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ADDENDUM NO. 02

Issued: 12.15.23

Project: Ridgeview Elementary School
701 Thornton Street, Liberty, Missouri 64068

Project No. 23026

Owner: Liberty Public Schools
8 Victory Lane
Liberty, MO 64068

Bidding Documents Issued: 11.30.23

This Addendum includes these 1 page and the following attachments:

Drawings:
Revised Architectural Sheets: A681
Refer to Henderson Engineers, MEP Addendum No. 2

DRAWINGS REVISIONS

A1 **SHEET A681** MATERIAL FINISH LEGEND AND ROOM SCHEDULE

A1.1 REVISED General finish notes to add Note 9 regarding Paint Touch-up

M1 **REFERENCE ATTACHED MEP ADDENDUM NO. 2**

E1 **REFERENCE ATTACHED MEP ADDENDUM NO. 2**

P1 **REFERENCE ATTACHED MEP ADDENDUM NO. 2**

T1 **REFERENCE ATTACHED MEP ADDENDUM NO. 2**

END OF ADDENDUM NO. 2

HENDERSON ENGINEERS

ADDENDUM NO 02

December 15, 2023

ISSUED BY
Henderson Engineers, Inc.
8345 Lenexa Dr.
Lenexa, KS 66214

ISSUED FOR
Hollis + Miller
1828 Walnut Street Suite 922
Kansas City, MO 64108

NOTICE TO ALL BIDDERS FOR THE
Liberty Public Schools Ridgeview Elementary School

You are instructed to read and to note the following described changes, corrections, clarifications, omissions, deletions, additions, approvals, and statements pertinent to the Contract Bid and Construction Documents.

This addendum is part of the Contract Bid and Construction Documents and shall govern in the performance of the Work.

DRAWINGS

MECHANICAL

1. Sheet M-201C – PIPING LEVEL 1 PLAN – AREA C
   A. Added heating water bypass valve and chilled water bypass valve.
   B. Added plan note M41and M42.
2. Sheet M-401 – MECHANICAL SCHEDULES
   A. Revised AHU Schedule for AHU-1 and AHU-6 to have 2-way valves.
3. Sheet M-500 – MECHANICAL DETAILS
   A. Removed detail 6 – 3-Way hydronic control valve.
4. Sheet M-601 – MECHANICAL CONTROLS
   A. Added Dehumidification control points.
   B. Added title for Single Zone AHU controls schematic.
5. Sheet M-602 – MECHANICAL CONTROLS
   A. Added title for Multizone AHU controls schematic.
6. Sheet M-603 – MECHANICAL CONTROLS
   A. Added bypass valve to sequence, controls schematic, and points list.
   B. Revised chilled water plant points list.
   C. Revised sequence of operations.
   D. Revised notes on the chiller plant load staging control matrix.
7. Sheet M-604 – MECHANICAL CONTROLS
   A. Added bypass valve to sequence, controls schematic, and points list.
   B. Revised heating hot water plant points list.
   C. Revised sequence of operations.

PLUMBING

1. Sheet P-103B – PLUMBING ROOF PLAN – AREA B
   A. Replaced the existing gas pressure regulators (GPR's) and showed more existing gas piping.
   B. Added plan note P12.
2. Sheet P-103C – PLUMBING ROOF PLAN – AREA C
   A. Replaced the existing gas pressure regulators (GPR's) and showed more existing gas piping.
   B. Added plan note P12.
3. Sheet P-301 – PLUMBING SCHEDULES & DETAILS
   A. Revised the Gas Pressure Regulator Schedule.

ELECTRICAL

1. Sheet ED102B – LIGHTING LEVEL 2 DEMO PLAN – AREA B
   A. Added removal of light switch in media center.
2. Sheet ED202A – POWER LEVEL 2 DEMO PLAN – AREA A
   A. Added removal of receptacles in conflict with new duct chases.
3. Sheet ED202B – POWER LEVEL 2 DEMO PLAN – AREA B
   A. Added removal of 2nd floor box in office.
   B. Added note to coordinate method of floor box removal.
4. Sheet E102B – LIGHTING LEVEL 2 PLAN – AREA B
   A. Revised lighting controls in Nurse B206 to including dimming.
   B. Added lighting to media center closet.
   C. Added replacement switch location for media center.
5. Sheet E202A – POWER LEVEL 2 PLAN – AREA A
   A. Added replacement receptacles on new chase walls.
6. Sheet E202B – POWER LEVEL 2 PLAN – AREA B
   A. Removed above counter receptacles in Reception B201.
   B. Added receptacle for undercounter fridge.
   C. Revised circuiting to accommodate receptacle changes.
   D. Revised connection for copier in Reception B201.
7. Sheet E500 – LIGHT FIXTURE SCHEDULE
   A. Added dimming lighting control devices.
   B. Added detail for connection of dimming lighting controls.
8. Sheet E600 – ELECTRICAL SCHEDULES
   A. Revised panel schedule LP to accommodate circuiting changes.

AUDIO-VIDEO

1. Sheet TA102B – AUDIO-VIDEO LEVEL 2 PLAN – AREA B
   A. Added connection box in classrooms A216 & A218.
   B. Revised Audio-Video Box Schedule.

TECHNOLOGY

1. Sheet TND102A – TECHNOLOGY LEVEL 2 DEMO PLAN – AREA A
   A. Added data devices to demolish in Classroom A216 and A218.
2. Sheet TND102B – TECHNOLOGY LEVEL 2 DEMO PLAN – AREA B
   A. Relocated data devices per site visit photos and changed phasing from existing to remain to demolish in Reception B201.
3. Sheet TN102A – TECHNOLOGY LEVEL 2 PLAN – AREA A
   A. Added data drops on new chase wall in Classroom A216 and A218.
4. Sheet TN102B – TECHNOLOGY LEVEL 2 PLAN – AREA B
   A. Devices that were previously shown as existing to remain are not shown as they are being demolished in Reception B201.

GENERAL FINISH NOTES

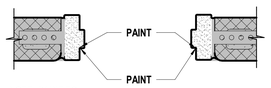
1. REFER TO FINISH FLOOR PLANS, REFLECTED CEILING PLANS, ELEVATIONS, AND DETAILS FOR EXTENT OF MULTIPLE FINISHES.
2. DO NOT PAINT NATURAL OR MANUFACTURED STONE, BRICK, GLAZED BLOCK OR ANY OTHER PREFINISHED MATERIALS.
3. DO NOT PAINT ALUMINUM OR OTHER NON-FERROUS METALS THAT ARE PREFINISHED.
4. MATCH VERTICAL FINISH OF ALL INTERIOR GYPSUM BOARD SOFFITS TO HORIZONTAL FINISH AS NOTED ON RCP OR ROOM FINISH SCHEDULE, UNO.
5. PAINT ALL EXPOSED CEILINGS DESIGNATED AS 'OTS' AS INDICATED ON ROOM FINISH SCHEDULE. PAINTING INCLUDES, BUT IS NOT LIMITED TO: EXPOSED STRUCTURE, JOISTS, METAL DECKING, EXISTING TECTUM PANELS, DUCTWORK AND MECHANICAL EQUIPMENT.
6. PAINT ALL EXPOSED STEEL, UNO.
7. PAINT ALL INTERIOR HOLLOW METAL DOORS AND FRAMES TO MATCH ADJACENT WALL, UNO.
8. PAINT OR FINISH THE FOLLOWING ITEMS TO MATCH ADJACENT PAINT OR FINISH:
   a. ELECTRICAL PANELS IN FINISHED ROOMS
   b. GRILLES, LOUVERS ETC. PRIMED OR SPECIFIED TO BE PAINTED
   c. UNFINISHED SPEAKER OUTLET GRILLES
   d. VISIBLE PORTIONS OF DUCTWORK AND MECH EQUIPMENT BEHIND VENTS, GRILLES AND DIFFUSERS
9. ALL GRID TOUCH-UP PAINT NOTED IN ROOM FINISH SCHEDULE IS TO BE TO 3" BELOW GRID HEIGHT, U.N.O. 2

MATERIAL FINISH LEGEND

MATERIAL	ID	KEYNOTE	MANUFACTURER	STYLE/MODEL NO	COLOR/FINISH	COMMENTS
Carpet	C1	09 68 13.A01	Mohawk Group	Side Stripe GT419	963 Heritage	Install Ashlar
Carpet	C1a	09 68 13.A01	Patcraft	Speak Your Language Studio	Speak in Color Black 00500	Match Existing Install
Carpet	C1b	09 68 13.A01	Tarkett	Crayon 01957	Precious Metal 40810	Match Existing Install
Carpet	C1C	09 68 13.A01	Salvaged Demo Stock			Match Existing Install
Ceiling	CLG1	09 51 13.A01	ARMSTRONG	1755 FINE FISSURED	WHITE (WH), 24X48	
Concrete Finish	CON1	03 30 00.A21			CLEAR SEAL CONCRETE FINISH	
Fabric	F1	10 21 23.A01	MAHARAM	CARRY 2, 511518	006 INHALE	
Floor (Poured) Topping	FT1	09 67 23.A01	DESCO	CREMONA TG	33% SW7653, 32% SW7018, 35%SW7625	INTEGRAL BASE
Floor (Poured) Topping	FT2	09 67 23.A01	DESCO	CEREMONA TG	MATCH EXISTING	INTEGRAL BASE
High Performance Coating	HP1	09 96 00	SHERWIN WILLIAMS		SW 7636 ORIGAMI WHITE	
Paint	P1	09 91 23	SHERWIN WILLIAMS		SW 7636 ORIGAMI WHITE	
Paint	P1A	09 91 23	SHERWIN WILLIAMS		MATCH EXISTING COLOR	
Paint	P2	09 91 23	SHERWIN WILLIAMS		SW 6246 NORTH STAR	
Plastic Laminate	PL2	12 30 00	WILSONART	5016-38	FRENCH LINEN	
Resilient Base & Accessories	RB1	09 65 13.A01	ROPPE	700 SERIES 4" BASE	100 BLACK	
Resilient Flooring	RF1	09 65 19.A01	INTERFACE	BRUSHED LINES	A01604 GALENA	INSTALL ASHLAR
VCT	RT1	09 65 19.A01	ARMSTRONG	VCT, 12x12	51874, GRAYED BLUE	Match Existing Install, Install per manufacturer recommendations and standards
Simulated Stone	SS1	12 36 66	CORIAN	SOLID SURFACE	EVEREST	
Tile	T1	09 30 00.A01	DALTILE	COLORWHEEL 6X6	ARCTIC WHITE 0790	
Tile	T2	09 30 00.A01	DALTILE	COLORWHEEL MOSIACS	CURRANT HERRINGBONE SH17, 1X3	
Trim	TR1	09 30 00.A04	SCHLUTER	SCHIENE		
Trim	TR2	06 40 23.A24	Fry Reglet	MILLWORK TRIM - L CHANNEL	3/4", MWCL75, ANODIZED ALUMINUM	
Window Film	WF1	08 80 00.A93	3M	Matte SH2MAOW 1250, Opaque White	OPAQUE WHITE	

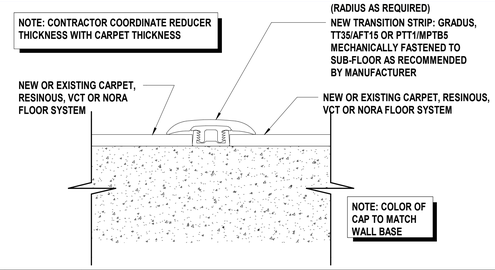
ROOM FINISH SCHEDULE

ROOM		FLOOR		WALLS				CEILING	
NO	Name	Finish	Base	North	East	South	West	Finish	Finish Remarks
A114	RESOURCE	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
A116	RESOURCE	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
A216	CLASSROOM	C1b	RB1	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
A218	CLASSROOM	C1b	RB1	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
B112	TEACHER'S LOUNGE	RE E5/A401B	RB1	EXIST P1A @ GRID TOUCH-UP	P1A	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
B112a	TLT	FT1	FT1	HP1	T1/T2	HP1	HP1	CLG1	
B113	GIRL'S	FT1	FT1	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	RE ELEV	CLG1	
B200	CORRIDOR	EXIST	EXIST	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	CLG1	PAINT SCOPE IS TOUCHUP ONLY AT CEILING GRID TRANSITION
B201	Reception	C1	RB1	P1	P1	P1	P1	CLG1	
B202	Office	C1	RB1	P1	P1	P1	P1	CLG1	
B203	Office	C1	RB1	P1	P1	P1	P1	CLG1	
B204	Office	C1	RB1	P1	P1	P1	P1		
B205	Meeting	RF1	RB1	P1	P1	P1	P1	CLG1	
B206	Nurse	FT1	FT1	P2	P2	P2	P2	CLG1	
B206a	RR	FT1	FT1	HP1	RE ELEV	HP1	HP1	CLG1	
B208	RR	FT1	FT1	HP1	HP1	HP1	RE ELEV	CLG1	
B209	Lactation	FT1	FT1	HP1	HP1	HP1	HP1	CLG1	
B210	BOY'S	FT1	FT1	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	CLG1	
B214	GIRL'S	FT1	FT1	RE ELEV	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	T1 7'-0"/HP1 ABOVE	CLG1	
B215	CLASSROOM	C1C	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C104	CLASSROOM	C1a	RB1	P1A	P1A	P1A	P1A	RE RCP	ENTIRE ROOM TO RECIEVE NEW FLOOR, BASE AND PAINT
C105	CONF.	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C106	CLASSROOM	C1C	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C107	CLASSROOM	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C108	CLASSROOM	C1a	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C109	RESOURCE	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C109a	RESOURCE	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C110	RESOURCE	C1a	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C112	CORRIDOR	EXIST	EXIST	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C204	CLASSROOM	C1a	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C205	CLASSROOM	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C206	RESOURCE	C1a	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C207	CLASSROOM	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C208	CLASSROOM	C1a	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C209	CLASSROOM	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C210	CLASSROOM	RT1	RB1	P1A	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C211	CLASSROOM	C1C	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK
C213	RESOURCE	C1a	RB1	EXIST P1A @ GRID TOUCH-UP	EXIST P1A @ GRID TOUCH-UP	P1A	EXIST P1A @ GRID TOUCH-UP	RE RCP	RE: G1/A403 FOR EXTENTS OF FLOORING & BASE WORK



NOTE: PAINT TO TRANSITION AT DOOR THROAT

A1 Scale 1 1/2" = 1'-0" — HM Jamb Frame Finish Where Noted



A4 Scale 12" = 1'-0" — Flooring Reducer Strip Detail

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Missouri State Certificate of Authority
Architecture # 0000161

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816.663.8700 phone

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

KEVIN E. NELSON
A-2019015618
STATE OF MISSOURI
ARCHITECT
DECEMBER 14, 2023
Kevin E. Nelson
A-2019015618

JOB NO: 23026
DRAWN BY: NR
CHECKED BY: JB
DATE: 11.22.2023

A681

12/14/2023 11:57:53 AM

MATERIAL FINISH LEGEND AND ROOM SCHEDULE

LIGHTING DEMOLITION GENERAL NOTES:

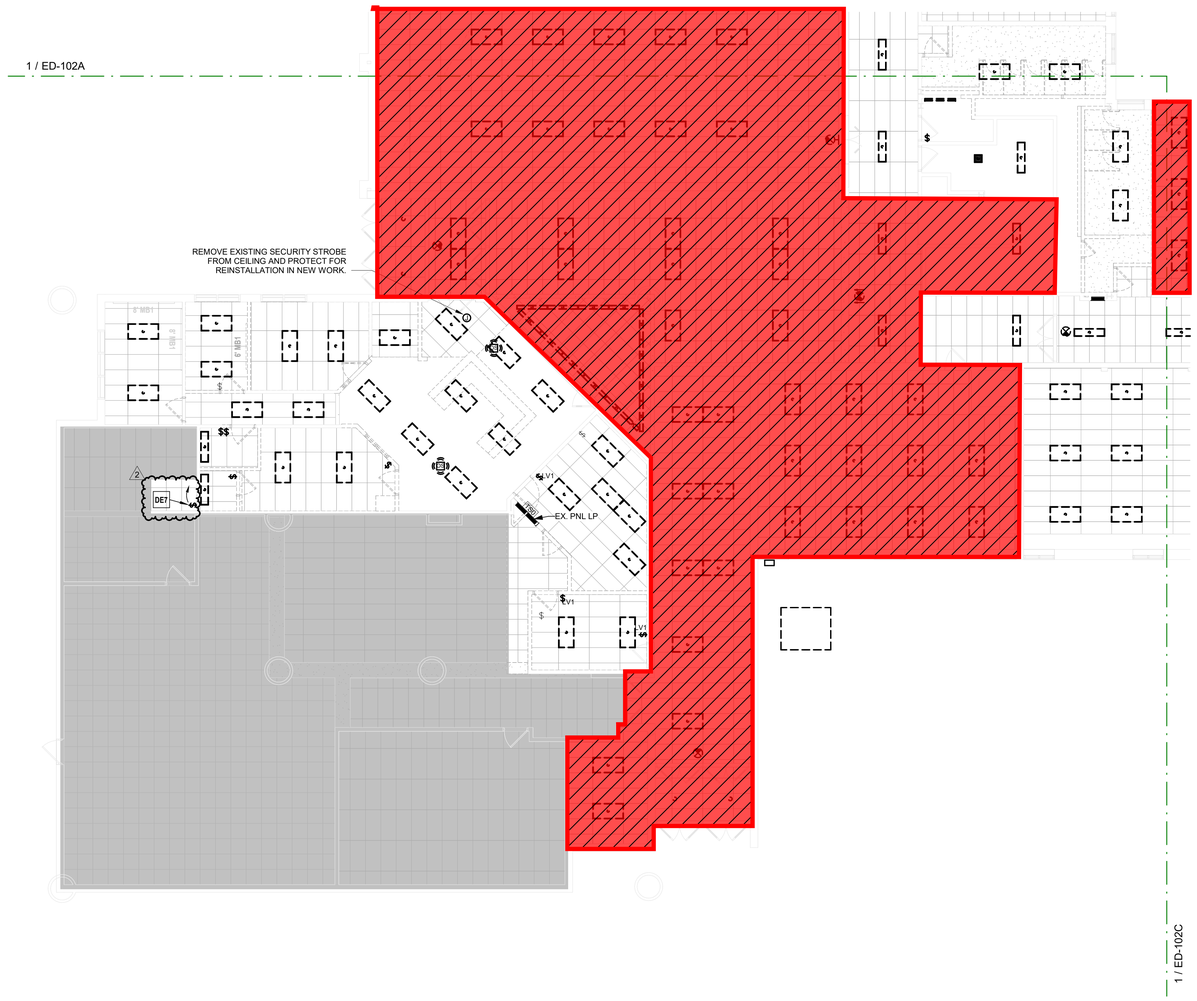
1. ALL EXISTING ROOM/CORRIDOR LIGHTING CIRCUITRY SHALL REMAIN FOR REUSE UNLESS NOTED OTHERWISE. REFER TO NEW WORK LIGHTING PLANS FOR ADDITIONAL REQUIREMENTS.

2

ELECTRICAL DEMOLITION PLAN NOTES:

DE7 RELOCATE EXISTING SWITCH TO NEW LOCATION TO ALLOW FOR NEW DOOR. REFER TO NEW WORK PLANS FOR MORE INFORMATION.

= Phase 2 Scope of Work
(Not included in this Bid Package)



1 LIGHTING LEVEL 2 DEMO PLAN - AREA B
1/8" = 1'-0"

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HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

Henderson Engineers
Mechanical/Electrical Engineers
Missouri #e-556D
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816.663.8700 phone

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8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
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MO. CORPORATE NO: E-556D
EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

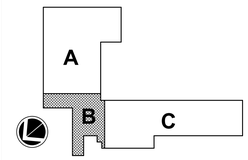
STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: HMD
CHECKED BY: ASM
DATE: 11.22.2023

KEY PLAN



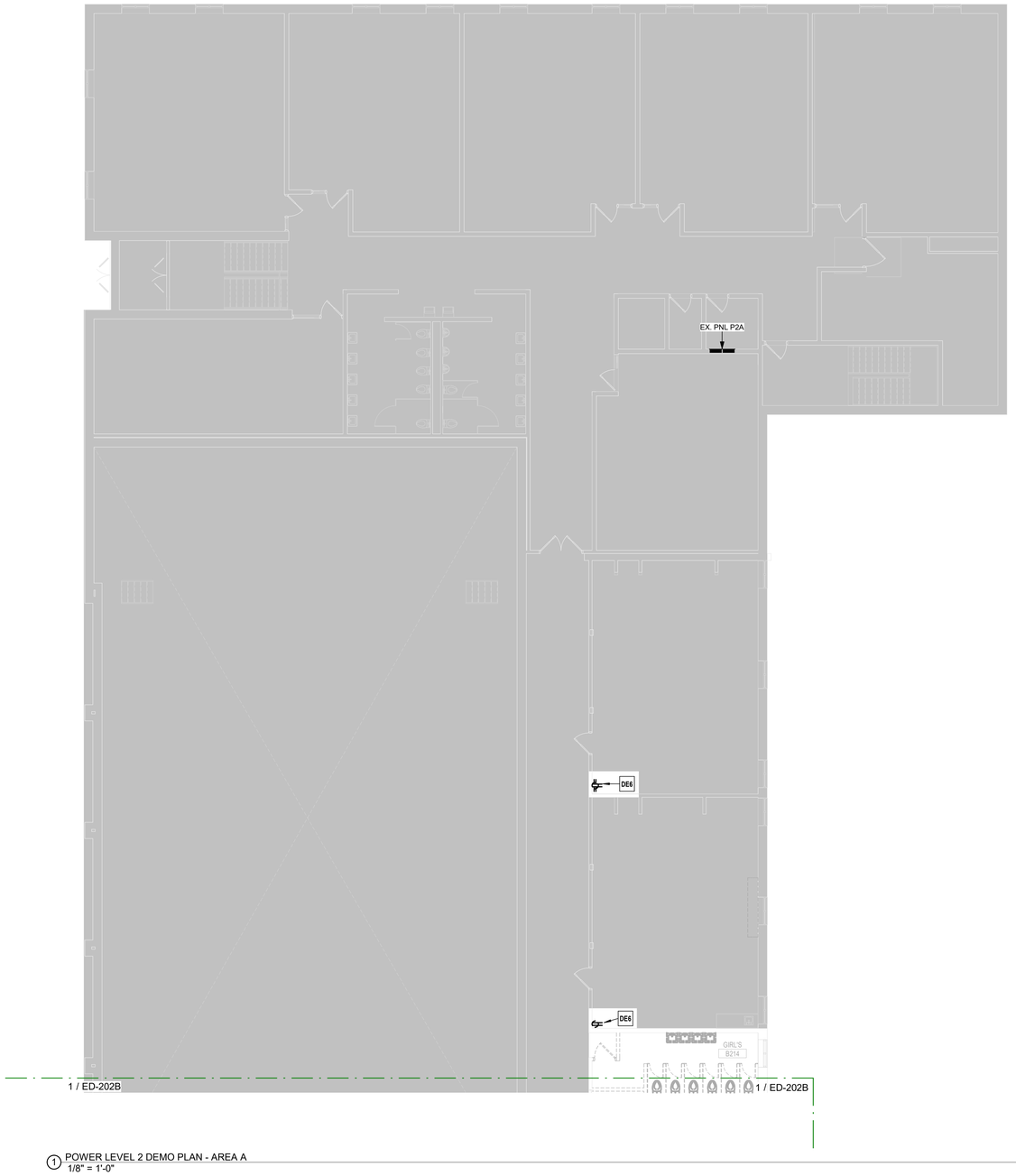
ED-102B

LIGHTING LEVEL 2 DEMO PLAN - AREA B

12/13/2023 4:09:46 PM
DOUGLAS M. EVERHART

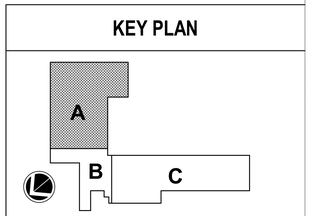
☐ ELECTRICAL DEMOLITION PLAN NOTES:

DE6 REMOVE RECEPTACLE AND ASSOCIATED CONNECTION TO ABOVE ACCESSIBLE CEILING TO ALLOW FOR INSTALLATION OF REPLACEMENT IN SAME GENERAL LOCATION. REFER TO NEW WORK PLANS FOR MORE INFORMATION.



1 POWER LEVEL 2 DEMO PLAN - AREA A
1/8" = 1'-0"

ENTIRE SHEET ADDED 2



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EXPIRES 10/31/2024

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REVISIONS:

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2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

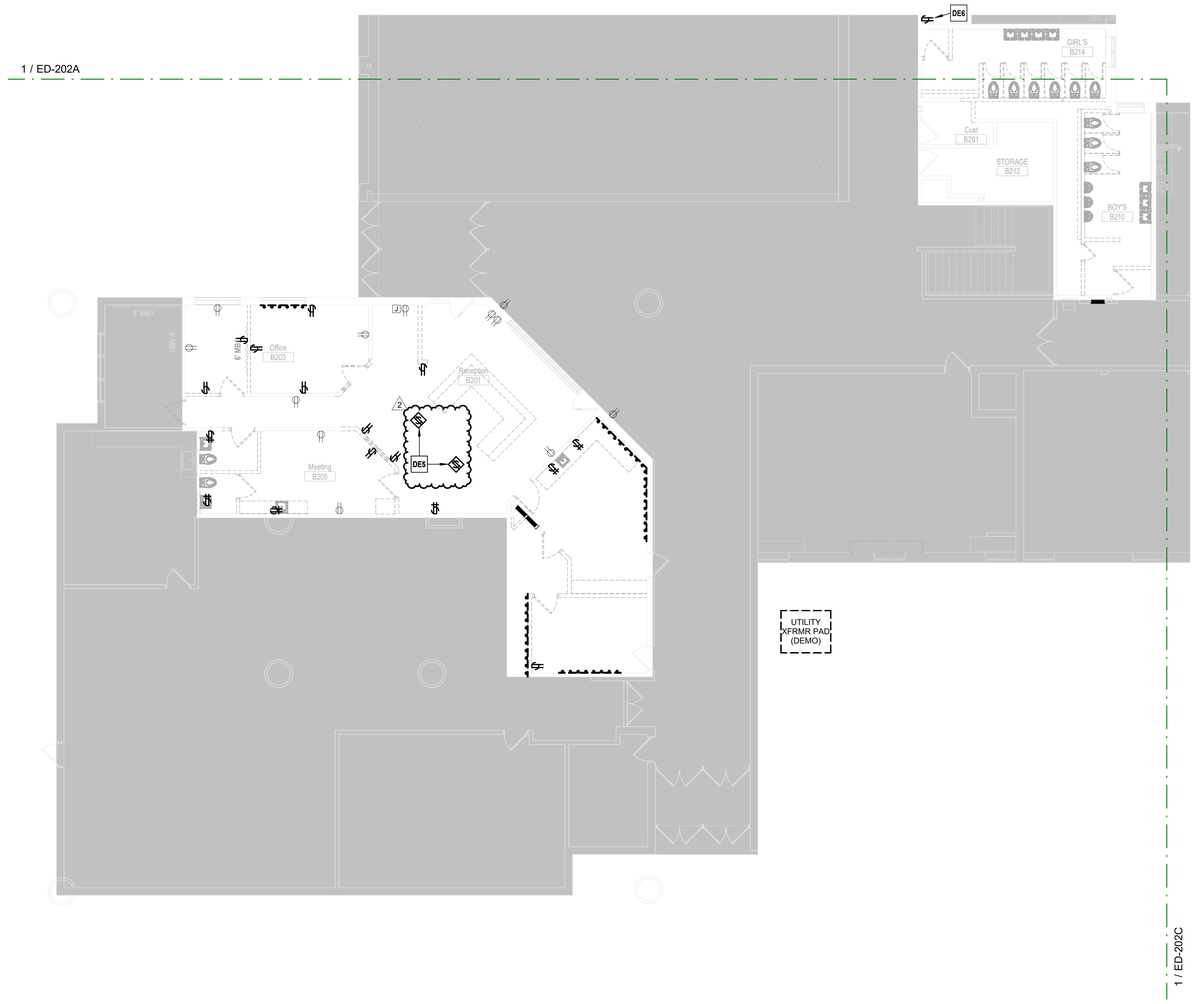
12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: ASM
CHECKED BY: HMD
DATE: 11.22.2023

ED-202A

POWER LEVEL 2 DEMO PLAN - AREA A



1 POWER LEVEL 2 DEMO PLAN - AREA B
1/8" = 1'-0"

2 **ELECTRICAL DEMOLITION PLAN NOTES:**

DES COORDINATE REMOVAL METHOD OF EXISTING FLOOR BOXES WITH ARCHITECT AND FINAL FLOOR FINISHES PRIOR TO BID.

DE6 REMOVE RECEPTACLE AND ASSOCIATED CONNECTION TO ABOVE ACCESSIBLE CEILING TO ALLOW FOR INSTALLATION OF REPLACEMENT IN SAME GENERAL LOCATION. REFER TO NEW WORK PLANS FOR MORE INFORMATION.

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100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

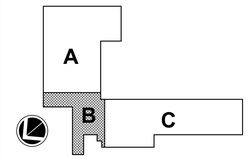
STATE OF MISSOURI
DOUGLAS M. EVERHART
PE-2019007648
PROFESSIONAL ENGINEER

12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: ASM
CHECKED BY: HMD
DATE: 11.22.2023

KEY PLAN



ED-202B

POWER LEVEL 2 DEMO PLAN - AREA B

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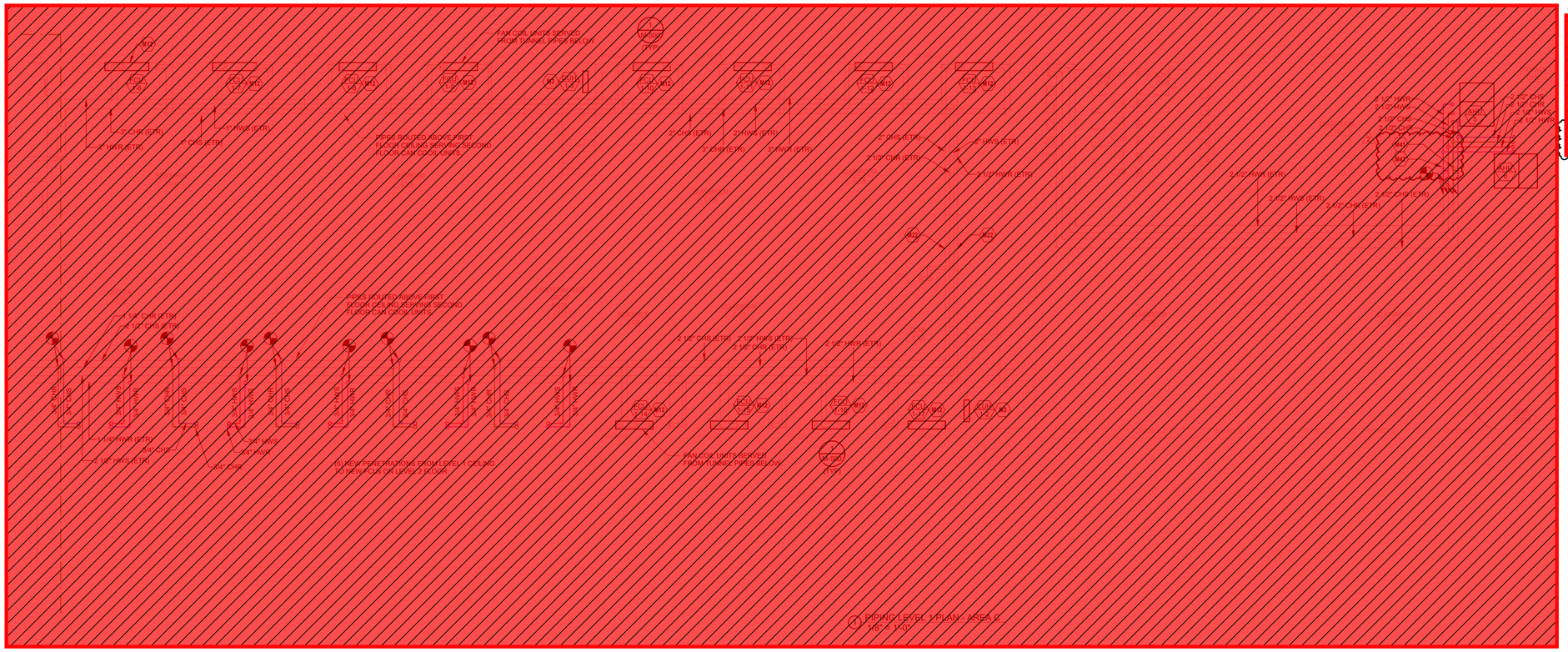
DOUGLAS M. EVERHART



MECHANICAL PLAN NOTES:

M1 INSTALL NEW CABINET UNIT HEATERS AND TEMPERATURE SENSOR IN SAME LOCATIONS AS UNIT HEATERS TO BE REMOVED. REPLACE CONTROLWIRE IN NECESSARY ROUTE TO REPLACE VERIFY MOUNTING TYPE AND TEMPERATURE CONTROL LOCATION TO MATCH EXISTING. RELOCATE PIPE PENETRATION LOCATIONS AS NECESSARY TO MATCH NEW UNIT CONNECTION LOCATIONS.

M2 POWER THE (2) NEW UNIT HEATERS FROM (2) NEW UNIT HEATING HOT WATER PIPES. PROVIDE ANY ADDITIONAL PIPING AS REQUIRED TO MAKE THE CONNECTION FROM THE NEW UNIT HEATER TO THE EXISTING PIPING. PROVIDE ANY UNINSULATED PIPING WITH INSULATION.

M3 INSTALL NEW CONTROL VALVE AND ACTUATOR ON THE 2" LOCATION OF THE CIRCUIT WATER BYPASS VALVE. PROVIDE PIPING, VALVE, STRAINER, AND ACTUATOR AT THE 1-1/4" LOCATION OF THE HEATING WATER BYPASS VALVE.

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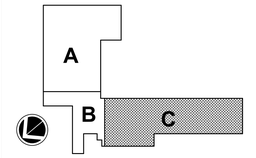
KELLEY P. CRAMM
NUMBER E-22323
REGISTERED PROFESSIONAL ENGINEER
STATE OF MISSOURI

12/13/2023

KELLEY P. CRAMM
LICENSE # E-022323

KEY PLAN



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M-201C

PIPING LEVEL 1 PLAN - AREA C

AIR HANDLING UNIT SCHEDULE (CHILLED WATER COOLING, HOT WATER HEATING)

			SUPPLY FAN									CHILLED WATER COOLING COIL												HEATING HOT WATER HEATING COIL																
UNIT#	TRANE MODEL	TYPE	FAN TYPE	DRIVE	BHP	MOTOR HP	MOTOR VOLTAGE	VFD	PHASE	TOTAL MBH	SENSIBLE MBH	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	MAX VFD (%)	FLOW (GPM)	ENT (°F)	LVG (°F)	MAX VFD (%)	MAX ΔP (ft)	MAX ΔP (PSI)	ROWS	NO OF CKTS	CAP (MBH)	EAT (°F)	LAT (°F)	FLOW (GPM)	ENT (°F)	LVG (°F)	MAX VFD (%)	MAX ΔP (PSI)	ROWS	CV	MIN OA (CFM)	MIN OA (%)	24 VOLT TEMP. MANUF. TEST	VALVE TYPE	VALVE WEIGHT (LBS)	NOTES
AHU-1	UCEA060	SZ VAV	FC	5HP	3.74	5	230	Yes	3	208.9	157.1	80.0	66.2	55.0	54.2	100	41.8	44	55	100	2.12	0.9	4	1	405.2	55.0	80.0	28	140	150	2.34	0.7	4	1,125	15%	225	20	2 WAY	150	ASLEEP	1
AHU-2	UCEA060	SZ VAV	FC	5HP	3.74	5	230	Yes	3	208.9	157.1	80.0	66.2	55.0	54.2	100	41.8	44	55	100	2.12	0.9	4	1	405.2	55.0	80.0	28	140	150	2.34	0.7	4	1,125	15%	225	20	2 WAY	150	ASLEEP	1
AHU-3	UCEA060	SZ VAV	FC	5HP	3.74	5	230	Yes	3	208.9	157.1	80.0	66.2	55.0	54.2	100	41.8	44	55	100	2.12	0.9	4	1	405.2	55.0	80.0	28	140	150	2.34	0.7	4	1,125	15%	225	20	2 WAY	150	ASLEEP	1
AHU-4	UCEA120	SZ VAV	FC	10HP	9.01	10	208 V	Yes	3	320.0	240.0	80.0	66.2	55.0	54.2	100	64.1	44	55	100	2.39	1.0	4	1	621.1	55.0	80.0	43	140	150	2.34	0.7	4	1,725	15%	345	20	2 WAY	150	ASLEEP	1
AHU-5	UCEA120	SZ VAV	FC	10HP	9.01	10	208 V	Yes	3	320.0	240.0	80.0	66.2	55.0	54.2	100	64.1	44	55	100	2.39	1.0	4	1	621.1	55.0	80.0	43	140	150	2.34	0.7	4	1,725	15%	345	20	2 WAY	150	ASLEEP	1
AHU-6	UCEA120	SZ VAV	FC	10HP	9.01	10	208 V	Yes	3	320.0	240.0	80.0	66.2	55.0	54.2	100	64.1	44	55	100	2.39	1.0	4	1	621.1	55.0	80.0	43	140	150	2.34	0.7	4	1,725	15%	345	20	2 WAY	150	ASLEEP	1

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
B. CHILLED WATER COIL PERFORMANCE WITH 30% GLYCOL.
C. FACTORY MOUNTED VARIABLE FREQUENCY DRIVE.
D. PROVIDE SHAFT GROUNDING SYSTEM ON MOTOR. REFER TO MOTOR SPECIFICATION FOR ADDITIONAL INFORMATION.
E. PROVIDE SINGLE POINT POWER CONNECTION.
F. SPECIFIED FAN RPM ACCOUNTS FOR DUCT LOSSES BETWEEN TO UNIT, FILTER LOSSES, UNIT INLET AND OUTLET CASING LOSSES.
G. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP. (Row Breathe Note 9)
H. DIVISION 26 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN RETURN AIR AND SUPPLY AIR DUCTS.
I. UNIT SHALL BE FROM TRANE CONFIGURATOR.
J. DIVISION 23 TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE CONTROL VALVE.
K. SELECT EQUIPMENT FOR ELEVATION OF 700 FEET ABOVE SEA LEVEL.
L. PROVIDE UNITS WITH 4" ISOLATION MOUNTING AND ALL THREAD HANGING RODS.
M. VARIABLE FREQUENCY DRIVES FURNISHED BY DIVISION 26 CONTRACTOR.

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LICENSE # E-022323

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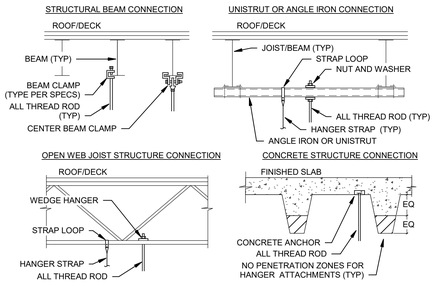
M-401

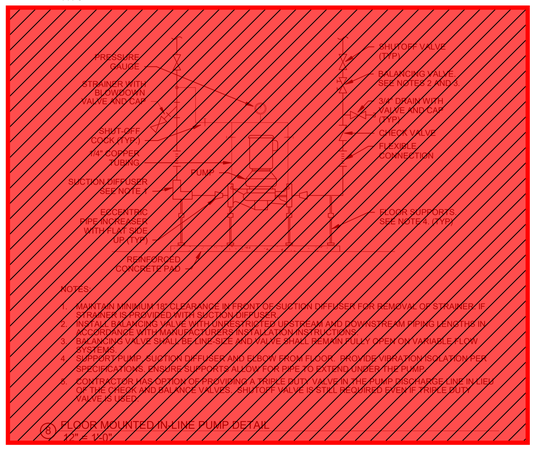
MECHANICAL SCHEDULES



NOTES:

1. ALL ATTACHMENTS SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND SHALL BE APPROVED FOR THE SPECIFIC APPLICATION.
2. COORDINATE ALL ATTACHMENTS WITH ARCHITECT AND STRUCTURAL ENGINEER.
3. REFER TO SPECIFICATIONS FOR MORE INFORMATION ON APPROVED ATTACHMENT METHODS.
4. REFER TO SPECIFICATIONS FOR REQUIREMENTS RELATING TO SEISMIC INSTALLATIONS.
5. FOR OPEN WEB JOIST STRUCTURE, CONTRACTOR MAY HANG FROM TOP CHORD AND RUN DUCT AND PIPING THROUGH WEB JOIST WHEN APPROPRIATE. ANY CONCENTRATED LOADS NOT OCCURRING AT JOIST PANEL POINTS MUST BE REVIEWED BY A STRUCTURAL ENGINEER FOR FIELD INSTALLED PANEL BRACE REQUIREMENTS.

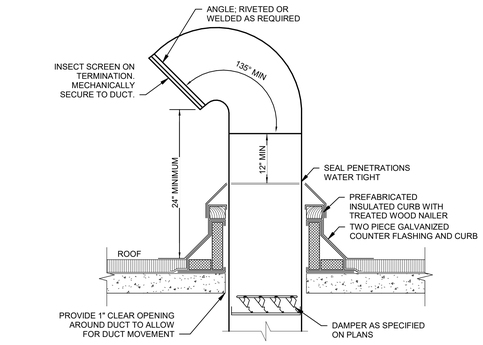
4 HANGER UPPER ATTACHMENT DETAILS
NTS



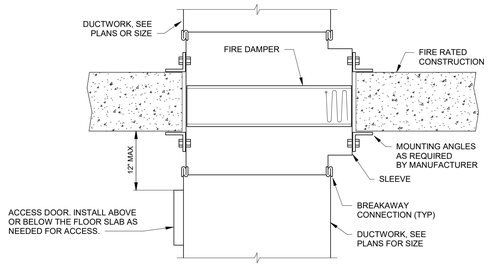
NOTES:

1. MAINTAIN MINIMUM RECOMMENDED STRAIGHT PIPE LENGTH OF SUCTION DIFFUSER FOR BEST PUMP OR STRAINER IS PROVIDED WITH SUCTION DIFFUSER.
2. INSTALL BALANCING VALVE WITH UNRESTRICTED STRAIGHT PIPE UPSTREAM AND DOWNSTREAM PIPING LENGTHS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. BALANCING VALVE SHALL BE ONE SIZE AND VALVE SHALL REMAIN FULLY OPEN ON VARIABLE FLOW SYSTEMS.
4. SUPPORT PUMP SUCTION DIFFUSER AND ELBOW FROM FLOOR. PROVIDE VIBRATION ISOLATION PER SPECIFICATIONS. ENSURE SUPPORTS ALLOW FOR PIPE TO EXTEND UNDER THE PUMP.
5. CONTRACTOR HAS OPTION OF PROVIDING A TRIPLE DUTY VALVE IN THE PUMP DISCHARGE LINE IN LIEU OF THE CHECK AND BALANCE VALVES. SHUTOFF VALVE IS STILL REQUIRED EVEN IF TRIPLE DUTY VALVES USED.

4 FLOOR MOUNTED IN-LINE PUMP DETAIL
12" = 1'-0"



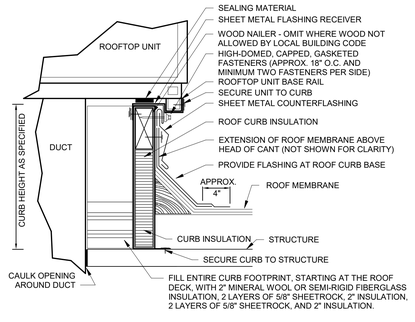
7 ROOF GOOSENECK DETAIL
NTS



NOTES:

1. INSTALL DAMPER PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS.
2. MAKE PENETRATION OPENING 1/8" PER FOOT LARGER THAN DAMPER DIMENSIONS WITH MINIMUM 1/4" REQUIRED, MAXIMUM 1".
4. INSTALL ACCESS DOOR (WHEN REQUIRED) ABOVE OR BELOW AS NEEDED FOR ACCESS IN ACCORDANCE WITH NFPA REQUIREMENTS.
5. FRAME OUT OPENINGS FOR MULTIPLE SECTION INSTALLATIONS OR PROVIDE FALSE MULLIONS TO SUPPORT MULTIPLE SECTION INSTALLATIONS PER MANUFACTURER'S RECOMMENDATIONS.

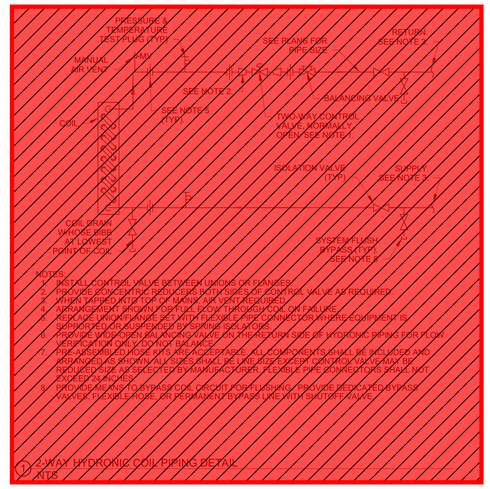
3 FIRE DAMPER IN FLOOR DETAIL
NTS



NOTES:

1. CUT METAL DECKING TO ALLOW CURB INSTALLATION ON STEEL FRAMING. AFTER CURB IS SET IN PLACE, TRIM REMAINING METAL DECKING AND INSTALL WITHIN CURB. TACK WELD DECKING TO SUPPORT STEEL. DO NOT WELD INTERIOR DECKING TO ROOF CURB. PROVIDE ADDITIONAL CROSS FRAMING TO SUPPORT INTERIOR DECKING AND FILL MATERIAL AS REQUIRED.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.

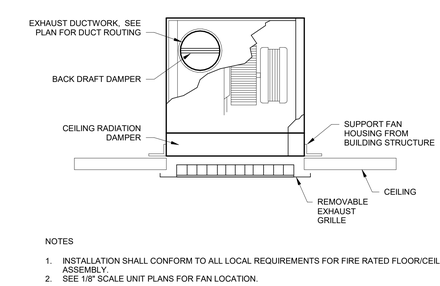
2 ROOF CURB DETAIL
NTS



NOTES:

1. INSTALL CONTROL VALVE BETWEEN UNION AND COIL.
2. PROVIDE CONTROL VALVE WITH BOTH SPRING RETURN AND CONTROL VALVE AIR REQUIRED.
3. WHEN PIPED INTO TOP OF MAINS, AIR VENT REQUIRED.
4. ARRANGEMENT SHOWN IS FOR TWO-WAY CONTROL VALVE ON COIL.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.
7. PROVIDE MEANS TO BYPASS COIL CIRCUIT FOR FLUSHING. PROVIDE DEDICATED BYPASS VALVES. FLEXIBLE HOSE OR PERMANENT BYPASS LINE WITH SWITCH AT VALVE.

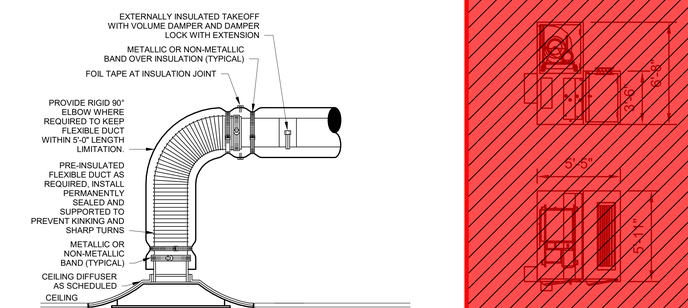
1 2-WAY HYDRONIC COIL PIPING DETAIL
NTS



NOTES

1. INSTALLATION SHALL CONFORM TO ALL LOCAL REQUIREMENTS FOR FIRE RATED FLOOR/CEILING ASSEMBLY.
2. SEE 1/8" SCALE UNIT PLANS FOR FAN LOCATION.

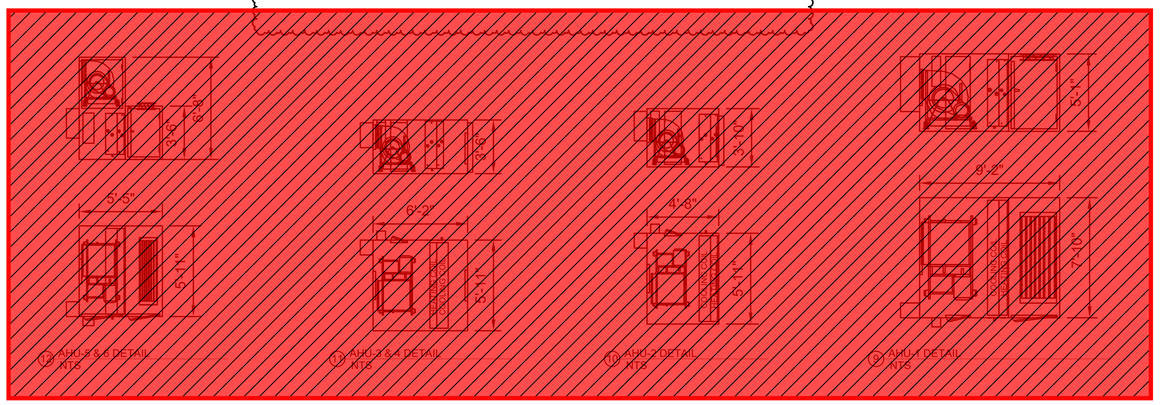
5 CEILING MOUNTED EXHAUST FAN DETAIL
NTS



NOTES:

1. FLEXIBLE DUCT LENGTH MAY NOT EXCEED 5'-0". EXTEND RIGID DUCT AS REQUIRED.
2. REFER TO SPECIFICATIONS FOR FLEXIBLE DUCTWORK INSTALLATION REQUIREMENTS.

13 CEILING DIFFUSER DETAIL
NTS



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KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 12.15.2023

M-500

MECHANICAL DETAILS

SEQUENCE OF OPERATIONS
SINGLE ZONE VARIABLE AIR VOLUME AIR HANDLING UNIT (SZVAV AHU)

GENERAL DESCRIPTION
The air handling unit(s) described by this sequence of operations consist(s) of cooling coil, reheating coil and supply fan.

OPERATING MODES
Control shall be programmed to allow operator to manually initiate each operating mode so that the operation of components can be independently tested and verified.

OCCUPIED MODE:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on the control drawings.

UNOCCUPIED MODE:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation.

COOLING MODE:
The unit shall not be capable of being in Cooling Mode and Heating Mode at the same time.
Once initiated, this mode shall remain active until Mode Switch Delay (MS-DLY) has elapsed.
When in Occupied Mode:
The unit shall be in Cooling Mode when the Zone Temperature (Z-T) is greater than the Zone Temperature Cooling Setpoint (Z-T-C).
When in Unoccupied Mode:
The unit shall be in Cooling Mode when the Zone Temperature (Z-T) is greater than the Zone Temperature Cooling Setback Setpoint (Z-T-C-SB).

HEATING MODE:
The unit shall not be capable of being in Cooling Mode and Heating Mode at the same time.
Once initiated, this mode shall remain active until Mode Switch Delay (MS-DLY) has elapsed.
When in Occupied Mode:
The unit shall be in Heating Mode when the Zone Temperature (Z-T) is less than the Zone Temperature Heating Setpoint (Z-T-H).
When in Unoccupied Mode:
The unit shall be in Heating Mode when the Zone Temperature (Z-T) is less than the Zone Temperature Heating Setback Setpoint (Z-T-H-SB).

MINIMUM COOLING MODE:
Unit is permitted to simultaneously be in Cooling Mode and Minimum Cooling Mode.
The unit shall be in Minimum Cooling Mode when:
The unit is in Cooling Mode
AND- the unit is in Occupied Mode
AND- the Zone Temperature (Z-T) is less than the current zone temperature setpoint
AND- the supply fan is running at minimum speed for duration exceeding the Mode Switch Delay (MS-DLY).
The unit shall exit Minimum Cooling Mode and return to Cooling Mode when:
The Zone Temperature (Z-T) is greater than the current zone temperature setpoint
AND- the Supply Air Temperature Cooling Setpoint (SAT-C) is equal to the Supply Air Temperature Cooling Low Range Setpoint (SAT-C-LSP) for duration exceeding the Mode Switch Delay (MS-DLY).

MINIMUM HEATING MODE:
Unit is permitted to simultaneously be in Heating Mode and Minimum Heating Mode.
The unit shall be in Minimum Heating Mode when:
The unit is in Heating Mode
AND- the unit is in Occupied Mode
AND- the Zone Temperature (Z-T) is greater than the current zone temperature setpoint
AND- the supply fan is running at minimum speed for duration exceeding the Mode Switch Delay (MS-DLY).
The unit shall exit Minimum Heating Mode and return to Heating Mode when:
The Zone Temperature (Z-T) is less than the current zone temperature setpoint
AND- the Supply Air Temperature Heating Setpoint (SAT-H) is equal to the Supply Air Temperature Heating High Range Setpoint (SAT-H-HSP) for duration exceeding the Mode Switch Delay (MS-DLY).

DEHUMIDIFICATION MODE (RELATIVE HUMIDITY ENABLED):
Once initiated, this mode shall remain active until Mode Switch Delay (MS-DLY) has elapsed.
The unit shall enter Dehumidification Mode when:
Zone Relative Humidity (Z-H) is greater than the Zone Relative Humidity Setpoint (Z-H-SP).
The unit shall exit Dehumidification Mode when:
Zone Relative Humidity (Z-H) is less than the Zone Relative Humidity Setpoint (Z-H-SP) minus the Zone Relative Humidity Deadband (Z-H-DB).

ECONOMIZER MODE – FIXED ENTHALPY WITH FIXED DRY-BULB TEMPERATURE ENABLED:
The unit shall be in Economizer Mode when all of the following are true:
The supply fan status is on
The unit is in Cooling Mode or Minimum Cooling Mode or Dehumidification Mode
The Outside Air Enthalpy (OAE) is less than the Economizer Outside Air Enthalpy High Limit (OAE-HL).
The Outside Air Temperature (OAT) is less than the Economizer Outdoor Air Dry Bulb High Limit (OAT-HL).
The unit shall exit Economizer Mode when any of the following are true:
The supply fan status is off
The unit enters Heating Mode
The Outside Air Enthalpy (OAE) is greater than the Economizer Outside Air Enthalpy High Limit (OAE-HL).
The Outside Air Temperature (OAT) is greater than the Economizer Outdoor Air Dry Bulb High Limit (OAT-HL).

FREEZE PROTECTION MODE LEVEL 1:
The unit shall be in Freeze Protection Mode Level 1 when:
The Mixed Air Temperature (MAT) is less than the Level 1 Low Limit Temperature Alarm Setpoint (LLT1-SP).
When in Freeze Protection Mode Level 1, an alarm shall generate at the operator workstation.
The alarm shall automatically reset and exit Freeze Protection Mode Level 1 when the temperature is above the alarm setpoint for a duration that exceeds the Freeze Protection Level 1 Delay (FZ-DLY) setpoint.

CONTROL SETPOINT RESETS
MINIMUM COOLING MODE SUPPLY AIR TEMPERATURE RESET:
When in Minimum Cooling Mode:
When Zone Temperature (Z-T) is less than the Zone Temperature Cooling Setpoint (Z-T-C) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Cooling Setpoint (SAT-C) up by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not increase the Supply Air Temperature Cooling Setpoint (SAT-C) to a value greater than the Supply Air Temperature Cooling High Range Setpoint (SAT-C-HSP).
When Zone Temperature (Z-T) is greater than the Zone Temperature Cooling Setpoint (Z-T-C) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Cooling Setpoint (SAT-C) down by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not decrease the Supply Air Temperature Cooling Setpoint (SAT-C) to a value less than the Supply Air Temperature Cooling Low Range Setpoint (SAT-C-LSP).
Continuously reset based on the logic above.
When Minimum Cooling Mode ends:
Return the Supply Air Temperature Cooling Setpoint (SAT-C) to its default setpoint.

DEHUMIDIFICATION MODE SUPPLY AIR TEMPERATURE RESET:
When in Dehumidification Mode:
When Zone Temperature (Z-T) is less than the Zone Temperature Cooling Setpoint (Z-T-C) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Cooling Setpoint (SAT-C) up by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not increase the Supply Air Temperature Cooling Setpoint (SAT-C) to a value greater than the Supply Air Temperature Cooling High Range Setpoint (SAT-C-HSP).
When Zone Temperature (Z-T) is greater than the Zone Temperature Cooling Setpoint (Z-T-C) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Cooling Setpoint (SAT-C) down by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not decrease the Supply Air Temperature Cooling Setpoint (SAT-C) to a value less than the Supply Air Temperature Cooling Low Range Setpoint (SAT-C-LSP).
Continuously reset based on the logic above.
When Dehumidification Mode ends:
Return the Supply Air Temperature Cooling Setpoint (SAT-C) to its default setpoint.

MINIMUM HEATING MODE SUPPLY AIR TEMPERATURE RESET:
When in Minimum Heating Mode:
When Zone Temperature (Z-T) is greater than the Zone Temperature Heating Setpoint (Z-T-H) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Heating Setpoint (SAT-H) down by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not decrease the Supply Air Temperature Heating Setpoint (SAT-H) to a value lower than the Supply Air Temperature Heating Low Range Setpoint (SAT-H-LSP).
When Zone Temperature (Z-T) is less than the Zone Temperature Heating Setpoint (Z-T-H) for a duration exceeding Reset Delay (RST-DLY):
Reset the Supply Air Temperature Heating Setpoint (SAT-H) up by an amount equal to Supply Air Temperature Reset Step (SAT-RST-STP).
Do not increase the Supply Air Temperature Heating Setpoint (SAT-H) to a value greater than the Supply Air Temperature Heating High Range Setpoint (SAT-H-HSP).
Continuously reset based on the logic above.
When Minimum Heating Mode ends:
Return the Supply Air Temperature Heating Setpoint (SAT-H) to its default setpoint.

SAFETIES, OVERRIDES, AND INTERLOCKS
MANUAL TEMPERATURE SETPOINT OVERRIDE:
Reset the current zone temperature setpoint based on occupant Manual Temperature Setpoint Adjustment (Z-TA).
Return the current one temperature setpoint to its default value after Manual Temperature Setpoint Adjust Delay (Z-TA-DLY) has elapsed.
SMOKE DETECTOR INTERLOCK:
Disable the unit via hard wired interlock on activation of a system smoke detector. Display smoke detector relay status (normal or alarm) at the BAS front end.
The unit shall require a manual reset.

CONTROL LOOPS
SUPPLY FAN CONTROL – VARIABLE SPEED (SINGLE ZONE VAV)
When the HOA switch is in hand position, operate the fan at the speed set manually by the operator at the user interface of the drive.
When the HOA switch is in off position, turn the fan off.
When the HOA switch is in auto position, operate the fan subject to the unit enable signal, and unit operating modes defined below.
During startup, correlate the fan speed settings to set fan operating points as detailed below:
Set the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) based on the scheduled fan minimum airflow.
Set the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) based on the scheduled fan maximum airflow.
Utilize a soft-start sequence when first energizing the fan. Fan initial setpoint shall be equal to the Supply Fan Minimum Speed Setpoint (SF-CO-MIN). Start the fan at its initial setpoint and slowly ramp up its speed to the current speed setpoint.
When in Occupied Mode:
Energize the fan and increase fan speed to its initial setpoint. Fan remains energized when in Occupied Mode.
When in Cooling Mode:
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Zone Temperature (Z-T) at the Zone Temperature Cooling Setpoint (Z-T-C).
When in Minimum Cooling Mode:
Operate fan at the Supply Fan Minimum Speed Setpoint (SF-CO-MIN).
Minimum Cooling Mode operation takes precedence over Cooling Mode operation.
When in Heating Mode:
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Zone Temperature (Z-T) at the Zone Temperature Heating Setpoint (Z-T-H).
When in Minimum Heating Mode:
Operate fan at the Supply Fan Minimum Speed Setpoint (SF-CO-MIN).
Minimum Heating Mode operation takes precedence over Heating Mode operation.
When in Unoccupied Mode:
When in Cooling Mode:
Energize the fan and increase fan speed to its initial setpoint.
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Zone Temperature (Z-T) at the Zone Temperature Cooling Setback Setpoint (Z-T-C-SB).
Turn off fan when at minimum speed and setpoint is satisfied.
When in Heating Mode:
Energize the fan and increase fan speed to its initial setpoint.
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Zone Temperature (Z-T) at the Zone Temperature Heating Setback Setpoint (Z-T-H-SB).
Turn off fan when at minimum speed and setpoint is satisfied.
When in Dehumidification Mode:
Incrementally reset the Supply Fan speed up by an amount equal to the Supply Fan Speed Reset (SF-CO-RST) in conjunction with the Reset Delay (RST-DLY) until the fan speed reaches Supply Fan 50 PCT Airflow Speed Setpoint (SF-CO-50). Revert fan speed to the operating speed prior to entering dehumidification mode after exiting dehumidification mode.
When in Humidification Mode:
Operate as described in Occupied Mode.
When in Economizer Mode:
Operate as described in Occupied Mode or Unoccupied Mode as applicable.

MIXED AIR DAMPERS – DAMPER POSITION TRACKING CONTROL
The mixed air damper assembly consists of an Outside Air Damper (OD) and Return Air Damper (RD) damper that modulate with an inversely proportional relationship.
The controller shall use linear interpolation to define Outside Air Damper and Return Air Damper positions that ensure the desired Outside Airflow Setpoint (OA-AF-SP) is provided as the supply air fan speed changes.
During startup, correlate Outside Air Damper and Return Air Damper positions that yield the Outside Airflow Setpoint (OA-AF-SP) according to the following table:

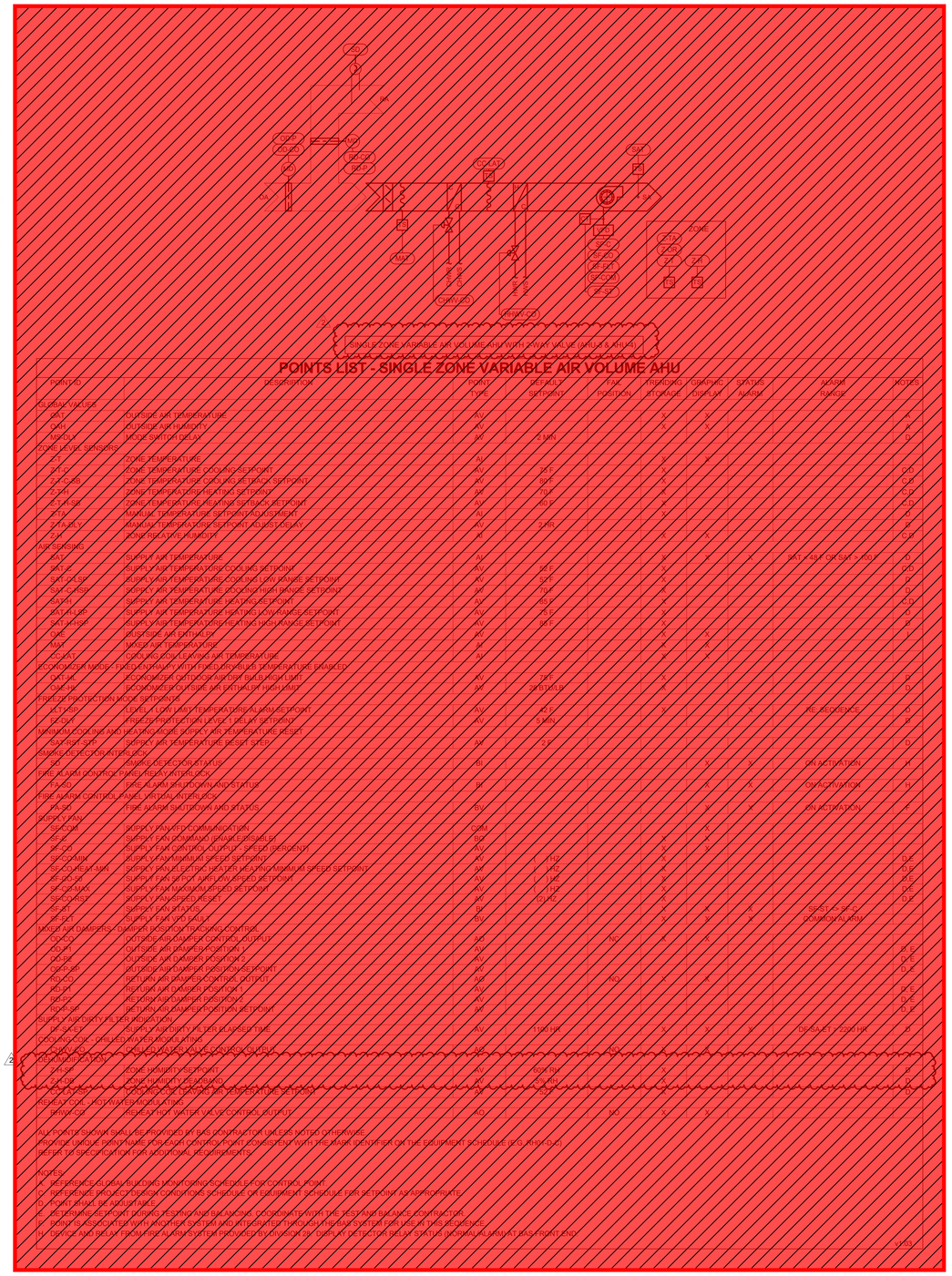
Supply Fan Speed	OD Position	RD Position
SF-CO-MIN	OD-P1	RD-P1
SF-CO-MAX	OD-P2	RD-P2

Calculation of the Outside Air Damper Position Setpoint (OD-P-SP) based on the current Outside Airflow Setpoint (OA-AF-SP) and linear interpolation as follows:
At least once per minute while the zone is in Occupied mode, calculate Outside Air Damper Position Setpoint (OD-P-SP) as a linear interpolation between OD-P1 and OD-P2 based on the current fan speed.
When in Occupied Mode:
When in Economizer Mode:
Modulate the Outside Air Damper and Return Air Damper to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
Outside Air Damper is permitted to modulate between the fully open position and the calculated Outside Air Damper Position Setpoint (OD-P-SP).
Return Air Damper is permitted to modulate between the closed position and the calculated Return Air Damper Position Setpoint (RD-P-SP).
When not in Economizer Mode:
Modulate the Outside Air Damper to its calculated Outside Air Damper Position Setpoint (OD-P-SP) based on the Outside Airflow Setpoint (OA-AF-SP).
Modulate the Return Air Damper to its calculated Return Air Damper Position Setpoint (RD-P-SP) based on the Outside Airflow Setpoint (OA-AF-SP).
When in Unoccupied Mode:
When in Economizer Mode:
Modulate the Outside Air Damper and Return Air Damper to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
The Outside Air Damper and Return Air Damper are permitted to modulate between the fully open and closed positions.
When not in Economizer Mode:
Close the Outside Air Damper. Open the Return Air Damper to its maximum position.

SUPPLY AIR FILTER MONITORING – RUN TIME
Provide time count labeled as Supply Air Dirty Filter Elapsed Time (DF-SA-ET). Increase time count to whenever the associated fan is on. Provide maintenance reminder for filter change when elapsed time is greater than or equal to Supply Air Dirty Filter Elapsed Time (DF-SA-ET) setpoint.
Reset time count to zero when filters are changed.

COOLING COIL CHILLED WATER VALVE – MODULATING
When in Occupied Mode:
Chilled water valve remains closed until Supply Air Fan (SF-ST) is proven on.
When in Cooling Mode:
Modulate the Chilled Water Valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
When in Minimum Cooling Mode:
Modulate the Chilled Water Valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
Adjust the Supply Air Temperature Setpoint subject to the Minimum Cooling Mode SAT Reset.
Minimum Cooling Mode operation takes precedence over Cooling Mode operation.
When in Economizer Mode:
Cooling coil is second stage to economizer for cooling duty.
Enable cooling coil only when Outside Air Damper is proven fully open. When enabled, modulate the Chilled Water Valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
When in Dehumidification Mode:
Dehumidification Mode operation shall take precedence over Cooling Mode or Minimum Cooling Mode operation.
Modulate the chilled water valve to maintain the Cooling Coil Leaving Air Temperature (CC-LAT) at the Cooling Coil Leaving Air Setpoint (CC-LAT-SP).
When in Heating Mode:
Close the chilled water valve.
When in Unoccupied Mode:
Operate as described in occupied mode.

REHEAT COIL - HOT WATER VALVE- MODULATING
When in Occupied Mode:
When in Cooling Mode:
Fully close the hot water valve.
When in Minimum Cooling Mode:
Fully close the hot water valve.
When in Dehumidification Mode:
Modulate the hot water valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Cooling Setpoint (SAT-C).
When in Economizer Mode:
Fully close the hot water valve.
When in Heating Mode:
Modulate the hot water valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Heating Setpoint (SAT-H).
When in Minimum Heating Mode:
Modulate the hot water valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Heating Setpoint (SAT-H).
Adjust the Supply Air Temperature Setpoint subject to the Minimum Heating Mode SAT Reset.
Minimum Heating Mode operation takes precedence over Heating Mode operation.
When in Unoccupied Mode:
Operate as described in occupied mode.



= Phase 2 Scope of Work
(Not included in this Bid Package)

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
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REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
KELLEY P. CRAMM
NUMBER E-022323
REGISTERED PROFESSIONAL ENGINEER
12/13/2023
KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 11.22.2023

M-601

MECHANICAL CONTROLS

12/13/2023 10:22:44 AM
KELLEY P. CRAMM

Please consider the environment before printing this.

SEQUENCE OF OPERATIONS
MULTIPLE ZONE VARIABLE AIR VOLUME AIR HANDLING UNIT (MZVAV AHU)

GENERAL DESCRIPTION
The air handling unit(s) described by this sequence of operations consist(s) of cooling coil, heating coil and supply fan.

OPERATING MODES
Control shall be programmed to allow operator to manually initiate each operating mode so that the operation of components can be independently tested and verified.

OCCUPIED MODE:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on the control drawings.

UNOCCUPIED MODE:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation.
Unoccupied mode is subject to overrides from the zone level controls. Refer to overrides section for more information.

COOLING MODE:
The unit shall not be capable of being in Cooling Mode and Heating Mode at the same time.
Once initiated, this mode shall remain active until Mode Switch Delay (MS-DLY) has elapsed.
The unit shall enter Cooling Mode when:
The Mixed Air Temperature (MAT) is greater than the Supply Air Temperature Setpoint (SAT-SP) plus one half of the Supply Air Temperature Deadband (SAT-DB).
The unit shall exit Cooling Mode when:
The system enters Heating Mode.

HEATING MODE:
The unit shall not be capable of being in Cooling Mode and Heating Mode at the same time.
Once initiated, this mode shall remain active until Mode Switch Delay (MS-DLY) has elapsed.
The unit shall enter Heating Mode when:
The Mixed Air Temperature (MAT) is less than the Supply Air Temperature Setpoint (SAT-SP) minus one half of the Supply Air Temperature Deadband (SAT-DB).
The unit shall exit Heating Mode when:
The system enters Cooling Mode.

ECONOMIZER MODE – FIXED ENTHALPY WITH FIXED DRY-BULB TEMPERATURE ENABLED:
The unit shall be in Economizer Mode when all of the following are true:
The supply fan status is on
The unit is in Cooling Mode or Dehumidification Mode
The Outside Air Enthalpy (OAE) is less than the Economizer Outside Air Enthalpy High Limit (OAE-HL).
The Outside Air Temperature (OAT) is less than the Economizer Outdoor Air Dry Bulb High Limit (OAT-HL).
The unit shall exit Economizer Mode when any of the following are true:
The supply fan status is off
The unit enters Heating Mode
The Outside Air Enthalpy (OAE) is greater than the Economizer Outside Air Enthalpy High Limit (OAE-HL).
The Outside Air Temperature (OAT) is greater than the Economizer Outdoor Air Dry Bulb High Limit (OAT-HL).

FREEZE PROTECTION MODE LEVEL 1:
The unit shall be in Freeze Protection Mode Level 1 when:
The Mixed Air Temperature (MAT) is less than the Level 1 Low Limit Temperature Alarm Setpoint (LLT1-SP).
When in Freeze Protection Mode Level 1, an alarm shall generate at the operator workstation.
The alarm shall automatically reset and exit Freeze Protection Mode Level 1 when the temperature is above the alarm setpoint for a duration that exceeds the Freeze Protection Level 1 Delay (FZ-DLY) setpoint.

CONTROL SETPOINT RESETS
Not Used.

SUPPLY AIR TEMPERATURE RESET - DIRECT OUTSIDE AIR RESET:
Linearly reset the Supply Air Temperature Setpoint (SAT-SP) based on the Outside Air Temperature Sensor (OAT) according to the following schedule:

Outside Air Temperature (OAT)	Supply Air Temp Setpoint (SAT-SP)
OAT Reset Max Value (OAT-RST-MAX)	SAT Minimum Setpoint (SAT-MIN)
OAT Reset Min Value (OAT-RST-MIN)	SAT Maximum Setpoint (SAT-MAX)

When in Dehumidification Mode:
Set the Supply air Temperature Setpoint (SAT-SP) to the SAT Minimum Setpoint (SAT-MIN).
When in Optimum Start Mode and in Cooling Mode:
Set the Supply air Temperature Setpoint (SAT-SP) to the SAT Minimum Setpoint (SAT-MIN).
When in Optimum Start Mode and in Heating Mode:
Set the Supply air Temperature Setpoint (SAT-SP) to the SAT Maximum Setpoint (SAT-MAX).

SAFETIES, OVERRIDES, AND INTERLOCKS
SYSTEM-LEVEL OCCUPANCY OVERRIDE:
When in Unoccupied Mode:
System-Level Occupancy Override is based feedback from individual zone controls on its Occupancy Override Condition as defined in the sequence of operations of individual zone terminal units.
Override unit to Occupied Mode of operation when any associated zone terminal unit is experiencing an Occupancy Override.
Remove the System-Level Occupancy Override when every associated zone terminal unit is not experiencing an Occupancy Override.

SMOKE DETECTOR INTERLOCK:
Disable the unit via hard wired interlock on activation of a system smoke detector. Display smoke detector relay status (normal or alarm) at the BAS front end.
The unit shall require a manual reset.

FIRE ALARM CONTROL PANEL INTERLOCK:
The unit shall be disabled via relay circuit signal from the fire alarm control panel. Division 28 shall provide the relay and leads from relay to unit for Fire Alarm Shutdown and Status (FA-SD). BAS contractor shall connect leads to unit. Display relay status (normal or alarm) at BAS front end.
Unit shall reset automatically after relay signal has been cleared.

HIGH SUPPLY AIR STATIC PRESSURE INTERLOCK:
The unit shall be disabled via hard wired interlock at the fan start circuit upon activation of the Supply Duct High Static Controller (SA-HS).
The unit shall require a manual reset.

CONTROL LOOPS
SUPPLY FAN CONTROL – VARIABLE SPEED (MULTI ZONE VAV)
When the HOA switch is in hand position, operate the fan at the speed set manually by the operator at the user interface of the drive.
When the HOA switch is in off position, turn the fan off.
When the HOA switch is in auto position, operate the fan subject to the unit enable signal, and unit operating modes defined below.
During startup, correlate the fan speed settings to set fan operating points as detailed below:
Set the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) based on the scheduled fan minimum airflow.
Set the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) based on the scheduled fan maximum airflow.
Utilize a soft-start sequence when first energizing the fan. Fan initial setpoint shall be equal to the Supply Fan Minimum Speed Setpoint (SF-CO-MIN). Start the fan at its initial setpoint and slowly ramp up its speed to the current speed setpoint.
When in Occupied Mode:
Energize the fan and increase fan speed to its initial setpoint. Fan remains energized when in Occupied Mode.
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Supply Air Duct Static Pressure (SA-DSP) at the Supply Air Duct Static Pressure Setpoint (SA-DSP-SP).
When in Unoccupied Mode:
Fan shall be permitted energize in response to requests for heating and cooling form the zone level.
Current Number of Requests Logic:
Heat/Cool requests are generated by the Mechanical Control System based on information from associated zone terminal units. Refer to the contract documents for more information on system associations.
For each individual associated zone unit, send a Zone "X" Heat/Cool Request (X-Z-T-R) when the current zone heating or cooling setpoint is not satisfied. This indicates that supply air is needed from the associated Air Handling Unit. Heating requests from Fan Powered Terminal units equipped with a heating coil and capable of recirculation shall be ignored.
Multiply each Zone "X" Heat/Cool Request (X-Z-T-R) by its Zone "X" Heat/Cool Request Weighting Factor (X-Z-T-W). The sum of weighted requests for every associated zone shall be recorded as the Supply Fan Request Total (SF-R).
When the Supply Fan Request Total (SF-R) is greater than the Supply Fan Number of Ignored Requests (T-I):
Energize the fan and increase fan speed to its initial setpoint.
Modulate fan between the Supply Fan Minimum Speed Setpoint (SF-CO-MIN) and the Supply Fan Maximum Speed Setpoint (SF-CO-MAX) to maintain the Supply Air Duct Static Pressure (SA-DSP) at the Supply Air Duct Static Pressure Setpoint (SA-DSP-SP).
When the Supply Fan Request Total (SF-R) is less than or equal to the Supply Fan Number of Ignored Requests (T-I):
Turn off the supply fan.
When in Economizer Mode:
Operate as described in Occupied Mode or Unoccupied Mode as applicable.
When in Freeze Protection Level 2 Mode:
Turn the fan off.

MIXED AIR DAMPERS – DAMPER POSITION TRACKING CONTROL
The mixed air damper assembly consists of an Outside Air Damper (OD) and Return Air Damper (RD) damper that modulate with an inversely proportional relationship.
The controller shall use linear interpolation to define Outside Air Damper and RD positions that ensure the desired Outside Airflow Setpoint (OA-AF-SP) is provided as the supply air fan speed changes.
During startup, correlate Outside Air Damper and RD positions that yield the Outside Airflow Setpoint (OA-AF-SP) according to the following table:

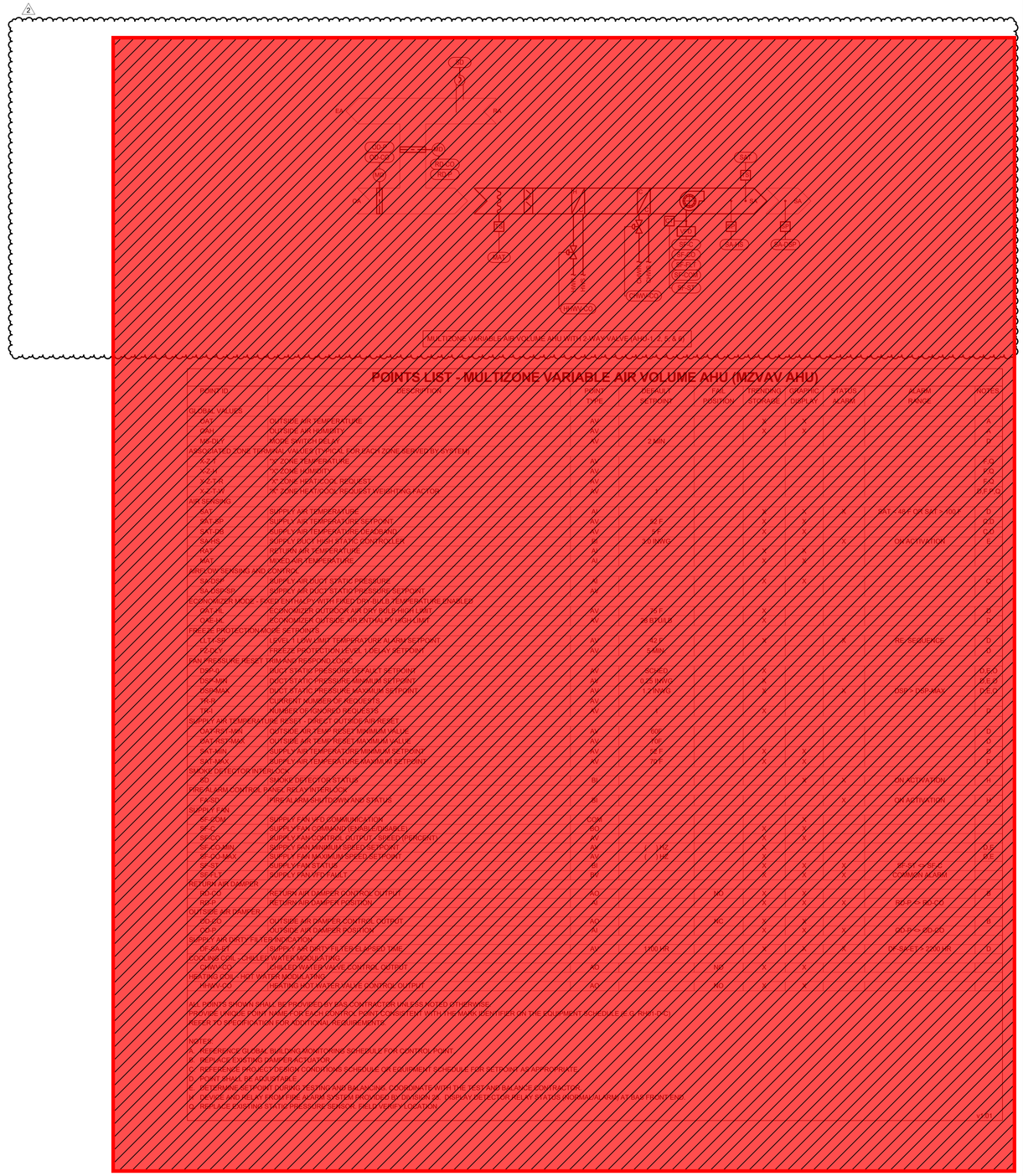
Supply Fan Speed	OD Position	RD Position
SF-CO-MIN	OD-P1	RD-P1
SF-CO-MAX	OD-P2	RD-P2

Calculation of the Outside Air Damper Position Setpoint (OD-P-SP) based on the current Outside Airflow Setpoint (OA-AF-SP) and linear interpolation as follows:
At least once per minute while the zone is in Occupied mode, calculate Outside Air Damper Position Setpoint (OD-P-SP) as a linear interpolation between OD-P1 and OD-P2 based on the current fan speed.
Calculation of the Return Air Damper Position Setpoint (RD-P-SP) based on the current Outside Airflow Setpoint (OA-AF-SP) using similar logic presented above.
When in Occupied Mode:
When in Economizer Mode:
Modulate the Outside Air Damper and Return Air Damper to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Setpoint (SAT-SP).
Outside Air Damper is permitted to modulate between the fully open position and the calculated Outside Air Damper Position Setpoint (OD-P-SP).
RD is permitted to modulate between the closed position and the calculated Return Air Damper Position Setpoint (RD-P-SP).
When not in Economizer Mode:
Modulate the Outside Air Damper to its calculated Outside Air Damper Position Setpoint (OD-P-SP) based on the Outside Airflow Setpoint (OA-AF-SP).
Modulate the Return Air Damper to its calculated Return Air Damper Position Setpoint (RD-P-SP) based on the Outside Airflow Setpoint (OA-AF-SP).
When in Unoccupied Mode:
When in Economizer Mode:
Modulate the Outside Air Damper and Return Air Damper to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Setpoint (SAT-SP).
The Outside Air Damper and Return Air Damper are permitted to modulate between the fully open and closed positions.
When not in Economizer Mode:
Close the Outside Air Damper. Open the Return Air Damper to its maximum position.
When in Freeze Protection Level 2 Mode:
Close the Outside Air Damper. Open the Return Air Damper to the fully open position.
Freeze Protection Mode takes precedence over any other active mode.
When in Optimum Start Mode:
When in Economizer Mode:
Operate as described in Occupied Mode.
When not in Economizer Mode:
Operate as described in Unoccupied Mode.

SUPPLY AIR FILTER MONITORING – RUN TIME
Provide time count labeled as Supply Air Dirty Filter Elapsed Time (DF-SA-ET). Increase time count to whenever the associated fan is on. Provide maintenance reminder for filter change when elapsed time is greater than or equal to Supply Air Dirty Filter Elapsed Time (DF-SA-ET) setpoint. Reset time count to zero when filters are changed.

COOLING COIL CHILLED WATER VALVE – MODULATING
When in Occupied Mode:
Chilled water valve remains closed until Supply Air Fan (SF-ST) is proven on.
When in Cooling Mode:
Modulate the Chilled Water Valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Setpoint (SAT-SP).
When in Economizer Mode:
Cooling coil is second stage to economizer for cooling duty.
Enable cooling coil only when Outside Air Damper is proven fully open. When enabled, modulate the Chilled Water Valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Setpoint (SAT-SP).
When in Heating Mode:
Close the chilled water valve.
When in Unoccupied Mode:
Operate as described in occupied mode.
When in Freeze Protection Mode Level 2:
Fully open the chilled water valve.
Freeze Protection Mode takes precedence over any other active mode.

HEATING COIL- HOT WATER VALVE- MODULATING
When in Occupied Mode:
When in Cooling Mode:
Fully close the hot water valve.
When in Economizer Mode:
Fully close the hot water valve.
When in Heating Mode:
Modulate the hot water valve to maintain the Supply Air Temperature (SAT) at the Supply Air Temperature Setpoint (SAT-SP).
When in Unoccupied Mode:
Operate as described in occupied mode.



= Phase 2 Scope of Work
(Not included in this Bid Package)

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
KELLEY P. CRAMM
NUMBER E-22323
REGISTERED PROFESSIONAL ENGINEER

12/13/2023

KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 11.22.2023

M-602

MECHANICAL CONTROLS

SEQUENCE OF OPERATIONS
CENTRAL CHILLED WATER PLANT

This sequence of operations is organized into the following main categories: operating modes, control setpoint resets, safeties, overrides and interlocks, and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that will be required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION
The chilled water plant sequence of operations shall modifies the existing constant primary flow chilled water to a constant volume primary with variable chilled water secondary configuration.

2 Refer to previous project for chiller controls. HEI project number - 225005449.

OPERATING MODES
PUMP FAILURE MODE:
A pump shall be in failure mode when:
The pump is given a start signal;
And- The pump status indicates it is off.

CONTROL LOOPS

STAGED PRIMARY PUMP CONTROL (PCHWP-1 – PCHWP-N)
The new pump(s) shall be controlled by the BAS.
When in chilled water plant disabled mode:
The pump shall be off.
When in chilled water plant enabled mode:
The pumps shall be on or off as described in the Chiller Plant Load Staging Control Matrix – Staged Primary Pumping.
Pumps that are on shall start on low speed and ramp up to maintain the scheduled water flow through the operating chillers as defined in the Chiller Plant Load Staging Control Matrix – Staged Primary Pumping. Speed setpoints shall be determined during system startup.
The pumps shall operate in parallel.
When in chiller stage-up mode:
The pumps shall be on or off according to the next highest plant load stage described in the Chiller Plant Load Staging Control Matrix – Staged Primary Pumping. The pump shall sequence with other components in the order described under the Chiller Control Loop.
When in chiller stage-down mode:
The pumps shall be on or off according to the next lowest plant load stage described in the Chiller Plant Load Staging Control Matrix – Staged Primary Pumping. The pump shall sequence with other components in the reverse order described under the Chiller Control Loop.
When in chiller low load mode:
The pump shall operate as in chilled water plant enabled mode.
When in pump failure mode:
The active pump shall remain energized and operate as in chilled water plant enabled mode. Active pump shall ramp up to maximin water flow if both chillers are engaged.

VARIABLE SECONDARY PUMP CONTROL (SCHWP-1 – SCHWP-N)
The existing pump(s) shall be modified and controlled by the BAS.
When in chilled water plant disabled mode:
The pump shall be off.
When in chilled water plant enabled mode:
The pumps shall energize subject to a lead/lag sequence. Sequence shall be based on equal run time.
A pump that is energized shall start on low speed and ramp up to maintain the chilled water differential pressure set point as measured by the differential pressure sensor(s) (SCHW-DP-X). Initial differential setpoint shall be determined during system startup. The most critical DP sensor shall govern pump speed. Multiple operating pumps shall ramp together to meet setpoint.
Optimized pump staging algorithm: Pumps shall energize on and off based on the optimum combination of primary pumps to minimize energy use. The test and balance contractor and controls contractor shall coordinate to field determine the optimized staging setpoints.
The test and balance contractor shall perform the following:
1. Ramp one pump from minimum speed to design speed and record the total amp draw from the pump at every 3 Hz interval.
2. Start another pump and repeat step 1 for the pumps operating simultaneously.
3. Repeat step 2 until the amp draw for all scheduled pumps operating simultaneously has been recorded.
The pump staging setpoints shall be determined from the rpm speed at which operating more pumps at the same flow rate draws less amperage than the current quantity of operating pumps.
When staging on a lag pump:
1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump on.
3. Ramp the operating pumps together to meet setpoint.
When staging off a lag pump:
1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump off.
3. Ramp the remaining operating pumps together to meet setpoint.

2 **CHILLED WATER SECONDARY BYPASS VALVE CONTROL (SCHW-BPV)**
The bypass control valve shall be sized for 165 gpm.
When in chilled water plant disabled mode:
The bypass valve shall be closed.
When in chilled water plant enabled mode:
The valve shall modulate to maintain the minimum chilled water flow when chilled water pump VFD is at minimum flow.

POINTS LIST - CHILLED WATER PLANT

POINT ID	DESCRIPTION	UNIT	ANALOG SETPOINT	ANALOG RESET RANGE	BINARY ALARM POSITION	BINARY ALARM	EXISTING POINT	RENOVATED POINT	NEW POINT	ALARM RANGE	NOTES
GLOBAL VALUES											
DATE	DATE						X				2, 5
TIME	TIME						X				2, 5
OAT	OUTSIDE AIRTEMP, BOOLEAN DISPLAY	°F					X				2, 5
OAHD	OUTSIDE AIR RELATIVE HUMIDITY	%RH					X				2, 5
CHILLER CONTROLS AND VALUES (TYPICAL ALL CHILLERS)											
CHI-CHW-MAX	CHILLER EVAPORATOR DIFFERENTIAL PRESSURE	PSI					X				
CHI-CHW-SETP	CHILLER CHILLED WATER SUPPLY TEMPERATURE	°F	44°F				X				
CHI-CHW-STAT	CHILLER CHILLED WATER FLOW STATUS						X				
CHILLER CONTROL PANEL (TYPICAL ALL CHILLERS)											
CHI-ALM-X	CHILLER ALARM						X			COMMON ALARM	
CHI-CMD-X	CHILLER ENABLE/DISABLE COMMAND						X				
PRIMARY CHILLED WATER LOOP											
CHW-T	CHILLED WATER RETURN TEMP	°F					X				
CHW-F	PRIMARY CHILLED WATER FLOW	GPM					X				
PRIMARY CHILLED WATER PUMP (TYPICAL ALL PCHWP)											
PCHWP-X-VFD	PUMP VFD CONTROL	%					X				
PCHWP-X-CMD	PUMP ENABLE/DISABLE COMMAND						X				
PCHWP-X-STAT	PUMP STATUS						X				
PCHWP-X-ALM	PUMP ALARM						X			COMMON ALARM	
SECONDARY CHILLED WATER LOOP											
SCHW-T	SECONDARY CHILLED WATER SUPPLY TEMPERATURE	°F	44°F				X				
SCHW-F	SECONDARY CHILLED WATER FLOW	GPM					X				
SECONDARY PUMP (TYPICAL ALL SCHWP)											
SCHWP-X-VFD	SECONDARY PUMP SPEED CONTROL	%		25% - 100%			X				
SCHWP-X-CMD	SECONDARY PUMP ENABLE/DISABLE COMMAND						X				
SCHWP-X-STAT	SECONDARY PUMP STATUS						X				
SCHWP-X-ALM	SECONDARY PUMP ALARM						X			COMMON ALARM	
ALL POINTS SHOWN SHALL BE PROVIDED BY MAIN CONTRACTOR UNLESS NOTED OTHERWISE.											
NOTES:											
1. BAS CONTRACTOR SHALL PROVIDE ENTIRE BAS SYSTEM AS SHOWN ON THIS SHEET AND AS NOTED BELOW.											
2. COORDINATE WITH CENTRAL PLANT EQUIPMENT AND FROM END REFERENCES (LOOPS, BOILERS, MONITORING) TO DETERMINE POINT QUANTITY.											
3. INCLUDE POINTS IN BAS FOR ALL EQUIPMENT PER CHILLER RECOMMENDED MAINTENANCE STANDARD 147.											
4. PROVIDE ALL WIRING, RACEWAY, CONDUIT AND ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM.											
5. DETERMINE SETPOINT VALUES.											
6. PROVIDE ALL MOTOR STARTER CONTACTS, AUXILIARY CONTACTS, INTERFACE RELAYS AND CONTROL WIRING FOR EQUIPMENT FURNISHED UNDER DIVISION 23 SECTIONS.											

CHILLER PLANT LOAD STAGING CONTROL MATRIX

PLANT LOAD STAGE	ANY DEVICE IN OPERATING CHILLER CHILLER % (NOTE 1)	MIN	MAX	CHILLER STATUS LEAD CHILLER	LAG CHILLER	CHILLER WATER ISOLATION VALVE STATUS LEAD CHILLER	LAG CHILLER
1	1%	1%	75%	ON	OFF	OPEN	CLOSED
2	75%	1%	75%	ON	ON	OPEN	OPEN
3	75%	1%	75%	ON	ON	OPEN	OPEN

NOTES:
1. THE CHILLER STAGE UP LOGIC WHEN ANY ONE CHILLER EXCEEDS STAGE UP SETPOINT AND TIMER EXPIRES.
2. ON POWER OUTAGE WATER SUPPLY TEMPERATURE INCREASES EXCESS SETPOINT BY GREATER THAN 1.5°F (MULLER ADJUSTABLE).
3. CHILLER STAGE DOWN LOGIC MAY CHILLER REDUCE PLANT LOAD STAGE (MINIMUM RUNTIME OPTION).
4. CHILLER PLANT LOAD STAGE DOWN WHEN ANY CHILLER'S MEASURED AMPS REDUCED BY RATED FLA LOAD AMPS.

STAGED PUMP CONTROL MATRIX

PRIMARY PUMP STATUS LEAD	LAG	TOTAL PRIMARY FLOW (GPM)	PRIMARY BOOSTER LOW FLOW (GPM) LEAD	LAG
OFF	OFF	0	OFF	OFF
ON	OFF	125	ON	OFF
ON	ON	250	ON	ON

2 = Phase 2 Scope of Work (Not included in this Bid Package)

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100% CONSTRUCTION DOCUMENTS

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Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER
KELLEY P. CRAMM
NUMBER E-22323

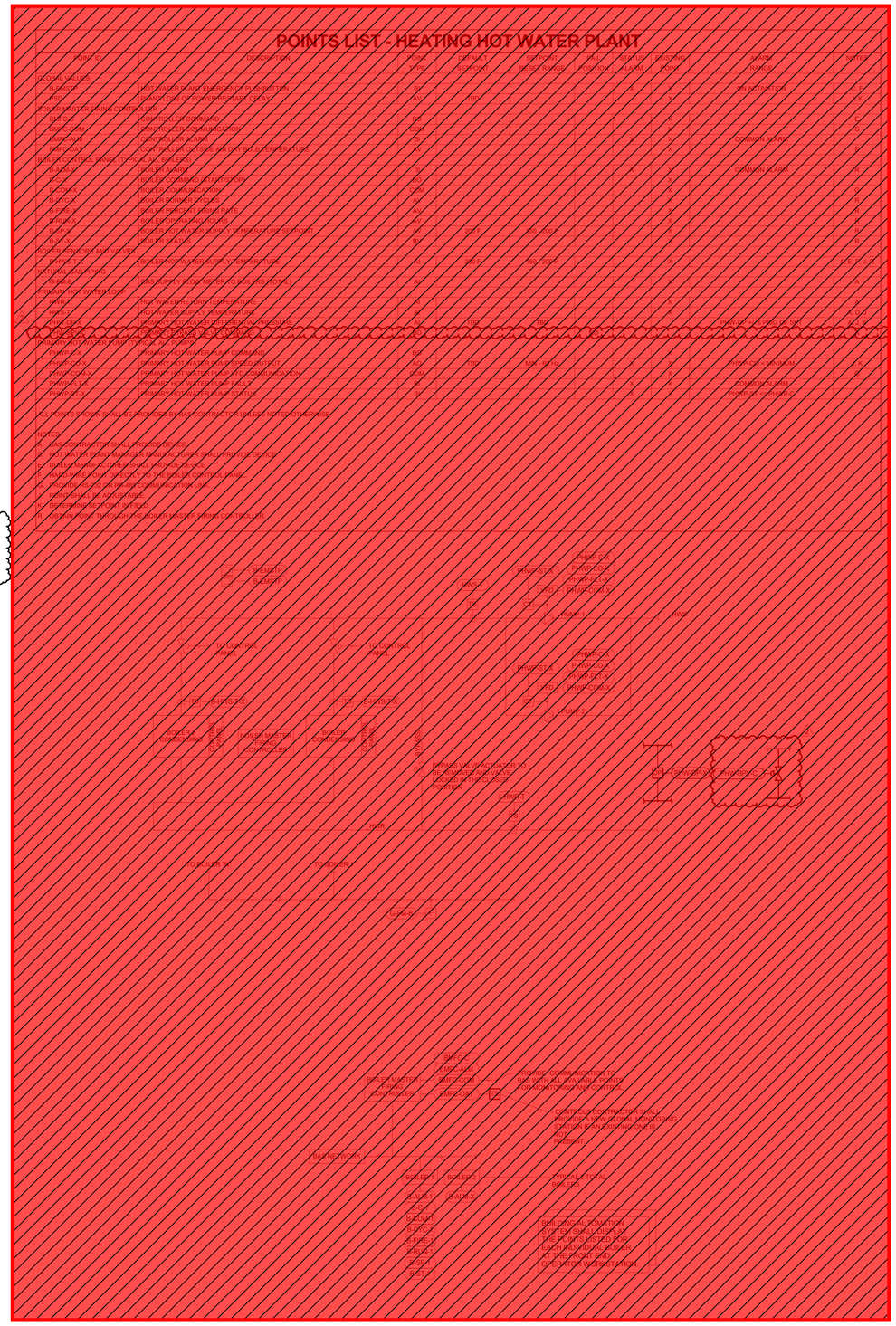
12/13/2023

KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 11.22.2023

M-603

MECHANICAL CONTROLS



SEQUENCE OF OPERATIONS
HOT WATER HEATING PLANT

This sequence of operations is organized into the following main categories: operating modes; control setpoint resets; safeties, overrides and interlocks; and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that will be required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections. Setpoints shall be adjustable (adj.) as noted.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION

The heating hot water plant described by this sequence of operations Shall be modified from a constant volume system to a variable primary system.

Refer to previous project for boiler controls. HEI project number - 2250005449.

VARIABLE PRIMARY PUMP CONTROL (PHWP-1 – PHWP-N)

The pump shall be operated by the BAS

When in hot water plant disabled mode:

The pump shall be off

When in hot water plant enabled mode:

The pumps shall energize subject to a lead/lag sequence. Sequence shall be based on equal run time. A pump that is energized shall start on low speed and ramp up to maintain the hot water differential pressure setpoint as measured by the differential pressure sensor(s) (PHW-DP-X). Initial differential setpoint shall be determined during system startup. The most critical DP sensor shall govern pump speed. Multiple operating pumps shall ramp together to meet setpoint.

Optimized pump staging algorithm: Pumps shall energize on and off based on the optimum combination of primary pumps to minimize energy use. The test and balance contractor and controls contractor shall coordinate to field determine the optimized staging setpoints.

The test and balance contractor shall perform the following:

1. Ramp one pump from minimum speed to design speed and record the total amp draw from the pump at every 3 Hz interval.
2. Start another pump and repeat step 1 for the pumps operating simultaneously.
3. Repeat step 2 until the amp draw for all scheduled pumps operating simultaneously has been recorded.

The pump staging setpoints shall be determined from the rpm speed at which operating more pumps at the same flow rate draws less amperage than the current quantity of operating pumps.

When staging on a lag pump:

1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump on.
3. Ramp the operating pumps together to meet setpoint.

When staging off a lag pump:

1. Ramp the operating pumps down to minimum speed.
2. Turn the lag pump off.
3. Ramp the remaining operating pumps together to meet setpoint.

HOT WATER BYPASS VALVE CONTROL (PHW-BPV)

The bypass control valve shall be sized for 150 gpm.

When in hot water plant disabled mode:

The bypass valve shall be closed.

When in hot water plant enabled mode:

The valve shall modulate to maintain the minimum heating water flow when heating water pump VFD is at minimum flow.

POINTS LIST - HEATING HOT WATER PLANT

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	SETPOINT RESET RANGE	FAIL POSITION	STATUS ALARM	EXISTING POINT	ALARM RANGE	NOTES
GLOBAL VALUES									
B-EMSTP	HOT WATER PLANT EMERGENCY PUSHBUTTON	BI				X	X	ON ACTIVATION	C, F
PSD	PLANT LOSS OF POWER RESTART DELAY	AV	TBD				X		J, K
BOILER MASTER FIRING CONTROLLER									
BMFC-C	CONTROLLER COMMAND	BO					X		E
BMFC-COM	CONTROLLER COMMUNICATION	COM					X		G
BMFC-ALM	CONTROLLER ALARM	BI				X	X	COMMON ALARM	
BMFC-OAT	CONTROLLER OUTSIDE AIR DRY BULB TEMPERATURE	AV					X		E
BOILER CONTROL PANEL (TYPICAL ALL BOILERS)									
B-ALM-X	BOILER ALARM	BI				X	X	COMMON ALARM	R
B-C-X	BOILER COMMAND (START/STOP)	BO					X		
B-COM-X	BOILER COMMUNICATION	COM					X		G
B-CYC-X	BOILER BURNER CYCLES	AV					X		R
B-FIRE-X	BOILER PERCENT FIRING RATE	AV					X		R
B-RUN-X	BOILER OPERATING HOURS	AV					X		R
B-SP-X	BOILER HOT WATER SUPPLY TEMPERATURE SETPOINT	AV	200 F	150 - 200 F			X		R
B-ST-X	BOILER STATUS	BV					X		R
BOILER SENSORS AND VALVES									
B-HWS-T-X	BOILER HOT WATER SUPPLY TEMPERATURE	AI	200 F	150 - 200 F			X		A, E, F, J, R
NATURAL GAS PIPING									
G-FM-B	GAS SUPPLY FLOW METER TO BOILERS (TOTAL)	AI					X		A
PRIMARY HOT WATER LOOP									
HWR-T	HOT WATER RETURN TEMPERATURE	AI					X		A
HWS-T	HOT WATER SUPPLY TEMPERATURE	AI					X		A, D, J
PHW-DP-X	PRIMARY HOT WATER DIFFERENTIAL PRESSURE	AI	TBD	TBD				PHW-DP +/- 5 PSIG OF SPT	A, J, K
PHW-BPV-C	PRIMARY BYPASS VALVE COMMAND	BO			NO				A
PRIMARY HOT WATER PUMP (TYPICAL ALL PUMPS)									
PHWP-C-X	PRIMARY HOT WATER PUMP COMMAND	BO					X		
PHWP-CO-X	PRIMARY HOT WATER PUMP SPEED OUTPUT	AO	TBD	MIN - 60 Hz		X	X	PHWP-CO < MINIMUM	J, K
PHWP-COM-X	PRIMARY HOT WATER PUMP VFD COMMUNICATION	COM					X		G
PHWP-FLT-X	PRIMARY HOT WATER PUMP FAULT	BI				X	X	COMMON ALARM	
PHWP-ST-X	PRIMARY HOT WATER PUMP STATUS	BI				X	X	PHWP-ST <> PHWP-C	

ALL POINTS SHOWN SHALL BE PROVIDED BY BAS CONTRACTOR UNLESS NOTED OTHERWISE.

NOTES:

A. BAS CONTRACTOR SHALL PROVIDE DEVICE.
D. HOT WATER PLANT MANAGER MANUFACTURER SHALL PROVIDE DEVICE.
E. BOILER MANUFACTURER SHALL PROVIDE DEVICE.
F. HARD-WIRE POINT DIRECTLY TO THE BOILER CONTROL PANEL.
G. PROVIDE RS-232 OR RS-485 COMMUNICATION LINK.
J. POINT SHALL BE ADJUSTABLE.
K. DETERMINE SETPOINT IN FIELD.
R. OBTAIN POINT THROUGH THE BOILER MASTER FIRING CONTROLLER.

▨ = Phase 2 Scope of Work
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Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

KELLEY P. CRAMM
NUMBER
E-22323
Kelley P. Cramm

12/13/2023

KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 11.22.2023

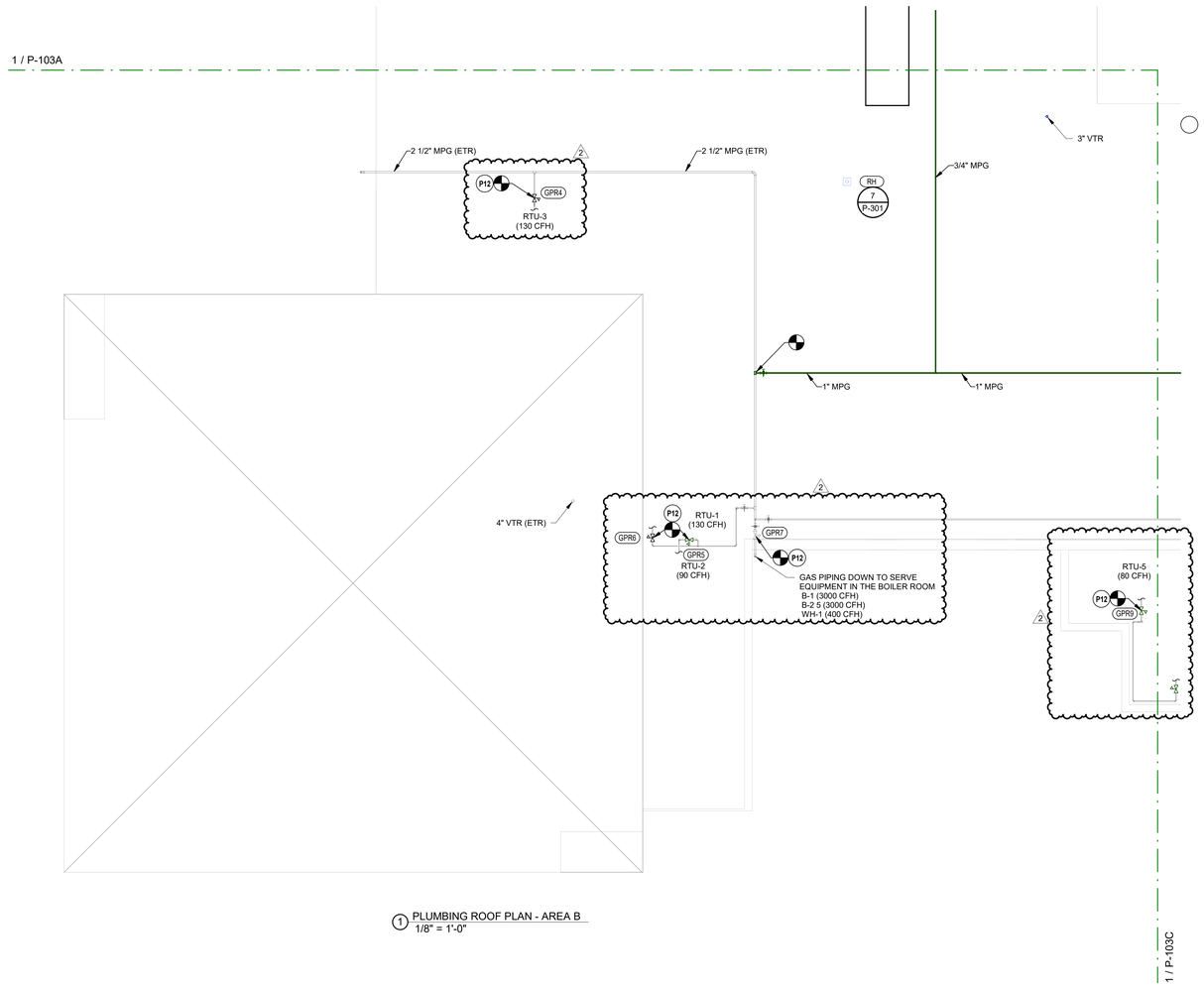
M-604

MECHANICAL CONTROLS

12/13/2023 10:03:06 AM
KELLEY P. CRAMM

PLUMBING PLAN NOTES:

2
P12 REMOVE EXISTING GAS PRESSURE REGULATOR AND INSTALL NEW GAS PRESSURE REGULATOR IN THE SAME LOCATION.



1 PLUMBING ROOF PLAN - AREA B
1/8" = 1'-0"

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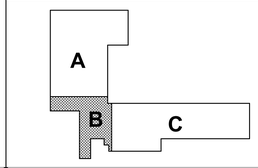
STATE OF MISSOURI
KELLEY P. CRAMM
NUMBER E-22323
REGISTERED PROFESSIONAL ENGINEER

12/14/2023

KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 12.15.2023

KEY PLAN



P-103B

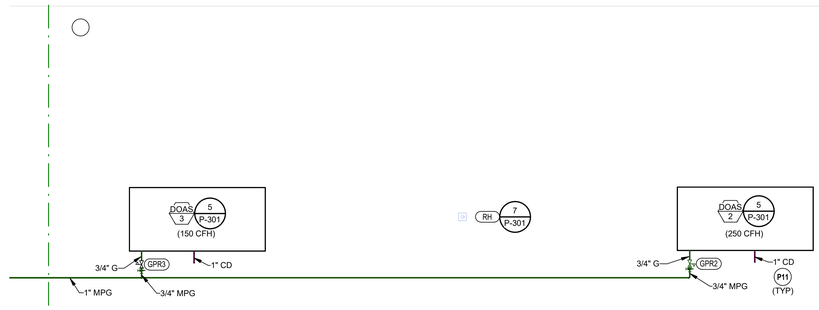
PLUMBING ROOF PLAN - AREA B

PLUMBING PLAN NOTES:

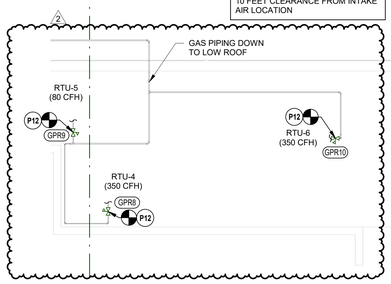
P11 ROUTE CD PIPE TO NEAREST DRAIN.

2 P12 REMOVE EXISTING GAS PRESSURE REGULATOR AND INSTALL NEW GAS PRESSURE REGULATOR IN THE SAME LOCATION.

1 / P-103B



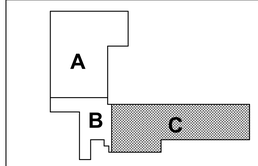
CONTRACTOR SHALL COORDINATE LOCATION OF EXISTING VTR'S WITH LOCATION OF NEW DOAS AND RELOCATE AS REQUIRED KEEPING 10 FEET CLEARANCE FROM INTAKE AIR LOCATION



1 / P-102B

1 PLUMBING ROOF PLAN - AREA C
1/8" = 1'-0"

KEY PLAN



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KELLEY P. CRAMM
NUMBER E-22223

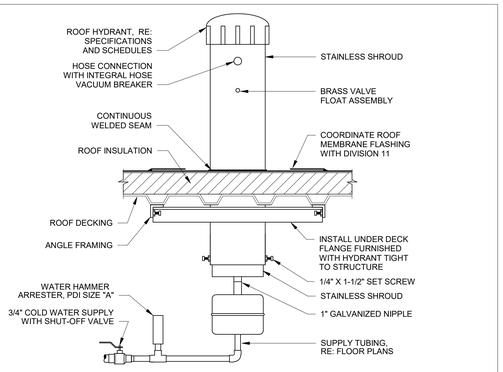
12/14/2023

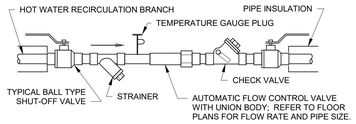
KELLEY P. CRAMM
LICENSE # E-022323

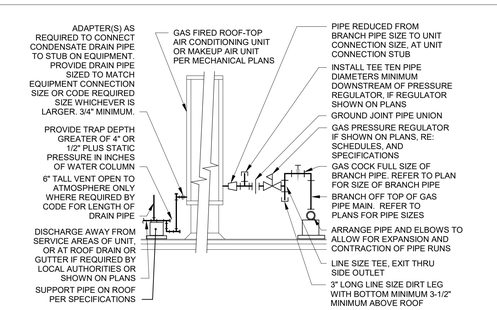
JOB NO: 23026
DRAWN BY: KRV
CHECKED BY: JMP
DATE: 12.15.2023

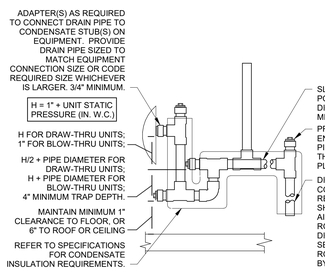
P-103C

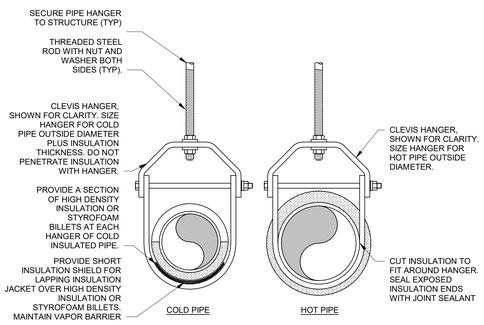
PLUMBING ROOF PLAN - AREA C

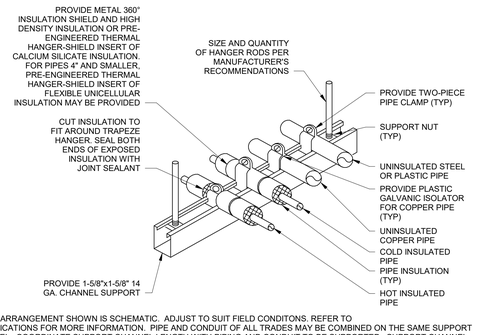


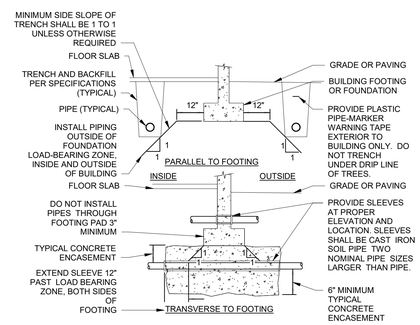












GAS PRESSURE REGULATOR SCHEDULE FOR 2 PSI SYSTEMS

MARK	MANUFACTURER	MODEL	VALVE TYPE	VALVE BODY SIZE (INCHES)	MAX. FLOW RATE (CFH)	INLET PRESSURE (PSI)	OUTLET PRESSURE (INCHES WATER COLUMN)	ACTUAL LOAD (CFH)	SERVICE	NOTES
GPR1	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	100	DOAS-1	A, B, C, D, E, F, G, H
GPR2	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	250	DOAS-2	A, B, C, D, E, F, G, H
GPR3	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	150	DOAS-3	A, B, C, D, E, F, G, H
GPR4	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	130	RTU-3	A, B, C, D, E, F, G, H
GPR5	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	90	RTU-2	A, B, C, D, E, F, G, H
GPR6	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	130	RTU-1	A, B, C, D, E, F, G, H
GPR7	PIETRO-FIORENTINI	31155	C	2"	9,339	1	7"	6,400	B-1, B-2, WH-1	A, B, C, D, E, F, G, H
GPR8	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	350	RTU-4	A, B, C, D, E, F, G, H
GPR9	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	80	RTU-5	A, B, C, D, E, F, G, H
GPR10	PIETRO-FIORENTINI	31052	C	3/4"	665	1	7"	350	RTU-6	A, B, C, D, E, F, G, H

NOTES:

A. C = SELF CONTAINED "DIRECT ACTING" DIAPHRAGM TYPE WITH INTERNAL VENT LIMITER
B. DROOP = 1" WATER COLUMN MAXIMUM
C. 65# ALUMINUM BODY, SCREWED CONNECTIONS AND OVERPRESSURE PROTECTION TO 25 PSI
D. MAXIMUM FLOW RATE SCHEDULED, MATCH BODY SIZE AND MAXIMUM FLOW RATE TO EQUIPMENT FLOW RATE. REFER TO EQUIPMENT SHOP DRAWINGS FOR EXACT LOADS.
E. LISTED TO MEET ANSI Z21.80 / CSA 6.22 WITH CSA LISTING STAMP ON REGULATOR BODY
F. GAS PRESSURE REGULATOR INLET PRESSURE = OPERATING PRESSURE - DESIGN FRICTION LOSS
G. 2 PSI MAXIMUM INLET PRESSURE AND 1 PSI MINIMUM INLET PRESSURE
H. PROVIDE EXTERNAL VENT LIMITER (WHERE APPROVED BY LOCAL AUTHORITIES) FOR INDOOR INSTALLATION AND INSTALL PER SPECIFICATIONS. INSTALL OUTDOORS PER SPECIFICATIONS.

2

PLUMBING FIXTURE CONNECTION SCHEDULE

FIXTURE	COLD WATER	HOT WATER	WASTE	VENT
WATER CLOSET (FV)	1-1/4" (NOTE 1)	--	4"	2"
URINAL	3/4" (NOTE 2)	--	2"	2"
LAVATORY/ HAND SINK	1/2"	1/2"	2"	2"
DRINKING FOUNTAIN	1/2"	--	2"	2"
JANITOR'S SINK	1/2"	1/2"	3"	2"
WASHFOUNTAIN	1"	1"	2"	2"
FLOOR DRAIN	--	--	2"	2"
SINK	1/2"	1/2"	2"	2"

NOTES:

PIPE SIZES SHOWN ARE MINIMUM. AND ARE FOR INDIVIUAL SERVICE PIPE SIZES

(NOTE 1) PROVIDE 1-1/4" CW TO FLUSH VALVE, REDUCE TO 1" PRIOR TO CONNECTING TO FLUSH VALVE INLET AT INSIDE OF WALL
(NOTE 2) PROVIDE 1" CW TO FLUSH VALV...

PLUMBING PIPE MATERIAL SCHEDULE

PIPING SYSTEM	ABBREVIATION	PIPING MATERIAL
SANITARY DRAINAGE & VENT (ABOVE GRADE)	S, W OR V	HUBLESS CAST IRON
SANITARY DRAINAGE & VENT (BELOW GRADE)	S, W OR V	PVC DWV
POTABLE WATER (ABOVE GRADE)	CW, HW OR HWR	TYPE L HARD DRAWN COPPER
CONDENSATE DRAIN - 1" & SMALLER	CD	TYPE M HARD DRAWN COPPER
CONDENSATE DRAIN - 1-1/4" & LARGER	CD	TYPE DWV HARD DRAWN COPPER

REFER TO SPECIFICATIONS FOR FITTINGS, INSTALLATION REQUIREMENTS AND FURTHER INFORMATION

MEDIUM PRESSURE GAS PIPE SIZING CHART

PIPE SIZE	LOAD (CFH)
1/2"	234
3/4"	490
1"	923
1-1/4"	1,896
1-1/2"	2,841
2"	5,471
2-1/2"	8,720
3"	15,415
4"	31,441

FOR SCHEDULE 40 STEEL PIPE
SPECIFIC GRAVITY OF GAS = 0.60
UPSTREAM PRESSURE (PSI) = 2
DOWNSTREAM PRESSURE (PSI) = 1
PRESSURE LOSS (PSI) = 1.0
TOTAL DEVELOPED LENGTH (FEET) = 350
BASED ON NFPA 54 EQUATION 4-2

TOTAL CONNECTED NATURAL GAS LOAD

EQUIPMENT DESIGNATION	DESCRIPTION	CFH (EACH)
RTU-1	ROOFTOP UNIT (ETR)	130
RTU-2	ROOFTOP UNIT (ETR)	90
RTU-3	ROOFTOP UNIT (ETR)	130
RTU-4	ROOFTOP UNIT (ETR)	350
RTU-5	ROOFTOP UNIT (ETR)	80
RTU-6	ROOFTOP UNIT (ETR)	350
B-1	BOILER (ETR)	3,000
B-2	BOILER (ETR)	3,000
WH-1	WATER HEATER (ETR)	400
DOAS-1	DEDICATED OUTSIDE AIR UNIT	100
DOAS-2	DEDICATED OUTSIDE AIR UNIT	250
DOAS-3	DEDICATED OUTSIDE AIR UNIT	150
	TOTAL =	8,030

NATURAL GAS SYSTEM OPERATING PRESSURE: 2 PSI
NATURAL GAS SYSTEM SIZED WITH TOTAL DEVELOPED LENGTH FROM GAS METER TO MOST REMOTE PIECE OF EQUIPMENT: 350 FEET
SYSTEM DESIGN PRESSURE DROP: 1 PSI

PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
EEW	EMERGENCY PULL-DOWN COUNTER MOUNTED EMERGENCY EYE WASH: GUARDIAN # GBF1849, TWO FILTERED SPRAY HEADS WITH SELF REGULATING FLOW CONTROL AND DUST COVERS, POLISHED CHROME BRASS SINGLE ACTION PULL-DOWN VALVE BODY, FULL ACTIVATION IN THE DOWN POSITION. MOUNT ON BACK OF COUNTER OR BACK WALL OUT OF SINK OPERATIONS, CHROME-PLATED BRASS DECK FLANGE, AND 3/8" INLET.
EMV	EMERGENCY MIXING VALVE: POWERS # ES150-AF05012, BRONZE BODY WITH ROUGH BRONZE FINISH, MEETING ASSE 1071, CORROSION RESISTANT INTERNAL PARTS, CHECK STOPS WITH REMOVABLE STRAINERS, DUAL INTERNAL COLD WATER BYPASS, PARAFFIN FILLED TEMPERATURE ELEMENT, DIAL THERMOMETER ON OUTLET, CAPABLE OF 4 GPM WITH A 5 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 1.0 GPM, AND STAINLESS STEEL WALL-MOUNTED CABINET. MAXIMUM TEMPERATURE STOP SET FOR 90°F.
FCO	FLOOR CLEANOUT: JAY R. SMITH, CAST IRON BODY, FLASHING FLANGE WITH CLAMPING COLLAR, ABS PLUG, AND ADJUSTABLE, ROUND, SECURED, NICKEL BRONZE, TOP. # 4031L (-F-C), SCORIATED TOP FOR EXPOSED, FLUSH WITH FINISHED FLOOR, APPLICATION(S), # 4031L (-F-C-Y), STAINLESS STEEL MARKER FOR INSTALLATION IN CARPETED FLOOR AREA(S), # 4151 (-F-C), 1/8" RECESS FOR INSTALLATION IN TILED FLOOR AREA(S), # 4191 (-F-C), 1/2" RECESS FOR INSTALLATION IN TERRAZZO AND SIMILAR POURED FLOOR AREA(S). REFER TO SPECIFICATIONS FOR INSTALLATION.
FCV	FLOW CONTROL VALVE: FLOWDESIGN # ICSS "AUTOFLOW", SERIES 300 STAINLESS UNION BODY WITH NICKEL PLATED UNION NUT, STAINLESS STEEL PRESSURE COMPENSATING CARTRIDGE, MEETING NSF 61 ANNEX G, NAMEPLATE AND 1/2" VALVE BODY SIZE UNLESS SHOWN OTHERWISE ON PLANS. PROVIDE 0.5 GPM FLOW RATE CARTRIDGE UNLESS SHOWN OTHERWISE ON PLANS.
FD1	FLOOR DRAIN: JAY R. SMITH # 2005L (-A), CAST IRON BODY AND CLAMPING COLLAR, ADJUSTABLE 6" ROUND NICKEL BRONZE STRAINER. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FD2	EQUIPMENT FLOOR DRAIN: JAY R. SMITH # 2110L (-B), CAST IRON BODY, 8" ROUND, LOOSE, MEDIUM DUTY, CAST IRON GRATE, SEDIMENT BUCKET, BOTTOM OUTLET, SEEPAGE PAN, AND MEMBRANE FLASHING CLAMP. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
IMB	ICE MAKER BOX: GUY GRAY MODEL # SSMIB1AB, 20 GAUGE STAINLESS STEEL BOX, 18 GAUGE STEEL FACEPLATE, USE STAINLESS STEEL SCREWS ON FACEPATES, BOTTOM INLET WATER SUPPLY WITH 1/2" x 1/4" COMPRESSION ANGLE STOP VALVE. TRIM: LOOP 4 FEET OF 1/4" TYPE "K" SOFT COPPER TUBING.
LV1	WALL-MOUNTED LAVATORY (ADA ACCESSIBLE): AMERICAN STANDARD # 0355.012 "LUCERNE" 20-1/2" X 18-1/4" RECTANGULAR WALL MOUNTED WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. FAUCET: SLOAN # EBF-650 BATTERY POWERED SENSOR FAUCET, 4-INCH CENTERSET, VANDAL RESISTANT, WITH 0.5 GPM MULTI-LAMINAR FLOW OUTLET. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 2.2 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 105°F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S). TRIM: McGUIRE # 155A GRID DRAIN WITH TAILPIECE, McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS, McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, CONCEALED ARM CARRIER WITH STANCHIONS TO FLOOR, PLUMBEREX "PRO-EXTREME" # X-4222 INSULATION KIT FOR WATER AND WASTE PIPES.
LV2	TWO STATION LAVATORY (ADA ACCESSIBLE): SLOANSTONE EW-72000-MSI WALL MOUNTED MULTI-LAV WITH MATRIX SILVER COLORED BOWL WITH INTEGRAL BACKSPLASH AND SIDE PANELS OF SOLID SURFACE MATERIAL WITH STAINLESS STEEL FRONT PANELS AND INTEGRAL AUTOMATED SENSOR FAUCETS AND THERMOSTATIC MIXING VALVE SET AT 105 DEGREES, ANCHOR BACKSPLASH AND HOUSING FRAMEWORK SECURELY TO WALL PER MANUFACTURER'S INSTRUCTIONS. INSTALLATION SHALL CONFORM TO ADA REQUIREMENTS. INSTALL "WCO" UNDERNEATH WASTE CONNECTION. TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS. (2) McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON. ELECTRICAL REQUIREMENTS: 120-VOLT, 5 FULL LOAD AMPS
LV3	THREE STATION LAVATORY (ADA ACCESSIBLE): SLOANSTONE EW-73000-MSI WALL MOUNTED MULTI-LAV WITH MATRIX SILVER COLORED BOWL WITH INTEGRAL BACKSPLASH AND SIDE PANELS OF SOLID SURFACE MATERIAL WITH STAINLESS STEEL FRONT PANELS AND INTEGRAL AUTOMATED SENSOR FAUCETS AND THERMOSTATIC MIXING VALVE SET AT 105 DEGREES. ANCHOR BACKSPLASH AND HOUSING FRAMEWORK SECURELY TO WALL PER MANUFACTURER'S INSTRUCTIONS. INSTALLATION SHALL CONFORM TO ADA REQUIREMENTS. INSTALL "WCO" UNDERNEATH WASTE CONNECTION. TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS. McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON. ELECTRICAL REQUIREMENTS: 120-VOLT, 5 FULL LOAD AMPS
RH	ROOF NON-FREEZE POST HYDRANT: MAPA PRODUCTS # MPH-24FP FREEZE PROOF POST HYDRANT MEETING ASSE #1057 WITH BLACK POWDER COATED CAST ALUMINUM WEATHER-GUARD DOME HANDLE, STAINLESS STEEL SHROUD WITH WELDED STAINLESS STEEL FLANGE, UNDER DECK CLAMP, BRONZE GLOBE ANGLE VALVE, 3/4" HOSE CONNECTION, QUICK DISCONNECT WITH BUILT-IN VACUUM BREAKER, STAINLESS STEEL RESERVOIR.
SK1	SINK (ADA ACCESSIBLE): ELKAY # LR2219-2, 19-1/2" " x 19" x 7-5/8" DEEP, SINGLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 304 STAINLESS STEEL, FIXTURE WITH FAUCET LEDGE AND CENTER DRAIN LOCATION. SET IN BED OF PUTTY. FAUCET: CHICAGO FAUCET # 895-GN2AE35ABCP 4" SPREAD LEAD FREE FAUCET WITH VANDAL RESISTANT LEVER HANDLES, 5-1/4" SWING SPOUT, 1.5 GPM VANDAL RESISTANT LAMINAR OUTLET, QUARTER TURN CERAMIC CARTRIDGES THERMOSTATIC MIXING VALVE: POWERS # LFe480, SOLID LEAD FREE BRASS BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 2.2 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.5 GPM. SET TEMPERATURE TO 120°F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S). TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP WITH BRASS CLEANOUT AND ESCUTCHEON.
SK2	SINK (ADA ACCESSIBLE): ELKAY # LR2219, 19-1/2" " x 19" x 7-5/8" DEEP, SINGLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 304 STAINLESS STEEL, FIXTURE WITH FAUCET LEDGE AND CENTER DRAIN LOCATION. COORDINATE HOLE LOCATION FOR EMERGENCY EYEWASH EITHER IN COUNTER OR IN SINK. SET IN BED OF PUTTY. FAUCET: CHICAGO FAUCET # 895-GN2AE35ABCP 4" SPREAD LEAD FREE FAUCET WITH VANDAL RESISTANT LEVER HANDLES, 5-1/4" SWING SPOUT, 1.5 GPM VANDAL RESISTANT LAMINAR OUTLET, QUARTER TURN CERAMIC CARTRIDGES THERMOSTATIC MIXING VALVE: POWERS # LFe480, SOLID LEAD FREE BRASS BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 2.2 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.5 GPM. SET TEMPERATURE TO 120°F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S). TRIM: McGUIRE # LF2165LKSS12 LEAD FREE BRASS QUARTER TURN, LOOSE KEY, COMPRESSION ANGLE STOP VALVES WITH STAINLESS STEEL BRAIDED RISERS AND ESCUTCHEONS, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP WITH BRASS CLEANOUT AND ESCUTCHEON.
UR1	URINAL (ADA ACCESSIBLE): AMERICAN STANDARD # 6550.001 "ALLBROOK FLOWISE" WHITE VITREOUS CHINA FIXTURE WITH FLUSHING RIM, 3/4" TOP SPUD, AND SIPHON FLUSH ACTION. VALVE: SLOAN ROYAL # 8186-0.5, 0.5 GALLON PER FLUSH, CHROME-PLATED, TOP MOUNTED PLASTIC AND CHROME PLATED METAL HOUSING WITH MECHANICAL OVERRIDE BUTTON, LITHIUM BATTERY POWERED SENSOR OPERATED, DIAPHRAGM TYPE FLUSH VALVE WITH CHLORAMINE RESISTANT DIAPHRAGM WITH PROTECTED ORIFICE, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP WITH VANDAL RESISTANT CAP, VACUUM BREAKER AND 3/4" FLUSH TUBE, SOLID RING PIPE SUPPORT, AND SWEAT ADAPTER KIT. TRIM: SUITABLE CARRIER WITH STANCHIONS TO FLOOR.
WC1	WALL-MOUNTED WATER CLOSET: AMERICAN STANDARD # 3351.101 "AFWALL MILLENIUM FLOWISE" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. VALVE : SLOAN # 8111-1.6-DFB-OR 1.6 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, OVERRIDE BUTTON, LITHIUM BATTERY POWERED SENSOR OPERATED, DIAPHRAGM TYPE FLUSH VALVE WITH CHLORAMINE RESISTANT DIAPHRAGM WITH PROTECTED ORIFICE, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP WITH VANDAL RESISTANT CAP, VACUUM BREAKER AND 1-1/2" FLUSH TUBE AND SWEAT ADAPTER KIT. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS-STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WC2	WALL-MOUNTED WATER CLOSET (ADA ACCESSIBLE): AMERICAN STANDARD # 3351.101 "AFWALL MILLENIUM FLOWISE" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. VALVE : SLOAN # 8111-1.6-DFB-OR 1.6 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, OVERRIDE BUTTON, LITHIUM BATTERY POWERED SENSOR OPERATED, DIAPHRAGM TYPE FLUSH VALVE WITH CHLORAMINE RESISTANT DIAPHRAGM WITH PROTECTED ORIFICE, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP WITH VANDAL RESISTANT CAP, VACUUM BREAKER AND 1-1/2" FLUSH TUBE AND SWEAT ADAPTER KIT. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS-STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WCO	WALL CLEANOUT: JAY R. SMITH # 4530S, CAST IRON CLEANOUT TEE, COUNTER SUNK PLUG, STAINLESS STEEL ROUND COVER AND SCREW, AND IRON PLUG WITH GASKET SEAL. REFER TO SPECIFICATIONS FOR INSTALLATION.
WHA	WATER HAMMER ARRESTER: PRECISION PLUMBING PRODUCTS, HARD DRAWN COPPER BODY WITH WROUGHT COPPER FITTINGS, PISTON TYPE WITH LUBRICATED EPDM "O" RING SEALS, MEETING ASSE 1010 OR PDI WH-201. PROVIDE PDI SIZES "A" THROUGH "F" AS SHOWN ON PLANS. PROVIDE SIZE "A" UNLESS SHOWN OTHERWISE ON THE PLANS.

PIPING ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS. RE: FLOOR PLANS FOR LOCATION.

7 ROOF HYDRANT DETAIL
NTS

REFER TO SPECIFICATIONS, SCHEDULES, AND NOTES FOR MORE INFORMATION. MAKE CONNECTIONS AND PROVIDE INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS. ARRANGEMENT IS SCHEMATIC: PROVIDE REDUCERS AND ADAPTERS AS REQUIRED.

6 AUTOMATIC FLOW CONTROL VALVE TRAIN
NTS

ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. VERIFY CONNECTION LOCATIONS BEFORE INSTALLING PIPE RUNS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS AND INSTALLATION. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. FOR PIPE SIZE(S) REFER TO FLOOR PLANS, OR CODE REQUIREMENTS FOR HVAC UNIT TONNAGE. PROVIDE GAS COCK, UNION AND DIRT LEG SAME SIZE AS BRANCH PIPE. SLOPE CONDENSATE PIPE AS MUCH AS POSSIBLE TOWARD DISCHARGE, 2% MINIMUM. PROVIDE CLEANOUTS IN ENDS AND TURNS OF PIPE PER LOCAL CODE REQUIREMENTS: ADAPTER WITH THREADED CLEANOUT PLUG. PROVIDE MINIMUM 6" CLEARANCE TO ROOF UNDER PIPES.

5 CONNECTIONS TO ROOF-TOP UNIT
NTS

ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS AND INSTALLATION. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. AT MOTORIZED EQUIPMENT ABOVE CEILING, PROVIDE NEOPRENE TUBE AND STAINLESS STEEL SCREW CLAMPS FOR FLEXIBLE CONNECTION. FOR PIPE SIZE(S) REFER TO FLOOR PLANS, OR CODE REQUIREMENTS FOR HVAC UNIT TONNAGE. PROVIDE HANGERS OR SUPPORTS PER SPECIFICATIONS. DO NOT COMBINE CONDENSATE DRAIN PIPES WITH NON-CONDENSATE INDIRECT DRAINS.

4 CONDENSATE DRAIN INSTALLATION
NTS

REFER TO SPECIFICATIONS FOR INSULATION TYPES, INSULATION THICKNESSES, HANGER TYPES, HANGER ROD CONNECTIONS TO STRUCTURE AND HANGER SPACING.

3 PIPE HANGER DETAIL
NTS

PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITONS. REFER TO SPECIFICATIONS FOR MORE INFORMATION. PIPE AND CONDUIT OF ALL TRADES MAY BE COMBINED ON THE SAME SUPPORT CHANNEL. COORDINATE SUPPORT CHANNEL LENGTH WITH PIPING AND CONDUIT TO BE SUPPORTED. SUPPORT CHANNEL SPACING SHALL BE DETERMINED BY SMALLEST PIPE TO BE SUPPORTED. CHANNEL SUPPORT MAY BE USED AS A WALL BRACKET, ATTACH TO WALL WITH ANCHOR BOLTS PER SPECIFICATIONS. FOR HORIZONTAL INSULATED PIPING, ATTACH CLAMPS AS INDICATED ABOVE, FOR VERTICAL INSULATED PIPING, ATTACH CLAMPS TO THE PIPE AND SEAL INSULATION AT BOTH CLAMP ENDS.

2 TRAPEZE PIPE HANGER
NTS

VERIFY EXCAVATION CONDITIONS (SOIL/ROCK) WITH GEOTECHNICAL REPORT AND/OR SITE INVESTIGATIONS. REFER TO SPECIFICATIONS FOR OTHER CONDITIONS. DO NOT INSTALL PIPES UNDER INTERIOR BUILDING SPREAD FOOTINGS OR PILE CAPS. COORDINATE WITH AFFECTED CONTRACTORS PRIOR TO THE START OF WORK.

1 PIPE AND TRENCH LOCATION
NTS

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools

701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
KELLEY P. CRAMM
NUMBER E-22323
REGISTERED PROFESSIONAL ENGINEER

Kelley P. Cramm

12/14/2023

KELLEY P. CRAMM
LICENSE # E-022323

JOB NO: 23026
DRAWN BY: BB
CHECKED BY: ARE
DATE: 12.15.2023

P-301

PLUMBING SCHEDULES & DETAILS

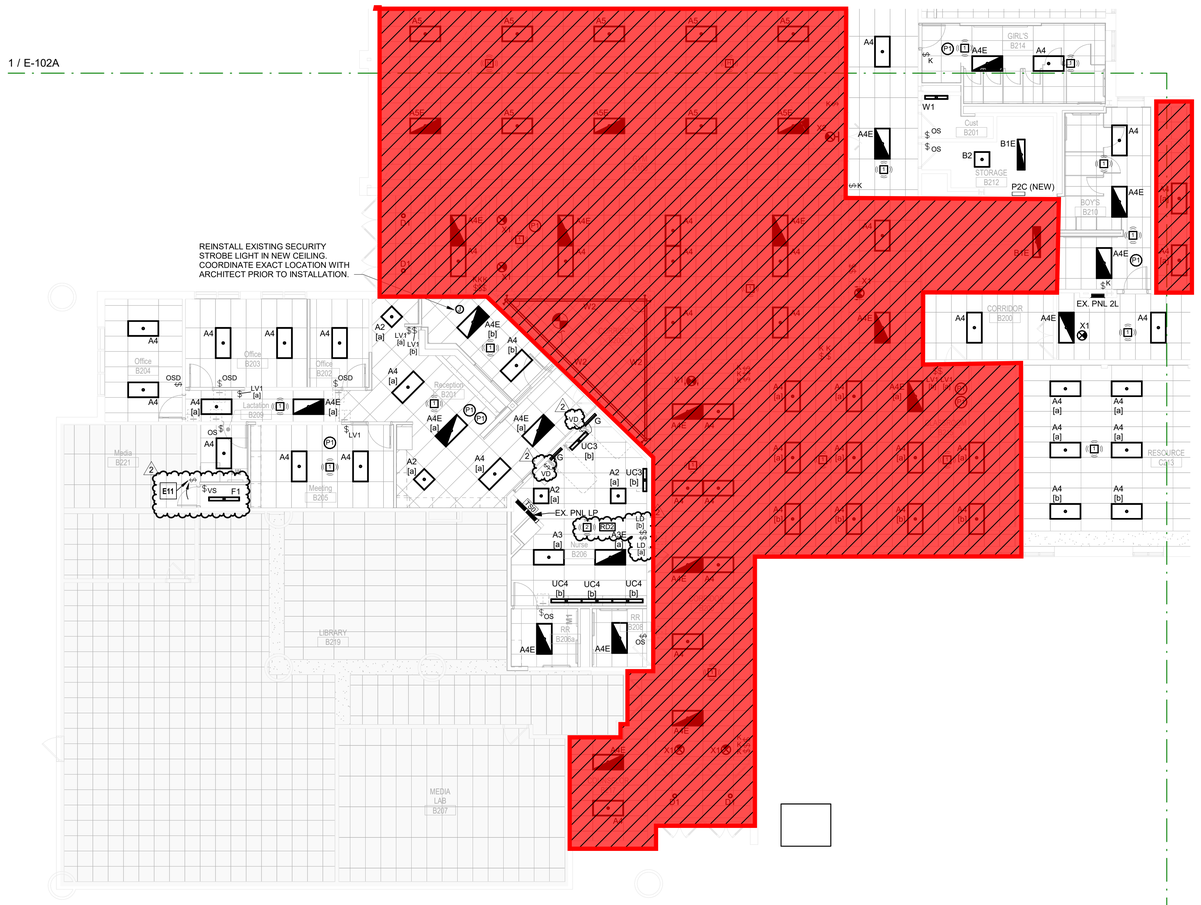
12/14/2023 8:12:24 AM
KELLEY P. CRAMM

LIGHTING GENERAL NOTES:

1. EXISTING ROOM LIGHTING CIRCUITS SHALL BE REUSED TO THE MAXIMUM EXTENT POSSIBLE TO CONNECT TO NEW FIXTURES AND CONTROLS IN EACH SPACE, AS DICATATED BY THE CONTROL SCHEME. EXTEND EXISTING CIRCUITRY AS REQUIRED FOR CONNECTION.

   NEW CIRCUITRY SHOWN ONLY WHERE DIFFERS FROM EXISTING DOCUMENTATION OR CHANGES ARE REQUIRED TO MEET DESIGN INTENT.

= Phase 2 Scope of Work
(Not included in this Bid Package)



1 LIGHTING LEVEL 2 PLAN - AREA B
1/8" = 1'-0"

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

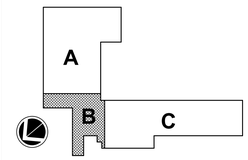
REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

KEY PLAN



JOB NO: 23026
DRAWN BY: HMD
CHECKED BY: ASM
DATE: 11.22.2023

E-102B

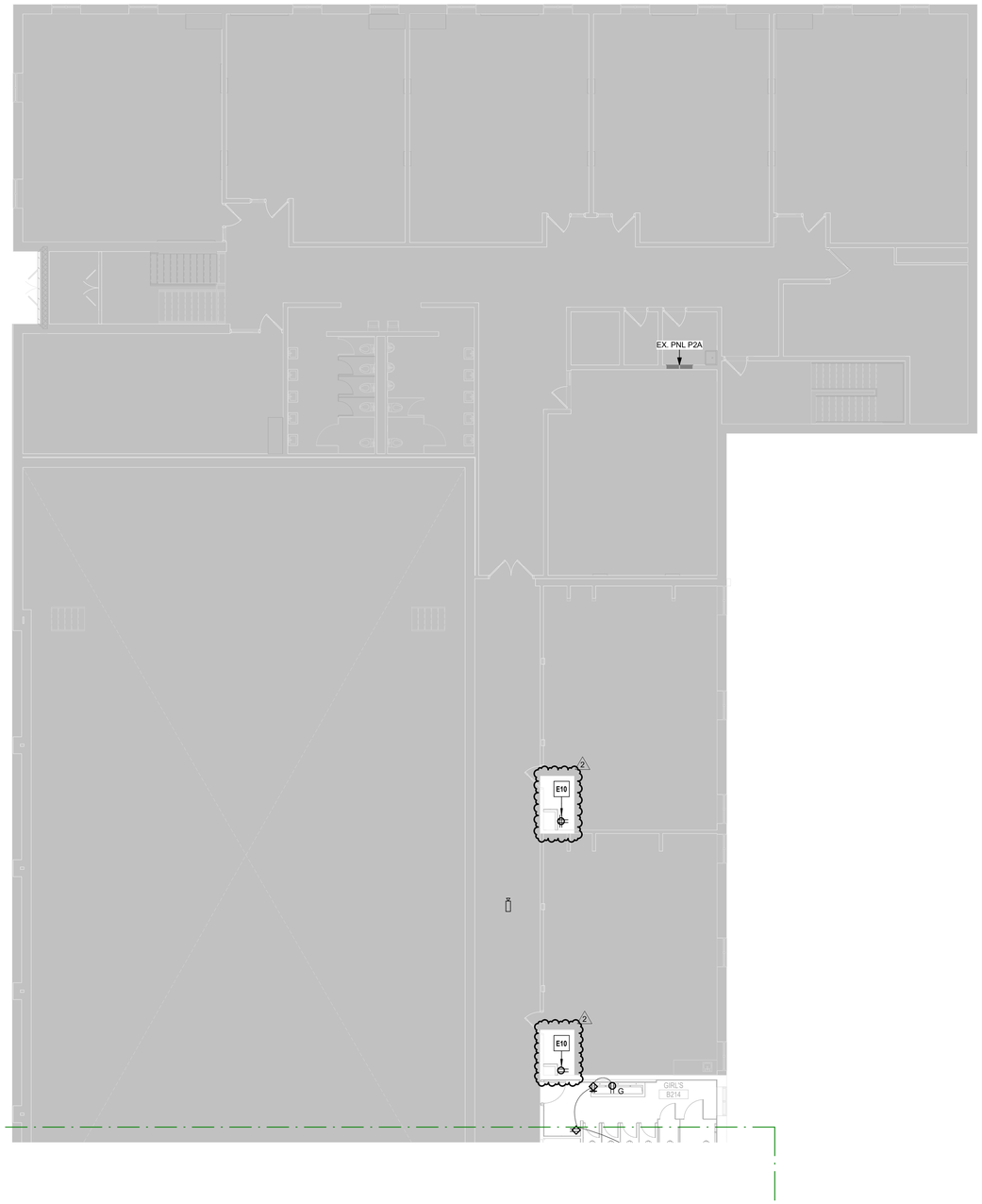
LIGHTING LEVEL 2 PLAN - AREA B

12/13/2023 4:09:10 PM
DOUGLAS M. EVERHART

Please consider the environment before printing this.

ELECTRICAL PLAN NOTES:

E10 PROVIDE NEW RECEPTACLE IN NEW CHASE WALL AND CONNECT TO EXISTING CIRCUIT SERVING RECEPTACLE TO BE REMOVED. REFER TO DEMO PLANS FOR MORE INFORMATION.



1 POWER LEVEL 2 PLAN - AREA A
1/8" = 1'-0"

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School

Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NOTARIES
PE-2019007648
PROFESSIONAL ENGINEER

12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
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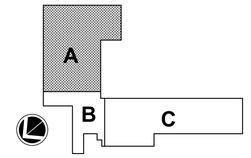
KEY PLAN



E-202A

POWER LEVEL 2 PLAN - AREA A

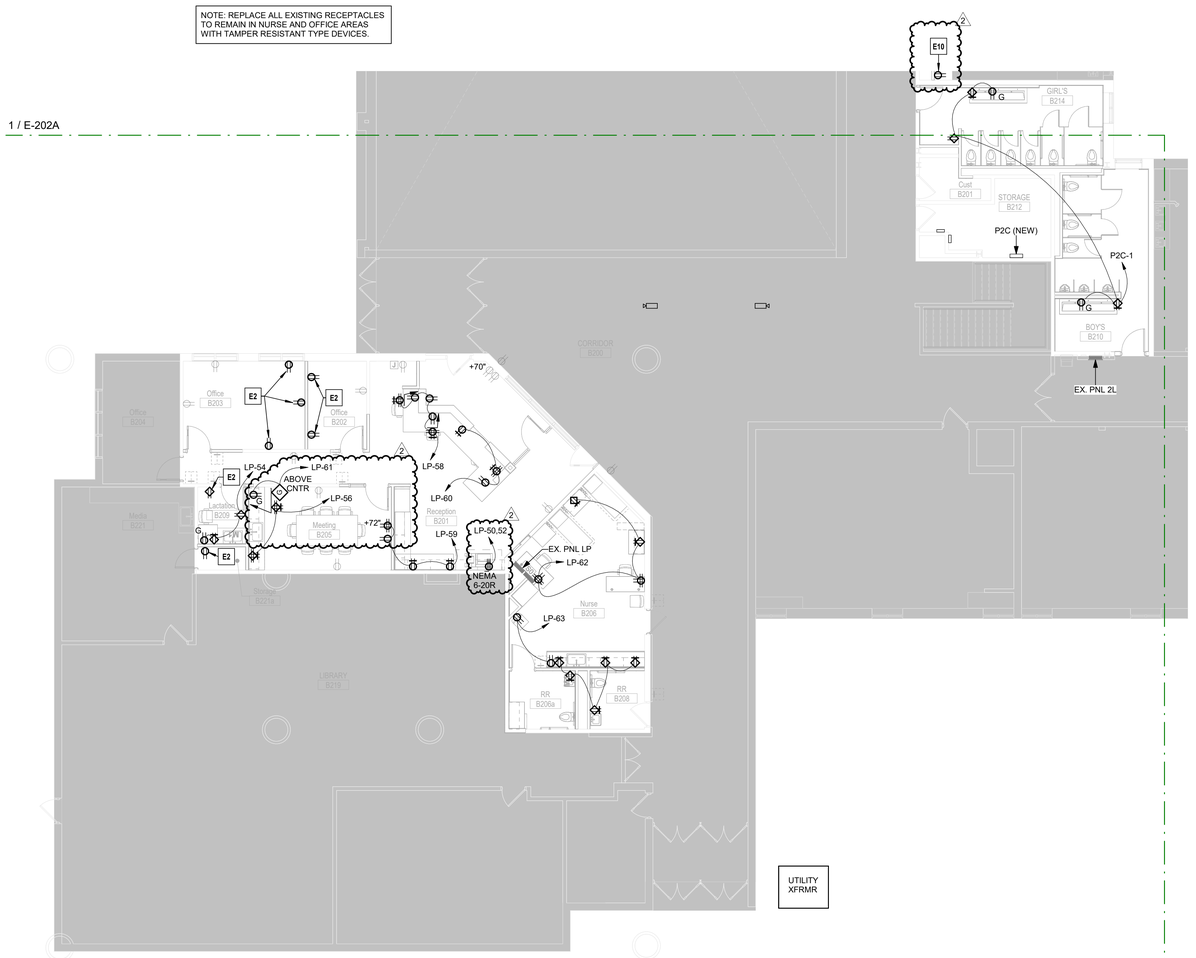
12/13/2023 4:08:16 PM
DOUGLAS M. EVERHART

ELECTRICAL PLAN NOTES:

E2 CONNECT RECEPTACLE IN NEW WALL TO EXISTING CIRCUIT SERVING RECEPTACLE REMOVED IN THE SAME GENERAL LOCATION.

2 E10 PROVIDE NEW RECEPTACLE IN NEW CHASE WALL AND CONNECT TO EXISTING CIRCUIT SERVING RECEPTACLE TO BE REMOVED. REFER TO DEMO PLANS FOR MORE INFORMATION.

NOTE: REPLACE ALL EXISTING RECEPTACLES TO REMAIN IN NURSE AND OFFICE AREAS WITH TAMPER RESISTANT TYPE DEVICES.



1 POWER LEVEL 2 PLAN - AREA B
1/8" = 1'-0"

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REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

12/14/2023

DOUGLAS M. EVERHART
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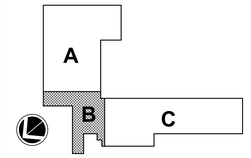
E-202B

KEY PLAN



POWER LEVEL 2 PLAN - AREA B

12/13/2023 4:09:23 PM
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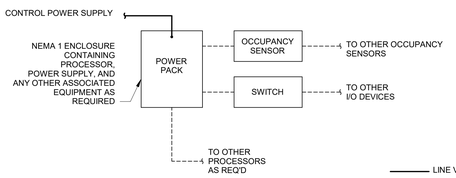
LIGHT FIXTURE SCHEDULE GENERAL NOTES:

1. ALL LIGHT FIXTURES AND RELATED COMPONENTS SHALL BE PROVIDED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE.
2. ALL LIGHT FIXTURES AND RELATED COMPONENTS SHALL BE PROVIDED BY THE CONTRACTOR AS PART OF THE BASE BID, UNLESS NOTED OTHERWISE.
3. THE PARTY SUPPLYING THE LIGHT FIXTURES IS RESPONSIBLE FOR SUPPLYING THE PROPER QUANTITY OF LIGHT FIXTURES.

SEQUENCE OF OPERATIONS

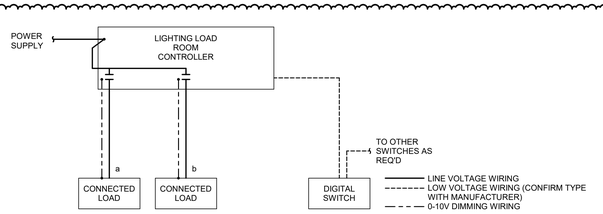
1. Classrooms
   a. Timeclock: N/A
   b. Daylighting: Lighting within daylight zone shall be switched separately from general lighting space lighting
   c. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
   d. Occupancy: Occupant must manually turn lights on.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.
2. Corridor
   a. Timeclock: N/A
   b. Daylighting: N/A
   c. Manual Control: Keyed switches
   d. Occupancy: Lights shall turn on to 100%.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.
3. Gym
   a. Timeclock: N/A
   b. Daylighting: N/A
   c. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
   d. Occupancy: Occupant must manually turn lights on.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.
4. Private Office, Nurse, Reception
   a. Timeclock: N/A
   b. Daylighting: N/A
   c. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
   d. Occupancy: Occupant must manually turn lights on.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.
5. Electrical/Mechanical Rooms
   a. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
6. Janitor/Storage
   a. Timeclock: N/A
   b. Daylighting: N/A
   c. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
   d. Occupancy: Occupant must manually turn lights on.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.
7. Cafeteria/Multipurpose Room
   a. Timeclock: N/A
   b. Daylighting: Lighting within daylight zone shall be switched separately from general lighting space lighting
   c. Manual Control: Occupant can manually control lights via local switch(es). (on/off)
   d. Occupancy: Occupant must manually turn lights on.
   e. Vacancy: After 20-mintues, all controlled loads shall turn off.



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
3. PROVIDE SYSTEM PROGRAMMING AS REQUIRED FOR SYSTEM TO OPERATE PER THESE CONTRACT DOCUMENTS.
4. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

1 DISTRIBUTED LIGHTING CONTROL DIAGRAM
NTS



NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. QUANTITY OF RELAYS SHOWN IS GENERIC. REFER TO PLANS, LIGHTING CONTROL DEVICE SCHEDULE, AND SHOP DRAWINGS FOR FINAL QUANTITY PER ROOM CONTROLLER.
3. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
4. CIRCUITING SHOWN ON THE PLAN CORRESPONDS TO THE LIGHTING CONTROL INTENT. IF CIRCUITING IS CHANGED IN THE FIELD, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS THE ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULES IN RECORD DRAWINGS.
5. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

v1.00

4 ROOM CONTROLLER DETAIL - ON/OFF OR ON/OFF/0-10V DIMMING CONTROL
NTS

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	SERIES / MODEL	APPROVED ALTERNATES	SOURCE QTY	SOURCE TYPE	SOURCE CRI	SOURCE CCT	SOURCE LUMENS	DIMMING TYPE	VOLTAGE	INPUT WATTS	INPUT VA	DESCRIPTION	NOTES
A2/A2E	HE WILLIAMS	LT SERIES LT-22-L27/835-AF-(EM/10W)-DIM-UNV	COOPER LITHONIA	-	LED	80	3500K	2722LM	0-10V, 10%	277	21	23	2X2 LED RECESSED TROFFER, DIFFUSE LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER.	
A3/A3E	COOPER LIGHTING	FPS LED SERIES 22FPSL2SCT3-EL10W	HE WILLIAMS LITHONIA	-	LED	80	3500K	SELECT	0-10V, 10%	277	22	24	2X4 LED FULLY LUMINOUS FLAT PANEL, CLEAR ACRYLIC LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER.	
A4/A4E	HE WILLIAMS	LT SERIES LT-24-L40/835-AF-(EM/10W)-DIM-UNV	COOPER LITHONIA	-	LED	80	3500K	3972LM	0-10V, 10%	277	32	35	2X4 LED RECESSED TROFFER, DIFFUSE LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER.	
A5/A5E	HE WILLIAMS	LT SERIES LT-24-L64/835-AF-(EM/10W)-DIM-UNV	COOPER LITHONIA	-	LED	80	3500K	6396LM	0-10V, 10%	277	49	53	2X4 LED RECESSED TROFFER, DIFFUSE LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER. 10W INTEGRAL EMERGENCY BATTERY ON A5E FIXTURES	
B1/B1E	HE WILLIAMS	LT SERIES LT-14-L28/835-AF-(EM/10W)-LT-14-SMK-W-DIM-UNV	COOPER LITHONIA	-	LED	80	3500K	2814LM	0-10V, 10%	277	21	24	1X4 LED SURFACE MOUNT TROFFER, DIFFUSE LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER.	
B2/B2E	HE WILLIAMS	LT SERIES LT-22-L27/835-AF-(EM/10W)-LT-22-SMK-W-DIM-UNV	COOPER LITHONIA	-	LED	80	3500K	2722LM	0-10V, 10%	277	21	23	2X2 LED SURFACE MOUNT TROFFER, DIFFUSE LENS. INTEGRAL 0-10V 10% DIMMABLE DRIVER.	
D1	HE WILLIAMS	6DR-TL SERIES 6DR-TL-L20/835-DIM-UNV-OW-OF-CS	COOPER LITHONIA	-	LED	80	3500K	1497LM	0-10V, 1%	277	14	15	6" LED DOWNLIGHT	
D1E	HE WILLIAMS	6DR-TL SERIES 6DR-TL-L20/835-DIM-UNV-OW-OF-CS-(WET/DC)	COOPER LITHONIA	-	LED	80	3500K	1497LM	0-10V, 1%	277	14	15	6" LED DOWNLIGHT WITH EMERGENCY OPTION AND WET/CC TRIM OPTION FOR USE IN EXTERIOR LOCATIONS UNDER COVERED CEILING.	
F1/F1E	HE WILLIAMS	75R SERIES 75R-4-L30/835-EM/10WLP-UNV	COOPER LITHONIA	-	LED	80	3500K	2916LM	N/A	277	20	22	ROUND LENSED 4 FT NARROW STRIP FOR BACK OF HOUSE AREAS.	
F2	HE WILLIAMS	75R SERIES 75R-2-L15/835-EM/10WLP-UNV	COOPER LITHONIA	-	LED	80	3500K	1511LM	N/A	277	11	12	ROUND LENSED 2 FT NARROW STRIP FOR BACK OF HOUSE AREAS.	
FP1/FP1E	HE WILLIAMS	75R SERIES 75R-4-L30/835-EM/10WLP-UNV	COOPER LITHONIA	-	LED	80	3500K	2916LM	0-10V, 10%	277	20	22	ROUND LENSED 4 FT PENDANT MOUNTED NARROW STRIP FOR BACK OF HOUSE AREAS.	
G	XICO	ESO275-W SERIES ESO275-W-2-MWH-E2-OFL-S80-35-DLAM-35-UNV-FD10-NN-EMB-(CONTROL SYSTEM)-WM-SWMB	TBD	-	LED	80	3500K	2902LM	0-10V, 1%	277	41	45	2'-0" WALL SCONCE. SLIM PROFILE, INTEGRAL 0-10% / 0-10V DIMMING DRIVER.	
UC3	COOPER LIGHTING	HU11 SERIES HU11XXD9SP	HE WILLIAMS LITHONIA	-	LED	90	SELECT	1125LM	0-10V, 5%	120	16	17	SLIM UNDERCABINET FIXTURE, FROSTED ACRYLIC LENS, HARDWIRED END FEED (NO PLUG), LENGTHS AS SHOWN ON PLANS - MOUNT END TO END FOR ENTIRE LENGTH OF CABINET. PROVIDE DAISY CHAIN CONNECTIONS AS NEEDED. ARCHITECT TO SELECT FINISH. FIXTURE TO BE ROUTED THROUGH SWITCH IN ROOM.	
UC4	COOPER LIGHTING	HU11 SERIES HU11XXD9SP	HE WILLIAMS LITHONIA	-	LED	90	SELECT	1540LM	0-10V, 5%	120	21	23	SLIM UNDERCABINET FIXTURE, FROSTED ACRYLIC LENS, HARDWIRED END FEED (NO PLUG), LENGTHS AS SHOWN ON PLANS - MOUNT END TO END FOR ENTIRE LENGTH OF CABINET. PROVIDE DAISY CHAIN CONNECTIONS AS NEEDED. ARCHITECT TO SELECT FINISH. FIXTURE TO BE ROUTED THROUGH SWITCH IN ROOM.	
W1	HE WILLIAMS	WMAUD SERIES WMAUD-3-L30/835UI/L30/835U-AF-EM/10W-UNV	COOPER LITHONIA	-	LED	80	3500K	6174LM	0-10V, 5%	277	47	51	ARCHITECTURAL WALL MOUNT UP/DOWN.	
W2	FLUXWERX	LN1 SERIES LN1-P3-D-WW-W1-835-A-F2-1/K-(FIELD VERIFY LNGTHS)-N	TBD	-	LED	80	3500K	1100LM/ 4FT	0-10V, 3%	277	279	307	ULTRA SLIM LINEAR, WALL MOUNTED AROUND PERIMETER OF TRIANGLE SPACE IN COMMONS AREA.	
W3	COOPER LIGHTING	LSRWM8B SERIES LSRWM8B20D010MB EC8B10208035 8LBMH	HE WILLIAMS LITHONIA	-	LED	80	3500K	2000LM	0-10V, 1%	277	21	23	WALL MOUNT CYLINDER DOWNLIGHT	
X1	LITHONIA	EXRG EL M6	HE WILLIAMS COOPER	-	LED	-	-	-	N/A	277	1	1	RED TEXT CEILING MOUNT EXIT WITH Ni-MH BACKUP BATTERY.	
X2	LITHONIA	EXRG EL M6	HE WILLIAMS COOPER	-	LED	-	-	-	N/A	277	1	1	RED TEXT WALL MOUNT EXIT WITH Ni-MH BACKUP BATTERY.	

LIGHTING CONTROL DEVICE SCHEDULE

LINE-VOLTAGE WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$VS $OS	LEGRAND DW-200	ACUITY, COOPER CRESTRON, HUBBELL LEVITON, LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCHES. DUAL RELAY. LINE-VOLTAGE. LOAD: 120V=800W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

LINE-VOLTAGE DIMMING WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$OSD	LEGRAND PW-100D	N/A	WALL MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCH. SINGLE RELAY. LINE-VOLTAGE. FORWARD PHASE DIMMING. LOAD: 120V=700W, 277V=1200W.	MAJOR 30' x 35' MINOR 15' x 20'	120/ 277	
$VD	LEGRAND PW-311	ACUITY, CRESTRON HUBBELL, LUTRON	WALL MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. MULTI-WAY. INTEGRAL MANUAL OVERRIDE SWITCH. SINGLE RELAY. LINE-VOLTAGE. 0-10V DIMMING. 50mA SINK. LOAD: 120V=1000W, 277V=1200W.	MAJOR 30' x 35' MINOR 15' x 20'	120/ 277	

STAND-ALONE LOW-VOLTAGE LIGHTING CONTROL SYSTEMS

STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
(1)	LEGRAND DT-300	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE. LOW-VOLTAGE. ISOLATED RELAY.	PIR MAJOR 36' Ø PIR MINOR 25' Ø ULT 36' x 36'	24	
(H)	LEGRAND HB-300B-L3	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. 360 DEGREE COVERAGE. LOW-VOLTAGE.	40' Ø (20' MOUNTING)	24	

STAND-ALONE LOW-VOLTAGE POWER PACKS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
(P1)	LEGRAND BZ-250	ACUITY, COOPER HUBBELL, LEVITON	POWER PACK FOR LOW-VOLTAGE OCCUPANCY SENSORS. 20A LOAD. (1) RELAY. MANUAL- AND AUTO-ON MODES. HOLD-ON AND -OFF INPUTS. LOAD: 16A AT 120V OR 277V. OUTPUT: 225mA AT 24V. PLENUM RATED.	120/ 277	

STAND-ALONE LOW-VOLTAGE SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$LV1	LEGRAND DCC2	ACUITY, COOPER HUBBELL, LEVITON	MOMENTARY 1-BUTTON DECORATOR SWITCH FOR MANUAL ON/OFF CONTROL OF STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON.	24	

NETWORK LIGHTING CONTROL SYSTEMS

NETWORK OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
(2)	LEGRAND LMDC-100	ACUITY, CRESTRON ETC, HUBBELL	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE. DIGITAL. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	PIR MAJOR 32' Ø PIR MINOR 15' Ø ULT MAJOR 25' x 25'	24	

NETWORK ROOM CONTROLLERS (POWER PACK)

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
RC2	LEGRAND LMRC-212 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (2) RELAY OUTPUTS. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	

NETWORK LIGHTING SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$LD	LEGRAND LMDM-101	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL SWITCH FOR MANUAL ON/OFF/DIMMING CONTROL. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	24	

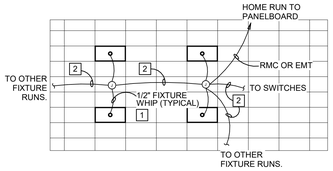
GENERAL NOTES:

A. OCCUPANCY SENSOR LAYOUT DESIGNED FROM BASIS-OF-DESIGN COVERAGE PATTERNS. IF SUBMITTING ALTERNATE PER 'EQUIVALENT MANUFACTURER' COLUMN, ADJUST SENSOR QUANTITIES AND LOCATIONS PER MANUFACTURER-SPECIFIC SPACING CRITERIA.
B. PROVIDE SHOP DRAWINGS FOR ENGINEER AND ARCHITECT REVIEW THAT INCLUDE PRODUCT CUTSHEETS AND PROJECT-SPECIFIC LAYOUTS. LAYOUTS MUST INCLUDE SENSOR LOCATIONS, HEIGHTS, ORIENTATION, AND COVERAGE AREAS. SHOW COORDINATION WITH ALL OTHER CEILING DEVICES INCLUDING BUT NOT LIMITED TO HVAC SUPPLY AND RETURN GRILLES, SPRINKLERS, LIGHT FIXTURES, AND OTHER OWNER-PROVIDED CEILING MOUNTED DEVICES SUCH AS SPEAKERS, SECURITY CAMERAS, PROJECTORS, ETC. (SENSORS MAY BE ADVERSELY AFFECTED IF LOCATED TOO CLOSE TO OTHER CEILING MOUNTED DEVICES). ALSO PROVIDE SCHEMATICS AND SCHEDULES WHEN APPLICABLE.
C. LIGHTING CONTROLS PRICING SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING.
D. VERIFY COLOR(S) FOR ALL WALL AND CEILING MOUNTED DEVICES WITH THE ARCHITECT.
E. ALL WALL SWITCH AND CEILING SENSORS SHALL HAVE AN ADJUSTABLE TIME DELAY RANGE OF 0-30 MIN, UNO. CONFIRM SENSOR SETTINGS WITH SEQUENCE OF OPERATIONS AND OWNER PRIOR TO SYSTEM COMMISSIONING.
F. PROVIDE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS FOR ALL DEVICES TO OWNER.
G. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL SWITCH LOCATIONS PER NEC REQUIREMENTS.
H. DO NOT SHARE NEUTRAL CONDUCTOR ON LOAD SIDE OF DIMMERS.

VERSION 4.06

ELECTRICAL NOTES:

1. PROVIDE SUFFICIENT LENGTH TO MOVE CENTER OF LUMINAIRE IN A 5'-0"
2. RADIUS OF THE LOCATION SHOWN ON THE PLANS. RMC OR EMT (UNLESS TYPE MC CABLE IS ALLOWED BY SPECIFICATIONS. IF MORE THAN 4 CURRENT CARRYING CONDUCTORS INCLUDING NEUTRALS, MC CABLE IS NOT ALLOWED).



2 LIGHTING STANDARD LUMINAIRE WIRING
NTS

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Architecture # 2000161
Structure # 2006031333

Henderson Engineers
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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
12/14/2023
DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: HMD
CHECKED BY: ASM
DATE: 11.22.2023

E-500

LIGHT FIXTURE SCHEDULE

12/13/2023 4:09:29 PM
DOUGLAS M. EVERHART

PANELBOARD: P1A (ETR)

BUS AMPS: 225A
MAIN SIZE/TYPE: 200A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP2
AIC RATING: 10000; FULLY RATED
MOUNTING: SURFACE
SERVES: GENERAL POWER
LOCATION: LOWER LEVEL E WING ADDITION
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
EX	1	PLUGMOLD 114	1,200			EX	20	1	1	20	EX	260			LTG RM 106,107,109	2	EX
EX	3	PLUGMOLD 115		1,200		EX	20	1	1	20	EX		1,800		LTG RM 110	4	EX
EX	5	PLUGMOLD 115			1,400	EX	20	1	1	20	EX			1,300	LTG RM 111	6	EX
EX	7	PLUGMOLD 111	1,600			EX	20	1	1	20	EX	1,300			LTG RM 111	8	EX
EX	9	PLUGMOLD 111		1,400		EX	20	1	1	20	EX		1,300		LTG RM 111	10	EX
EX	11	PLUGMOLD 112,113			1,000	EX	20	1	1	20	EX			1,500	LTG RM 114	12	EX
EX	13	PLUGMOLD 102,104	1,000			EX	20	1	1	20	EX	1,300			LTG RM 115	14	EX
EX	15	PLUGMOLD 105		1,600		EX	20	1	1	20	EX		1,400		LTG RM 115	16	EX
EX	17	PLUGMOLD 105			1,600	EX	20	1	1	20	EX			1,300	LTG RM 104	18	EX
EX	19	UNIT VENTALATORS	1,500			EX	20	1	1	20	EX	1,200			LTG RM 104	20	EX
EX	21	ELEV LTS/RCPT		400		EX	20	1	1	20	EX		900		LTG RM 102,103	22	EX
FV	23	EXISTING LOAD				EX	20	1	1	20	EX			1,600	LTG RM 101	24	EX
EX	25	RCPTS 104,106,107,109				EX	20	1	1	20	EX	1,800			LTG RM 105	26	EX
EX	27	ELEV CTRLS		1,000		EX	20	1	1	20	EX		1,200		LTG RM 100	28	EX
FV	29	EXISTING LOAD				EX	20	1	1	20	EX			800	LTG STAIRS	30	EX
		SECTION: 2															
FV	31	EXISTING LOAD				EX	20	1	1	20	EX	300			VOL BOXES	32	EX
EX	33	DRINK FOUNTAIN		1,200		EX	20	1	1	20	EX				EXISTING LOAD	34	FV
EX	35	DRINK FOUNTAIN			1,000	EX	20	1	1	20	EX				EXISTING LOAD	36	FV
EX	37	REFRIGE HALL EAST	1,000			EX	20	1	1	25	EX	2,300			HAND DRYER 103	38	EX
EX	39	PLUGMOLD 101		1,600		EX	20	1	1	25	EX		2,300		HAND DRYER 103	40	EX
EX	41	PLUGMOLD 101			1,600	EX	20	1	1	25	EX			2,300	HAND DRYER 102	42	EX
	43								1	25	EX	2,300			HAND DRYER 102	44	EX
D	45	SPARE					35	3	1	20	EX		500		AHU CONTROLS	46	EX
	47								1	20	EX			500	AHU CONTROLS	48	EX
	49		3,423						1	20	EX				PLUGMOLD 110	50	EX
R	51	AHU-2		3,423		6	60	3	1	20	EX				PLUGMOLD 110	52	EX
	53				3,423				1	20	EX				EXISTING LOAD	54	FV
EX	55	EQUIPPED SPACE						1	1						EQUIPPED SPACE	56	EX
EX	57	EQUIPPED SPACE						1	1						EQUIPPED SPACE	58	EX
EX	59	EQUIPPED SPACE						1	1						EQUIPPED SPACE	60	EX
		SUBTOTAL	9,723	11,823	10,023							10,760	9,400	9,300	SUBTOTAL		

TOTAL PHASE A - VA	20,483	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	171	COOLING [C]	10,269	1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA	21,223	HEATING [H]	10,269	0	SIGNAGE [S]		1.25	
AMPS	177	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	19,323	RECEPTACLES [R]		1.0/.5	EXISTING [E]	50,760	1.00	
AMPS	161	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
TOTAL PNLBD - VA	61,029	SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	61,029 VA
AMPS	169	MISC EQUIP [Z]		1.00	LTG TRACK		1.00	169 A

PANELBOARD NOTES

FEED THRU CONNECTION: #4/0

PANELBOARD: P2A (ETR)

BUS AMPS: 225A
MAIN SIZE/TYPE: 200A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP2
AIC RATING: 10000; FULLY RATED
MOUNTING: SURFACE
SERVES: GENERAL POWER
LOCATION: UPPER LEVEL E WING ADDITION
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
EX	1	PLUGMOLD 200				EX	20	1	1	20	EX				LIGHTS 209	2	EX
EX	3	PLUGMOLD 200				EX	20	1	1	20	EX				LIGHTS 209	4	EX
EX	5	PLUGMOLD 213				EX	20	1	1	20	EX				LIGHTS 210	6	EX
EX	7	PLUGMOLD 213				EX	20	1	1	20	EX				LIGHTS 210	8	EX
EX	9	PLUGMOLD 213				EX	20	1	1	20	EX				LIGHTS 204	10	EX
EX	11	PLUGMOLD 212				EX	20	1	1	20	EX				LIGHTS 205,206	12	EX
EX	13	PLUGMOLD 212				EX	20	1	1	20	EX				LIGHTS 211	14	EX
EX	15	PLUGMOLD 211				EX	20	1	1	20	EX				LIGHTS 211	16	EX
EX	17	PLUGMOLD 211				EX	20	1	1	20	EX				LIGHTS 212	18	EX
EX	19	PLUGMOLD 210				EX	20	1	1	20	EX				LIGHTS 212	20	EX
EX	21	PLUGMOLD 210				EX	20	1	1	20	EX				LIGHTS 201,202	22	EX
EX	23	PLUGMOLD 209				EX	20	1	1	20	EX				LIGHTS 200	24	EX
EX	25	PLUGMOLD 209				EX	20	1	1	20	EX				LIGHTS 213	26	EX
EX	27	PLUGMOLD 209				EX	20	1	1	20	EX				LIGHTS 213	28	EX
EX	29	EXISTING LOAD				EX	20	1	1	20	EX				EXISTING LOAD	30	FV
		SECTION: 2															
	31		1,885						1	20	EX				LIGHTS 207	32	EX
N	33	AHU-3		1,885		10	30	3	1	20	EX				VOL. BOXES	34	EX
	35				1,885				1	20	EX				DRINK FOUNTAIN	36	EX
	37		1,885						1	20	EX				DRINK FOUNTAIN	38	EX
N	39	AHU-4		1,885		10	30	3	1	25	EX				HAND DRYER 202	40	EX
	41				1,885				1	25	EX				HAND DRYER 202	42	EX
EX	43	EF-1				EX	20	1	1	25	EX				HAND DRYER 201	44	EX
EX	45	UNIT VENTILATORS				EX	20	1	1	25	EX				HAND DRYER 201	46	EX
EX	47	RCPTS 203,205,206				EX	20	1	1	20	EX				LIGHTS 203	48	EX
EX	49	RCPTS 201,202,203				EX	20	1	1	20	EX				LIGHTS 203	50	EX
EX	51	PLUGMOLD 204				EX	20	1	1	20	EX				OUTSIDE LIGHTS	52	EX
EX	53	PLUGMOLD 204				EX	20	1	1	20	EX				EXISTING LOAD	54	FV
EX	55	GYM AHU CONTROLS				EX	20	1	1						EQUIPPED SPACE	56	EX
EX	57	EQUIPPED SPACE						1	1						EQUIPPED SPACE	58	EX
EX	59	EQUIPPED SPACE						1	1						EQUIPPED SPACE	60	EX
		SUBTOTAL	3,770	3,770	3,770										SUBTOTAL		

TOTAL PHASE A - VA	3,770	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	31	COOLING [C]	11,310	1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA	3,770	HEATING [H]	11,310	0	SIGNAGE [S]		1.25	
AMPS	31	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	3,770	RECEPTACLES [R]		1.0/.5	EXISTING [E]		1.00	
AMPS	31	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
TOTAL PNLBD - VA	11,310	SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	11,310 VA
AMPS	31	MISC EQUIP [Z]		1.00	LTG TRACK		1.00	31 A

PANELBOARD NOTES

FEED THRU CONNECTION: #4/0

PANELBOARD: LP (ETR)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP
AIC RATING: 10000; FULLY RATED
MOUNTING: RECESSED
SERVES: GENERAL POWER
LOCATION: OFFICE AREA
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
EX	1	RECPT 203,204,213				EX	20	1	1	20	EX				PLUGMOLD COMPUTER ROOM	2	EX
EX	3	PLUGMOLD RM 213				EX	20	1	1	20	EX				PLUGMOLD COMPUTER ROOM	4	EX
EX	5	RECPT 203,204,213				EX	20	1	1	20	EX				PLUGMOLD COMPUTER ROOM	6	EX
EX	7	COPY MACHINE 204				EX	20	1	1	20	EX				PLUGMOLD COMPUTER ROOM	8	EX
EX	9	RECPT 210,211,212				EX	20	1	1	20	EX				RECPTS COMPUTER ROOM	10	EX
EX	11	RECPT 210,211,212				EX	20	1	1	20	EX				RECPTS COMPUTER ROOM	12	EX
EX	13	RECPT 210,211,212				EX	20	1	1	20	EX				LIGHTS 214	14	EX
EX	15	RECPT 214,215				EX	20	1	1	20	EX				LIGHTS 215 HALL 220	16	EX
EX	17	RECPT 214, LIBRARY DESK				EX	20	1	1	20	EX				LIGHTS COMPUTER ROOM	18	EX
EX	19	RECPT 215				EX	20	1	1	20	EX				LIGHTS MAIN HALLWAYS	20	EX
EX	21	RECPT 203,205,206,207,208				EX	20	1	1	20	EX				LIGHTS MAIN HALLWAYS	22	EX
EX	23	RECPT 203,205,206,207,208				EX	20	1	1	20	EX				LIGHTS MAIN HALLWAYS	24	EX
EX	25	RECPT 203,205,206,207,208				EX	20	1	1	20	EX				LIGHTS MAIN HALLWAYS	26	EX
EX	27	RECPT 214,216,220				EX	20	1	1	20	EX				LIGHTS 204,205,207,208,211	28	EX
EX	29	RECPT 214,216,220				EX	20	1	1	20	EX				LIGHTS 204,205,207,208,212	30	EX
EX	31	RECPT 214,216,220				EX	20	1	1	20	EX				LIGHTS 204,205,207,208,214	32	EX
EX	33	SECRUITY PANEL				EX	20	1	1	20	EX				LIGHTS 216 N	34	EX
EX	35	FIRE ALARM PANEL				EX	20	1	1	20	EX				LIGHTS 216 N	36	EX
EX	37	INTERCOM				EX	20	1	1	20	EX				LIGHTS 216 S	38	EX
EX	39	POWER POLE LRC				EX	20	1	1	20	EX				LGTS OUTSDE WALLPKS/TIMER	40	EX
EX	41	EQUIPPED SPACE						1	1	20	EX				LIGHTS - SKYLIGHT	42	EX
		SECTION: 2															
EX	43	PARKING LOT LIGHTS				EX	40	2	1	20	EX				PARKING LOT LIGHTS	44	EX
	45								1	20	EX				EXISTING LOAD	46	FV
EX	47	PLUGMOLD 215 AV STOR				EX	20	1	1	20					SPARE	48	EX
EX	49	CUSTODIAL CLOSET				EX	20	1	2	20	12	1,000			COPIER 208 ACU	50	N
FV	51	EXISTING LOAD				EX	30	1					1,000			52	
FV	53	EXISTING LOAD				EX	20	1	1	20	12			540	RCPT - LACTATION B209	54	N
FV	55	EXISTING LOAD				EX	20	1	1	20	12	1,260			RCPT - MEETING B205	56	N
FV	57	EXISTING LOAD				EX	20	1	1	20	12		1,260		RCPT - RECEPTION DESK B201	58	N
N	59	RCPT - CONTR B201 & TV B205			900	12	20	1	1	20	12			720	RCPT - RECEPTION DESK B201	60	N
N	61	RCPT - MTG B205 FRIDGE	500			12	20	1	1	20	12	1,080			RCPT - NURSE B206	62	N
N	63	RCPT - NURSE B206, RST RMS		1,260		12	20	1	1						EQUIPPED SPACE	64	EX
EX	65	EQUIPPED SPACE						1	1						EQUIPPED SPACE	66	EX
EX	67	EQUIPPED SPACE						1	1						EQUIPPED SPACE	68	EX
EX	69	EQUIPPED SPACE						1	1						EQUIPPED SPACE	70	EX
EX	71	EQUIPPED SPACE						1	1						EQUIPPED SPACE	72	EX
		SUBTOTAL	500	1,260	900							3,340	2,260	1,260	SUBTOTAL		

TOTAL PHASE A - VA	3,840	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	32	COOLING [C]		1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA	3,520	HEATING [H]		0	SIGNAGE [S]		1.25	
AMPS	29	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	2,160	RECEPTACLES [R]	7,520	1.0/.5	EXISTING [E]	2,000	1.00	
AMPS	18	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
TOTAL PNLBD - VA	9,520	SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	9,520 VA
AMPS	26	MISC EQUIP [Z]		1.00	LTG TRACK		1.00	26 A

PANELBOARD NOTES

FEED THRU CONNECTION: #4/0

PROVIDE NEW MAIN CIRCUIT BREAKER WITHIN EXISTING PANELBOARD AND CONNECT TO NEW FEEDER.

PANELBOARD: P1B (ETR)

BUS AMPS: 225A
MAIN SIZE/TYPE: 200A MCB
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP
AIC RATING: 10000; FULLY RATED
MOUNTING: SURFACE
SERVES: GENERAL POWER
LOCATION: LOWER LEVEL S WING ADDITION
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
EX	1	PLUGMOLD 127	1,600			EX	20	1	1	20	EX	600			LIGHTS 128	2	EX
EX	3	PLUGMOLD 127		1,600		EX	20	1	1	20	EX		1,350		LIGHTS 121	4	EX
EX	5	RCPTS 121,128			1,200	EX	20	1	1	20	EX			1,000	LIGHTS 125,126	6	EX
EX	7	PLUGMOLD 124	1,600			EX	20	1	1	20	EX	1,600			LIGHTS 127	8	EX
EX	9	PLUGMOLD 124		1,600		EX	20	1	1	20	EX		1,600		LIGHTS 122	10	EX
EX	11	PLUGMOLD 122			1,800	EX	20	1	1	20	EX			1,600	LIGHTS 124	12	EX
EX	13	PLUGMOLD 122	1,600			EX	20	1	1	20	EX	200			VOL. BOXES	14	EX
EX	15	SOUTH UNIT VENTILATORS		1,200		EX	20	1	1	20	EX		600		EXISTING LOAD	16	EX
EX	17	SOUTH UNIT VENTILATORS			1,320	EX	20	1	1	20	EX			1,000	DRINK FOUNTAIN	18	EX
EX	19	SOUTH ENTRY CHU	1,356			EX	20	1	1	20	EX	1,000			DRINK FOUNTAIN	20	EX
EX	21	EXISTING LOAD		1,000		EX	20	1	1	20	EX		600		LIGHTS 127	22	EX
	23				3,036				1	20	EX			1,200	LIGHTS 122,124	24	EX
EX	25	AHU-5	3,036			EX	50	3	1	25	EX	2,300			HAND DRYER 125	26	EX
	27			3,036					1	25	EX		2,300		HAND DRYER 125	28	EX
	29				3,036				1	25	EX			2,300	HAND DRYER 126	30	EX
EX	31	AHU-6	3,036			EX	50	3	1	25	EX	2,300			HAND DRYER 126	32	EX
	33			3,036					1	20	EX		800		RCPT E10	34	EX
EX	35	EXISTING LOAD				EX	20	1	1	20	EX			1,000	NORTH ENTRY CHU	36	EX
EX	37	SPACE						1	1	20	EX	1,000			NORTH UNIT VENTILATORS	38	EX
EX	39	SPACE						1	1	20	EX		1,000		AHU CONTROLS	40	EX
EX	41	SPACE						1	1	20	EX			1,000	AHU CONTROLS	42	EX
		SUBTOTAL	12,228	11,472	10,392							9,000	8,250	9,100	SUBTOTAL		

TOTAL PHASE A - VA	21,228	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	177	COOLING [C]		1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA	19,722	HEATING [H]		0	SIGNAGE [S]		1.25	
AMPS	164	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	19,492	RECEPTACLES [R]		1.0/.5	EXISTING [E]	60,442	1.00	
AMPS	162	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
TOTAL PNLBD - VA	60,442	SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	60,442 VA
AMPS	168	MISC EQUIP [Z]		1.00	LTG TRACK		1.00	168 A

PANELBOARD NOTES

PANELBOARD: P2C (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP2
AIC RATING: 20000; FULLY RATED
MOUNTING: RECESSED
SERVES: GENERAL POWER
LOCATION: UPPER LEVEL CENTRAL CORE
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
	1	RCPTS-RR WASH FOUNTAINS	900			12	20	1	1	20	12	400			FIRE SMOKE DAMPERS	2	FA
	3	RCPTS-ROOFTOP SERVICE		540		12	20	1	1	20					SPARE	4	
	5	SPARE					20	1	1	20					SPARE	6	
	7		4,527						1	20					SPARE	8	
	9	DOAS-1		4,527		6	60	3	1	20					SPARE	10	
	11				4,527				1	20					SPARE	12	
	13		9,547						1	20					SPARE	14	
	15	DOAS-2		9,547		2	110	3	1	20					SPARE	16	
	17				9,547				1	20					SPARE	18	
	19		6,629						1	20					SPARE	20	
	21	DOAS-3		6,629		4	70	3	1	20					SPARE	22	
	23				6,629				1	20					SPARE	24	
	25	EQUIPPED SPACE						1	1						EQUIPPED SPACE	26	
	27	EQUIPPED SPACE						1	1						EQUIPPED SPACE	28	
	29	EQUIPPED SPACE						1	1						EQUIPPED SPACE	30	
	31	EQUIPPED SPACE						1	1						EQUIPPED SPACE	32	
	33	EQUIPPED SPACE						1	1						EQUIPPED SPACE	34	
	35	EQUIPPED SPACE						1	1						EQUIPPED SPACE	36	
	37	EQUIPPED SPACE						1	1						EQUIPPED SPACE	38	
	39	EQUIPPED SPACE						1	1						EQUIPPED SPACE	40	
	41	EQUIPPED SPACE						1	1						EQUIPPED SPACE	42	
		SUBTOTAL	21,603	21,243	20,703							400			SUBTOTAL		

TOTAL PHASE A - VA	22,003	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	183	COOLING [C]	62,109	1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA	21,243	HEATING [H]		0	SIGNAGE [S]		1.25	
AMPS	177	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	20,703	RECEPTACLES [R]	1,440	1.0/.5	EXISTING [E]		1.00	
AMPS	173	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
TOTAL PNLBD - VA	63,949	SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	63,949 VA
AMPS	178	MISC EQUIP [Z]	400	1.00	LTG TRACK		1.00	178 A

PANELBOARD NOTES

PANELBOARD: L1 (ETR)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208/120V, 1PH, 3W
SECTION: 1
FED FROM: PP
AIC RATING: CONTRACTOR TO VERIFY & NOTIFY EOR
MOUNTING: RECESSED
SERVES: GENERAL POWER
LOCATION: LOWER LEVEL CENTRAL HALL
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE		WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE		DESCRIPTION	CKT	
	NO.		A	B	NO.	AMP			AMP	NO.	A	B		NO.	
EX	1	PLUGS RM 111			EX	20	1	1	20	EX			PLUGS RM 111	2	EX
EX	3	LOUNGE 111			EX	20	1	1	20	EX			ROOM 111	4	EX
EX	5	ROOM 111			EX	20	1	1	20	EX			ROOM 111	6	EX
EX	7	HALL			EX	20	1	1	20	EX			TOILET & SHOWER RMS	8	EX
EX	9	PLUGS RM 110			EX	20	1	1	20	EX			PLUGS RM 110	10	EX
EX	11	HALL			EX	20	1	1	20	EX			HALL	12	EX
EX	13	BOILER RM LIGHTS, STOR. GYM			EX	20	1	1	20	EX			LIGHTS RM 110	14	EX
EX	15	LIGHTS RM 110			EX	20	1	1	20	EX			LIGHTS RM 110	16	EX
EX	17	CONVECTOR MOTORS			EX	20	1	1	20	EX			PLUGS RM 110	18	EX
EX	19	HALLS PLUGS			EX	20	1	1	20	EX			LIGHTS RM 105	20	EX
EX	21	LIGHTS RM 105			EX	20	1	1	20	EX			LIGHTS RM 105	22	EX
EX	23	STAIRS & ROOM 107			EX	20	1	1	20	EX			TUNNEL LIGHTS	24	EX
EX	25	AIR COMPRESSOR			EX	20	1	1	20	EX			CIR PUMP	26	EX
EX	27	LIGHTS RM 119			EX	20	1	1	20	EX			LIGHTS RM 119	28	EX
EX	29	LIGHTS RM 119			EX	20	1	1	20	EX			HALL LIGHTS	30	EX
FV	31	EXISTING LOAD			EX	50	2	1	20	EX			ROOM 119	32	EX
	33							1	20	EX			ROOM 105	34	EX
EX	35	DATA CLOSET			EX	20	1	2	30	10			DRYER	36	RC
EX	37	LOUNGE N. MICROWAVE			EX	20	1							38	
EX	39	LOUNGE S. MICRIOWAVE			EX	20	1	1	20	EX			FACP	40	EX
EX	41	EQUIPPED SPACE					1	1	20	12	360		RCPTS-TEACHER RR	42	N
		SUBTOTAL									360		SUBTOTAL		

TOTAL PHASE A - VA	360	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	3	COOLING [C]		1.00	REFRIG [F]		1.00	
TOTAL PHASE B - VA		HEATING [H]		0	SIGNAGE [S]		1.25	
AMPS		LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PNLBD - VA	360	RECEPTACLES [R]	360	1.0/.5	EXISTING [E]		1.00	
AMPS	2	MOTORS [M]		1.00	LRG MOTOR		1.25	TOTAL DEMAND
		SUPP HEAT [U]		1.00	SHOW WND [W]		1.25	360 VA
		MISC EQUIP [Z]		1.00	LTG TRACK		1.00	2 A

PANELBOARD NOTES

LOADCENTER: LCP (ETR)

BUS AMPS: 200A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 208Y/120V, 3PH, 4W
SECTION: 1
FED FROM: MDP2
AIC RATING: 22000; FULLY RATED
MOUNTING: SURFACE
SERVES: HYDRONIC SYSTEM
LOCATION: MAIN ELEC RM
LINE-SIDE LUGS: MECHANICAL
EQUIPMENT GROUND BUS

	CKT	DESCRIPTION	VOLTAMPS/PHASE			WIRE	BKR	P	P	BKR	WIRE	VOLTAMPS/PHASE			DESCRIPTION	CKT	
	NO.		A	B	C	NO.	AMP			AMP	NO.	A	B	C		NO.	
EX	1	BAS CONTROL	250			EX	20	1	1	20	EX	500			CIRCULATION PUMP	2	EX
EX	3	RCPTS-BOILER ROOM		540		EX	20	1	1	20					SPARE	4	EX
	5				781				1	20	EX			200	WATER SOFTENER	6	EX
EX	7	BOILER 1	781			EX	15	3				781				8	
	9			781					3	15	EX		781		BOILER 2	10	EX
EX	11	GAS SOLENOID VALVE			15	EX	20	1						781		12	
EX	13	WATER HEATER WH-1	2,027			EX	20	1	1						EQUIPPED SPACE	14	EX
EX	15	GLYCOL PUMP		3,038		EX	20	1	1						EQUIPPED SPACE	16	EX
	17				3,038									3,038		18	
N	19	PCHWP-1 VIA VFD	3,038			8	50	3	3	50	8	3,038			PCHWP-2 VIA VFD	20	N
	21												3,038			22	
EX	23	EQUIPPED SPACE						1	1						EQUIPPED SPACE	24	EX
EX	25	EQUIPPED SPACE						1	1						EQUIPPED SPACE	26	EX
EX	27	EQUIPPED SPACE						1	1						EQUIPPED SPACE	28	EX
EX	29	EQUIPPED SPACE						1	1						EQUIPPED SPACE	30	EX
EX	31	EQUIPPED SPACE						1	1						EQUIPPED SPACE	32	EX
EX	33	EQUIPPED SPACE						1	1						EQUIPPED SPACE	34	EX
EX	35	EQUIPPED SPACE						1	1						EQUIPPED SPACE	36	EX
EX	37	EQUIPPED SPACE						1	1						EQUIPPED SPACE	38	EX
EX	39	EQUIPPED SPACE						1	1						EQUIPPED SPACE	40	EX
EX	41	EQUIPPED SPACE						1	1						EQUIPPED SPACE	42	EX
		SUBTOTAL	6,096	4,359	3,834							4,319	3,819	4,019	SUBTOTAL		

TOTAL PHASE A - VA	10,415	LOAD	CONN. VA	DF	LOAD	CONN. VA	DF	
AMPS	87	COOLING [C]		0	REFRIG [F]		1.00	
TOTAL PHASE B - VA	8,178	HEATING [H]	4,686	1.00	SIGNAGE [S]		1.25	
AMPS	68	LIGHTING [L]		1.25	KITCHEN [K]		1.00	
TOTAL PHASE C - VA	7,853	RECEPTACLES [R]	540	1.0/.5	EXISTING [E]		1.00	
AMPS	65	MOTORS [M]	10,740	1.00	LRG MTR: 7.5HP	9,115	1.25	TOTAL DEMAND
TOTAL PNLBD - VA	26,446	SUPP HEAT [U]	900	1.00	SHOW WND [W]		1.25	28,725 VA
AMPS	73	MISC EQUIP [Z]	465	1.00	LTG TRACK		1.00	80 A

PANELBOARD NOTES

PANELBOARD LEGEND

ABBREVIATIONS V1.01

AF	ARC FAULT CIRCUIT INTERRUPTER.
C#	CIRCUIT VIA CONTACTOR #.
CL	CIRCUIT VIA CURRENT LIMITING DEVICE.
D	DISCONNECT CIRCUITRY FOR REMOVED LOAD, UPDATE CIRCUIT DIRECTORY TO SPARE AND TURN OFF.
EM	EMERGENCY LIGHTING HANDLE-ON CLAMP.
EX	EXISTING.
F	FUTURE LOAD; NOTE AS SPARE AND TURN OFF.
FV	FIELD VERIFY EXISTING LOAD AND UPDATE CIRCUIT DIRECTORY. IF SPARE LABEL AND TURN OFF.
FA	RED/HANDLE-ON CLAMP.
GF	GROUND-FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKER (5 mA).
GFEP	GROUND FAULT EQUIPMENT PROTECTION BREAKER (30 mA).
HT	PROVIDE HANDLE-TIE FOR MULTI-WIRE BRANCH CIRCUIT PER CODE.
IG	ISOLATED GROUND CIRCUIT.
L#	LIGHTING CONTROL SCHEME NUMBER.
LCK	HANDLE PADLOCKABLE-OFF DEVICE.
LO	HANDLE-ON CLAMP.
N	PROVIDE NEW CIRCUIT BREAKER.
OL	REFER TO ELECTRICAL ONE-LINE/RISER DIAGRAM.
PS	POWER-SWITCHING CIRCUIT BREAKER.
PSE	EMERGENCY POWER-SWITCHING CIRCUIT BREAKER.
R	REUSE EXISTING CIRCUIT BREAKER FOR NEW/REVISED LOAD.
RC	RECONNECT REPLACED LOAD TO EXISTING CIRCUIT BREAKER
RP	CIRCUIT VIA RELAY PANEL.
ST	SHUNT TRIP CIRCUIT BREAKER.
V	VERIFY EXISTING LOAD AND UPDATE DIRECTORY, IF UNUSED, NOTE AS SPARE AND TURN OFF.
VD	BRANCH CIRCUITRY HAS BEEN UPSIZED TO REDUCE VOLTAGE DROP. ADJUST GROUND WIRE SIZE PER CODE. PROVIDE LUG ADAPTORS IF REQUIRED.
Z	CORRECT/REPAIR EXISTING HAZARD TO MAKE CODE COMPLIANT INSTALLATION.

NOT ALL ABBREVIATIONS ARE USED.

▨ = Phase 2 Scope of Work
(Not included in this Bid Package)

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Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

#	Description	Date
2	Addendum 2	12.15.23

DOUGLAS M. EVERHART
NUMBER
PE-2019007648
12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: ASM
CHECKED BY: HMD
DATE: 11.22.2023

E-600

ELECTRCIAL SCHEDULES

12/13/2023 4:09:40 PM
DOUGLAS M. EVERHART

AUDIO-VIDEO BOX SCHEDULE

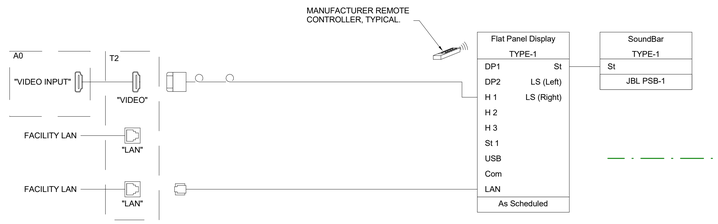
ID	DESCRIPTION	TYPE	B.O.D. MANUF.	B.O.D. MODEL	MOUNTING	COVER	INSERTS	NOTES
BOX FUNCTION		BOX PROPERTIES				BOX ACCESSORIES		
AV	ASSORTED CONNECTION WALL BOX	2G/2G	RACO	260 W/ 818	FLUSH	N/A	2-GANG MUD RING	
AV	ASSORTED CONNECTION WALL BOX	2G/2G	RACO	260 W/ 818	FLUSH	N/A	2-GANG MUD RING	
A0	ASSORTED CONNECTION WALL BOX	2G/1G	RACO	260 W/ 843	FLUSH	N/A	1-GANG MUD RING	
T2	TELEVISION CONNECTION BOX	WALL BOX 14X07X04	FSR	PWB-250	FLUSH	N/A	N/A	

AUDIO-VIDEO FLAT PANEL DISPLAY SCHEDULE

ID	DISPLAY PROPERTIES			MOUNTING REQUIREMENTS		DISPLAY RESPONSIBILITY		NOTES
	SPEC NAME	B.O.D. MANUF.	B.O.D. MODEL	TYPE	FURNISHED BY	INSTALLED BY	PROVIDED BY	
FPD:TYPE-1	FPD-55"/UHD-T	NEC	E558	WALL - ARTICULATING	CONTRACTOR	CONTRACTOR	CONTRACTOR	

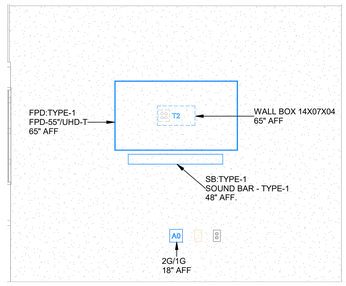
AUDIO-VIDEO LOUDSPEAKER SCHEDULE

ID	SPEC NAME	QTY	B.O.D. MANUF.	B.O.D. MODEL	IMPEDANCE (OHM)	POWER DRAW	WIRE AWG#	MOUNTING CONDITION	HEIGHT	NOTES
		LOUDSPEAKER PROPERTIES			CIRCUIT PROPERTIES			LOUDSPEAKER MOUNTING		
SB:TYPE-1	SOUND BAR - TYPE-1	1	JBL	PSB-1	4	20 W	18	WALL - SURFACE	48"	

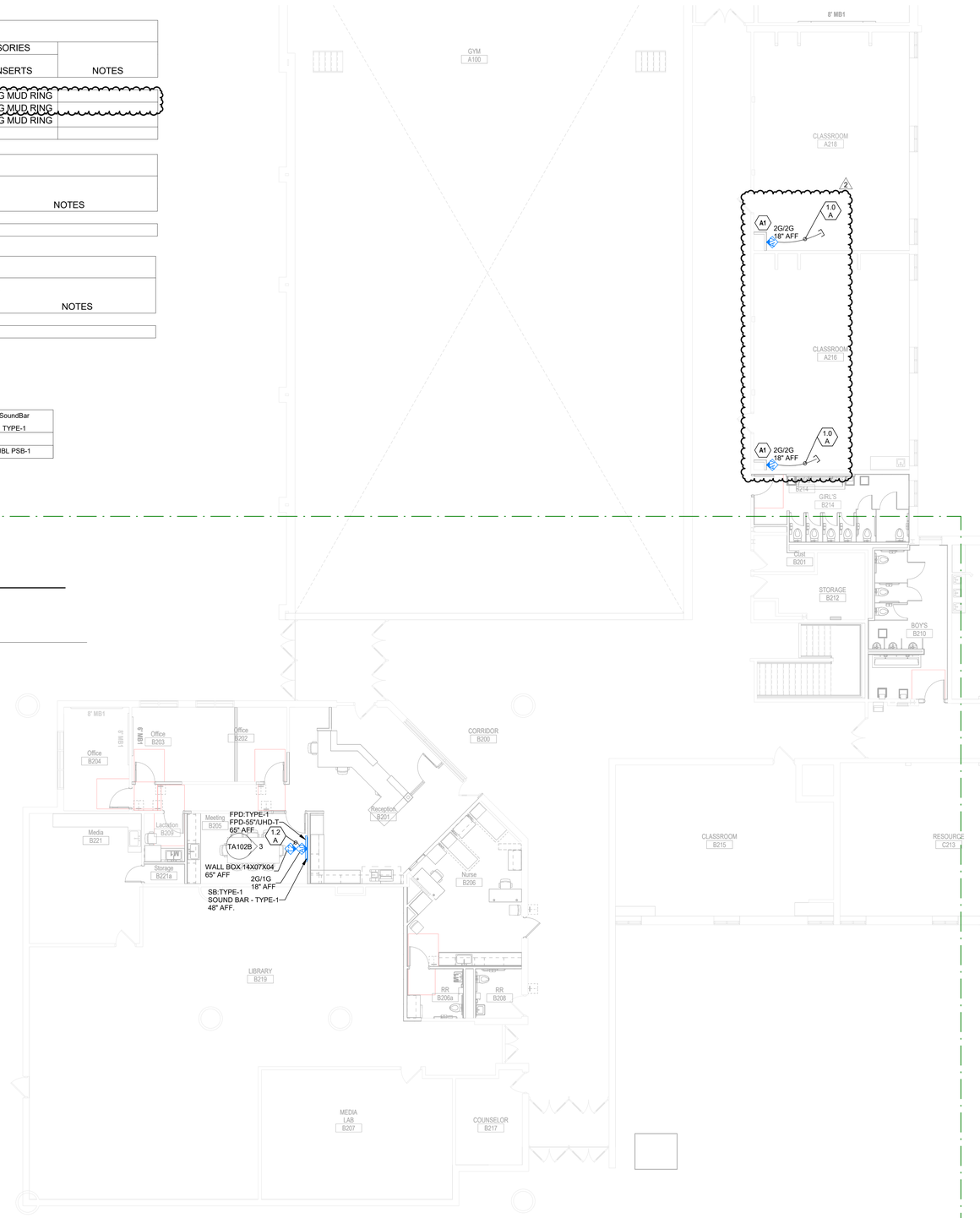


1 MEETING B205 AUDIO-VIDEO SYSTEM

2 MEETING ROOM B205 AUDIO-VIDEO SIGNAL FLOW
NTS



3 AUDIO-VIDEO PRESENTATION WALL ELEVATION
1/2" = 1'-0"



1 AUDIO-VIDEO LEVEL 2 PLAN - AREA B
1/8" = 1'-0"

AUDIO-VIDEO PLAN NOTES:

A1 EXISTING CONNECTION PLATE AND WIRING SHALL BE REMOVED AND PROTECTED PRIOR TO EXECUTING NEW WORK AND REINSTALLED IN TO NEW BOX AND CONDUIT AS SHOWN ON DRAWING. OWNER WILL BE RESPONSIBLE FOR AV RACK AND EQUIPMENT.

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REVISIONS:

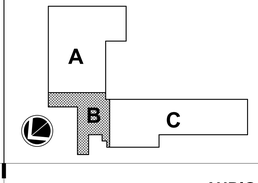
#	Description	Date
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: JFR
CHECKED BY: JG
DATE: 11.22.2023

KEY PLAN

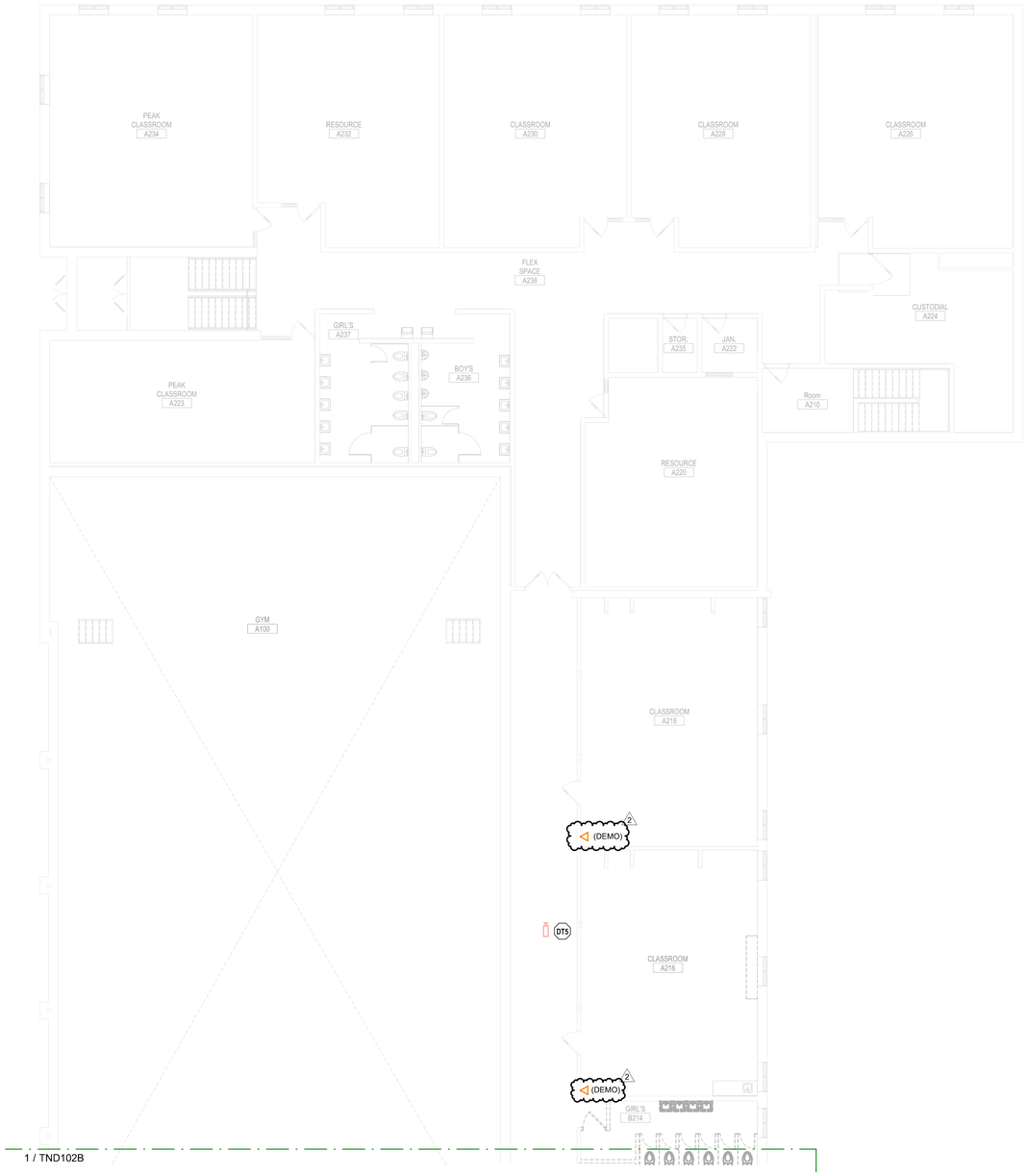


TA102B

AUDIO-VIDEO LEVEL 2 PLAN - AREA B

TECHNOLOGY DEMOLITION PLAN NOTES:

DTS EXISTING CAMERA SHALL BE REMOVED AND PROTECTED PRIOR TO EXECUTING NEW WORK AND REINSTALLED IN SAME LOCATION DURING NEW WORK.



1 / TND102B

1 TECHNOLOGY LEVEL 2 DEMO PLAN - AREA A
1/8" = 1'-0"

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2	Addendum 2	12.15.23

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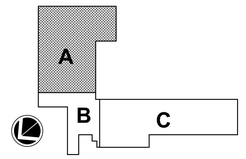
DRAWN BY: GB
CHECKED BY: RR,LF
DATE: 12.15.2023

KEY PLAN



TND102A

TECHNOLOGY LEVEL 2 DEMO PLAN - AREA A

Please consider the environment before printing this.

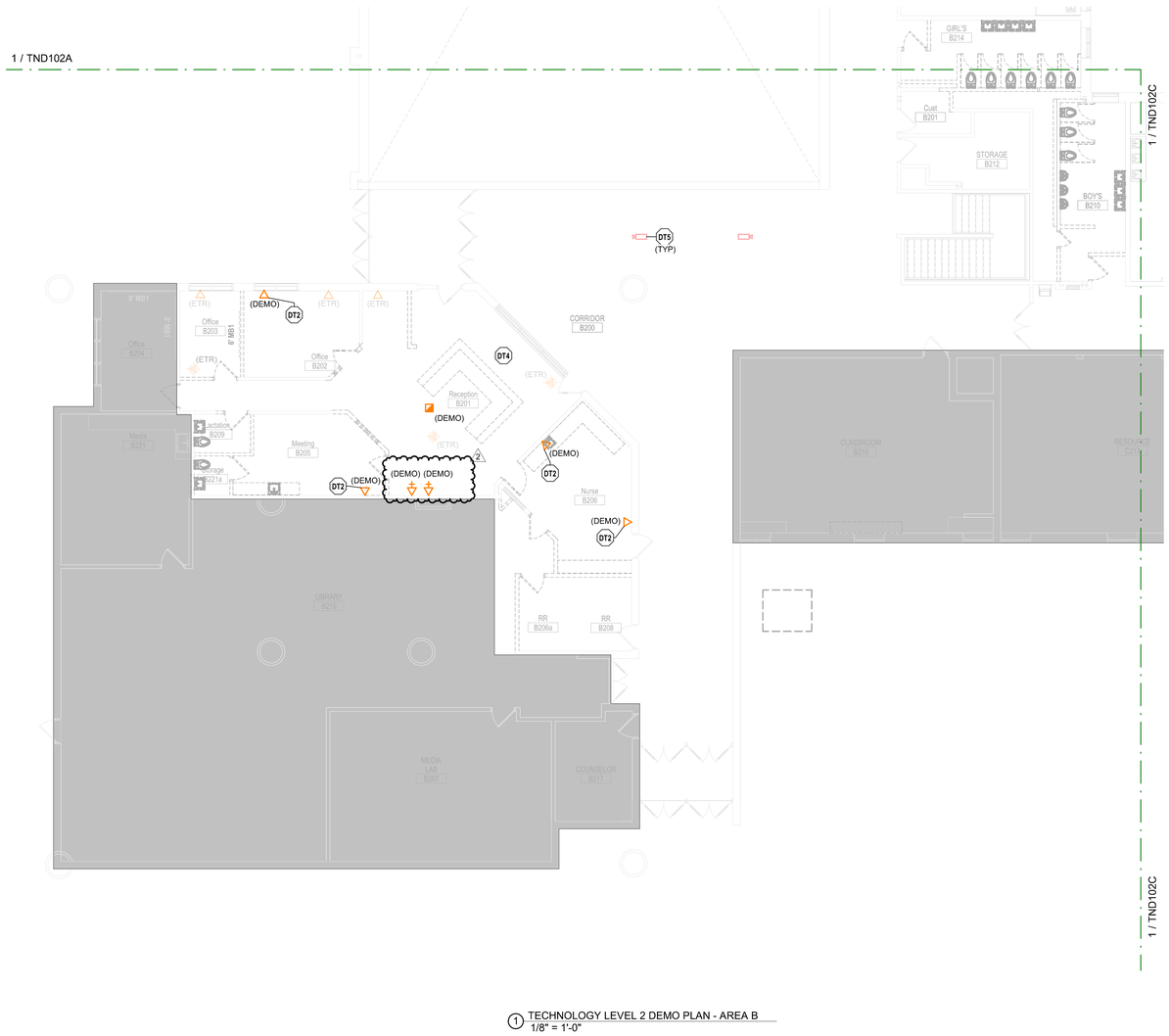
12/14/2023 10:47:17 AM
DOUGLAS M. EVERHART

TECHNOLOGY DEMOLITION PLAN NOTES:

DT2 COIL UP CABLING ABOVE CEILING FOR REUSE LATER.

DT4 EXISTING WIRELESS PANIC DEVICE AND STROBE SHALL BE REMOVED AND PROTECTED PRIOR TO EXECUTING NEW WORK AND REINSTALLED IN SAME LOCATION DURING NEW WORK.

DT5 EXISTING CAMERA SHALL BE REMOVED AND PROTECTED PRIOR TO EXECUTING NEW WORK AND REINSTALLED IN SAME LOCATION DURING NEW WORK.



1 TECHNOLOGY LEVEL 2 DEMO PLAN - AREA B
1/8" = 1'-0"

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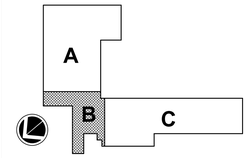
KEY PLAN



TND102B

TECHNOLOGY LEVEL 2 DEMO PLAN - AREA B

Please consider the environment before printing this.

12/14/2023 10:47:28 AM
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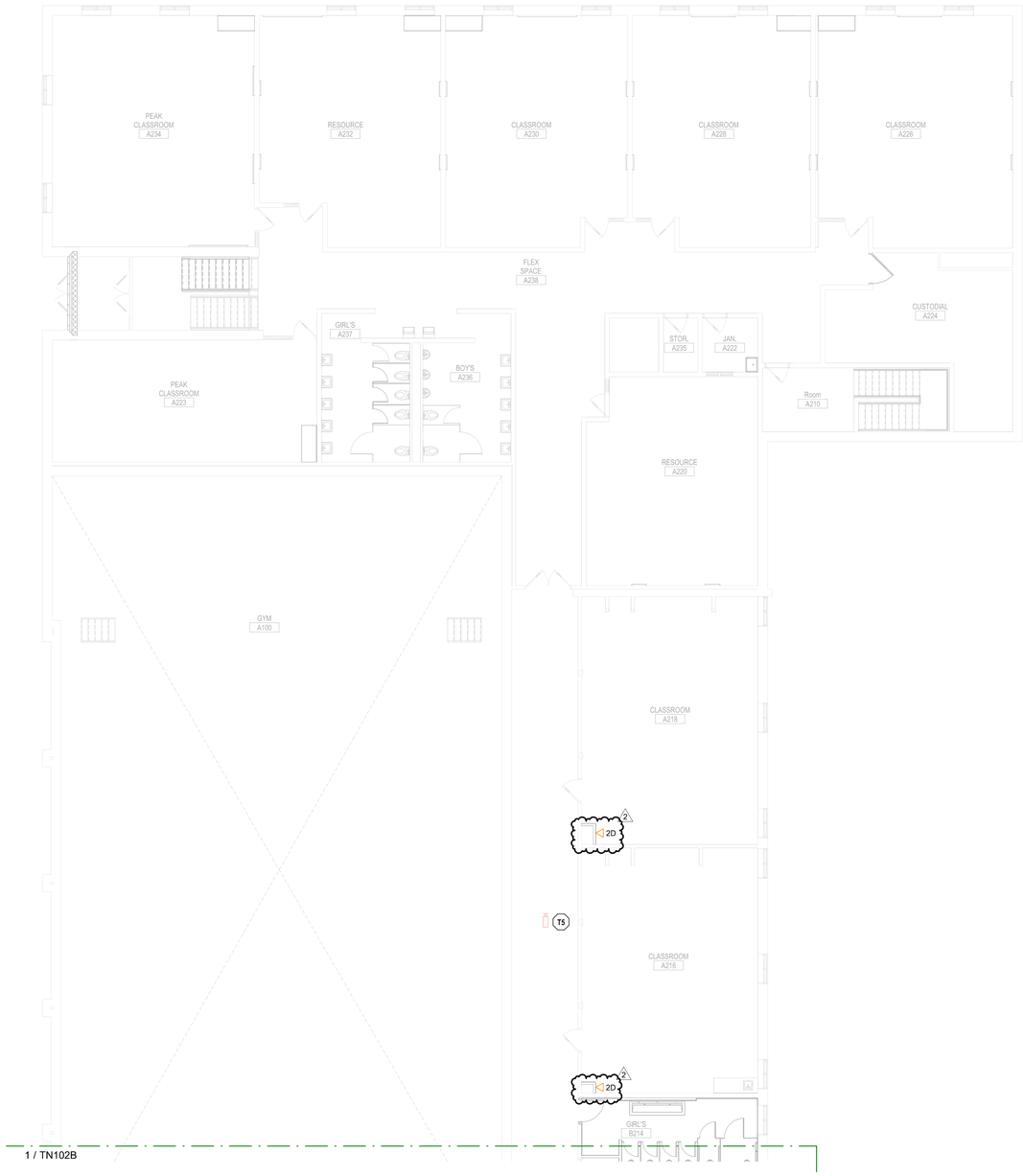
TECHNOLOGY PLAN NOTES:

T5 REINSTALL CAMERA.



1 TECHNOLOGY LEVEL 2 PLAN - AREA A
1/8" = 1'-0"

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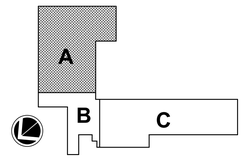


TN102A

TECHNOLOGY LEVEL 2 PLAN - AREA A

12/14/2023 10:46:54 AM
DOUGLAS M. EVERHART

TECHNOLOGY PLAN NOTES:

T1 PROTECT AND TEMPORARILY PULL BACK OUT OF CONSTRUCTION AREA ALL EXISTING LOW VOLTAGE CABLING SUPPORTED FROM EXISTING UPPER CORRIDOR CEILING TO BE DEMOLISHED. (REFER TO ARCHITECTURAL DEMO PLANS FOR MORE INFORMATION.) REINSTALL ALL REMOVED CABLES AND PROVIDE NEW SUPPORT SYSTEM FROM STRUCTURE AS NEEDED. TEST ALL LOW VOLTAGE CABLING REINSTALLED IN THIS PROJECT TO ENSURE PROPER OPERATION.

T2 PROVIDE 48-PORT CATEGORY 6 AND CATEGORY 6A PATCH PANELS AS NECESSARY. PROVIDE QUANTITY AS REQUIRED TO SUPPORT ALL CATEGORY 6 AND CATEGORY 6A DATA OUTLETS SERVED BY TELECOM ROOM PLUS SPARES. REFER TO DIVISION 27 SPECIFICATIONS FOR MORE INFORMATION.

T3 REINSTALL WIRELESS PANIC DEVICE AND STROBE.

T4 INSTALL REMOTE OPEN TO NEW FURNITURE, COORDINATE REQUIREMENTS WITH FURNITURE PROVIDER.

T5 REINSTALL CAMERA.

T6 NO CAPACITY FOR NEW CARD READER ON EXISTING ACCESS CONTROL PANELS. PROVIDE MR52 BOARD TO ENCLOSURE WITH AVAILABLE SPACE.

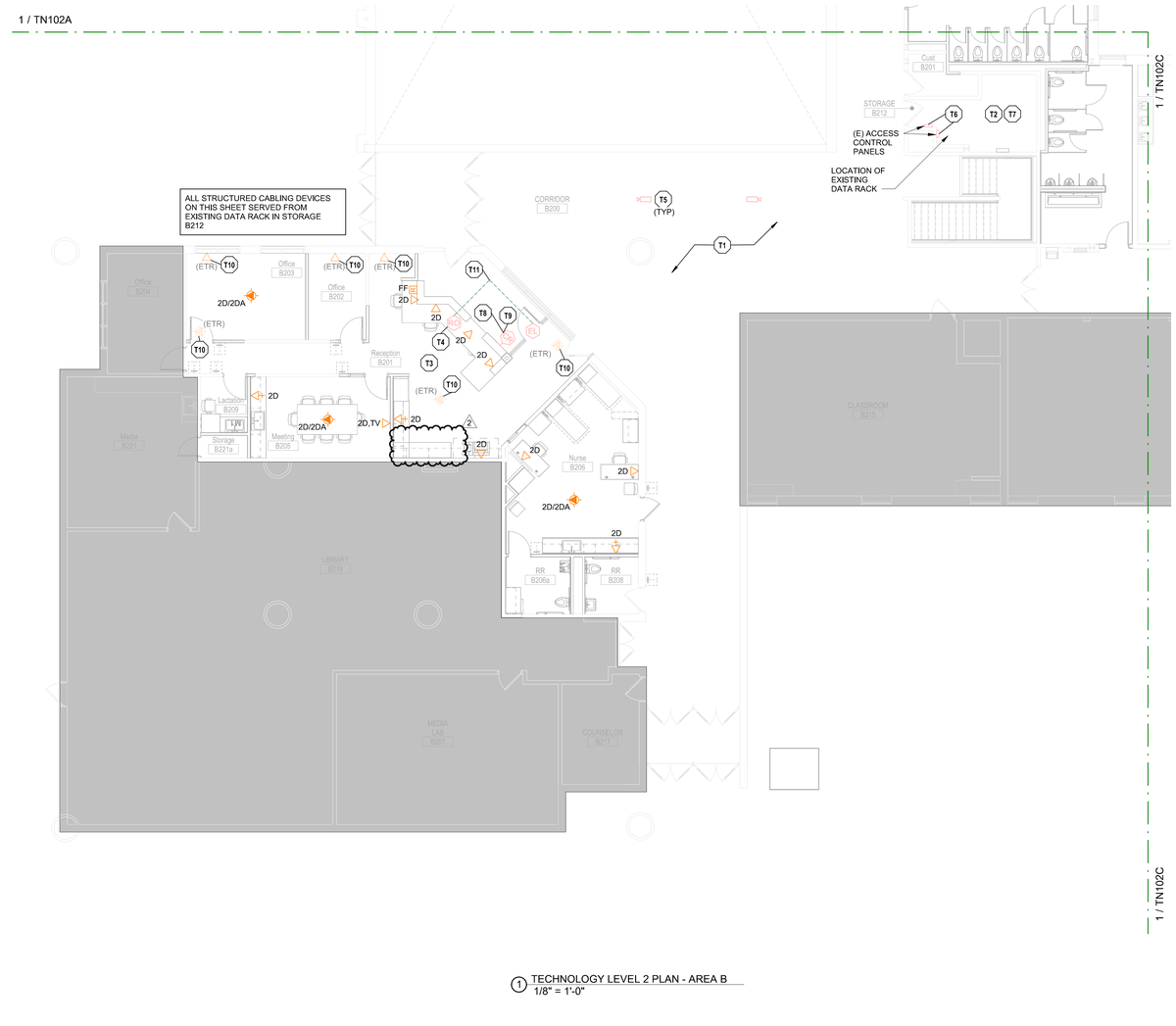
T7 PROTECT EXISTING RACKS DURING CONSTRUCTION.

T8 PROVIDE WINDY CITY WIRE 4461030 (OR APPROVED EQUAL) FROM NEW CARD READER TO ACCESS CONTROL PANEL IN STORAGE B212.

T9 PROVIDE NEW CARD READER MANUFACTURED BY HID AND CAPABLE OF READING THE HID PROXIMITY PROTOCOL. REFER TO DIVISION 28 SPECIFICATIONS FOR MORE INFORMATION.

T10 EXISTING TO REMAIN DEVICE. NEW CASEWORK TO BE INSTALLED IN THIS LOCATION. COORDINATE WITH CASEWORK INSTALLER AND OWNER TO RAISE OR LOWER DEVICE SO THAT DEVICE REMAINS ACCESSIBLE.

T11 LOGICAL CONNECTION. DEVICES WIRE BACK TO ACCESS CONTROL PANEL.



1 TECHNOLOGY LEVEL 2 PLAN - AREA B
1/8" = 1'-0"

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EXPIRES 10/31/2024

100% CONSTRUCTION DOCUMENTS

Ridgeview Elementary School
Liberty Public Schools
701 Thornton Street
Liberty, MO 64068

REVISIONS:

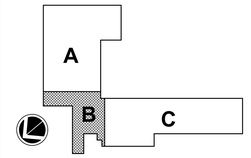
#	Description	Date
1	Addendum 1	12.08.23
2	Addendum 2	12.15.23

STATE OF MISSOURI
DOUGLAS M. EVERHART
E-2019007648
PROFESSIONAL ENGINEER
12/14/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

JOB NO: 23026
DRAWN BY: GB
CHECKED BY: RR,LF
DATE: 12.15.2023

KEY PLAN



TN102B

TECHNOLOGY LEVEL 2 PLAN - AREA B