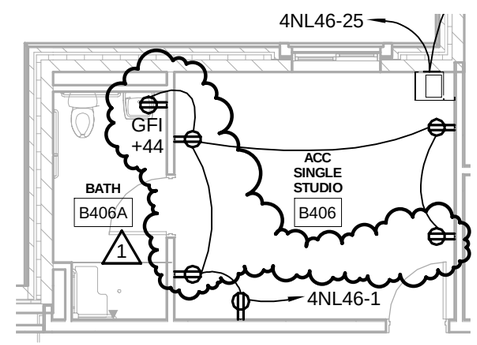

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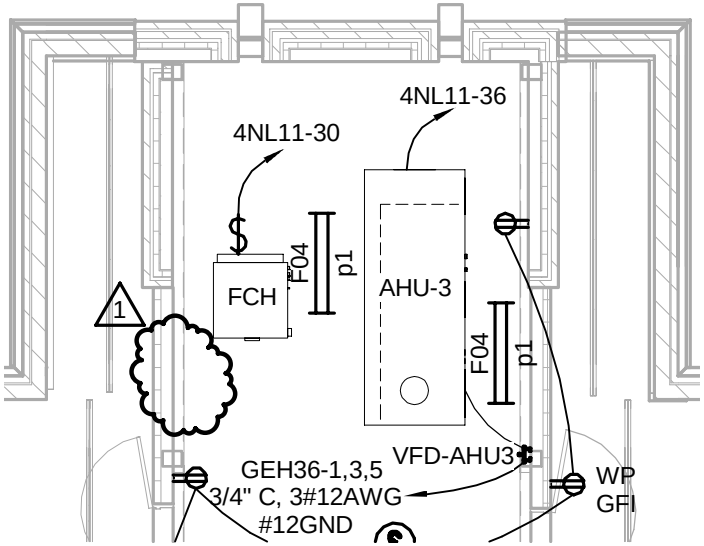

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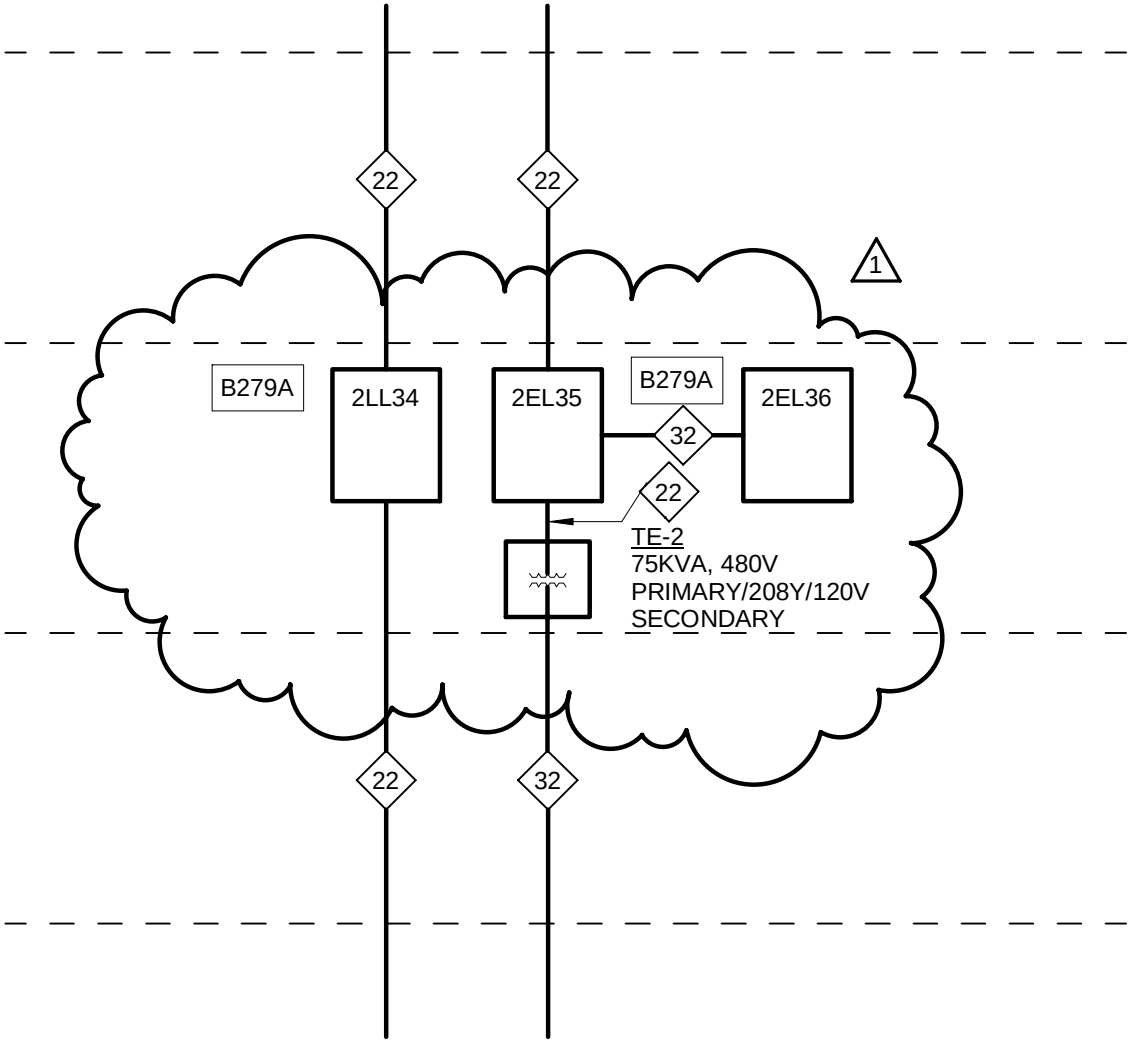

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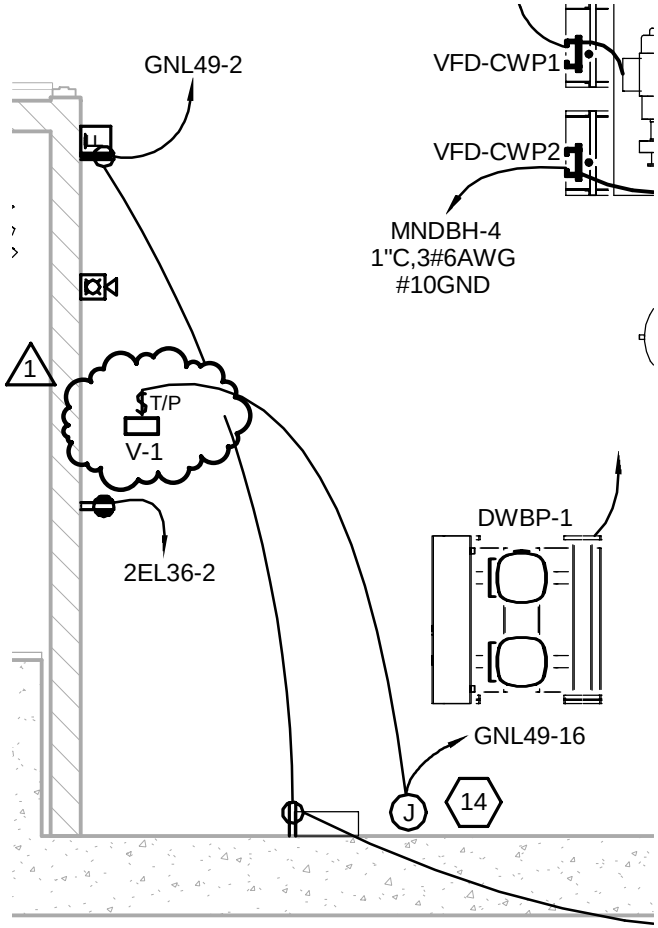

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