


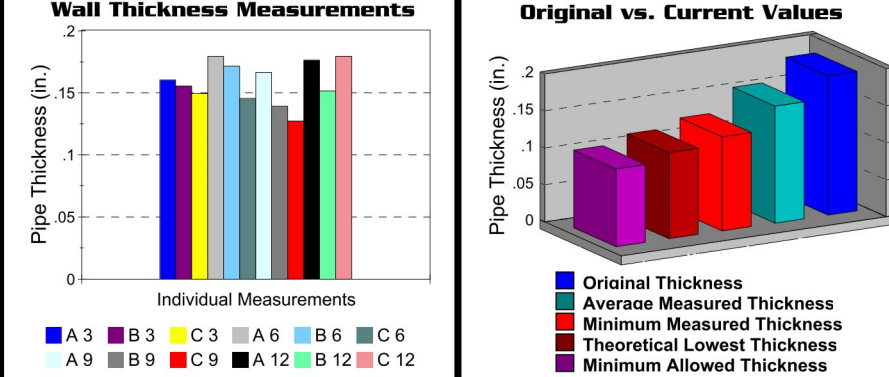
Test Location No: 1

Piping Technicalities
 Location - Health Science Building 1st Floor Fire Pump Room. Fire sprinkler main supply line to the fire pump. Test points located 1-24 in. above main location valve.

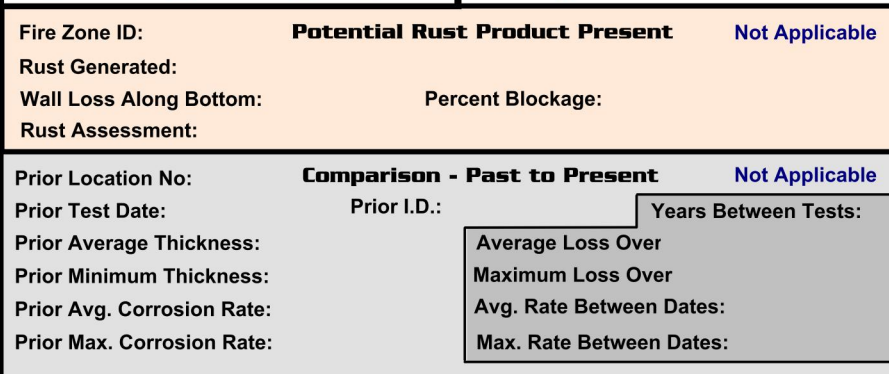
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-8-01 Field No: 1
 Nominal Pipe Size: 8 in. Actual: 8.625 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 10
 Construction: Grooved-Rolled
 Flow: Supply To Pumps
 Pipe Orientation: Vertical
 Pressure: 70 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.000 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: None Observed
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.189 in.**
 ASTM Wall Thickness: **0.189 in.**
 Barlow Calculated Minimum: **0.044 in.**
 Default Minimum Wall: **0.105 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Default Minimum
 High To Low Range: 0.092 in.
 Proximity To Threads Or Groove Cut: Not Applicable
 Standard Deviation: 0.017
 Pitting Index: 19.66 High Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.158 in.**
 Average Pipe Loss: 0.030 in.
 Average Corrosion Rate: 2.7 mpy
 Percent of Allowable Loss: 36.0 %
 Average Pipe Life: 40.7 years
 Estimated Retirement: **April 2054**

Minimum Based Scenario
 Minimum Wall Thickness: **0.127 in.**
 Maximum Pipe Loss: 0.061 in.
 Maximum Corrosion Rate: 2.7 mpy
 Percent of Allowable Loss: 73.5 %
 Minimum Pipe Life: 8.3 years
 Estimated Retirement: **November 2031**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.116 in.**
 Theoretical Pipe Loss: 0.072 in.
 Theoretical Corrosion Rate: 3.1 mpy
 Percent of Allowable Loss: 86.4 %
 Lowest Theoretical Life: 3.6 years
 Estimated Retirement: **March 2027**

Testing Indicators: Pipe is Approaching Retirement


Overall Assessment: We measure higher than normal corrosion and pitting activity at this example, which is not unusual for pump related fire pipe having more flow and oxygen content. We estimate some service life available but still show the pipe approaching retirement.

August 24, 2023 Page 47

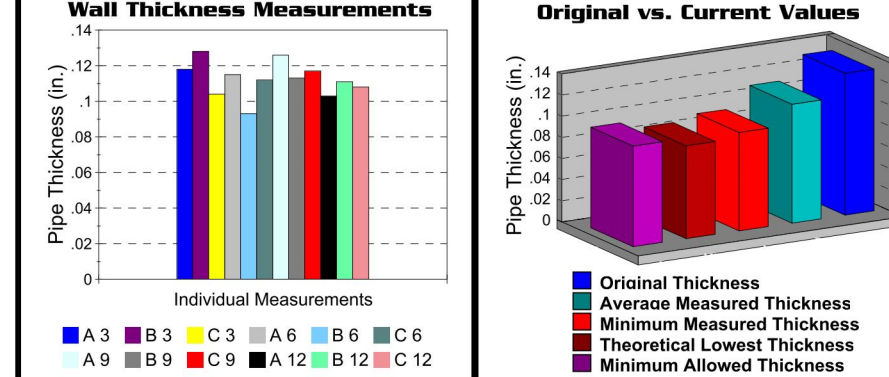
Test Location No: 4

Piping Technicalities
 Location - Health Science Building 1st Floor Fire Pump Room. Fire sprinkler FDC connection. Test points located between valve and elbow.

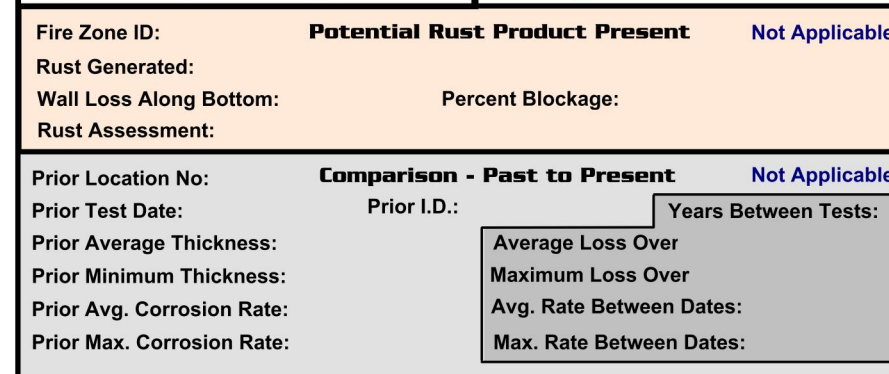
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-8-06 Field No: 6
 Nominal Pipe Size: 6 in. Actual: 6.625 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 10
 Construction: Grooved-Rolled
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 70 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.000 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: None Observed
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.134 in.**
 ASTM Wall Thickness: **0.134 in.**
 Barlow Calculated Minimum: **0.038 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Default Minimum
 High To Low Range: 0.035 in.
 Proximity To Threads Or Groove Cut: Not Applicable
 Standard Deviation: 0.010
 Pitting Index: 17.21 High Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.112 in.**
 Average Pipe Loss: 0.022 in.
 Average Corrosion Rate: 1.9 mpy
 Percent of Allowable Loss: 55.6 %
 Average Pipe Life: 18.4 years
 Estimated Retirement: **December 2041**

Minimum Based Scenario
 Minimum Wall Thickness: **0.093 in.**
 Maximum Pipe Loss: 0.041 in.
 Maximum Corrosion Rate: 1.9 mpy
 Percent of Allowable Loss: 100.0 %
 Minimum Pipe Life: 0.0 years
 Estimated Retirement: **August 2023**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.088 in.**
 Theoretical Pipe Loss: 0.040 in.
 Theoretical Corrosion Rate: 2.0 mpy
 Percent of Allowable Loss: 100.0 %
 Lowest Theoretical Life: 0.0 years
 Estimated Retirement: **August 2023**

Testing Indicators: Pipe Replacement Indicated


Overall Assessment: We produce dramatically different results for this fire department connection, which is extremely common since the pipe is typically partially filled. Lowest wall thickness has reached below minimum standards. High pitting and low thickness measurements suggest that no further reliable service life is available.

August 24, 2023 Page 50

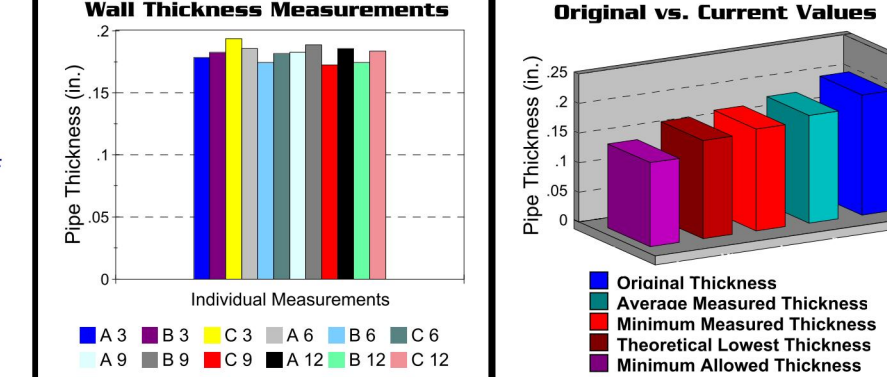
Test Location No: 13

Piping Technicalities
 Location - Health Science Building 1st Floor Fire Pump Room. Fire sprinkler FDC connection. Test points located between wall and valve.

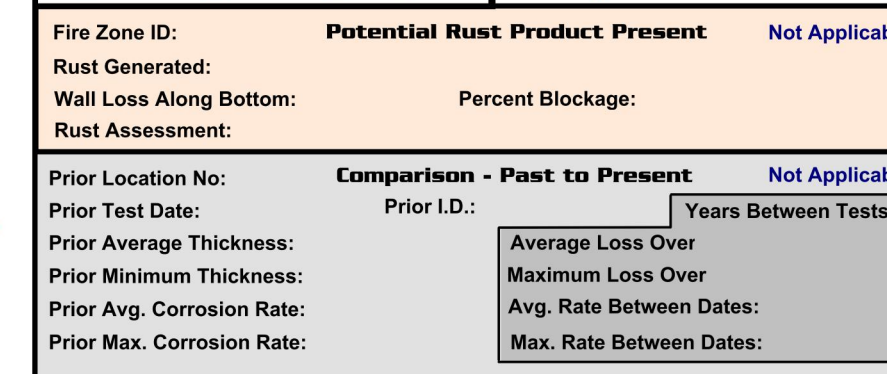
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-2-12-61 Field No: 61
 Nominal Pipe Size: 2-1/2 in. Actual: 2.875 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 155 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.105 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: Thread Leak
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.203 in.**
 ASTM Wall Thickness: **0.203 in.**
 Barlow Calculated Minimum: **0.042 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.142 in.**
 Minimum Value Based On: Barlow
 High To Low Range: 0.021 in.
 Proximity To Threads Or Groove Cut: 0.067 in.
 Standard Deviation: 0.006
 Pitting Index: 5.19 Low Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.181 in.**
 Average Pipe Loss: 0.022 in.
 Average Corrosion Rate: 1.9 mpy
 Percent of Allowable Loss: 35.2 %
 Average Pipe Life: 42.3 years
 Estimated Retirement: **November 2055**

Minimum Based Scenario
 Minimum Wall Thickness: **0.172 in.**
 Maximum Pipe Loss: 0.031 in.
 Maximum Corrosion Rate: 1.4 mpy
 Percent of Allowable Loss: 50.5 %
 Minimum Pipe Life: 22.5 years
 Estimated Retirement: **January 2046**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.166 in.**
 Theoretical Pipe Loss: 0.037 in.
 Theoretical Corrosion Rate: 1.6 mpy
 Percent of Allowable Loss: 60.2 %
 Lowest Theoretical Life: 15.1 years
 Estimated Retirement: **September 2038**

Testing Indicators: Pipe Replacement is Mandatory

Overall Assessment: Testing at this smaller threaded hose connection identifies schedule 40 pipe. We observed signs of water damage to the wall below, and rust at the threads which suggests that some installation deficiency has resulted in a thread leak. Based on our wall thickness readings alone, very long service life remains.

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Test Location No: 35

Piping Technicalities
 Location - Health Science Building 1st Floor Fire Pump Room. Fire sprinkler jockey pump. Test points located between valve and elbow.

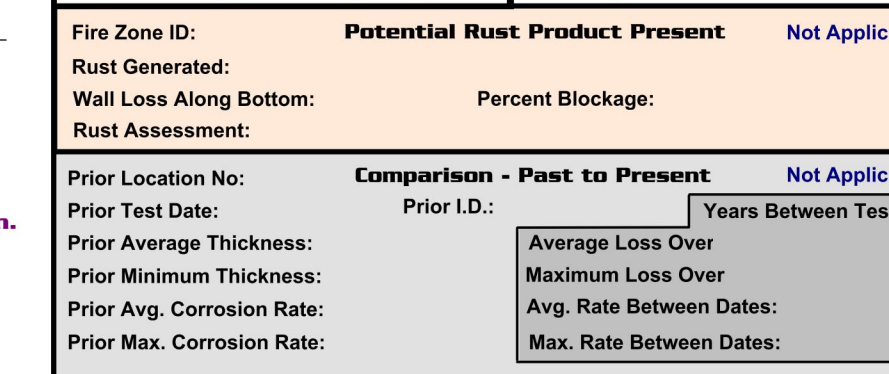
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-1-14-04 Field No: 4
 Nominal Pipe Size: 1-1/4 in. Actual: 1.660 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Make-Up
 Pipe Orientation: Horizontal
 Pressure: 70 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.073 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: Thread Leak
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.140 in.**
 ASTM Wall Thickness: **0.140 in.**
 Barlow Calculated Minimum: **0.094 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Defined Minimum
 High To Low Range: 0.022 in.
 Proximity To Threads Or Groove Cut: 0.029 in.
 Standard Deviation: 0.008
 Pitting Index: 10.72 Mild Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.114 in.**
 Average Pipe Loss: 0.028 in.
 Average Corrosion Rate: 1.7 mpy
 Percent of Allowable Loss: 57.2 %
 Average Pipe Life: 17.2 years
 Estimated Retirement: **September 2040**

Minimum Based Scenario
 Minimum Wall Thickness: **0.102 in.**
 Maximum Pipe Loss: 0.038 in.
 Maximum Corrosion Rate: 1.7 mpy
 Percent of Allowable Loss: 84.4 %
 Minimum Pipe Life: 4.2 years
 Estimated Retirement: **October 2027**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.098 in.**
 Theoretical Pipe Loss: 0.042 in.
 Theoretical Corrosion Rate: 1.8 mpy
 Percent of Allowable Loss: 92.6 %
 Lowest Theoretical Life: 1.8 years
 Estimated Retirement: **June 2025**

Testing Indicators: Pipe Replacement is Mandatory


Overall Assessment: Testing at this jockey pump line produces still good results. A higher movement of water often deteriorates this smaller threaded pipe ahead of all other examples. A thread leak at the joint defines its replacement as mandatory.

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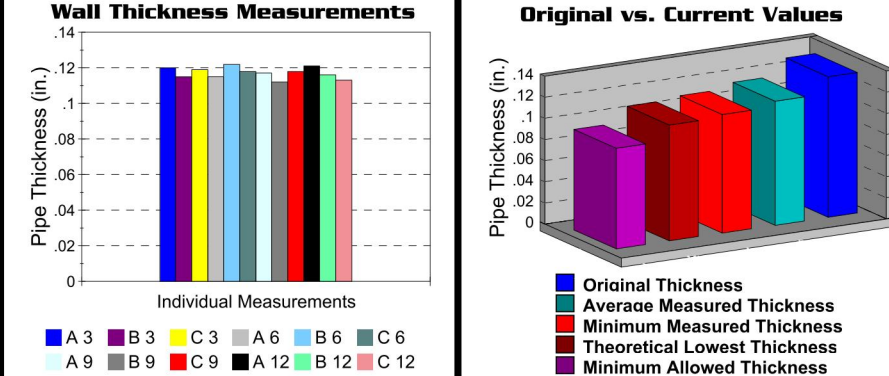
Test Location No: 38

Piping Technicalities
 Location - Health Science Building 1st Floor Community Room 115. Fire sprinkler branch line to sprinkler head. Test points located between elbows.

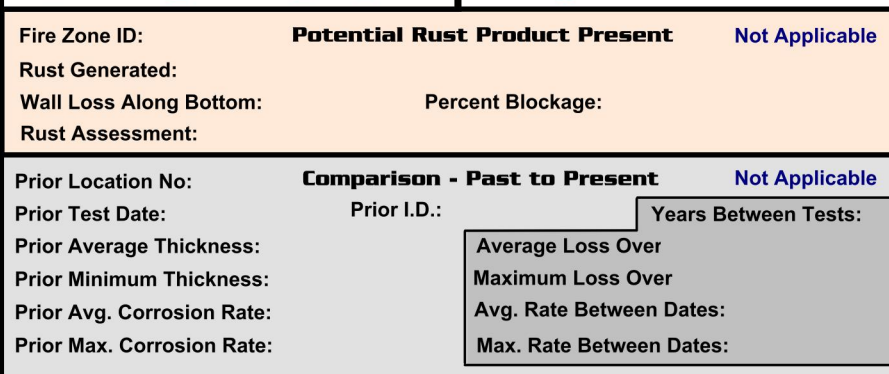
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-1-25 Field No: 25
 Nominal Pipe Size: 1 in. Actual: 1.315 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 155 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.073 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: Nearby Thread Leak
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.133 in.**
 ASTM Wall Thickness: **0.133 in.**
 Barlow Calculated Minimum: **0.098 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Defined Minimum
 High To Low Range: 0.010 in.
 Proximity To Threads Or Groove Cut: 0.039 in.
 Standard Deviation: 0.003
 Pitting Index: 4.41 Very Low Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.117 in.**
 Average Pipe Loss: 0.016 in.
 Average Corrosion Rate: 0.7 mpy
 Percent of Allowable Loss: 41.7 %
 Average Pipe Life: 32.1 years
 Estimated Retirement: **September 2055**

Minimum Based Scenario
 Minimum Wall Thickness: **0.112 in.**
 Maximum Pipe Loss: 0.021 in.
 Maximum Corrosion Rate: 0.9 mpy
 Percent of Allowable Loss: 55.3 %
 Minimum Pipe Life: 18.6 years
 Estimated Retirement: **March 2048**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.109 in.**
 Theoretical Pipe Loss: 0.024 in.
 Theoretical Corrosion Rate: 1.0 mpy
 Percent of Allowable Loss: 62.1 %
 Lowest Theoretical Life: 14.0 years
 Estimated Retirement: **August 2037**

Testing Indicators: Pipe Replacement is Mandatory


Overall Assessment: Testing at this portion of the pipe length produces good results in terms of remaining wall thickness, but also identifies a nearby leak at a threaded connection. A thread leak at this branch line defines pipe replacement as mandatory.

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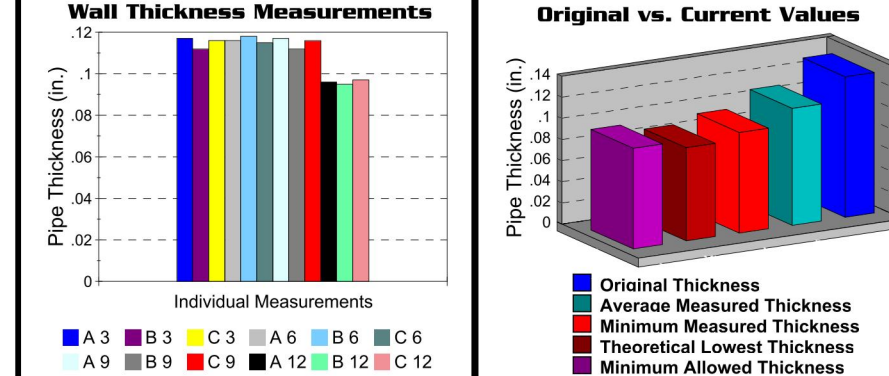
Test Location No: 39

Piping Technicalities
 Location - Health Science Building 1st Floor Community Room 115. Fire sprinkler branch line to sprinkler head in front of storage room 114. Test points located between elbows, 1st 8 measurements at random, last 3 at weld seam.

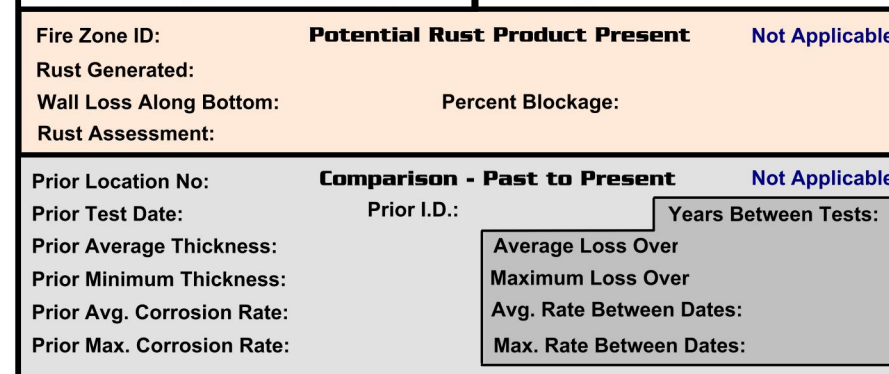
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-1-27 Field No: 27
 Nominal Pipe Size: 1 in. Actual: 1.315 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 155 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.073 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: None Observed
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.133 in.**
 ASTM Wall Thickness: **0.133 in.**
 Barlow Calculated Minimum: **0.098 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Defined Minimum
 High To Low Range: 0.022 in.
 Proximity To Threads Or Groove Cut: 0.041 in.
 Standard Deviation: 0.001
 Pitting Index: 14.09 Moderate Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.111 in.**
 Average Pipe Loss: 0.022 in.
 Average Corrosion Rate: 1.0 mpy
 Percent of Allowable Loss: 59.0 %
 Average Pipe Life: 18.0 years
 Estimated Retirement: **July 2039**

Minimum Based Scenario
 Minimum Wall Thickness: **0.095 in.**
 Maximum Pipe Loss: 0.039 in.
 Maximum Corrosion Rate: 1.7 mpy
 Percent of Allowable Loss: 100.0 %
 Minimum Pipe Life: 0.0 years
 Estimated Retirement: **August 2023**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.088 in.**
 Theoretical Pipe Loss: 0.045 in.
 Theoretical Corrosion Rate: 2.0 mpy
 Percent of Allowable Loss: 20.0 %
 Lowest Theoretical Life: 0.0 years
 Estimated Retirement: **August 2023**

Testing Indicators: Pipe Replacement Indicated


Overall Assessment: Low wall thickness measurements at this pipe section were specifically identified along the ERW weld seam. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. Low thickness measurements at the weld seam suggest that no further reliable service life is available. Pipe wall exists 22 mils from the thread cut.

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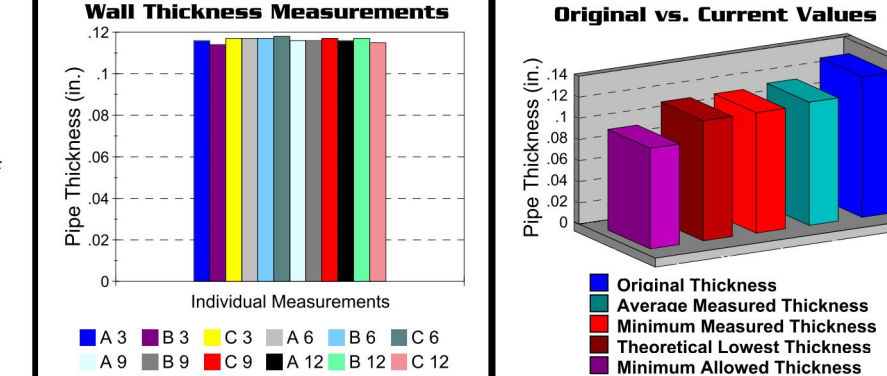
Test Location No: 40

Piping Technicalities
 Location - Health Science Building 1st Floor Community Room 115. Fire sprinkler branch line to sprinkler head, in seating area. Test points located between elbows.

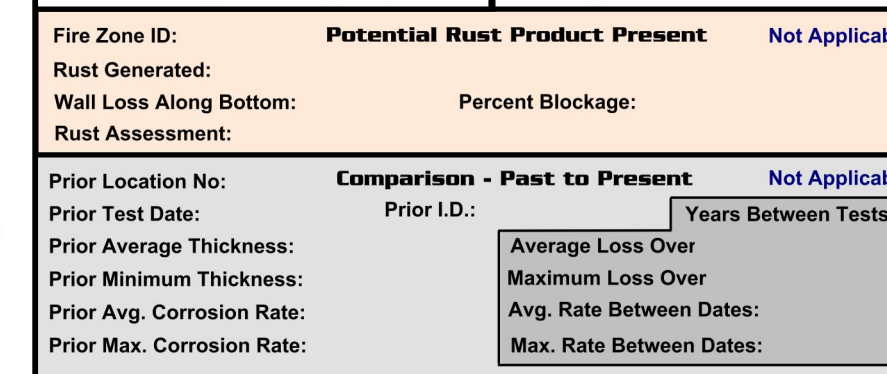
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-1-26 Field No: 26
 Nominal Pipe Size: 1 in. Actual: 1.315 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 155 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.073 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: Thread Leak
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.133 in.**
 ASTM Wall Thickness: **0.133 in.**
 Barlow Calculated Minimum: **0.098 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Defined Minimum
 High To Low Range: 0.041 in.
 Proximity To Threads Or Groove Cut: 0.041 in.
 Standard Deviation: 0.001
 Pitting Index: 2.01 Insignificant Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.116 in.**
 Average Pipe Loss: 0.017 in.
 Average Corrosion Rate: 0.7 mpy
 Percent of Allowable Loss: 43.9 %
 Average Pipe Life: 29.4 years
 Estimated Retirement: **December 2058**

Minimum Based Scenario
 Minimum Wall Thickness: **0.114 in.**
 Maximum Pipe Loss: 0.019 in.
 Maximum Corrosion Rate: 0.8 mpy
 Percent of Allowable Loss: 50.0 %
 Minimum Pipe Life: 23.0 years
 Estimated Retirement: **July 2046**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.114 in.**
 Theoretical Pipe Loss: 0.019 in.
 Theoretical Corrosion Rate: 0.8 mpy
 Percent of Allowable Loss: 50.9 %
 Lowest Theoretical Life: 22.1 years
 Estimated Retirement: **September 2045**

Testing Indicators: Pipe Replacement is Mandatory


Overall Assessment: Based on our wall thickness readings alone, we still estimate long service life remaining. However, a thread leak at this pipe section defines its replacement as mandatory.

August 24, 2023 Page 86

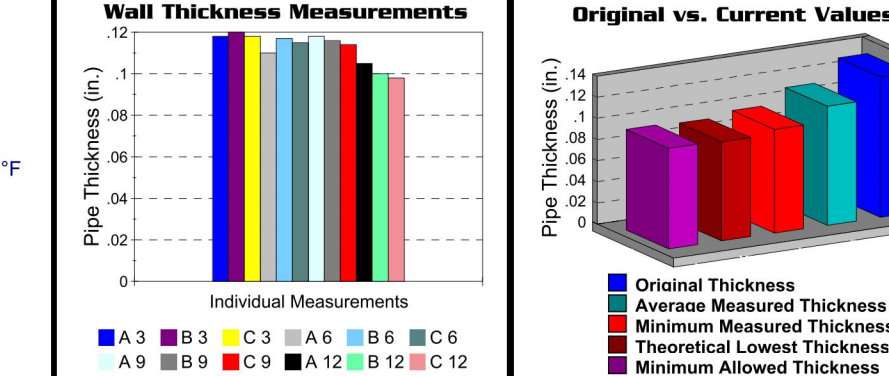
Test Location No: 43

Piping Technicalities
 Location - Health Science Building 1st Floor Community Room 117. Fire sprinkler branch line to sprinkler head. Test points located between elbows, 1st 9 measurements at random, last 3 at weld seam.

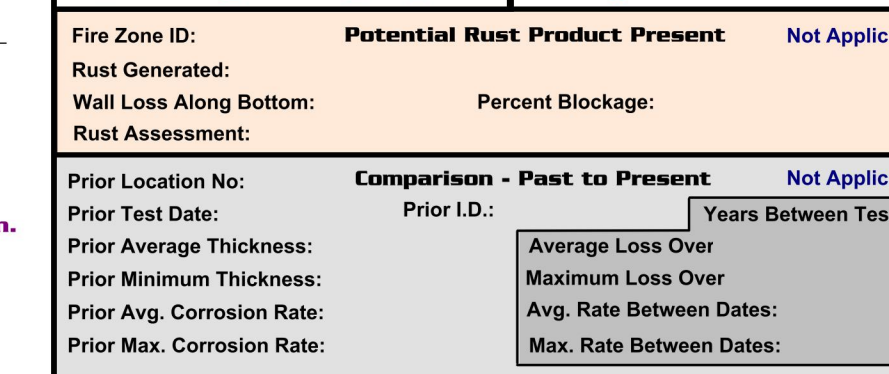
Pipe Service: **Fire Sprinkler**
 Placed In Service: September 1, 2000
 Date Source: Building Construction
 Date Of Test: August 9, 2023
 In Service: 23.0 years Corrosion Period: 23.0 years
 Test Site ID: 1-FS-1-29 Field No: 29
 Nominal Pipe Size: 1 in. Actual: 1.315 in.
 Material: Carbon Steel
 Stress Value: 12,800 psi
 Manufacturer: Unknown
 Schedule / Type: Schedule 40
 Construction: Threaded
 Flow: Supply To Building
 Pipe Orientation: Horizontal
 Pressure: 155 psi Temperature: 75 °F
 Test Pattern: Random Points
 Depth Allowance: 0.073 in.
 External PI Depth: 0.000 in.
 Abnormal Condition: None Observed
 Drawing / Reference No: n/a
 UT Technician: William P. Duncan III



Wall Thickness Measurements



Original vs. Current Values



Base Statistical Calculations
 Reported Wall Thickness: **0.133 in.**
 ASTM Wall Thickness: **0.133 in.**
 Barlow Calculated Minimum: **0.098 in.**
 Default Minimum Wall: **0.095 in.**
 Minimum Allowable Thickness: **0.095 in.**
 Minimum Value Based On: Defined Minimum
 High To Low Range: 0.022 in.
 Proximity To Threads Or Groove Cut: 0.025 in.
 Standard Deviation: 0.007
 Pitting Index: 12.82 Moderate Pitting Activity

Average Based Scenario
 Average Wall Thickness: **0.112 in.**
 Average Pipe Loss: 0.021 in.
 Average Corrosion Rate: 0.9 mpy
 Percent of Allowable Loss: 54.2 %
 Average Pipe Life: 19.4 years
 Estimated Retirement: **January 2043**

Minimum Based Scenario
 Minimum Wall Thickness: **0.098 in.**
 Maximum Pipe Loss: 0.035 in.
 Maximum Corrosion Rate: 1.5 mpy
 Percent of Allowable Loss: 92.1 %
 Minimum Pipe Life: 2.0 years
 Estimated Retirement: **July 2025**

Theoretical Based Scenario
 Theoretically Lowest Thickness: **0.094 in.**
 Theoretical Pipe Loss: 0.039 in.
 Theoretical Corrosion Rate: 1.7 mpy
 Percent of Allowable Loss: 100.0 %
 Lowest Theoretical Life: 0.0 years
 Estimated Retirement: **August 2023**

Testing Indicators: Pipe is Approaching Retirement

Overall Assessment: Testing at this location again identified much lower wall thickness along the ERW weld seam. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. We can estimate that limited and less reliable service life remains. Pipe wall exists 25 mils from the thread cut.

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SCOPE OF WORK:

THE SCOPE OF THIS PROJECT IS TO REPLACE THE CORRODED SPRINKLER PIPING IN THE HEALTH SCIENCE BUILDING. THE PIPING WAS SCANNED UTILIZING ULTRASONIC TESTING DEVICES TO DETERMINE THE AMOUNT OF CORROSION IN VARIOUS SEGMENTS OF THE PIPING SYSTEM. THE SCAN RESULTS ARE INCLUDED ON THESE DRAWINGS FOR THE SECTIONS OF PIPING THAT WAS IDENTIFIED AS NEEDING TO BE REPLACED. SOME OF THE SCANS ARE OF THE SMALL DIAMETER PIPING AT THE ARM-OVERS TO THE SPRINKLER HEADS. THE SCOPE SHALL INCLUDE REPLACING ALL THE ARM-OVERS AND EXISTING SPRINKLER HEADS WITH NEW FLEXIBLE SPRINKLER HEADS.

1 FIRE PROTECTION PIPE REPLACEMENT INFORMATION



SPARTANBURG HEALTH SCIENCE BUILDING
 107 COMMUNITY COLLEGE DRIVE
 SPARTANBURG, SC 29303

SHEET ISSUE:	NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM	

ISSUED FOR BIDS 02-26-2024
 PRINCIPAL IN CHARGE: WEM
 PROJECT ARCHITECT: ARL
 DRAWN BY:

FIRE PROTECTION PIPE REPLACEMENT INFORMATION

SHEET NO. PROJ. NO. 023034

FP1



SPARTANBURG SPARTANBURG COMMUNITY COLLEGE HEALTH SCIENCE BUILDING 107 COMMUNITY COLLEGE DRIVE SPARTANBURG, SC 29303

Table with 4 columns: NO, DATE, DESCRIPTION, BY. Row 1: 0, 02-26-2024, ISSUED FOR BIDS, WEM

ISSUED FOR BIDS 02-26-2024

PRINCIPAL IN CHARGE: WEM PROJECT ARCHITECT: ARL DRAWN BY: ARL

SHEET TITLE:

FIRE PROTECTION PIPE REPLACEMENT INFORMATION

SHEET NO. PROJ. NO. 023034

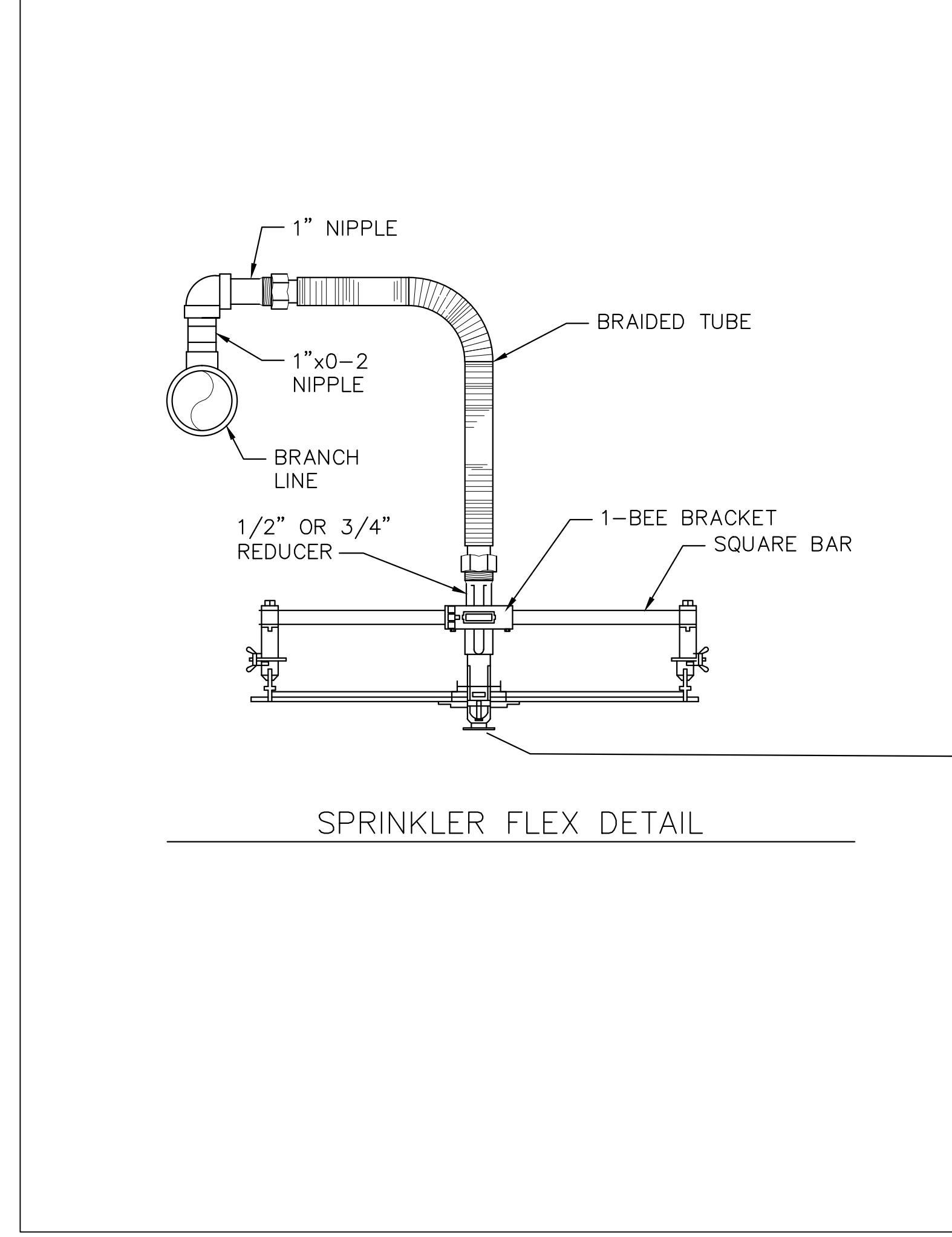
FP2

Test Location No: 50. Piping Technicalities, Wall Thickness Measurements, Original vs. Current Values, Base Statistical Calculations, Scenarios, and Testing Indicators.

Test Location No: 49. Piping Technicalities, Wall Thickness Measurements, Original vs. Current Values, Base Statistical Calculations, Scenarios, and Testing Indicators.

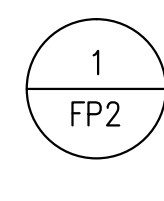
Test Location No: 47. Piping Technicalities, Wall Thickness Measurements, Original vs. Current Values, Base Statistical Calculations, Scenarios, and Testing Indicators.

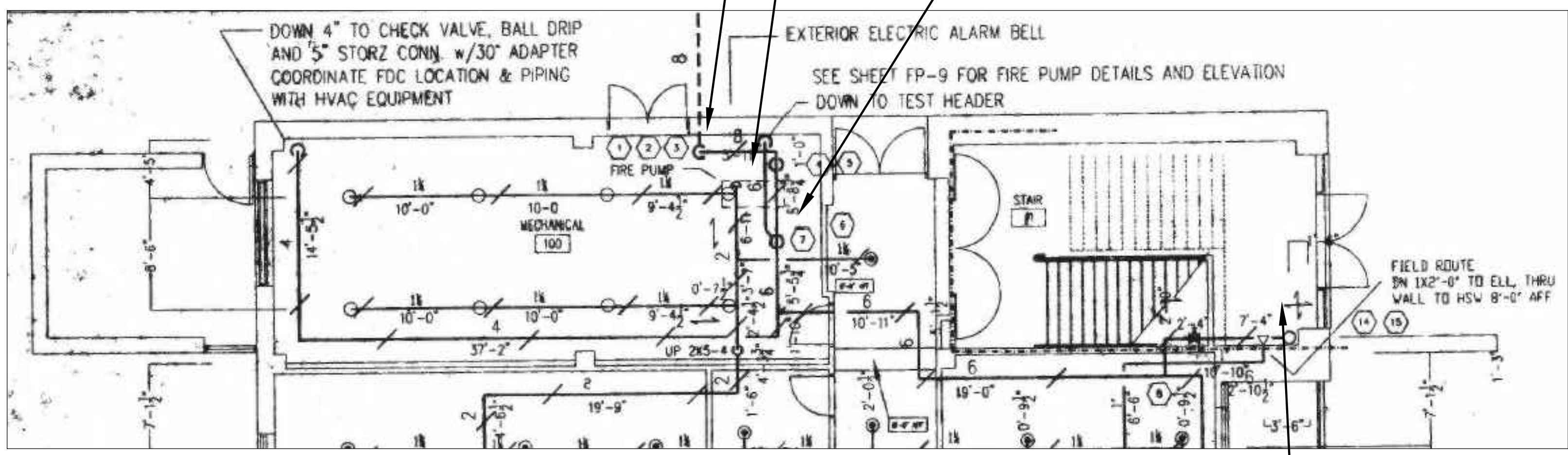
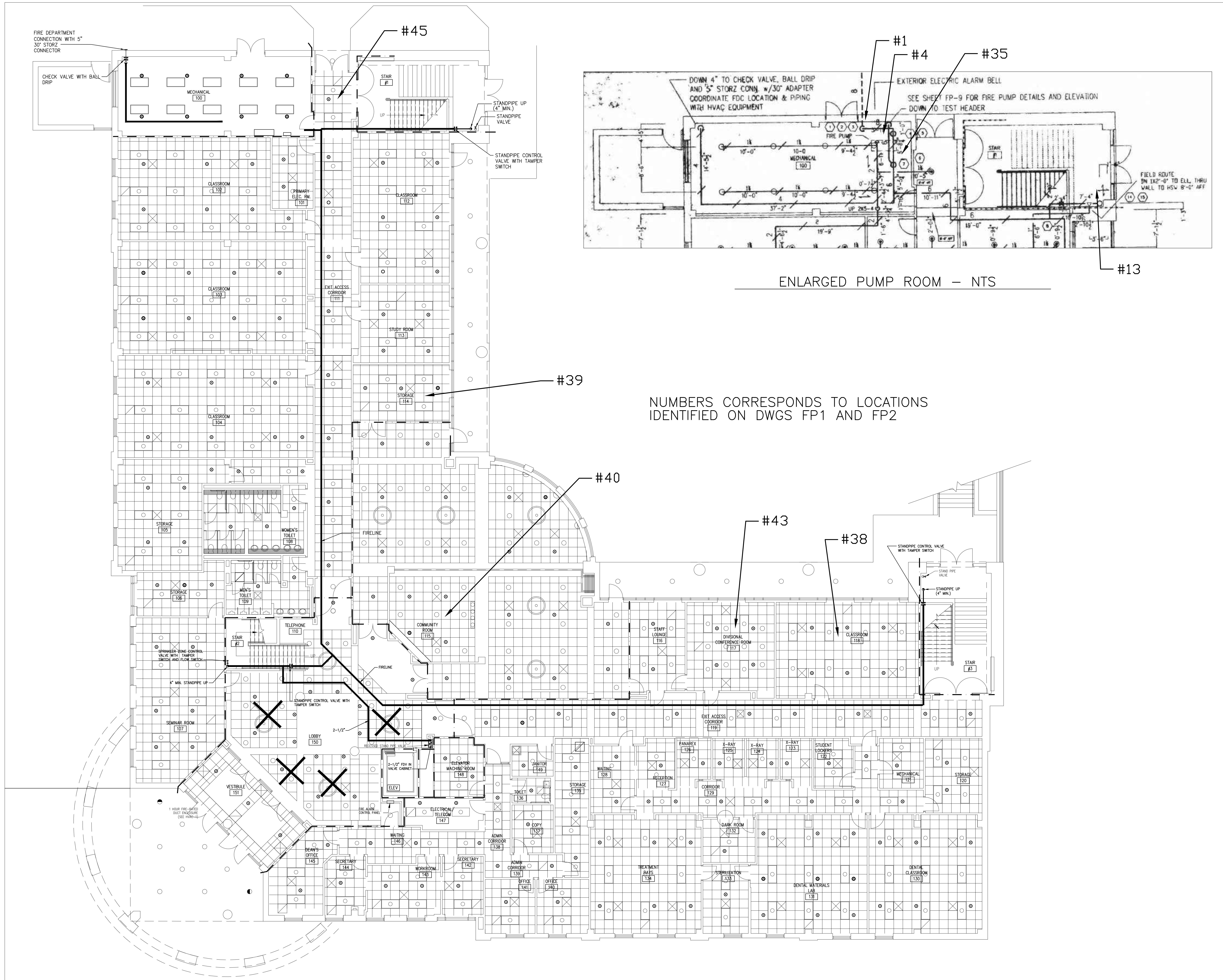
Test Location No: 45. Piping Technicalities, Wall Thickness Measurements, Original vs. Current Values, Base Statistical Calculations, Scenarios, and Testing Indicators.



Test Location No: 51. Piping Technicalities, Wall Thickness Measurements, Original vs. Current Values, Base Statistical Calculations, Scenarios, and Testing Indicators.

1 FIRE PROTECTION PIPE REPLACEMENT INFORMATION 1/8" = 1'-0"

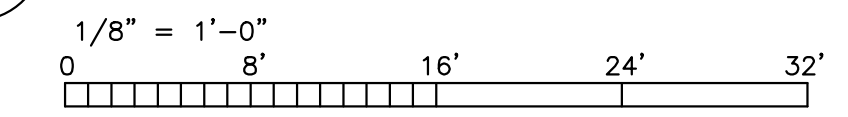




ENLARGED PUMP ROOM – NTS

NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

1 FIRE PROTECTION PLAN – 1ST FLOOR
FP3



CONSULTANT LOGO



SCALE

SPARTANBURG
SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING
107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM

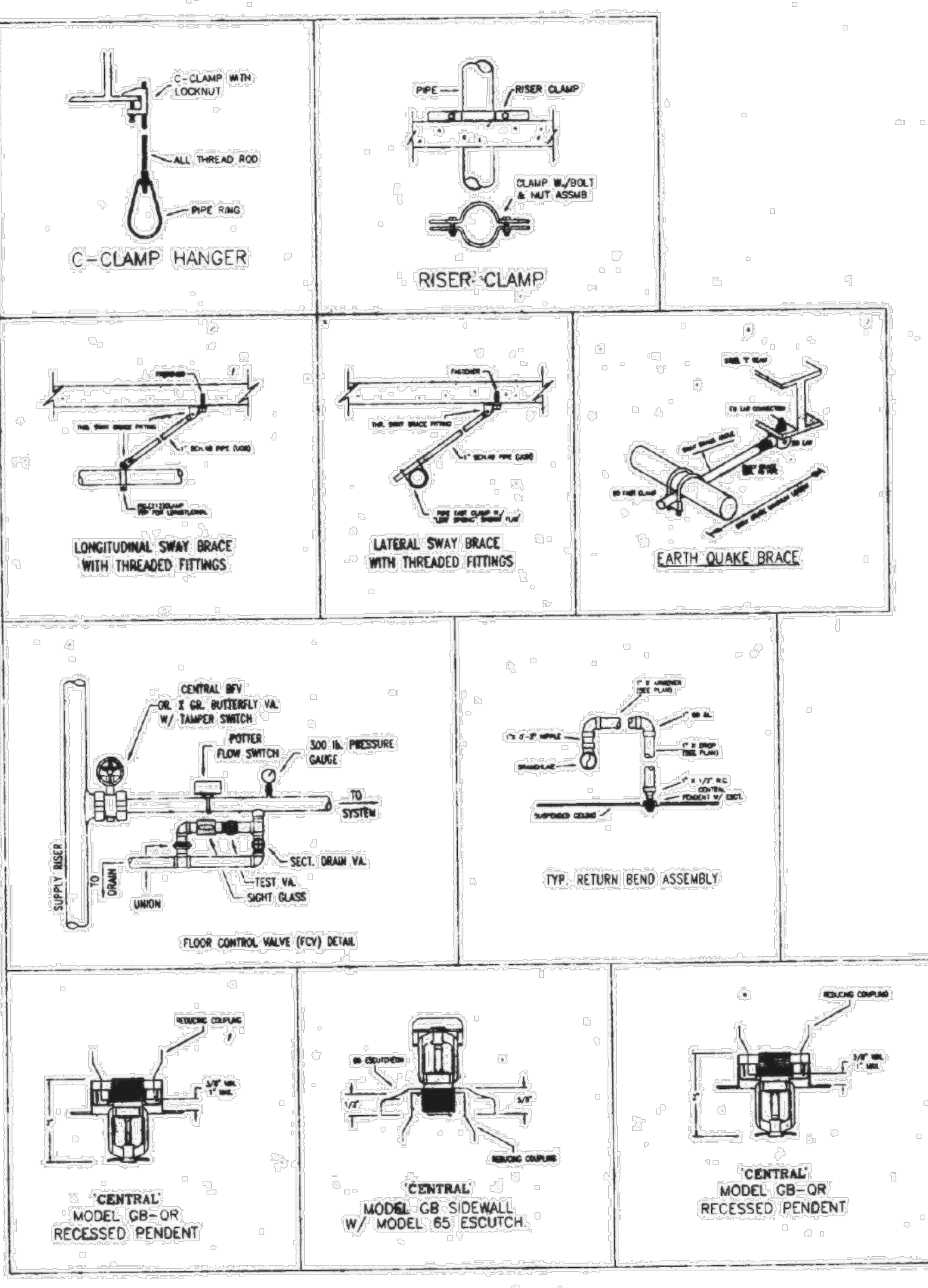
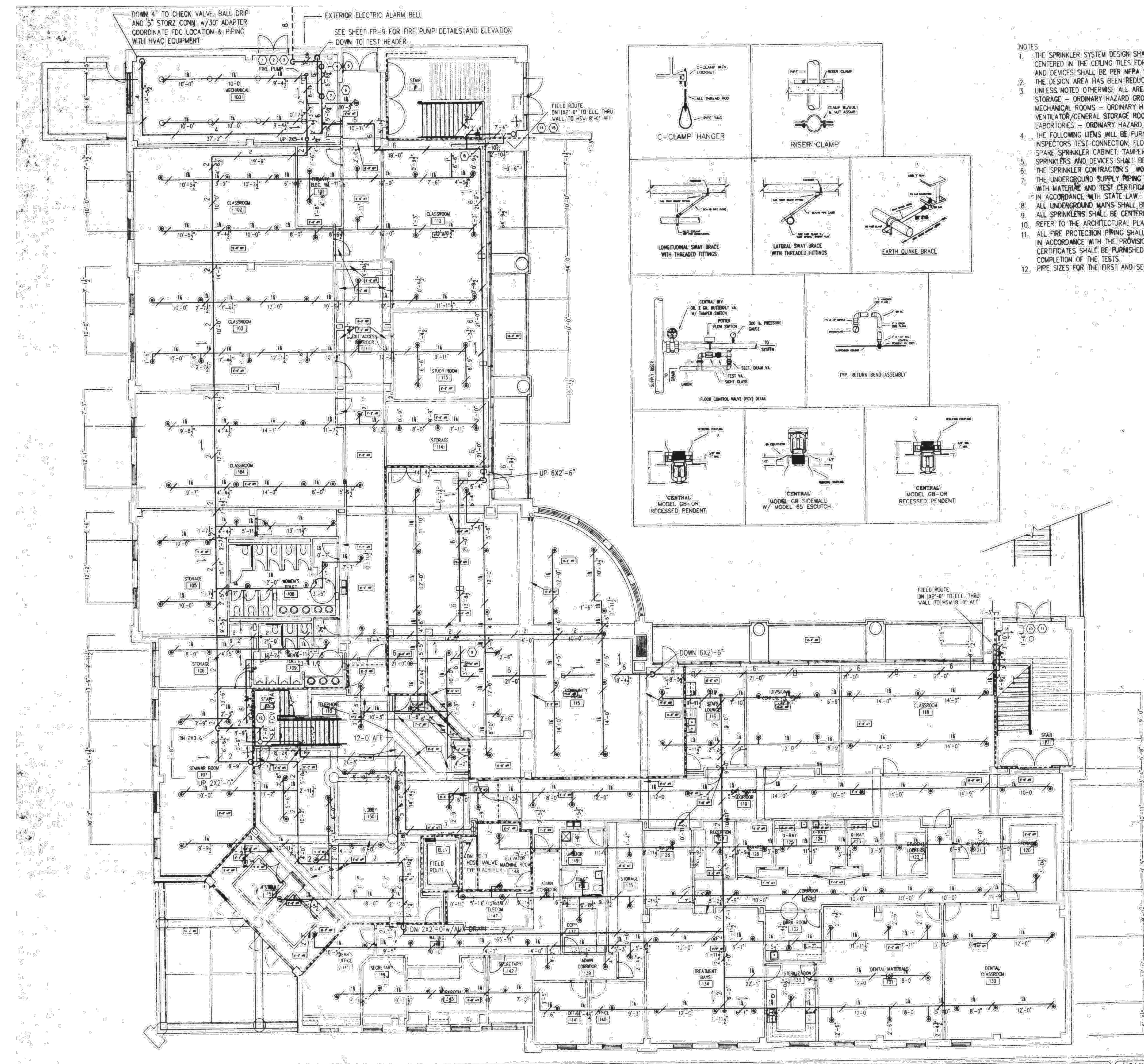
NOT FOR CONSTRUCTION
FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024

PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: ARL
DRAWN BY:

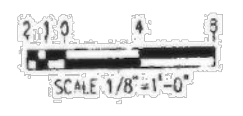
SHEET TITLE:
**FIRE PROTECTION
PLAN - 1ST FLOOR**

SHEET NO. PROJ. NO.
FP3 023034



- NOTES
1. THE SPRINKLER SYSTEM DESIGN SHALL BE PER NFPA 13 (1996). SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES FOR ALL FINISHED AREAS. ALL PIPE, FITTINGS, HANGERS AND DEVICES SHALL BE PER NFPA 11.
 2. THE DESIGN AREA HAS BEEN REDUCED FOR THE USE OF QUICK RESPONSE SPRINKLERS. UNLESS NOTED OTHERWISE, ALL AREAS SHALL BE LIGHT HAZARD EXCEPT AS FOLLOWS:
STORAGE - ORDINARY HAZARD GROUP 2
MECHANICAL ROOMS - ORDINARY HAZARD GROUP 1
VENTILATOR/GENERAL STORAGE ROOM 321 - 0.30 GPM PER SF
LABORATORIES - ORDINARY HAZARD GROUP 1
 3. THE FOLLOWING ITEMS WILL BE FURNISHED WHETHER OR NOT INDICATED ON THESE DRAWINGS:
INSPECTOR'S TEST CONNECTION, FLOOR CONTROL VALVE, FLOW SWITCH, HYDRAULIC DATA SIGN, SPARE SPRINKLER CABINET, TAMPER SWITCHES ON ISOLATION VALVES.
SPRINKLERS AND DEVICES SHALL BE MANUFACTURED BY CENTRAL.
 4. THE SPRINKLER CONTRACTOR'S WORK BEGINS AT THE FLOOR FLANGE 1'-0" AFF.
 5. THE UNDERGROUND SUPPLY PIPING SHALL BE TESTED AND FLUSHED IN ACCORDANCE WITH NFPA 24 WITH MATERIAL AND TEST CERTIFICATES FURNISHED TO THE STATE FIRE MARSHAL'S OFFICE IN ACCORDANCE WITH STATE LAW.
 6. ALL UNDERGROUND MAINS SHALL BE FLUSHED PRIOR TO CONNECTION OF THE INTERIOR PIPING.
 7. ALL SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES PER THE PROJECT SPECIFICATIONS.
 8. REFER TO THE ARCHITECTURAL PLANS FOR THE LOCATIONS OF ALL FIRE RATED WALLS.
 9. ALL FIRE PROTECTION PIPING SHALL BE HYDROSTATICALLY TESTED TO 200 PSI FOR 2 HOURS IN ACCORDANCE WITH THE PROVISIONS OF NFPA 13 (1996). CONTRACTOR MATERIAL AND TEST CERTIFICATES SHALL BE FURNISHED TO THE OWNER AND THE STATE FIRE MARSHAL'S OFFICE UPON COMPLETION OF THE TESTS.
 10. PIPE SIZES FOR THE FIRST AND SECOND FLOORS ARE BASED ON HYDRAULIC CALCULATIONS FOR THE THIRD FLOOR.

- INSTALLATION NOTES:
1. ALL PIPING TO BE 10'-0" AFF UNLESS NOTED OTHERWISE.
 2. ALL ARMOVERS TO PENDENT SPRINKLERS TO BE 0'-6" UNLESS NOTED OTHERWISE.
 3. ALL DROPS TO PENDENT SPRINKLERS TO BE AS FOLLOWS:
CEILING HT. PIPE AFF DROP
8'-0" 13'-0" 2'-6"
9'-0" 13'-0" 2'-0"
10'-0" 13'-0" 1'-6"
11'-0" 12'-0" 2'-6"
11'-0" 12'-0" 1'-6"
 4. FIRST FLOOR TOP OF STEEL 15'-8" AFF.



ALL SPRINKLERS ARE CENTRAL GB-OR

SYMBOL	SIZE	TEMP	SPRINKLER TYPE
○	8	155	BRASS UPRIGHT
⊙	1 1/2	155	PENDENT
⊙	1 1/2	155	HSW
⊙	2	135	HSW GB-ED
SHEET TOTAL: 268			
P/B TOTAL: 693			
FILE NUMBER: _____			

DATE: APRIL 14, 2020	SCALE: 1/8" = 1'-0"
APPROVAL: STATE FIRE MARSHAL	
SOUTHEASTERN SPRINKLER CO.	
712 ANHOCH CHURCH ROAD	
GREENVILLE, SC	
864-277-5340	
CONTRACT NO. _____	SHEET NO. 02-3 OF _____

GENERAL NO. _____	WATER FLOW TEST	HYDRAULIC CALCULATIONS	DESIGN CRITERIA	NO. DATE	REVISIONS	BY
REVISIONS:	STATIC LOCATION	DESIGN AREA #	SYSTEM #	10		
FLOW:	DATE OF TEST	DENSITY	TYPE OF SYSTEM	9		
DATE OF TEST	TIME OF TEST	DESIGN AREA	DENSITY / GPM	8		
TEST TAKEN BY:	TEST TAKEN BY:	SPRINKLER AREA	CL. SPR. AREA SIZE	7		
HYDRANT LOCATION:	HYDRANT LOCATION:	AREA IN R. SPRINKLER	AREA IN R. SPRINKLER	6		
		UNDERGROUND	SPRINKLER ORifice	5		
		# HAZARDS CALCULATED	SPRINKLER K-FACTOR	4		
			INSIDE HOSE	3		
			OUTSIDE HOSE	2		
				1		

1 FIRE PROTECTION PLAN - 1ST FLOOR (ORIGINAL SPRINKLER PLANS)
FP3A NTS



SPARTANBURG
SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING
107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

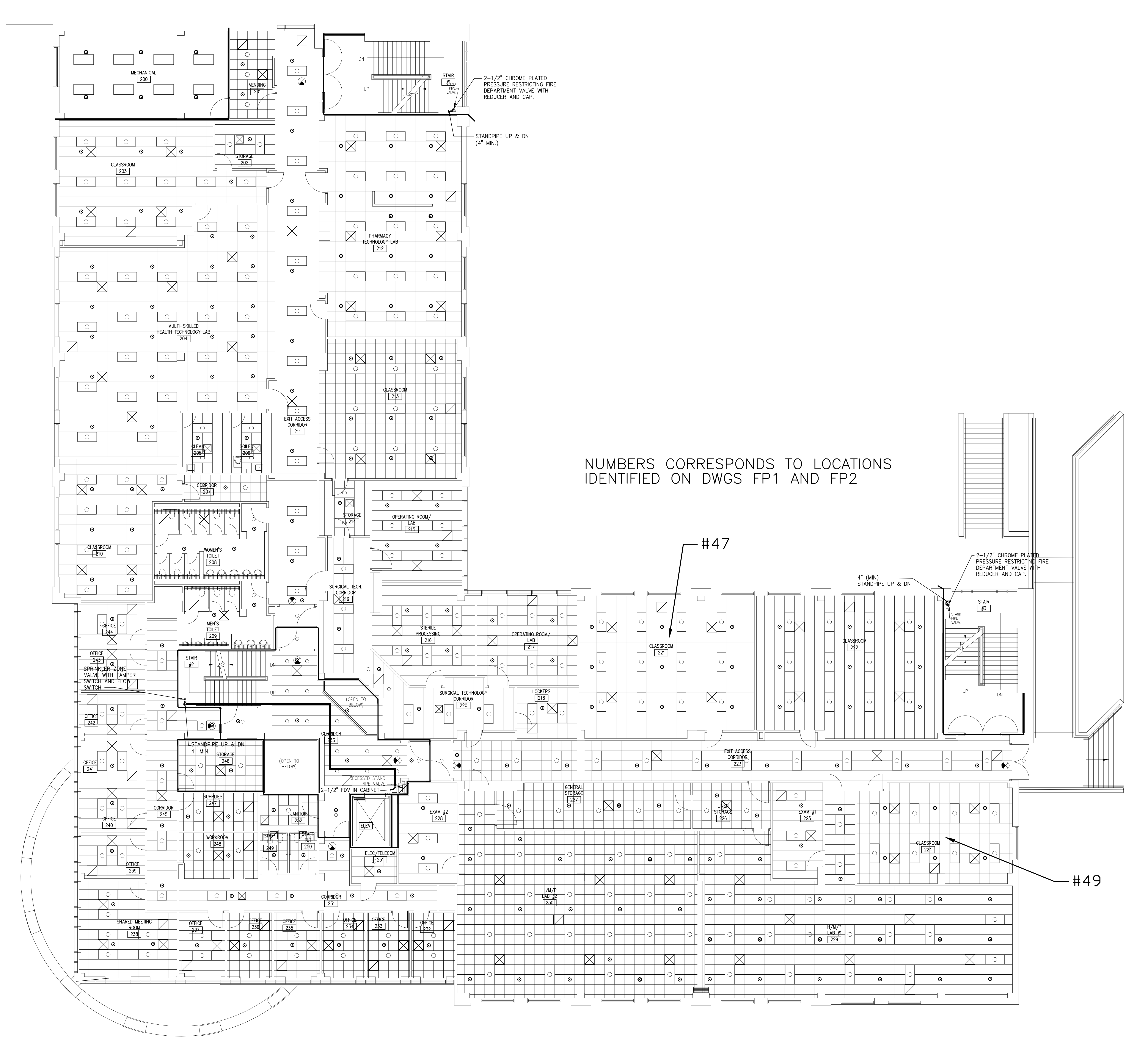
NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM

NOT FOR CONSTRUCTION
FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: ARL
DRAWN BY:

SHEET TITLE:
FIRE PROTECTION
PLAN - 1ST FLOOR
(ORIGINAL
SPRINKLER PLANS)
SHEET NO. PROJ. NO.
023034

FP3A

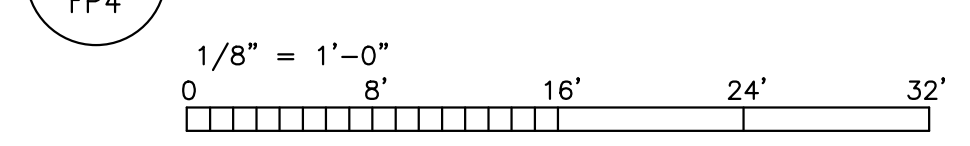


NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

#47

#49

1 FIRE PROTECTION PLAN - 2ND FLOOR



CONSULTANT LOGO



SEALS

SPARTANBURG
 SPARTANBURG COMMUNITY COLLEGE
 HEALTH SCIENCE BUILDING
 107 COMMUNITY COLLEGE DRIVE
 SPARTANBURG, SC 29303

SHEET ISSUE:	NO	DATE	DESCRIPTION	BY
	0	02-26-2024	ISSUED FOR BIDS	WEM

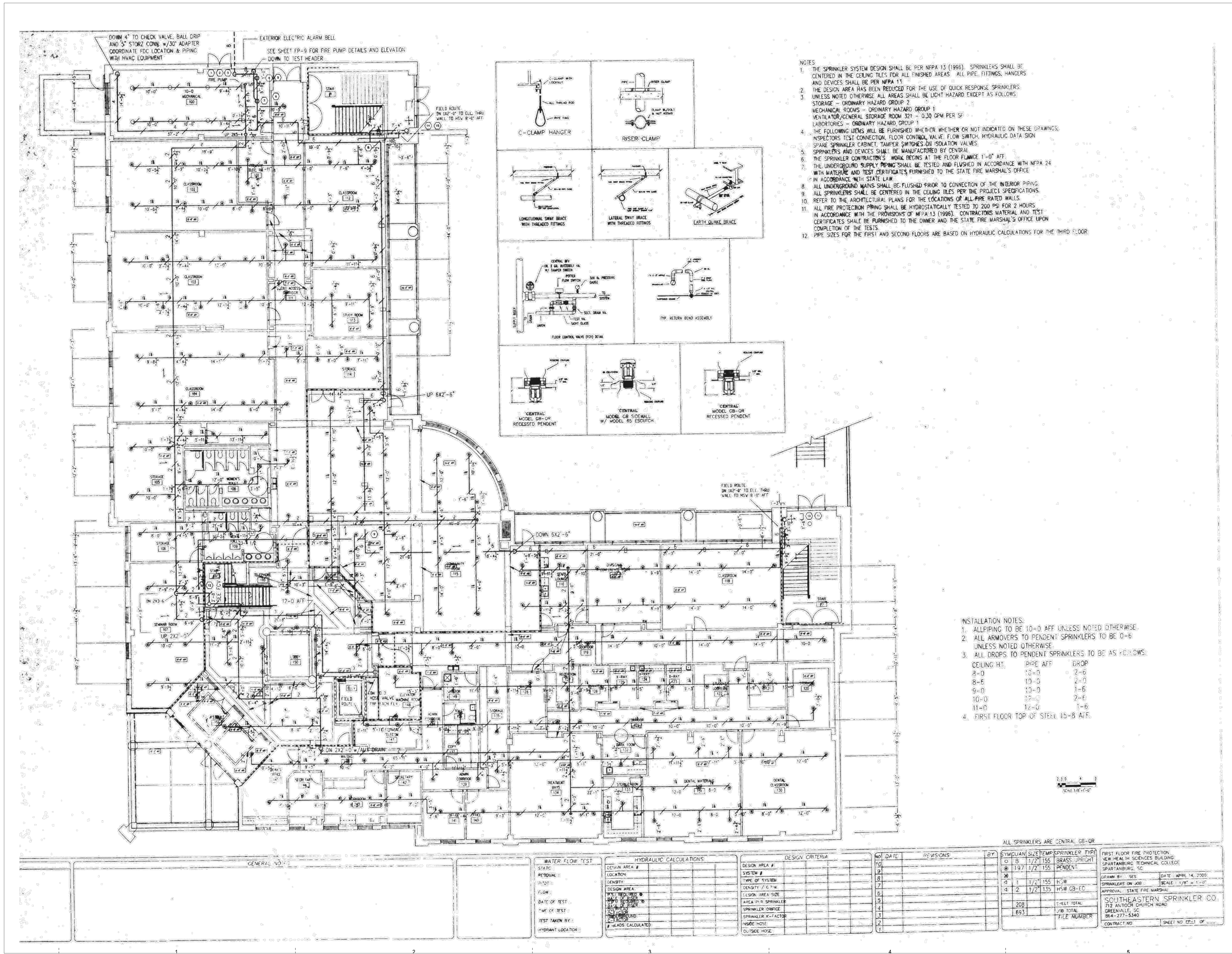
NOT FOR CONSTRUCTION
 FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024
 PRINCIPAL IN CHARGE: WEM
 PROJECT ARCHITECT: ARL
 DRAWN BY:

FIRE PROTECTION
 PLAN - 2ND FLOOR

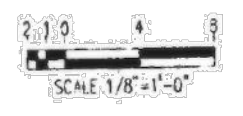
SHEET NO. PROJ. NO. 023034

FP4



- NOTES
1. THE SPRINKLER SYSTEM DESIGN SHALL BE PER NFPA 13 (1996). SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES FOR ALL FINISHED AREAS. ALL PIPE, FITTINGS, HANGERS AND DEVICES SHALL BE PER NFPA 11.
 2. THE DESIGN AREA HAS BEEN REDUCED FOR THE USE OF QUICK RESPONSE SPRINKLERS. UNLESS NOTED OTHERWISE, ALL AREAS SHALL BE LIGHT HAZARD EXCEPT AS FOLLOWS:
STORAGE - ORDINARY HAZARD GROUP 2
MECHANICAL ROOMS - ORDINARY HAZARD GROUP 1
VENTILATOR/GENERAL STORAGE ROOM 321 - 0.30 GPM PER SF
LABORATORIES - ORDINARY HAZARD GROUP 1
 3. THE FOLLOWING ITEMS WILL BE FURNISHED WHETHER OR NOT INDICATED ON THESE DRAWINGS:
INSPECTORS TEST CONNECTION, FLOOR CONTROL VALVE, FLOW SWITCH, HYDRAULIC DATA SIGN, SPARE SPRINKLER CABINET, TAMPER SWITCHES ON ISOLATION VALVES.
SPRINKLERS AND DEVICES SHALL BE MANUFACTURED BY CENTRAL.
 4. THE SPRINKLER CONTRACTOR'S WORK BEGINS AT THE FLOOR FINISH 1'-0" AFF.
 5. THE UNDERGROUND SUPPLY PIPING SHALL BE TESTED AND FLUSHED IN ACCORDANCE WITH NFPA 24 WITH MATERIAL AND TEST CERTIFICATES FURNISHED TO THE STATE FIRE MARSHAL'S OFFICE IN ACCORDANCE WITH STATE LAW.
 6. ALL UNDERGROUND MAINS SHALL BE FLUSHED PRIOR TO CONNECTION OF THE INTERIOR PIPING.
 7. ALL SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES PER THE PROJECT SPECIFICATIONS.
 8. REFER TO THE ARCHITECTURAL PLANS FOR THE LOCATIONS OF ALL FIRE RATED WALLS.
 9. ALL FIRE PROTECTION PIPING SHALL BE HYDROSTATICALLY TESTED TO 200 PSI FOR 2 HOURS IN ACCORDANCE WITH THE PROVISIONS OF NFPA 13 (1996). CONTRACTOR MATERIAL AND TEST CERTIFICATES SHALL BE FURNISHED TO THE OWNER AND THE STATE FIRE MARSHAL'S OFFICE UPON COMPLETION OF THE TESTS.
 10. PIPE SIZES FOR THE FIRST AND SECOND FLOORS ARE BASED ON HYDRAULIC CALCULATIONS FOR THE THIRD FLOOR.

- INSTALLATION NOTES:
1. ALL PIPING TO BE 10'-0" AFF UNLESS NOTED OTHERWISE.
 2. ALL ARMOVERS TO PENDENT SPRINKLERS TO BE 0'-6" UNLESS NOTED OTHERWISE.
 3. ALL DROPS TO PENDENT SPRINKLERS TO BE AS FOLLOWS:
CEILING HT. PIPE AFF DROP
8'-0" 13'-0" 2'-6"
9'-0" 13'-0" 2'-0"
10'-0" 13'-0" 1'-6"
11'-0" 13'-0" 2'-6"
12'-0" 12'-0" 1'-6"
 4. FIRST FLOOR TOP OF STEEL 15'-8" AFF.



ALL SPRINKLERS ARE CENTRAL CB-OR

SYMBOL	SIZE	TEMP	SPRINKLER TYPE
○	8	155	BRASS UPRIGHT
⊙	1 1/2	155	PENDENT
⊙	1 1/2	155	HSW
⊙	2	135	HSW CB-ED

NO.	DATE	REVISIONS	BY
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

DESIGN AREA #	DESIGN CRITERIA
1	TYPE OF SYSTEM
2	DESIGN AREA
3	DESIGN AREA SIZE
4	AREA IN # SPRINKLER
5	SPRINKLER ORifice
6	SPRINKLER K-FACTOR
7	INSIDE HOSE
8	OUTSIDE HOSE

WATER FLOW TEST	HYDRAULIC CALCULATIONS
1	DESIGN AREA #
2	LOCATION
3	DENSITY
4	DESIGN AREA
5	AREA IN # SPRINKLER
6	SPRINKLER ORifice
7	SPRINKLER K-FACTOR
8	INSIDE HOSE
9	OUTSIDE HOSE

GENERAL NO.	DESCRIPTION
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

NO.	DATE	REVISIONS	BY
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

SYMBOL	SIZE	TEMP	SPRINKLER TYPE
○	8	155	BRASS UPRIGHT
⊙	1 1/2	155	PENDENT
⊙	1 1/2	155	HSW
⊙	2	135	HSW CB-ED

FIRST FLOOR FIRE PROTECTION	DATE
NEW HEALTH SCIENCES BUILDING	APRIL 14, 2000
SPARTANBURG TECHNICAL COLLEGE	
SPARTANBURG, SC	
DRAWN BY: SES	SCALE: 1/8" = 1'-0"
APPROVAL: STATE FIRE MARSHAL	
SOUTHEASTERN SPRINKLER CO.	
712 ANHOCH CHURCH ROAD	
GREENVILLE, SC	
864-277-5340	
CONTRACT NO.	SHEET NO. 02-3 OF

1 FIRE PROTECTION PLAN - 2ND FLOOR (ORIGINAL SPRINKLER PLANS)
FP4A NTS

CONSULTANT LOGO

Ph: 864-534-1875
P.O. Box 26286
Greenville, SC 29616
428 IA The Parkway
Green, SC 29650

SPARTANBURG
SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING

107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

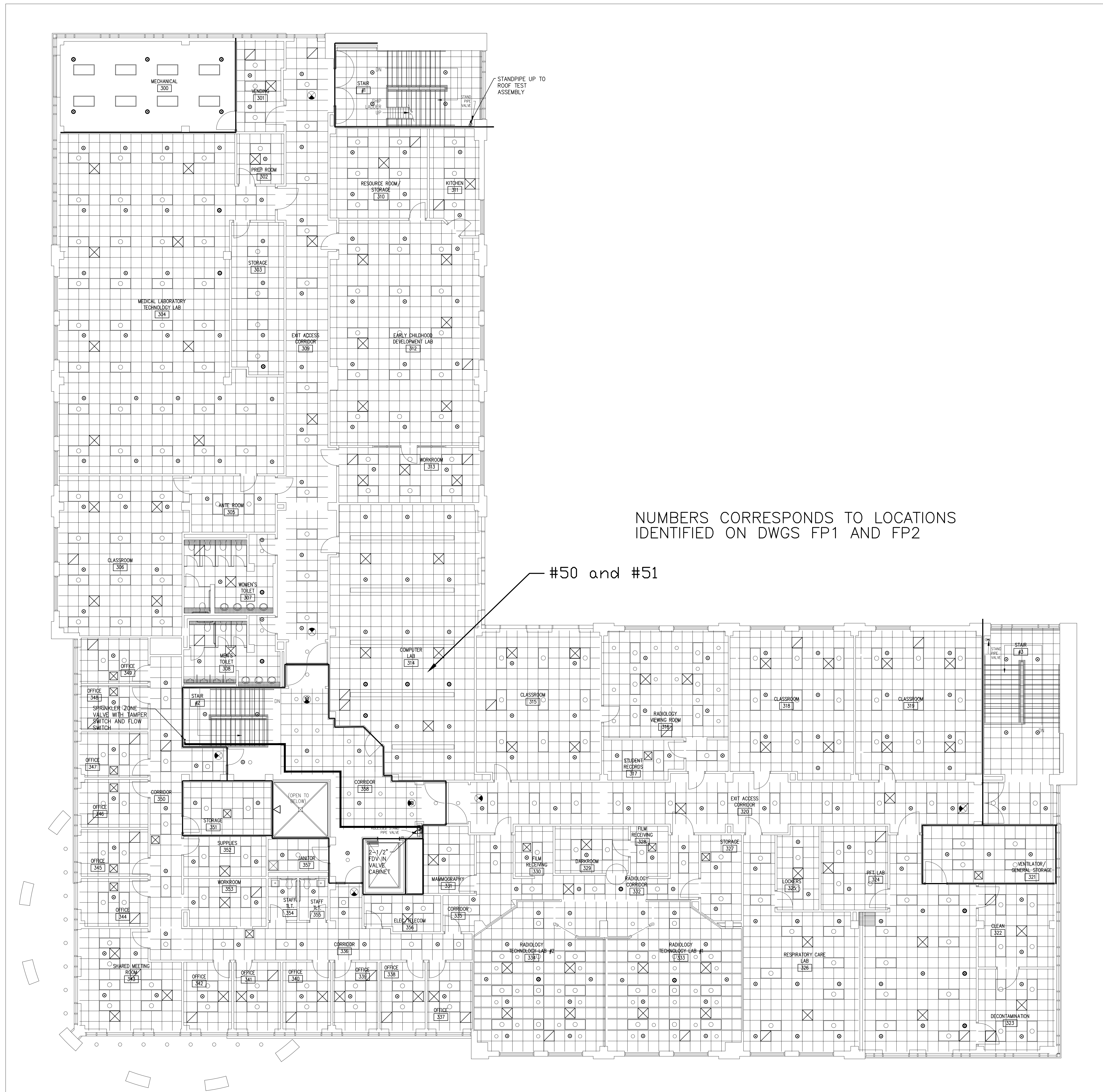
SHEET ISSUE:	NO.	DATE	DESCRIPTION	BY
	0	02-26-2024	ISSUED FOR BIDS	WEM

NOT FOR CONSTRUCTION
FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: ARL
DRAWN BY:

SHEET TITLE:
FIRE PROTECTION
PLAN - 2ND FLOOR
(ORIGINAL
SPRINKLER PLANS)
SHEET NO. PROJ. NO.
023034

FP4A



CONSULTANT LOGO



SEALS

SPARTANBURG
**SPARTANBURG COMMUNITY COLLEGE
 HEALTH SCIENCE BUILDING**
 107 COMMUNITY COLLEGE DRIVE
 SPARTANBURG, SC 29303

SHEET ISSUE NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM

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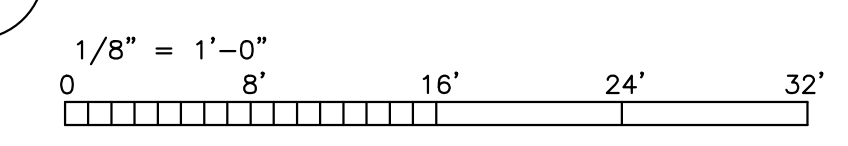
ISSUED FOR BIDS	DATE	PRINCIPAL IN CHARGE	WEM
	02-26-2024		
		PROJECT ARCHITECT	ARL
		DRAWN BY:	
		SHEET TITLE:	

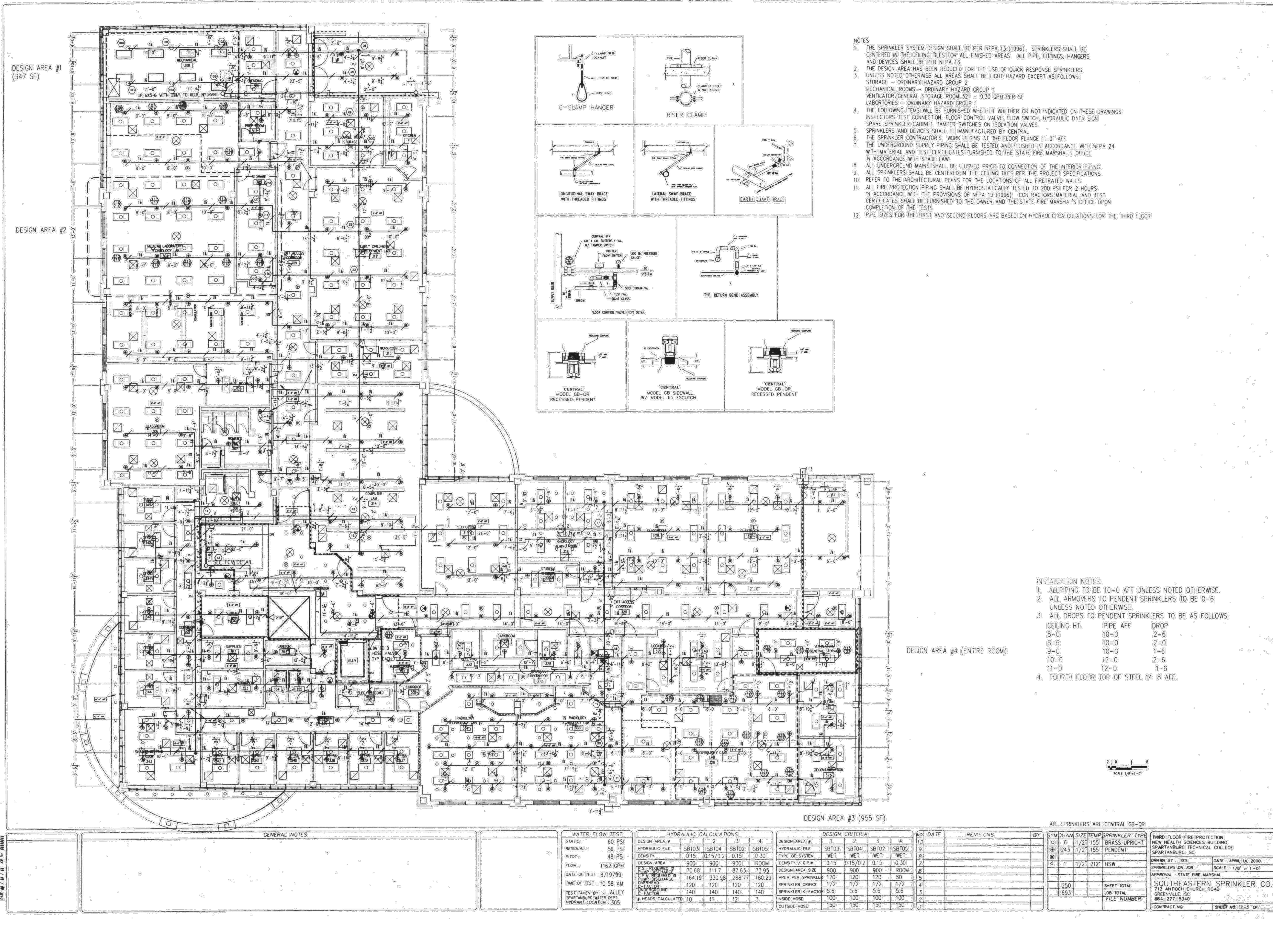
**FIRE PROTECTION
 PLAN - 3RD FLOOR**

SHEET NO. PROJ. NO.
 023034

FP5

1 FIRE PROTECTION PLAN - 3RD FLOOR
 FP5





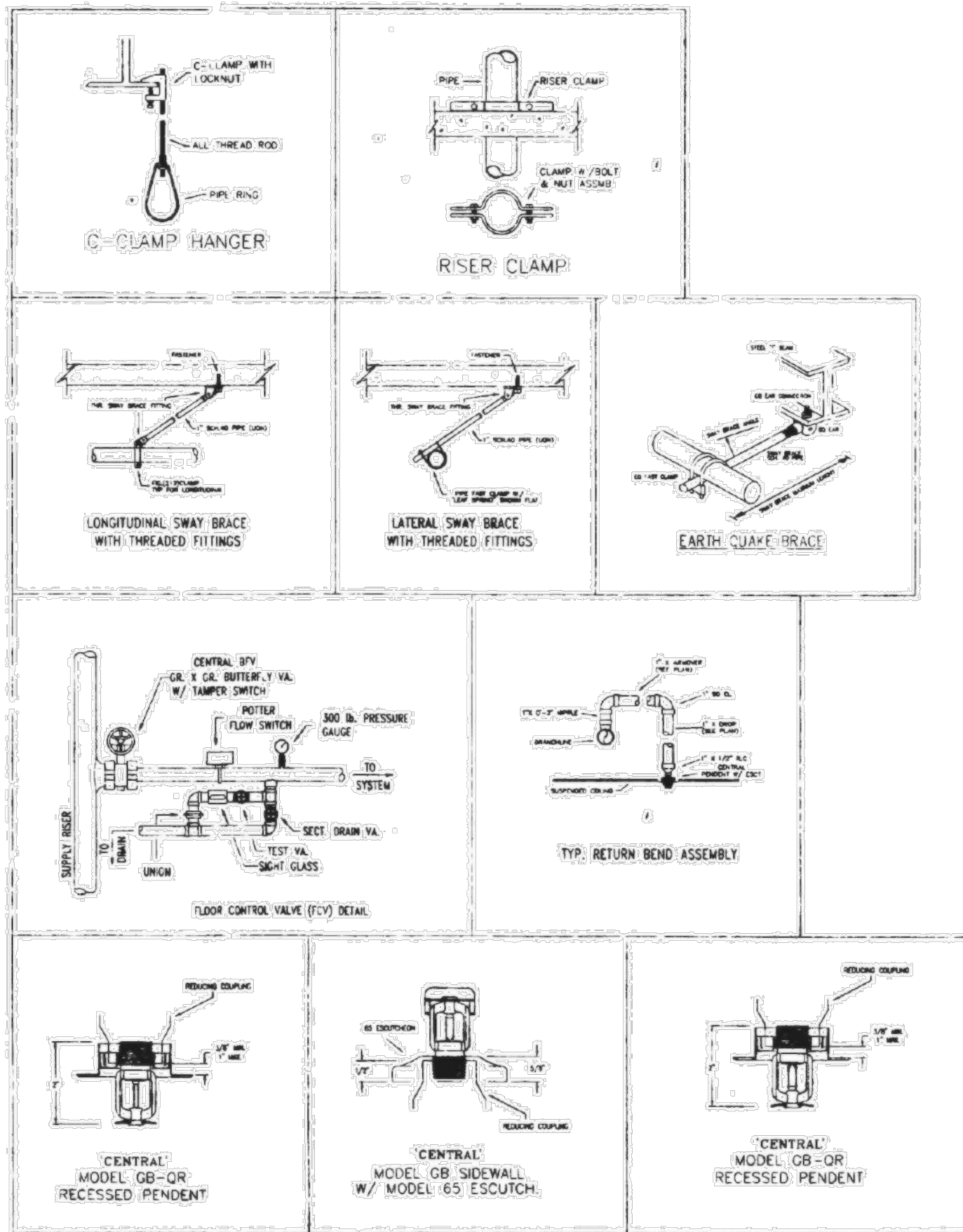
- NOTES
1. THE SPRINKLER SYSTEM DESIGN SHALL BE PER NFPA 13 (1996). SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES FOR ALL FINISHED AREAS. ALL PIPE, FITTINGS, HANGERS AND DEVICES SHALL BE PER NFPA 13.
 2. THE DESIGN AREA HAS BEEN REDUCED FOR THE USE OF QUICK RESPONSE SPRINKLERS. UNLESS NOTED OTHERWISE ALL AREAS SHALL BE LIGHT HAZARD EXCEPT AS FOLLOWS:
STORAGE - ORDINARY HAZARD GROUP 2
MECHANICAL ROOMS - ORDINARY HAZARD GROUP 1
VENTILATOR/GENERAL STORAGE ROOM 321 - 0.30 GPM PER SF
LABORATORIES - ORDINARY HAZARD GROUP 1
 3. THE FOLLOWING ITEMS WILL BE FURNISHED WHETHER INDICATED OR NOT ON THESE DRAWINGS:
INSPECTORS TEST CONNECTION, FLOOR CONTROL VALVE, FLOW SWITCH, HYDRAULIC DATA SIGN
SPARE SPRINKLER CABINET, TAMPER SWITCHES ON ISOLATION VALVES
SPRINKLERS AND DEVICES SHALL BE MANUFACTURED BY CENTRAL.
 4. THE SPRINKLER CONTRACTOR'S WORK BEGINS AT THE FLOOR FLANGE 1'-0" AFF.
 5. THE UNDERGROUND SUPPLY PIPING SHALL BE TESTED AND FLUSHED IN ACCORDANCE WITH NFPA 24 WITH MATERIAL AND TEST CERTIFICATES FURNISHED TO THE STATE FIRE MARSHAL'S OFFICE IN ACCORDANCE WITH STATE LAW.
 6. ALL UNDERGROUND MAINS SHALL BE FLUSHED PRIOR TO CONNECTION OF THE INTERIOR PIPING.
 7. ALL SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES PER THE PROJECT SPECIFICATIONS.
 8. REFER TO THE ARCHITECTURAL PLANS FOR THE LOCATIONS OF ALL FIRE RATED WALLS.
 9. ALL FIRE PROTECTION PIPING SHALL BE HYDROSTATICALLY TESTED TO 200 PSI FOR 2 HOURS IN ACCORDANCE WITH THE PROVISIONS OF NFPA 13 (1996). CONTRACTOR MATERIAL AND TEST CERTIFICATES SHALL BE FURNISHED TO THE OWNER AND THE STATE FIRE MARSHAL'S OFFICE UPON COMPLETION OF THE TESTS.
 10. PIPE SIZES FOR THE FIRST AND SECOND FLOORS ARE BASED ON HYDRAULIC CALCULATIONS FOR THE THIRD FLOOR.

INSTALLATION NOTES:

1. ALL PIPING TO BE 10'-0" AFF UNLESS NOTED OTHERWISE.
2. ALL ARMORS TO PENDENT SPRINKLERS TO BE 0'-6" UNLESS NOTED OTHERWISE.
3. ALL DROPS TO PENDENT SPRINKLERS TO BE AS FOLLOWS:

CEILING HT.	PIPE AFF	DROP
8'-0"	10'-0"	2'-6"
8'-6"	10'-0"	2'-0"
9'-0"	10'-0"	1'-6"
10'-0"	12'-0"	2'-6"
11'-0"	12'-0"	1'-6"

4. FOURTH FLOOR TOP OF STEEL 14' (8" AFF).



CONSULTANT LOGO



SCALE

SPARTANBURG
**SPARTANBURG COMMUNITY COLLEGE
 HEALTH SCIENCE BUILDING**
 107 COMMUNITY COLLEGE DRIVE
 SPARTANBURG, SC 29303

SHEET ISSUE:	NO.	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM	

NOT FOR CONSTRUCTION
 FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024
 PRINCIPAL IN CHARGE: WEM
 PROJECT ARCHITECT: ARL
 DRAWN BY:

SHEET TITLE:
**FIRE PROTECTION
 PLAN - 3RD FLOOR
 (ORIGINAL
 SPRINKLER PLANS)**

SHEET NO. PROJ. NO. 023034

FP5A

1 FIRE PROTECTION PLAN - 3RD FLOOR (ORIGINAL SPRINKLER PLANS)
 FPSA NTS