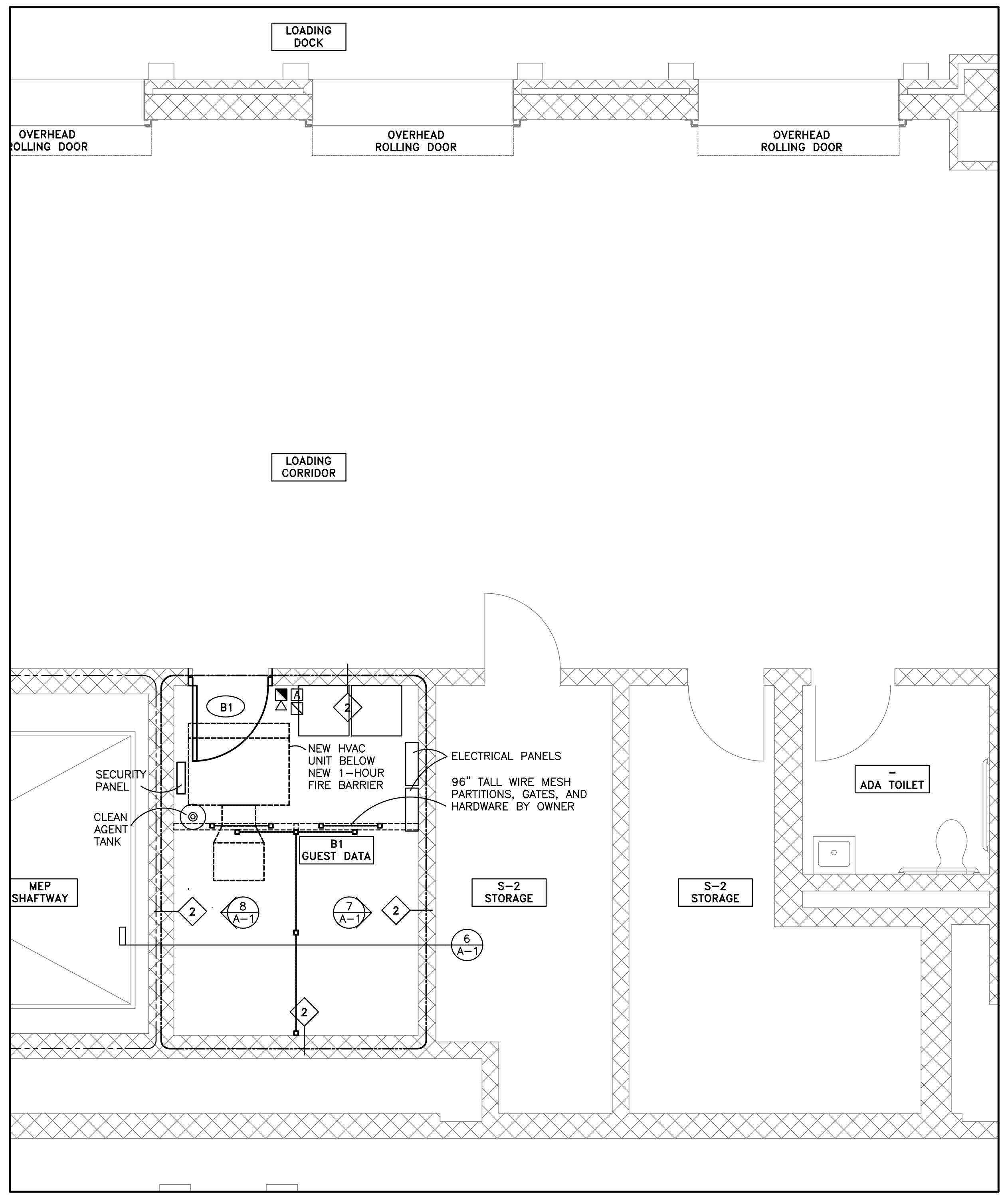
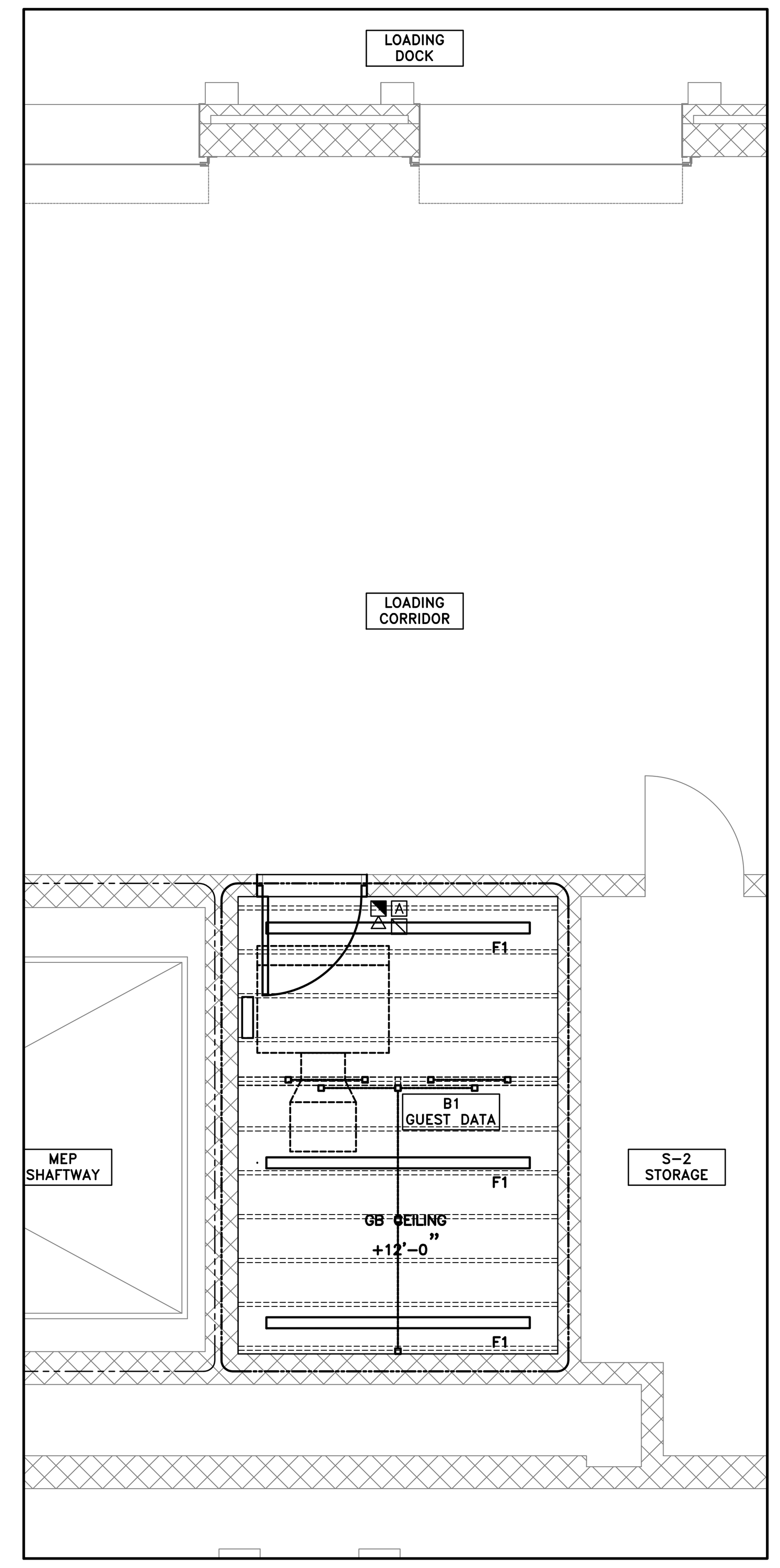
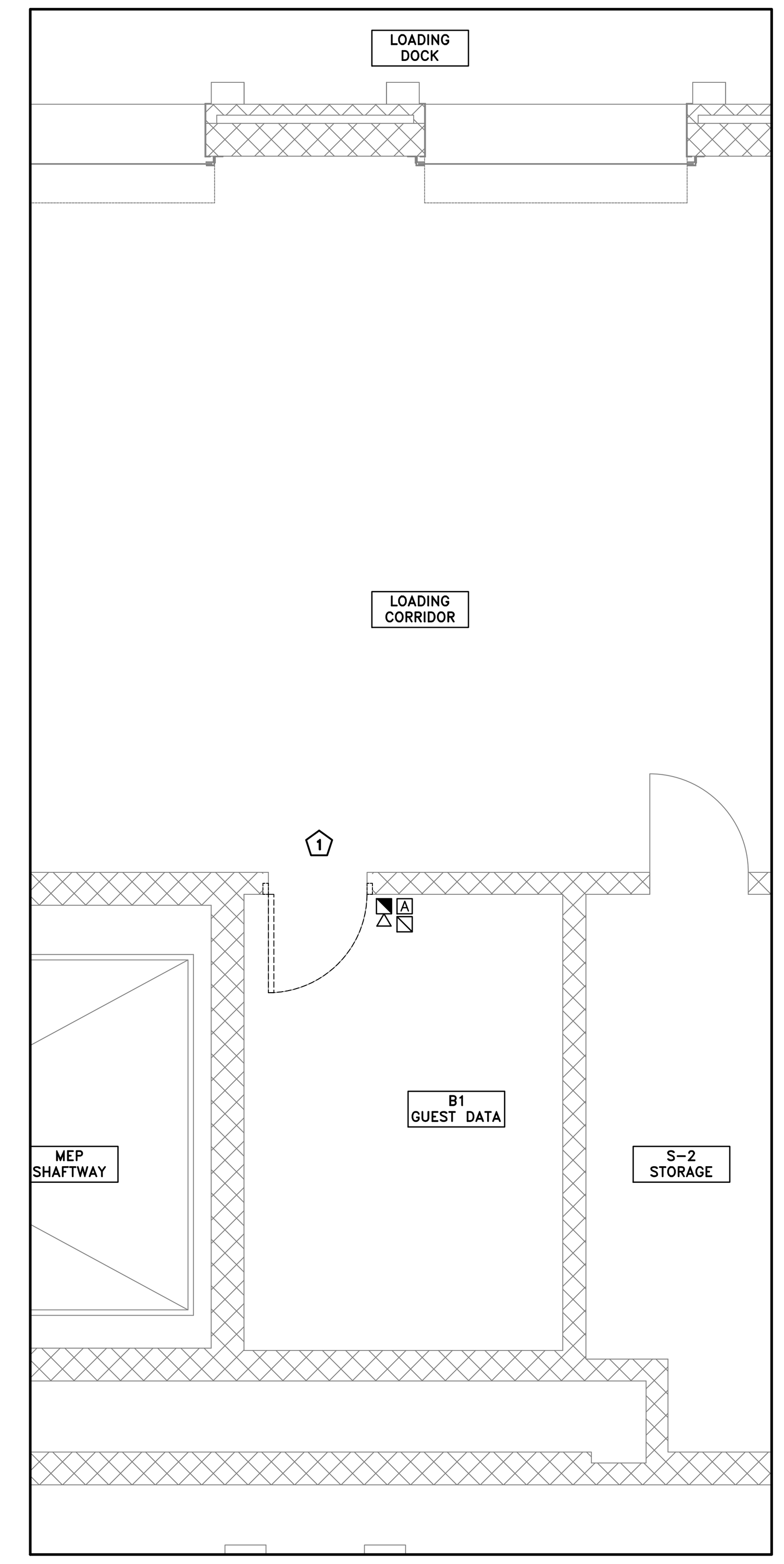


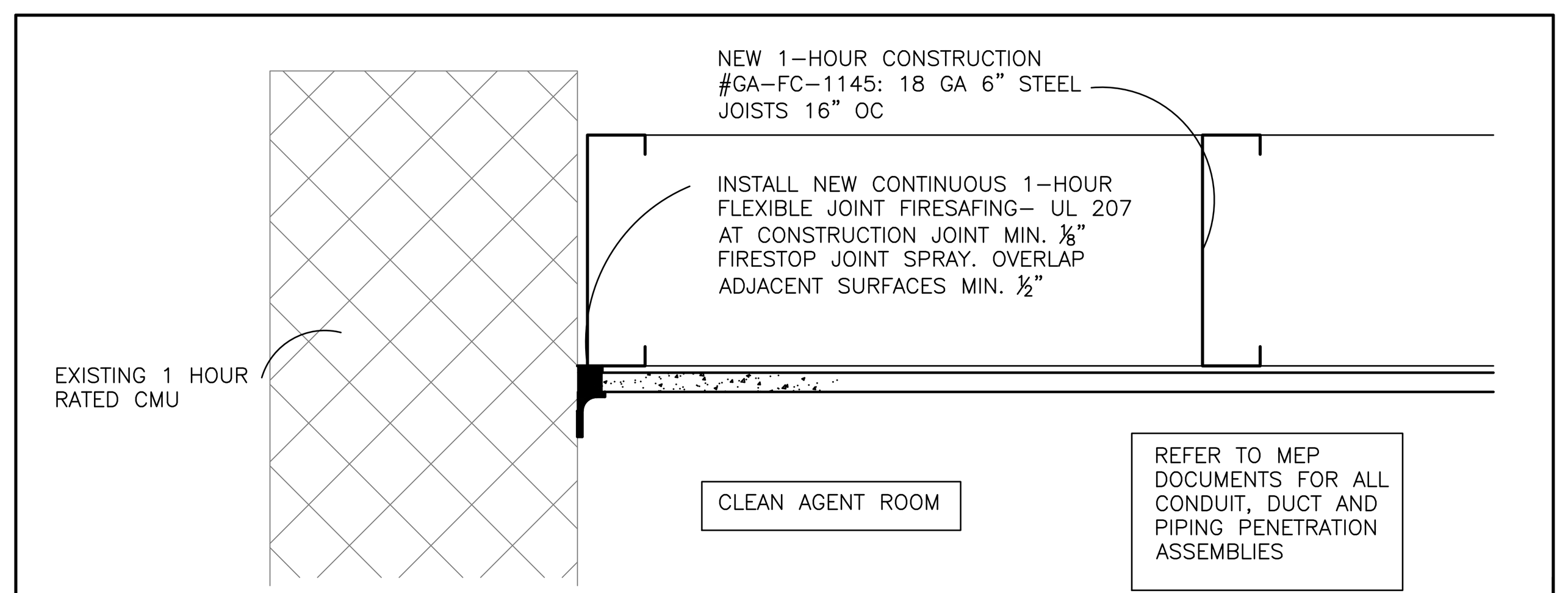
1. PARTAIL LEVEL-2 FLOOR PLAN
SCALE: ⅛"-1'-0"



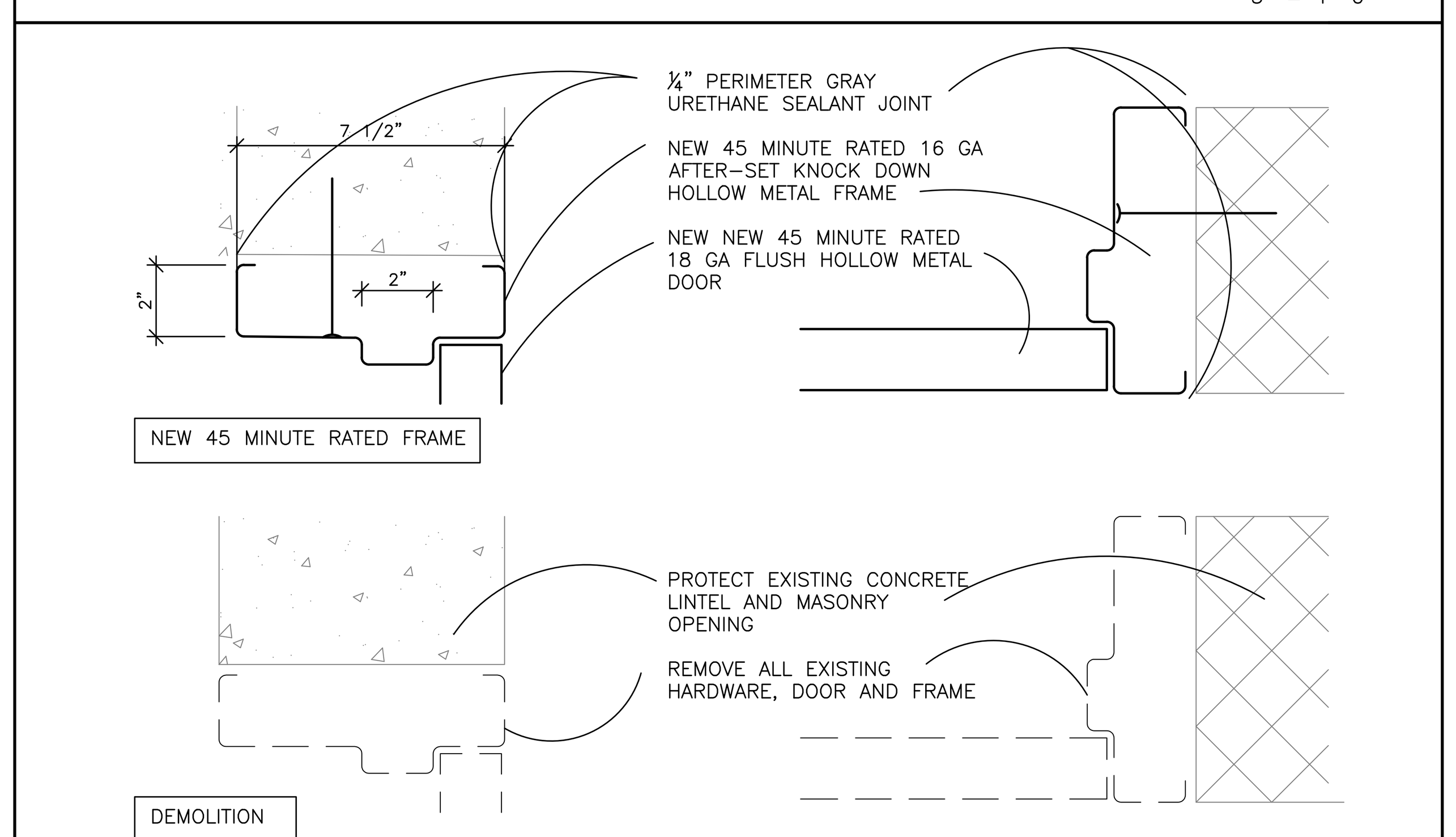
2. PARTAIL LEVEL-2 RCP PLAN
SCALE: ⅛"-1'-0"



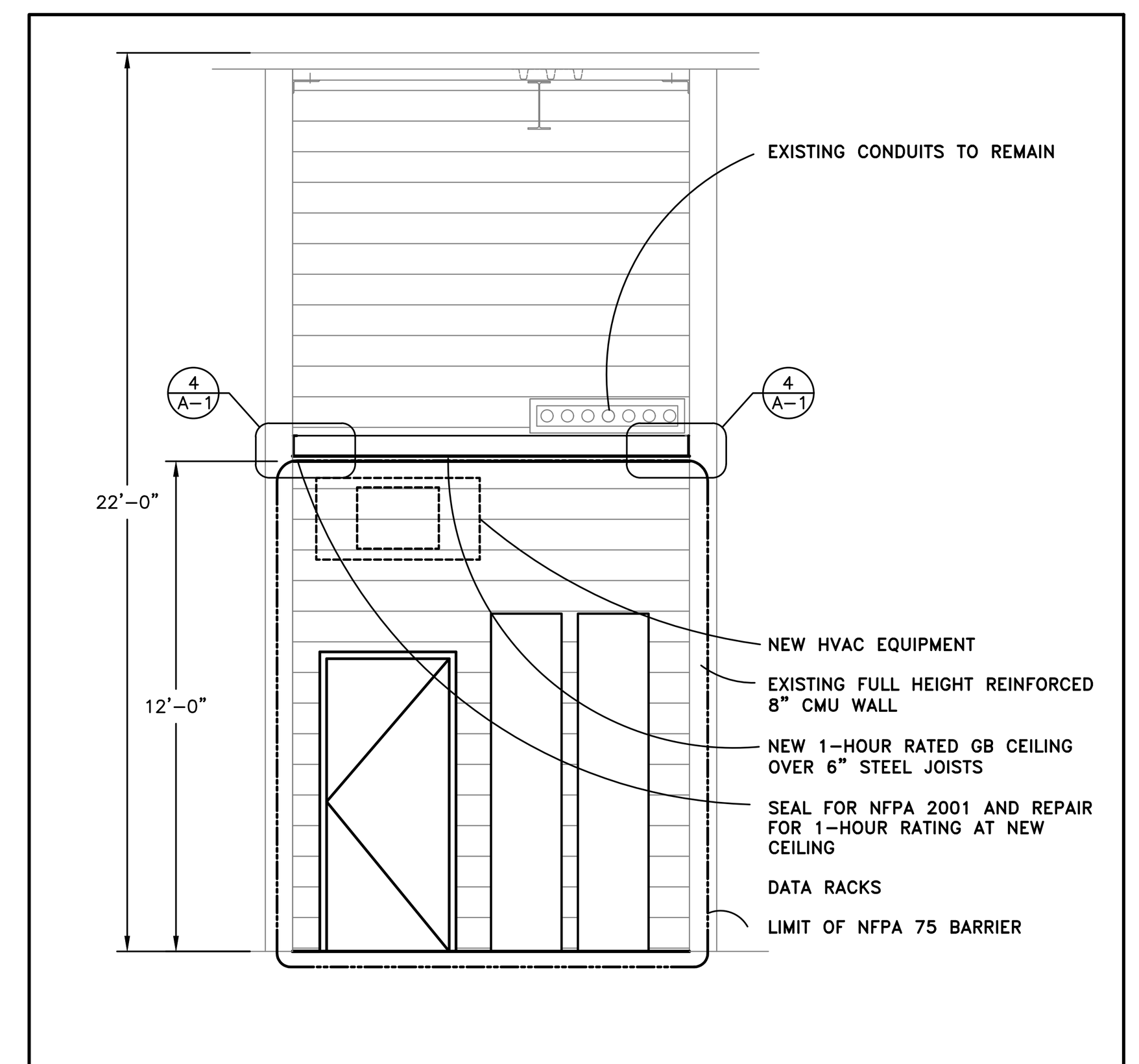
3. PARTAIL LEVEL-2 DEMOLITION PLAN
SCALE: ⅛"-1'-0"



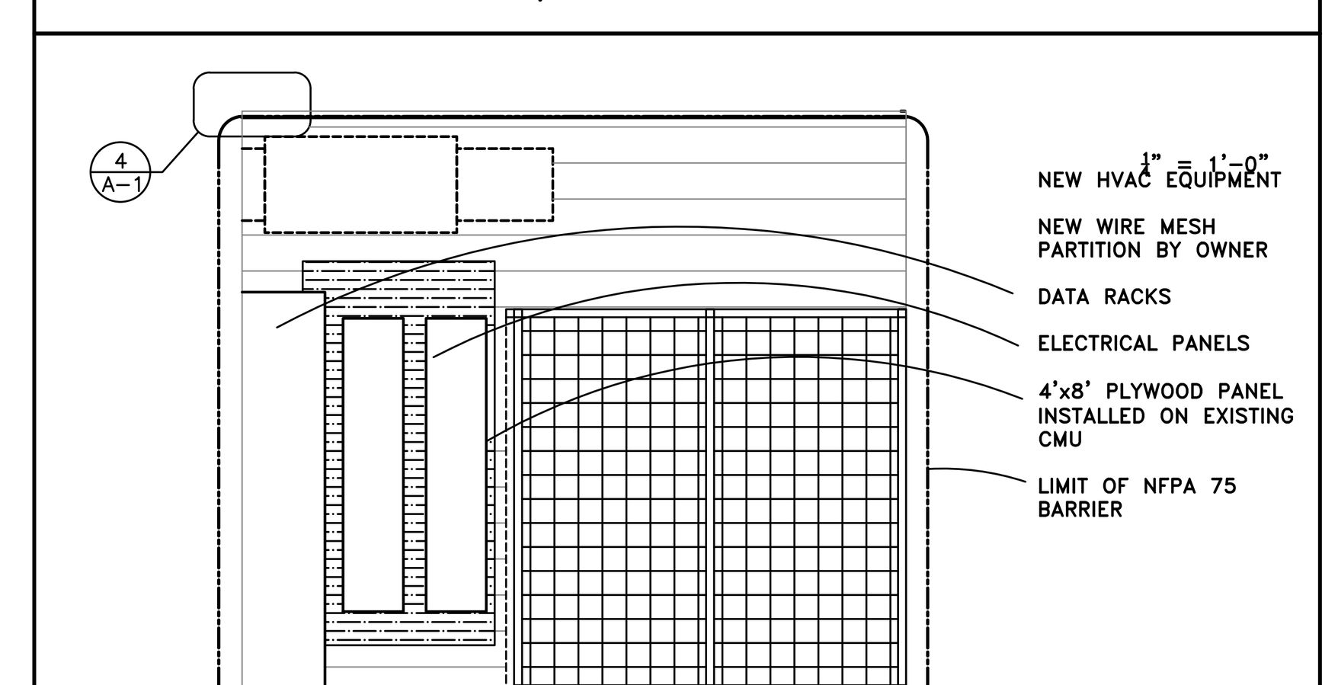
4. CMU AT NEW 1-HOUR RATED GB CEILING — 3" = 1'-0"



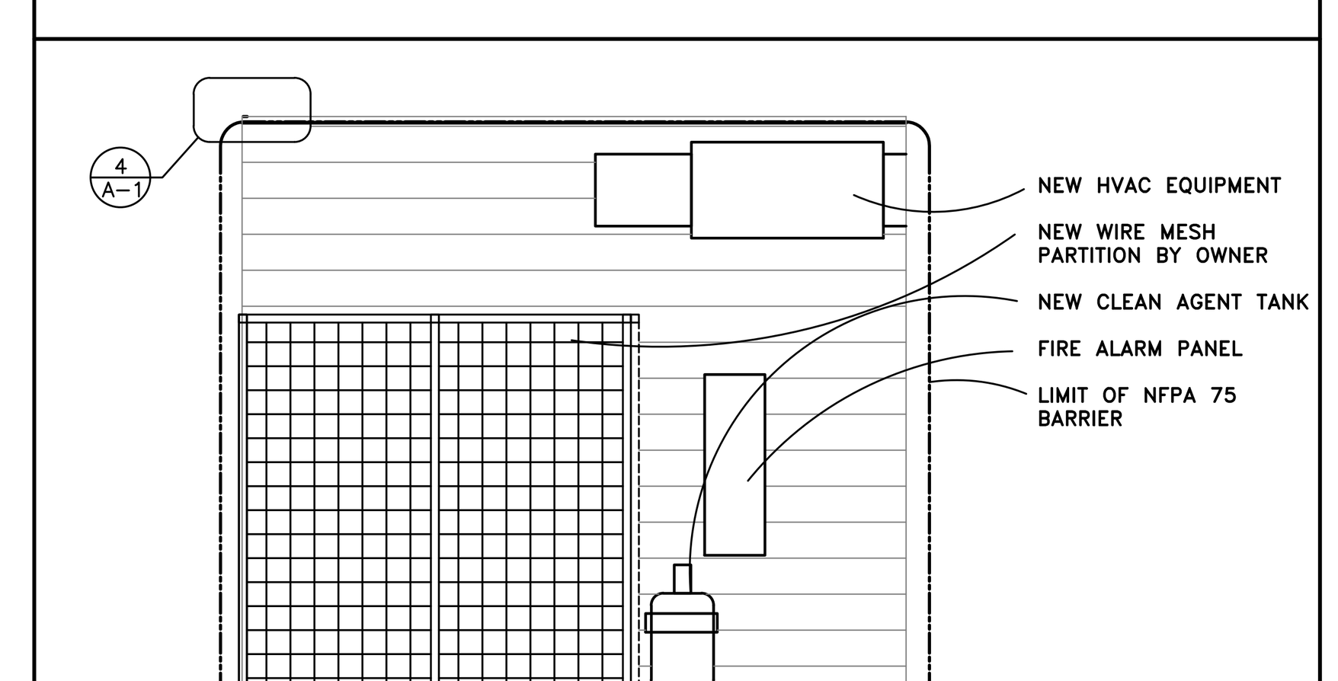
5. NEW RATED FRAME AT EXISTING CMU OPENING DETAILS — 3" = 1'-0"



6. ROOM B1- ELEVATION/ SECTION



7. ROOM B1- ELEVATION EAST



8. ROOM B1- ELEVATION WEST

<u>PENNSYLVANIA CONVENTION CENTER</u>
<u>PENNSYLVANIA CONVENTION CENTER AUTHORITY</u>
<u>LEVEL 200 ROOM B1: DATA ROOM REPAIR</u>
COMMONWEALTH OF PENNSYLVANIA.

PENNSYLVANIA CODES REFERENCE:
- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL EXISTING BUILDING CODE
- 2018 INTERNATIONAL MECHANICAL CODE
- 2020 NATIONAL ELECTRIC CODE
- 2018 IBC ENERGY CONSERVATION CODE
- 2018 INTERNATIONAL FIRE CODE

REFER TO FIRE PROTECTION DOCUMENTS FOR INFORMATION PERTAINING TO THE FOLLOWING:
- NFPA 2001: STANDARD ON CLEAN AGENT FIRE PROTECTION.
- NFPA 75: STANDARD FOR THE FIRE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT.

PROPOSED WORK ARE "REPAIRS" (PER IEBC 2018: PROPOSED WORK DOES NOT INCLUDE THE REMOVAL AND REPLACEMENT OF ANY DOOR, OR WALL.)

WORK INCLUDES NO STRUCTURAL REPAIRS

TOTAL AREA OF LEVEL 2:	A-3 OCCUPANCY	256,093 GSF
	S-1 OCCUPANCY	5,419 GSF
	S-2 OCCUPANCY	795 GSF
AREA OF S-2 OCCUPANCY PROPOSED REPAIR:		135 NSF

WORK IS CONFINED TO EXISTING TYPE S-2 LOW HAZARD OCCUPANCY - STORAGE OCCUPANCY PER SHEETS A-110 CODE INFORMATION AND A-111 OVERALL LEVEL-1 CODE PLAN, EXPANSION AND RENOVATION/ PENNSYLVANIA CONVENTION CENTER RECORD SET DATED MAY 02, 2011:

NO CHANGE IN USE, OCCUPANCY, OR OCCUPANT LOAD.
EXISTING USE GROUP- STORAGE
EXISTING BUILDING IS TYPE 1A CONSTRUCTION
EXISTING BUILDING IS PROTECTED BY SPRINKLERS (NFPA 13).
FLAME SPREAD RATING (803.9) - CLASS B.

ALTERATION DOES NOT EFFECT EXISTING USE, EXITING, OR EXIT ACCESS. WORK INCLUDES REPAIRS TO FIRE ALARM SYSTEM AND SMOKE DETECTION SYSTEM. EXISTING NFPA 13 SPRINKLER SYSTEM REPAIRS ARE INCLUDED IN THE WORK.

EXISTING SHAFT ENCLOSURES AND FLOOR PENETRATIONS AT REPAIRS TO COMPLY WITH 2-HOUR SEPARATION REQUIREMENTS OF IBC ARTICLE 708.

EXISTING PERIMETER PARTITIONS TO BE USED AS ENCLOSURE INTEGRITY PER NFPA 75 AND NFPA 2001 <u>SHALL BE REPAIRED TO BE 1-HOUR FIRE RATED ASSEMBLIES AND SEALED AS NOTED IN THESE DOCUMENTS TO RESIST CLEAN AGENT ACTIVATION PRESSURES</u>.

BUILDING AND LIFE SAFETY CODE SUMMARY

<u>ALL SEALING ASSEMBLIES TO MEET REQUIREMENTS FOR SMOKE PARTITIONS PER NFPA 2001 PERIMETER ENCLOSURE INTEGRITY EXPECTED PRESSURE RATINGS. REFER TO FIRE PROTECTION DRAWINGS FOR ADDITIONAL INFORMATION REGARDING TESTING AND RE-TESTING REQUIRMENTS:</u>

TYPICAL NFPA 2001 PERIMETER SEALING NOTES

<u>EXISTING WALL TYPES</u>

- ⟨2⟩ **EXISTING FULL HEIGHT REINFORCED 8" CMU WALL: SEAL FOR NFPA 2001 AND REPAIR FOR 1-HOUR RATING**
- NFPA 75 ONE HOUR RATING AND NFPA 2001 "ENCLOSURE INTEGRITY" PERIMETER
- EXISTING 2-HOUR ASSEMBLIES

PLAN LEGEND

1. REMOVE EXISTING DOORS AND FRAME: REFER TO DTL 8/A-1

DEMOLITION PLAN LEGEND

MARK	WIDTH	HEIGHT	TYPE	THK	FRAME	COMMENTS	HARDWARE SET
B1	36"	86"	A	1 ¾"	HM	NEW 45 MINUTE FIRE RATING NEW DOOR AND FRAME	1

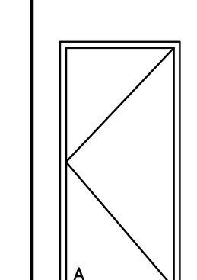
DOOR SCHEDULE

SET 1: DOORS B1: NEW HOLLOW METAL DOORS AND FRAMES- FAIL SECURE: REFER TO ELECTRICAL DOCUMENTS FOR EXISTING CARD READERS, POWER SUPPLY, ELECTRIFIED JAMB, AND CONTINUOUS GEARED ELECTRIC HINGES.

- (1) AUTOMATIC DOOR CLOSER LCN 4111.
- (1) EXIT DEVICE VON DUPRIN 9947 EOF
- (1) LEVER VON DUPRIN RHODES
- (1) REUSE EXISTING LOCK CYLINDER).
- (1) ELEC. STRIKE VON DUPRIN 6223. CONTRACTOR TO VERIFY VOLTAGE TYPE AND LEVEL OF EXISTING POWER SUPPLY.
- (1) SMOKE SEAL SYSTEM HAGER 721 36" +84" +84"
- (1) 36" THRESHOLD HAGER 580N (NEOPRENE INSERT)

ALL HARDWARE FINISH TO SATIN CHROME.

SUBMIT COORDINATED SECURITY SYSTEM AND HARDWARE PACKAGE MEETING ALL PCC REQUIREMMENTS



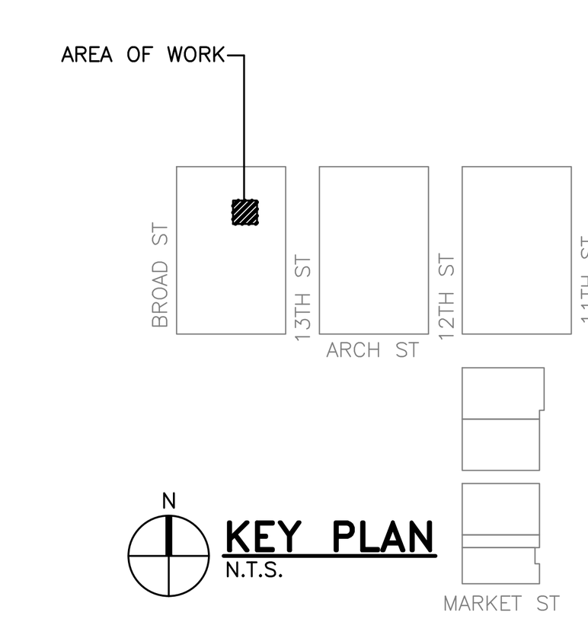
DOOR TYPE

HARDWARE NOTES

ROOM	NAME	FLOOR	WALL	BASE	CEILING	NOTES
B1	GUEST DATA	NONE	PAINT	NONE	PAINT	-

FINISH SCHEDULE

1. <u>PAINT:</u>
   - 1.1. BENJAMIN MOORE WATER BASED EPOXY PRIMER AND TWO (2) FINISH COATS OR EQUAL. CONTACTS: RICCARDI BROTHERS: 215-462-8027, LINDA CIPRIANO benjaminmoore.com 267-406-3494.
   - 3.2 WALLS: FLAT GLOSS. COLORS: MATCH EXISTING.
   - 3.3 HOLLOW METAL: SEMI-GLOSS. COLOR: MATCH EXISTING
   - 3.4 PAINT ALL EXPOSED ITEMS OUTSIDE OF DATA ROOM EXCEPT: PRE-FINISHED FIXTURES, EQUIPMENT, ELECTRICAL AND MECHANICAL LABELS AND <u>DO NOT PAINT ANY EXPOSED WIRING</u> NOT INSTALLED IN CONDUIT.



KEY PLAN
N.T.S.

REV	DESCRIPTION	DATE
0	ISSUED FOR BID	03/22/2024

PENNSYLVANIA CONVENTION CENTER AUTHORITY
ONE CONVENTION CENTER PLACE
1101 ARCH STREET
PHILADELPHIA, PENNSYLVANIA 19107

GUEST IDF
200 LEVEL: ROOM B1
CLEAN AGENT SUPPRESSION SYSTEM INSTALLATION

PLANS, SCHEDULES AND DETAILS

MICHAEL JOHNSON ARCHITECT LLC
PLANNING, RESEARCH, AND DESIGN

420 NORTH ESSEX AVE, NARBERTH PA 19072
610.888.4006 302.438.1969 mjarchllc@gmail.com

DIMITRI J. VERVERELLI INC.
CONSULTING ENGINEERS
PHILADELPHIA, PENNSYLVANIA

DRAWN BY:	SCALE:	DWG. NO.
ASP	AS NOTED	A-1
CHECKED BY: DWG	PROJ. NO: 2013	

MECHANICAL LEGEND

DUCTWORK

- NEW DUCTWORK
- EXISTING DUCTWORK
- EXISTING DUCTWORK TO BE REMOVED
- RETURN AIR OR MAKE-UP AIR
- EXHAUST AIR
- SUPPLY AIR
- SUPPLY AIR OR OUTSIDE AIR DUCT/DIFFUSER
- RETURN AIR DUCT/ GRILLE
- EXHAUST AIR DUCT/ GRILLE
- CHAMFER CONNECTION WITH VOLUME DAMPER
- BELLMOUTH CONNECTION WITH VOLUME DAMPER
- FLEXIBLE DUCT
- RECTANGLE TO ROUND TRANSITION
- VOLUME DAMPER
- CAP DUCT
- DIRECTION OF FLOW
- BREAK LINE
- CONCENTRIC REDUCER/INCREASER
- ECCENTRIC REDUCER/INCREASER
- FLEXIBLE CONNECTION
- RISE IN DUCT
- FD/AD — FIRE DAMPER WITH ACCESS DOOR
- DUCTWORK ROOF SUPPORT
- CONTROL DAMPER
- DAMPER NUMBER
- MOTORIZED CONTROL DAMPER

DEVICES

- CO2 — CO2 SENSOR
- DPS — DIFFERENTIAL PRESSURE SENSOR
- SD — DUCT MOUNTED SMOKE DETECTOR
- FS — FLOW SENSOR
- FZ — FREEZESTAT
- H — HUMIDSTAT
- PG — PRESSURE GAUGE
- SD — SMOKE DETECTOR
- TS — TEMPERATURE SENSOR
- T — THERMOSTAT

MISC. DRAWING SYMBOLS

- CONSTRUCTION NOTE
- DEMOLITION NOTE
- REVISION NOTE
- XX / XY — EQUIPMENT TYPE / EQUIPMENT NUMBER
- XX / XX — DETAIL NUMBER / REFERENCED DRAWING
- XX / XX — SECTION NUMBER / REFERENCED DRAWING
- POINT OF CONNECTION NEW TO EXISTING
- EXTENT OF DEMOLITION
- EX. — EXISTING TO REMAIN
- (R) — EXISTING TO BE REMOVED
- (ER) — EXISTING TO BE RELOCATED
- (F) — FUTURE
- (N) — NEW
- SQUARE FOOT
- ø — DIAMETER

PIPING

- XXX — EXISTING PIPE
- EXISTING PIPE TO BE REMOVED
- AIR VENT HIGH CAPACITY
- AIR VENT LOW CAPACITY
- AUTOMATIC CONTROL 2-WAY VALVE
- AUTOMATIC CONTROL 3-WAY VALVE
- AUTOMATIC CONTROL BUTTERFLY VALVE
- BALANCING VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GAS COCK
- GATE VALVE
- GLOBE VALVE
- GLOBE STYLE CHECK VALVE
- RELIEF VALVE
- TRIPLE DUTY VALVE
- SOLENOID VALVE
- WYE STRAINER W/ BLOWDOWN VALVE AND HOSE END CONNECTION
- WYE STRAINER
- BREAK LINE
- DIRECTION OF FLOW
- CAP PIPE
- FLANGED CONNECTION
- FLEXIBLE CONNECTION
- INSERTION PLUG FOR TEMPERATURE/PRESSURE GAUGE
- PIPE BRANCH OFF BOTTOM
- PIPE DROP
- PIPE RISE
- REDUCER/INCREASER CONCENTRIC
- REDUCER/INCREASER ECCENTRIC
- UNION
- PRESSURE GAUGE W/ ISOLATION VALVE
- PUMP
- SUCTION DIFFUSER W/ DRAIN VALVE AND HOSE END CONNECTION
- THERMOMETER W/ THERMOWELL

EQUIPMENT

- VARIABLE AIR VOLUME BOX
- VARIABLE AIR VOLUME BOX WITH REHEAT COIL
- FAN
- PUMP
- AIR FLOW STATION

ABBREVIATIONS

AD	ACCESS DOOR
AFCS	AIR FLOW CONTROL STATION
AFF	ABOVE FINISHED FLOOR
AFS	AIR FLOW MONITOR STATION
AHU	AIR HANDING UNIT
AS	AIR SEPARATOR
ASC	AIR SCOOP
BAS	BUILDING AUTOMATION SYSTEM
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CONDENSATE DRAIN
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CO	CLEAN OUT
CONN	CONNECTION
CSF	CHEMICAL SHOT FEEDER
CU	CONDENSER UNIT
CUH	CABINET UNIT HEATER
CV	COEFFICIENT, VALVE FLOW
CVB	CONSTANT VOLUME BOX
DB	DRY BULB TEMPERATURE
DEG	DEGREES (FAHRENHEIT)
DIA	DIAMETER
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ELEV	ELEVATION
ER	EXHAUST REGISTER
ERU	ENERGY RECOVERY UNIT
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXH	EXHAUST
EXT	EXPANSION TANK
F	FAHRENHEIT
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FMS	FACILITIES MANAGEMENT SYSTEM
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPI	FINS PER INCH
FPU	FAN POWERED UNIT
FSD	FIRE SMOKE DAMPER
FT	FIN TUBE RADIATION
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HZ	HERTZ
IN.WG.	INCHES WATER GAUGE
LAT	LEAVING AIR TEMPERATURE
LD	LINEAR DIFFUSER
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSAND BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MOD	MOTORIZED OPERATED DAMPER
MUA	MAKE UP AIR
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NK	NECK
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
PH	PHASE
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RAD	RADIATOR
RCVD	REMOTE CONTROLLED VOLUME DAMPER
RF	RETURN FAN
RG	RETURN GRILLE
RH	REHEAT COIL
RR	RETURN REGISTER
SA	SOUND ATTENUATOR
SCD	SMOKE CONTROL DAMPER
SD	SMOKE DETECTOR
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SP	STATIC PRESSURE
SR	SUPPLY REGISTER
TEMP	TEMPORARY
TG	TRANSFER GRILLE
UH	UNIT HEATER
UV	UNIT VENTILATOR
V	VOLTS
VAV	VARIABLE AIR VOLUME BOX
VD	VOLUME DAMPER
VF	VERIFY IN FIELD
VFD	VARIABLE FREQUENCY DRIVE
W/	WITH
WB	WET BULB TEMPERATURE
WMS	WIRE MESH SCREEN

NOTE: THIS IS A GENERAL MECHANICAL LEGEND, ALL SYMBOLS, ABBREVIATIONS AND LINE DESIGNATIONS MAY NOT APPEAR ON THE DRAWINGS. SEE EQUIPMENT SCHEDULES FOR EQUIPMENT DESIGNATIONS.

GENERAL NOTES

ALL OF THE FOLLOWING NOTES ARE GENERAL AND SOME MAY NOT APPLY TO THIS SPECIFIC PROJECT.

1. THE SUBMISSION OF A PROPOSAL BY THE CONTRACTOR IS NOTIFICATION THAT THE CONTRACTOR HAS TOTALLY FAMILIARIZED HIMSELF WITH THE CONTRACT DOCUMENTS AND EXISTING SITE CONDITIONS AND HAS AGREED TO PROVIDE THE NECESSARY LABOR AND MATERIAL FOR THE COMPLETE INSTALLATION OF EACH SYSTEM IN A NEAT AND WORKMANLIKE MANNER IN ACCORDANCE WITH ALL AUTHORITIES HAVING JURISDICTION.
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, SIZES, CLEARANCES AND LOCATIONS PRIOR TO THE START OF CONSTRUCTION AND ADVISE THE ENGINEER AND THE OWNER OF ANY DISCREPANCIES BEFORE PERFORMING THE WORK.
3. THE DRAWINGS INDICATE ARRANGEMENTS AND APPROXIMATE SIZES AND RELATIVE LOCATIONS OF PRINCIPLE APPARATUS, EQUIPMENT, DEVICES AND SERVICES TO BE PROVIDED. DRAWINGS ARE DIAGRAMMATIC AND ARE A GRAPHIC REPRESENTATION OF THE CONTRACT REQUIREMENTS TO BEST AVAILABLE STANDARDS AT THE SCALE INDICATED.
4. LAYOUT OF EQUIPMENT INDICATED ON THE DRAWINGS SHALL BE CHECKED AND COMPARED AGAINST ALL DRAWINGS AND SPECIFICATIONS OF ALL TRADES AND EXACT LOCATIONS DETERMINED USING APPROVED SHOP DRAWINGS OF THE EQUIPMENT BEING INSTALLED, AND AS DIRECTED. OTHERWISE, ALL DEMOLISHED OR REMOVED MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR, SHALL BE REMOVED FROM THE SITE, AND BE DISPOSED OF IN A LEGAL MANNER.
5. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER AND ALL OTHER CONTRACTORS. CONTRACTOR SHALL ALSO SCHEDULE HIS WORK IN ACCORDANCE WITH THE CONSTRUCTION SCHEDULE SO THAT ALL OF HIS WORK CAN BE INSTALLED WITHOUT DELAYING THE PROJECT.
6. ALL WORK SHALL COMPLY AND BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES, THE UNIFORM CONSTRUCTION CODE STATUTE, THE APPLICABLE INTERNATIONAL CODES (E.G. THE INTERNATIONAL MECHANICAL CODE, THE INTERNATIONAL BUILDING CODE) AS AMENDED AND ADOPTED BY THE LOCAL JURISDICTION, AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES, THE NATIONAL FIRE CODES), THE NATIONAL ELECTRIC CODE, BUILDING STANDARDS, NFPA AND ALL OTHER AGENCIES AND AUTHORITIES HAVING JURISDICTION. REFER TO THE CODES AND STANDARDS TABLE FOR VERSIONS OF CODES.
7. CONTRACTOR SHALL SECURE AND PAY ALL FEES AND PERMITS PERTAINING TO THE CONTRACT. GIVE ALL NOTICES, OBTAIN ALL PERMITS, AND PAY ALL GOVERNMENTAL TAXES, FEES, AND COSTS; FILE NECESSARY PLANS AND OBTAIN APPROVALS OF ALL GOVERNMENT DEPARTMENTS HAVING JURISDICTION; OBTAIN CERTIFICATES OF INSPECTION FROM AN NFPA APPROVED AGENCY FOR THE WORK AND DELIVER THE SAME TO THE OWNER WITH REQUEST FOR FINAL PAYMENT.
8. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURERS' WRITTEN INSTRUCTIONS.
9. ANY ITEM DEEMED NECESSARY OR RECOMMENDED, OR REQUIRED BY CODE, BY THIS TRADE CONTRACTOR TO ACHIEVE THE FUNCTION SHOWN, BUT NOT INDICATED HEREIN, SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BIDDING IN WRITTEN "RFI" FORMAT. FAILURE TO IDENTIFY ITEMS DEEMED NECESSARY PRIOR TO BIDDING SHALL INDICATE TO THE ENGINEER AND OWNER THAT SAID ITEMS ARE INCLUDED IN THE CONTRACT PRICE.
10. ANY EXISTING POTENTIALLY HAZARDOUS MATERIALS ENCOUNTERED IN THE COURSE OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER FOR REMOVAL AND DISPOSAL.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR WORKMEN'S IDENTIFICATION AND BADGING, SAFETY AND FIRE PROTECTION, BARRICADES, WARNING SIGNS, TRASH REMOVAL, CUTTING AND PATCHING.
12. SMOKING AT THE JOB SITE IS NOT ALLOWED.
13. ALL WORK AND SCHEDULING TO BE COORDINATED WITH OWNER. CONTRACTOR SHALL SCHEDULE ALL SHUTDOWNS OF EXISTING UTILITIES AND PORTIONS OF THE BUILDING THAT MUST REMAIN IN OPERATION WITH THE OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RIGGING, HANDLING AND PROTECTION OF MATERIALS. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND WITHOUT BLEMISH OR DEFECT.
15. CONTRACTOR SHALL PROVIDE LABOR TO RECEIVE, UNLOAD, STORE, PROTECT AND TRANSFER TO POINT OF INSTALLATION ALL OWNER FURNISHED ITEMS.
16. FLAMMABLE MATERIALS MAY NOT BE STORED OR ALLOWED TO REMAIN OVERNIGHT WITHIN THE BUILDING. THIS INCLUDES, BUT IS NOT LIMITED TO, PAINTS, THINNERS, CLEANING AND RESTORATION PRODUCTS, RAGS OR BRUSHES, AND ANY TOOL THAT IS CAPABLE OF PRODUCING FLAME. DISPOSAL SCRAP LUMBER SOAKED RAGS, AND OTHER FLAMMABLE CONSTRUCTION DEBRIS MUST BE COLLECTED AT THE END OF EACH DAY AND DISPOSED OF PROPERLY OUTSIDE OF THE BUILDING.
17. MAINTAIN SUITABLE FIRE PROTECTION EQUIPMENT AT BUILDING SITE. AT MINIMUM, TYPE ABC FIRE EXTINGUISHERS SHALL BE PROVIDED WHERE WORK IS BEING PERFORMED WITH OPEN FLAME OR USING FLAMMABLE MATERIALS AND AN ADDITIONAL FIRE EXTINGUISHER SHALL BE PROVIDED IN THE WORKER PERFORMING THE WORK. TRAIN ALL WORKERS IN THE USE OF FIRE PROTECTION EQUIPMENT.
18. ALL FIRE SAFETY REQUIREMENTS LISTED ABOVE ARE TO BE CONSIDERED MINIMUMS. CONTRACTOR IS RESPONSIBLE FOR TAKING OTHER MEASURES DEEMED NECESSARY BY THE CONTRACTOR TO PROTECT THE BUILDING.
19. CONTRACTOR SHALL SUBMIT SCHEDULE OF SUBMITTALS PRIOR TO SUBMITTING ANY SHOP DRAWINGS. THIS SCHEDULE SHALL IDENTIFY ALL PRODUCT DATA, DRAWINGS, ETC. TO BE SUBMITTED FOR THIS PROJECT, INCLUDING THE ANTICIPATED DATE OF EACH SUBMISSION. CONTRACTOR SHALL SUBMIT (6) SETS OF SHOP DRAWINGS AND EQUIPMENT CUTS TO THE ENGINEER FOR APPROVAL PRIOR TO PURCHASING EQUIPMENT OR STARTING ANY WORK. CONTRACTOR SHALL SUBMIT (3) PRINTS AND (1) REPRODUCIBLE OF ALL PIPING, DUCTWORK, FIRE PROTECTION, CONDUIT, AND CABLE TRAY FIELD INSTALLATION DRAWINGS FOR EACH SYSTEM TO BE INSTALLED. ANY WORK INSTALLED OR EQUIPMENT PURCHASED PRIOR TO RECEIPT OF ENGINEER-APPROVED SHOP DRAWINGS THAT REQUIRES CHANGES SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.
20. SUBMIT CATALOG INFORMATION, FACTORY ASSEMBLY DRAWINGS AND FIELD INSTALLATION DRAWINGS AS REQUIRED FOR A COMPLETE EXPLANATION AND DESCRIPTION OF ALL ITEMS TO BE PROVIDED. THE CONTRACTOR SHALL REVIEW AND APPROVE ALL SHOP DRAWINGS. NO SUBMISSION WILL BE ACCEPTED WITHOUT THE SIGNED APPROVAL OF THE CONTRACTOR. THE CONTRACTOR SHALL CHECK AND VERIFY ALL FIELD MEASUREMENTS.
21. INSTALLED SYSTEMS SHALL OPERATE UNDER ALL CONDITIONS OF LOAD WITHOUT SOUND OR VIBRATION THAT IS OBJECTIONABLE TO THE ENGINEER OR OWNER. OBJECTIONABLE SOUND OR VIBRATION CONDITIONS SHALL BE CORRECTED IN AN APPROVED MANNER BY THE CONTRACTOR AT HIS EXPENSE.
22. FURNISH ACCESS DOORS AS REQUIRED FOR OPERATION AND MAINTENANCE OF CONCEALED EQUIPMENT, VALVES, CONTROLS, DAMPERS, ETC. ALL ACCESS DOORS SHALL BE COORDINATED WITH THE OWNER AND SHALL MATCH THE FIRE RATING OF THE PENETRATION AS REQUIRED.
23. ALL WORK FURNISHED UNDER THE CONTRACT SHALL BE GUARANTEED AGAINST ANY AND ALL DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE. ANY DEFECTS OF WORKMANSHIP DEVELOPING DURING THIS PERIOD SHALL BE REMEDIED AND ANY DEFECTIVE MATERIAL SHALL BE REPLACED WITHOUT ADDITIONAL COST TO THE OWNER.
24. CONTRACTOR SHALL NOTIFY ENGINEER OF ESTIMATED DATE OF COMPLETION OF ROUGH-IN WORK AND DATE OF BOTH WALL AND CEILING INSTALLATION. NOTIFICATION SHALL BE A MINIMUM OF ONE WEEK PRIOR TO DATE TO ENABLE ENGINEER TO SCHEDULE PRELIMINARY PUNCHLIST INSPECTION. CONTRACTOR SHALL SIMILARLY NOTIFY ENGINEER OF COMPLETION OF ALL WORK, INDICATING THE CONTRACTOR IS READY FOR THE ENGINEER TO PERFORM THE FINAL PUNCHLIST INSPECTION.
25. UPON COMPLETION OF ALL UNFINISHED OR FAULTY WORK NOTED IN ENGINEER'S FINAL PUNCHLIST, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER IN WRITING A LETTER OF COMPLETION CERTIFYING THAT ALL PUNCHLIST ITEMS HAVE BEEN COMPLETED AND ALL AS-BUILT PLANS, MANUALS, ETC. HAVE BEEN SUBMITTED.
26. ALL CHANGES MADE BY THE CONTRACTOR WHICH ARE NOT APPROVED BY THE DESIGN ENGINEER SHALL BE DONE AT THE LIABILITY OF THE CONTRACTOR.
27. CONTRACTOR SHALL RESTORE EXISTING SYSTEMS, DEVICES, FINISHES, ETC. DAMAGED OR ALTERED BY WORK TO ACCEPTABLE CONDITION AS DETERMINED BY THE OWNER OR ENGINEER.
28. EXISTING WORK THAT IS TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER OR DISPOSED OF AT THE OWNER'S DIRECTION. ALL WORK TO BE DISPOSED OF SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM THE SITE. ALL EQUIPMENT TO BE TURNED OVER TO THE OWNER SHALL BE DELIVERED TO AN ON-SITE CENTRAL RECEIVING LOCATION DESIGNATED BY THE OWNER.
29. PROVIDE ALL NECESSARY REMOVAL OF EXISTING CEILING TILES AND REINSTALLATION OF CEILING TILES OR REPLACEMENT AS NEEDED TO ACCOMPLISH NEW WORK. PERFORM ALL NECESSARY CEILING WORK INCLUDING BUT NOT LIMITED TO REMOVAL, REINSTALLATION AND PROVIDING NEW CEILING TILES, CEILING GRID, T-BARS SUPPORTS, AND ALL APPURTENANCES.
30. GENERAL MECHANICAL NOTES PERTAIN TO ALL MECHANICAL DRAWINGS.
31. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN-LIKE MANNER.
32. REFERENCE ARCHITECTURAL, ELECTRICAL, PLUMBING AND STRUCTURAL DRAWINGS FOR COORDINATION.
33. PERFORM ALL RIGGING REQUIRED TO COMPLETE ALL WORK UNDER THIS CONTRACT. IF REQUIRED, THE CONTRACTOR SHALL DISASSEMBLE EQUIPMENT OR ITEMS FOR RIGGING AND/OR ACCESS INTO THE BUILDING. AFTER RIGGING IS COMPLETE, THE CONTRACTOR SHALL REASSEMBLE THE EQUIPMENT OR ITEMS.
34. THE CONTRACTOR SHALL REVIEW THE SITE AND ALL CLEARANCES TO VERIFY THE NEW EQUIPMENT CAN BE INSTALLED IN THE LOCATION SHOWN ON DRAWINGS. PROVIDE ANY NECESSARY SHIPPING SPLITS ON UNITS TO ALLOW THEM TO BE INSTALLED IN THE LOCATION SHOWN. REMOVE ANY NECESSARY OBSTRUCTIONS TO ALLOW FOR INSTALLATION OF EQUIPMENT AND REPAIR/REPLACE ONCE INSTALLATION IS COMPLETE.
35. PROVIDE MANUFACTURER DESIGNATED CLEARANCES FOR EQUIPMENT MAINTENANCE AND REPAIR.
36. MECHANICAL CONTRACTOR SHALL COORDINATE RELOCATION OF SPRINKLER AND PIPING WITH SPRINKLER CONTRACTOR AS REQUIRED FOR INSTALLATION OF NEW HVAC EQUIPMENT AND DUCTWORK.

GENERAL DEMOLITION NOTES

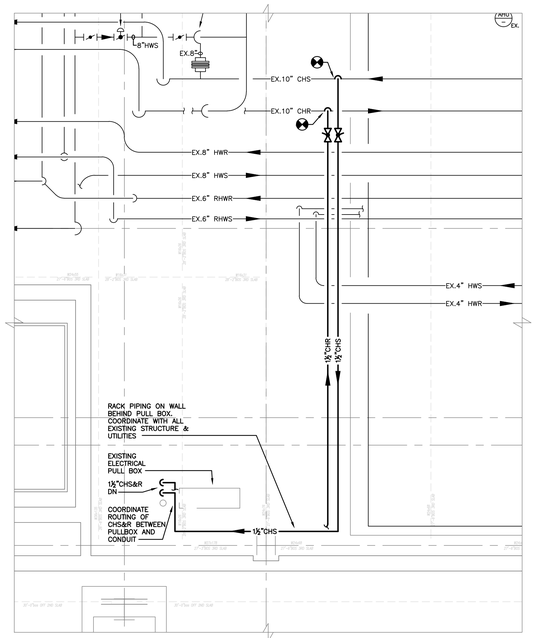
ALL OF THE FOLLOWING NOTES ARE GENERAL AND SOME MAY NOT APPLY TO THIS SPECIFIC PROJECT.

1. DEMOLITION/RELOCATIONS: EACH TRADE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND RELOCATIONS OF SERVICES, EQUIPMENT AND MATERIAL RELATING TO THEIR RESPECTIVE TRADE.
2. THE CONTRACTOR SHALL REMOVE ALL WORK AS NOTED ON THE DRAWINGS. WHERE IT IS NOTED TO REMOVE EXISTING EQUIPMENT, DUCTWORK AND PIPING, ALL ASSOCIATED VALVES, FITTINGS, HANGERS, SUPPORTS, INSULATION, CONTROLS, ELECTRICAL WORK, AND APPURTENANCES SHALL ALSO BE REMOVED. ADEQUATELY SUPPORT EXISTING DUCTWORK AND PIPING TO REMAIN. PROVIDE TEMPORARY CAPS ON EXISTING PIPING ENDS/DUCT OPENINGS WHERE SYSTEMS WILL REMAIN IN SERVICE PRIOR TO INSTALLATION OF NEW WORK. CAP AND SEAL EXISTING OPENINGS WHERE NOT REUSED AND PATCH INSULATION TO MATCH EXISTING. THE CONTRACTOR SHALL RELOCATE EXISTING WORK AS REQUIRED TO INSTALL NEW WORK.
3. WHERE EXISTING WALLS, FLOORS OR CEILINGS ARE REMOVED, ALL HVAC SHALL BE PROTECTED FROM DAMAGE AND SUPPORTED AS REQUIRED. REPAIR ANY DAMAGE TO EXISTING TO REMAIN EQUIPMENT.
4. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL REVIEW WITH THE OWNER ALL MATERIALS TO BE REMOVED. SHOULD THE OWNER OPT TO KEEP ANY MATERIALS, THE CONTRACTOR SHALL REMOVE AND DELIVER THE PARTS TO THE OWNER ON THE SITE WHERE DIRECTED. OTHERWISE, ALL DEMOLISHED OR REMOVED MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR, SHALL BE REMOVED FROM THE SITE, AND BE DISPOSED OF IN A LEGAL MANNER.
5. DEMOLITION SHALL INCLUDE REMOVAL OF ALL PARTS AND PIECES IN THEIR ENTIRETY BACK TO THE POINTS INDICATED OR IF NOT INDICATED BACK TO THEIR POINT OF SOURCE. WHERE CONDITIONS PROHIBIT TOTAL REMOVAL OF THE WORK, THE REMAINING PORTION SHALL BE CUT FLUSH WITH THE SURROUNDING SURFACE (CAPPED OR TERMINATED AS NOTED) AND BE REFINISHED IN AN APPROVED MANNER.
6. MAINTAIN EXISTING UTILITIES INDICATED OR WHERE REQUIRED TO REMAIN, KEEP IN SERVICE, AND PROTECT AGAINST DAMAGE DURING DEMOLITION OPERATIONS. DO NOT INTERRUPT EXISTING UTILITIES SERVING OCCUPIED OR USED FACILITIES, EXCEPT WHEN SCHEDULED WITH THE OWNER.
7. DO NOT REMOVE EXISTING STRUCTURAL WORK. DO NOT REMOVE OPERATIONAL ELEMENTS AND SAFETY-RELATED COMPONENTS IN A MANNER RESULTING IN A REDUCTION OF CAPACITIES TO PERFORM IN THE MANNER INTENDED OR RESULTING IN DECREASED OPERATIONAL LIFE, INCREASED MAINTENANCE, OR DECREASED SAFETY.
8. REMOVALS, DISCONNECTIONS, AND RELOCATIONS SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE INVOLVED AND SHALL BE EMPLOYED BY A CONTRACTOR LICENSED IN THE TRADE INVOLVED. ALL WORK SHALL BE DONE ACCORDING TO ACCEPTED TRADE PRACTICES.
9. PROVIDE ADEQUATE TEMPORARY SUPPORT FOR WORK TO REMAIN TO PREVENT FAILURE. DO NOT ENDANGER OTHER WORK.
10. PROTECTION: PROVIDE ADEQUATE PROTECTION WHERE REQUIRED FOR THE PRESENT BUILDING AND ITS CONTENTS. TEMPORARY DUSTPROOF BARRIERS SHALL BE ERECTED WHERE REQUIRED FOR PROTECTION OF PERSONNEL, PROTECTION FROM DUST AND DIRT, FOR SECURITY, FIRE AND WEATHER PROTECTION. CONTRACTOR SHALL TAKE EVERY PRECAUTION AGAINST FIRE BY EMPLOYING FIRE DEPARTMENT TYPE HOSES AND PORTABLE FIRE EXTINGUISHERS AS REQUIRED BY OSHA AND/OR THE OWNER'S INSURANCE UNDERWRITER. COMPLY WITH GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
11. ALL EXISTING EQUIPMENT REQUIRED TO BE REUSED SHALL BE CLEANED. IN ALL INSTANCES WHERE CONTRACTOR FINDS THAT EXISTING EQUIPMENT IS DEFECTIVE TO THE POINT WHERE IT CANNOT BE PROPERLY RESTORED AND WILL NOT OPERATE PROPERLY, THEY SHALL REPORT THE SPECIFIC INSTRUMENTS OR EQUIPMENT TO THE DESIGN PROFESSIONAL FOR DIRECTIONS.
12. EXTREME CARE SHALL BE EXERCISED FOR ALL EXISTING ITEMS THAT ARE TO REMAIN IN SERVICE UNTIL NEW ITEMS ARE INSTALLED FOR THE SAME SERVICE. ALL SHUTDOWNS OF ANY SYSTEM SHALL BE COORDINATED WITH THE OWNER.
13. ALL WORK TO BE DEMOLISHED REQUIRING DISRUPTION TO EXISTING AREAS ON FLOORS ABOVE BELOW, OR ADJACENT TO THE CONTRACT AREA; EACH CONTRACTOR SHALL SCHEDULE EACH DISRUPTION WITH THE OWNER. WHERE DEMOLITION WORK WILL REQUIRE TEMPORARY REMOVAL OF EXISTING PIPING WHICH ARE TO REMAIN, THE OWNER SHALL DIRECT AND DEFINE PROCEDURES. NO WORK SHALL PROCEED WITHOUT OWNER'S AUTHORIZATION.
14. REMOVE AND REROUTE BY OFFSETTING AS REQUIRED ANY EXISTING PIPING RISERS, STACKS OR LATERAL PIPING TO REMAIN IN SERVICE AND BECOME EXPOSED DUE TO NEW FLOOR PLAN OR AND OR NEW CEILING LAYOUT.
15. WHERE DRAWINGS INDICATE THE DEMOLITION OF PIPING OR DUCTWORK, THE CONTRACTOR SHALL REMOVE ALL ABANDONED HANGERS AND SUPPORTS. PIPING AND/OR DUCTWORK SHALL BE CAPPED AND INSULATED WITH MATERIALS TO MATCH EXISTING.
16. THE CONTRACTOR SHALL REPAIR ALL PENETRATIONS OF ROOFS, WALLS AND FLOORS TO MATCH EXISTING OF WHICH ITEMS HAVE BEEN DEMOLISHED.
17. UNLESS NOTED OTHERWISE, THE CONTRACTOR SHALL REMOVE EQUIPMENT PADS/CURBS/ SUPPORTS FOR ALL FLOOR OR ROOF MOUNTED EQUIPMENT INDICATED TO BE REMOVED. REPAIR FLOORS AND ROOFS AS REQUIRED TO MATCH EXISTING. REMOVE HANGERS AND SUPPORTS FOR ALL SUSPENDED EQUIPMENT INDICATED TO BE REMOVED.
18. WHERE EQUIPMENT IS INDICATED TO BE REMOVED, THE CONTRACTOR SHALL REMOVE ALL DISCONNECTS, DRIVES, STARTERS, CONTACTORS, SWITCHES, CONTROLLERS, SENSORS, ACTUATORS, ETC. REMOVE EQUIPMENT POWER FEED WIRING AND CONDUIT COMPLETE BACK TO DISTRIBUTION PANEL. ALL CONTROLS CONDUIT, WIRING AND/OR PNEUMATIC TUBING SHALL BE REMOVED BACK TO SOURCE.

GENERAL CONSTRUCTION NOTES

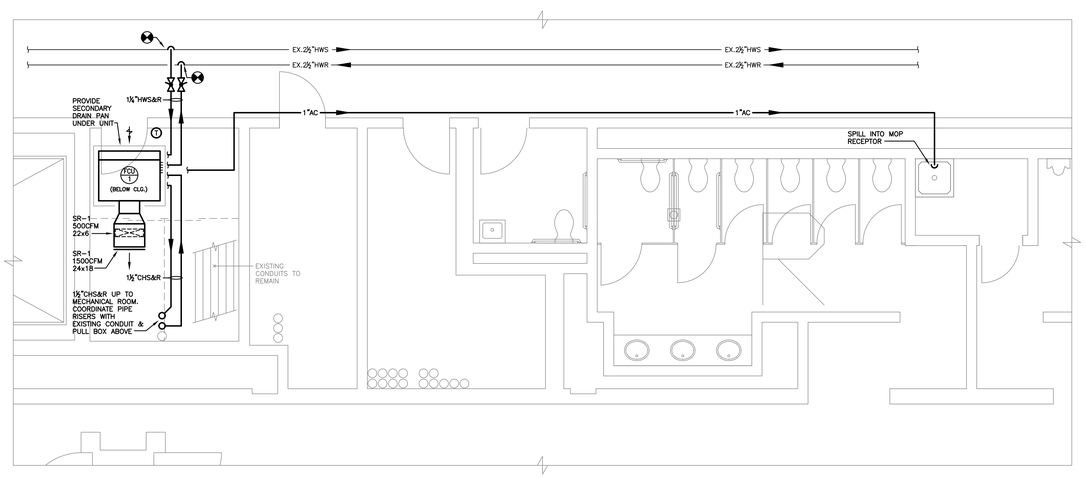
ALL OF THE FOLLOWING NOTES ARE GENERAL AND SOME MAY NOT APPLY TO THIS SPECIFIC PROJECT.

1. THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING COORDINATION OF ALL TRADES, INCLUDING, BUT NOT LIMITED TO: DUCTS, PIPING, CONDUIT, EQUIPMENT, FIXTURES, STRUCTURE, FRAMING AND ANY ITEMS PENETRATING THE CEILING AND ROOF. THE CONTRACTOR SHALL INCUR ALL EXPENSES RELATED TO A LACK OF COORDINATION BETWEEN TRADES.
2. ALL MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND SHOW DESIGN INTENT ONLY. THE EXACT LOCATION AND SIZES OF ALL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR AND COORDINATED WITH THE DESIGN PROFESSIONAL AND ALL OTHER TRADES. DUCTWORK AND PIPING SHALL BE SET UP AND DOWN AND OFFSET AS REQUIRED TO SUIT FIELD CONDITIONS.
3. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING ALL CONTRACT DOCUMENTS RELATED TO THIS PROJECT. THERE MAY BE WORK REQUIRED OF THIS TRADE SHOWN ON OTHER DRAWINGS.
4. THE CONTRACTOR TO PROVIDE A FUNCTIONAL INSTALLATION AS INTENDED BY THE DESIGN PROFESSIONAL.
5. MECHANICAL CONTRACTOR SHALL ENSURE MINIMUM NEC CLEARANCES ARE MAINTAINED IN FRONT OF ALL ELECTRICAL PANELS AND GEAR.
6. ALL FLOOR MOUNTED HVAC EQUIPMENT SHALL BE INSTALLED ON 4" HIGH REINFORCED CONCRETE HOUSEKEEPING PADS PROVIDED BY THE G.C. UNLESS NOTED OTHERWISE. HOUSEKEEPING PAD SHALL BE MINIMUM 4" LARGER THAN EQUIPMENT ON ALL SIDES. UNLESS OTHERWISE REQUIRED BY EQUIPMENT MANUFACTURER.
7. MECHANICAL SCHEDULES DO NOT NECESSARILY INDICATE EQUIPMENT QUANTITIES.
8. MECHANICAL CONTRACTOR SHALL PROVIDE FLEXIBLE CONNECTIONS AT ALL DUCTWORK-TO-EQUIPMENT CONNECTIONS.
9. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" FROM POINT OF RIGID DUCT CONNECTION TO AIR TERMINAL. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEVIATIONS FROM THE CONTRACT DRAWINGS THAT ARE NOT APPROVED BY THE DESIGN PROFESSIONAL.
10. MECHANICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL WALL MOUNTED THERMOSTATS AND HUMIDISTATS WITH THE DESIGN PROFESSIONAL AND/OR OWNER.
11. MECHANICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION, MOUNTING STYLE AND FINISH OF ALL GRILLES, REGISTERS, DIFFUSERS, ETC. WITH THE DESIGN PROFESSIONAL.
12. ALL SUSPENDED AND FLOOR MOUNTED EQUIPMENT SHALL BE FURNISHED WITH VIBRATION ISOLATION AS PER MECHANICAL SPECIFICATIONS.
13. DUCT MOUNTED SMOKE DETECTORS ARE FURNISHED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING FROM THE SMOKE DETECTOR'S ON-BOARD RELAY(S) TO THE EQUIPMENT CONTROLLERS/STARTERS/VFD'S FOR SHUTTING DOWN THE ASSOCIATED MECHANICAL EQUIPMENT AND ACTIVATION OF REQUIRED FIRE/SMOKE DAMPERS. THE SMOKE DETECTOR SHALL BE TIED INTO THE FIRE ALARM SYSTEM AND REMOTE TEST STATIONS BY THE ELECTRICAL CONTRACTOR. THE DUCT DETECTOR SHALL BE SUPPLIED WITH THE APPROPRIATE SAMPLING TUBES TO FIT THE INSTALLATION. COORDINATE INSTALL OF SMOKE DETECTORS WITH ELECTRICAL CONTRACTOR.
14. DUCT SIZES SHOWN ON PLANS REFER TO CLEAR INSIDE DIMENSIONS (CID) UNLESS NOTED OTHERWISE.
15. DIELECTRIC COUPLINGS SHALL BE USED WHERE DISSIMILAR METALS ARE JOINED.
16. PROVIDE INSULATED BLANK-OFF CAPS/PANELS FOR ALL UNUSED PORTIONS OF LOUVERS, EQUIPMENT RETURNS/SUPPLIES, DUCTWORK, AIR TERMINALS, ETC.
17. PROVIDE ALL DUCTWORK AND PIPING TRANSITIONS/REDUCERS TO EQUIPMENT, COILS, ETC. AS REQUIRED THAT MAY NOT NECESSARILY APPEAR ON PLANS.
18. MECHANICAL CONTRACTOR SHALL INSULATE ALL DUCTWORK AND PIPING PER MECHANICAL SPECIFICATIONS, UNLESS OTHERWISE NOTED ON PLANS.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SLAB OPENINGS, WALL OPENINGS, ROOF PENETRATI



MECHANICAL NEW WORK PARTIAL PLAN – 500 LEVEL MECHANICAL ROOM

SCALE: ¼" = 1'-0"



MECHANICAL NEW WORK PARTIAL PLAN – 200 LEVEL IDF ROOM

SCALE: ¾" = 1'-0"

BALANCING AND ADJUSTING OF THE HYDRONIC AND AIR SYSTEMS

1. PERFORM ALL AIR AND HYDRONIC BALANCING FOR THE SYSTEMS AND/OR AREAS LISTED IN THE BALANCING SCHEDULE.
2. ALL WORK SHALL BE PERFORMED BY SKILLED MECHANICS UNDER THE DIRECTION AND SUPERVISION OF THE CONTRACTOR FOR BALANCING AND ADJUSTING WHICH SHALL BE AN INDEPENDENT, CERTIFIED NEBB OR AABC CERTIFIED COMPANY NOT AFFILIATED WITH THE MECHANICAL CONTRACTOR
3. PERMANENTLY MARK SETTINGS OF VALVES, DAMPERS, AND OTHER ADJUSTMENT DEVICES ALLOWING SETTINGS TO BE RESTORED. SET AND LOCK MEMORY STOPS.
4. AIR SYSTEMS:
   A. MEASURE AIR QUANTITIES AT AIR OUTLETS.
   B. ADJUST DISTRIBUTION SYSTEM TO OBTAIN UNIFORM SPACE TEMPERATURES FREE FROM OBJECTIONABLE DRAFTS.
   C. USE VOLUME CONTROL DEVICES TO REGULATE AIR QUANTITIES ONLY TO EXTENT ADJUSTMENTS DO NOT CREATE OBJECTIONABLE AIR MOTION OR SOUND LEVELS. EFFECT VOLUME CONTROL BY USING VOLUME DAMPERS LOCATED IN DUCTS.
   D. VARY TOTAL SYSTEM AIR QUANTITIES BY ADJUSTMENT OF FAN SPEEDS. PROVIDE SHEAVE DRIVE CHANGES TO VARY FAN SPEED. VARY BRANCH AIR QUANTITIES BY DAMPER REGULATION.
   E. MEASURE TOTAL AIR PRESSURE CONDITIONS ON AIR SUPPLY UNITS, INCLUDING FILTER AND COIL PRESSURE DROPS, AND TOTAL PRESSURE ACROSS FAN. MAKE ALLOWANCES FOR 50 PERCENT LOADING OF FILTERS.
5. HYDRONIC SYSTEMS:
   A. ADJUST WATER SYSTEMS, AFTER AIR BALANCING, TO OBTAIN DESIGN QUANTITIES.
   B. ADJUST HYDRONIC DISTRIBUTION SYSTEMS BY MEANS OF BALANCING COCKS, VALVES, AND FITTINGS. DO NOT USE SERVICE OR SHUT-OFF VALVES FOR BALANCING UNLESS INDEXED FOR BALANCE POINT.
6. CONTRACTOR SHALL AFTER PERFORMING THE TAB PROCEDURES PLUG PIPING WATER TIGHT, PATCH DUCTWORK AIR TIGHT AND PATCH INSULATION AND RE-ESTABLISH INTEGRITY OF THE VAPOR BARRIER. MATERIALS USED SHALL BE IDENTICAL TO THOSE REMOVED, CUT OR DRILLED.
7. BALANCING CONTRACTOR SHALL SUBMIT EQUIPMENT CALIBRATION REPORTS OF EQUIPMENT USED DURING BALANCING TO CERTIFY ACCURACY OF MEASUREMENTS. CALIBRATIONS REPORTS SHALL BE SUBMITTED WITH BALANCING REPORT.
8. SUBMIT A REPORT INDICATING ALL FINAL CONDITIONS.

BALANCING SCHEDULE

DESCRIPTION	AIRFLOW	HYDRONIC
FCU–1	YES	YES

AIR LEAKAGE TEST

1. THE CONTRACTOR SHALL CONDUCT AN AIR LEAKAGE TEST ON THE ROOM. THE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH SMACNA AIR DUCT LEAKAGE TEST MANUAL, SECOND EDITION.
2. CLOSE ALL DOORS AND DAMPERS AND STOP ALL HVAC SYSTEM SERVING THE AREA PRIOR TO THE TEST. TEST SHALL SIMULATE CONDITIONS IN THE ROOM DURING A DISCHARGE OF CLEAN AGENT.
3. THE CONTRACTOR SHALL PRESSURIZE THE SPACE TO A PRESSURE OF _____"IN. W.G. AND MEASURE THE AIRFLOW REQUIRE TO MAINTAIN SPACE PRESSURE. THE MAXIMUM ALLOWABLE LEAKAGE SHALL BE AS SCHEDULED.
4. IF THE LEAKAGE EXCEEDS THE SCHEDULED VALUE, THE CONTRACTORS SHALL RESEAL, AS REQUIRED AND REPEAT THE TEST AT NO ADDITIONAL COST TO THE OWNER.

GENERAL NOTES

1. SEAL ALL DUCT AND PIPE PENETRATIONS AT WALLS. PENETRATIONS TO BE FIRE STOPPED AND SMOKE SEALED WITH INTUMESCENT FIRE STOP SEALANT.
2. AFTER ALL PENETRATIONS HAVE BEEN SEALED BY ALL TRADES, THE CONTRACTOR SHALL PRESSURE TEST THE ROOM. REFER TO THE SPECIFICATIONS FOR LEAKAGE TEST REQUIREMENTS. IF ROOM LEAKAGE EXCEEDS PERMISSABLE LEVELS, THE CONTRACTOR SHALL RESEAL THE ROOM AND REPEAT THE TEST AS REQUIRED UNTIL THE LEAKAGE RATES ARE BELOW ACCEPTABLE LEVELS. RESEALING AND RETESTING SHALL BE AT NO ADDITIONAL COST TO OWNER.

INSULATION SPECIFICATIONS

1. GENERAL

   REFER TO THE INSULATION SCHEDULE FOR INSULATION THICKNESS AND TYPE TO BE PROVIDED FOR SPECIFIC SYSTEMS AND LOCATIONS.

2. FIBERGLASS DUCT WRAP INSULATION
   A. PROVIDE MICROLITE XG FORMALDEHYDE FREE DUCT WRAP INSULATION. INSULATION SHALL BE A WHITE, LIGHTWEIGHT RESILIENT BLANKET MANUFACTURED FROM FIBERGLASS BONDED WITH THERMOSETTING ACRYLIC RESIN COMPLYING WITH ASTM C1290.
   B. INSULATION SHALL BE 1.5 POUNDS PER CUBIC FEET (PCF) WITH A FOIL–SCRIM–KRAFT (FSK) VAPOR BARRIER FACING COMPLYING WITH ASTM C11365.
   C. INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT GREATER THAN 25 AND A SMOKE DEVELOPED RATING NOT GREATER THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84 AND UL 723 AND SHALL MEET NFPA 90A AND 90B STANDARDS.
   D. INSULATION SHALL BE GREEN BUILDING CERTIFIED FOR RECYCLED CONTENT, ENERGY STAR, LEED CREDITS, LEED–NC, AND SHALL MEET ES1350 REQUIREMENTS.
   E. INSULATION SHALL HAVE A THERMAL CONDUCTIVITY (K) OF 0.27 BTU PER INCH PER HOUR PER SQUARE FEET AT 75 DEGREES F. MEAN TEMPERATURE PER ASTM C518.
3. FIBERGLASS BOARD INSULATION
   A. PROVIDE 800 SERIES SPIN–GLAS FIBERGLASS BOARD INSULATION WITH AS INDICATED SURFACE. BOARD RATING NOT LESS THAN A DENSITY OF POUNDS PER CUBIC FEET (PCF) PER PARAGRAPH 3 BELOW. INSULATION SHALL COMPLY WITH ASTM C553 TYPE III AND ASTM C612 TYPES 1A AND 1B.
   B. INSULATION SHALL BE MANUFACTURED FROM INORGANIC GLASS FIBERS BONDED TOGETHER WITH THERMOSETTING RESIN. UNFACED INSULATION SHALL HAVE A MAXIMUM SYSTEM OPERATING TEMPERATURE OF 450 DEGREES F, AND FACED INSULATION SHALL HAVE A MAXIMUM SYSTEM OPERATING TEMPERATURE OF 150 DEGREES F.
   C. INSULATION SHALL BE PROVIDED WITH A PAINTABLE ALL PURPOSE (AP) FACING THAT SHALL BE A WHITE KRAFT PAPER BONDED TO ALUMINUM FOIL REINFORCED WITH FIBERGLASS YARN. THE KRAFT PAPER SHALL BE LAMINATED WITH A FIRE RESISTANT ADHESIVE TO MINIMIZE CORROSION OF THE FOIL.
   D. INSULATION SHALL HAVE A THERMAL CONDUCTIVITY (K) OF 0.22 TO 0.24 ZBTU PER INCH PER HOUR PER SQUARE FEET AT 75 DEGREES F. MEAN TEMPERATURE PER ASTM C518.
4. FIBERGLASS PIPING INSULATION
   A. FIBERGLASS PIPING SHALL CONSIST OF 1LB. DENSITY FIBERGLASS INSULATION HAVING AN OUTER JACKET OF KRAFT PAPER BONDED TO ALUMINUM FOIL REINFORCED WITH FIBERGLASS YARN. THE LONGITUDINAL SEAMS OF THE JACKET SHALL OVERLAP AND BE SEALED USING THE FACTORY APPLIED PRESSURE SENSITIVE ADHESIVE. STAPLES ARE PROHIBITED. INSULATION THICKNESS SHALL NOT BE LESS THAN THOSE RECOMMENDED IN 2009 INTERNATIONAL ENERGY CONSERVATION CODE FOR THE INTENDED SERVICE OF THAT REQUIRED TO PRESENT THE FORMATION OF CONDENSATION OF THE REQUIRED TO ASSURE A MAXIMUM SURFACE TEMPERATURE OF 80°F, WHICHEVER IS THE MOST STRINGENT. THE INSULATION SHALL HAVE A MAXIMUM THERMAL CONDUCTIVITY OF 0.23 BTU–IN./HR.–SQFT–°F AT A MEAN TEMPERATURE OF 75°F.
   B. ALL NON–SERVICE/MAINTENANCE RELATED FITTINGS (I.E. ELBOWS, TEE,S ETC.) SHALL BE INSULATED WITH PRE–MOLDED, LIGHT IMPACT, UV RESISTANT PVC COVERS. THE MINIMUM THICKNESS OF THE COVER WILL BE 30 MIL. FITTINGS INSULATION THICKNESS SHALL BE EQUAL TO THE REQUIRED THICKNESS OF THE ADJOINING PIPING. FOAM FILLED FITTINGS AND COVERS ARE PROHIBITED.
   C. FITTINGS REQUIRING SERVICE/MAINTENANCE ACCESS (I.E. UNIONS, SHUT–OFF VALVES, CHECK VALVES, BALANCING VALVES, ETC.) SHALL BE INSULATED WITH REMOVABLE, REUSABLE COVERS WHICH USE STRAPS AND BUCKLES TO SECURE THE COVER IN PLACE. PROVIDE THE INTERFACE BETWEEN THE REMOVABLE COVER AN THE ADJACENT PIPING INSULATION TO ASSURE A TIGHT INTERFACE WHICH PREVENTS HEAT LOSS AND THE FORMATION OF CONDENSATION. COVERS SHALL CONSIST OF INNER AND OUTER WALLS OF 304 SS 0.11" THICK MESH, NYLON COATED 20455 0.15" THREADED SEAMS, 304SS ¾" THICK X 1½" BUCKLES, PTFE/TEFLON BELTING AND 304SS I.D. TAGS.
   D. ALL INSULATION PROVIDE SHALL CONFORM TO ALL PERTINENT CODES INCLUDING: ASTM E–84, UL 73 AND NFPA 255, AND SHALL NOT EXCEED A FLAME SPREAD OF 25, FUEL CONTRIBUTED 50 AND SMOKE DEVELOPED 50.
   E. PROVIDE AN 18LB. DENSITY MOLDED FIBERGLASS BLOCK, 1½"WIDEX6"LONG, AND SHEETMETAL SADDLE AT EACH PIPE SUPPORT AND/OR HANGER POINT.
4. ELASTOMERIC PIPE INSULATION
   A. PROVIDE ARMACELL MODEL AP/ARMAFLEX FLEXIBLE CLOSED CELL ELASTOMERIC PIPE INSULATION IN TUBE FORM. INSULATION MAY BE PROVIDED WITH SELF–SEAL OR SELF–ADHESIVE OPTION AND SHALL MEET THE FOLLOWING REQUIREMENTS:
      a. INSULATION SHALL BE MANUFACTURED WITHOUT THE USE OF CFC, HFC, OR HCFC COMPOUNDS, FORMALDEHYDE AND FIBER FREE WITH VOC'S AND SHALL BE PRODUCED WITH AN EPA APPROVED ANTIMICROBIAL PRODUCT PROTECTION FOR DEFENSE AGAINST MOLD FORMATION AND BE FUNGI AND BACTERIA RESISTANT PER UC 181, ASTM G21/C1338 AND ASTM G22.
      b. INSULATION SHALL HAVE A THERMAL CONDUCTIVITY (K) OF 0.25BTU PER INCH PER HOUR PER SQUARE FEET AT 75 DEGREES F. MEAN TEMPERATURE PER ASTM C177 OR C 518. WATER VAPOR PERMEABILITY SHALL BE 0.05 PERM PER INCH PER ASTM E96 PROCEDURE A.
      c. INSULATION SHALL HAVE A MAXIMUM SERVICE TEMPERATURE OF 220 DEGREES F. FOR TUBES AND 180 DEGREES F FOR SHEETS. INSULATION MAY BE PROVIDED ON PIPING WITH TEMPERATURES DOWN TO MINUS 20 DEGREES F. FOR TEMPERATURE BELOW MINUS 20 DEGREES CONSULT MANUFACTURER.
      d. INSULATION SHALL HAVE A FLAME SPREAD RATING NOT GREATER THAN 25 AND A SMOKE DEVELOPED RATING NOT GREATER THAN 50 WHERE TESTED IN ACCORDANCE WITH ASTM E84.
   B. FITTING INSULATION SHALL BE FABRICATED FROM MITER–CUT PIECES OF INSULATION, OVERLAPPED AND SEALED TO ADJOINING INSULATION.
   C. SEAMS AND JOINTS SHALL BE SEALED WITH ARMAFLEX 520 BLV ADHESIVE.
   D. WHERE INSULATION IS EXPOSED AND IS TO HAVE A FINISHED APPEARANCE PROVIDE A 2–COAT ARMAFLEX WB FINISH. FINISH SHALL BE SEMI–GLOSS WHITE WATER BASE LATEX ENAMEL DESIGNED FOR USE ON ELASTOMERIC PIPE INSULATION FOR INDOOR AND OUTDOOR USE. FINISH SHALL BE ULTRAVIOLET AND OZONE RESISTANT.
5. PVC PIPE JACKETING
   A. JACKET SHALL BE A MOISTURE RETARDANT. JACKET SHALL BE 30 MIL (0.8 MM) THICKNESS FOR PIPING, INCLUDING INSULATION AND WHERE PIPING IS SUBJECT TO ABUSE. JACKET SHALL HAVE A FLAME SPREAD INDEX OF 25 AND A SMOKE DEVELOPED INDEX OF 50 PER ASTM E136.
   B. JACKETING SHALL INCLUDE STRAIGHT RUNS, FITTINGS AND ELBOWS TO PROVIDE A COMPLETE SYSTEM. JACKETING SHALL HAVE A 2 INCH OVERLAP ON BOTH CIRCUMFERENTIAL AND LONGITUDINAL JOINTS.
   C. THE COLOR OF THE PVC JACKET COVERS SHALL BE SELECTED BY THE ENGINEER.

AUTOMATIC TEMPERATURE CONTROLS SPECIFICATIONS

1. AUTOMATIC TEMPERATURE CONTROLS
   A. PRE–QUALIFIED BAS CONTRACTORS SHALL BE AS FOLLOWS:
      SIEMENS BUILDING TECHNOLOGIES
      1450 UNION MEETING RD.
      BLUE BELL, PA 19422
      847–215–1050
   B. AUTOMATIC TEMPERATURE CONTROLS (ATC) SHALL BE AN EXTENSION OF THE EXISTING SYSTEM.
   C. THE SCOPE OF WORK SHALL INCLUDE CONTROLLERS, TEMPERATURE TRANSMITTERS, PRESSURE SWITCHES, CONTROL VALVES AND ALL WORK NECESSARY TO CONNECT THE NEW WORK TO THE EXISTING SYSTEM AND PROVIDE FEEDBACK TO THE NEW EQUIPMENT. THE WORK SHALL ALSO INCLUDE PROGRAMMING THE CENTRAL SYSTEM AND GENERATING GRAPHICS AS REQUIRED TO RECOGNIZE AND COMMUNICATE WITH THE NEW DEVICES. REFERENCE ALL CONTROL DIAGRAMS, SEQUENCE OF CONTROL, AND DEVICE SCHEDULES FOR FULL EXTENT OF ATC SCOPE OF WORK.
   D. SEQUENCE OF CONTROL SHALL BE AS INDICATED ON THE DRAWINGS.
   E. PERFORM ALL ELECTRICAL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. PERFORM ALL ELECTRICAL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. INTERIOR CONTROL WIRING SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) WHERE EXPOSED AND PLENUM RATED CABLE WHERE CONCEALED IN WALLS OR LOCATED ABOVE CEILINGS. WIRING LOCATED ABOVE CLOUD OR FLOATING CEILINGS SHALL BE IN EMT. EXTERIOR CONTROL WIRING SHALL BE INSTALLED IN RIGID ALUMINUM CONDUIT.
   F. SUBMIT COMPLETE AUTOMATIC TEMPERATURE CONTROL INSTALLATION SHOP DRAWINGS FOR REVIEW.

PIPING SPECIFICATIONS

1. PIPING
   A. REFER TO THE PIPING MATERIALS SCHEDULE FOR PIPING MATERIALS FOR SPECIFIC SYSTEMS.
   B. COPPER PIPING 2 INCHES AND SMALLER SHALL BE HARD DRAWN TYPE L SEAMLESS COPPER TUBING PER ASTM B88. FITTINGS SHALL BE WROUGHT COPPER, PER ANSI B16.22.
   C. FITTINGS FOR COPPER PIPING SHALL BE MADE OF THE SAME WALL THICKNESS AND OF THE SAME MATERIAL AS THE PIPE TO WHICH THEY ARE ATTACHED. FITTINGS SHALL BE MADE FROM PURE COPPER MILL PRODUCTS PER ASTM B75 ALLOY C12200, MEETING DESIGN STANDARDS ANSI B16.22 AND MSS–SP–104. FITTINGS SHALL BE RATED FOR AN INTERNAL WORKING PRESSURE OF 250 PSI AT 200 DEGREES F. FITTINGS IN COPPER TUBING SHALL BE WROUGHT COPPER SOLDER JOINT FITTINGS OR PROPRESS PRESSURE FITTING SYSTEM AS MANUFACTURED BY VEGA AS FOLLOWS:
      1) COPPER TUBING SHALL CONFORM TO ASTM B75 OR ASTM B88.
      2) COPPER AND COPPER ALLOY FITTINGS SHALL CONFORM TO MATERIAL REQUIREMENTS OF ASME B16.18 OR ASME B16.22 AND PERFORMANCE CRITERIA OF IAPMO PS117.
      3) SOLDER METAL SHALL CONFORM TO THE REQUIREMENTS OF ASTM B32. SOLDERING FLUXES SHALL CONFORM TO ASTM B813.
      4) PIPE THREADS SHALL CONFORM TO ASME B1.20.1.
      5) HANGERS AND SUPPORTS SHALL CONFORM TO MSS–SP–58.
   D. FOR WORK IN OCCUPIED SPACES ONLY, PROPRESS, PRESSURE FITTING SYSTEM AS MANUFACTURED BY VEGA SHALL BE PERMITTED. SEALING ELEMENTS FOR PRESS FITTINGS SHALL BE EPDM. SEALING ELEMENTS SHALL BE FACTORY INSTALLED OR AN ALTERNATIVE SUPPLIED BY FITTING MANUFACTURER. PRESS END SHALL HAVE SC (SMART CONNECT) FEATURE DESIGN (LEAKAGE PATH). IN PRO PRESS ½ INCH TO 2 INCH DIMENSIONS, THE SMART CONNECT FEATURE SHALL ASSURE LEAKAGE OF LIQUIDS FROM INSIDE THE SYSTEM PAST THE SEALING ELEMENT OF AN UNPRESSED CONNECTION. THE FUNCTION OF THIS FEATURE SHALL BE TO PROVIDE THE INSTALLER QUICK AND EASY IDENTIFICATION OF CONNECTIONS WHICH HAVE NOT BEEN PRESSED PRIOR TO PUTTING THE SYSTEM INTO OPERATION.
   E. STEEL PIPING SHALL BE PER ANSI/ASME B31.1 CODE FOR PRESSURE PIPING, ASTM A–106 OR A–53 GRADE B, AND DIMENSION STANDARDS OF ANSI B36.10, SCHEDULE 40 ERW CARBON STEEL.
   F. FITTINGS FOR STEEL PIPING 2 INCH AND SMALLER SHALL BE SCREWED OR WELDED TYPE. FITTINGS FOR STEEL PIPING 2–1/2 INCH AND ABOVE SHALL BE WELDED OR FLANGED TYPE AND SHALL BE SHORT OR LONG PATTERN SEAMLESS BUTT WELDED FITTINGS OF THE SAME WALL THICKNESS AND OF THE SAME MATERIAL AS THE PIPE TO WHICH THEY ARE ATTACHED. STEEL FITTINGS SHALL HAVE PRESSURE RATINGS (PSI) AS INDICATED OR AS REQUIRED TO MEET SYSTEM OPERATING PRESSURES.
      1) SCREWED FITTINGS SHALL BE MALLEABLE CARBON STEEL; 150 LB. CLASS, BLACK, AND IN ACCORDANCE WITH ANSI B16.3, ANSI B1.20.1 AND ASTM A126 CLASS B.
      2) ALL SCREWED CONNECTIONS SHALL BE ASSEMBLED WITH LUBRICANT APPLIED TO THE MALE THREADS ONLY.
      3) FLANGED FITTINGS SHALL BE CAST IRON, SHORT BODY, CLASS 125 OR 250, BLACK AND IN ACCORDANCE WITH ANSI B16.1. GASKETS SHALL BE FULL FACE 1/8 INCH MINIMUM THICKNESS AS HERE–IN–AFTER SPECIFIED.
      4) ALL FLANGE BOLTING SHALL BE ASTM A307 GRADE B HEAVY HEX BOLTS AND STUD BOLTS WITH ASTM A563 GRADE A HEAVY HEX NUTS. BOLT AND STUD LENGTH SHALL BE IN ACCORDANCE WITH ASME B16.5, TABLE 8. ALL BOLT THREADS SHALL BE LUBRICATED WITH ANTI–SEIZE THREAD COMPOUND. NEITHER STUDS NOR THREADED ROD SHALL BE USED.
      5) ALL SLIP–ON FLANGES SHALL BE BACK–WELDED.
      6) WELD FITTINGS SHALL BE FORGED STEEL SCHEDULE 40 UP TO 10 INCHES, BLACK, CLASS 150, AND IN ACCORDANCE WITH ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5 , OR ANSI B16.11.
   G. ALL WELDING, SHOP AND FIELD, SHALL BE DONE BY A CERTIFIED LICENSED WELDER FOLLOWING STANDARD PRACTICES ESTABLISHED BY THE AMERICAN WELDING SOCIETY DURING ALL FIELD WELDING A FIRE WATCH SHALL BE MAINTAINED.
   H. WHERE CONNECTIONS ARE MADE BETWEEN STEEL PIPING OR FERROUS EQUIPMENT AND COPPER TUBING, PROVIDE A DIELECTRIC WATERWAY OR FLANGE WITH A GASKET OF INERT AND DI–ELECTRIC MATERIAL, TEFLON OR APPROVED EQUAL.
      a. DIELECTRIC WATERWAYS SHALL BE RATED AT 210 DEGREES F AT 250 PSI CONFORMING TO ANSI B16.39. PIPE THREADS SHALL CONFORM TO ANSI B2.1.
      b. FLANGED FITTINGS SHALL BE RATED AT 175 PSI CONFORMING TO ANSI B16.42 (IRON) OR B16.24 (BRONZE). BOLTS SHALL BE PROVIDED WITH BOLT INSULATORS. FOR PRESSURE ABOVE 175 PSI THE CONTRACTOR SHALL PROVIDE 250 PSI FLANGES TO MATCH PIPING MATERIAL, WITH DI–ELECTRIC GASKET AND BOLT INSULATORS.
      c. FITTINGS SHALL BE CERTIFIED TO WITHSTAND A MINIMUM OF 600 VOLTS ON A DRY LINE WITH NO FLASHOVER.
   I. DRAWINGS DO NOT INDICATE ALL PIPING OFFSETS THAT MAY BE REQUIRED. NO PIPING, VALVES, JOINTS, OR FITTINGS SHALL BE ERECTED OVER ANY MOTORS, PANEL BOARDS, OR OTHER ELECTRICAL EQUIPMENT.
   J. UNLESS OTHERWISE INDICATED, PROVIDE MANUAL AIR VENTS IN ALL HIGH POINTS OF THE NEW PIPING AND DRAIN VALVES AT ALL LOW POINTS. VENTS AND DRAINS SHALL CONSIST OF A BALL VALVE AND ¾" HOSE ADAPTER/CAP.
   K. WHEN CONNECTIONS ARE MADE TO EXISTING SYSTEMS PROVIDE ALL REQUIRED PIPING MODIFICATIONS, ADAPTERS, ETC.
   L. MISCELLANEOUS EXISTING PIPING WHICH IS REVISED SHALL BE DONE WITH MATERIALS THAT MATCH THE EXISTING.
   M. UNIONS FOR COPPER TUBING SHALL BE ANSI 125 LB. PATTERN, ALL BRONZE GROUND JOINT UNIONS WITH ENDS FOR SOLDERED JOINTS.
   N. PRESSURE TEST ALL EXISTING PIPING AND RISERS TO BE REUSED. REPAIR AND REPLACE AS NEEDED.
   O. ALL PIPING INSULATION SHALL BE AS SCHEDULED OR SPECIFIED.
   P. SPECIALITIES, AND APPURTENANCES FOR HYDRONIC SYSTEMS SHALL BE AS SCHEDULED OR SPECIFIED.
   Q. THE PIPE SYSTEMS UNLESS OTHERWISE INDICATED, SHALL NOT PITCH LESS THAN INDICATED ON THE SCHEDULE:
2. VALVES
   A. VALVES FOR THE VARIOUS PIPING SYSTEMS SHALL BE AN APPROVED EQUAL TO THE MANUFACTURER AND FIGURE NUMBERS SCHEDULED.
3. FLEXIBLE CONNECTIONS
   A. FLEXIBLE CONNECTIONS IN STEEL PIPING SHALL BE METRAFLEX TYPE MLP FLEXIBLE CONNECTION (OR APPROVED EQUAL) WITH TYPE 321 STAINLESS STEEL INNER CORRUGATED HOSE, TYPE 304 OUTER BRAID, ASA 150# FLANGED ENDS AND MINIMUM WORKING PRESSURE OF 200 PSI.
4. PRESSURE GAUGES
   A. PROVIDE AND INSTALL ALL PRESSURE GAGES IN SUCH A MANNER AS TO BE EASILY READ FROM NORMAL OBSERVATION POSITIONS
   B. PROVIDE AN ISOLATION VALVE FOR EACH GAUGE (REFER TO VALVE SCHEDULE).
   C. ALL PRESSURE GAUGES UTILIZED FOR STEAM SERVICE SHALL BE EQUIPPED WITH A COIL SYPHON CONSTRUCTED OF 316 STAINLESS STEEL OR SEAMLESS SCHEDULE 80 CARBON STEEL.
   D. SELECT RANGE IN SUCH A MANNER THAT THE OPERATING PRESSURE IS AT THE MID–POINT OF THE SCALE.
   E. PRESSURE GAUGES SHALL BE WEISS #NF40U01 MARSH #P0146 4½" DIAMETER WITH SAFECASE MOLDED TURRET, 1/4" BOTTOM CONNECTION, 0–100 PSI RANGE AND COPPER ALLOY BOURDON TYPE BRAZED TO TIP AND SOCKET. PROVIDE A 1/4" "T" HANDLE BRASS GAUGE COCK FOR EACH GAUGE.
   F. THERMOMETERS SHALL BE WEISS STEM TYPE MODEL 9VS35 VARIABLE ANGEL LIQUID FILLED, THE CASE SHALL BE V SHAPED MOLDED OF POLYESTER 40 PERCENT GLASS/MINERAL REINFORCED CASE IN BLACK FINISH. A HEAVY GLASS PROTECTED WINDOW SHALL BE FIRMLY SEALED AGAINST RATTLES BY A SPRING ACTION.
   G. STEM THERMOMETERS IN CHILLED WATER AND CONDENSER WATER SYSTEMS SHALL BE GRADUATED FROM ZERO DEGREES F TO 120 DEGREES F WITH 10 DEGREE INTERVALS AND ONE DEGREE DIVISIONS. HOT WATER AND DUAL TEMPERATURE SYSTEMS SHALL BE GRADUATED FROM 30 DEGREES F TO 240 DEGREES F WITH 10 DEGREE INTERVALS AND 2 DEGREE DIVISIONS.
6. HANGERS
   A. SUPPORT COMPONENTS SHALL CONFORM TO MANUFACTURER'S STANDARDIZATION SOCIETY SPECIFICATIONS SP–58.
   B. PIPE HANGERS SHALL BE LOCATED NEAR OR AT CHANGES IN PIPING DIRECTION AND CONCENTRATED LOADS. ALL HANGERS SHALL BE CLEVIS TYPE AND ARE TO HAVE VERTICAL ADJUSTMENTS FOR MAINTAINING THE PITCH OF PIPING.
   C. HANGER ROD SIZES SHALL BE AS FOLLOWS:

PIPE SIZE	MIN. HANGER ROD DIAMETER
1–1/2 INCHES AND SMALLER	3/8 INCH
2 THRUGH 3 INCHES	1/2 INCH
4 THROUGH 5 INCHES	5/8 INCH
6 INCHES	7/8 INCH

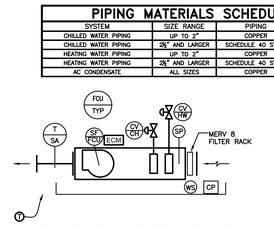
   D. HANGER SPACING SHALL BE AS FOLLOWS:

PIPE SIZE	MIN. HANGER SPACING
1–1/2 INCHES AND SMALLER	NOT OVER 6 FEET
2 THROUGH 6 INCHES	NOT OVER 10 FEET

   E. HANGERS AND SUPPORTS SHALL BE THE FOLLOWING GRINNEL NUMBERS AND ON INSULATED PIPING SHALL BE SIZED TO FIT OUTSIDE INSULATION COVERING:
      1) FIG. 260 HANGER FOR INSULATED COPPER AND STEEL PIPING AND UNINSULATED STEEL PIPING
      2) FIG. 191 PIPE SUPPORT WITH ADJUSTABLE PIPE STANCHION SADDLE WITH U–BOLT.
7. GASKETS
   A. ALL GASKETS SHALL BE RING–TYPE OF 1/16" THICK NON–ASBESTOS SHEET MATERIAL SUITABLE FOR THE TEMPERATURES AND PRESSURES OF THE SERVICE INVOLVED.
   B. GASKETS SHALL NOT BE REUSED OR REPAIRED IN ANY WAY. THEY SHALL BE REPLACED IF:
      1) THEY ARE DAMAGED DURING INSTALLATION.
      2) IF A FITTING MUST BE DISASSEMBLED AFTER IT HAS BEEN TIGHTENED.
      3) IF THERE IS ANY LEAKAGE DURING A PRESSURE TEST (IF THE FITTING ITSELF IS SCORED OR DAMAGED, IT SHALL BE REPLACED),
   C. GASKET CEMENTS OR SEALERS SHALL NOT BE USED.
23. CLEANING AND TESTING
   A. TEST ALL NEW PIPING AT 1–1/2 TIMES THE SYSTEM'S OPERATING PRESSURE WITH A MINIMUM 150# HYDROSTATIC TEST WHICH SHALL HOLD TIGHT FOR A PERIOD OF TWO (2) HOURS. ALL LEAKS SHALL BE REPAIRED WITH NEW MATERIALS AND THEN RETESTED. SUBMIT TEST RECORDS FOR REVIEW.
   B. CLEAN AND FLUSH MODIFIED SECTIONS OF PIPING IN ACCORDANCE WITH RECOMMENDATIONS OF WATER TREATMENT CONTRACTOR. CLEAN AND REPLACE STRAINER SCREENS.
   C. FILL MODIFIED SECTIONS OF PIPING AND INTRODUCE WATER TREATMENT AS RECOMMENDED BY WATER TREATMENT CONTRACTOR.
8. IDENTIFICATION
   A. PROVIDE IDENTIFICATION AND FLOW ARROWS ON ALL NEW AND EXISTING PIPING. PIPE IDENTIFICATION SHALL BE BY SETON NAMEPLATE CORPORATION OR BRADY USA, INC. AND MANUFACTURED ON PRESSURE SENSITIVE VINYL SHEETS WITH SCREEN PRINTED LETTERS. COLORING SHALL BE PER ASME COLOR CODE.
   B. ALL EXISTING PIPING IN MECHANICAL ROOM SHALL BE PROVIDED WITH NEW LABELS ON OUTER JACKETING OF INSULATION INDICATING FLOW DIRECTION AND TYPE OF PIPING WHERE LABELING IS CURRENTLY MISSING (FIELD VERIFY LOCATIONS).
   C. PROVIDE DESCRIPTIVE ENGRAVED 1/16" THICK PLASTIC–LAMINATED LABEL WITH BLACK FACE AND WHITE LETTERS ON ALL EQUIPMENT BEING ADDED OR MODIFIED AND ON ALL NEW CIRCUIT BREAKERS.
   D. LABELS SHALL BE PUNCHED AND ATTACHED TO EQUIPMENT WITH MECHANICAL FASTENERS.
9. VALVE TAGS
   A. PROVIDE FOR EACH VALVE A 2" DIAMETER BRASS VALVE TAG ATTACHED TO THE VALVE WITH A BRASS HOOK AND JACK CHAIN. IDENTIFY EACH VALVE AND ADD SAME TO THE EXISTING VALVE CHARTS OR PROVIDE A NEW VALVE CHART WITH ALL VALVE DATA (VALVE NUMBER, SERVICE, SIZE, AND LOCATION).

PIPING MATERIALS SCHEDULE

SYSTEM	SIZE RANGE	PIPING	SLOPE
CHILLED WATER PIPING	UP TO 2"	COPPER	1" IN 50'
CHILLED WATER PIPING	2½" AND LARGER	SCHEDULE 40 STEEL	1" IN 50'
HEATING WATER PIPING	UP TO 2"	COPPER	1" IN 50'
HEATING WATER PIPING	2½" AND LARGER	SCHEDULE 40 STEEL	1" IN 50'
AC CONDENSATE	ALL SIZES	COPPER	1" IN 8'



FAN COIL UNIT CONTROL DIAGRAM

N.T.S.

FAN COIL UNIT SEQUENCE OF CONTROL

A. GENERAL

1. THE DIRECT DIGITAL AUTOMATIC CONTROLS SHALL BE THROUGH NEW NETWORK CONTROL UNITS AND THE EXISTING BUILDING AUTOMATION SYSTEM.
2. MONITOR THE SPACE TEMPERATURE THROUGH LOCAL THERMOSTATS, T.
3. ON A RISE IN SPACE TEMPERATURE ABOVE 80°F (ADJUSTABLE), THE CHILLED WATER VALVE SHALL MODULATE OPEN & SUPPLY FAN SHALL ENERGIZE AND MODULATE WITH CONTROL VALVE TO MAINTAIN SETPOINT.
4. ON A DECREASE IN SPACE TEMPERATE BELOW 55°F (ADJUSTABLE), THE HOT WATER VALVE SHALL MODULATE OPEN AND SUPPLY FAN SHALL ENERGIZE AND MODULATE WITH CONTROL VALVE TO MAINTAIN SETPOINT.
5. WATER LEVE

ELECTRICAL LEGEND

- CONSTRUCTION NOTE
- XX / XX — EQUIPMENT TYPE / EQUIPMENT NUMBER
- SAME CIRCUIT/SWITCHED SEPARATELY
- NO. OF HASH MARKS DENOTES NO. OF CIRCUITS
- CIRCUIT HOMERUN
- FM — FRACTIONAL HP MOTOR/BRANCH CIRCUIT RELAY
- S_D — MOTOR DISCONNECT SWITCH
- S_{SF} — SUPPLY FAN ON/OFF SWITCH
- NEW BRANCH CIRCUIT PANELBOARD
- MOTOR CONNECTION
- JUNCTION BOX
- MOD — MOTOR OPERATED DAMPER – 120V
- ENCLOSED CIRCUIT BREAKER
- DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- MOTOR STARTER
- COMBINATION MOTOR STARTER
- CP — CLEAN AGENT CONTROL PANEL
- CLEAN AGENT CEILING DETECTOR
- CLEAN AGENT HOT/COLD CHAMBER & ABOVE CEILING DETECTOR
- CLEAN AGENT SUB-FLOOR DETECTOR
- CLEAN AGENT MANUAL PULL STATION
- A — CLEAN AGENT ABORT STATION
- CLEAN AGENT HORN/STROBE
- CLEAN AGENT DISCHARGE STROBE
- F — BUILDING FIRE ALARM MANUAL PULL STATION
- BUILDING FIRE ALARM HORN/STROBE
- SD — BUILDING FIRE ALARM SMOKE DETECTOR
- HD — PRE-ACTION SYSTEM HEAT DETECTOR
- RT — BUILDING FIRE ALARM REMOTE TEST STATION
- DUPLEX RECEPTACLE
- MM — FIRE ALARM MONITORING MODULE
- REX — DOOR ACCESS REQUEST TO EXIT
- VESDA — VESDA SMOKE DETECTION SYSTEM
- E — DOOR ACCESS ELECTRIC STRIKE
- CR — DOOR ACCESS CARD READER
- S_V — VACANCY SENSOR LIGHT SWITCH
- D — DAMPER TEST SWITCH
- S_C — CLEAN AGENT PURGE SWITCH
- (E) — DENOTES "EXISTING TO REMAIN"
- CLG — DENOTES "CEILING"
- (R) — DENOTES "REMOVE EXISTING"

GENERAL ELECTRICAL SPECIFICATIONS

1. ALL WORK SHALL COMPLY AND BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES, THE LATEST UNIFORM CONSTRUCTION CODE STATUTE, THE INTERNATIONAL CODES AS AMENDED AND ADOPTED BY THE LOCAL JURISDICTION (PHILADELPHIA, PA), REGULATIONS, LOCAL CODES, THE NATIONAL ELECTRIC CODE, DREXEL BUILDING STANDARDS, NFPA, AND ALL OTHER AGENCIES HAVING JURISDICTION. OBTAIN ALL REQUIRED PERMITS AND PAY ALL REQUIRED FEES.
2. ALL ELECTRICAL EQUIPMENT, MATERIALS, DEVICES, AND APPLIANCES SHALL BE LABELED AND LISTED BY A CERTIFIED TESTING LABORATORY.
3. PROVIDE COMPLETE ELECTRICAL SYSTEMS AS INDICATED ON DRAWINGS AND SPECIFIED HEREIN. "PROVIDE" SHALL MEAN "FURNISH AND INSTALL". "OWNER" SHALL MEAN "PCCA – PENNSYLVANIA CONVENTION CENTER AUTHORITY" OR THEIR REPRESENTATIVE. "DESIGN TEAM AND/OR ENGINEER" SHALL MEAN "DIMITRI J. VERVERELLI, INC." OR THEIR REPRESENTATIVE.
4. REFERENCE ARCHITECTURAL, STRUCTURAL, FIRE PROTECTION, AND MECHANICAL DRAWINGS FOR COORDINATION AND OTHER WORK.
5. PROVIDE ALL MATERIALS AND LABOR FOR THE COMPLETE ELECTRICAL WORK AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. ANY APPLIANCE, DEVICE OR WORK INCIDENTAL OR NECESSARY TO MAKE THE WORK COMPLETE SHALL BE PROVIDED WITHOUT ADDITIONAL EXPENSE TO THE OWNER.
6. GIVE ALL NOTICES, OBTAIN ALL PERMITS AND PAY ALL GOVERNMENTAL TAXES, FEES AND COSTS; FILE NECESSARY PLANS AND OBTAIN APPROVALS OF ALL GOVERNMENTAL DEPARTMENTS AND PUBLIC UTILITIES HAVING JURISDICTION; OBTAIN CERTIFICATES OF INSPECTION FROM AN NFPA APPROVED AGENCY FOR THE WORK AND DELIVER SAME TO THE OWNER WITH REQUEST FOR FINAL PAYMENT.
7. VISIT THE SITE AND VERIFY ALL MEASUREMENTS AND FIELD CONDITIONS AFFECTING THE WORK, PRIOR TO SUBMITTING BID. IN SUBMITTING BID THE CONTRACTOR VERIFIES AND ASSERTS THAT HE HAS VISITED THE SITE AND NO ADDITIONAL COST TO THE OWNER WILL BE INCURRED DUE TO THE CONTRACTOR'S FAILURE TO VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING HIS BID. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND FIELD CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER.
8. WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER BY SKILLED MECHANICS USING THE BEST TRADE METHODS.
9. SUBMIT SHOP DRAWINGS ACCORDING TO THE GENERAL CONDITIONS AND OBTAIN APPROVAL BEFORE PURCHASE OR INSTALLATION OF WORK.
10. COORDINATE ALL RIGGING ACTIVITIES AND POWER SHUTDOWNS WITH THE OWNER'S REPRESENTATIVE AND OTHER TRADES. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL STAGING, RIGGING, HOISTING AND SERVICES NECESSARY FOR THE ERECTION AND DELIVERY OF THE ELECTRICAL EQUIPMENT INTO THE BUILDING.
11. PRIOR TO FINAL ACCEPTANCE OF THE WORK SUBMIT A WRITTEN STATEMENT TO THE DESIGN PROFESSIONAL GUARANTEEING ALL EQUIPMENT AND WORK FOR ONE (1) YEAR FROM DATE OF ACCEPTANCE.
12. DEVICE LOCATIONS SHOWN ON DRAWINGS ARE DIAGRAMMATIC, COORDINATE EXACT LOCATION AND MOUNTING HEIGHT IN FIELD PRIOR TO ROUGH IN.
13. NOTE THAT CONSTRUCTION IS TO BE PERFORMED IN EXISTING FACILITIES AND THAT THE DRAWINGS GENERALLY SHOW ONLY NEW WORK THAT IS REQUIRED. THE DRAWINGS DO NOT SHOW IN DETAIL HOW THE NEW WORK IS TO BE INSTALLED BECAUSE UNKNOWN OBSTRUCTIONS OR ITS ARRANGEMENT MAY BE DISCLOSED AS THE WORK PROGRESSES. PERFORM THE WORK INDICATED, AND PERFORM SUCH ADDITIONAL WORK AS MAY BE REQUIRED BUT IS NOT SPECIFICALLY SHOWN. PERFORM THIS WORK IN SUCH A MANNER AS TO OVERCOME ALL OBSTRUCTIONS AND DIFFICULTIES THAT ARE ENCOUNTERED AT NO ADDITIONAL EXPENSE TO THE OWNER.
14. NEW AND EXISTING WIRING PASSING THROUGH FIRE RATED PARTITIONS, FLOORS, AND CEILINGS: CAULK THE SPACE BETWEEN THE OPENING AND SLEEVE OR WIRING/CONDUIT AND THE SPACE BETWEEN THE SLEEVE AND WIRING/CONDUIT WITH U.L. APPROVED FIRESTOP PRODUCT AS MANUFACTURED BY HILTI, 3M, OR STI TO OBTAIN A U.L. LISTED FIRE RATED ASSEMBLY. ALL PRODUCTS SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL EXISTING PENETRATIONS SHALL BE SEALED WITH A U.L. FIRE RATED ASSEMBLY.
15. CONTRACTOR SHALL PROPERLY PROTECT ALL WORK AND EQUIPMENT TO PREVENT OBSTRUCTION, DAMAGE, OR LOSS. ALL CONDUIT OPENINGS SHALL BE CLOSED WITH CAPS OR PLUGS DURING INSTALLATION. ALL EQUIPMENT SHALL BE TIGHTLY COVERED WITH APPROVED MATERIAL AND PROTECTED AGAINST DIRT, WATER, OR MECHANICAL INJURY. AT FINAL COMPLETION, ALL WORK SHALL BE THOROUGHLY CLEANED AND DELIVERED IN PERFECT, UNBLEMISHED CONDITION.
16. PROVIDE BARRICADES AND LIGHTS (IF REQUIRED) AROUND ALL WORK AREAS TO PROTECT PEDESTRIAN TRAFFIC AND TO PREVENT UNAUTHORIZED PEDESTRIAN ACCESS. PROTECTION SHALL MEET THE REQUIREMENTS OF THE LOCAL AND STATE REGULATIONS AND GOVERNMENT BODIES.
17. ALL DAMAGE TO THE BUILDING, MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEMS OR SURROUNDINGS, RESULTING FROM CONTRACTOR'S FAILURE TO ADEQUATELY PROTECT THE WORK SHALL BE REPAIRED OR REPLACED AS DIRECTED, AT NO ADDITIONAL COST TO THE OWNER, INCLUDING ANY WORK DAMAGED IN ORDER TO MAKE GOOD SUCH DEFECTS.
18. ALL EQUIPMENT AND MATERIALS REMOVED AND NOT WANTED BY OWNER SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED IMMEDIATELY FROM THE SITE.
19. SEAL AND PATCH ALL REMAINING HOLES, OPENINGS, ETC. TO MATCH THE ADJOINING SURFACES IN MATERIALS, TEXTURES, AND FINISHES.
20. ANY EXISTING POTENTIALLY HAZARDOUS MATERIALS ENCOUNTERED IN THE COURSE OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER FOR REMOVAL AND DISPOSAL.
21. SMOKING AT THE JOB SITE IS NOT ALLOWED.
22. FLAMMABLE MATERIALS MAY NOT BE STORED OR ALLOWED TO REMAIN OVERNIGHT WITHIN THE BUILDING. THIS INCLUDES, BUT IS NOT LIMITED TO, PAINTS, THINNERS, CLEANING AND RESTORATION PRODUCTS, RAGS OR BRUSHES, AND ANY TOOL THAT IS CAPABLE OF PRODUCING FLAME. SAWDUST, SCRAP LUMBER, SOAKED RAGS, AND OTHER FLAMMABLE CONSTRUCTION DEBRIS MUST BE COLLECTED AT THE END OF EACH DAY AND DISPOSED OF PROPERLY OUTSIDE OF THE BUILDING.
23. MAINTAIN SUITABLE FIRE PROTECTION EQUIPMENT AT BUILDING SITE. AT MINIMUM, TYPE ABC FIRE EXTINGUISHERS SHALL BE PROVIDED WHERE WORK IS BEING PERFORMED WITH OPEN FLAME OR USING FLAMMABLE MATERIALS AND AN ADDITIONAL FIRE EXTINGUISHER SHALL BE PROVIDED TO THE WORKER PERFORMING THE WORK. TRAIN ALL WORKERS IN THE USE OF FIRE PROTECTION EQUIPMENT.
24. ALL FIRE SAFETY REQUIREMENTS LISTED ABOVE ARE TO BE CONSIDERED MINIMUM. CONTRACTOR IS RESPONSIBLE FOR TAKING OTHER MEASURES DEEMED NECESSARY BY THE CONTRACTOR TO PROTECT THE BUILDING.
25. THE CONTRACTOR SHALL MAINTAIN AS-BUILT DRAWINGS OF THE WORK PERFORMED. AT THE COMPLETION OF THE INSTALLATION, EACH TRADE WILL INCORPORATE ALL FIELD CHANGES ON THE AUTOCAD DATA BASE AND SUBMIT THREE (3) SETS OF PLOTTED PRINTS & A DATA DISK FOR RECORD PURPOSES.

FIRE SUPPRESSION SYSTEM GENERAL NOTES

1. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT AND WIRING FOR THE CLEAN AGENT FIRE SUPPRESSION SYSTEM AND THE VESDA SMOKE DETECTION SYSTEM; INCLUDING ALL RELAYS AND DEVICES. REFERENCE THE ARCHITECTURAL, MECHANICAL, AND FIRE PROTECTION DRAWINGS FOR OTHER WORK TO BE PERFORMED BY THE ELECTRICAL CONTRACTOR.
2. CONTROL PANELS SHALL BE WIRED THROUGH SEPARATE CONDUIT TO A 20 AMP, 120 VAC DEDICATED CIRCUIT BREAKER, MINIMUM #12 AWG SHALL BE USED. THREE CONDUCTORS MUST BE RUN: HOT, GROUND, AND NEUTRAL.
3. ALL ELECTRICAL WIRING MUST MEET REQUIREMENTS SET FORTH BY ARTICLE 760 OF THE NEC, AND LOCAL CODES.
4. HIGH VOLTAGE/LOW VOLTAGE LINES MUST BE RUN IN SEPARATE CONDUIT.
5. ALL WIRES MUST BE LABELED, NUMBERED, OR COLOR CODED.
6. ALL AUDIBLE DEVICE CIRCUITS ARE SUPERVISED – PARALLEL BRANCHING OF WIRES IS NOT PERMISSIBLE.
7. ALL WIRING SHALL BE IN EMT. ALL ABOVE CEILING OR BELOW RAISED FLOOR WIRING SHALL BE UL LISTED FIRE ALARM METAL CLAD (MC) CONTROL CABLE.
8. DETECTORS SHALL NOT BE LOCATED IN DIRECT AIR STREAMS FROM SUPPLY DUCTS.
9. CONTROL PANEL SHALL BE CONNECTED TO EARTH GROUND TO DEFEND AGAINST REDUCED LIGHTNING PROTECTION AND LOSS OF GROUND FAULT SUPERVISION (ARTICLE 760 OF THE NEC).
10. ALL PENETRATIONS MADE BY INSTALLING CONTRACTOR SHALL BE SEALED TO INSURE ROOM INTEGRITY.
11. ELECTRICAL CONTRACTOR SHALL CONFORM TO THE MANUFACTURER'S SPECIFICATIONS.
12. DETECTORS, IF SHOWN, MUST BE MINIMUM 3'-0" FROM DIFFUSERS AND REGISTERS.
13. CONDUIT SHALL NOT ENTER THE BOTTOM OF THE CONTROL PANELS.
14. ALL CONDUIT INSTALLED AT THE DECK LEVEL TO BE A MINIMUM OF 1-1/2" LOWER THAN THE LOWEST POINT OF THE DECKING.
15. COMPONENT LOCATIONS ARE DIAGRAMMATIC. CONTROL PANEL AND ALL ASSOCIATED DEVICES ARE TO BE SURFACE MOUNTED.
16. ALL PENETRATIONS IN PERIMETER WALLS SHALL BE SEALED. SEAL ALL CONDUIT AND CABLE TRAY RUNS. THE AIR DISTRIBUTION SYSTEM SHALL BE SHUTDOWN AND/OR ISOLATED BY DAMPERS.

GENERAL FIRE ALARM NOTES

1. THIS SPECIFICATION DESCRIBES AN EXTENSION OF THE EXISTING FIRE ALARM SYSTEM FOR THE ADDITION OF HORN/STROBES AND MONITORING/CONTROL OF THE CLEAN AGENT FIRE SUPPRESSION SYSTEM AND VESDA SMOKE DETECTION SYSTEM.
2. MANUFACTURER: SIEMENS
3. EXPANSION OF THE FIRE ALARM SYSTEM WILL BE A DIRECT CONTRACT WITH PCCA FOR EQUIPMENT, DEVICES, PROGRAMMING, AND COMMISSIONING. INSTALLATION, SAMPLE TUBING/FITTINGS/NOZZLES, WIRING, AND CONDUIT TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR. REFERENCE SIEMENS SUBMITTAL AND INSTALLATION DRAWINGS FOR ADDITIONAL SCOPE.
4. THE SYSTEM SHALL BE IN FULL COMPLIANCE WITH NATIONAL AND LOCAL CODES.
5. THE SYSTEM SHALL INCLUDE ALL REQUIRED HARDWARE, RACEWAYS, INTERCONNECTING WIRING AND SOFTWARE TO ACCOMPLISH THE REQUIREMENTS OF THIS SPECIFICATION AND THE CONTRACT DRAWINGS, WHETHER OR NOT SPECIFICALLY ITEMIZED HEREIN.
6. ALL EQUIPMENT FURNISHED SHALL BE NEW AND THE LATEST STATE OF THE ART PRODUCTS OF A SINGLE MANUFACTURER, ENGAGED IN THE MANUFACTURING AND SALE OF FIRE DETECTION DEVICES FOR OVER TEN YEARS, UNLESS OTHERWISE NOTED TO REUSE EXISTING.
7. THE SYSTEM AS SPECIFIED SHALL BE SUPPLIED, INSTALLED, TESTED AND APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION, AND TURNED OVER TO THE OWNER IN AN OPERATIONAL CONDITION.
8. STROBES SHALL BE MOUNTED 80" ABOVE FINISH FLOOR OR 6" BELOW CEILING, WHICH EVER IS LOWER.
9. ALL FIRE ALARM CABLE SHALL BE SOLID COPPER CABLE INSTALLED IN EMT. THE CONTRACTOR IS RESPONSIBLE FOR SIZING ALL WIRE AND CABLE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, NFPA, AND VOLTAGE DROP.
10. PROVIDE ADDITIONAL POWER SUPPLIES, AMPLIFIERS, AND CONTROL HARDWARE AS REQUIRED FOR A COMPLETE FUNCTIONAL SYSTEM INTEGRATED WITH THE EXISTING BUILDING SYSTEM.
11. SYSTEMS MUST BE PROTECTED AND MAINTAINED DURING DEMOLITION AND CONSTRUCTION.
12. THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID PROPOSAL ALL COSTS INCURRED BY THE FIRE ALARM VENDOR AND FOR ALL EQUIPMENT AND DEVICES.
13. FURNISH BATTERY CALCULATIONS AND DRAWINGS FOR THE NEW SYSTEM.
14. LABEL ALL FIELD DEVICES, I.E. DETECTORS AND MODULES, WITH A PRINTED DEVICE ADDRESS.
15. CONDUIT COMPRESSION CONNECTORS AND COUPLINGS ARE TO BE INSULATED STEEL.

GUIDELINES FOR CONTAMINATION CONTROL

1. ELECTRICAL CONTRACTOR SHALL MAINTAIN A CLEAN ENVIRONMENT DURING THE CONSTRUCTION WORK. THIS INCLUDES ROUTINE CLEANING OF ENVIRONMENTAL SURFACES FOR ALL TRADES WORKING INSIDE THE PROTECTED ROOMS.
2. SUBMIT AN ENVIRONMENTAL CLEANING PLAN TO THE OWNER FOR REVIEW PRIOR TO ANY WORK. DO NOT ALLOW ANY WORK TO OCCUR IN PROTECTED ROOMS UNTIL THE ENVIRONMENTAL IMPACT OF THE WORK IS KNOWN AND PROTOCOLS FOR CONTAMINATION CONTROL HAVE BEEN REVIEWED AND APPROVED BY THE OWNER.
3. NO FOOD OR BEVERAGES ARE ALLOWED INSIDE THE PROTECTED ROOMS.
4. DO NOT UNPACK OR UNCRATE EQUIPMENT OR OTHER ITEMS INSIDE THE PROTECTED ROOMS. A STAGING AREA OUTSIDE OF THE PROTECTED ROOMS SHOULD BE ESTABLISHED FOR UNPACKING OR UNCRATING ACTIVITY.
5. DO NOT STORE CARDBOARD, WOOD OR PAPER TYPE PRODUCTS INSIDE THE PROTECTED ROOMS.
6. DO NOT PROP OPEN DOORS THAT LEAD TO NON-COMPUTER ROOM AREAS.
7. ANY TOOLS AND/OR MATERIALS BROUGHT IN THE PROTECTED ROOMS BY THE CONTRACTOR SHALL BE REASONABLY CLEAN AND CONTAMINANT FREE.
8. PLACE CONTAMINATION CONTROL MATS AT ALL ENTRANCES TO THE PROTECTED ROOMS AND BELOW ALL CEILING TILES BEING REMOVED.
9. MAINTAIN POSITIVE AIR PRESSURIZATION IN THE PROTECTED ROOMS RELATIVE TO SURROUNDING AREAS.
10. CLEAN TOP OF FLOOR SURFACES AND ENVIRONMENTAL SURFACES FREQUENTLY DURING CONSTRUCTION.
11. VACUUM CLEAN UNDERFLOOR PLENUM SPACE EACH TIME A FLOOR TILE IS REMOVED AND RESET.
10. VACUUM CLEAN TOP OF CEILING TILES AND SURROUNDING AREA EACH TIME A CEILING TILE IS REMOVED AND RESET.
11. VACUUM CLEAN PLENUM SPACE ABOVE CEILING, INCLUDING SURFACES OF PIPING, CONDUIT, DUCTS, ETC.
12. WIPE DOWN CONTAMINATED SURFACES WITH PRODUCTS APPROVED FOR COMPUTER ROOMS.
13. ALL VACUUM CLEANERS SHALL BE PROVIDED WITH HEPA FILTERS.

GENERAL WIRING METHODS

1. ALL CONDUCTOR INSULATION SHALL BE 90°C THHN/THWN. ALL FEEDERS AND BRANCH CIRCUITS SHALL BE COPPER.
2. ALL LUGS SHALL BE U.L. LISTED FOR USE WITH COPPER OR ALUMINUM CABLE WHOSE AMPACITY IS BASED ON 75°C CONDUCTOR TEMPERATURE RATING.
3. ALL CIRCUITS TO BE 2#12, 1#12GND., UNLESS OTHERWISE NOTED. PROVIDE #10 AWG CONDUCTORS FOR ALL 120V.,20A BRANCH CIRCUITS EXCEEDING 90 FEET IN LENGTH.
4. BRANCH CIRCUITS ARE DIAGRAMMATIC AND DO NOT REPRESENT ACTUAL PLACEMENT OF CONDUIT.
5. ALL JUNCTION BOX AND DEVICE COVER PLATES SHALL IDENTIFY CIRCUIT NUMBERS.
6. ALL DEVICES SHALL HAVE ADHESIVE LABELS ATTACHED TO FACEPLATE IDENTIFYING CIRCUIT NUMBER(S).
7. ALL BRANCH CIRCUIT WIRING IN FINISHED AREAS IS TO BE INSTALLED CONCEALED IN FLOORS, WALLS AND CEILINGS.
8. ALL OUTLET BOXES SHALL BE 4 INCH SQUARE GALVANIZED PRESSED STEEL WITH RAISED COVER PLATES. BOXES FOR SINGLE DEVICES MAY BE 2" x 4" SINGLE SIZES. BOXES FOR LIGHTING FIXTURES SHALL 4" OCTAGON TYPE. EXTERIOR BOXES SHALL BE CAST METAL WITH THREADED HUBS.
9. METAL CLAD CABLE (MC) AND CONDUIT SHALL BE SUPPORTED FROM THE BUILDING CONSTRUCTION ABOVE AT INTERVALS NOT GREATER THAN 6'-0" AND WITHIN 12" OF A DEVICE BACKBOX. AT NO TIME SHALL 'MC' CABLE OR CONDUIT BE SUPPORTED FROM FIXTURE HANGERS, CEILING GRID HANGERS OR HVAC SUPPORTS. 'MC' CABLE SHALL NOT LAY ON TOP OF THE CEILING SYSTEM.
10. ALL ELECTRICAL CIRCUITS SHALL BE RATED FOR NO LESS THAN 20 AMPERES.
11. GROUNDING SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE ARTICLE 250.
12. WIRE AND CABLE SHALL BE COPPER, 600 VOLT INSULATION TYPE THHN, UNLESS OTHERWISE NOTED. WIRE SIZES #10 AND SMALLER SHALL BE SOLID, #8 AND LARGER SHALL BE STRANDED. MINIMUM SIZE WIRE SHALL BE #12AWG. BRANCH CIRCUITS CONNECTED TO VIBRATING EQUIPMENT (MOTORS, AHU'S, FCU'S, CU'S ETC.) SHALL BE STRANDED.
13. ALL RACEWAYS SHALL BE U.L. APPROVED. MINIMUM SIZE CONDUIT AND EMT SHALL BE ¾"
14. MC CABLE SHALL BE GALVANIZED SPIRAL STEEL ASSEMBLY WITH THHN WIRES INCLUDED, OR WITH APPROVED FITTINGS AND COUPLINGS BY AFC CO. CABLE SHALL HAVE GREEN INSULATED GROUND WIRE.
15. INTERIOR WIRING METHODS
    - FEEDERS – ELECTRICAL METALLIC TUBING (EMT).
    - BRANCH CIRCUITS – ELECTRICAL METALLIC TUBING (EMT) WHERE EXPOSED AND METAL CLAD CABLE (MC) WHERE CONCEALED IN WALLS AND MAXIMUM 8' ABOVE ACCESSIBLE CEILINGS TO LIGHT FIXTURES.
    - FIRE ALARM – ELECTRICAL METALLIC TUBING (EMT)
    - ALL LOW VOLTAGE WIRING TO BE INSTALLED IN EMT.

FIRESTOPPING & SMOKE BARRIER GENERAL NOTES

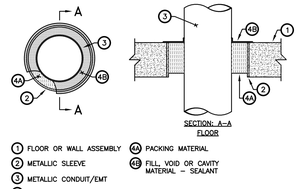
1. ALL EXISTING AND NEW PENETRATIONS THROUGH THE AV/TEL/ELEC ROOM WALLS/CEILINGS/FLOORS SHALL BE SEALED TO BLOCK PASSAGE OF THE FIRE EXTINGUISHING AGENT TO ADJACENT AREAS/SPACES OUTSIDE THE PROTECTED ROOMS.
2. CONTRACTOR SHALL REFERENCE AND COMPLY WITH APPLICABLE U.L. INSTALLATION DETAILS FOUND AT RESPECTIVE MANUFACTURER'S WEBSITES.
3. CONTRACTOR SHALL FIELD VERIFY TYPE AND QUANTITY OF FIRE STOP/SMOKE BARRIER ASSEMBLIES REQUIRED AT EACH PENETRATION LOCATION PRIOR TO ORDERING MATERIAL.
4. CLEAN SUBSTRATE SURFACES OF DIRT, DUST, GREASE, OIL, LOOSE MATERIAL, OR OTHER MATTER AFFECTING BOND OF FIRESTOPPING MATERIAL. REMOVE INCOMPATIBLE MATERIALS AFFECTING BOND. PROVIDE BACKING MATERIALS TO ARREST LIQUID MATERIAL LEAKAGE.
5. PROVIDE MATERIAL AT FIRE RATED CONSTRUCTION PERIMETERS/OPENINGS AND AT LOCATIONS CONTAINING PENETRATING SLEEVES, PIPING, DUCTWORK, CONDUIT AND OTHER ITEMS. APPLY PRIMER WHERE RECOMMENDED BY MANUFACTURER FOR TYPE OF FIRESTOPPING MATERIAL AND SUBSTRATE INVOLVED, AND AS REQUIRED FOR COMPLIANCE WITH REQUIRED FIRE RATINGS.
6. APPLY FIRESTOPPING MATERIAL IN SUFFICIENT THICKNESS TO ACHIEVE REQUIRED FIRE AND SMOKE RATING. COMPRESS FIBERED MATERIAL TO MAXIMUM 40 PERCENT OF ITS UNCOMPRESSED SIZE. PLACE FOAMED MATERIAL IN LAYERS TO ENSURE HOMOGENOUS DENSITY, FILLING CAVITIES AND SPACES. PLACE SEALANT TO COMPLETELY SEAL JUNCTIONS WITH ADJACENT DISSIMILAR MATERIALS. PLACE INTUMESCENT COATING IN SUFFICIENT COATS TO ACHIEVE RATING REQUIRED.
7. PROVIDE RETROFIT FIRE RATED SLEEVES AND PATHWAY ASSEMBLIES WHERE MULTIPLE CABLES AND CONDUITS OCCUR AT THE SAME LOCATION. SINGLE CABLE AND CONDUIT PENETRATION LOCATIONS DO NOT REQUIRE A SLEEVE.
8. DURING INSTALLATION, PROVIDE MASKING AND DROP CLOTHS TO PREVENT FIRESTOPPING MATERIALS FROM CONTAMINATING ANY ADJACENT SURFACES.
9. PROVIDE COMPONENTS FOR EACH FIRESTOPPING SYSTEM THAT ARE NEEDED TO INSTALL FILL MATERIAL. USE ONLY COMPONENTS SPECIFIED BY THE FIRESTOPPING MANUFACTURER AND APPROVED BY THE QUALIFIED TESTING AGENCY FOR THE DESIGNATED FIRE-RESISTANCE-RATED SYSTEMS.
10. PROVIDE NON-CURING, RE-PENETRABLE, INTUMESCENT FIRESTOP BLOCKS OR PUTTY AROUND COMMUNICATION CABLES PENETRATING THROUGH FIRE RATED WALLS. THE FIRESTOP SYSTEM ASSEMBLY SHALL BE ACCESSIBLE FROM ONE SIDE OF THE WALL. THE FIRESTOP MATERIAL SHALL ALLOW UP TO 12'OF UNREINFORCED ANNULAR SPACE.

ELECTRICAL DEVICE MOUNTING HEIGHT SCHEDULE

DEVICE	MOUNTING HEIGHT
LIGHT SWITCHES, WALL MOUNTED OCCUPANCY SENSORS	44" TO CENTERLINE OF BOX.
WALL MOUNTED EXIT SIGNS	90" CENTERLINE OF SIGN OR CENTERED IN WALL AREA BETWEEN TOP OF DOOR AND CEILING.
PENDANT MOUNTED FIXTURES	REFERENCE FIXTURE SCHEDULE
RECEPTACLES	16" TO BOTTOM OF BOX U.O.N.
RECEPTACLES – ABOVE COUNTER	42" TO BOTTOM OF BOX U.O.N.
RECEPTACLES – REFRIGERATORS/VENDING	54" TO BOTTOM OF BOX U.O.N.
SPECIAL OUTLETS OR RECEPTACLES	16" TO BOTTOM OF BOX OR AS NOTED ON DRAWINGS.
VOICE/DATA OUTLETS	16" TO BOTTOM OF BOX. *EXCEPTION: 44" MAXIMUM TO TOP ABOVE COUNTERS WHICH ARE 20"-25"D*
TELEPHONE OUTLETS – WALL TYPE	54" TO DIAL CENTER (NON-ACCESSIBLE). 48" TO HIGHEST OPERABLE PART (ACCESSIBLE).
FIRE ALARM MANUAL PULL STATIONS	MINIMUM 42" ABOVE FINISHED FLOOR AND A MAXIMUM OF 48" ABOVE FINISHED FLOOR TO CENTER OF DEVICE.– NOT MORE THAN 5'-0" FROM EXIT
FIRE ALARM HORNS, BELLS, STROBES, ETC.	STROBES SHALL BE MOUNTED SUCH THAT THE ENTIRE LENS IS NOT LESS THAN 80" AND NOT GREATER THAN 96" ABOVE FINISH FLOOR OR 6" BELOW CEILING, WHICH EVER IS LOWER.
WALL MOUNTED REMOTE INDICATOR LIGHT FOR DUCT MOUNTED SMOKE DETECTORS	80" TO CENTERLINE OF DEVICE OR 6" BELOW CEILING, WHICHEVER IS LOWER.
INTERCOM STATION	48" TO CENTERLINE OF BOX.
THERMOSTATS	54" TO HIGHEST OPERABLE PART (SIDE ACCESS) 48" TO HIGHEST OPERABLE PART (FORWARD ACCESS).
TEMPERATURE/HUMIDITY SENSORS	60" TO CENTERLINE OF BOX.
STARTERS AND DISCONNECT SWITCHES	5'-0" TO CENTERLINE FROM FINISHED FLOOR.
PANELBOARDS	6'-6" TO TOP CIRCUIT BREAKER (MAXIMUM)
MOTION DETECTORS, CAMERAS, AND GLASS BREAK DETECTORS	COORDINATE WITH SECURITY SYSTEMS VENDOR/MANUFACTURER
TELEVISION AND CABLE TV OUTLETS	16" TO BOTTOM OF BOX. U.O.N.

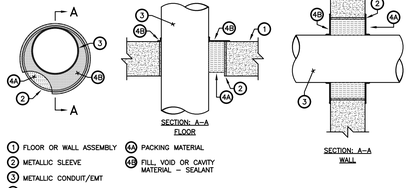
1. ALL DIMENSIONS ARE CONSIDERED FROM FINISHED FLOOR AND, UNLESS NOTED OTHERWISE, AND SHALL NOT VARY. ALL DIMENSIONS SHALL BE COORDINATED WITH ARCHITECTURAL DETAILS AND MAY BE ADJUSTED TO CONFORM WITH ARCHITECTURAL REQUIREMENTS AS LONG AS NO CODE RESTRICTION IS VIOLATED.
2. OUTLETS INSTALLED LOWER THAN 15" AFF (FORWARD REACH) AND 9" AFF (SIDE REACH) ARE IN VIOLATION OF ADA.
3. EXIT SIGNS SHALL NOT BE INSTALLED SO THAT IT BLOCKS FIRE ALARM VISUAL DEVICES.
4. CONTRACTOR SHALL COORDINATE ALL THE ABOVE MOUNTING HEIGHTS WITH THOSE SHOWN ON THE ARCHITECTURAL PLANS PRIOR TO ROUGH-IN.

SYSTEM NO. C-AJ-1009
F RATING – 2 HR
T RATING – 0 HR



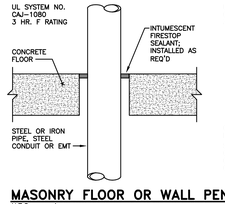
1. FLOOR OR WALL ASSEMBLY
2. METALLIC SLEEVE
3. METALLIC CONDUIT/EMT
4. FIRESTOP SYSTEM
- 4A. PACKING MATERIAL
- 4B. FILL, VOID OR CAVITY MATERIAL – SEALANT

SYSTEM NO. C-AJ-1318
F RATING – 2 HR
T RATING – 0 HR

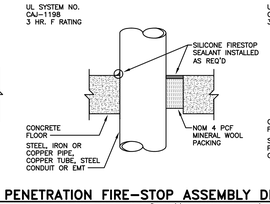


1. FLOOR OR WALL ASSEMBLY
2. METALLIC SLEEVE
3. METALLIC CONDUIT/EMT
4. FIRESTOP SYSTEM
- 4A. PACKING MATERIAL
- 4B. FILL, VOID OR CAVITY MATERIAL – SEALANT

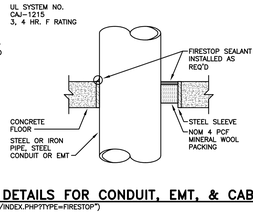
UL SYSTEM NO. CAJ-1080
3 HR. F RATING



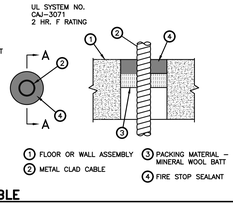
UL SYSTEM NO. CAJ-1198
3 HR. F RATING



UL SYSTEM NO. CAJ-1215
3, 4 HR. F RATING



UL SYSTEM NO. CAJ-3071
2 HR. F RATING

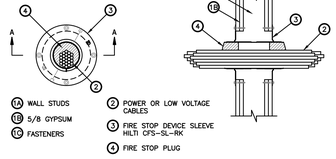


1. FLOOR OR WALL ASSEMBLY
2. METAL CLAD CABLE
3. PACKING MATERIAL – MINERAL WOOL BATT
4. FIRE STOP SEALANT

MASONRY FLOOR OR WALL PENETRATION FIRE-STOP ASSEMBLY DETAILS FOR CONDUIT, EMT, & CABLE

N.T.S. (CONTRACTOR SHALL REFERENCE AND COMPLY WITH APPLICABLE DETAILS FOUND AT "HTTP://PRODUCTSPEC.UL.COM/INDEX.PHP?TYPE=FIRESTOP")

UL SYSTEM NO. W-L-3393
1, 2 HR. F RATING



- 1A. WALL STUDS
- 1B. 5/8 GYPSUM
- 1C. FASTENERS
- 2. POWER OR LOW VOLTAGE CABLES
- 3. FIRE STOP DEVICE SLEEVE HILTI CFS-SL-RK
- 4. FIRE STOP PLUG

UL SYSTEM NO. W-L-3065
1,

STANDBY

NEW PANEL C1.4
LOCATION: 243A GUEST DATA

VOLTAGE: 208/120V.,3ø,4W
MAINS: 125A.,M.L.O.

NEUTRAL BUS SIZE: 100%
INTERRUPTING RATING: 65KAIC

CKT NO.	CKT LOAD	BKR SIZE	CIRCUIT SIZE	CIRCUIT DESCRIPTION AND/OR LOCATION	LOAD VA øA	LOAD VA øB	LOAD VA øC	CIRCUIT DESCRIPTION AND/OR LOCATION	CIRCUIT SIZE	BKR SIZE	CKT LOAD	CKT NO.
1	1664	20/2	2#12,1#10GND.,3/4"C.	TENANT A	3328			TENANT B	2#12,1#10GND.,3/4"C.	20/2	1664	2
3	1664					3328					1664	4
5	1664	20/2	2#12,1#10GND.,3/4"C.	TENANT A			3328	TENANT B	2#12,1#10GND.,3/4"C.	20/2	1664	6
7	1664				3328						1664	8
9	1664	20/2	2#12,1#10GND.,3/4"C.	DEMARC RACK		3328		DEMARC RACK	2#12,1#10GND.,3/4"C.	20/2	1664	10
11	1664						3328				1664	12
13	500	[20/1]	2#12,1#10GND.,3/4"C.	CLEAN AGENT CONTROL PANEL	500			SPARE		20/1	0	14
15	250	20/1	2#12,1#10GND.,3/4"C.	FCU SHUTDOWN CONTACTOR		250		SPARE		20/1	0	16
17	0			SPACE			0	SPACE			0	18
				TOTAL/PHASE (VA):	7156	6906	6656					
				LOAD FROM SUBPANELS (VA):	0	0	0					
				TOTAL (VA):	20718							

20/1 = 5mA GFCI BKR
-20/1- = CKT BKR HANDLE TIE
+20/1+ = AFCI BKR
[20/1] = CKT BKR HANDLE LOCK
20/1 = 30mA GFCI BKR
ST = SHUNT TRIP BKR
>20/1< = DUAL AFCI/GFCI
T = TANDEM BKR

RECEPTACLE:	FIRST 10KVA @ 100% DEMAND	=	10,000 VA	X 100% =	10,000 VA
RECEPTACLE:	REMAINDER @ 50% DEMAND	=	9,968 VA	X 50% =	4,984 VA
LIGHTING:	TOTAL @ 100% DEMAND	=	0 VA	X 100% =	0 VA
MECHANICAL:	TOTAL @ 100% DEMAND	=	750 VA	X 90% =	675 VA
KITCHEN:	TOTAL @ 100% DEMAND	=	0 VA	X 65% =	0 VA
EV CHARGER:	TOTAL @ 125% DEMAND	=	0 VA	X 125% =	0 VA
ELECTRIC HEAT	TOTAL @ 125% DEMAND	=	0 VA	X 125% =	0 VA
PLUS 25% OF LARGEST MOTOR LOAD:		=	0 VA	X 25% =	0 VA
			TOTAL DEMAND LOAD =		15,659 VA
			TOTAL AMPS =		44 A

BUSSING: ☐ ALUMINUM ☒ TIN PLATED COPPER
ENCLOSURE: ☒ TYPE 1 ☐ TYPE 3R/4X STAINLESS STEEL
MOUNTING: ☒ SURFACE ☐ FLUSH
LUGS: ☐ FEED-THRU ☐ DOUBLE MAIN
MAIN: ☐ BREAKER ☒ LUGS ONLY
TRIM: DOOR-IN-DOOR HINGED FRONT TRIM
SAFETY: IEC 60529 IP2X FINGER BARRIERS

NORMAL

NEW PANEL RP2.A
LOCATION: 243A GUEST DATA

VOLTAGE: 208/120V.,3ø,4W
MAINS: 125A.,M.L.O.

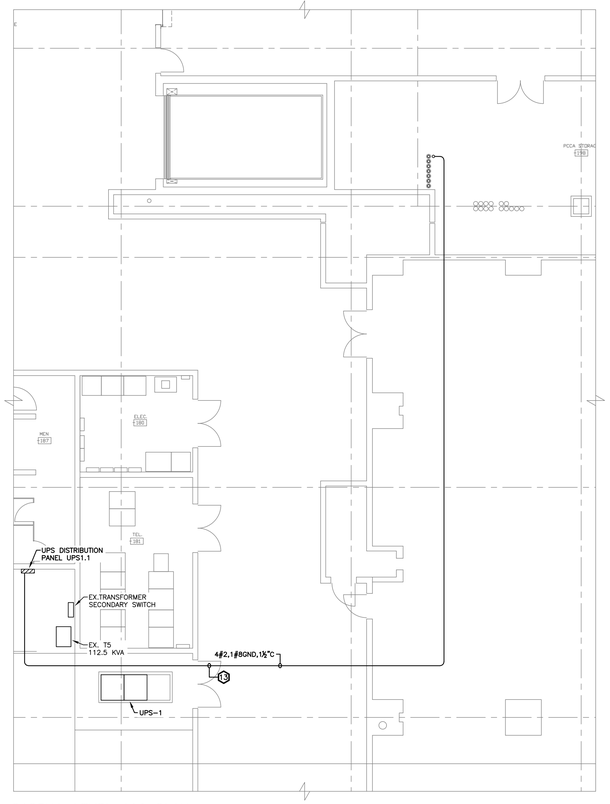
NEUTRAL BUS SIZE: 100%
INTERRUPTING RATING: 22KAIC

CKT NO.	CKT LOAD	BKR SIZE	CIRCUIT SIZE	CIRCUIT DESCRIPTION AND/OR LOCATION	LOAD VA øA	LOAD VA øB	LOAD VA øC	CIRCUIT DESCRIPTION AND/OR LOCATION	CIRCUIT SIZE	BKR SIZE	CKT LOAD	CKT NO.
1	1664	20/2	2#12,1#10GND.,3/4"C.	TENANT A	3328			TENANT B	2#12,1#10GND.,3/4"C.	20/2	1664	2
3	1664					3328					1664	4
5	1664	20/2	2#12,1#10GND.,3/4"C.	TENANT A			3328	TENANT B	2#12,1#10GND.,3/4"C.	20/2	1664	6
7	1664				3328						1664	8
9	1664	20/2	2#12,1#10GND.,3/4"C.	DEMARC RACK		3328		DEMARC RACK	2#12,1#10GND.,3/4"C.	20/2	1664	10
11	1664						3328				1664	12
13	1069			FCU-1	1249			GENERAL RECEPTACLES	2#12,1#10GND.,3/4"C.	20/1	180	14
15	1069	25/3	3#10,1#10GND,3/4"C.			1569		SPARE		20/1	500	16
17	1069						1069	SPARE		20/1	0	18
19	0	20/1		SPARE	0			SPARE		20/1	0	20
21	0	20/1		SPARE		0		SPARE		20/1	0	22
23	0			SPACE			0	SPACE			0	24
25	0			SPACE	0			SPACE			0	26
27	0			SPACE		0		SPACE			0	28
29	0			SPACE			0	SPACE			0	30
				TOTAL/PHASE (VA):	7905	8225	7725					
				LOAD FROM SUBPANELS (VA):	0	0	0					
				TOTAL (VA):	23855							

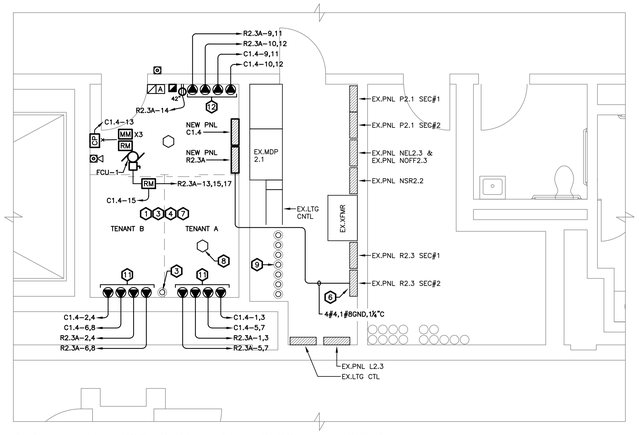
20/1 = 5mA GFCI BKR
-20/1- = CKT BKR HANDLE TIE
+20/1+ = AFCI BKR
[20/1] = CKT BKR HANDLE LOCK
20/1 = 30mA GFCI BKR
ST = SHUNT TRIP BKR
>20/1< = DUAL AFCI/GFCI
T = TANDEM BKR

RECEPTACLE:	FIRST 10KVA @ 100% DEMAND	=	10,000 VA	X 100% =	10,000 VA
RECEPTACLE:	REMAINDER @ 50% DEMAND	=	10,148 VA	X 50% =	5,074 VA
LIGHTING:	TOTAL @ 100% DEMAND	=	0 VA	X 100% =	0 VA
MECHANICAL:	TOTAL @ 100% DEMAND	=	3,207 VA	X 90% =	2,886 VA
KITCHEN:	TOTAL @ 100% DEMAND	=	0 VA	X 65% =	0 VA
EV CHARGER:	TOTAL @ 125% DEMAND	=	0 VA	X 125% =	0 VA
ELECTRIC HEAT	TOTAL @ 125% DEMAND	=	0 VA	X 125% =	0 VA
PLUS 25% OF LARGEST MOTOR LOAD:		=	3,207 VA	X 25% =	802 VA
			TOTAL DEMAND LOAD =		18,762 VA
			TOTAL AMPS =		52 A

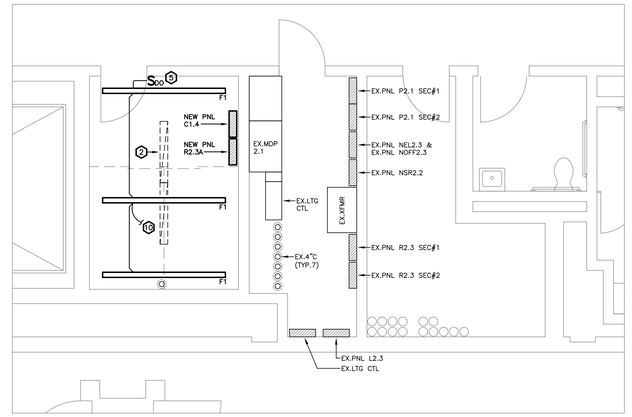
BUSSING: ☐ ALUMINUM ☒ TIN PLATED COPPER
ENCLOSURE: ☒ TYPE 1 ☐ TYPE 3R/4X STAINLESS STEEL
MOUNTING: ☒ SURFACE ☐ FLUSH
LUGS: ☐ FEED-THRU ☐ DOUBLE MAIN
MAIN: ☐ BREAKER ☒ LUGS ONLY
TRIM: DOOR-IN-DOOR HINGED FRONT TRIM
SAFETY: IEC 60529 IP2X FINGER BARRIERS



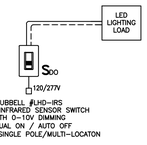
PARTIAL LEVEL 100 PLAN
SCALE: ⅛" = 1'-0"



PARTIAL LEVEL 200 PLAN – DATA CLOSET – POWER
SCALE: ¼" = 1'-0"

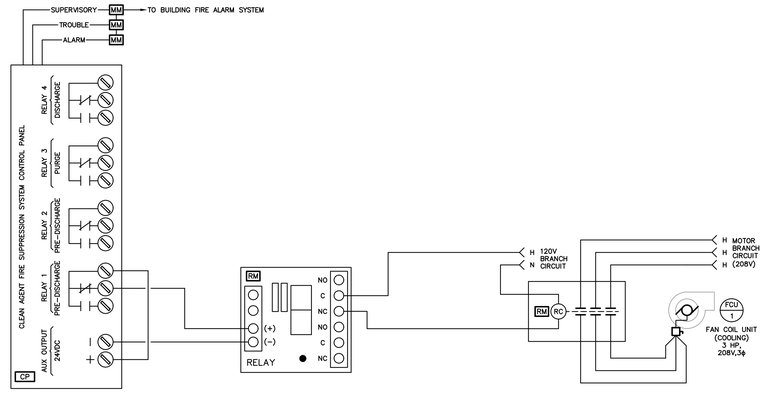


PARTIAL LEVEL 200 PLAN – DATA CLOSET – LIGHTING
SCALE: ¼" = 1'-0"



HUBBELL #LHD-IRS
PASSIVE INFRARED SENSOR SWITCH
WITH 0-10V DIMMING
MANUAL ON / AUTO OFF
120-277V, SINGLE POLE/MULTI-LOCATON

WALL SWITCH OCCUPANCY SENSORS WITH 0-10V DIMMING
SCALE: NONE



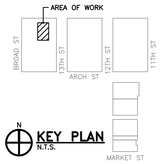
CLEAN AGENT FIRE SUPPRESSION SYSTEM – FCU REMOTE SHUTDOWN
N.T.S.

CONSTRUCTION NOTES

1. TYPICAL THROUGHOUT, EXISTING AND NEW CONDUIT(S) PENETRATION(S) TO BE FIRE STOPPED AND SMOKE SEALED WITH INTUMESCENT FIRE STOP SEALANT.
2. EXISTING LIGHT FIXTURE TO BE REMOVED; CIRCUIT TO BE RE-USED FOR NEW LIGHTING.
3. TYPICAL THROUGHOUT, ALL EXISTING AND NEW CONDUIT/MC CABLE PENETRATIONS TO BE FIRE STOPPED AND SMOKE SEALED WITH INTUMESCENT FIRE STOP SEALANT AT WALLS AND HARD CEILING.
4. FOR ALL RECESSED DEVICES – PROVIDE RECTORSEAL FIRE RATED GASKETS BEHIND ALL DEVICES/COVER PLATES ON PERIMETER WALLS ADJACENT TO OTHER SPACES. OR AT HARD CEILING
5. REPLACE EXISTING WALL SWITCH WITH NEW VACANCY SENSOR DIMMER SWITCH. PROVIDE BOX EXTENSION AND NEW STAINLESS STEEL COVER PLATE.
6. PROVIDE NEW 80/3, 22KAIC CIRCUIT BREAKER IN EXISTING PANEL R2.3, SECTION 2 FOR NEW PANEL R2.3A. PROVIDE HANDLE LOCK.
7. ALL NEW AND EXISTING FIRE ALARM DEVICES THAT HAVE CONDUIT ENTERING BACK OF BOX THROUGH WALL SHALL BE PROVIDED WITH NEW GASKET BETWEEN COVER AND BOX. SEAL PERIMETER OF BOX WITH INTUMESCENT FIRE STOP SEALANT.
8. SMOKE DETECTORS TO BE MINIMUM 3' AWAY FROM DIFFUSERS AND REGISTERS.
9. EXISTING SPARE CONDUITS MAY BE USED FOR FEEDER FROM UPS1.1 ON LEVEL 1 TO C2.1 IN GUEST DATA ROOM.
10. CONNECT TO EXISTING LIGHTING CIRCUIT SERVING ROOM.
11. L6-20R RECEPTACLES FOR GUEST DATA RACKS. CONFIRM MOUNTING LOCATION WITH IT CONTRACTOR.
12. L6-20R RECEPTACLES FOR DEMARC DATA RACK. CONFIRM RECEPTACLE TYPE AND MOUNTING LOCATION WITH OWNER AND IT CONTRACTOR.
13. APPROX. PATH OF NEW FEEDER – VERIFY IN FIELD. REMOVE AND REPLACE CEILING, LIGHTING, ETC. AS REQUIRED FOR INSTALLATION OF NEW FEEDER.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MOUNTING TYPE	MOUNTING HEIGHT	VOLTS	LAMP TYPE	SYSTEM WATTS	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN CATALOG NO.	NOTES
F1	8' MULTIPURPOSE LINEAR LED WITH ROUND LENSE, 0-10V DIMMING	SURFACE	N/A	UNV	LED 1500 LUMENS 3500K-80CRI	10	COLUMBIA	MPS8-35XX-CW-EDU	



REV	DESCRIPTION	DATE
0	ISSUED FOR BID	03/22/2024

PENNSYLVANIA CONVENTION CENTER AUTHORITY
ONE CONVENTION CENTER PLACE
1101 ARCH STREET
PHILADELPHIA, PENNSYLVANIA 19107

DATA CLOSET

PARTIAL 100 & 200 LEVEL – ELECTRICAL PLANS, SCHEDULES AND DIAGRAMS

DIMITRI J. VERVERELLI INC.
CONSULTING ENGINEERS
PHILADELPHIA, PENNSYLVANIA

DRAWN BY:	SCALE:	DWG. NO.
THS	AS NOTED	E-2
CHECKED BY: LOM	PROJ. NO: 2328	

FIKE CLEAN AGENT SPECIFICATIONS

GENERAL CONDITIONS

1. SCOPE

THIS SPECIFICATION OUTLINES THE REQUIREMENTS FOR A "TOTAL FLOOD" CLEAN AGENT FIRE SUPPRESSION SYSTEM UTILIZING FK-5-1-12 AS THE FIRE EXTINGUISHING AGENT AND WITH A SHP PRO DETECTION AND CONTROL SYSTEM. THE WORK DESCRIBED IN THIS SPECIFICATION INCLUDES ALL ENGINEERING, LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY, AND REQUIRED, TO COMPLETE AND TEST THE SUPPRESSION AND DETECTION SYSTEM. THE SYSTEM SHALL BE SUPPLIED AND INSTALLED BY THE LOCAL AUTHORIZED DISTRIBUTOR: SUPPRESSION SYSTEMS, INC., 155 NESTLE WAY, SUITE 104, BREINIGSVILLE, PA, 18031. CONTACT: JERRY KROUSE, PHONE # 800-360-0687.

2. APPLICABLE STANDARDS AND PUBLICATIONS

THE DESIGN, EQUIPMENT, INSTALLATION, TESTING AND MAINTENANCE OF THE CLEAN AGENT SYSTEM SHALL BE IN COMPLIANCE AND ACCORDANCE WITH THE APPLICABLE REQUIREMENTS SET FORTH IN THE LATEST EDITION OF THE FOLLOWING CODES, STANDARDS, AND THIRD PARTY APPROVAL AGENCIES:

A. NFPA NO. 2001 – CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

B. NFPA NO. 70 – NATIONAL ELECTRICAL CODE

C. NFPA NO. 72 – NATIONAL FIRE ALARM CODE

D. FM APPROVALS

E. UNDERWRITERS LABORATORY

F. REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION (AHJ)

THE STANDARDS LISTED, AS WELL AS ALL OTHER APPLICABLE CODES AND STANDARDS SHALL BE USED AS "MINIMUM" DESIGN STANDARDS. ALSO TO BE CONSIDERED ARE THE REQUIREMENTS OF THE "AUTHORITY HAVING JURISDICTION" AND GOOD ENGINEERING PRACTICES.

3. REQUIREMENTS

THE CLEAN AGENT FIRE SUPPRESSION SYSTEM INSTALLATION SHALL BE MADE IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS AND APPLICABLE STANDARDS. SHOULD A CONFLICT OCCUR BETWEEN THE DRAWINGS AND SPECIFICATIONS, THE SPECIFICATIONS SHALL PREVAIL.

4. EXCLUSIONS

THE WORK LISTED BELOW SHALL BE PROVIDED BY OTHERS, OR UNDER OTHER SECTIONS OF THIS SPECIFICATION:

A. 120 VAC OR 240 VAC POWER SUPPLY TO THE SYSTEM CONTROL PANEL.

B. INTERLOCK WIRING AND CONDUIT FOR SHUTDOWN OF HVAC, DAMPERS AND/OR ELECTRIC POWER SUPPLIES, RELAYS OR SHUNT TRIP BREAKERS.

C. CONNECTION TO LOCAL/REMOTE FIRE ALARM SYSTEMS, LISTED CENTRAL ALARM STATION(S).

5. QUALITY ASSURANCE

A. MANUFACTURER:

1) THE MANUFACTURER OF THE CLEAN AGENT SYSTEM HARDWARE AND DETECTION COMPONENTS SHALL HAVE A MINIMUM OF 10 YEARS EXPERIENCE IN THE DESIGN AND MANUFACTURE OF SIMILAR TYPES OF SUPPRESSION SYSTEMS AND WHO REFER TO SIMILAR INSTALLATIONS PROVIDING SATISFACTORY SERVICE.

2) THE NAME OF THE MANUFACTURER, PART NUMBERS AND SERIAL NUMBERS SHALL APPEAR ON ALL MAJOR COMPONENTS.

3) ALL DEVICES, COMPONENTS AND EQUIPMENT SHALL BE THE PRODUCTS OF THE SAME MANUFACTURER.

4) ALL DEVICES, COMPONENTS AND EQUIPMENT SHALL BE NEW, STANDARD PRODUCTS OF THE MANUFACTURER'S LATEST DESIGN AND SUITABLE TO PERFORM THE FUNCTIONS INTENDED.

5) ALL DEVICES AND EQUIPMENT SHALL BE U.L LISTED OR FM APPROVED.

6) LOCKS FOR ALL CABINETS SHALL BE KEYED ALIKE.

B. INSTALLER:

1) THE INSTALLING CONTRACTOR SHALL BE TRAINED BY THE SUPPLIER TO DESIGN, INSTALL, TEST AND MAINTAIN CLEAN AGENT SYSTEM.

2) WHEN POSSIBLE, THE INSTALLING CONTRACTOR SHALL EMPLOY A NICET CERTIFIED SPECIAL HAZARD DESIGNER, LEVEL 3 OR ABOVE, WHO WILL BE RESPONSIBLE FOR THIS PROJECT.

3) THE INSTALLING CONTRACTOR SHALL BE AN EXPERIENCED FIRM REGULARLY ENGAGED IN THE INSTALLATION OF CLEAN AGENT, OR SIMILAR, FIRE SUPPRESSION SYSTEMS IN STRICT ACCORDANCE WITH ALL APPLICABLE STANDARDS.

4) THE INSTALLING CONTRACTOR MUST HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN THE DESIGN, INSTALLATION AND TESTING OF CLEAN AGENT, OR SIMILAR, FIRE SUPPRESSION SYSTEMS. A LIST OF SYSTEMS OF A SIMILAR NATURE AND SCOPE SHALL BE PROVIDED ON REQUEST.

5) THE INSTALLING CONTRACTOR SHALL SHOW EVIDENCE THAT HIS COMPANY CARRIES A MINIMUM $2,000,000.00 LIABILITY AND COMPLETED OPERATIONS INSURANCE POLICY. THESE LIMITS SHALL SUPERSEDE LIMITS REQUIRED IN THE GENERAL CONDITIONS OF THE SPECIFICATIONS.

6) THE INSTALLING CONTRACTOR SHALL MAINTAIN, OR HAVE ACCESS TO, A CLEAN AGENT RECHARGING STATION. THE INSTALLING CONTRACTOR SHALL PROVIDE PROOF OF HIS ABILITY TO RECHARGE THE LARGEST CLEAN AGENT SYSTEM WITHIN 24 HOURS AFTER A DISCHARGE. INCLUDE THE AMOUNT OF BULK AGENT STORAGE AVAILABLE.

7) THE INSTALLING CONTRACTOR SHALL BE AN AUTHORIZED STOCKING DISTRIBUTOR OF THE CLEAN AGENT SYSTEM EQUIPMENT SO THAT IMMEDIATE REPLACEMENT PARTS ARE AVAILABLE FROM INVENTORY.

8) THE INSTALLING CONTRACTOR SHALL SHOW PROOF OF EMERGENCY SERVICE AVAILABLE ON A TWENTY-FOUR HOUR, SEVEN-DAY-A-WEEK BASIS.

C. SUBMITTALS

1) THE INSTALLING CONTRACTOR SHALL SUBMIT THE FOLLOWING DESIGN INFORMATION AND DRAWINGS FOR APPROVAL PRIOR TO STARTING WORK ON THIS PROJECT:

A) FIELD INSTALLATION LAYOUT DRAWINGS HAVING A SCALE OF NOT LESS THAN 1/8"=1'-0" (1:100M) DETAILING THE LOCATION OF ALL AGENT STORAGE TANKS, PIPE RUNS INCLUDING PIPE SIZES AND LENGTHS, CONTROL PANEL(S), DETECTORS, MANUAL PULL STATIONS, ABORT STATIONS, AUDIBLE AND VISUAL ALARMS, ETC.

B) AUXILIARY DETAILS AND INFORMATION SUCH AS MAINTENANCE PANELS, DOOR HOLDERS, SPECIAL SEALING REQUIREMENTS AND EQUIPMENT SHUTDOWNS.

C) SEPARATE LAYOUTS, OR DRAWINGS, SHALL BE PROVIDED FOR EACH LEVEL, (I.E.; ROOM, UNDERFLOOR, AND ABOVE CEILING) AND FOR MECHANICAL AND ELECTRICAL WORK.

D) A SEPARATE LAYOUT OR DRAWING, SHALL SHOW ISOMETRIC DETAILS OF AGENT STORAGE CONTAINERS, MOUNTING DETAILS AND PROPOSED PIPE RUNS AND SIZES.

E) ELECTRICAL LAYOUT DRAWINGS SHALL SHOW THE LOCATION OF ALL DEVICES AND INCLUDE POINT-TO-POINT CONDUIT RUNS AND A DESCRIPTION OF THE METHOD(S) USED FOR DETECTOR MOUNTING.

F) PROVIDE AN INTERNAL CONTROL PANEL WIRING DIAGRAM WHICH SHALL INCLUDE POWER SUPPLY REQUIREMENTS AND FIELD WIRING TERMINATION POINTS.

G) GRAPHIC ANNUNCIATOR WIRING SCHEMATICS AND DIMENSIONED DISPLAY PANEL ILLUSTRATION SHALL BE PROVIDED. (OPTIONAL DEVICE)

H) COMPLETE HYDRAULIC FLOW CALCULATIONS, FROM FIKE'S UL/FM APPROVED FLOW CALCULATION PROGRAM, SHALL BE PROVIDED FOR ALL ENGINEERED CLEAN AGENT SYSTEMS. THE INDIVIDUAL SECTIONS OF PIPE TO BE USED, AS SHOWN ON THE ISOMETRICS, MUST BE IDENTIFIED AND INCLUDED IN THE CALCULATION. TOTAL AGENT DISCHARGE TIME MUST BE SHOWN AND DETAILED BY ZONE.

I) PROVIDE CALCULATIONS FOR THE BATTERY STAND-BY POWER SUPPLY TAKING INTO CONSIDERATION THE POWER REQUIREMENTS OF ALL ALARMS, INITIATING DEVICES AND AUXILIARY COMPONENTS UNDER FULL LOAD CONDITIONS.

J) A COMPLETE SEQUENCE OF OPERATION SHALL BE SUBMITTED DETAILING ALL ALARM DEVICES,SHUTDOWN FUNCTIONS, REMOTE SIGNALING, DAMPER OPERATION, TIME DELAY AND AGENT DISCHARGE FOR EACH ZONE OR SYSTEM.

2) SUBMIT DRAWINGS, CALCULATIONS AND SYSTEM COMPONENT DATA SHEETS FOR APPROVAL TO THE LOCAL FIRE PREVENTION AGENCY, OWNERS INSURANCE UNDERWRITER, AND ALL OTHER AUTHORITIES HAVING JURISDICTION BEFORE STARTING INSTALLATION. SUBMIT APPROVED PLANS TO THE ARCHITECT/ENGINEER FOR RECORD.

AGENT REQUIREMENTS

1. SYSTEM DESCRIPTION AND OPERATION

A. THE SYSTEM SHALL BE A CLEAN AGENT FIRE SUPPRESSION SYSTEM UTILIZING FK-5-1-12 AS THE FIRE EXTINGUISHING AGENT SUPPLIED BY:

SUPPRESSION SYSTEMS INC.
155 NESTLE WAY, SUITE 104
BREINIGSVILLE, PA 18031
(800)-360-0687
CONTACT: JERRY KROUSE

B. THE CLEAN AGENT FIRE SUPPRESSION SYSTEM SHALL PROVIDE A MINIMUM DESIGN CONCENTRATION OF 4.5%, BY VOLUME, IN ALL AREAS AND/OR PROTECTED SPACES, AT THE MINIMUM ANTICIPATED TEMPERATURE WITHIN THE PROTECTED AREA. PER NFPA 2001, THE SYSTEM DESIGN SHALL NOT EXCEED A MAXIMUM EXPOSURE LIMIT CONCENTRATION LEVEL OF 10%, BY VOLUME, UNLESS PROVISIONS FOR ROOM EVACUATION, BEFORE AGENT RELEASE, ARE PROVIDED. ALL PERSONNEL SHOULD BE ABLE TO LEAVE THE PROTECTED SPACE PRIOR TO THE DISCHARGE OR AT LEAST WITHIN 5 MINUTES OF THE COMMENCEMENT OF DISCHARGE.

C. THE SYSTEM SHALL BE COMPLETE IN ALL WAYS. IT SHALL INCLUDE ALL MECHANICAL AND ELECTRICAL INSTALLATION, ALL DETECTION AND CONTROL EQUIPMENT, AGENT STORAGE CONTAINERS, SUPPRESSION AGENT, SYSTEM ACTUATION EQUIPMENT, DISCHARGE NOZZLES, PIPE AND FITTINGS, MANUAL RELEASE AND ABORT STATIONS, AUDIBLE AND VISUAL ALARM DEVICES, AUXILIARY DEVICES AND CONTROLS, SHUTDOWNS, ALARM INTERFACE, CAUTION/ ADVISORY SIGNS, FUNCTIONAL CHECKOUT AND TESTING, TRAINING AND ALL OTHER OPERATIONS NECESSARY FOR A FUNCTIONAL U.L. LISTED AND/OR F.M. APPROVED CLEAN AGENT FIRE SUPPRESSION SYSTEM.

D. PROVIDE TWO (2) INSPECTIONS DURING THE FIRST YEAR OF SERVICE. INSPECTIONS SHALL BE MADE AT 6 MONTH INTERVALS COMMENCING WHEN THE SYSTEM IS FIRST PLACED INTO NORMAL SERVICE.

E. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING AND SECURING THE PROTECTED SPACES AGAINST AGENT LOSS AND/OR LEAKAGE DURING THE 1 MINUTE "HOLD" PERIOD.

F. THE SYSTEM(S) SHALL BE ACTUATED BY A COMBINATION OF IONIZATION AND/OR PHOTOELECTRIC DETECTORS INSTALLED IN ACCORDANCE WITH THE GUIDELINES STATED IN NFPA 72.

G. DETECTORS SHALL BE WIRED IN SEQUENTIAL DETECTION METHOD OF OPERATION, STANDARD CROSS-ZONED DETECTION, OR SINGLE DETECTOR RELEASE. NO OTHER DETECTION / WIRING ARRANGEMENTS WILL BE ACCEPTABLE.

H. AUTOMATIC OPERATION OF EACH PROTECTED AREA SHALL BE AS FOLLOWS:

1) ACTUATION OF ONE (1) DETECTOR, WITHIN THE SYSTEM, SHALL:

A) ILLUMINATE THE "ALARM" LAMP ON THE CONTROL PANEL FACE.

B) ENERGIZE AN ALARM BELL AND/OR AN OPTIONAL VISUAL INDICATOR.

C) TRANSFER SETS OF 5 AMP RATED AUXILIARY CONTACTS WHICH CAN PERFORM AUXILIARY SYSTEM FUNCTIONS SUCH AS:

- OPERATE DOOR HOLDER/CLOSURES ON ACCESS DOORS.
- TRANSMIT A SIGNAL TO A FIRE ALARM SYSTEM.
- SHUTDOWN HVAC EQUIPMENT.

D) LIGHT AN INDIVIDUAL LAMP ON AN OPTIONAL GRAPHIC ANNUNCIATOR.

2) ACTUATION OF A 2ND DETECTOR, WITHIN THE SYSTEM, SHALL:

A) ILLUMINATE THE "PRE-DISCHARGE" LAMP ON THE CONTROL PANEL FACE.

B) ENERGIZE A PRE-DISCHARGE HORN OR HORN/STROBE DEVICE.

C) SHUT DOWN THE HVAC SYSTEM AND/OR CLOSE DAMPERS.

D) START TIME-DELAY SEQUENCE (NOT TO EXCEED 60 SECONDS).

E) SYSTEM ABORT SEQUENCE IS ENABLED AT THIS TIME.

F) LIGHT AN INDIVIDUAL LAMP ON AN OPTIONAL GRAPHIC ANNUNCIATOR.

3) AFTER COMPLETION OF THE TIME-DELAY SEQUENCE, THE CLEAN AGENT FIRE SUPPRESSION SYSTEM SHALL ACTIVATE AND THE FOLLOWING SHALL OCCUR:

A) ILLUMINATE A "RELEASE" LAMP ON THE CONTROL PANEL FACE.

B) SHUTDOWN OF ALL POWER TO HIGH-VOLTAGE EQUIPMENT

C) ENERGIZE A VISUAL INDICATOR(S) OUTSIDE THE HAZARD IN WHICH THE DISCHARGE OCCURRED.

D) ENERGIZE A "SYSTEM RELEASE" AUDIBLE DEVICE. (OPTIONAL)

4) THE SYSTEM SHALL BE CAPABLE OF BEING ACTUATED BY MANUAL DISCHARGE DEVICES LOCATED AT EACH HAZARD EXIT. OPERATION OF A MANUAL DEVICE SHALL DUPLICATE THE SEQUENCE DESCRIPTION ABOVE EXCEPT THAT THE TIME DELAY AND ABORT FUNCTIONS SHALL BE BYPASSED. THE MANUAL DISCHARGE STATION SHALL BE OF THE ELECTRICAL ACTUATION TYPE AND SHALL BE SUPERVISED AT THE MAIN CONTROL PANEL.

5) THE SYSTEM SHALL BE CAPABLE OF PROVIDING A "PRE-ALARM" FEATURE THAT CAN GIVE ADVANCED WARNING OF A POSSIBLE ALARM CONDITION.

2. MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS

THE CLEAN AGENT FIRE SUPPRESSION SYSTEM MATERIALS AND EQUIPMENT SHALL BE STANDARD PRODUCTS OF THE SUPPLIER'S LATEST DESIGN AND SUITABLE TO PERFORM THE FUNCTIONS INTENDED. WHEN ONE OR MORE PIECES OF EQUIPMENT MUST PERFORM THE SAME FUNCTION(S), THEY SHALL BE DUPLICATES PRODUCED BY ONE MANUFACTURER.

1) ALL DEVICES AND EQUIPMENT SHALL BE U.L. LISTED AND/OR F.M. APPROVED.

B. AGENT STORAGE AND DISTRIBUTION

EACH SYSTEM SHALL HAVE ITS OWN SUPPLY OF CLEAN AGENT.

1) THE SYSTEM DESIGN CAN BE MODULAR, CENTRAL STORAGE, OR A COMBINATION OF BOTH DESIGN CRITERIA UTILIZING A FAST ACTING RUPTURE DISC VALVE. THE VALVE SHALL CONTAIN A SCORED, NON-FRAGMENTING, RUPTURE DISC TO PROVIDE IMMEDIATE TOTAL DISCHARGE OF THE SUPPRESSION AGENT.

2) SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES.

3) EACH SUPPLY SHALL BE LOCATED WITHIN THE HAZARD AREA, OR AS NEAR AS POSSIBLE, TO REDUCE THE AMOUNT OF PIPE AND FITTINGS REQUIRED TO INSTALL THE SYSTEM.

4) THE CLEAN AGENT SHALL BE STORED IN FIKE P/N 70-XXX SERIES AGENT STORAGE CONTAINERS. CONTAINERS SHALL BE SUPER-PRESSURIZED, WITH DRY NITROGEN, TO AN OPERATING PRESSURE OF 360 PSI @ 70 F (25 BAR @ 21 C). CONTAINERS SHALL BE OF HIGH-STRENGTH ALLOY STEEL. CONSTRUCTION AND CONFORM TO NFPA 2001.

5) CONTAINERS SHALL BE ACTUATED BY THE FOLLOWING METHODS:

A) SINGLE CONTAINER APPLICATIONS (ELECTRIC) – BY AN IMPULSE VALVE OPERATOR (IVO) WIRED THROUGH A FIKE P/N 10-2748 IMPULSE RELEASING MODULE (IRM). THIS METHOD ALLOWS MECHANICAL RELEASE.

B) MULTIPLE CONTAINER APPLICATIONS (ELECTRIC / PNEUMATIC) – THE 1ST CONTAINER IS OPERATED BY AN IMPULSE VALVE OPERATOR (IVO) WIRED THROUGH A FIKE P/N 10-2748 IMPULSE RELEASING MODULE (IRM). 6 ADDITIONAL CONTAINERS EQUIPPED WITH IMPULSE VALVE PNEUMATIC OPERATOR(S) (VPO) CAN BE OPERATED BY THE PRESSURE FROM THE 1ST CONTAINER. THIS METHOD ALLOWS MECHANICAL RELEASE.

C) MULTIPLE CONTAINER APPLICATIONS (ELECTRIC) – BY IMPULSE VALVE OPERATORS (IVO) WIRED THROUGH A FIKE P/N 10-2748 IMPULSE RELEASING MODULES (IRM), LOCATED AT EACH AGENT STORAGE CONTAINER. (MAXIMUM 6 CONTAINER SYSTEM). THIS METHOD DOES NOT ALLOW MECHANICAL RELEASE.

6) EACH CONTAINER SHALL HAVE A PRESSURE GAUGE AND LOW PRESSURE SWITCH TO PROVIDE VISUAL AND ELECTRICAL SUPERVISION OF THE CONTAINER PRESSURE. THE LOW PRESSURE SWITCH SHALL BE WIRED TO THE CONTROL PANEL TO PROVIDE AN AUDIBLE AND VISUAL "TROUBLE" ALARM IN THE EVENT THE CONTAINER PRESSURE DROPS BELOW 288 PSI (19 BAR). THE PRESSURE GAUGE SHALL BE COLOR CODED TO PROVIDE AN EASY, VISUAL INDICATION OF CONTAINER PRESSURE.

7) EACH CONTAINER SHALL HAVE A PRESSURE RELIEF PROVISION THAT AUTOMATICALLY OPERATES WHEN THE INTERNAL TEMPERATURE EXCEED 150 F (66 C).

8) ENGINEERED DISCHARGE NOZZLES SHALL BE PROVIDED, WITHIN THE MANUFACTURER'S GUIDELINES, TO DISTRIBUTE THE SUPPRESSION AGENT THROUGHOUT THE PROTECTED SPACES. THE NOZZLES SHALL BE FIKE P/N 85-XXX DESIGNED TO PROVIDE PROPER AGENT QUANTITY AND DISTRIBUTION.

A) NOZZLES SHALL BE AVAILABLE IN NPT SIZES ¾" – 2.0" (8MM– 50MM). EACH SIZE SHALL BE AVAILABLE IN 180 AND 360 DISTRIBUTION PATTERNS.

9) DISTRIBUTION PIPING, AND FITTINGS, SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS, NFPA 2001 AND APPROVED PIPING STANDARDS AND GUIDELINES. ALL DISTRIBUTION PIPING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS USING GOOD, ACCEPTED PRACTICES AND QUALITY PROCEDURES. ALL PIPING SHALL BE ADEQUATELY SUPPORTED AND ANCHORED AT ALL DIRECTIONAL CHANGES AND NOZZLE LOCATIONS.

A) ALL PIPING SHALL BE REAMED, BLOWN CLEAR AND SWABBED WITH SUITABLE SOLVENTS TO REMOVE BURRS, MILL VARNISH AND CUTTING OILS BEFORE ASSEMBLY.

B) ALL PIPE THREADS SHALL BE SEALED WITH TEFLON TAPE PIPE SEALANT APPLIED TO THE MALE THREAD ONLY.

ELECTRICAL REQUIREMENTS

1. CONTROL PANEL

A. THE CONTROL PANEL SHALL BE A SHP PRO CONVENTIONAL CONTROL PANEL, P/N 10-063-M-C-P, MANUFACTURED BY FIKE CORPORATION, BLUE SPRINGS, MO.

1) THE SHP PRO CONTROL SYSTEM, AND ITS COMPONENTS, SHALL BE UL LISTED AND FM APPROVED FOR RELEASING SERVICE AND BE SUITABLE FOR DELUGE/PRE-ACTION SPRINKLER SERVICE.

2) THE SHP PRO CONTROL SYSTEM SHALL PERFORM ALL FUNCTIONS NECESSARY TO OPERATE THE SYSTEM DETECTION, ACTUATION AND AUXILIARY FUNCTIONS, AS OUTLINED.

3) THE SHP PRO CONTROL SYSTEM SHALL BE CAPABLE OF PROVIDING 7AH OR 40AH BATTERY STANDBY POWER SUPPLIES.

4) THE SHP PRO CONTROL SYSTEM SHALL BE MICROPROCESSOR BASED WITH HARDWARE AND SOFTWARE INTEGRATION DESIGNED TO GUARANTEE RELIABILITY.

5) THE SHP PRO CONTROL SYSTEM SHALL SUPPORT CROSS ZONED, SEQUENTIAL, SINGLE DETECTOR RELEASE AND MANUAL RELEASE DETECTION/ACTUATION METHODS.

6) THE SHP PRO CONTROL SYSTEM SHALL PROVIDE THE FOLLOWING CAPABILITIES AND FUNCTIONS:

A) THREE (3) CLASS B (STYLE Y) NOTIFICATION APPLIANCE CIRCUITS RATED FOR 2.0 AMPS @ 24 VDC.

B) UP TO TWO (2) STYLE B INITIATING DEVICE CIRCUITS CAPABLE OF SEQUENTIAL ALARM, CROSS-ZONE, OR SINGLE DETECTOR RELEASE OPERATION WITH AN OVERALL SYSTEM CAPACITY OF 50 DETECTORS MAXIMUM.

C) THREE (3) STYLE B INITIATING DEVICE CIRCUITS CAPABLE OF MONITORING CLOSED CONTACT DEVICES.

D) OPTIONAL CLASS A MODULE THAT CONVERTS ALL FIVE INITIATING DEVICE CIRCUITS TO STYLE D WIRING AND OPERATION.

E) OPTIONAL CLASS A MODULE THAT CONVERTS ALL FIVE OUTPUT CIRCUITS TO STYLE Z (3 NAC, 2 RELEASING)

F) EIGHT (10) STATUS LEDS PLUS ALPHA-NUMERIC DISPLAY FOR TROUBLESHOOTING: AC NORMAL; ALARM; PRE-DISCHARGE; RELEASE; SUPERVISORY; TROUBLE; PANEL SILENCED; ABORT; RELEASE DISABLED; AND GROUND FAULT.

G) PROGRAMMABLE PRE-DISCHARGE AND DISCHARGE TIMERS

H) RESETTABLE AND CONTINUOUS AUXILIARY OUTPUT POWER

I) FIVE (5) OPTIONAL ABORT TYPES

J) INTELLIGENT TRANSISTOR PROTECTION TO PREVENT NOISE SPIKES AND MICROPROCESSOR FAILURE FROM INADVERTENTLY ACTIVATING RELEASE OUTPUTS

K) A DEDICATED DISARM SWITCH FOR RELEASE OUTPUTS

L) DEDICATED ALARM AND TROUBLE CONTACTS PROGRAMMABLE FOR ALARM, TROUBLE, PRE-DISCHARGE, DISCHARGE, ABORT, SUPERVISORY OR WATER FLOW FUNCTIONS, DEPENDING ON PANEL CONFIGURATION.

M) TWO (3) FORM 'C' RELAYS, RATED AT 2 AMPS, ARE PROVIDED ON THE SHP PRO PANEL BOARD. INSTALLATION OF UP TO TWO (2) OPTIONAL CRM4 RELAY MODULE (P/N 10-2204) WILL PROVIDE UP TO EIGHT (8) ADDITIONAL 2 AMP RELAYS.

N) MULTIPLE INPUT POWER SOURCE – 120 VAC OR 240 VAC

O) 4.0 AMP @ 24 VDC POWER SUPPLY TO OPERATE HIGH CURRENT DRAW HORNS AND STROBES.

P) AVAILABLE IN EITHER RED OR GRAY FINISH

2. DETECTORS

THE DETECTORS SHALL BE SPACED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THE GUIDELINES OF NFPA NO. 72 – CURRENT EDITION.

A. THE PHOTOELECTRIC DETECTOR SHALL BE A FIKE P/N 63-1024 *

* ADDITIONAL DETECTORS ARE AVAILABLE FROM FIKE.

3. DETECTOR BASES

THE DETECTOR BASES SHALL BE SELECTED ACCORDING TO THEIR OPERATIONAL CHARACTERISTICS AND SIZE OF BASE.

A. 430 OHM BASES ARE USED TO PROVIDE SEQUENTIAL OR CROSS ZONE DETECTION ON THE SHP PRO INITIATING CIRCUITS. THE BASES SHALL BE FIKE P/N 67-1034 (6"/15MM) BASE, OR P/N 67-1036 (4"/10MM) BASE.*

B. 220 OHM BASES ARE USED TO PROVIDE CROSS ZONE OR SINGLE DETECTOR RELEASE DETECTION ON THE SHP PRO INITIATING CIRCUITS. THE BASES SHALL BE FIKE P/N 67-1035 (6"/15MM) BASE, OR P/N 67-1037 (4"/10MM) BASE.*

C. WHEN USING THE SHP PRO IN CONJUNCTION WITH A GRAPHIC ANNUNCIATOR PANEL, THE FOLLOWING OLD STYLE BASES MUST BE USED.

1) FIKE P/N 67-1034 (6"/15 CM) 430 OHM BASE.

2) FIKE P/N 67-1036 (4"/10 CM) 430 OHM BASE.

3) FIKE P/N 67-1035 (6"/15 CM) 220 OHM BASE.

4) FIKE P/N 67-1037 (4"/10 CM) 220 OHM BASE.

* ADDITIONAL BASES ARE AVAILABLE FROM FIKE CORPORATION.

4. MANUAL RELEASE (ELECTRIC)

THE ELECTRIC MANUAL RELEASE SWITCH SHALL BE A DUAL ACTION DEVICE WHICH PROVIDES A MEANS OF MANUALLY DISCHARGING THE CLEAN AGENT FIRE SUPPRESSION SYSTEM WHEN USED IN CONJUNCTION WITH THE FIKE SHP PRO CONTROL SYSTEM.

A. THE MANUAL RELEASE SWITCH SHALL BE A FIKE P/N 10-1638 OR A MANUAL PULL STATION, P/N 02-3710.

B. THE MANUAL RELEASE SWITCH OR MANUAL PULL STATION SHALL BE A DUAL ACTION DEVICE REQUIRING TWO DISTINCT OPERATIONS TO INITIATE A SYSTEM ACTUATION.

C. MANUAL ACTUATION SHALL BYPASS THE TIME DELAY AND ABORT FUNCTIONS, SHALL CAUSE THE SYSTEM TO DISCHARGE AND SHALL CAUSE ALL RELEASE AND SHUTDOWN DEVICES TO OPERATE IN THE SAME MANNER AS IF THE SYSTEM HAD OPERATED AUTOMATICALLY.

D. A MANUAL RELEASE OR MANUAL PULL SWITCH SHALL BE LOCATED AT EACH EXIT FROM THE PROTECTED HAZARD AND SHALL HAVE AN ADVISORY SIGN, FIKE P/N 02-10312, PROVIDED AT EACH LOCATION.

E. THE MANUAL RELEASE OR MANUAL PULL STATION SHALL BE CONNECTED TO A FRCM WHICH IS PROGRAMMED FOR THE INTENDED FUNCTION.

5. MANUAL RELEASE (MECHANICAL)

MECHANICAL MANUAL RELEASE SHALL BE MADE AVAILABLE IN THE EVENT ALL BATTERY BACK-UP AND COMMERCIAL POWER IS LOST. THE IMPULSE VALVE OPERATOR (IVO) IS EQUIPPED WITH A MANUAL STRIKE BUTTON FOR MECHANICAL MANUAL RELEASE FOR ACTUATION METHODS A AND B IN PARAGRAPH 5 ON PAGE 4. CONSIDERATION SHOULD BE GIVEN FOR CONVENIENCE OF OPERATION AND EGRESS FROM THE HAZARD AREA(S).

6. ABORT STATION (OPTIONAL)

THE OPTIONAL ABORT STATION SHALL BE THE "DEAD MAN" TYPE AND SHALL BE LOCATED NEXT TO EACH MANUAL SWITCH.

A. "LOCKING" OR "KEYED" ABORT STATIONS SHALL NOT BE PERMITTED.

B. THE ABORT STATION SHALL BE A FIKE P/N 10-1639.

C. THE ABORT STATION SHALL BE SUPERVISED AND SHALL INDICATE A TROUBLE CONDITION AT THE SHP PRO CONTROL PANEL, IF DEPRESSED, AND NO ALARM CONDITION EXISTS.

D. THE (OPTIONAL) ABORT STATION SHALL BE LOCATED ADJACENT TO EACH MANUAL STATION AND CAN BE FURNISHED IN COMBINATION WITH A MANUAL RELEASE SWITCH OR IN COMBINATION WITH A MANUAL RELEASE SWITCH AND (OPTIONAL) DIGITAL COUNTDOWN TIMER (FIKE P/N 20-046).

E. THE ABORT STATION SHALL BE CONNECTED TO A FRCM WHICH IS PROGRAMMED FOR THE INTENDED FUNCTION.

7. AUDIBLE AND VISUAL ALARMS

ALARM AUDIBLE AND VISUAL SIGNAL DEVICES SHALL OPERATE FROM THE SHP PRO CONTROL PANEL.

A. THE HORN/STROBE DEVICE SHALL BE FIKE P/N 20-123-48, OR EQUAL IN QUALITY, PERFORMANCE AND FEATURES. AN 'AGENT' LABEL SHALL BE ATTACHED TO THE STROBE LENS WHEN REQUIRED.

B. THE VISUAL ALARM UNIT SHALL BE A FIKE P/N 20-123-01 VERTICAL STROBE DEVICE, OR EQUAL IN QUALITY, PERFORMANCE AND FEATURES. AN 'AGENT' LABEL SHALL BE ATTACHED TO THE STROBE LENS WHEN REQUIRED.

C. A STROBE DEVICE SHALL BE PLACED OUTSIDE, AND ABOVE, EACH EXIT DOOR FROM THE PROTECTED SPACE. PROVIDE AN ADVISORY SIGN AT EACH LIGHT LOCATION.

8. CAUTION AND ADVISORY SIGNS

PROVIDE SIGNS, AS REQUIRED, TO COMPLY WITH NFPA 2001 AND THE RECOMMENDATIONS OF THE EQUIPMENT SUPPLIER:

A. ENTRANCE SIGN: ONE (1) REQUIRED AT EACH ENTRANCE INTO A PROTECTED SPACE. (FIKE P/N 02-10139)

B. MANUAL DISCHARGE SIGN: ONE (1) REQUIRED AT EACH MANUAL DISCHARGE STATION. (FIKE P/N 02-10317)

C. FLASHING LIGHT SIGN: ONE (1) REQUIRED AT EACH FLASHING LIGHT OVER EACH EXIT FROM A PROTECTED SPACE.

9. SYSTEM AND CONTROL WIRING

ALL SYSTEM WIRING SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

A. ALL WIRING SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT), OR CONDUIT, AND MUST BE INSTALLED AND KEPT SEPARATE FROM ALL OTHER BUILDING WIRING.

B. ALL SYSTEM COMPONENTS SHALL BE SECURELY SUPPORTED INDEPENDENT OF THE WIRING. RUNS OF CONDUIT AND WIRING SHALL BE STRAIGHT, NEATLY ARRANGED, PROPERLY SUPPORTED, INSTALLED PARALLEL AND PERPENDICULAR TO WALLS AND PARTITIONS.

C. THE SIZES OF THE CONDUCTORS SHALL BE THOSE SPECIFIED BY THE MANUFACTURER. COLOR CODED WIRE SHALL BE USED. ALL WIRES SHALL BE TAGGED AT ALL JUNCTION POINTS AND SHALL BE FREE FROM SHORTS, EARTH CONNECTIONS (UNLESS SO NOTED ON THE SYSTEM DRAWINGS), AND CROSSES BETWEEN CONDUCTORS. FINAL TERMINATIONS BETWEEN THE SHP PRO CONTROL PANEL AND THE SYSTEM FIELD WIRING SHALL BE MADE UNDER THE DIRECT SUPERVISION OF A FACTORY TRAINED REPRESENTATIVE.

D. ALL WIRING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS, IN A NEAT AND WORKMANLIKE MANNER, TO CONFORM TO THE NATIONAL ELECTRICAL CODE, ARTICLE 725, AND ARTICLE 760, EXCEPT AS OTHERWISE PERMITTED FOR LIMITED ENERGY CIRCUITS, AS DESCRIBED IN NFPA 72 –1993 EDITION. WIRING INSTALLATION SHALL MEET ALL LOCAL, STATE, PROVINCE AND/OR COUNTRY CODES.

E. THE COMPLETE SYSTEM ELECTRICAL INSTALLATION, AND ALL AUXILIARY COMPONENTS, SHALL BE CONNECTED TO EARTH GROUND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

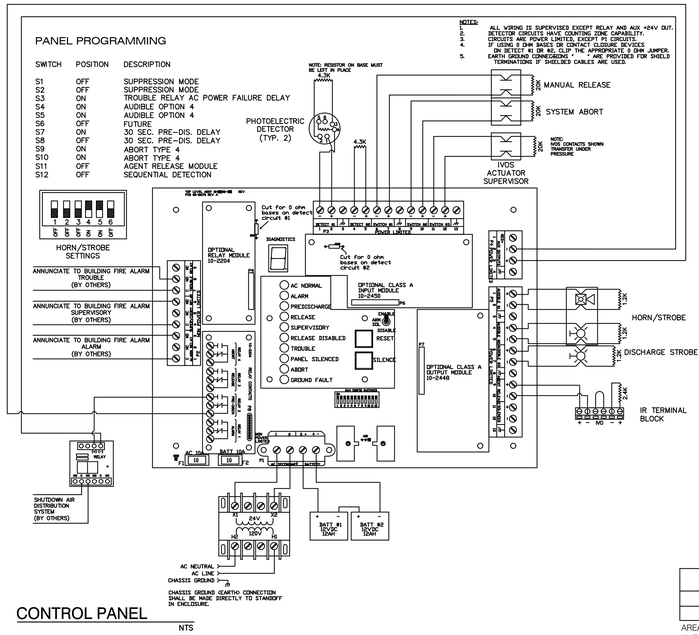
10. SYSTEM INSPECTION AND CHECKOUT

AFTER THE SYSTEM INSTALLATION HAS BEEN COMPLETED, THE ENTIRE SYSTEM SHALL BE CHECKED OUT, INSPECTED AND FUNCTIONALLY TESTED BY QUALIFIED, TRAINED PERSONNEL, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES AND NFPA STANDARDS.

A. ALL CONTAINERS AND DISTRIBUTION PIPING SHALL BE CHECKED FOR PROPER MOUNTING AND INSTALLATION.

B. ALL ELECTRICAL WIRING SHALL BE TESTED FOR PROPER CONNECTION, CONTINUITY AND RESISTANCE TO EARTH.

C. THE COMPLETE SYSTEM SHALL BE FUNCTIONALLY TESTED, IN THE PRESENCE OF THE OWNER OR HIS REPRESEN



CONTROL PANEL

NTS

SEQUENCE OF OPERATIONS

ALARM: ACTIVATION OF ANY ONE SMOKE DETECTOR SHALL CAUSE:
- THE PIEZO ON THE PANEL TO "CHIRP".
- AN ALARM CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ACTIVATION OF HORN/STROBE UNIT(S) (SLOW).
- ANNUNCIATION TO THE BUILDING FIRE ALARM.

PRE-DISCHARGE: ACTIVATION OF ANY TWO SMOKE DETECTORS SHALL CAUSE:
- THE PIEZO ON THE PANEL TO "CHIRP".
- A PRE-DISCHARGE CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ACTIVATION OF HORN/STROBE UNIT(S) (FAST).
- INITIATION OF 30 SECOND TIME DELAY.
- THE SHUTDOWN OF THE AIR DISTRIBUTION SYSTEM.

RELEASE: 30 SECOND TIME DELAY EXPIRATION SHALL CAUSE:
- THE PIEZO ON THE PANEL TO "CHIRP".
- A RELEASE CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ACTIVATION OF HORN/STROBE UNIT(S) (STEADY) AND DISCHARGE STROBE(S).
- FIRE SUPPRESSION AGENT TO BE DISCHARGED.

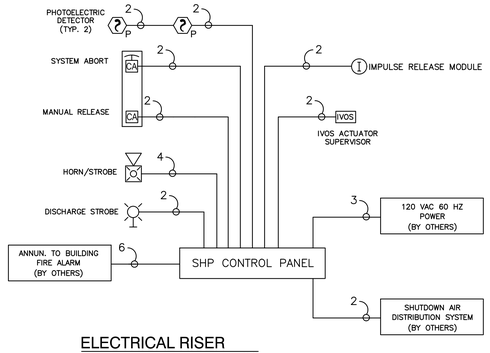
ACTIVATION OF A MANUAL RELEASE STATION SHALL CAUSE:
- A RELEASE CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ACTIVATION OF ALL HORN/STROBE UNITS) (STEADY) AND DISCHARGE STROBE(S).
- FIRE SUPPRESSION AGENT TO BE DISCHARGED IMMEDIATELY.
- ALL SYSTEM FUNCTIONS TO INITIATE.
- AN OVERRIDE OF THE SYSTEM ABORT SWITCH.

ACTIVATION OF A SYSTEM ABORT SWITCH SHALL CAUSE (ABORT TYPE 4)*
- AN ABORT CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- A TROUBLE SIGNAL SENT TO THE BUILDING FIRE ALARM.
- A RESET OF ANY TIME DELAY WITHIN THE SYSTEM. UPON RELEASE THE SYSTEM WILL COUNTDOWN THE PRE-SET TIME DELAY AND AGENT RELEASE WILL OCCUR.

*THIS IS A MOMENTARY SWITCH WHICH WHEN ACTIVATED MUST BE HELD IN FOR APPROXIMATELY ONE SECOND TO ENGAGE.

TROUBLE CONDITION SHALL CAUSE:
- A TROUBLE CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ANNUNCIATION TO THE BUILDING FIRE ALARM.

SUPERVISORY CONDITION SHALL CAUSE:
- A SUPERVISORY CONDITION DISPLAYED AT THE FIRE SUPPRESSION PANEL.
- ANNUNCIATION TO THE BUILDING FIRE ALARM.



ELECTRICAL RISER

NTS

NOTE: ALL WIRING SHALL BE THHN #14 AWG STRANDED UNLESS OTHERWISE NOTED. SEE ELECTRICAL NOTES ON SHEET 2 FOR POWER INPUT WIRING.

FK-5-1-12 DESIGN DATA CHART										
ROOM NAME	ZONE	STORAGE CYLINDER	PROTECTED HEIGHT	AREA (SQ. FT.)	VOLUME (CU. FT.)	TEMP.	CONCENTRATION (AMDC)	AGENT REQUIRED	ELEVATION CORRECTION	AGENT SUPPLIED	CONCENTRATION (FDC)
IDF ROOM	1	A	12'-0"	137.3	1647.7	70°	4.5%	67.6#	N/A	70#	4.68%

AREA VOLUME X 4.5% (.0410 PER NFPA 2001) = AGENT REQUIRED
AMDC = ADJUSTED MINIMUM DESIGN CONCENTRATION
FDC = FINAL DESIGN CONCENTRATION

NOTE: FOR LAYOUT PURPOSES ONLY, NOT FOR FABRICATION. ALL REDUCTIONS SHALL BE MADE USING REDUCERS OR REDUCING FITTINGS – BUSHINGS ARE NOT PERMITTED.

	SPACING PER DETECTOR			
MINUTES PER AIR CHANGE	AIR CHANGES PER HOUR	FT²	DETECTOR TO DETECTOR	DETECTOR TO WALL	DETECTOR TO CORNER
1	60	125	11'-2"	5'-7"	7'-10"
2	30	250	15'-10"	7'-11"	11'-1"
3	20	375	19'-4"	9'-8"	13'-6"
4	15	500	22'-4"	11'-2"	15'-7"
5	12	625	25'-0"	12'-6"	17'-6"
6	10	750	27'-4"	13'-8"	19'-2"
7	8.6	875	29'-7"	14'-9"	20'-8"
8	7.5	900	30'-0"	15'-0"	21'-0"
9	6.7	900	30'-0"	15'-0"	21'-0"
10	6	900	30'-0"	15'-0"	21'-0"

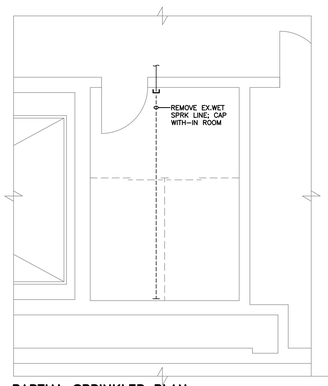
NOTES:
1. ALL POINTS ON THE CEILING SHALL HAVE A SMOKE DETECTOR WITHIN A DISTANCE EQUAL TO OR LESS THAN 0.7 TIMES THE NOMINAL SPACING.
2. ALL SMOKE DETECTORS TO BE A MINIMUM OF 3'-0" FROM DIFFUSERS AND REGISTERS.

SMOKE DETECTOR SPACING CHART

NTS

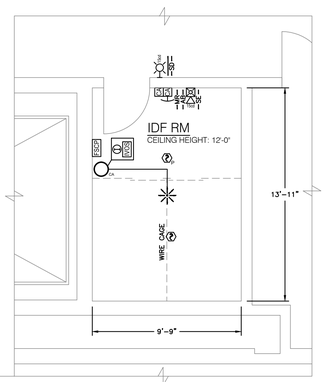
FK-5-1-12 PIPING NOTE:

ALL FK-5-1-12 NOZZLES MUST BE DIRECTED DOWNWARD.



PARTIAL SPRINKLER PLAN

SCALE: ¼" = 1'-0"



SYSTEM LAYOUT

SCALE: ¼" = 1'-0"

NOTE: COORDINATE LOCATION OF TANK WITH OTHER EQUIPMENT

ENCLOSURE HEIGHT	FK-5-1-12	
1'-4" - 16'-0"	180°	44'-11"
1'-4" - 16'-0"	360°	28'-5"
<1'-4"	180°	22'-5"
<1'-4"	360°	14'-2"

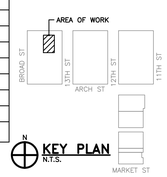
NOZZLE THROW CHART

NTS

SHEET INDEX

SHEET	DESCRIPTION
1	EQUIPMENT LEGEND, SYSTEM LAYOUT, CONTROL PANEL, ISOMETRIC & RISER
2	NOTES & DETAILS

EQUIPMENT LEGEND			
SYM	PART NUMBER	QTY	DESCRIPTION
FSCP	10-063-1-R-1	1	SHP PRO CONTROL SYSTEM, ALL MODES, RED, 110V
	B12120	2	BATTERIES 12V 12AH
	20-1175	1	SINGLE(DPDT) RELAY
	10-2204	1	CRM4 RELAY MODULE
EMEN	10-2975	1	MANUAL RELEASE / SYSTEM ABORT
	20-123-01	1	STROBE WALL MOUNT RED/WHT
	20-123-48	1	HORN/STROBE WALL MOUNT RED/WHT
	20-123-TRIM-R	2	"AGENT" BEZEL RED (GE SERIES)
P	63-1307	2	PHOTOELECTRIC DETECTOR
	67-1034	2	6" BASE 430 OHM
	70-362	1	100# AGENT STORAGE CONTAINER
	02-15980	76#	FK-5-1-12 AGENT FACTORY FILLED & PRESSURIZED
	70-279	1	IMPULSE VALVE OPERATOR (IVO) KIT (IVOS INCLUDED)
	80-124-075	1	3/4" - 360° DISCHARGE NOZZLE
–SE–	02-104	1	PULSE SEQUENCE SIGN
–SD–	02-E02	1	"IF ALARM ACTIVE, DO NOT ENTER" SIGN
–AB–	02-AB1	1	"SYSTEM ABORT" SIGN
–MR–	02-MR1	1	"MANUAL RELEASE" SIGN
——	02-E01	1	"DO NOT ENTER DURING OR AFTER DISCHARGE" SIGN



REV	DESCRIPTION	DATE
0	ISSUED FOR BID	03/22/2024

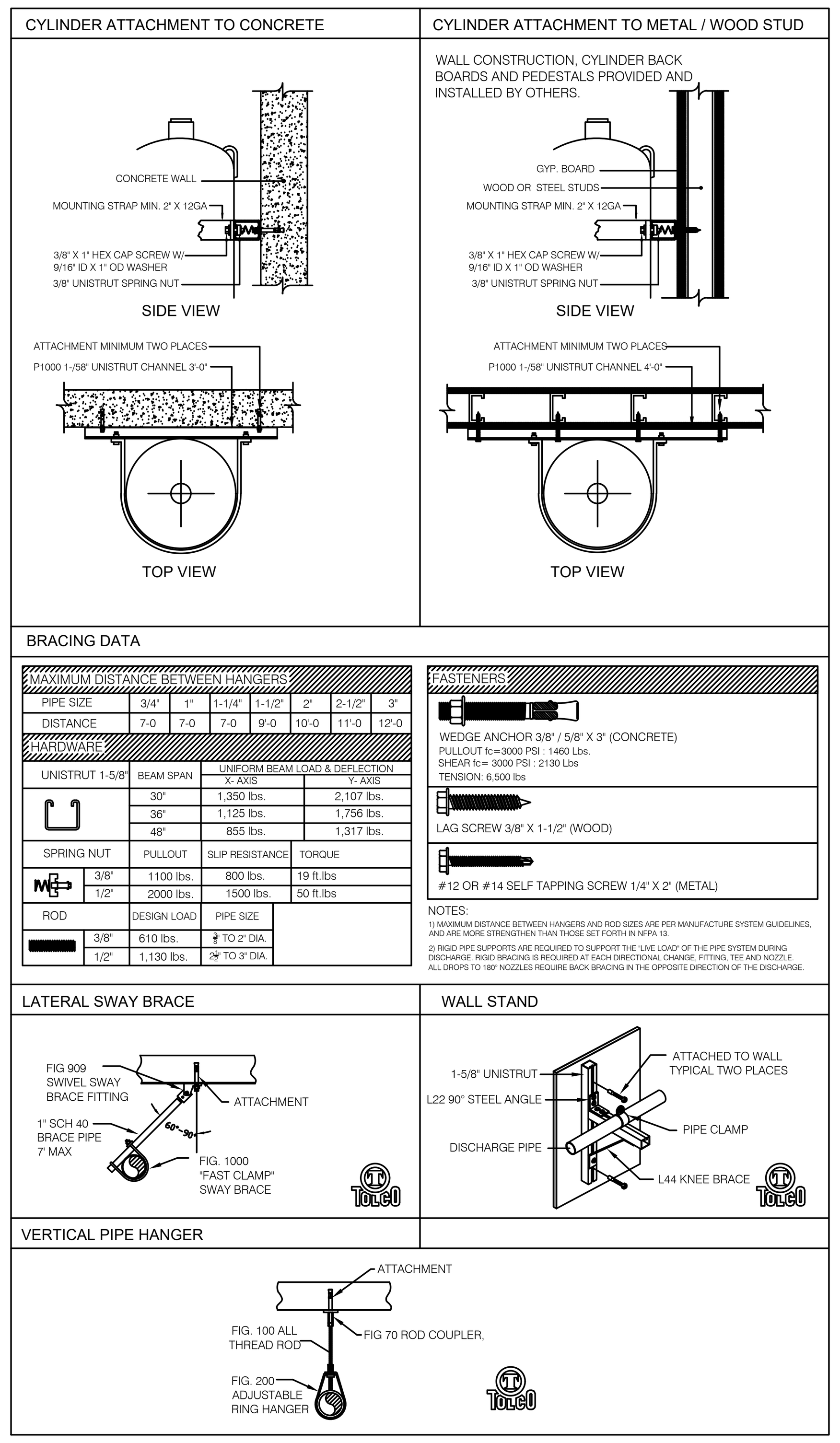
PENNSYLVANIA CONVENTION CENTER AUTHORITY
ONE CONVENTION CENTER PLACE
1101 ARCH STREET
PHILADELPHIA, PENNSYLVANIA 19107

DATA CLOSET

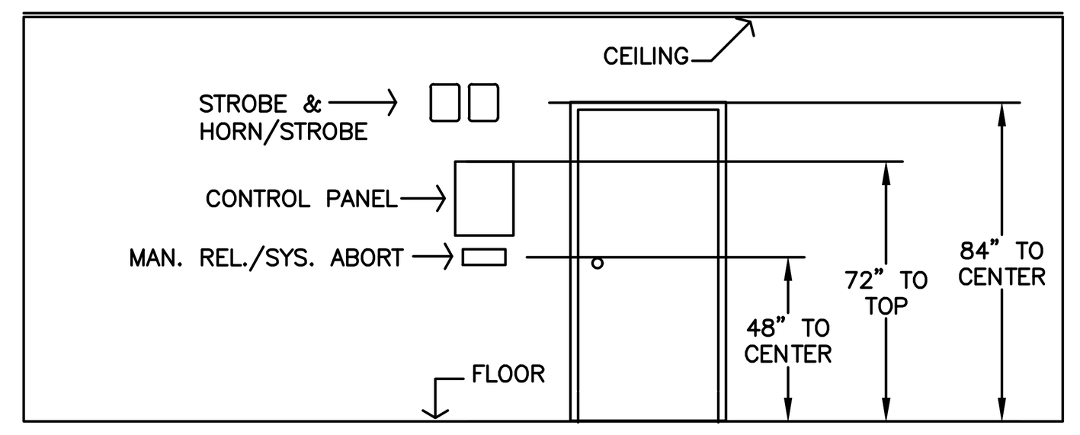
DIAGRAMS, SCHEDULES AND NOTES

DIMITRI J. VERVERELLI INC.
CONSULTING ENGINEERS
PHILADELPHIA, PENNSYLVANIA

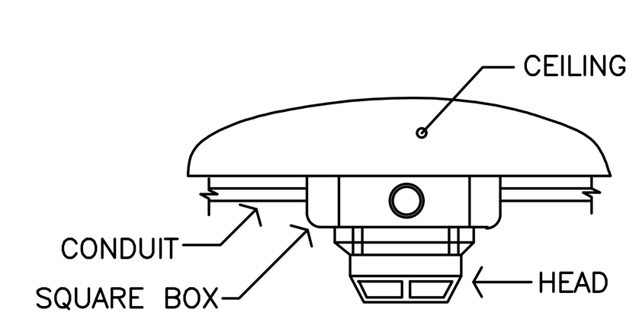
DRAWN BY:	SCALE:	DWG. NO.
THS	AS NOTED	FP–1
CHECKED BY: RWR	PROJ. NO: 2328	



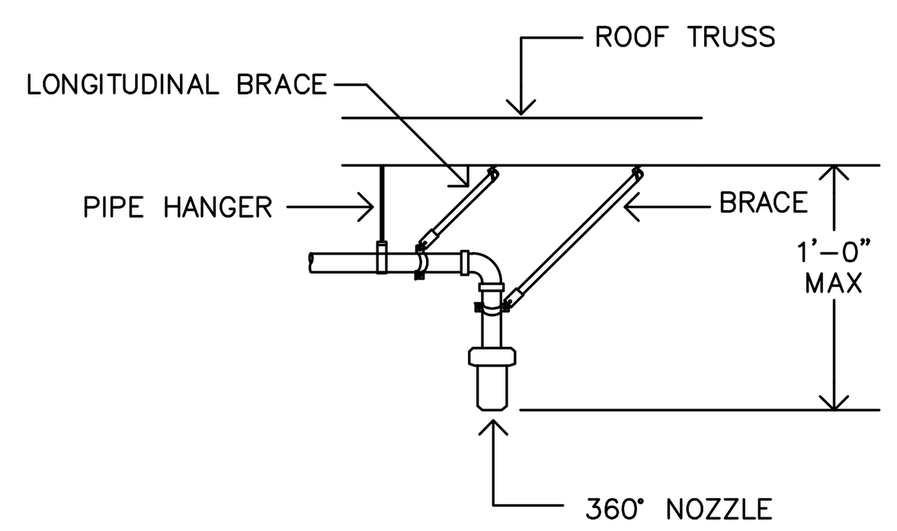
PIPE BRACING
NTS



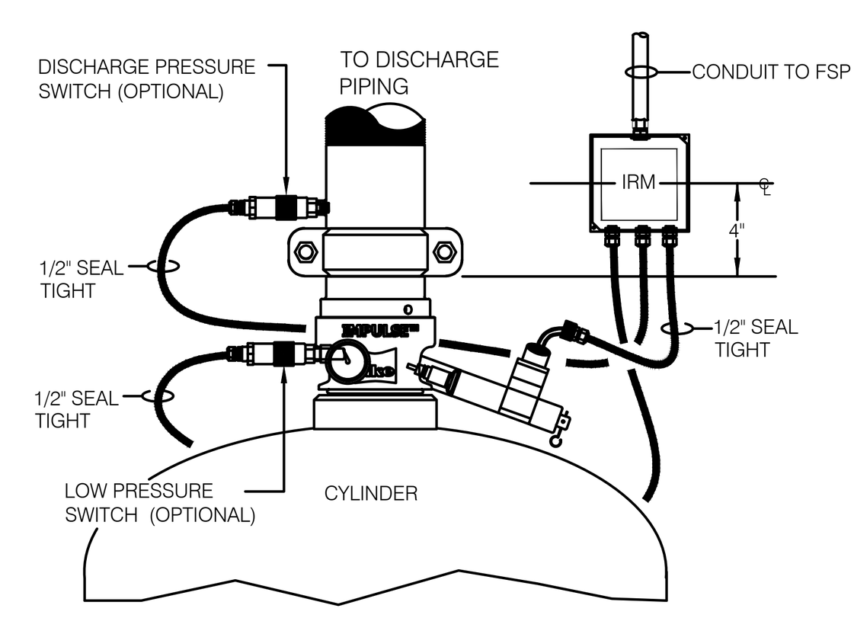
ELEVATION
COMPONENT LOCATIONS NTS



CEILING DETECTOR
NTS

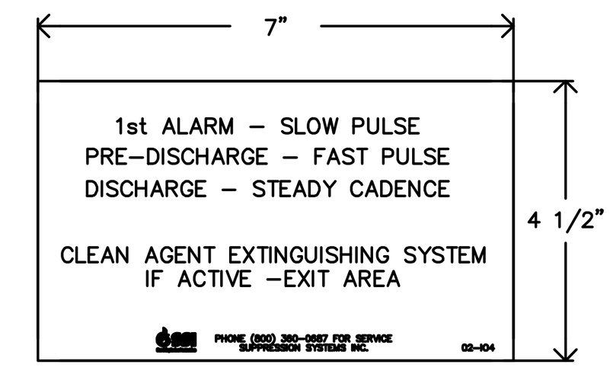


CEILING NOZZLE INSTALLATION
NTS

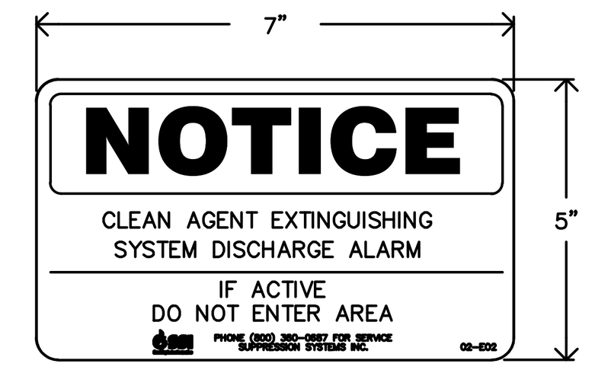


1. LOW PRESSURE AND DISCHARGE PRESSURE SWITCHES AND MODULES ARE OPTIONAL AND MAY NOT BE PART OF SCOPE.
2. ACTUAL LAYOUT SHALL BE FIELD DETERMINED.

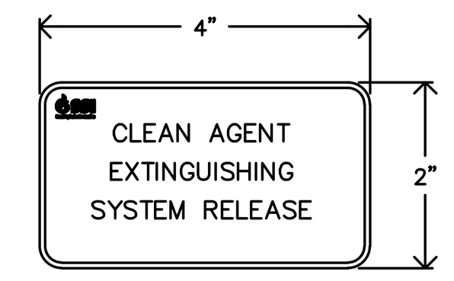
CYLINDER ASSEMBLY
NTS



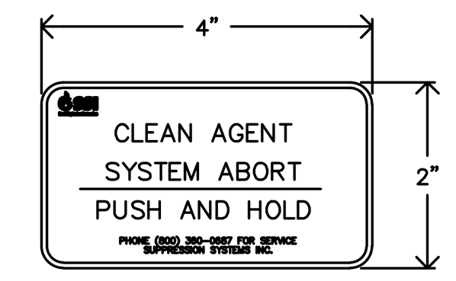
02-I04 PULSE SEQUENCE SIGN
SIGN NTS



02-E02 SYSTEM DISCHARGE SIGN
SIGN NTS

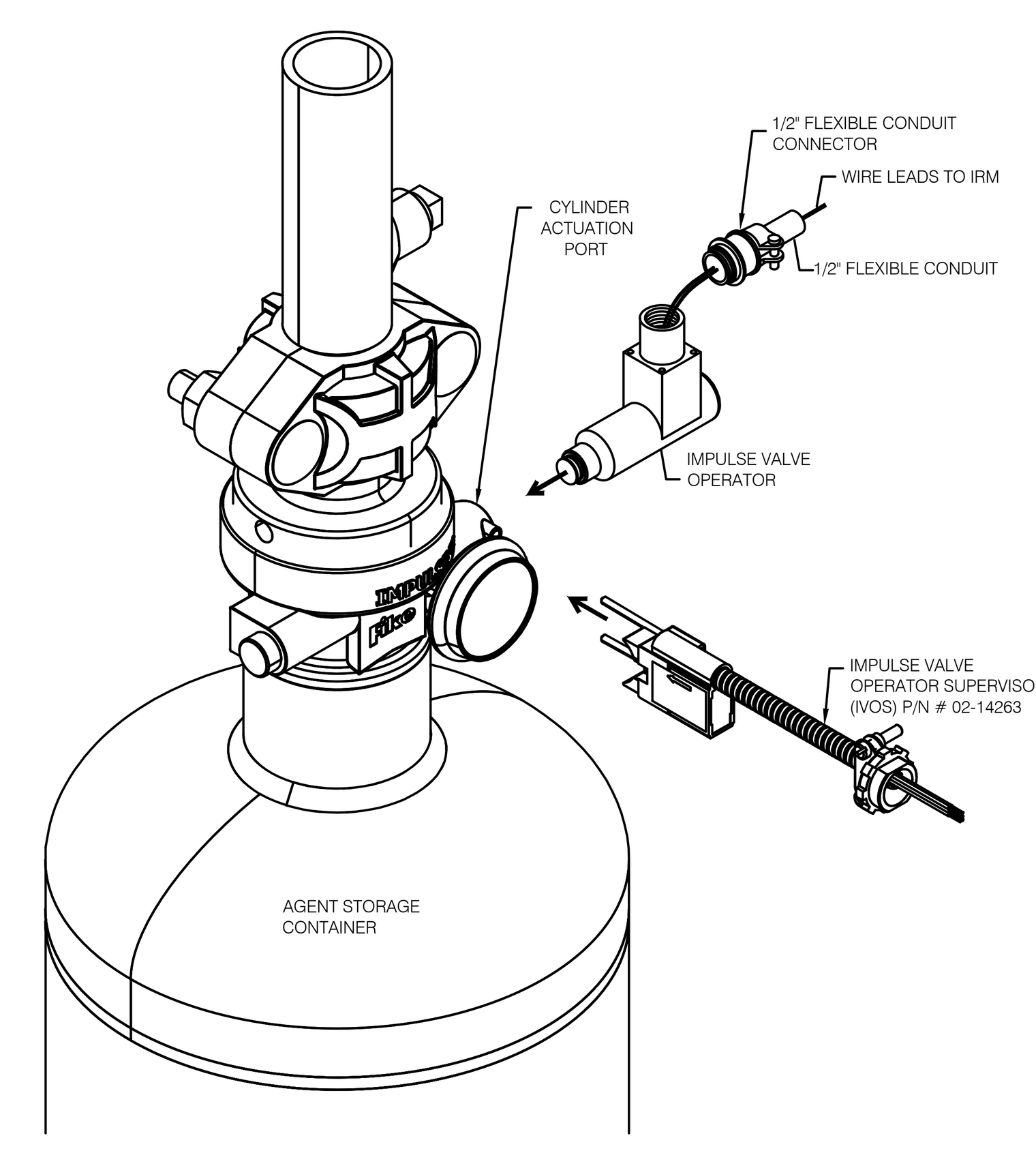


02-MR1 MANUAL RELEASE SIGN
SIGN NTS



02-AB1 SYSTEM ABORT SIGN
SIGN NTS

02-E01 CAUTION SIGN
SIGN NTS



IMPULSE VALVE OPERATOR SUPERVISOR
NTS

FK-5-1-12 MECHANICAL NOTES:

1) PIPING MATERIALS MUST CONFORM TO THE REQUIREMENT AS OUTLINED IN NFPA 2001, SECTION 4.2.1, CURRENT EDITION. BLACK PIPE, SCHEDULE 40 MUST BE USED.
2) PIPE FITTINGS MUST CONFORM TO THE REQUIREMENTS AS OUTLINED IN NFPA 2001, SECTION 4.2.3, CURRENT EDITION. MALLEABLE IRON FITTINGS MUST BE 300 LB. CLASS CONFORMING TO ASTM SPECIFICATION A-197 150 LB. CLASS AND ORDINARY CAST IRON FITTINGS ARE NOT PERMITTED. VICTAULIC OR GROOVED PIPE FITTINGS MAY BE USED AS WELL AS THREADED, WELDED OR FLANGED, AS LONG AS THEY CONFORM TO THE ABOVE REQUIREMENTS. HOWEVER, HOLE-CUT FITTINGS OR SIMILAR, MAY NOT BE USED.
3) ALL REDUCTIONS SHALL BE MADE USING REDUCERS OR REDUCING FITTINGS - BUSHINGS ARE NOT PERMITTED.
4) ALL PIPE AND NOZZLE DROPS MUST BE BRACED TO WALLS, COLUMNS, OR CEILINGS USING STEEL HANGERS WITH A MINIMUM OF 3/8" ALL-THREAD ROD PLACED PER NFPA CODE, (CONSULT SSI MECHANICAL SPECS). ALL DROPS TO 180° NOZZLES REQUIRE BACK BRACING IN THE OPPOSITE DIRECTION OF THE DISCHARGE. RIGID PIPE SUPPORTS ARE REQUIRED TO SUPPORT "LIVE LOAD" OF THE PIPE SYSTEM DURING DISCHARGE, RIGID BRACING IS REQUIRED AT EACH DIRECTIONAL CHANGE, FITTING, TEE AND NOZZLE. EARTHQUAKE BRACING SHALL BE USED WHERE REQUIRED.
5) PIPING IS DESIGNED "CENTER TO CENTER", AND FITTINGS ALLOWANCE IS INCLUDED IN PIPE LENGTH "CALL-OFF". LENGTHS OF PIPE ARE APPROXIMATE ONLY. INSTALLING CONTRACTOR MUST DETERMINE EXACT LENGTH REQUIREMENTS PRIOR TO FABRICATION, TO INSURE UNOBSTRUCTED DISCHARGE.
6) EACH PIPE SECTION SHALL BE CLEANED INTERNALLY BEFORE INSTALLATION WITH A NONFLAMMABLE CLEANER SUCH AS PERCHLOROETHYLENE IN ACCORDANCE WITH NFPA 2001, LATEST EDITION.
7) ALL PENETRATIONS MUST BE SEALED BY INSTALLING CONTRACTOR.
8) LUBRICATE GASKETS ON ALL VICTAULIC COUPLINGS USING VICTAULIC OR NON-PETROLEUM BASED LUBRICANTS.
9) FLOW CALCULATIONS ARE BASED ON PIPING BEING INSTALLED EXACTLY AS DIAGRAMMED ON SSI DRAWINGS. ALL FIELD PIPING CHANGES SHALL BE APPROVED BY SSI PRIOR TO FABRICATION AND INSTALLATION.
10) TEFLON TAPE OR JOINT COMPOUND SHALL BE USED ON ALL THREADED JOINTS.
11) ALL "THRU TEES" MUST BE RUN IN A HORIZONTAL PLANE.
12) THE PIPING SYSTEM SHOULD BE SECURELY SUPPORTED WITH DUE ALLOWANCE FOR AGENT THRUST FORCES, THERMAL EXPANSION, AND CONTRACTION, AND SHOULD NOT BE SUBJECTED TO MECHANICAL, CHEMICAL, VIBRATION, OR OTHER DAMAGE.
13) ALL NOZZLES TO BE WITHIN 1'0" OF CEILING, 180° NOZZLES TO BE WITHIN 1'0" OF WALL.
14) ALL NOZZLES SHALL BE DIRECTED DOWNWARD.

ELECTRICAL NOTES:

1) CONTROL PANEL SHALL BE WIRED THROUGH SEPARATE CONDUIT TO A 15 AMP, 120 VAC DEDICATED CIRCUIT BREAKER, MINIMUM #12 AWG SHALL BE USED. THREE CONDUCTORS MUST BE RUN: HOT, GROUND, AND NEUTRAL
2) ALL ELECTRICAL WIRING MUST MEET REQUIREMENTS SET FORTH BY ARTICLE 760 OF THE NEC, AND LOCAL CODES.
3) HIGH VOLTAGE/LOW VOLTAGE LINES MUST BE RUN IN SEPARATE CONDUIT.
4) ALL WIRES MUST BE LABELED, NUMBERED, OR COLOR CODED.
5) ALL AUDIBLE DEVICE CIRCUITS ARE SUPERVISED - PARALLEL BRANCHING OF WIRES IS NOT PERMISSIBLE.
6) ALL SF WIRING MUST BE IN EMT CONDUIT. ALL CEILING WIRING MUST BE IN EMT OR FIRE ALARM METAL CLAD (MC) CONTROL CABLE.
7) DETECTORS MAY NOT BE LOCATED IN DIRECT AIR STREAMS FROM SUPPLY DUCTS.
8) CONTROL PANEL SHALL BE CONNECTED TO EARTH GROUND TO DEFEND AGAINST REDUCED LIGHTNING PROTECTION AND LOSS OF GROUND FAULT SUPERVISION (ARTICLE 760 OF THE NEC)
9) ALL PENETRATIONS MADE BY INSTALLING CONTRACTOR SHALL BE SEALED TO INSURE ROOM INTEGRITY.
10) INSTALLING CONTRACTOR SHALL CONFORM TO SSI ELECTRICAL SPECIFICATIONS.
11) DETECTORS MUST BE MINIMUM 3'0" FROM DIFFUSERS AND REGISTERS.
12) BATTERY CALCULATIONS WERE PERFORMED USING CANDELA AS SHOWN ON SYSTEM LAYOUT. MAKE SURE THE CANDELA SELECTION SLIDER SWITCH ON THE DEVICE IS SET AT CORRECT CANDELA TO ENSURE CORRECT BATTERY CALCULATIONS.
13) NO CONDUIT TO THE BOTTOM OF THE CONTROL PANEL.
14) ALL CONDUIT INSTALLED AT THE DECK LEVEL TO BE A MINIMUM OF 1-1/2" LOWER THAN THE LOWEST POINT OF THE DECKING.

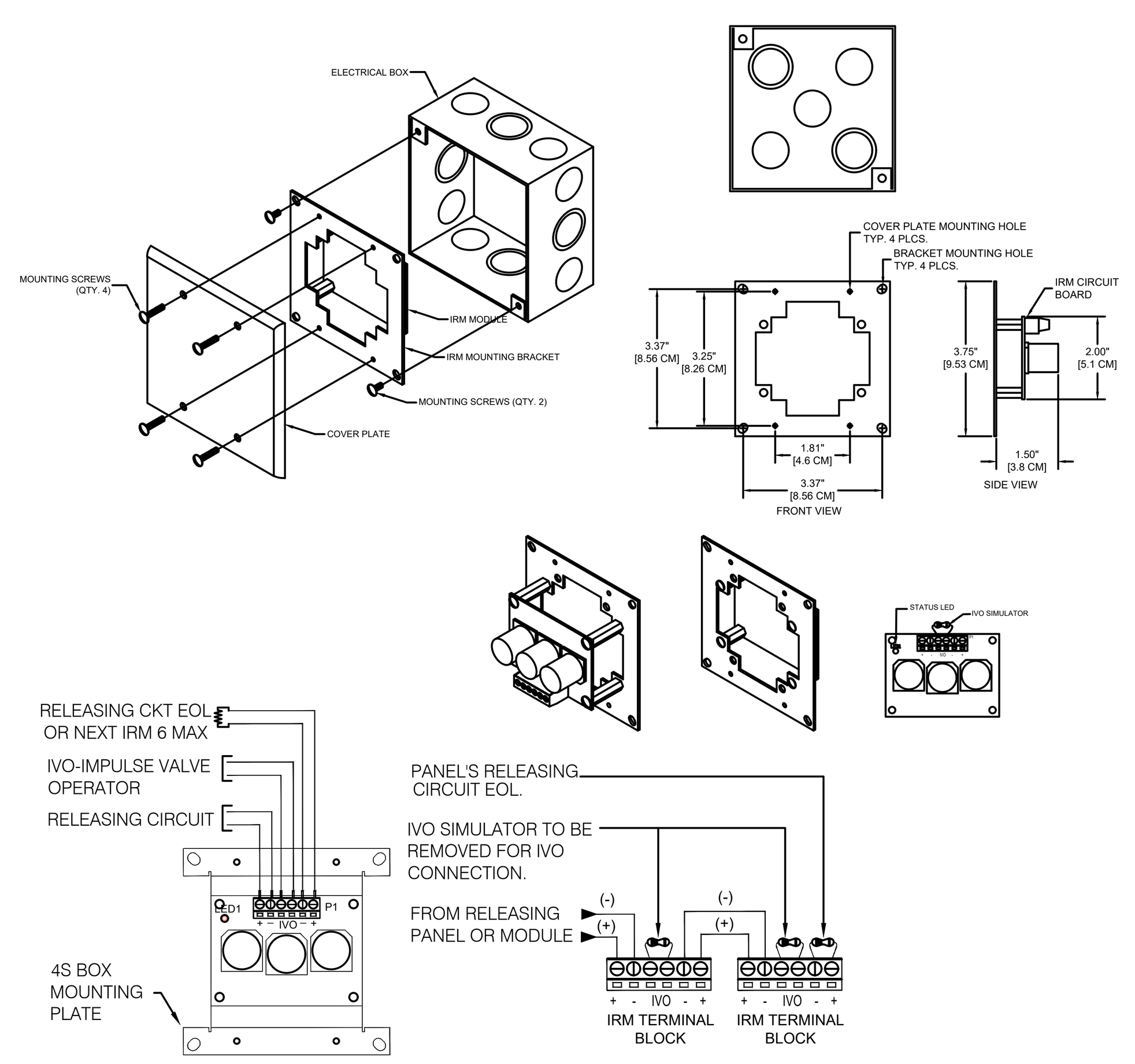
SYSTEM NOTES:

1) COMPONENT LOCATIONS ARE SHOWN FOR DESIGN PURPOSES, AND MUST BE APPROVED PRIOR TO INSTALLATION
2) CONTROL PANEL AND ALL ASSOCIATED DEVICES ARE TO BE SURFACE MOUNTED.
3) ALL DOORS TO PROTECTED AREAS ARE CONSIDERED "NORMALLY CLOSED".
4) ANY DEVIATIONS FROM BASIC DESIGN MUST MEET APPROVAL BY THE SSI ENGINEERING DEPARTMENT PRIOR TO CONTINUING WITH THE INSTALLATION.
5) VERIFY DIMENSIONS IN THE FIELD, REPORT ANY DISCREPANCIES TO SSI ENGINEERING DEPARTMENT.
6) OPERATING TEMPERATURE OF FK-5-1-12 IS BETWEEN 32° F AND 130° F.

FK-5-1-12 STRUCTURAL GUIDELINES :

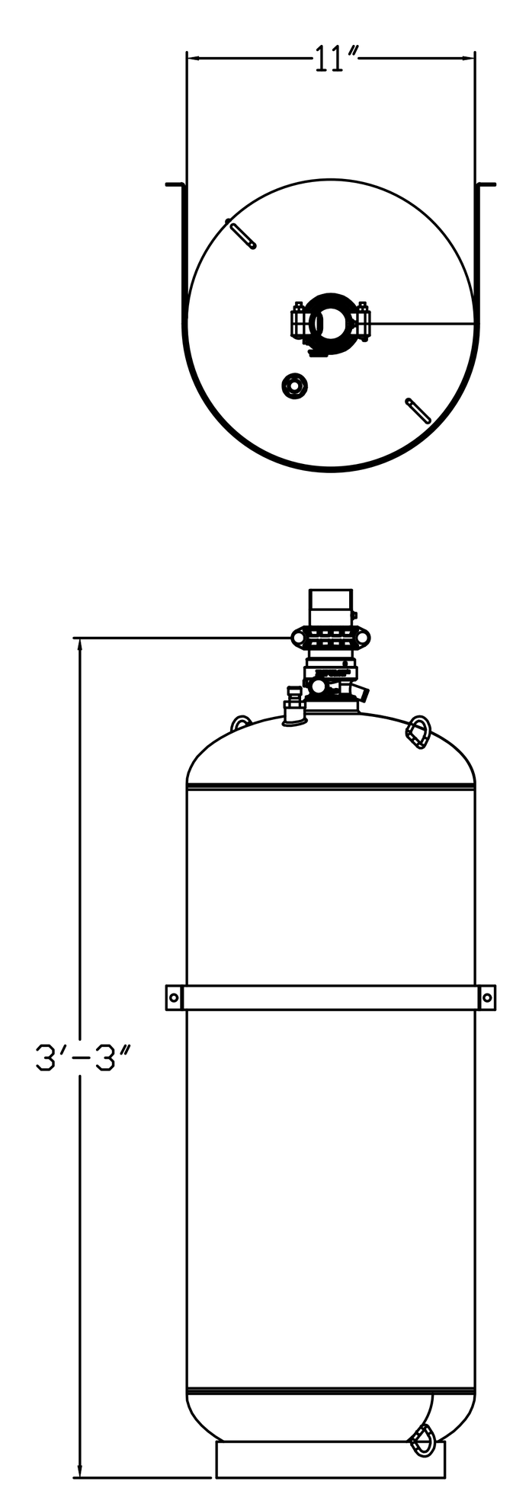
BECAUSE OF THE CONCEPT BY WHICH FK-5-1-12 SUPPRESSES A FIRE AND THE CHARACTERISTICS THE AGENT POSSESSES, IT IS ESSENTIAL TO RETAIN THE DESIGN CONCENTRATION OF AGENT WITHIN THE HAZARD FOR A SPECIFIED DURATION. THE DURATION TIME MAY VARY WITH THE SPECIFIC APPLICATION AND AUTHORITY HAVING JURISDICTION. THE AGENT "HOLD TIME" IS A DIRECT REFLECTION OF THE INTEGRITY OR STRUCTURAL TIGHTNESS OF THE HAZARD AREA. SINCE FK-5-1-12 IS HEAVIER THAN AIR, FK-5-1-12 HAS A TENDENCY TO ESCAPE FROM LOWER OPENINGS, SUCH AS BENEATH DOORS AND AT THE JUNCTION OF FLOORS AND PARTITION WALLS. HOWEVER, THE FAN PRESSURIZATION TESTS THE ENTIRE HAZARD AREA SLAB TO DECK. ALL PENETRATIONS SHALL BE SEALED. THE FOLLOWING LIST IS SUGGESTIONS SSI PROVIDES TO HELP MAINTAIN A STRUCTURALLY TIGHT AND ACCEPTABLE HAZARD AREA FOR A FK-5-1-12 DISCHARGE. THESE SUGGESTIONS ARE BASED ON SSI'S EXPERIENCE WITH THE AGENT, AND ARE PROVIDED AS GENERAL GUIDELINES THAT MAY BE BENEFICIAL TO FOLLOW. SSI WILL NOTIFY THE APPROPRIATE PARTIES OF ANY POSSIBLE PROBLEM AREAS DURING SYSTEM INSTALLATION AND/OR TESTING.

1) ALL DOORS SHALL HAVE PNEUMATIC OR ELECTRICAL DOOR CLOSING DEVICES.
2) SWEEPS AND WEATHER-STRIPPING SHALL BE PROVIDED ON ALL DOORS.
3) ANY DOUBLE DOORS HAVING GAPS SHALL HAVE EXTENSIONS INSTALLED.
4) ALL PENETRATIONS IN PERIMETER WALLS SHALL BE SEALED.
5) SEAL ALL CONDUIT AND CABLE TRAY RUNS.
6) FLOOR DRAINS SHALL HAVE TRAPS INSTALLED AND PRIMED.
7) THE AIR DISTRIBUTION SYSTEM SHALL BE SHUTDOWN AND/OR ISOLATED BY DAMPERS.
8) WALLS MUST EXTEND SLAB TO DECK..
9) ROOF FLUTES MUST BE SEALED WITH APPROPRIATE FIRE CAULK, OR DRYWALL CUT TO FIT FLUTES AND CAULKED. (STUFFING ROCK WOOL OR FIBERGLASS IN FLUTES IS NOT ACCEPTABLE.)

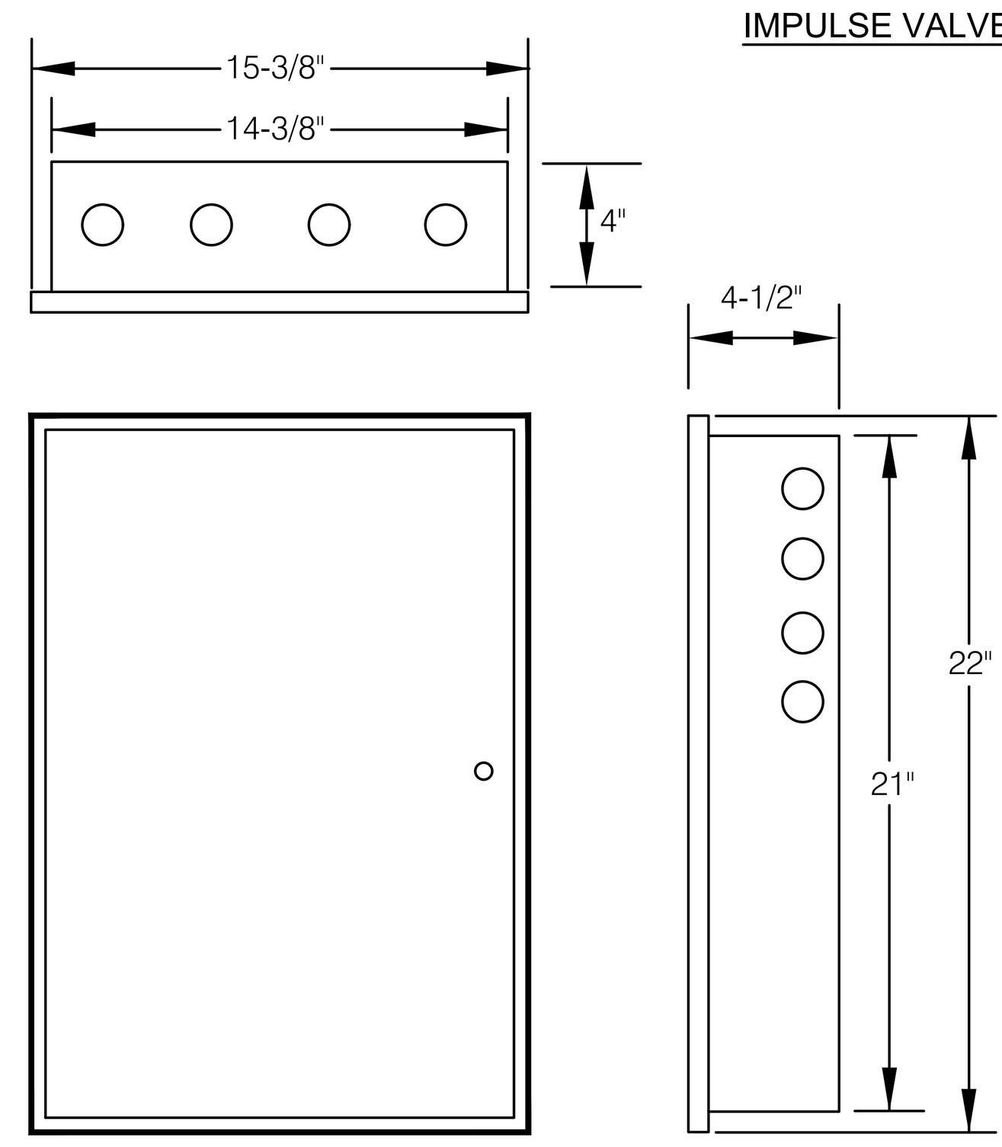


1. MAXIMUM WIRE SIZE FOR TERMINALS IS #14 AWG.
2. 24VDC @ 2.0 AMPS MAX. SUPERVISED, POWER LIMITED.
3. MAXIMUM OF SIX (6) IRM'S WIRED IN PARALLEL, CAN BE CONNECTED TO A SINGLE RELEASE CIRCUIT.

IRM INTERFACE
NTS



100 LB. AGENT STORAGE CONTAINER
N.T.S.



SHP PANEL ENCLOSURE
N.T.S.

SHP SERIES BATTERY REQUIREMENT CALCULATION						
NORMAL OPERATION						
Control Current	0.135	A				
Aux Output Current	0.000	A				
Total Normal Current	0.135	A	x	24	Hours =	3.24 AH
ALARM OPERATION						
Controller Current	0.135	A				
CRM4 Current	0.010	A	(.01 A per output used)			
Output Device Current	0.149	A				
Aux Output Current	0.040	A				
Total Alarm Current	0.334	A	x	0.083	Hours =	0.03 AH
					Total AH used =	3.27 AH
					x	1.20 factor
					Total Power Required =	3.92 AH
					Total Battery Pack AH Provided =	12.00 AH

Note: The SHP Pro 0.135 Amp current includes power to activate the normally energized trouble relay and power for a maximum number of two wire detectors.

BATTERY CALCULATION
NTS

MINIMUM PIPING DISTANCE (ENGINEERED SYSTEMS):

A MINIMUM OF TEN (10) PIPE DIAMETERS MUST BE MAINTAINED BETWEEN FITTINGS TO STABILIZE THE FLOW AND MAINTAIN THE ACCURACY OF THE SPLITS OCCURRING AT THE TEES. THE (10) PIPE DIAMETER RULE APPLIES TO THE FOLLOWING CONFIGURATIONS.

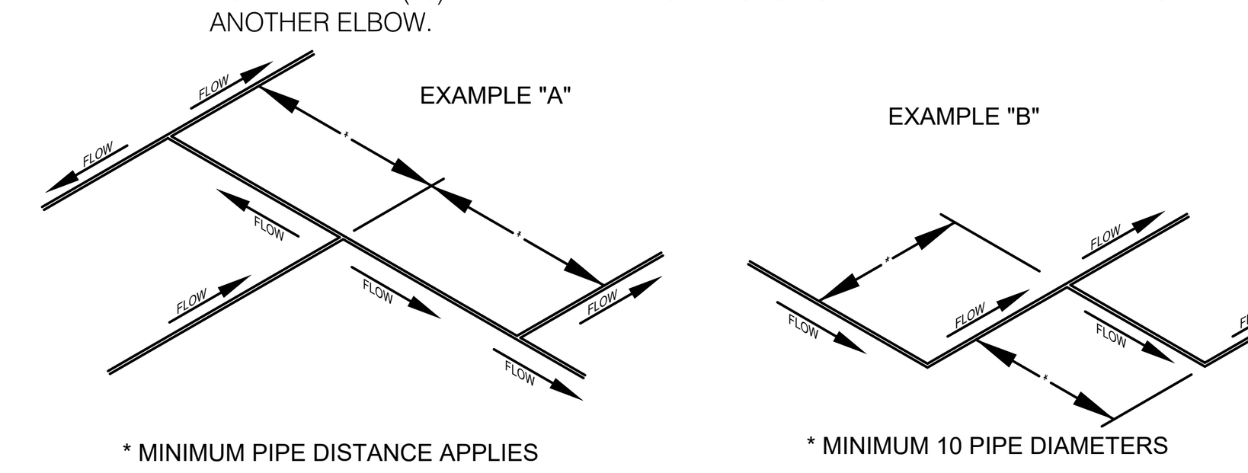
DISTANCE BETWEEN TWO TEES:

A) A MINIMUM OF 2.41 FEET (28.92 INCHES) MUST BE MAINTAINED BETWEEN TEES FOR PIPE SIZES 2-1/2 INCH AND SMALLER. FOR PIPE SIZES 3 INCH AND LARGER, A MINIMUM OF TEN PIPE DIAMETERS MUST BE MAINTAINED BETWEEN TEES.

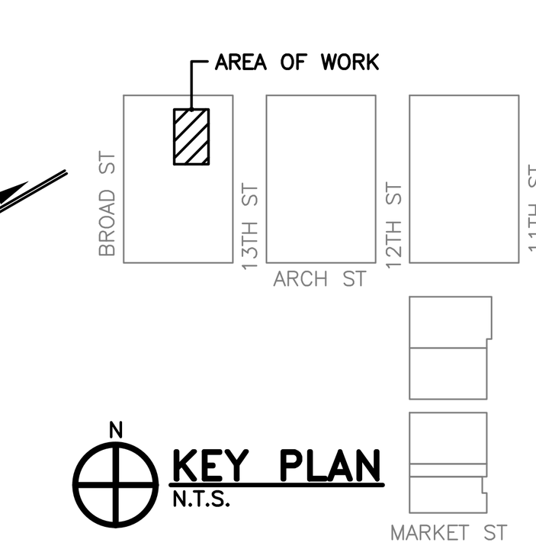
DISTANCE FROM AN ELBOW TO A TEE:

B) WHEN AN ELBOW IS LOCATED DIRECTLY BEFORE OR DIRECTLY AFTER A TEE, THE MINIMUM DISTANCE BETWEEN THE ELBOW AND THE TEE MUST BE TEN (10) PIPE DIAMETERS.

NOTE: THE TEN (10) PIPE DIAMETER RULE DOES NOT APPLY BETWEEN AN ELBOW AND ANOTHER ELBOW.



FK-5-1-12 PIPING NOTES
NTS



KEY PLAN
N.T.S.

REV	DESCRIPTION	DATE
0	ISSUED FOR BID	03/22/2024

PENNSYLVANIA CONVENTION CENTER AUTHORITY
ONE CONVENTION CENTER PLACE
1101 ARCH STREET
PHILADELPHIA, PENNSYLVANIA 19107

DATA CLOSET

DETAILS AND NOTES

DIMITRI J. VERVERELLI INC.
CONSULTING ENGINEERS
PHILADELPHIA, PENNSYLVANIA

DRAWN BY: THS	SCALE: AS NOTED	DWG. NO. FP–2
CHECKED BY: RWR	PROJ. NO: 2328	