

**Test Location No: 1**

**Piping Technicalities**  
 Location - Health Science Building 1st Floor Fire Pump Room. Fire sprinkler main supply line, in the 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: 75 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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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: **0.105 in.**  
 Minimum Value Based On: Default Value  
 High To Low Range: 0.021 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: 75 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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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 Value  
 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: **0.111 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 hose 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: 2.12 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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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.

August 24, 2023 Page 59

**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: 1.64 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: 75 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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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: 0.006  
 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.

August 24, 2023 Page 81

**Test Location No: 38**

**Piping Technicalities**  
 Location - Health Science Building 1st Floor Community Room 116. 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-1-56 Field No: 56  
 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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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: 52.1 %  
 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.

August 24, 2023 Page 84

**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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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: 0.022 in.  
 Standard Deviation: 0.009  
 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: 50.0 %  
 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: 100.0 %  
 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.

August 24, 2023 Page 85

**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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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**  
 Individual Measurements: A3, B3, C3, A6, B6, C6, A9, B9, C9, A12, B12, C12

**Original vs. Current Values**  
 Original Thickness, Average Measured Thickness, Minimum Measured Thickness, Theoretical Lowest Thickness, Minimum Allowed Thickness

**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.

August 24, 2023 Page 89

**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  
 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	

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

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: ARL

SHEET TITLE:

FIRE PROTECTION  
PIPE REPLACEMENT  
INFORMATION

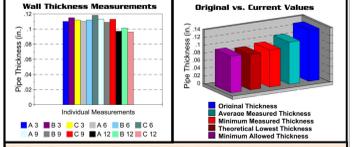
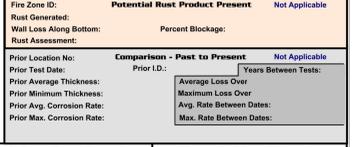
SHEET NO. PROJ. NO.  
FP2 023034

FP2

**Test Location No: 50** Photo No: SCC-1-71.jpg Orientation: Below Side View Detail: Pipe Location / Condition

**Piping Technicalities**  
Location - Health Science Building 3rd Floor Classroom 314. Fire sprinkler branch line to sprinkler head, near professors desk. Test points located between threaded and above. 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: 3-FS-146 Field No: 46  
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: 145 psi Temperature: 75 °F  
Test Pattern: Random Points  
Depth Allowance: 0.073 in.  
External PIT Depth: 0.000 in.  
Abnormal Condition: Thread Leak  
Drawing / Reference No: n/a  
UT Technician: William P. Duncan III

**Base Statistical Calculations**  
Reported Wall Thickness: 0.133 in.  
ASTM Wall Thickness: 0.133 in.  
At Spec: Yes Underspec: Overspec:  
Barlow Calculated Minimum: 0.097 in.  
Default Minimum Wall: 0.095 in.  
Minimum Allowable Thickness: 0.095 in.  
Minimum Value Based On: Defined Minimum  
High To Low Range: 0.026 in.  
Proximity To Threads Or Groove Cut: 0.023 in.  
Standard Deviation: 0.007  
Pitting Index: 11.79 Moderate Pitting Activity

Scenario	Average Wall Thickness	Minimum Wall Thickness	Theoretically Lowest Thickness
Average Based Scenario	0.110 in.	0.093 in.	0.098 in.
Minimum Based Scenario	0.109 in.	0.096 in.	0.091 in.
Theoretical Based Scenario	0.109 in.	0.096 in.	0.091 in.

Estimated Retirement: September 2036  
Condition: █ Gauge

**Testing Indicators: Pipe Replacement is Mandatory** █ A Leak Currently Exists

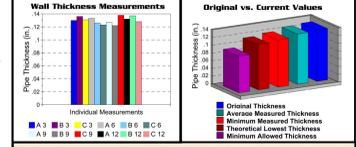
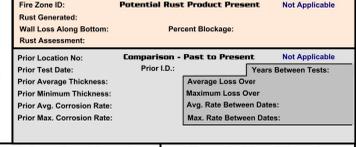
**Overall Assessment:** Testing at this location identifies a thread leak at a pipe section where we also suspect the ERW weld seam is incomplete. This location is an ideal candidate for failure analysis. A thread leak at this pipe section defines its replacement as mandatory.

August 24, 2023 Page 96

**Test Location No: 49** Photo No: SCC-1-48.jpg Orientation: Side View Detail: Pipe Location

**Piping Technicalities**  
Location - Health Science Building 2nd Floor Classroom 224. Fire sprinkler branch line to sprinkler head. Test points located 1-12 in. above sprinkler head.

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: 2-FS-137 Field No: 37  
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: Vertical  
Pressure: 150 psi Temperature: 75 °F  
Test Pattern: Random Points  
Depth Allowance: 0.073 in.  
External PIT Depth: 0.000 in.  
Abnormal Condition: Nearly Thread Leak  
Drawing / Reference No: n/a  
UT Technician: William P. Duncan III

**Base Statistical Calculations**  
Reported Wall Thickness: 0.133 in.  
ASTM Wall Thickness: 0.133 in.  
At Spec: Yes Underspec: Overspec:  
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: 0.016 in.  
Proximity To Threads Or Groove Cut: 0.049 in.  
Standard Deviation: 0.007  
Pitting Index: 6.33 Low Pitting Activity

Scenario	Average Wall Thickness	Minimum Wall Thickness	Theoretically Lowest Thickness
Average Based Scenario	0.130 in.	0.103 in.	0.117 in.
Minimum Based Scenario	0.122 in.	0.101 in.	0.117 in.
Theoretical Based Scenario	0.122 in.	0.101 in.	0.117 in.

Estimated Retirement: July 2148  
Condition: █ Gauge

**Testing Indicators: Pipe Replacement is Mandatory** █ A Leak Currently Exists

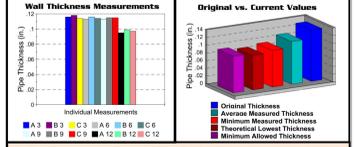
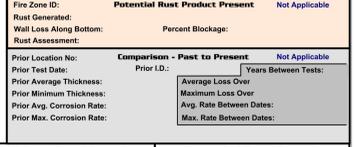
**Overall Assessment:** Although we measure high and uniform wall thickness at this pipe section itself, the fact that a nearby joint is now leaking defines the need for replacement.

August 24, 2023 Page 95

**Test Location No: 47** Photo No: SCC-1-57.jpg Orientation: Below Side View Detail: Pipe Location

**Piping Technicalities**  
Location - Health Science Building 2nd Floor Classroom 221. Fire sprinkler branch line to sprinkler head, near A/C unit. Test points located between above, 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: 2-FS-139 Field No: 39  
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: 150 psi Temperature: 75 °F  
Test Pattern: Random Points  
Depth Allowance: 0.073 in.  
External PIT Depth: 0.000 in.  
Abnormal Condition: None Observed  
Drawing / Reference No: n/a  
UT Technician: William P. Duncan III

**Base Statistical Calculations**  
Reported Wall Thickness: 0.133 in.  
ASTM Wall Thickness: 0.133 in.  
At Spec: Yes Underspec: Overspec:  
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: 0.023 in.  
Proximity To Threads Or Groove Cut: 0.022 in.  
Standard Deviation: 0.008  
Pitting Index: 13.96 Moderate Pitting Activity

Scenario	Average Wall Thickness	Minimum Wall Thickness	Theoretically Lowest Thickness
Average Based Scenario	0.110 in.	0.093 in.	0.098 in.
Minimum Based Scenario	0.109 in.	0.096 in.	0.091 in.
Theoretical Based Scenario	0.109 in.	0.096 in.	0.091 in.

Estimated Retirement: April 2039  
Condition: █ Gauge

**Testing Indicators: Pipe Replacement is Mandatory**

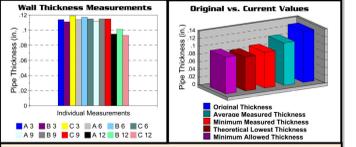
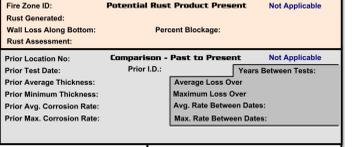
**Overall Assessment:** Here we show another pipe section where we suspect an incomplete ERW weld seam exists. High pitting and low thickness measurements suggest that no further reliable service life is available. Pipe wall exists 22 mils from the thread cut.

August 24, 2023 Page 93

**Test Location No: 45** Photo No: SCC-1-11.jpg Orientation: Below Side View Detail: Pipe Location

**Piping Technicalities**  
Location - Health Science Building 1st Floor Hallway. Fire sprinkler branch line to sprinkler head, in front of Staar 1. Test points located 1-2 in. above bottom elbow, 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-111 Field No: 11  
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: Vertical  
Pressure: 155 psi Temperature: 75 °F  
Test Pattern: Random Points  
Depth Allowance: 0.073 in.  
External PIT Depth: 0.000 in.  
Abnormal Condition: None Observed  
Drawing / Reference No: n/a  
UT Technician: William P. Duncan III

**Base Statistical Calculations**  
Reported Wall Thickness: 0.133 in.  
ASTM Wall Thickness: 0.133 in.  
At Spec: Yes Underspec: Overspec:  
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: 0.026 in.  
Proximity To Threads Or Groove Cut: 0.020 in.  
Standard Deviation: 0.009  
Pitting Index: 15.52 High Pitting Activity

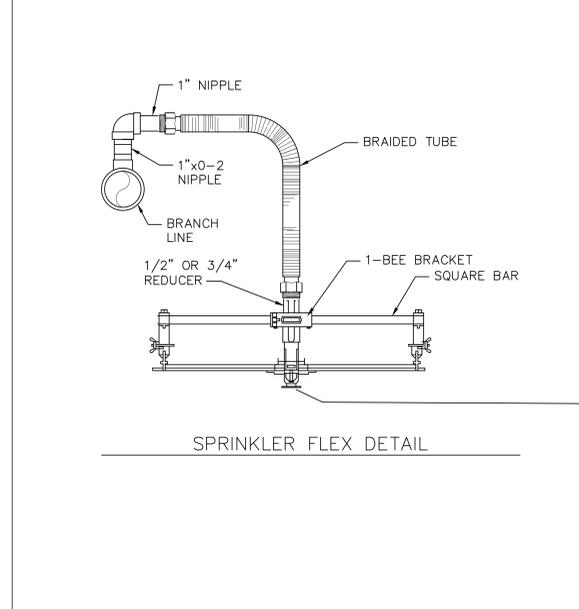
Scenario	Average Wall Thickness	Minimum Wall Thickness	Theoretically Lowest Thickness
Average Based Scenario	0.110 in.	0.093 in.	0.098 in.
Minimum Based Scenario	0.109 in.	0.096 in.	0.091 in.
Theoretical Based Scenario	0.109 in.	0.096 in.	0.091 in.

Estimated Retirement: September 2038  
Condition: █ Gauge

**Testing Indicators: Pipe Replacement is Mandatory**

**Overall Assessment:** We continue to identify lower wall thickness along the ERW weld seam at multiple pipe sections. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. High pitting and low thickness measurements suggest that no further reliable service life is available. Pipe wall exists 20 mils from the thread cut.

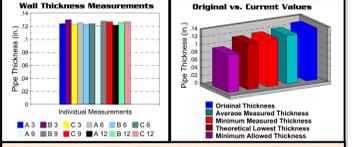
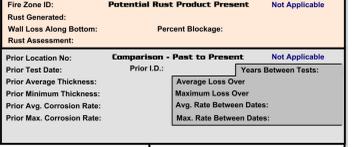
August 24, 2023 Page 91



**Test Location No: 51** Photo No: SCC-1-61.jpg Orientation: Side View Detail: Pipe Location / Condition

**Piping Technicalities**  
Location - Health Science Building 3rd Floor Classroom 314. Fire sprinkler branch line to sprinkler head. Test points located between elbow and sprinkler head.

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: 3-FS-150 Field No: 50  
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: Vertical  
Pressure: 145 psi Temperature: 75 °F  
Test Pattern: Random Points  
Depth Allowance: 0.073 in.  
External PIT Depth: 0.000 in.  
Abnormal Condition: Thread Leak  
Drawing / Reference No: n/a  
UT Technician: William P. Duncan III

**Base Statistical Calculations**  
Reported Wall Thickness: 0.133 in.  
ASTM Wall Thickness: 0.133 in.  
At Spec: Yes Underspec: Overspec:  
Barlow Calculated Minimum: 0.097 in.  
Default Minimum Wall: 0.095 in.  
Minimum Allowable Thickness: 0.095 in.  
Minimum Value Based On: Barlow  
High To Low Range: 0.009 in.  
Proximity To Threads Or Groove Cut: 0.048 in.  
Standard Deviation: 0.003  
Pitting Index: 3.20 Insignificant Pitting Activity

Scenario	Average Wall Thickness	Minimum Wall Thickness	Theoretically Lowest Thickness
Average Based Scenario	0.125 in.	0.108 in.	0.118 in.
Minimum Based Scenario	0.121 in.	0.102 in.	0.118 in.
Theoretical Based Scenario	0.121 in.	0.102 in.	0.118 in.

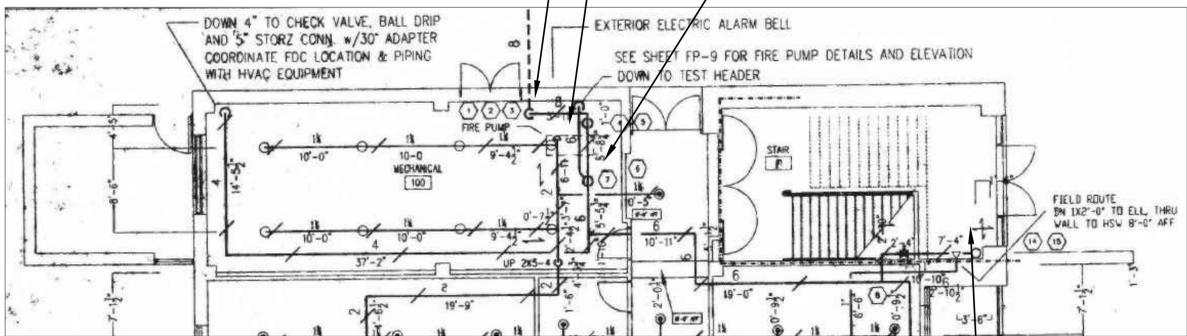
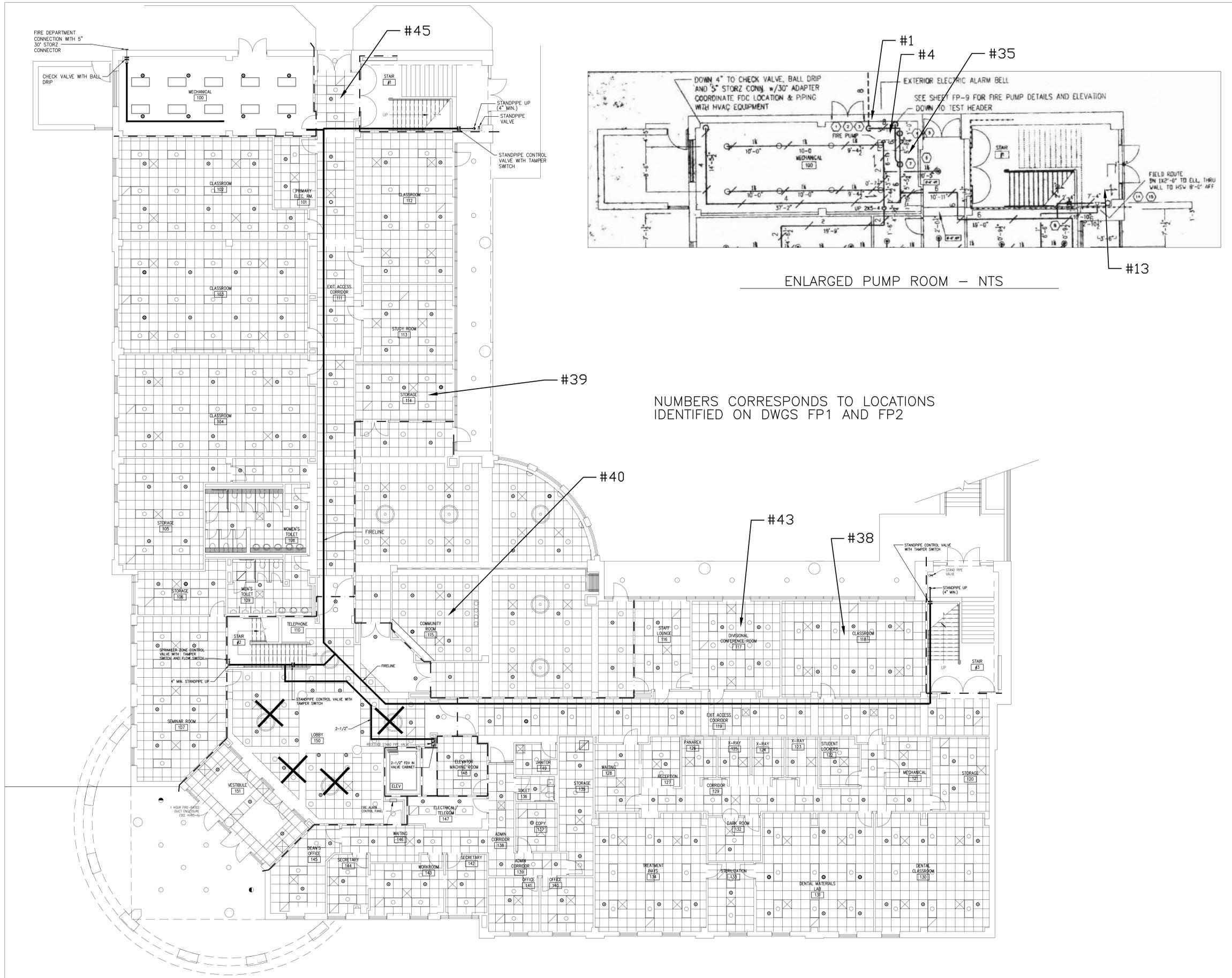
Estimated Retirement: December 2108  
Condition: █ Gauge

**Testing Indicators: Pipe Replacement is Mandatory** █ A Leak Currently Exists

**Overall Assessment:** Here we show another pipe section where wall thickness readings are high, but a thread leak also exists. Some deficiency with threading, pipe sealant, or fitting-up is suspected. A thread leak at this pipe section defines its replacement as mandatory.

August 24, 2023 Page 97

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



ENLARGED PUMP ROOM - NTS

NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

1 FIRE PROTECTION PLAN - 1ST FLOOR



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

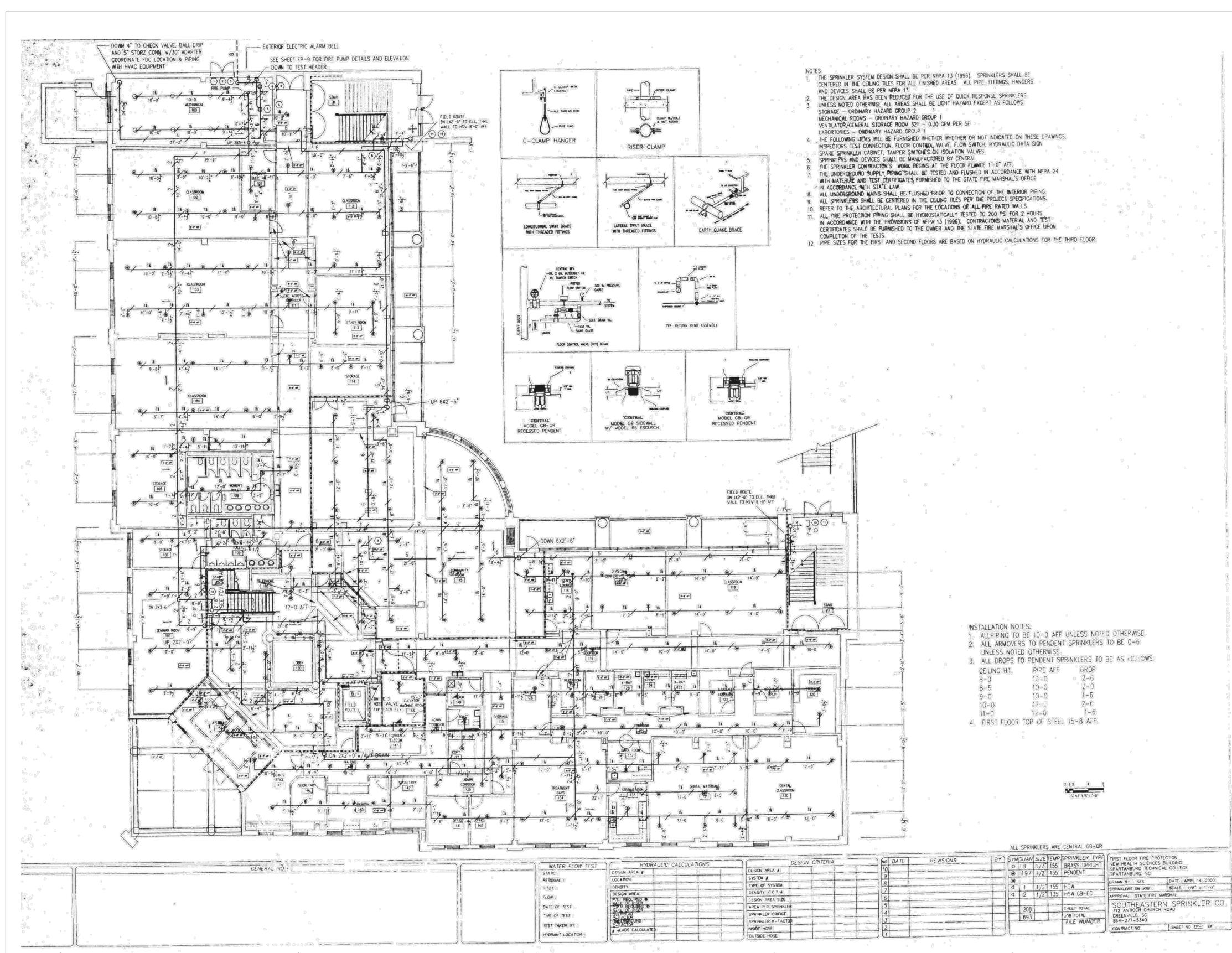
NOT FOR CONSTRUCTION  
 FOR PRICING ONLY

ISSUED FOR BIDS 02-26-2024

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

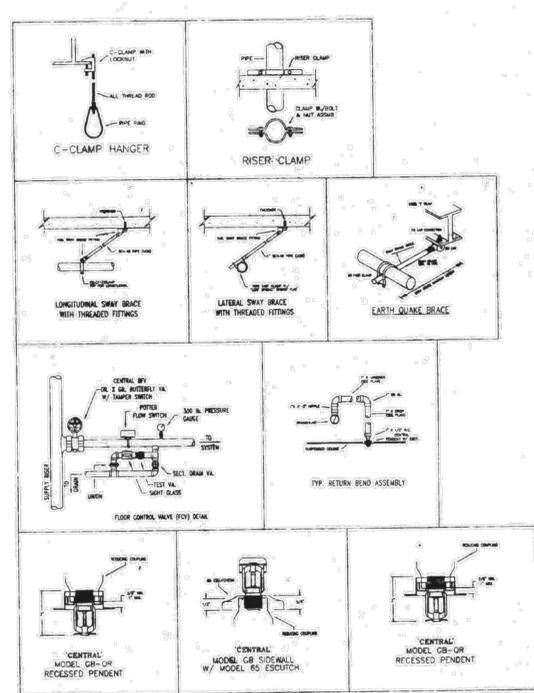
SHEET TITLE:  
**FIRE PROTECTION  
 PLAN - 1ST FLOOR**

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 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" 13'-0" 1'-6"
  4. FIRST FLOOR TOP OF STEEL 15'-8" AFF.



ALL SPRINKLERS ARE CENTRAL CB-OR

SYMBOL	SIZE	TEMP	SPRINKLER TYPE
0	8	155	BRASS UPRIGHT
1	1 1/2	155	PENDENT
2	1 1/2	155	HSW
3	1 1/2	135	HSW CB-ED
4	208		
5	693		

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	DENSITY / GPM
4	TEMPERATURE
5	AREA IN SPRINKLER
6	SPRINKLER ORIFICE
7	SPRINKLER K-FACTOR
8	INSIDE HOSE
9	OUTSIDE HOSE

WATER FLOW TEST	HYDRAULIC CALCULATIONS
STATIC	DESIGN AREA #
PISTON	LOCATION
FLOW	DENSITY
DATE OF TEST	DESIGN AREA
TIME OF TEST	TEMPERATURE
TEST TAKEN BY	AREA IN SPRINKLER
HYDRANT LOCATION	SPRINKLER ORIFICE
	SPRINKLER K-FACTOR
	INSIDE HOSE
	OUTSIDE HOSE

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

DATE	DESCRIPTION	BY
02-26-2024	ISSUED FOR BIDS	WEM

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

CONSULTANT LOGO

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

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

SHEET ISSUE

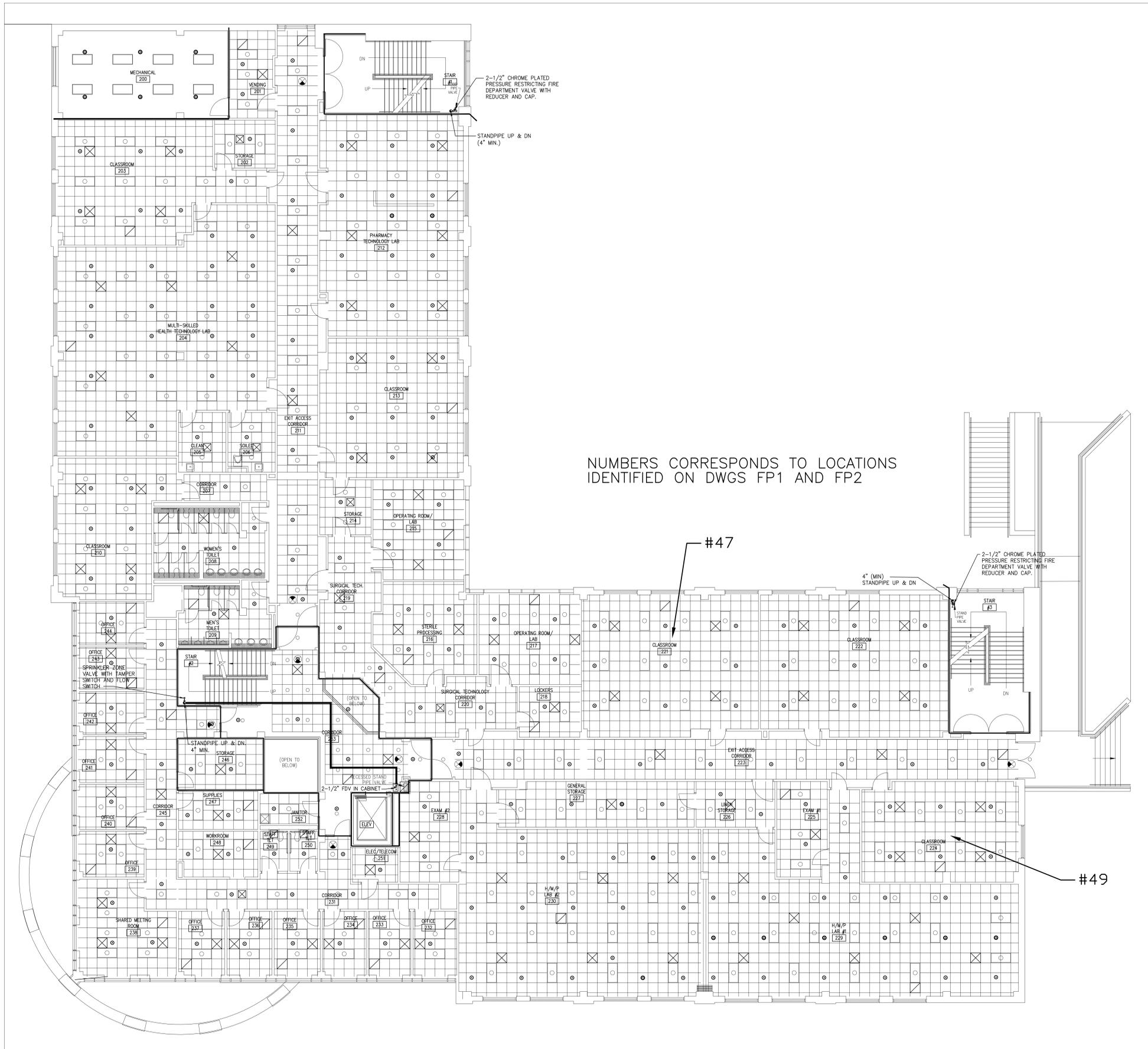
NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM

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 - 1ST FLOOR  
(ORIGINAL  
SPRINKLER PLANS)  
SHEET NO. PROJ. NO.  
023034

FP3A

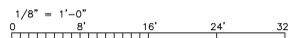


NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

#47

#49

1 FIRE PROTECTION PLAN - 2ND FLOOR  
FP4



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

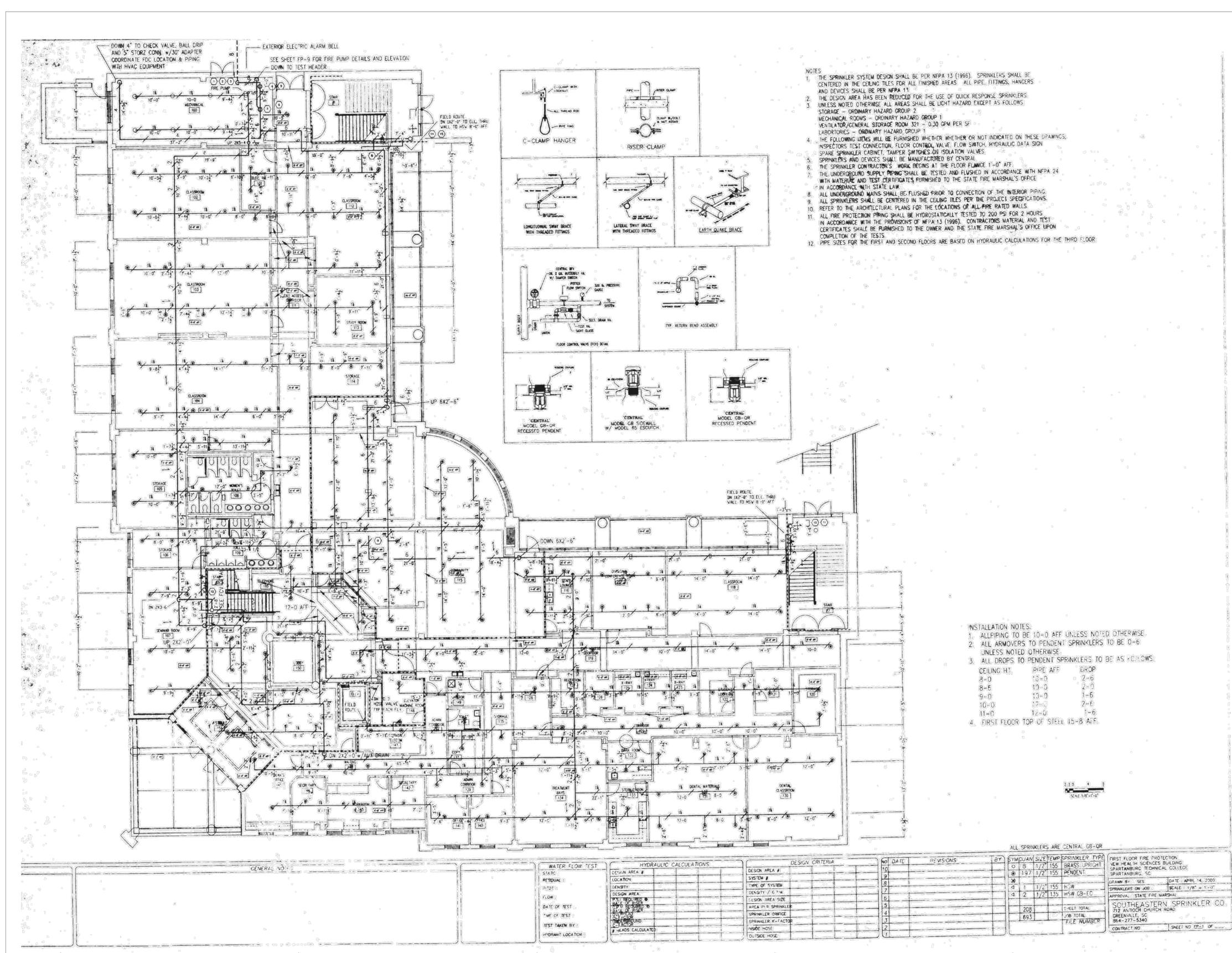
NOT FOR CONSTRUCTION  
FOR PRICING ONLY

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

FIRE PROTECTION  
PLAN - 2ND FLOOR

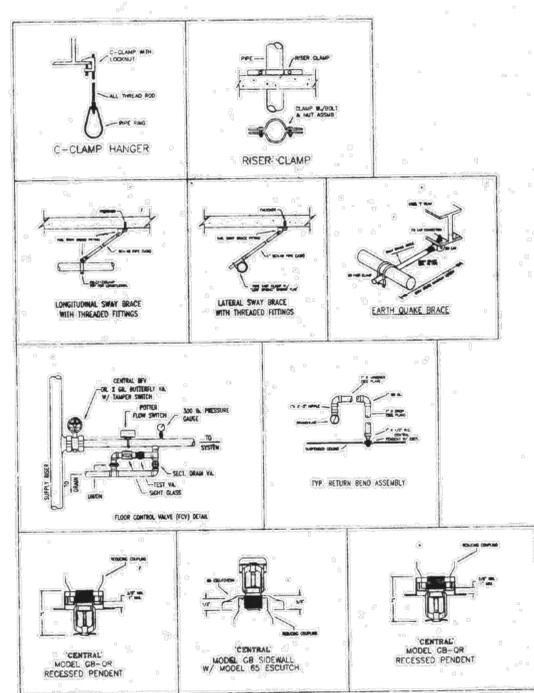
SHEET NO. PROJ. NO.  
023034

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:  
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 CB-OR

SYMBOL	SIZE	TEMP	SPRINKLER TYPE
0	8	155	BRASS UPRIGHT
1	1 1/2	155	PENDENT
2	1 1/2	155	HSW
3	1 1/2	135	HSW CB-ED
4	208		
5	693		

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	DENSITY / GPM
4	TEMPERATURE
5	AREA IN SPRINKLER
6	SPRINKLER ORifice
7	SPRINKLER K-FACTOR
8	INSIDE HOSE
9	OUTSIDE HOSE

WATER FLOW TEST	HYDRAULIC CALCULATIONS
STATIC	DESIGN AREA #
PISTON	LOCATION
FLOW	DENSITY
DATE OF TEST	DESIGN AREA
TIME OF TEST	TEMPERATURE
TEST TAKEN BY	AREA IN SPRINKLER
HYDRANT LOCATION	SPRINKLER ORifice
	SPRINKLER K-FACTOR
	INSIDE HOSE
	OUTSIDE HOSE

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



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

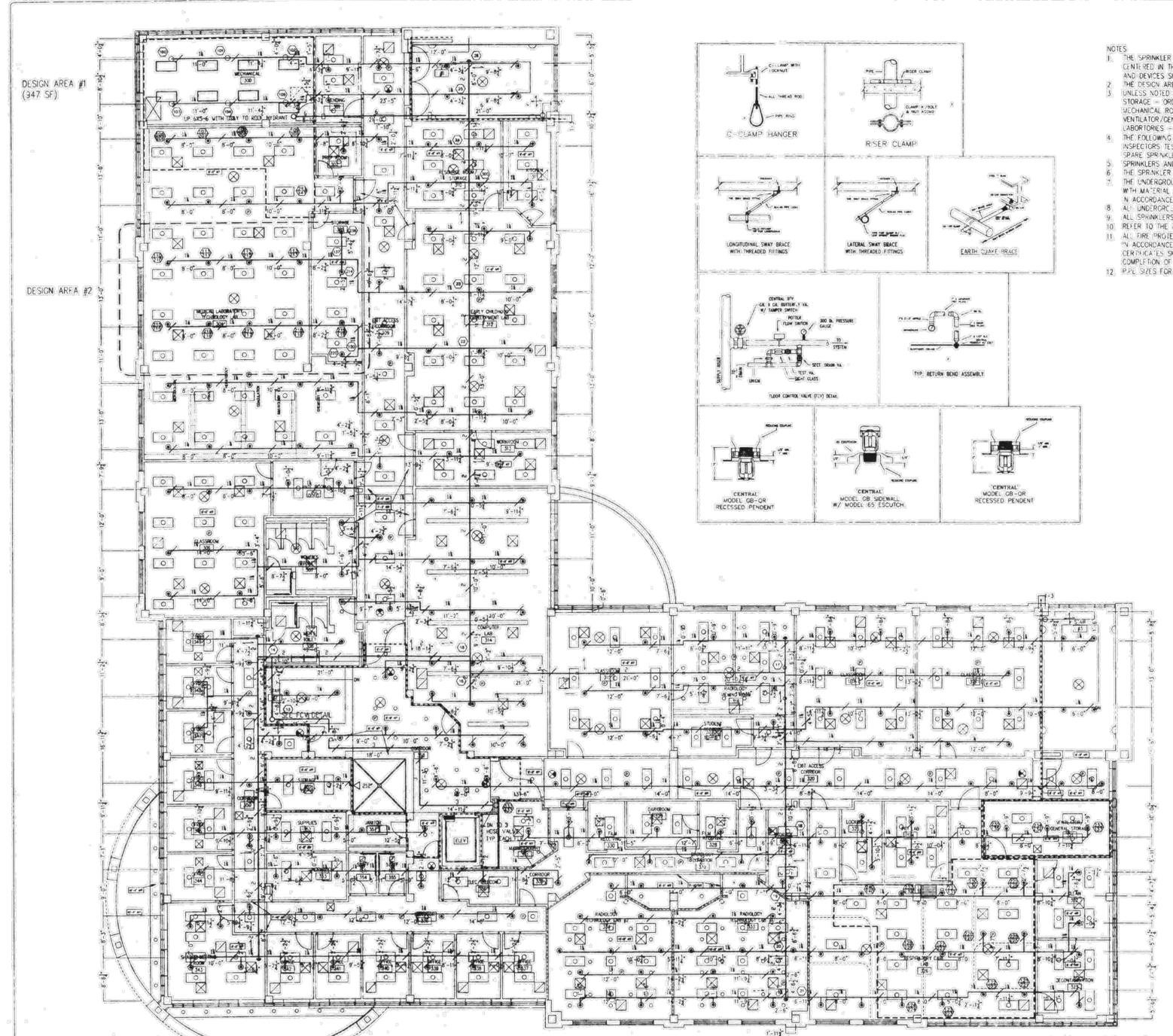
SHEET ISSUE	NO	DATE	DESCRIPTION	BY
0	02-26-2024	ISSUED FOR BIDS	WEM	

NOT FOR CONSTRUCTION  
 FOR PRICING ONLY

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

SHEET TITLE:  
**FIRE PROTECTION  
 PLAN - 2ND FLOOR  
 (ORIGINAL  
 SPRINKLER PLANS)**  
 SHEET NO. PROJ. NO.  
 02034





- NOTES
- 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.
  - 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
  - THE FOLLOWING ITEMS WILL BE FURNISHED WHETHER INDICATED OR NOT 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.
  - THE SPRINKLER CONTRACTOR'S WORK BEGINS AT THE FLOOR FLANGE (1'-0" AFF). 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.
  - ALL UNDERGROUND MAINS SHALL BE FLUSHED PRIOR TO CONNECTION OF THE INTERIOR PIPING.
  - ALL SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES PER THE PROJECT SPECIFICATIONS.
  - REFER TO THE ARCHITECTURAL PLANS FOR THE LOCATIONS OF ALL FIRE RATED WALLS.
  - 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.
  - PIPE SIZES FOR THE FIRST AND SECOND FLOORS ARE BASED ON HYDRAULIC CALCULATIONS FOR THE THIRD FLOOR.

INSTALLATION NOTES:

- ALL PIPING TO BE 10'-0" AFF UNLESS NOTED OTHERWISE.
- ALL ARMORS TO PENDENT SPRINKLERS TO BE 0'-6" UNLESS NOTED OTHERWISE.
- 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"

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

GENERAL NOTES		WATER FLOW TEST		HYDRAULIC CALCULATIONS				DESIGN CRITERIA				REVISIONS		ALL SPRINKLERS ARE CENTRAL GB-OR						
DATE: 8/19/99		STATIC: 60 PSI	DESIGN AREA #	1	2	3	4	DESIGN AREA #	1	2	3	4	NO.	DATE	BY	SYMBOL	SIZE	TEMP	SPRINKLER TYPE	
TIME OF TEST: 10:58 AM		RESIDUAL: 56 PSI	HYDRAULIC FILE	SBT03	SBT04	SBT02	SBT05	HYDRAULIC FILE	SBT03	SBT04	SBT02	SBT05	1			0	6	172	155	BRASS UPRIGHT
TEST TAP: BY J. ALLEY		PISTON: 48 PSI	DENSITY	0.15	0.15	0.15	0.30	TYPE OF SYSTEM	WET	WET	WET	WET	2			243	1/2	155	PENDENT	
SPARTANBURG WATER DEPT.		FLOW: 1162 GPM	DESIGN AREA	900	900	900	ROOM	LENGTH / GPM	0.15	0.15	0.15	0.30	3			4	1	1/2	212	MSW
HYDRANT LOCATION: 305		DATE OF TEST: 8/19/99	TEST SPRINKLER	70.68	111.7	87.53	73.95	DESIGN AREA SIZE	900	900	900	ROOM	6							
		TIME OF TEST: 10:58 AM	TEST SPRINKLER	164.19	330.58	288.77	160.29	LARVAL PER SPRINKLER	120	120	120	90	15							
		TEST TAP: BY J. ALLEY	TEST SPRINKLER	120	120	120	120	SPRINKLER ORIFICE	1/2	1/2	1/2	1/2	14							
		SPARTANBURG WATER DEPT.	TEST SPRINKLER	140	140	140	140	SPRINKLER FACTOR	3.5	3.5	3.5	3.5	1							
		HYDRANT LOCATION: 305	TEST SPRINKLER	10	11	12	3	INSIDE HOSE	100	100	100	100	2							
			TEST SPRINKLER	140	140	140	140	OUTSIDE HOSE	150	150	150	150	1							



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**