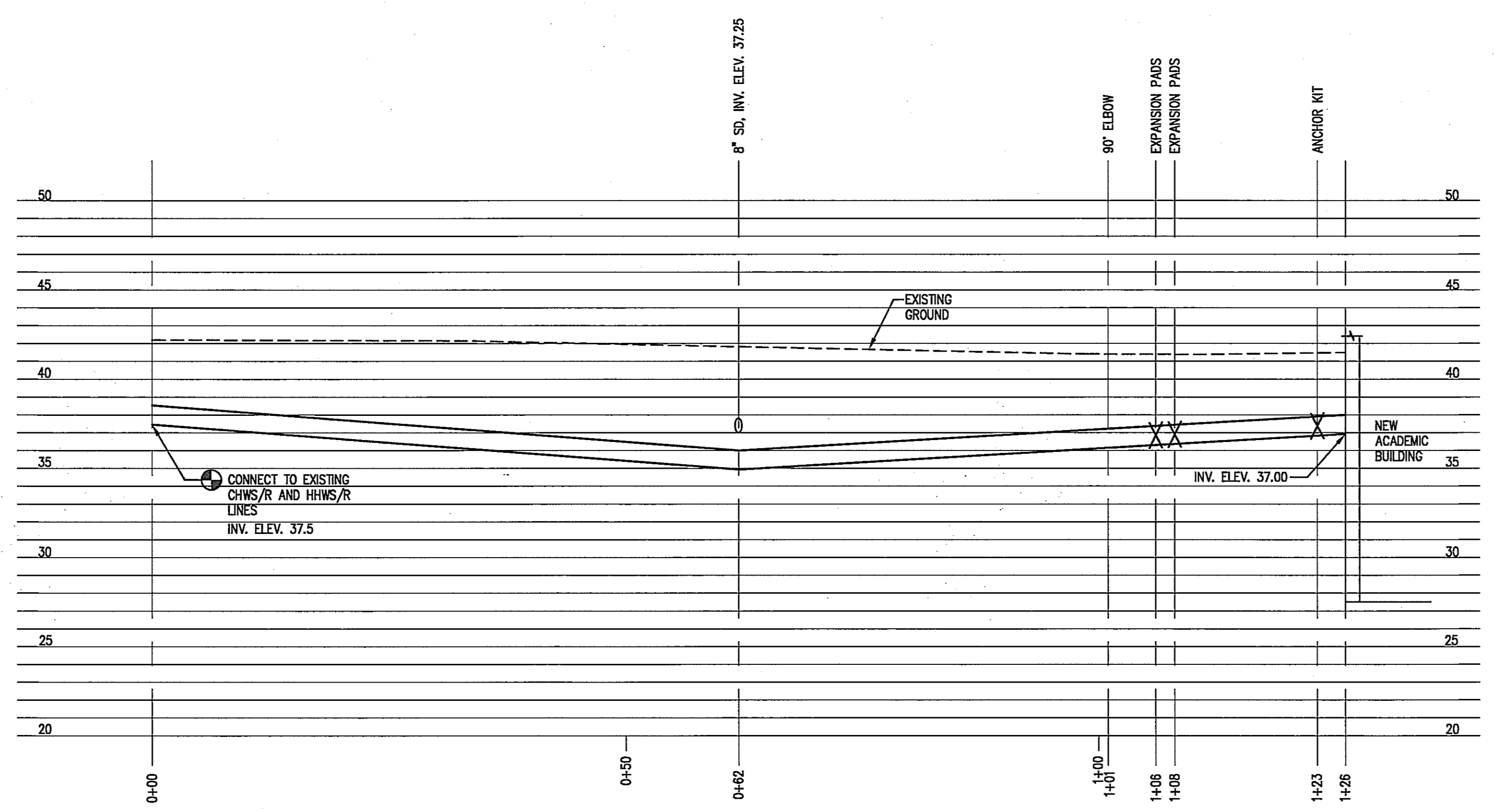


1 SITE PLAN - MECHANICAL NEW WORK
SCALE: 1"=10'



2 CHILLED AND HEATING WATER PROFILE
SCALE: HORIZ. 1"=10'-0"
VERT. 1"=5'-0"

GENERAL NOTES

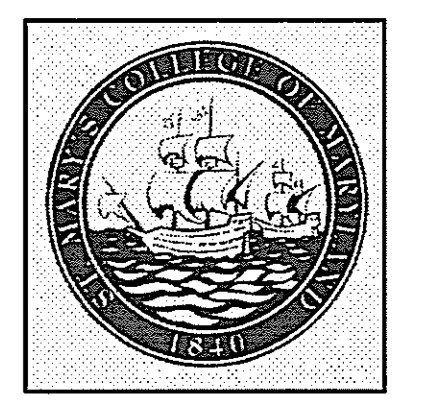
1. FOR DETAILS SEE MECHANICAL DRAWING M6.3.

LEGEND

- SF — SILT FENCE
- ■ ■ LIMIT OF DISTURBANCE

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| TITLE _____ | DATE _____ |

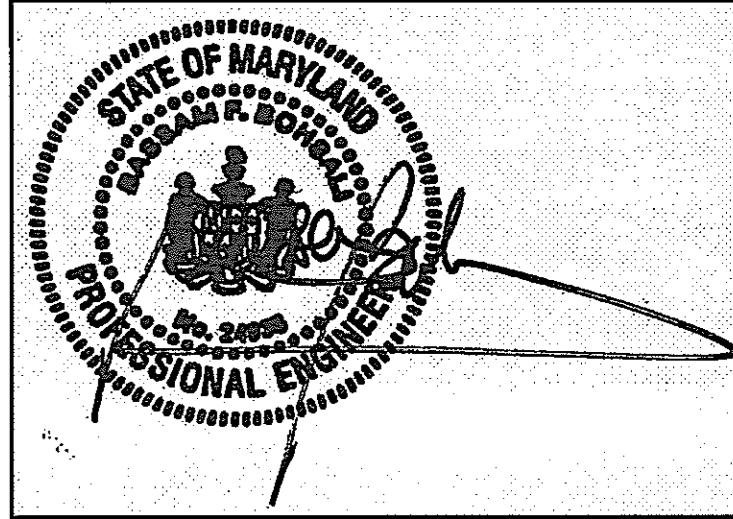
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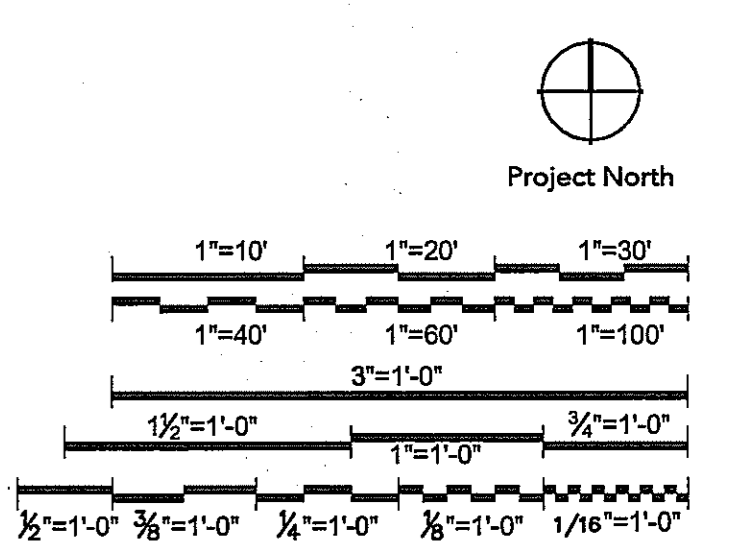
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Seals and Signatures



01/05/05
DATE

Graphic Scales



**SITE PLAN
NEW WORK
MECHANICAL**

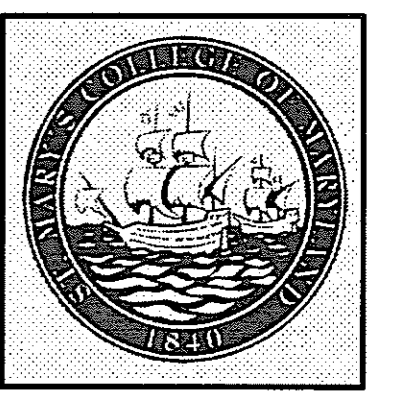
AS NOTED

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M1.0

Drawing Number

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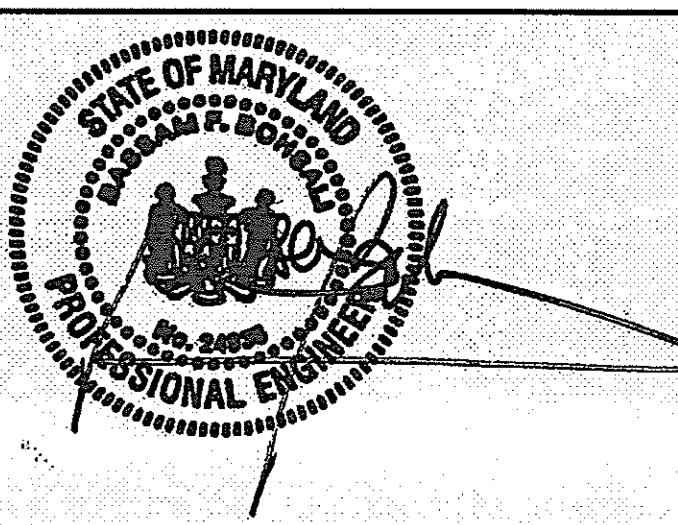
DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER DATE

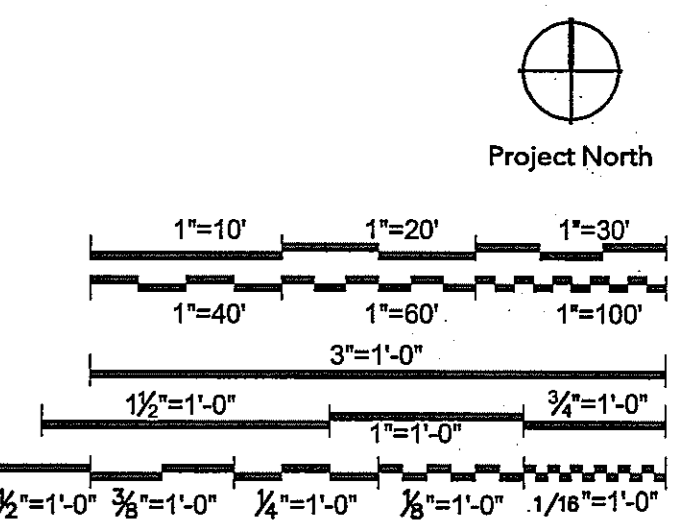
CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

Seals and Signatures



Graphic Scales DATE



Drawing Title
BASEMENT PRESSURIZATION PLAN

1/8" = 1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M1.1

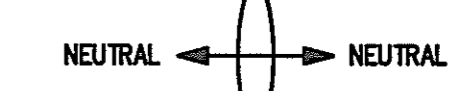
Drawing Number

GENERAL NOTES

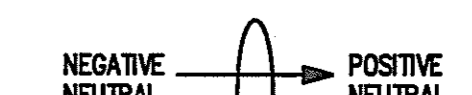
THE ANIMAL HOLDING AREA SHALL BE NEGATIVELY PRESSURIZED IN RESPECT TO THE REST OF THE BUILDING

SYMBOLS

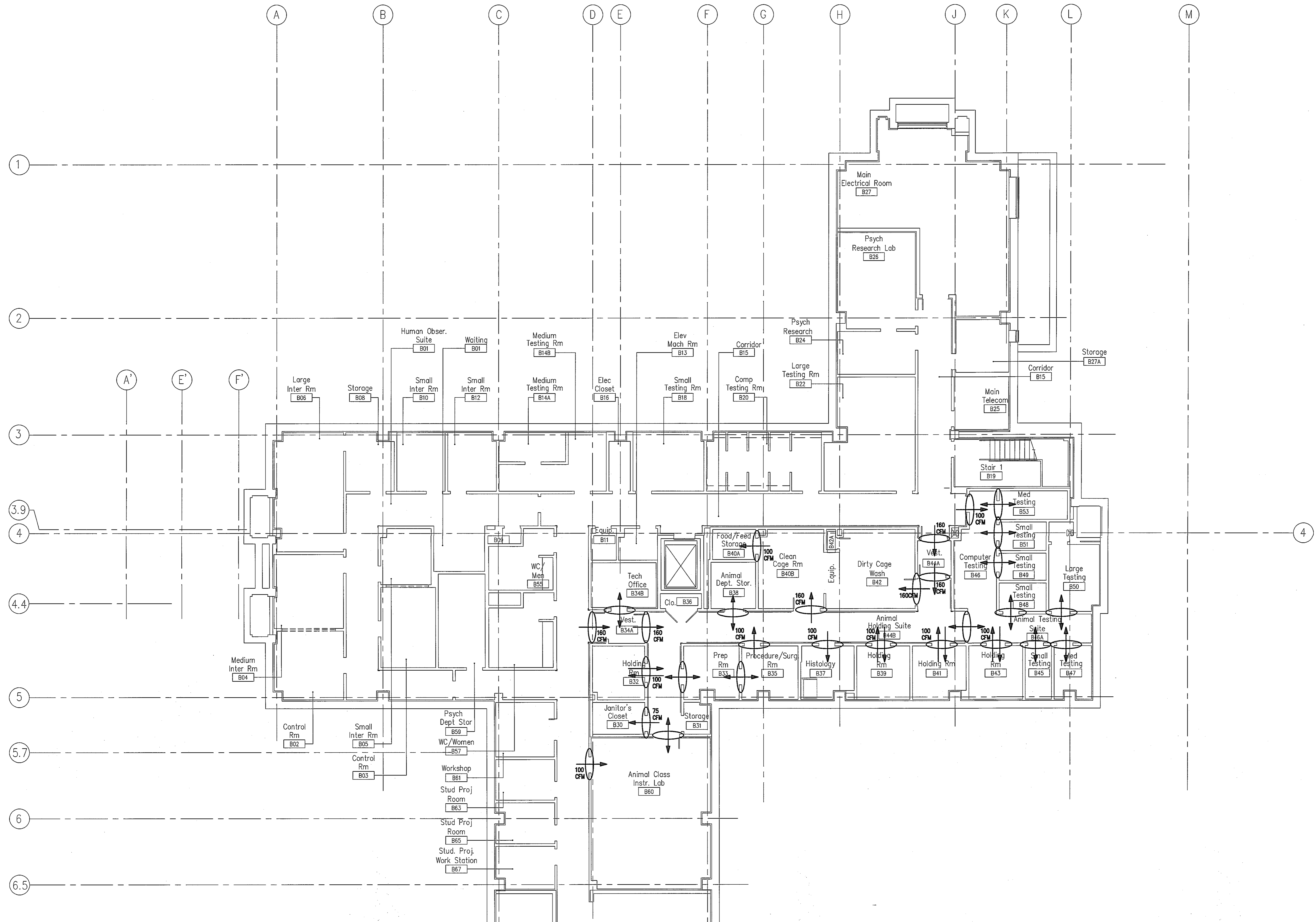
PRESET PRESSURIZATION:



USER ADJUSTABLE PRESSURIZATION:



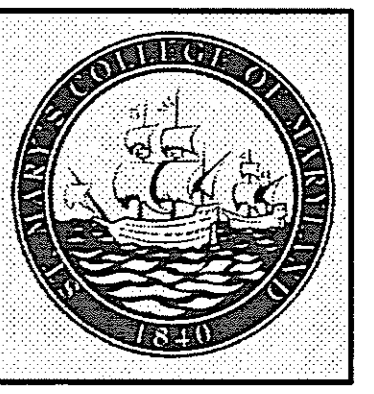
DRAWING NOTES



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4.4
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5.7
6
6.5

A E F

A B C D E F G H J K L M



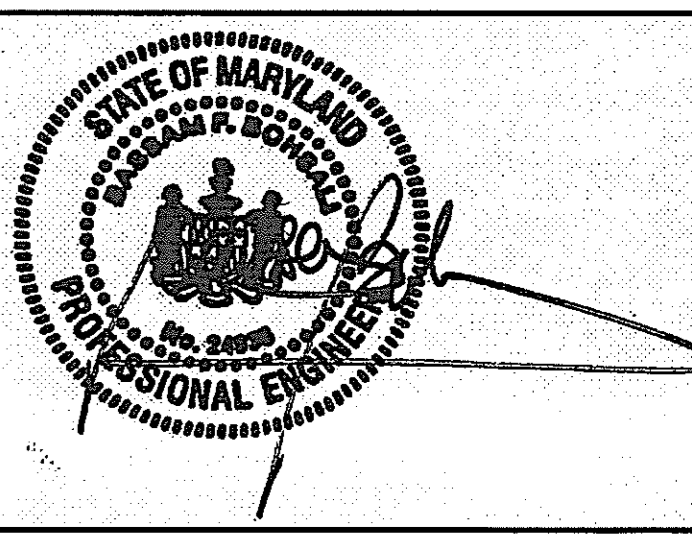
NAME _____
TITLE _____ DATE _____

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

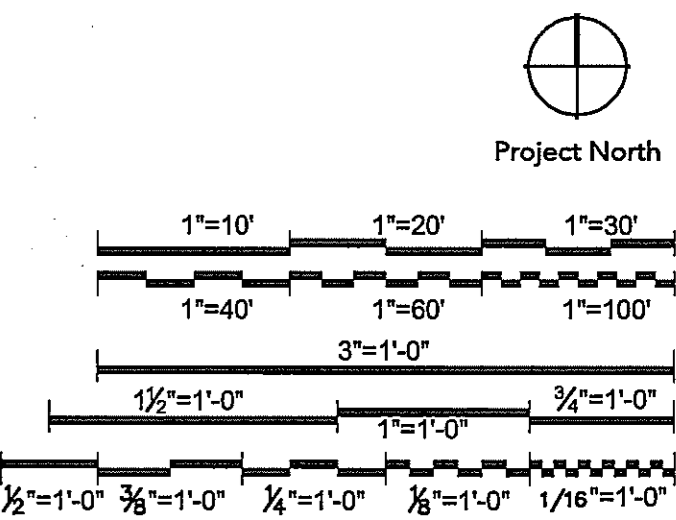
Issued for _____ Rev Date _____

Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title

SECOND FLOOR PRESSURIZATION PLAN

1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M1.2

Drawing Number

GENERAL NOTES

THE CHEMISTRY LABORATORY AREA IS POSITIVELY PRESSURIZED IN RESPECT TO THE AMBIENT.
INDIVIDUAL ROOM PRESSURIZATION AS SHOWN ON THE DRAWINGS.

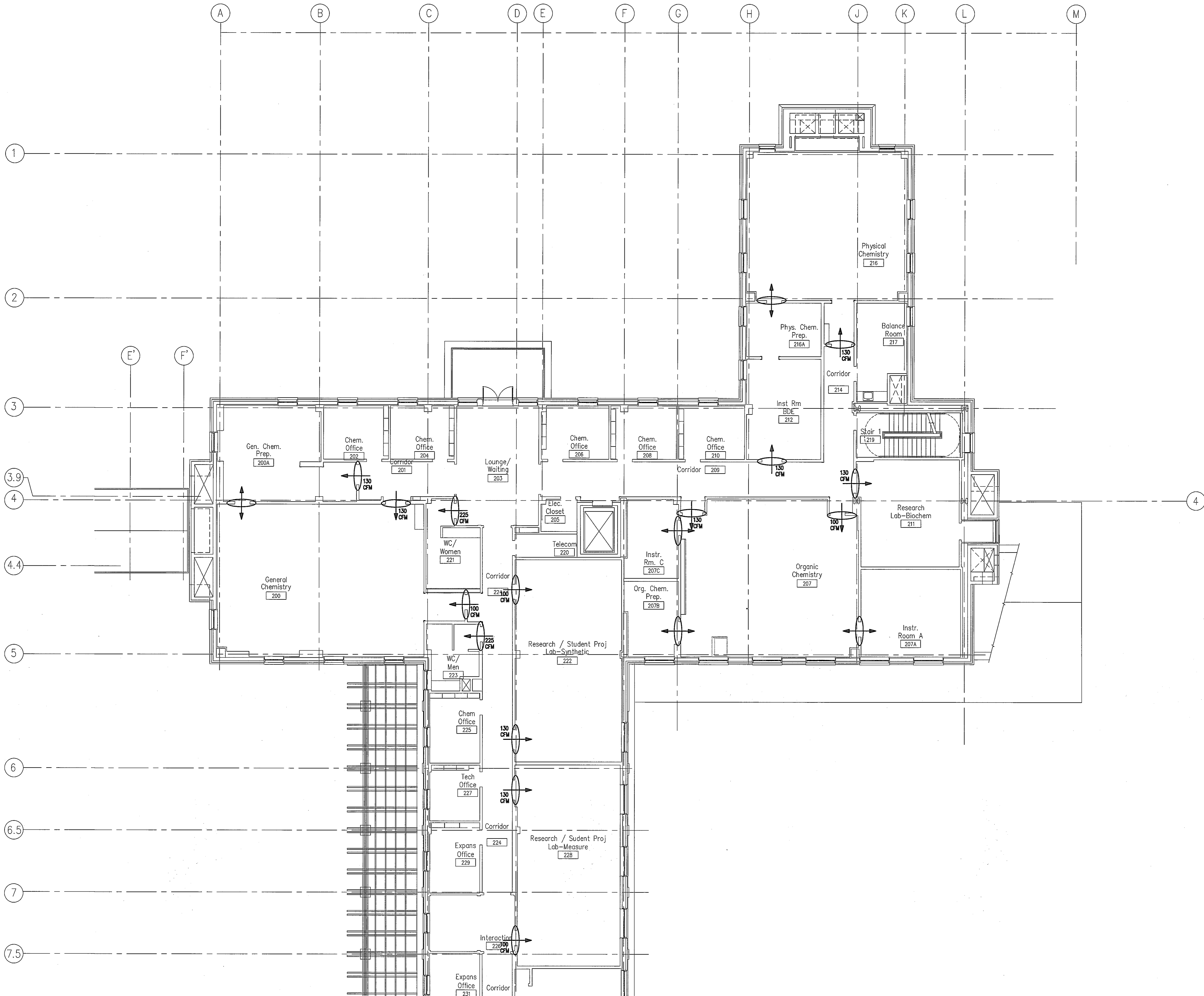
SYMBOLS:

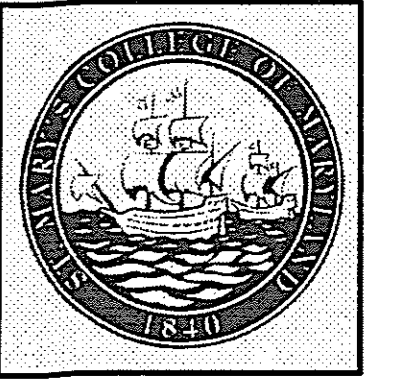
PRESET PRESSURIZATION:

NEGATIVE [Symbol]

NEUTRAL [Symbol]

DRAWING NOTES





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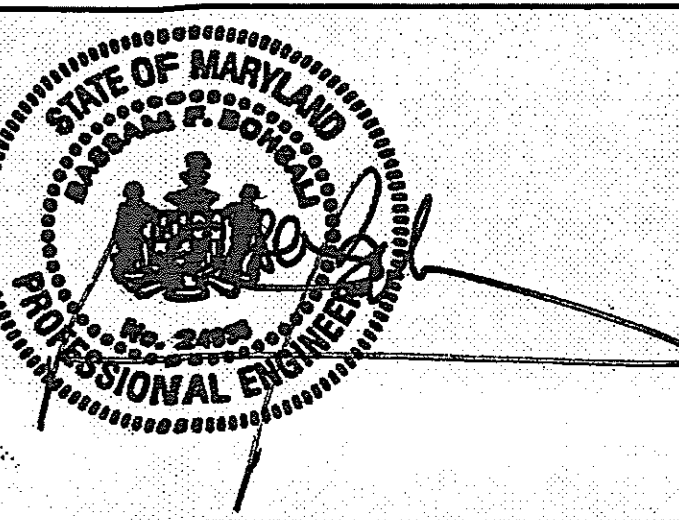
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

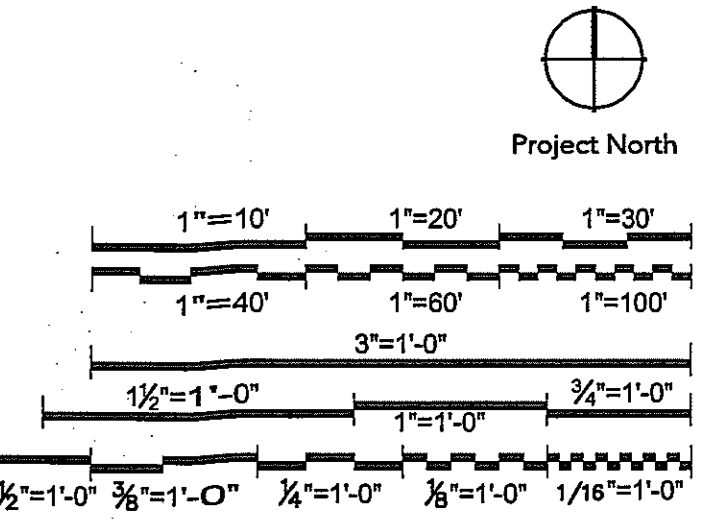
APPENDIX FB-10

Seals and Signatures



01/05/05
DATE

Graphic Scales



Drawing Title
**BASEMENT
HVAC PLAN
NORTH**

1/8"=1'-0"

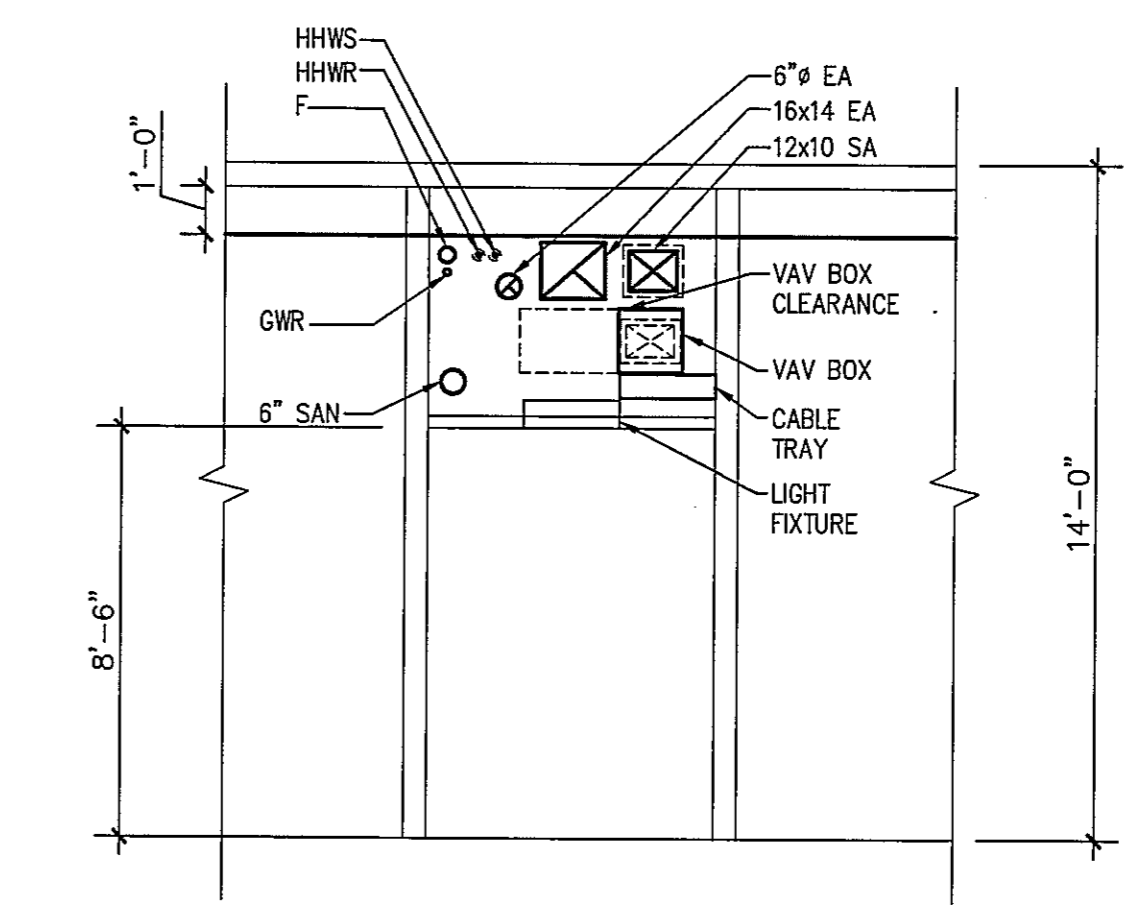
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.0.A

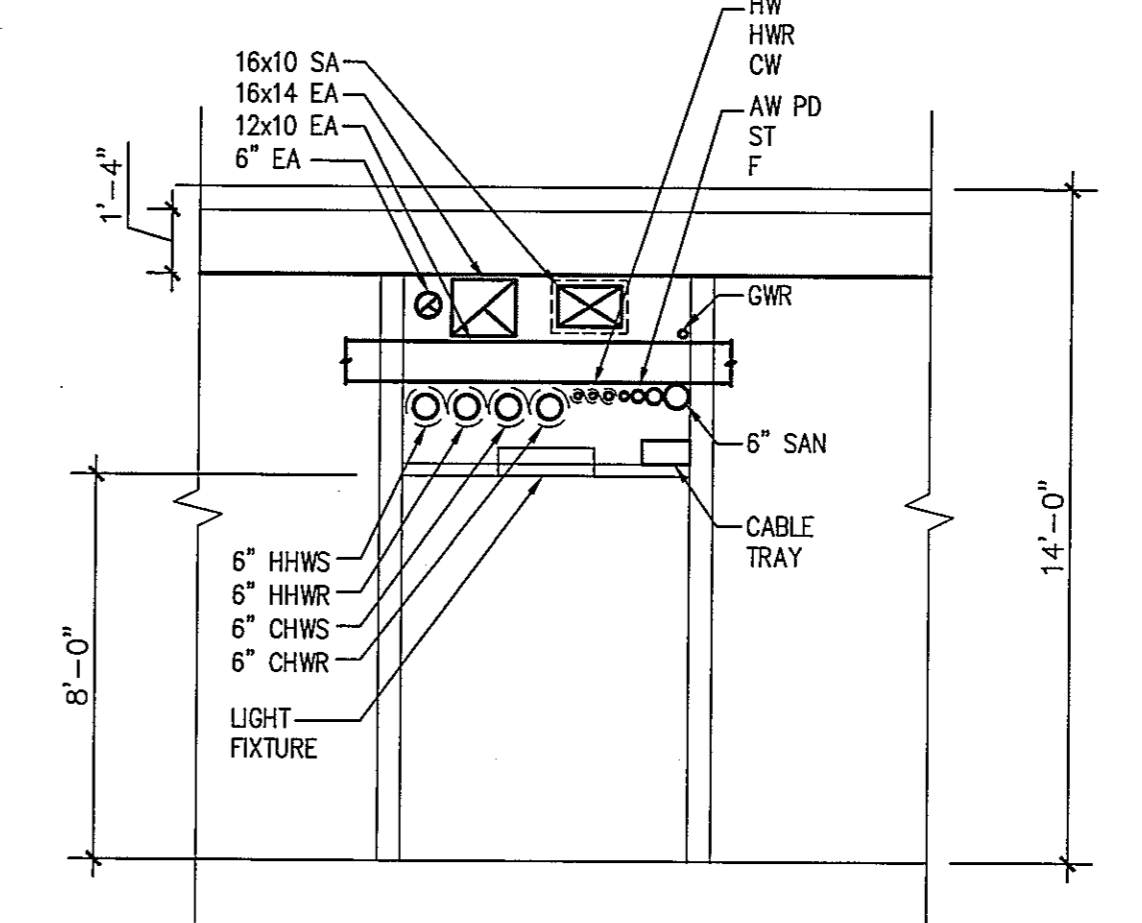
Drawing Number

SHEET NOTES

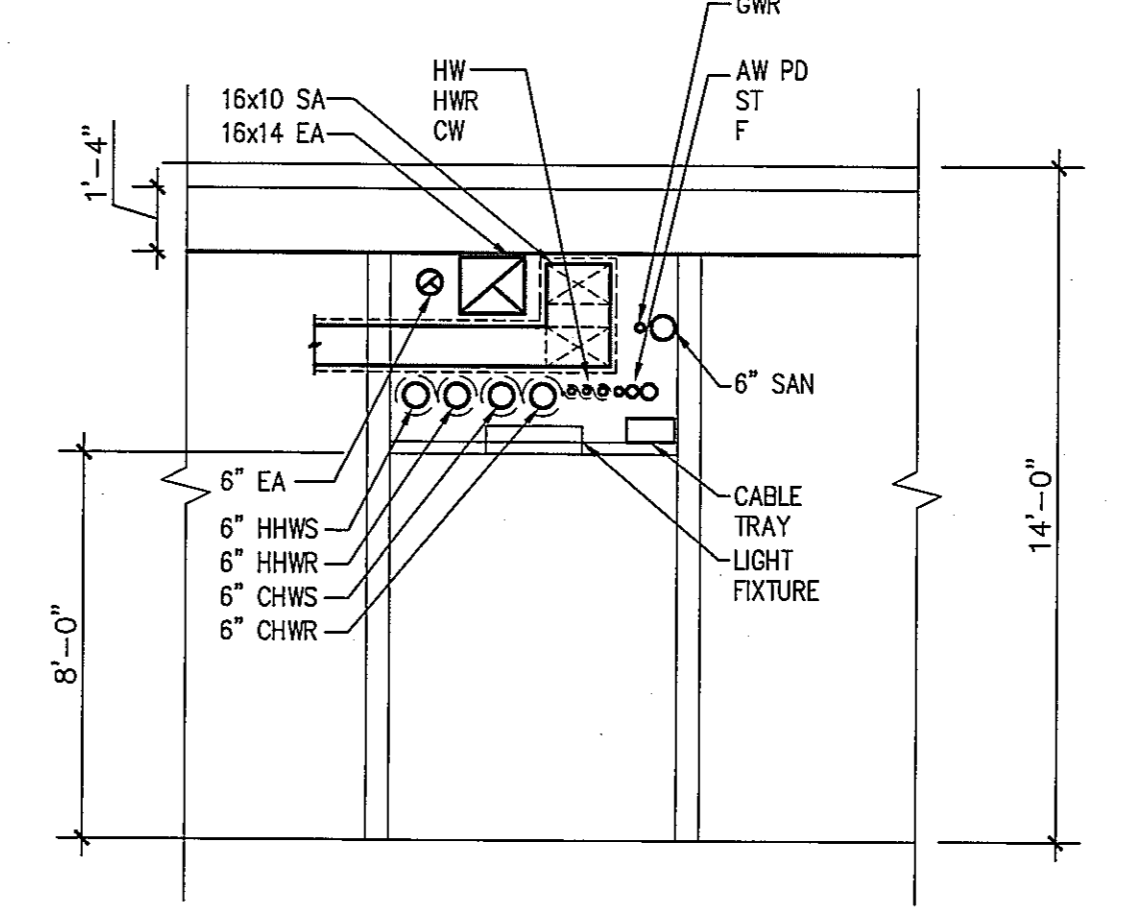
- 1. PROVIDE ACOUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACOUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.



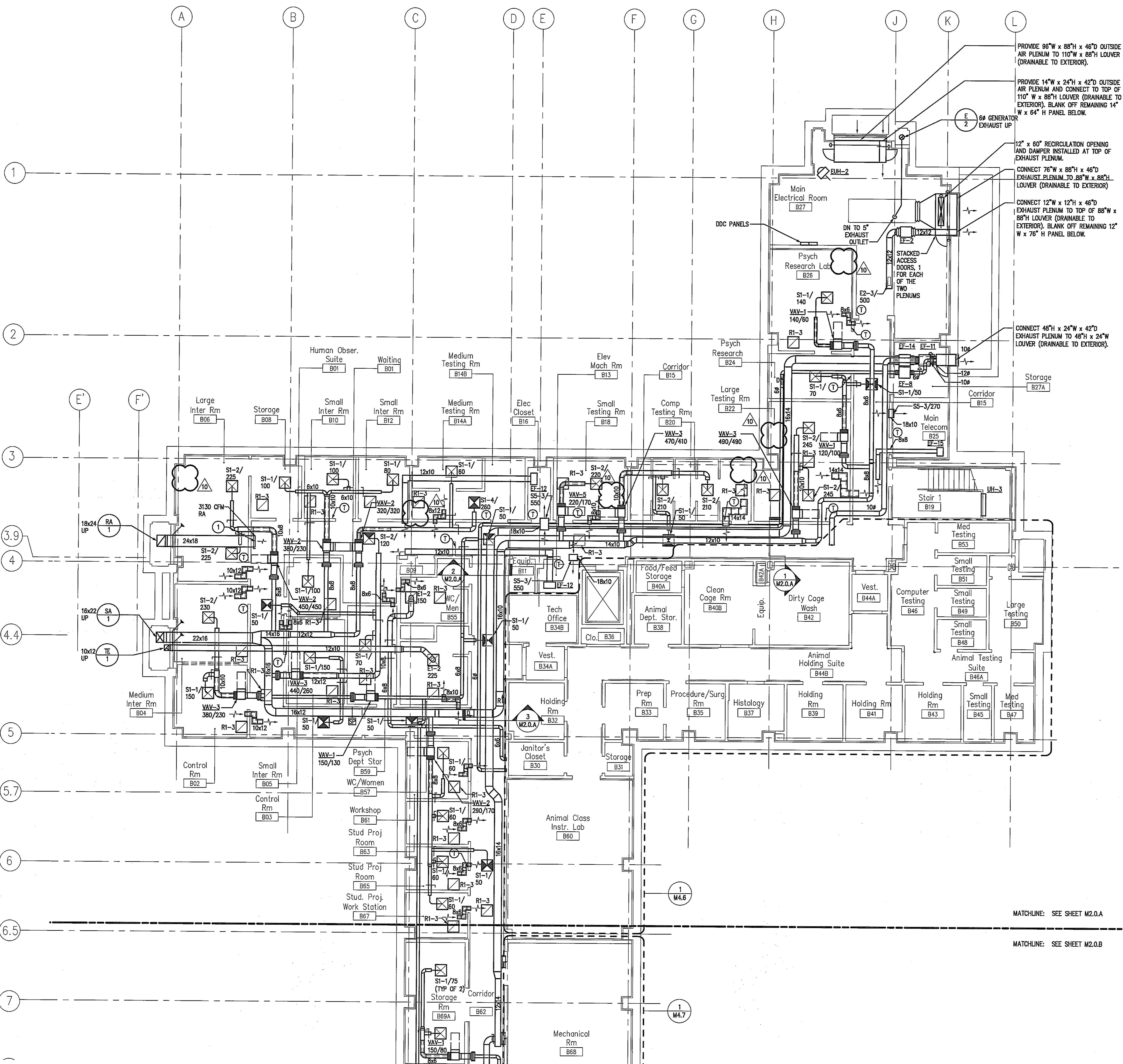
1 CORRIDOR SECTION
SCALE: 1/4" = 1'-0"



2 CORRIDOR SECTION
SCALE: 1/4" = 1'-0"



3 CORRIDOR SECTION
SCALE: 1/4" = 1'-0"



PROVIDE 96"W x 88"H x 46"D OUTSIDE AIR PLENUM TO 110"W x 88"H LOUVER (DRAINABLE TO EXTERIOR).

PROVIDE 14"W x 24"H x 42"D OUTSIDE AIR PLENUM AND CONNECT TO TOP OF 110"W x 88"H LOUVER (DRAINABLE TO EXTERIOR). BLANK OFF REMAINING 14" W x 64" H PANEL BELOW.

CONNECT 12"W x 12"H x 46"D EXHAUST PLENUM TO 88"W x 88"H LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

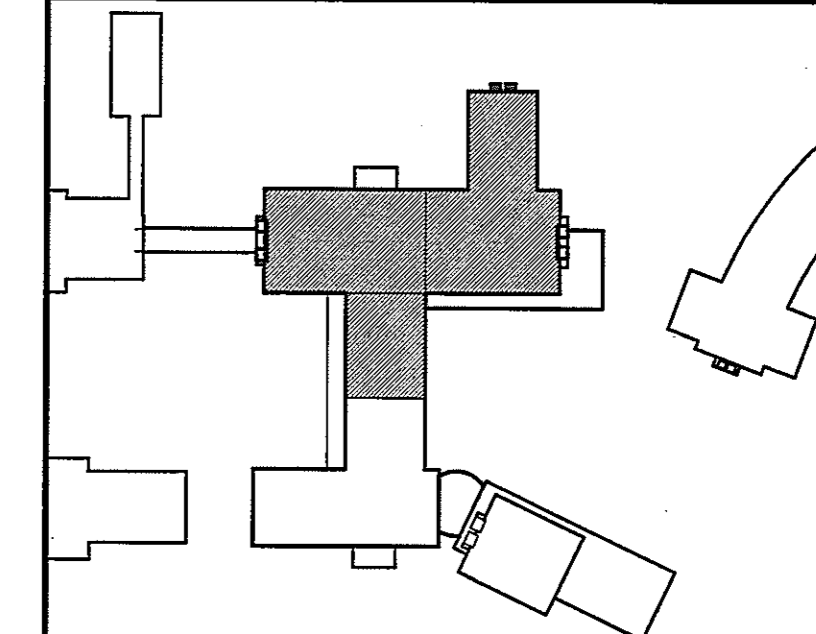
CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

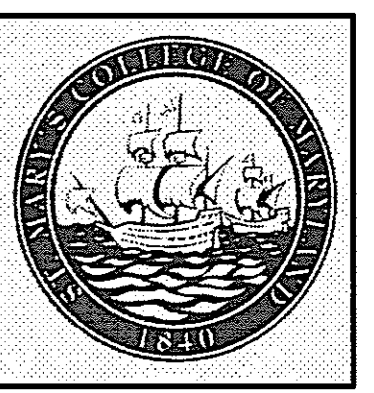
CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).

CONNECT 48"H x 24"W x 42"D EXHAUST PLENUM TO 48"H x 24"W LOUVER (DRAINABLE TO EXTERIOR).





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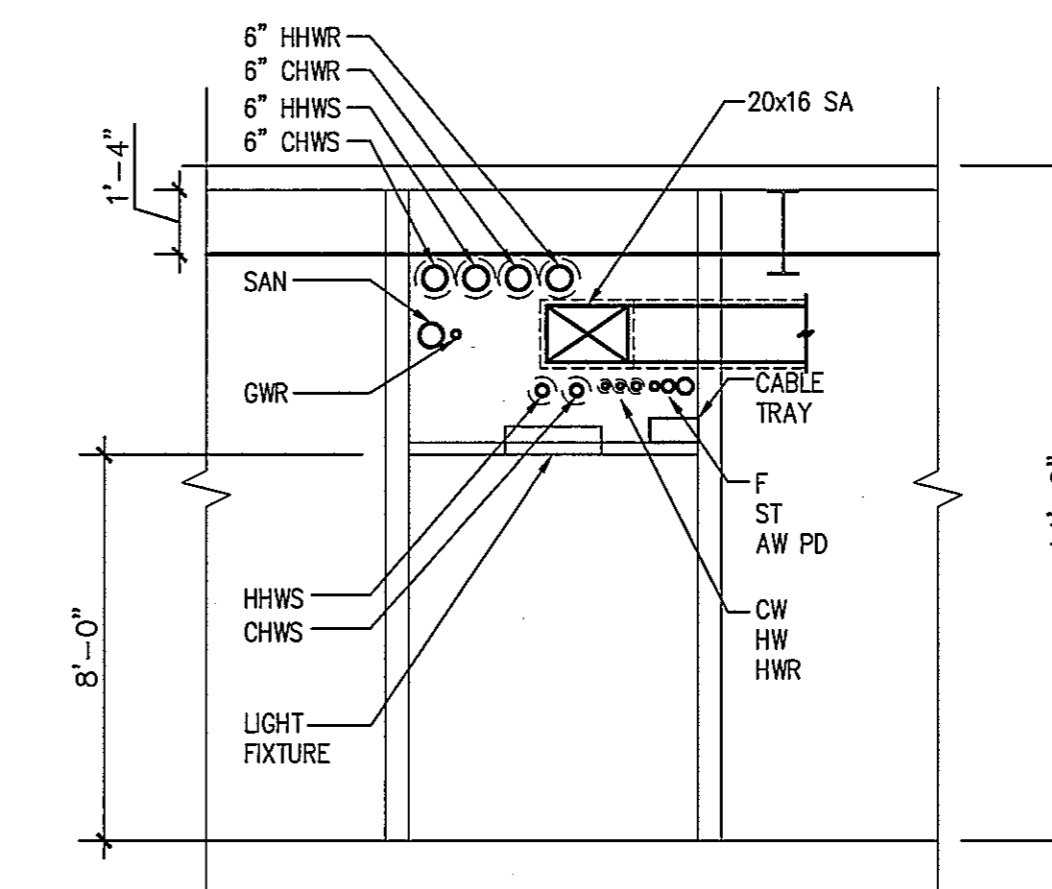
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

SHEET NOTES

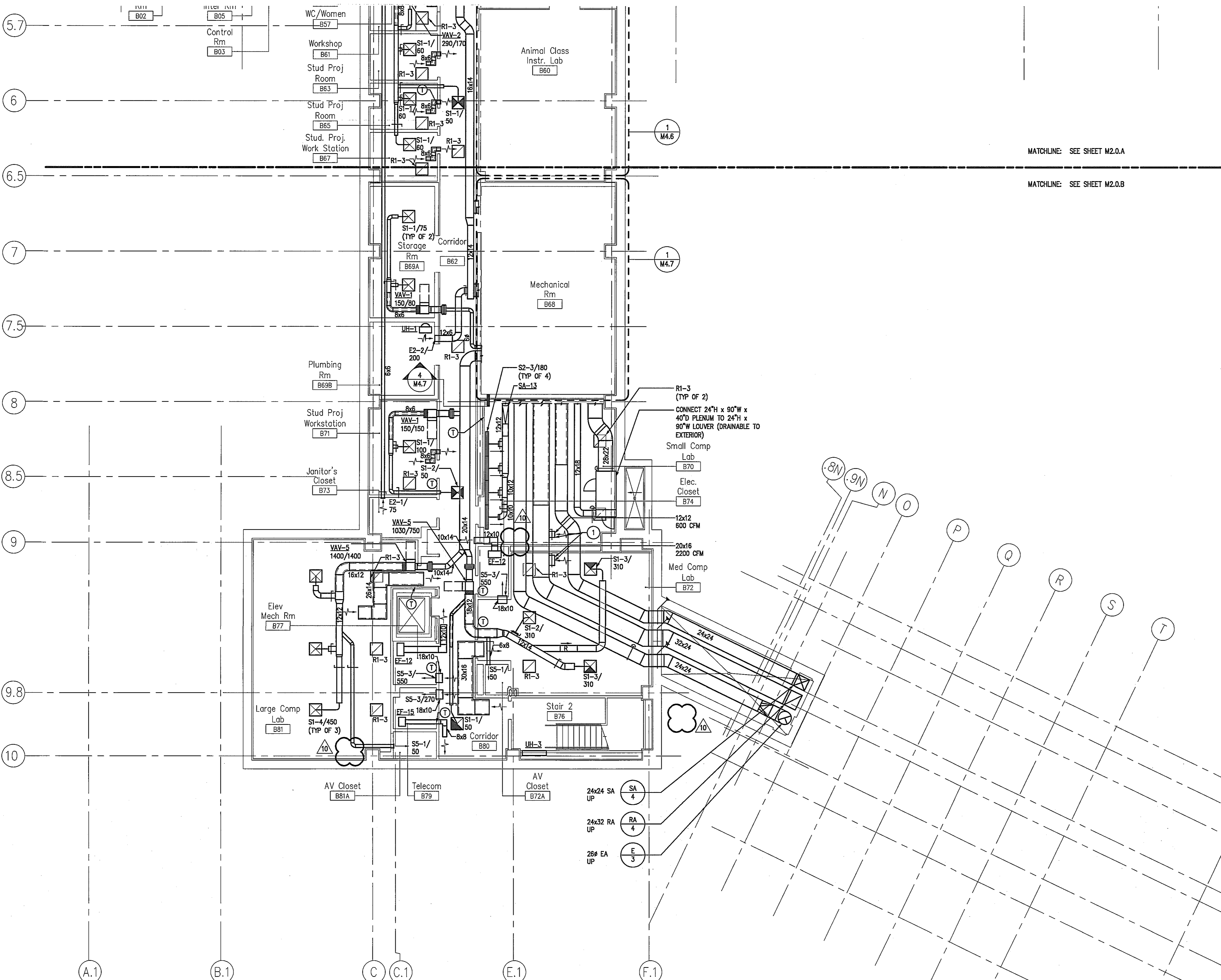
1. PROVIDE ACOUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACOUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.



4 CORRIDOR SECTION
SCALE: 1/4" = 1'-0"

MATCHLINE: SEE SHEET M2.0.A

MATCHLINE: SEE SHEET M2.0.B



KEY NOTES

1 COVER RETURN DUCT OPENING WITH 1" WIRE MESH

NAME _____

TITLE _____ DATE _____

DEPT. OF GENERAL
SERVICES APPROVAL

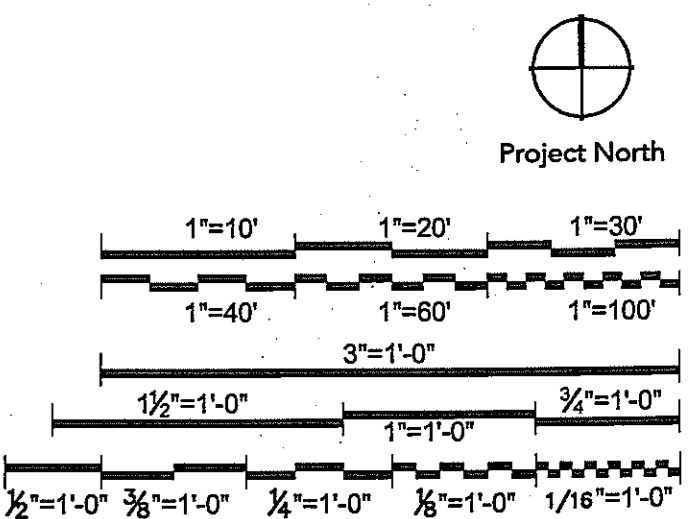
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

01/05/05 DATE

Graphic Scales



Drawing Title

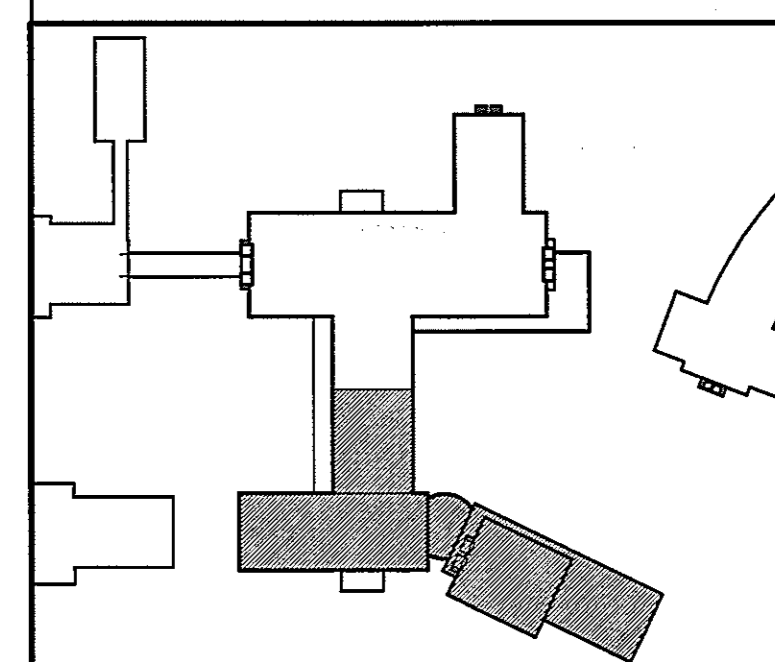
**BASEMENT
HVAC PLAN
SOUTH**

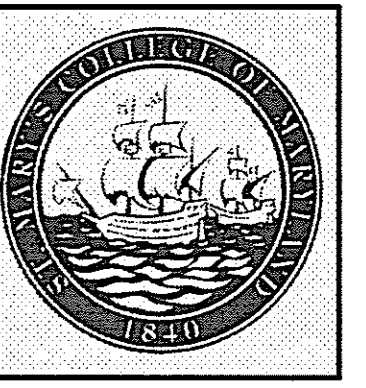
1/8" = 1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.0.B

Drawing Number





NAME _____
TITLE _____ DATE _____

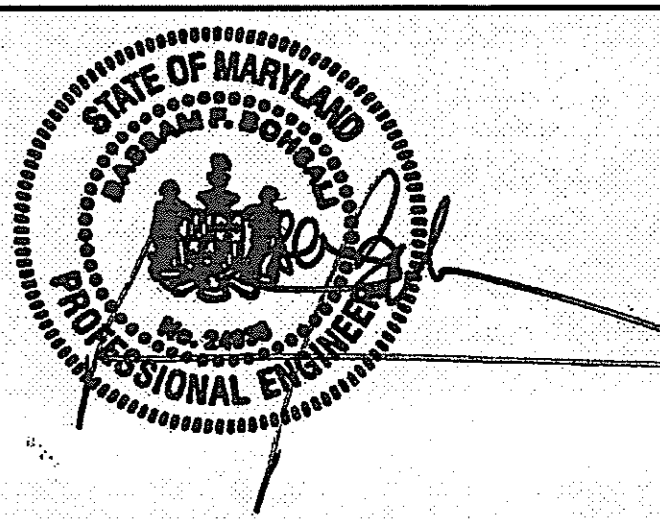
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

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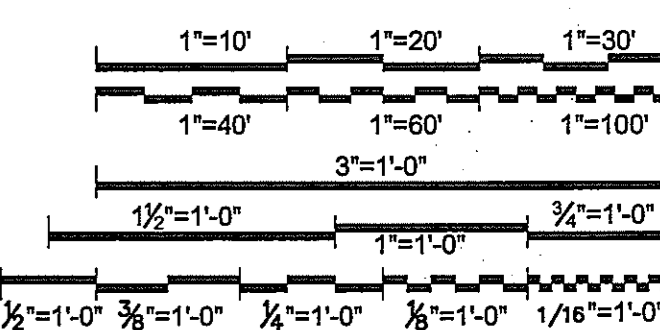
ADDENDUM FB-10 05/13/05

Seals and Signatures



01/05/05
DATE

Graphic Scales



Drawing Title

**FIRST FLOOR
HVAC PLAN
NORTH**

1/8"=1'-0"

Scale J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.1.A

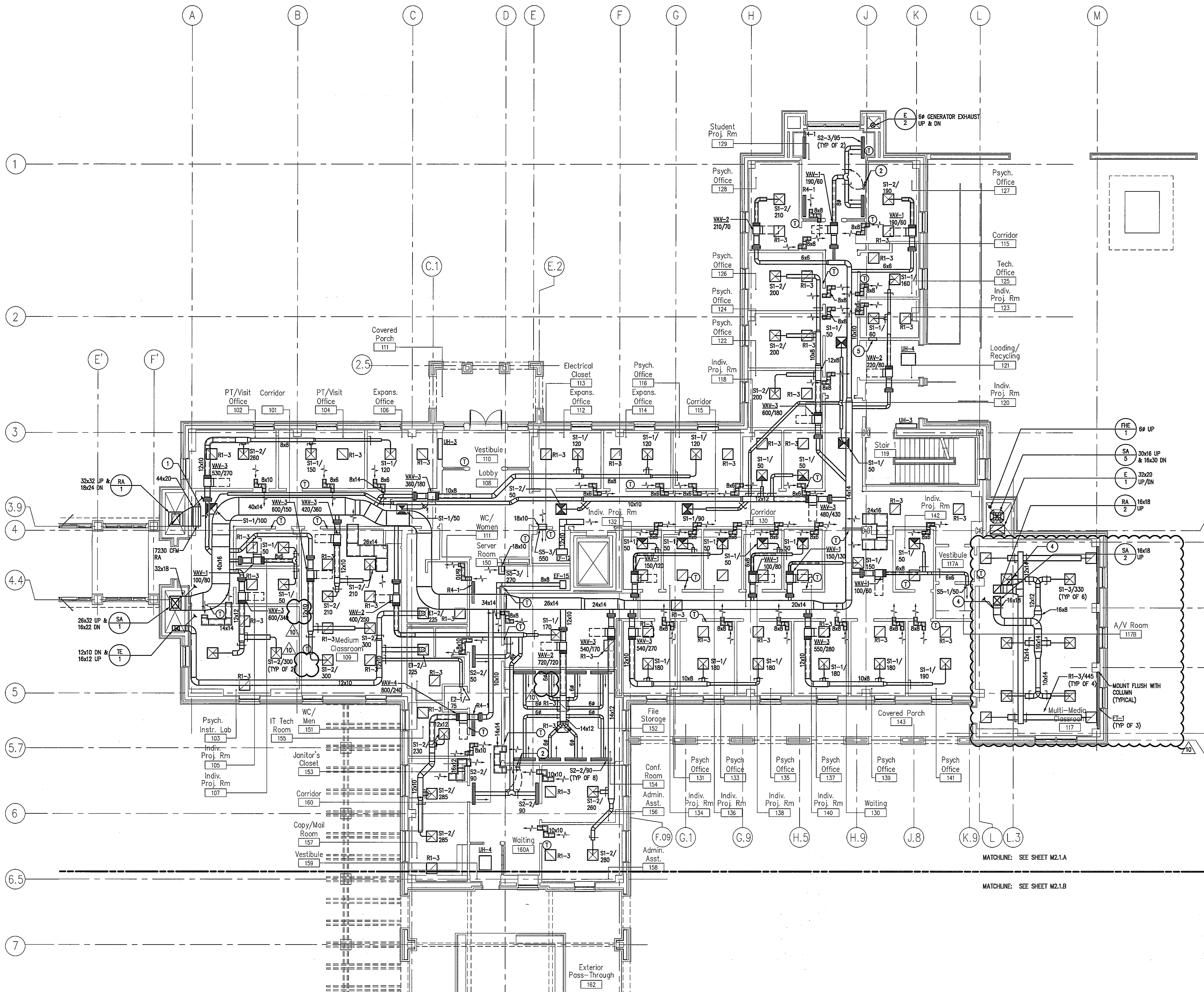
Drawing Number

SHEET NOTES

1. PROVIDE ACUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.

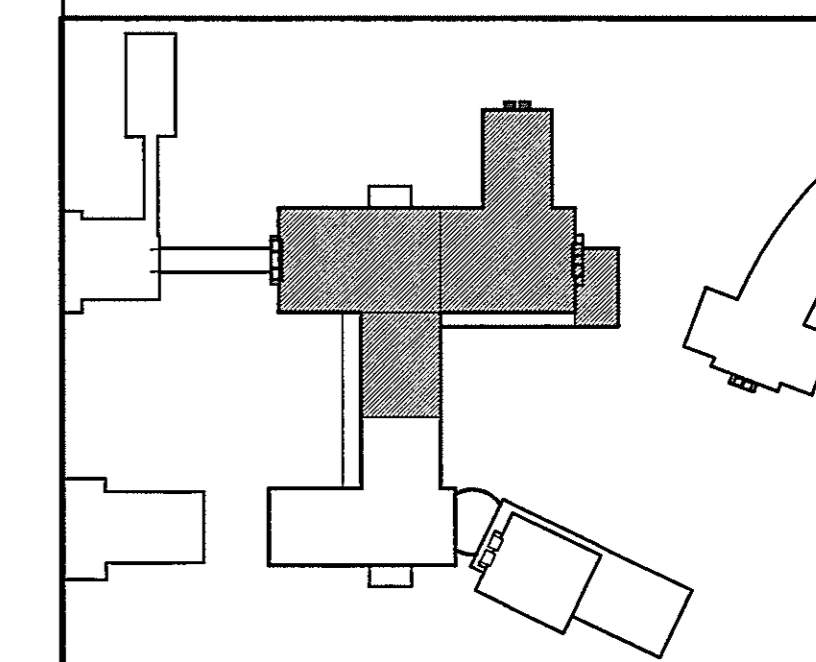
KEY NOTES

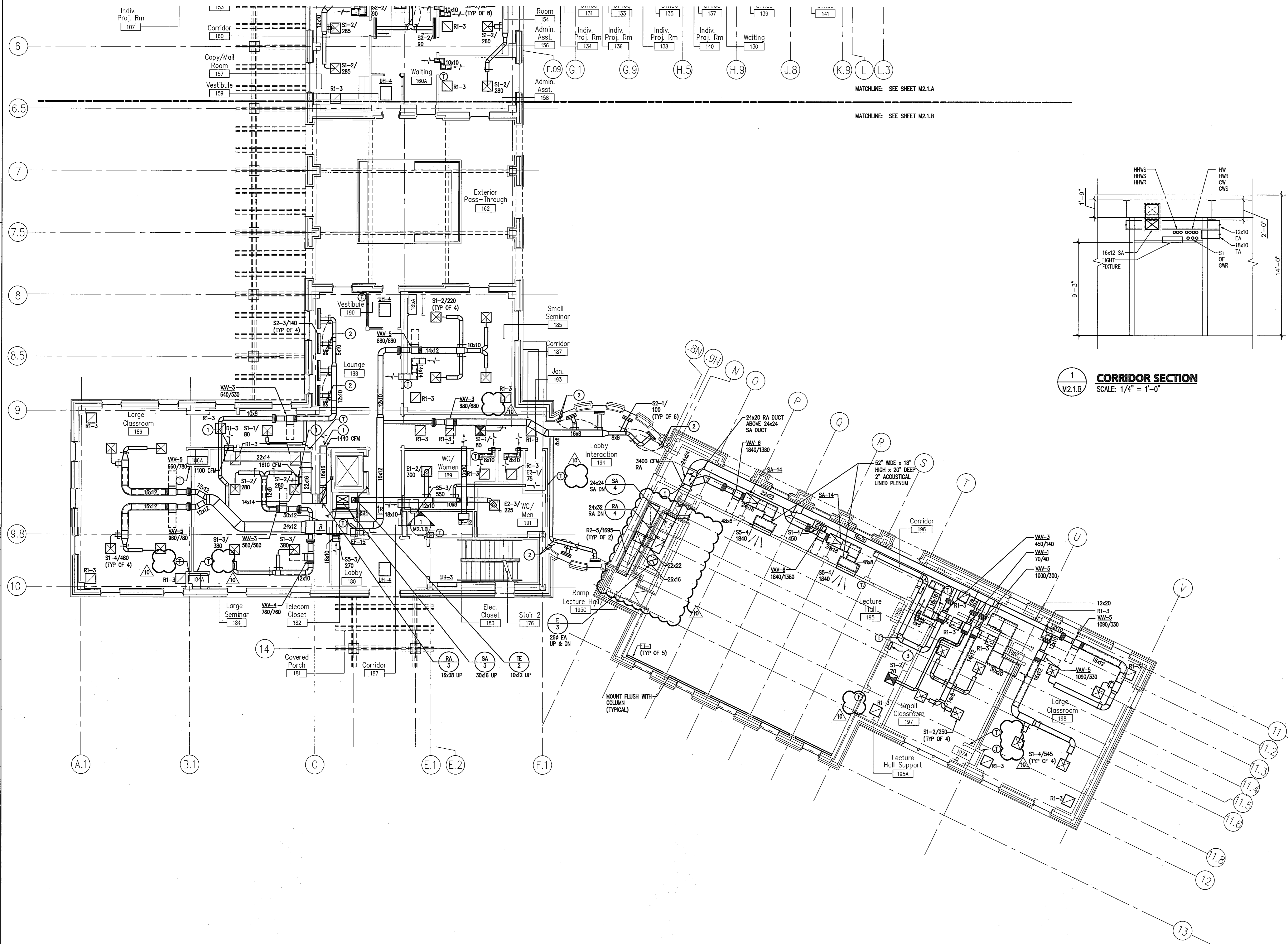
- 1 COVER RETURN DUCT OPENING WITH 1" WIRE MESH.
- 2 PROVIDE REMOTE DAMPER OPERATOR.
- 4 DUCT PENETRATES SHAFT BOTTOM ABOVE THE CEILING ON SECOND FLOOR.
- 5 DDC CONTROL PANEL.



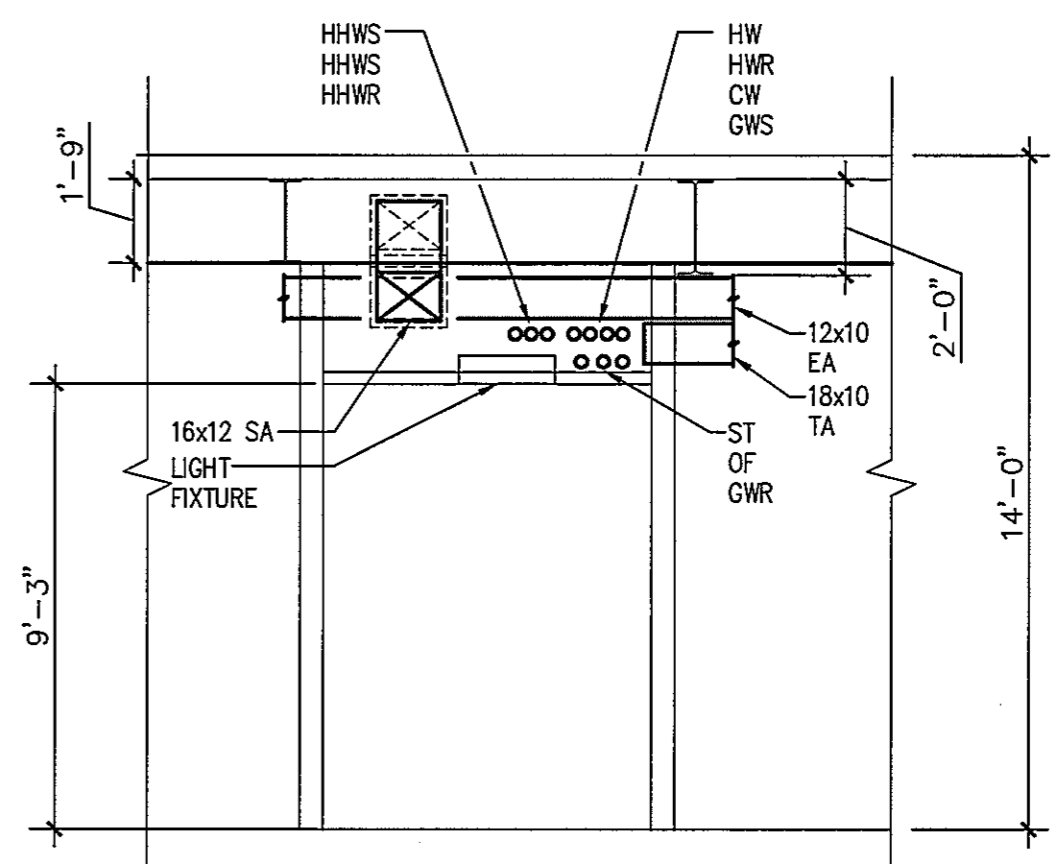
MATCHLINE: SEE SHEET M2.1.A

MATCHLINE: SEE SHEET M2.1.B





1 CORRIDOR SECTION
SCALE: 1/4" = 1'-0"



SHEET NOTES

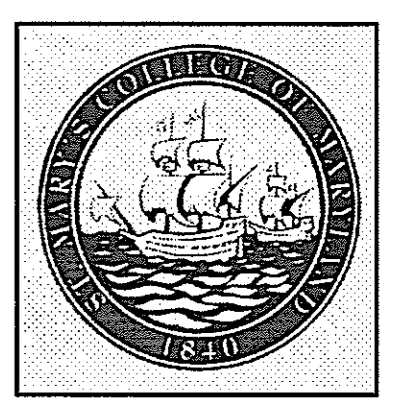
1. PROVIDE ACOUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACOUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.

KEY NOTES

- 1 COVER RETURN DUCT OPENING WITH 1" WIRE MESH.
- 2 PROVIDE REMOTE DAMPER OPERATOR.
- 3 DDC CONTROL PANEL.

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TITLE _____ DATE _____

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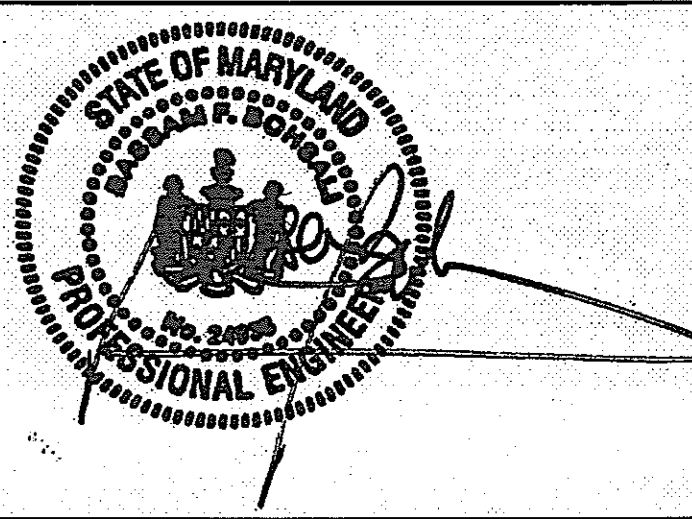
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

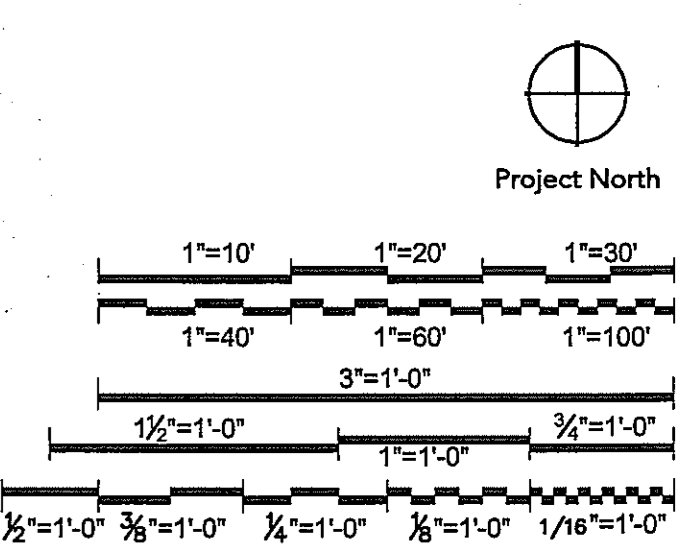
Issued for _____ Rev Date _____

APPENDIX FB-10 **05/13/05**

Seals and Signatures



Graphic Scales _____ DATE _____



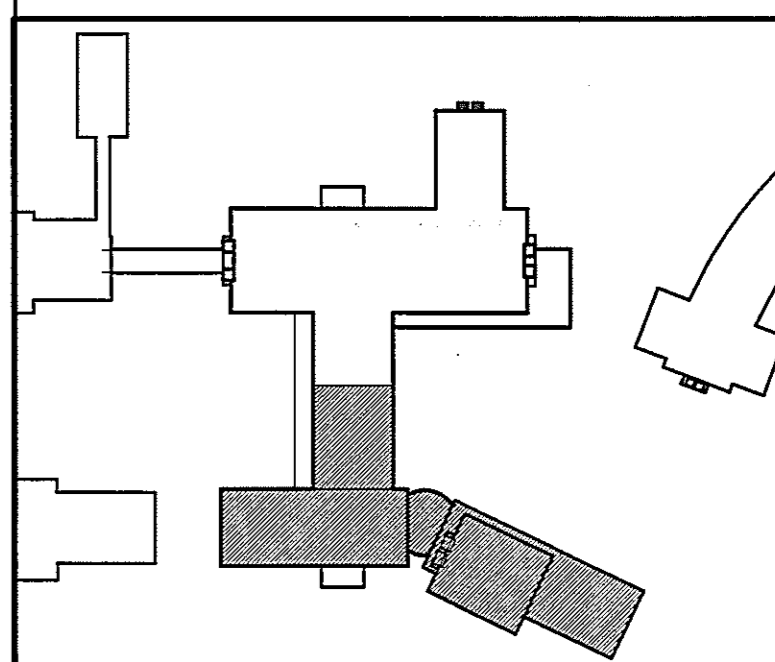
Drawing Title
FIRST FLOOR HVAC PLAN SOUTH

1/8" = 1'-0"

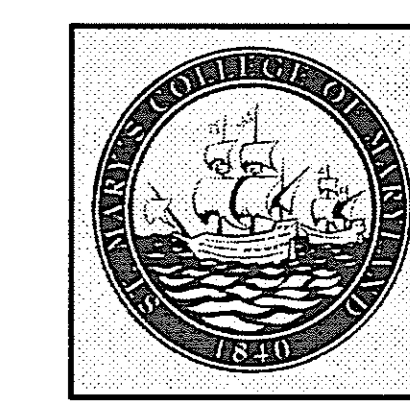
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.1.B

Drawing Number



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SHEET NOTES

1. PROVIDE ACCUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACCUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.
2. REFER TO ARCHITECTURAL DETAIL FOR FUME EXTRACTOR (POINT EXHAUST) CONNECTION TO LAB EXHAUST SYSTEM.
3. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER BETWEEN LABORATORY AND CORRIDOR FOR ALL NEGATIVELY PRESSURIZED LABS. REFER TO CONTROLS ON M8.1

KEY NOTES

- 1 POINT EXHAUST - 150 CFM.
- 2 TO VAV BOX IN MECHANICAL PENTHOUSE.
- 3 REPEAT COILS SIZED FOR MAX CFM.
- 4 LOCATION OF ROOM PRESSURE CONTROLLER DDC CONTROL PANEL.
- 5 DDC CONTROL PANEL.
- 6 LOCATE OXYGEN SENSOR 4' AFF.
- 7 LOCATION OF OXYGEN ANALYZER.
- 8 CONNECT TO TRIBLE EXHAUST TRANSITION BY WAY OF FLEXIBLE CONNECTION.

NAME _____ DATE _____

TITLE _____

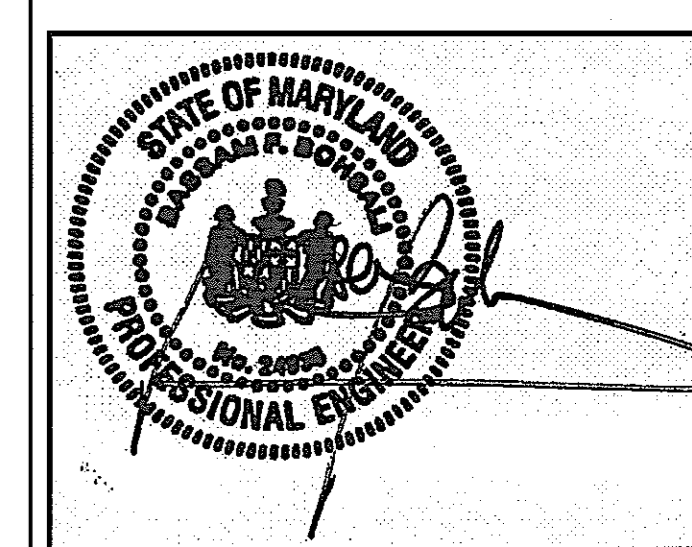
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGMT. & DSGN. _____ DATE _____

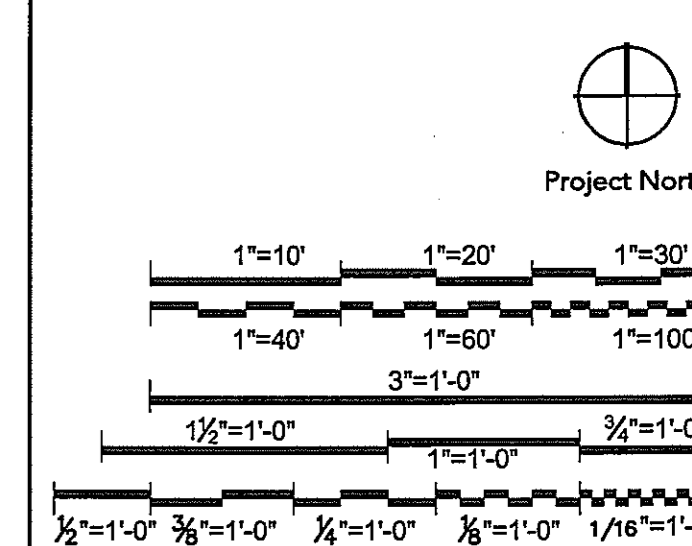
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APPENDIX PB-10 05/13/05

Seals and Signatures



01/05/05
DATE



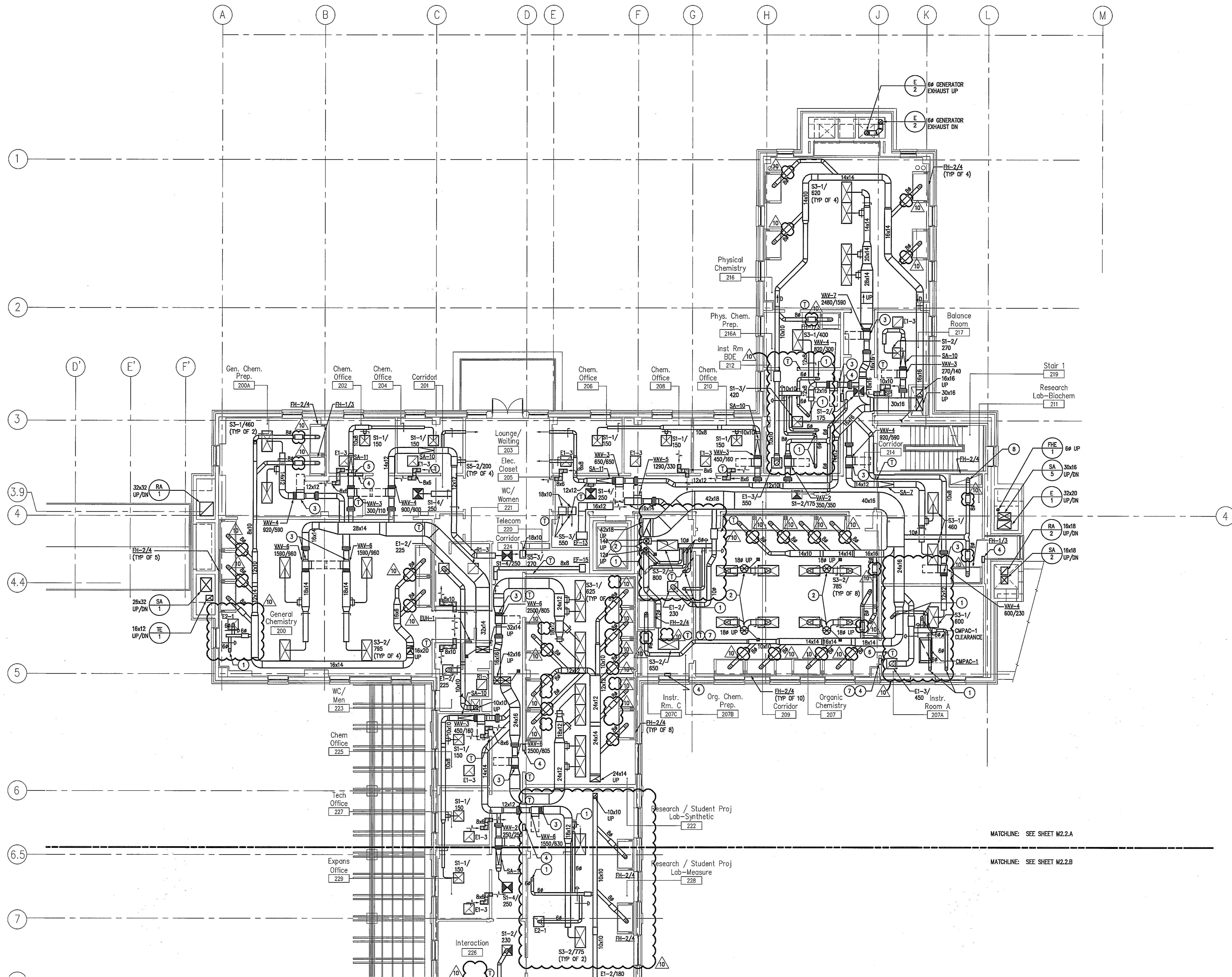
Drawing Title
SECOND FLOOR HVAC PLAN NORTH

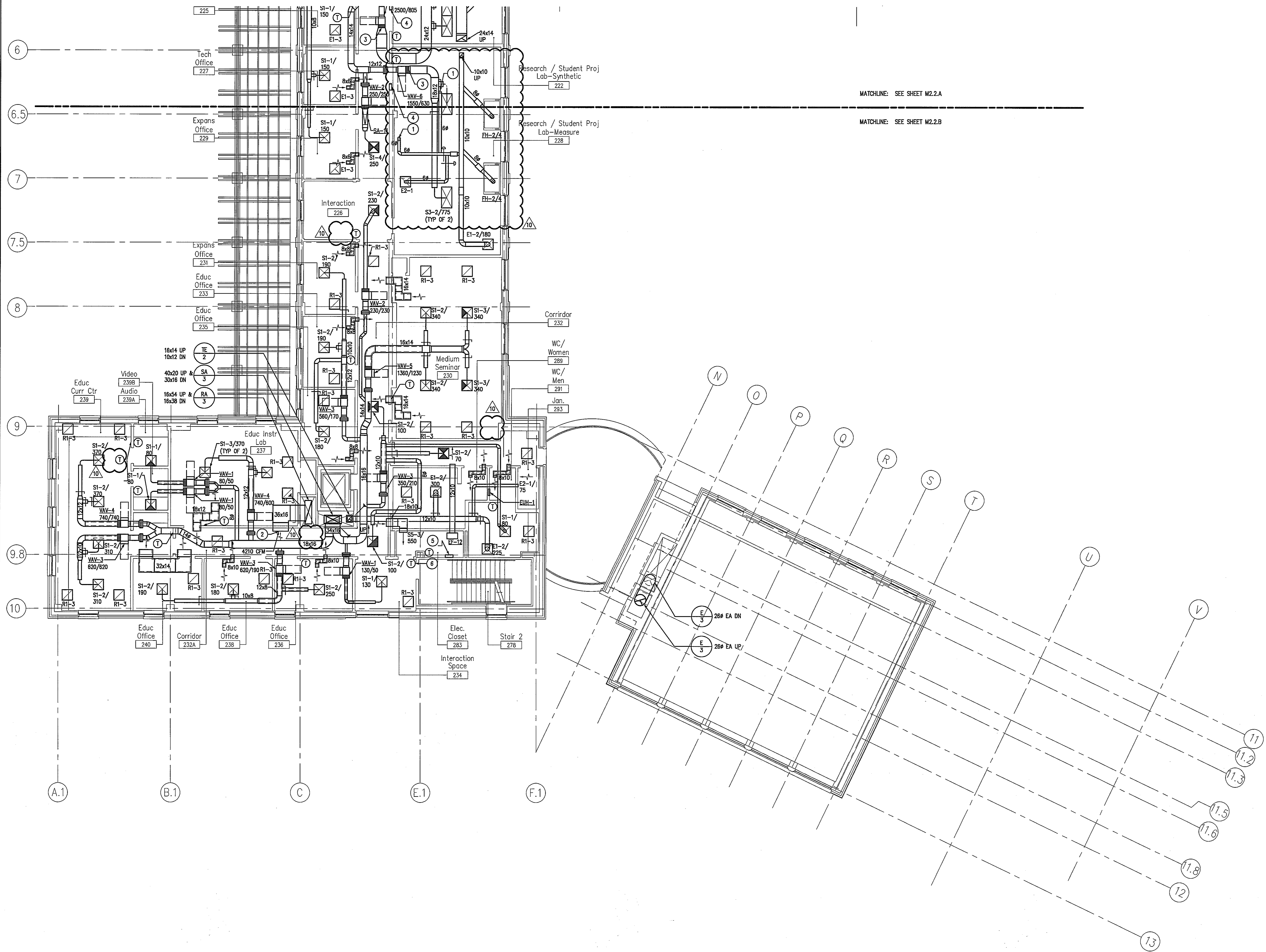
Scale
1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.2.A

Drawing Number





SHEET NOTES

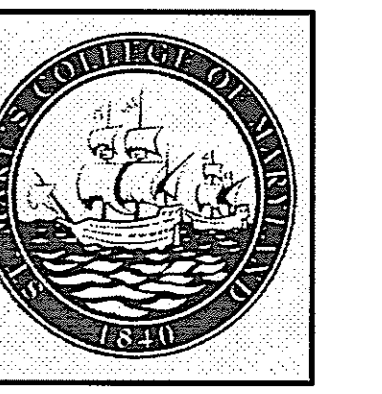
1. PROVIDE ACOUSTICAL LINING IN DUCTS DOWNSTREAM OF VAV BOXES SERVED BY AHU-2, 3 & 5. PROVIDE 6 LINEAR FT ACOUSTICAL LINING FOR UP TO 800 CFM AND 10 FT FOR MORE THAN 800 CFM AIRFLOW.
2. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER BETWEEN LABORATORY AND CORRIDOR FOR ALL NEGATIVELY PRESSURIZED LABS. REFER TO CONTROLS ON M2.1

KEY NOTES

- 1 POINT EXHAUST - 150 CFM.
- 2 COVER OPENING WITH 1" WIRE MESH.
- 3 REHEAT COILS SIZED FOR MAX CFM.
- 4 LOCATION OF ROOM PRESSURE CONTROLLER DDC CONTROL PANEL.
- 5 DDC CONTROL PANEL.
- 6 SERVES QTY. TWO (2) CORRIDOR VAV BOXES.

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APPROVAL

NAME _____
TITLE _____ DATE _____

DEPT. OF GENERAL
SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

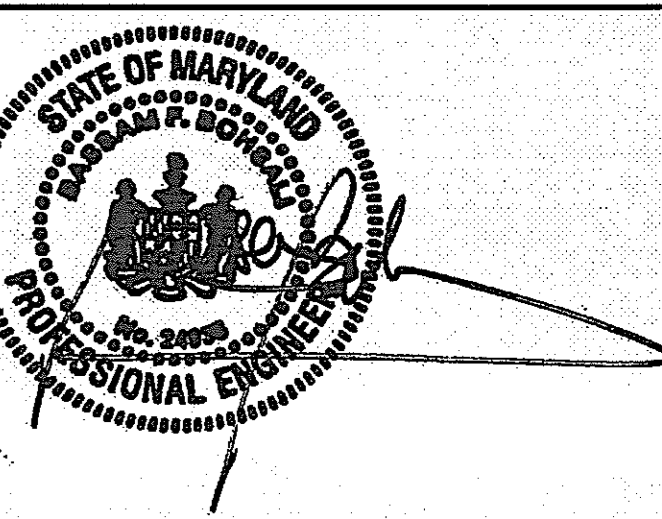
CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

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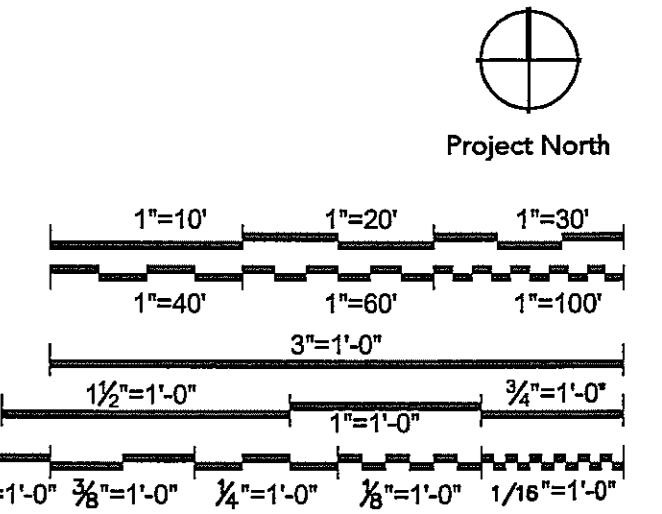
ADDENDUM FB-10 CS/19/05

Seals and Signatures

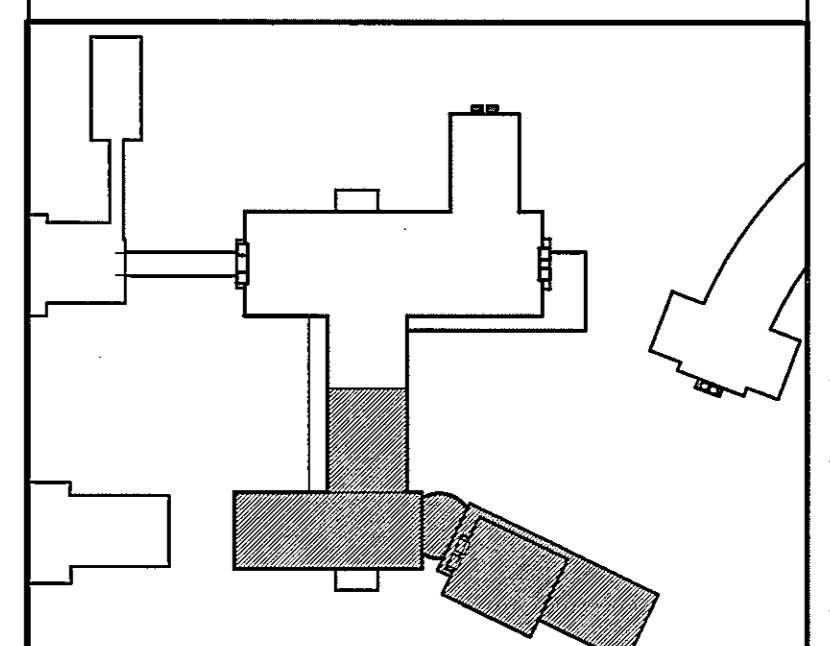


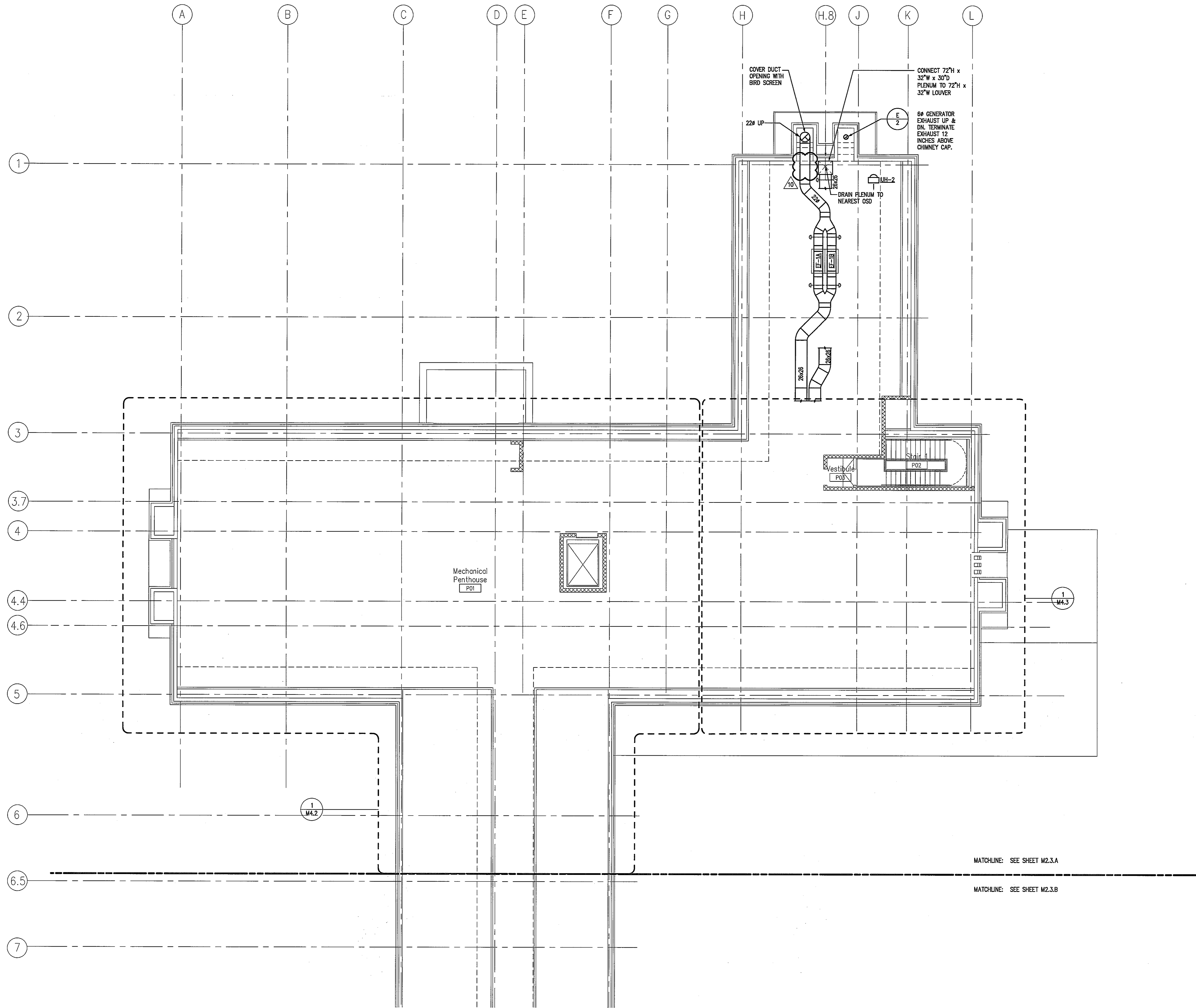
01/05/05
DATE

Graphic Scales



Drawing Title
**SECOND FLOOR
HVAC PLAN
SOUTH**
1/8" = 1'-0"
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number
M2.2.B
Drawing Number



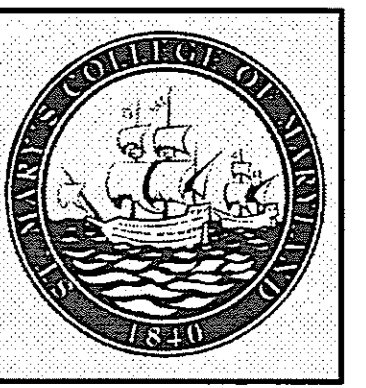


SHEET NOTES

KEY NOTES

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DEPT. OF GENERAL SERVICES APPROVAL

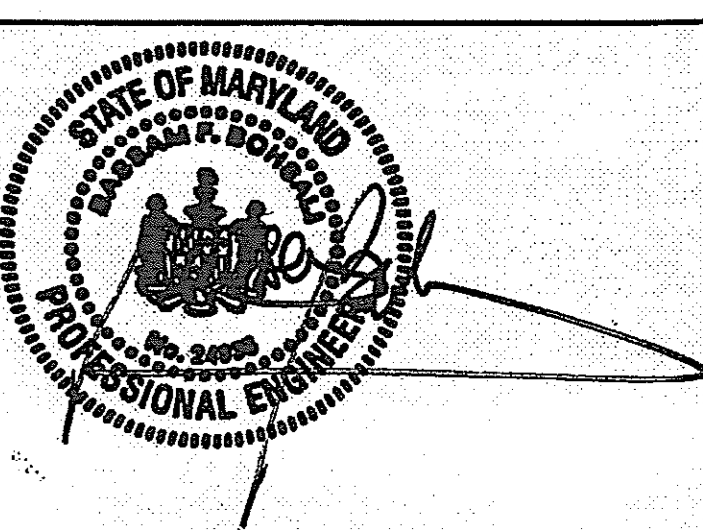
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

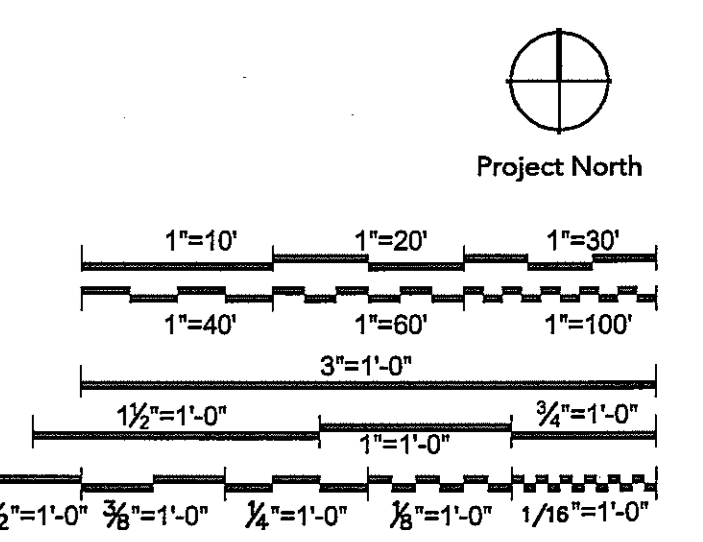
ADDENDUM FB-10 CS/13/CS

Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title

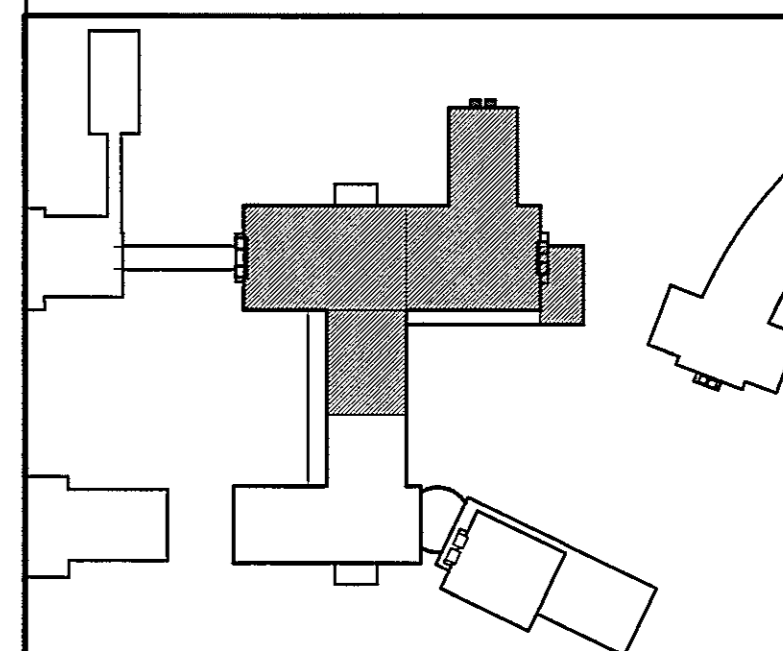
PENTHOUSE HVAC PLAN NORTH

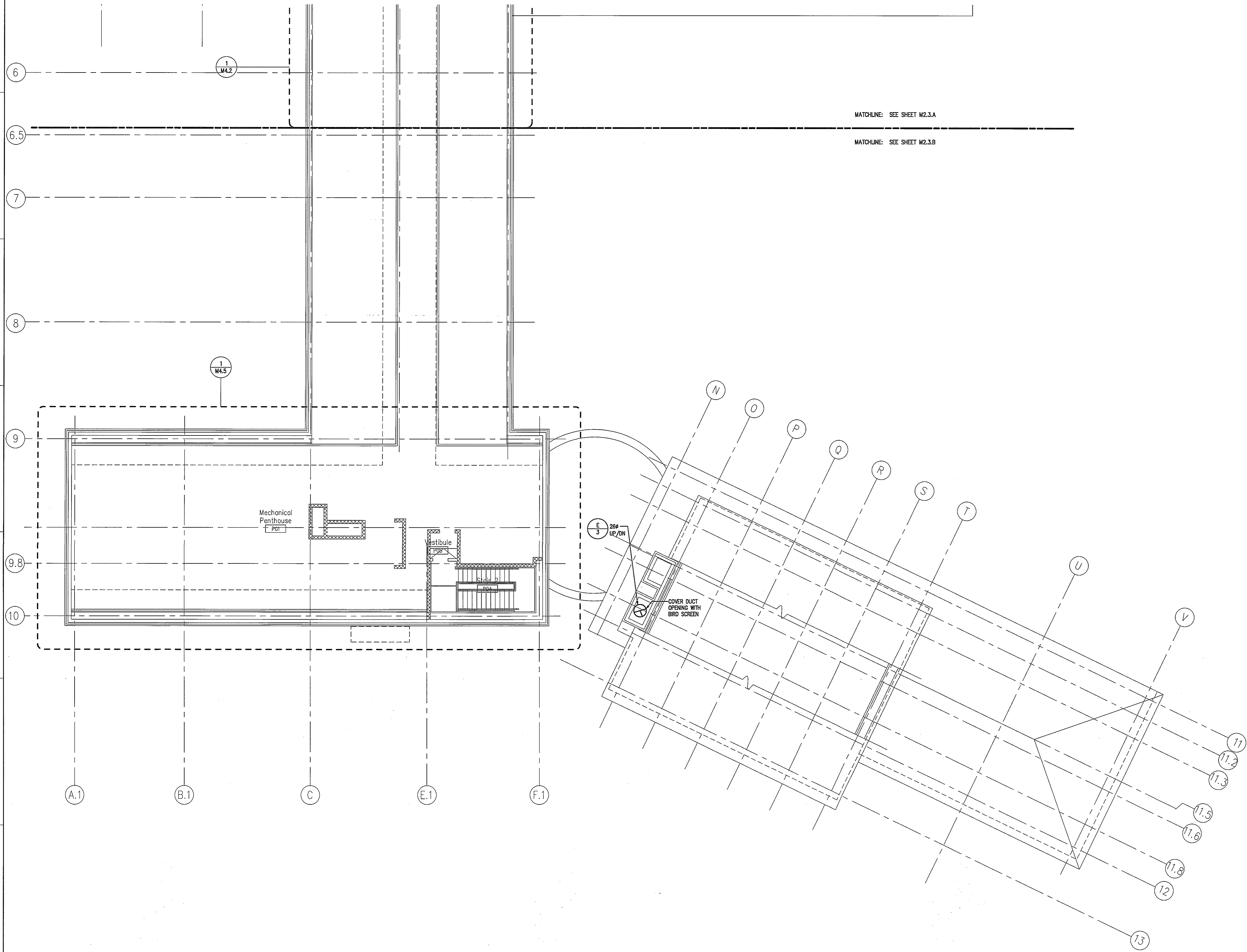
1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M2.3.A

Drawing Number

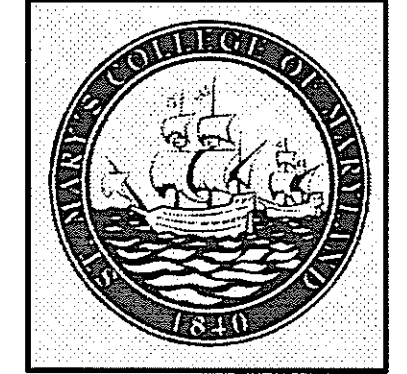




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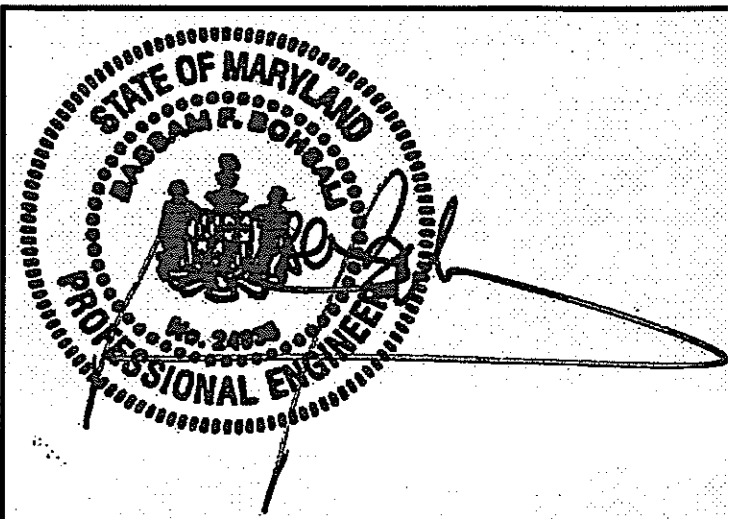
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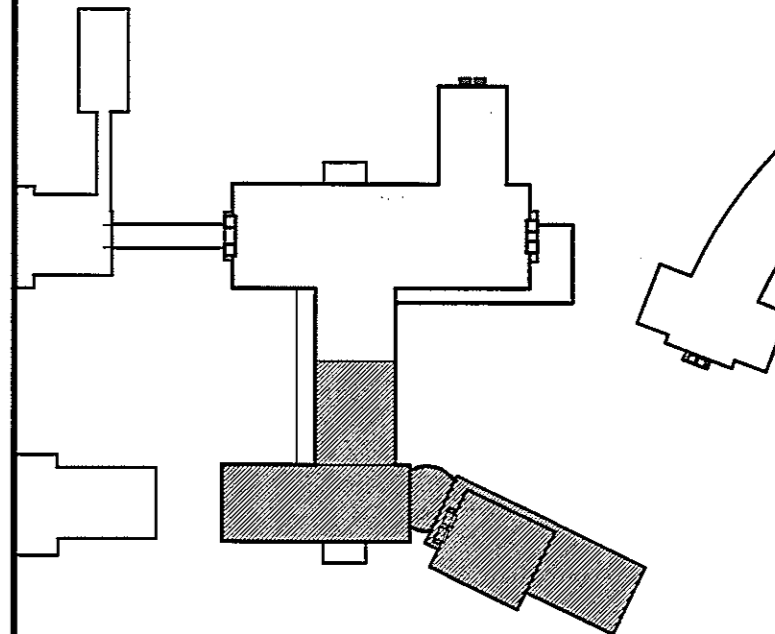
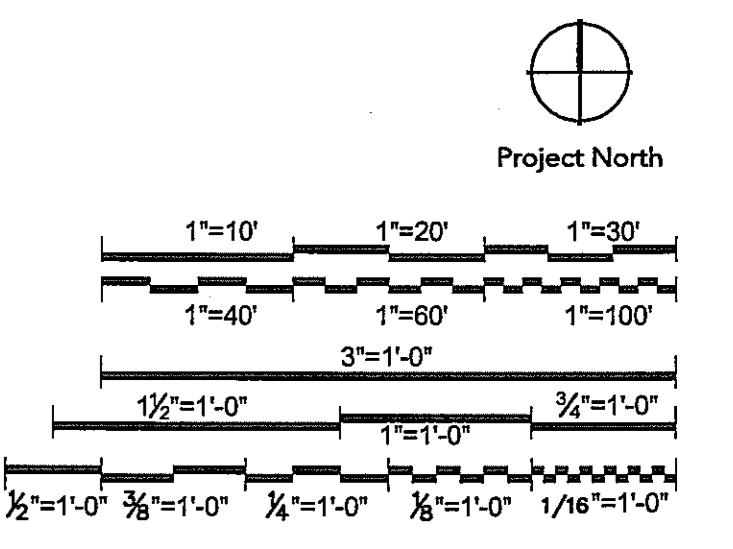
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| NAME | DATE |
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Seals and Signatures



01/05/05

Graphic Scales



Drawing Title

PENTHOUSE HVAC PLAN SOUTH

1/8"=1'-0"

Scale
 J-494-020-002 25379.000
 DGS Project Number SG Project Number

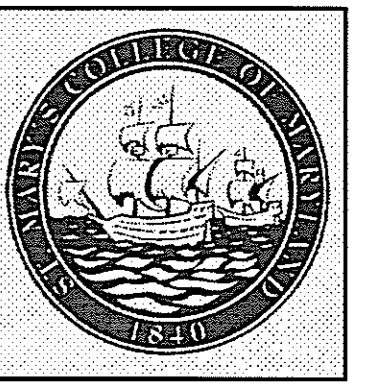
M2.3.B

Drawing Number

SHEET NOTES

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KEY NOTES

NAME
TITLE DATE

DEPT. OF GENERAL
SERVICES APPROVAL

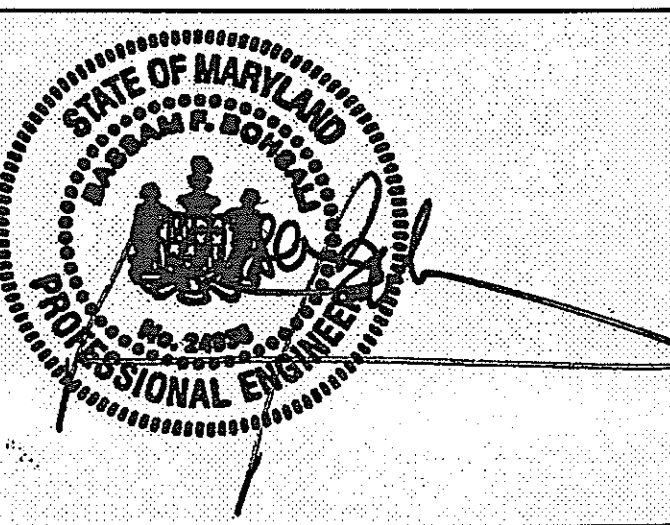
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

Issued for Rev Date

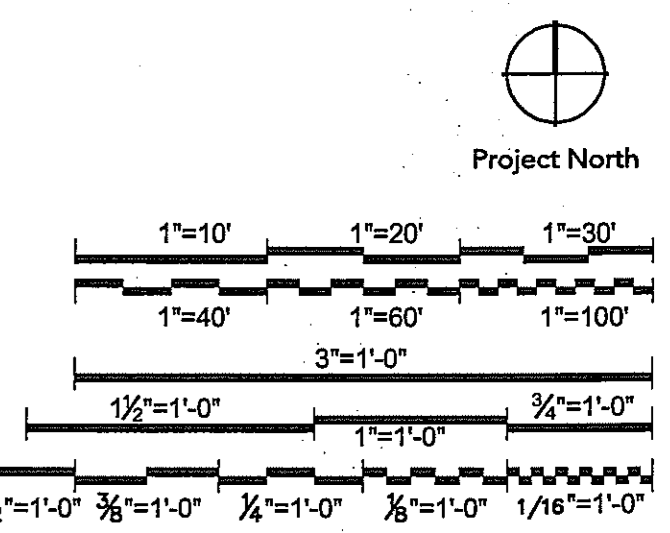
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Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title

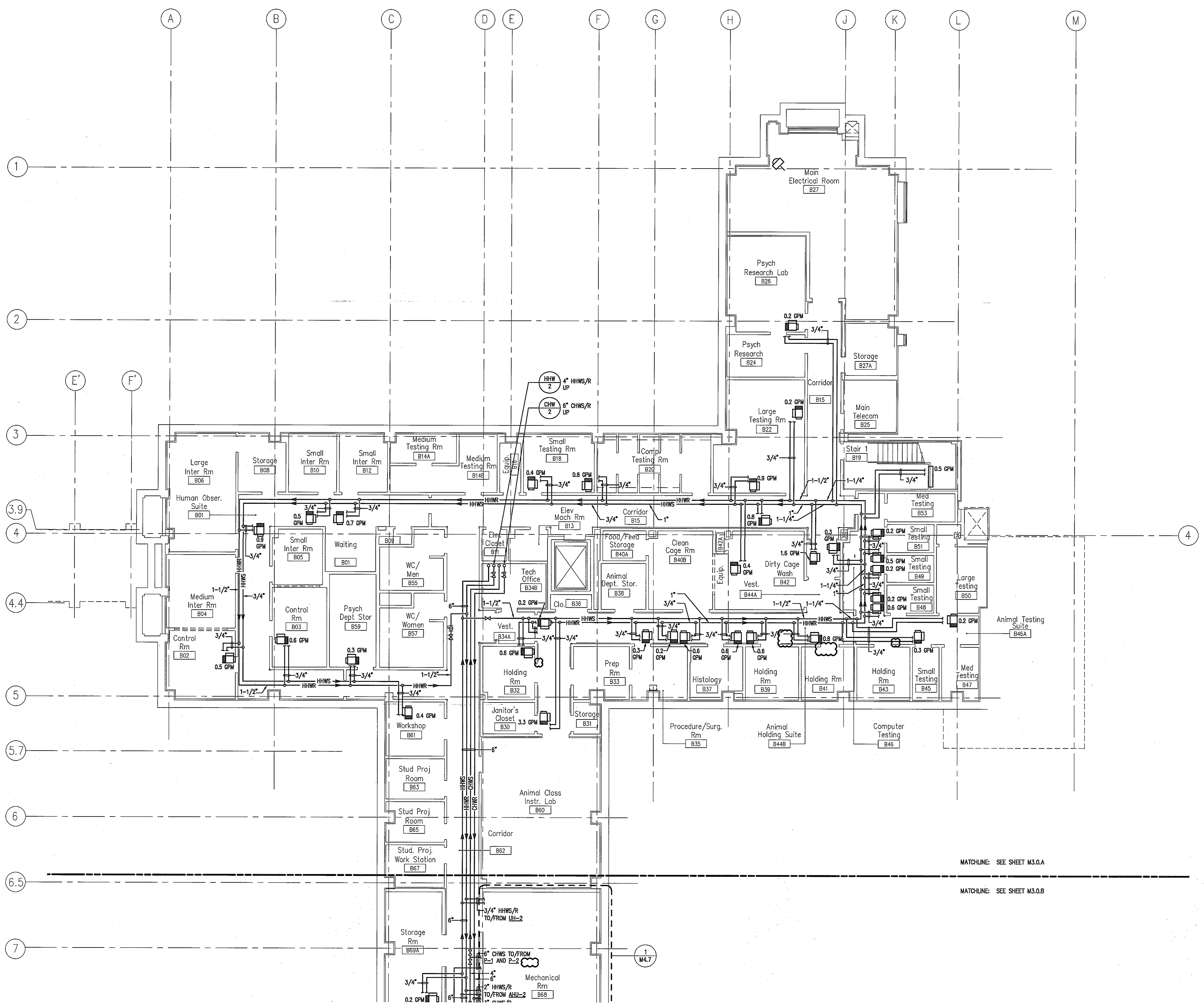
**BASEMENT
PIPING PLAN
NORTH**

1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

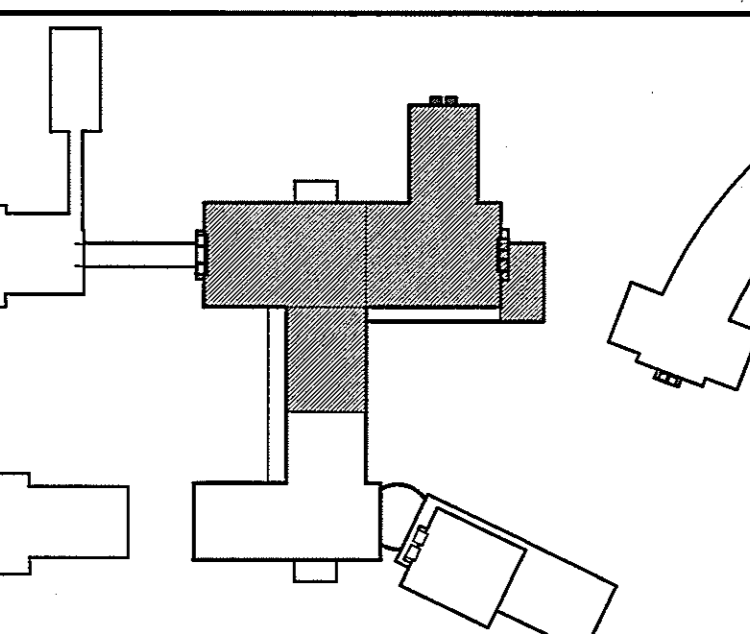
M3.0.A

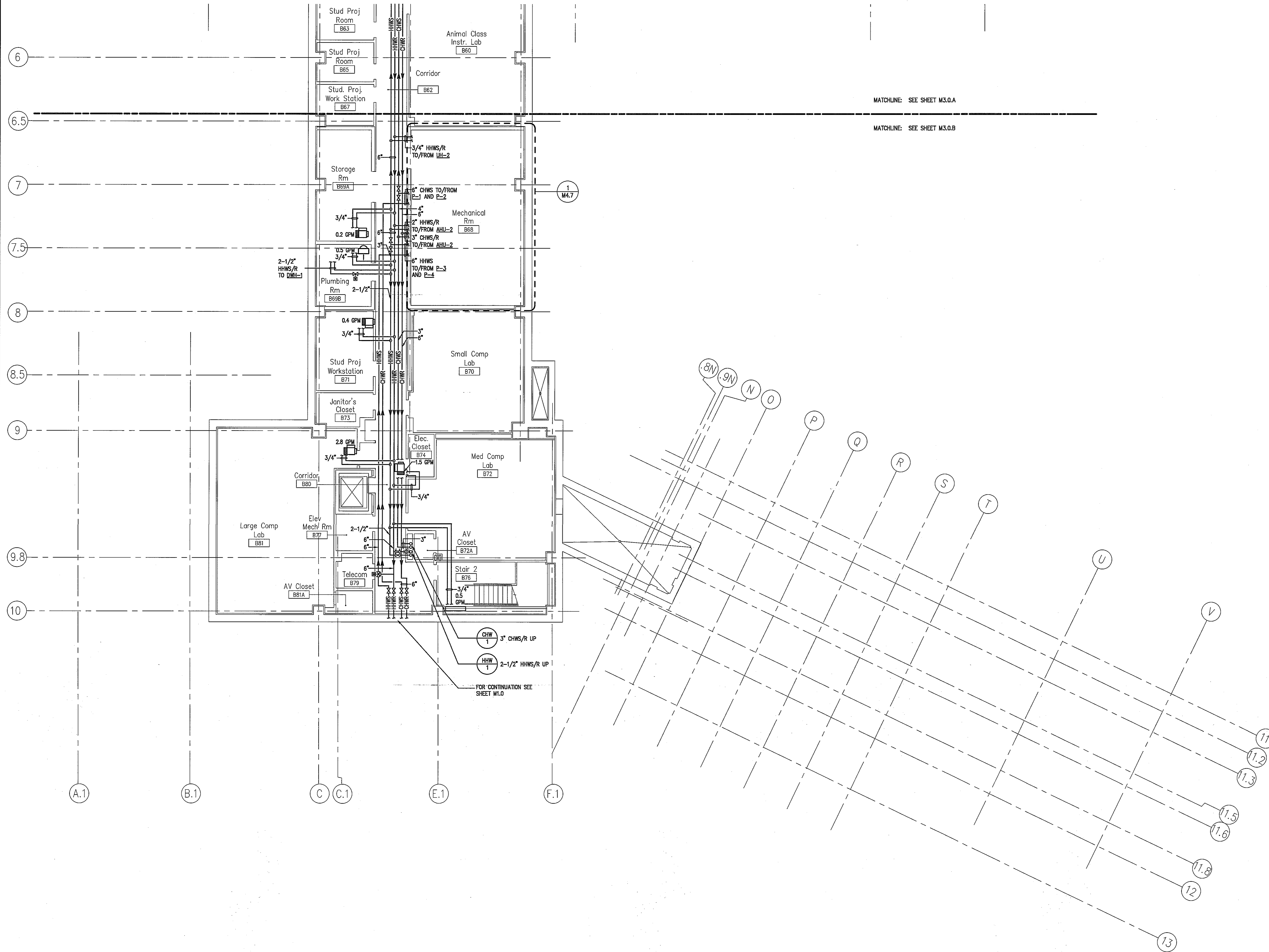
Drawing Number



MATCHLINE: SEE SHEET M3.0.A

MATCHLINE: SEE SHEET M3.0.B



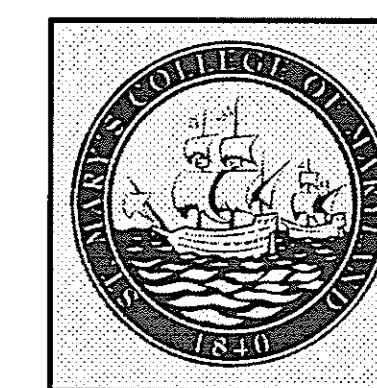


SHEET NOTES

KEY NOTES

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TITLE _____ DATE _____

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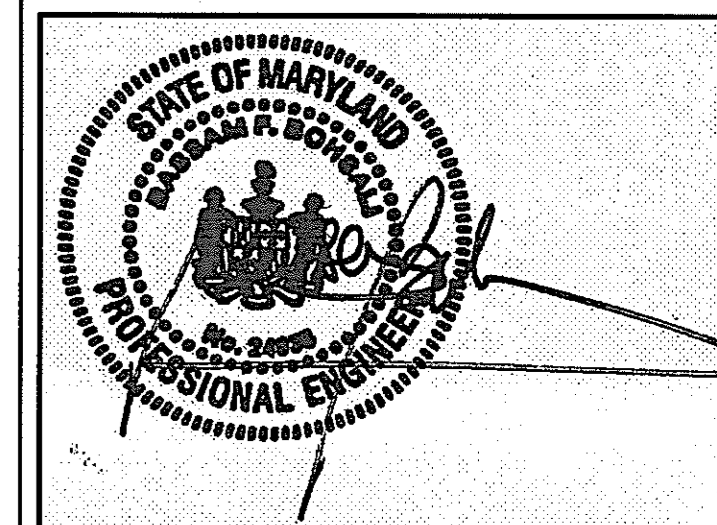
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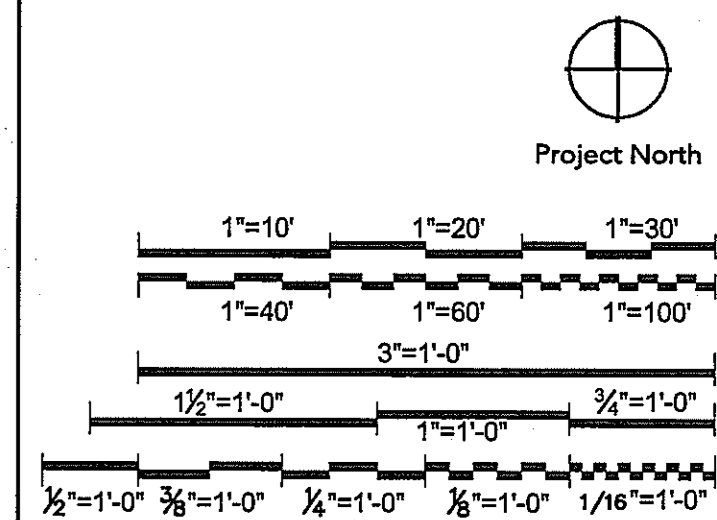
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Seals and Signatures



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Graphic Scales



Drawing Title

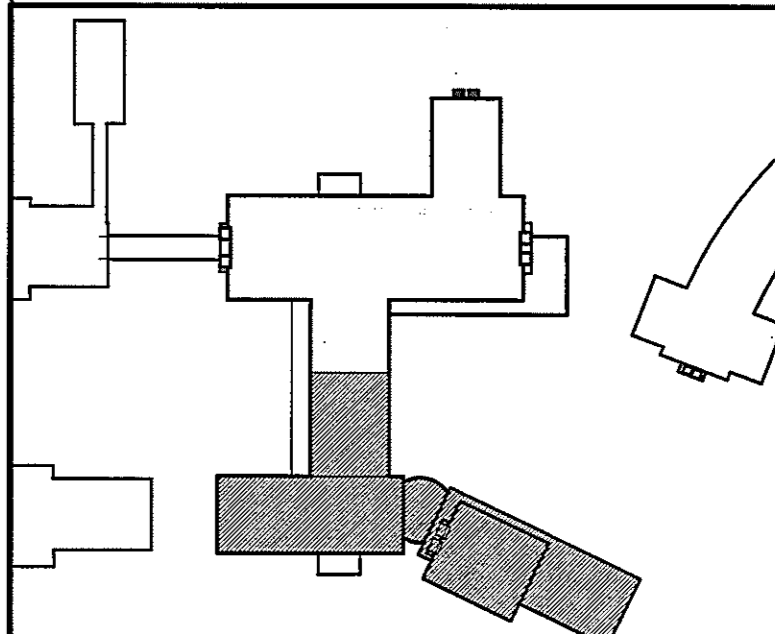
BASEMENT PIPING PLAN SOUTH

1/8"=1'-0"

Scale J-494-020-002 25379.000
DGS Project Number SG Project Number

M3.0.B

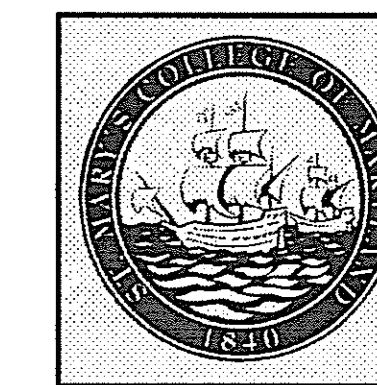
Drawing Number



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KEY NOTES

NAME _____ DATE _____
TITLE _____

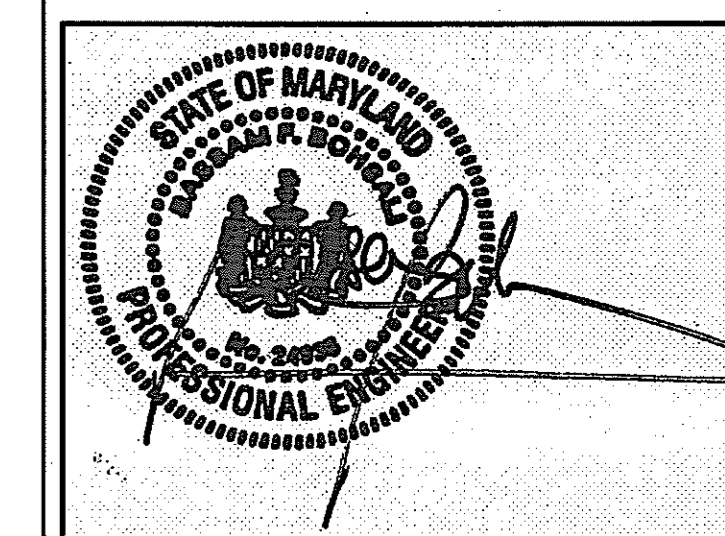
DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

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Seals and Signatures

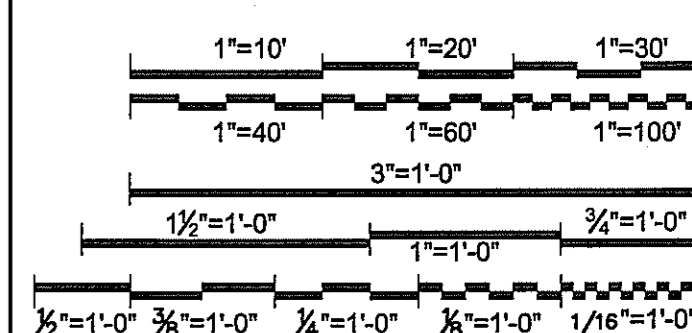


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Graphic Scales _____ DATE _____



Project North



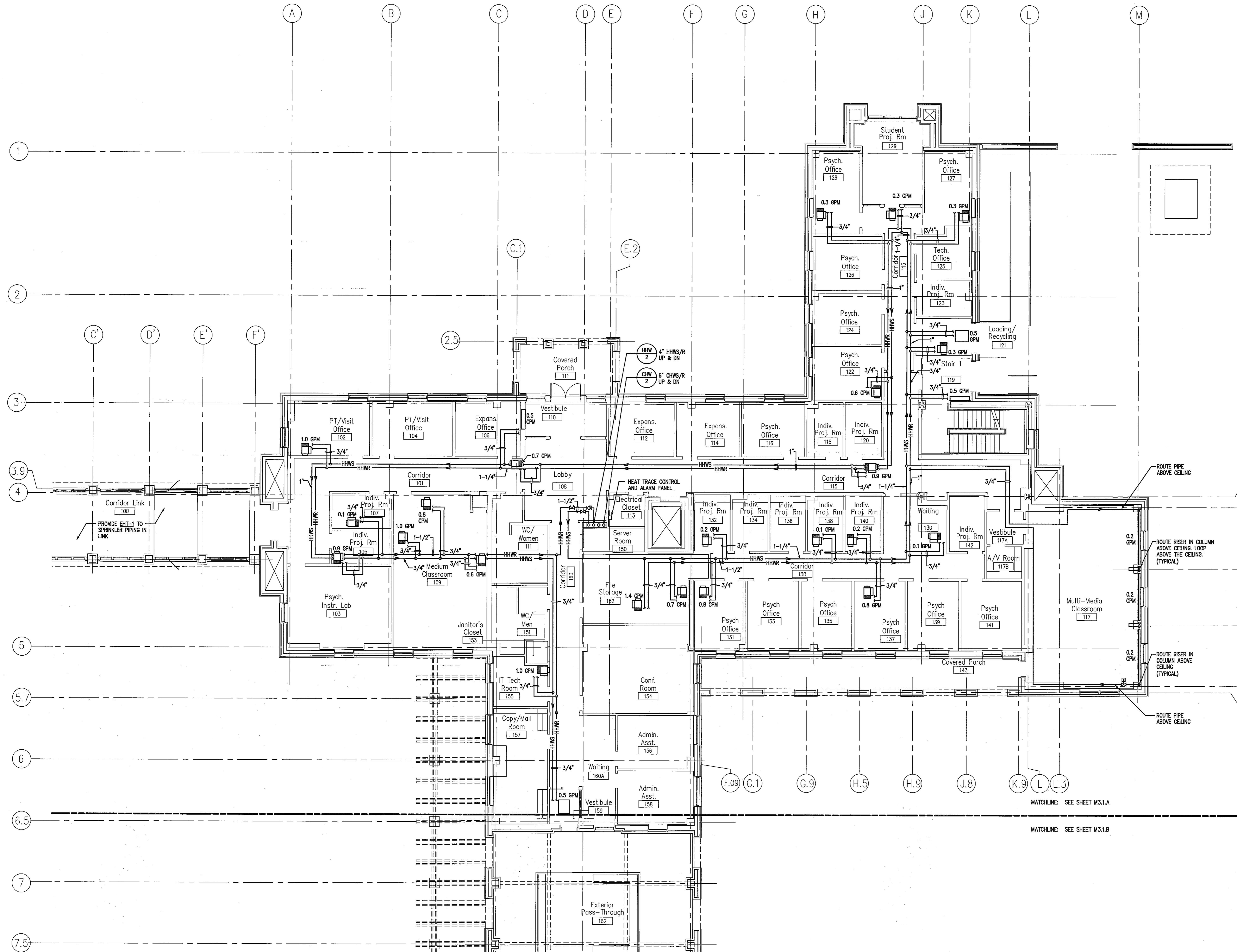
Drawing Title
**FIRST FLOOR
PIPING PLAN
NORTH**

1/8" = 1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

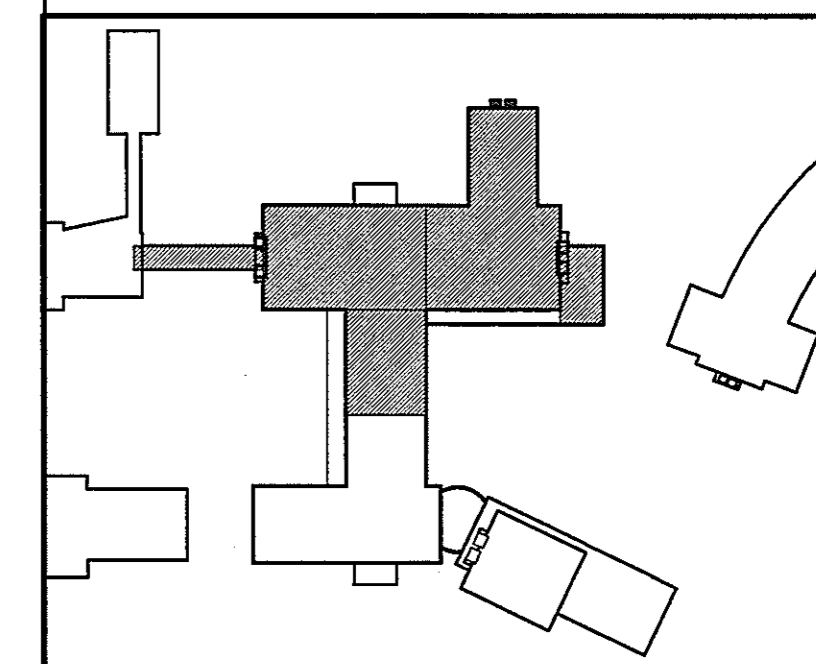
M3.1A

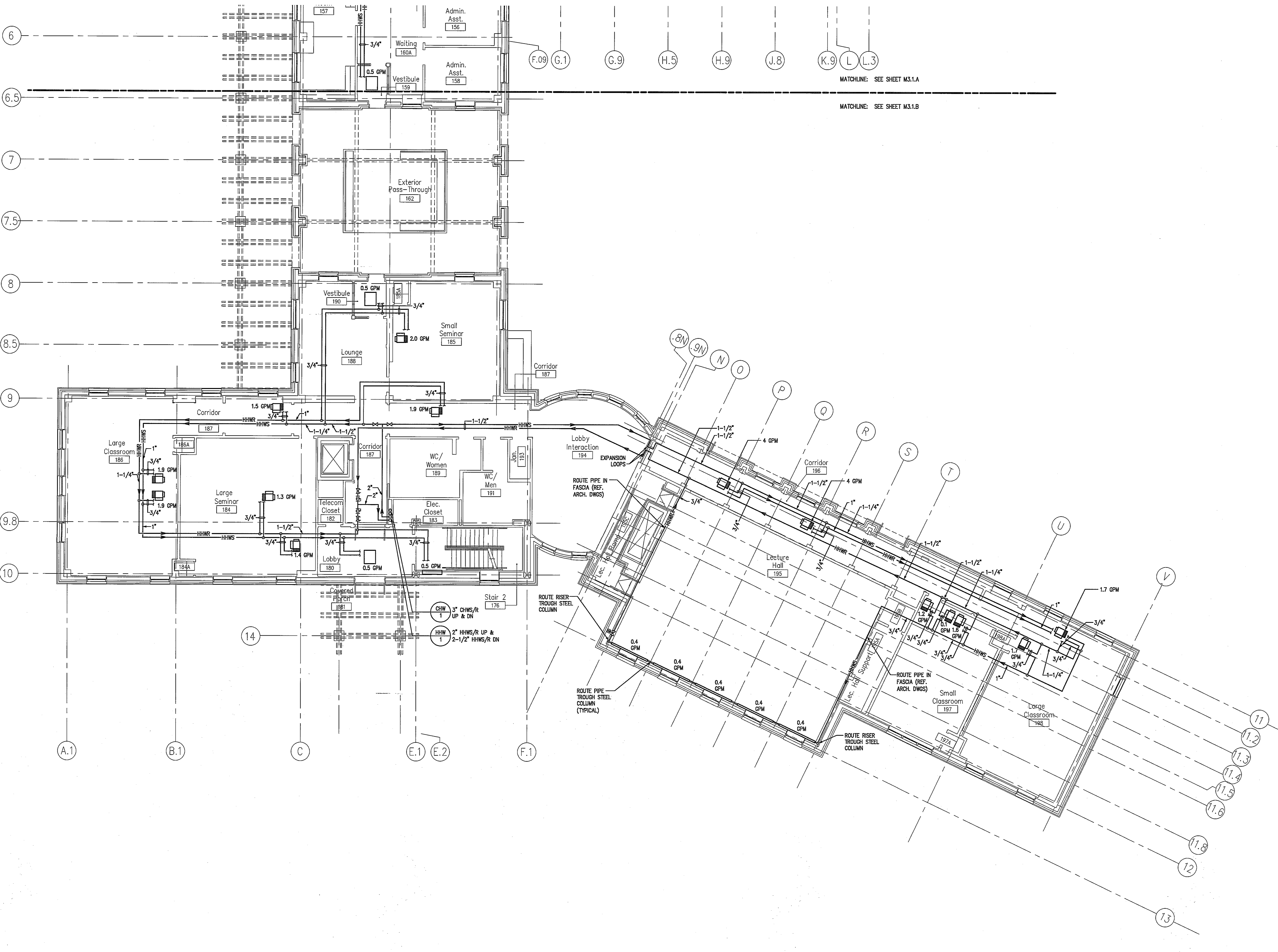
Drawing Number



MATCHLINE: SEE SHEET M3.1.A

MATCHLINE: SEE SHEET M3.1.B





SHEET NOTES

NAME _____
 TITLE _____ DATE _____

DEPT. OF GENERAL SERVICES APPROVAL

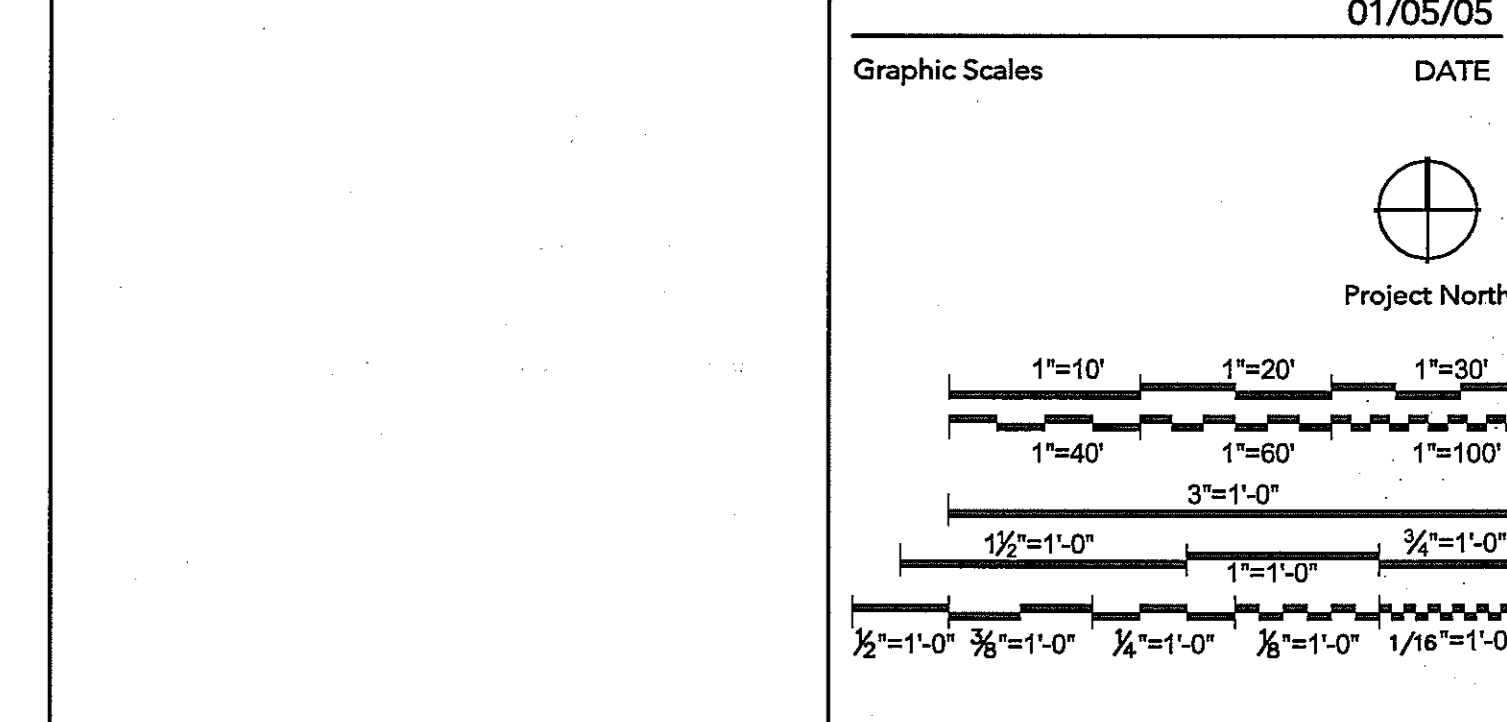
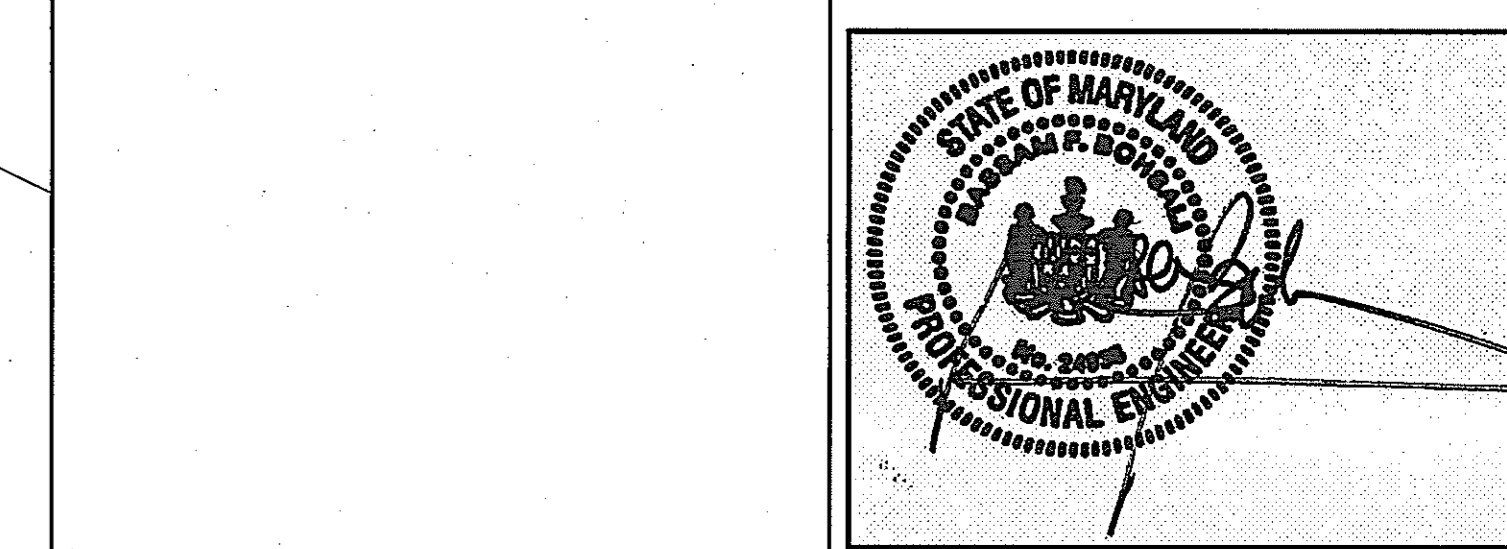
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Seals and Signatures

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Drawing Title

FIRST FLOOR PIPING PLAN SOUTH

Scale: 1/8"=1'-0"

J-494-020-002 25379.000
 DGS Project Number SG Project Number

M3.1.B

Drawing Number

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SHEET NOTES

KEY NOTES

1 HEAT TRACE CONTROL AND ALARM PANEL.

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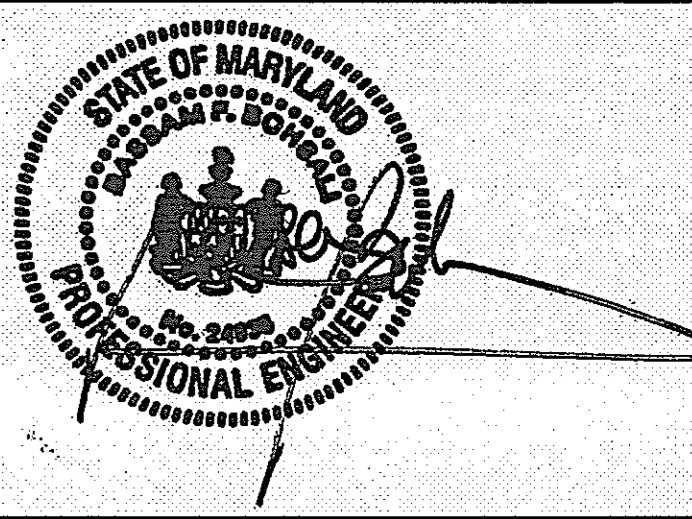
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TITLE _____ DATE _____

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

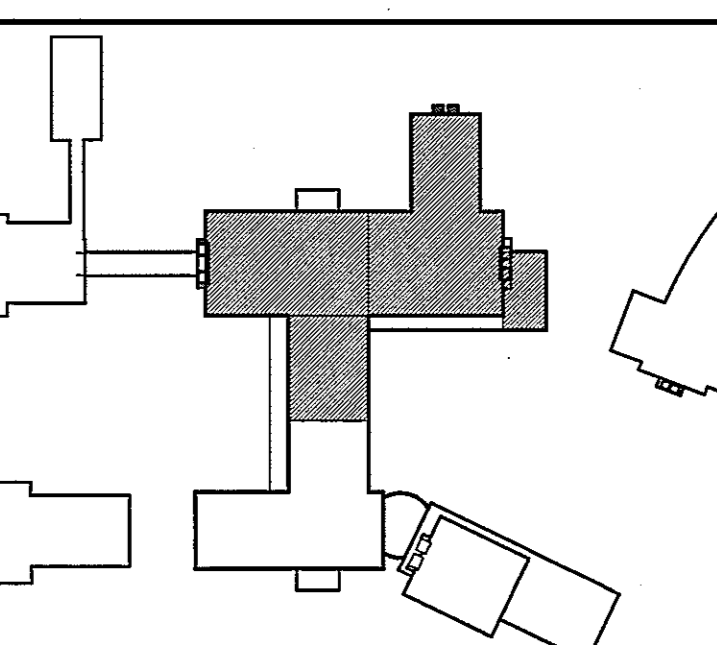
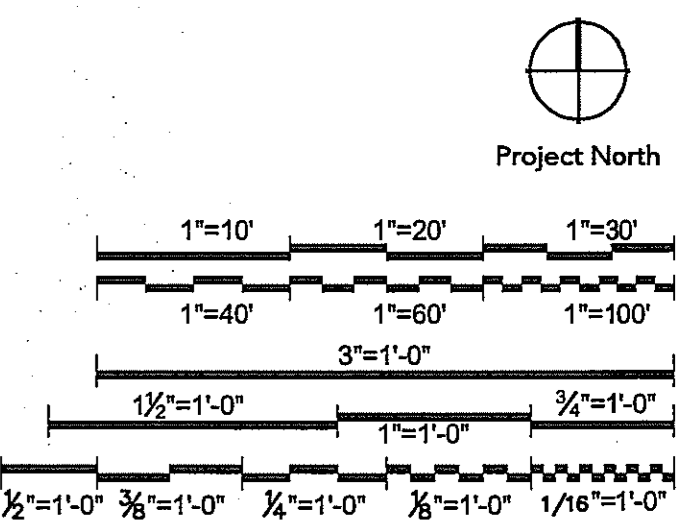
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Seals and Signatures



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Graphic Scales DATE _____



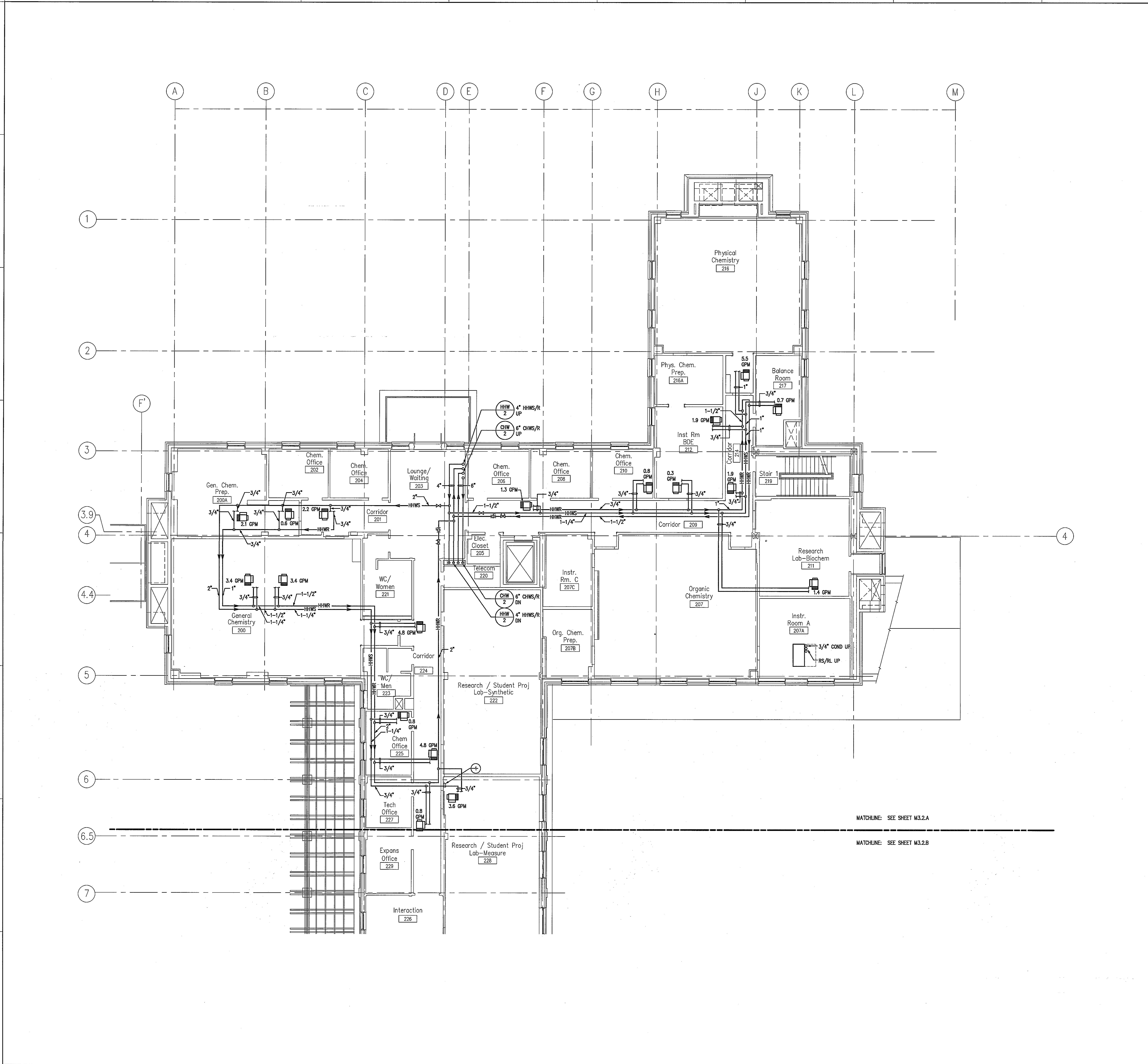
SECOND FLOOR PIPING PLAN NORTH

1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

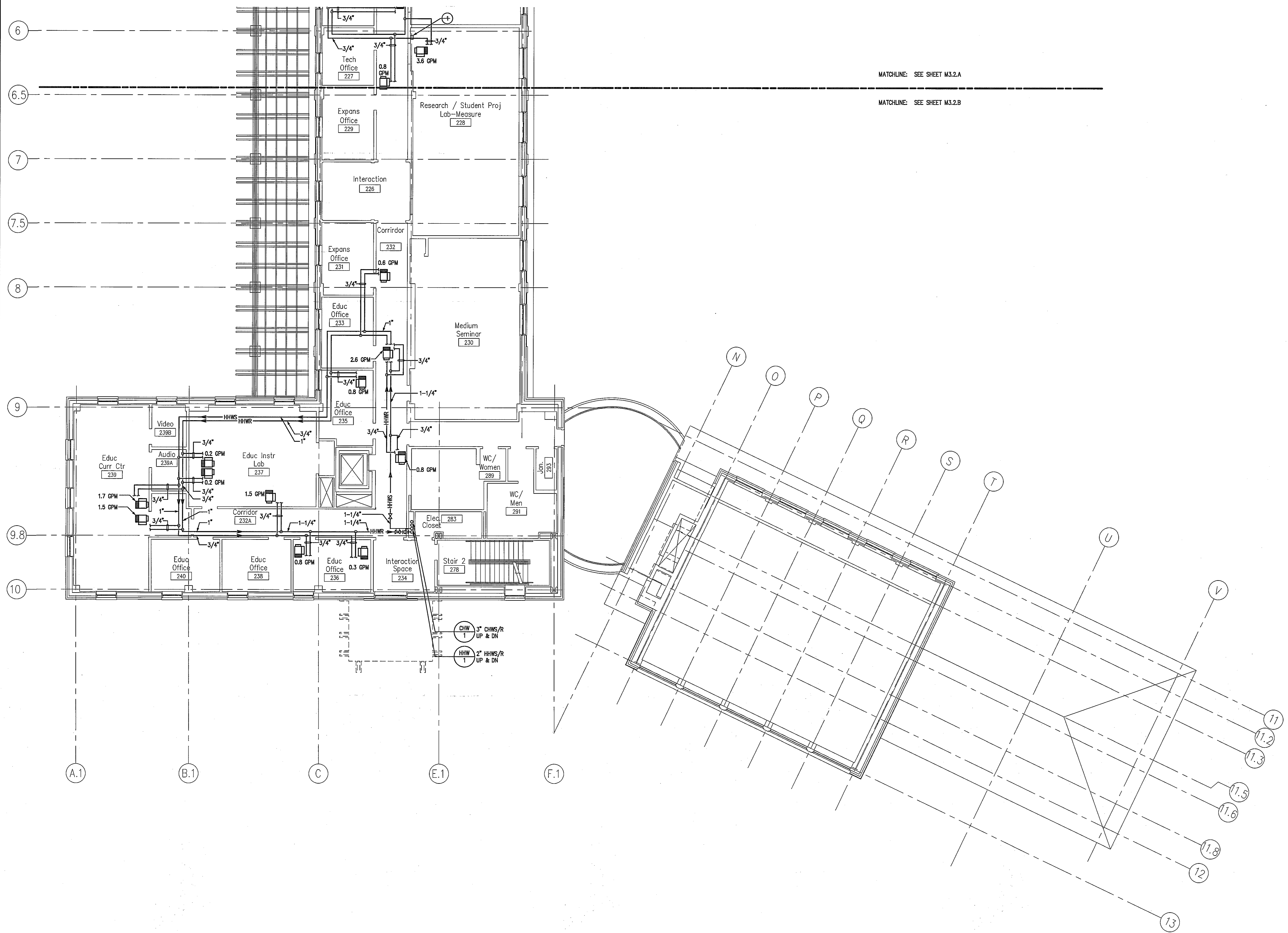
M3.2.A

Drawing Number _____



MATCHLINE: SEE SHEET M3.2.A

MATCHLINE: SEE SHEET M3.2.B



MATCHLINE: SEE SHEET M3.2.A
 MATCHLINE: SEE SHEET M3.2.B

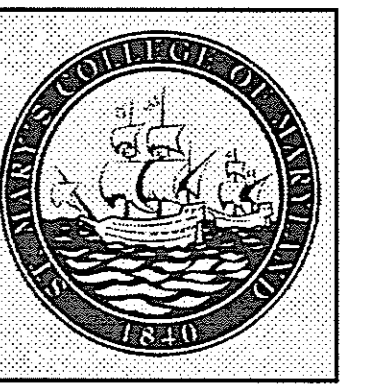
SHEET NOTES

KEY NOTES

- ① HEAT TRACE CONTROL AND ALARM PANEL.

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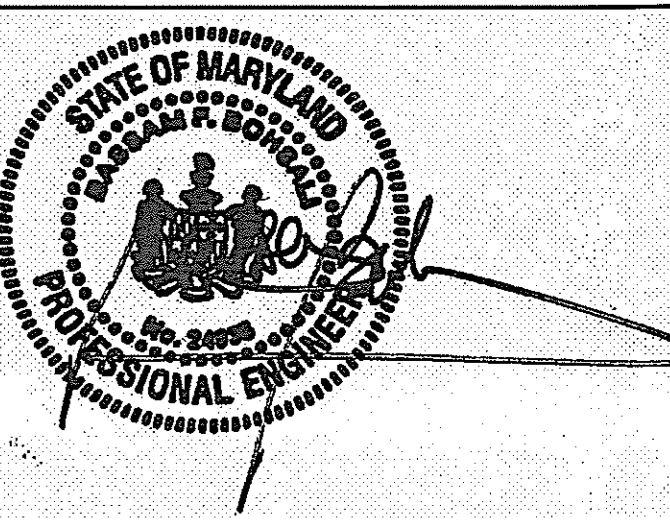
NAME _____ DATE _____
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PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

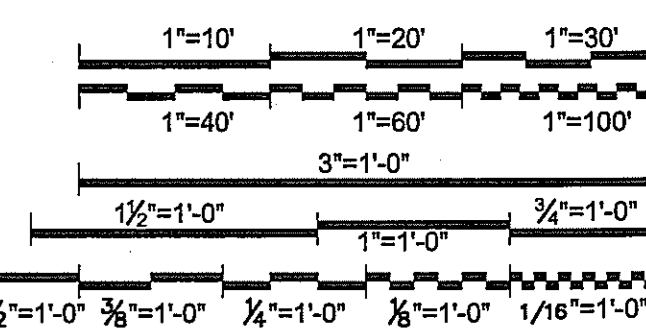
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Seals and Signatures



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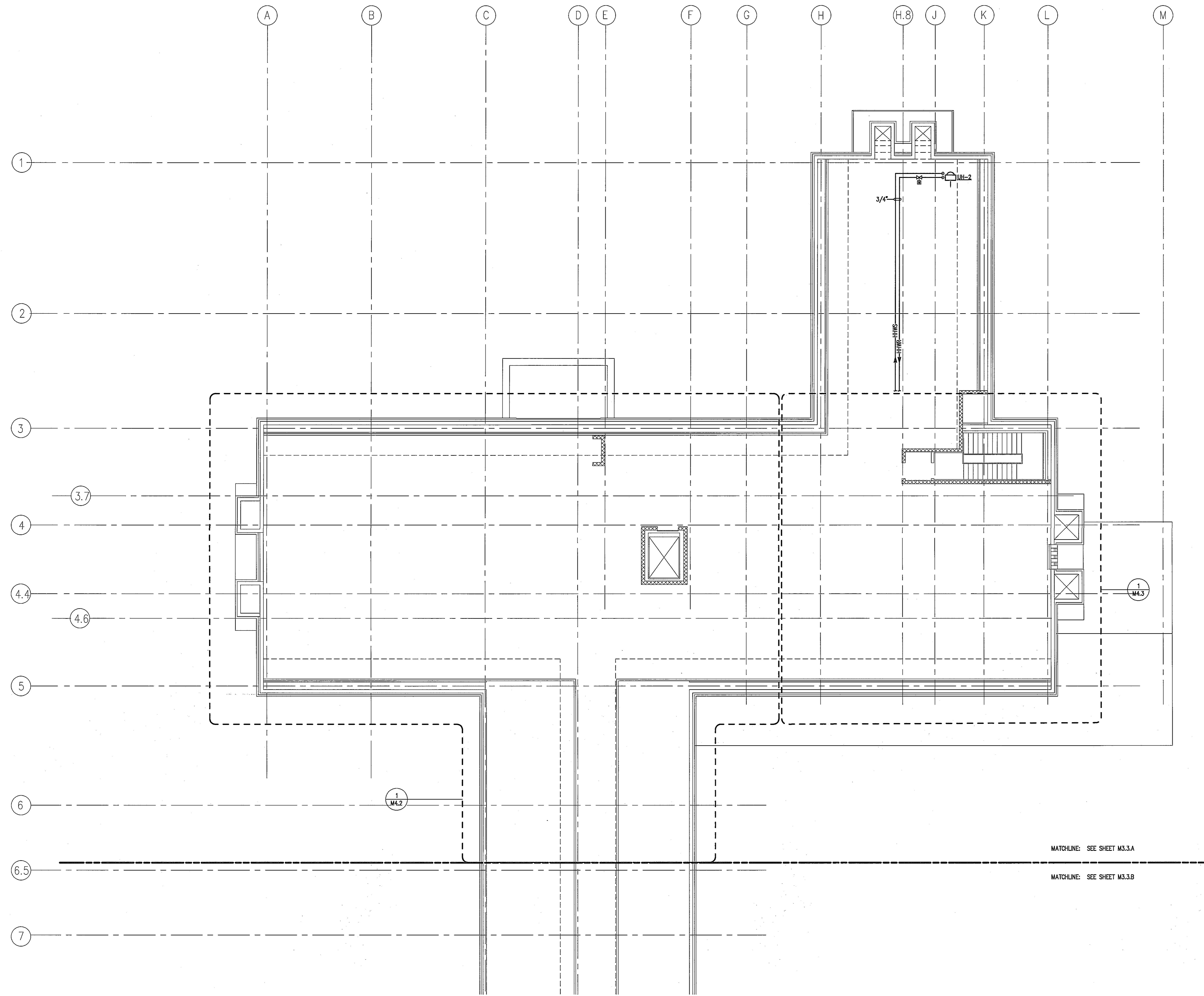
SECOND FLOOR PIPING PLAN SOUTH

1/8"=1'-0"

Scale J-494-020-002 25379.000
 DGS Project Number SG Project Number

M3.2.B

Drawing Number



MATCHLINE: SEE SHEET M3.3.A

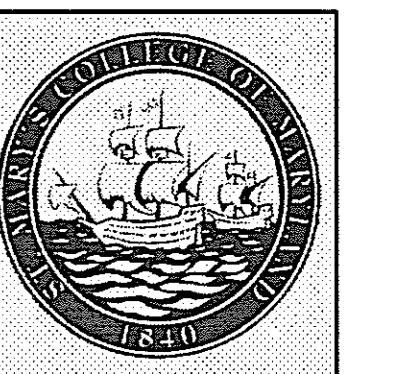
MATCHLINE: SEE SHEET M3.3.B

SHEET NOTES

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PROJECT MANAGER _____ DATE _____

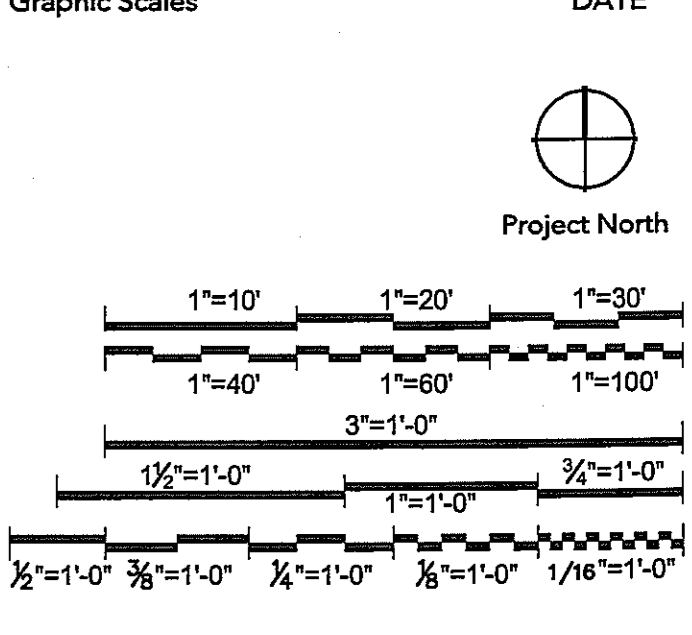
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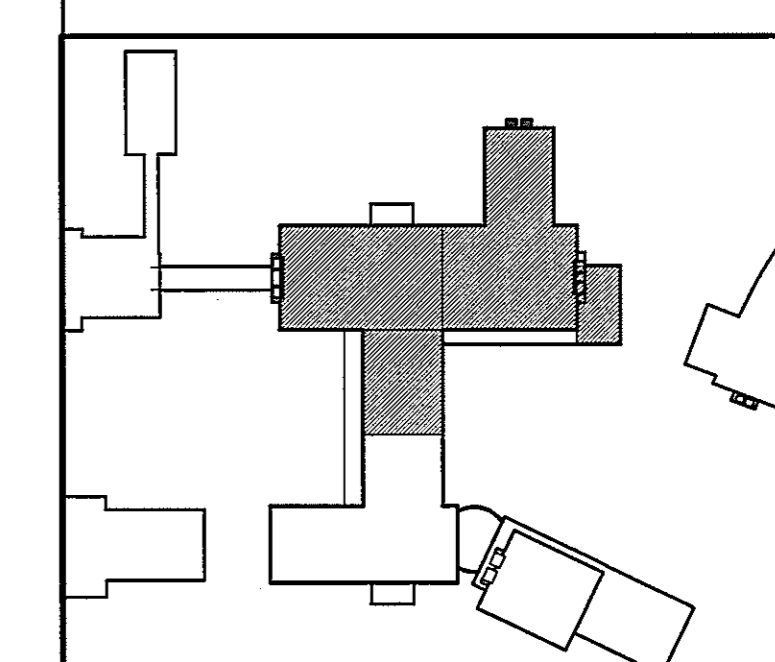
Seals and Signatures

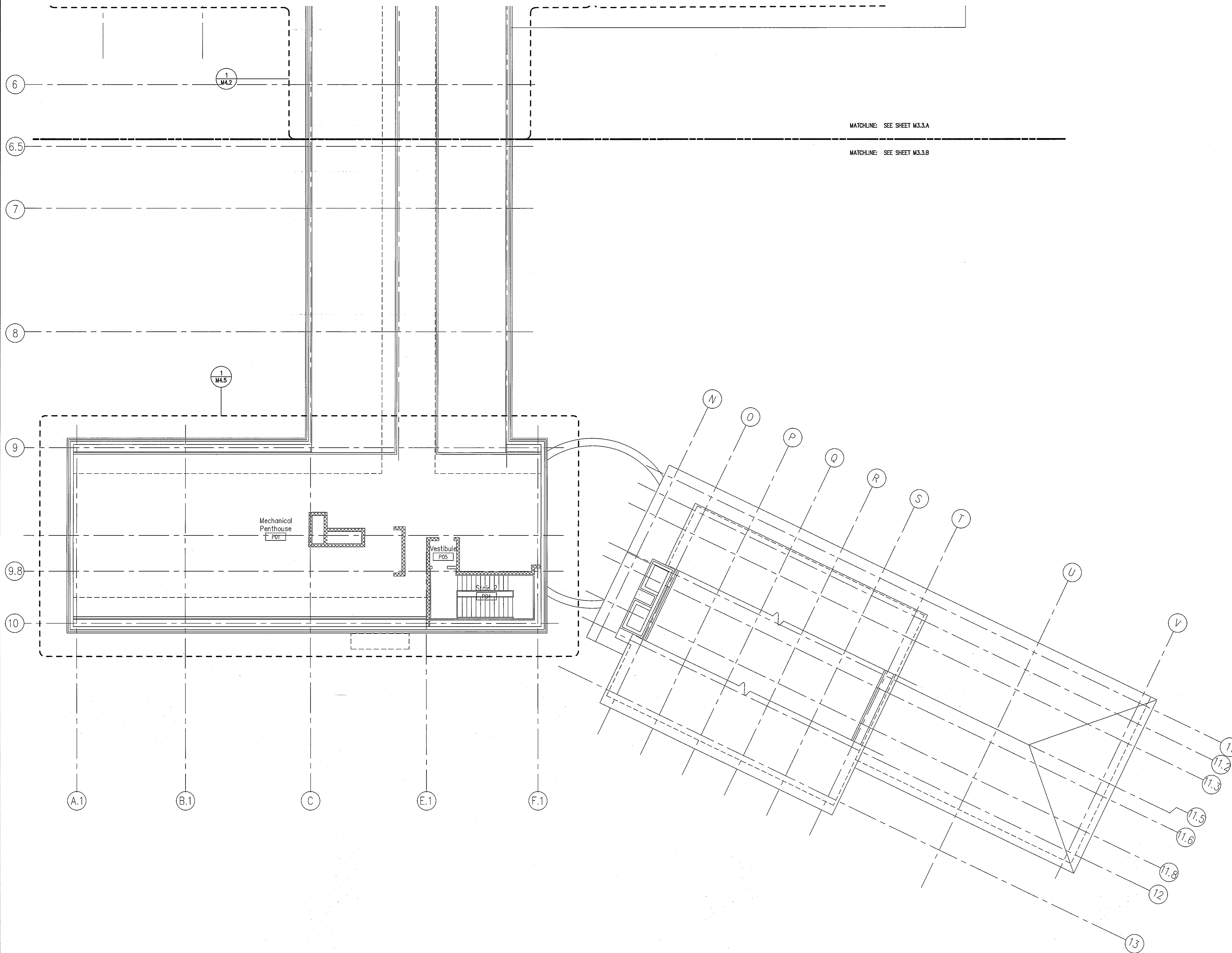


01/05/05
DATE



Drawing Title
PENTHOUSE PIPING PLAN NORTH
Scale
1/8"=1'-0"
J-494-020-002 25379.000
DGS Project Number SG Project Number
M3.3.A
Drawing Number



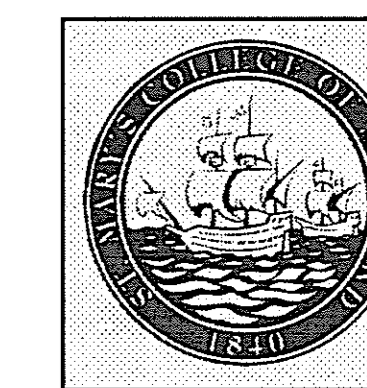


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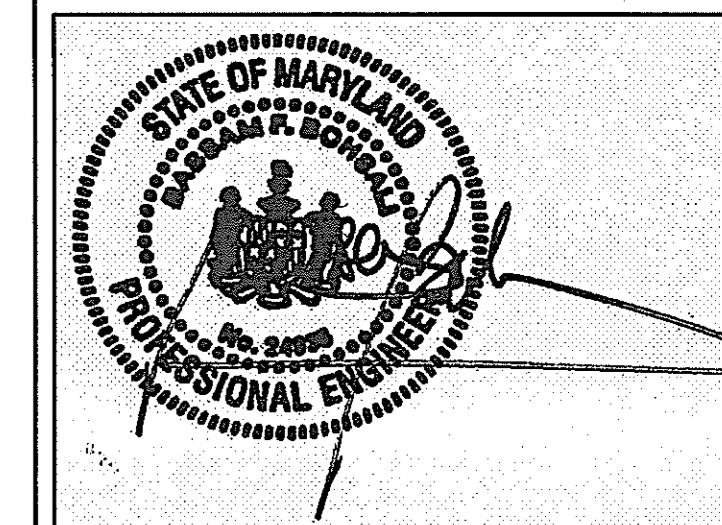
DEPT. OF GENERAL
SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

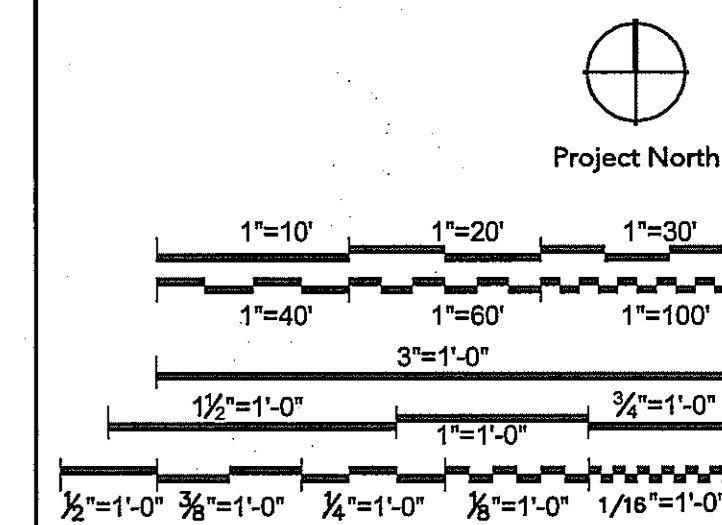
Issued for _____ Rev _____ Date _____

Seals and Signatures



01/05/05

Graphic Scales DATE _____



Drawing Title

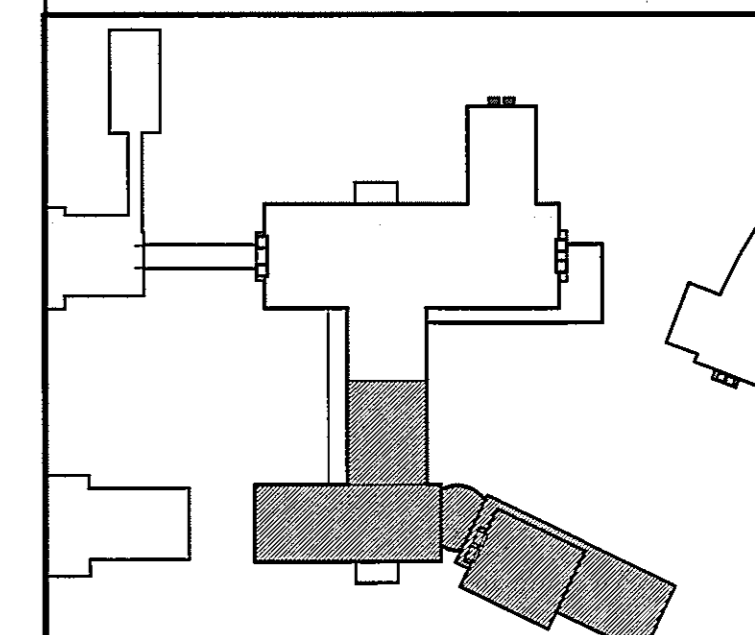
**PENTHOUSE
PIPING PLAN
SOUTH**

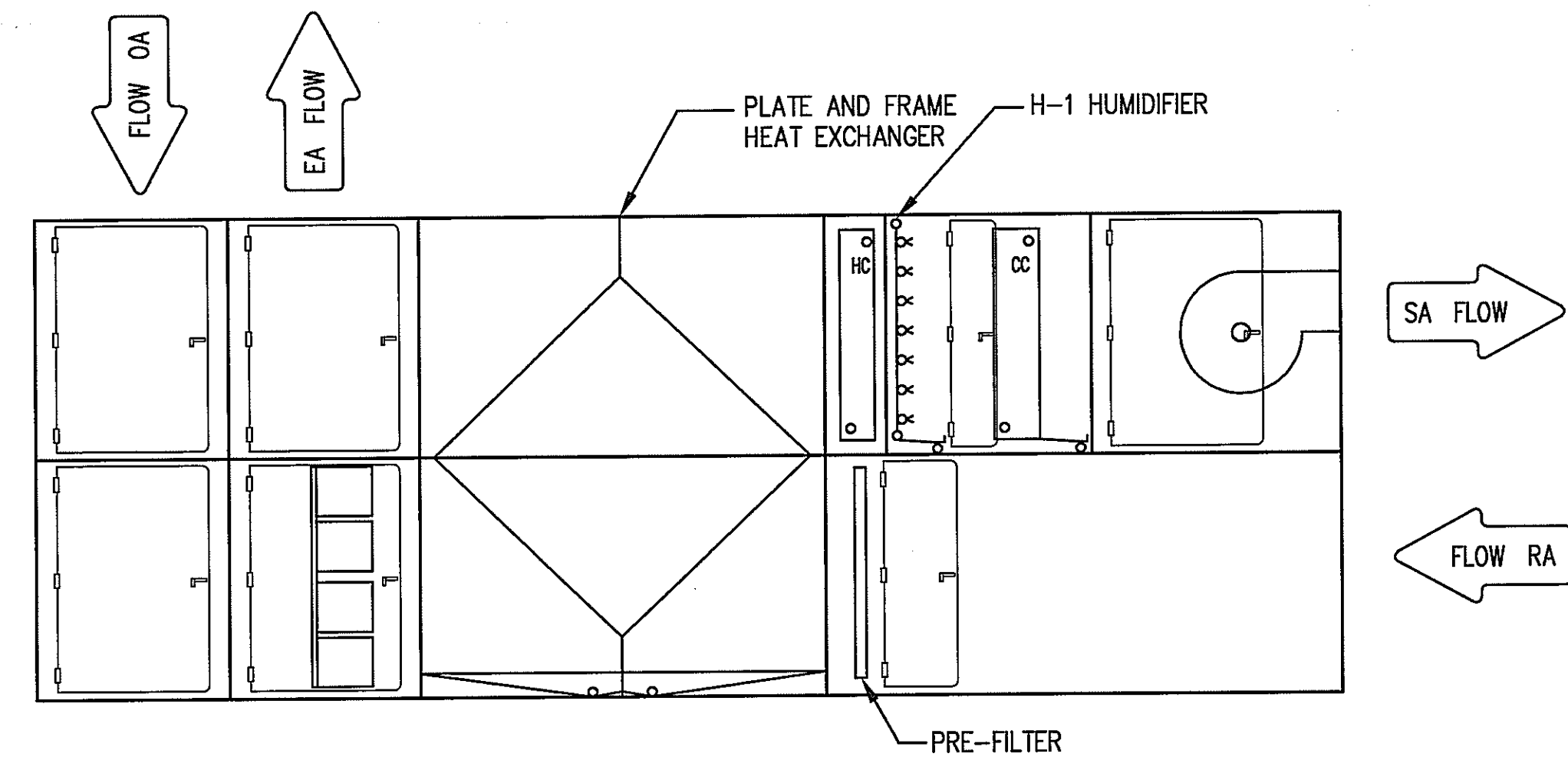
1/8"=1'-0"

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

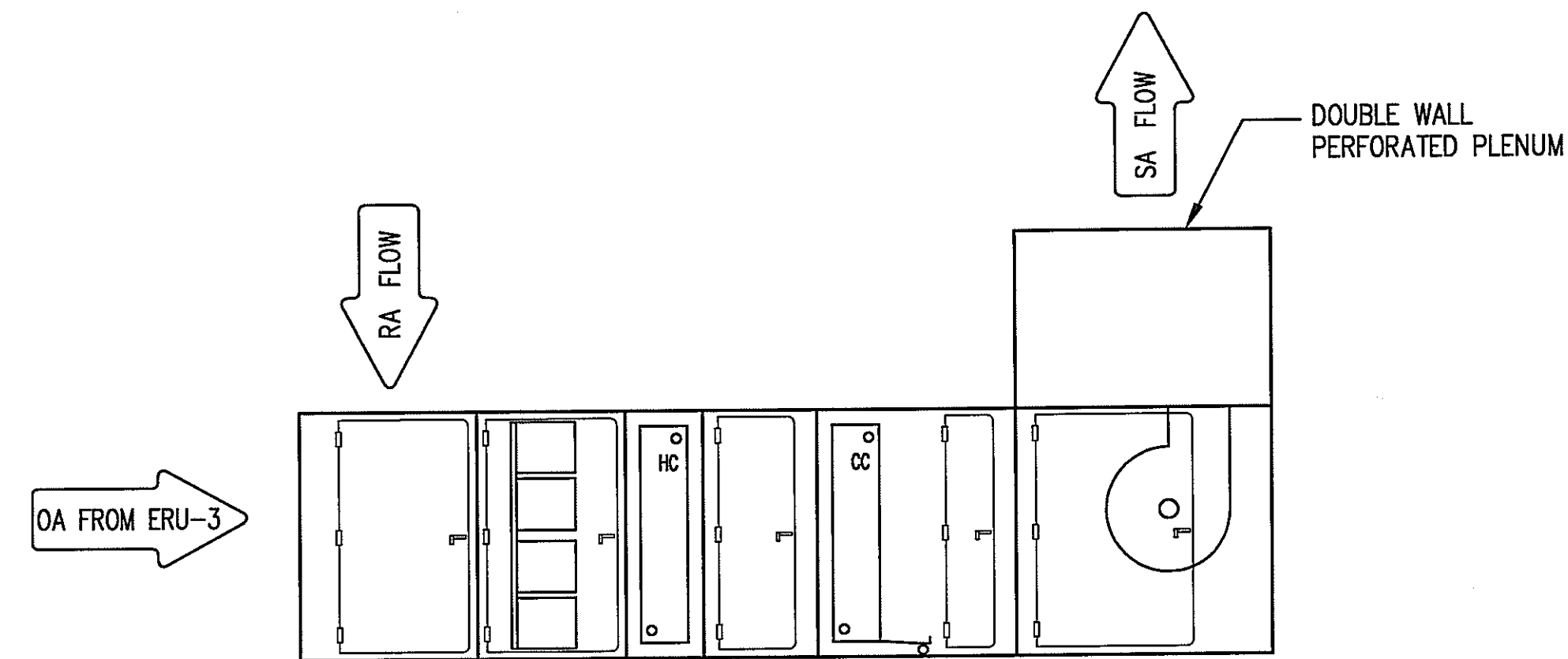
M3.3.B

Drawing Number

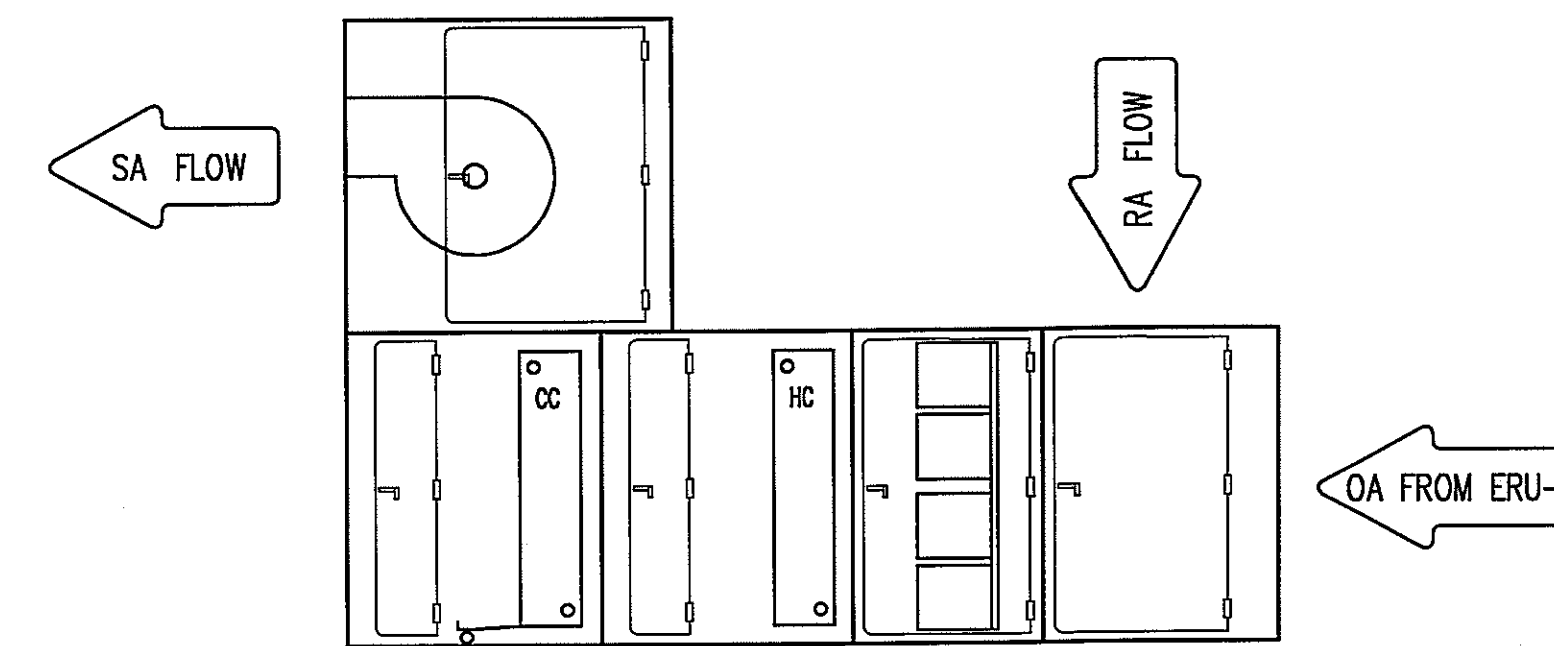




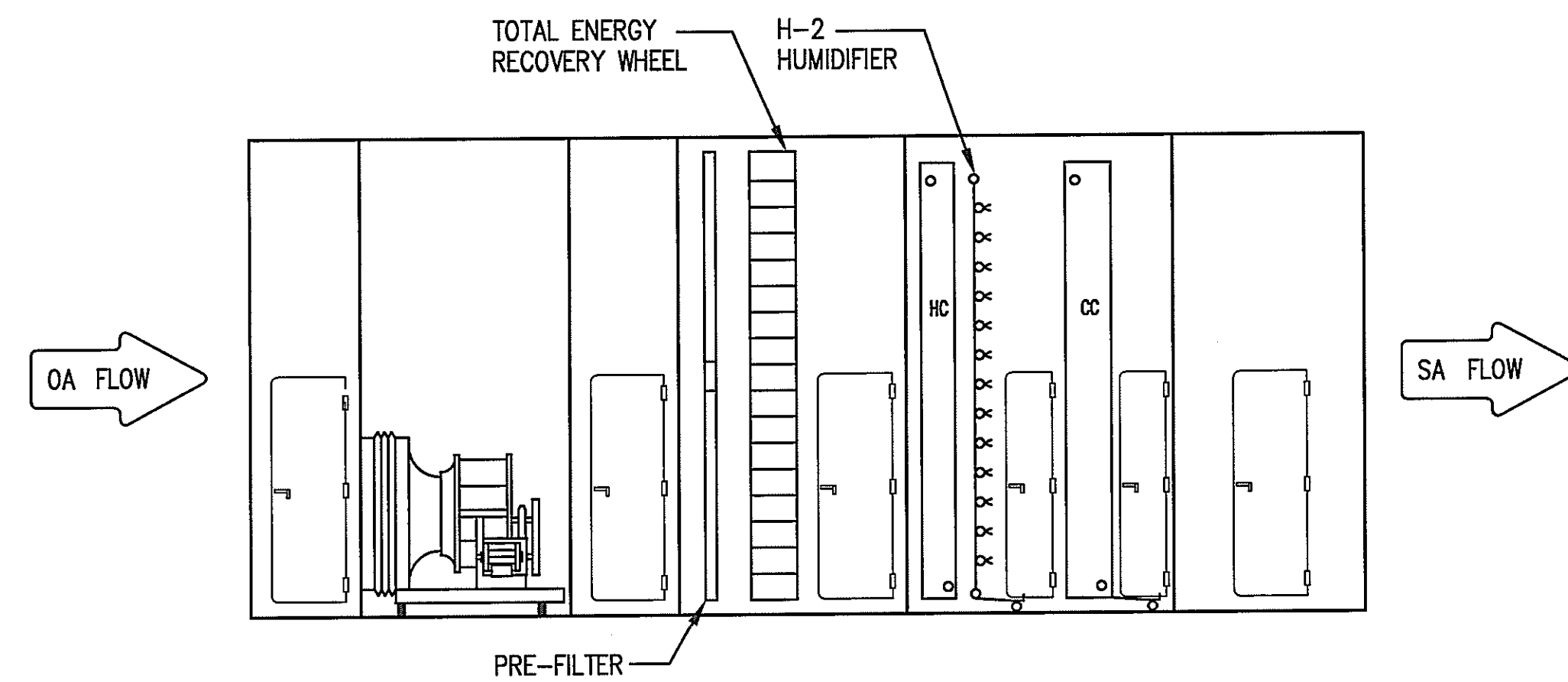
1 AHU-1 ELEVATION
M4.1 NOT TO SCALE



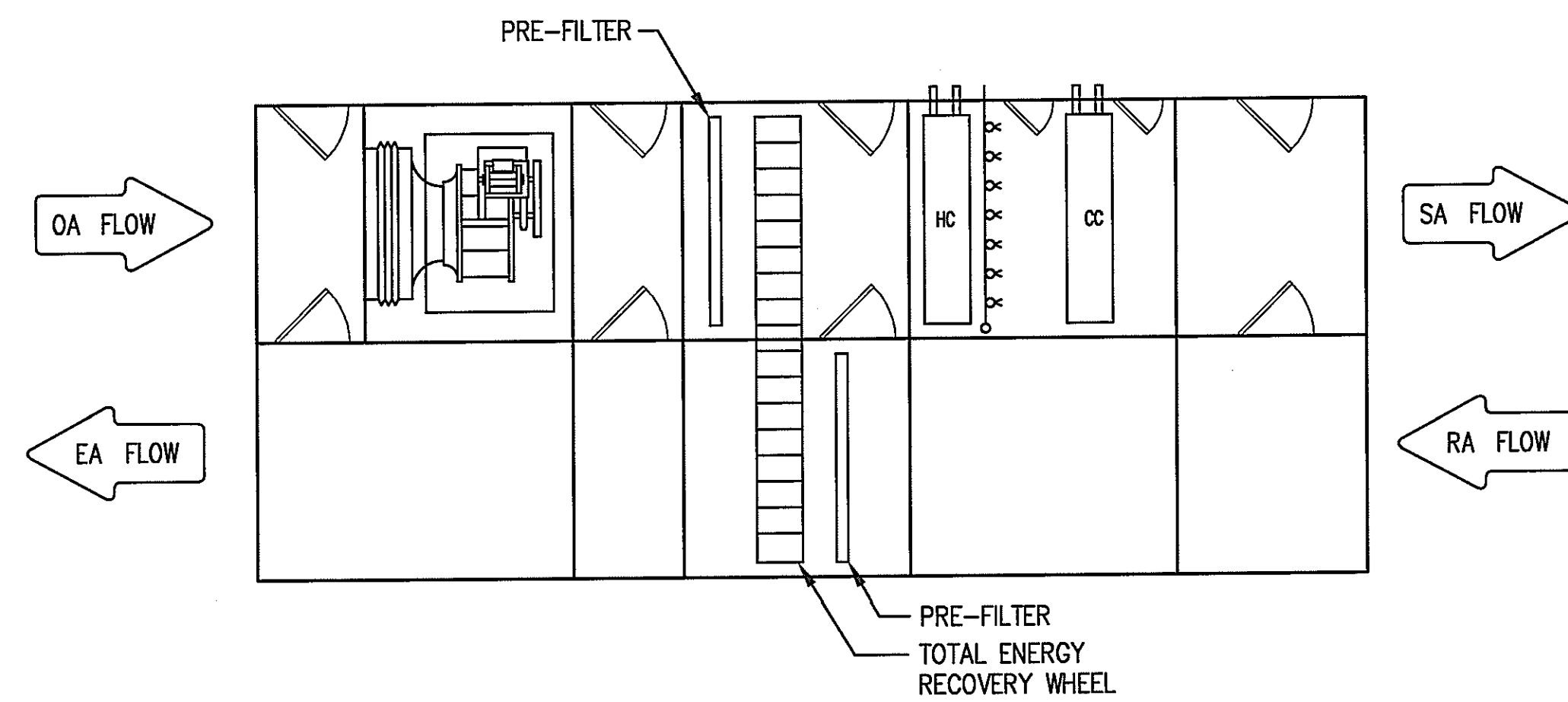
2 AHU-2 ELEVATION
M4.1 NOT TO SCALE



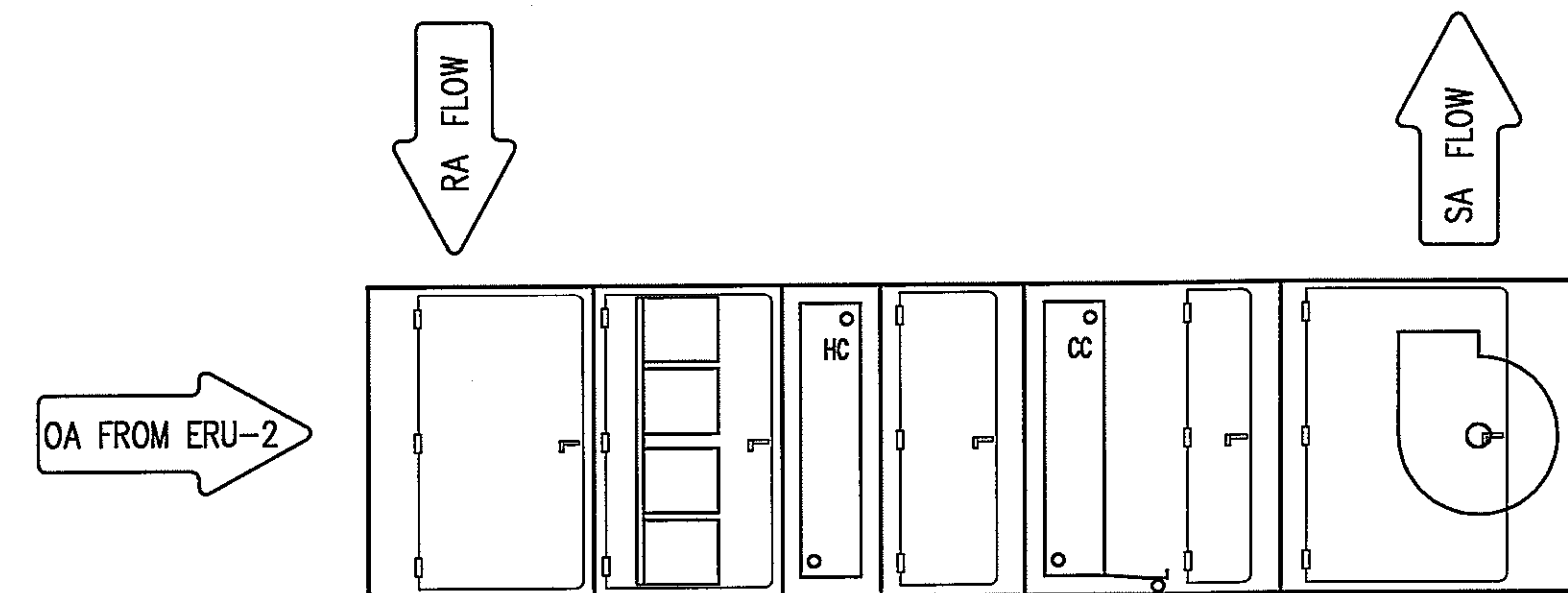
3 AHU-3 ELEVATION
M4.1 NOT TO SCALE



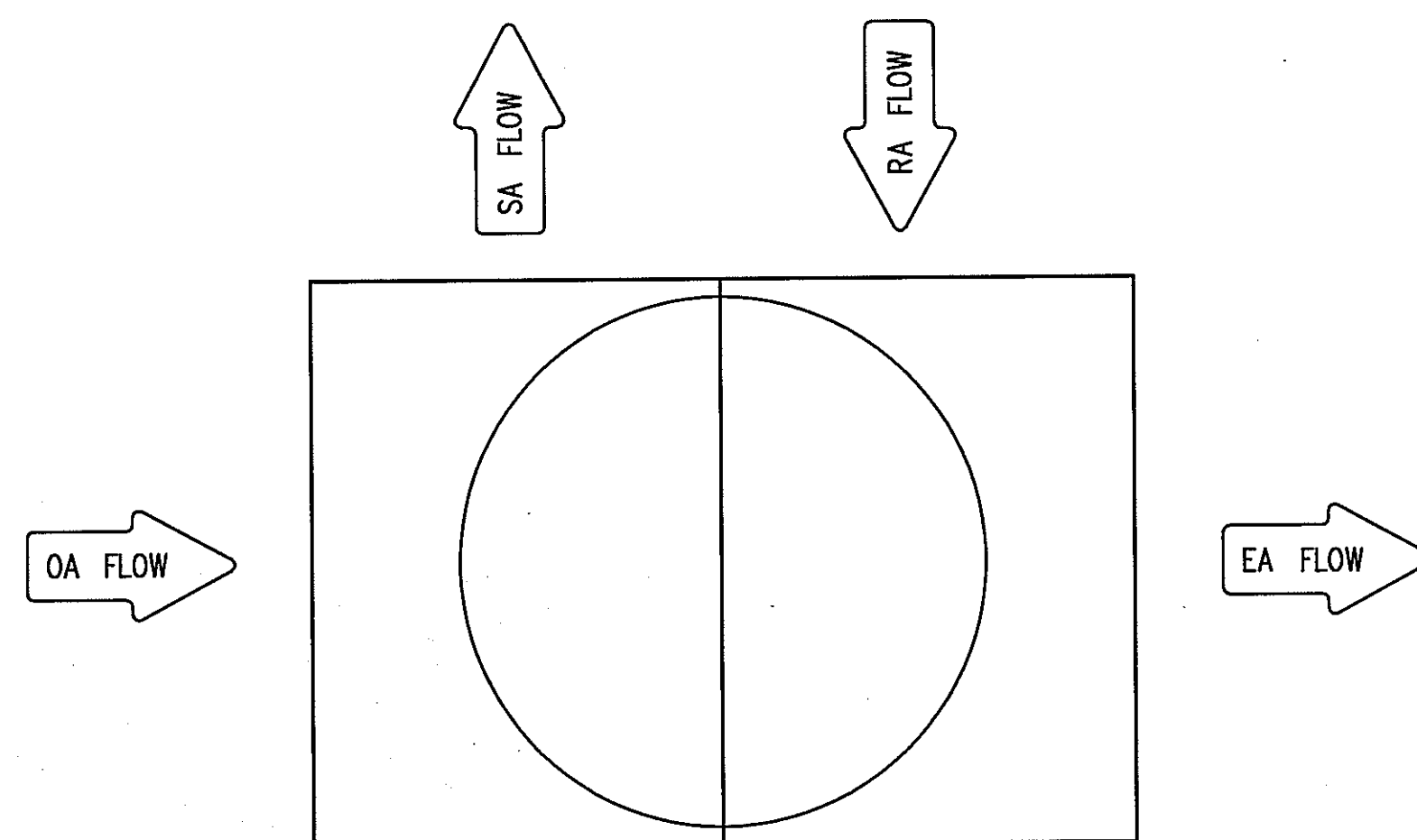
4 AHU-4 ELEVATION
M4.1 NOT TO SCALE



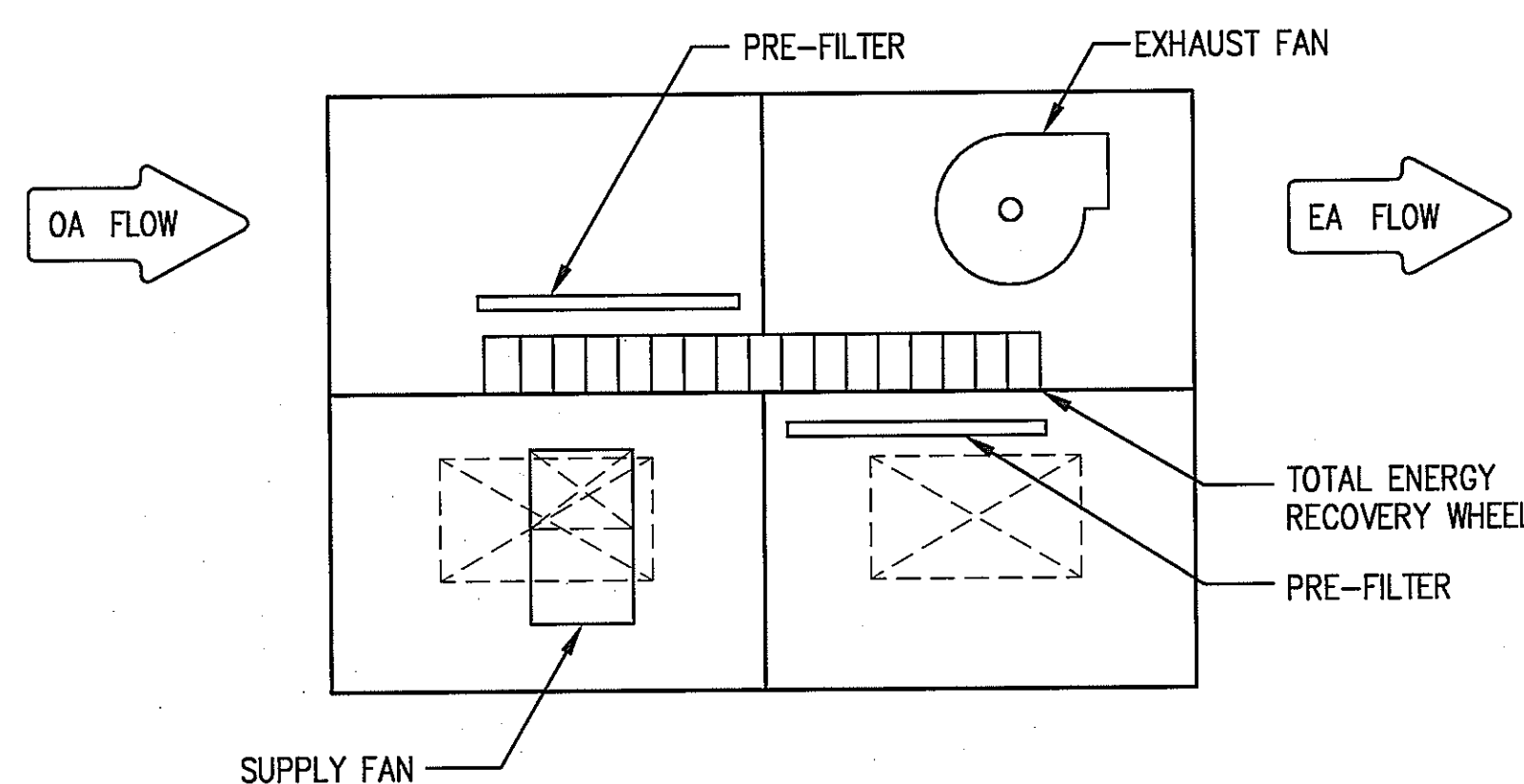
5 AHU-4 PLAN VIEW
M4.1 NOT TO SCALE



6 AHU-5 ELEVATION
M4.1 NOT TO SCALE

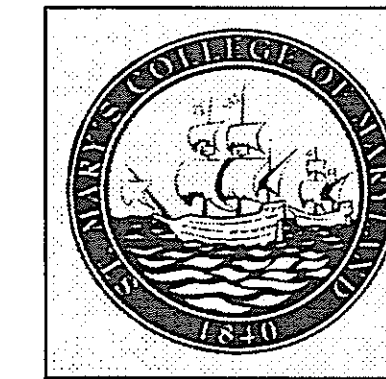
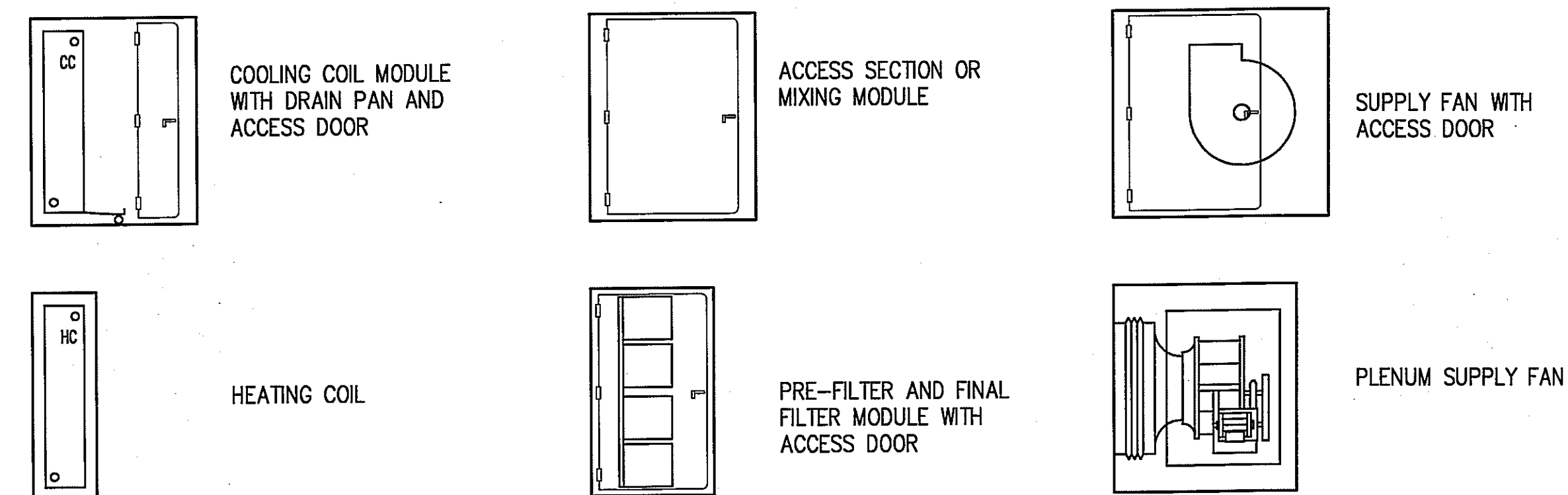


7 ERU PLAN VIEW
M4.1 NOT TO SCALE



8 ERU ELEVATIONS
M4.1 NOT TO SCALE

AHU COMPONENT SYMBOLS:



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SmithGroup Incorporated
1825 Eye Street NW
Suite 250
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E 202.942.2100
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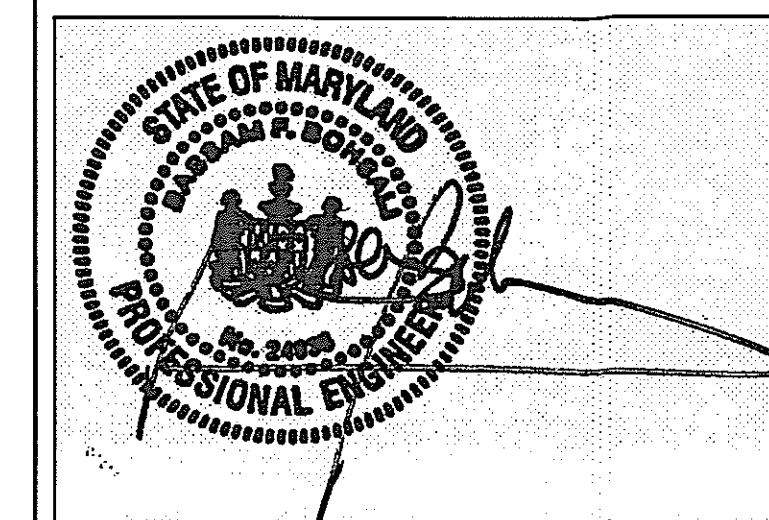
DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

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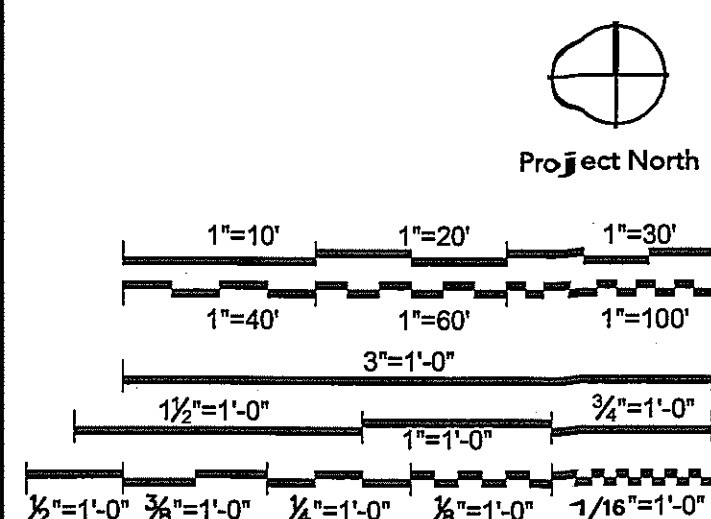
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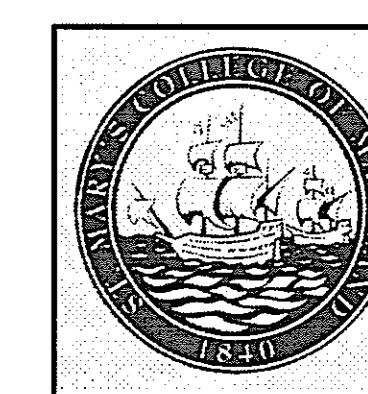
01/05/05
DATE

Graphic Scales



MECHANICAL AHU DIAGRAMS

Scale
1/4"=1'-0"
J-494-020-002 25379.000
DGS Project Number SG Project Number
M4.1
Drawing Number



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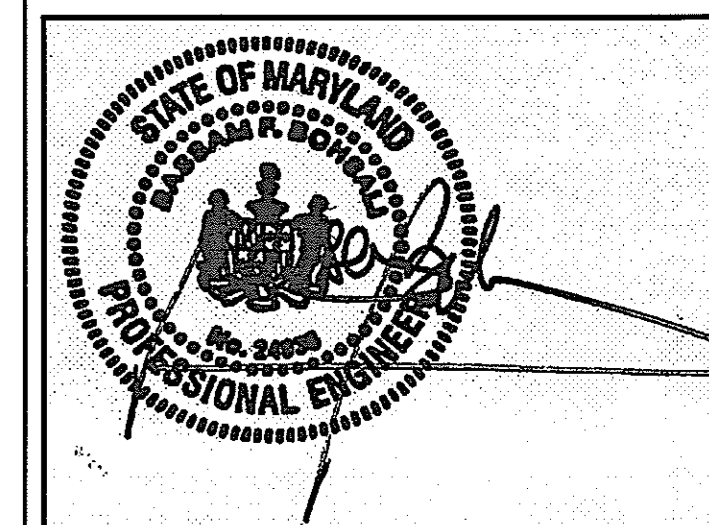
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

Issued for _____ Rev _____ Date _____

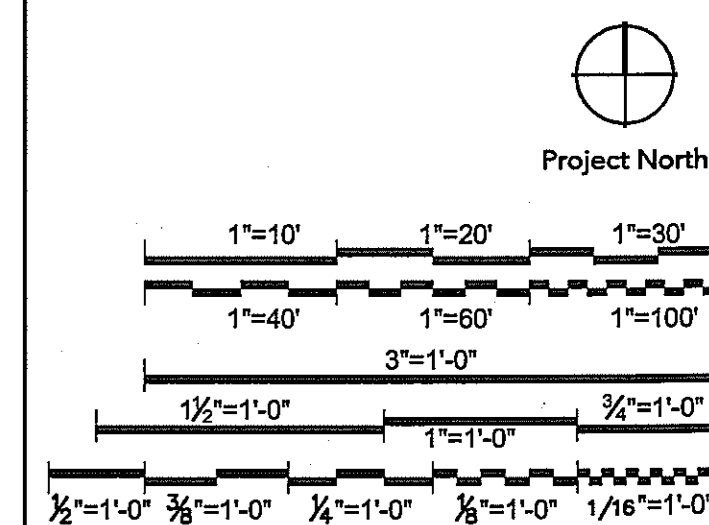
ADDENDUM PB-10 05/13/05

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01/05/05
DATE

Graphic Scales _____



Drawing Title _____

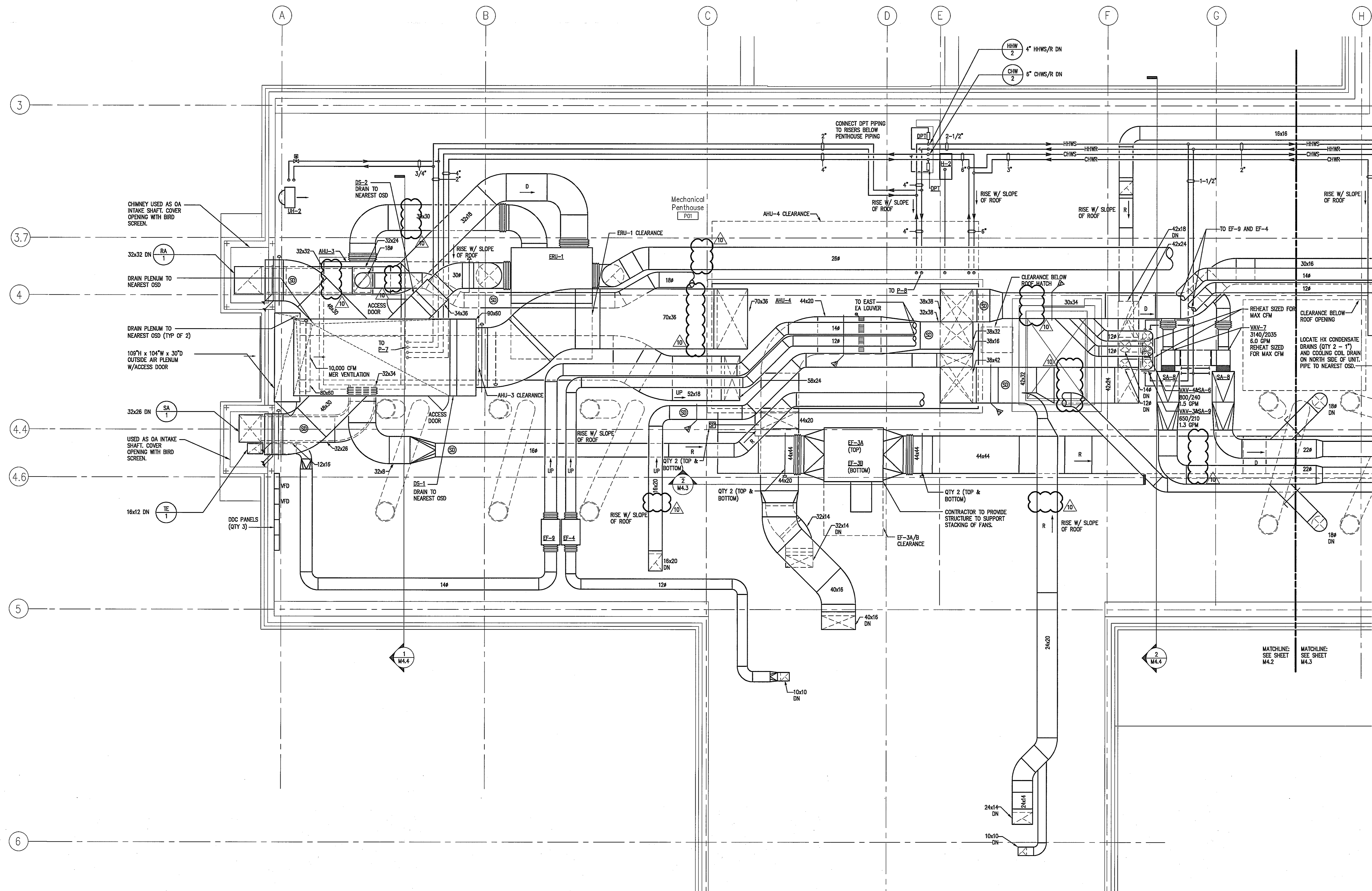
**ENLARGED PLANS
AND SECTIONS**

AS SHOWN

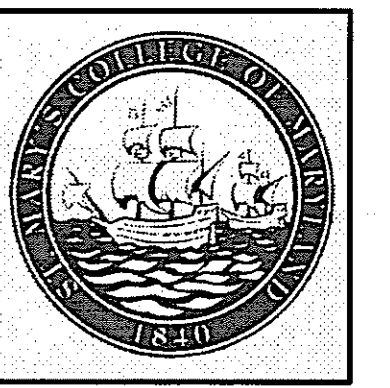
Scale J-494-020-002 25379.000
DGS Project Number SG Project Number

M4.2

Drawing Number



1
M4.2 **MECHANICAL EQUIPMENT ROOM - PENTHOUSE NORTH WING**
SCALE: 1/4" = 1'-0"



USING AGENCY APPROVAL

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TITLE _____

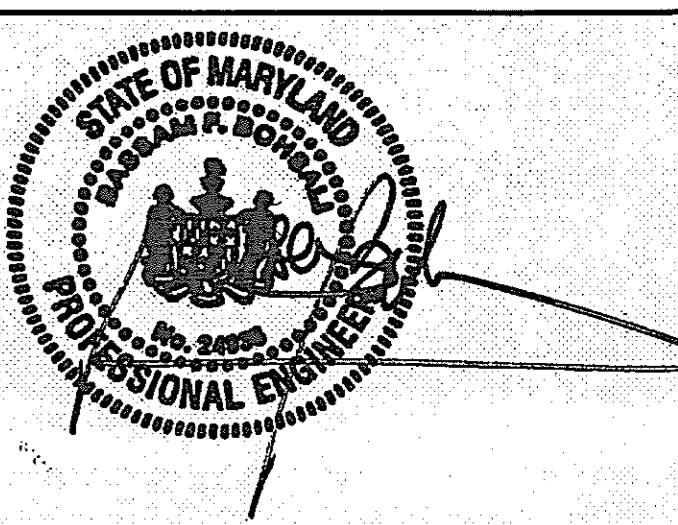
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PROJECT MANAGER _____ DATE _____

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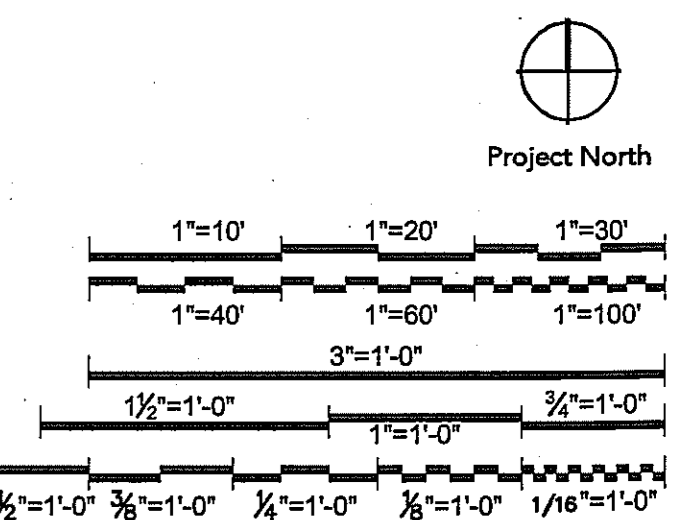
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Graphic Scales



Drawing Title

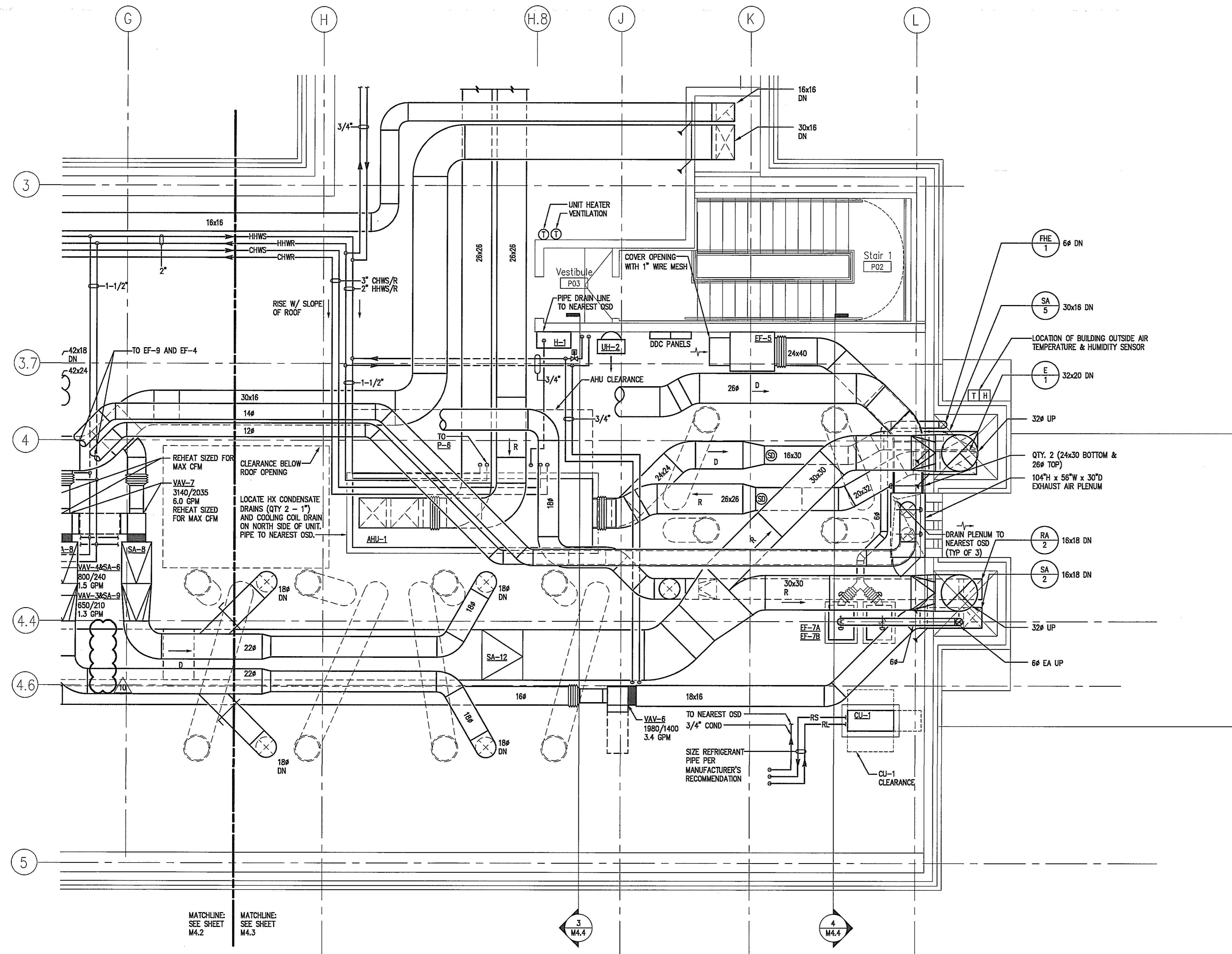
ENLARGED PLANS AND SECTIONS

AS SHOWN

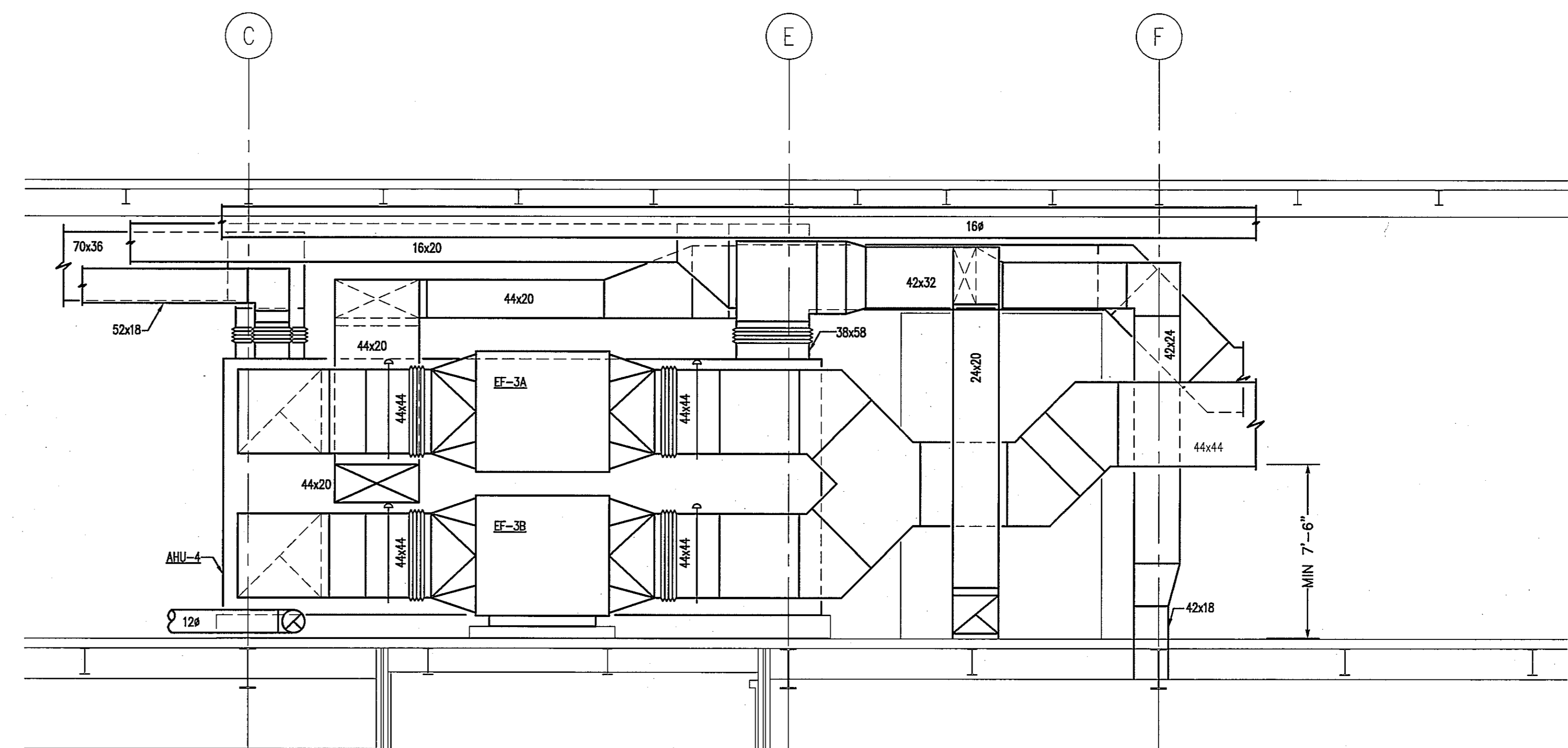
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M4.3

Drawing Number



1
M4.3 MECHANICAL EQUIPMENT ROOM - PENTHOUSE NORTH WING
SCALE: 1/4" = 1'-0"



2
M4.3 MECHANICAL EQUIPMENT ROOM SECTION - PENTHOUSE NORTH WING
SCALE: 1/4" = 1'-0"



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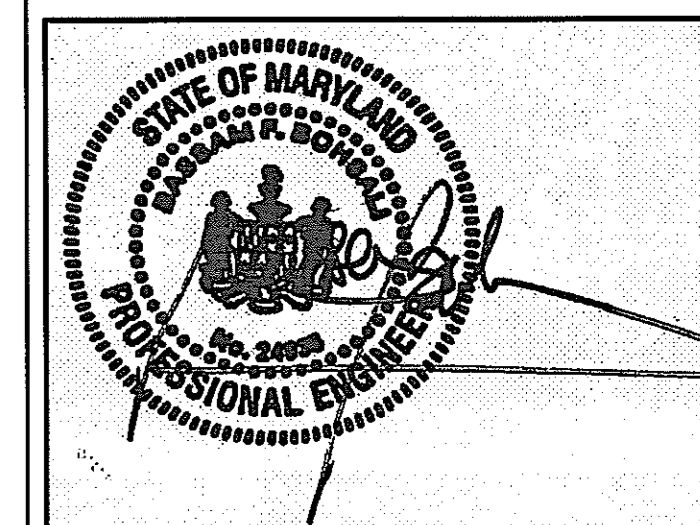
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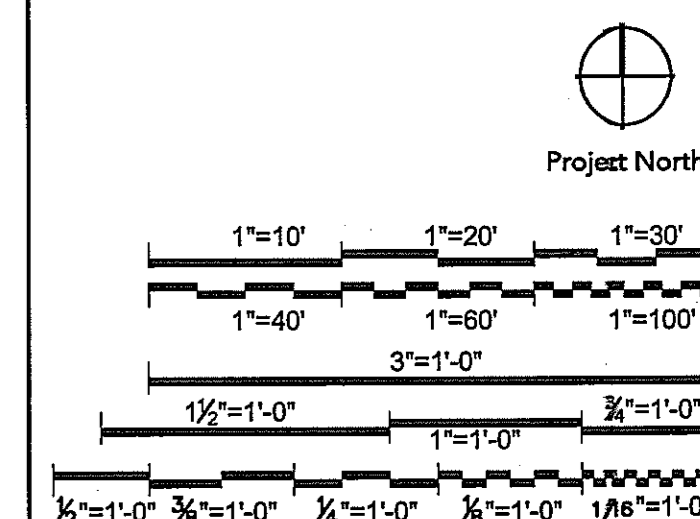
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ADDENDUM PB-10 DATE 05/18/05

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Drawing Title

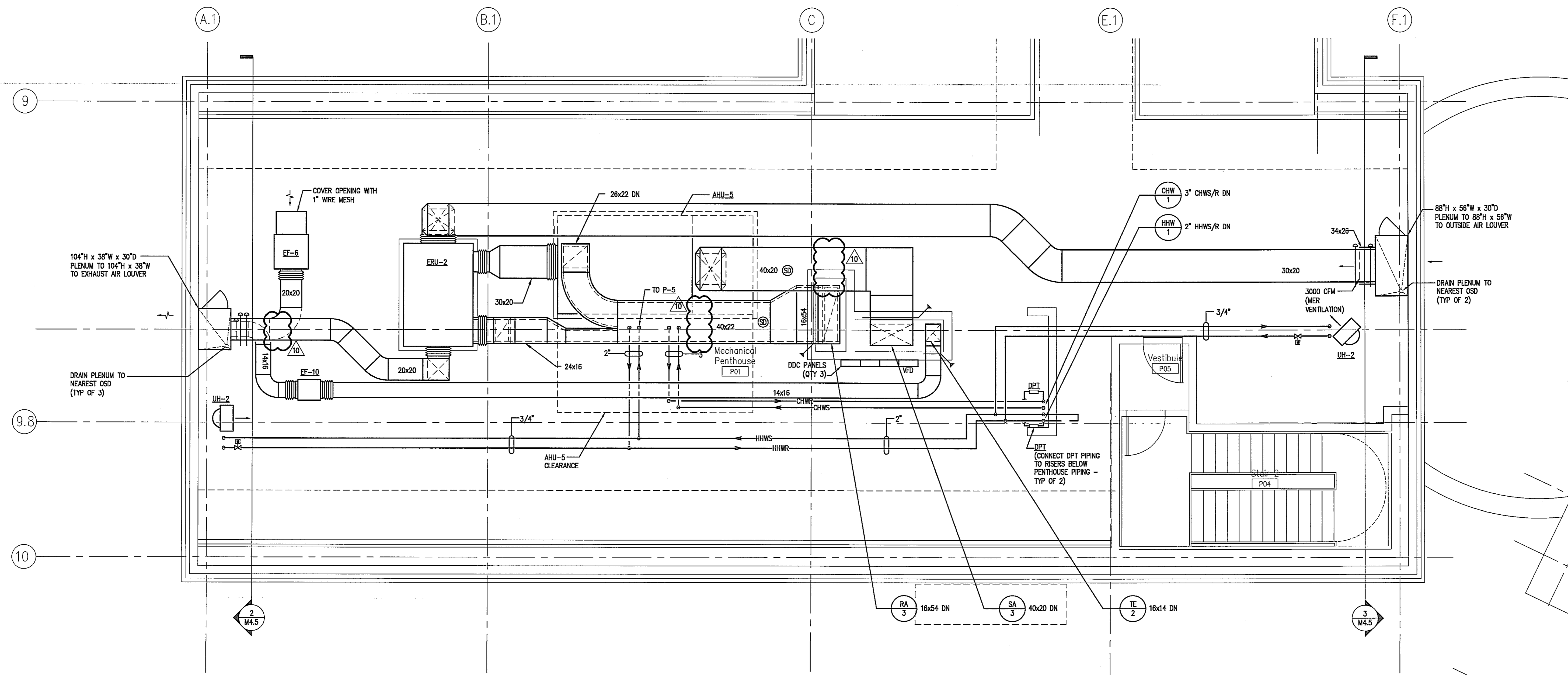
ENLARGED PLANS AND SECTIONS

AS SHOWN

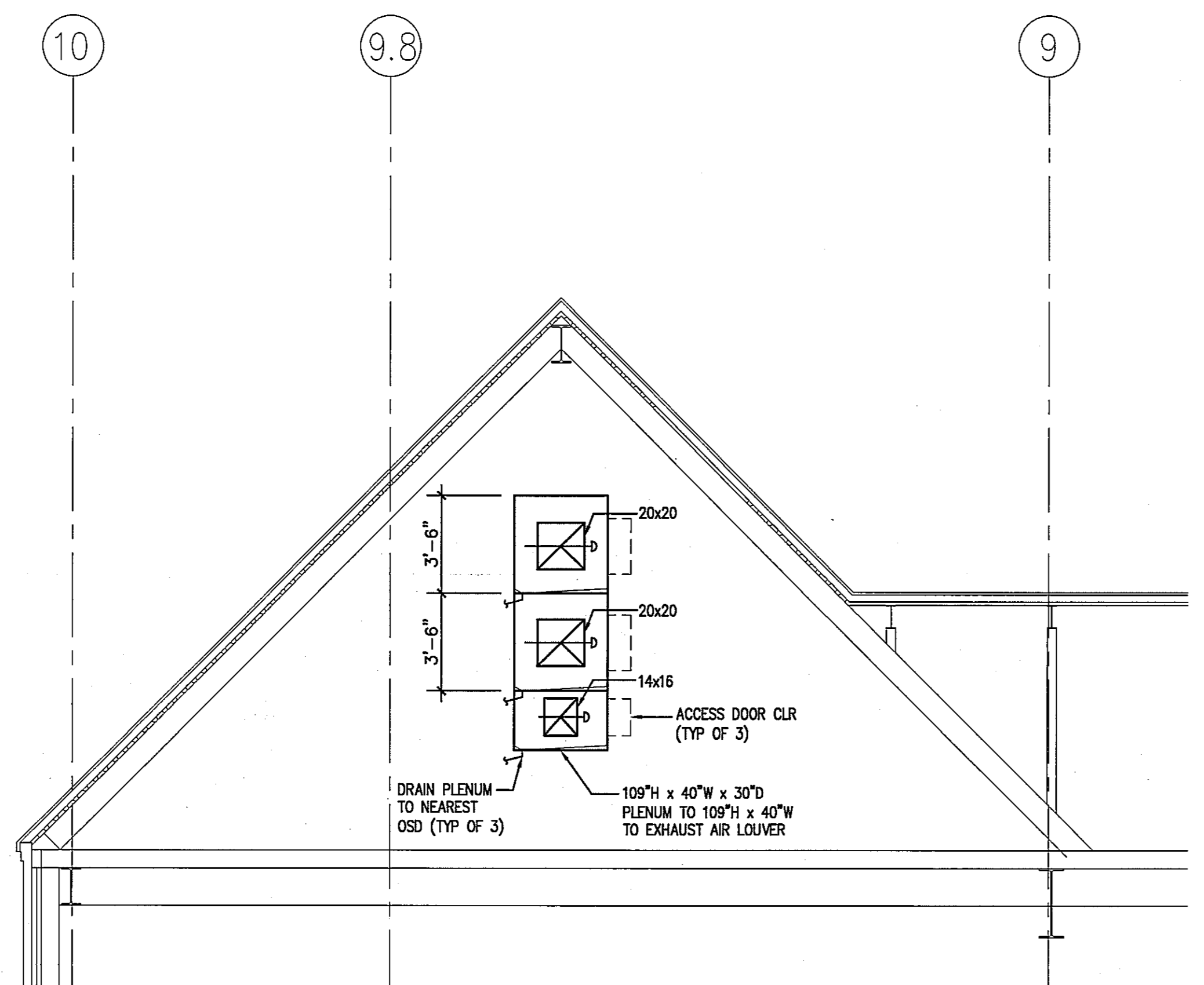
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DSG Project Number SG Project Number

M4.5

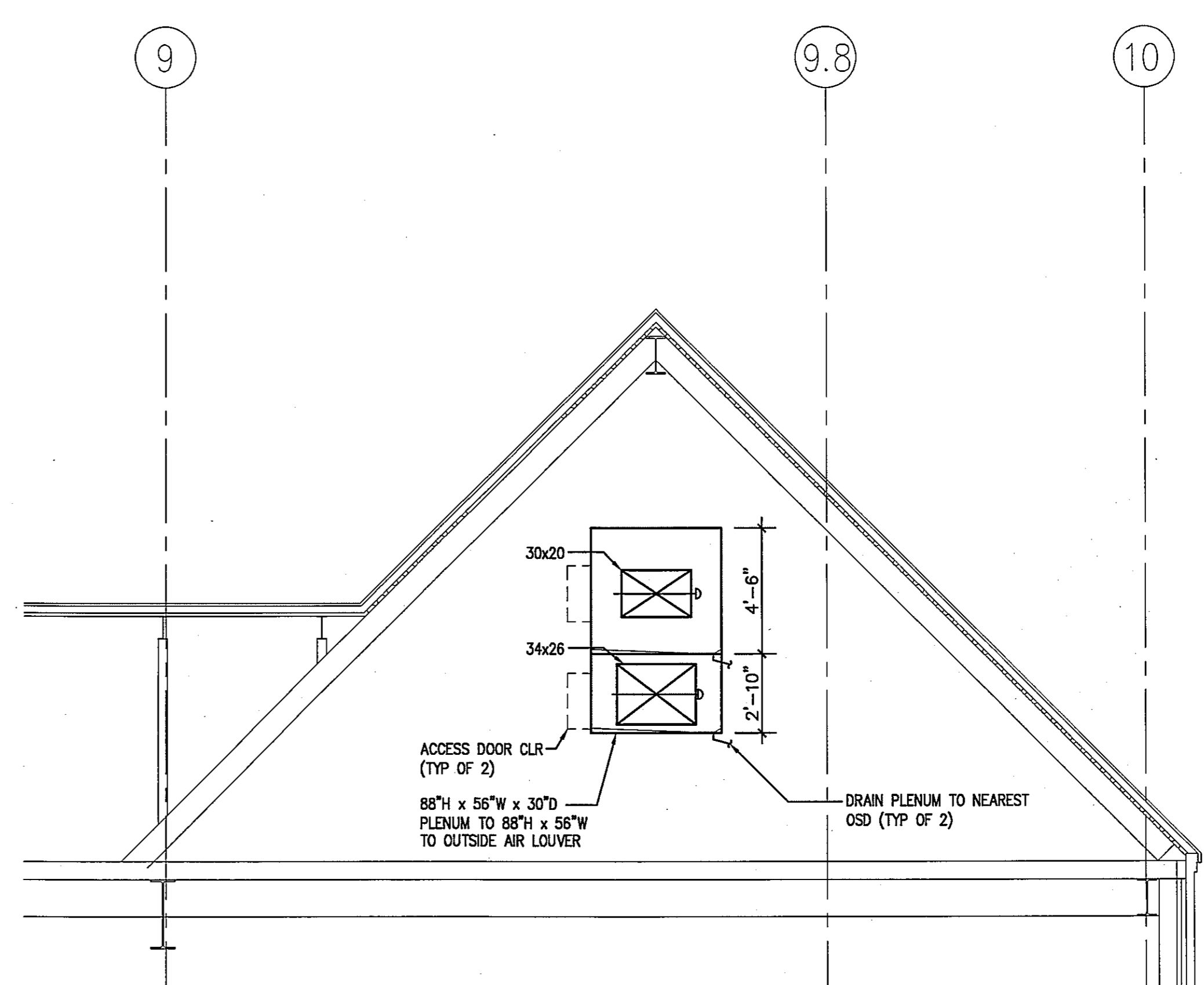
Drawing Number



1 MECHANICAL EQUIPMENT ROOM - PENTHOUSE SOUTH WING
SCALE: 1/4" = 1'-0"



2 MECHANICAL EQUIPMENT ROOM SECTION - PENTHOUSE SOUTH WING
SCALE: 1/4" = 1'-0"



3 MECHANICAL EQUIPMENT ROOM SECTION - PENTHOUSE SOUTH WING
SCALE: 1/4" = 1'-0"



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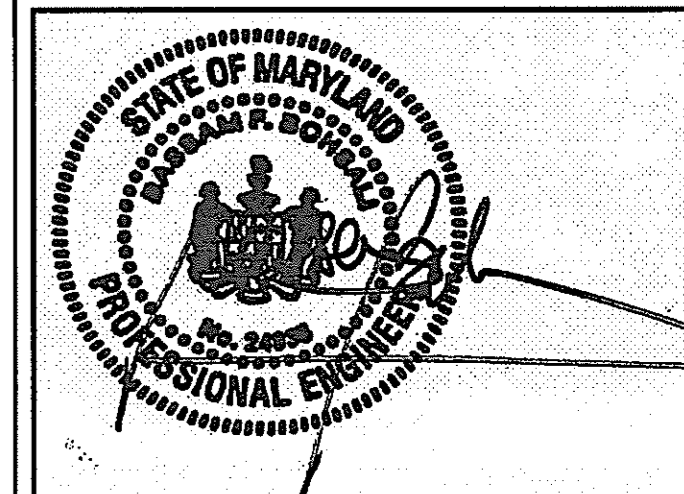
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

Issued for _____ Rev Date _____

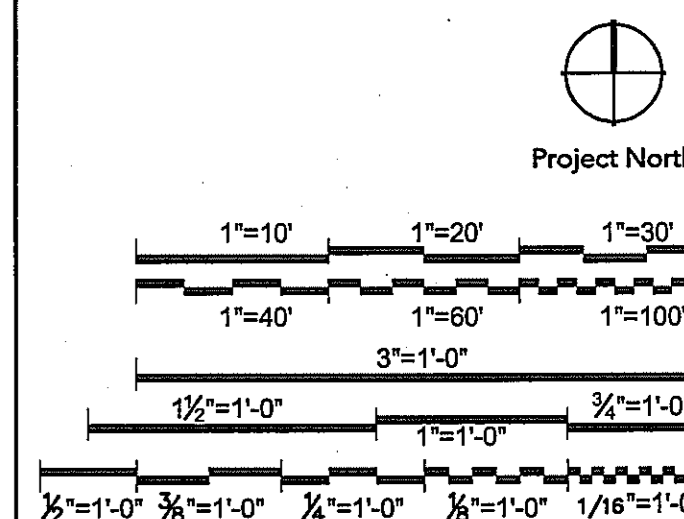
ADDENDUM FB-10 05/13/05

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**ENLARGED PLANS
AND SECTIONS**

AS SHOWN

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M4.6

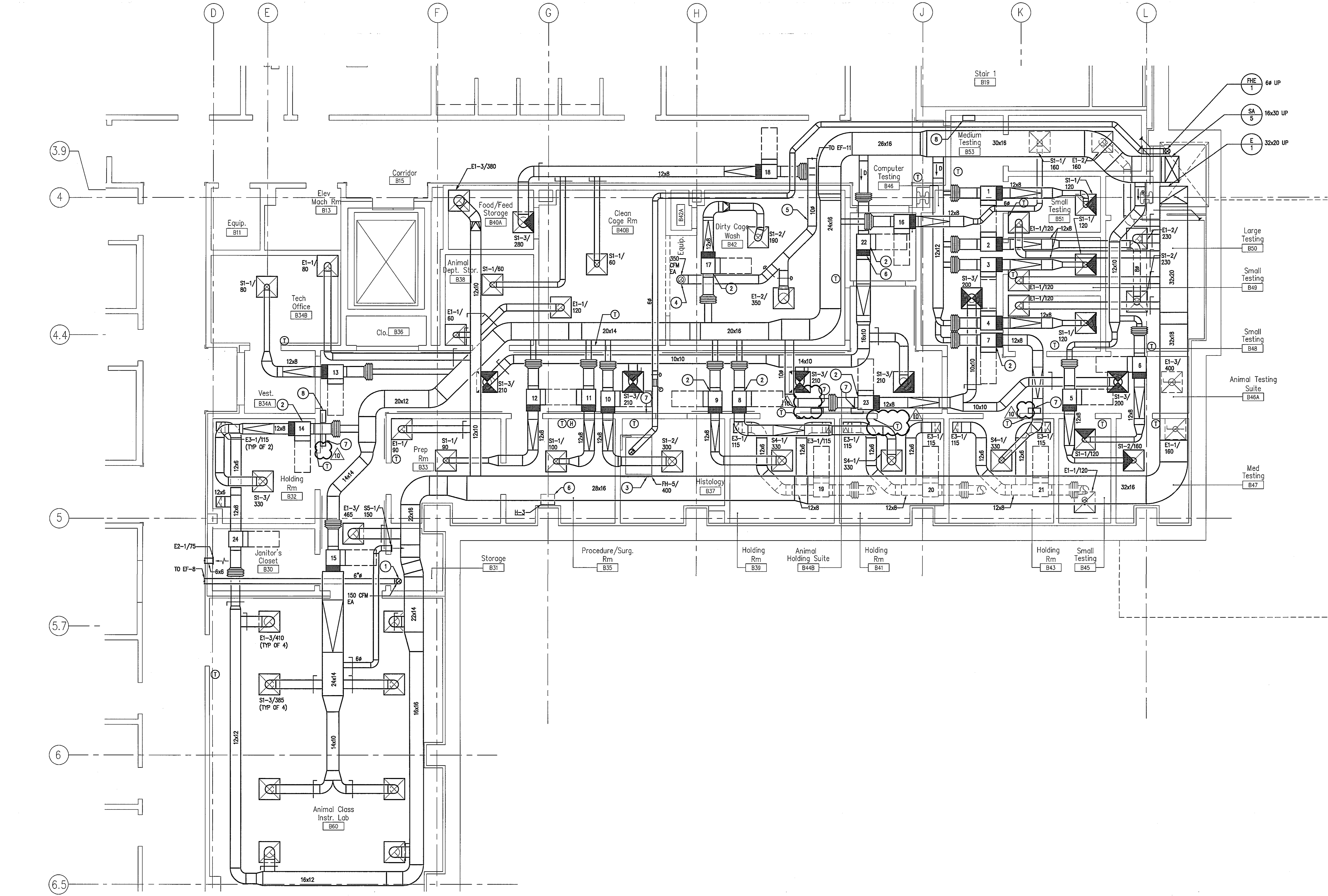
Drawing Number

SHEET NOTES

1. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER BETWEEN ANIMAL HOLDING ROOMS AND SUITE CORRIDORS AS WELL AS BETWEEN ANIMAL SUITES AND CORRIDOR B15. REFER TO CONTROLS ON M8.1 & M8.4.
2. TERMINAL UNITS: ANIMAL HOLDING:
 - 1) YAV-1 120/120
 - 2) YAV-2 230/230
 - 3) YAV-1 120/120
 - 4) YAV-1 120/120
 - 5) YAV-1 150/150
 - 6) YAV-1 120/120
 - 7) YAV-2 330/130
 - 8) YAV-2 330/130
 - 9) YAV-2 330/130
 - 10) YAV-2 300/300
 - 11) YAV-1 100/100
 - 12) YAV-1 90/90
 - 13) YAV-1 80/80
 - 14) YAV-2 330/130
 - 15) YAV-5 1650/1650
 - 16) YAV-1 160/160
 - 17) YAV-1 190/190
 - 18) YAV-3 400/400
 - 19) YAV-2 230/230
 - 20) YAV-2 230/230
 - 21) YAV-2 230/230
 - 22) YAV-4 840/240
 - 23) YAV-5 400/200
 - 24) YAV-2 230/230
3. SOUND ATTENUATORS: ANIMAL HOLDING
 - YAV-1 SA-1
 - YAV-2 SA-2
 - YAV-3 SA-3
 - YAV-4 & 5 SA-4
 - YAV-5 SA-5
4. PROVIDE SOUND ATTENUATOR FOR EACH SUPPLY AIR TERMINAL UNIT IN ANIMAL SUITES.

KEY NOTES

1. SEE DETAIL ON M8.1.
2. REHEAT COIL DIMENSIONED FOR MAX VAV CFM.
3. CONSTANT VOLUME FUME HOOD.
4. TRANSITION AND CONNECT TO 8" CAGE WASHER EXHAUST.
5. SLOPE DUCT TO CAGE WASHER WITH 1/8" PER FT.
6. MOUNT HUMIDIFIER H-3 HIGH ON WALL. PROVIDE CLEARANCE AS PER MANUFACTURER'S REQUIREMENTS. PIPE 1" DRAIN LINE TO NEAREST CSB.
7. LOCATION OF ROOM PRESSURE CONTROLLER.
8. LOCATION OF SUITE PRESSURE CONTROLLER.



1 ANIMAL HOLDING ROOMS - BASEMENT NORTH WING
M4.6 SCALE: 1/4" = 1'-0"



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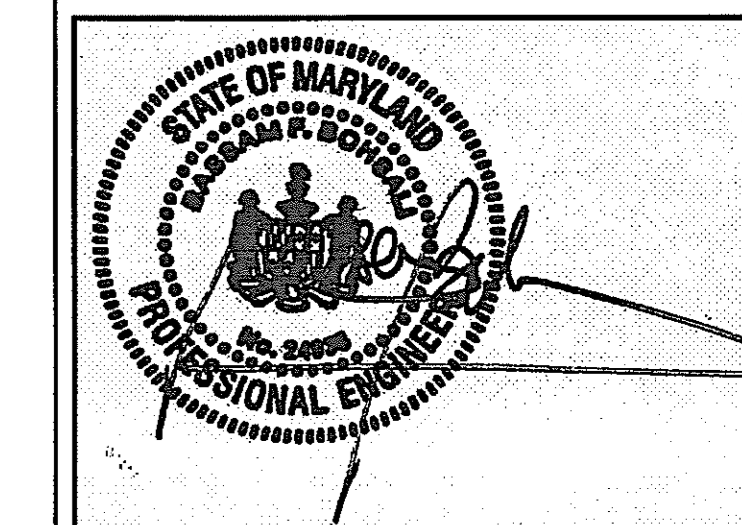
PROJECT MANAGER DATE

CHIEF - PROJ. MGT. & DSGN. DATE

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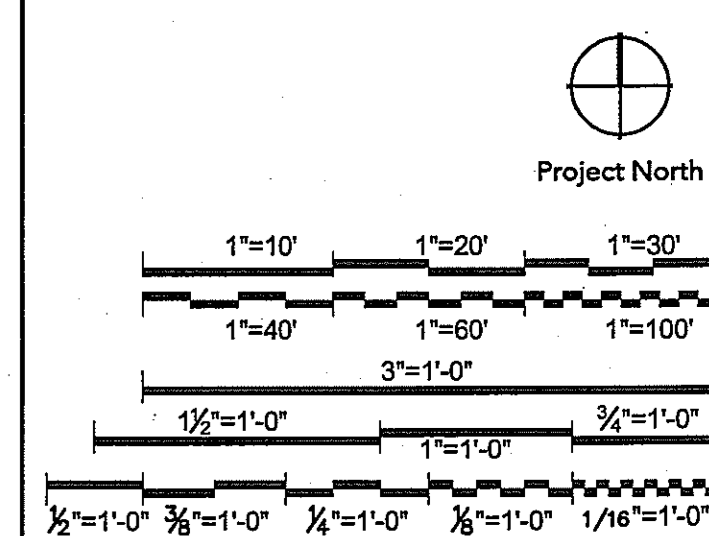
APPENDIX PB-10 05/13/05

Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title

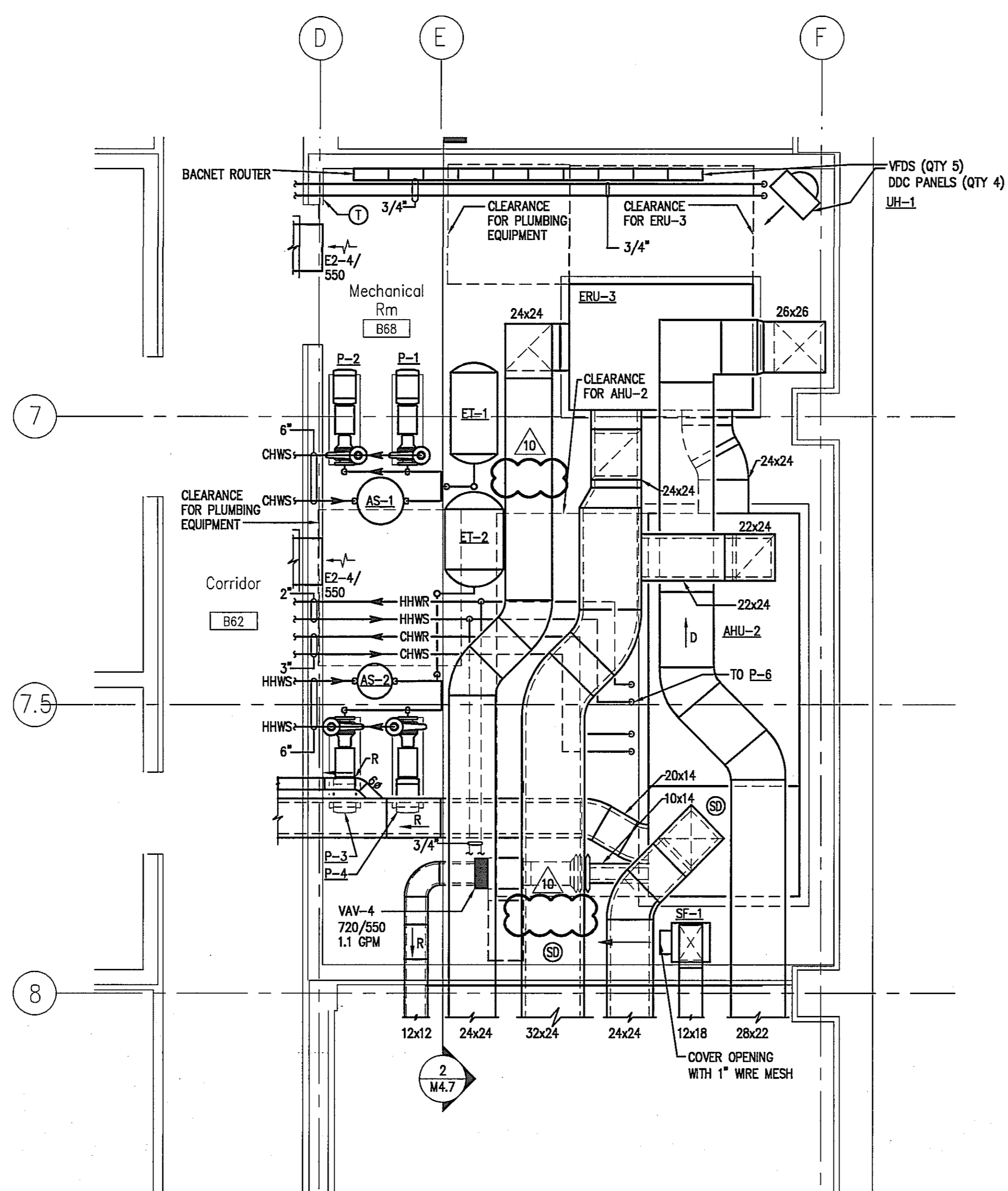
**ENLARGED PLANS
AND SECTIONS**

AS NOTED

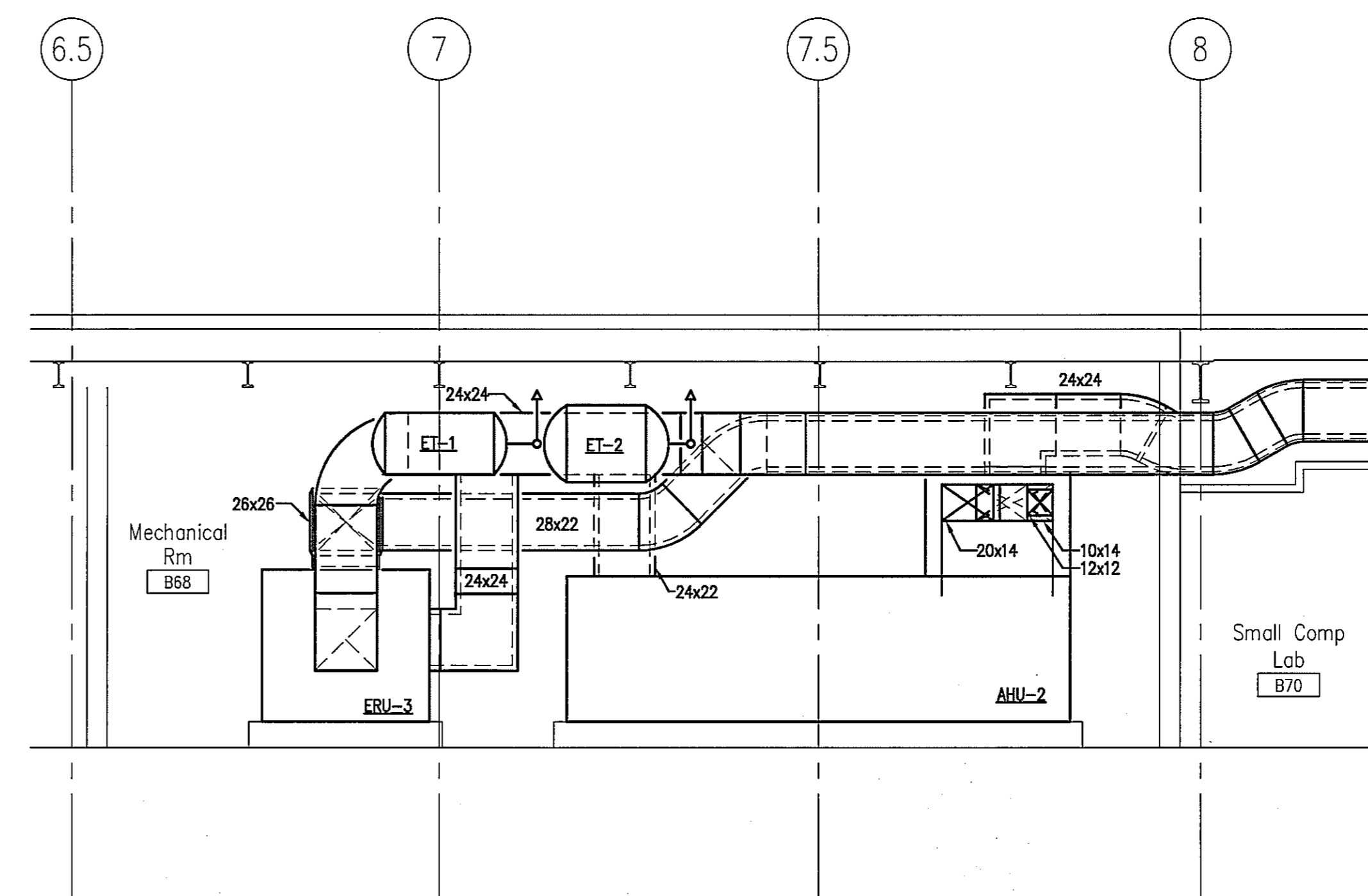
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M4.7

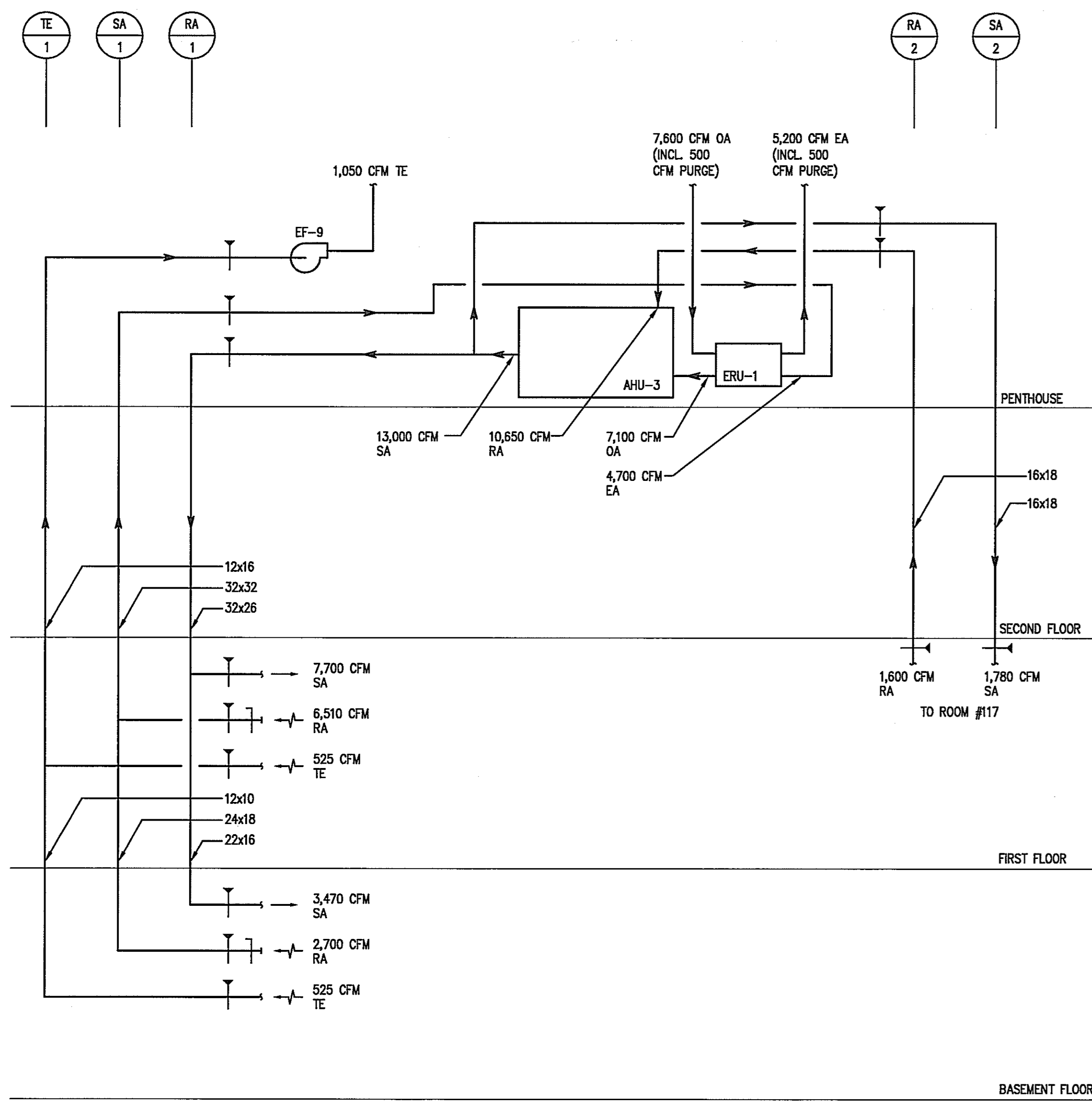
Drawing Number



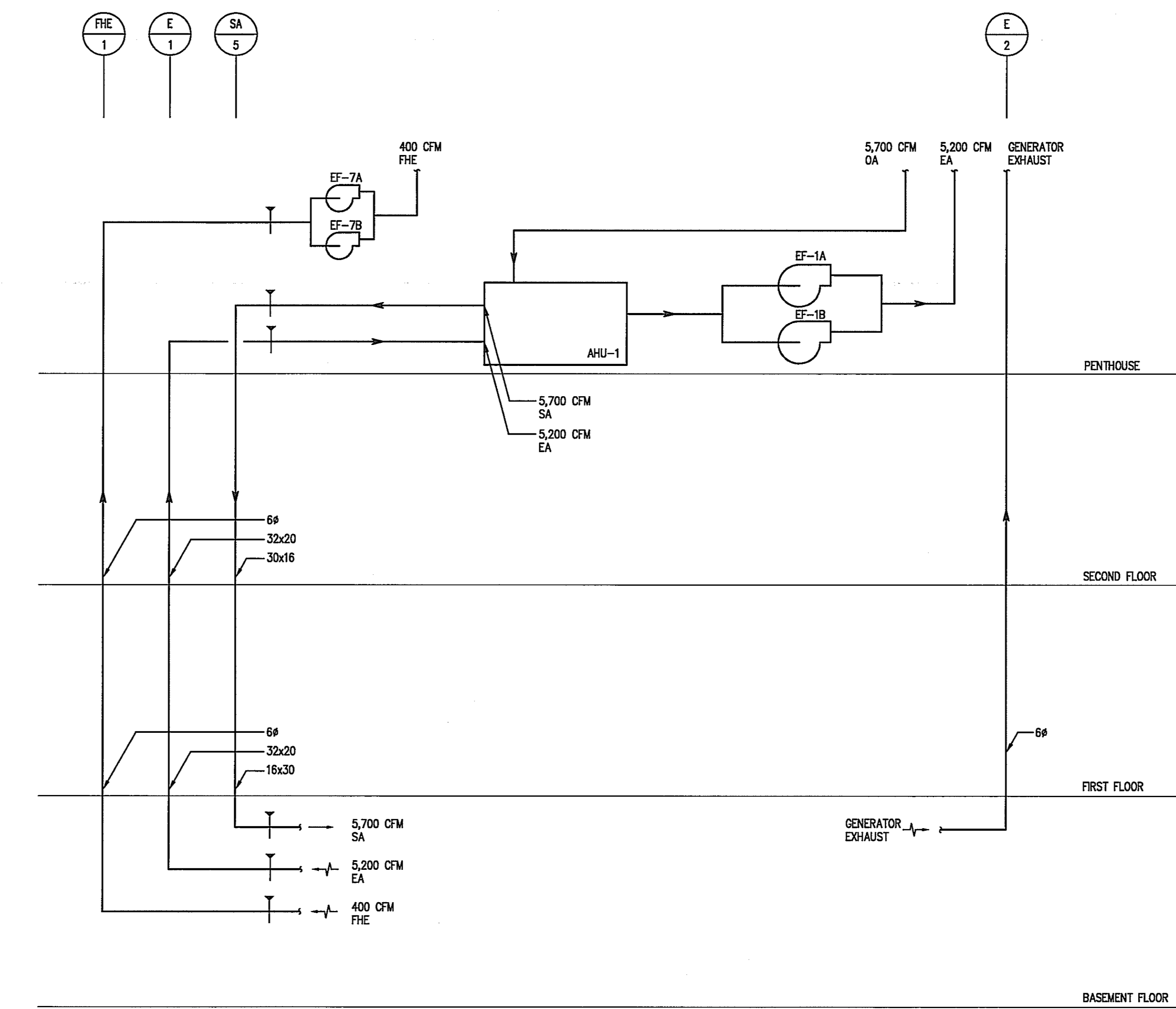
1 MECHANICAL ROOM - BASEMENT
SCALE: 1/4" = 1'-0"



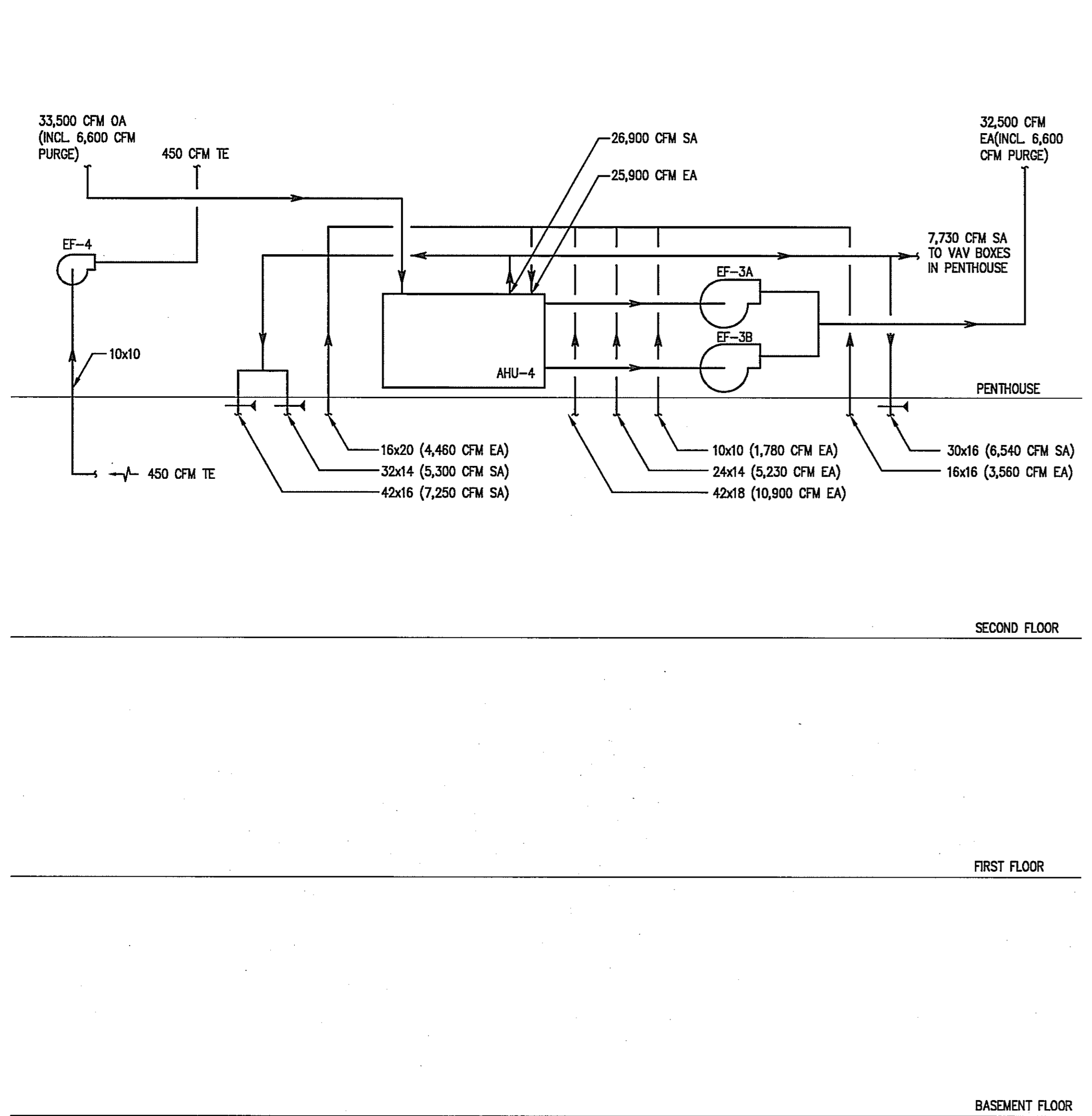
2 MECHANICAL ROOM SECTION - BASEMENT
SCALE: 1/4" = 1'-0"



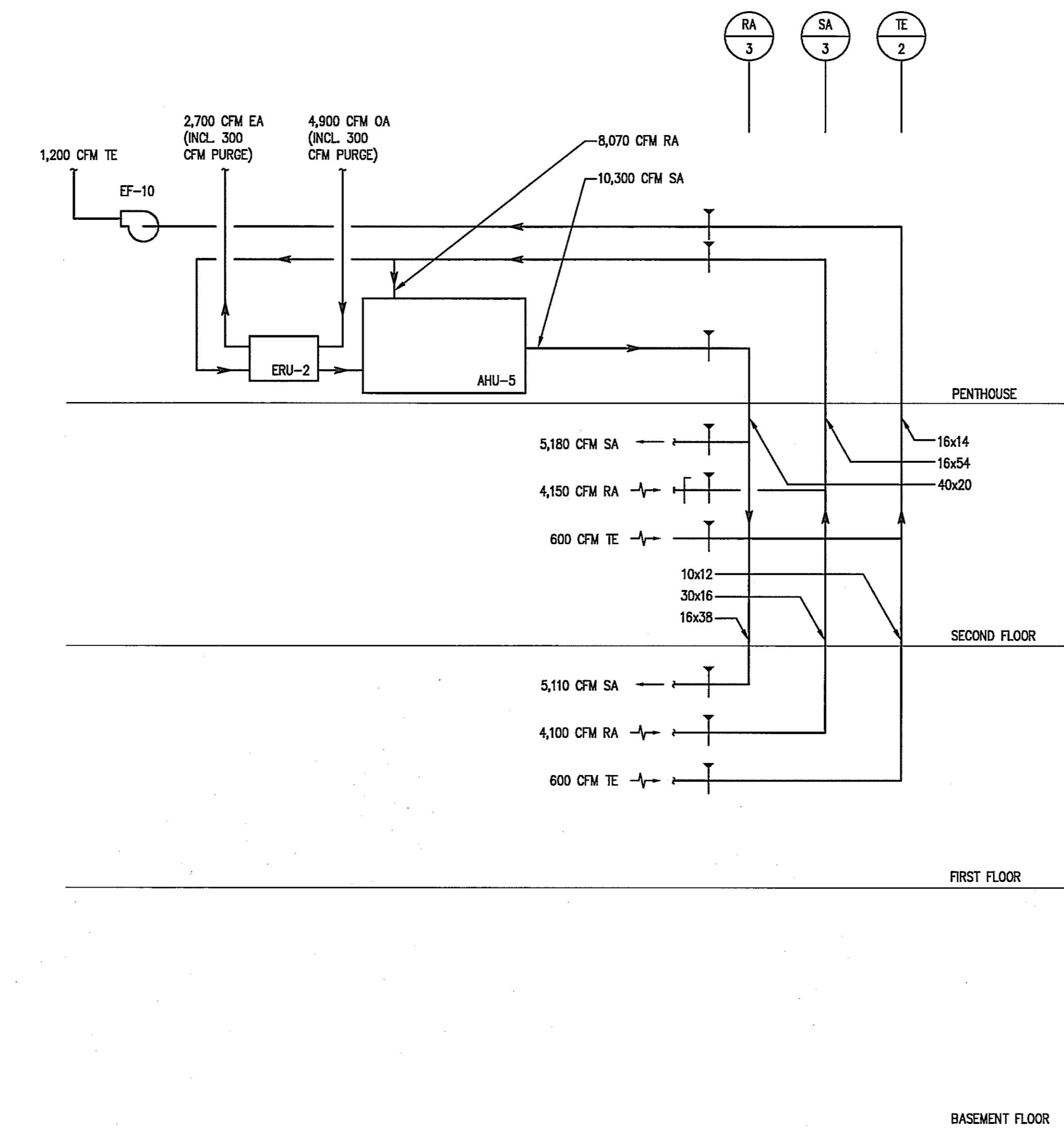
1 AHU-3
M5.1 SCALE: NONE



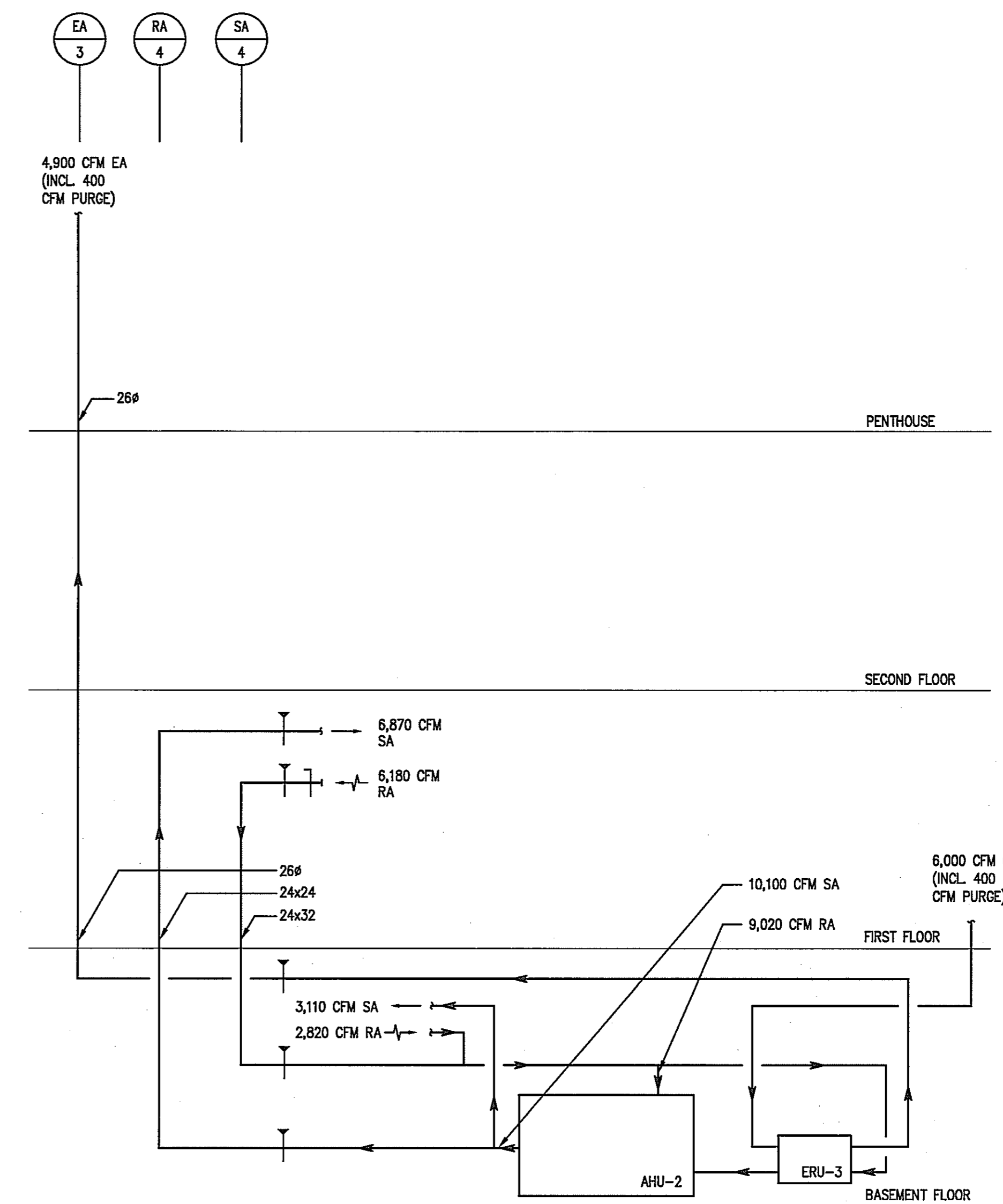
2 AHU-1
M5.1 SCALE: NONE



3 AHU-4
M5.1 SCALE: NONE



4 AHU-5
M5.1 SCALE: NONE



5 AHU-2
M5.1 SCALE: NONE

SHEET NOTES
1. DUE TO SYSTEM DIVERSITY, SYSTEM AIRFLOWS MAY BE LESS THAN BRANCH AIRFLOWS.

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Graphic Scales

Project North

Drawing Title

AIR RISER DIAGRAMS

NO SCALE

Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M5.1

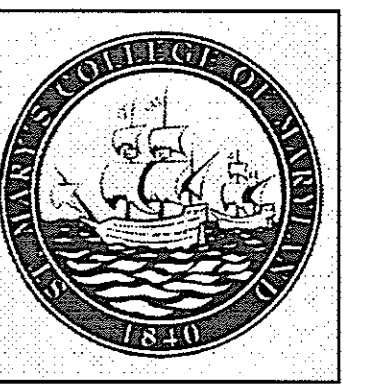
Drawing Number

SHEET NOTES

- REFER TO DETAIL SHEET FOR EQUIPMENT INSTALLATION COMPONENTS.
- DUE TO SYSTEM DIVERSITY, SYSTEM WATER FLOWS MAY BE LESS THAN BRANCH WATER FLOWS.

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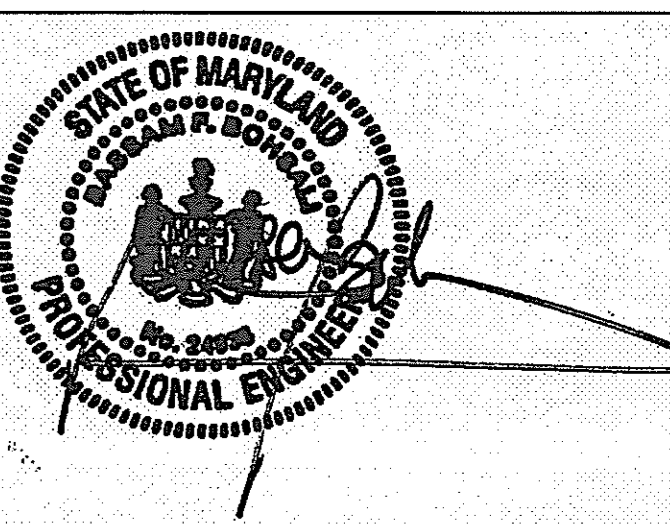
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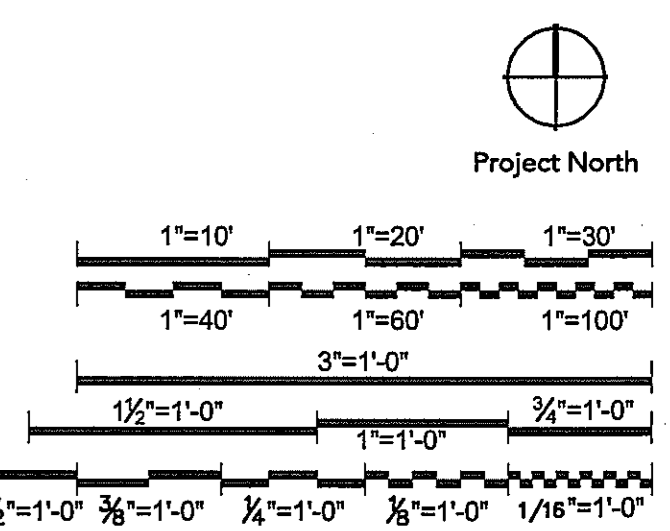
APPENDIX PB-10 _____ DATE _____

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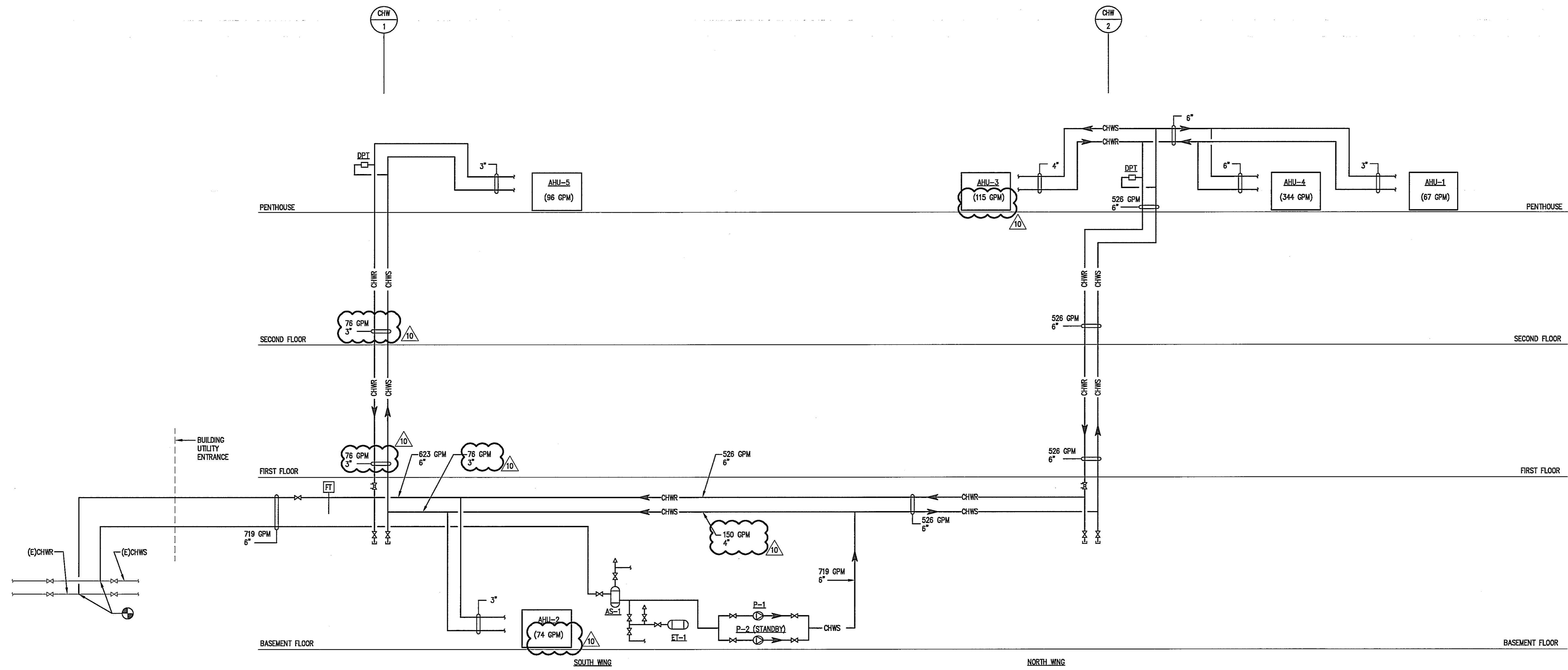
Drawing Title
**WATER RISER
DIAGRAMS**

NO SCALE

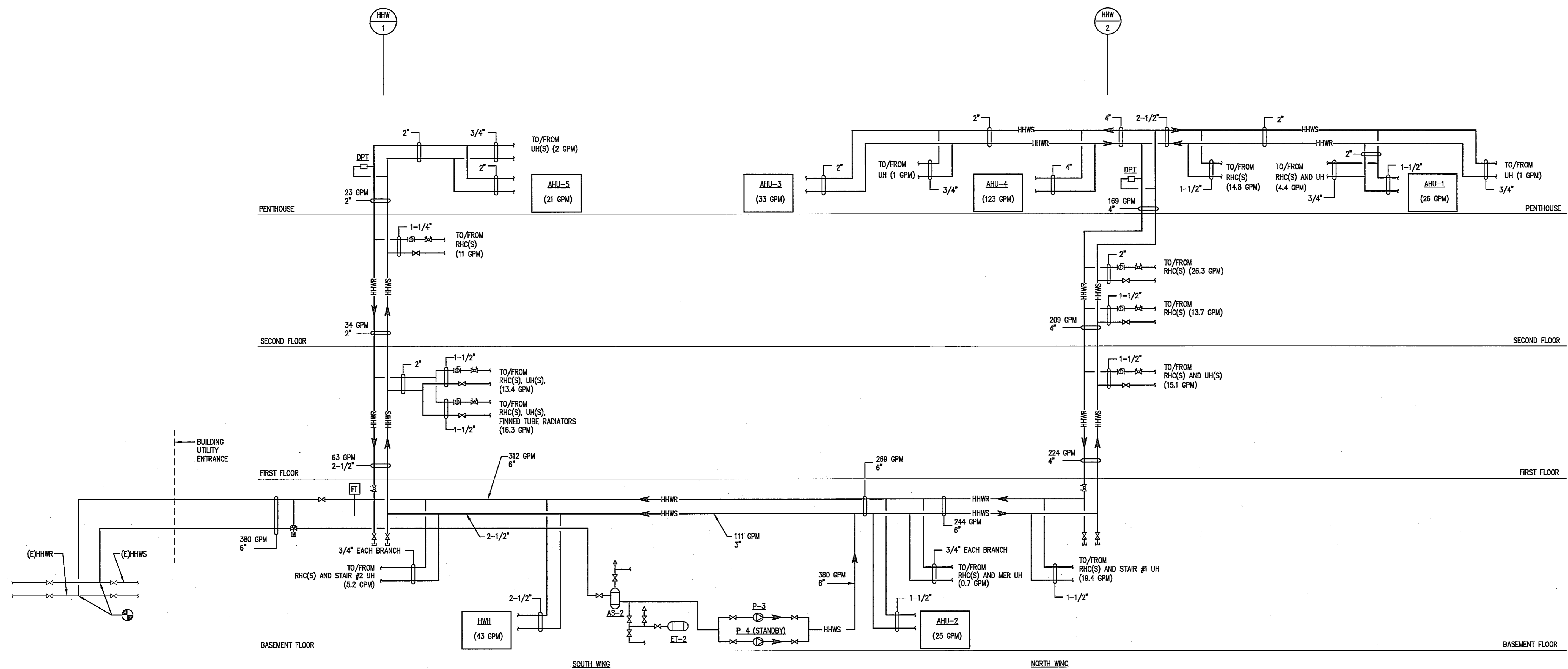
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

M5.2

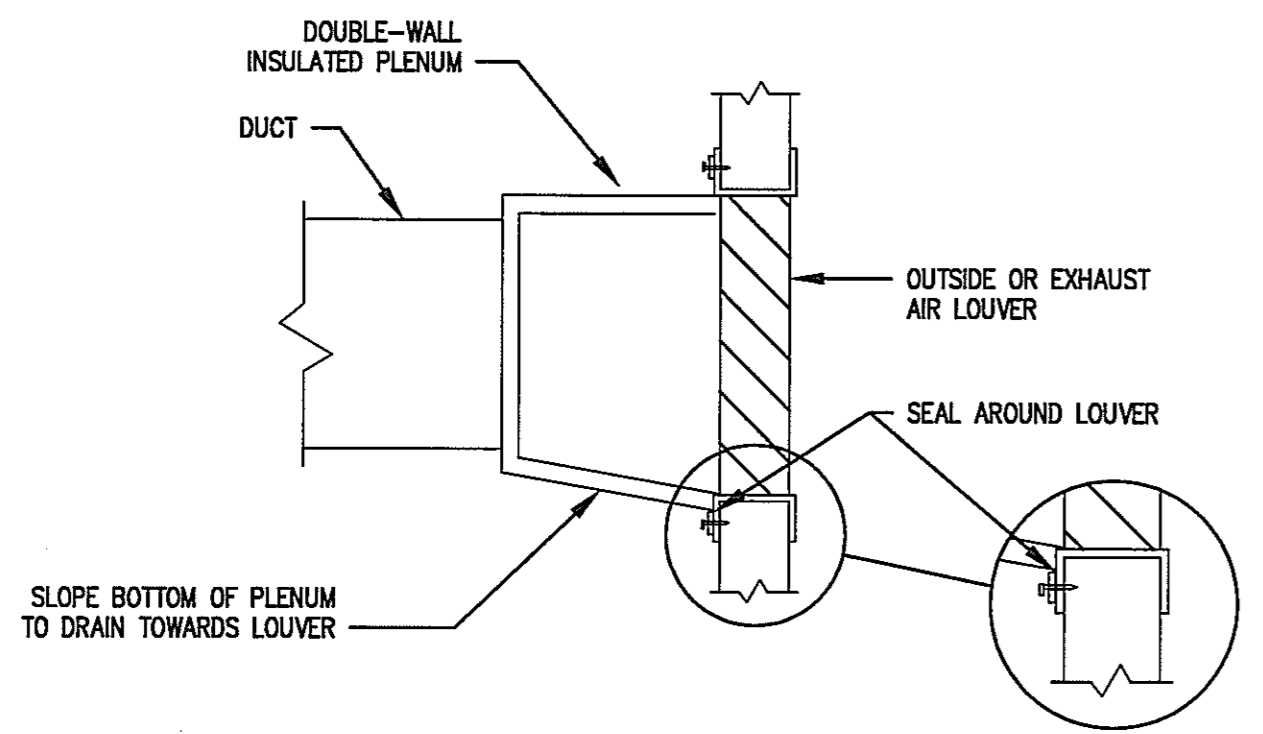
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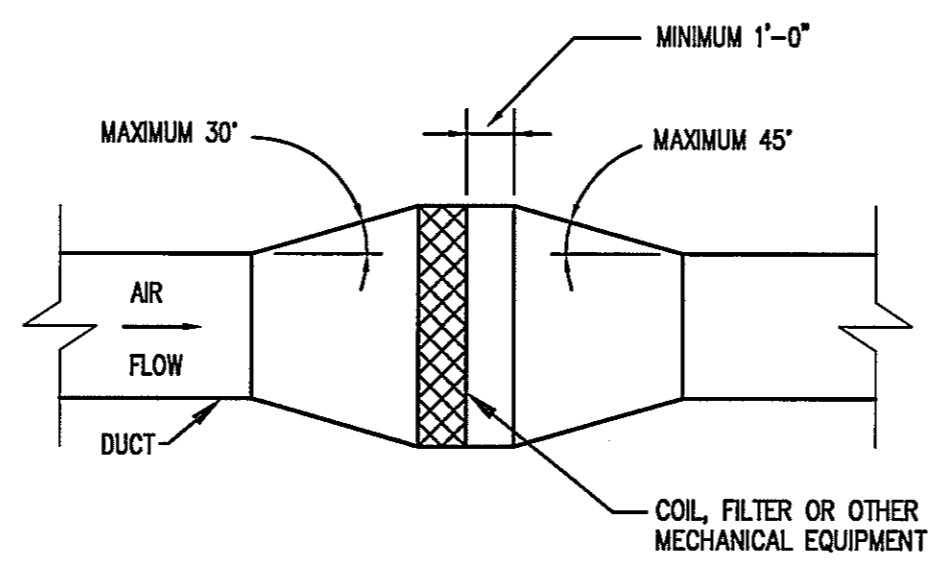
1
M5.2
CHILLED WATER RISER DIAGRAM
SCALE: NONE



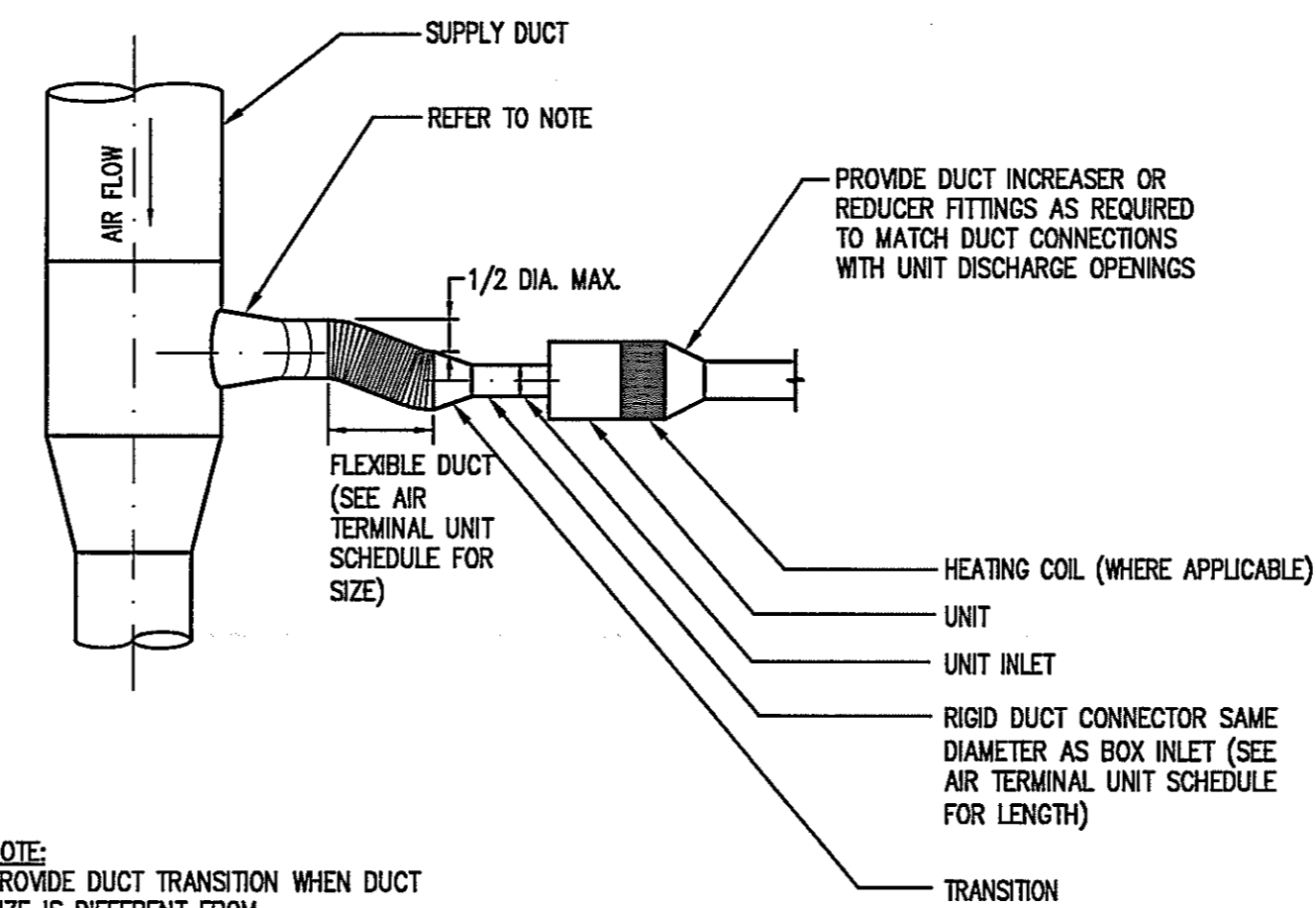
2
M5.2
HEATING HOT WATER RISER DIAGRAM
SCALE: NONE



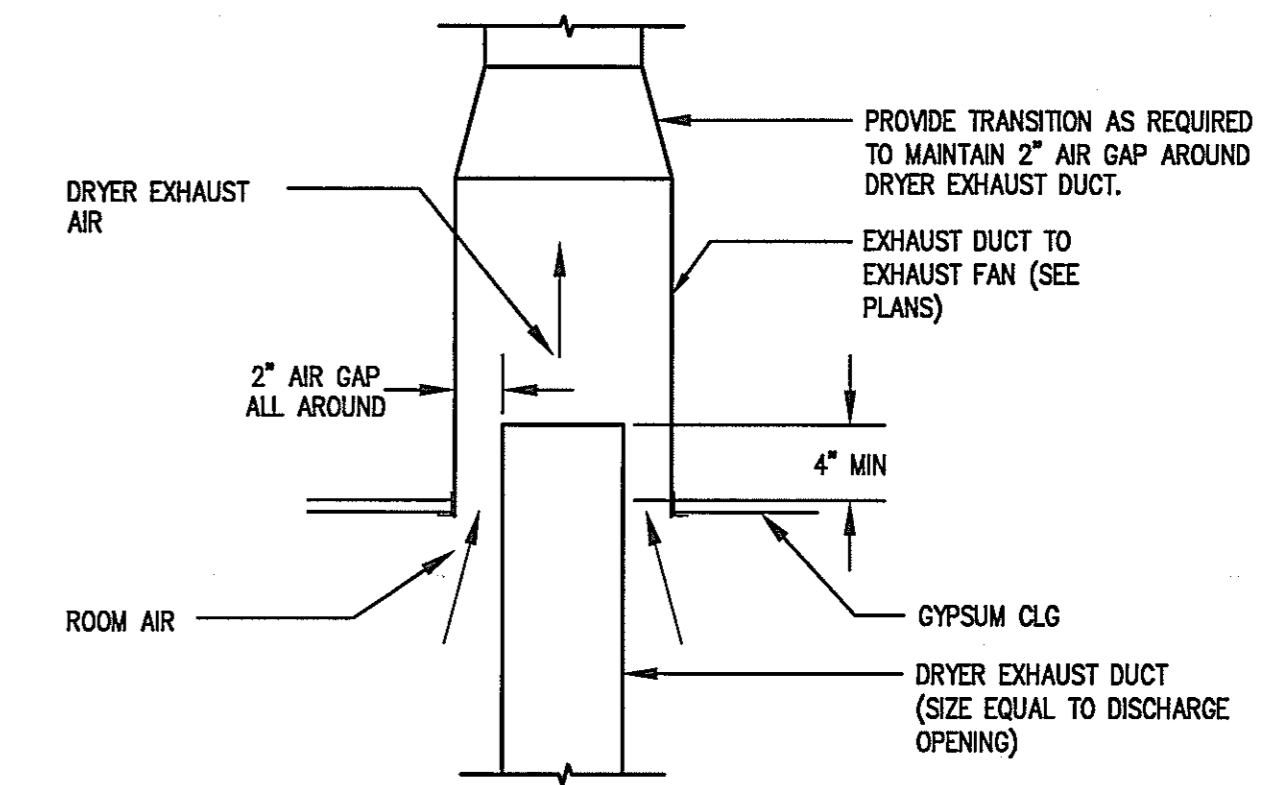
1 LOUVER PLENUM - SLOPED TO EXTERIOR WALL
SCALE: NONE



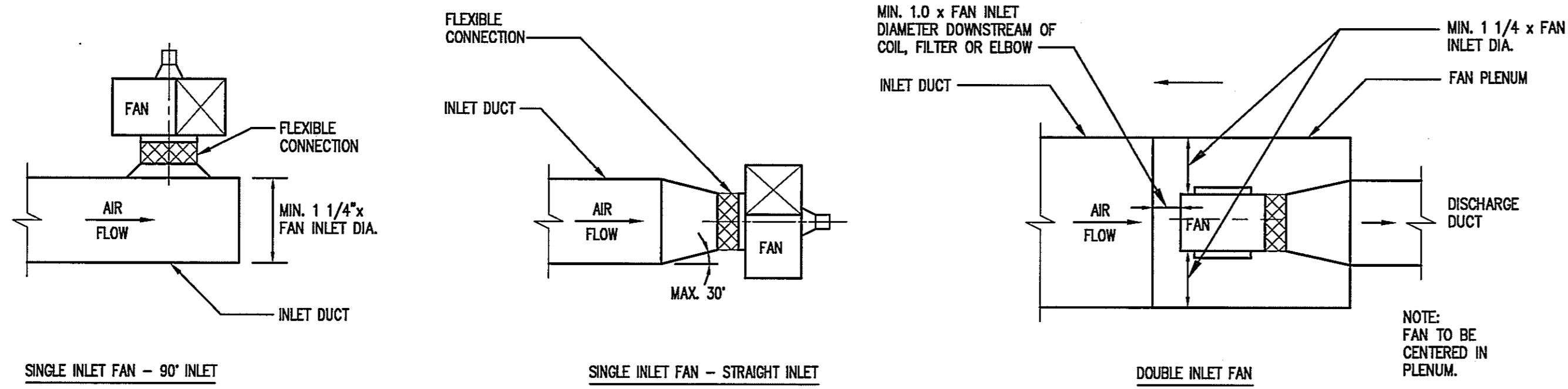
2 DUCT TRANSITION
SCALE: NONE



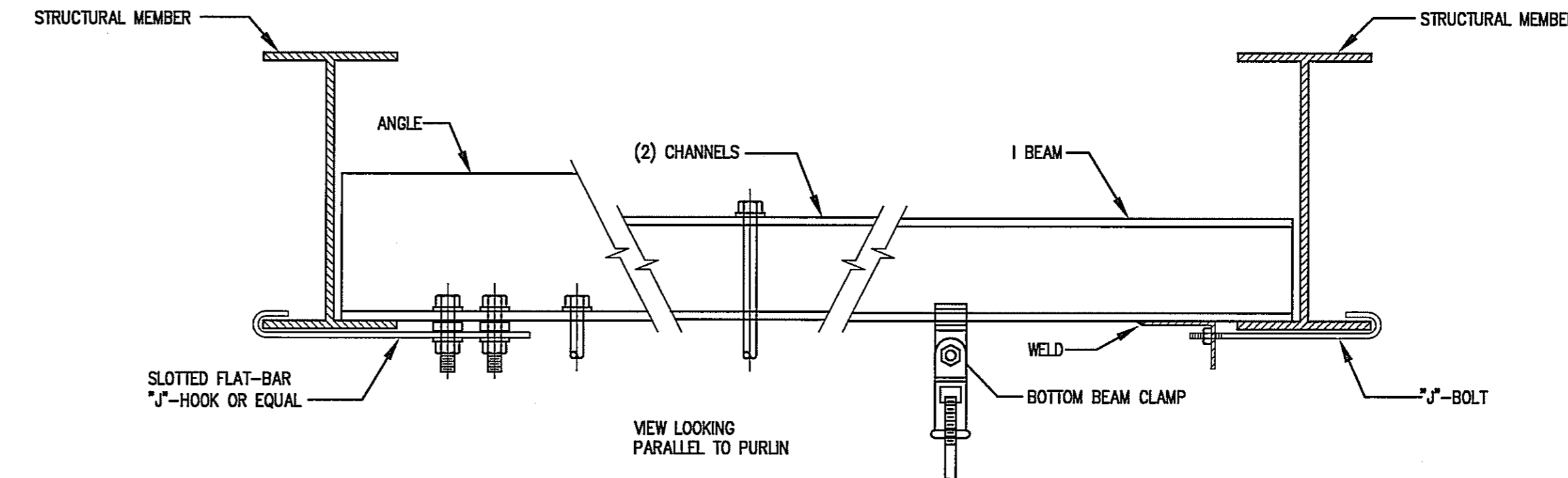
3 AIR TERMINAL UNIT CONNECTION
SCALE: NONE



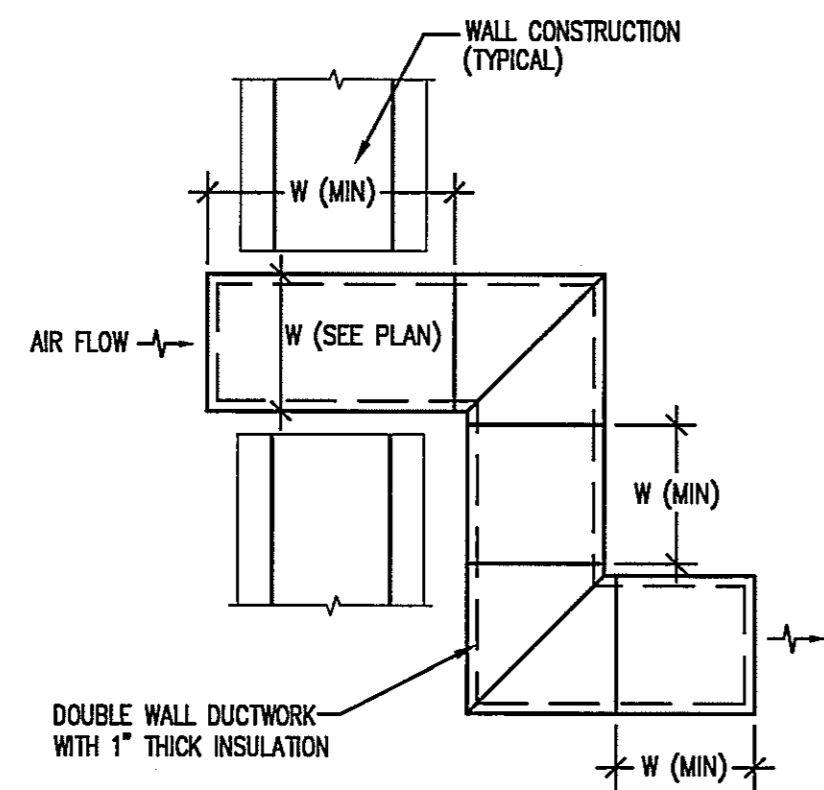
4 DRYER EXHAUST CONNECTION
SCALE: NONE



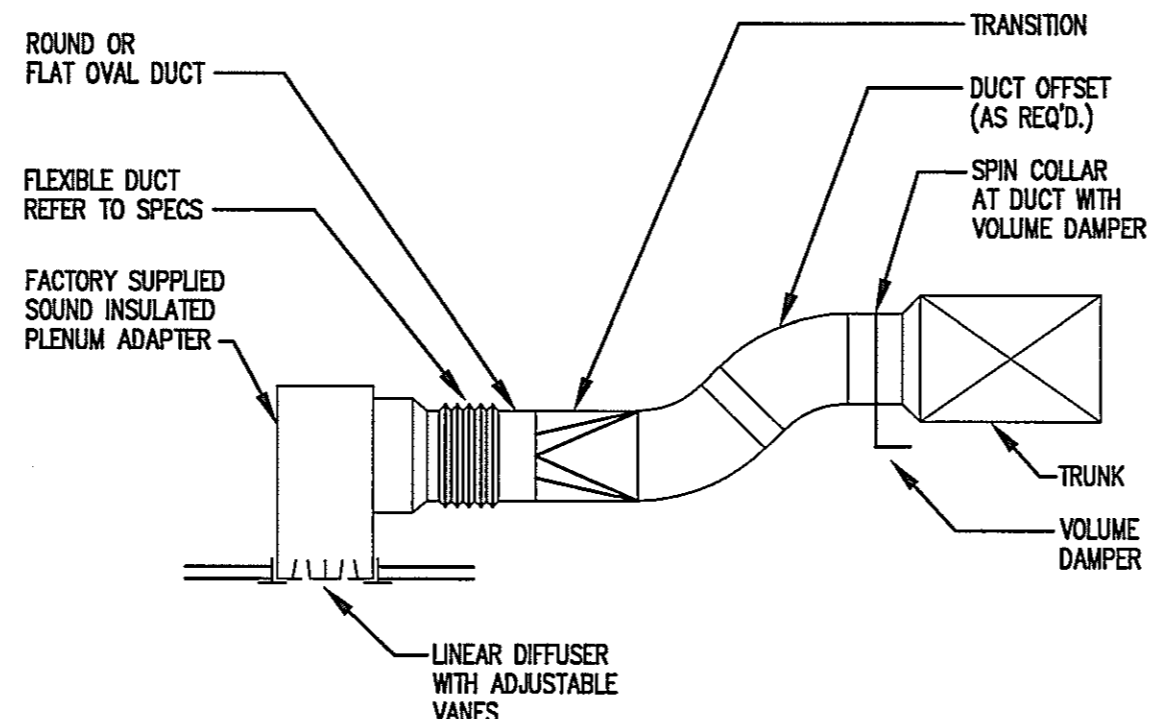
5 FAN INLET CONNECTIONS
SCALE: NONE



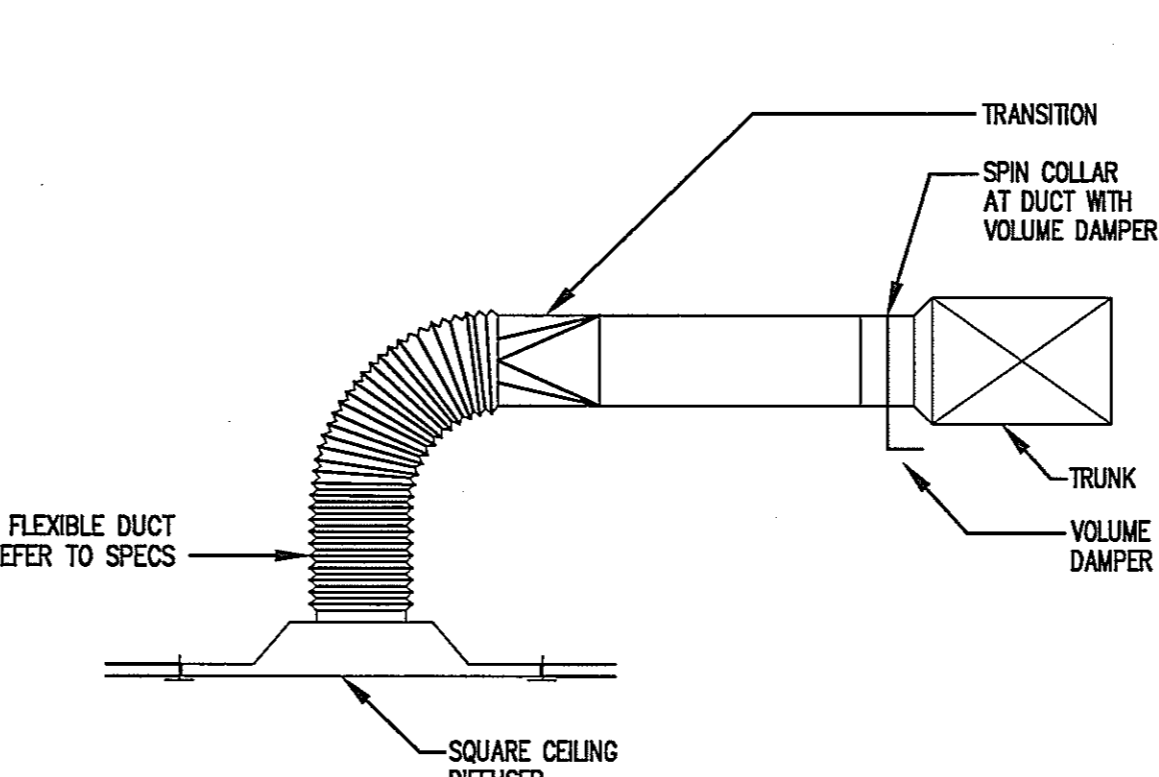
6 ALTERNATE SUPPORT MEANS BETWEEN HORIZONTAL STRUCTURAL MEMBERS
SCALE: NONE



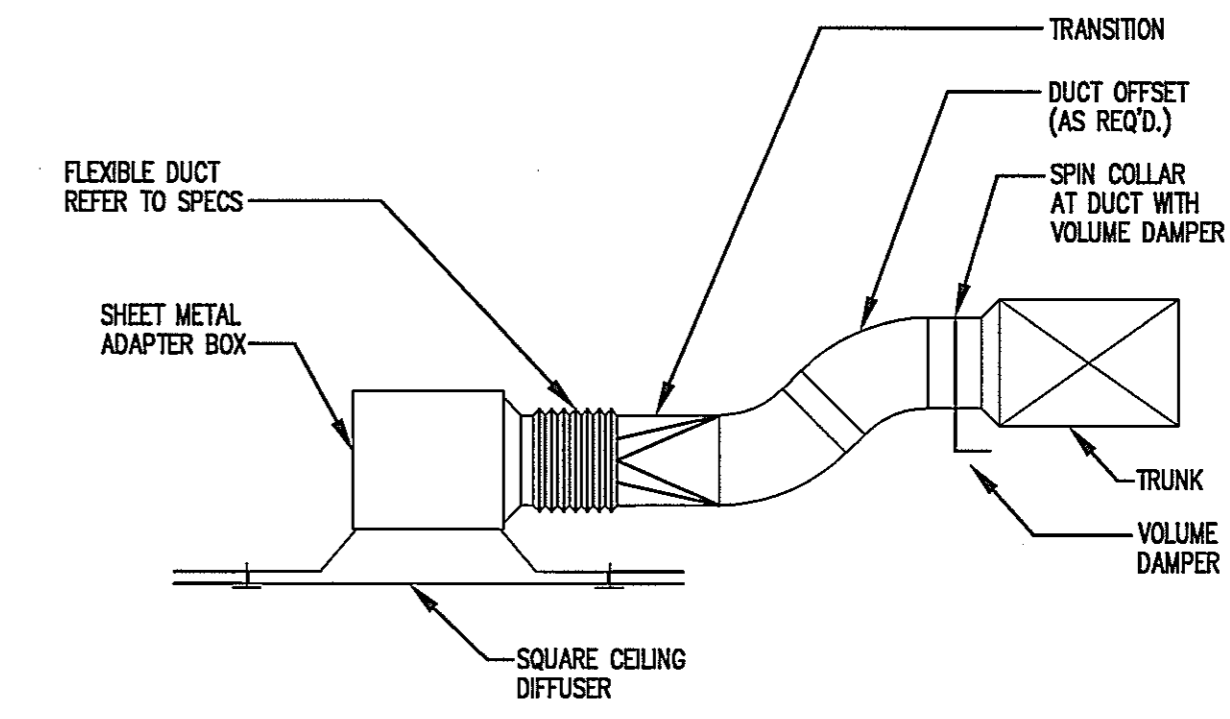
7 TRANSFER DUCT DETAIL
SCALE: NONE



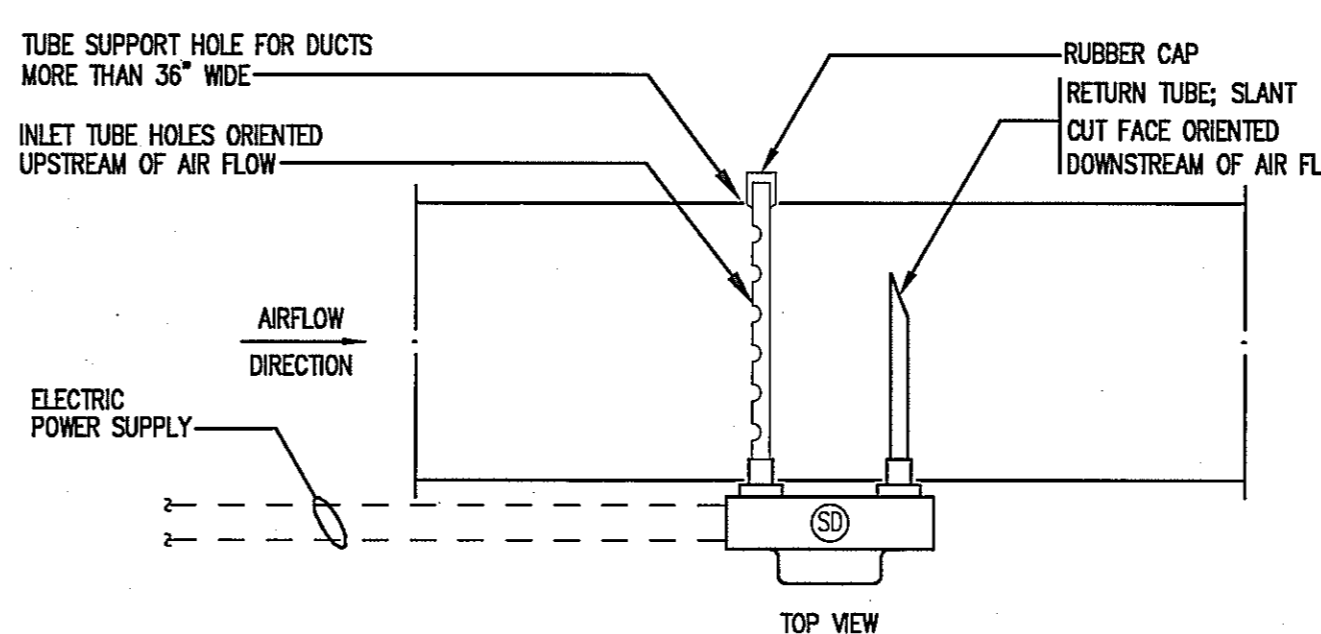
8 LINEAR DIFFUSER AND SUPPLY DUCT DETAIL
SCALE: NONE



9 LINEAR DIFFUSER AND SUPPLY DUCT DETAIL
SCALE: NONE

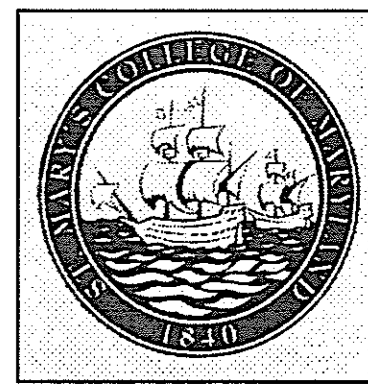


10 LINEAR DIFFUSER AND SUPPLY DUCT DETAIL - ACCEPTABLE ALTERNATIVE
SCALE: NONE



11 SMOKE DUCT DETECTOR DETAIL
SCALE: NONE

- NOTES:
1. INLET TUBE LENGTH SHALL BE EQUAL TO FULL WIDTH OF DUCT.
 2. RETURN TUBE SHALL BE AS RECOMMENDED BY THE DETECTOR'S MANUFACTURER.
 3. CLEARANCES FROM OBSTRUCTIONS, INLETS AND PROPER LOCATION IN THE SYSTEM SHALL BE IN ACCORDANCE WITH NEMA: "GUIDE FOR PROPER USE OF SMOKE DETECTORS IN DUCT APPLICATIONS", NFPA 90A UL STANDARD 268A AND NFPA 72E.



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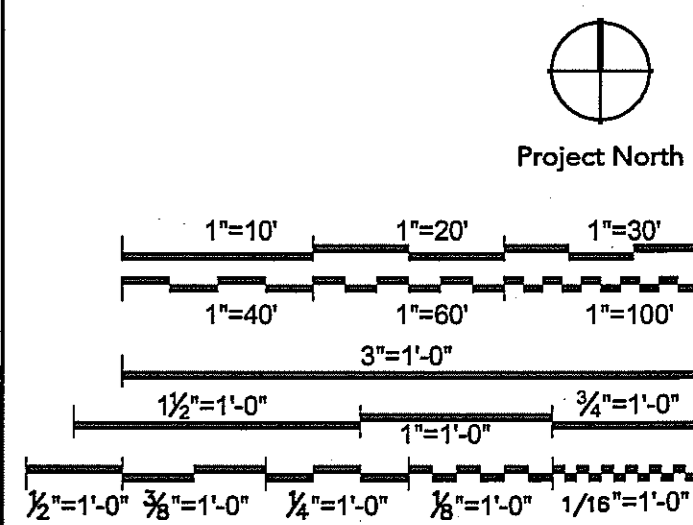
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Seals and Signatures



01/05/05

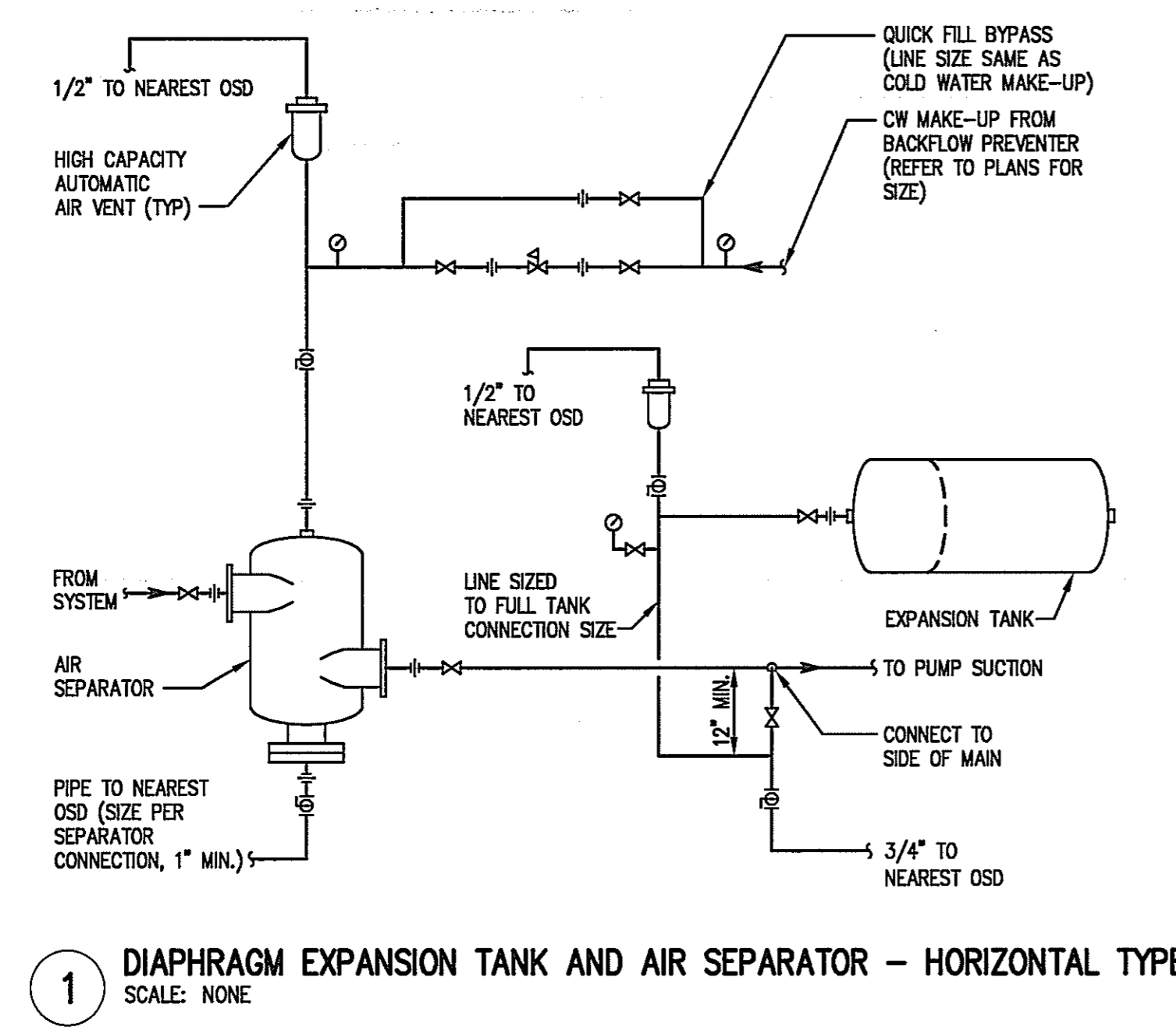
Graphic Scales DATE



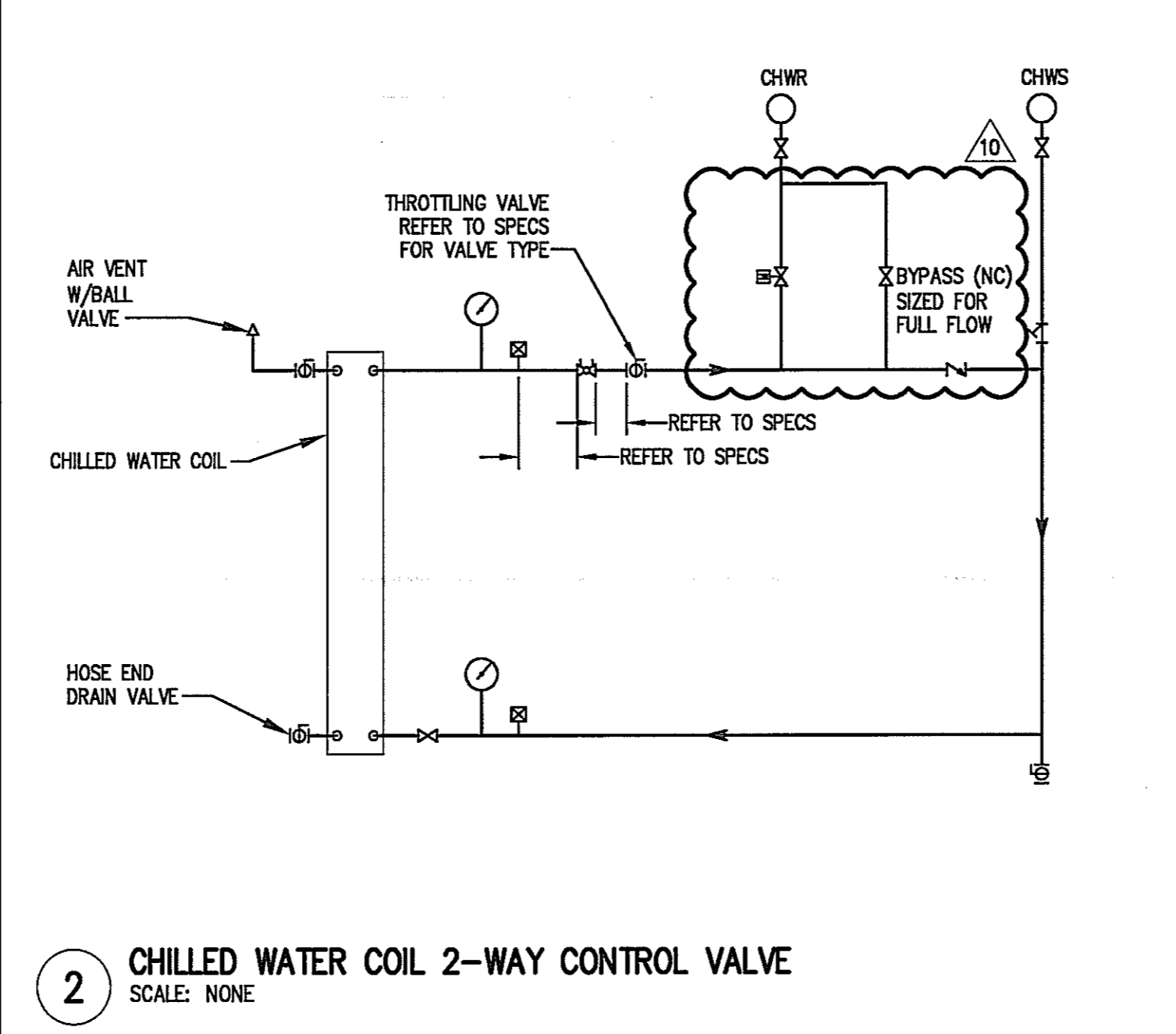
Drawing Title
DETAILS

NO SCALE
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

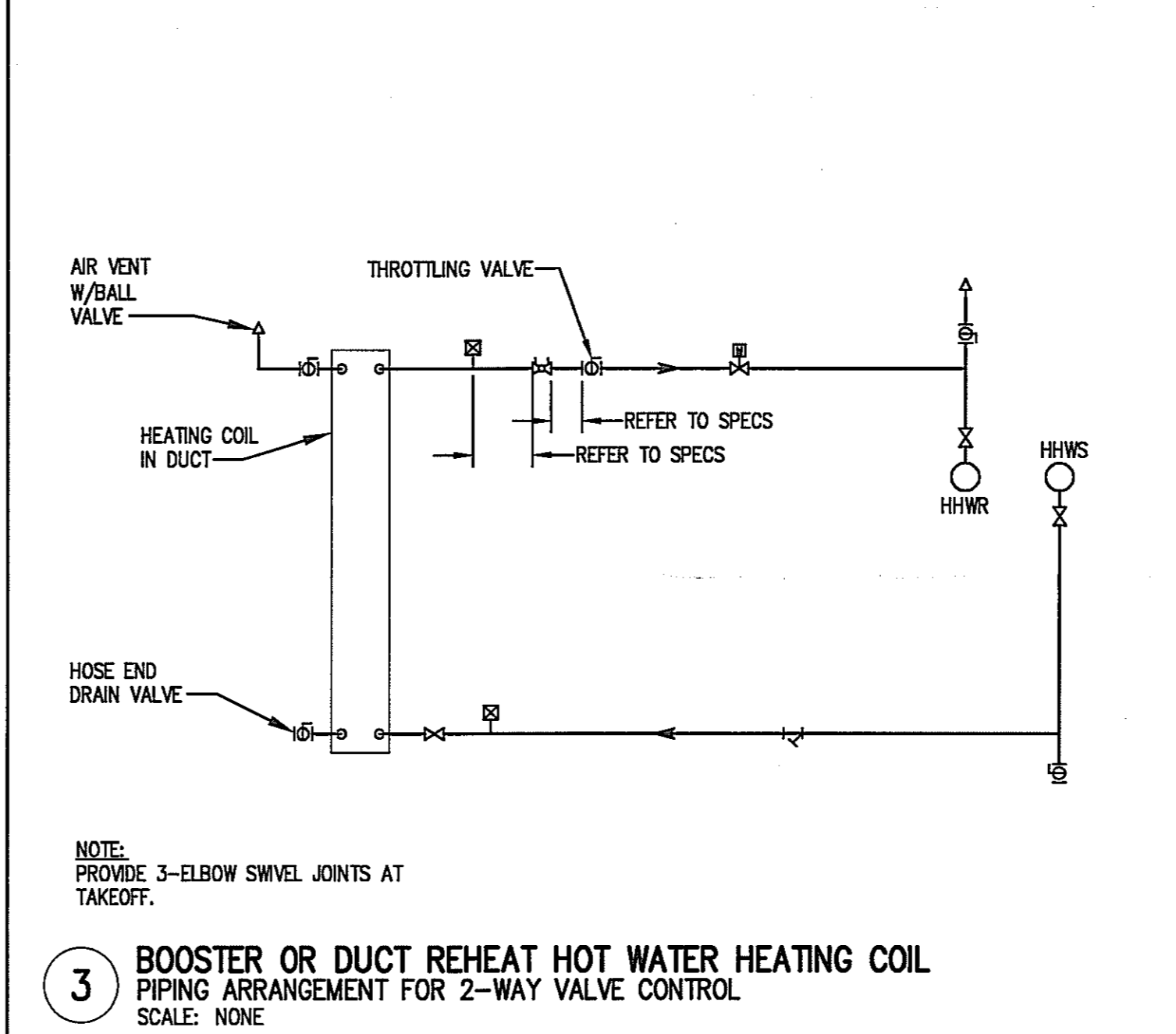
Drawing Number
M6.1



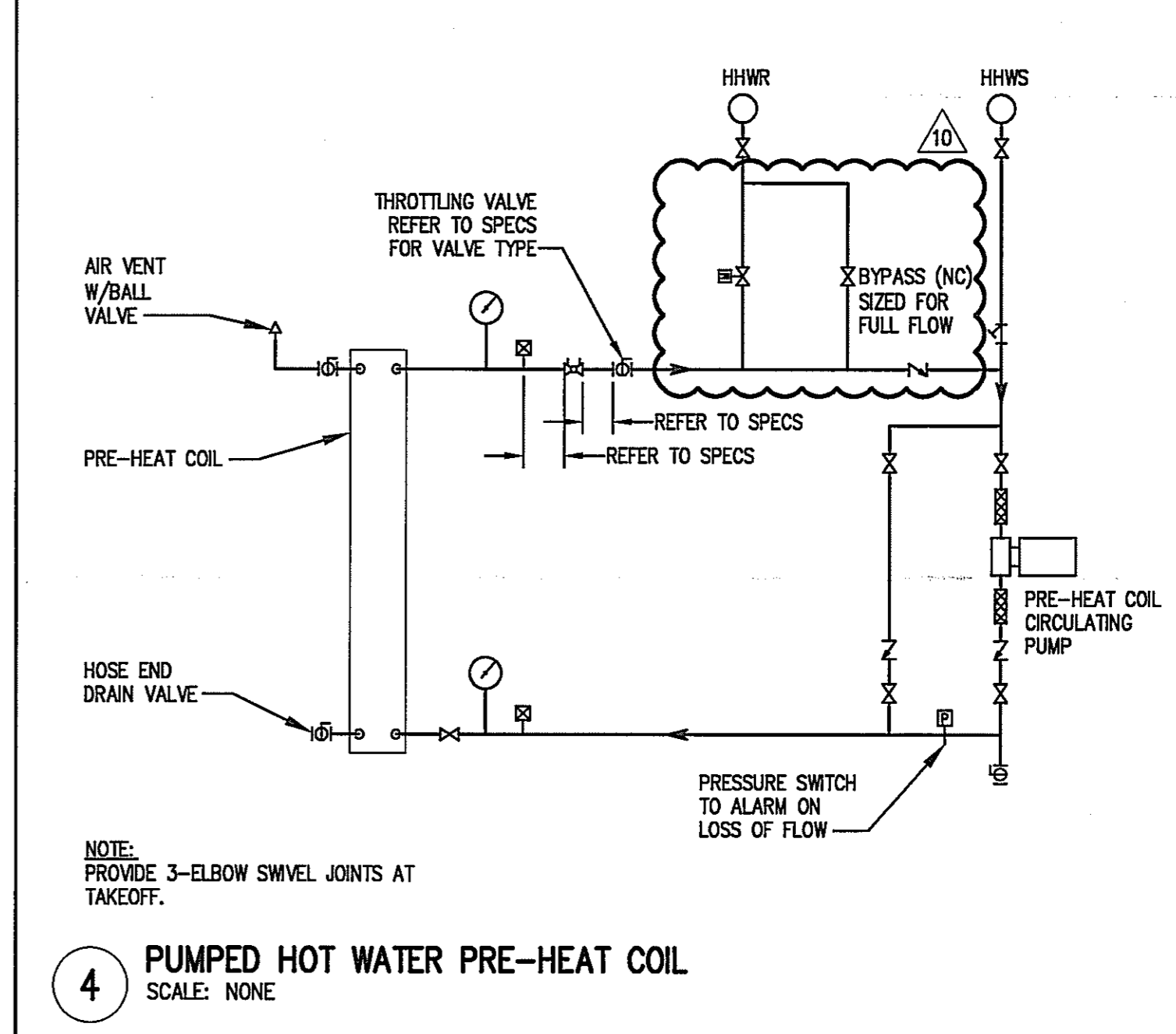
1 DIAPHRAGM EXPANSION TANK AND AIR SEPARATOR - HORIZONTAL TYPE
SCALE: NONE



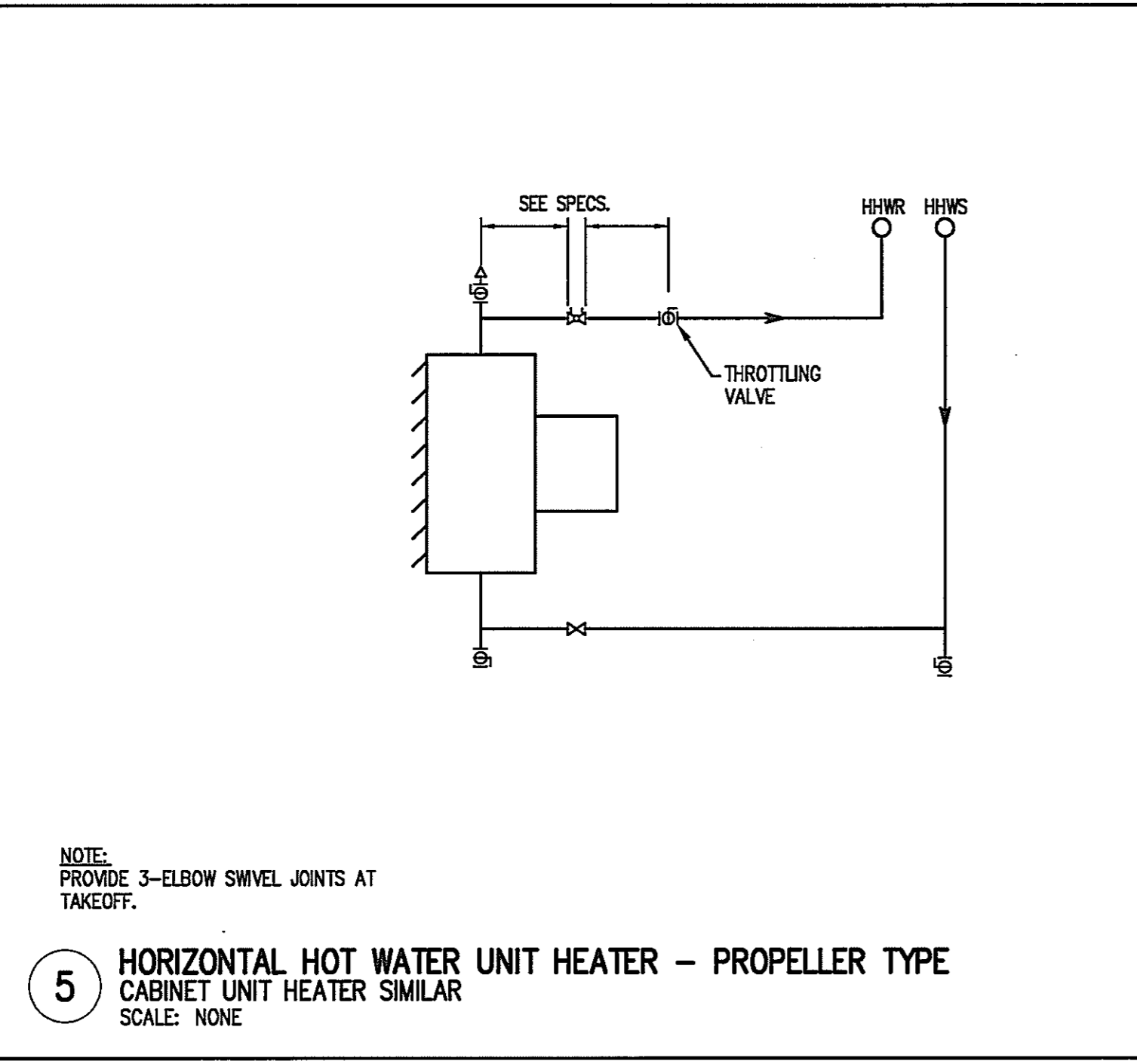
2 CHILLED WATER COIL 2-WAY CONTROL VALVE
SCALE: NONE



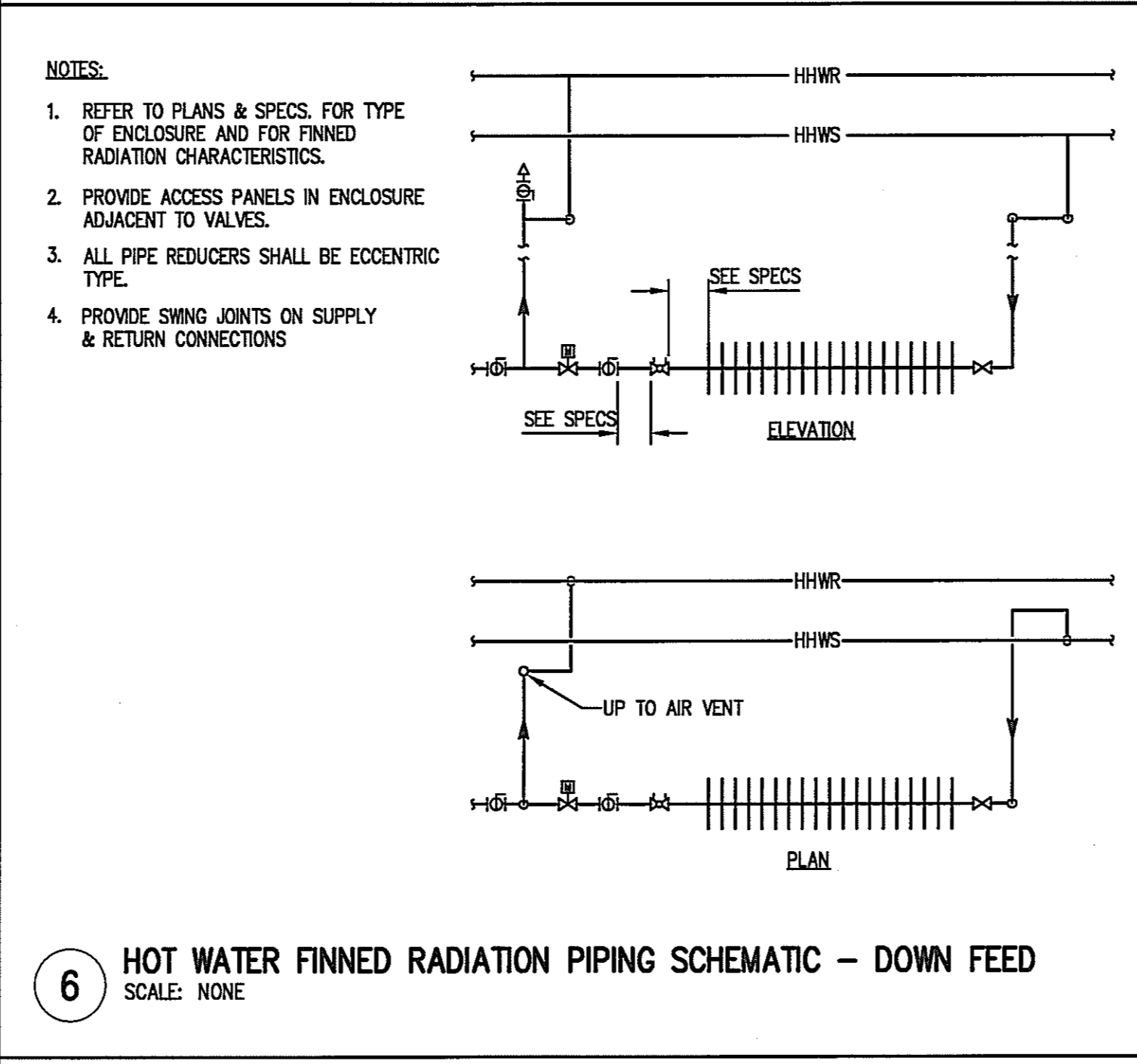
3 BOOSTER OR DUCT REHEAT HOT WATER HEATING COIL PIPING ARRANGEMENT FOR 2-WAY VALVE CONTROL
SCALE: NONE



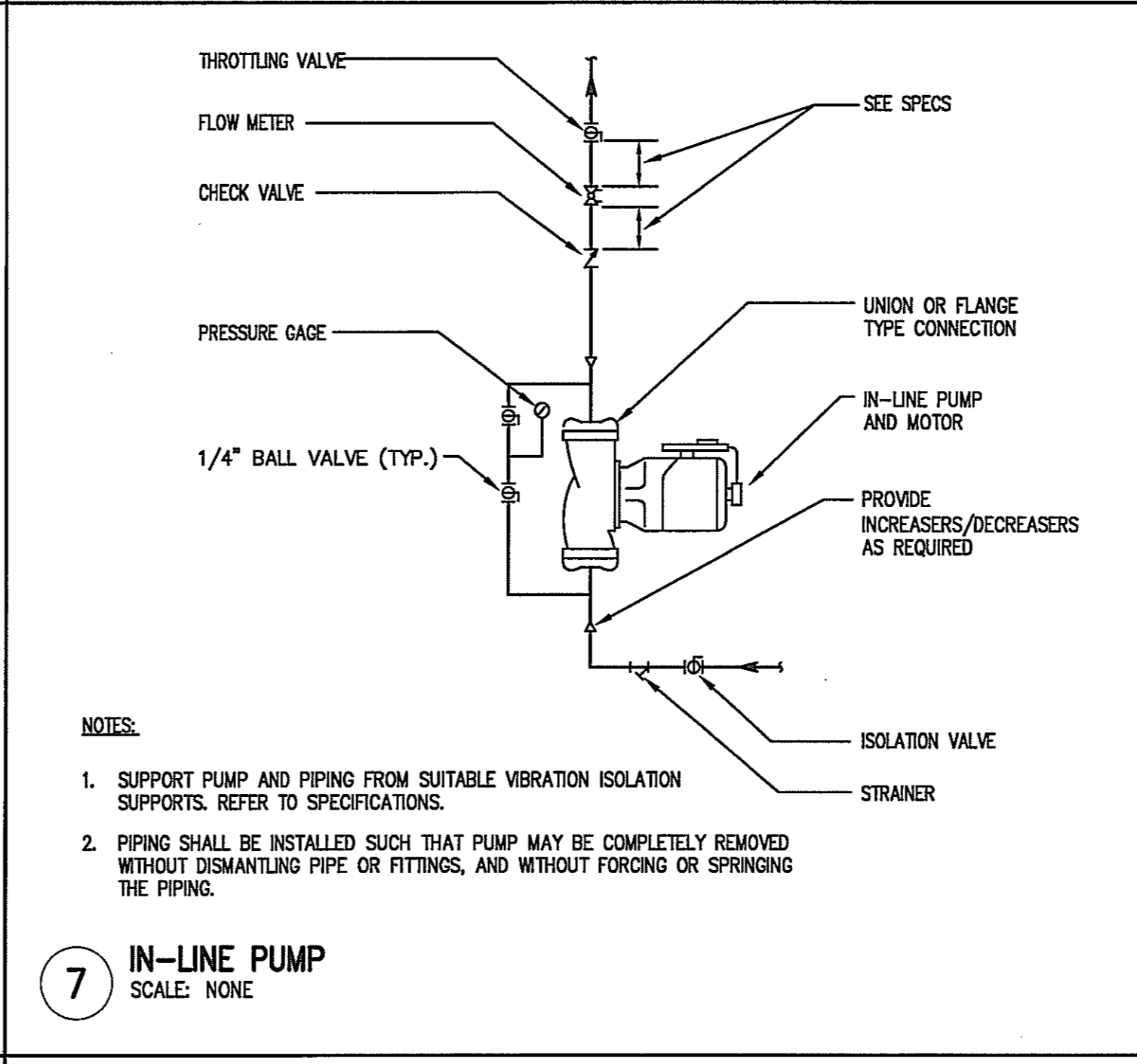
4 PUMPED HOT WATER PRE-HEAT COIL
SCALE: NONE



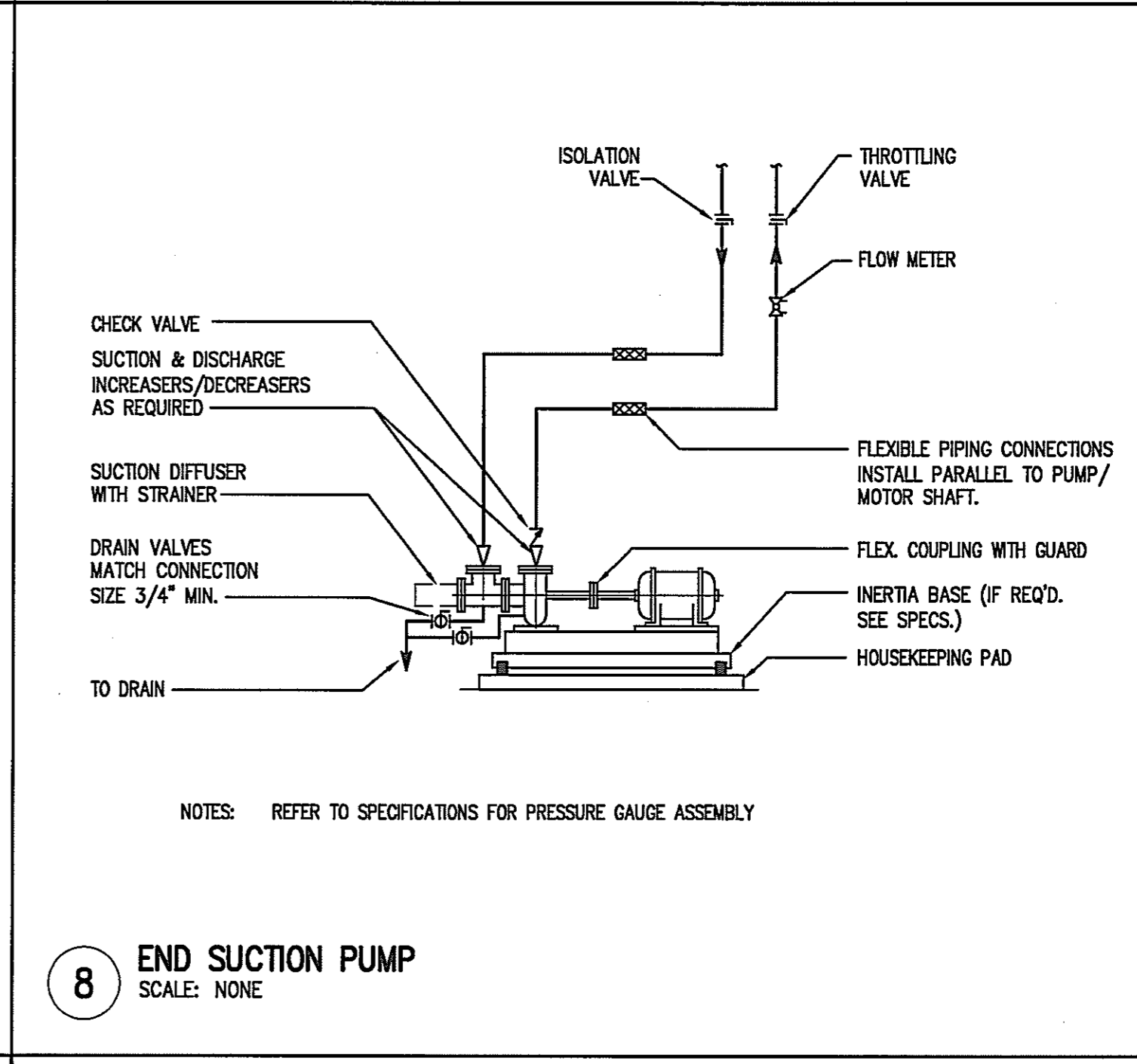
5 HORIZONTAL HOT WATER UNIT HEATER - PROPELLER TYPE CABINET UNIT HEATER SIMILAR
SCALE: NONE



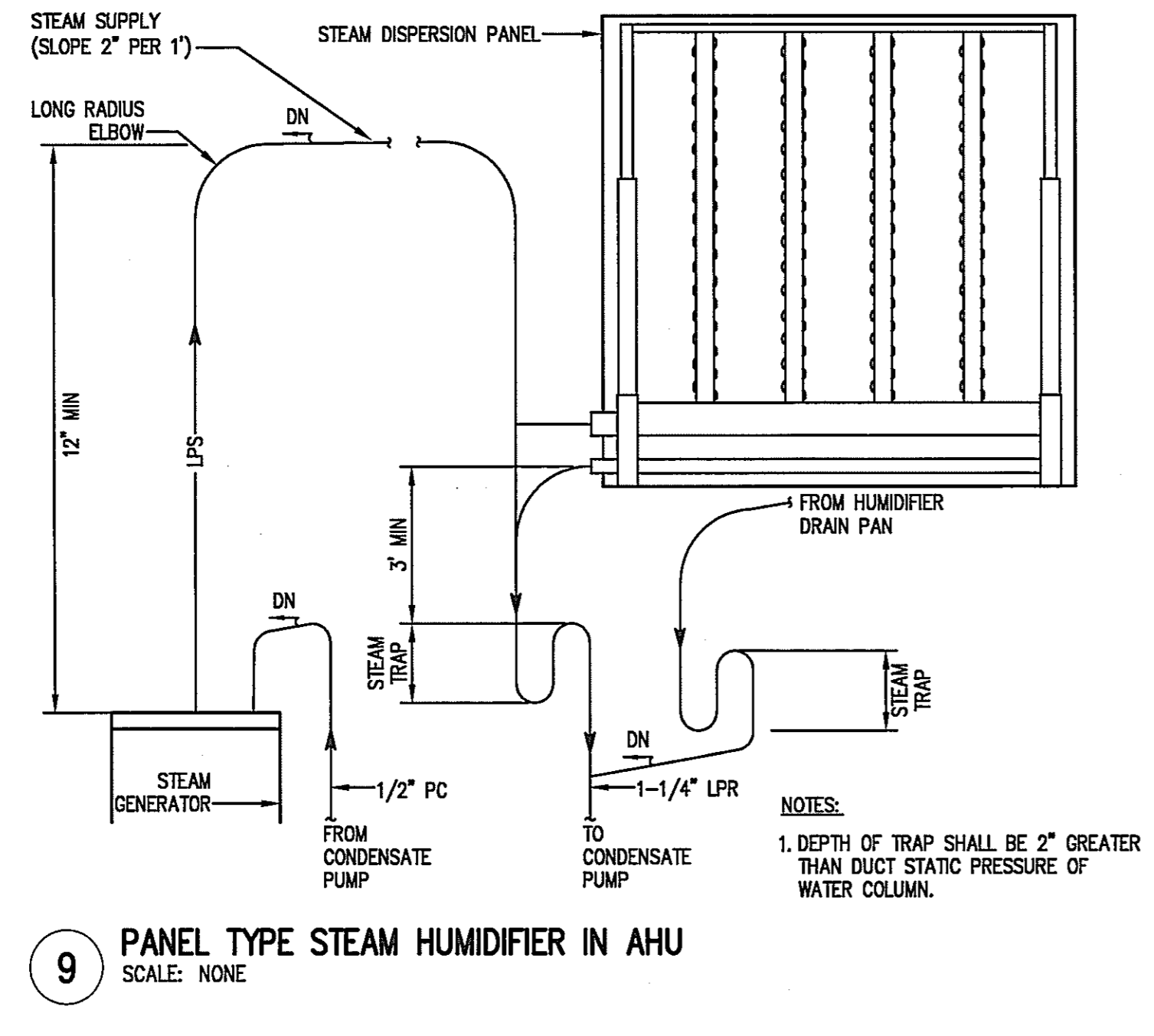
6 HOT WATER FINNED RADIATION PIPING SCHEMATIC - DOWN FEED
SCALE: NONE



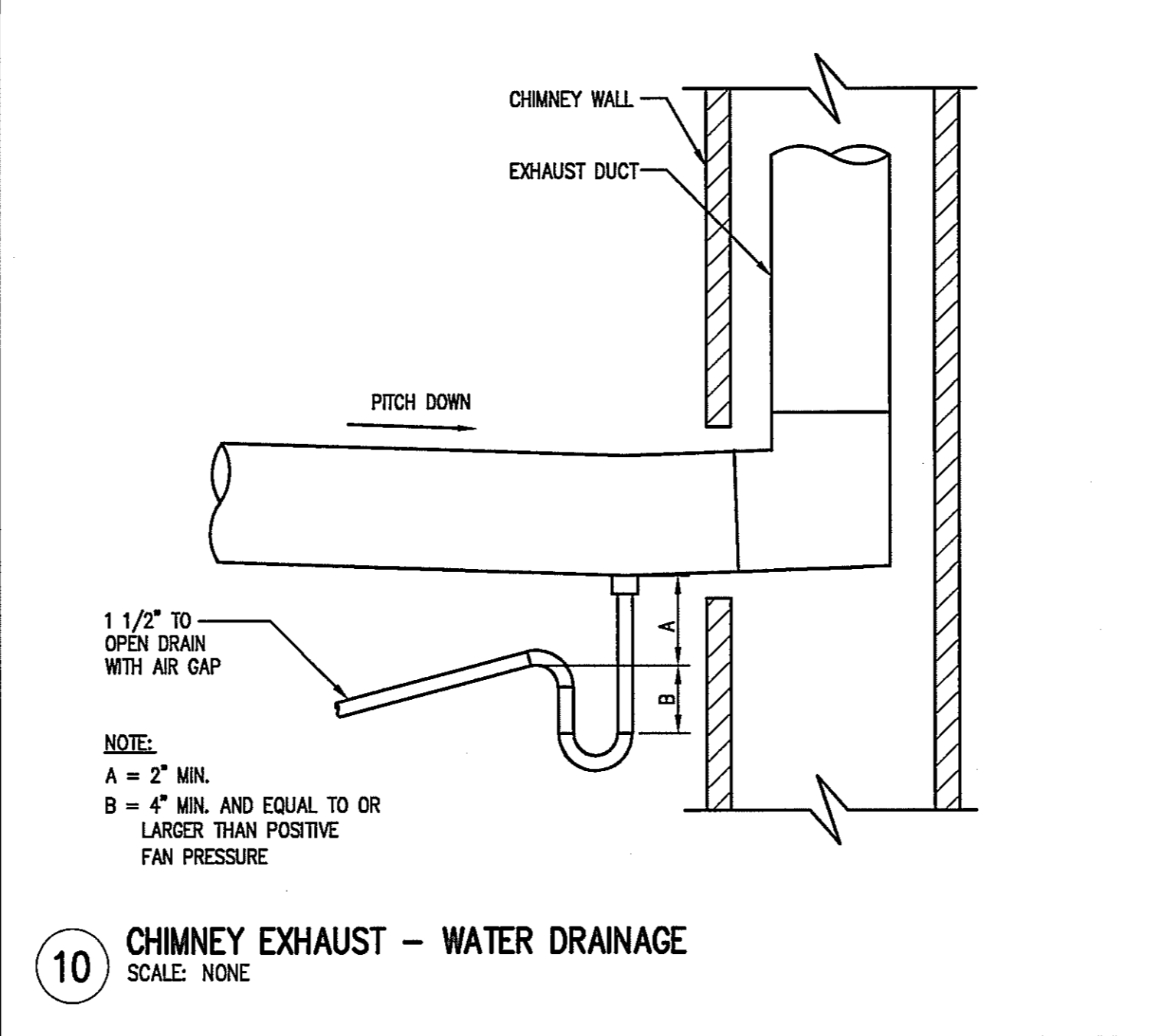
7 IN-LINE PUMP
SCALE: NONE



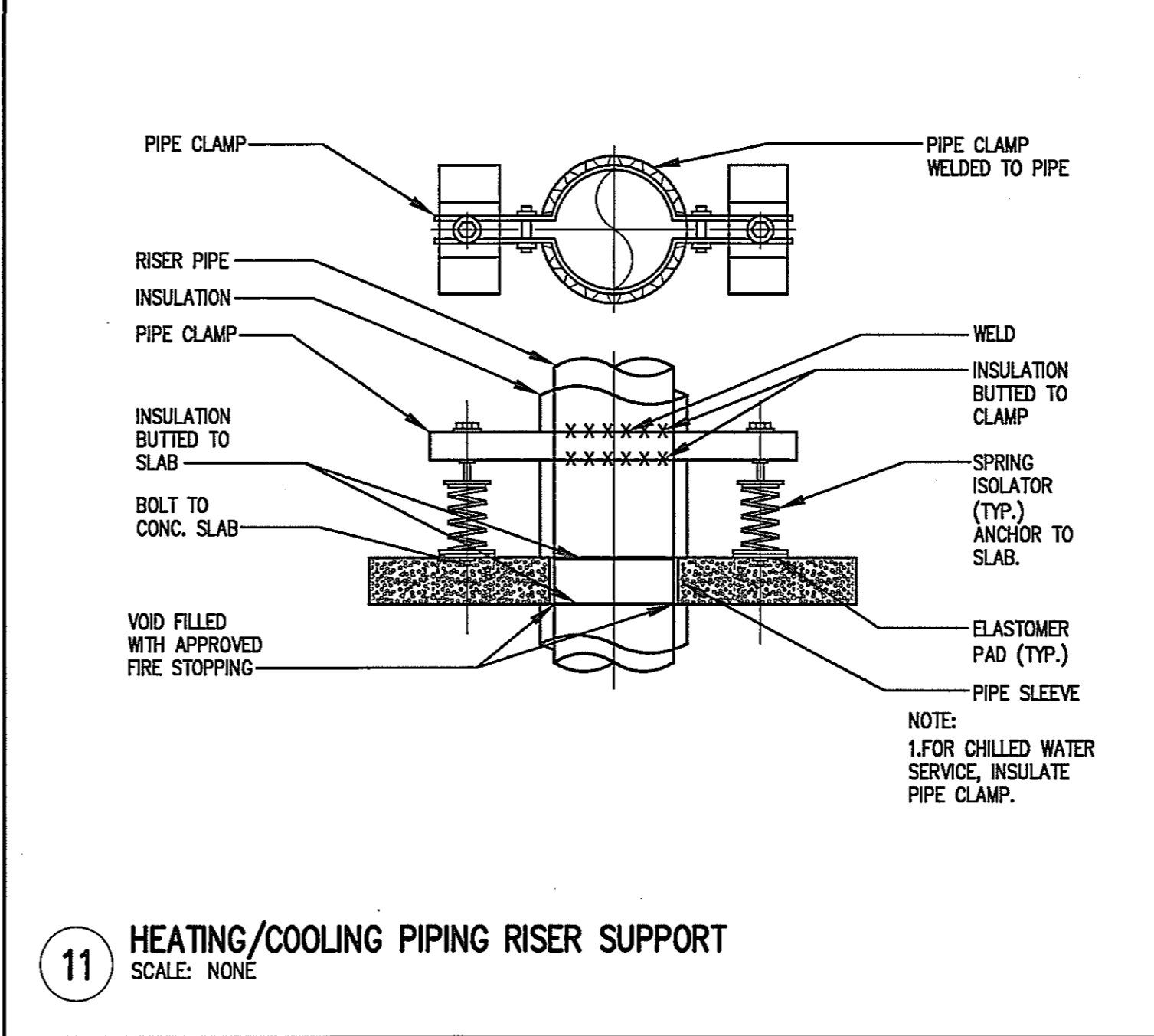
8 END SUCTION PUMP
SCALE: NONE



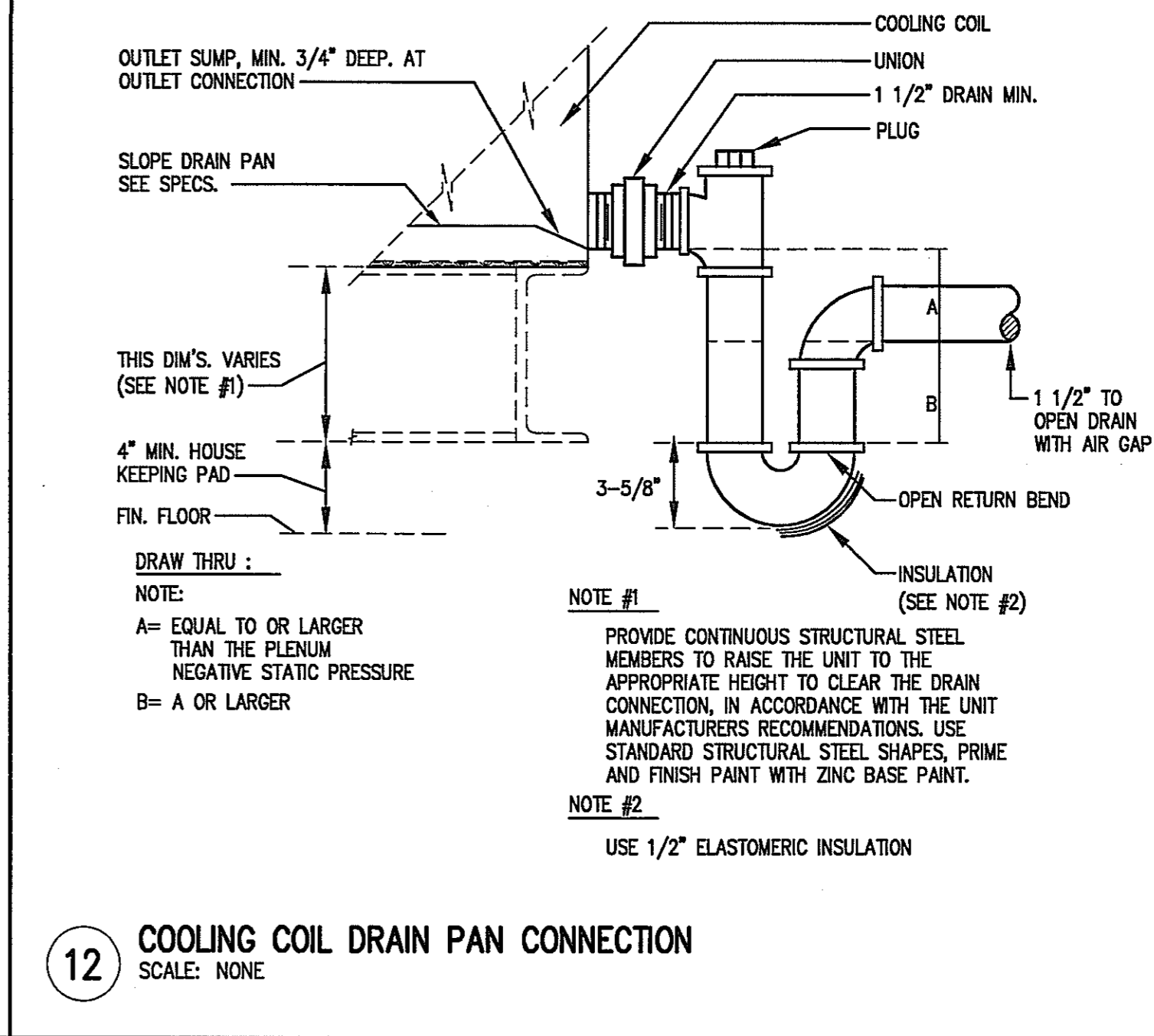
9 PANEL TYPE STEAM HUMIDIFIER IN AHU
SCALE: NONE



10 CHIMNEY EXHAUST - WATER DRAINAGE
SCALE: NONE



11 HEATING/COOLING PIPING RISER SUPPORT
SCALE: NONE



12 COOLING COIL DRAIN PAN CONNECTION
SCALE: NONE

USING AGENCY APPROVAL

NAME _____ DATE _____
TITLE _____

DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____
CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

Issued for _____ Rev _____ Date _____

01/05/05
DATE

Graphic Scales

Project North

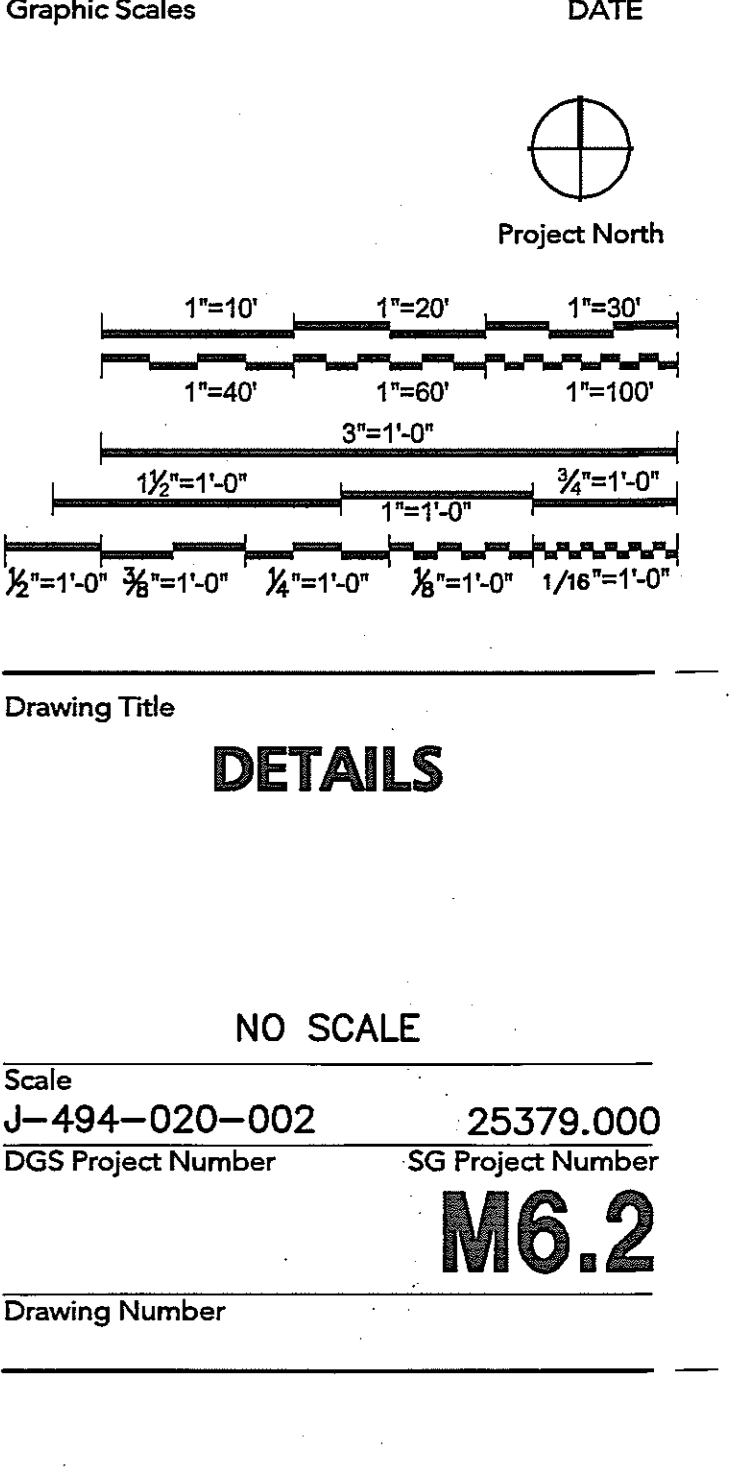
1"=10' 1"=20' 1"=30'
1"=40' 1"=60' 1"=100'
3"=1'-0" 1"=1'-0" 1/2"=1'-0"
1/2"=1'-0" 3/8"=1'-0" 1/4"=1'-0" 3/16"=1'-0" 1/8"=1'-0"

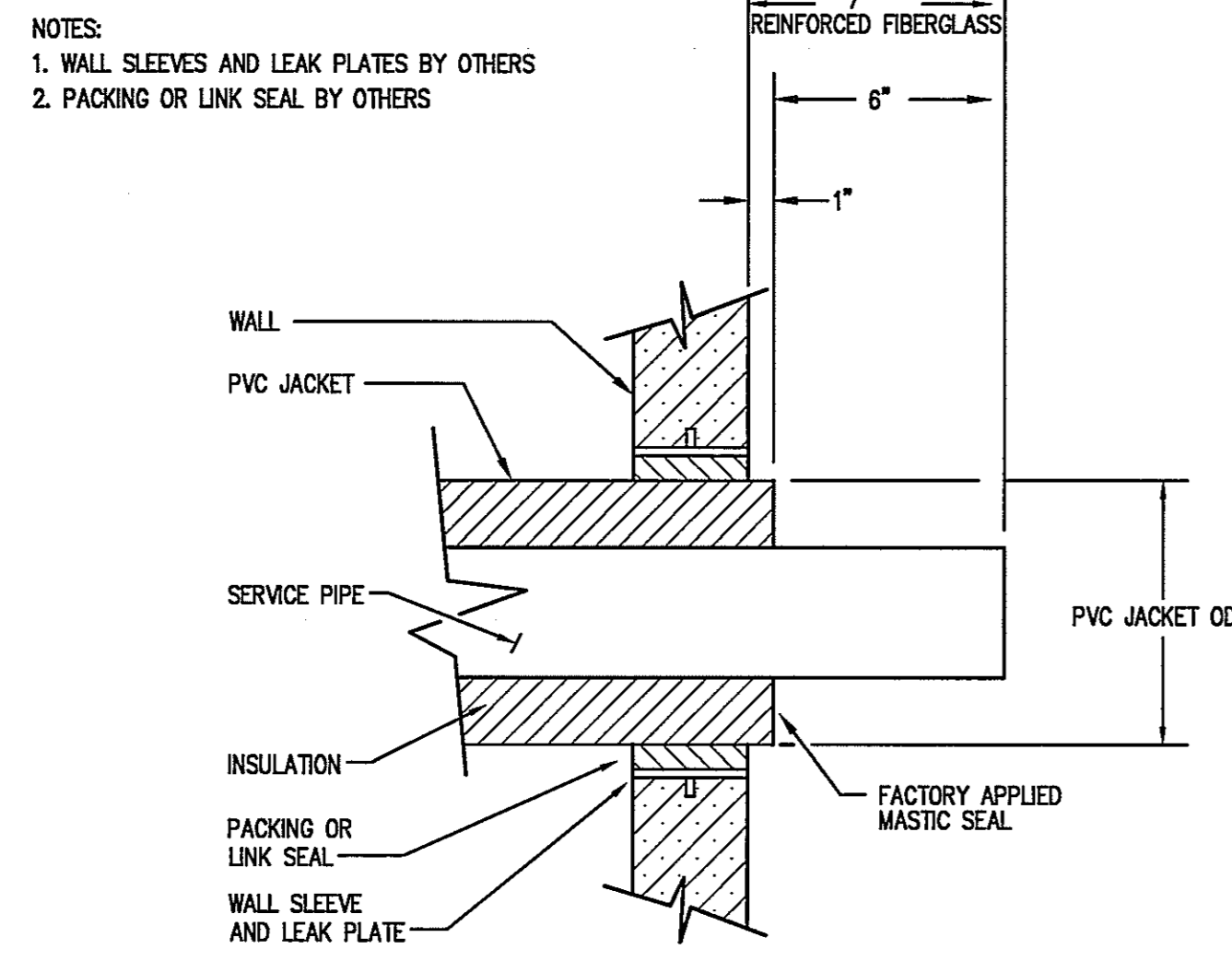
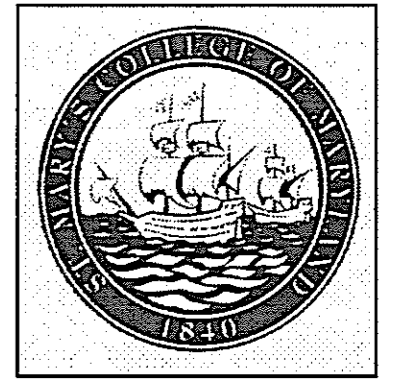
Drawing Title
DETAILS

NO SCALE

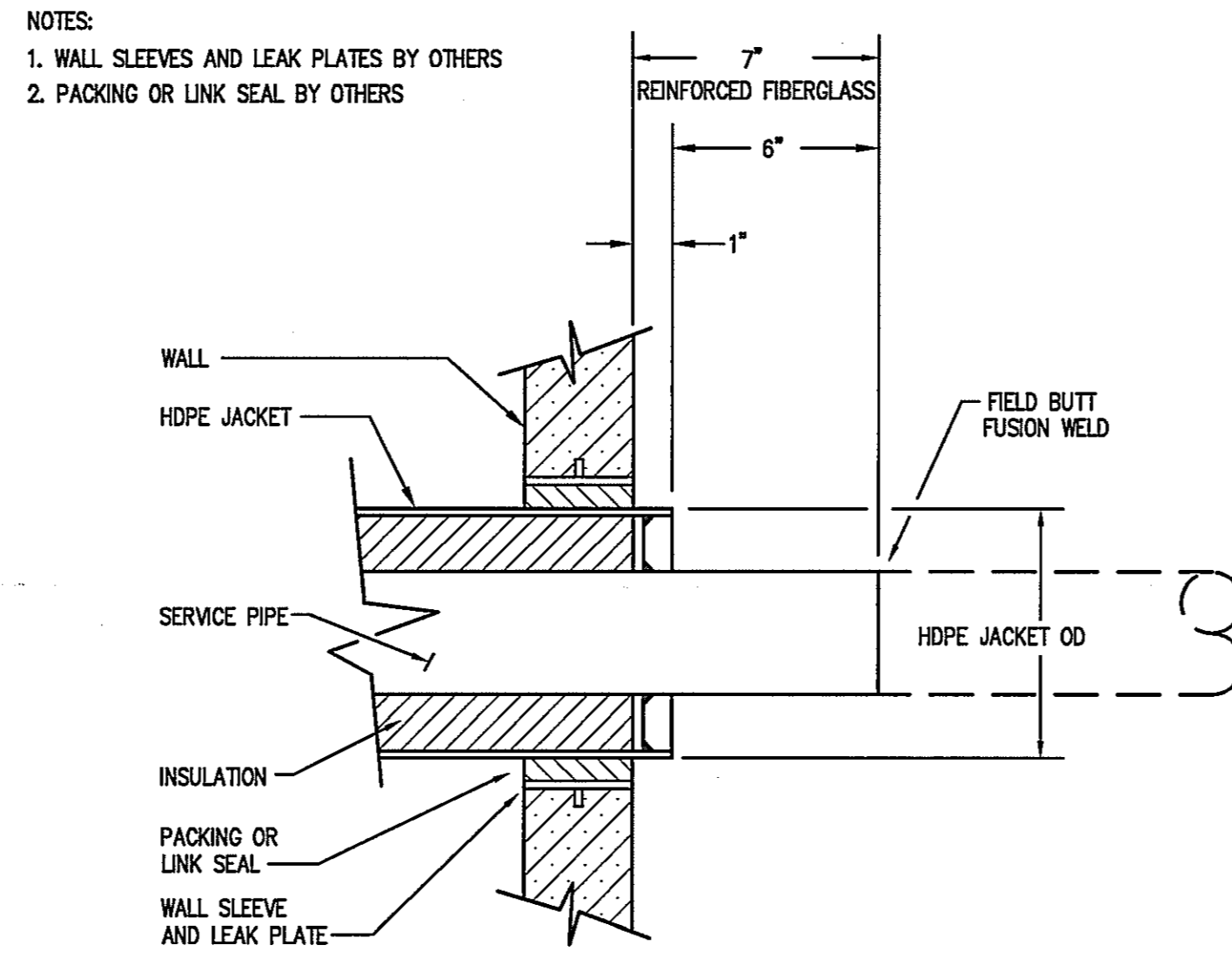
Scale
J-494-020-002 25379.000
DGS Project Number SG Project Number

Drawing Number
M6.2

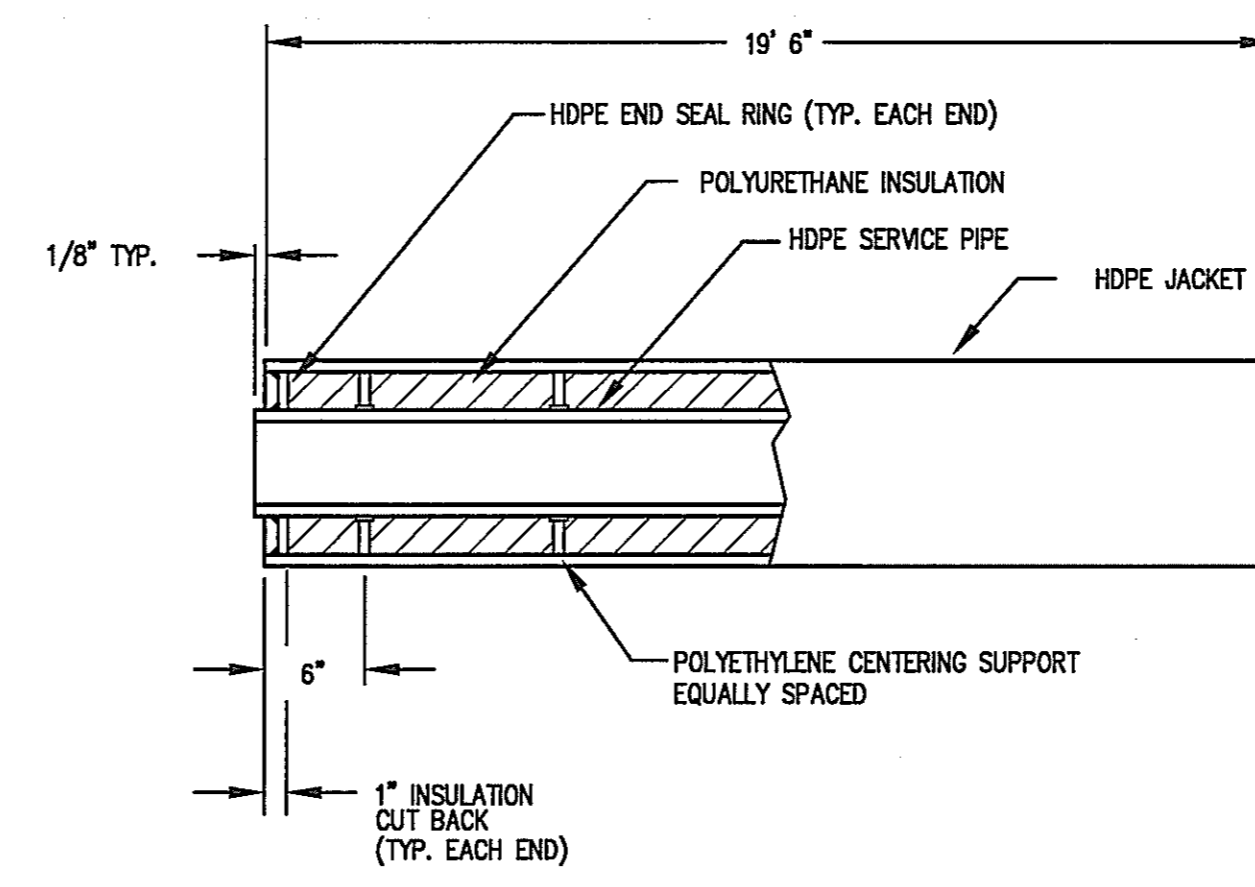




1 ECONO-GARD, WALL PENETRATION MASTIC END SEAL
SCALE: NONE



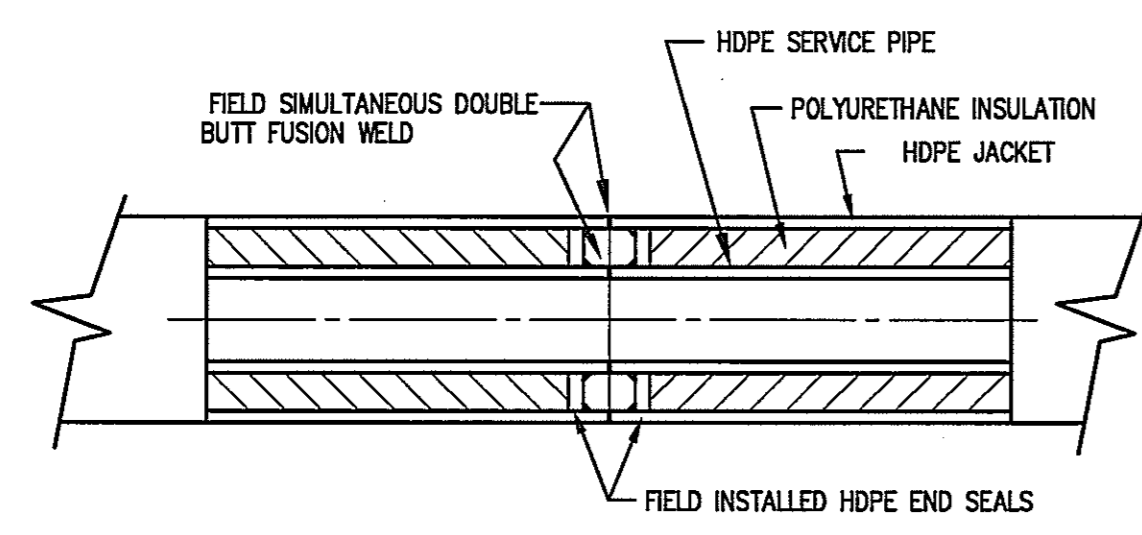
2 QUICK-THERM, WALL PENETRATION
SCALE: NONE



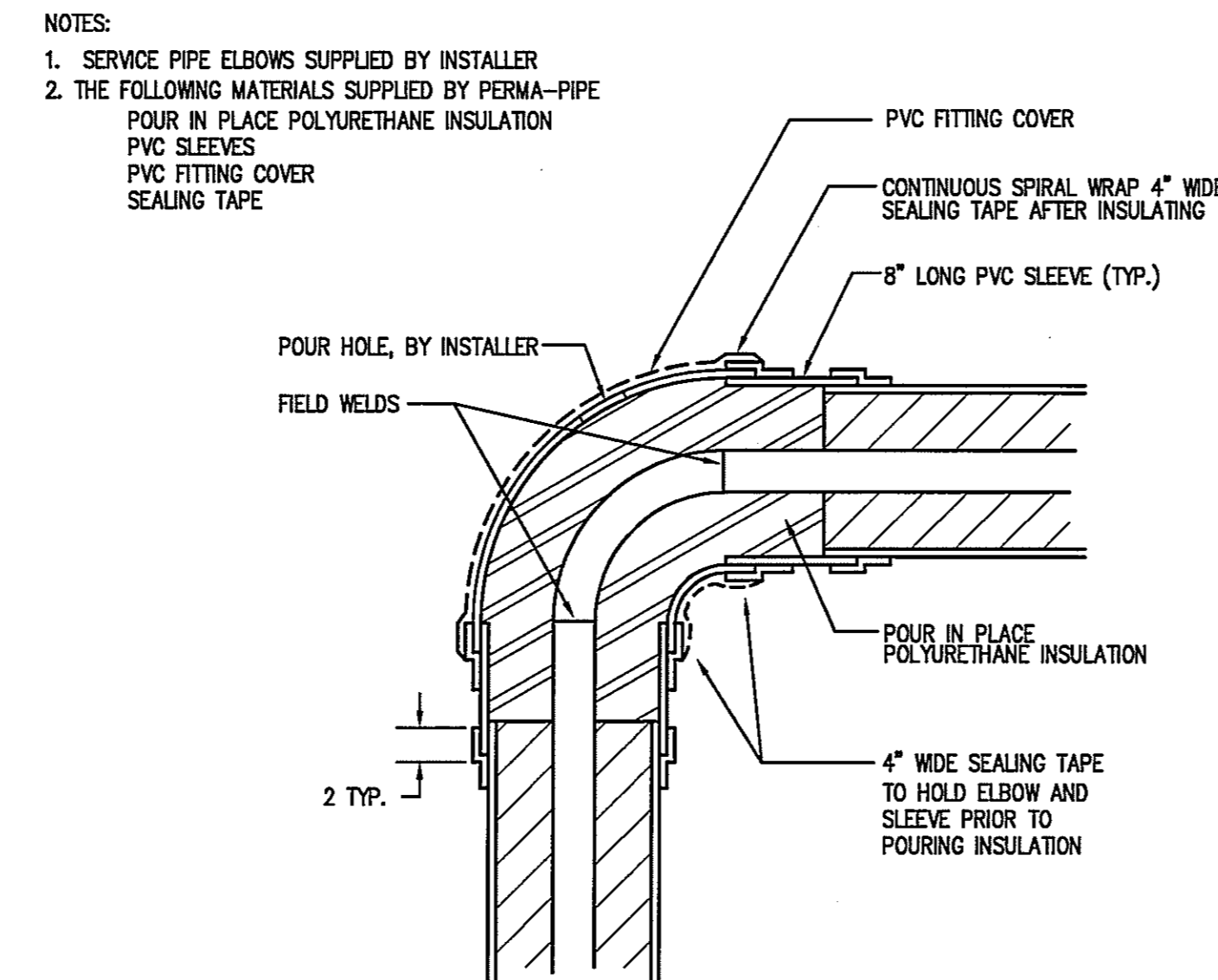
3 QUICK-THERM 19'-6" STRAIGHT LENGTH
SCALE: NONE

- NOTES:
1. SERVICE PIPE AND JACKET ARE IPS PIPE SIZE
2. POLYETHYLENE CENTERING SUPPORTS

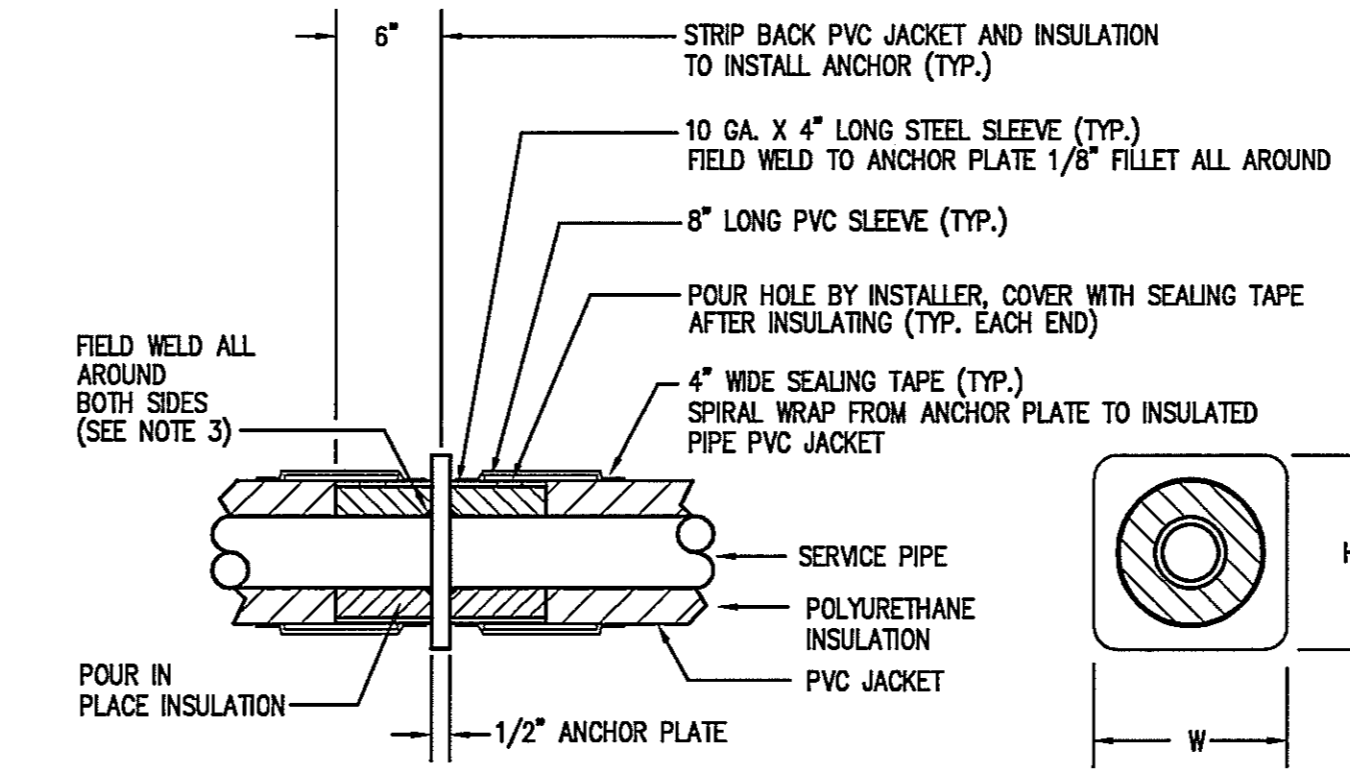
| SERVICE PIPE SIZE (IN.) | MINIMUM NO. POLYETHYLENE CENTERING SUPPORTS |
|-------------------------|---|
| 1 1/2" | 10 |
| 2" | 10 |
| 3" | 8 |
| 4" | 8 |
| 6" | 6 |
| 8" | 6 |
| 10" | 6 |
| 12" | 6 |
| 14" | 6 |



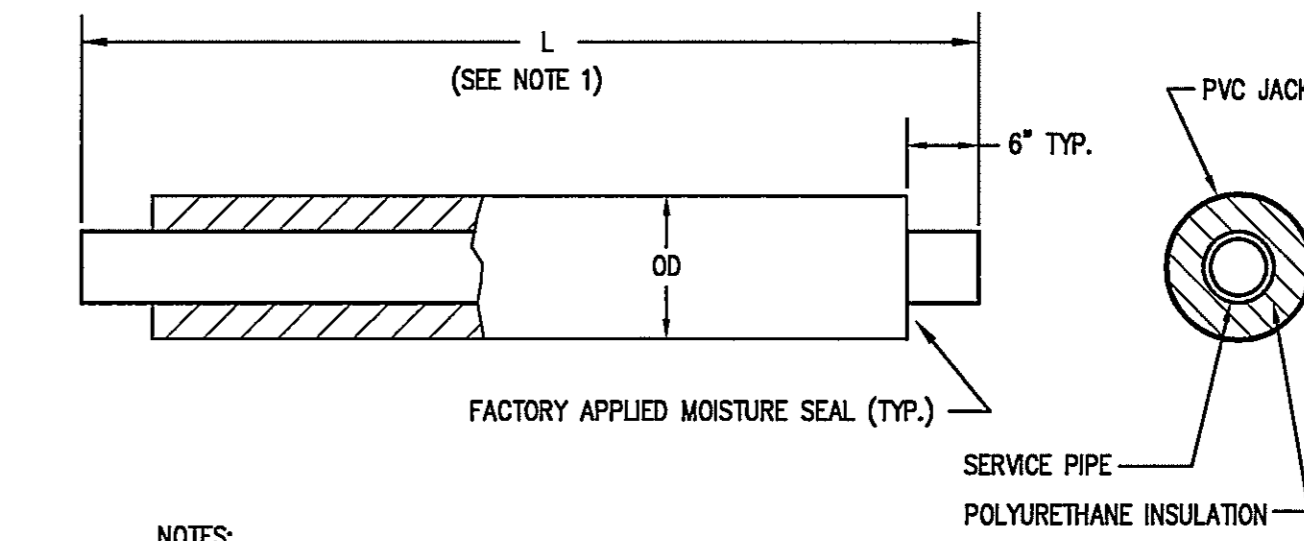
4 QUICK-THERM FIELD JOINT
SCALE: NONE



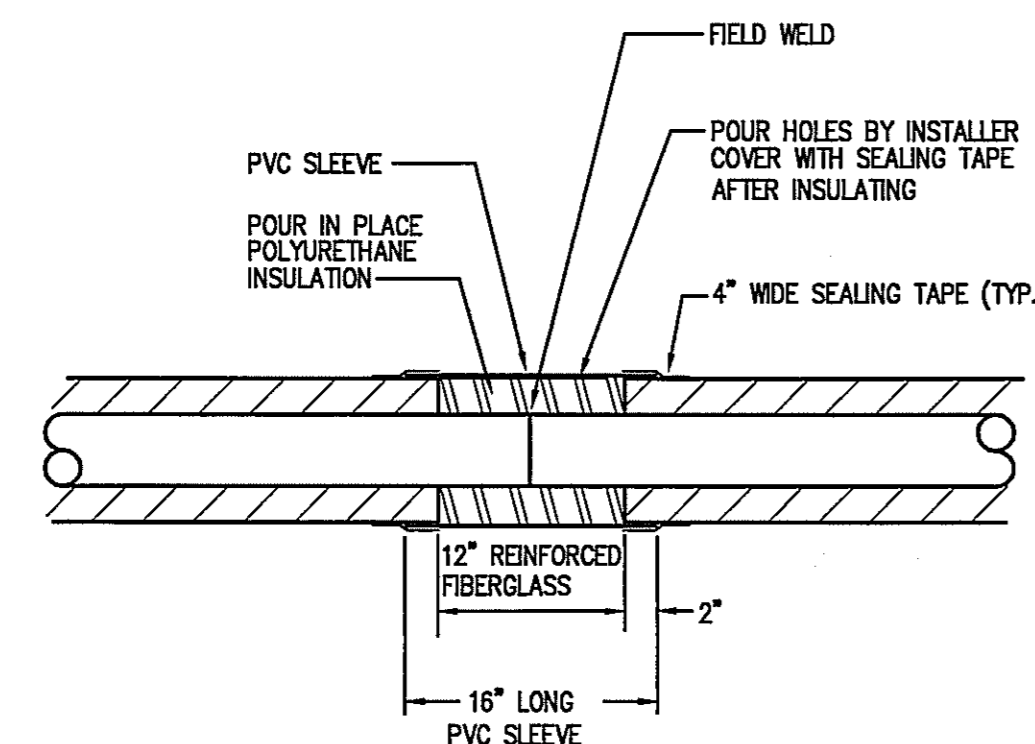
5 ECONO-GARD, STEEL PIPE ELBOW INSULATION FIELD KIT
SCALE: NONE



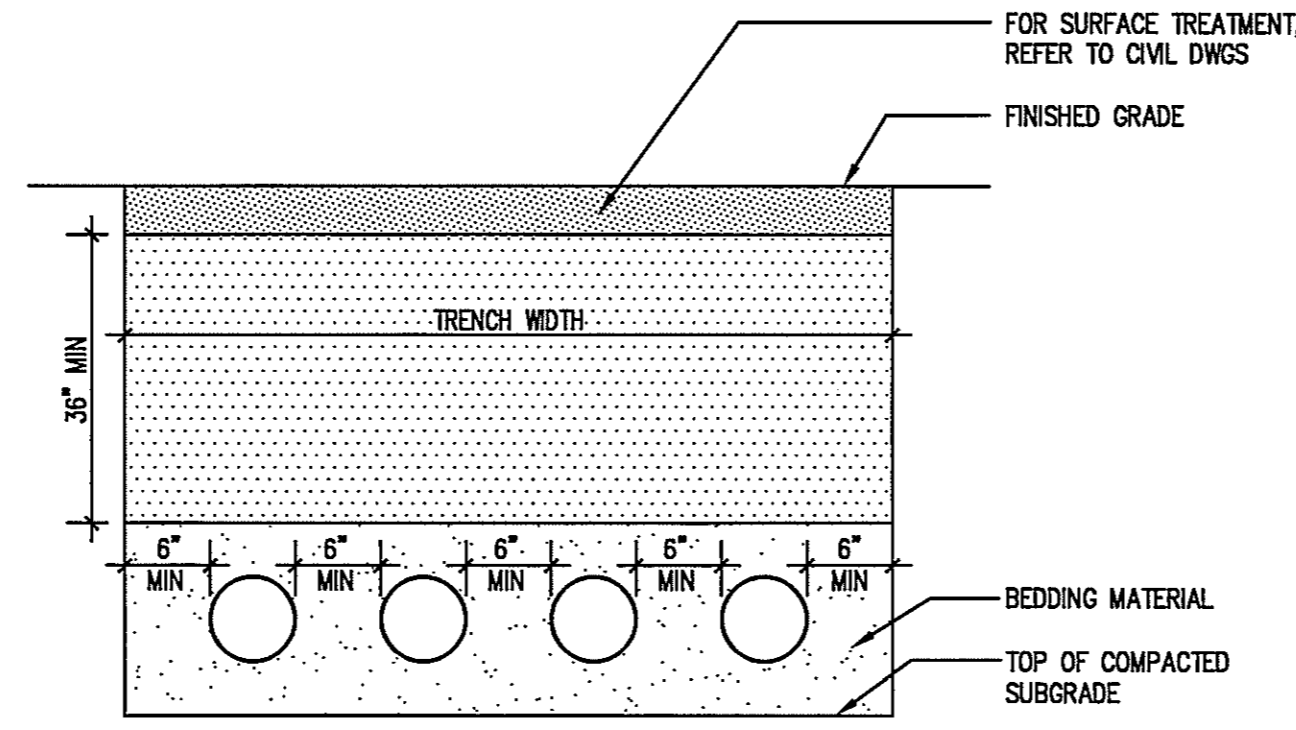
6 ECONO-GARD, STEEL PIPE STRAIGHT PIPE, ANCHOR FIELD KIT
SCALE: NONE



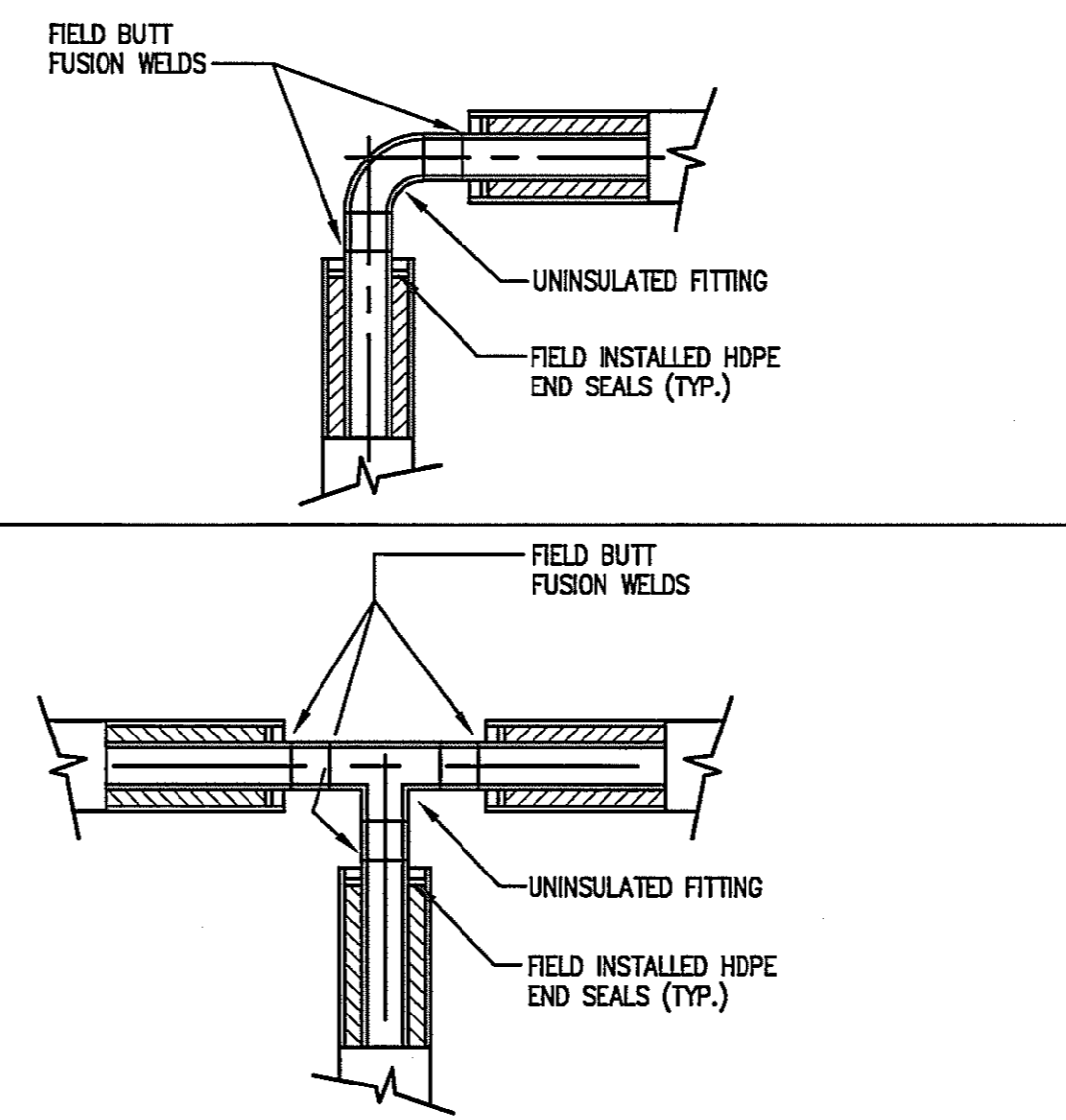
7 ECONO-GARD, STEEL PIPE STRAIGHT LENGTH
SCALE: NONE



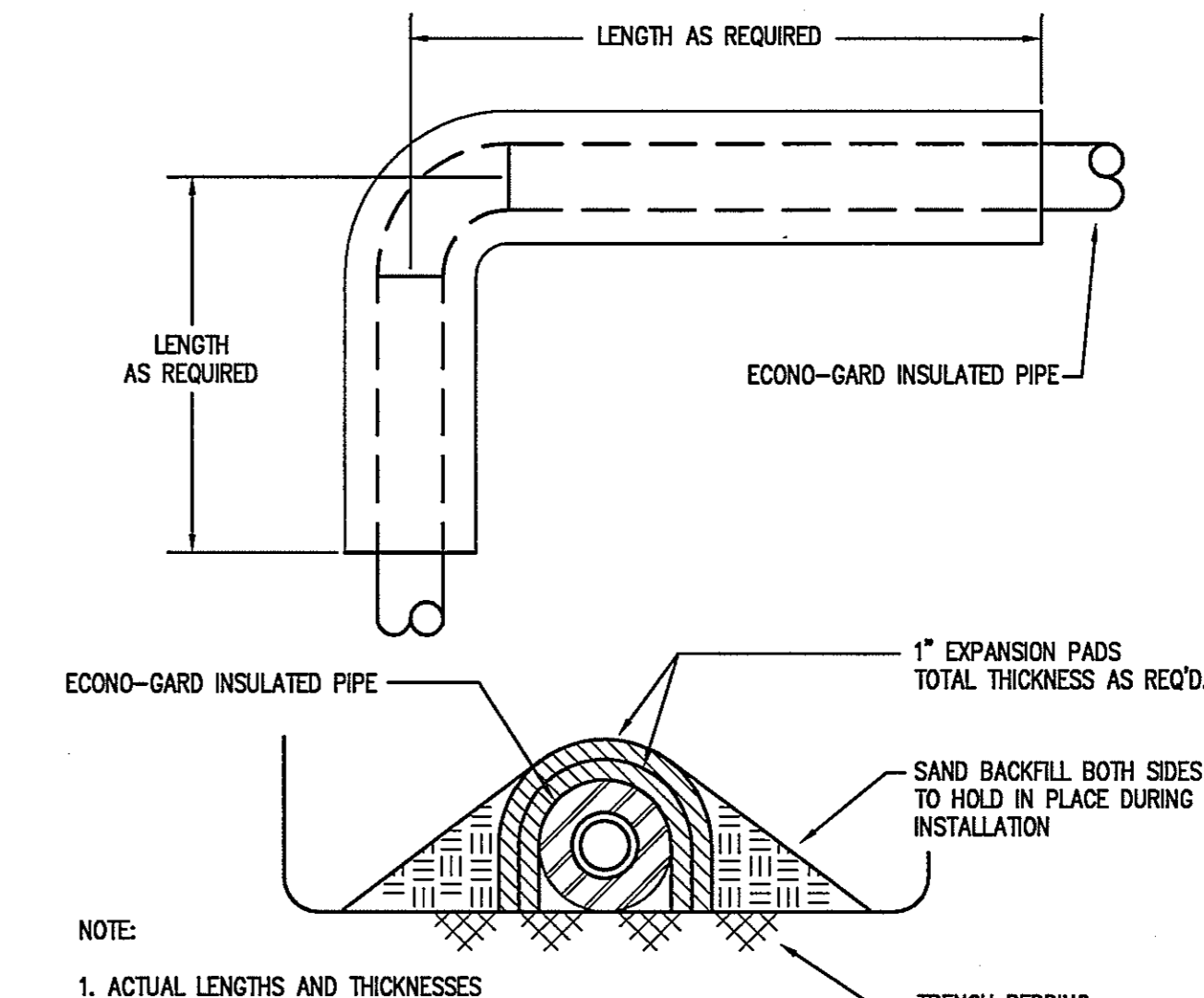
8 ECONO-GARD, STEEL PIPE FIELD JOINT, SEALING TAPE (STANDARD)
SCALE: NONE



9 GRASS TRENCH RESTORATION DETAIL
SCALE: NONE



10 QUICK-THERM FITTING INSTALLATION
SCALE: NONE



11 ECONO-GARD, EXTERNAL EXPANSION PADS
SCALE: NONE

USING AGENCY APPROVAL

NAME _____
TITLE _____ DATE _____

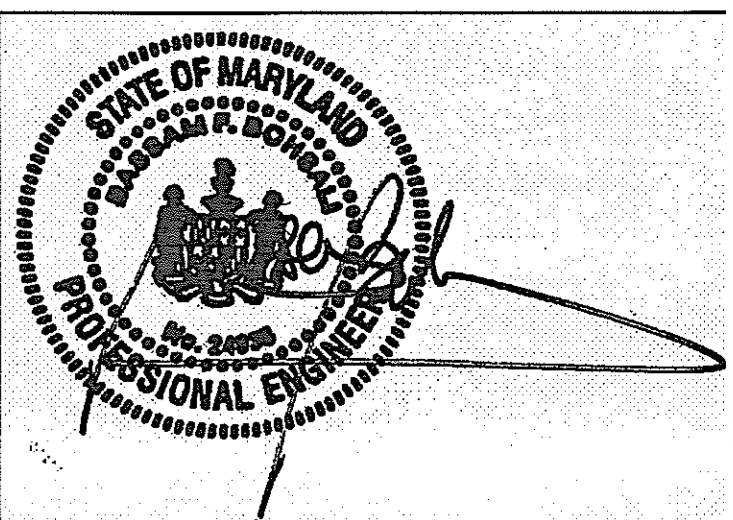
DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

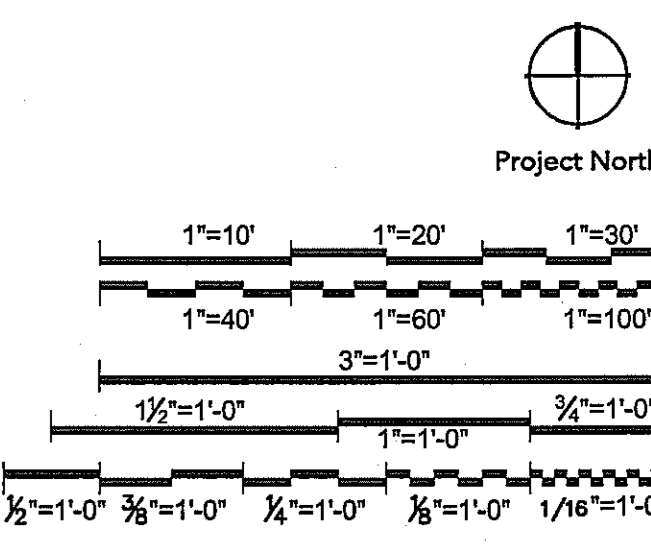
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Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title
DETAILS

NO SCALE
Scale: J-494-020-002 25379.000
DGS Project Number SG Project Number
M6.3
Drawing Number



USING AGENCY APPROVAL

NAME _____
TITLE _____ DATE _____

DEPT. OF GENERAL SERVICES APPROVAL

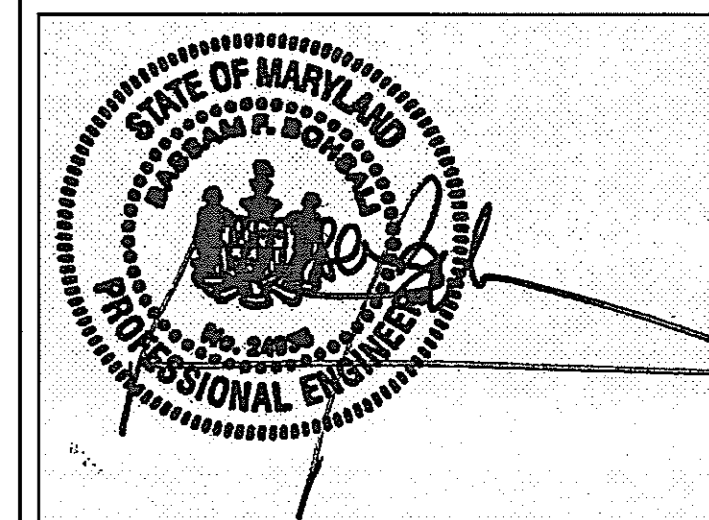
PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

Issued for _____ Rev Date _____

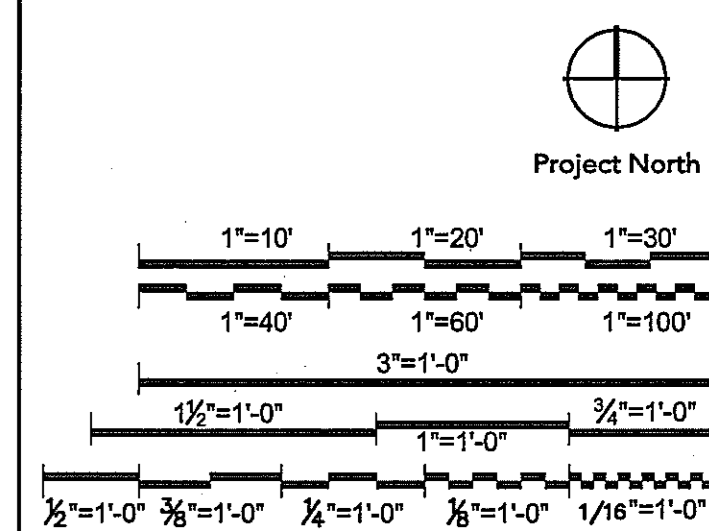
ADDENDUM FB-10 05/13/05

Seals and Signatures



01/05/05

Graphic Scales DATE



Drawing Title

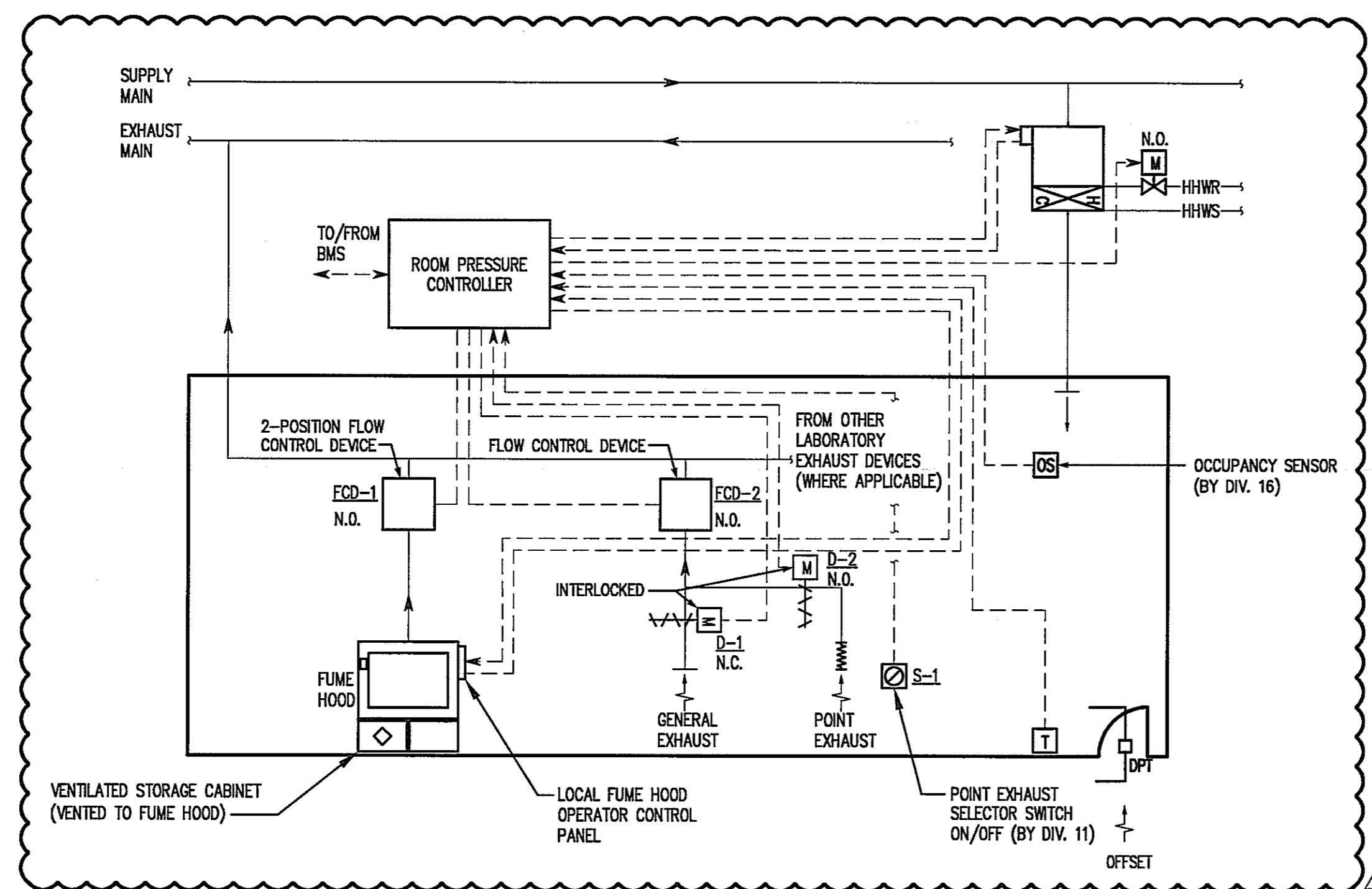
AUTOMATIC CONTROLS

NO SCALE

Scale J-494-020-002 25379.000
DGS Project Number SG Project Number

M8.1

Drawing Number



TYPICAL LABORATORY CONTROL SCHEMATIC

GENERAL

THIS SYSTEM CONSISTS OF FUME HOOD, POINT EXHAUST AND GENERAL EXHAUST CONTROL DEVICES; TERMINAL CONTROL BOX WITH HOT WATER REHEAT COIL; ROOM TEMPERATURE SENSOR; DIFFERENTIAL PRESSURE TRANSMITTER; FUME HOOD CONTROL PANEL; AND, ROOM PRESSURE CONTROLLER.

TWO-STATE CONTROL (OCCUPIED / UNOCCUPIED)

EACH FUME HOOD, UNLESS OTHERWISE NOTED, IS A TWO-STATE (OCCUPIED/UNOCCUPIED) LOW FLOW HOOD. FUME HOODS ARE INDEXED AUTOMATICALLY BY THE ROOM PRESSURE CONTROLLER BETWEEN THEIR TWO STATES BY WAY OF ROOM-WIDE OCCUPANCY SENSORS. WHEN SWITCHED TO UNOCCUPIED MODE, FLOW CONTROL DEVICE FCD-1 SHALL MAINTAIN MINIMUM EXHAUST AIRFLOW SETTINGS. WHEN SWITCHED TO OCCUPIED MODE, FLOW CONTROL DEVICE FCD-2 SHALL MAINTAIN MAXIMUM EXHAUST AIRFLOW SETTING.

FUME HOODS IN THE FOLLOWING ROOMS ARE CONTROLLED BY WAY OF ROOM-WIDE OCCUPANCY SENSORS: 200, 200A, 207, 207B, 211, 216, 216A, 222 AND 228. IN THE OCCUPIED MODE, ALL FUME HOODS SHALL BE INDEXED TO THEIR MAXIMUM EXHAUST AIRFLOW SETTING. IN THE UNOCCUPIED MODE, ALL FUME HOODS SHALL BE INDEXED TO THEIR MINIMUM EXHAUST AIRFLOW SETTING. HOOD SASHES MUST BE MANUALLY CLOSED PRIOR TO INDEXING THE SYSTEM TO UNOCCUPIED MODE TO PREVENT THE HOODS FROM ALARMING. A TIME DELAY OF 5 MINUTES (ADJ) SHALL BE PROVIDED FOR SWITCHING FROM THE OCCUPIED TO UNOCCUPIED MODE.

GENERAL EXHAUST AND POINT EXHAUST

FLOW CONTROL DEVICE FCD-2 MAINTAINS CONSTANT FLOW AS SPECIFIED ON THE DRAWINGS. DAMPERS D-1 AND D-2 ARE INTERLOCKED. DAMPER D-1 OPENS WHEN DAMPER D-2 CLOSES AND VICE VERSA. DAMPER D-2 IS INDEXED TO THE OPEN OR CLOSED POSITION BY POINT EXHAUST SELECTOR SWITCH S-1.

ROOM PRESSURE CONTROL

AN AIRFLOW TRACKING SCHEME SHALL BE USED TO CONTROL ROOM PRESSURIZATION IN A TYPICAL LABORATORY TO MAINTAIN A FLOW DIFFERENTIAL, OR OFFSET (ADJ), BETWEEN SUPPLY AND EXHAUST AIR. ROOM DIFFERENTIAL PRESSURE SHALL BE MONITORED BY THE BMS AND THE OFFSET ADJUSTED BY THE OPERATOR AS REQUIRED. THE OFFSET MAINTAINS THE LABORATORY AT A NEGATIVE PRESSURE RELATIVE TO THE CORRIDOR.

ROOM TEMPERATURE CONTROL

SPACE TEMPERATURE SHALL BE MEASURED CONTINUOUSLY. ON A RISE IN SPACE TEMPERATURE, THE ROOM PRESSURE CONTROLLER SHALL (IN SEQUENCE) MODULATE CLOSED THE HEATING VALVE AND MODULATE OPEN THE GENERAL EXHAUST AIR DAMPER TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. ON A DROP IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR.

INITIAL TEMPERATURE SETPOINTS

OCCUPIED HEATING TEMPERATURE: 70F
OCCUPIED COOLING TEMPERATURE: 78F
UNOCCUPIED HEATING TEMPERATURE: 65F
UNOCCUPIED COOLING TEMPERATURE: 80F

OCCUPIED/UNOCCUPIED MODE, AS IT RELATES TO TEMPERATURE SETPOINTS, SHALL BE SCHEDULED BY THE BMS OR OVERRIDDEN LOCALLY.

LOCAL SETPOINT ADJUSTMENT

ALL THERMOSTATS SHALL HAVE LOCAL ADJUSTMENT CONTROL. ADJUSTMENT RANGES SHALL BE SET AND ADJUSTED AT THE TERMINAL UNIT CONTROLLER. INITIAL ADJUSTMENT RANGE SHALL BE +/- 2F.

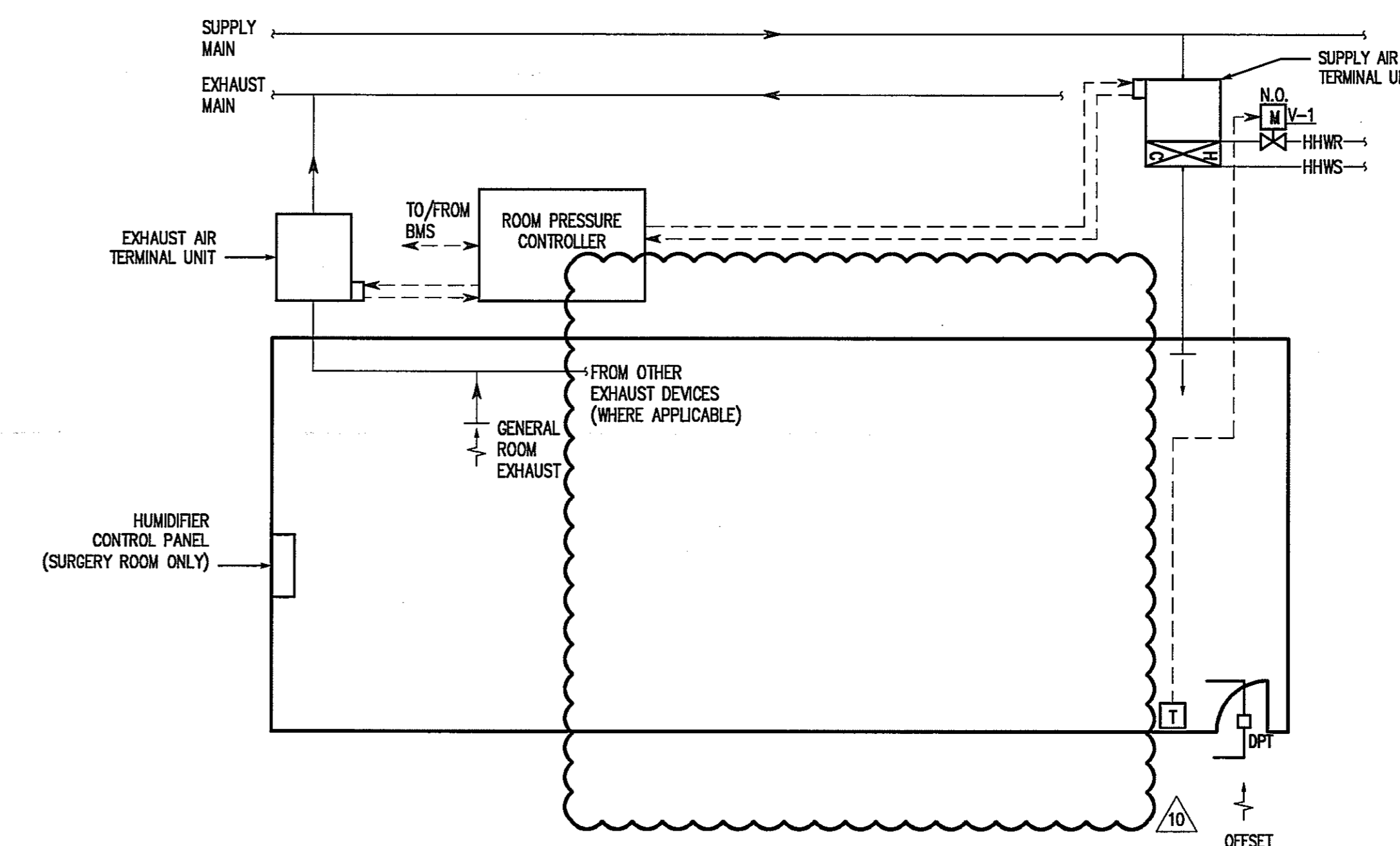
LOCAL OVERRIDE

PROVIDE LOCAL OVERRIDE OF UNOCCUPIED TEMPERATURE SETPOINTS. ONCE ACTIVATED, THE OVERRIDE REMAINS IN EFFECT FOR A PERIOD OF 2 HOURS (ADJ). AT THE END OF THE OVERRIDE PERIOD, THERMOSTAT REVERTS BACK TO UNOCCUPIED SETPOINTS UNLESS OVERRIDDEN AGAIN LOCALLY.

SYSTEM POINT LIST

| SYSTEM POINT DESCRIPTION | ANALOG | | BINARY | | SYSTEM FEATURES | | NOTES |
|-----------------------------------|-------------|-----------------------|----------|----------------------|-----------------|--------|-------|
| | INPUT | | OUTPUT | | ALARMS | | |
| | TEMPERATURE | DIFFERENTIAL PRESSURE | POSITION | SET POINT ADJUSTMENT | STATUS | STATUS | |
| TERMINAL CONTROL UNIT | X | X | | | | | |
| 2-WAY HEATING COIL CONTROL VALVE | X | | X | X | | | |
| ROOM TEMPERATURE SENSOR | X | X | | | | | |
| DIFFERENTIAL PRESSURE TRANSMITTER | X | | | | | | |
| FUME HOOD CONTROL PANEL | X | | | | | | |
| FACE VELOCITY MONITOR | X | | | | | | |
| FUME HOOD EXHAUST AIRFLOW | X | | X | X | | | |
| GENERAL/POINT EXHAUST AIRFLOW | X | | X | X | | | |
| OCCUPANCY SENSOR (ROOM) | X | | | | | | |
| ROOM PRESSURE CONTROLLER | X | | | | | | |

GENERAL NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED POINTS TO ACCOMPLISH THE AUTOMATIC CONTROL REQUIREMENTS OF THE MECHANICAL WORK. REFER TO SYSTEM SCHEMATIC, SEQUENCE OF OPERATION AND CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



ANIMAL HOLDING ROOM CONTROL SCHEMATIC

GENERAL

AN AIRFLOW TRACKING SCHEME SHALL BE USED TO CONTROL ROOM PRESSURIZATION IN A TYPICAL ANIMAL HOLDING ROOM TO MAINTAIN A FLOW DIFFERENTIAL, OR OFFSET (ADJ), BETWEEN SUPPLY AND EXHAUST AIR. ROOM DIFFERENTIAL PRESSURE SHALL BE MONITORED BY THE BMS AND THE OFFSET ADJUSTED BY THE OPERATOR AS REQUIRED.

THIS SYSTEM CONSISTS OF GENERAL EXHAUST TERMINAL UNIT; SUPPLY AIR TERMINAL UNIT WITH HOT WATER REHEAT COIL; SPACE THERMOSTAT; HUMIDIFIER CONTROL PANEL (SURGERY ROOM ONLY); DIFFERENTIAL PRESSURE TRANSMITTER; WALL MOUNTED KEY SWITCH; AND ROOM PRESSURE CONTROLLER.

ROOM PRESSURIZATION SETTING

THE ROOM PRESSURIZATION SETTING IS MANUALLY SELECTED VIA THE BMS. WHEN SWITCHED TO POSITIVE, THE VOLUMETRIC AIRFLOW OFFSET BETWEEN TOTAL SUPPLY AND TOTAL EXHAUST FLOW VOLUMES SHALL BE POSITIVE (TRANSFER AIRFLOW OUT OF HOLDING ROOM). WHEN SWITCHED TO NEUTRAL, THE VOLUMETRIC AIRFLOW OFFSET BETWEEN TOTAL SUPPLY AND TOTAL EXHAUST FLOW VOLUMES SHALL BE ZERO (NO TRANSFER AIRFLOW INTO OR OUT OF HOLDING ROOM). WHEN SWITCHED TO NEGATIVE, THE VOLUMETRIC AIRFLOW OFFSET BETWEEN TOTAL SUPPLY AND TOTAL EXHAUST FLOW VOLUMES SHALL BE NEGATIVE (TRANSFER AIRFLOW INTO HOLDING ROOM).

ROOM PRESSURE CONTROL

SUPPLY AIRFLOW, EXHAUST AIRFLOW AND ROOM DIFFERENTIAL PRESSURE ARE MEASURED CONTINUOUSLY. THE ROOM PRESSURE CONTROLLER MODULATES THE SUPPLY AIR DAMPER TO MAINTAIN A VOLUMETRIC AIRFLOW OFFSET BETWEEN TOTAL SUPPLY AND TOTAL EXHAUST FLOW VOLUMES. THIS OFFSET MAINTAINS THE HOLDING ROOM AT POSITIVE, NEUTRAL OR NEGATIVE PRESSURE RELATIVE TO THE CORRIDOR. EXHAUST AIR TERMINAL UNITS ARE CONSTANT VOLUME.

ROOM TEMPERATURE CONTROL

SPACE TEMPERATURE SHALL BE MEASURED CONTINUOUSLY. ON A RISE IN SPACE TEMPERATURE, THE ROOM TEMPERATURE SENSOR SHALL MODULATE CLOSED THE HEATING VALVE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. ON A DROP IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR.

INITIAL TEMPERATURE SETPOINTS

OCCUPIED HEATING TEMPERATURE: 70F
OCCUPIED COOLING TEMPERATURE: 78F

ANIMAL HOLDING ROOMS SHALL BE MAINTAINED AT OCCUPIED TEMPERATURE SETPOINTS AT ALL TIMES.

LOCAL SETPOINT ADJUSTMENT

ALL THERMOSTATS SHALL HAVE LOCAL ADJUSTMENT CONTROL. ADJUSTMENT RANGES SHALL BE SET AND ADJUSTED AT THE TERMINAL UNIT CONTROLLER. INITIAL ADJUSTMENT RANGE SHALL BE +/- 2F.

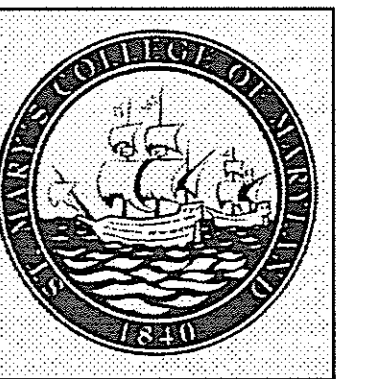
ROOM HUMIDITY CONTROL (SURGERY ROOM ONLY)

SPACE HUMIDITY CONTROL SHALL BE PERFORMED BY STAND-ALONE HUMIDIFIER AND ASSOCIATED HUMIDISTAT. REMOTE INDICATION BY BMS SHALL BE PROVIDED FOR STATUS AND ALARM FUNCTIONS.

SYSTEM POINT LIST

| SYSTEM POINT DESCRIPTION | ANALOG | | BINARY | | SYSTEM FEATURES | | NOTES |
|-----------------------------------|-------------|-----------------------|----------|----------------------|-----------------|--------|-------|
| | INPUT | | OUTPUT | | ALARMS | | |
| | TEMPERATURE | DIFFERENTIAL PRESSURE | POSITION | SET POINT ADJUSTMENT | STATUS | STATUS | |
| TERMINAL CONTROL UNIT - SUPPLY | X | X | | | | | |
| 2-WAY HEATING COIL CONTROL VALVE | X | | X | X | | | |
| ROOM TEMPERATURE SENSOR | X | X | | | | | |
| DIFFERENTIAL PRESSURE TRANSMITTER | X | | | | | | |
| TERMINAL CONTROL UNIT - EXHAUST | X | | X | X | | | |
| HUMIDIFIER CONTROL PANEL | X | | | | | | |
| ROOM PRESSURE CONTROLLER | X | | | | | | |

GENERAL NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED POINTS TO ACCOMPLISH THE AUTOMATIC CONTROL REQUIREMENTS OF THE MECHANICAL WORK. REFER TO SYSTEM SCHEMATIC, SEQUENCE OF OPERATION AND CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



USING AGENCY APPROVAL

DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

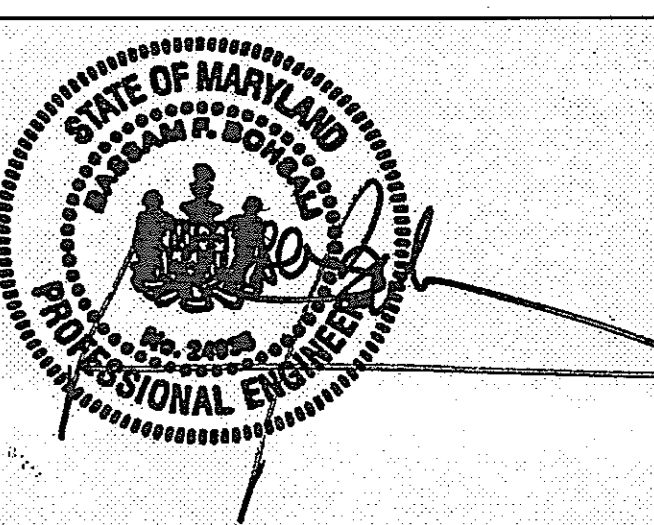
CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

Issued for _____ Rev Date _____

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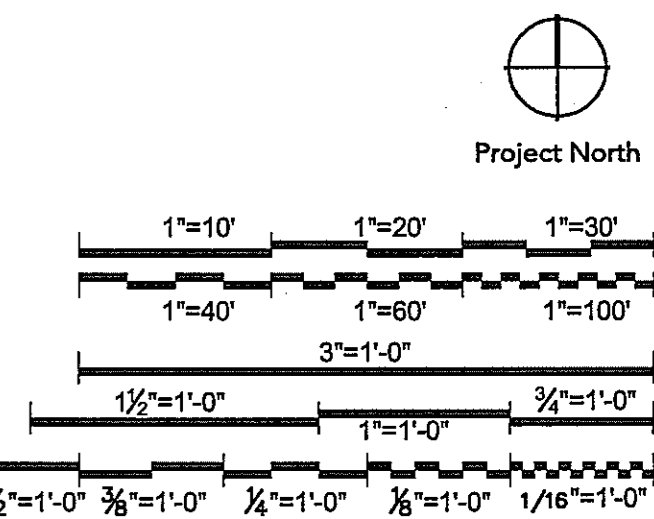
ADDITIONAL REVISIONS _____

Seals and Signatures _____



01/05/05 DATE

Graphic Scales _____



Drawing Title

AUTOMATIC CONTROLS

NO SCALE

Scale J-494-020-002 25379.000
DGS Project Number SG Project Number

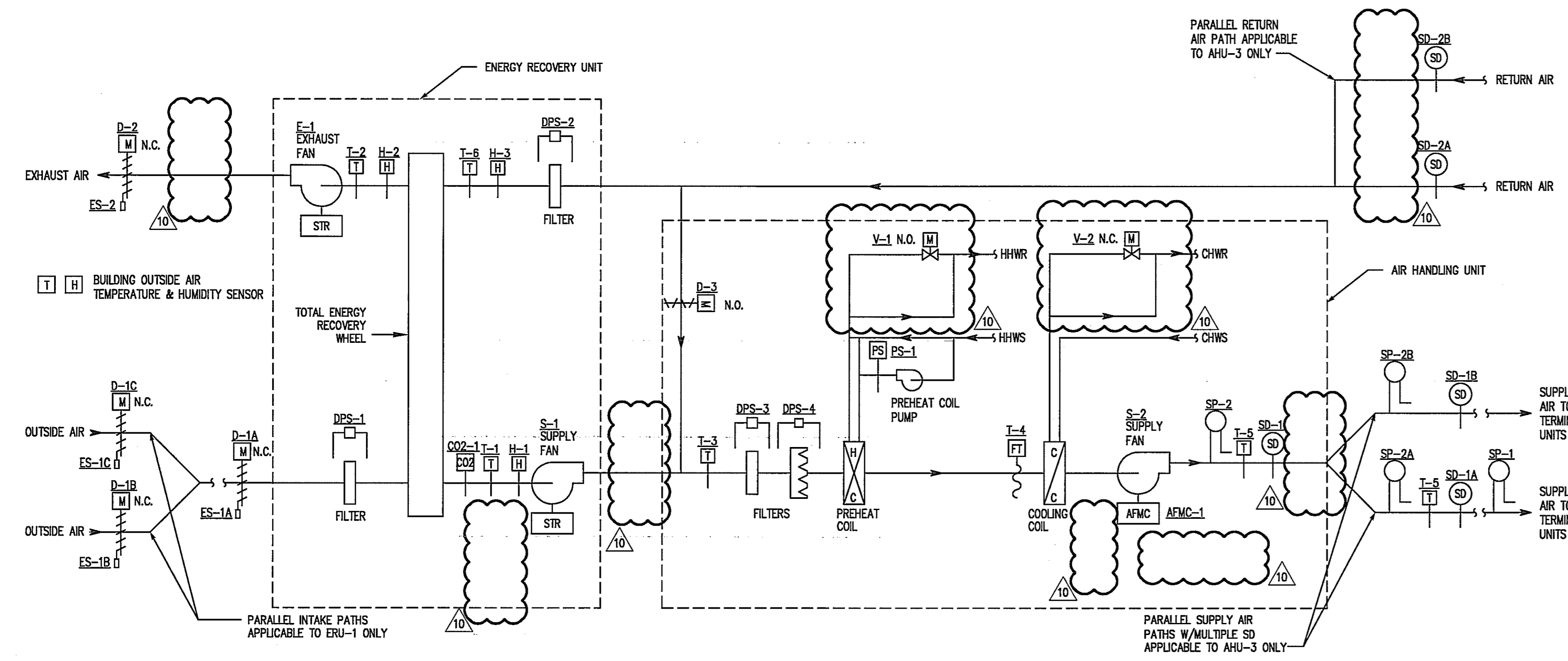
M8.2

Drawing Number

SYSTEM POINT LIST

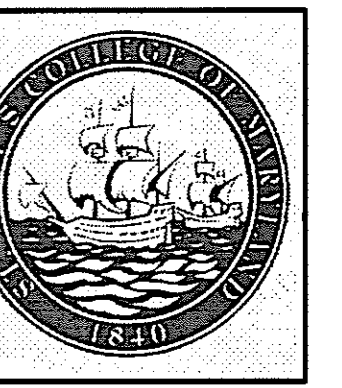
| SYSTEM POINT DESCRIPTION | ANALOG | | | | BINARY | | SYSTEM FEATURES | | NOTES |
|---|-------------|-----------------------|-----------|----------|--------|-----------------|-----------------|-----------|------------------------------------|
| | INPUT | | OUTPUT | | INPUT | OUTPUT | ALARMS | | |
| | TEMPERATURE | DIFFERENTIAL PRESSURE | FLOW RATE | POSITION | STATUS | DRIVE BY-PASSED | START/STOP | HAND/AUTO | DIAGNOSTICS |
| AHU-2, 3 & 5 ERU-1, 2 & 3 (VARIABLE VOLUME AIR HANDLING UNIT WITH ENERGY RECOVERY UNIT) | | | | | | | | | |
| OUTSIDE AIR DAMPER | X | | | | | | | | |
| EXHAUST AIR DAMPER | X | | | | | | | | |
| RETURN AIR DAMPER | X | | | | | | | | |
| OUTSIDE AIR DAMPER END SWITCH | X | | | | | | | | |
| EXHAUST AIR DAMPER END SWITCH | X | | | | | | | | |
| BUILDING OUTSIDE AIR TEMPERATURE SENSOR | X | X | | | | | | | COMMON BUILDING TEMPERATURE SENSOR |
| ERU SUPPLY AIR TEMPERATURE SENSOR | X | X | | | | | X | | T-1 |
| ERU EXHAUST AIR TEMPERATURE SENSOR | X | X | | | | | | | T-2 |
| MIXED AIR TEMPERATURE SENSOR | X | X | | | | | | | T-3 |
| FREEZE/STAT | X | | | | | | | X | T-4 |
| SUPPLY AIR TEMPERATURE SENSOR | X | X | | | | | | | T-5 |
| RETURN AIR TEMPERATURE SENSOR | X | X | | | | | | | T-6 |
| OUTSIDE AIR CO2 SENSOR | X | | X | | | | | | CO2-1 |
| BUILDING OUTSIDE AIR HUMIDITY SENSOR | X | X | | | | | | | COMMON BUILDING HUMIDITY SENSOR |
| ERU SUPPLY AIR HUMIDITY SENSOR | X | X | | | | | | | H-1 |
| ERU EXHAUST AIR HUMIDITY SENSOR | X | X | | | | | | | H-2 |
| RETURN AIR HUMIDITY SENSOR | X | X | | | | | | | H-3 |
| SUPPLY DUCT SMOKE DETECTOR | X | | | | | X | | | SD-1 |
| RETURN DUCT SMOKE DETECTOR | X | | | | | X | | | SD-2 |
| PREHEAT COIL VALVES | X | | | | X | | | | Y-1 |
| COOLING COIL VALVES | X | | | | X | | | | Y-2 |
| PREHEAT COIL PUMP | X | | | | | X | X | | REFER TO SCHEDULE |
| PREHEAT COIL PUMP PRESSURE SWITCH | X | | | | | X | | X | PS-1 |
| ERU SUPPLY FAN | X | | | | | X | X | | S-1 |
| ERU EXHAUST FAN | X | | | | | X | X | | E-1 |
| SUPPLY FAN | X | | | | | X | X | | S-2 |
| ADJUSTABLE FREQUENCY MOTOR CONTROLLER | X | | X X | | X | X X | X X | | AFMC-1 |
| OUTSIDE AIR FILTER DPS | X | | | | | X | X | X | DPS-1 |
| EXHAUST AIR FILTER DPS | X | | | | | X | X | X | DPS-2 |
| MIXED AIR PRE-FILTER DPS | X | | | | | X | X | X | DPS-3 |
| MIXED AIR SECONDARY FILTER DPS | X | | | | | X | X | X | DPS-4 |
| SUPPLY AIR STATIC PRESSURE SENSOR | X | X | | | | X | | | SP-1 |
| HIGH DUCT STATIC PRESSURE SWITCH | X | | | | | X | X | | SP-2 |
| ENERGY RECOVERY UNIT CONTROL PANEL | X | | | | | | | X | - |
| - | | | | | | | | | - |
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GENERAL NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED POINTS TO ACCOMPLISH THE AUTOMATIC CONTROL REQUIREMENTS OF THE MECHANICAL WORK. REFER TO SYSTEM SCHEMATIC, SEQUENCE OF OPERATION AND CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



VARIABLE VOLUME AIR HANDLING AND ENERGY RECOVERY UNIT CONTROL SCHEMATIC (AHU-3 & ERU-1, AHU-5 & ERU-2, AND AHU-2 & ERU-3 SIMILAR)

GENERAL
THE AIR HANDLING AND ENERGY RECOVERY UNITS ARE STARTED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH IS KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED ONLY FOR MAINTENANCE PURPOSES.
WHEN EITHER AHU-4 OR THE UNIT (AHU-2, 3 OR 5) IS COMMANDED TO START, DAMPER D-1 OPENS FULLY. DAMPER D-2 OPENS FULLY WHEN UNIT IS COMMANDED TO START. UPON PROOF BY DAMPER END SWITCHES THAT THE DAMPERS ARE OPEN, SUPPLY AIR FAN S-2 SHALL BE COMMANDED TO START WITH THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER (AFMC) AT MINIMUM SPEED. WHEN MINIMUM SUPPLY AIRFLOW IS REACHED, ERU SUPPLY FAN S-1 AND EXHAUST FAN E-1 SHALL BE COMMANDED TO START. THE CONTROL ALGORITHMS ARE ALLOWED TO FUNCTION WHEN THE UNIT STARTS.
WHEN THE UNIT IS COMMANDED TO STOP, ADJUSTABLE FREQUENCY CONTROLLER ON SUPPLY FAN S-2 SHALL REDUCE TO MINIMUM SPEED. WHEN MINIMUM SUPPLY AIRFLOW IS REACHED, ERU SUPPLY FAN S-1 AND EXHAUST FAN E-1 SHALL BE COMMANDED TO STOP. SUPPLY FAN S-2 SHALL BE COMMANDED TO STOP. WHEN BOTH AHU-4 AND THE UNIT IS OFF, DAMPER D-1 CLOSES. WHEN THE UNIT IS OFF, DAMPER D-2 CLOSES.
ALL VALVES AND DAMPERS RETURN TO THEIR NORMAL POSITIONS WHENEVER THE UNIT IS NOT IN OPERATION.
PRE-OCCUPANCY MORNING WARMUP
OPTIMUM START CONTROLS USING AN ADAPTIVE ALGORITHM SHALL COMMAND THE AIR HANDLING UNIT TO START FOR PRE-OCCUPANCY MORNING WARMUP. DAMPERS D-1, D-2 AND D-3 SHALL REMAIN IN THEIR NORMAL POSITIONS AND SUPPLY FAN S-2 SHALL BE COMMANDED TO START WITH THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER (AFMC) AT MINIMUM SPEED. WHEN MINIMUM SUPPLY AIRFLOW IS REACHED, AIRFLOW CONTROL SHALL COMMENCE.
ONCE THE OCCUPIED SETPOINT IS ACHIEVED, NORMAL START-UP PROCEDURES SHALL ENSUE.
SHUTDOWN/RESTART
THE AIR HANDLING AND ENERGY RECOVERY UNITS SHALL BE STARTED/STOPPED BY WAY OF A 7-DAY PROGRAMMABLE SCHEDULE THAT IS ABLE TO RETAIN PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST 10 HOURS.
WHEN THE AIR HANDLING AND ENERGY RECOVERY UNITS ARE SHUT DOWN ON A POWER FAILURE AND THE POWER IS RESTORED, THEY ARE TO BE RESTARTED MANUALLY THROUGH A SEQUENCE PROGRAM TO PREVENT OVERLOADING OF THE ELECTRICAL DISTRIBUTION SYSTEM.
THE SYSTEM SHALL BE STARTED MANUALLY BY WAY OF LOCAL OVERRIDE INTEGRAL TO THE ROOM TEMPERATURE SENSOR THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.
THE SYSTEM SHALL BE STARTED AND OPERATED FOR AS LONG AS IS REQUIRED TO MAINTAIN ZONE TEMPERATURES ABOVE A MAXIMUM HEATING SET POINT OF 55F (ADJ). DAMPERS D-1 AND D-2 SHALL REMAINED CLOSED DURING SETBACK.
EMERGENCY CONSTANT SPEED OPERATION
UPON FAILURE OF THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER, THE SUPPLY FAN MAY BE STARTED/STOPPED MANUALLY THROUGH THE BY-PASS STARTER AND OPERATE AT CONSTANT SPEED. ALL VAV BOXES ASSOCIATED WITH THE SYSTEM, THROUGH THE DDC, OPEN TO MAXIMUM CFM WHEN SUPPLY FAN IS PLACED IN THE MANUAL BY-PASS POSITION. AN ALARM SHALL BE SENT TO THE BMS.
ENERGY RECOVERY UNIT CONTROL
THE ENERGY RECOVERY UNIT IS INTERLOCKED TO OPERATE UNDER ITS OWN CONTROL TO MAINTAIN THE WHEEL LEAVING AIR TEMPERATURE SETPOINT (ADJ) AS SENSED BY T-1 WHENEVER THE AHU IS OPERATING.
T-1 SETPOINT:
ERU-1 - 52F
ERU-2 - 52F
ERU-3 - 52F
PROVIDE AN ALARM SIGNAL TO THE BMS INDICATING FAILURE OF WHEEL ROTATION.
TEMPERATURE CONTROL
PREHEAT COIL VALVES Y-1 AND COOLING COIL VALVES Y-2 ARE MODULATED THROUGH THE DDC TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE SETPOINT (35F, ADJ) AS SENSED BY TEMPERATURE SENSOR T-5.
AIR FLOW CONTROL
STATIC PRESSURE SENSOR SP-1, THROUGH THE DDC, MODULATES THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER ON SUPPLY FAN S-2 TO MAINTAIN THE DESIRED DUCT STATIC PRESSURE.
STATIC PRESSURE SET POINT RESET
THE STATIC PRESSURE SET POINT SHALL BE RESET TO MAINTAIN THE NEAR-WIDE-OPEN POSITION OF THE MOST OPEN VAV DAMPER.
PREHEAT PUMP
THE PREHEAT PUMP OPERATES WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN 45F. PRESSURE SWITCH TO ALARM ON LOSS OF FLOW.
FREEZE PROTECTION
FREEZE/STAT T-4 STOPS THE FANS AND SENDS AN ALARM TO THE DDC WHEN IT SENSES 35F AIR ENTERING THE COOLING COIL.
SMOKE DETECTION
WHEN SMOKE IS DETECTED BY DSD-1 OR DSD-2 IN THE SUPPLY OR EXHAUST DUCT, THE AIR HANDLING AND ENERGY RECOVERY UNITS ARE SHUT DOWN.
FILTER ALARM
THE DDC SYSTEM GENERATES A MAINTENANCE ALARM WHEN THE PRESSURE DROP ACROSS ANY OF THE FILTERS EXCEEDS THE MAXIMUM PRESSURE DROP SPECIFIED.
HIGH DUCT STATIC PRESSURE DETECTION
STATIC PRESSURE SWITCH SP-2 IN THE MAIN SUPPLY DUCT STOPS SUPPLY FAN S-1 & S-2 IF THE DUCT PRESSURE EXCEEDS A PRESSURE SET POINT OF 3" WG (ADJ).
FIELD ADJUSTMENT OF STATIC PRESSURE SETPOINTS
THESE SETPOINTS ARE RECOMMENDED VALUES AND SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.



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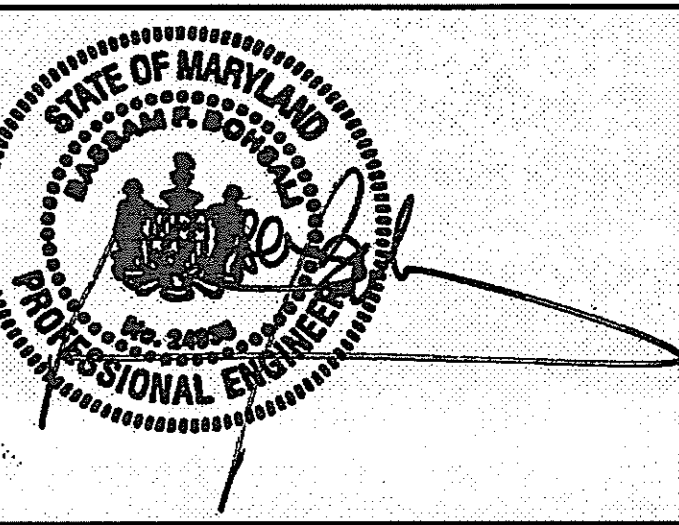
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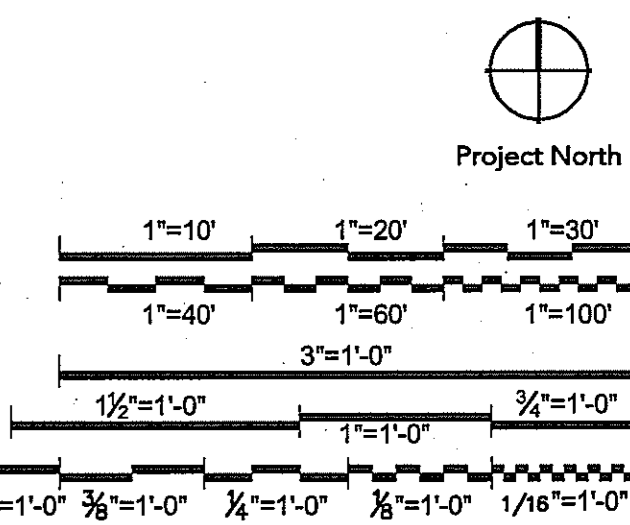
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APPENDIX PB-10 DATE 05/13/05

Seals and Signatures



Graphic Scales DATE



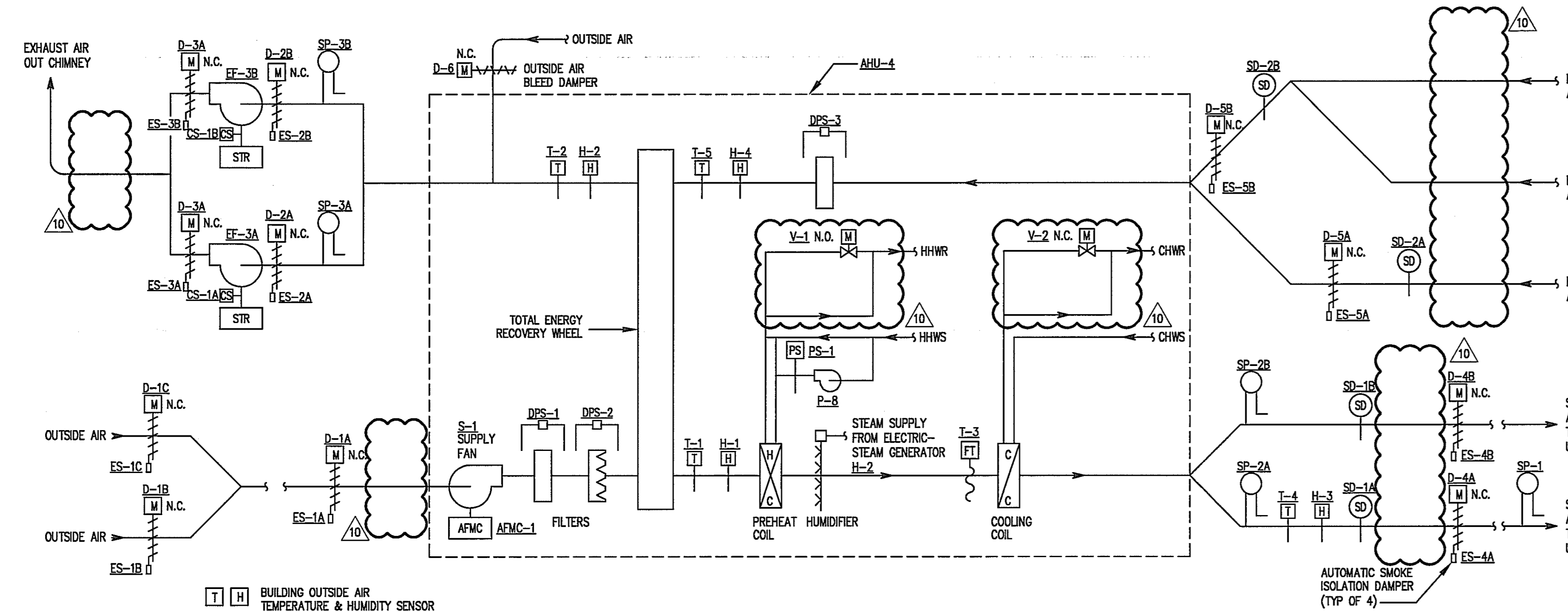
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AUTOMATIC CONTROLS

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J-494-020-002 25379.000
DGS Project Number SG Project Number

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Drawing Number



GENERAL

AHU-4 IS STARTED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH IS KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED ONLY FOR MAINTENANCE PURPOSES.

EXHAUST DAMPERS D-2A AND D-3A ARE PAIRED, RESPECTIVELY, WITH DAMPERS D-2B AND D-3B. DAMPERS D-2 AND D-3 DESIGNATIONS USED IN THE SEQUENCE ARE INTENDED TO REPRESENT ANY DAMPER PAIRING (I.E., D-2A & D-3A; D-2B & D-3B).

WHEN AHU-3 OR THE UNIT (AHU-4) IS COMMANDED TO START, INTAKE DAMPERS D-1A, -1B & -1C OPEN FULLY. WHEN AHU-4 IS COMMANDED TO START, SMOKE ISOLATION DAMPERS D-4A, -4B, -4C & -4D OPEN FULLY. UPON PROOF BY DAMPER END SWITCHES THAT THE DAMPERS ARE OPEN, SUPPLY AIR FAN S-1 SHALL BE COMMANDED TO START WITH THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER (AFMC) AT MINIMUM SPEED. WHEN MINIMUM SUPPLY AIRFLOW IS REACHED LEAD EXHAUST FAN SHALL BE COMMANDED TO START. THE BMS OPERATOR SHALL ASSIGN THE LEAD EXHAUST FAN. IF THE LEAD EXHAUST FAN FAILS TO START, AS SENSED BY ITS RESPECTIVE CURRENT SWITCH, AN ALARM SHALL BE SENT TO THE BMS. THE LEAD EXHAUST FAN STOPPED AND THE STANDBY EXHAUST FAN STARTED. IF THE STANDBY EXHAUST FAN FAILS TO START, AS SENSED BY ITS RESPECTIVE CURRENT SWITCH, AN ALARM SHALL BE SENT TO THE BMS, AND THE ENTIRE UNIT STOPPED. THE CONTROL ALGORITHMS ARE ALLOWED TO FUNCTION WHEN THE UNIT STARTS.

WHEN THE UNIT IS COMMANDED TO STOP, ADJUSTABLE FREQUENCY MOTOR CONTROLLER ON SUPPLY FAN S-1 SHALL REDUCE TO MINIMUM SPEED. WHEN MINIMUM SUPPLY AIRFLOW IS REACHED, THE LEAD EXHAUST FAN IS STOPPED. SUPPLY FAN S-1 SHALL BE COMMANDED TO STOP. WHEN AHU-3 AND AHU-4 THE UNIT IS OFF, INTAKE DAMPERS D-1A, -1B & -1C CLOSE. WHEN AHU-4 IS OFF, SMOKE ISOLATION DAMPERS D-4A, -4B, -4C & -4D, AND LEAD EXHAUST FAN EXHAUST DAMPERS D-2 & D-3 CLOSE.

ALL VALVES AND DAMPERS RETURN TO THEIR NORMAL POSITIONS WHENEVER THE UNIT IS NOT IN OPERATION.

EMERGENCY POWER

ALL CONTROL DEVICES SHALL BE CONNECTED TO EMERGENCY POWER.

EMERGENCY CONSTANT SPEED OPERATION

UPON FAILURE OF THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER, THE SUPPLY FAN MAY BE STARTED/STOPPED MANUALLY THROUGH THE BY-PASS STARTER AND OPERATE AT CONSTANT SPEED. ALL VAV BOXES ASSOCIATED WITH THE SYSTEM, THROUGH THE DDC, OPEN TO MAXIMUM CFM WHEN SUPPLY FAN IS PLACED IN THE MANUAL BY-PASS POSITION. AN ALARM SHALL BE SENT TO THE BMS.

ENERGY RECOVERY WHEEL CONTROL

THE ENERGY RECOVERY WHEEL IS INTERLOCKED TO OPERATE UNDER ITS OWN CONTROL TO MAINTAIN THE WHEEL LEAVING AIR TEMPERATURE SETPOINT (55F, ADJ) AS SENSED BY TEMPERATURE SENSOR T-1 DURING HEATING MODE WHENEVER THE AHU IS OPERATING. PROVIDE AN ALARM SIGNAL TO THE BMS INDICATING FAILURE OF WHEEL ROTATION. ALL AVAILABLE POINTS SHALL BE TIED INTO THE BMS.

TEMPERATURE CONTROL

PREHEAT COIL VALVES V-1 AND COOLING COIL VALVES V-2 MODULATED THROUGH THE DDC TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE OF 55F (ADJ) AS SENSED BY TEMPERATURE SENSOR T-4.

RELATIVE HUMIDITY CONTROL

HUMIDIFIER H-2 SHALL OPERATE UNDER ITS OWN CONTROL TO MAINTAIN THE MINIMUM EXHAUST AIR RELATIVE HUMIDITY SETPOINT OF 30% (ADJ) AS SENSED BY H-4. THE FOLLOWING POINTS SHALL BE COMMUNICATED TO THE BMS: ON/OFF STATUS AND GENERAL CONTROL PANEL ALARM.

SA TEMPERATURE RESET

THE UNIT SHALL RUN CONTINUOUSLY. OCCUPIED/UNOCCUPIED MODES SHALL BE PROGRAMMED AT THE BMS BASED ON TIME-OF-DAY SCHEDULES AND HOLIDAYS. UNOCCUPIED MODE MAY BE OVERRIDDEN AT THE ROOM TEMPERATURE CONTROLLER. OCCUPIED/UNOCCUPIED/HEATING/COOLING TEMPERATURE SETPOINTS SHALL BE EXECUTED AT THE DDC-VAV BOX CONTROLLER. WHEN THE UNIT IS IN BOTH UNOCCUPIED AND COOLING MODES OF OPERATION, THE SA TEMPERATURE SETPOINT SHALL BE RESET TO 60F (ADJ).

SUPPLY AIR FLOW CONTROL

STATIC PRESSURE SENSOR SP-1, THROUGH THE DDC, MODULATES THE ADJUSTABLE FREQUENCY MOTOR CONTROLLER ON SUPPLY FAN S-1 TO MAINTAIN THE DESIRED DUCT STATIC PRESSURE.

STATIC PRESSURE SET POINT RESET

THE STATIC PRESSURE SET POINT SHALL BE RESET TO MAINTAIN THE NEAR-WIDE-OPEN POSITION OF THE MOST OPEN VAV DAMPER.

EXHAUST AIR FLOW CONTROL

EXHAUST FANS EF-3A AND -3B OPERATE AT CONSTANT VOLUME TO MAINTAIN CONSTANT EXHAUST VELOCITIES OUT THE STACK. STATIC PRESSURE SENSOR SP-3 MODULATES OUTSIDE AIR DAMPER D-6 TO MAINTAIN A CONSTANT STATIC PRESSURE IN THE EXHAUST DUCT.

PREHEAT PUMP

PREHEAT PUMP P-8 OPERATES WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN 45F. PRESSURE SWITCH TO ALARM ON LOSS OF FLOW.

FREEZE PROTECTION

FREEZESTAT T-3 STOPS THE FANS AND SENDS AN ALARM TO THE DDC WHEN IT SENSES 35F AIR ENTERING THE COOLING COIL.

SMOKE DETECTION

WHEN SMOKE IS DETECTED BY SD-1A, -1B, -2A OR -2B IN THE SUPPLY OR EXHAUST DUCTS, AHU-4 AND THE LEAD EXHAUST FAN SHALL BE SHUTDOWN AND ALL DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS.

FILTER ALARM

THE DDC SYSTEM GENERATES A MAINTENANCE ALARM WHEN THE PRESSURE DROP ACROSS ANY OF THE FILTERS EXCEEDS THE MAXIMUM PRESSURE DROP SPECIFIED.

HIGH DUCT STATIC PRESSURE DETECTION

STATIC PRESSURE SWITCHES SP-2A AND -2B IN THE MAIN SUPPLY DUCTS STOP SUPPLY FAN S-1 IF THE DUCT PRESSURE EXCEEDS AN OPERATING PRESSURE SET POINT OF 3" WG (ADJ).

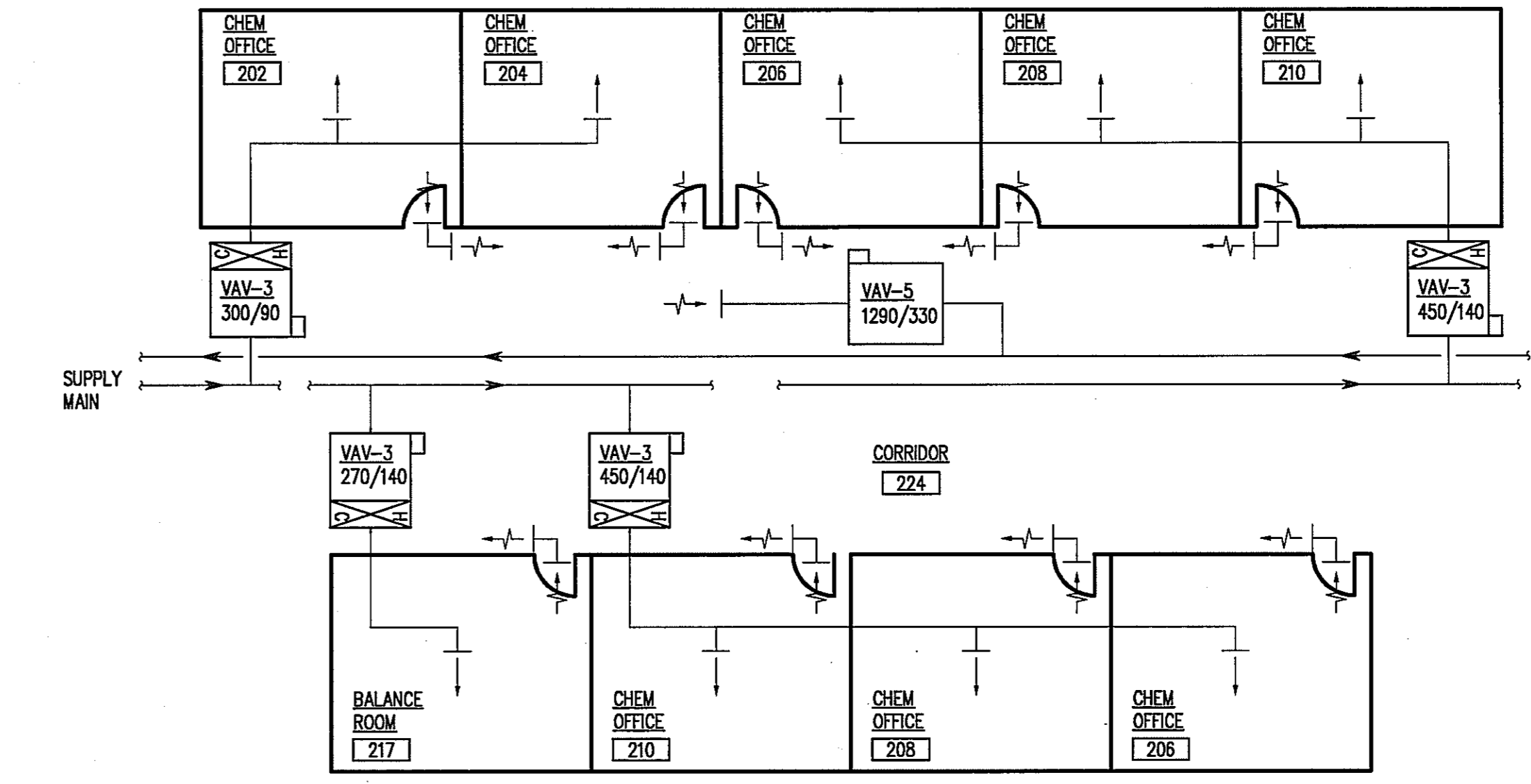
FIELD ADJUSTMENT OF STATIC PRESSURE SETPOINTS

THESE SETPOINTS ARE RECOMMENDED VALUES AND SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

SYSTEM POINT LIST

| SYSTEM POINT DESCRIPTION | ANALOG | | BINARY | | SYSTEM FEATURES | | NOTES |
|---|-------------|-----------------------|--------|----------------|-----------------|------------|------------------------------------|
| | INPUT | OUTPUT | INPUT | OUTPUT | ALARMS | | |
| | TEMPERATURE | DIFFERENTIAL PRESSURE | ON/OFF | DRIVE BYPASSED | STATUS | START/STOP | |
| OUTSIDE AIR DAMPERS | X | | | X | | | D-1A, -1B & -1C |
| OUTSIDE AIR BLEED DAMPER | X | | X | | | | D-6 |
| EXHAUST AIR DAMPERS | X | | | X | | | D-2A & -3A, D-2B & -3B |
| SUPPLY AIR SMOKE DAMPERS | X | | | X | | | D-4A & -4B |
| EXHAUST AIR SMOKE DAMPERS | X | | | X | | | D-5A & -5B |
| OUTSIDE AIR DAMPER END SWITCHES | X | | X | | | | ES-1A, -1B & -1C |
| EXHAUST AIR DAMPER END SWITCHES | X | | X | | | | ES-2A & -3A, ES-2B & -3B |
| SUPPLY AIR SMOKE DAMPER END SWITCHES | X | | X | | X | | ES-4A & -4B |
| EXHAUST AIR SMOKE DAMPER END SWITCHES | X | | X | | X | | ES-5A & -5B |
| BUILDING OUTSIDE AIR TEMPERATURE SENSOR | X | X | | | | | COMMON BUILDING TEMPERATURE SENSOR |
| ERW SUPPLY AIR TEMPERATURE SENSOR | X | | X | | | | T-1 |
| ERW EXHAUST AIR TEMPERATURE SENSOR | X | | X | | | | T-2 |
| FREEZESTAT | X | | | X | | | T-3 |
| SUPPLY AIR TEMPERATURE SENSOR | X | X | | | | | T-4 |
| EXHAUST AIR TEMPERATURE SENSOR (FROM ZONES) | X | X | | | | | T-5 |
| BUILDING OUTSIDE AIR HUMIDITY SENSOR | X | X | | | | | COMMON BUILDING HUMIDITY SENSOR |
| ERW SUPPLY AIR HUMIDITY SENSOR | X | X | | | | | H-1 |
| ERW EXHAUST AIR HUMIDITY SENSOR | X | X | | | | | H-2 |
| SUPPLY AIR HUMIDITY SENSOR | X | X | | | | | H-3 |
| EXHAUST AIR HUMIDITY SENSOR (FROM ZONES) | X | X | | | | | H-4 |
| ELECTRIC-STEAM GENERATOR | X | | | X | | | ELECTRIC-STEAM GENERATOR H-2 |
| SUPPLY DUCT SMOKE DETECTORS | X | | X | | | | SD-1A & -1B |
| EXHAUST DUCT SMOKE DETECTORS | X | | X | | | | SD-2A & -2B |
| PREHEAT COIL VALVES | X | | X | | | | V-1 |
| COOLING COIL VALVES | X | | X | | | | V-2 |
| PREHEAT COIL PUMP | X | | X | X | | | P-8 |
| PREHEAT COIL PUMP PRESSURE SWITCH | X | | X | | | X | PS-1 |
| SUPPLY FAN | X | | X | X | | | S-1 |
| EXHAUST FANS | X | | X | X | | | EF-3A & -3B |
| ADJUSTABLE FREQUENCY MOTOR CONTROLLER | X | | X | X | X | X | AFMC-1 |
| EXHAUST FAN CURRENT SWITCHES | X | | X | | | | CS-1 & -2 |
| OUTSIDE AIR PRIMARY FILTER DPS | X | | X | | | | DPS-1 |
| OUTSIDE AIR SECONDARY FILTER DPS | X | | X | | | | DPS-2 |
| EXHAUST AIR FILTER DPS | X | | X | | | | DPS-3 |
| SUPPLY AIR STATIC PRESSURE SENSOR | X | X | X | | | | SP-1 |
| HIGH DUCT STATIC PRESSURE SWITCHES | X | | X | | | | SP-2A & -2B |
| EXHAUST AIR STATIC PRESSURE SENSOR | X | X | X | | | | SP-3A & -3B |

GENERAL NOTES:
1. CONTRACTOR SHALL PROVIDE ALL REQUIRED POINTS TO ACCOMPLISH THE AUTOMATIC CONTROL REQUIREMENTS OF THE MECHANICAL WORK. REFER TO SYSTEM SCHEMATIC, SEQUENCE OF OPERATION AND CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.



CHEMISTRY LABORATORY SUITE PRESSURIZATION

THE CHEMISTRY LABORATORY PRESSURIZATION SYSTEM (SECOND FLOOR, NORTH WING) COMPRISES: FOUR (4) SUPPLY AIR VOLUME CONTROL BOXES SERVING NON-LABORATORY SPACES (OFFICES 202, 204, 206, 208, 210, 225, 227 & 229 AND BALANCE ROOM 217) AND ONE (1) EXHAUST AIR VOLUME CONTROL BOX SERVING CORRIDOR 224.

AN AIRFLOW TRACKING SCHEME SHALL BE USED TO MAINTAIN POSITIVE PRESSURIZATION ON THIS FLOOR BASED ON A FLOW DIFFERENTIAL BETWEEN SUPPLY AND EXHAUST TO NON-LABORATORY SPACES.

VOLUME CONTROL BOX SUPPLY AIRFLOWS ARE MEASURED CONTINUOUSLY. THE BMS MODULATES THE EXHAUST AIR DAMPER TO MAINTAIN A VOLUMETRIC FLOW DIFFERENTIAL BETWEEN TOTAL SUPPLY AND TOTAL EXHAUST FLOW VOLUMES OF 180 CFM (ADJ).



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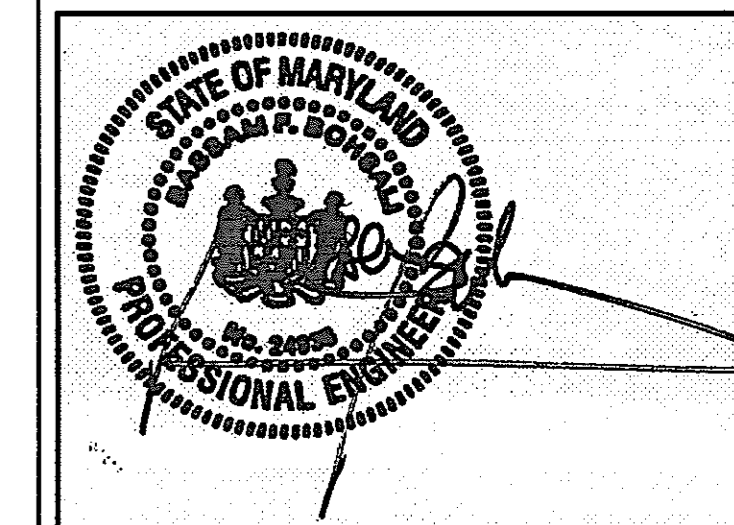
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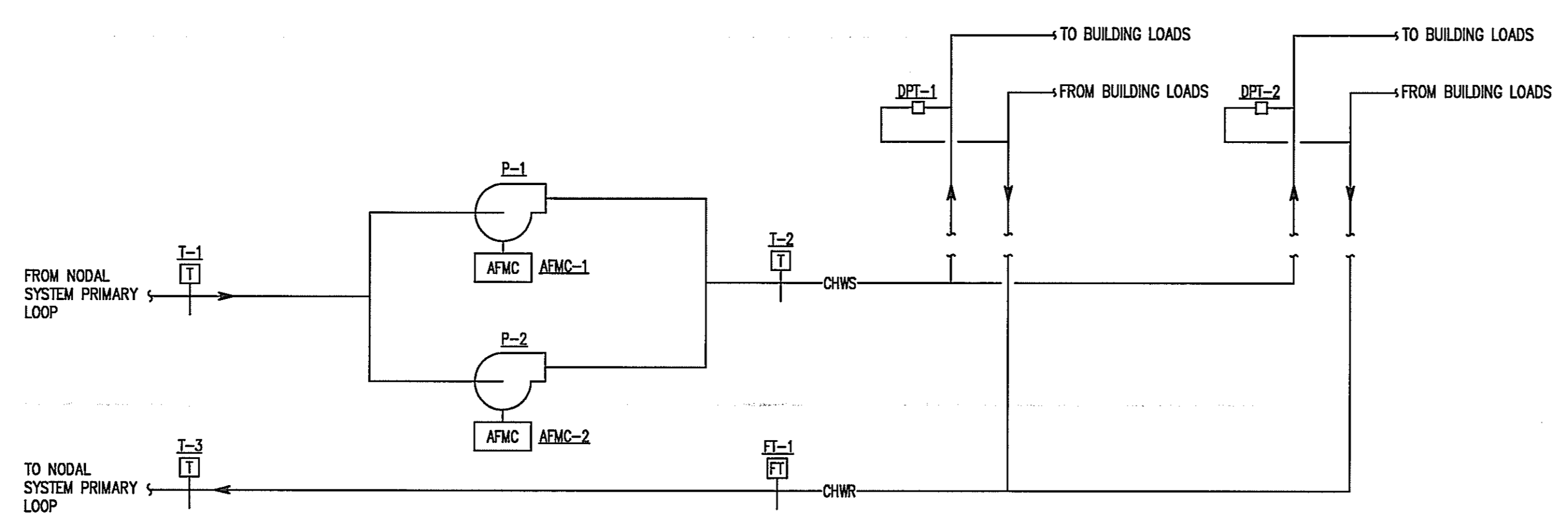


AUTOMATIC CONTROLS

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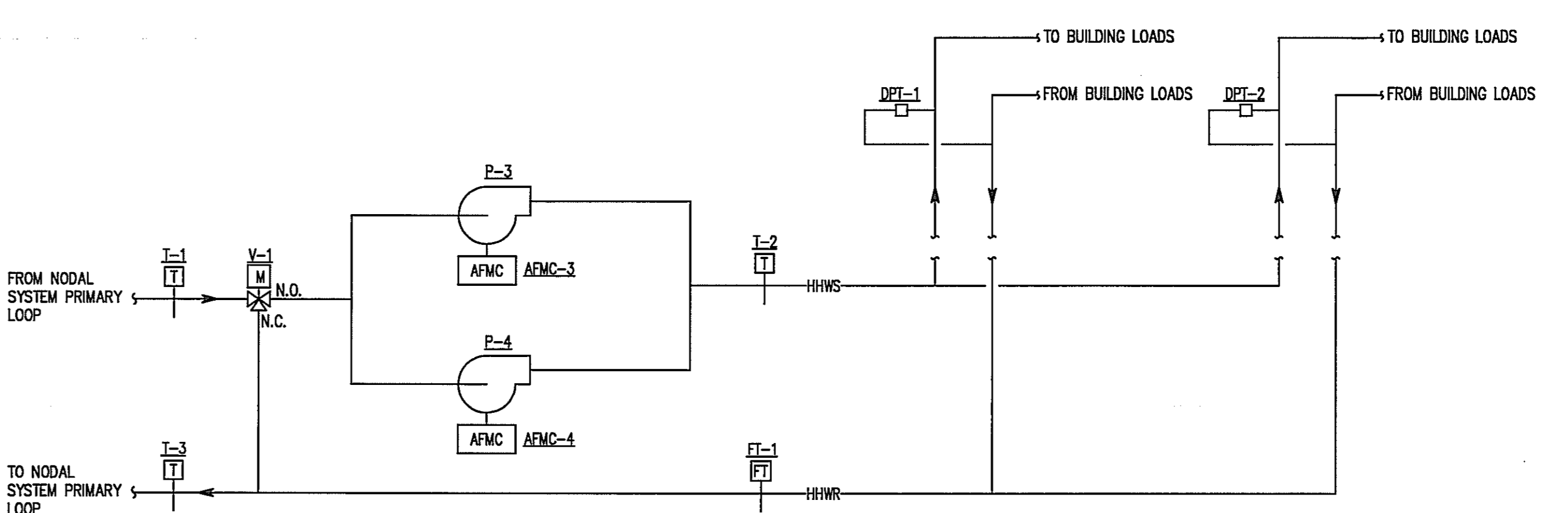
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SECONDARY CHILLED WATER CONTROL SCHEMATIC

RUN CONDITIONS
PUMPS P-1 & P-2 ARE STARTED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH IS KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED ONLY FOR MAINTENANCE PURPOSES.
CHILLED WATER PUMPS SHALL BE ENABLED WHENEVER ONE OR MORE COILS CALL FOR COOLING AND WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 52°F (ADJ). TO PREVENT SHORT CYCLING, THE CHILLED WATER PUMP SHALL RUN FOR AND BE OFF FOR A MINIMUM OF 20 MINUTES (ADJ).
LEAD/LAG OPERATION
THE TWO PUMPS SHALL OPERATE IN LEAD/LAG FASHION. THE DESIGNATED LEAD PUMP IS STARTED MANUALLY OR AUTOMATICALLY BY THE DDC CONTROLLER. IF THE LEAD PUMP FAILS, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF. ON DECREASING DIFFERENTIAL PRESSURE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN THE RISERS' DIFFERENTIAL PRESSURE SETPOINTS. THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS:
• MANUALLY THROUGH SOFTWARE SWITCH
• IF PUMP RUNTIME IS EXCEEDED
• MONTHLY (ADJ)
THE FOLLOWING ALARMS SHALL BE PROVIDED:
• STATUS (FAILURE)
• DRIVE BYPASSED
• RUNTIME EXCEEDED
WATER DIFFERENTIAL PRESSURE CONTROL
THE DDC MONITORS THE DIFFERENTIAL PRESSURE ACROSS THE BUILDING CHILLED WATER SUPPLY AND RETURN PIPING AS SENSED BY DPT-1 & DPT-2 AND MODULATES THE ADJUSTABLE FREQUENCY MOTOR CONTROLLERS (AFMC-1 & AFMC-2) TO MAINTAIN THEIR DIFFERENTIAL PRESSURE SET POINTS OF xx FT WG (ADJ) AND yy FT WG (ADJ), RESPECTIVELY. AFMC MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ).
ON DROPPING DIFFERENTIAL PRESSURE, THE AFMCS SHALL STAGE ON AND RUN TO MAINTAIN SETPOINT AS FOLLOWS:
• THE DDC SHALL MODULATE THE LEAD AFMC TO MAINTAIN SETPOINT.
• IF THE LEAD AFMC SPEED IS GREATER THAN 80%, THE LAG AFMC SHALL STAGE ON.
• THE LAG AFMC SHALL RAMP UP TO MATCH THE LEAD AFMC SPEED AND THEN RUN IN UNISON WITH THE LEAD AFMC TO MAINTAIN SETPOINT.
ON RISING DIFFERENTIAL PRESSURE, THE AFMCS SHALL STAGE OFF AS FOLLOWS:
• IF THE AFMCS' SPEEDS DROP BELOW 30% (ADJ), THE LAG AFMC SHALL STAGE OFF.
• THE LEAD AFMC SHALL RUN TO MAINTAIN SETPOINT.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH WATER DIFFERENTIAL PRESSURE (25% (ADJ) GREATER THAN SETPOINT)
• LOW WATER DIFFERENTIAL PRESSURE (25% (ADJ) LOWER THAN SETPOINT)
• AFMC FAULT
FIELD ADJUSTMENT OF WATER DIFFERENTIAL PRESSURE SETPOINTS
THESE SETPOINTS ARE RECOMMENDED VALUES AND SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

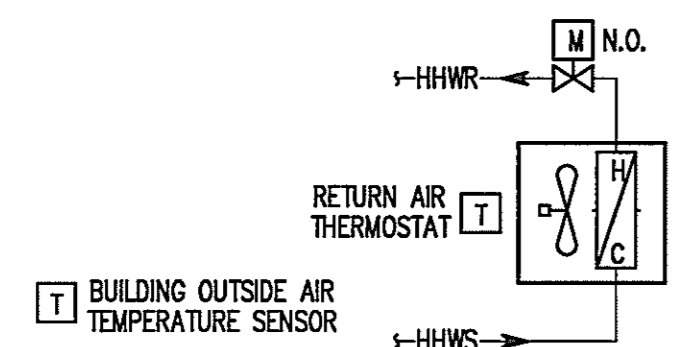
SYSTEM POINT LIST table with columns for SYSTEM POINT DESCRIPTION, ANALOG (INPUT, OUTPUT), BINARY (INPUT, OUTPUT), SYSTEM FEATURES (ALARMS), and NOTES.



SECONDARY HEATING HOT WATER CONTROL SCHEMATIC

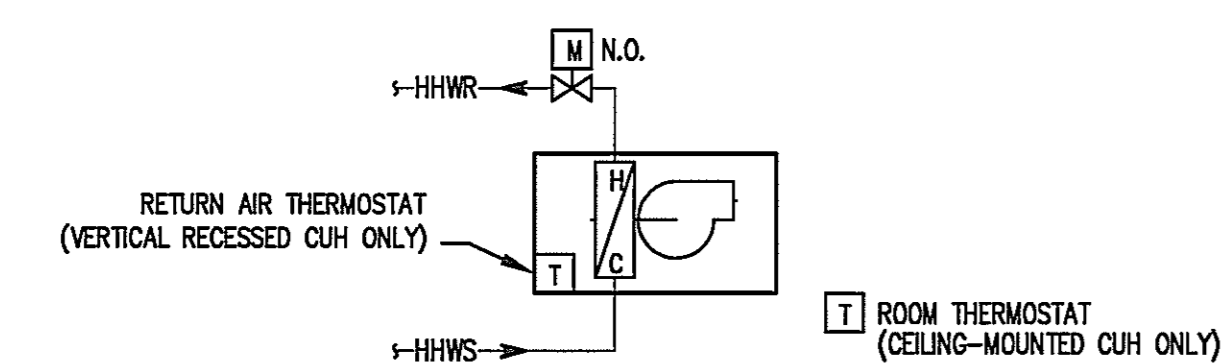
RUN CONDITIONS
PUMPS P-3 & P-4 ARE STARTED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH IS KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED ONLY FOR MAINTENANCE PURPOSES.
HEATING HOT WATER PUMPS SHALL BE ENABLED WHENEVER ONE OR MORE COILS CALL FOR HEATING. TO PREVENT SHORT CYCLING, THE HEATING HOT WATER PUMP SHALL RUN FOR AND BE OFF FOR A MINIMUM OF 20 MINUTES (ADJ).
LEAD/LAG OPERATION
THE TWO PUMPS SHALL OPERATE IN LEAD/LAG FASHION. THE DESIGNATED LEAD PUMP IS STARTED MANUALLY OR AUTOMATICALLY BY THE DDC CONTROLLER. IF THE LEAD PUMP FAILS, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF. ON DECREASING DIFFERENTIAL PRESSURE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN THE RISERS' DIFFERENTIAL PRESSURE SETPOINTS. THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS:
• MANUALLY THROUGH SOFTWARE SWITCH
• IF PUMP RUNTIME IS EXCEEDED
• MONTHLY (ADJ)
THE FOLLOWING ALARMS SHALL BE PROVIDED:
• STATUS (FAILURE)
• DRIVE BYPASSED
• RUNTIME EXCEEDED
WATER DIFFERENTIAL PRESSURE CONTROL
THE DDC MONITORS THE DIFFERENTIAL PRESSURE ACROSS THE BUILDING HEATING HOT WATER SUPPLY AND RETURN PIPING AS SENSED BY DPT-1 & DPT-2 AND MODULATES THE ADJUSTABLE FREQUENCY MOTOR CONTROLLERS (AFMC-3 & AFMC-4) TO MAINTAIN THEIR DIFFERENTIAL PRESSURE SET POINTS OF xx FT WG (ADJ) AND yy FT WG (ADJ), RESPECTIVELY. AFMC MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ).
ON DROPPING DIFFERENTIAL PRESSURE, THE AFMCS SHALL STAGE ON AND RUN TO MAINTAIN SETPOINT AS FOLLOWS:
• THE DDC SHALL MODULATE THE LEAD AFMC TO MAINTAIN SETPOINT.
• IF THE LEAD AFMC SPEED IS GREATER THAN 80%, THE LAG AFMC SHALL STAGE ON.
• THE LAG AFMC SHALL RAMP UP TO MATCH THE LEAD AFMC SPEED AND THEN RUN IN UNISON WITH THE LEAD AFMC TO MAINTAIN SETPOINT.
ON RISING DIFFERENTIAL PRESSURE, THE AFMCS SHALL STAGE OFF AS FOLLOWS:
• IF THE AFMCS' SPEEDS DROP BELOW 30% (ADJ), THE LAG AFMC SHALL STAGE OFF.
• THE LEAD AFMC SHALL RUN TO MAINTAIN SETPOINT.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH WATER DIFFERENTIAL PRESSURE (25% (ADJ) GREATER THAN SETPOINT)
• LOW WATER DIFFERENTIAL PRESSURE (25% (ADJ) LOWER THAN SETPOINT)
• AFMC FAULT
FIELD ADJUSTMENT OF WATER DIFFERENTIAL PRESSURE SETPOINTS
THESE SETPOINTS ARE RECOMMENDED VALUES AND SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.
MIXING VALVE CONTROL
THE DESIGN PLANT HEATING HOT WATER SUPPLY TEMPERATURE IS 160°F, BUT MAY BE RESET UPWARDS TO 200°F. MIXING VALVE, V-1, SHALL MODULATE SUPPLY AND RETURN PORTS TO MAINTAIN A BUILDING HEATING HOT WATER SUPPLY TEMPERATURE OF 160°F.

SYSTEM POINT LIST table with columns for SYSTEM POINT DESCRIPTION, ANALOG (INPUT, OUTPUT), BINARY (INPUT, OUTPUT), SYSTEM FEATURES (ALARMS), and NOTES.



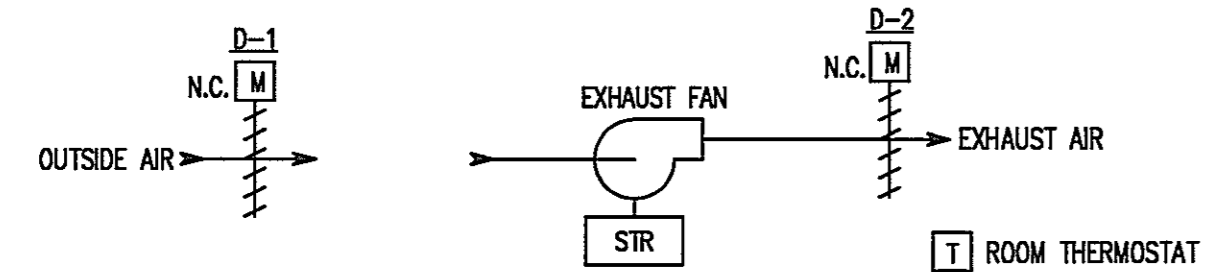
PROPELLER UNIT HEATER

RETURN AIR TEMPERATURE SENSOR (PROVIDED BY EQUIPMENT MANUFACTURER) MODULATES 2-WAY HEATING CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT OF 55F (ADJ.). FOR UNIT HEATERS IN PENTHOUSE MECHANICAL EQUIPMENT ROOM ONLY, FAN SHALL RUN CONTINUOUSLY TO ELIMINATE STRATIFICATION WHENEVER THE OUTDOOR TEMPERATURE IS BELOW 50F (ADJ.) AND/OR CONTROL VALVE IS OPEN. FOR ALL OTHER UNIT HEATERS, FAN SHALL BE INTERLOCKED TO RUN WHENEVER THE CONTROL VALVE IS OPEN.



CABINET UNIT HEATER

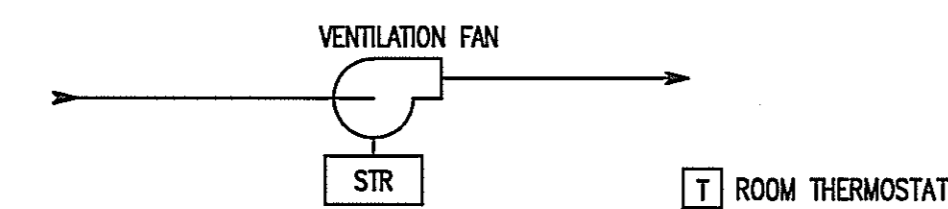
ROOM TEMPERATURE SENSOR (PROVIDED BY EQUIPMENT MANUFACTURER) CYCLES UNIT HEATER FAN AND MODULATES 2-WAY HEATING CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT OF 80F (ADJ.). REFER TO DRAWINGS FOR SPECIFIC LOCATION OF TEMPERATURE SENSOR (WALL-MOUNTED OR RETURN AIR).



MECHANICAL EQUIPMENT ROOM VENTILATION

FAN SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

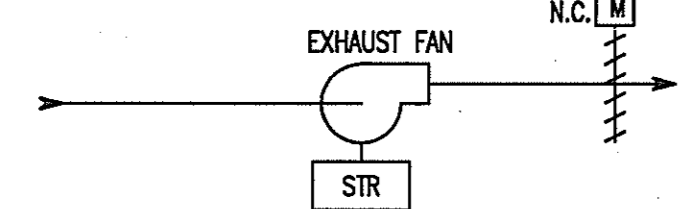
WHEN THE FAN IS OFF, OUTSIDE AND EXHAUST AIR DAMPERS, D-1 AND D-2, SHALL FULLY CLOSE. WHEN THE FAN IS COMMANDED TO START, OUTSIDE AND EXHAUST AIR DAMPERS SHALL OPEN FULLY. FAN SHALL CYCLE ON AND OFF WITH AN ADJUSTABLE TIME DELAY OF 15 MINUTES TO MAINTAIN A ROOM TEMPERATURE SETPOINT OF 85F (ADJ.) AS SENSED BY THE ROOM TEMPERATURE SENSOR. FANS ARE SIZED TO MAINTAIN A MAXIMUM SPACE TEMPERATURE OF 100F ABOVE AMBIENT, OR 100F. FAILURE TO MAINTAIN THIS HIGH TEMPERATURE LIMIT FOR 15 MINUTES (ADJ.) SHALL GENERATE AN ALARM AT THE BMS.



TYPICAL VENTILATION FAN (ELECTRICAL AND TELECOM CLOSETS & ELEVATOR MACHINE ROOMS)

FAN SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

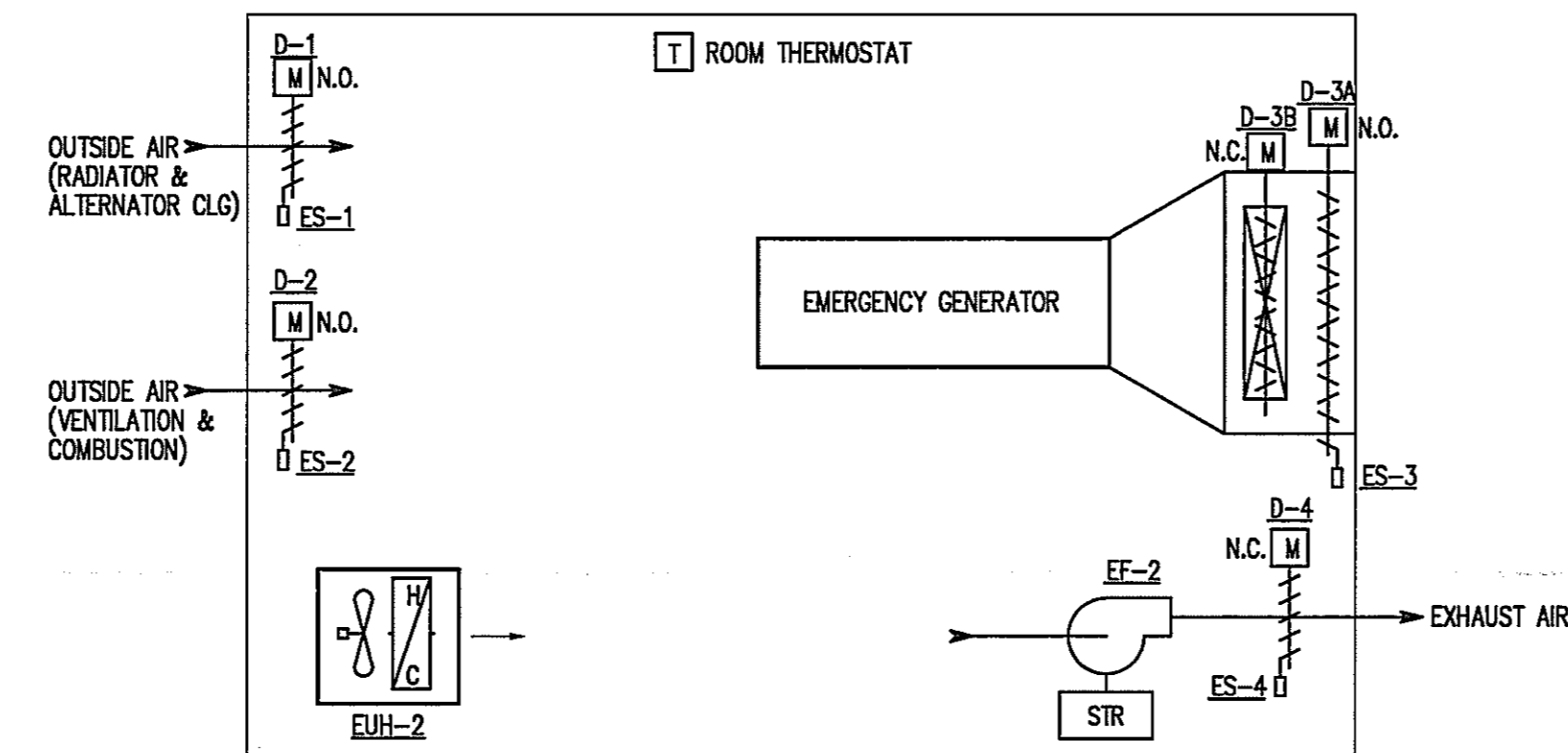
FAN SHALL CYCLE ON AND OFF WITH AN ADJUSTABLE TIME DELAY OF 15 MINUTES TO MAINTAIN A ROOM TEMPERATURE SETPOINT OF 85F (ADJ.) AS SENSED BY THE ROOM TEMPERATURE SENSOR. FANS SERVING ELECTRICAL CLOSETS ARE DESIGNED TO MAINTAIN A MAXIMUM TEMPERATURE OF 100F, BUT SHALL OPERATE AT SPACE TEMPERATURES EQUAL TO OR GREATER THAN 85F. FAILURE TO MAINTAIN THIS HIGH TEMPERATURE LIMIT FOR 15 MINUTES (ADJ.) SHALL GENERATE AN ALARM AT THE BMS.



TYPICAL TOILET EXHAUST FAN

EXHAUST FAN SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

WHEN THE EXHAUST FAN IS OFF, EXHAUST DAMPER SHALL FULLY CLOSE. WHEN THE EXHAUST FAN IS COMMANDED TO START, EXHAUST DAMPER SHALL OPEN FULLY. TOILET ROOM EXHAUST FANS SHALL BE INTERLOCKED TO RUN WHENEVER THEIR RESPECTIVE AHU SUPPLY FAN RUNS.



MAIN ELECTRICAL ROOM VENTILATION

GENERAL

FAN EF-2 SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

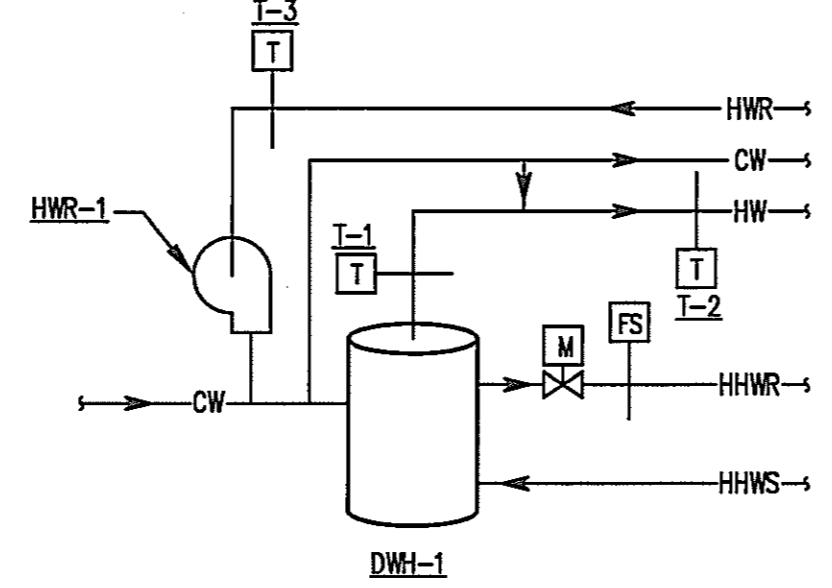
GENERATOR OFF

WHEN FAN EF-2 IS OFF, OUTSIDE AND EXHAUST AIR DAMPERS, D-2 AND D-4, SHALL FULLY CLOSE. WHEN THE FAN IS COMMANDED TO START, OUTSIDE AND EXHAUST AIR DAMPERS SHALL OPEN FULLY. UPON PROOF BY END SWITCHES THAT DAMPERS ARE OPEN, FAN SHALL START AND MAINTAIN A ROOM TEMPERATURE SETPOINT OF 85F (ADJ.) AS SENSED BY THE ROOM TEMPERATURE SENSOR. FAN IS SIZED TO MAINTAIN A MAXIMUM SPACE TEMPERATURE OF 100F (10F ABOVE AMBIENT). FAILURE TO MAINTAIN SPACE TEMPERATURE BELOW THIS HIGH TEMPERATURE LIMIT FOR 5 MINUTES (ADJ.) SHALL GENERATE AN ALARM AT THE BMS. FAN SHALL BE COMMANDED TO STOP WHENEVER THE SPACE TEMPERATURE DROPS TO 80F FOR 5 MINUTES (ADJ.).

ROOM TEMPERATURE SENSOR SHALL CYCLE ON/OFF ELECTRIC UNIT HEATER, EUH-2, TO MAINTAIN A MINIMUM SPACE TEMPERATURE SETPOINT OF 55F (ADJ.). FAILURE TO MAINTAIN LOW TEMPERATURE LIMIT OF 45F (ADJ.) FOR 5 MINUTES (ADJ.) SHALL GENERATE AN ALARM AT THE BMS.

GENERATOR ON

WHEN THE GENERATOR IS COMMANDED TO RUN, OUTSIDE AIR DAMPERS D-1 & D-2 AND EXHAUST AIR DAMPER D-3A SHALL OPEN FULLY. FAILURE OF DAMPERS TO OPEN SHALL GENERATE AN ALARM AT THE BMS. EF-2 AND EUH-2 SHALL BE LOCKED OUT WHENEVER THE GENERATOR IS RUNNING. ROOM TEMPERATURE SENSOR SHALL MODULATE EXHAUST AND RECIRCULATING DAMPERS D-3A AND D-3B TO MAINTAIN THE MINIMUM SPACE TEMPERATURE SETPOINT. WHEN THE GENERATOR IS OFF, OUTSIDE AIR DAMPERS D-1 & D-2 AND EXHAUST AIR DAMPERS D-3A & D-3B SHALL CLOSE.



DOMESTIC HOT WATER SYSTEM

GENERAL

UNDER NORMAL OPERATING CONDITIONS, DOMESTIC HOT WATER IS GENERATED BY WAY OF AN INDIRECT HOT WATER HEAT EXCHANGER WITH HEATING HOT WATER FROM THE CAMPUS NODAL PLANT.

WATER HEATER TEMPERATURE CONTROL

2-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN A STORAGE WATER TEMPERATURE OF 140F (ADJ.).

ELECTRIC BACKUP CONTROL

AN AUXILIARY ELECTRIC HEATER IS PROVIDED AS BACKUP AND MAY BE STAGED ON / OFF MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. AN ON / OFF STATUS SIGNAL SHALL BE COMMUNICATED TO THE BMS.

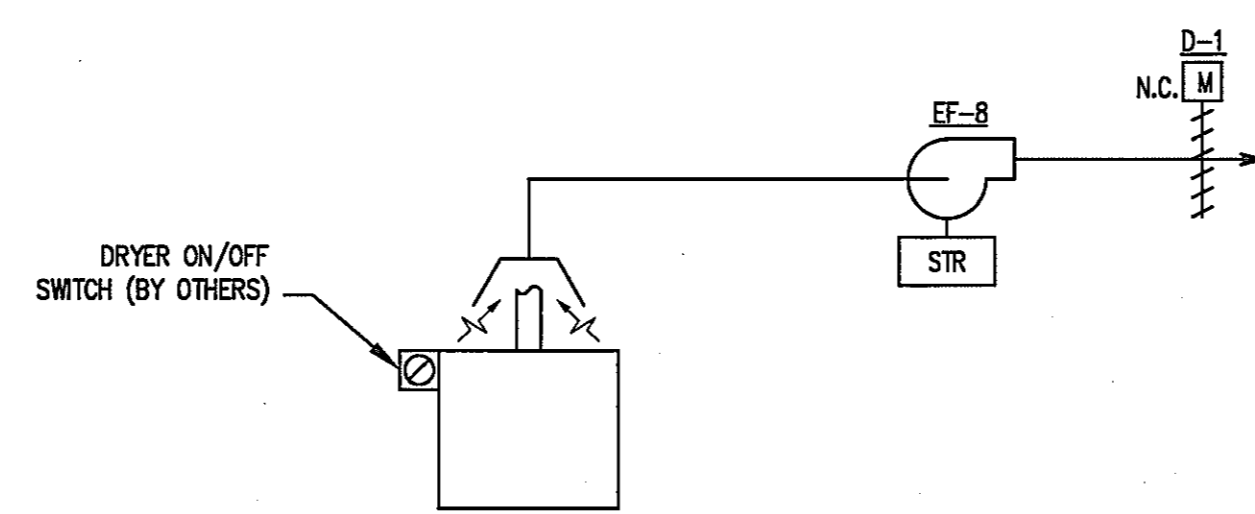
THE ELECTRIC HEATER SHALL BE STAGED ON IN THE EVENT OF THE FOLLOWING:

- LOSS OF FLOW AS SENSED BY THE FLOW SWITCH IN THE HHWR LINE OR,
- THE WATER HEATER DISCHARGE HOT WATER TEMPERATURE, AS SENSED BY T-1, DROPS BELOW THE LOW TEMPERATURE LIMIT OF 120F

EITHER CONDITION SHALL GENERATE AN ALARM AT THE BMS.

HOT WATER REDCIRCULATION CONTROL

HOT WATER RETURN TEMPERATURE SENSOR, T-3, SHALL START PUMP HWR-1 WHENEVER THE RETURN WATER TEMPERATURE REACHES THE LOW TEMPERATURE LIMIT OF 95F (ADJ.). PUMP HWR-1 SHALL STOP WHEN THE HIGH TEMPERATURE LIMIT OF 110F (ADJ.) IS REACHED.



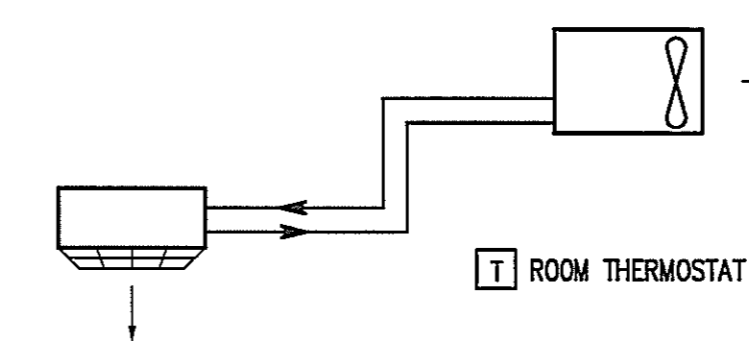
DRYER EXHAUST

FAN EF-8 SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

WHEN FAN EF-8 IS OFF, EXHAUST AIR DAMPER, D-1, SHALL FULLY CLOSE. WHEN THE FAN IS COMMANDED TO START, EXHAUST AIR DAMPER SHALL OPEN FULLY. EF-8 SHALL BE COMMANDED TO RUN WHENEVER THE SUPPLY FAN FOR AHU-1 IS ON AND SHALL RUN CONTINUOUSLY.

SYSTEM POINT LIST table for Main Electrical Room with columns for System Point Description, Analog Input/Output, Binary Input/Output, System Features (Alarms), and Notes.

SYSTEM POINT LIST table for Domestic Hot Water System with columns for System Point Description, Analog Input/Output, Binary Input/Output, System Features (Alarms), and Notes.

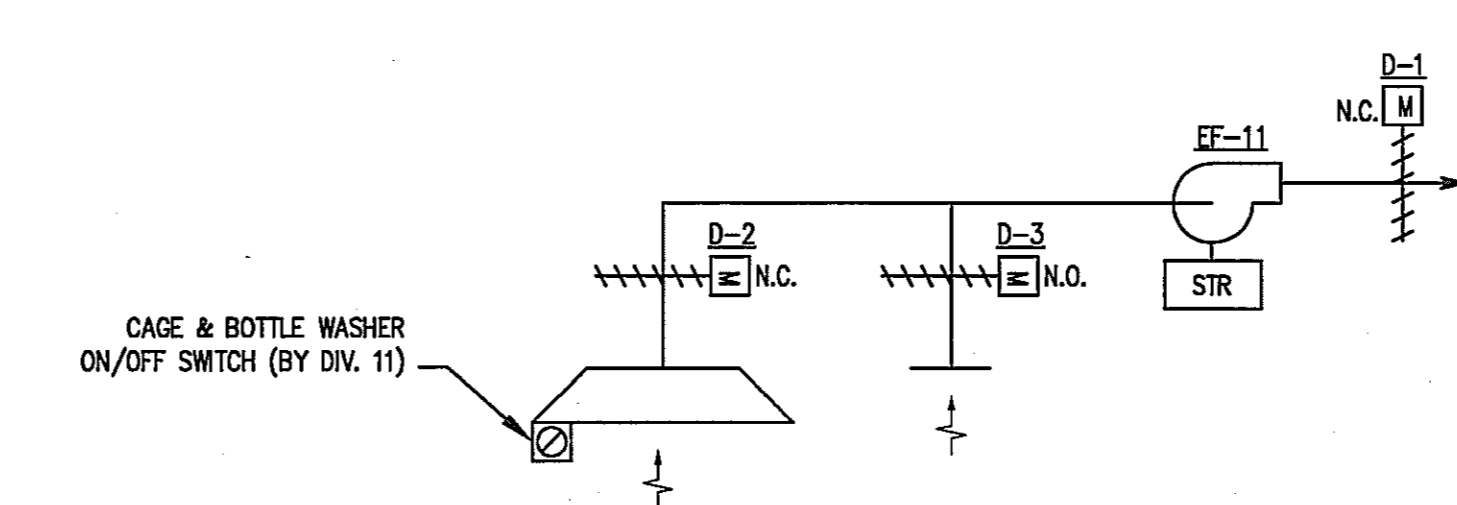


NMR SPLIT SYSTEM AC UNIT

AC UNIT SHALL BE INTERLOCKED TO RUN WHENEVER THE NMR IS ON. ROOM TEMPERATURE SENSOR SHALL MODULATE SUPPLY FAN BETWEEN LOW AND HIGH SPEEDS OR OFF TO MAINTAIN ROOM SETPOINT TEMPERATURES:

- OCCUPIED HEATING SETPOINT: 70F
- OCCUPIED COOLING SETPOINT: 76F

THE UNIT CONTROL PANEL SHALL RELAY ON/OFF STATUS AND COMMON PANEL ALARM TO THE BMS.

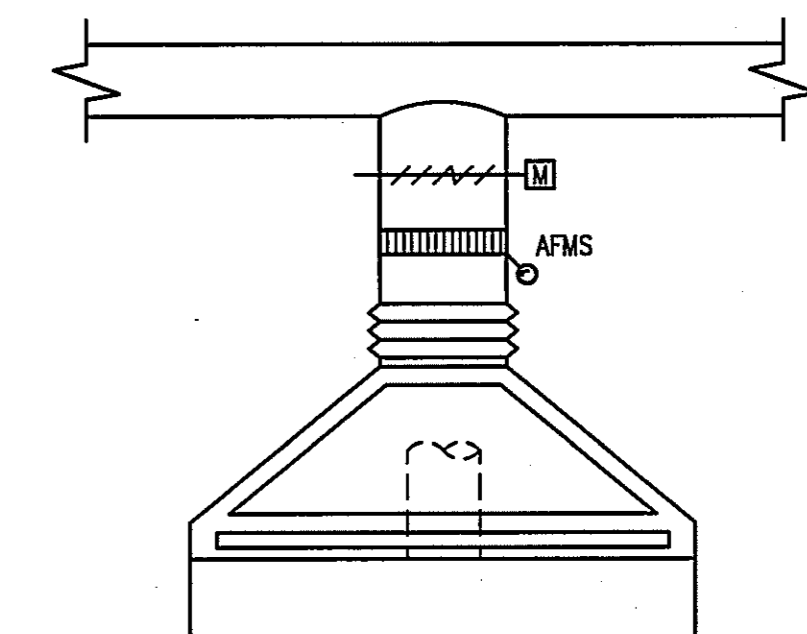


CAGE & BOTTLE WASHER EXHAUST

FAN EF-11 SHALL BE STARTED AND STOPPED MANUALLY OR AUTOMATICALLY THROUGH THE DDC OR REMOTELY AT THE BMS. THE H-O-A SWITCH SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF ARE USED FOR MAINTENANCE PURPOSES.

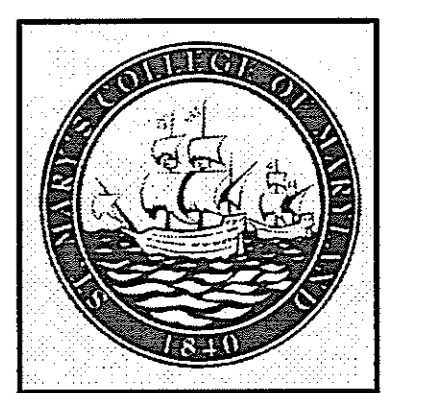
WHEN FAN EF-11 IS OFF, EXHAUST AIR DAMPER, D-1, SHALL FULLY CLOSE. WHEN THE FAN IS COMMANDED TO START, EXHAUST AIR DAMPER SHALL OPEN FULLY. EF-11 SHALL BE COMMANDED TO RUN WHENEVER THE SUPPLY FAN FOR AHU-1 IS ON AND SHALL RUN CONTINUOUSLY.

CAGE AND BOTTLE WASHER DAMPER, D-2, SHALL BE INTERLOCKED THROUGH A SET OF DRY CONTACTS TO OPEN WHENEVER THE CAGE & BOTTLE WASHER IS SWITCHED ON. WHEN DAMPER D-2 IS OPENED, GENERAL EXHAUST DAMPER D-3 SHALL CLOSE. WHEN DAMPER D-2 IS CLOSED, GENERAL EXHAUST DAMPER D-3 SHALL OPEN.



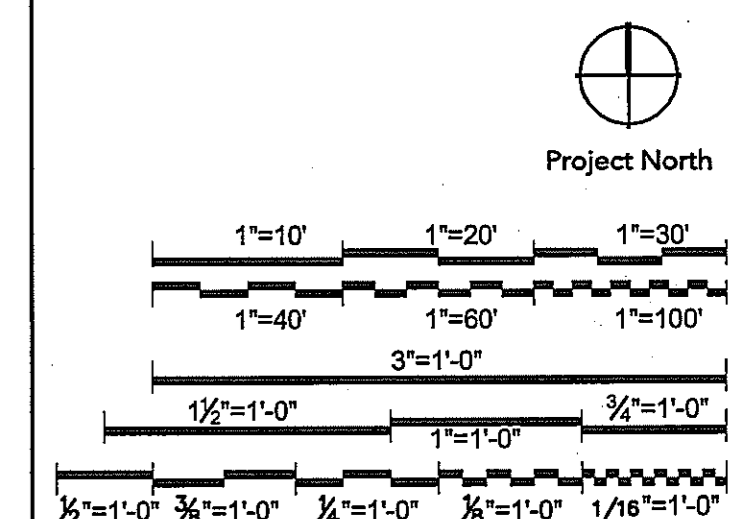
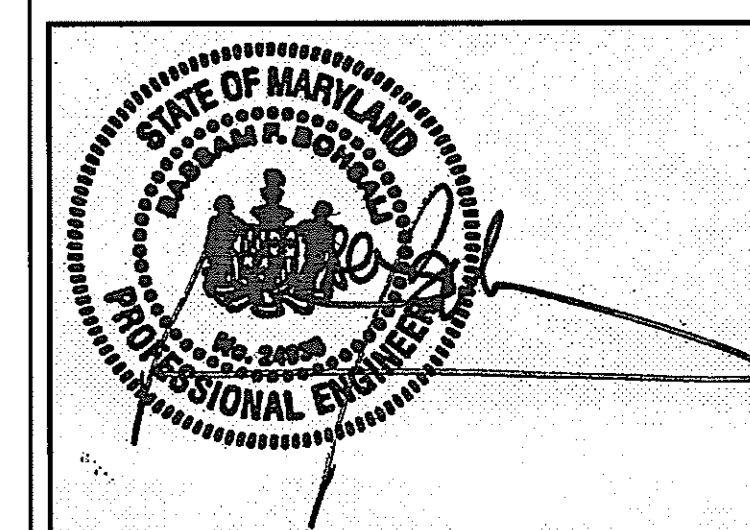
BIO SAFETY CABINET EXHAUST

EXHAUST AIR DAMPER SHALL BE INTERLOCKED TO OPEN WHENEVER THE BSC FAN IS ON AND SHALL CLOSE WHENEVER THE BSC FAN IS OFF.



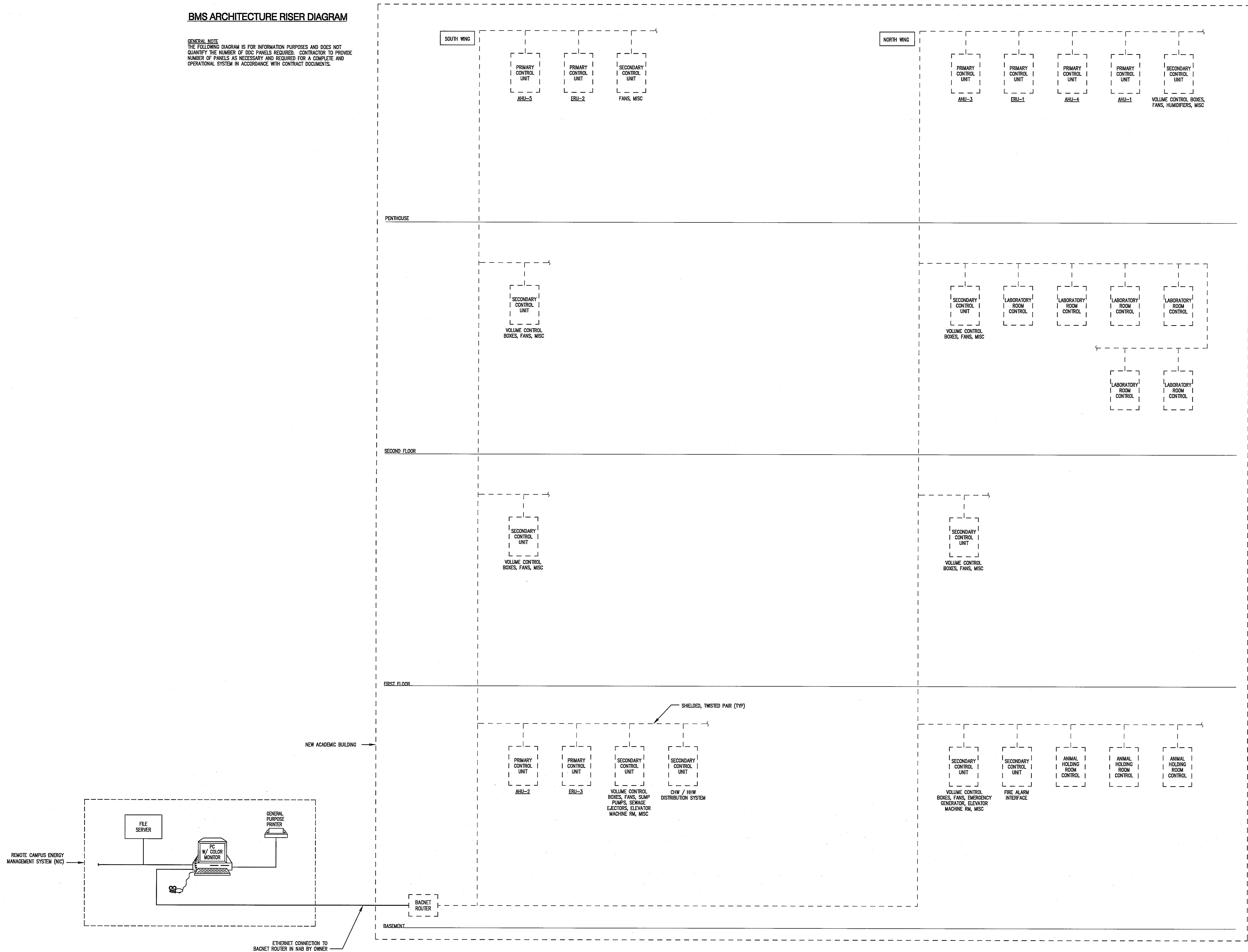
Approval form with fields for Name, Title, Date, and Project Manager.

Table for tracking issued forms and signatures, with columns for Issued For, Rev, and Date.



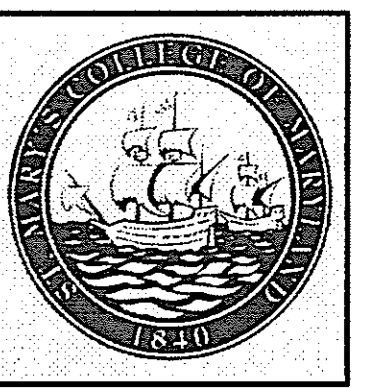
BMS ARCHITECTURE RISER DIAGRAM

GENERAL NOTE
 THE FOLLOWING DIAGRAM IS FOR INFORMATION PURPOSES AND DOES NOT QUANTIFY THE NUMBER OF I/O PANELS REQUIRED. CONTRACTOR TO PROVIDE NUMBER OF PANELS AS NECESSARY AND REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH CONTRACT DOCUMENTS.



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 TITLE _____ DATE _____

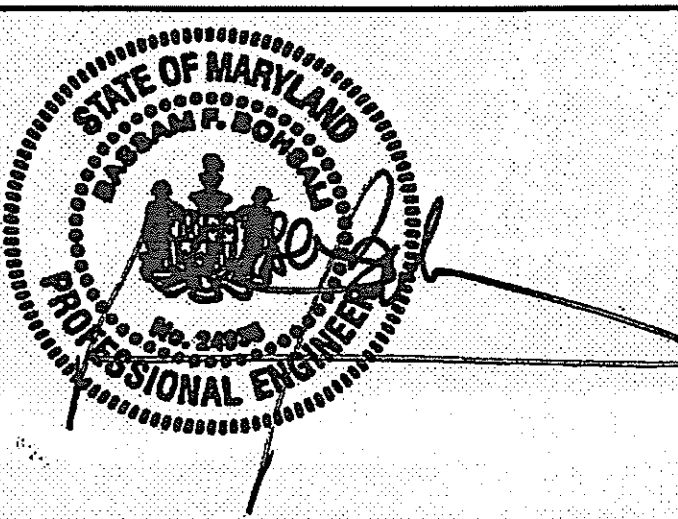
DEPT. OF GENERAL SERVICES APPROVAL

PROJECT MANAGER _____ DATE _____

CHIEF - PROJ. MGT. & DSGN. _____ DATE _____

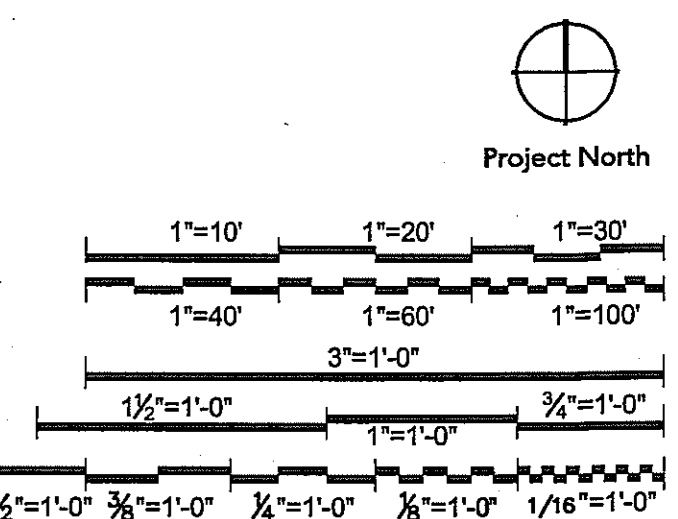
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Seals and Signatures



01/05/05
 DATE

Graphic Scales



AUTOMATIC CONTROLS

NO SCALE

Scale
 J-494-020-002 25379.000
 DGS Project Number SG Project Number

M8.8

Drawing Number