RE-BID-REPLACE DRY PIPE SPRINKLER SYSTEM NORTHWEST MISSOURI PSYCHIATRIC REHABILITATION CENTER

ST. JOSEPH, MISSOURI

FSC, Inc.
CONSULTING ENGINEERS
SINCE 1979
8675 West 96th Street
Overland Park, KS 66212
Phone 913.722.3473
FSC Project # F19038

OWNER: STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

DEPARTMENT OF MENTAL HEALTH

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DESIGNER: FSC, Inc.
8675 West 96th Street
Overland Park, KS 66212

PROJECT NUMBER: M2005-01

INFECTION CONTROL CLASSIFICATION: CLASS-II, GROUP I

ASSET NUMBER: 6517353016

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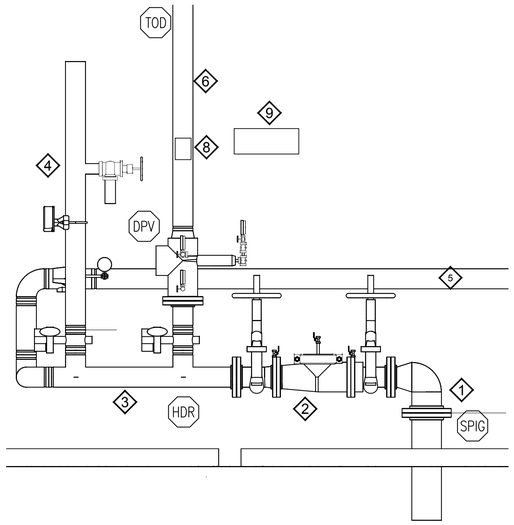
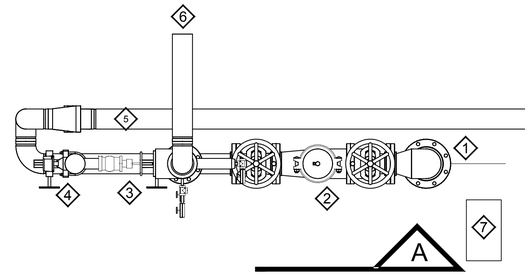
CONSTRUCTION DOCUMENT: 08/26/2022

SHEET NUMBER:
G-001
01 OF 07 SHEETS
08/26/2022



ELEVATION A-A

(NO SCALE)



PIPING PLAN AT RISER ROOM

(NO SCALE)

RISER LEGEND:

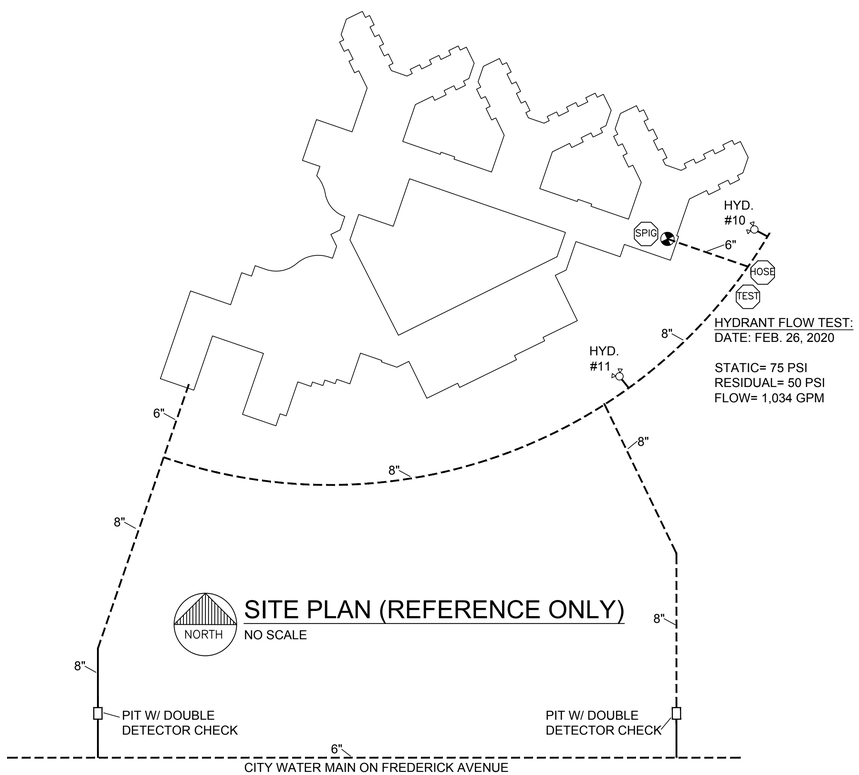
1. EXISTING 6" UNDERGROUND AND 6x4 FLANGED 90° ELL TO REMAIN.
2. EXISTING BACK FLOW PREVENTER TO REMAIN.
3. EXISTING HEADER TO REMAIN.
4. EXISTING WET SYSTEM WITH CONTROL VALVE, GAUGE, AND MAIN DRAIN TO REMAIN.
5. EXISTING FIRE DEPARTMENT CONNECTION WITH CHECK VALVE TO REMAIN.
6. DEMO EXISTING DRY SYSTEM STARTING WITH CONTROL VALVE AND REPLACE WITH NEW CONTROL VALVE , NEW DRY PIPE VALVE WITH ALL NECESSARY DRAIN AND ALARM TRIM, EXTERNAL RESET, AIR MAINTENANCE DEVICE AND ACCELERATOR &/OR EXHAUSTER.
7. NEW NITROGEN GENERATOR PROPERLY SIZED, APPROVED AND LISTED UNIT CAPABLE OF SUPPORTING ENTIRE NEW DRY SYSTEM. COORDINATE LOCATION WITH FACILITY MAINTENANCE.
8. HYDRAULIC PLACARD
9. SPARE SPRINKLER HEAD CABINET

SCOPE OF WORK:

1. THIS IS AN EXISTING FACILITY CURRENTLY PROTECTED WITH EXISTING SPRINKLER SYSTEMS.
2. EXISTING WET PIPE SYSTEMS FOR AREA BELOW CEILING ARE TO REMAIN IN SERVICE ALL THE TIME AND ARE OUT OF SCOPE OF THIS PROJECT.
3. THE EXISTING DRY PIPE SYSTEM FOR THE ATTIC NEEDS TO BE REMOVED AND REPLACED WITH A NEW SYSTEM, AS SPECIFIED AND INDICATED ON THE DRAWINGS.
4. DEMO THE EXISTING DRY PIPE SYSTEM IN THE ATTIC, INCLUDING BUT NOT LIMITED TO, PIPING, FITTINGS, HANGERS, SPRINKLERS, DRY PIPE VALVE, BUTTERFLY VALVE, AND RELATED DEVICES IN RISER ROOM BELOW.
5. ALL MATERIAL AND EQUIPMENT DEMOLISHED SHALL BE DISPOSED AND REMOVED OFF THE PREMISE. CONSULT WITH OWNER IF ANY SPECIFIC ITEM NEEDS TO BE SALVAGED FOR OWNER.
6. FACILITY WILL PROVIDE A FIRE WATCH DURING CONSTRUCTION HOURS. CONTRACTOR SHALL COORDINATE WITH THE OWNER DURING PERIODS OF EXISTING SYSTEM IMPAIRMENT.
7. PROVIDE NEW GROOVED BUTTERFLY VALVE, DRY PIPE VALVE, AND ALL OTHER COMPONENTS FOR NEW WORKING DRY PIPE SYSTEM FOR THE ATTIC.
8. AIR SUPPLY FOR DRY SYSTEMS SHALL BE PROVIDED WITH A NITROGEN GENERATOR SET CAPABLE OF SUPPORTING THE DRY SYSTEM.
9. ALL NEW PIPING FOR DRY SYSTEM SHALL BE BLACK STEEL.
10. SPRINKLER HEADS IN ATTIC SHALL BE, BUT NOT LIMITED TO, QUICK RESPONSE, STANDARD COVERAGE UPRIGHTS, SPECIAL APPLICATION ATTIC SPRINKLERS (TYCO OR EQUAL) INCLUDING “SD1”, “AP”, “HIP” PER NFPA 13 AND THE MANUFACTURER'S LISTING.

HYDRAULIC CALCULATIONS

1. SYSTEM IS SUPPLIED BY CITY WATER ONLY.
2. FLOW TEST USED IS OBTAINED FROM ACTUAL TEST PERFORMED BY JOHNSON CONTROLS ON FEBRUARY 26, 2020
3. ALL CALCULATIONS SHALL BE PER NFPA 13 USING ONLY 90% OF THE WATER SUPPLY AVAILABLE LEAVING REMAINING 10% FOR SAFETY.
4. REFER TO DRAWINGS FOR DESIGN CRITERIA. WHERE DESIGN CRITERIA IS NOT LISTED, THE DESIGN SHALL BE PER NFPA 13 OCCUPANCY CLASSIFICATIONS AND LISTING REQUIREMENTS OF SPECIAL APPLICATION ATTIC SPRINKLERS.



SITE PLAN (REFERENCE ONLY)

NO SCALE

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	ALL SPACES ARE LIGHT HAZARD UNLESS NOTED OTHERWISE
[?-?]	DIMENSION FROM FINISHED FLOOR UP TO CENTERLINE OF PIPE (FEET & INCHES)
[? Bts]	DIMENSION FROM BOTTOM OF DECK, DOWN TO CENTERLINE OF PIPE (INCHES)
(?–?)	CEILING HEIGHT
(?)	HYDRAULIC CALCULATION REFERENCE POINT
- - - - -	EXISTING SPRINKLER SYSTEM PIPING
———	NEW SPRINKLER SYSTEM PIPING

GENERAL NOTES:

1. THIS PROJECT REQUIRES REPLACEMENT OF EXISTING SPRINKLER SYSTEM IN ATTIC AREA TO BE PROVIDED WITH NEW DRY PIPE SPRINKLER SYSTEM AS INDICATED ON THE DRAWINGS.
2. DESIGN IS BASED ON THE FOLLOWING CODES AND STANDARDS. THE INFORMATION LISTED IN THE APPENDIX OF NFPA STANDARDS SHALL BE CONSIDERED PART OF EACH STANDARD.
   a. LOCAL CODES.
   b. NFPA 13 (2016), “INSTALLATION OF SPRINKLER SYSTEMS”
3. ALL SPRINKLER PIPING IS SIZED BY HYDRAULIC CALCULATION. THE CONTRACTOR SHALL PROVIDE NEW HYDRAULIC CALCULATIONS USING MAXIMUM 90% OF WATER SUPPLY AVAILABLE.
4. ALL WORK, EQUIPMENT, MATERIALS, AND INSTALLATION SHALL BE IN COMPLIANCE WITH ALL APPLICABLE NFPA STANDARDS, UNDERWRITERS LABORATORY (UL) LISTED AND/OR FM APPROVED.
5. SHOULD THERE BE A DISCREPANCY BETWEEN THE DRAWINGS, AND THE REQUIREMENTS OF THE CODES/STANDARDS, THE CONTRACTOR'S DESIGN AND INSTALLATION SHALL MEET THE MOST STRINGENT REQUIREMENTS.
6. CONTRACTOR SHALL PREPARE AND SUBMIT DETAILED SHOP DRAWINGS IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS.
7. CONTRACTOR SHALL PREPARE AND SUBMIT ALL CERTIFICATES OF COMPLETION FOR INSTALLATIONS IN ACCORDANCE WITH NFPA.
8. THESE DOCUMENTS ARE BASED ON INFORMATION PROVIDED BY OTHERS AND OBTAINED FROM EXISTING DOCUMENTS, HENCE MAY NOT REFLECT ALL OBSTRUCTIONS OR OTHER CONDITIONS AFFECTING THE INSTALLATION OF THE FIRE PROTECTION SYSTEM. CONTRACTOR SHALL VISIT SITE AND CONFIRM ALL BACKGROUND INFORMATION (ARCHITECTURAL, STRUCTURAL, HVAC, LIGHTING, ETC.) PRIOR TO STARTING ANY WORK.
9. TEMPERATURE RATING OF SPRINKLER HEADS RELATIVE TO LOCAL HEAT SOURCES SHALL BE VERIFIED AND PROVIDED ACCORDINGLY.
10. SPRINKLER HEADS SHALL BE INSTALLED WITH MANUFACTURER'S WRENCH AND/OR MANUFACTURER'S REQUIRED METHOD DESIGNATED FOR THAT PARTICULAR HEAD. ANY SPRINKLER HEAD DAMAGED DURING INSTALLATION DUE TO THE USE OF A NON-APPROVED METHOD OR TOOL SHALL BE REPLACED AT NO COST TO OWNER.
11. ALL ELECTRICAL CONNECTIONS FOR THE SUPERVISION OF SPRINKLER SYSTEM COMPONENTS SHALL BE INSTALLED BY THIS CONTRACTOR.
12. ALL PIPING 2” AND SMALLER SHALL BE SCHEDULE 40 BLACK STEEL.
13. ALL PIPING 2½” AND LARGER SHALL BE SCHEDULE 10 BLACK STEEL.
14. PIPE SIZES SHOWN ARE FOR BIDDING PURPOSES ONLY. DIMENSIONAL DATA (CENTER-TO-CENTER DISTANCES, ELEVATIONS, CLEARANCES, PIPE SIZES, ETC.) SHOWN ON DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BE COORDINATED AND CONFIRMED BY THE CONTRACTOR. ACTUAL INSTALLATION MAY REQUIRE ADDITIONAL OFFSETS, TRANSITIONS, REROUTING OF PIPING, AND ADJUSTMENT OF SPRINKLER HEAD LOCATIONS AS REQUIRED FOR COORDINATION WITH ACTUAL FIELD CONDITIONS AT NO ADDITIONAL COST TO OWNER.
15. CONTRACTOR SHALL PROTECT SYSTEM FROM FREEZING PRIOR TO ACCEPTANCE BY OWNER.
16. SPRINKLERS SHALL BE PROTECTED FROM MECHANICAL DAMAGE.
17. IF A FIRE AND/OR SMOKE RATED WALL/CEILING/FLOOR IS PENETRATED BY PIPING, THE PENETRATIONS SHALL BE SEALED AROUND THE PIPE WITH A LISTED FIRESTOPPING ASSEMBLY.
18. WHETHER INDICATED ON THE DRAWINGS OR NOT, THE FOLLOWING IS TO BE PROVIDED IN ACCORDANCE WITH NFPA
    a. SUPERVISION OF VALVES CONTROLLING WATER SUPPLIES
    b. ADEQUATE SUPPORT OF ALL PIPE AND COMPONENTS.
    c. PROVISION FOR FLUSHING AND DRAINING ALL PIPING.
    d. SYSTEM INSPECTOR'S TEST CONNECTION AT MOST REMOTE LOCATION.
    e. SYSTEM TESTING INCLUDING HYDROSTATIC TESTING PER NFPA.
    f. SIGNAGE / MARKING OF PIPING.
19. EXISTING SYSTEMS ARE NOT BRACED FOR SEISMIC LOADS THEREFORE, NO SEISMIC BRACING REQUIRED.

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08/26/2022

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DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

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3505 FREDERICK AVENUE ST. JOSEPH, MO 64506

PROJECT # M2005-01
ASSET # 6517353016

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DESIGNED BY:	RP

SHEET TITLE:

GENERAL NOTES, DETAILS & PLANS

SHEET NUMBER:

FP-01

POSSIBLE LOCATION FOR ATTIC ACCESS.
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○ ½" ORIFICE, K=5.60 QUICK RESPONSE STANDARD SPRAY BRASS UPRIGHT, INTERMEDIATE TEMPERATURE RATING.

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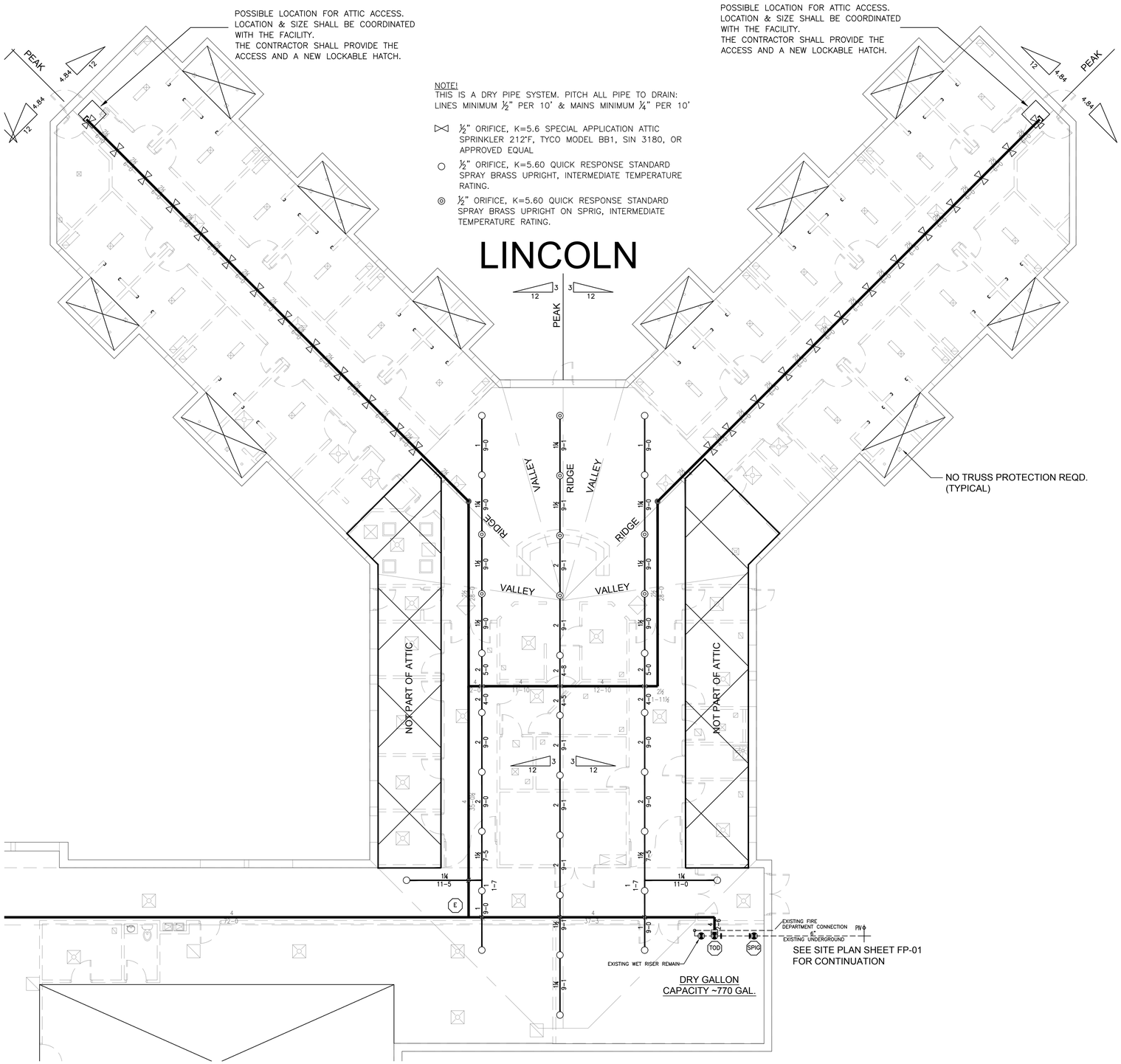
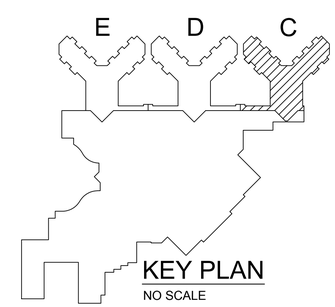
LINCOLN





NORTH

LINCOLN WING ATTIC DRY SYSTEM

SCALE 1/8"=1'-0"

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LINCOLN WING ATTIC DRY PIPE SPRINKLER

SHEET NUMBER:

FP-02

03 OF 07 SHEETS

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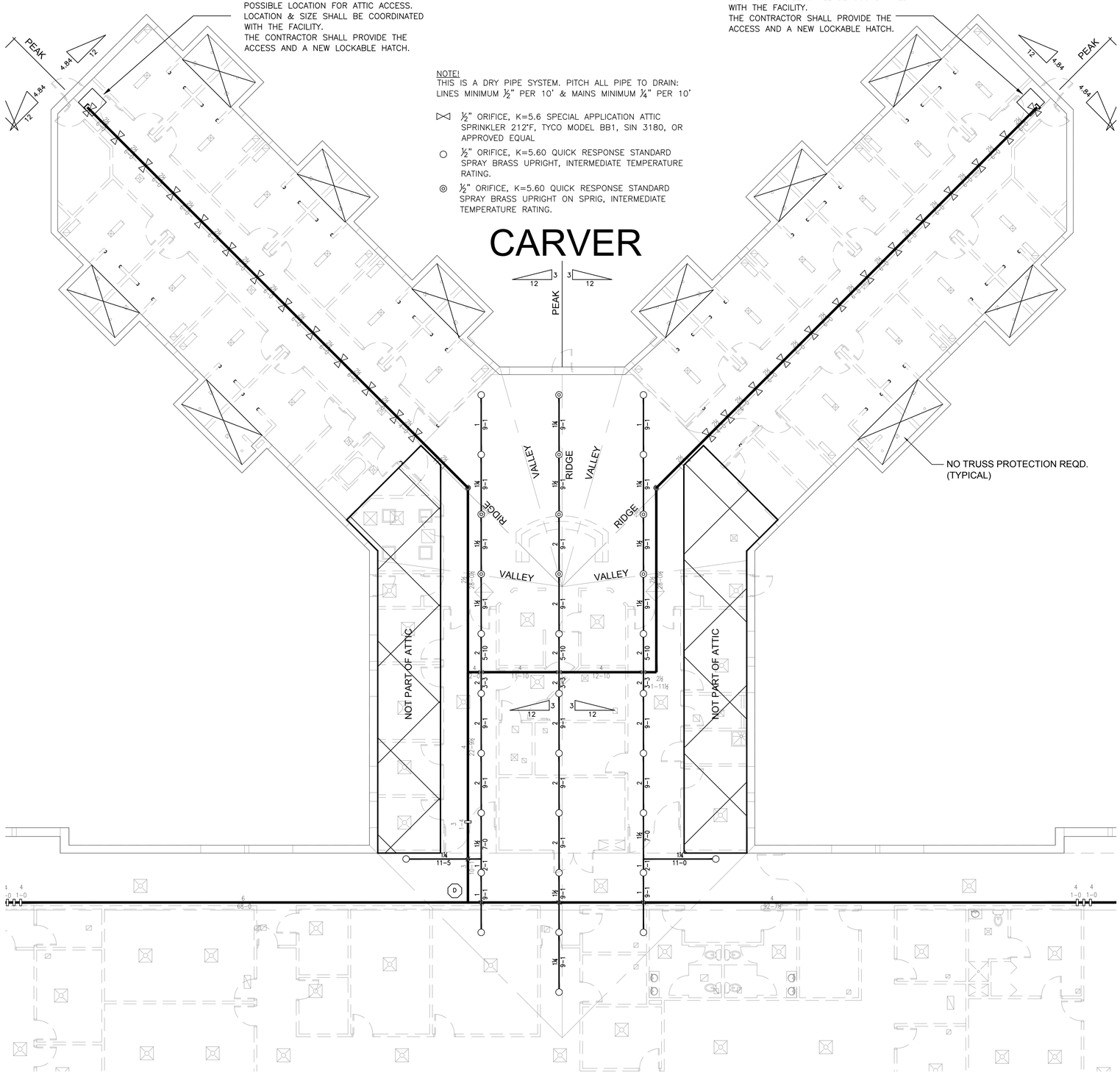
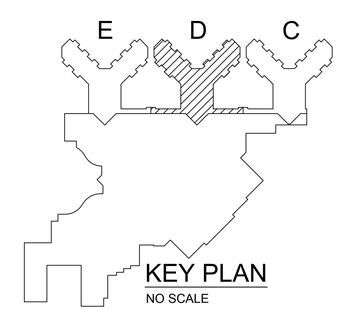
CARVER





KEY PLAN
NO SCALE

NORTH

CARVER WING ATTIC DRY SYSTEM

SCALE 1/8"=1'-0"

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CARVER WING ATTIC DRY PIPE SPRINKLER

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FP-03

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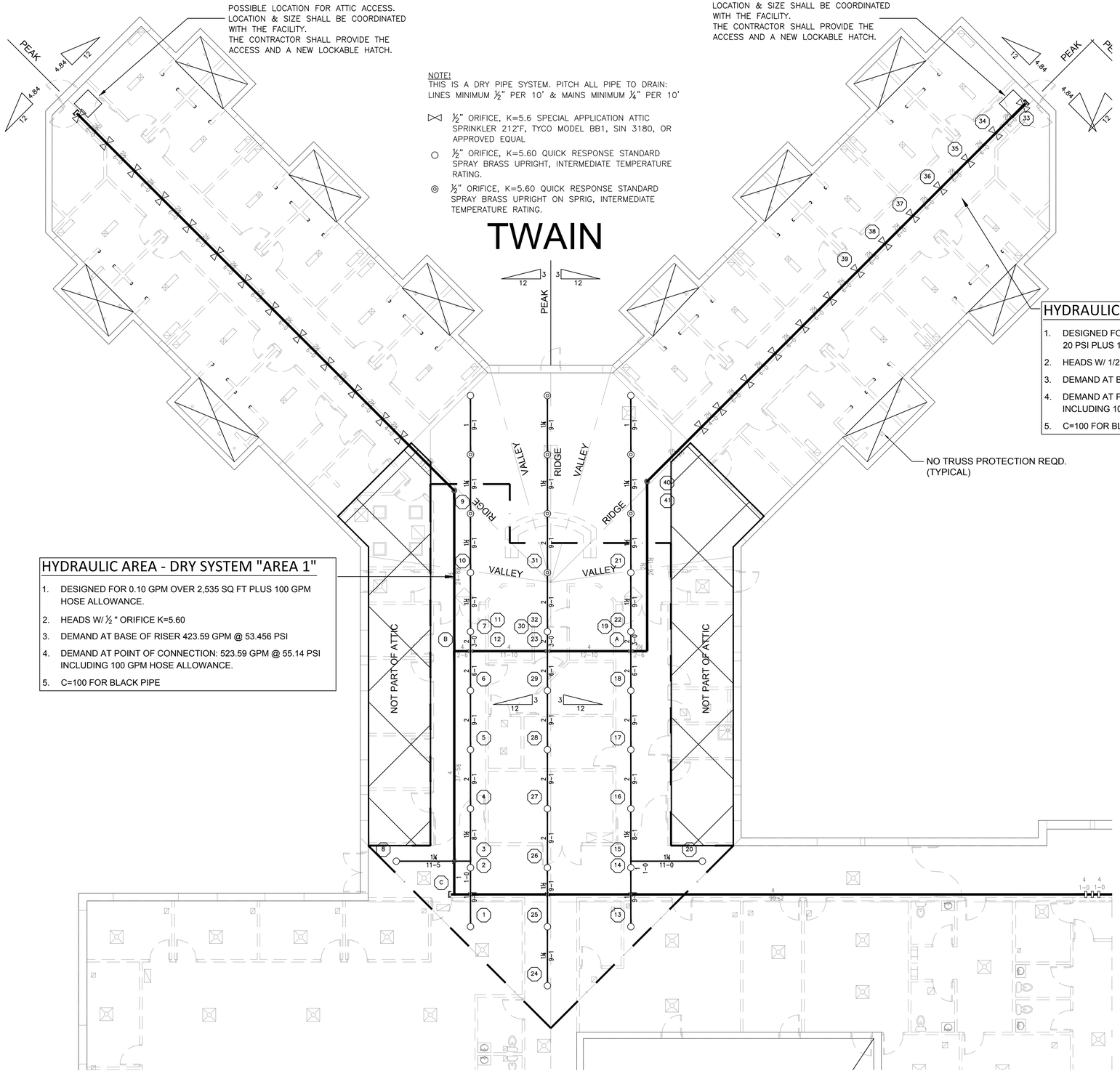
TWAIN

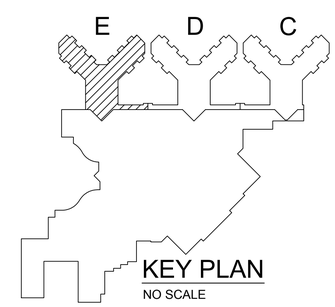


HYDRAULIC AREA - DRY SYSTEM "AREA 2"

1. DESIGNED FOR (7) HEADS OPERATING AT MINIMUM 25 GPM @ 20 PSI PLUS 100 GPM FOR HOSE ALLOWANCE
2. HEADS W/ 1/2" ORIFICE K=5.60
3. DEMAND AT BASE OF RISER 177.24 GPM @ 48.92 PSI
4. DEMAND AT POINT OF CONNECTION: 277.24 GPM @ 49.59 PSI INCLUDING 100 GPM HOSE ALLOWANCE
5. C=100 FOR BLACK PIPE

HYDRAULIC AREA - DRY SYSTEM "AREA 1"

1. DESIGNED FOR 0.10 GPM OVER 2,535 SQ FT PLUS 100 GPM HOSE ALLOWANCE.
2. HEADS W/ ½ " ORIFICE K=5.60
3. DEMAND AT BASE OF RISER 423.59 GPM @ 53.456 PSI
4. DEMAND AT POINT OF CONNECTION: 523.59 GPM @ 55.14 PSI INCLUDING 100 GPM HOSE ALLOWANCE.
5. C=100 FOR BLACK PIPE



KEY PLAN
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NORTH

TWAIN WING ATTIC DRY SYSTEM

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TWAIN WING ATTIC DRY PIPE SPRINKLER

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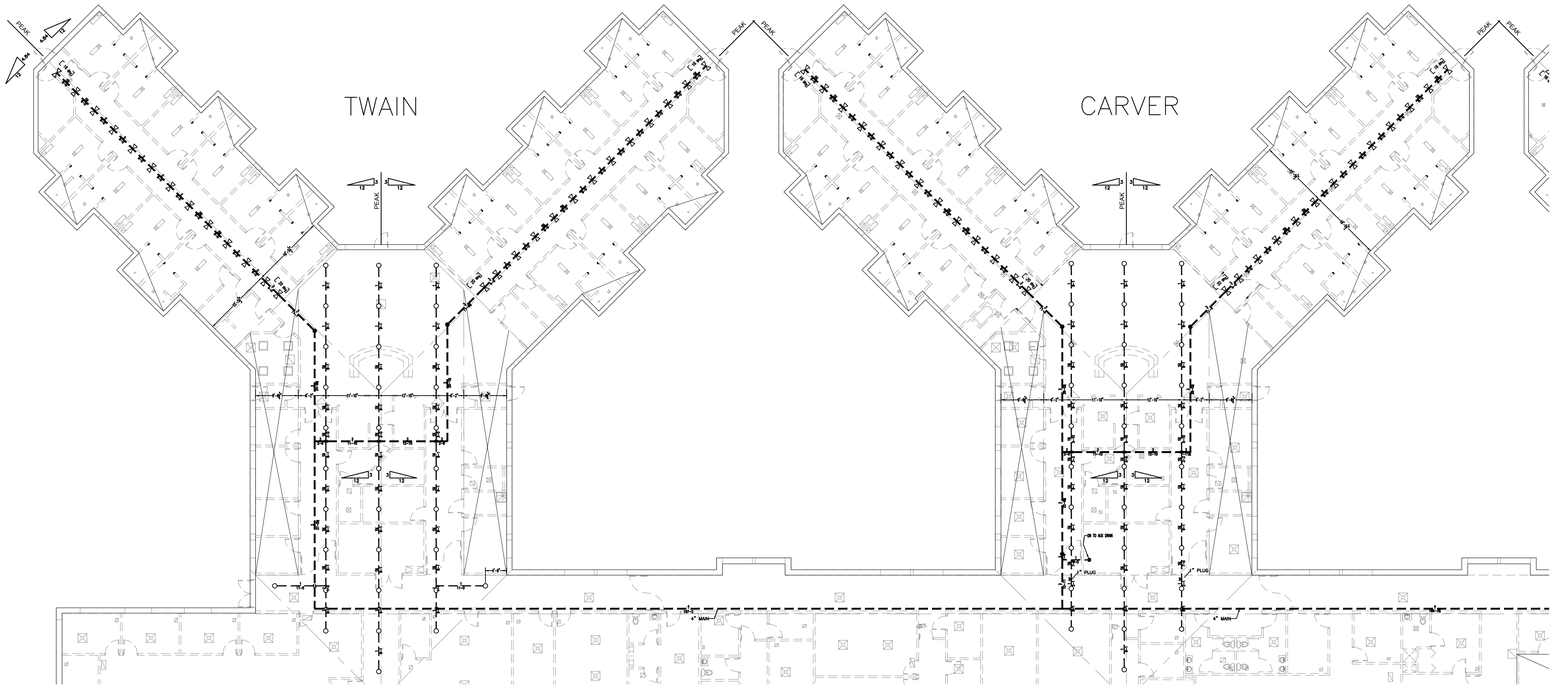
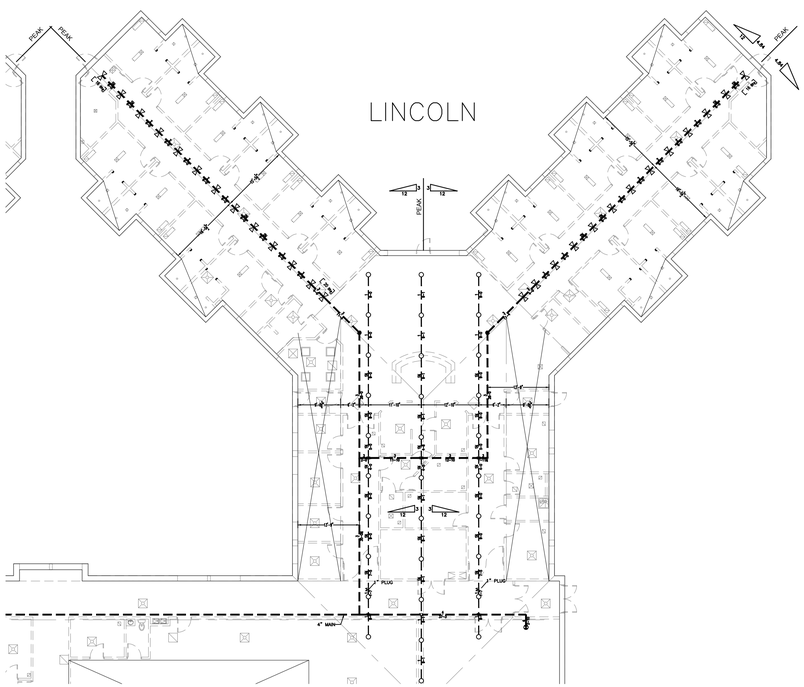
FP-04



NORTH

PARTIAL ATTIC DRY SYSTEM DEMO PLAN

SCALE 1/16"=1'-0"



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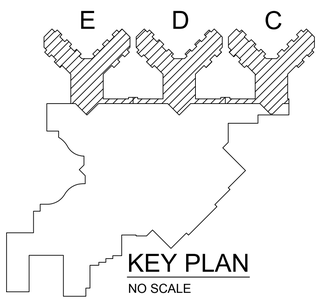

KEY PLAN

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DEMO EXISTING ATTIC DRY SYSTEM

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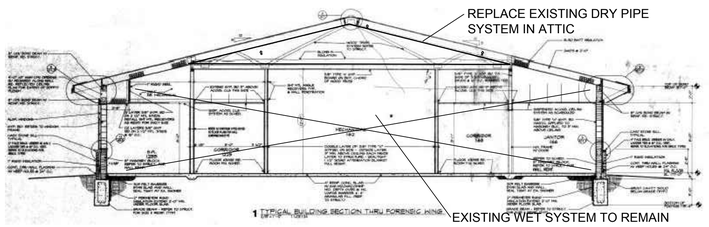
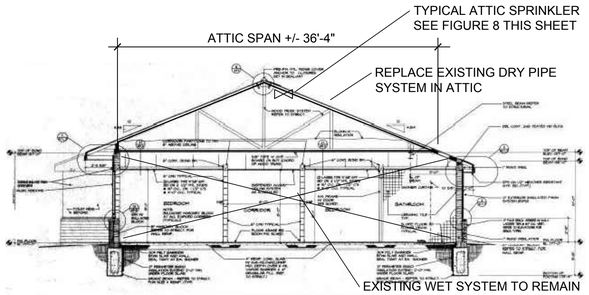
06 OF 07 SHEETS



1 TYPICAL BUILDING SECTION THRU FORENSIC KING



2 TYPICAL BUILDING SECTION THRU FORENSIC BEDROOM KING

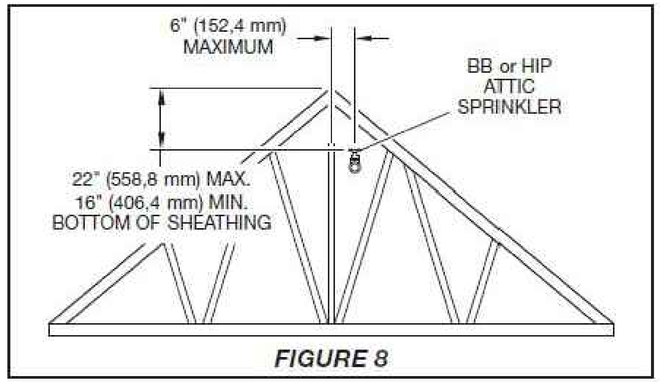
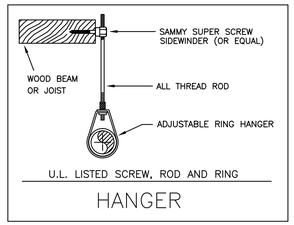
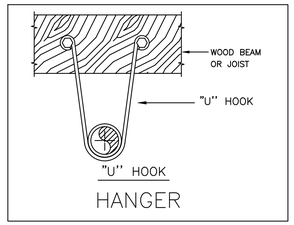


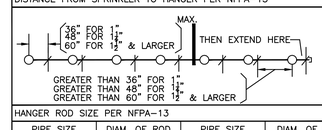
FIGURE 8





MAXIMUM DISTANCE BETWEEN HANGERS (FT–IN.) PER NFPA–13									
PIPE SIZE	3/4"	1"	1¼"	1½"	2"	2½"	3"	4"	6"
STEEL PIPE	N/A	12–0	12–0	15–0	15–0	15–0	15–0	15–0	15–0

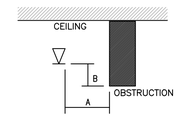
DISTANCE FROM SPRINKLER TO HANGER PER NFPA–13



HANGER ROD SIZE PER NFPA–13

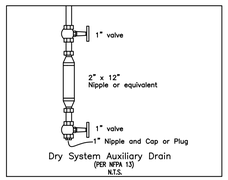
PIPE SIZE	DIAM. OF ROD	PIPE SIZE	DIAM. OF ROD
UP TO AND INCLUDEING 4"	3/8"	6" AND 8"	1/2"

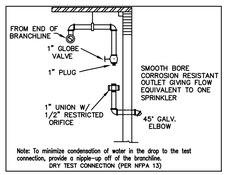
HANGER SPACING CHART

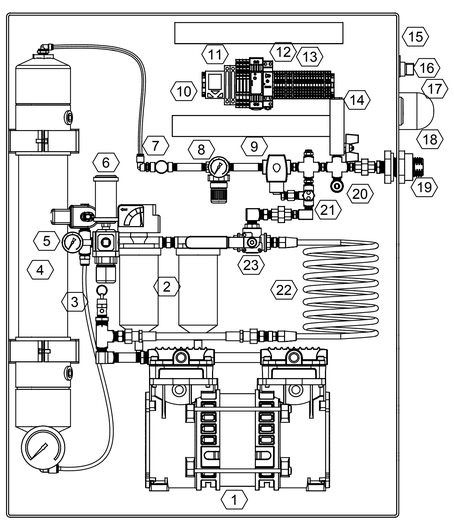


DISTANCE FROM SPRINKLERS TO SIDE OF OBSTRUCTION (A)	MAXIMUM ALLOWABLE DISTANCE OF DEFLECTOR ABOVE BOTTOM OF OBSTRUCTION (IN.) (B)
LESS THAN 1 FT	0
ONE FT TO LESS THAN 1 FT 6 IN.	2–1/2"
1 FT 6 IN. TO LESS THAN 2 FT	3–1/2"
2 FT TO LESS THAN 2 FT 6 IN	5–1/2"
2 FT 6 IN. TO LESS THAN 3 FT	7–1/2"
3 FT TO LESS THAN 3 FT 6 IN	9–1/2"
3 FT 6 IN. TO LESS THAN 4 FT	12"
4 FT TO LESS THAN 4 FT 6 IN	14"
4 FT 6 IN. TO LESS THAN 5 FT	16–1/2"
5 FT AND GREATER	18"

POSITIONING OF SPRINKLERS TO AVOID OBSTRUCTIONS TO DISCHARGE (SSU/SSP)







NITROGEN GENERATOR CABINET - SCHEMATIC

(NO SCALE)

NITROGEN GENERATOR:

SHOWN HERE IS AN ECS CORROSION CONTROL MODEL PGEN-10 FOR REFERENCE ONLY. THE CONTRACTOR SHALL PROVIDE A PROPERLY SIZED, APPROVED AND LISTED NITROGEN GENERATOR UNIT IN A CABINET AS A SINGLE UNIT.

LEGEND: ⟨XX⟩

1. AIR COMPRESSOR
2. FILTERS - COALESCING & WATER SEPARATOR
3. PRESSURE RELIEF VALVE
4. NITROGEN MEMBRANE
5. EXCESS AIR REGULATOR
6. EXCESS AIR MUFFLER
7. FLOW CONTROL VALVE
8. NITROGEN BACK PRESSURE REGULATOR & GAUGE
9. NITROGEN PRODUCTION SOLENOID
10. PRESSURE TRANSDUCER
11. SYSTEM MONITORING SIGNAL CONNECTIONS, RELAYS, & FUSES
12. RUN-TIME COUNTER MODULE
13. 120 VAC POWER CONNECTIONS
14. FLOW METER
15. GENERATOR RUN TIME CYCLE COUNTER
16. ON/OFF POWER SWITCH
17. BYPASS ALARM INDICATOR
18. GENERATOR RUN TIME HOUR METER
19. NITROGEN OUTLET
20. NITROGEN SAMPLING PORT
21. BYPASS ALARM SENSOR
22. AFTER COOLER
23. BYPASS VALVE

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	ALL SPACES ARE LIGHT HAZARD UNLESS NOTED OTHERWISE
[?-?]	DIMENSION FROM FINISHED FLOOR UP TO CENTERLINE OF PIPE (FEET & INCHES)
[? Bts]	DIMENSION FROM BOTTOM OF DECK, DOWN TO CENTERLINE OF PIPE (INCHES)
(?–?)	CEILING HEIGHT
(?)	HYDRAULIC CALCULATION REFERENCE POINT
▪▪▪▪▪	EXISTING SPRINKLER SYSTEM PIPING
▬▬▬	NEW SPRINKLER SYSTEM PIPING

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR

STATE OF MISSOURI
H. D. DOSHI
NUMBER PE-16482
REGISTERED PROFESSIONAL ENGINEER
08/26/2022

FSC, Inc.
CONSULTING ENGINEERS
SINCE 1979
8675 West 96th Street
Overland Park, KS 66212
Phone 913.722.3473

FSC Project # F19038

OFFICE OF ADMINISTRATION

DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

DEPARTMENT OF MENTAL HEALTH

RE-BID-REPLACE DRY PIPE SPRINKLER SYSTEM

NORTHWEST MISSOURI PSYCHIATRIC REHABILITATION CENTER

3505 FREDERICK AVENUE ST. JOSEPH, MO 64506

PROJECT # M2005-01
ASSET # 6517353016

REVISION: -
DATE: -
REVISION: -
DATE: -
REVISION: -
DATE: -
ISSUE DATE: 08/26/2022

CAD DWG FILE: F19038-SPRK.DWG
DRAWN BY: BC / RP
CHECKED BY: HD
DESIGNED BY: RP

SHEET TITLE:

SECTIONS AND DETAILS

SHEET NUMBER:

FP-06

07 OF 07 SHEETS