MONTANA
STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
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ADDENDUM NO. 1 - OUTLINE AND SUMMARY INFORMATION

Project Name: Renne Library Data Center Fire Protection System Upgrades PPA: 20-0036
Location: Montana State University – Bozeman Date: 01/28/2021

Owner: State of Montana, MSU - Bozeman
Plew Building 6th and Grant, PO Box 172760
Bozeman, Montana 59717-2760

To: All Plan Holders of Record

*The Plans and Specification prepared by **Coffman Engineers** dated **January 17, 2021** shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.*

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

1. AMENDMENTS TO THE PROJECT MANUAL

   a. N/A

2. AMENDMENTS TO THE DRAWINGS

   a. Sheet FA0.1, FA1.0 & FX0.2

3. PRE-BID MEETING INFORMATION

   a. A pre-bid meeting was conducted on 1/26/21. All attendees (see attached list) were given a brief overview of the contract requirements as well as the project scope. A walk through of the spaces affected by the project scope was conducted. It was pointed out that this is an operational data center, and all equipment needs to remain protected and operational during construction. The contractor is responsible for providing means and method for protection of the equipment work while still allowing for the cooling system to operate correctly. See section 5 below for clarification to questions asked during the pre-bid meeting.

4. PRIOR APPROVALS

   a. N/A

5. OTHER

   a. As indicated in the specifications, flexible pipe drops (off the top of the branch line) to the pendent sprinklers in the suspended acoustical tile are acceptable in lieu of hard piped return bends shown on the drawings. Contractor would need to submit on proposed flexible pipe drops for approval per the specifications.

b. As required by NFPA 13 to not cause damage during testing, the main drain from the new pre-action system riser shall be piped to the exterior through the West wall of the mechanical room (approximately 1' above grade). An auxiliary drain is to be installed on the main drain for system drainage to the existing floor sink below the riser.

c. It has been clarified that the existing Halon system and associated detection and releasing system shall be left in place and operational until the new pre-action system and detection system for releasing are active. Once the new pre-action system is operational, the existing Halon system and associated detection and releasing system can be removed. Release of the Halon system may be disarmed during construction periods where people are working in the space, but the detection system shall remain active. The halon system shall be put back in service at the end of each work period.

d. As indicated in the revised drawings noted in Section 2 above, the detection for the pre-action system release has been changed from heat detection to smoke detection. Relays have also been added for shutdown of the cooling units in the data center upon activation of the area smoke detection.

e. Seismic Details have been updated on drawing FX0.2 to reflect a change from the Hilit TZ Wedge Anchor to the Dewalt Power Stud Wedge Anchor to match Seismic Calculations. Contractor may submit other similar anchors for approval as indicated in the specifications.

6. ATTACHMENTS

a. Pre-bid meeting attendance list

b. Revised Sheets FA0.1, FA1.0, FX0.2

RENNE
Data Center Fire Upgrades

1/26/21

Pre Bid Mtg Attendance

Name	Company	Phone	Email
Dave Yaggy	W.S.F.P	406 539.5121	Dave.yaggy@wsfp.
Jason Anderson	Coffman Eng	406-582-1936	anderson@coffman.com
Michael Bergman	PRG Commercial	406-829-4795	mbergman@prgcommercialMT.com
Jason Boyer	PRG Commercial	406-920-1146	j.boyer@prgcommercialmt.co
John Case	ITM division	406 465 8129	johnboy95@gmail.com
RBERNDT	ICI	406 579 8550	rbi@in-tch.c
Sam Taylor	MSU-UIT	406 570-0798 Cell 406 994-0511 office	samuel.taylor1@montana.edu
Todd Cook	MSU	406-580-7900	Todd.cook1@montana.edu
Tony Colliard	MSU	406-580-0666	Acolliard@montana.edu
Loras O'Toole	MSU	406-548-4930	loras@montana.edu

FIRE ALARM NOTES:

1. FIRE ALARM SYSTEM SHALL COMPLY WITH:
   A. NFPA 13 (FIRE SPRINKLER CODE), 2016
   B. NFPA 70 (NATIONAL ELECTRIC CODE), 2018
   C. NFPA 72 (FIRE ALARM CODE), 2016
   D. IBC (INTERNATIONAL BUILDING CODE), 2018
   E. IFC (INTERNATIONAL FIRE CODE), 2018
   F. IMC (INTERNATIONAL MECHANICAL CODE), 2018
   G. ADA/ABA, 2004
   H. PROJECT SPECIFICATIONS
   I. LOCAL AND STATE AHJ REQUIREMENTS
2. THESE DRAWINGS REPRESENT ENGINEERED FINALIZED SHOP DRAWINGS READY FOR INSTALLATION. THE CONTRACTOR SHALL PROVIDE RED-LINE FIELD ASBUILTS TO THE FIRE PROTECTION ENGINEER. THE FIRE PROTECTION ENGINEER WILL PREPARE AND PROVIDE RECORD DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR COMPLETED NFPA 72 INSPECTION & TESTING, RECORD OF COMPLETION FORMS AND AND PROVIDE OPERATION & MAINTENANCE MANUALS TO THE OWNER REPRESENTATIVE.
3. COORDINATE THE EXACT DEVICE LOCATIONS WITH ELECTRICAL AND MECHANICAL SYSTEM EQUIPMENT AND BUILDING ARCHITECTURAL FEATURES. INSTALLING CONTRACTOR SHALL CONSULT/CONFIRM ANY NECESSARY DEVIATION OF DEVICE BOX PLACEMENT OR CONDUIT/CIRCUIT ROUTING WITH THE DESIGNER OF RECORD PRIOR TO IMPLEMENTING CHANGES IN THE FIELD.
4. CONDUIT SHALL BE USED AT ALL LOCATIONS. FIRE ALARM CONDUIT SHALL BE FACTORY RED 3/4" MINIMUM UNLESS OTHERWISE NOTED. CONCEAL CONDUITS IN WALL AND CEILING SPACES WHEREVER FEASIBLE. SURFACE CONDUIT IN FINISHED AREAS SHALL BE 3/4" MINIMUM UNLESS OTHERWISE NOTED AND PAINTED TO MATCH SURROUNDINGS.
5. MINIMUM CIRCUIT PERFORMANCE REQUIREMENTS:
   IDC - INITIATING DEVICE CIRCUIT SHALL BE CLASS B.
   NAC - NOTIFICATION APPLICATION CIRCUIT SHALL BE CLASS B.
   SLC - SIGNALING LINE CIRCUIT SHALL BE CLASS B. KEEP T-TAPS TO A MINIMUM.
6. "T" TAPPING OF ANY NAC OR IDC CIRCUIT IS PROHIBITED.
7. ALL NOTIFICATION APPLIANCES SHALL OPERATE IN SYNCHRONIZATION AS REQUIRED BY NFPA 72.
8. PAINT FIRE ALARM JUNCTION BOXES AND COVERS RED. BOTH SIDES OF COVER PLATES SHALL BE PAINTED RED. ALL CONDUIT/RACEWAY SHALL BE PAINTED RED.
9. FIRE ALARM EQUIPMENT CABINETS, BOXES, AND DEVICES SHALL HAVE TAGS PERMANENTLY AFFIXED TO THE FACE . LABEL EACH DEVICE USING SELF-ADHESIVE LASER PRINTED COMMERCIALLY AVAILABLE ID TAGS. ADDRESSABLE DEVICES SHALL BE LABELED WITH ADDRESS. NOTIFICATION APPLIANCES SHALL BE LABELED WITH THEIR ASSOCIATED NAC IDENTIFIER MATCHING THAT ON THESE PLANS. LABEL ALL MONITOR AND RELAY MODULES WITH ASSOCIATED FUNCTION. LABEL REMOTE TEST SWITCHES WITH ASSOCIATED DUCT DETECTOR ADDRESS AND AIR HANDLER DESIGNATION.
10. DO NOT SPLICE FIRE ALARM CONDUCTORS EXCEPT WHERE INDICATED ON THESE DRAWINGS. ALL FIRE ALARM WIRING SHALL ONLY BE TERMINATED AT A DEVICE OR APPROVED TERMINAL BLOCK LOCATION ONLY.

ELECTRICAL NOTES:

1. THE CONTRACTOR SHALL COMPLY WITH THE CONSTRUCTION PRACTICES AND REQUIREMENTS OF THE REFERENCED EDITION OF THE NATIONAL ELECTRIC CODE (2011 NFPA 70), CURRENT NATIONAL ELECTRICAL SAFETY CODE, AND INSTRUCTIONS OF MANUFACTURERS OF EQUIPMENT AND MATERIALS SUPPLIED FOR THE PROJECT.
2. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED ON THE PLANS. SIZING OF THESE BOXES SHALL BE PER THE NATIONAL ELECTRICAL CODE.
3. ALL PENETRATIONS THROUGH FIRE BARRIERS SHALL BE FIRE STOPPED TO MAINTAIN THE INTEGRITY OF THE FIRE BARRIER. FIRE STOPPING MATERIAL SHALL BE U.L. LISTED.
4. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE GENERAL CONTRACTOR QUALITY CONTROL REPRESENTATIVE PRIOR TO MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS.
5. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE GENERAL CONTRACTOR. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION SHALL NOT BE CONSIDERED AN ITEM FOR EXTRA COST.
6. REPAIR ANY DAMAGE TO EXISTING CONSTRUCTION RESULTING FROM THE INSTALLATION OF ELECTRICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR.
7. ALL EXPOSED AND CONCEALED CONDUITS SHALL BE EMT (ELECTRICAL METALLIC TUBING). ALL UNDERGROUND CONDUIT SHALL BE PVC CONDUIT SCHEDULE 40, UNLESS NOTED OTHERWISE. USE FLEXIBLE METAL CONDUIT AND SEAL-TIGHT WHERE APPLICABLE.
8. ALL EQUIPMENT SHALL BE CAPABLE OF FITTING IN THE SPACES LOCATED WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS. REVIEW ALL PLACES WHERE EQUIPMENT IS TO BE INSTALLED PRIOR TO ORDERING OF EQUIPMENT AND NOTIFY THE CONTRACTING OFFICER OF ANY INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATIONS OF THE EQUIPMENT.
9. PROVIDE ACCESS PANELS TO ALL CONCEALED TRANSFORMERS, DEVICES, JUNCTION BOXES AND EQUIPMENT. COORDINATE THE LOCATION OF ACCESS PANELS TO INSURE THAT THE EQUIPMENT CAN BE MAINTAINED ADEQUATELY.
10. ALL EQUIPMENT AND CABLE SHALL BE PROPERLY RATED FOR THE CONDITIONS IN WHICH IT IS INSTALLED.
11. ALL 120VAC CIRCUIT BREAKERS SERVING FIRE ALARM EQUIPMENT SHALL BE RED AND LOCKABLE.
12. ANY PENETRATION OF THE BUILDING VAPOR BARRIER SYSTEM SHALL BE APPROPRIATELY SEALED TO RETAIN THE INTEGRITY OF THE SYSTEM. THIS INCLUDES BUT IS NOT LIMITED TO CONDUITS AND BACKS OF ELECTRICAL BOXES.

FIRE ALARM MATRIX

				ANNUNCIATION				NOTIFICATION		CONTROL			OFF-SITE TRANSMITTED SIGNALS			
				DISPLAY EVENT SPECIFIC INFORMATION ON LCD DISPLAY INCLUDING BUT NOT LIMITED TO DEVICE ADDRESS AND DESCRIPTION	ALARM NOTIFICAITON AT PANEL VIA AUDIBLE AND VISUAL MEANS	SUPERVISORY NOTIFICATION AT PANEL VIA AUDIBLE AND VISUAL MEANS	TROUBLE NOTIFICATION AT PANEL VIA AUDIBLE AND VISUAL MEANS	ACTIVATE ALL COMMON AREA FIRE ALARM NOTIFICATION APPLIANCES THROUGHOUT FACILITY	ACTIVATE OUTSIDE WEATHER-PROOF HORN STROBES	SHUTDOWN AIR HANDLING UNITS OVER 2000 C.F.M.	ACTICVATE PRE-ACTION SOLENOID	SHUTDOWN CRAC UNIT	GENERAL ALARM	SPRINKLER ALARM	GENERAL TROUBLE	SPRINKLER SUPERVISORY
				A.1	A.2	A.3	A.4	B.1	B.2	C.1	C.2	C.3	D.1	D.2	D.3	D.4
FIRE ALARM SYSTEM INPUTS	INITIATING DEVICES	MANUAL PULL STATION (EXISTING)	1.1	×	×			×					×			
		DATA CENTER SMOKE DETECTOR	1.2	×	×			×					×			
		DUCT DETECTOR (EXISTING)	1.3	×	×					×						×
		RELAY MODULES										×				
	FIRE SPRINK	WATERFLOW / PRESSURE SWITCH	2.1	×	×			×	×					×		
		TAMPER SWITCH	2.2	×		×										×
		PRE-ACTION LOW AIR	2.3	×		×										×
		CONCURRENT SMOKE DET (1.2)	2.3								×			×		
	CONTROL EQUIP	LOW BATTERY VOLTAGE (EXISTING)	3.1	×			×								×	
		GROUND FAULT / OPEN / SHORT CIRCUIT (EXISTING)	3.2	×			×								×	
		AC POWER LOSS (EXISTING)	3.3	×			×								×	

1

WIRE & CABLE LEGEND

TAG	TYPE	CIRCUIT DESCRIPTION
B	16-2 UTP-FPL	SIGNALING LINE CIRCUIT
N	2 #14 THHN	NOTIFICATION APPLIANCE CIRCUIT - STROBES
P	2 #14 THHN	AUXILIARY 24VDC RISER
Y	2 #14 THHN	INITIATING DEVICE CIRCUIT 'CLASS B'
Z	3 #12 THHN	120VAC POWER CIRCUIT

INSTALLING CONTRACTOR SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES. MAINTAIN COLOR CODE THROUGHOUT EACH CIRCUIT.

NOTIFICATION APPLIANCE DEVICE ANNOTATION

N1-1
15cd

'N1' = HORN/STROBE NAC #
'-1' = APPLIANCE #
#cd = STROBE INTENSITY SETTING IN CANDELA

SCOPE OF WORK

THE EXISTING EST-3X SYSTEM WILL REMAIN IN PLACE

1. A NEW CIRCUIT WITH NEW HORN/STROBES WILL BE INSTALLED FROM THE EXISTING FIRE PANEL.
2. HEAT DETECTORS REQUIRED FOR A PREACTION FIRE SPRINKLER SYSTEM WILL BE INSTALLED FROM THE EXISTING SLC CIRCUIT

ACRONYMS/ABBREVIATIONS:

1. AFF ABOVE FINISHED FLOOR
2. AC ALTERNATING CURRENT
3. AWG AMERICAN WIRE GAGE
4. BFC BELOW FINISHED CEILING
5. CD CANDELA
6. CKT CIRCUIT BREAKER
7. C CONDUIT
8. DB DECIBEL
9. DED DEDICATED
10. DC DIRECT CURRENT
11. EMT ELECTRICAL METALLIC TUBING
12. EOL END OF LINE RESISTOR
13. EOLR END OF LINE RELAY
14. ETR EXISTING TO REMAIN
15. XP EXPLOSION PROOF
16. FA FIRE ALARM
17. FPL FIRE ALARM POWER LIMITED
18. HVAC HEATING VENTILATING AIR CONDITIONING
19. HZ HERTZ
20. IAW IN ACCORDANCE WITH
21. IDC INITIATING DEVICE CIRCUIT
22. LV LOW VOLTAGE
23. NAC NOTIFICATION APPLIANCE CIRCUIT
24. NEMA NATIONAL ELECTRICAL MANUFACTURER ASSOC.
25. NEC NATIONAL ELECTRIC CODE
26. NIC NOT IN CONTRACT
27. NTS NOT TO SCALE
28. RGS RIGID GALVANIZED STEEL CONDUIT
29. SLC SIGNALING LINE CIRCUIT
30. SPDT SINGLE THROW DOUBLE THROW
31. SPST SINGLE THROW SINGLE THROW
32. TSP TWISTED SHIELDED PAIR
33. UTP UNSHIELDED TWISTED PAIR
34. UL UNDERWRITERS LABORATORIES
35. V VOLT
36. WP WEATHERPROOF
37. W/ WITH
38. W/O WITHOUT

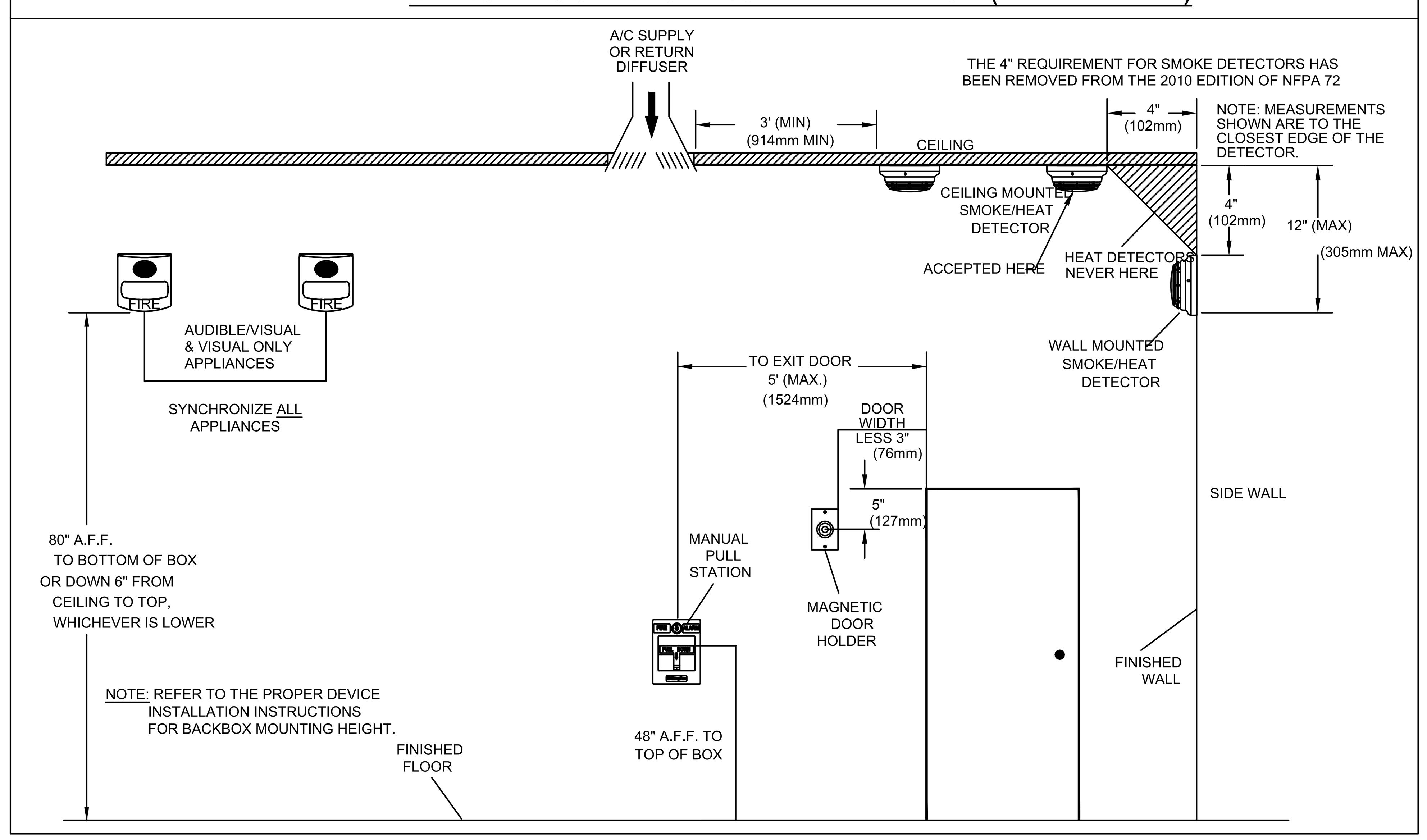
FIRE ALARM DEVICE LEGEND

SYMBOL	QTY	DESCRIPTION	MODEL	ROUGH-IN
FACP	x	FIRE ALARM MASS NOTIFICATION CONTROL PANEL	EST3 X	FACP IS EXISTING
PRE	1	PREACTION RELEASING PANEL	SIGA-REL	REQUIRES 24V FROM THE EXISTING PANEL. TO BE LOCATED WITHIN EXISTING PANEL. LOCATE NEXT TO EXISTING RELEASING MODULE
	16	ADDRESSABLE SMOKE DETECTOR W/STANDARD BASE	SIGA-PD W/SIGA-SB	REQUIRES 4" OCTAGON BOX OR 4" SQUARE WITH 3" ROUND RING.
M	4	ADDRESSABLE MONITOR MODULE	SIGA-CT1 *	REQUIRES 4" SQUARE DEEP BOX WITH SINGLE GANG RING ALL (4) MONITOR MODULES ARE EXISTING AND TO BE RE-USED
PS	N/A	PRESSURE SWITCH	BY OTHERS	FLEX TO ASSOCIATED MODULE
LA	N/A	LOW AIR ALARM	BY OTHERS	FLEX TO ASSOCIATED MODULE
TS	N/A	VALVE TAMPER SWITCH	BY OTHERS	FLEX TO ASSOCIATED MODULE
WF	N/A	WATERFLOW SWITCH	BY OTHERS	FLEX TO ASSOCIATED MODULE
F	4	HORN STROBE - WALL - CLEAR LENS, RED BODY, MARKED 'FIRE'	GENESIS G4AVRF	REQUIRES 4 SQUARE DEEP BOX. MOUNT APPLIANCE UP 80"-96" BUT NOT LESS THAN 6" FROM FINISHED CEILING.
	1	STROBE - WALL - CLEAR LENS, RED BODY, MARKED 'FIRE'	GENESIS G4ARF	REQUIRES 4 SQUARE DEEP BOX. MOUNT APPLIANCE UP 80"-96" BUT NOT LESS THAN 6" FROM FINISHED CEILING.
JB	VARIES AS NEEDED	JUNCTION BOX		* SEE WIRING DIAGRAM FOR SPECIFIC MODEL OF MODULE BEING USED.
SV	1	SOLENOID	BY OTHERS	FLEX TO ASSOCIATED MODULE
R	2	ADDRESSABLE RELAY MODULE	SIGA-CR	REQUIRES 4" SQUARE DEEP BOX WITH SINGLE GANG RING ALL (4) MONITOR MODULES ARE EXISTING AND TO BE RE-USED

1

1

DEVICE MOUNTING HEIGHT REFERENCE (PER NFPA 72)



MONTANA STATE UNIVERSITY

MSU-CPDC
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RENNE LIBRARY
DATA CENTER - FIRE PROTECTION UPGRADES

COFFMAN ENGINEERS

DRAWN BY: BMH
REVIEWED BY: JAA

REV.	DESCRIPTION	DATE
1	ADDENDUM	11.25.21

JASON ANDERSON No. 11805PE LICENSED PROFESSIONAL ENGINEER

PPA#20-0036

SHEET TITLE

FA GENERAL NOTES & MATRIX

SHEET

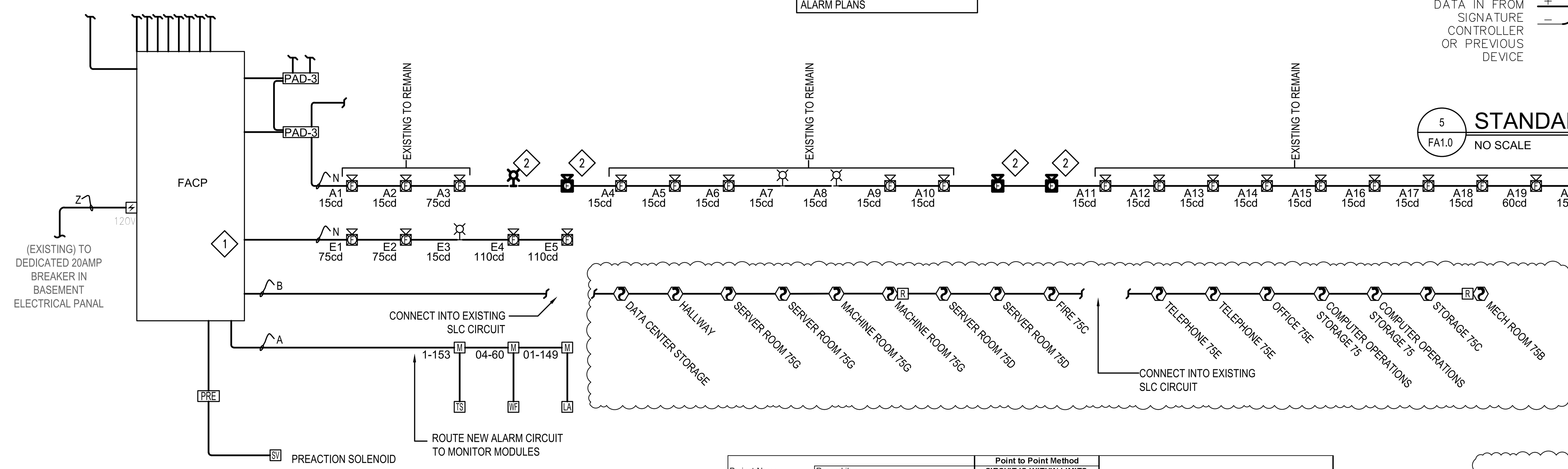
FA0.1

DATE
01-17-2021

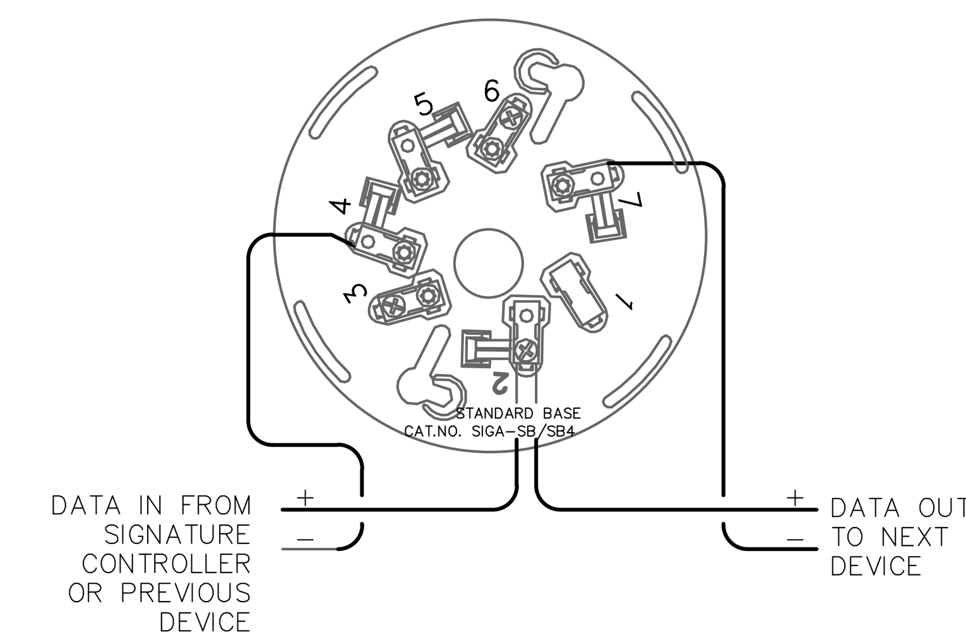
RISER DIAGRAM KEY NOTES ⟨X⟩

1. TIE NEW CIRCUIT INTO AN EXISTING NAC OUTPUT
2. DEVICE TO BE REMOVED AND CIRCUIT TIED THROUGH. SHOWN ON RISER DIAGRAM FOR REFERENCE ONLY. RE-ADDRESS DEVICE AS SHOWN.

NOT ALL DEVICES SHOWN ON RISER DIAGRAM ARE SHOWN ON FIRE ALARM PLANS

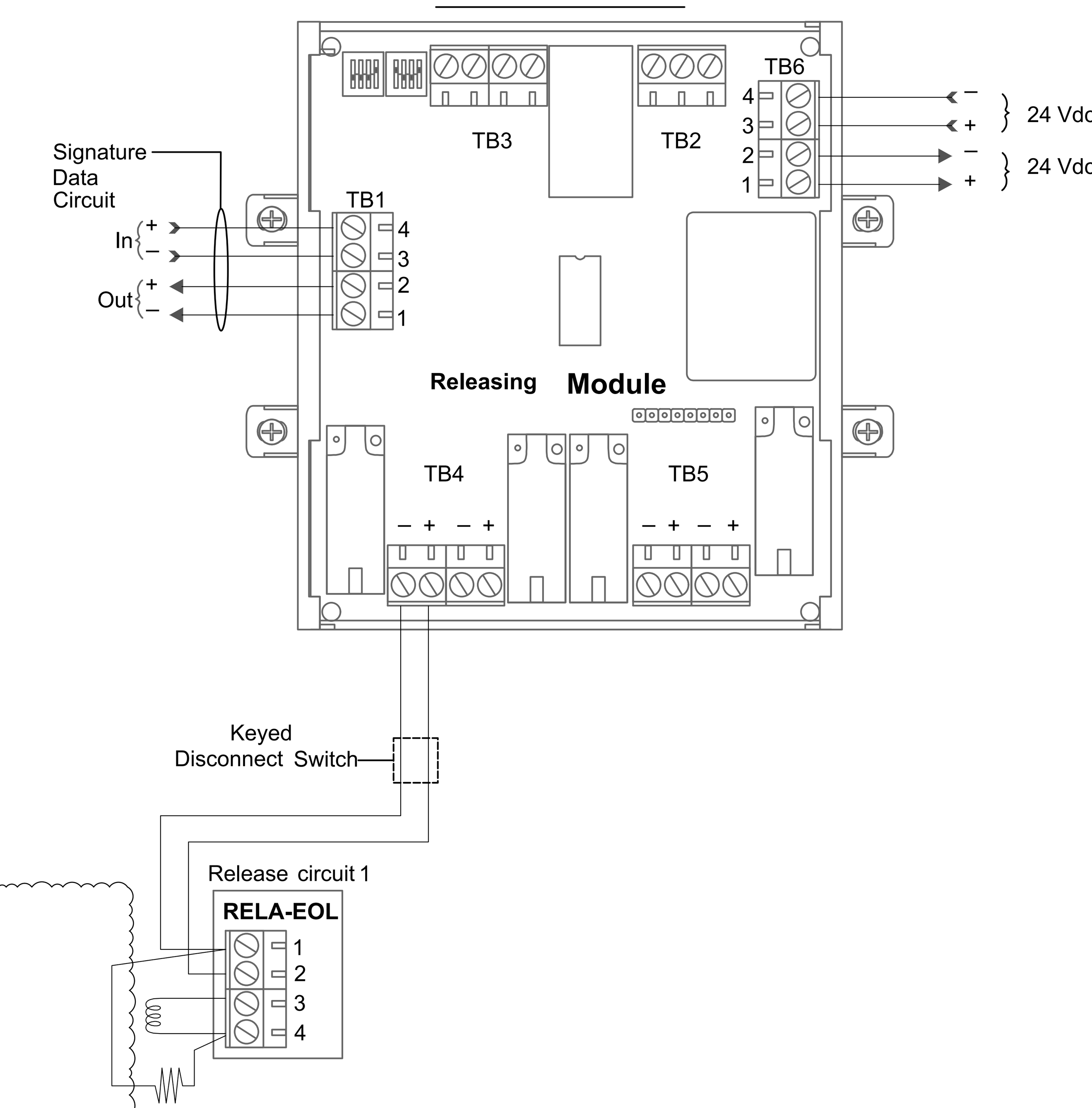


4 / FA1.0 RISER DIAGRAM
NO SCALE



5 / FA1.0 STANDARD BASE EST SIGA-SB4
NO SCALE

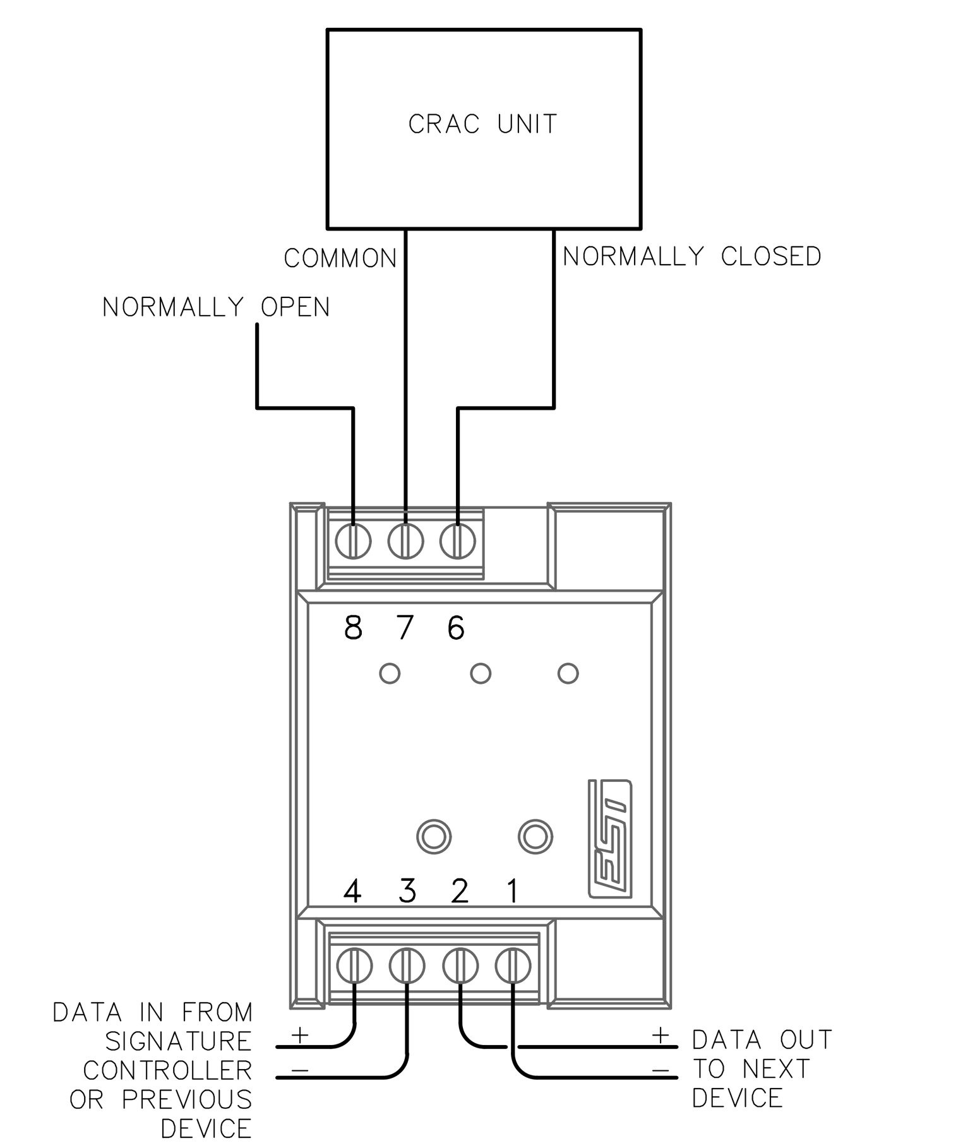
RELEASING MODULE EST SIGA-REL



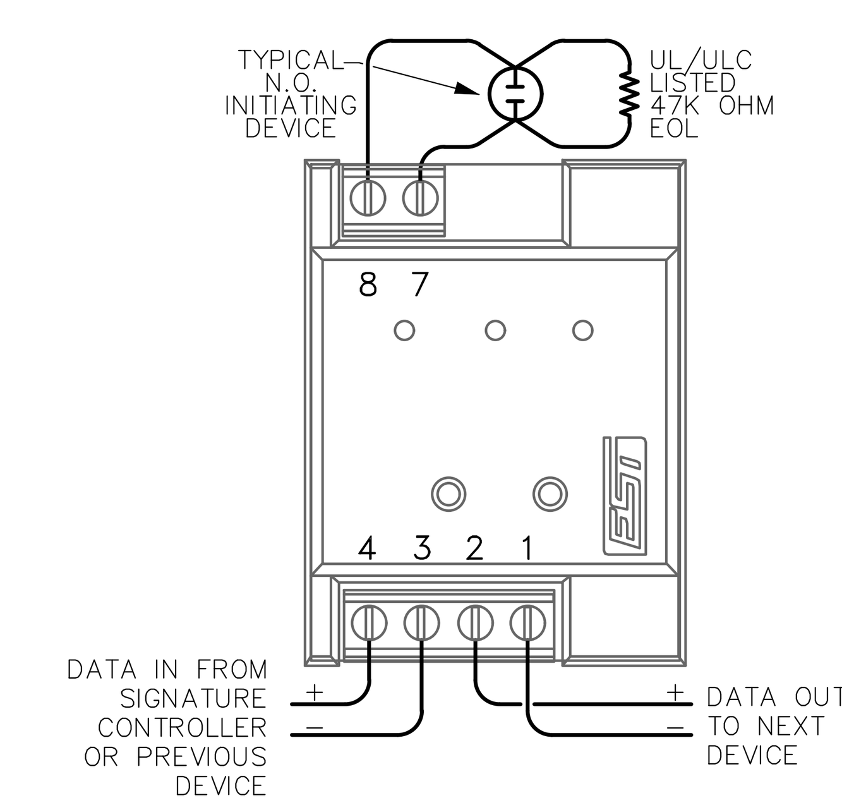
2 / FA1.0 RELEASING MODULE EST SIGA-REL
NO SCALE

Project Name	Renne Library					Point to Point Method										
Date	10/28/2020					CIRCUIT IS WITHIN LIMITS										
Circuit Number	E1					Totals		Voltage Drop								
Area Covered						**Current**	Distance									
Nominal System Voltage		20.4				**0.228**	250	0.19								
Minimum Allowed Device Voltage		16				**End of Line Voltage**		**20.21**								
Total Circuit Current	**0.228**		Wire Gauge	Ohm's Per 1000		**Percent Drop**		0.93%								
Distance from source to 1st device		30	14	3.07		Standard Wire Resistance in Ohms per 1000 feet. 16=4.89 14=3.07										
Wire Gauge for balance of circuit			14	3.07		Note: Wire resistance is doubled in the calculations for two wires (Positive and Negative)										
Device Number	Device Current	Distance from previous device	At Device	Voltage Drop from source	Percent Drop											
Device 1	0.050	30	20.36	0.042	0.21%											
Device 2	0.050	40	20.31	0.086	0.42%											
Device 3	0.028	55	20.27	0.129	0.63%	Device Manufacturer	Edwards EST			Device Manufacturer	Edwards EST					
Device 4	0.050	75	20.23	0.175	0.86%			UL Max Current @16VDC				UL Max Current @16VDC				
Device 5	0.050	50	20.21	0.190	0.93%	G4AVRF				G4VRF						
END			20.21	0.190	0.93%		Candela				Candela					
END			20.21	0.190	0.93%	HORN/STROBE	15-110	0.050		STOBE ONLY	15-110	0.028				
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
END			20.21	0.190	0.93%											
Totals	**0.228**	250	End of Line Voltage		**20.21**											

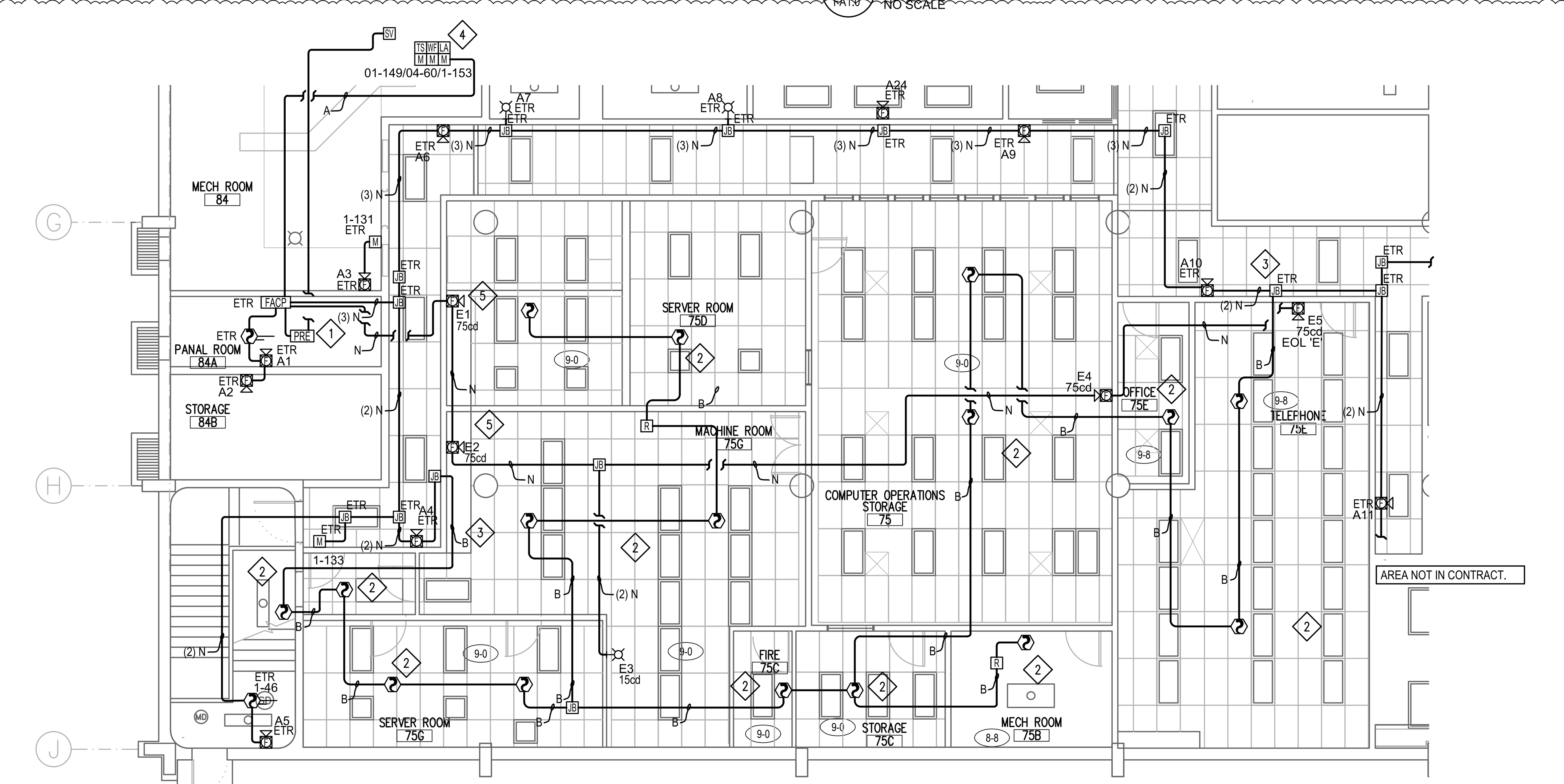
6 / FA1.0 CIRCUIT 'E' LOAD/LOSS CALCULATION
NO SCALE



3 / FA1.0 RELAY MODULE EST SIGA-CR
NO SCALE



3 / FA1.0 INPUT MODULE EST SIGA-CT1
NO SCALE



1 / FA1.0 BASEMENT FLOOR - FIRE ALARM PLAN
1/8" = 1'-0"

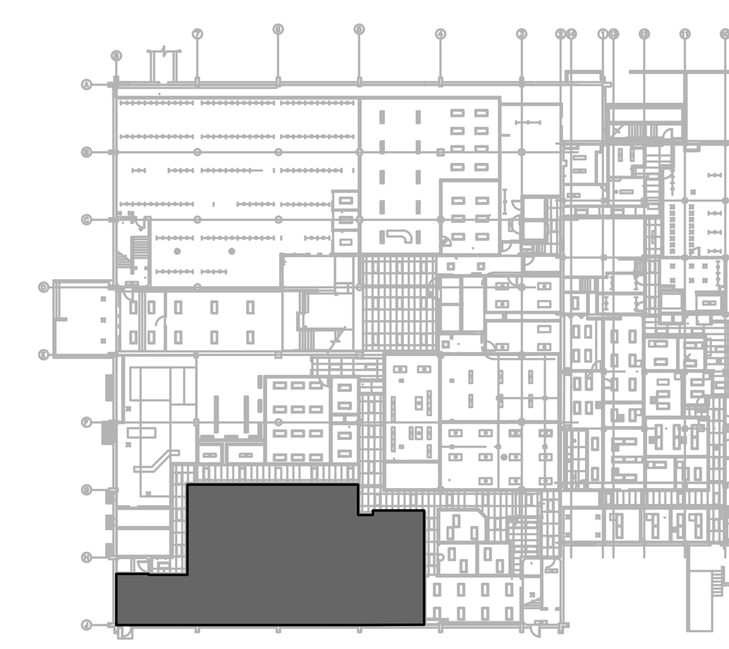
GENERAL NOTES

1. PLANS CREATED FROM AS-BUILT DRAWINGS AS PROVIDED BY MSU-BOZEMAN
2. DEVICE ADDRESSES TO BE FIELD COORDINATED BASED ON PANEL PROGRAM AVAILABILITY. CONTRACTOR TO PROVIDE REDLINES OF ADDRESSES USED FOR ALL NEW WORK TO BE INCORPORATED IN RECORD DOCUMENTS.
3. 'A' CIRCUIT HORN/STROBES SHALL HAVE NEW ADDRESSES AS NOTED
4. ALL EQUIPMENT WITHIN THE DATA ROOMS SHALL BE ADEQUATELY PROTECTED FROM DUST AND DEBRIS DURING INSTALLATION. DATA CENTER MANAGERS SHALL APPROVE PROTECTION BEFORE INSTALLATION OF DEMOLITION WITHIN THE AREA.

PLAN KEY NOTES ⟨X⟩

1. LOCATION OF EXISTING EST3X FIRE ALARM CONTROL PANEL. CONTRACTOR TO INSTALL NEW RELEASING MODULE FOR NEW FIRE SPRINKLER PREACTION SYSTEM. SEE SCHEDULE
2. NEW SMOKE DETECTORS FOR ACTUATION OF NEW PREACTION ZONE
3. TIE INTO EXISTING SLC CIRCUIT TO PROVIDE WIRING FOR NEW HEAT DETECTORS
4. RE-USE EXISTING MONITOR MODULES AS SHOWN ON FA DEMO SHEET FD0.2
5. CONTRACTOR TO PLACE NEW FIRE ALARM DEVICES DIRECTLY ADJACENT TO EXISTING DEVICES, NOW COVERED WITH BLANKS, AS PER THE DEMO SHEET FX0.2

GRAPHIC SCALE : 1/8" = 1'-0"
0' 4' 8' 16' 24'



KEYPLAN

MONTANA STATE UNIVERSITY

MSU-CPDC
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BOZEMAN, MONTANA
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FAX: 406.994.5665

RENNE LIBRARY
DATA CENTER - FIRE PROTECTION UPGRADES

COFFMAN ENGINEERS
www.coffman.com

DRAWN BY: BMH
REVIEWED BY: JAA

REV.	DESCRIPTION	DATE
⚠	ADDENDUM 1	1.25.21

JASON ANDERSON No. 11805PE LICENSED PROFESSIONAL ENGINEER MONTANA

PPA#20-0036

SHEET TITLE

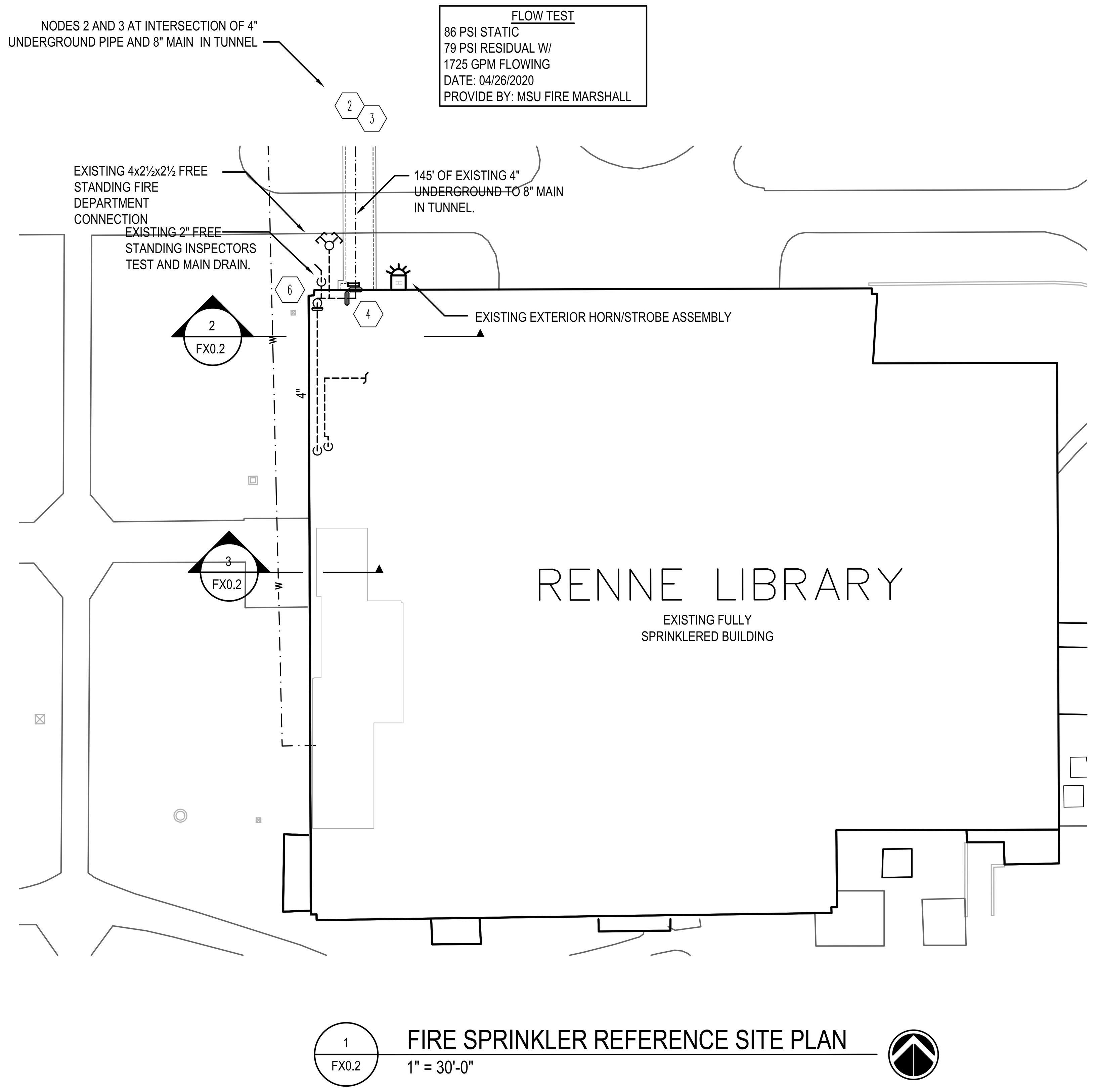
DATA CENTER FIRE ALARM PLAN

SHEET

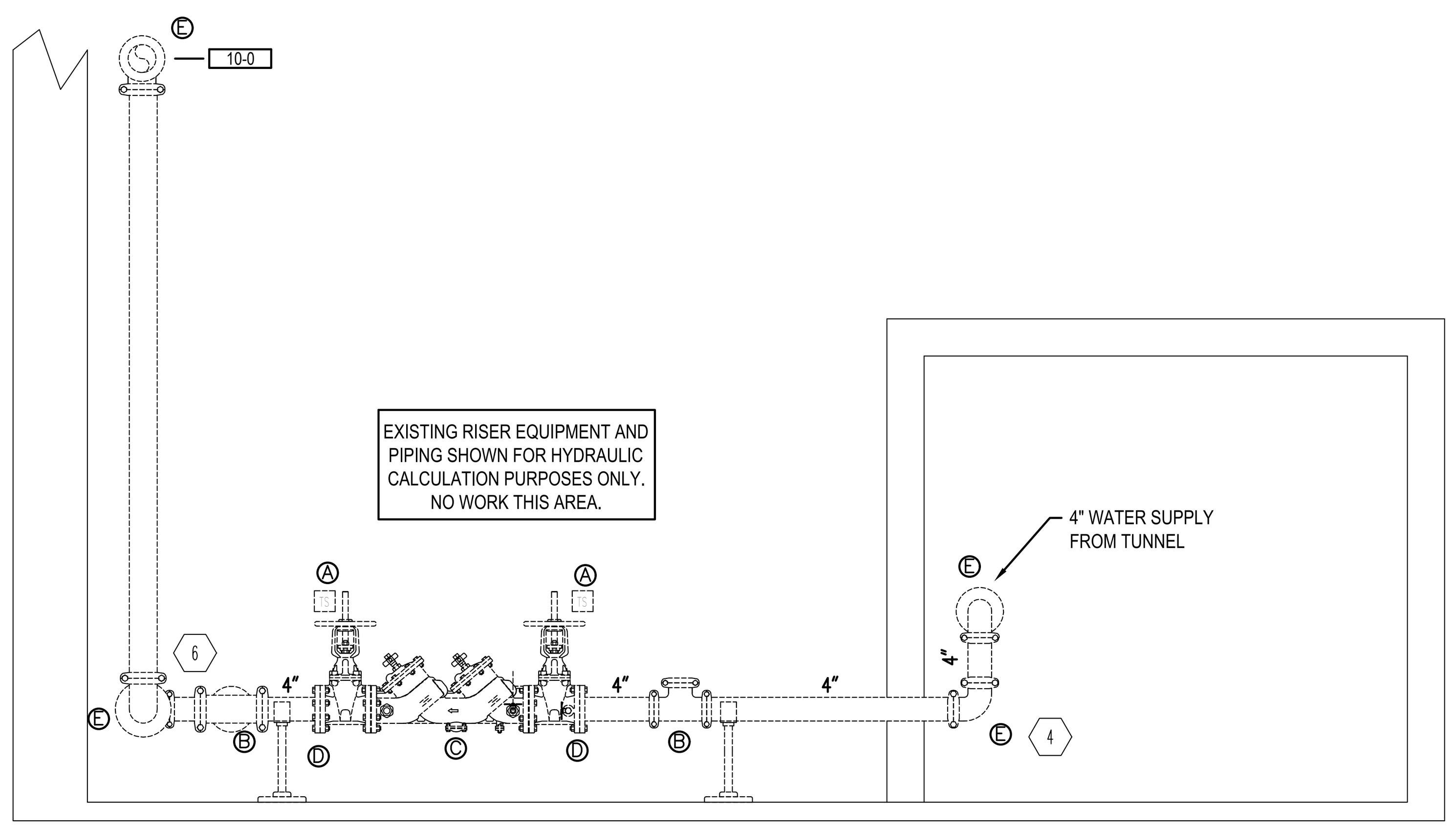
FA1.0

DATE

01-17-2021



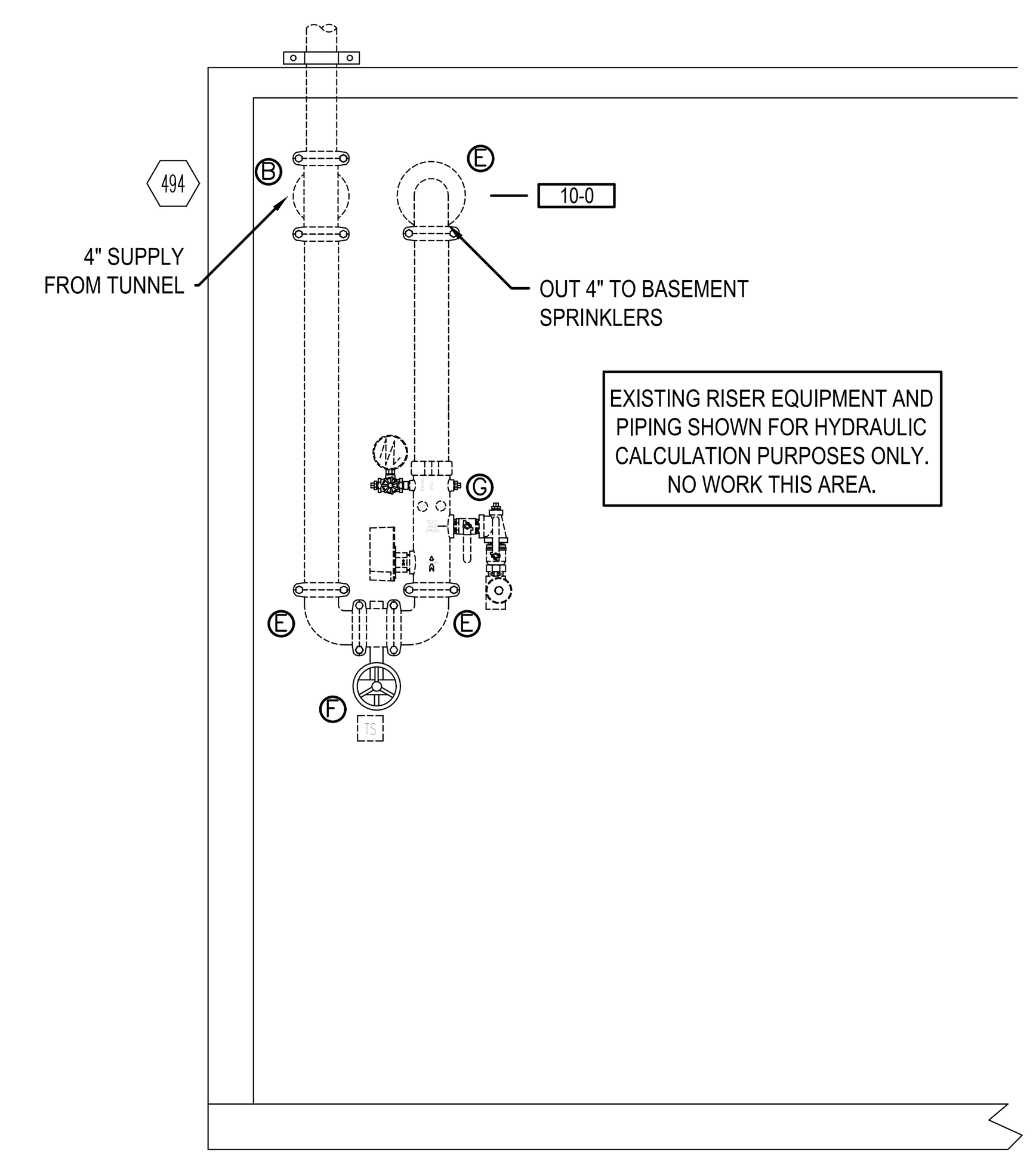
1 FX0.2 FIRE SPRINKLER REFERENCE SITE PLAN
1" = 30'-0"



EXISTING RISER LEGEND

- (A) TAMPER SWITCH
- (B) 4" GROOVED TEE
- (C) 4" DOUBLE CHECK VALVE ASSEMBLY
- (D) 4" GROOVED FLANGE
- (E) 4" GROOVED ELBOW
- (F) 4" GROOVED BUTTERFLY VALVE
- (G) 4" RISER ASSEMBLY WITH FLOW SWITCH

2 FX0.2 EXISTING FIRE SPRINKLER RISER DETAIL
½" = 1'-0"



3 FX0.2 EXISTING FIRE SPRINKLER BASEMENT RISER DETAIL
½" = 1'-0"

SEISMIC BRACING REQUIREMENTS

EARTHQUAKE BRACING SHALL CONFORM WITH N.F.P.A. #13 (2016 EDITION), I.B.C. (2018 EDITION), NEHRP, AND ASCE/SEI 7-16 (2016 EDITION) CRITERIA.

DESCRIPTION OF SITE CONDITIONS	
MAPPED SPECTRAL ACCELERATION FOR SHORT PERIODS	S_S = 0.683
MAPPED SPECTRAL ACCELERATION FOR A 1-SECOND PERIOD	S_1 = 0.215
SITE CLASS	D
SEISMIC OCCUPANCY CATEGORY OF BUILDING	II
MAXIMUM SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS	S_{DS} = 0.571
MAXIMUM SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIODS	S_{D1} = -
SEISMIC DESIGN CATEGORY BASED ON S_{DS}	D
SEISMIC DESIGN CATEGORY BASED ON S_{D1}	D
SEE CALCULATIONS BELOW FOR DETERMINATION OF FORCE FACTOR FOR SEISMIC DESIGN CATEGORY 'C' & 'D'.	
COMPONENT IMPORTANCE FACTOR	I_P = 1.50
COMPONENT RESPONSE MODIFICATION FACTOR	R_P = 4.50
COMPONENT AMPLIFICATION FACTOR	A_P = 2.50
HEIGHT IN STRUCTURE OF POINT OF ATTACHMENT W/ RESPECT TO THE BASE	Z = 1
AVERAGE ROOF HEIGHT OF STRUCTURE WITH RESPECT TO THE BASE	H = 1

$$F_P = \frac{0.4 * A_P * S_{DS} * W_P}{\frac{R_P}{I_P}} * (1+2*\frac{Z}{H})$$

F_P = SEISMIC DESIGN FORCE, C_P = FORCE FACTOR
W_P = 1.15 TIMES WEIGHT OF WATER FILLED PIPE

$F_P = C_P * W_P$ $F_P = 0.571 * W_P$

ASCE 7-05 ALLOWS A REDUCTION FACTOR OF 1.4 FOR STRESS BASED DESIGN: $F_P = 0.407 * W_P$

FIRE SPRINKLER GENERAL NOTES

1. FIRE PROTECTION SYSTEM SHALL BE DESIGNED, INSTALLED, TESTED, AND FLUSHED IN ACCORDANCE WITH:
   - INTERNATIONAL BUILDING CODE (IBC) - 2018 EDITION WITH LOCALLY ADOPTED MODIFICATIONS
   - NFPA 13 (STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS) - 2016 EDITION
2. NO INSTALLATION OF ANY PIPING OR EQUIPMENT IS TO BEGIN PRIOR TO APPROVAL OF PLANS BY THE AUTHORITY HAVING JURISDICTION AND THE OWNER'S REPRESENTATIVE.
3. ALL PAINTING OF FIRE PROTECTION PIPING AND RELATED COMPONENTS TO BE PERFORMED UNDER THIS CONTRACT AS REQUIRED.
4. ALL ELECTRICAL WIRING OF FIRE ALARM SYSTEM AND FIRE SPRINKLER ELECTRICAL COMPONENTS TO BE PERFORMED BY LICENSED ELECTRICIAN AND SHALL BE PERFORMED UNDER THIS CONTRACT. THE FIRE SPRINKLER SYSTEM SHALL BE SUPERVISED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE AND NFPA 72 (NATIONAL FIRE ALARM CODE).
5. SYSTEM DESIGN ACCOUNTS FOR NO PENETRATIONS IN STRUCTURAL MEMBERS UNLESS OTHERWISE NOTED. OBTAIN APPROVALS FROM THE STRUCTURAL ENGINEER PRIOR TO PENETRATING ANY STRUCTURAL MEMBERS DUE TO FIELD CHANGES.
6. IT IS THE OWNERS RESPONSIBILITY TO PROVIDE ADEQUATE HEAT TO PREVENT FREEZING THROUGHOUT WET PIPE SPRINKLER SYSTEM AREAS AND IN ENCLOSURES FOR DRY PIPE AND OTHER TYPES OF VALVES CONTROLLING WATER SUPPLIES TO SPRINKLER SYSTEMS.

SPRINKLER PIPE AND FITTINGS TABLE

MATERIALS MAY BE OF DOMESTIC OR IMPORT ORIGIN
ALL MATERIALS SHALL BE OF "DOMESTIC" OR "DESIGNATED COUNTRY" ORIGIN (FEDERAL PROJECT)

PIPE SIZE	PIPE	FITTINGS AND OUTLETS
1" TO 2"	GALV SCH-40 DRAIN PIPING	GALVANIZED CLASS-150 MALLEABLE IRON THREADED FITTINGS (300 PSI RATED)
1" TO 2" PA SYSTEM	GALVANIZED SCH-40	BLACK CLASS-125 CAST IRON THREADED FITTINGS (175 PSI RATED)
2½" PREACTION SYSTEM	GALVANIZED SCH-10	WELDED OUTLETS WITH ROLL GROOVED ENDS AND PAINTED DUCTILE IRON GROOVED FITTINGS (300 PSI RATED) (SHORT TAKEOUT-I.E. 4" ELL = 4")

BRANCHLINE RESTRAINT REQUIREMENTS

PER N.F.P.A #13 2016, CHAPTER 9.3.6

SEISMIC COEFFICIENT, C_P = 0.407 (SEE SEISMIC CALCULATIONS FOR C_P VALUES)	STEEL BRANCH LINE SIZE			
	1"	1¼"	1½"	2"
MAXIMUM SPACING OF BRANCH LINE RESTRAINTS	43'	46'	49'	53'

WHERE NOT REQUIRED:
-NO RESTRAINT REQUIRED IF HANGER ROD IS LESS THAN 6" LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE.
WHERE REQUIRED:
-ON ALL BRANCH LINES (WITH HANGER ROD >6") AT INTERVALS NOT EXCEEDING THOSE SPECIFIED IN TABLE ABOVE BASED ON BRANCH LINE DIAMETER AND THE VALUE OF C_P.
-SPRIG-UPS 4'-0" OR LONGER SHALL BE RESTRAINED AGAINST LATERAL MOVEMENT.

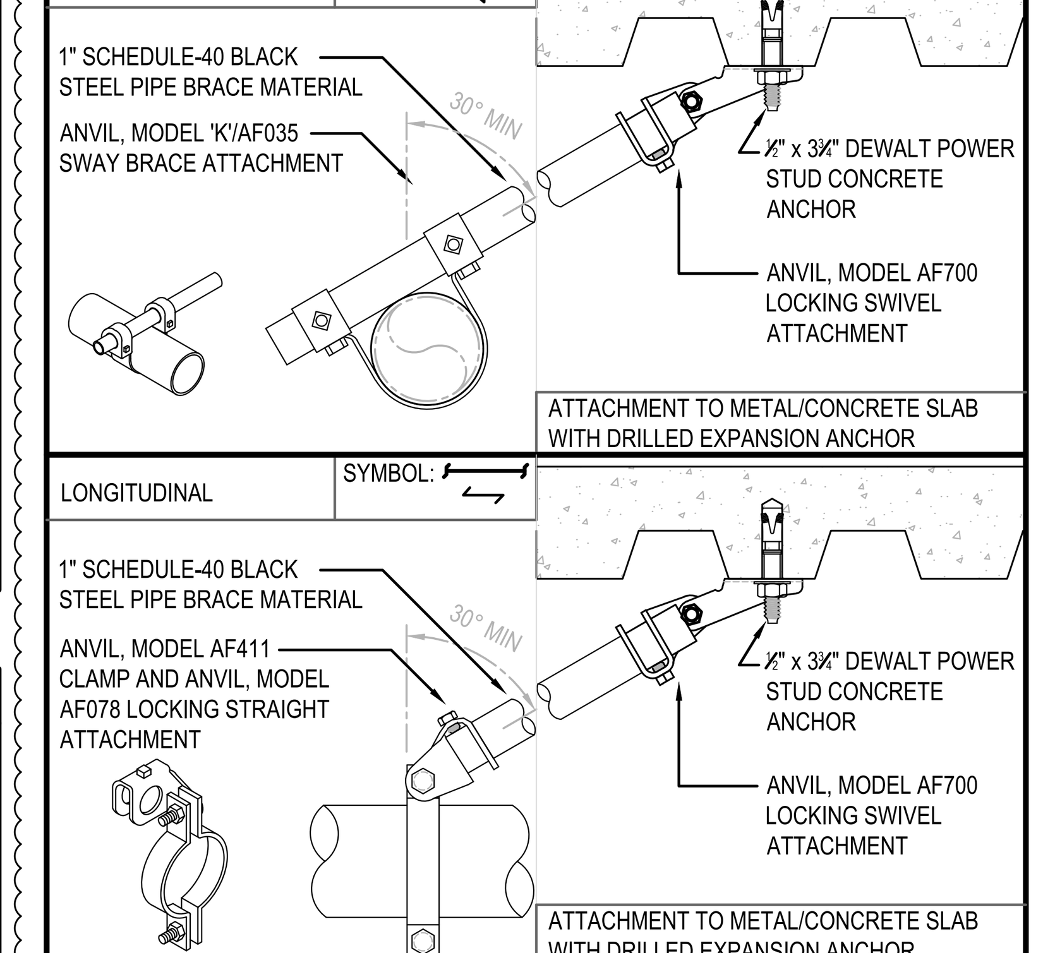
-RESTRAINT SHALL BE PROVIDED BY USE OF ONE OF THE FOLLOWING:
1) A LISTED SWAY BRACE ASSEMBLY
2) A WRAPAROUND U-HOOK
3) #12, 440-LB WIRE INSTALLED AT LEAST 45° FROM THE VERTICAL PLANE AND ANCHORED ON BOTH SIDES OF THE PIPE.
4) A HANGER NOT LESS THAN 45° FROM VERTICAL INSTALLED WITHIN 6" OF THE VERTICAL HANGER ARRANGED FOR RESTRAINT AGAINST UPWARD MOVEMENT, PROVIDED IT IS UTILIZED SUCH THAT L/R DOES NOT EXCEED 300, WHERE THE ROD SHALL EXTEND TO THE PIPE OR HAVE A SURGE CLIP RESTRAINT.
5) OTHER APPROVED MEANS

-WIRES USED FOR PIPING RESTRAINTS SHOULD BE ATTACHED TO THE BRANCH LINE WITH TWO TIGHT TURNS AROUND THE PIPE AND FASTENED WITH FOUR TIGHT TURNS WITHIN 1-1/2"(SEE DETAIL), AND ATTACHED TO THE STRUCTURE WITH MEANS APPROVED BY NFPA.

-RESTRAINT SHALL BE LOCATED WITHIN 2 FT OF A HANGER. THE HANGER CLOSEST TO THE RESTRAINT SHALL BE OF A TYPE THAT RESISTS UPWARD MOVEMENT OF A BRANCH LINE SUCH AS A SURGE CLIP.

EARTHQUAKE BRACING DETAILS

FOUR-WAY	SYMBOL:	LATERAL AND LONGITUDINAL BRACE AS DETAILED, NO MORE THAN 6" APART
LATERAL	SYMBOL:	
LONGITUDINAL	SYMBOL:	



SEISMIC BRACING NOTES
1. ALL BRACE PIPING SHALL BE SCHEDULE 40 BLACK STEEL.
2. MAX BRACE PIPE LENGTH = 7'-0" (PROVIDE 40" PER BRACE FOR LISTING)
3. MAX LATERAL BRACE SPACING FOR 2½" PIPE = 30'-0" U.O.N.
4. MAX LONGITUDINAL BRACE SPACING FOR 2½" PIPE = 80'-0" U.O.N.

1

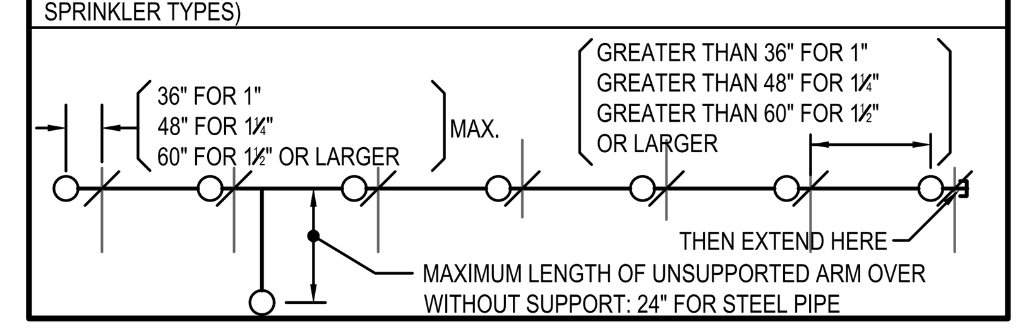
HANGER SPACING REQUIREMENTS

MAXIMUM DISTANCE BETWEEN HANGERS (FT-IN.) - N.F.P.A. #13

NOMINAL PIPE SIZE	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"
STEEL PIPE	N/A	12-0	12-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0

NOTE:
TYPICAL HANGER SYMBOLS AS SHOWN ON PIPING PLAN MAY NOT REFLECT ACTUAL FIELD INSTALLATION. FINAL HANGER INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF N.F.P.A. #13.

DISTANCE FROM SPRINKLER TO HANGER - N.F.P.A. #13 - MAX PRESSURES ≤ 100 PSI (ALL SPRINKLER TYPES)



FIRE SPRINKLER LEGEND

*ALTERNATE SPRINKLER TEMPERATURES MAY BE NOTED NEXT TO SYMBOL (I.E. INT = INTERMEDIATE; HIGH = HIGH TEMPERATURE)

SYMBOL	DESCRIPTION
◉	STANDARD SPRAY PENDENT SPRINKLER ON - DROP
○	STANDARD SPRAY UPRIGHT SPRINKLER ON - LINE
◎	STANDARD SPRAY UPRIGHT SPRINKLER ON - SPRIG
	EXISTING PENDENT SPRINKLER
	EXISTING UPRIGHT SPRINKLER
	LATERAL OR LONGITUDINAL SWAY BRACE
	COMBINATION LATERAL AND LONGITUDINAL SWAY BRACE
FS	FLOW SWITCH
TS	TAMPER SWITCH
LAA	LOW AIR ALARM
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
OR	CHECK VALVE
OR	BUTTERFLY VALVE (GROOVED OR THREADED)
OR	GLOBE VALVE
H	HORN/STROBE ASSEMBLY
	FREE STANDING FIRE DEPARTMENT CONNECTION
X-X	PIPE CENTERLINE FROM FINISHED FLOOR
X	HYDRAULIC NODE POINT
X-X	CEILING HEIGHT
	RISER
*	DISTANCE PIPE FROM DECK
	GROOVED ELBOW UP
	GROOVED ELBOW DOWN
	FLEXIBLE GROOVED COUPLING
	GROOVED COUPLING
	SCREWED ELBOW DOWN
	SCREWED ELBOW UP
	HANGER SYMBOL - SEE DETAIL FOR TYPE
	HANGER SYMBOL - SEE DETAIL FOR TYPE
	HANGER SYMBOL - SEE DETAIL FOR TYPE
	HANGER SYMBOL - SEE DETAIL FOR TYPE
	HANGER SYMBOL - SEE DETAIL FOR TYPE
	SEISMIC RESTRAINT #1
	SEISMIC RESTRAINT #2
HEADS	HEAD BOX
⊗	TAPPING VALVE
▲	THRUST BLOCKING/PLUG
	NEW PREACTION SPRINKLER PIPE
	EXISTING SPRINKLER PIPE
	DEMO SPRINKLER PIPE
	EXISTING UNDERGROUND WATER MAIN/FIRE MAIN
AFF	ABOVE FINISHED FLOOR
ATR	ALL THREAD ROD
A.S.	AUTOMATIC SPRINKLER
CIF	CUT IN FIELD
DN	DOWN
FDC	FIRE DEPARTMENT CONNECTION
FG	FINISHED GRADE
GALV	GALVANIZED
GBE	GROOVE BOTH ENDS
GOE	GROOVE ONE END
GMI	GALVANIZED MALLEABLE IRON
OS&Y	OUTSIDE STEM & YOKE
PA	PRE-ACTION
RN	RISER NIPPLE
TBE	THREAD BOTH ENDS
TOE	THREAD ONE END
T&G	THREAD AND GROOVE
UON	UNLESS OTHERWISE NOTED

SEISMIC CLEARANCE REQUIREMENTS

PROVIDE CLEARANCE AT ALL PIPING EXTENDING THROUGH WALLS, FLOORS, FOUNDATIONS. NO CLEARANCE REQUIRED AT GYPSUM BOARD OR EQUALLY FRANGIBLE CONSTRUCTION THAT IS NOT REQUIRED TO HAVE A FIRE RESISTANCE RATING.

NOMINAL PIPE SIZE		CORE DRILL HOLE OR PIPE SLEEVE SIZE	
INCH	MM	INCH	MM
1	25	3	80
1¼	32	4	100
1½	40	4	100
2	50	4	100
2½	65	6	150
3	80	6	150
4	100	8	200
6	150	10	250

AT CONTRACTORS OPTION FLEXIBLE COUPLINGS MAY BE INSTALLED WITHIN 12" OF THE WALL SURFACE ON EACH SIDE, OR WITHIN 12" ABOVE FLOOR AND 24" BELOW FLOOR, AND THE CLEARANCES NOTED ARE NOT REQUIRED.

FIRE CAULK HOLE AND PROVIDE SPLIT CHROME WALL PLATES AT ALL EXPOSED WALL LOCATIONS.

(NOTE THAT AT NON-RATED FRANGIBLE GYPSUM BOARD WALLS NO CLEARANCE IS REQUIRED)

SPRINKLER HEADS - PROJECT TOTAL

MANUFACTURER	MODEL	TYPE	SIN	FINISH	THREAD	K-FACTOR	CANOPY	ESCUTCH	TEMP	WRENCH	SYMBOL	QUANTITY
TYCO	TY-FRB	PEND	TY323	WHITE	1/2"	5.6	REC'D	STY15	200°	W7	◉	49
TYCO	TYFRB	UP	TY313	BRASS	1/2"	5.6	ON-LINE	N/A	200°	W7	○	2
TYCO	TYFRB	UP	TY313	BRASS	1/2"	5.6	SPRIG	N/A	200°	W7	◎	1
											TOTAL	52

GRAPHIC SCALE : 1/2" = 1'-0"
0' 1' 2' 4' 6'

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DATA CENTER - FIRE PROTECTION UPGRADES

COFFMAN ENGINEERS
DRAWN BY: BMH
REVIEWED BY: JAA

REV.	DESCRIPTION	DATE
1	ADDENDUM 1	1.25.21

JASON T. ANDERSON No. 11805PE LICENSED PROFESSIONAL ENGINEER MONTANA

PPA#20-0036

SHEET TITLE
F.S. GENERAL NOTES & SITE PLAN

SHEET
FX0.2

DATE
01-17-2021