

**PROJECT:**

# EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION HENDERSON, KENTUCKY

**OWNER:**

HENDERSON COUNTY SCHOOLS  
1805 SECOND STREET  
HENDERSON, KENTUCKY 42420

**ARCHITECT:**

R.B.S. DESIGN GROUP, P.S.C.  
723 HARVARD DRIVE  
OWENSBORO, KENTUCKY 42301  
270-683-1158 (F) 270-683-2446

**M.E.P.  
ENGINEER:**

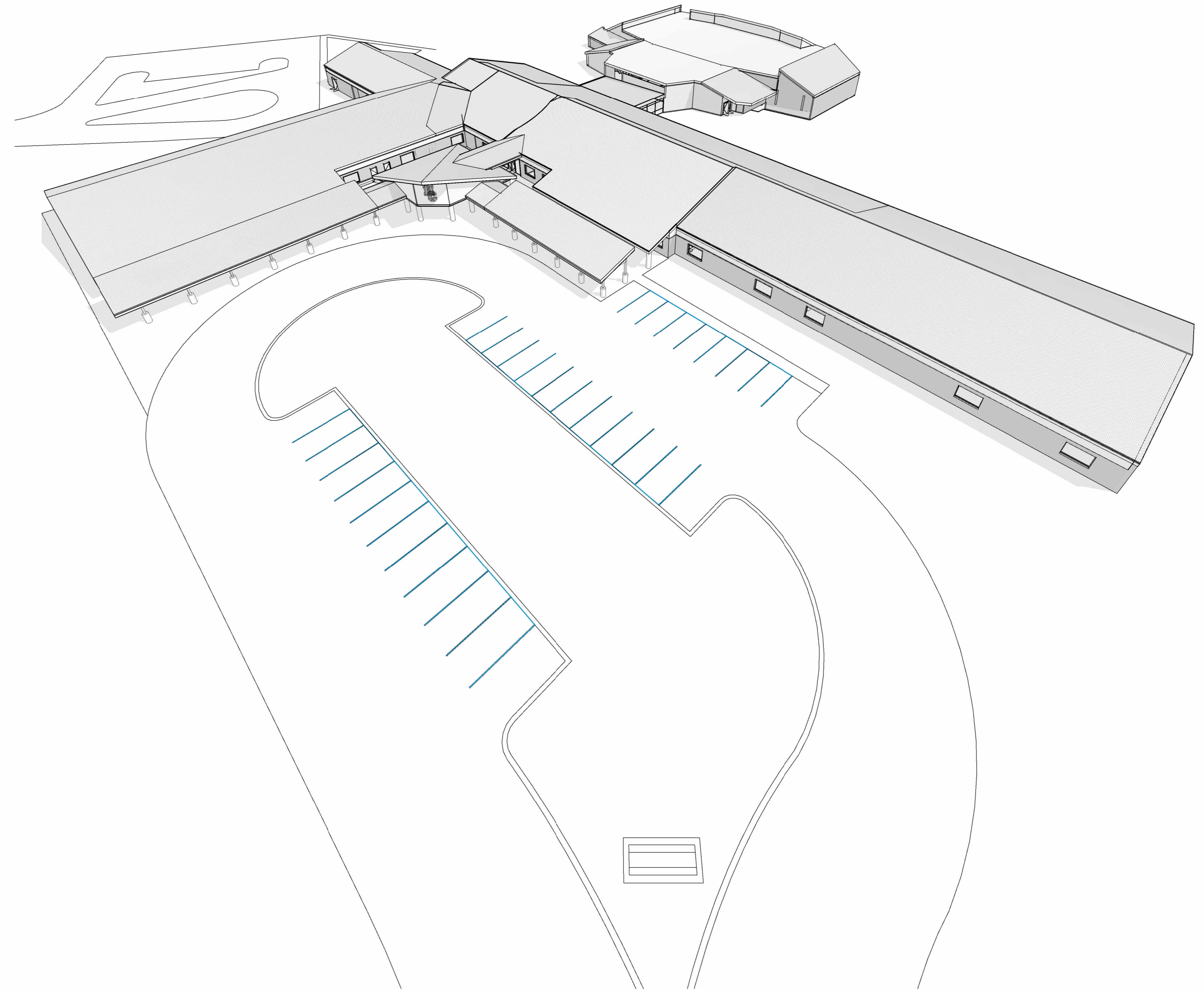
CMTA CONSULTING ENGINEERS  
115 MEMORIAL DRIVE, SUITE 115  
PADUCAH, KENTUCKY 42001  
270-984-0066

**STRUCTURAL  
ENGINEER:**

WILKIE STRUCTURAL ENGINEERING, INC.  
20 NW THIRD STREET, SUITE 1220  
EVANSVILLE, INDIANA 47708  
812-423-6347

**CIVIL  
ENGINEER:**

ASSOCIATED ENGINEERS, INC.  
2740 NORTH MAIN STREET  
MADISONVILLE, KENTUCKY 42431  
270-821-7732



① MODEL VIEW

MATERIAL & GRAPHIC SYMBOLS	
	DRAINAGE FILL
	PRECAST CONCRETE
	GROUT
	CUT STONE (RECT.)
	WOOD BLOCKING
	E.I.P.S. (ELEV.)
	GLASS (PLAN)
	GLASS BLOCK (ELEV.)
	CEILING TAG

ABBREVIATIONS		
A.F.F. - ABOVE FINISH FLOOR	DN. - DOWN	INSUL - INSULATION
ACOB - ABOVE CURB	DRN. - DRAIN	IP - IRON PIPE
ADJ. - ADJUSTABLE	DRN. - DRAIN	JT. - JOINT
AIR - AIR	DRN. - DRAIN	JST. - JOIST
AIR C. - AIR CONDITIONER	DRN. - DRAIN	JST. - JOIST
AIR H. - AIR HANDLING UNIT	DRN. - DRAIN	JST. - JOIST
ALUM. - ALUMINUM	DSP. - DRAINAGE PATTERN	JST. - JOIST
AND. - ANDERSON	DSP. - DRAINAGE PATTERN	JST. - JOIST
APP. - APPROXIMATE	DSP. - DRAINAGE PATTERN	JST. - JOIST
AVG. - AVERAGE	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.G. - BASE GABINET	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.H. - BATH	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.L. - BULL DOG	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.S. - BRICK	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.T. - BOTTOM	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.T. - BOTTOM OF FOOTINGS	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.T. - BOTTOM THERMAL UNIT	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.U. - BUILT UP ROOFING	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.W. - BUILT UP ROOFING	DSP. - DRAINAGE PATTERN	JST. - JOIST
B.W. - BUILT UP ROOFING	DSP. - DRAINAGE PATTERN	JST. - JOIST

VACINITY MAP	
LOCAL MAP	
1776 ADAMS LANE HENDERSON, KENTUCKY 42420	

DESIGN DATA	
DESIGN DATA	
PROJECT STATUS	
SET NUMBER	
DRAWN BY:	DATE:
BTS	05-01-2024

SHEET INDEX	
SHEET INDEX	
T1.1	

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
TITLE SHEET

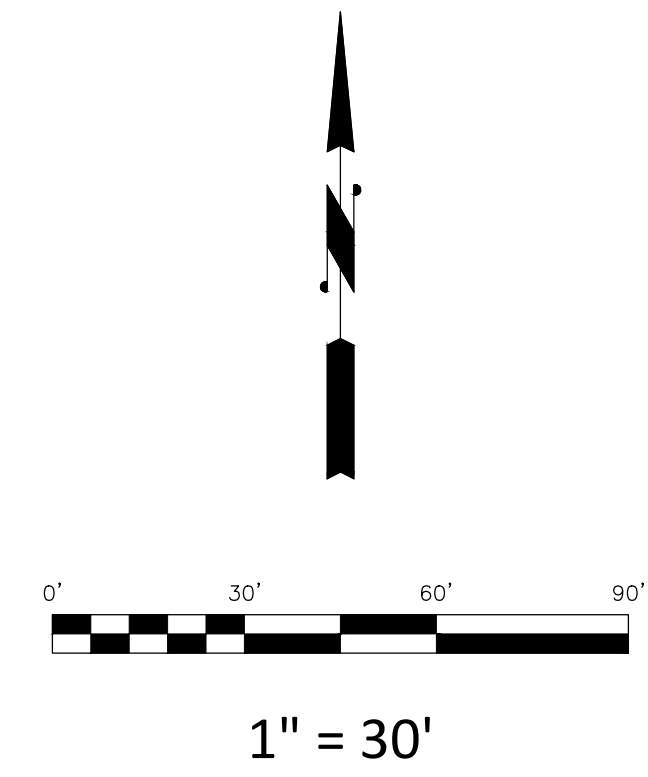
RBS DESIGN GROUP  
ARCHITECTURE

JOB NUMBER	Y2301A	BTS	CT
DRAWN BY		CHECKED BY	
DATE		DATE	

DESIGN DOCUMENTS

SHEET NUMBER  
T1.1

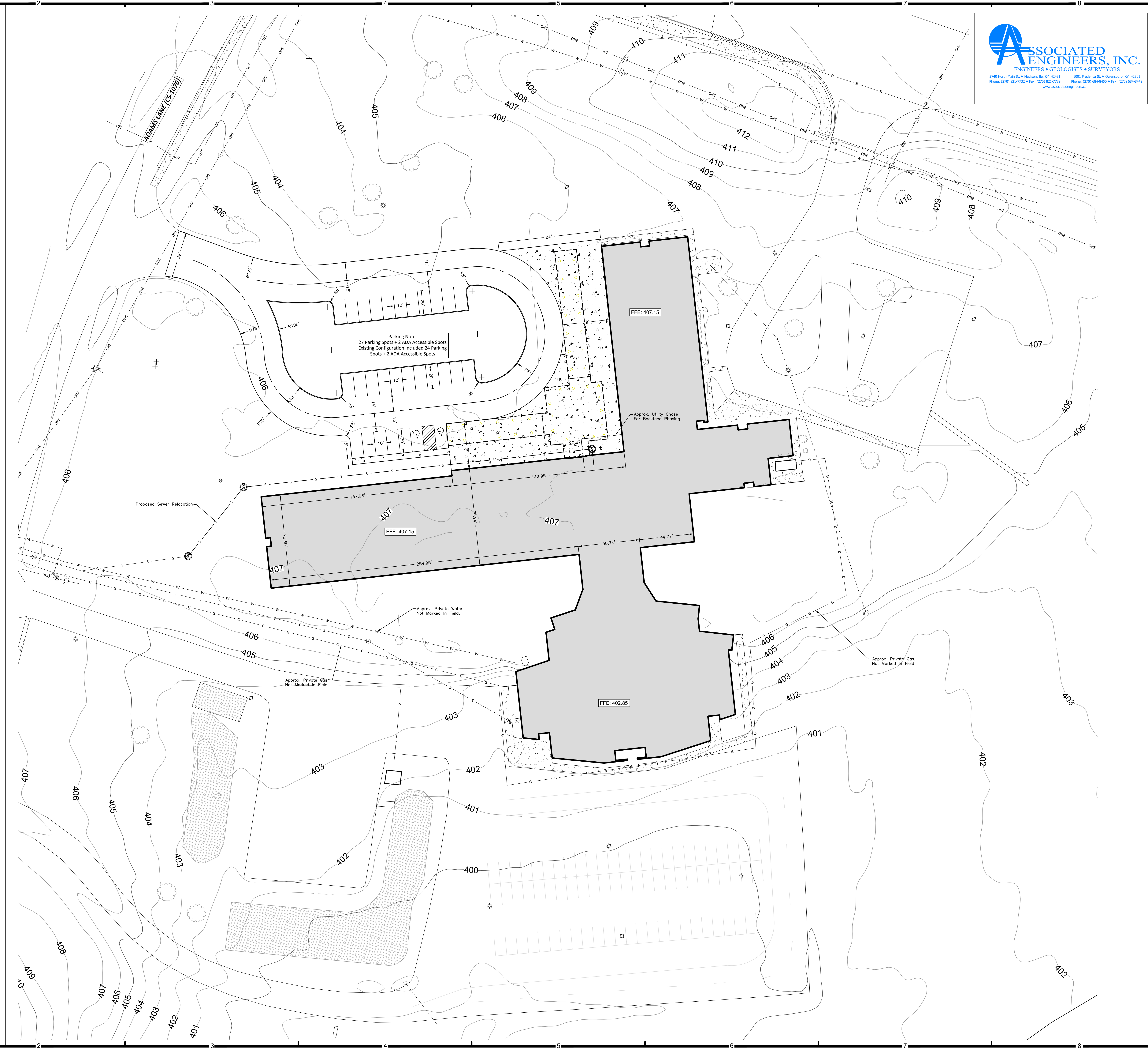




**LEGEND**

- EXISTING CONTOUR
- EDGE OF EXISTING CONCRETE/ASPHALT
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC
- EXISTING FIBER OPTIC LINE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM WATER LINE
- EXISTING WATER LINE
- EXISTING BUILDING
- EXISTING CONCRETE
- EXISTING ASPHALT
- EXISTING PLAYGROUND AREA
- EXISTING LIGHT POLE
- EXISTING GAS METER
- EXISTING WATER METER
- UNIDENTIFIED MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING TREE
- EXISTING POWER POLE

**DO NOT SCALE DRAWINGS**  
 USE GIVEN DIMENSIONS ONLY. IF DIMENSION IS NOT SHOWN, VERIFY AND DOCUMENT CORRECT DIMENSION WITH THE ENGINEER. CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE.



**Parking Note:**  
 27 Parking Spots + 2 ADA-Accessible Spots  
 Existing Configuration Included 24 Parking Spots + 2 ADA Accessible Spots

**RBS DESIGN GROUP**  
 Architecture

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JOB NUMBER	23-0101
DRAWN BY	Staff
CHECKED BY	D.A.L.
DATE	02/12/2024

REVISIONS	
NO.	DATE

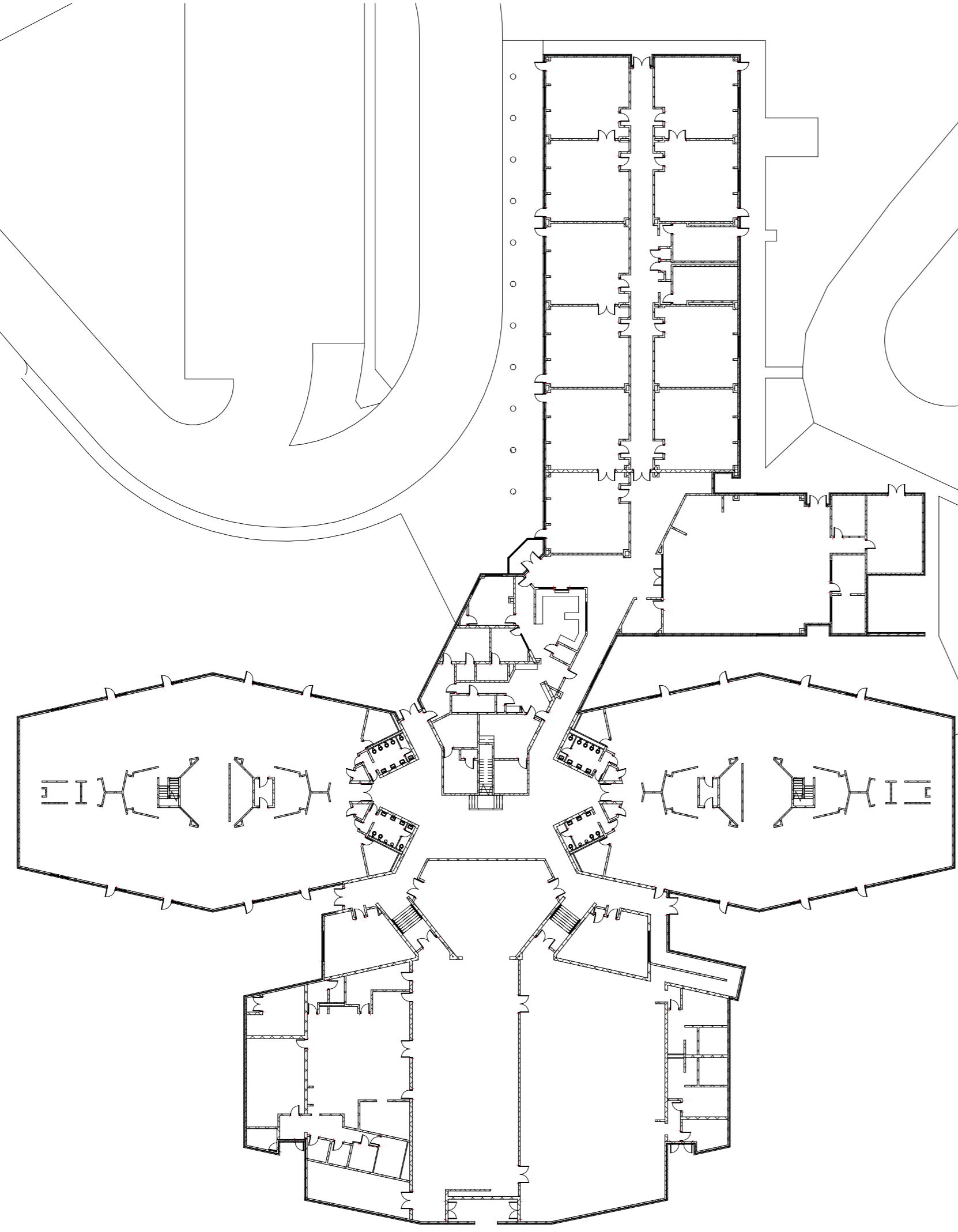
**PRELIMINARY**

HENDERSON COUNTY BOARD OF EDUCATION  
 EAST HEIGHTS ELEMENTARY SCHOOL  
 BUILDING ADDITION  
 SITE LAYOUT PLAN

SHEET NUMBER  
**C-1**  
 OF X

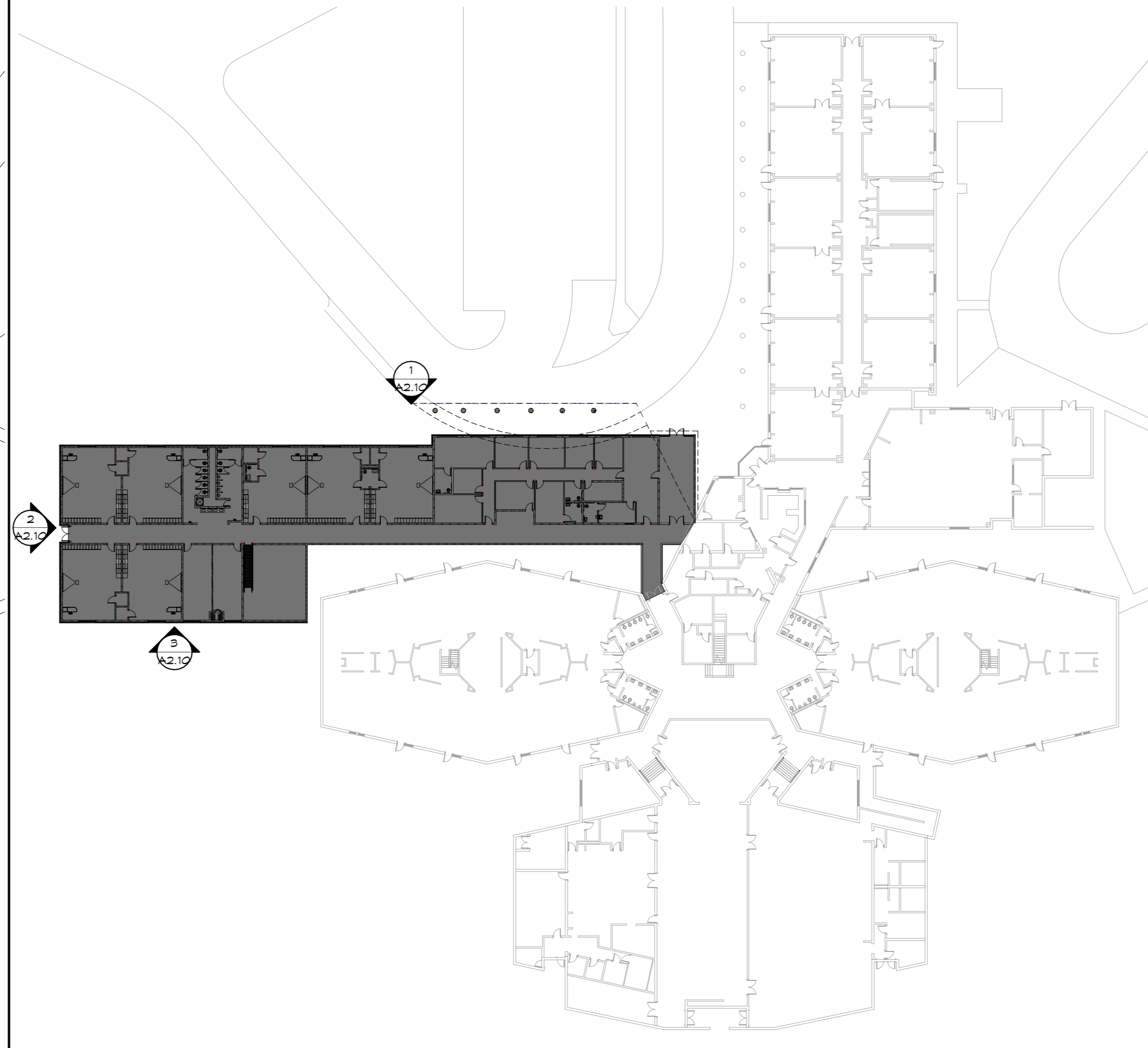


EXISTING FLOOR PLAN



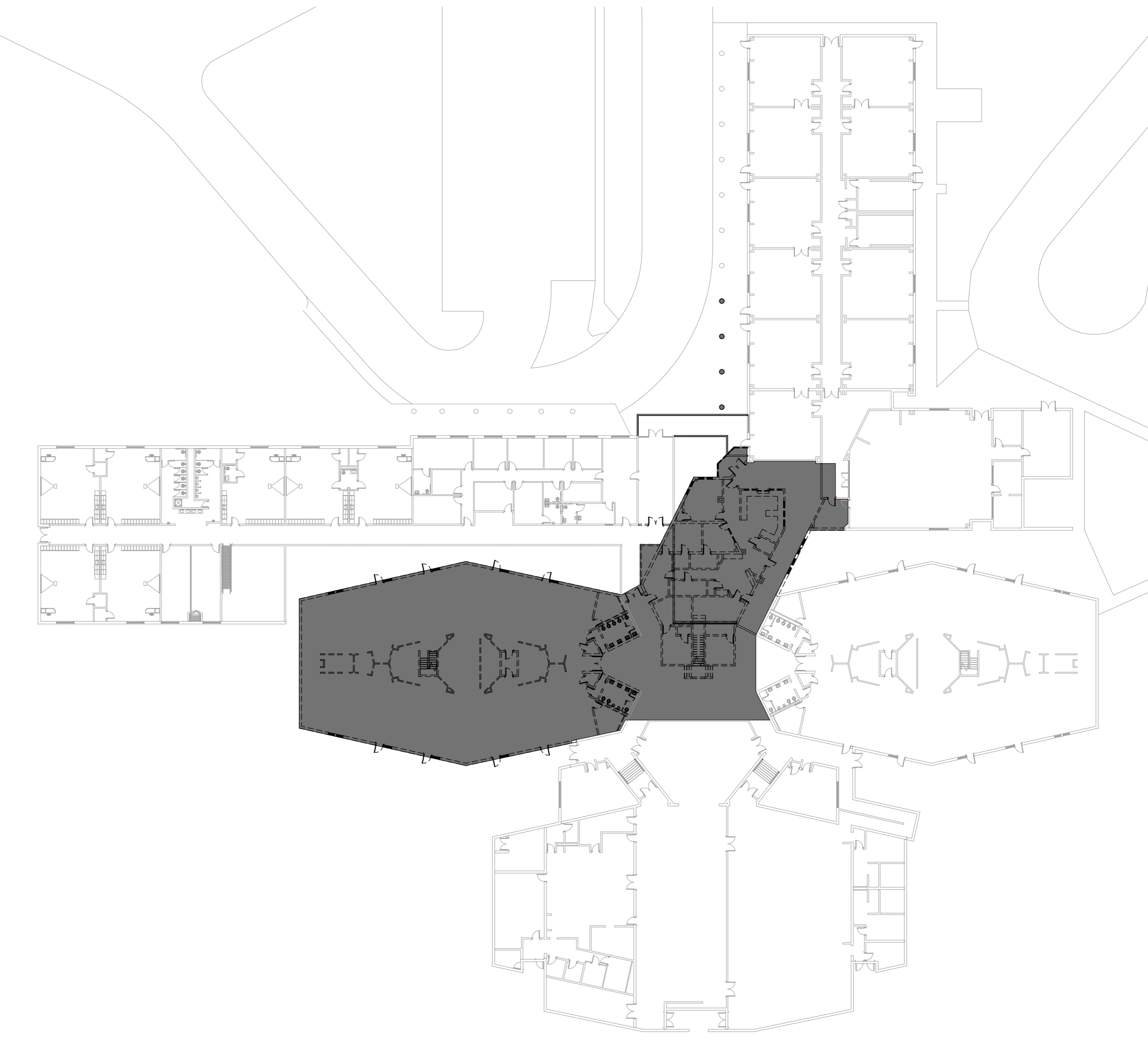
EXISTING PLAN  
1" = 40'-0"

PHASE 1 - NEW WING ADDITION



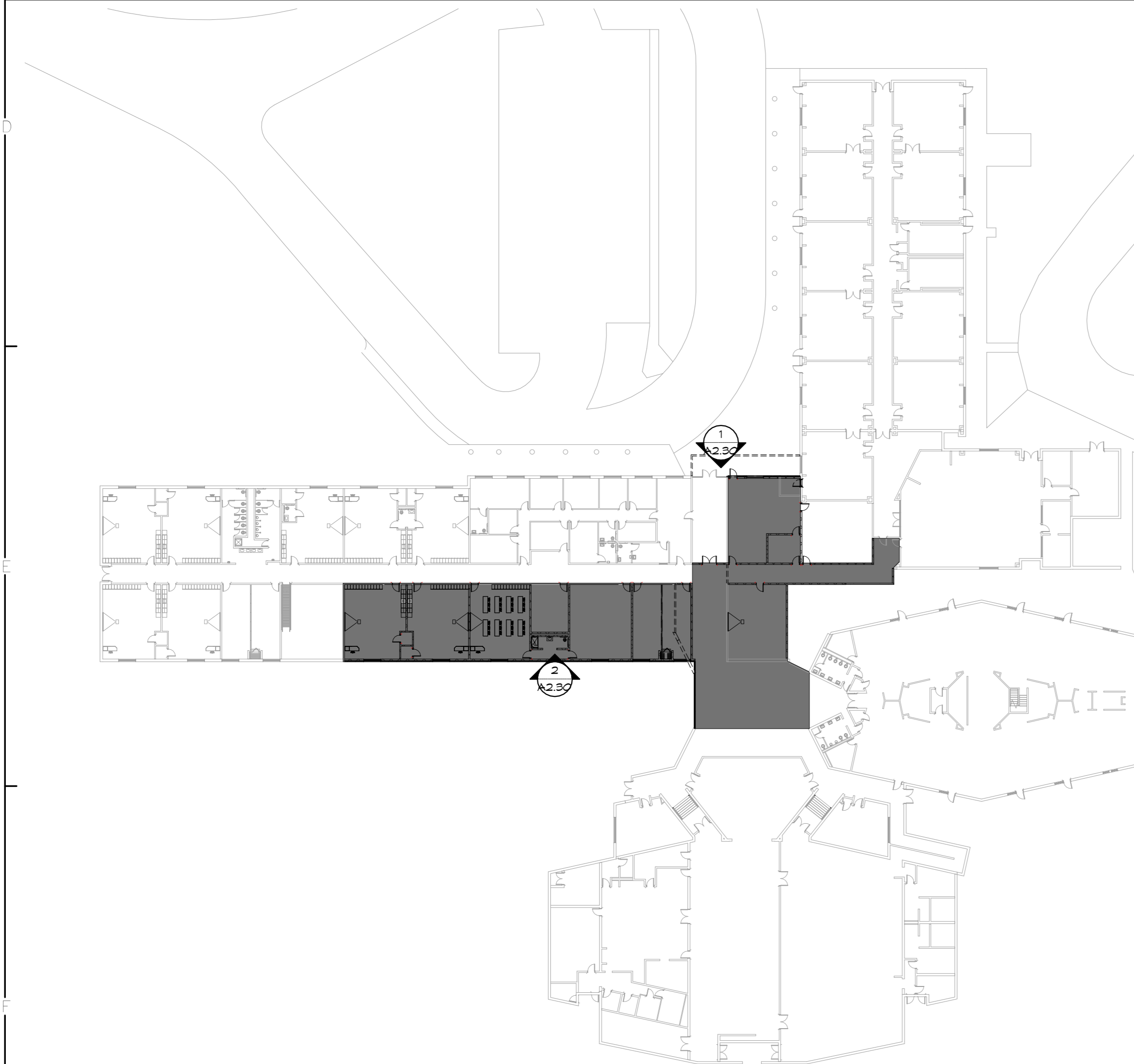
PHASE - 1  
1" = 40'-0"

PHASE 2 - EXISTING WING & ENTRY DEMOLITION



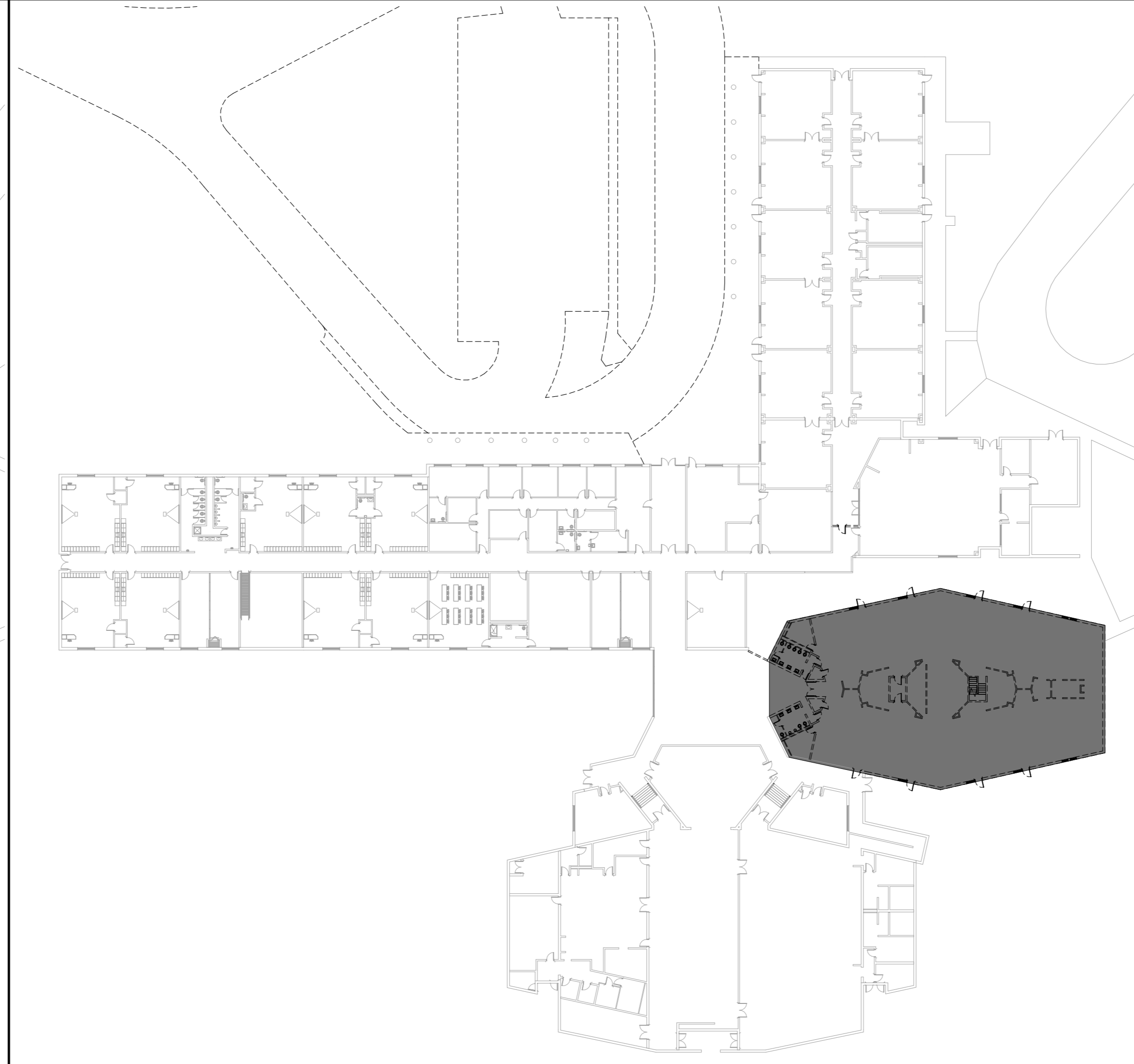
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PHASE 3 - NEW WING CONTINUATION



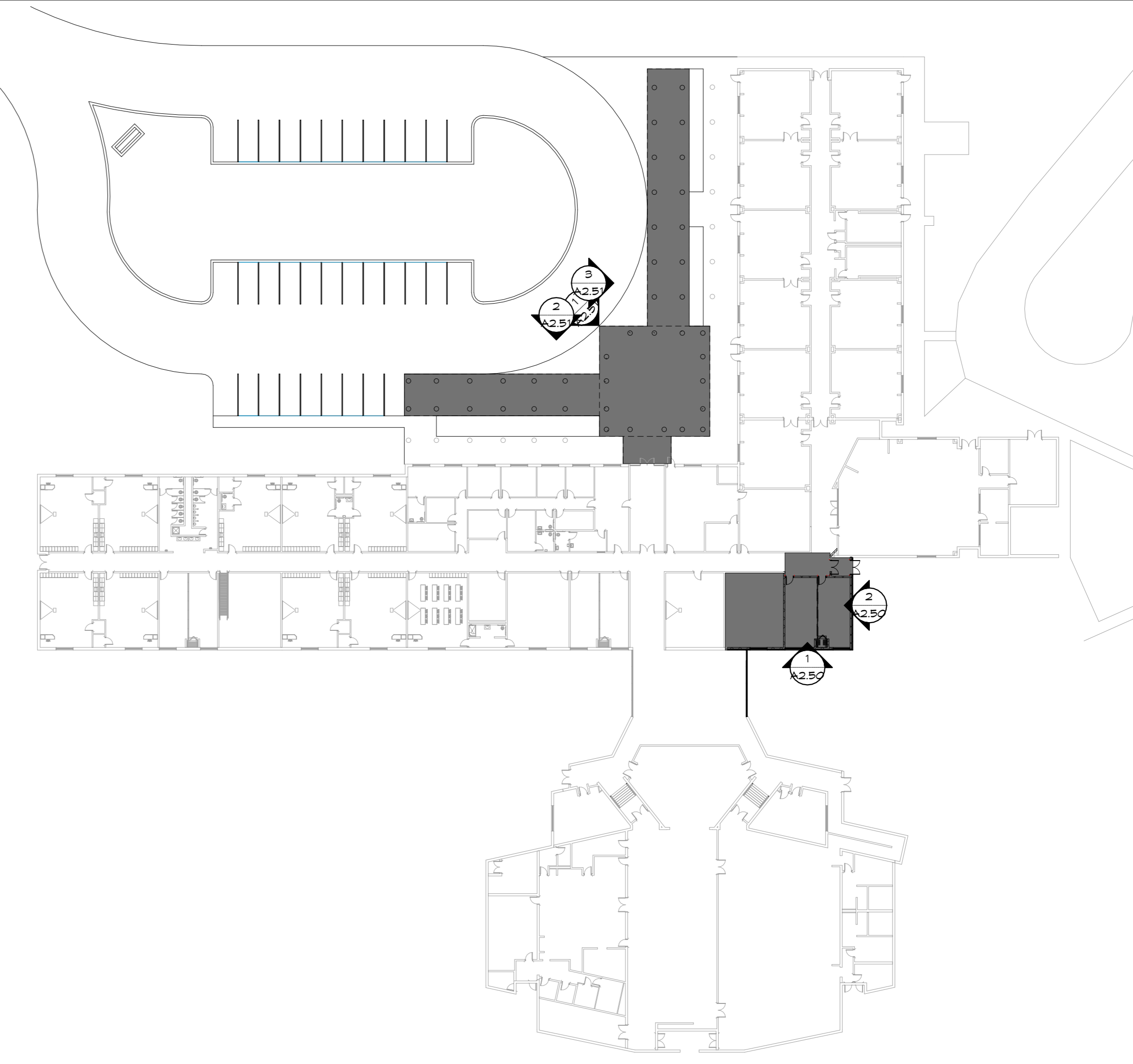
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PHASE 4 - EXISTING WING DEMOLITION



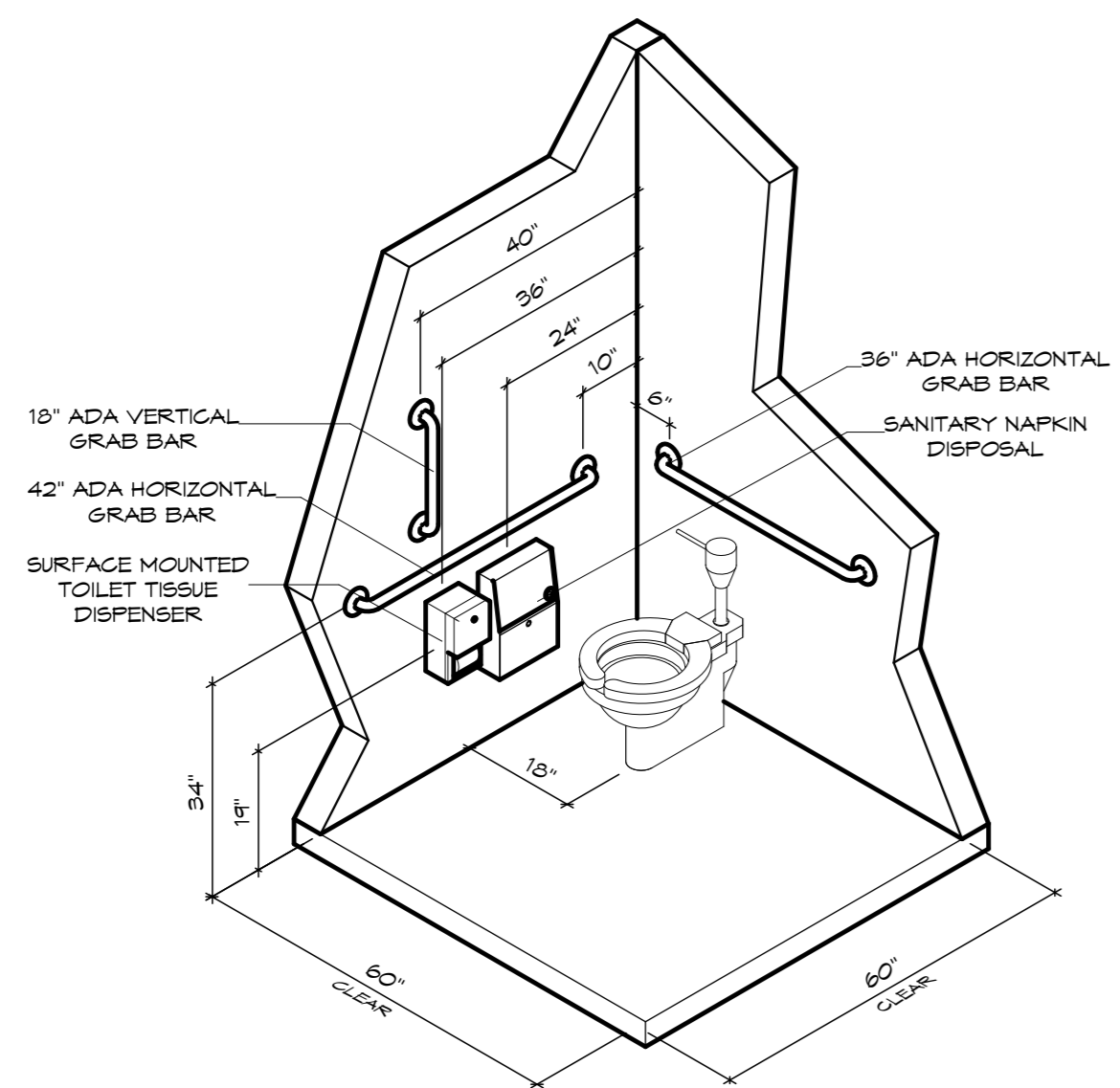
PHASE - 4  
1" = 40'-0"

PHASE 5 - NEW WING COMPLETION & CANOPY

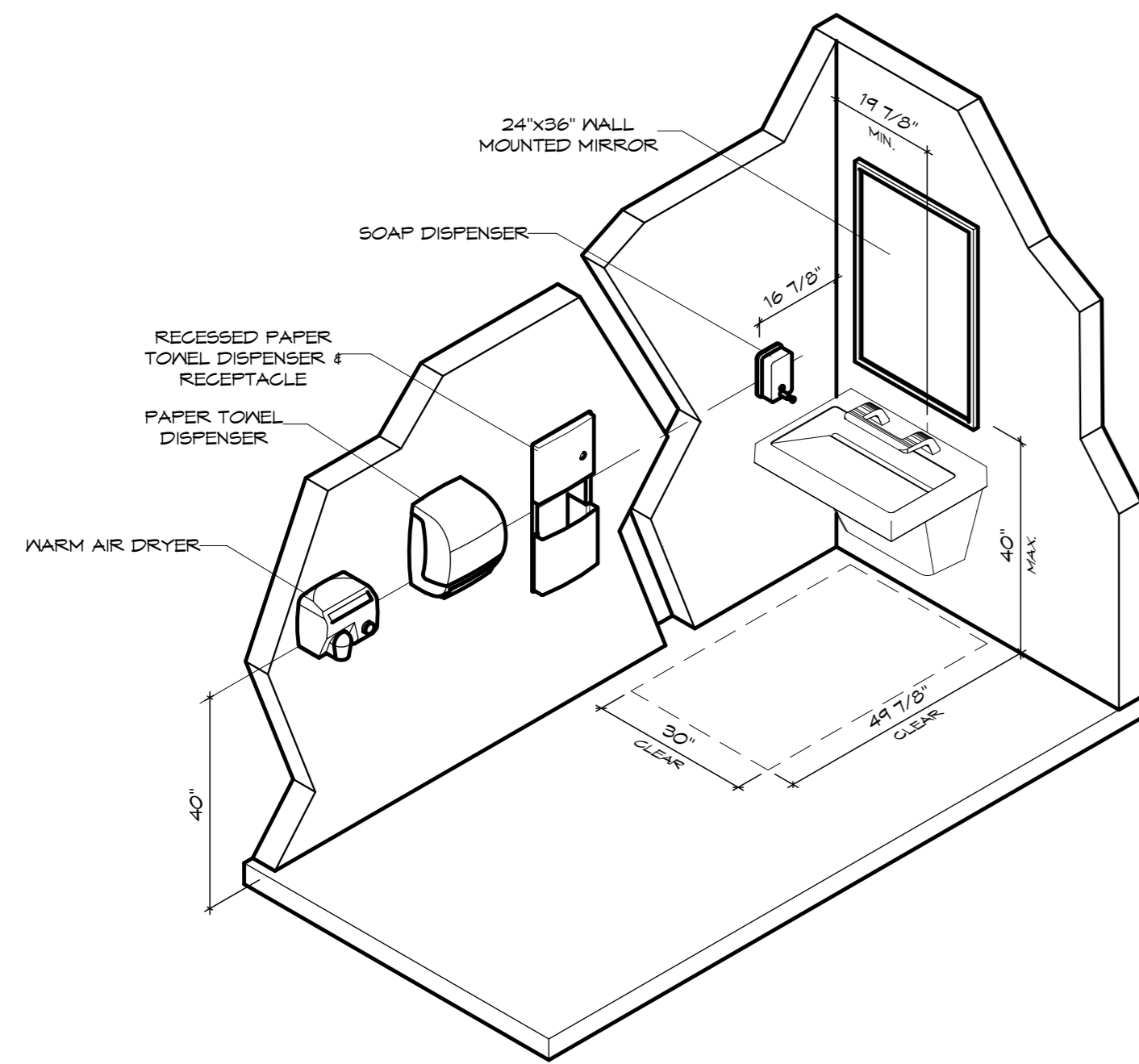


PHASE - 5  
1" = 40'-0"

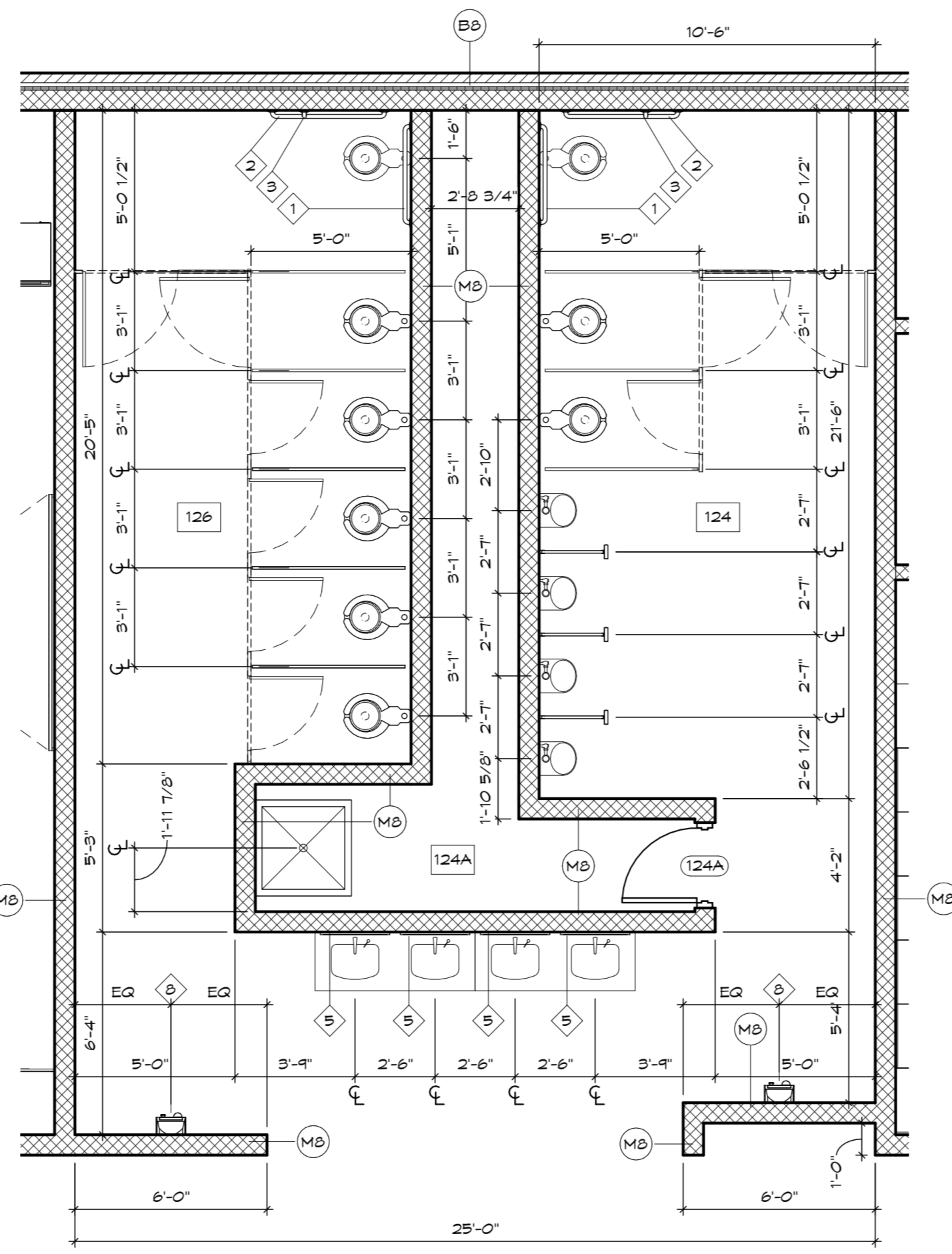




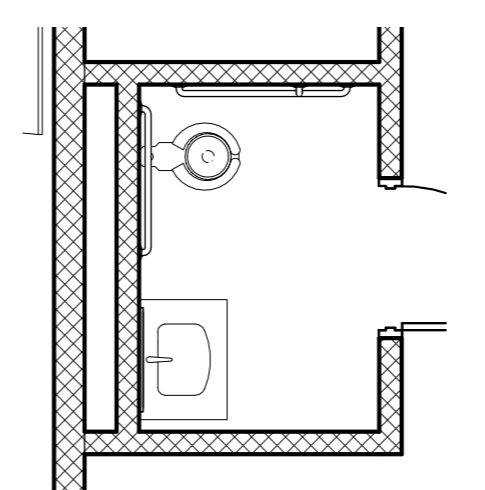
8 ISO - TYP ADA STALL



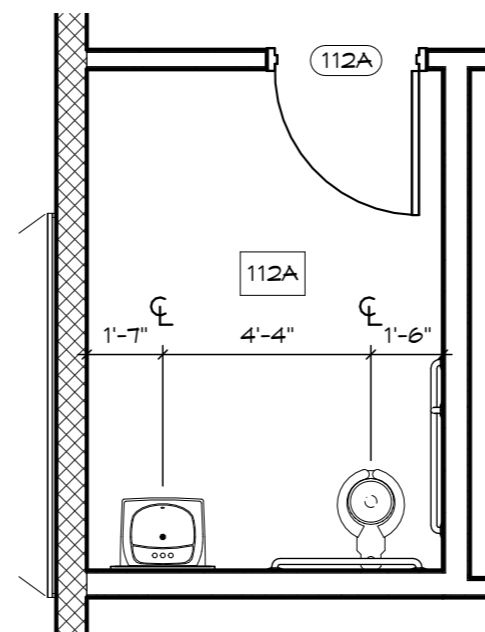
9 ISO - TYP MOUNTING HEIGHTS



3 P1-ENLARGED RR-E  
1/4" = 1'-0"



7 P1-ENLARGED RR-D  
1/4" = 1'-0"

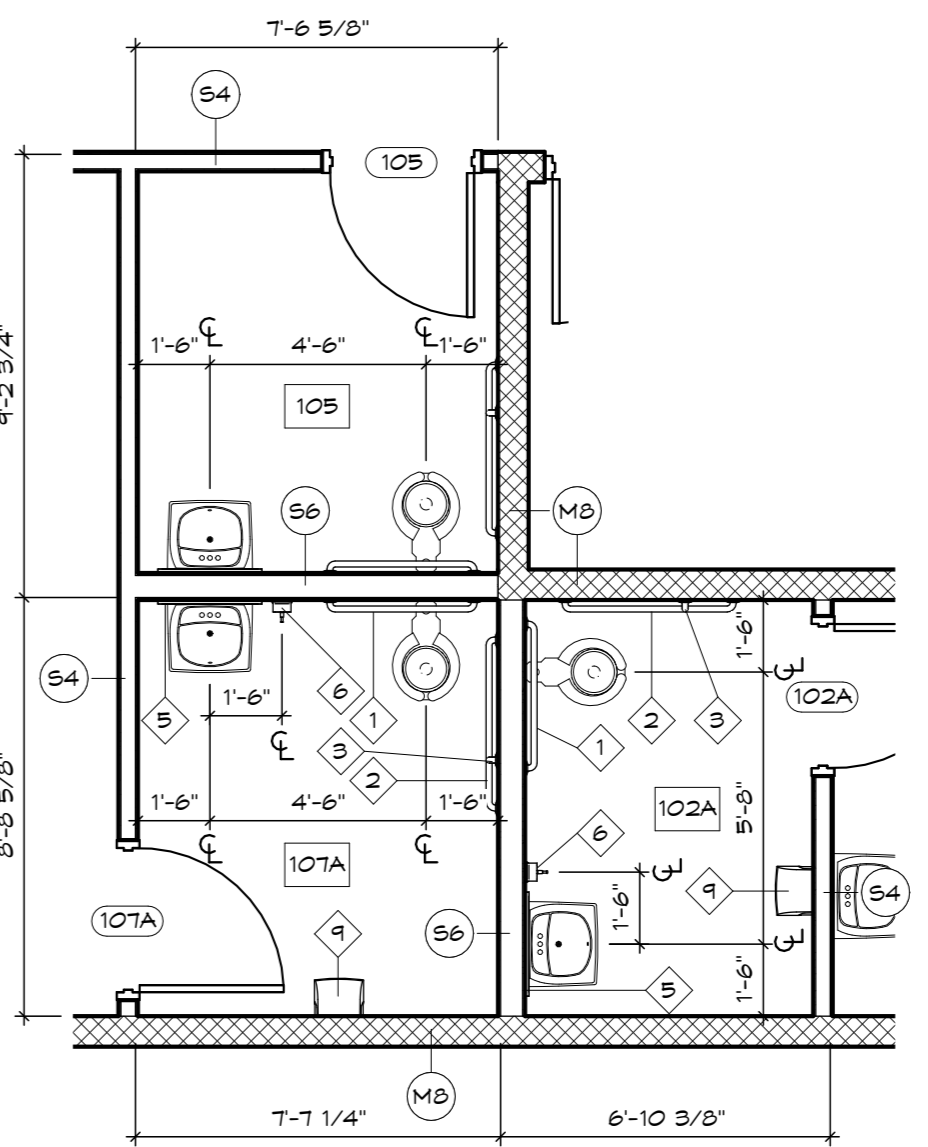


5 P1-ENLARGED RR-B  
1/4" = 1'-0"

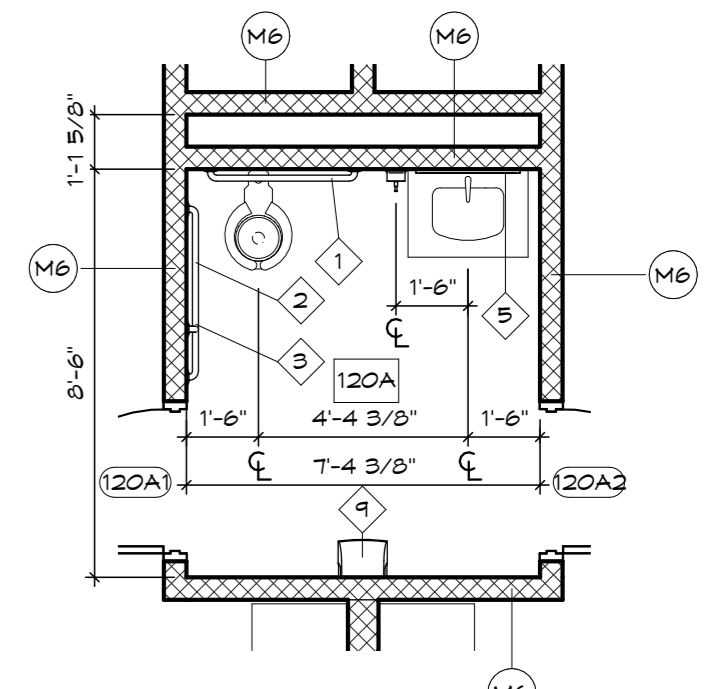
ROOM FINISH LEGEND						
MARK	FLOOR	BASE	WALL	CEILING	NOTES	
A	LVT-1	WALK-OFF	VINYL	P-1/P-4	ACT-1	
B	LVT-2		VINYL	P-2	ACT-1	
C	MGT-1		VINYL	P-3	ACT-1	
D	GFT-1		VINYL	P-2/P-4	ACT-1	
E	LVT-2		VINYL	P-2	ACT-1	
F	MGT-1		VINYL	P-3/P-4	ACT-1	
G	MGT-2		VINYL	P-3/P-4	ACT-1	
H	MGT-3		VINYL	P-3	ACT-1	
J	BRUSHED CONC.					
M	BRUSHED CONC.					
K	GFT		GFT 0" - 4'-0", P-4 ABOVE	ACT-2		
S	GFT-2		VINYL	P-3	ACT-1	

DEMO KEYNOTE LEGEND	
MARK	DESCRIPTION
D3	SAW CUT & REMOVE THE EXISTING CONCRETE PAVK (OR SLAB) IN ITS ENTIRETY AS REQ'D FOR NEW CONSTRUCTION INCLUDING BUT NOT LIMITED TO CONCRETE REINFORCING, EXPANSION MATERIAL, VAPOR BARRIER, AND SEALANTS. PREP TO RECEIVE NEW CONCRETE SLAB OR SIDEWALK AS INDICATED ON PLANS.
D14	SAW CUT AND REMOVE PORTION OF EXISTING ASPHALT AS REQUIRED FOR NEW WORK TO BE DONE.

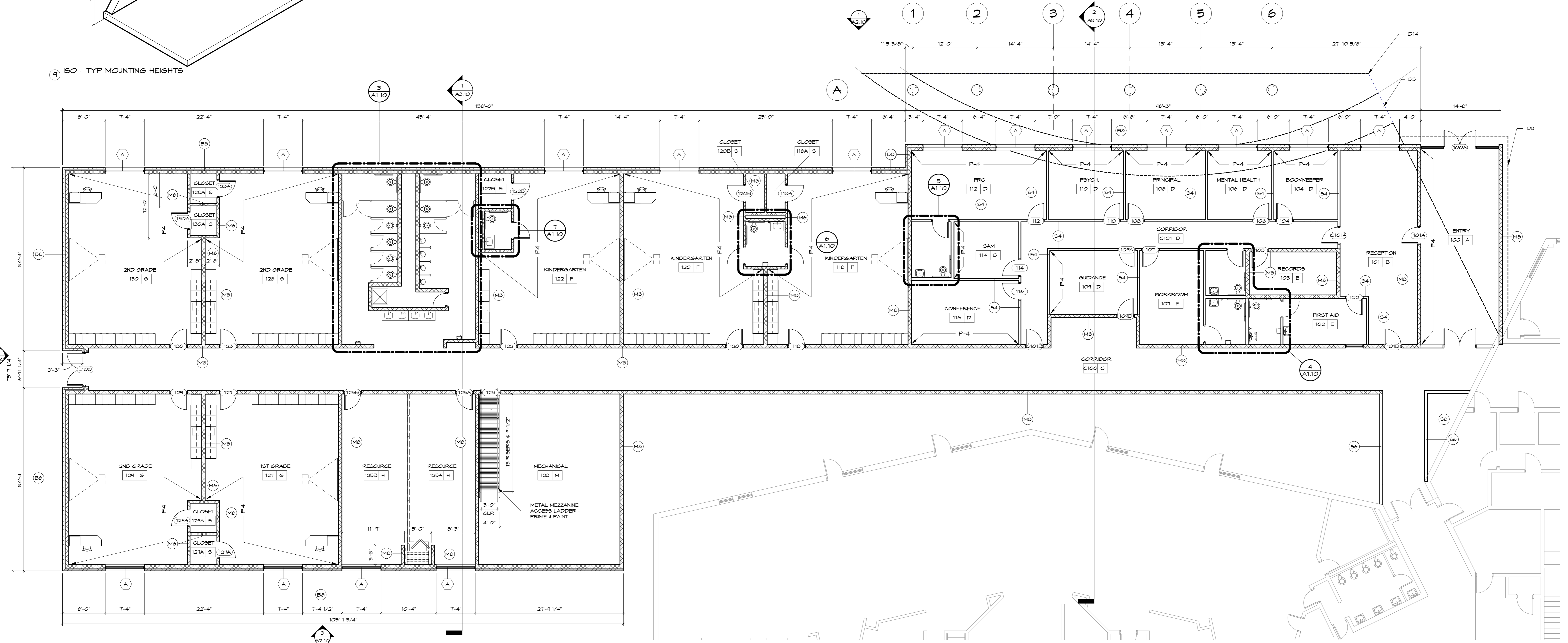
WALL TYPE LEGEND	
54	5/8" GWB - 3-5/8" MTL STUD - 5/8" GWB
56	5/8" GWB - 5-1/2" MTL STUD - 5/8" GWB
M4	4" CONCRETE MASONRY UNIT WALL
M6	6" CONCRETE MASONRY UNIT WALL
M12	12" CONCRETE MASONRY UNIT WALL
B6	8" CMU, 1-1/4" SPREAD FOAM INSUL., 1-1/2" AIR SPACE, 3-5/8" BRICK



4 P1-ENLARGED RR-A  
1/4" = 1'-0"



6 P1-ENLARGED RR-C  
1/4" = 1'-0"

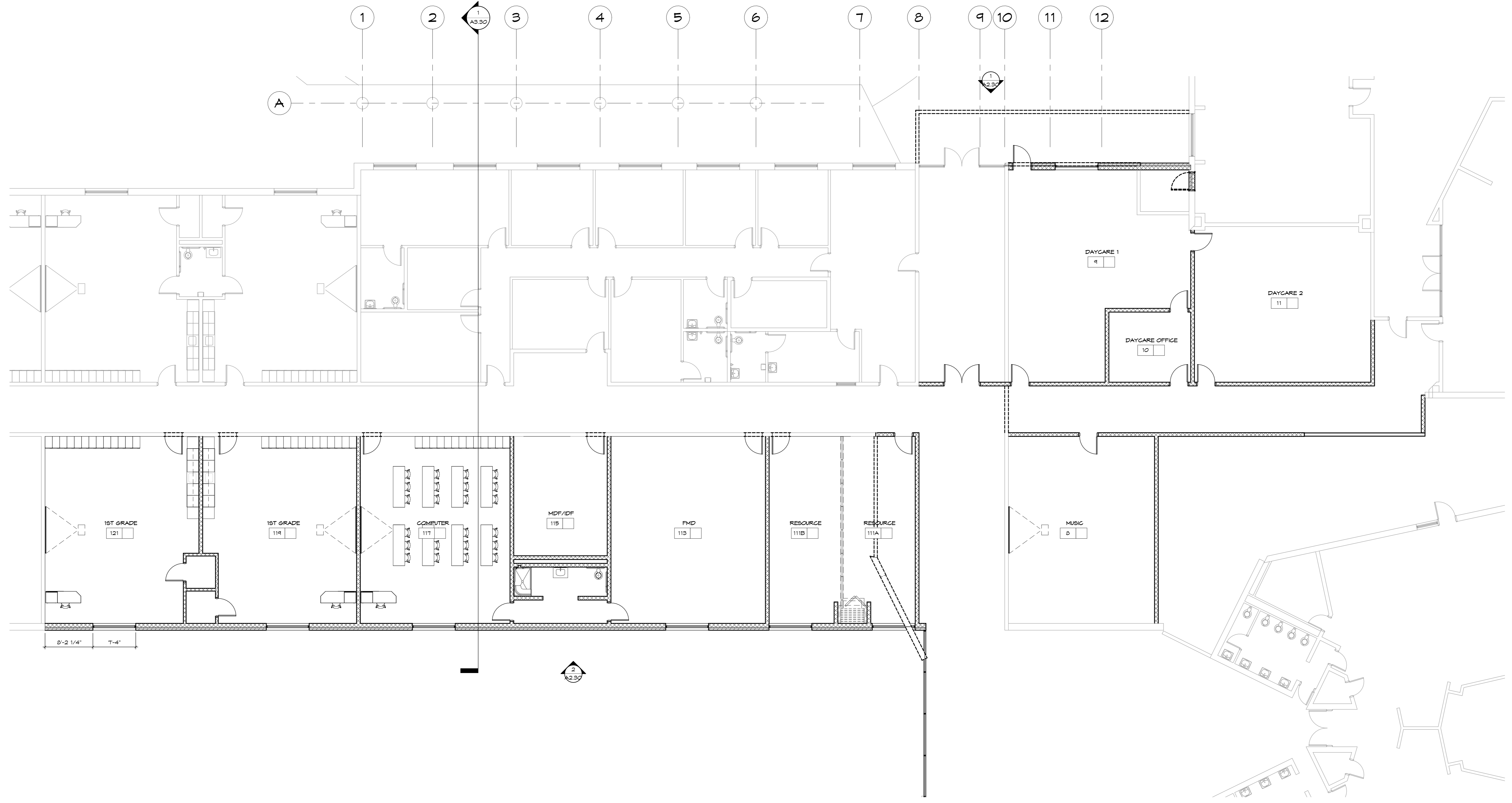


1 PHASE 1 - ENLARGED NEW WORK PLAN  
1/8" = 1'-0"









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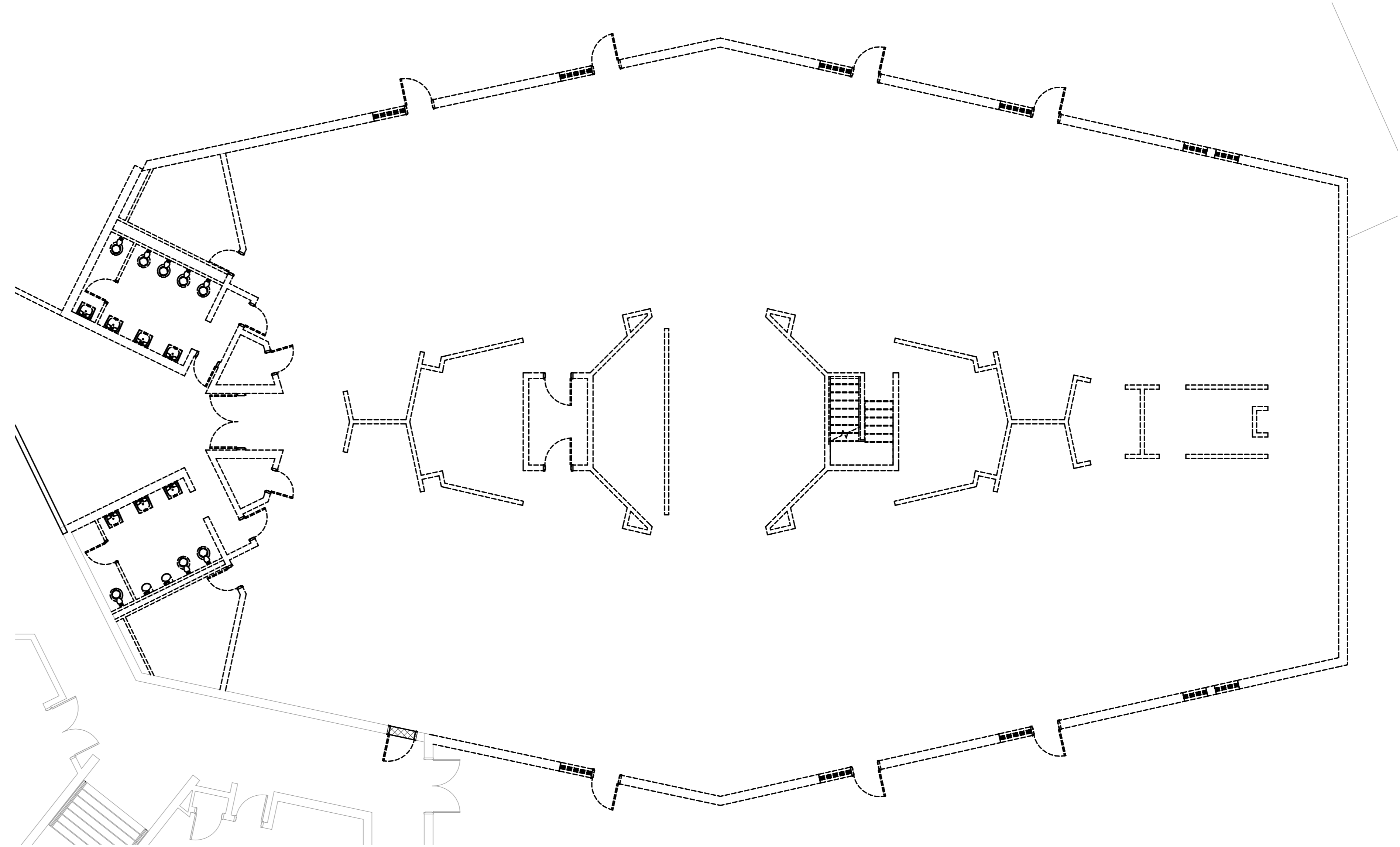
JOB NUMBER	Y23011A
DRAWN BY	Autor
CHECKED BY	Creator
DATE	05-07-2024

NO.	Description	Date

DESIGN DOCUMENTS

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
**PHASE 3 - ENLARGED NEW WORK PLAN**





SHEET NUMBER  
**A1.40**

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 HENDERSON, KENTUCKY  
**PHASE 4 - ENLARGED DEMOLITION PLAN**

DESIGN  
DOCUMENTS

No.	Description	Date

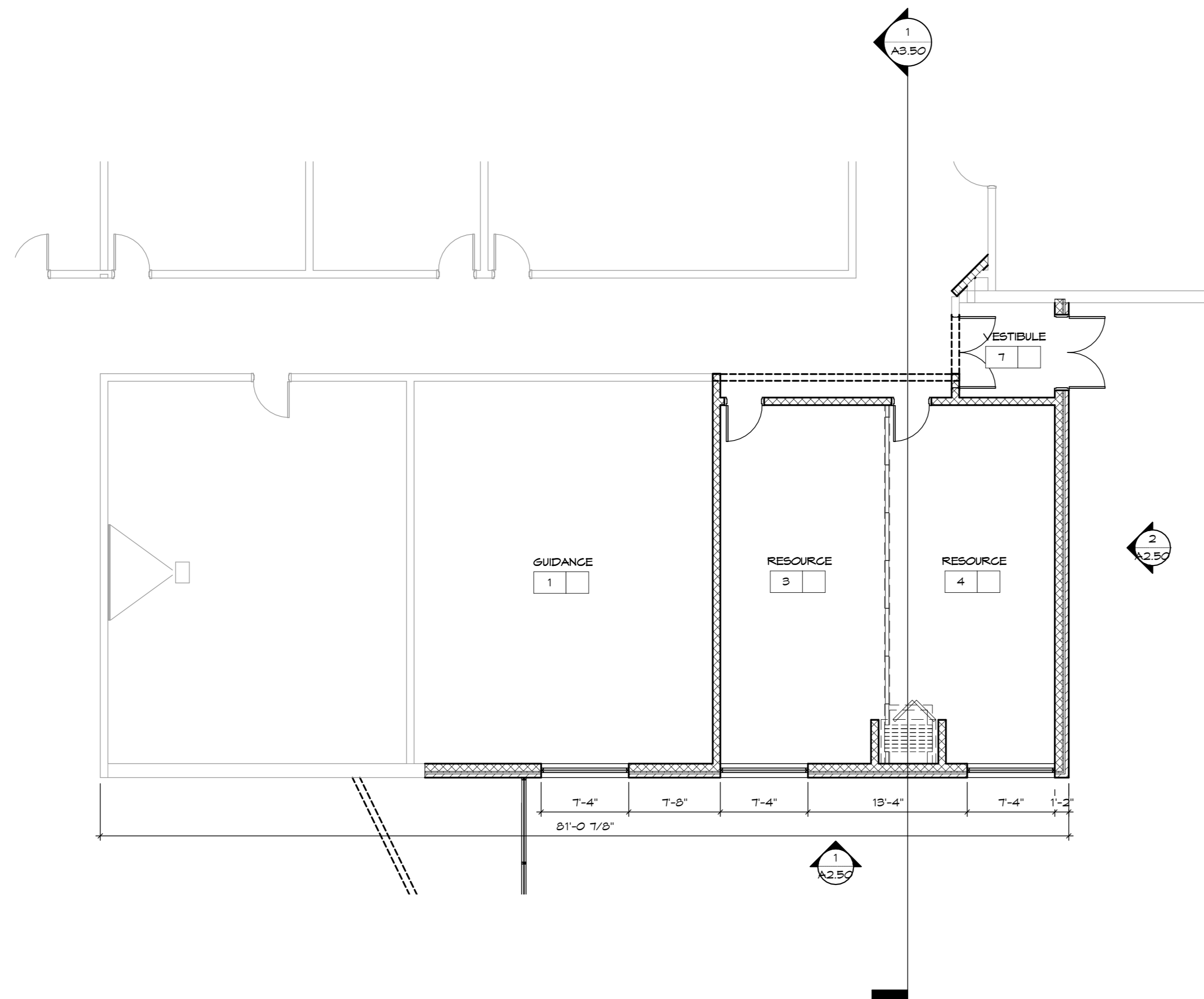
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DRAWN BY	Autor
CHECKED BY	Creator
DATE	05-07-2024

**RBS DESIGN GROUP**  
 ARCHITECTURE

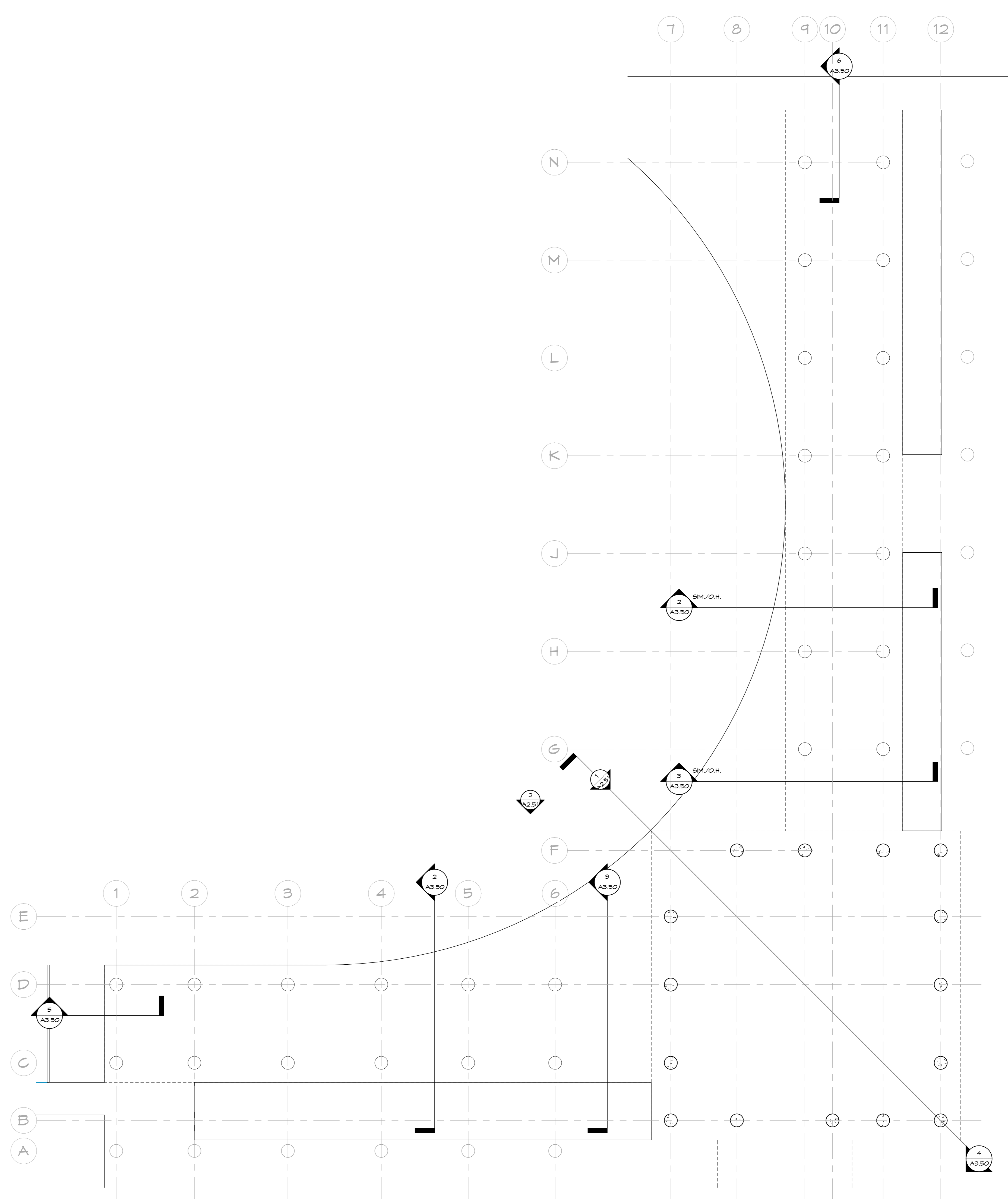
220 Highland Drive, Henderson, KY 40024  
 Phone: 502-261-4444  
 Email: office@rbsdesigngroup.com

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2 PHASE 5 - ENLARGED NEW WORK PLAN  
1/8" = 1'-0"



1 PHASE 5 - ENLARGED NEW ENTRANCE  
1/8" = 1'-0"

NO.	DESCRIPTION	DATE

JOB NUMBER	DATE
Y23011A	

DESIGNED BY	CHECKED BY	DATE

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 5 - ENLARGED NEW WORK PLAN

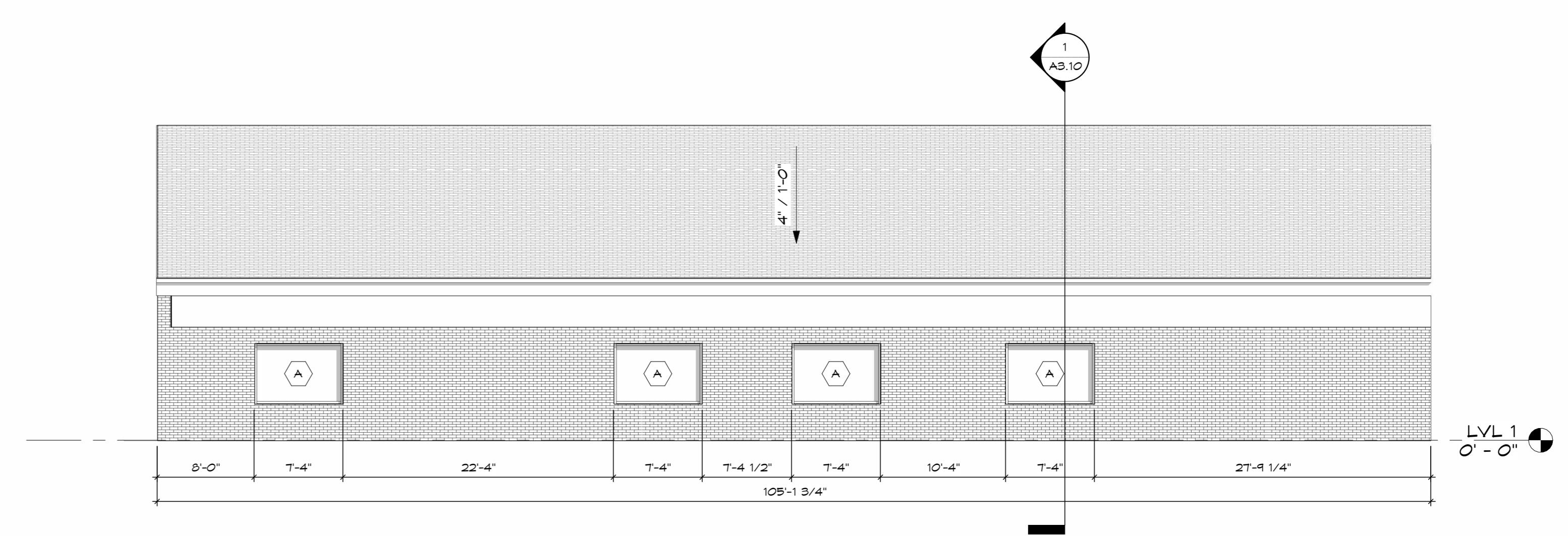


PROJECT NUMBER	Y23011A
DATE	
DESIGNED BY	Author
CHECKED BY	Checker
DATE	05-01-2024

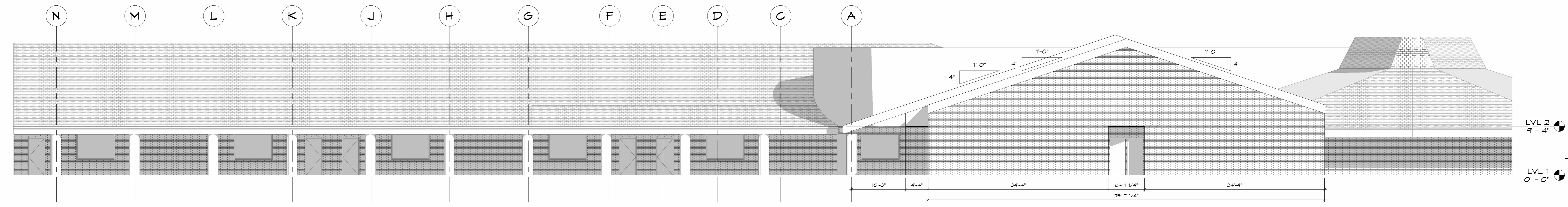
DESIGN DOCUMENTS

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 1 - BUILDING ELEVATIONS

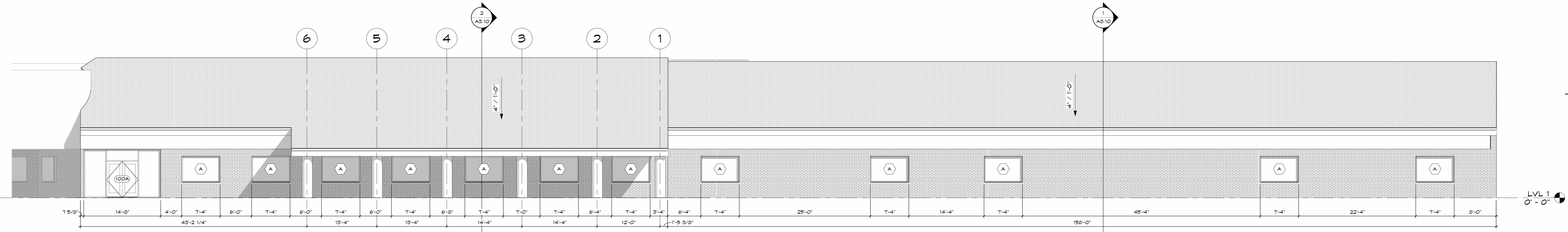
SHEET NUMBER  
**A2.10**



③ PHASE 1 - ELEVATION C  
1/8" = 1'-0"

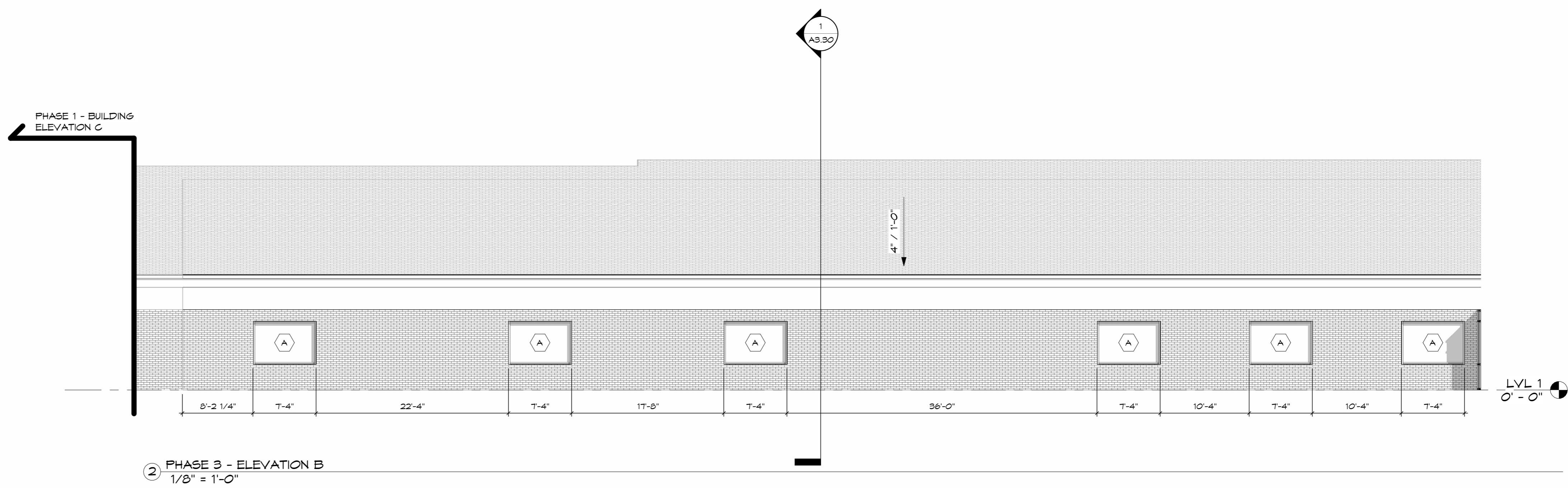


② PHASE 1 - ELEVATION B  
1/8" = 1'-0"

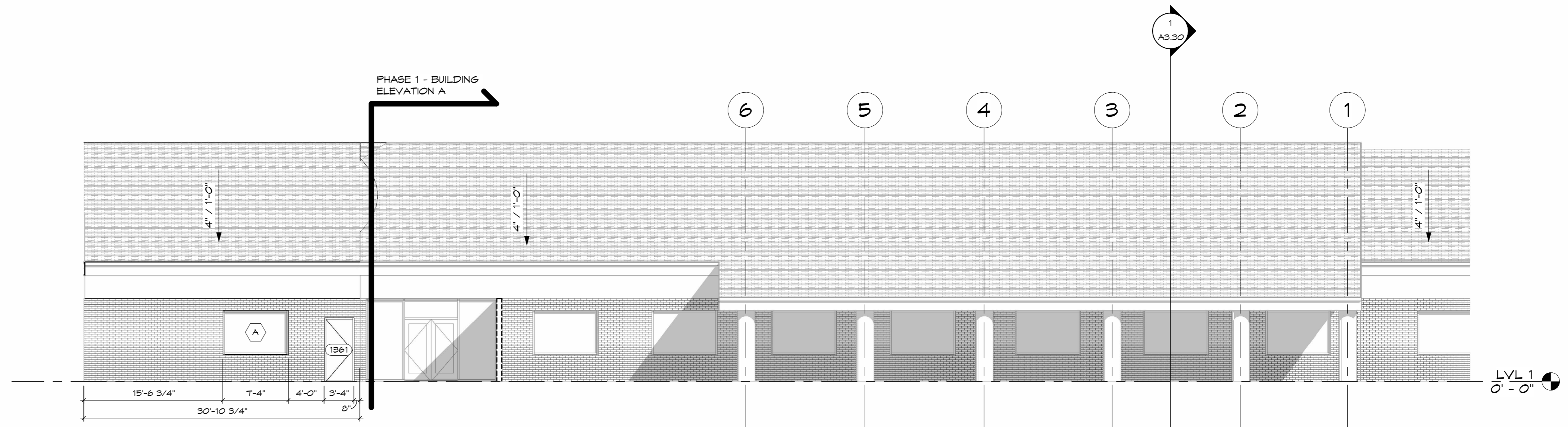


① PHASE 1 - ELEVATION A  
1/8" = 1'-0"





② PHASE 3 - ELEVATION B  
1/8" = 1'-0"



① PHASE 3 - ELEVATION A  
1/8" = 1'-0"

NO.	Description	Date

JOB NUMBER	Y23011A
DRAWN BY	Author
CHECKED BY	Checker
DATE	05-01-2024

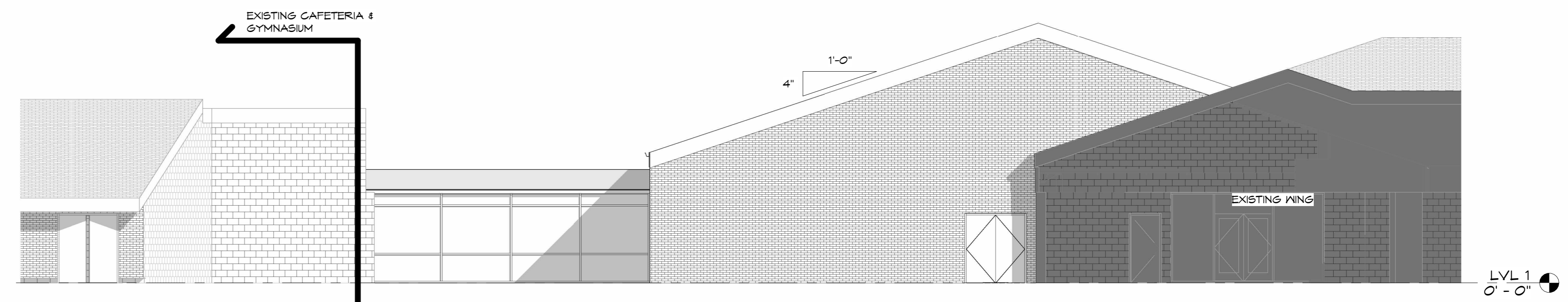
DESIGN DOCUMENTS

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 3 - BUILDING ELEVATIONS

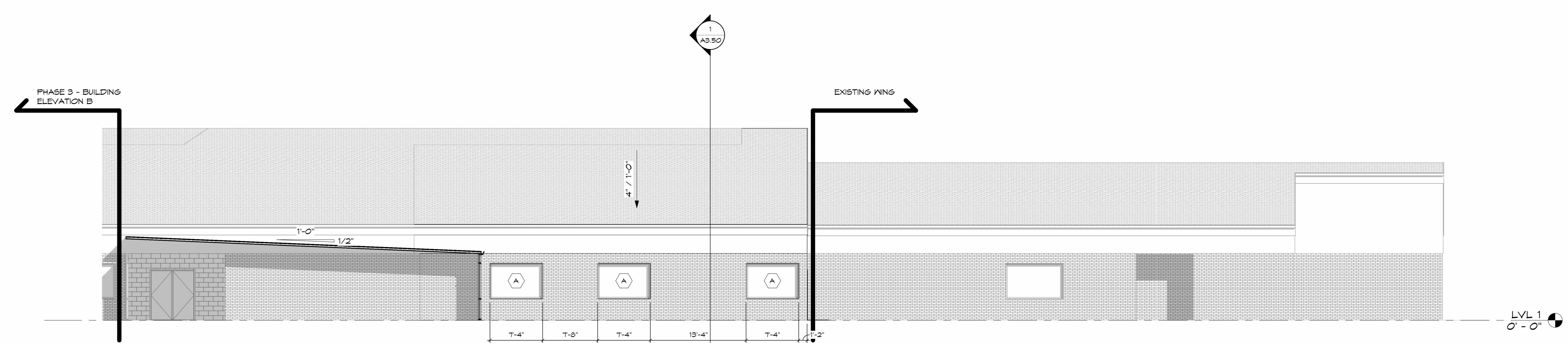
SHEET NUMBER

A2.30





② PHASE 5 - ELEVATION B  
1/8" = 1'-0"



① PHASE 5 - ELEVATION A  
1/8" = 1'-0"

NO.	Description	Date	Job Number
			Y23011A

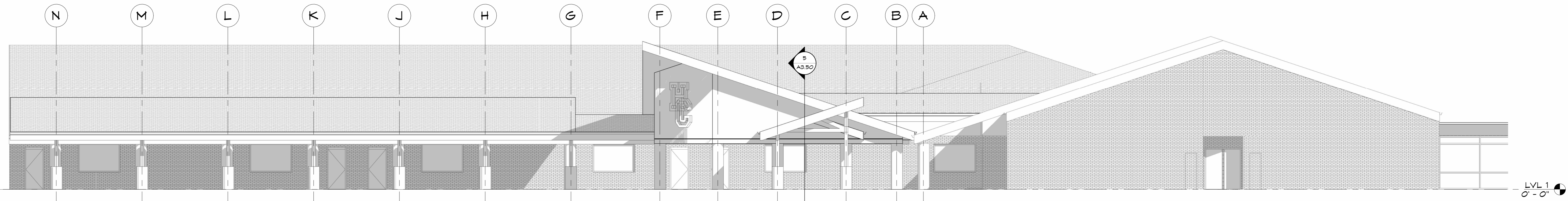
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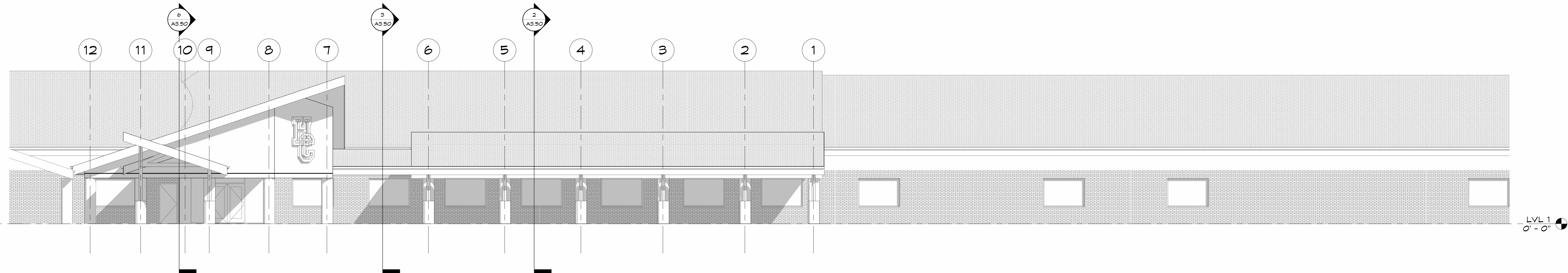
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 5 - BUILDING ELEVATIONS

SHEET NUMBER

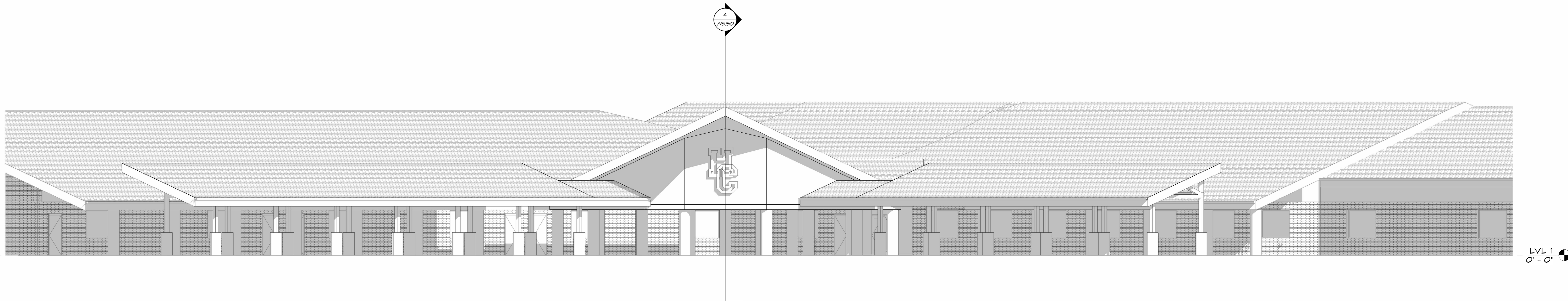




③ PHASE 5 - CANOPY ELEVATION C  
1/8" = 1'-0"



② PHASE 5 - CANOPY ELEVATION B  
1/8" = 1'-0"



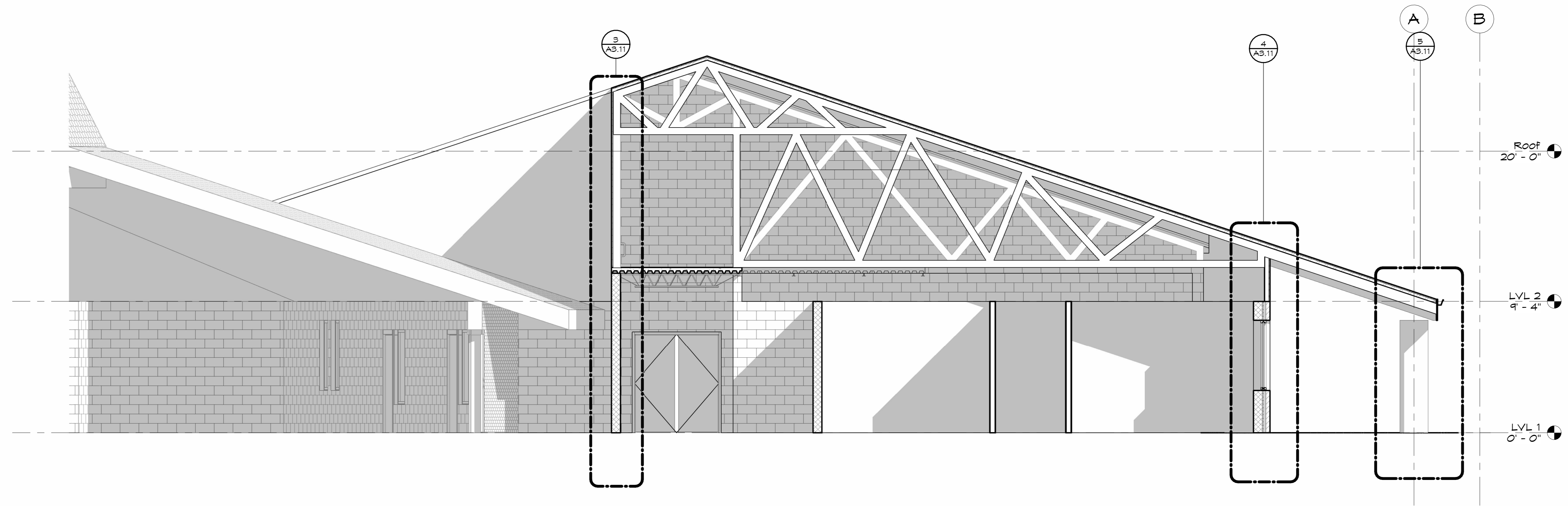
① PHASE 5 - CANOPY ELEVATION A  
1/8" = 1'-0"

JOB NUMBER	Y23011A
DRAWN BY	Author
CHECKED BY	Checker
DATE	05-01-2024

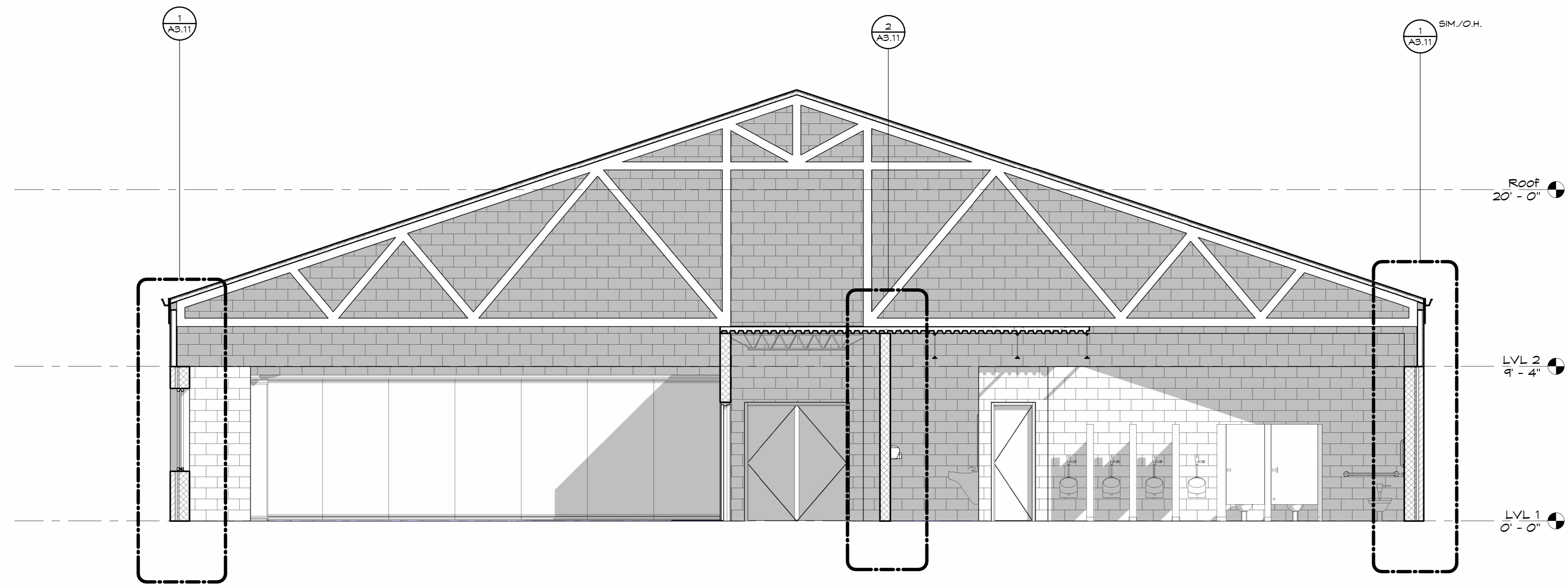
DESIGN DOCUMENTS

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 5 - CANOPY ELEVATIONS





② PHASE 1 - BUILDING SECTION B  
1/4" = 1'-0"



① PHASE 1 - BUILDING SECTION A  
1/4" = 1'-0"

No.	Description	Date

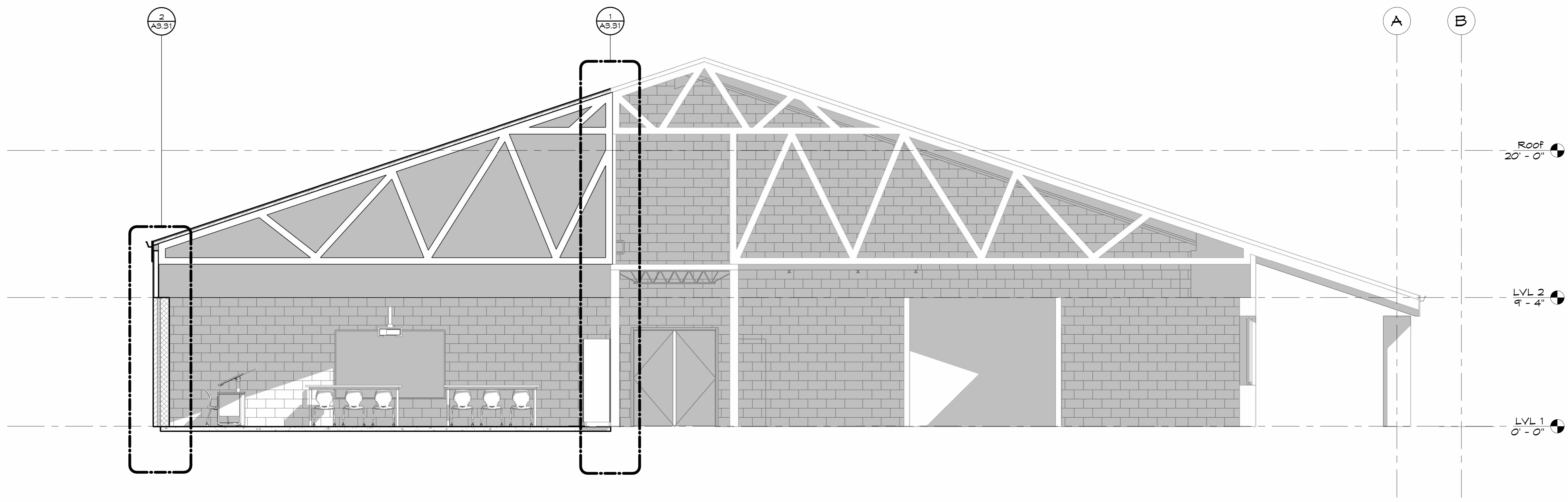
DESIGN DOCUMENTS

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 1 - BUILDING SECTIONS

SHEET NUMBER

A3.10





① PHASE 3 - BUILDING SECTION A  
1/4" = 1'-0"

NO.	DESCRIPTION	DATE

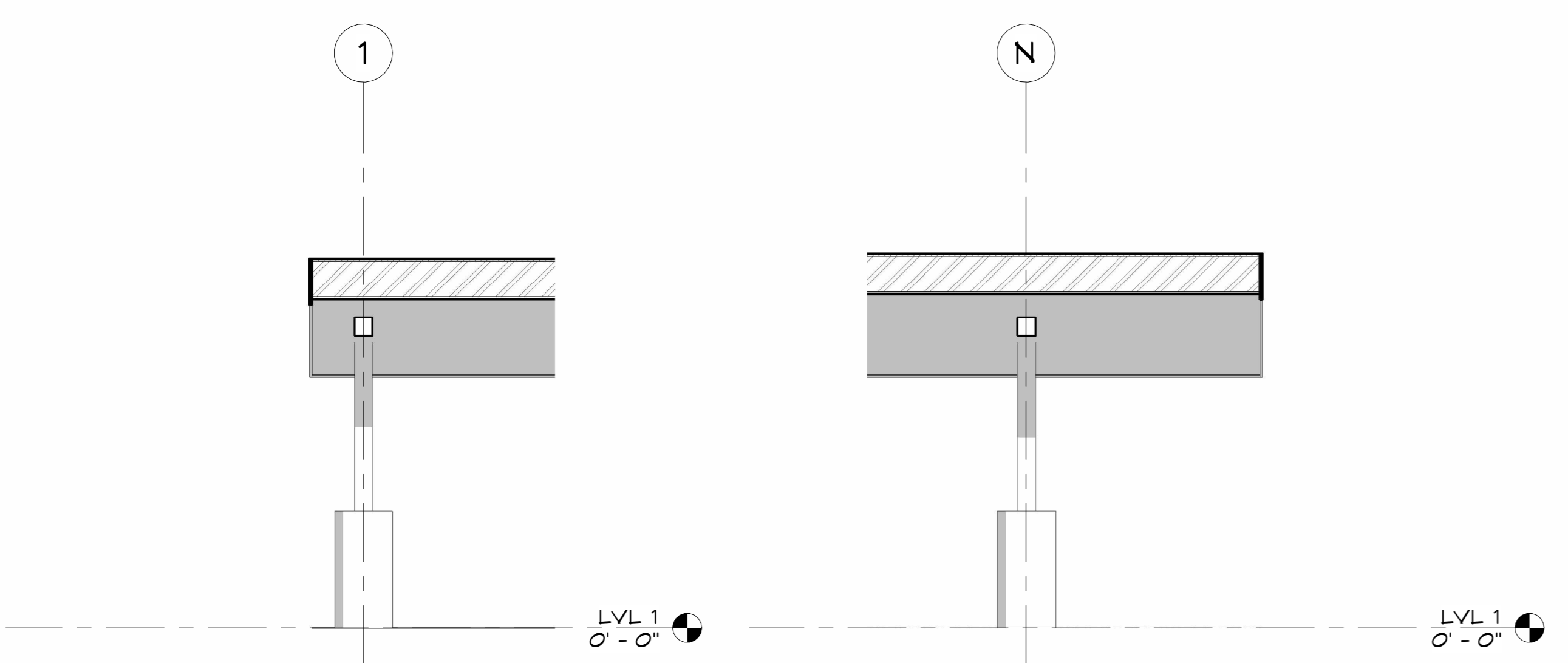
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 DRAWN BY: Author  
 CHECKED BY: Creator  
 DATE: 02-07-2024

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 FINISHES SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.  
 MATERIALS SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.  
 CONSTRUCTION SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.

DESIGN DOCUMENTS

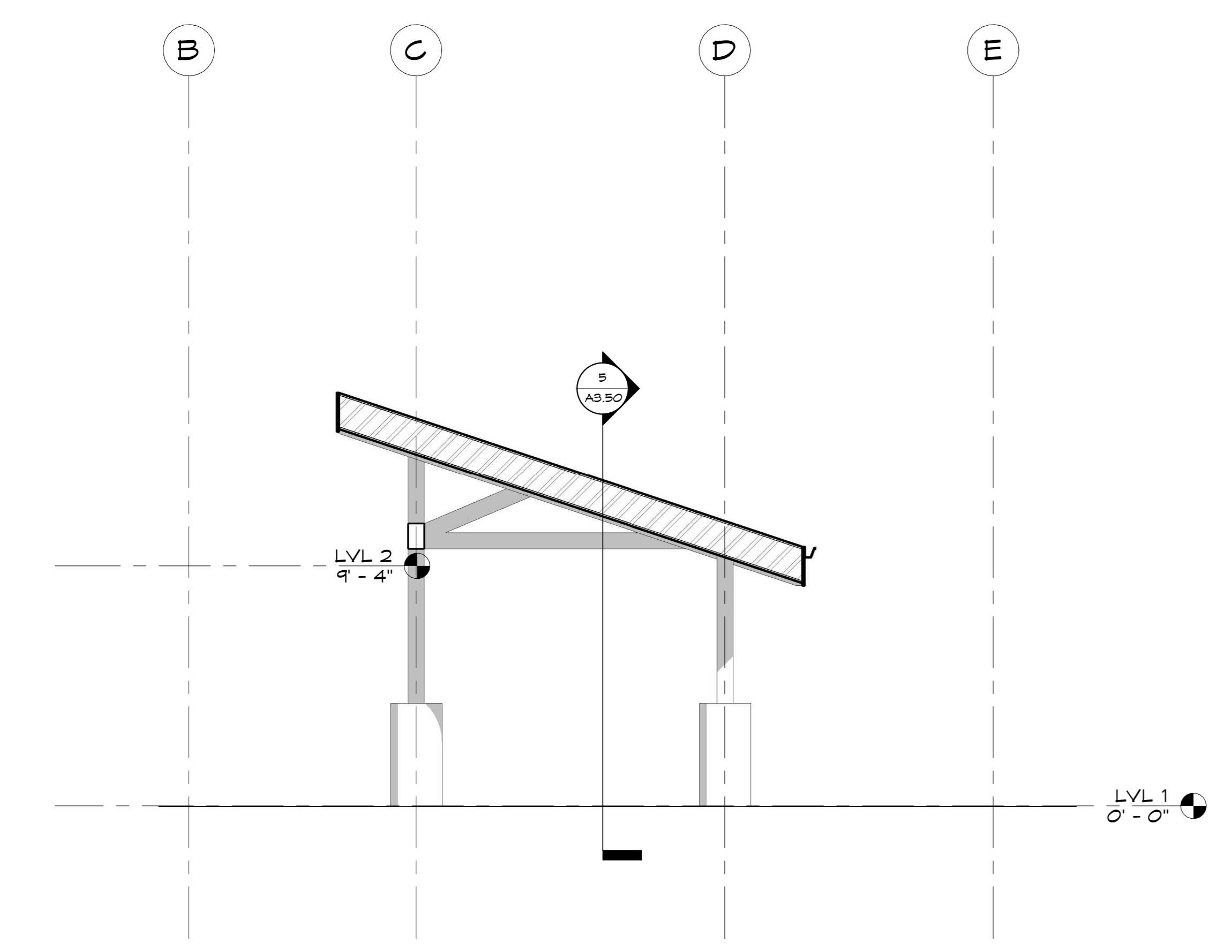
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
HENDERSON, KENTUCKY  
PHASE 3 - BUILDING SECTIONS



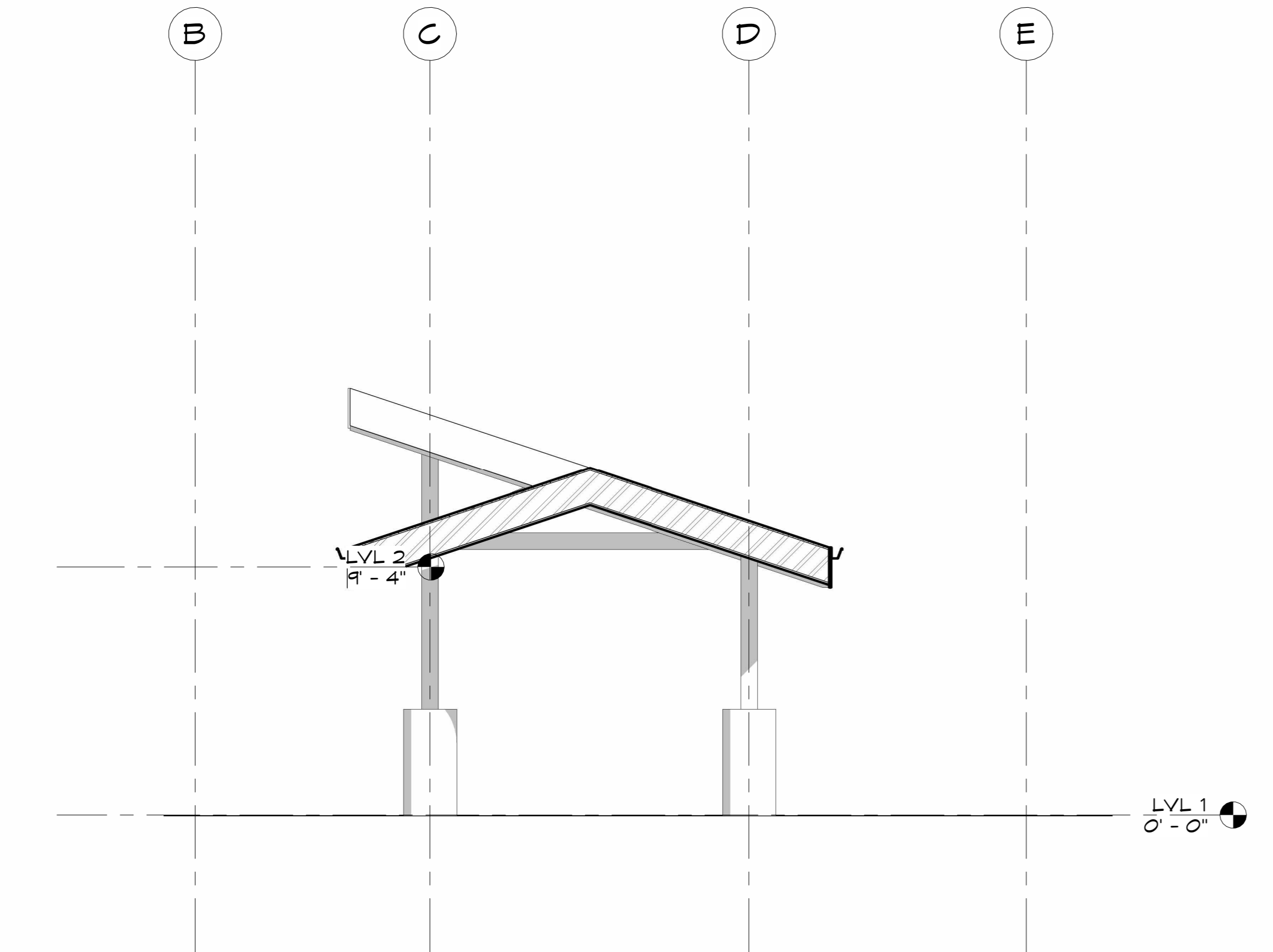


5 PHASE 5 - CANOPY SECTION D  
1/4" = 1'-0"

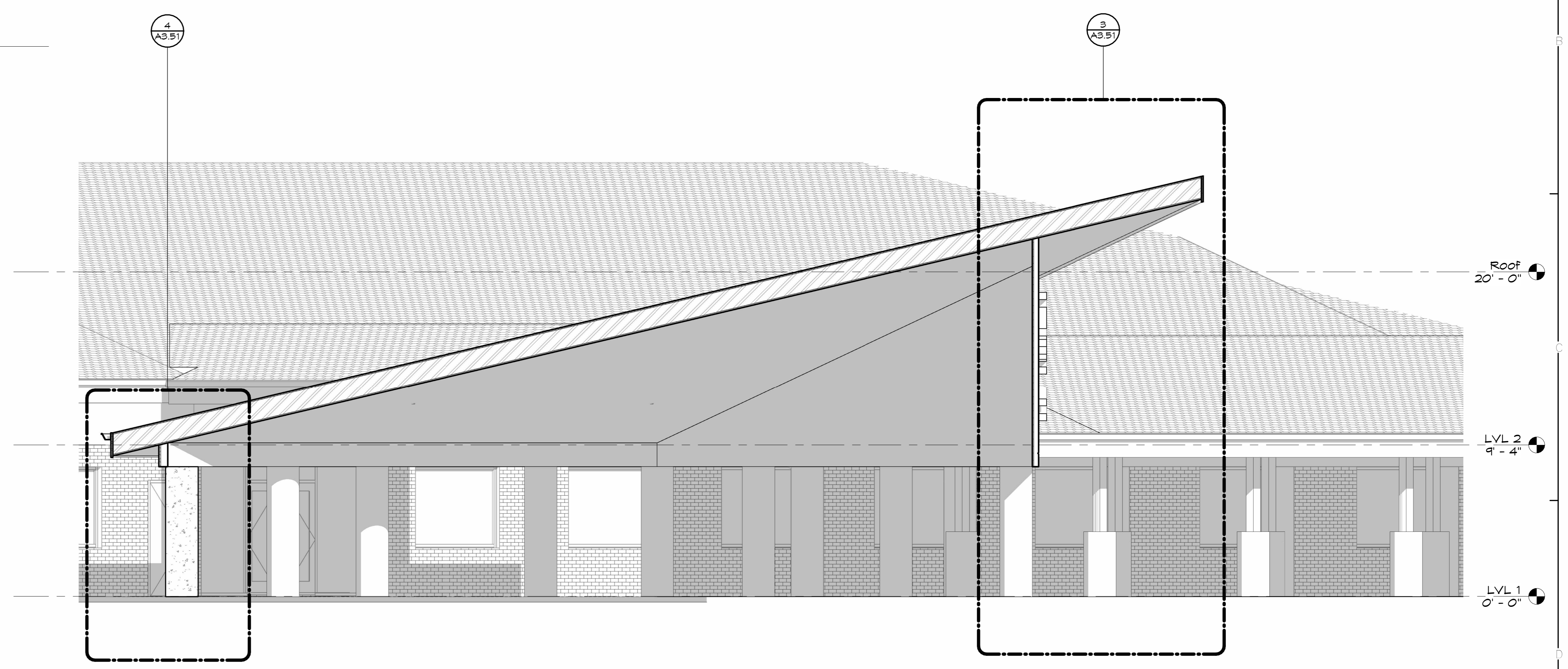
6 PHASE 5 - CANOPY SECTION E  
1/4" = 1'-0"



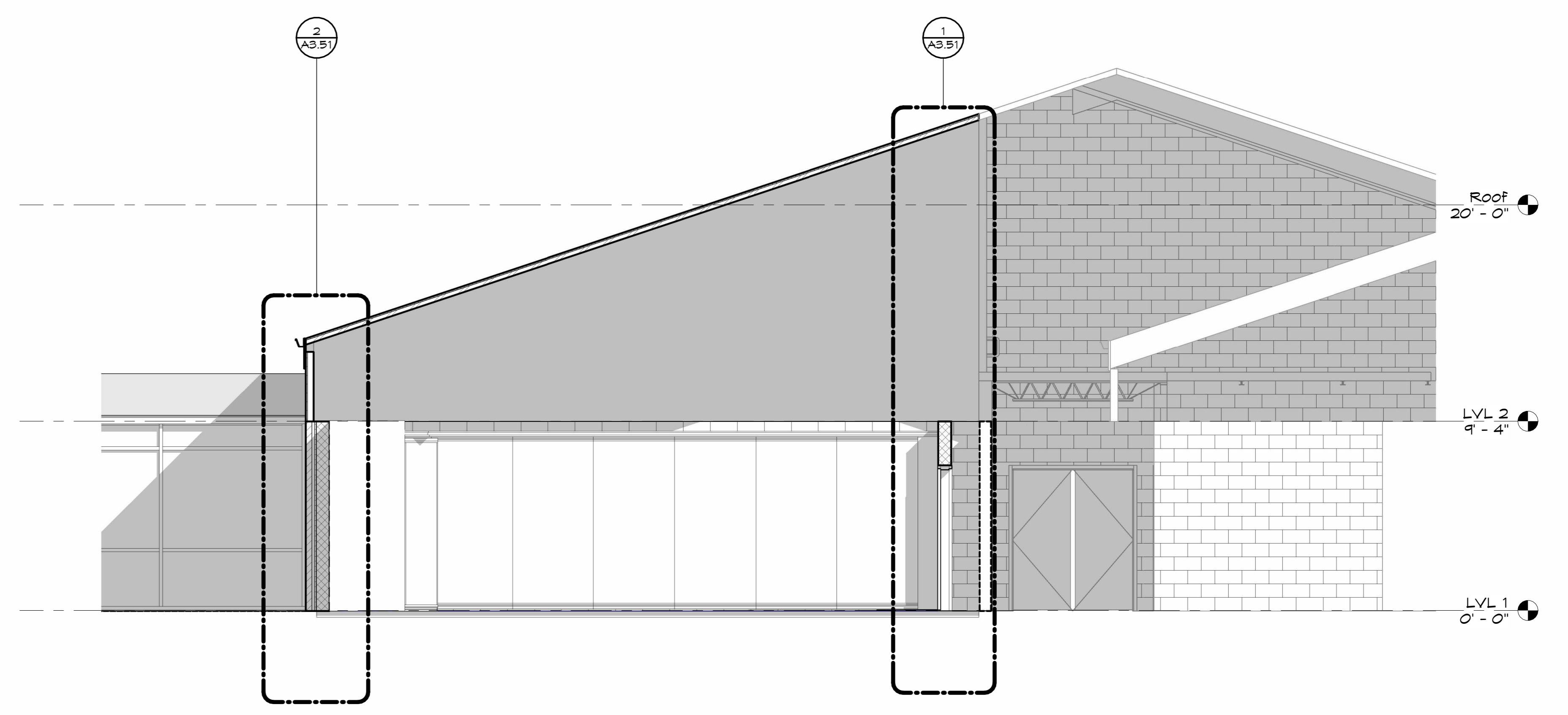
2 PHASE 5 - CANOPY SECTION A  
1/4" = 1'-0"



3 PHASE 5 - CANOPY SECTION B  
1/4" = 1'-0"

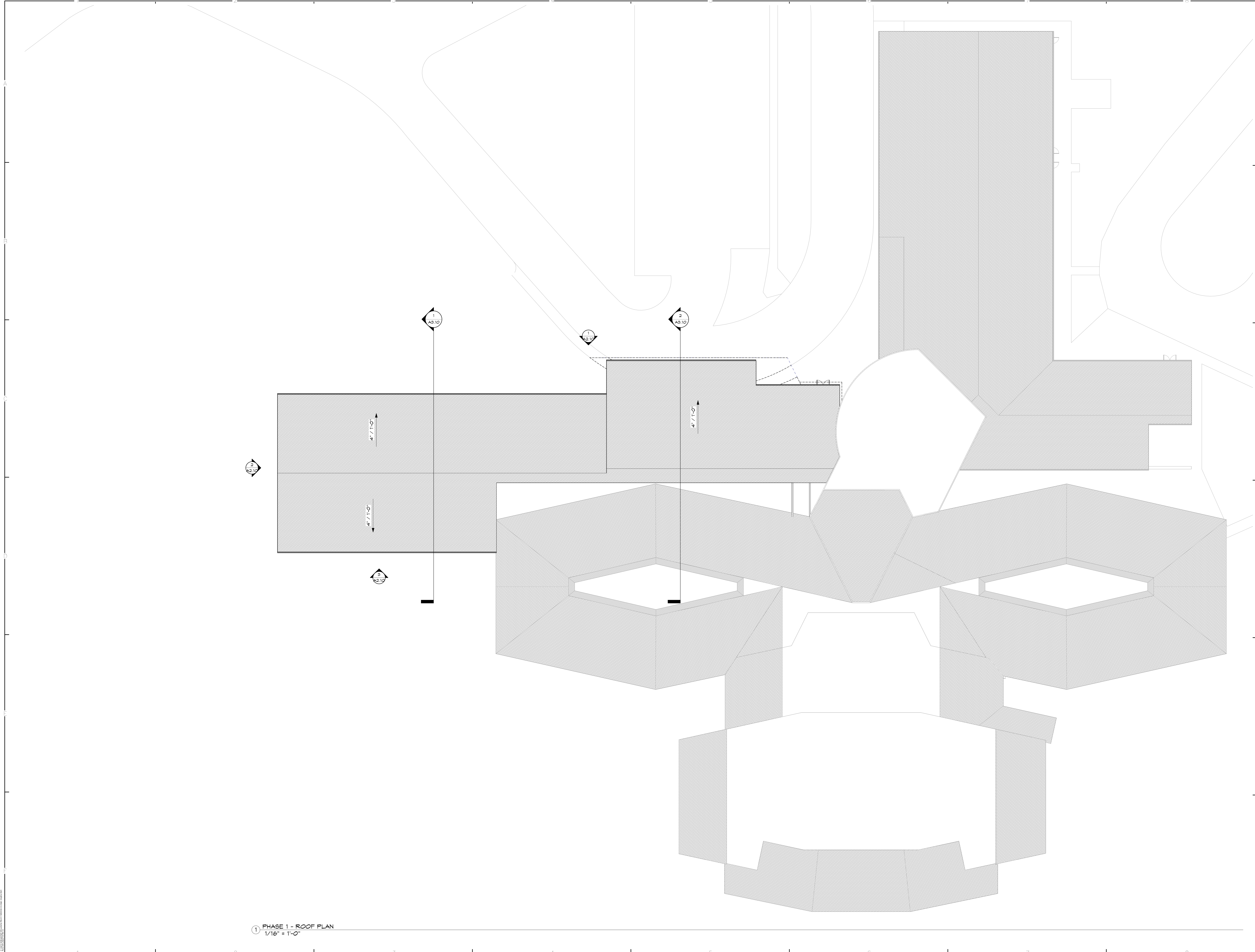


4 PHASE 5 - CANOPY SECTION C  
1/4" = 1'-0"




1 PHASE 5 - BUILDING SECTION A  
1/4" = 1'-0"

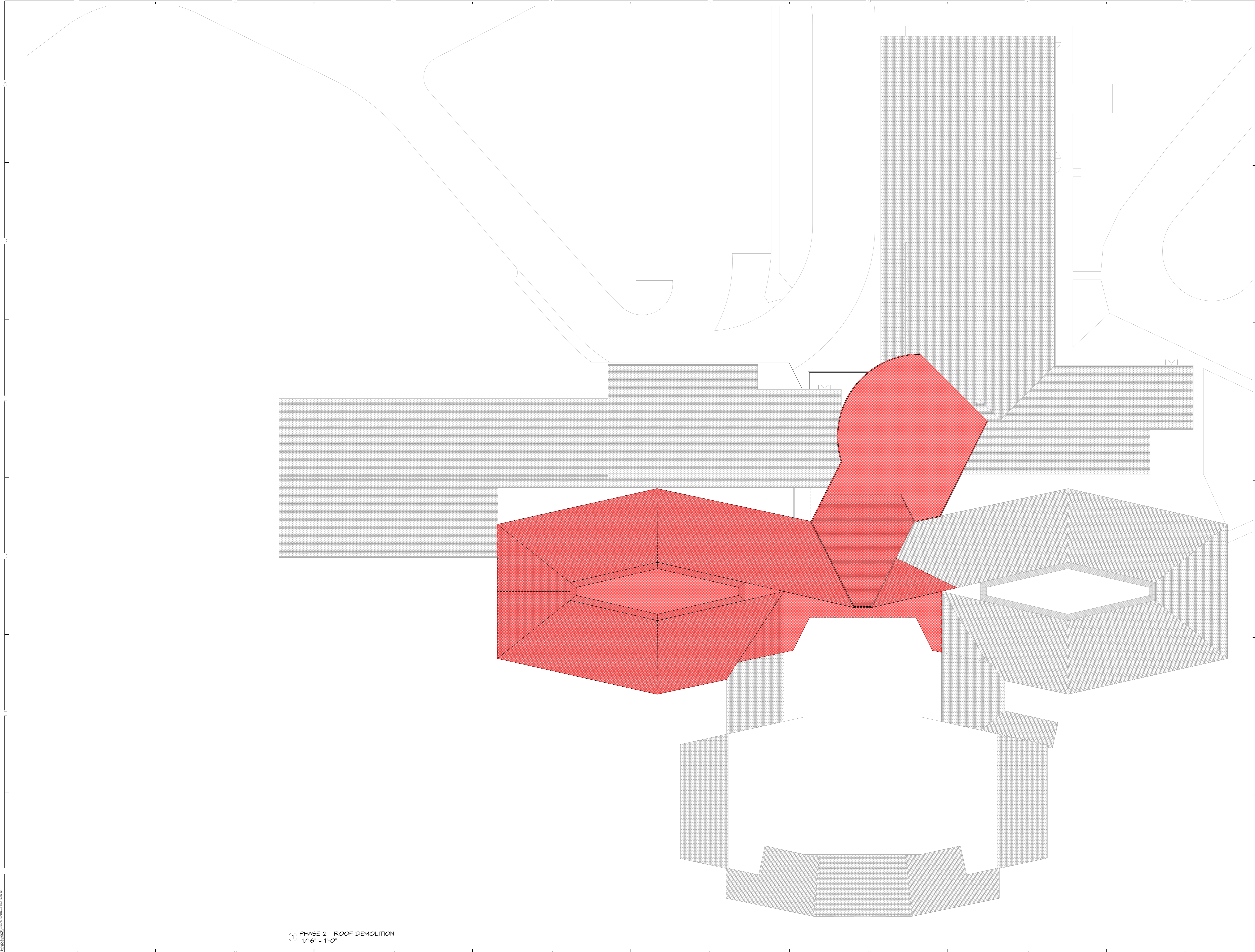





① PHASE 1 - ROOF PLAN  
1/16" = 1'-0"

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DESIGN DOCUMENTS	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION HENDERSON, KENTUCKY <b>PHASE 1 - ROOF PLAN</b>	
SHEET NUMBER	
<b>A4.10</b>	

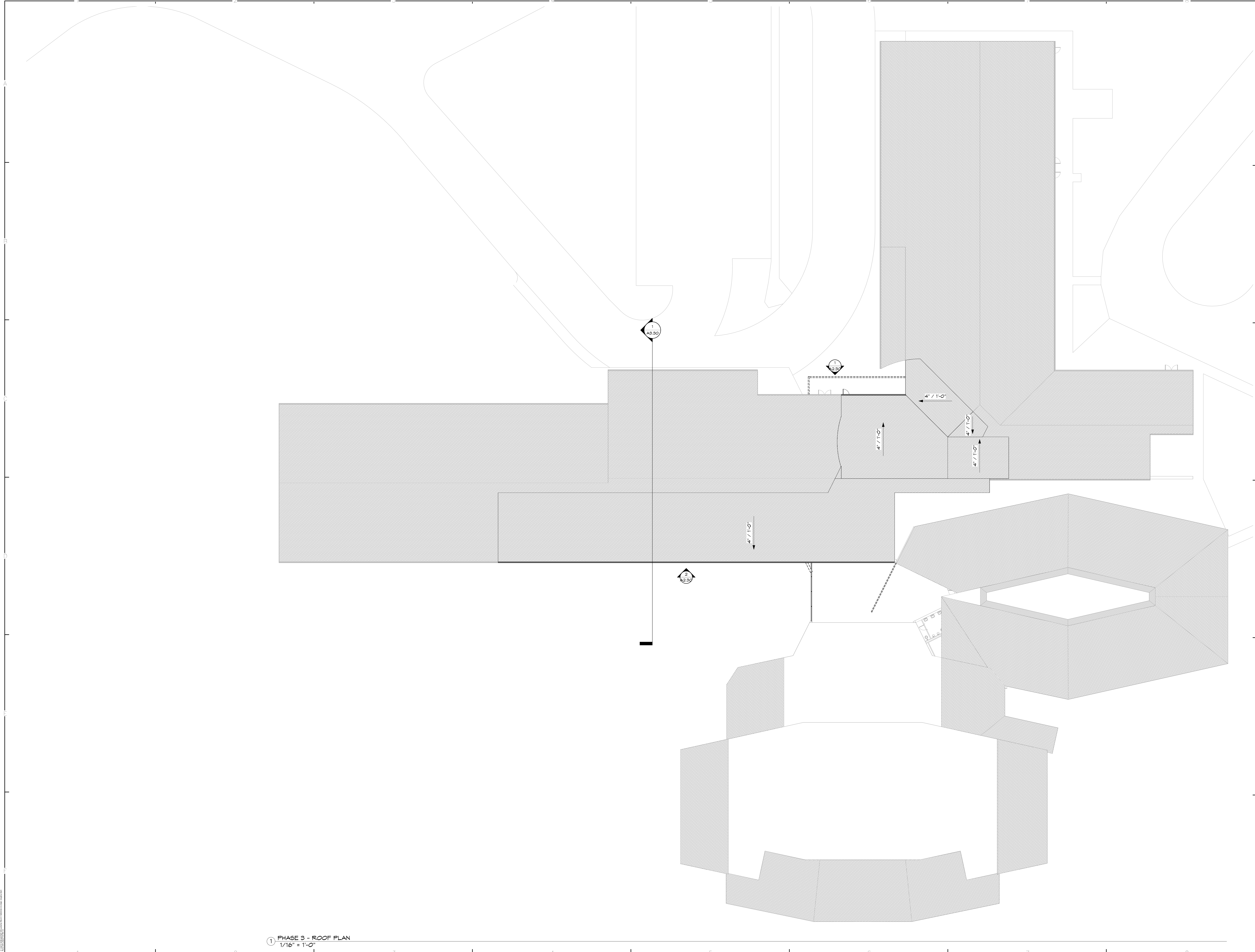





① PHASE 2 - ROOF DEMOLITION  
1/16" = 1'-0"

 <b>RBS DESIGN GROUP</b> ARCHITECTURE <small>225 Highland Drive, Henderson, KY 40024          E-Mail: office@rbsdesigngroup.com</small>	
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<small>JOB NUMBER</small> Y23011A	<small>DATE</small> 05-01-2024
<small>DRAWN BY</small> Author	<small>CHECKED BY</small> Creator
<small>DATE</small> 05-01-2024	<small>DATE</small> 05-01-2024
DESIGN DOCUMENTS	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION HENDERSON, KENTUCKY <b>PHASE 2 - ROOF DEMOLITION</b>	
SHEET NUMBER	
<b>A4.20</b>	

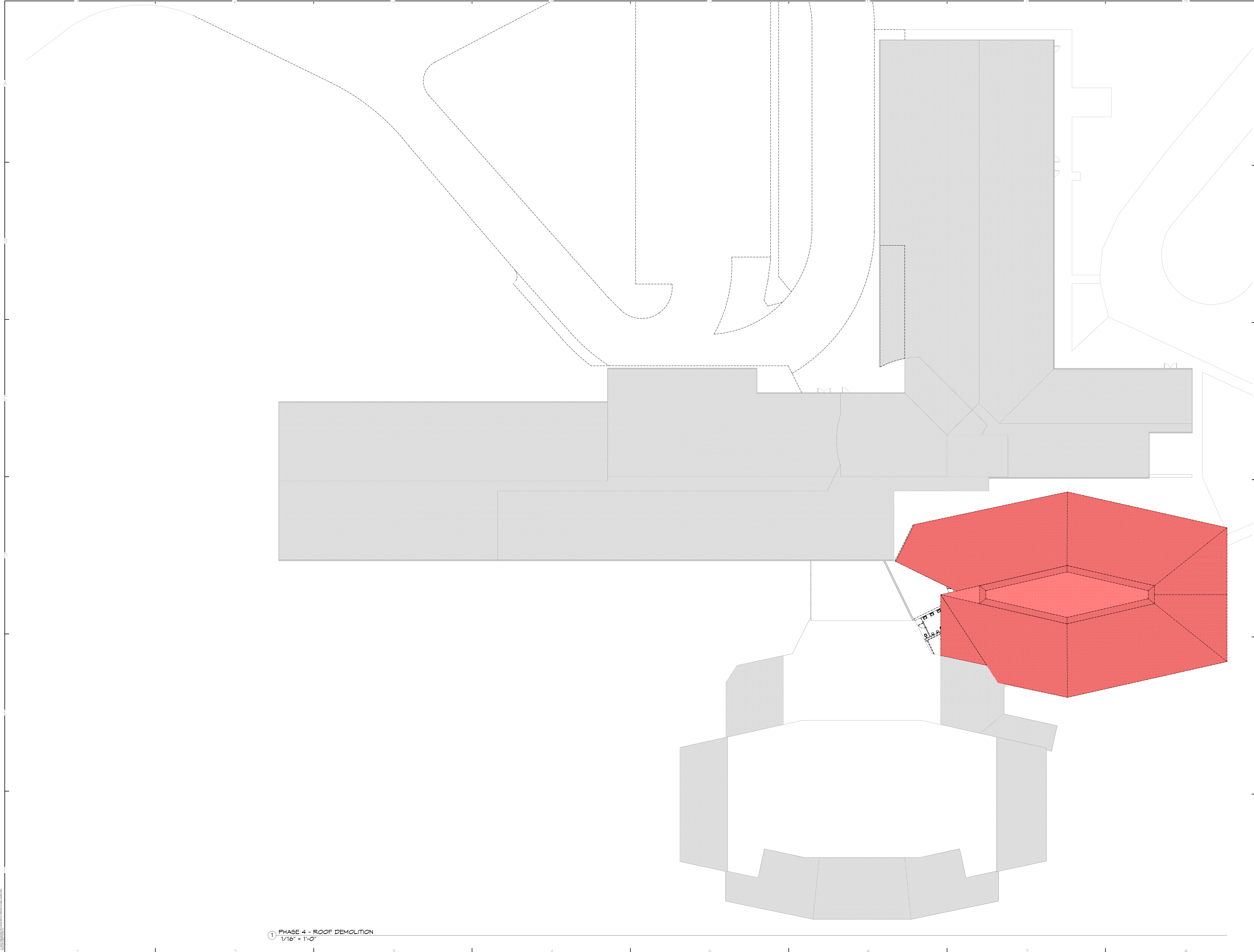





① PHASE 3 - ROOF PLAN  
1/16" = 1'-0"

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JOB NUMBER: Y23011A DRAWN BY: Author CHECKED BY: Creator DATE: 05-01-2024	SHEET NUMBER: <b>A4.30</b>
DESIGN DOCUMENTS	
<b>HENDERSON COUNTY SCHOOLS          EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION          HENDERSON, KENTUCKY          PHASE 3 - ROOF PLAN</b>	

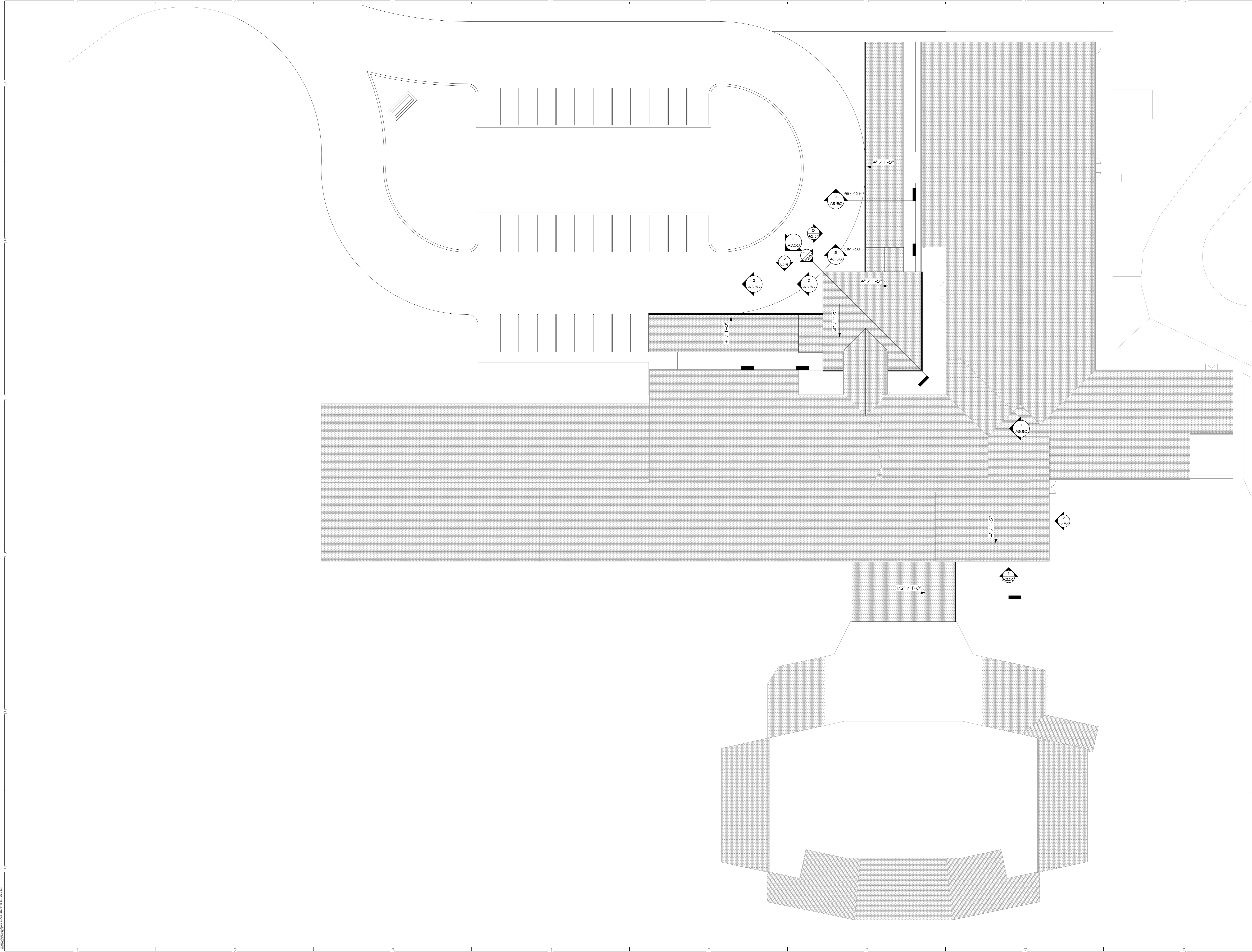





① PHASE 4 - ROOF DEMOLITION  
1/16" = 1'-0"

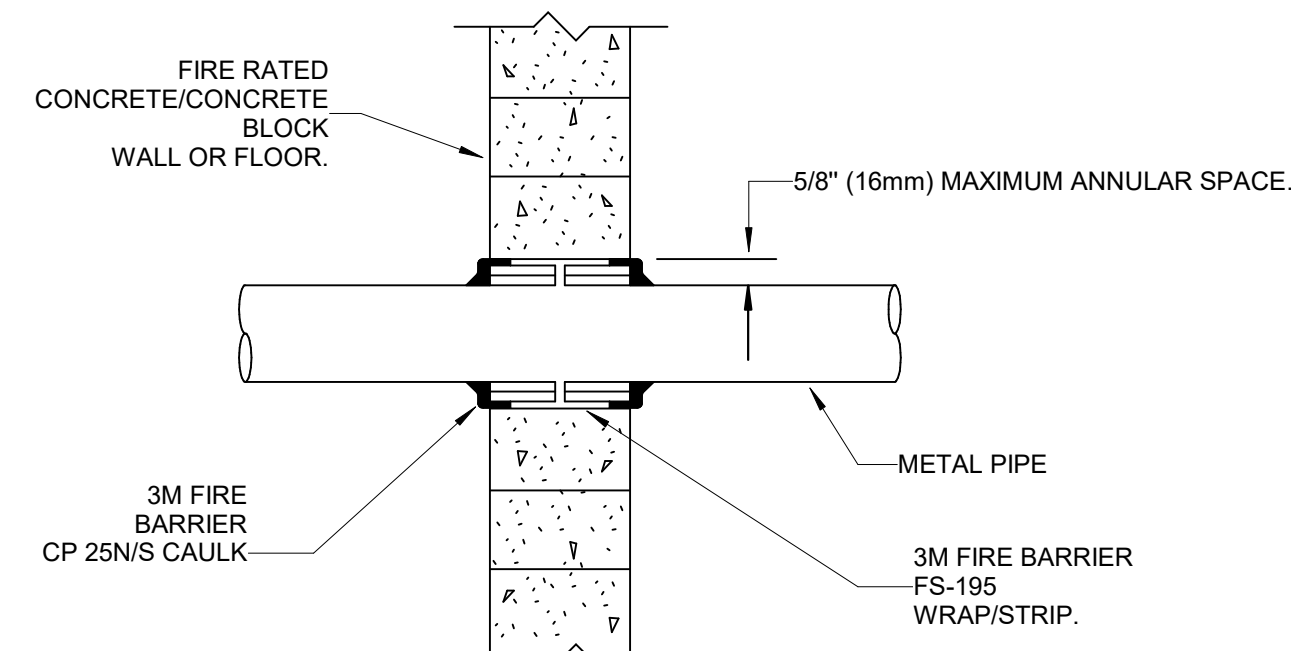
	
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DESIGN DOCUMENTS	
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SHEET NUMBER <b>A4.40</b>	





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JOB NUMBER Y23011A	DRAWN BY Author
NO.   Description   Date	CHECKED BY Checker
1 2 3 4	DATE 05-01-2024
DESIGN DOCUMENTS	
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SHEET NUMBER <b>A4.50</b>	





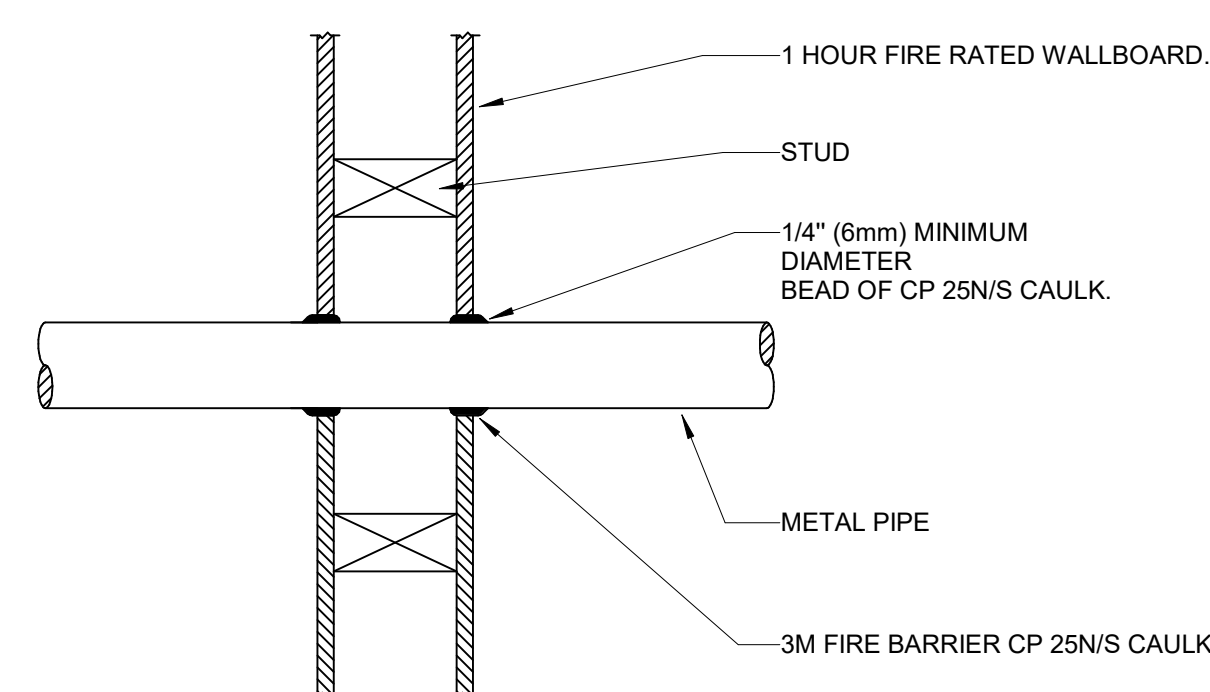
**NOTES:**

1. THE MAXIMUM ANNULAR SPACE AROUND THE METAL PIPE OR CONDUIT IS 5/8" (16mm). (IF THE ANNULAR SPACE EXCEEDS 5/8" PATCH THE WALL AND PENETRATE WALL AT ANOTHER LOCATION).
2. WRAP THE 3M MODEL# FS-195 WRAP/STRIP AROUND THE PIPE/CONDUIT, FOIL SIDE OUT. TO FILL THE SPACE BETWEEN THE PIPE/CONDUIT AND THE WALL OPENING. THE 3M MODEL# FS-195 WRAP/STRIP SHOULD BE TIGHTLY SECURED WITH ALUMINUM FOIL TAPE OR STEEL TIE WIRE AND PUSHED INTO THE OPENING UNTIL THE TOP EDGE OF THE WRAP IS FLUSH WITH THE WALL SURFACE. THE IDENTICAL INSTALLATION SHOULD BE INSTALLED ON THE OTHER SIDE OF THE WALL.
3. USE 3M MODEL# CP 25N/S(NO SAG) CAULK TO FILL THE AREA BETWEEN THE FS-195 WRAP/STRIP AND THE EDGES OF THE OPENING AND ANY VOIDS IN THE 3M MODEL# FS-195 WRAP/STRIP. A FILL OF CP 25 CAULK SHOULD COAT ALL EXPOSED EDGES OF THE FS-195 WRAP/STRIP AND COMPLETELY SEAL THE AREA BETWEEN THE FS-195 WRAP/STRIP, THE PIPE/CONDUIT AND THE WALL SURFACE.

**PENETRATION FIRESTOP FOR METAL PIPE/CONDUIT THROUGH A CONCRETE WALL**  
NOT TO SCALE

**FIRE STOPPING NOTES:**

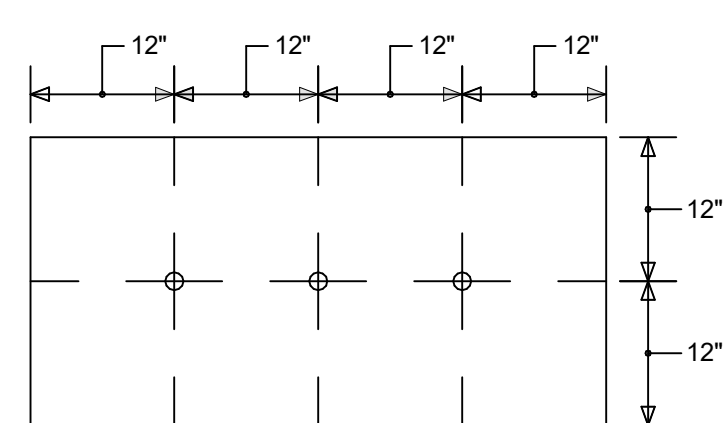
1. FIRE STOPPING IS CRITICAL AND MUST BE ACCOMPLISHED. ALL PIPES MUST BE FIRESTOPPED WHERE THEY PENETRATE FIRE RESISTIVE, FIRE RATED, AND SMOKE RESISTIVE WALLS OR FLOORS. ALL FLOORS CORRIDOR WALLS, STAIR WALLS, MECHANICAL ROOM WALLS, STORAGE ROOM WALLS AND OTHER HAZARDOUS ROOM WALLS ARE ONE HOUR RATED.
2. A FOUR-HOUR TRAINING SESSION SHALL BE CONDUCTED BY MANUFACTURER OF THE FIRESTOPPING MATERIAL. THIS SHALL BE DONE PRIOR TO THE INSTALLATION OF THE MATERIAL. CONTACT HOSPITAL ENGINEER AND CMTA TO ADVISE OF DATE AND TIME OF THIS MEETING.
3. ALL PENETRATIONS WILL BE REVIEWED BY THE HOSPITAL ENGINEER OR CMTA PRIOR TO INSPECTION. ALL CEILING TILES BENEATH THE PENETRATIONS SHALL BE REMOVED BY THE CONTRACTOR.



**NOTES:**

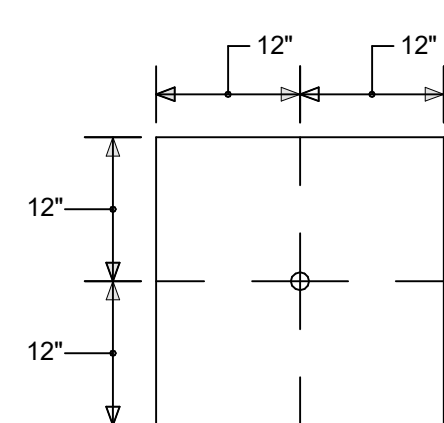
1. FORCE THE 3M MODEL# CP 25N/S CAULK INTO THE ANNULAR SPACE TO THE MAXIMUM EXTENT POSSIBLE, FLUSH WITH THE EXTERIOR OF THE PENETRATION SURFACE.
2. FINISH CAULKING WITH A 1/4" (6mm) MINIMUM BEAD OF CP 25N/S CAULK APPLIED TO THE PERIMETER OF THE CONDUIT/PIPE AT ITS EGRESS FROM THE WALL.
3. THE MAXIMUM ANNULAR SPACE IS NOT TO EXCEED 3/16" (5mm). (IF IT DOES PATCH WALL AND PENETRATE WALL AT ANOTHER LOCATION).
4. INSTALL THE 3M FIRESTOP ON BOTH SIDES OF THE WALL.

**PENETRATION FIRESTOP FOR METAL PIPE/CONDUIT THROUGH ONE HOUR WALL**  
NOT TO SCALE



SPRINKLER HEADS MAY BE INSTALLED IN 2x4 CEILING TILES IN ANY OF THE THREE LOCATIONS INDICATED ABOVE. NO EXCEPTIONS!

**2x4 CEILING TILE DETAIL**  
SCALE: NONE



SPRINKLER HEADS TO BE INSTALLED IN CENTER OF 2x2 CEILING TILES.

**2x2 CEILING TILE DETAIL**  
SCALE: NONE

**ABBREVIATIONS**

ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
CLG	CEILING
CLR	CLEAR
DN	DOWN
ENGR	ENGINEER
EQ	EQUAL
ETR	EXISTING TO REMAIN
EXT	EXTERIOR
FVC	FIRE VALVE CABINET
FL	FLOOR
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPC	FIRE PROTECTION CONTRACTOR
FT	FEET OR FOOT
FUT	FUTURE
GA	GAGE/GAUGE
GAL	GALLON (-S)
GC	GENERAL CONTRACTOR
HORIZ	HORIZONTAL
ID	I (-IDENTIFICATION, -NSIDE DIAMETER, -NSIDE DIMENSION)
IN	INCH (-ES)
INT	INTER (-IOR, -ERVAL)
IPS	IRON PIPE SIZE
LBS	POUNDS
LF	LINEAR FEET/FOOT
MAX	MAXIMUM
MFG	MANUFACTURER
MIN	MIN (-IMUM, -UTE)
MISC	MISCELLANEOUS
MTG	MOUNTING
N/A	NOT APPLICABLE
NC	NOISE CRITERIA OR NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DI (-AMETER, -MENSION)
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
PC	PLUMBING CONTRACTOR
PLBG	PLUMBING
PRV	PRESSURE REDUCING VALVE (STEAM, WATER, GAS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	PPSI GAUGE
SQ FT	SQUARE FEET OR FOOT
TBD	TO BE DETERMINED

**ABBREVIATIONS (CONTINUED)**

TE	TOP ELEVATION
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
WT	WEIGHT
W/	WITH
W/O	WITHOUT
%	PERCENT
CL	CENTERLINE

**GENERAL SYMBOLS**

⊕	TAGGED NOTE DESIGNATOR
△	REVISION TRIANGLE
ROOM TAG	ROOM TAG
EQUIPMENT TAG	EQUIPMENT TAG
POINT OF CONNECTION / CONNECT TO EXISTING	POINT OF CONNECTION / CONNECT TO EXISTING
POINT OF DEMOLITION	POINT OF DEMOLITION

**MECHANICAL PIPING LEGEND**

○	PIPE ELBOW TURNING UP
⊖	PIPE ELBOW TURNING DOWN
⊕	PIPE TEE; CONNECTION ON TOP
⊖	PIPE TEE; CONNECTION ON BOTTOM
—	PIPE CAP
—FP	FIRE PROTECTION PIPING
--D(XXX)--	PIPING TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
—E(XXX)—	EXISTING PIPING - (XXX) DENOTES SYSTEM
—A(XXX)—	ABANDONED IN PLACE PIPING - (XXX) DENOTES SYSTEM
— —	STRAINER
— —	MANUAL ISOLATION VALVE
— —	GLOBE VALVE
— —	OS&Y (GATE) VALVE
— —	PRESSURE REDUCING VALVE (STEAM, GAS, WATER, ETC.)
— —	CHECK VALVE
— —	DOUBLE CHECK VALVE ASSEMBLY
— —	FLEXIBLE PIPE CONNECTION
— —	PIPING UNION
— —	FLOW SWITCH
— —	PRESSURE SWITCH
— —	TAMPER SWITCH
— —	PETE'S PLUG; TEMPERATURE/PRESSURE PORT
●	SEMI-RECESSED SPRINKLER HEAD WITH REMOVABLE ESCUTCHEON PLATE
●	UPRIGHT TYPE SPRINKLER HEAD
▶	SIDEWALL TYPE SPRINKLER HEAD

**APPLICABLE BUILDING CODES**

APPLICABLE BUILDING CODES	DOCUMENT	YEAR
ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES	ANSI A117.1	2009
FIRE SPRINKLER CODE	NFPA 13	2013
INTERNATIONAL BUILDING CODE (IBC)	STATE EDITION	2015
INTERNATIONAL ENERGY CONSERVATION CODE (IECC) OR ASHRAE 90.1	STATE EDITION	2012 OR 2010
INTERNATIONAL FIRE CODE (IFC)	STATE EDITION	2015
INTERNATIONAL FUEL GAS CODE (IFGC)	STATE EDITION	2015
INTERNATIONAL MECHANICAL CODE (IMC)	STATE EDITION	2015
INTERNATIONAL PLUMBING CODE (IPC)	STATE EDITION	2015
INTERNATIONAL EXISTING BUILDING CODE (IEBC)	STATE EDITION	2009
NATIONAL ELECTRIC CODE (NEC)	NFPA 70	2017
NATIONAL FIRE ALARM & SIGNALING CODE	NFPA 72	2013
UNIFORM STATEWIDE BUILDING CODE		2018

**FLOW DATA**

STATIC PSI:	259
RESIDUAL PSI:	150
FLOW:	1500 GPM
DURATION:	CONTINUOUS
DATE & TIME:	08/06/2018
SOURCE OF WATER:	PAV A FIRE PUMP
SOURCE OF DATA:	KENTUCKY AMERICAN WATER
HAZARD:	LIGHT & ORDINARY
OCCUPANCY OF BUILDING:	HOSPITAL

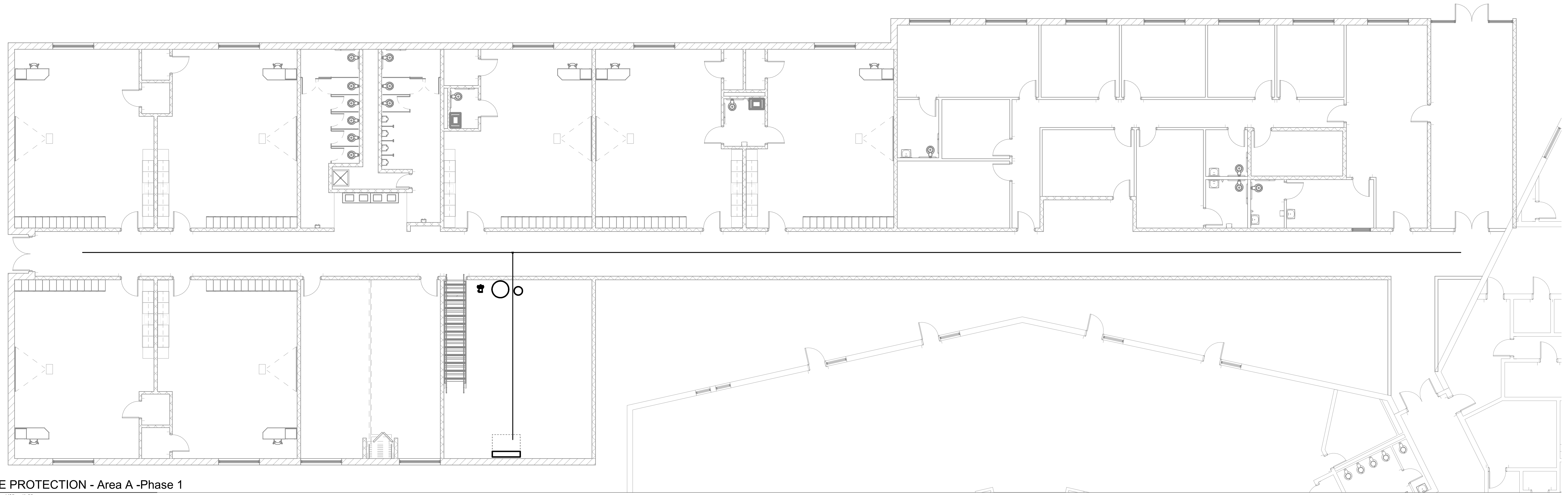
**HENDERSON COUNTY SCHOOLS**  
**EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION**  
**EAST HEIGHTS ELEMENTARY RENOVATION**  
**FIRE PROTECTION LEGEND**

**RBS DESIGN GROUP**  
**ARCHITECTURE**

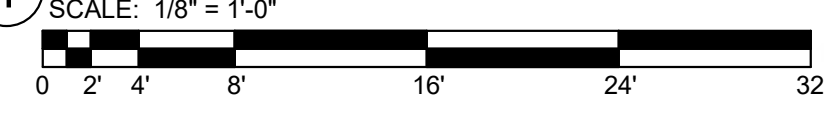
NOT FOR CONSTRUCTION

SHEET NUMBER  
**FP1.0**





1 FIRE PROTECTION - Area A -Phase 1  
 SCALE: 1/8" = 1'-0"



No.	Description	Date	Job Number	Drawn By	Checked By	Scale	Date
1			2024114	XHER23	DRH	1/8" = 1'-0"	2/12/2024

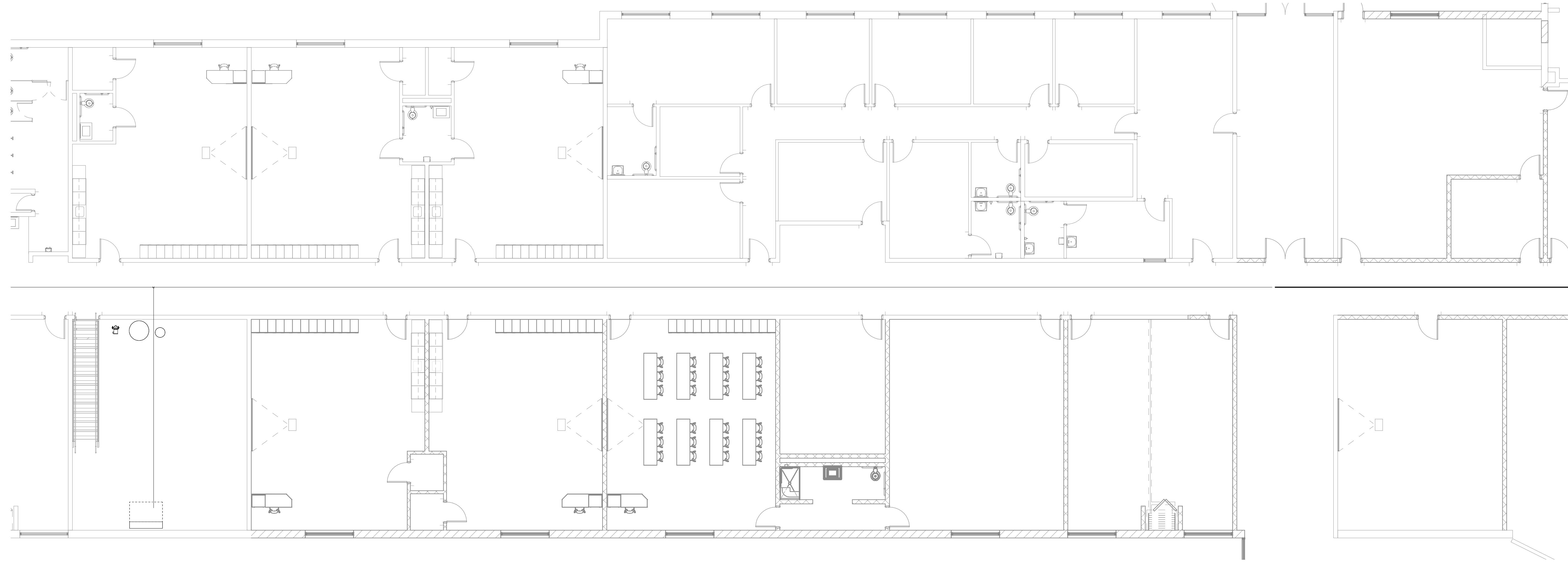
NOT FOR CONSTRUCTION

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 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRE PROTECTION - PHASE 1 - AREA A

SHEET NUMBER

FP2.0





① FIRE PROTECTION - Area A -Phase 3  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

No.	Description	Date	Job Number	Drawn By	Checked By	Scale	Date
1	VP211141	XHER23	091	HCH			2/12/2024

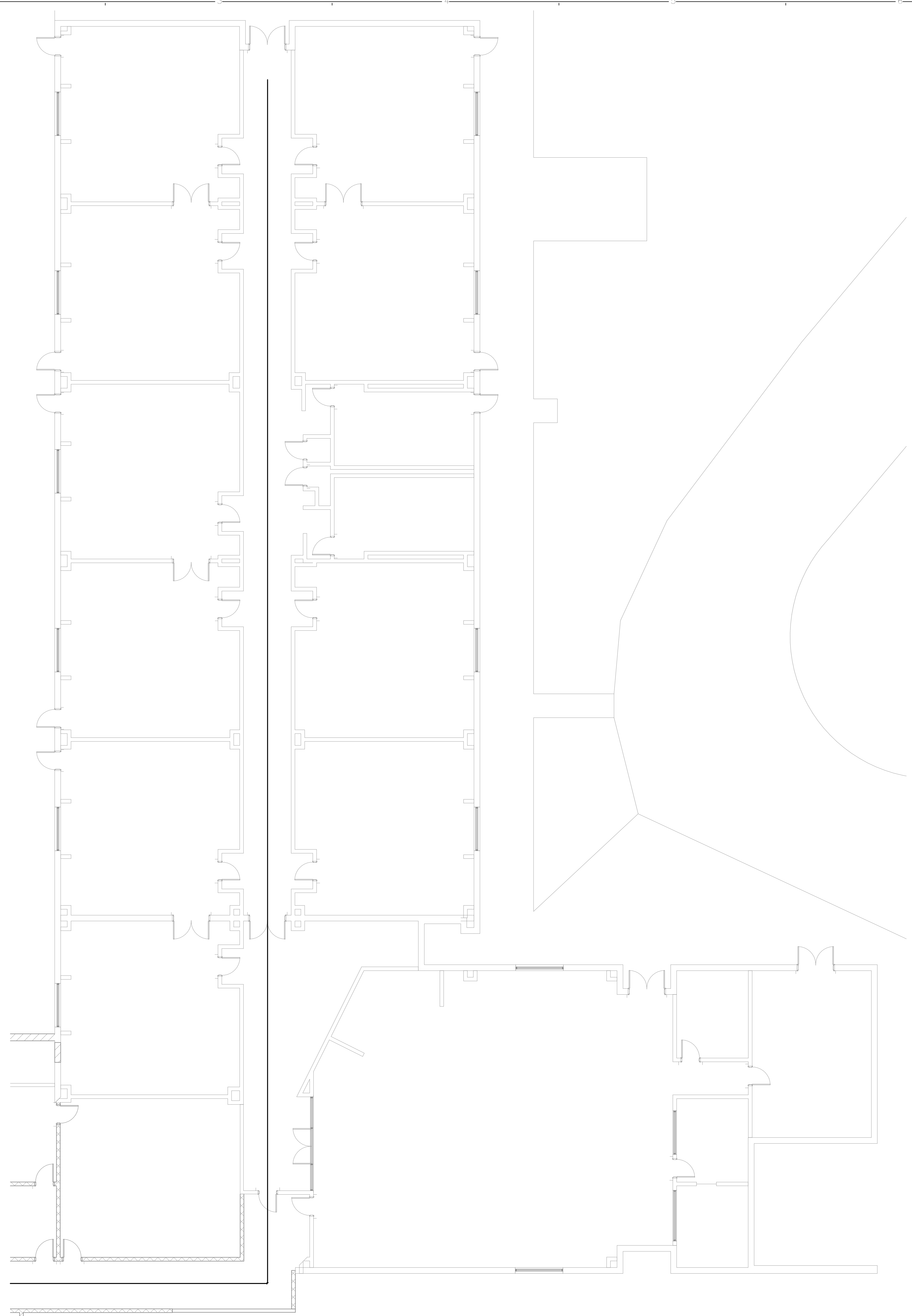
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HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRE PROTECTION - PHASE 3 - AREA A

SHEET NUMBER

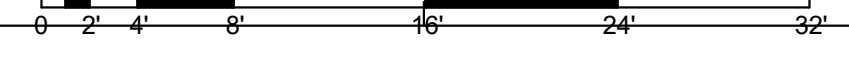
**FP2.1**





1 FIRE PROTECTION - Area E - Phase 3

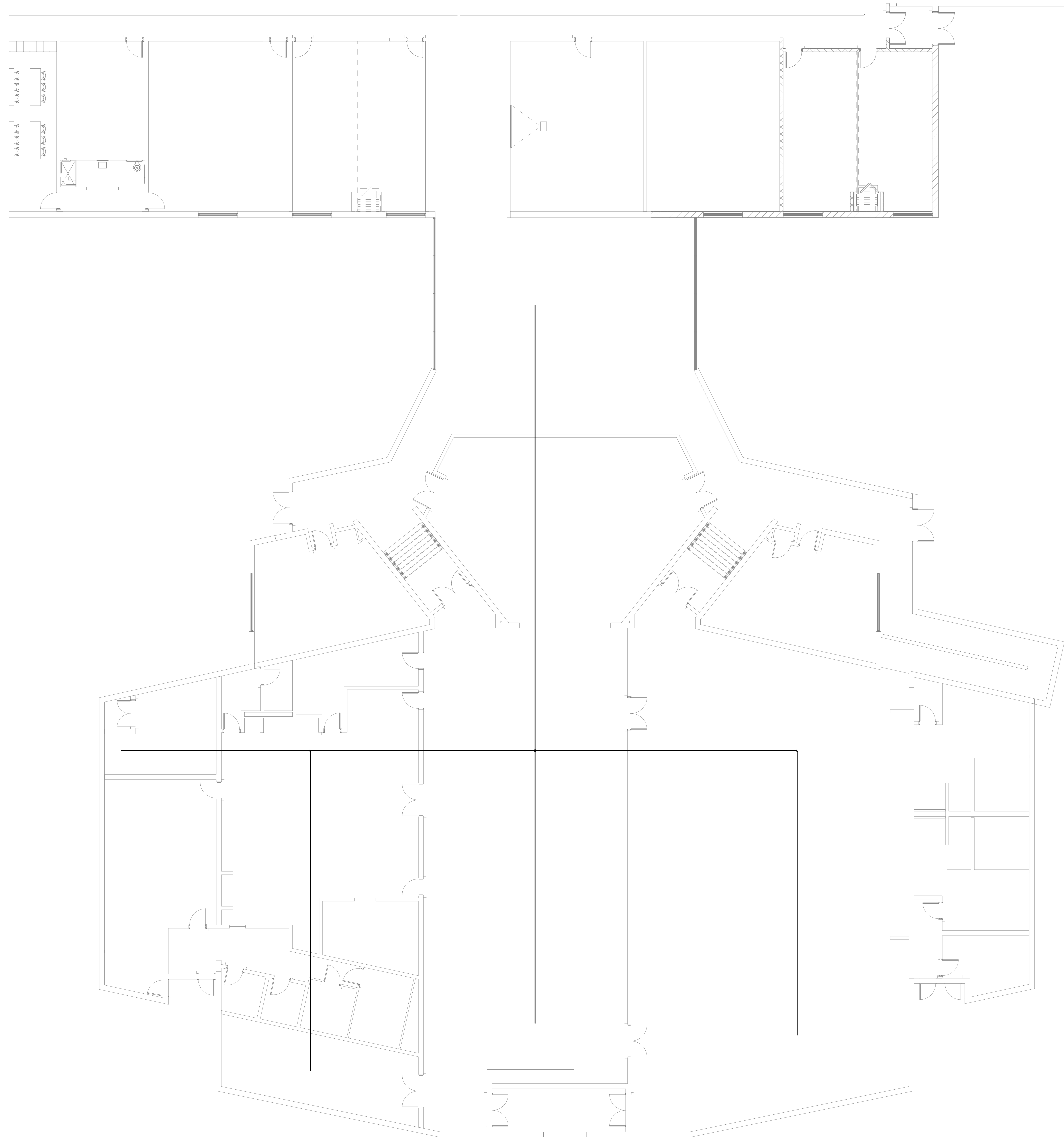
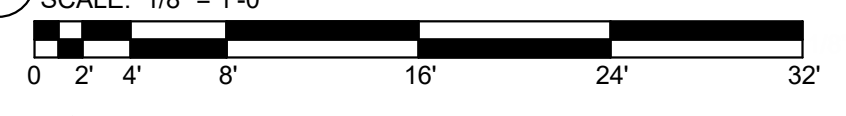
SCALE: 1/8" = 1'-0"



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HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION FIRE PROTECTION - PHASE 3 - AREA E	
SHEET NUMBER	
FP2.2	



1 FIRE PROTECTION - Area C & D - Phase 5  
 SCALE: 1/8" = 1'-0"



SHEET NUMBER  
**FP2.3**

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRE PROTECTION - PHASE 5 - AREA C & D

NOT FOR  
 CONSTRUCTION

No.	Description	Date	Job Number	Y2011A4 XHER23

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 12000 W. Highway 100, Suite 100  
 Henderson, NC 27536-2448  
 Phone: 703.885.1200  
 Fax: 703.885.1201  
 E-Mail: office@hcsdesigngroup.com

**RBS DESIGN GROUP**  
 ARCHITECTURE

12000 W. Highway 100, Suite 100  
 Henderson, NC 27536-2448  
 Phone: 703.885.1200  
 Fax: 703.885.1201  
 E-Mail: office@hcsdesigngroup.com



FLOW DATA	
STATIC PSI:	###
RESIDUAL PSI:	###
FLOW:	### GPM
DURATION:	CONTINUOUS
DATE & TIME:	###/##/202#
SOURCE OF WATER:	<INSERT WATER COMPANY>
SOURCE OF DATA:	<INSERT WHO DID TEST>
HAZARD:	<LIST HAZARD>
OCCUPANCY OF BUILDING:	<OCCUPANCY>

7 FIRE HYDRANT FLOW TEST LOCATIONS  
SCALE: NONE

REQUIRED FIRE FLOW			
BUILDING LIGHT HAZARD FLOW			
NFPA 13 HOSE STREAM TABLE 5-2.3	LIGHT HAZARD	TOTAL INSIDE AND OUTSIDE HOSE	100 GPM
NFPA 13 AREA/DENSITY CURVE TABLE 5-2.3	LIGHT HAZARD	REMOTE SPRINKLER DEMAND 0.10 GPM/FT <sup>2</sup> X 1,500 SQ. FT	150 GPM
		TOTAL	250 GPM
BUILDING ORDINARY GROUP 1 HAZARD FLOW			
NFPA 13 HOSE STREAM TABLE 19.3.3.1.2	ORDINARY GROUP 1	TOTAL INSIDE AND OUTSIDE HOSE	250 GPM
NFPA 13 AREA/DENSITY CURVE TABLE 19.3.3.1.1	ORDINARY GROUP 1	REMOTE SPRINKLER DEMAND 0.15 GPM/FT <sup>2</sup> X 1,500 SQ. FT	225 GPM
		TOTAL	475 GPM
HIC <sup>1</sup> K STORAGE ORDINARY GROUP 2 HAZARD FLOW			
NFPA 13 HOSE STREAM TABLE 19.3.3.1.2	ORDINARY GROUP 2	TOTAL INSIDE AND OUTSIDE HOSE	250 GPM
NFPA 13 AREA/DENSITY CURVE TABLE 19.3.3.1.1	ORDINARY GROUP 2	REMOTE SPRINKLER DEMAND 0.20 GPM/FT <sup>2</sup> X 1,500 SQ. FT	300 GPM
		TOTAL	550 GPM

BUILDING LIGHT HAZARD PRESSURE LOSS AT 250 GPM		
	HEAD LOSS	COMPONENT PRESSURE LOSS
SITE PIPE FRICTION	??? (0.5/100') = ??? HD	??? PSI
SITE PIPE ELBOW EQUIVALENT LENGTH	??? (0.5/100') = ??? HD	??? PSI
SITE ELEVATION HEAD LOSS		??? PSI
BACKFLOW PREVENTION LOSS		5 PSI
BUILDING PIPE FRICTION LOSS	??	10 PSI
BUILDING ELBOW FRICTION LOSS	??	?? PSI
BUILDING ELEVATION HEAD LOSS	??	?? PSI
REMOTE SPRINKLER HEAD LOSS		15 PSI
TOTAL		?? PSI

PIPE AND ELBOW FRICTION COEFFICIENT WAS TAKEN FROM NFPA 13-19, TABLE 27.2.3.1.1.

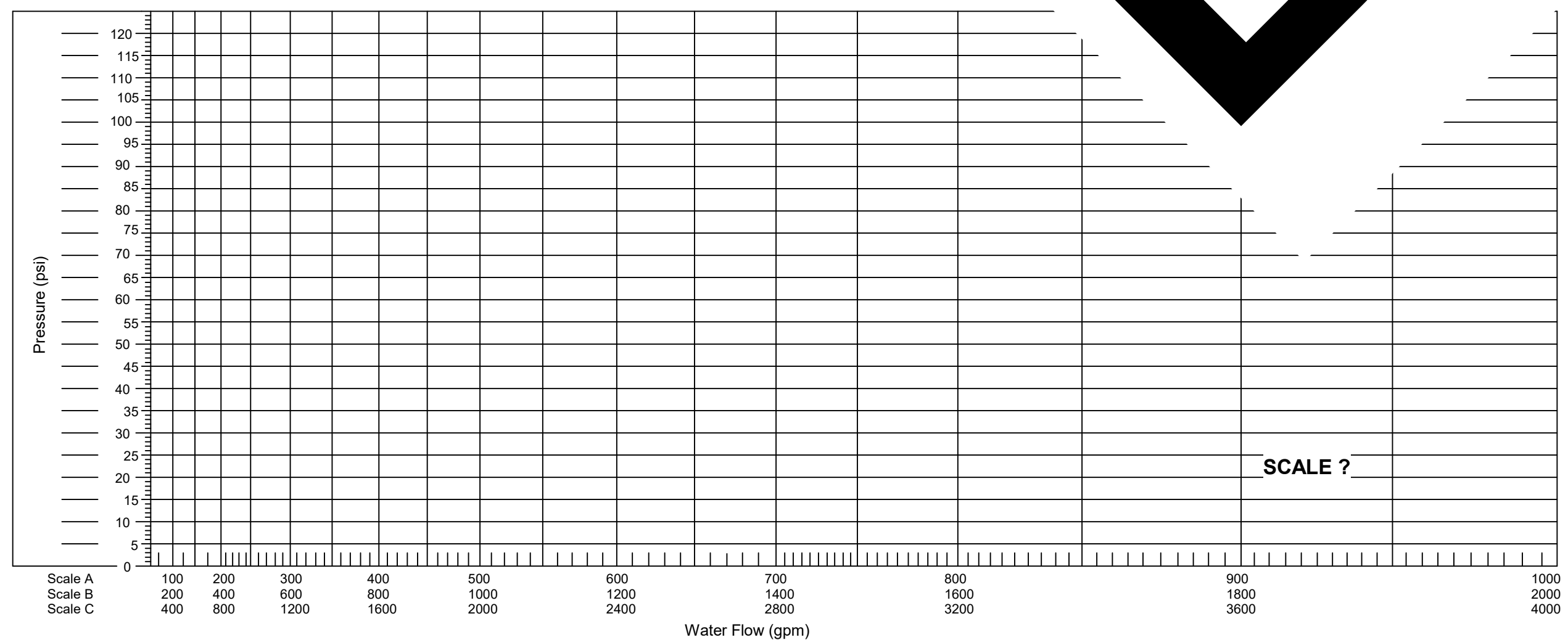
4 REMOTE AREA PRESSURE LOSS CALCULATION  
SCALE: NONE

**SEISMIC BRACING**

- SEISMIC RESTRAINTS
  - BUILDING CLASSIFICATION CATEGORY IS III (2013 IBC - TABLE 1604.5). (DESIGNER TO E)
  - SEISMIC DESIGN CATEGORY: D (DESIGNER TO EDIT)
  - SEISMIC CALCULATIONS, DESIGN AND INSTALLATION FOR SYSTEMS SHALL BE PER ASCE STANDARD 7, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, 10TH EDITION, CHAPTER 13.
  - COMPONENT IMPORTANCE FACTOR IS 1.5 FOR ALL FIRE PROTECTION SYSTEMS
- SEISMIC RESTRAINT QUALITY ASSURANCE
  - PROFESSIONAL ENGINEER QUALIFICATIONS: A PROFESSIONAL ENGINEER QUALIFIED TO PRACTICE IN THE JURISDICTION WHERE THE PROJECT IS LOCATED. HAS A MINIMUM OF 5 YEARS EXPERIENCE IN PROVIDING ENGINEERING SERVICES AS INDICATED. ENGINEERING SERVICES ARE DEFINED AS THOSE PROFESSIONAL SERVICES INCLUDING INSTALLATIONS OF VIBRATION ISOLATION BASES AND SEISMIC RESTRAINTS SIMILAR TO THOSE INDICATED FOR THIS PROJECT IN MATERIALS.
- SUBMITTALS
  - PRODUCT DATA: INDICATE TYPES, STYLES, MATERIALS, MANUFACTURERS, AND SEISMIC RESTRAINT SPECIFIED. IN MATERIALS.
  - SHOP DRAWINGS: SHOW DESIGNS AND CALCULATIONS FOR SEISMIC RESTRAINTS. INDICATE DEGREE RATINGS ON SUBMITTED MATERIALS. INDICATE DEGREE RATINGS ON SUBMITTED MATERIALS. INDICATE DEGREE RATINGS ON SUBMITTED MATERIALS.

...ED EQUIVALENT AS FOLLOWS:  
...ED SPRINKLER HEADS, EXTENDED  
...S, PROVIDE TWO PIECES, SEMI RECESSED,  
... ESCUTCHEON.  
... ARE SUBJECT TO PHYSICAL ABUSE. HEADS  
... ETC.  
... BE INSTALLED. INSTALL IN ACCORDANCE WITH  
...  
... ALL BE DETERMINED BY THE AREA SERVICED IN ACCORD  
... AND PRACTICES. INDICATE DEGREE RATINGS ON SUBMITTED  
...  
... AT TO THE ENGINEER FOR INSPECTION, ONE (1) SAMPLE OF EACH  
... PROPOSED TO BE USED ON THE PROJECT.  
... ALLED IN A TILE CEILING, THEY SHALL BE INSTALLED IN THE MIDDLE OF  
... QUARTER POINTS ALONG THE LENGTH OF THE TILES. INSTALL SPRINKLER  
... POINTS OF CENTER SCOURED 2' X 4' CEILING TILES.  
... TEMPERATURE HEADS AROUND RANGE HOODS, KITCHEN EQUIPMENT, KILNS,  
... HEATERS AND OTHER HEAT PRODUCING EQUIPMENT.

DRAFT

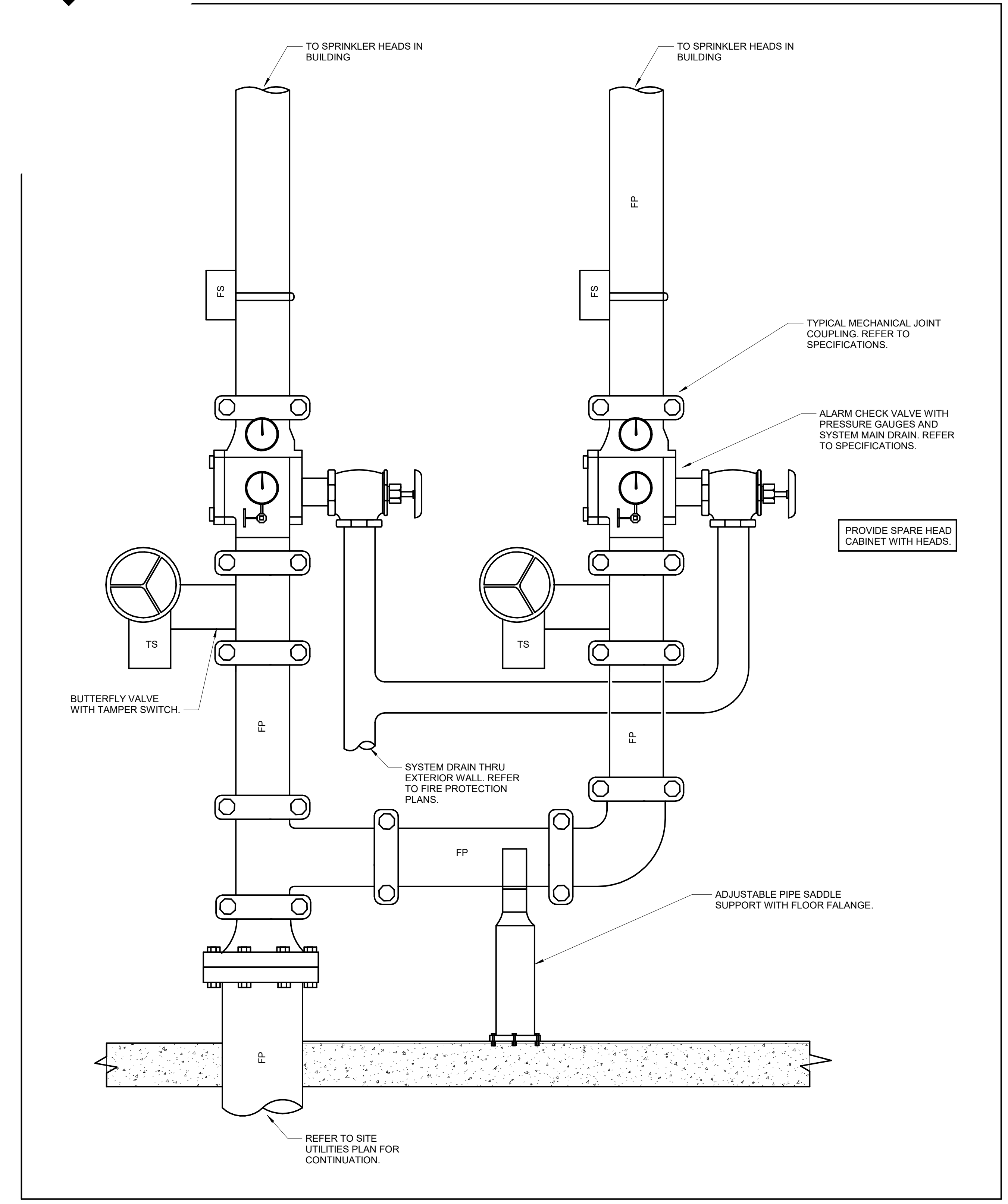


2 FIRE PROTECTION DESIGN CRITERIA MATRIX  
SCALE: NONE

BUILDING AREA		
	AREA (SQ. FT)	NO. OF SYSTEMS REQUIRED
FIRST FLOOR	###,###	#
SECOND FLOOR	-	-
TOTAL	###,###	#

NFPA 13-19 ALLOWS MAXIMUM 52,000 SQUARE FEET PER FLOOR PER SYSTEM RISER.

1 BUILDING AREA CALCULATION  
SCALE: NONE



5 FIRE PROTECTION SYSTEM SCHEMATIC  
SCALE: NONE



**PLUMBING GENERAL NOTES:**

- A. COORDINATE THE LOCATION OF DRAINS, THERMOSTATS, GAS OUTLETS, ETC., WITH ALL CASEWORK EQUIPMENT, MECHANICAL ROOM EQUIPMENT, ETC., PRIOR TO COMMENCING INSTALLATION. WORK NOT SO COORDINATED SHALL BE REMOVED AND PROPERLY INSTALLED AT THE EXPENSE OF THE CONTRACTOR.
- B. THE CONTRACTOR SHALL EXERCISE EXTREME CARE IN THE COURSE OF THEIR WORK SO AS TO INSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE. FOR SAFETY PURPOSES, PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES. VERIFY THE LOCATION, SIZE, TYPE, ETC., OF EACH UNDERGROUND OR OVERHEAD UTILITY. ALL WORK SHALL BE PERFORMED IN ACCORD WITH ALL FEDERAL, STATE AND/OR LOCAL RULES, REGULATIONS, STANDARD AND SAFETY REQUIREMENTS. UTILITIES SHALL BE INSTALLED IN ACCORD WITH THE APPLICABLE MUNICIPALITY OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
- C. WHERE WORK IS REQUIRED ABOVE EXISTING LAY-IN PLASTER OR GYPSUM BOARD CEILINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REINSTALLATION (OR REPLACEMENT, IF DAMAGED) OF ALL CEILING OR TILE AND GRID MEMBERS NECESSARY TO PERFORM HIS WORK. NEW TILE AND GRID SHALL MATCH THE SURROUNDING AREAS. ALL PATCHING WORK SHALL MATCH ADJACENT SURFACES.
- D. ALL NEW WORK SHALL BE HUNG FROM STRUCTURE, NOT FROM THE WORK OF OTHER TRADES, WHETHER EXISTING OR NEW.
- E. COORDINATE ALL WORK WITH PROJECT PHASING REQUIREMENTS.
- F. PATCH, REPAIR AND PAINT OR PROVIDE WALL COVERING FOR (TO OWNER'S STANDARDS) EXISTING WALLS, CEILINGS, ETC., THAT ARE TO REMAIN IF DAMAGED DURING CONSTRUCTION. REPAIRS SHALL MATCH ADJACENT SURFACES TO THE SATISFACTION OF THE ARCHITECT AND OWNER.
- G. OBSERVE ALL APPLICABLE CODES, RULES AND REGULATIONS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT. (CITY, COUNTY, LOCAL, FEDERAL, MUNICIPALITY, UTILITY COMPANY, COMMONWEALTH OF KENTUCKY, ETC.)
- H. CONTRACTOR SHALL BE AWARE OF UNSEEN PLUMBING WORK DURING DEMOLITION. IF ITEMS ARE UNCOVERED DURING DEMOLITION THEN FIELD VERIFY THE USE OF THE ITEMS AND PLAN AN ALTERNATE ROUTE TO RUN THESE ITEMS. THEN CONTACT THE ENGINEERS TO REVIEW THE ROUTING.
- I. IF AREA OF CONSTRUCTION HAS A POST TENSION FLOOR SLAB, CONTRACTOR SHALL USE ULTRA SOUND OR OTHER APPROVED METHODS TO SURVEY THE EXISTING FLOOR STRUCTURE BEFORE MAKING ANY FLOOR PENETRATIONS.
- J. WHERE FIRE PROOFING IS SPRAYED ON EXISTING STRUCTURE ALL EXISTING CONDUITS, WATER, HYDRONIC STEAM, CHILLED WATER, FIRE PROTECTION LINES, MED GAS, ETC. SHALL BE LOWERED TO BE BELOW FULL THICKNESS OF FIRE PROOFING WITH NO INTERFERENCE.
- K. ALL PENETRATIONS OF FIRE AND SMOKE RATED ASSEMBLIES SHALL BE APPROPRIATELY FIRE STOPPED PER AN APPROVED U.L. LISTED STANDARD. CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO INSULATED PIPING PENETRATIONS.
- L. ALL WORK REQUIRING DOWNTIME OF ANY AREA IN THE BUILDING SHALL BE SCHEDULED 2 WEEKS IN ADVANCE, AND SHALL COMPLY WITH INTERIM LIFE SAFETY MEASURES.
- M. ALL PIPING IN ROOMS WITH CEILINGS SHALL BE ABOVE CEILING EXCEPT AS NOTED.
- N. IN ACCORDANCE WITH K.S.S. ALL PLUMBING WORK SHALL BE CONSTRUCTED IN COMPLIANCE WITH PLANS APPROVED BY AND BEARING THE APPROVAL STAMP OF THE KENTUCKY DIVISION OF PLUMBING AND/OR THE DIVISION OF WATER. THE CONTRACTOR SHALL NOT BEGIN WORK UNTIL HE HAS RECEIVED SUCH APPROVED PLANS.
- O. LOCATIONS OF PIPING AND EQUIPMENT ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. DO NOT SCALE THE DRAWINGS.
- P. ALL OFFSETS IN PIPING ARE NOT NECESSARILY SHOWN. PROVIDE ADDITIONAL OFFSETS WHERE NECESSARY.
- Q. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY COMPANY FEES OR OTHER COSTS THAT ANY UTILITY COMPANY MAY REQUIRE TO COMPLETE THEIR WORK. (GAS, SEWER, WATER, ETC.)
- R. INSTALL ALL PIPING AND EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTION. IF IN CONFLICT WITH THE DESIGN INDICATED IN CONTRACT DOCUMENTS, ADVISE THE ENGINEERS PRIOR TO INSTALLATION FOR CLARIFICATION. PROVIDE RECOMMENDED ACCESS AND SERVICE CLEARANCES FOR ALL EQUIPMENT.
- S. SEAL AIRTIGHT AROUND ALL DUCTS AND PIPING PENETRATIONS THROUGH WALLS, FLOORS AND ROOF. PROVIDE FIRE STOPPING IN FIRE PARTITION.
- T. THE CONTRACTOR SHALL RELOCATE OR AVOID ANY EXISTING APPURTENANCES, ETC., THAT CONFLICT WITH NEW WORK.
- U. WHERE MOUNTING HEIGHTS ARE NOT INDICATED OR ARE IN CONFLICT WITH ANY OTHER BUILDING SYSTEM, CONTACT THE ENGINEERS BEFORE INSTALLATION. REFER ALSO TO ARCHITECTURAL WALL INTERIOR AND EXTERIOR WALL ELEVATIONS, CEILING HEIGHTS AND OTHER DETAIL OF THESE DOCUMENTS.
- V. ANY VIBRATING, OSCILLATING OR OTHER NOISE OR MOTION PRODUCING EQUIPMENT SHALL BE ISOLATED FROM SURROUNDING SYSTEMS IN AN APPROVED MANNER. NOISY OR STRUCTURALLY DAMAGING INSTALLATIONS SHALL BE SATISFACTORILY REPLACED OR REPAIRED AT THE INSTALLING CONTRACTOR'S EXPENSE. THE FINAL DECISION ON THE SUITABILITY OF A PARTICULAR INSTALLATION'S ACCEPTABILITY SHALL BE THAT OF THE ENGINEER.
- W. DEVIATIONS IN SIZE, CAPACITIES, FIT, FINISH, ETC. FOR EQUIPMENT FROM THAT USED AS BASIS OF DESIGN SHALL BE THE RESPONSIBILITY OF THE PURCHASER OF THAT EQUIPMENT. ANY PROVISIONS REQUIRED TO ACCOMMODATE A DEVIATION, WHETHER APPROVED BY THE ENGINEERS OR NOT, SHALL BE THE RESPONSIBILITY OF THE PURCHASER.
- X. VALVES, BALANCING DAMPERS OR ANY MECHANICAL/ELECTRICAL ITEM REQUIRING ACCESS SHALL NOT BE LOCATED ABOVE A HARD CEILING. IF THIS IS NOT POSSIBLE, THEN AN APPROPRIATELY SIZED ACCESS DOOR SHALL BE PLACED UNDER THE ITEM TO ALLOW EASY MAINTENANCE AND ADJUSTMENT. ADDITIONALLY ALL SUCH ITEMS SHALL NOT BE LOCATED AN UNREASONABLE DISTANCE ABOVE THE CEILINGS. IN GENERAL ALL SUCH ITEMS UNLESS INDICATED OTHERWISE SHALL BE MOUNTED SIX TO TWELVE INCHES ABOVE THE CEILING. IF IN DOUBT, CONTACT ENGINEER PRIOR TO INSTALLING.
- Y. ALL MANHOLES, VAULTS AND SIMILAR UNDERGROUND STRUCTURES SHALL HAVE THE TOP ELEVATION SET FLUSH WITH FINISHED GRADE UNLESS SPECIFICALLY NOTED OTHERWISE. NO PIPING SHALL BE ROUTED BELOW A FOOTER OR IN THE ZONE OF INFLUENCE. THE ZONE OF INFLUENCE IS THE AREA UNDER THE FOOTER WITHING A 45 DEGREE ANGLE PROJECTING DOWN FROM THE EDGE OF THE FOOTER ON ALL SIDES. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS AND REQUIREMENTS FOR ROUTING OF PIPES IN THE VICINITY OF BUILDING FOOTERS. CONSULT STRUCTURAL ENGINEER IF IN QUESTION.
- Z. WORK IN CONFINED AREAS SHALL BE IN ACCORDANCE WITH THE OWNER'S SAFETY POLICY REQUIREMENTS.

**PLUMBING PHASING NOTES:**

- A. THIS PROJECT INTERFACES EXTENSIVELY WITH EXISTING BUILDING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND PHASE ALL TIE-INS AND INTERRUPTIONS OF EXISTING SERVICES TO MINIMIZE OR ELIMINATE DOWNTIME. AS AN EXAMPLE, MAIN GAS SERVICE, WATER SERVICE, ELECTRICAL SERVICE, HVAC SERVICES, STEAM GENERATION, ETC., WILL BE AFFECTED AND REPLACED OR MOVED DURING THIS PROJECT. THE CONTRACTOR SHALL INSTALL ALL NEW SERVICES AND EQUIPMENT AND HAVE THEM TESTED AND FULLY AND RELIABLY FUNCTIONAL PRIOR TO INTERRUPTING RELOCATING OR REMOVING ANY EXISTING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BARE ANY AND ALL COSTS ASSOCIATED WITH THIS PHASING, INCLUDING TEMPORARY SERVICES, TEMPORARY RELOCATION, PREMIUM TIME WORK, ETC. CONTRACTOR SHALL COORDINATE ALL SAID WORK WITH THE OWNER AND APPLICABLE UTILITIES PER THE CONTRACT DOCUMENTS.

**ABBREVIATIONS**

AC	ALTERNATING CURRENT
ADJ	ADJUSTABLE
AFB	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHJ	AUTHORITY HAVING JURISDICTION
AMP	AMPERE (AMP, AMPS)
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
APD	AIR PRESSURE DROP
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR-CONDITIONING ENGINEERS
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BHP	BREAK HORSEPOWER
BTU	BRITISH THERMAL UNIT
CAP	CAPACITY
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
C.I.	CAST IRON
CLG	CEILING
CLR	CLEAR
CO	CARBON MONOXIDE
COND	CONDENS (-ER, -ING, -ATION, -ATE)
CONT	CONTINU (-ED, -OUS)
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
CV	VALVE FLOW COEFFICIENT
dB	DECIBEL
DB	DRY BULB
DC	DIRECT CURRENT
DD	DUCT SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE (-S)
DIA	DIAMETER (-S)
DN	DOWN
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVA (-TION, -TOR)
ENGR	ENGINEER
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EVAP	EVAPORAT (-E, -ING, -ED, -OR, -ION)
EWT	ENTERING WATER TEMPERATURE
EXP	EXPANSION
EXT	EXTERIOR
FA	FREE AREA

**ABBREVIATIONS (CONTINUED)**

FL	FLOOR
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPC	FIRE PROTECTION CONTRACTOR
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET OR FOOT
FUT	FUTURE
FV	FACE VELOCITY
GAL	GAGE/GAUGE
GAL	GALLON (-S)
GC	GENERAL CONTRACTOR
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRAINS
H	HUMIDITY
HD	HEAD
HG	MERCURY
HORIZ	HORIZONTAL
HP	H (-ORSEPOWER, -EAT PUMP)
HR	HOUR (-S)
HVAC	HEATING, VENTILATING, & AIR-CONDITIONING
Hz	HERTZ
ID	I (-DENTIFICATION, -NSIDE DIAMETER, -NSIDE DIMENSION)
IN	INCH (-ES)
INSUL	INSULAT (-ED, -ION)
INT	INTER (-IOR, -ERVAL)
IPS	IRON PIPE SIZE
kW	KILOWATT
kWh	KILOWATT HOUR
LBS	POUNDS
LF	LINEAR FEET/FOOT
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	BTU PER HOUR [THOUSANDS]
MCA	MINIMUM CIRCUIT AMPS
MFG	MANUFACTURER
MIN	MIN (-IMUM, -UTE)
MISC	MISCELLANEOUS
MOCOP	MAXIMUM OVERCURRENT PROTECTION [AMPS]
MTG	MOUNTING
N/A	NOT APPLICABLE
NC	NOISE CRITERIA OR NORMALLY CLOSED
NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
NIC	NOT IN CONTRACT

**ABBREVIATIONS (CONTINUED)**

NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DI (-AMETER, -MENSION)
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OR	OPEN RECEPTACLE
OZ	OUNCE (-S)
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PH	PHASE [ELECTRICAL]
PLBG	PLUMBING
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE (STEAM, WATER, GAS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	PPSI GAUGE
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SQ	SQUARE
SQ FT	SQUARE FEET OR FOOT
SQ IN	SQUARE INCH OR INCHES
TAB	TESTING AND BALANCING
TBD	TO BE DETERMINED
TE	TOP ELEVATION
TEMP	TEMPERATURE
TPA	TRAP PRIMER ADAPTER
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT (-AGE, -S)
VAR	VARI (-ABLE, -IES)
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
W	WATT (-AGE, -S)
WB	WET BULB
WBT	WET BULB TEMPERATURE
WT	WEIGHT
W/	WITH
W/O	WITHOUT
%	PERCENT
ΔP	DIFFERENTIAL PRESSURE
ΔT	TEMPERATURE DIFFERENCE
℄	CENTERLINE

**GENERAL SYMBOLS**

	TAGGED NOTE DESIGNATOR
	REVISION TRIANGLE
	ROOM TAG
	EQUIPMENT TAG
	DOMESTIC WATER RISER TAG
	SANITARY, WASTE, & VENT RISER TAG
	FIRE SUPPRESSION RISER TAG
	POINT OF CONNECTION / CONNECT TO EXISTING
	POINT OF DEMOLITION
	PIPING TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
	EXISTING PIPING - (XXX) DENOTES SYSTEM
	ABANDONED IN PLACE PIPING - (XXX) DENOTES SYSTEM

**VALVE SYMBOL LEGEND**

	TWO-WAY CONTROL VALVE
	THREE-WAY CONTROL VALVE
	AUTOMATIC AIR VENT (AAV)
	MANUAL AIR VENT (MAV)
	MANUAL BALANCING VALVE (BV)
	BALL VALVE
	BUTTERFLY VALVE
	TRIPLE DUTY VALVE (TDV)
	STRAINER
	MANUAL ISOLATION VALVE
	GLOBE VALVE
	OS&Y (GATE) VALVE
	PRESSURE REDUCING VALVE (STEAM, GAS, WATER, ETC.)
	AUTO-FLOW CONTROL VALVE
	CHECK VALVE
	DOUBLE CHECK VALVE ASSEMBLY

**PLUMBING PIPING LEGEND**

	PIPE ELBOW TURNING UP
	PIPE ELBOW TURNING DOWN
	PIPE TEE; CONNECTION ON TOP
	PIPE TEE; CONNECTION ON BOTTOM
	PIPE CAP
	ACID VENT
	ACID WASTE
	COMPRESSED AIR
	COMBUSTION AIR INTAKE/EXHAUST
	CHILLED BEAM SUPPLY/RETURN
	CONDENSATE DRAIN
	CARBON DIOXIDE
	CLEAN STEAM PIPING
	DOMESTIC COLD WATER (DCW)
	DOMESTIC HOT WATER (DHW)
	RECIRCULATED DOMESTIC HOT WATER (DHR)
	HIGH PRESSURE STEAM CONDENSATE
	HIGH PRESSURE STEAM; (#) DENOTES PRESSURE
	HEAT PUMP WATER SUPPLY/RETURN
	HEAT RECOVERY SUPPLY/RETURN PIPING
	HEATING WATER SUPPLY/RETURN
	LOW PRESSURE STEAM CONDENSATE
	LOW PRESSURE STEAM; (#) DENOTES PRESSURE
	MEDIUM PRESSURE STEAM RETURN
	MEDIUM PRESSURE STEAM; (#) DENOTES PRESSURE
	ROOF LEADER
	SANITARY
	STEAM CONDENSATE PUMPED DISCHARGE
	STEAM VENT PIPING
	VENT

**PLUMBING SYMBOL LEGEND**

	FLEXIBLE PIPE CONNECTION
	FLOW METER (VENTURI)
	PIPPING UNION
	FLOW SWITCH
	PRESSURE SWITCH
	TAMPER SWITCH
	THERMOMETER
	PET'S PLUG; TEMPERATURE/PRESSURE PORT

**APPLICABLE BUILDING CODES**

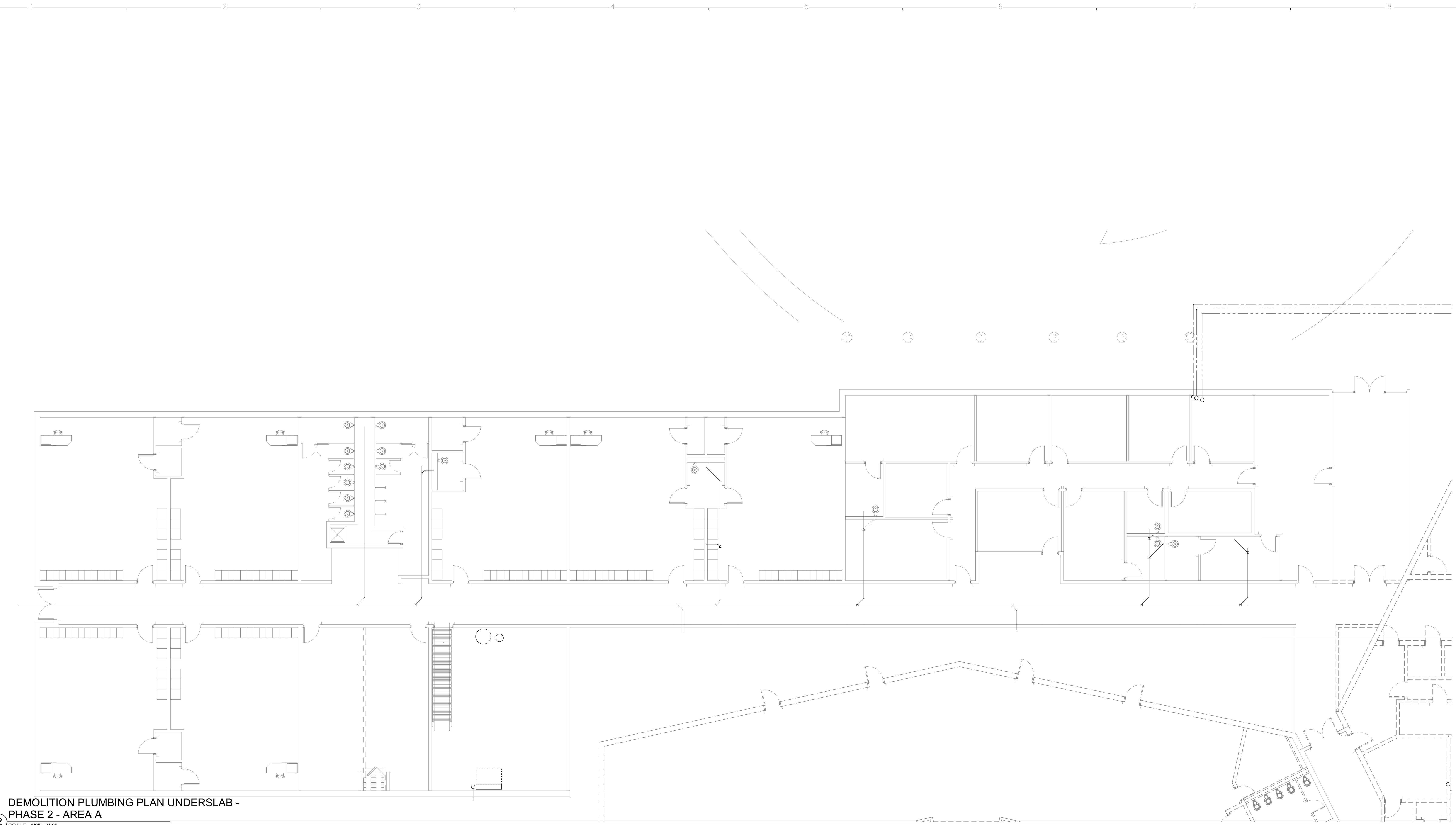
APPLICABLE BUILDING CODES	DOCUMENT	YEAR
ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES	ANSI A117.1	2009
FIRE SPRINKLER CODE	NFPA 13	2013
INTERNATIONAL BUILDING CODE (IBC)	STATE EDITION	2015
INTERNATIONAL ENERGY CONSERVATION CODE (IECC) Q8, ASHRAE 90.1	STATE EDITION	2012
INTERNATIONAL FUEL GAS CODE (IFGC)	STATE EDITION	2015
INTERNATIONAL MECHANICAL CODE (IMC)	STATE EDITION	2015
INTERNATIONAL PLUMBING CODE (IPC)	STATE EDITION	2015
INTERNATIONAL EXISTING BUILDING CODE (IEBC)	STATE EDITION	2009
NATIONAL ELECTRIC CODE (NEC)	NFPA 70	2017
NATIONAL FIRE ALARM & SIGNALING CODE	NFPA 72	2013
UNIFORM STATEWIDE BUILDING CODE		2018

**PLUMBING FIXTURE SCHEDULE**

TAG	DESCRIPTION	CW	HW	VENT	WASTE/DRAIN	VOLTAGE	EXTERNAL CHECK VALVE
HB	HOSE BIBB - ZURN MODEL Z1350 OR EQUAL ENCASED MODERATE CLIMATE WALL HYDRANT FOR NARROW WALL INSTALLATION. WITH ALL BRONZE BODY, ALL BRONZE INTERIOR PARTS, REPLACEABLE SEAT WASHER, LOOSE KEY OPERATED CONTROL VALVE, VACUUM BREAKER AND 3/4" MALE HOSE CONNECTION. ADJUSTABLE STAINLESS STEEL BOX FURNISHED WITH HINGED COVER CYLINDER LOCK AND "WATER" STAMPED ON THE COVER. MOUNTED WITH HOSE CONNECTION AT 18" ABOVE FINISHED FLOOR ELEVATION OF AREA SERVED.	1/2"	-	-	-	Yes	Yes

**RBS DESIGN GROUP ARCHITECTURE**  
 1000 S. 10TH AVENUE, SUITE 100, DENVER, CO 80202  
 PHONE: 303.733.1300 FAX: 303.733.1301  
 WWW.RBSDESIGNGROUP.COM  
 PROJECT: HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 SHEET: PLUMBING LEGEND  
 DATE: 9/12/2024  
 DRAWN BY: [ ] CHECKED BY: [ ]  
 NOT FOR CONSTRUCTION





DEMOLITION PLUMBING PLAN UNDERSLAB -  
 PHASE 2 - AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

ALUMINUM	ALUMINUM
BRASS	BRASS
COPPER	COPPER
IRON	IRON
STEEL	STEEL
GLASS	GLASS
CONCRETE	CONCRETE
CEMENT	CEMENT
PLASTER	PLASTER
PAINT	PAINT
DRYWALL	DRYWALL
INSULATION	INSULATION
MECHANICAL	MECHANICAL
ELECTRICAL	ELECTRICAL
PLUMBING	PLUMBING
WOOD	WOOD
OTHER	OTHER

JOB NUMBER	Y2011A
DATE	XHER23
DRAWN BY	DRH
CHECKED BY	HCH
DATE	2/12/2024

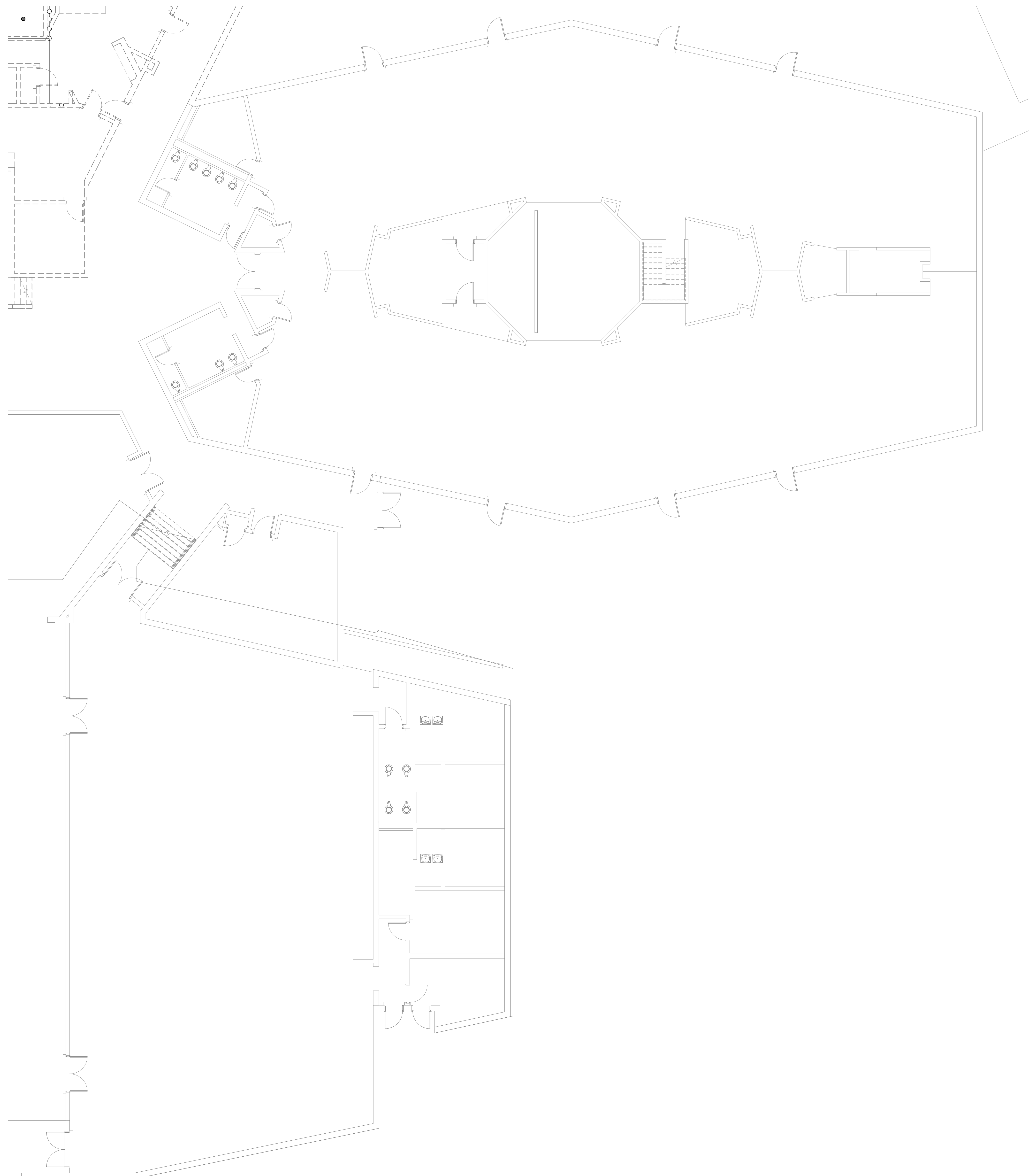
NOT FOR  
 CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING UNDERSLAB DEMOLITION PLAN - PHASE 2 - AREA A

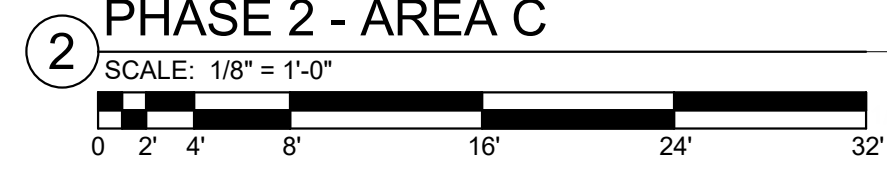








DEMOLITION PLUMBING PLAN UNDERSLAB -  
PHASE 2 - AREA C

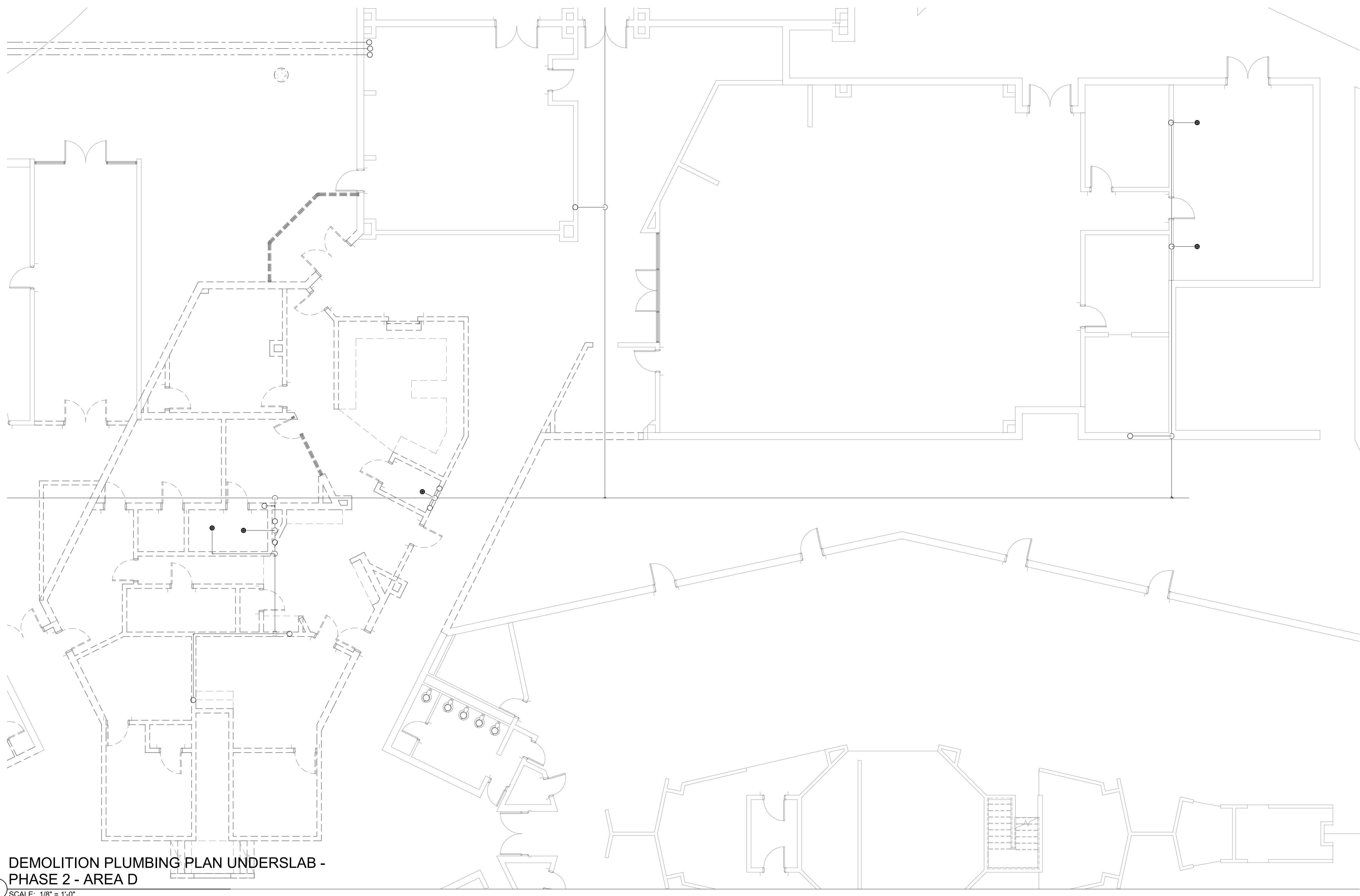


<b>ALUMINUM</b>		<b>JOB NUMBER</b>	
RBS DESIGN GROUP, INC. 1000 W. 10TH AVENUE, SUITE 100 DENVER, CO 80202 TEL: 303.733.8888 WWW.RBSDESIGNGROUP.COM		Y2011A	XHER23
<b>BRASS</b>		<b>DRAWN BY</b>	DRH
RBS DESIGN GROUP, INC. 1000 W. 10TH AVENUE, SUITE 100 DENVER, CO 80202 TEL: 303.733.8888 WWW.RBSDESIGNGROUP.COM		<b>CHECKED BY</b>	HCH
<b>STAINLESS STEEL</b>		<b>DATE</b>	2/12/2024

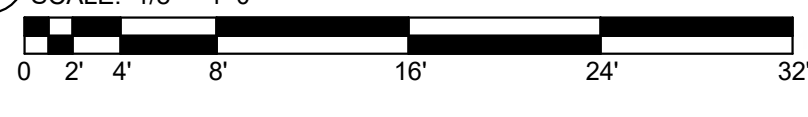
NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PLUMBING UNDERSLAB DEMOLITION PLAN - PHASE 2 - AREA C





DEMOLITION PLUMBING PLAN UNDERSLAB -  
PHASE 2 - AREA D

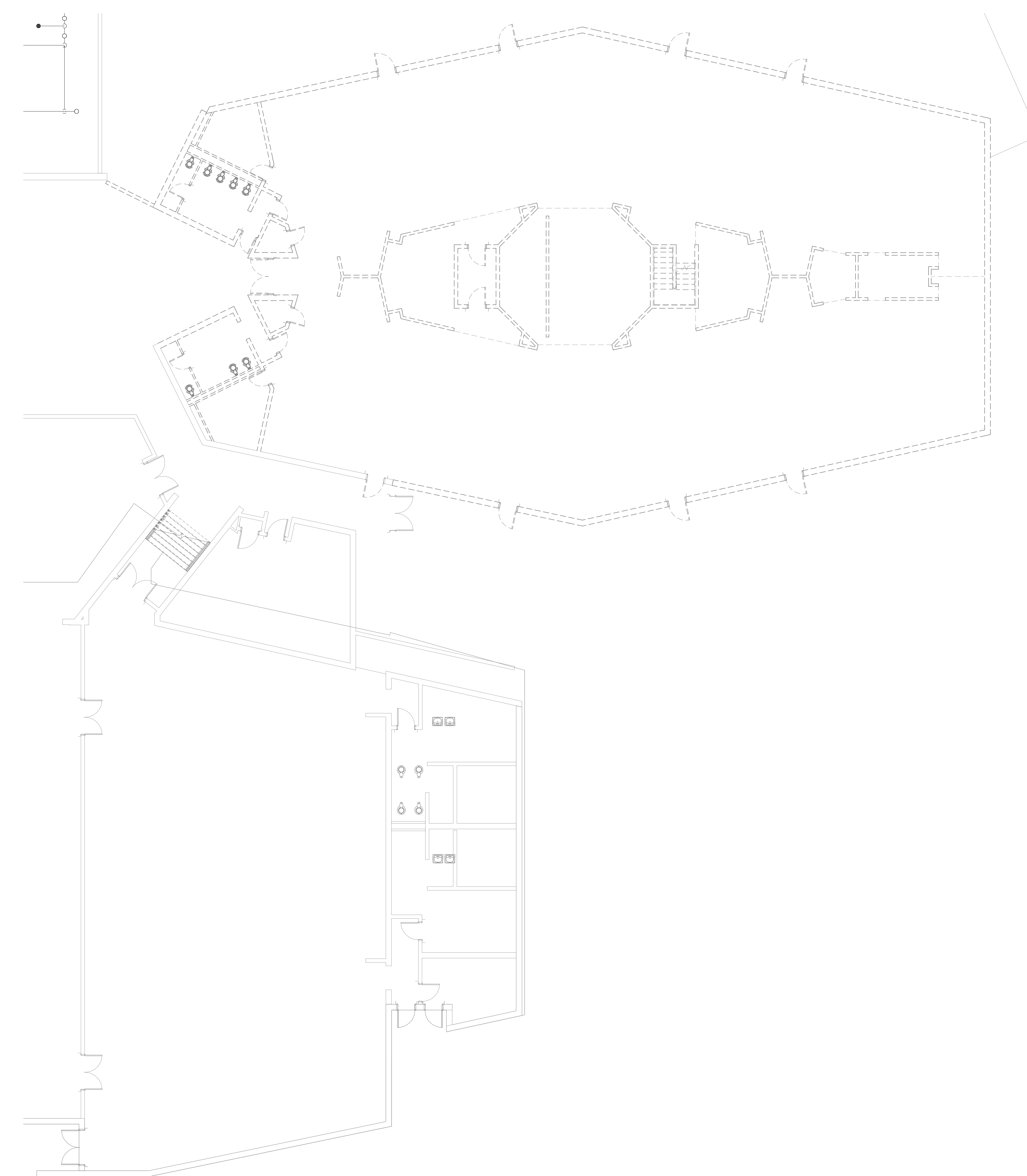


No.	Description	Date	Job Number	Drawn By	Checked By	Date
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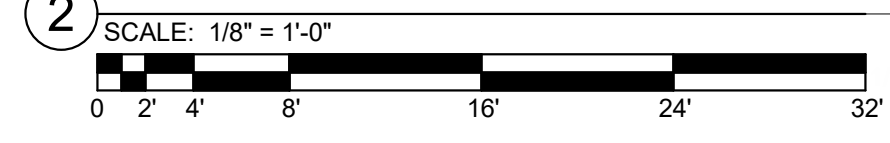
NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PLUMBING UNDERSLAB DEMOLITION PLAN - PHASE 2 - AREA D



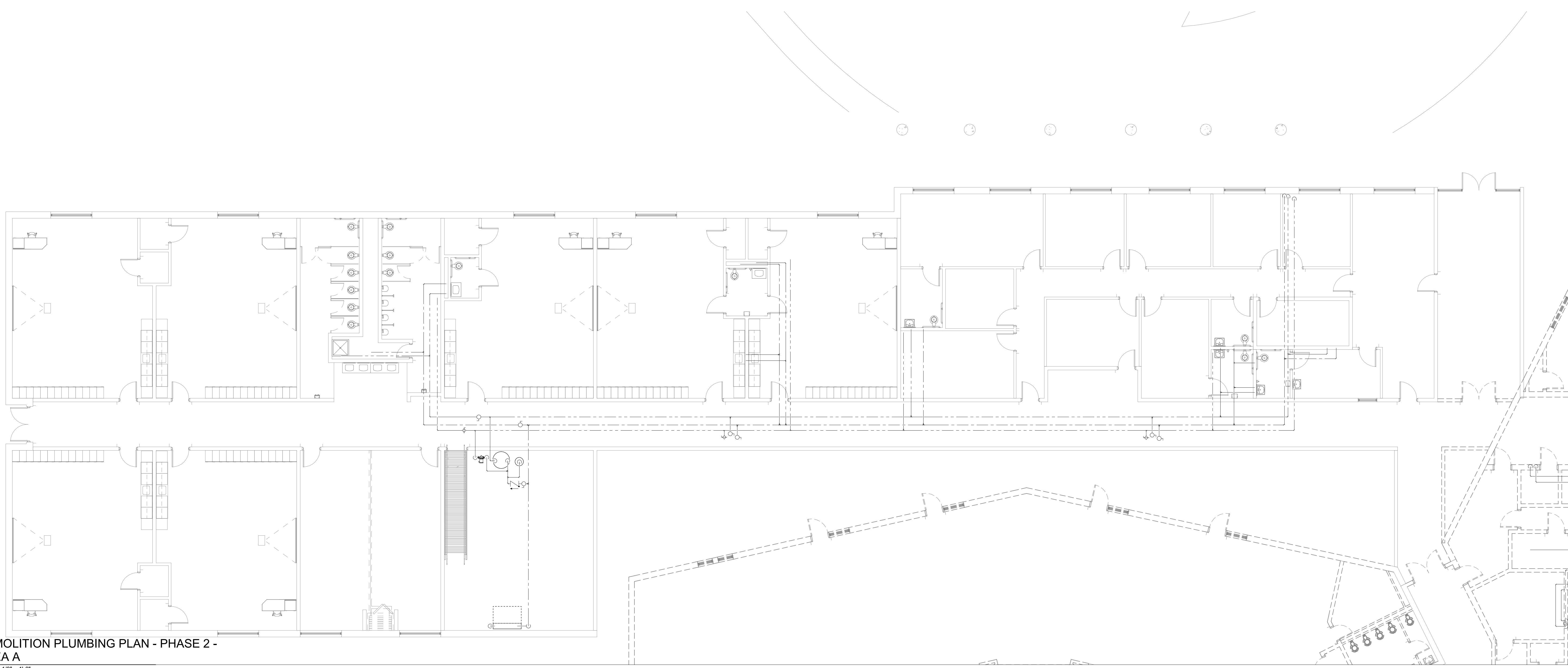


DEMOLITION PLUMBING PLAN UNDERSLAB -  
 PHASE 4 - AREA C  
 SCALE: 1/8" = 1'-0"

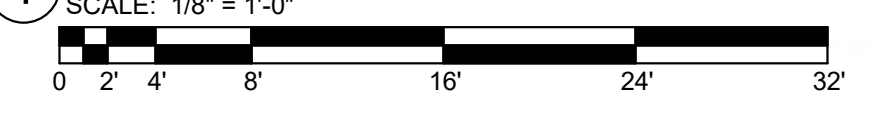


		<b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           12345 Main Street, Suite 100            Charlotte, NC 27203            Phone: (770) 888-1234            Fax: (770) 888-5678            Email: office@rbsdesigngroup.com         </small>		<small>           12345 Main Street, Suite 100            Charlotte, NC 27203            Phone: (770) 888-1234            Fax: (770) 888-5678            Email: office@rbsdesigngroup.com         </small>	
<small>           No.   Description   Date         </small>	<small>           JOB NUMBER            Y2011A            XHER23         </small>	<small>           DRAWN BY            DRH         </small>	<small>           CHECKED BY            HCN         </small>
<small>           DATE         </small>	<small>           DATE         </small>	<small>           DATE         </small>	<small>           DATE         </small>
NOT FOR CONSTRUCTION		NOT FOR CONSTRUCTION	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION PLUMBING UNDERSLAB DEMOLITION PLAN - PHASE 4 - AREA C			
SHEET NUMBER		P2.42	





DEMOLITION PLUMBING PLAN - PHASE 2 -  
 AREA A  
 1 SCALE: 1/8" = 1'-0"

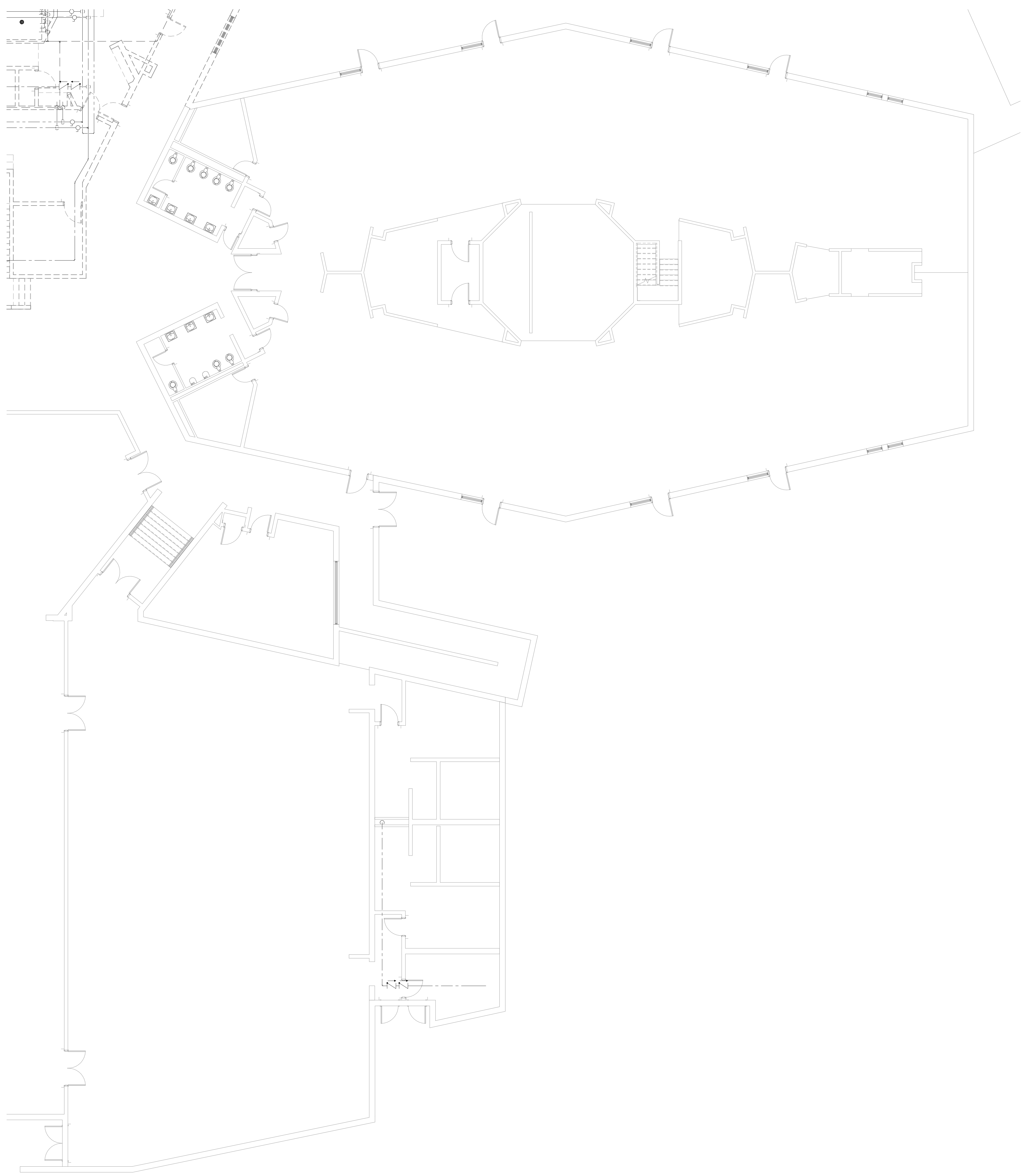


<b>RBS DESIGN GROUP</b> ARCHITECTURE	
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JOB NUMBER: Y201144 XHER23	DRAWN BY: DRH CHECKED BY: HCN DATE: 2/12/2024
No. Description Date	NOT FOR CONSTRUCTION
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION PLUMBING DEMOLITION PLAN - PHASE 2 - AREA A	
SHEET NUMBER	
P3.20	

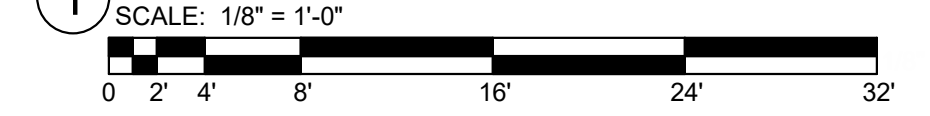








DEMOLITION PLUMBING PLAN - PHASE 2 -  
AREA C



No.	Description	Date	JOB NUMBER	Y2011A1
			DRAWN BY	XHER23
			CHECKED BY	HCH
			DATE	2/12/2024

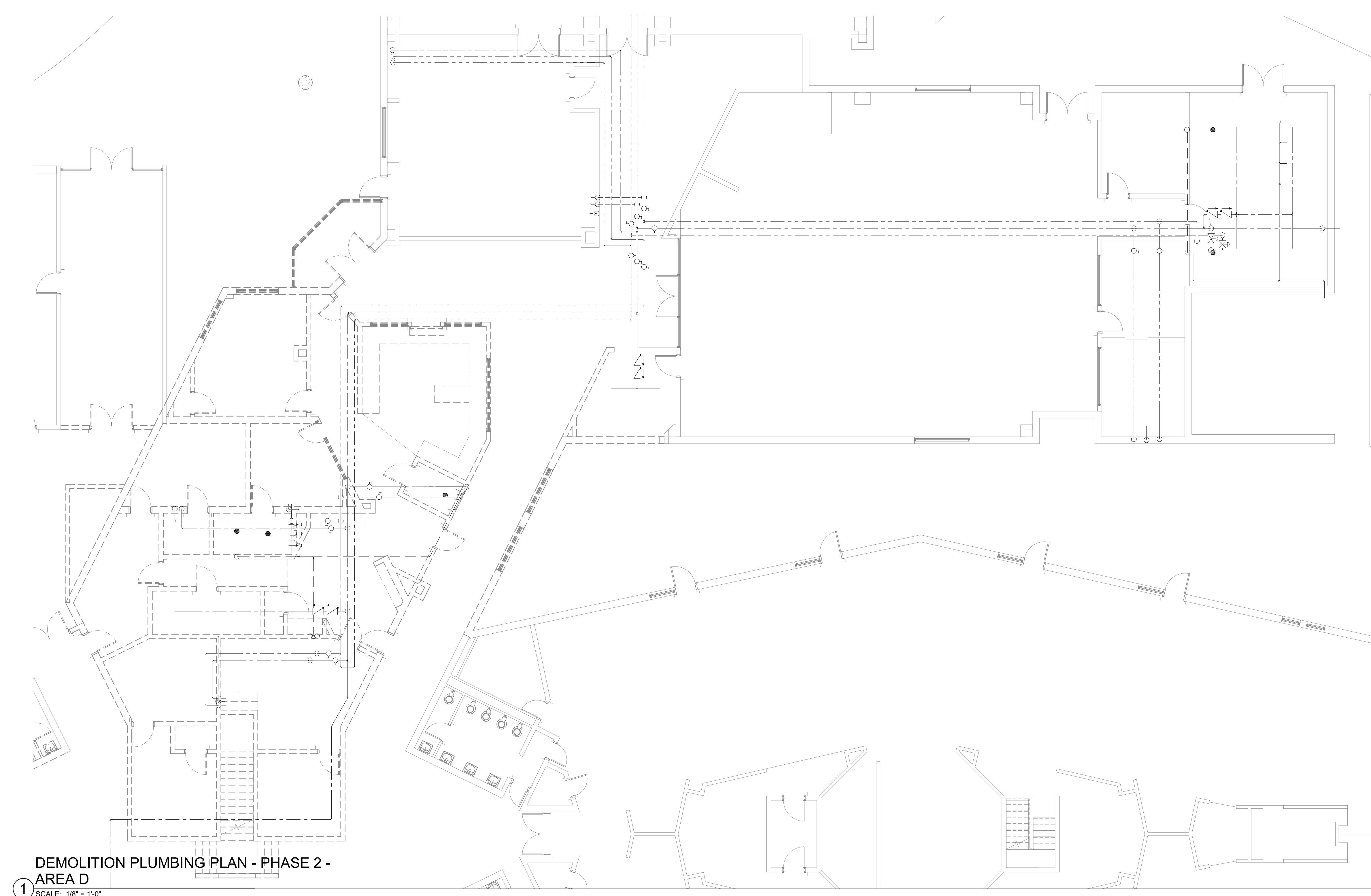
NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PLUMBING DEMOLITION PLAN - PHASE 2 - AREA C

SHEET NUMBER

P3.22





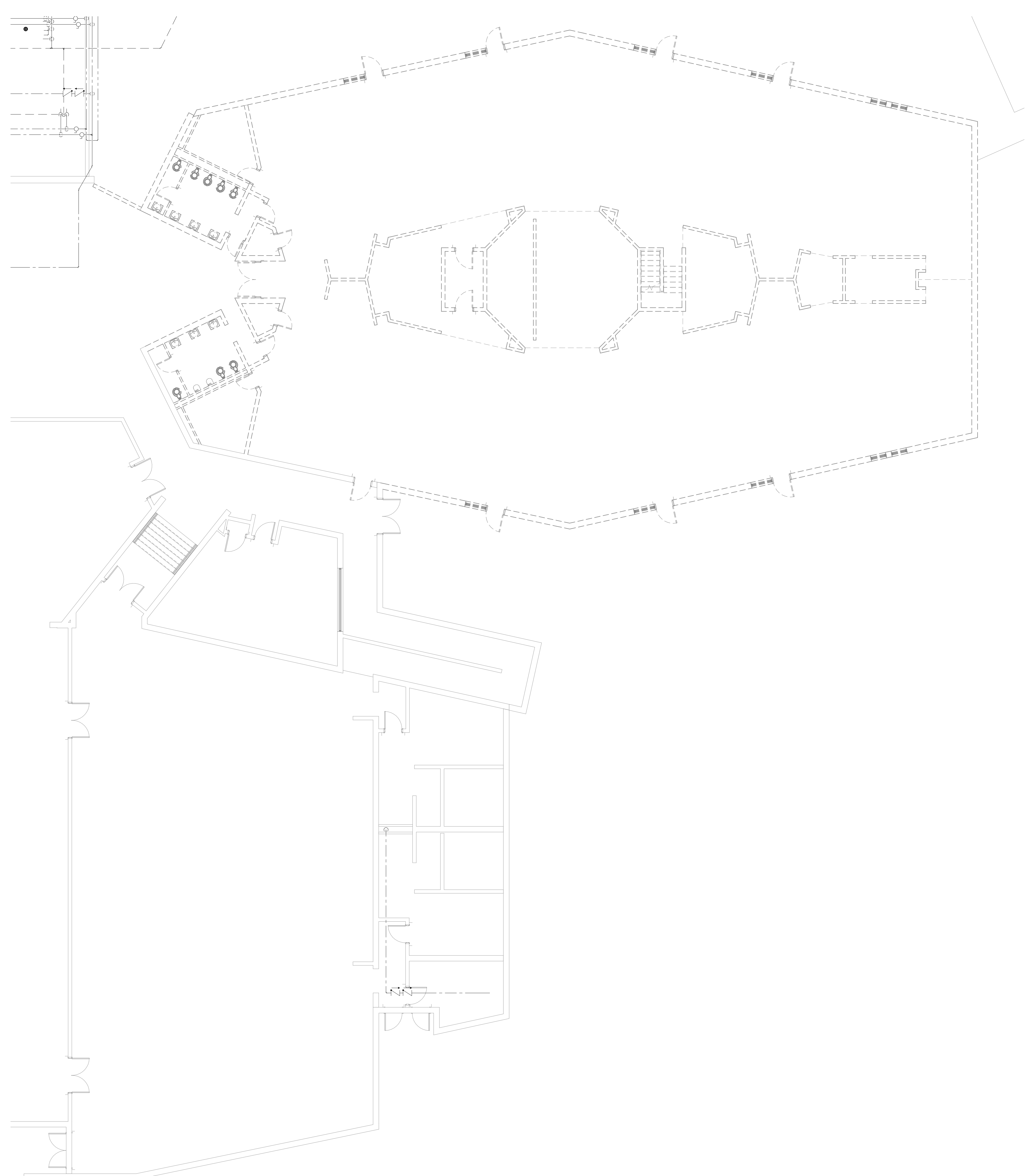
① DEMOLITION PLUMBING PLAN - PHASE 2 -  
 AREA D  
 SCALE: 1/8" = 1'-0"  
 0 2 4 8 16 24 32

No.	Description	Date	Job Number	Year	Drawn By	Checked By	Date
			2021144	2023	DRH	HCH	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING DEMOLITION PLAN - PHASE 2 - AREA D





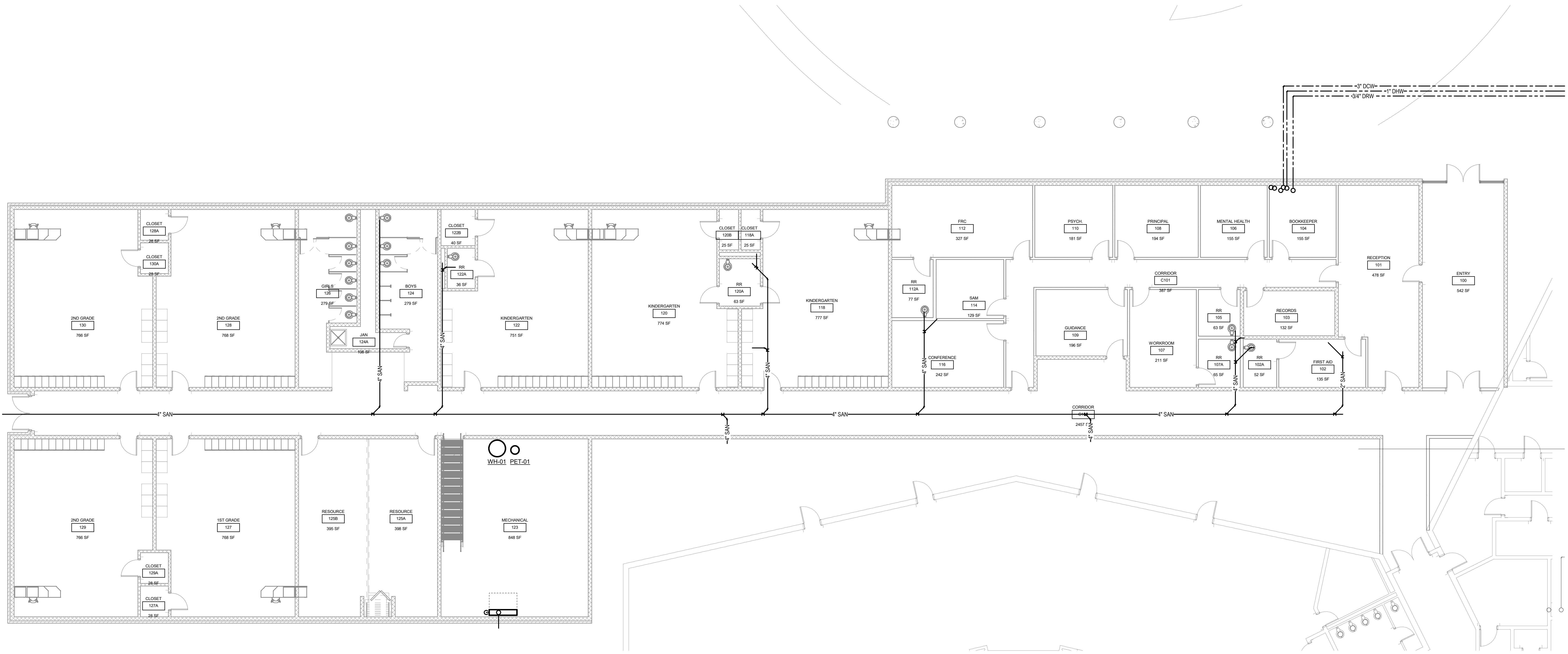
DEMOLITION PLUMBING PLAN - PHASE 4 -  
 AREA C  
 1 SCALE: 1/8" = 1'-0"  
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<b>ALUMINUM</b>	<b>JOB NUMBER</b>	Y2011A
<b>BRASS</b>	<b>DRAWN BY</b>	XHERZ
<b>COPPER</b>	<b>CHECKED BY</b>	DRH
<b>IRON</b>	<b>DATE</b>	1/12/2024
<b>STEEL</b>		
<b>WOOD</b>		
<b>ZINC</b>		

NOT FOR  
 CONSTRUCTION

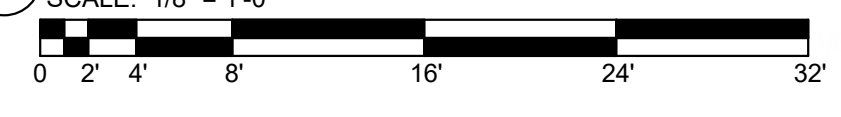
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING DEMOLITION PLAN - PHASE 4 - AREA C





PLUMBING PLAN UNDERSLAB - PHASE 1 -

AREA A



ALUMINUM	DATE	NO.
DESCRIPTION	DATE	NO.
JOB NUMBER	DRAWN BY	CHECKED BY
Y2011141	XHER23	DRH
2102024		

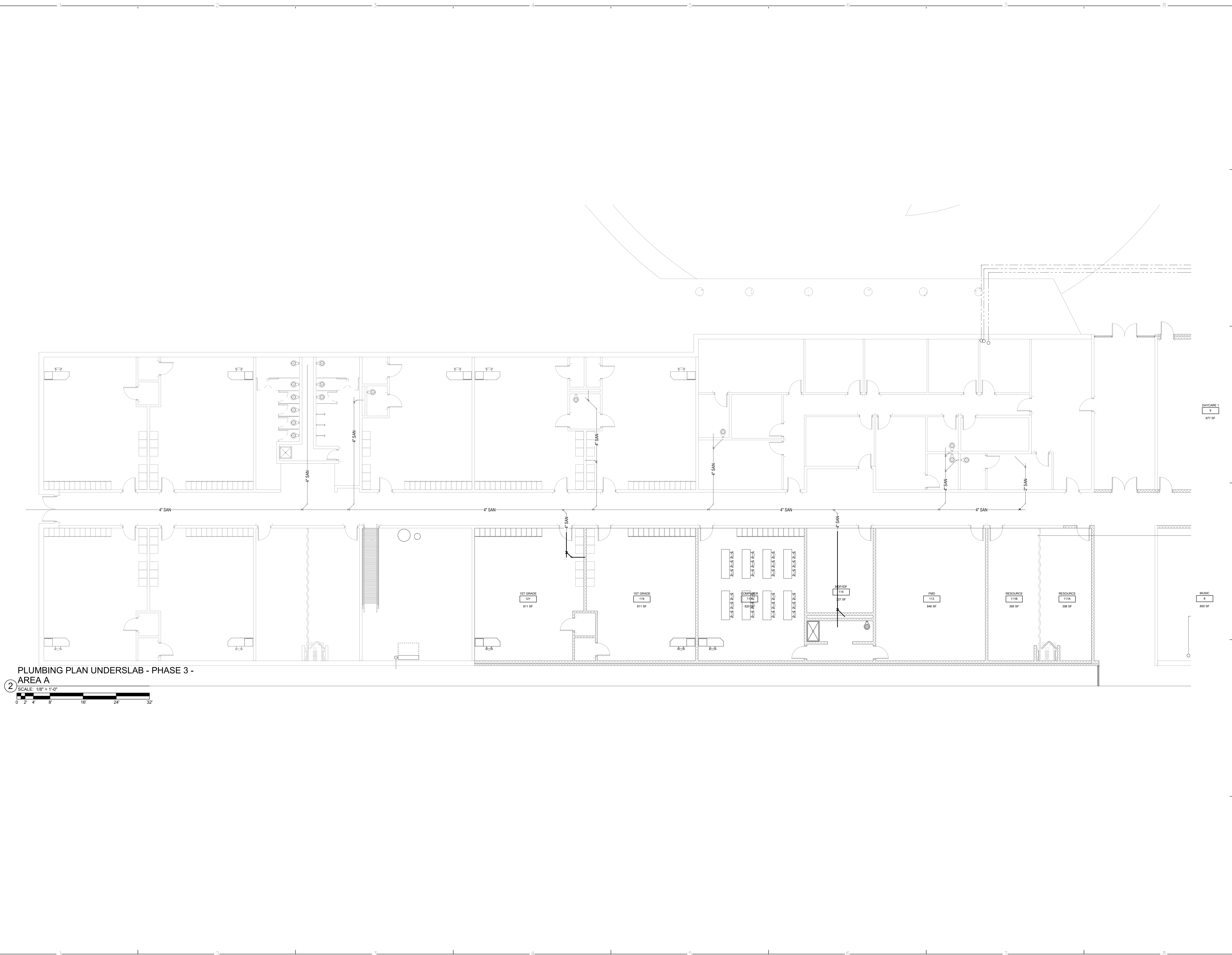
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HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PLUMBING UNDERSLAB NEW WORK PLAN - PHASE 1 - AREA A

SHEET NUMBER

P4.10





PLUMBING PLAN UNDERSLAB - PHASE 3 -  
 AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2 4 8 16 24 32

**RBS DESIGN GROUP**  
 ARCHITECTURE

2330 West 10th Street, Suite 100  
 Omaha, NE 68104  
 Phone: (402) 426-1234  
 Email: office@rbsdesigngroup.com

No.	Description	Date	Job Number	Drawn By	Checked By	Date
			Y2011A XHER23	DRH	HCH	2/12/2024

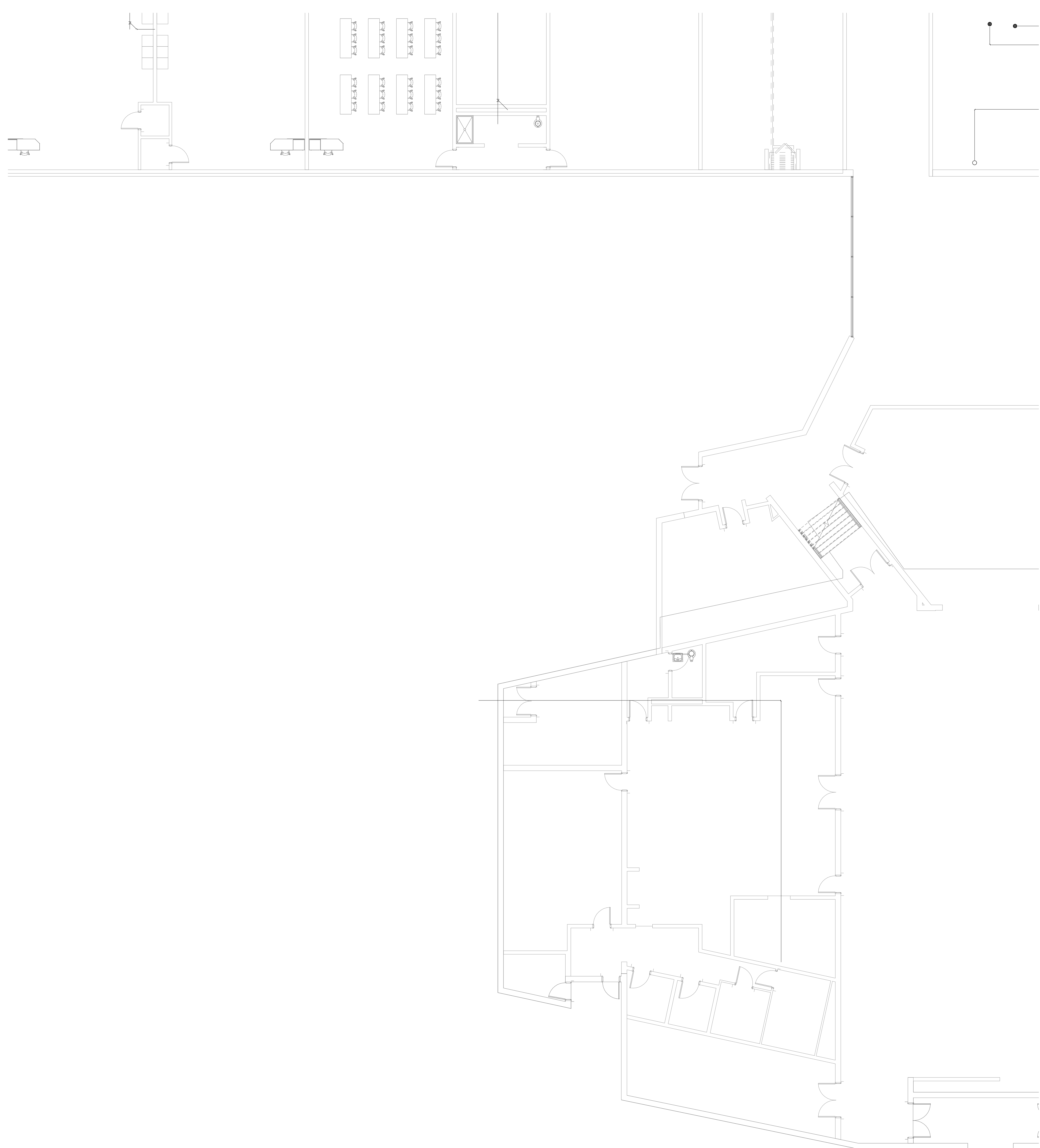
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING UNDERSLAB NEW WORK PLAN - PHASE 3 - AREA A

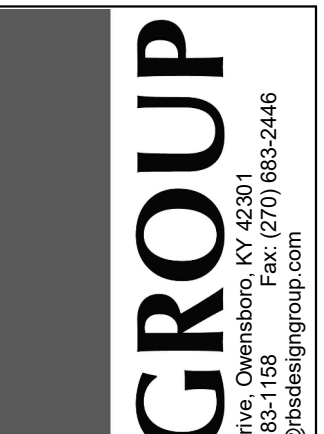
SHEET NUMBER

P4.30

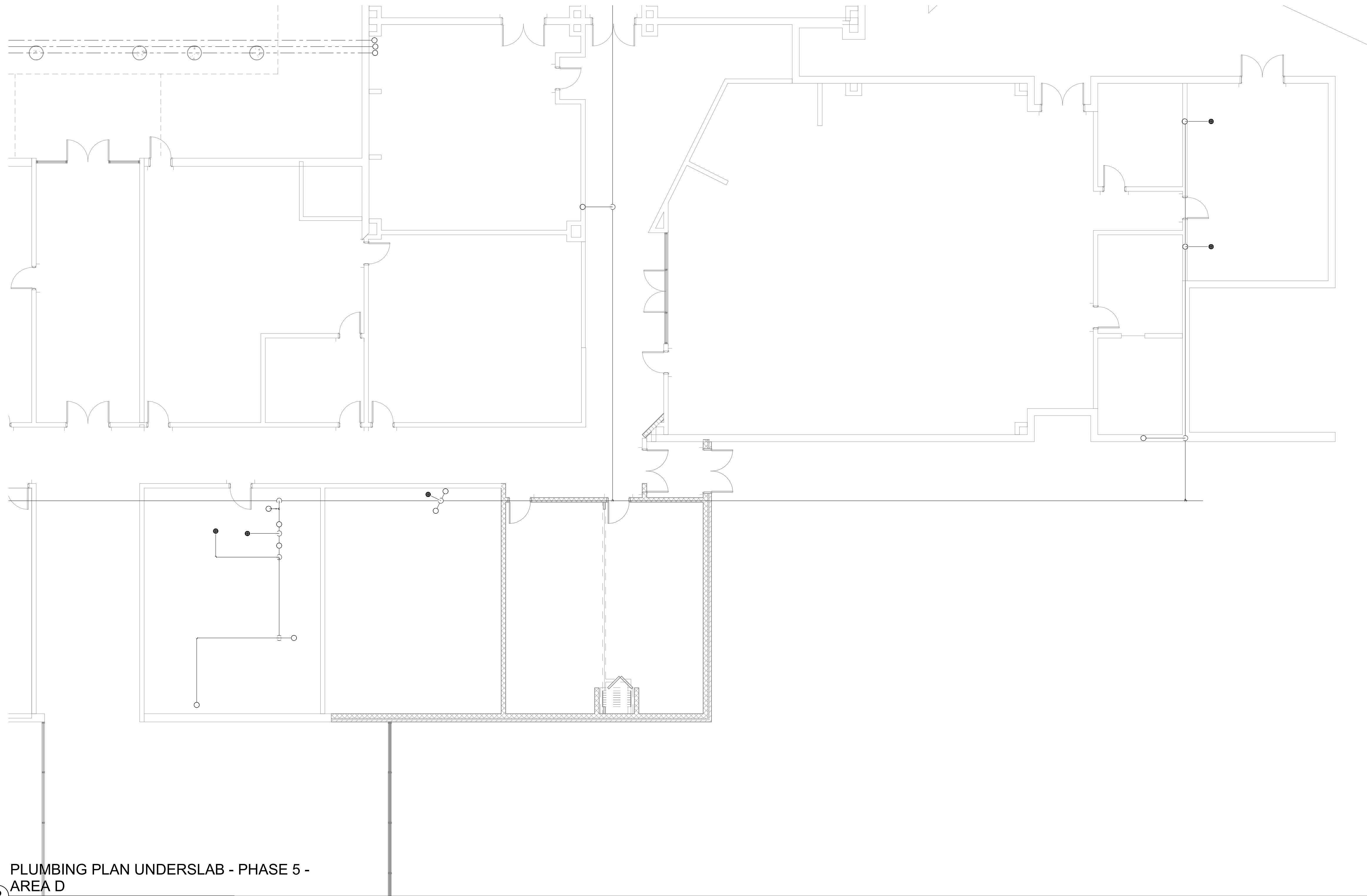




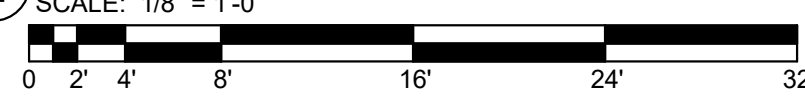
2 PLUMBING PLAN UNDERSLAB - PHASE 5 -  
 AREA B  
 SCALE: 1/8" = 1'-0"  
 0 2 4 8 16 24 32

 <b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           1000 RIVERSIDE DRIVE, SUITE 100            FARMINGTON, CT 06030            TEL: 860.633.1234            FAX: 860.633.1235            WWW.RBSDESIGNGROUP.COM         </small>	
<small>           JOB NUMBER            Y2011A            XHER23         </small>	<small>           DRAWN BY            DPH         </small>
<small>           CHECKED BY            HCN         </small>	<small>           DATE            2/12/2024         </small>
<small>           NOT FOR CONSTRUCTION         </small>	
<b>HENDERSON COUNTY SCHOOLS          EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION          EAST HEIGHTS ELEMENTARY RENOVATION          PLUMBING UNDERSLAB NEW WORK PLAN - PHASE 5 - AREA B</b>	
<small>SHEET NUMBER</small> <b>P4.51</b>	





2 PLUMBING PLAN UNDERSLAB - PHASE 5 - AREA D  
 SCALE: 1/8" = 1'-0"

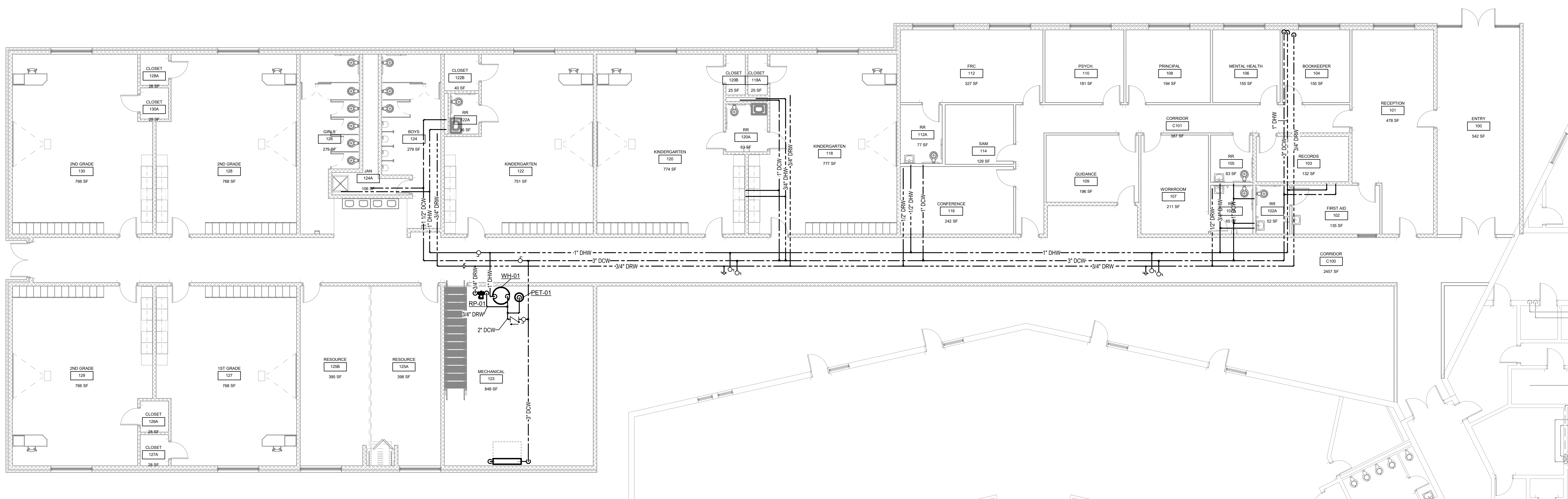


No.	Description	Date	Job Number	Drawn By	Checked By	Date
			YS2114A XHER23	DNH	HCH	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING UNDERSLAB NEW WORK PLAN - PHASE 5 - AREA D





1 PLUMBING PLAN - PHASE 1 - AREA A



ALUMINUM	20211114	Y201114	2/12/2024
DATE	DATE	DATE	DATE
NO.	DESCRIPTION	DATE	DATE
1	PLUMBING PLAN - PHASE 1 - AREA A		

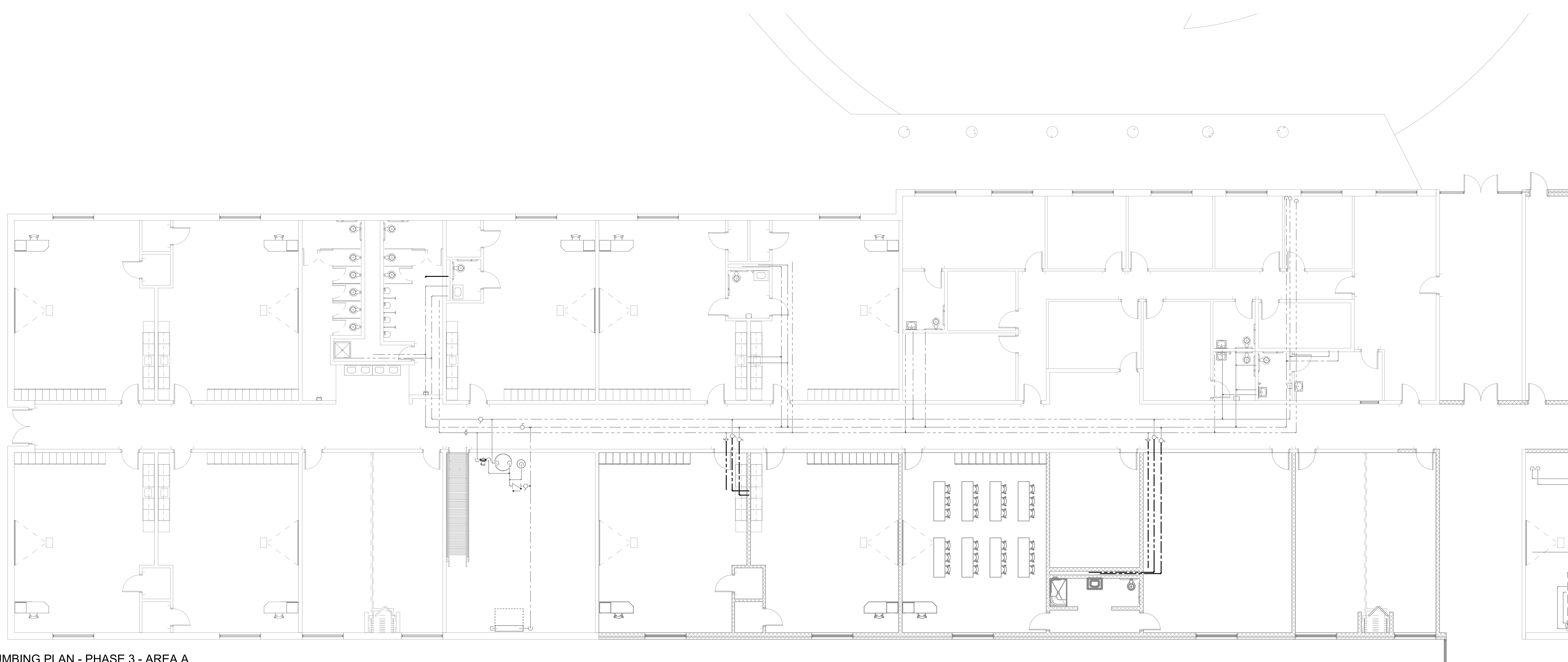
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PLUMBING NEW WORK PLAN - PHASE 1 - AREA A

SHEET NUMBER

P5.10





1 PLUMBING PLAN - PHASE 3 - AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2 4 8 16 24 32

No.	Description	Date	Job Number	Drawn By	Checked By	Date
			Y2011A XHER23	DRH	HCH	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING NEW WORK PLAN - PHASE 3 - AREA A



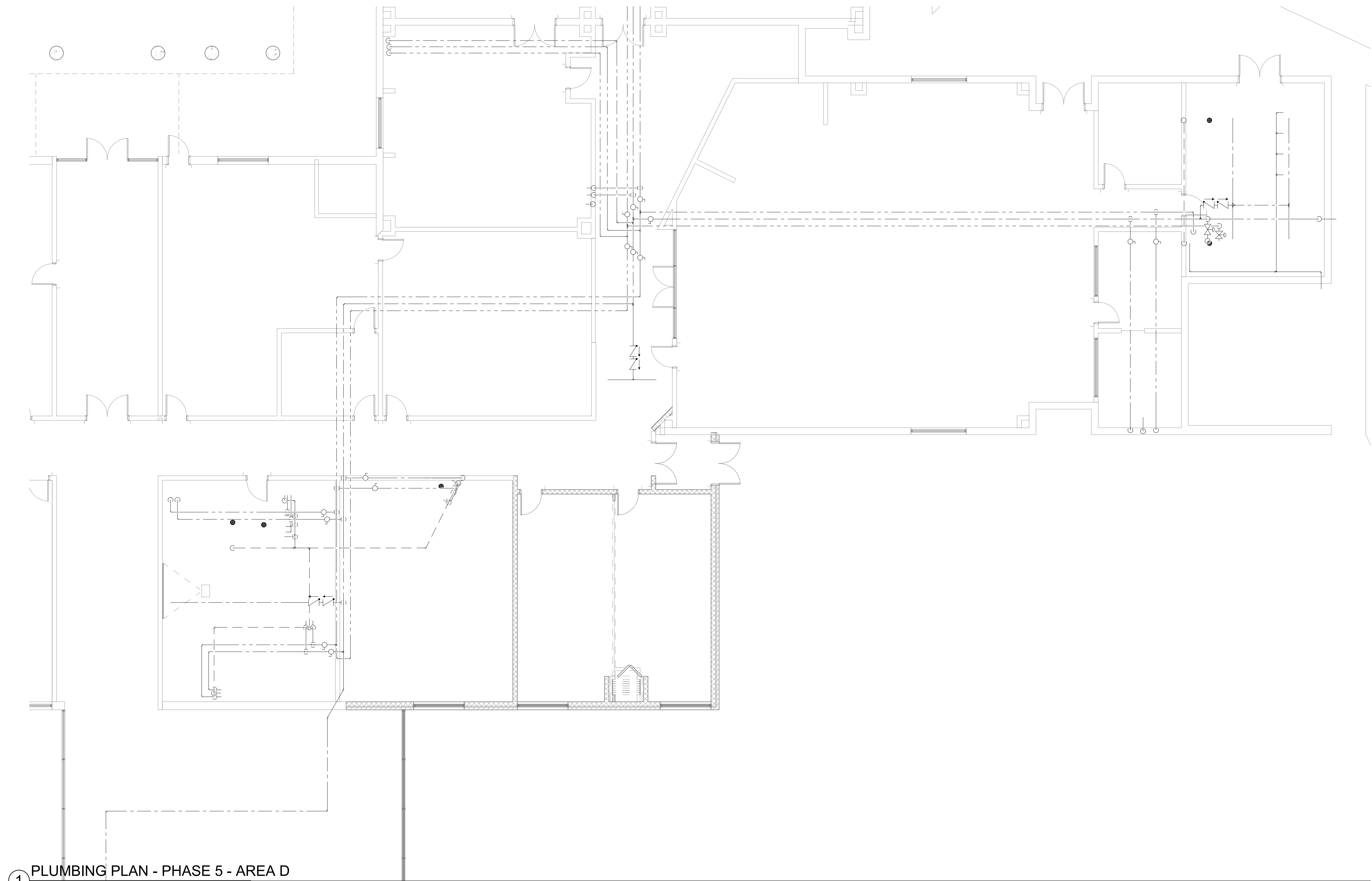


① PLUMBING PLAN - PHASE 5 - AREA B  
 SCALE: 1/8" = 1'-0"

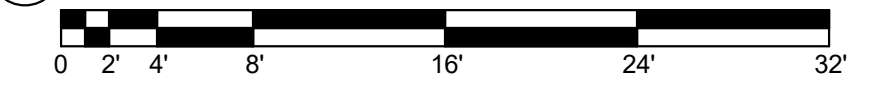


<p><b>RBS DESIGN GROUP</b>          ARCHITECTURE</p> <p>12345 Main Street, Suite 100          Raleigh, NC 27611          Phone: 703.123.4567          Email: office@rbsgroup.com</p>			
<b>NO.</b>	<b>DESCRIPTION</b>	<b>DATE</b>	
<b>JOB NUMBER</b>	Y2011A	<b>DRAWN BY</b>	DNH
	XHER23	<b>CHECKED BY</b>	HCH
		<b>DATE</b>	2/12/2024
<b>NOT FOR CONSTRUCTION</b>			
<p>HENDERSON COUNTY SCHOOLS          EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION          EAST HEIGHTS ELEMENTARY RENOVATION          PLUMBING NEW WORK PLAN - PHASE 5 - AREA B</p>			
<b>SHEET NUMBER</b>			<b>P5.51</b>





1 PLUMBING PLAN - PHASE 5 - AREA D  
 SCALE: 1/8" = 1'-0"



No.	Description	Date	Job Number	Version	Drawn By	Checked By	Scale	Date
			2024114	XHER23	DRH	HCH		2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PLUMBING NEW WORK PLAN - PHASE 5 - AREA D







**MECHANICAL GENERAL NOTES:**

- A. COORDINATE THE LOCATION OF DRAINS, THERMOSTATS, GAS OUTLETS, ETC., WITH ALL CASEWORK EQUIPMENT, MECHANICAL ROOM EQUIPMENT, ETC., PRIOR TO COMMENCING INSTALLATION. WORK NOT SO COORDINATED SHALL BE REMOVED AND PROPERLY INSTALLED AT THE EXPENSE OF THE CONTRACTOR.
- B. THE CONTRACTOR SHALL EXERCISE EXTREME CARE IN THE COURSE OF THEIR WORK SO AS TO INSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE. FOR SAFETY PURPOSES, PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES. VERIFY THE LOCATION, SIZE, TYPE, ETC., OF EACH UNDERGROUND OR OVERHEAD UTILITY. ALL WORK SHALL BE PERFORMED IN ACCORD WITH ALL FEDERAL, STATE AND/OR LOCAL RULES, REGULATIONS, STANDARD AND SAFETY REQUIREMENTS. UTILITIES SHALL BE INSTALLED IN ACCORD WITH THE APPLICABLE MUNICIPALITY OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY.
- C. WHERE WORK IS REQUIRED ABOVE EXISTING LAY-IN, PLASTER OR GYPSUM BOARD CEILINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REINSTALLATION (OR REPLACEMENT, IF DAMAGED) OF ALL CEILING OR TILE AND GRID MEMBERS NECESSARY TO PERFORM HIS WORK. NEW TILE AND GRID SHALL MATCH THE SURROUNDING AREAS. ALL PATCHING WORK SHALL MATCH ADJACENT SURFACES.
- D. ALL NEW WORK SHALL BE HUNG FROM STRUCTURE, NOT FROM THE WORK OF OTHER TRADES, WHETHER EXISTING OR NEW. COORDINATE ALL WORK WITH PROJECT PHASING REQUIREMENTS.
- F. PATCH, REPAIR AND PAINT OR PROVIDE WALL COVERING FOR (TO OWNER'S STANDARDS) EXISTING WALLS, CEILINGS, ETC., THAT ARE TO REMAIN IF DAMAGED DURING CONSTRUCTION. REPAIRS SHALL MATCH ADJACENT SURFACES TO THE SATISFACTION OF THE ARCHITECT AND OWNER.
- G. OBSERVE ALL APPLICABLE CODES, RULES AND REGULATIONS THAT MAY APPLY TO THE WORK UNDER THIS CONTRACT. (CITY, COUNTY, LOCAL, FEDERAL, MUNICIPALITY, UTILITY COMPANY, COMMONWEALTH OF KENTUCKY, ETC.)
- H. CONTRACTOR SHALL BE AWARE OF UNSEEN PLUMBING, HVAC AND ELECTRICAL WORK DURING DEMOLITION. IF ITEMS ARE UNCOVERED DURING DEMOLITION THEN FIELD VERIFY THE USE OF THE ITEMS AND PLAN AN ALTERNATE ROUTE TO RUN THESE ITEMS. THEN CONTACT THE ENGINEERS TO REVIEW THE ROUTING.
- I. IF AREA OF CONSTRUCTION HAS A POST TENSION FLOOR SLAB, CONTRACTOR SHALL USE ULTRA SOUND OR OTHER APPROVED METHODS TO SURVEY THE EXISTING FLOOR STRUCTURE BEFORE MAKING ANY AND ALL FLOOR PENETRATIONS.
- J. WHERE FIRE PROOFING IS REQUIRED ON EXISTING STRUCTURE ALL EXISTING CONDUITS, WATER, HYDRONIC, STEAM, CHILLED WATER, FIRE PROTECTION LINES, MED GAS, ETC. SHALL BE LOWERED TO BE BELOW FULL THICKNESS OF FIRE PROOFING WITH NO INTERFERENCE.
- K. ALL PENETRATIONS OF FIRE AND SMOKE RATED ASSEMBLIES SHALL BE APPROPRIATELY FIRE STOPPED PER AN APPROVED U.L. LISTED STANDARD. CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO INSULATION TO INSULATED PIPING PENETRATIONS.
- L. ALL WORK REQUIRING DOWNTIME OF ANY AREA IN THE BUILDING SHALL BE SCHEDULED 2 WEEKS IN ADVANCE, AND SHALL COMPLY WITH INTERIM LIFE SAFETY MEASURES.
- M. ALL DUCTWORK PIPING, CONDUITS, ETC. IN ROOMS WITH CEILINGS SHALL BE ABOVE CEILING EXCEPT AS NOTED.
- N. INSTALL AIR VENTS AT HIGH POINTS IN PIPING AND DRAINS IN LOW POINTS. USE CARE TO AVOID FREEZING OF EXTERIOR VENTS.
- O. LOCATIONS OF PIPING, DUCTS AND EQUIPMENT ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. DO NOT SCALE THE DRAWING.
- P. ALL OFFSETS IN DUCTS AND PIPING ARE NOT NECESSARILY SHOWN. PROVIDE ADDITIONAL OFFSETS WHERE NECESSARY. COORDINATE ALL HVAC WORK WITH ELECTRICAL, PLUMBING AND OTHER TRADES TO AVOID INTERFERENCE WITH PIPING, DUCTS, CONDUIT AND EQUIPMENT.
- Q. INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTION. IF IN CONFLICT WITH THE DESIGN INDICATED IN CONTRACT DOCUMENTS, ADVISE THE ENGINEERS PRIOR TO INSTALLATION FOR CLARIFICATION. PROVIDE RECOMMENDED ACCESS AND SERVICE CLEARANCES FOR ALL EQUIPMENT.
- S. SEAL AIRTIGHT AROUND ALL DUCTS AND PIPING PENETRATIONS THROUGH WALLS, FLOORS AND ROOF. PROVIDE FIRE STOPPING IN FIRE PARTITION.
- T. SEAL ALL NEW DUCTWORK JOINTS WITH UNITED MCGILL, IRONGRIP 601 OR EQUAL WATER BASED SEALANT.
- U. ALL MOTOR DRIVEN EQUIPMENT SHALL BE INSTALLED WITH FLEXIBLE CONNECTIONS TO DUCTWORK, PIPING, ETC., UNLESS OTHERWISE NOTED.
- V. THE CONTRACTOR SHALL RELOCATE OR AVOID ANY EXISTING EQUIPMENT APPURTENANCES, ETC., THAT CONFLICT WITH NEW WORK.
- W. WHERE MOUNTING HEIGHTS ARE NOT INDICATED OR ARE IN CONFLICT WITH ANY OTHER BUILDING SYSTEM, CONTACT THE ENGINEERS BEFORE INSTALLATION. REFER ALSO TO ARCHITECTURAL WALL INTERIOR AND EXTERIOR WALL ELEVATIONS, CEILING HEIGHTS AND OTHER DETAIL OF THESE DOCUMENTS.
- X. DOUBLE WIDTH TURNING VANES SHALL BE INSTALLED IN ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK ELBOWS. TURNING VANES NOT REQUIRED FOR KITCHEN EXHAUSTS.
- Y. ANY VIBRATING, OSCILLATING OR OTHER NOISE OR MOTION PRODUCING EQUIPMENT SHALL BE ISOLATED FROM SURROUNDING SYSTEMS IN AN APPROVED MANNER. NOISE OR STRUCTURALLY DAMAGING INSTALLATIONS SHALL BE SATISFACTORILY REPLACED OR REPAIRED AT THE CONTRACTOR'S EXPENSE. THE FINAL DECISION ON THE SUITABILITY OF A PARTICULAR INSTALLATION'S ACCEPTABILITY SHALL BE THAT OF THE ENGINEER.
- Z. DEVIATIONS IN SIZE, CAPACITIES, FIT, FINISH, ETC. FOR EQUIPMENT FROM THAT USED AS BASIS OF DESIGN SHALL BE THE RESPONSIBILITY OF THE PURCHASER OF THAT EQUIPMENT. ANY PROVISIONS REQUIRED TO ACCOMMODATE A DEVIATION, WHETHER APPROVED BY THE ENGINEERS OR NOT, SHALL BE THE RESPONSIBILITY OF THE PURCHASER.
- AA. VALVES, BALANCING DAMPERS OR ANY MECHANICAL/ELECTRICAL ITEM REQUIRING ACCESS SHALL NOT BE LOCATED ABOVE A HARD CEILING. IF THIS IS NOT POSSIBLE, THEN AN APPROPRIATELY SIZED ACCESS DOOR SHALL BE PLACED UNDER THE ITEM TO ALLOW EASY MAINTENANCE AND ADJUSTMENT. ADDITIONALLY ALL SUCH ITEMS SHALL NOT BE LOCATED AN UNREASONABLE DISTANCE ABOVE THE CEILINGS. IN GENERAL ALL SUCH ITEMS UNLESS INDICATED OTHERWISE SHALL BE MOUNTED SIX TO TWELVE INCHES ABOVE THE CEILING. IF IN DOUBT, CONTACT ENGINEER PRIOR TO INSTALLING.
- BB. ALL MANHOLES, VALVES AND SIMILAR UNDERGROUND STRUCTURES SHALL HAVE THE TOP ELEVATION SET FLUSH WITH FINISHED GRADE UNLESS SPECIFICALLY NOTED OTHERWISE.
- CC. WHEN RUNNING ANY TYPE OF PIPING BELOW A FOOTER, OR IN THE ZONE OF INFLUENCE THE PIPING SHALL BE BACKFILLED WITH CONCRETE OR FLOWABLE FILL PER SPECIFICATIONS. WHENEVER POSSIBLE, LOCATE PIPING OUTSIDE OF THE ZONE OF INFLUENCE. THE ZONE OF INFLUENCE IS THE AREA UNDER THE FOOTER WITHIN A 45 DEGREE ANGLE PROJECTING DOWN FROM THE BOTTOM EDGE OF THE FOOTER OF ALL SIDES OF THE FOOTER. ADDITIONALLY, GREASE TRAPS, MANHOLES, VALVES AND OTHER UNDERGROUND STRUCTURES SHALL BE HELD AWAY FROM BUILDING WALLS FAR ENOUGH TO BE OUTSIDE OF THE ZONE OF INFLUENCE.
- DD. WORK IN CONFINED AREAS SHALL BE IN ACCORDANCE WITH THE OWNER'S SAFETY POLICY REQUIREMENTS.

**MECHANICAL DEMOLITION NOTES:**

- A. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR AREAS IN WHICH THE CEILING IS REMAINING. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE EXISTING CEILING AS REQUIRED AND REINSTALLATION. TEMPORARILY SUPPORT LIGHTS, DIFFUSERS, CEILING ETC. REPLACE BROKEN CEILING TILES WITH NEW AT NO ADDITIONAL COST TO OWNER. FIELD VERIFY EXACT REQUIREMENTS.
- B. DURING SPRINKLER SYSTEM OUTAGES THE CONTRACTOR SHALL PROVIDE FIRE WATCH OF AREAS WITH OUTAGES.
- C. ALL WALLS AND FLOOR SLABS SHALL BE REPAIRED TO MATCH EXISTING AND TO A LIKE NEW CONDITION. ALL RATED WALLS AND FLOOR SLABS SHALL BE PATCHED AND REPAIRED TO MAINTAIN RATING.
- D. ALL EXISTING BUILDING FINISHES SHALL BE PROTECTED DURING THE DEMOLITION PHASE.
- E. HEAVY DASHED LINES INDICATE ITEMS FOR REMOVAL (UON) AND LIGHT SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.
- F. COORDINATE DISPOSAL OF ALL FIXTURES, DEVICES, ETC. (INDICATED FOR DEMOLITION) WITH THE OWNER.
- G. ALL OUTAGES SHALL BE SCHEDULED THROUGH THE MERCY PROJECT REPRESENTATIVE FOR PROPER COORDINATION. A REQUEST FOR AN OUTAGE SHALL BE SUBMITTED IN WRITING A MINIMUM OF TWO WEEKS IN ADVANCE.
- H. ALL DUCTWORK, PIPING, CONDUIT, ETC. SHALL BE INSTALLED A MINIMUM OF 4" ABOVE THE TOP OF THE CEILING GRID.

**MECHANICAL HAZARDOUS NOTES:**

- A. THE CONTRACTOR IT IS HEREBY ADVISED THAT IT IS POSSIBLE THAT ASBESTOS AND/OR OTHER HAZARDOUS MATERIALS ARE OR WERE PRESENT IN THIS BUILDING(S). ANY WORKER, OCCUPANT, VISITOR, ETC., WHO ENCOUNTERS ANY MATERIAL OF WHOSE CONTENT THEY ARE NOT CERTAIN SHALL PROMPTLY REPORT THE EXISTENCE AND LOCATION OF THAT MATERIAL TO THE OWNER. FURTHERMORE, THE CONTRACTOR SHALL INSURE THAT NO ONE COMES NEAR TO OR IN CONTACT WITH ANY SUCH MATERIAL OR FUMES THEREFROM UNTIL ITS CONTENT CAN BE ASCERTAINED TO BE NON-HAZARDOUS.
- B. CMTA, INC. HAS NO EXPERTISE IN THE DETERMINATION OF THE PRESENCE OF ANY HAZARDOUS MATERIAL. THEREFORE, NO ATTEMPT HAS BEEN MADE BY CMTA TO IDENTIFY THE EXISTENCE OR LOCATION OF ANY SUCH HAZARDOUS MATERIAL. FURTHERMORE, CMTA NOR ANY AFFILIATE HEREOF WILL NOT OFFER OR MAKE ANY RECOMMENDATIONS RELATIVE TO THE REMOVAL, HANDLING OR DISPOSAL OF SUCH MATERIAL.
- C. IF THE WORK WHICH IS TO BE PERFORMED INTERFACES, CONNECTS OR RELATES IN ANY PHYSICAL WAY WITH OR TO EXISTING COMPONENTS WHICH CONTAIN OR BEAR ANY HAZARDOUS MATERIAL, ASBESTOS BEING ONE, THEN IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO CONTACT THE OWNER AND SO ADVISE HIM IMMEDIATELY.
- D. THE CONTRACTOR BY EXECUTION OF THE CONTRACT FOR ANY WORK AND/OR BY THE ACCOMPLISHMENT OF ANY WORK THEREBY AGREES TO BRING NO CLAIM RELATIVE TO HAZARDOUS MATERIALS FOR NEGLIGENCE, BREACH OF CONTRACT, INDEMNITY, OR ANY OTHER SUCH ITEM AGAINST CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS OR CONSULTANTS. ALSO, THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD CMTA, ITS PRINCIPALS, EMPLOYEES, AGENTS AND CONSULTANTS HARMLESS FROM ANY SUCH RELATED CLAIMS WHICH MAY BE BROUGHT BY ANY SUBCONTRACTORS, SUPPLIERS OR ANY OTHER THIRD PARTIES.
- E. THE CONTRACTOR IS DIRECTED TO THE SPECIFICATIONS FOR FURTHER INFORMATION.

**MECHANICAL PHASING NOTES:**

- A. THIS PROJECT INTERFACES EXTENSIVELY WITH EXISTING BUILDING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND PHASE ALL TIE-INS AND INTERRUPTIONS OF EXISTING SERVICES TO MINIMIZE OR ELIMINATE DOWNTIME. AS AN EXAMPLE, MAIN GAS SERVICE, WATER SERVICE, ELECTRICAL SERVICE, HVAC SERVICES, STEAM GENERATION, ETC., WILL BE AFFECTED AND REPLACED OR MOVED DURING THIS PROJECT. THE CONTRACTOR SHALL INSTALL ALL NEW SERVICES AND EQUIPMENT AND HAVE THEM TESTED AND FULLY AND RELIABLY FUNCTIONAL PRIOR TO INTERRUPTING, RELOCATING OR REMOVING ANY EXISTING SERVICES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BARE ANY AND ALL COSTS ASSOCIATED WITH THIS PHASING, INCLUDING TEMPORARY SERVICES, TEMPORARY RELOCATION, PREMIUM TIME WORK, ETC. CONTRACTOR SHALL COORDINATE ALL SAID WORK WITH THE OWNER AND APPLICABLE UTILITIES PER THE CONTRACT DOCUMENTS.

**ABBREVIATIONS**

AC	ALTERNATING CURRENT
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHJ	AUTHORITY HAVING JURISDICTION
AMP	AMPERE (AMP, AMPS)
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
APD	AIR PRESSURE DROP
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR-CONDITIONING ENGINEERS
ATU	AIR TERMINAL UNIT
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BHP	BREAK HORSEPOWER
BTU	BRITISH THERMAL UNIT
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
C.I.	CAST IRON
CLG	CEILING
CLR	CLEAR
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
COND	CONDENS (-ER, -ING, -ATION, -ATE)
CONT	CONTINU (-ED, -OUS)
CJ FT	CUBIC FEET
CJ IN	CUBIC INCHES
CV	VALVE FLOW COEFFICIENT
dB	DECIBEL
DB	DRY BULB
DBT	DRY BULB TEMPERATURE
DC	DIRECT CURRENT
DD	DUCT SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE (-S)
DIA	DIAMETER (-S)
DN	DOWN
DWG	DRAWING
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVA (-TION, -TOR)
ENGR	ENGINEER
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EVAP	EVAPORAT (-E, -ING, -ED, -OR, -ION)
EWT	ENTERING WATER TEMPERATURE
EXP	EXPANSION
EXT	EXTERIOR
FA	FREE AREA

**ABBREVIATIONS (CONTINUED)**

FD	FIRE DAMPER
FL	FLOOR
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPC	FIRE PROTECTION CONTRACTOR
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET OR FOOT
FUTJ	FUTURE
FV	FACE VELOCITY
GA	GAGE/GAUGE
GAL	GALLON (-S)
GC	GENERAL CONTRACTOR
GD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRAINS
H	HUMIDITY
HD	HEAD
HG	MERCURY
HORIZ	HORIZONTAL
HP	H (-ORSEPOWER, -EAT PUMP)
HR	HOOR (-S)
HVAC	HEATING, VENTILATING, & AIR-CONDITIONING
Hz	HERTZ
ID	I (-DENTIFICATION, -NSIDE DIAMETER, -NSIDE DIMENSION)
IN	INCH (-ES)
INSUL	INSULAT (-ED, -ION)
INT	INTER (-OR, -ERVAL)
IPS	IRON PIPE SIZE
KW	KILOWATT
kWh	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LF	LINEAR FEET/FOOT
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	BTU PER HOUR (THOUSANDS)
MCA	MINIMUM CIRCUIT AMPS
MFG	MANUFACTURER
MIN	MIN (-IMUM, -UTE)
MISC	MISCELLANEOUS
MOC	MAXIMUM OVERCURRENT PROTECTION [AMPS]
MTG	MOUNTING
N/A	NOT APPLICABLE
NC	NOISE CRITERIA OR NORMALLY CLOSED
NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
NIC	NOT IN CONTRACT

**ABBREVIATIONS (CONTINUED)**

NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DI (-AMETER, -MENSION)
OCFI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
OCFI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OR	OPEN RECEPTACLE
OZ	OUNCE (-S)
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PH	PHASE [ELECTRICAL]
PLBG	PLUMBING
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE (STEAM, WATER, GAS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	PPSI GAUGE
RH	RELATIVE HUMIDITY [%]
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SD	SMOKE DAMPER
SP	STATIC PRESSURE
SQ	SQUARE
SQ FT	SQUARE FEET OR FOOT
SQ IN	SQUARE INCH OR INCHES
TAB	TESTING AND BALANCING
TBD	TO BE DETERMINED
TE	TOP ELEVATION
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TY	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT (-AGE, -S)
VAR	VARI (-ABLE, -IES)
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
W	WATT (-AGE, -S)
WB	WET BULB
WBT	WET BULB TEMPERATURE
WPD	WATER PRESSURE DROP
WT	WEIGHT
W/	WITH
W/O	WITHOUT
%	PERCENT
ΔP	DIFFERENTIAL PRESSURE
ΔT	TEMPERATURE DIFFERENCE
℄	CENTERLINE

**GENERAL SYMBOLS**

	TAGGED NOTE DESIGNATOR
	REVISION TRIANGLE
	ROOM TAG
	EQUIPMENT TAG
	POINT OF CONNECTION / CONNECT TO EXISTING
	POINT OF DEMOLITION
<b>HVAC LEGEND</b>	
	SUPPLY AIR DIFFUSER
	RETURN AIR DIFFUSER
	EXHAUST AIR DIFFUSER
	TRANSFER AIR DIFFUSER W/ SOUND ATTENUATING BOOT
	SIDEWALL DIFFUSER/GRILLE
	SIDEWALL DIFFUSER/GRILLE
	AIR DEVICE TAG (REGISTER, GRILLE, DIFFUSER, LOUVER)
	RECTANGULAR DUCT
	ROUND/SPIRAL DUCT
	FLAT OVAL DUCT
	SUPPLY AIR DUCT
	RETURN AIR DUCT
	EXHAUST AIR DUCT
	OUTSIDE AIR DUCT
	TRANSFER AIR DUCT
	COMBUSTION AIR EXHAUST DUCT
	COMBUSTION AIR INTAKE DUCT
	SA AIR DUCT TURNING UP
	SA AIR DUCT TURNING DOWN
	RA AIR DUCT TURNING UP
	RA AIR DUCT TURNING DOWN
	EA AIR DUCT TURNING UP
	EA AIR DUCT TURNING DOWN
	EXISTING DUCT - (XXX) DENOTES SYSTEM
	DUCT TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
	DUCT TO BE ABANDONED IN PLACE - (XXX) DENOTES SYSTEM
	MITERED ELBOW WITH TURNING VANES
	FLEXIBLE DUCT
	THERMOSTAT
	TEMPERATURE SENSOR
	HUMIDITY SENSOR
	CARBON DIOXIDE SENSOR
	TEMPERATURE & CARBON DIOXIDE SENSOR
	MANUAL BALANCING/VOLUME DAMPER
	MOTORIZED DAMPER
	FIRE DAMPER
	SMOKE DAMPER
	COMBINATION FIRE & SMOKE DAMPER

**MECHANICAL PIPING LEGEND**

	PIPE ELBOW TURNING UP
	PIPE ELBOW TURNING DOWN
	PIPE TEE, CONNECTION ON TOP
	PIPE TEE, CONNECTION ON BOTTOM
	PIPE CAP
	BOILER FEEDWATER
	COMBUSTION AIR INTAKE/EXHAUST
	CHILLED BEAM SUPPLY/RETURN
	CONDENSATE DRAIN
	CHILLED WATER SUPPLY/RETURN
	CLEAN STEAM PIPING
	CONDENSER WATER SUPPLY/RETURN
	DUAL TEMP. WATER SUPPLY/RETURN
	GEO THERMAL WATER SUPPLY/RETURN
	HIGH PRESSURE STEAM CONDENSATE
	HIGH PRESSURE STEAM; (#) DENOTES PRESSURE
	HEAT PUMP WATER SUPPLY/RETURN
	HEAT RECOVERY SUPPLY/RETURN PIPING
	HEATING WATER SUPPLY/RETURN
	LOW PRESSURE STEAM CONDENSATE
	LOW PRESSURE STEAM; (#) DENOTES PRESSURE
	MEDIUM PRESSURE STEAM RETURN
	MEDIUM PRESSURE STEAM; (#) DENOTES PRESSURE
	STEAM CONDENSATE PUMPED DISCHARGE
	STEAM VENT PIPING
	PIPING TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
	EXISTING PIPING - (XXX) DENOTES SYSTEM
	ABANDONED IN PLACE PIPING - (XXX) DENOTES SYSTEM
	TWO-WAY CONTROL VALVE
	THREE-WAY CONTROL VALVE
	AUTOMATIC AIR VENT (AAV)
	MANUAL AIR VENT (MAV)
	MANUAL BALANCING VALVE (BV)
	BALL VALVE
	BUTTERFLY VALVE
	TRIPLE DUTY VALVE (TDV)
	STRAINER
	MANUAL ISOLATION VALVE
	GLOBE VALVE
	OS&Y (GATE) VALVE
	PRESSURE REDUCING VALVE (STEAM, GAS, WATER, ETC.)
	AUTO-FLOW CONTROL VALVE
	CHECK VALVE
	DOUBLE CHECK VALVE ASSEMBLY
	FLEXIBLE PIPE CONNECTION
	FLOW METER (VENTURI)
	PIPING UNION
	FLOW SWITCH
	PRESSURE SWITCH
	TAMPER SWITCH
	THERMOMETER
	PETE'S PLUG; TEMPERATURE/PRESSURE PORT

APPLICABLE BUILDING CODES		
APPLICABLE BUILDING CODES	DOCUMENT	YEAR
ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES	ANSI A117.1	2009
FIRE SPRINKLER CODE	NFPA 13	2013
INTERNATIONAL BUILDING CODE (IBC)	STATE EDITION	2015
INTERNATIONAL ENERGY CONSERVATION CODE (IECC)	STATE EDITION	2012
INTERNATIONAL FIRE CODE (IFC)	STATE EDITION	2015
INTERNATIONAL FUEL GAS CODE (IFGC)	STATE EDITION	2015
INTERNATIONAL MECHANICAL CODE (IMC)	STATE EDITION	2015
INTERNATIONAL PLUMBING CODE (IPC)	STATE EDITION	2015
INTERNATIONAL EXISTING BUILDING CODE (IEBC)	STATE EDITION	2009
NATIONAL ELECTRIC CODE (NEC)	NFPA 70	2017
NATIONAL FIRE ALARM & SIGNALING CODE	NFPA 72	2013
UNIFORM STATEWIDE BUILDING CODE	KBC	2018

**HENDERSON COUNTY SCHOOLS**  
**EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION**  
**EAST HEIGHTS ELEMENTARY RENOVATION**  
**MECHANICAL LEGEND**

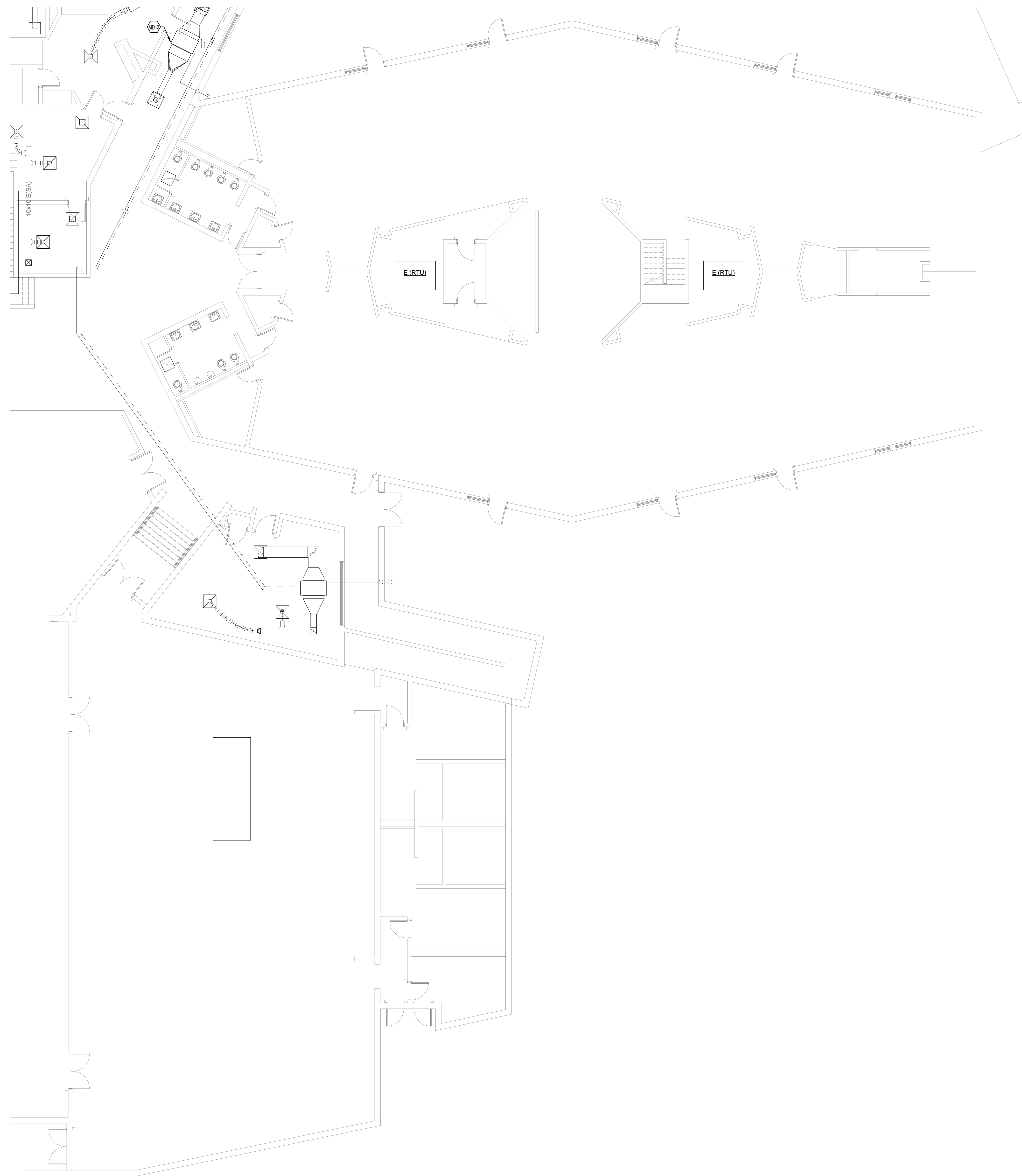
**RBS DESIGN GROUP**  
**ARCHITECTURE**

PROJECT: EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 PROJECT NO: 2018-001  
 SHEET NO: M1.0  
 DATE: 07/10/2018  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 DATE: 07/10/2018

NOT FOR CONSTRUCTION

SHEET NUMBER  
**M1.0**

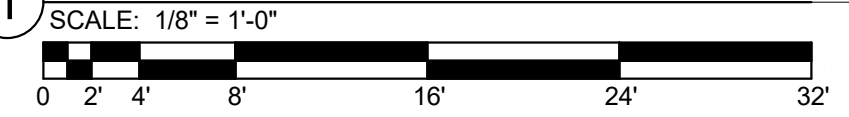




**TAGGED NOTES**  
 MD13 EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS,  
 PIPING, ETC. TO REMAIN.



MECHANICAL DEMOLITION PLAN - PHASE 1 -  
 AREA C



**RBS DESIGN GROUP**  
 ARCHITECTURE

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<b>ALUMINUM</b>	<b>JOB NUMBER</b>	Y2011A1
<b>DATE</b>	<b>DRAWN BY</b>	XHERZ3
<b>DESCRIPTION</b>	<b>CHECKED BY</b>	DNH
<b>NO.</b>	<b>DATE</b>	HCH
	<b>DATE</b>	2/12/2024

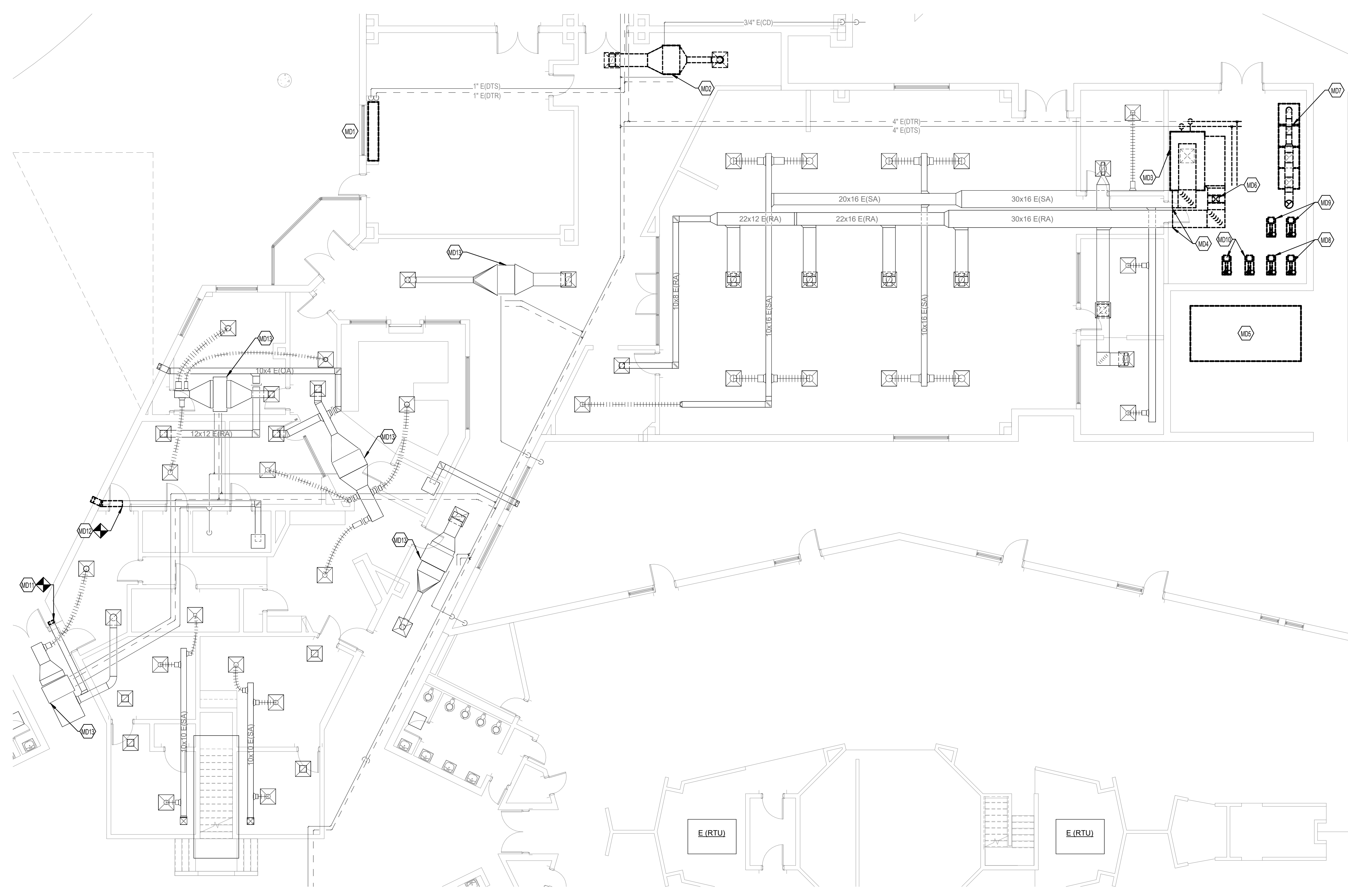
NOT FOR  
 CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 1 - AREA C

SHEET NUMBER

**M2.12**





MECHANICAL DEMOLITION PLAN - PHASE 1 -  
 AREA D  
 1 SCALE: 1/8" = 1'-0"  
 0 2 4 8 16 24 32

**TAGGED NOTES**

- MD1 EXISTING UNIT VENTILATOR TO BE DEMOLISHED COMPLETELY. REMOVE OUTSIDE LOUVER, PATCH AND REPAIR WALL. REFER TO ARCHITECTURAL PLANS.
- MD2 EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ETC. TO BE DEMOLISHED COMPLETELY.
- MD3 EXISTING AIR HANDLER, ASSOCIATED PIPING, ETC. TO BE DEMOLISHED.
- MD4 SUPPLY/RETURN AIR DUCT TO BE DEMOLISHED BACK TO POINT INDICATED. REFER TO NEW WORK PLANS FOR RECONNECTION.
- MD5 EXISTING CHILLER, ASSOCIATED PIPING, ETC. TO BE DEMOLISHED COMPLETELY.
- MD6 OUTSIDE AIR DUCT, LOUVER, ETC. TO BE DEMOLISHED COMPLETELY. PATCH AND REPAIR ROOF. REFER TO ARCHITECTURAL PLANS.
- MD7 EXISTING BOILERS, FLUE DUCT, ECT. TO BE DEMOLISHED COMPLETELY. PATCH AND REPAIR ROOF. REFER TO ARCHITECTURAL PLANS.
- MD8 EXISTING CHILLED WATER PUMPS, ASSOCIATED PIPING, FITTINGS, ETC. TO BE DEMOLISHED COMPLETELY.
- MD9 EXISTING HOT WATER PUMP, ASSOCIATED PIPING, FITTINGS, ETC. TO BE DEMOLISHED COMPLETELY.
- MD10 EXISTING DUAL TEMPERATURE WATER PUMPS, ASSOCIATED PIPING, FITTINGS, ETC. TO BE DEMOLISHED COMPLETELY.
- MD11 OUTSIDE AIR DUCT TO BE DEMOLISHED BACK TO POINT INDICATED. REFER TO NEW WORK PLANS.
- MD12 EXHAUST AIR DUCT TO BE DEMOLISHED BACK TO POINT INDICATED. REFER TO NEW WORK PLANS.
- MD13 EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, PIPING, ETC. TO REMAIN.

RBS DESIGN GROUP

ARCHITECTURE

1000 W. BROADWAY, SUITE 200, DENVER, CO 80202  
 TEL: 303.733.1100 FAX: 303.733.1101  
 WWW.RBSDESIGNGROUP.COM

PROJECT: HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY RENOVATION  
 SHEET: MECHANICAL DEMOLITION PLAN - PHASE 1 - AREA D  
 DATE: 2/12/2024

JOB NUMBER: Y201144  
 DRAWN BY: DPH  
 CHECKED BY: MCH  
 DATE: 2/12/2024

NO. | Description | Date

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS

EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION

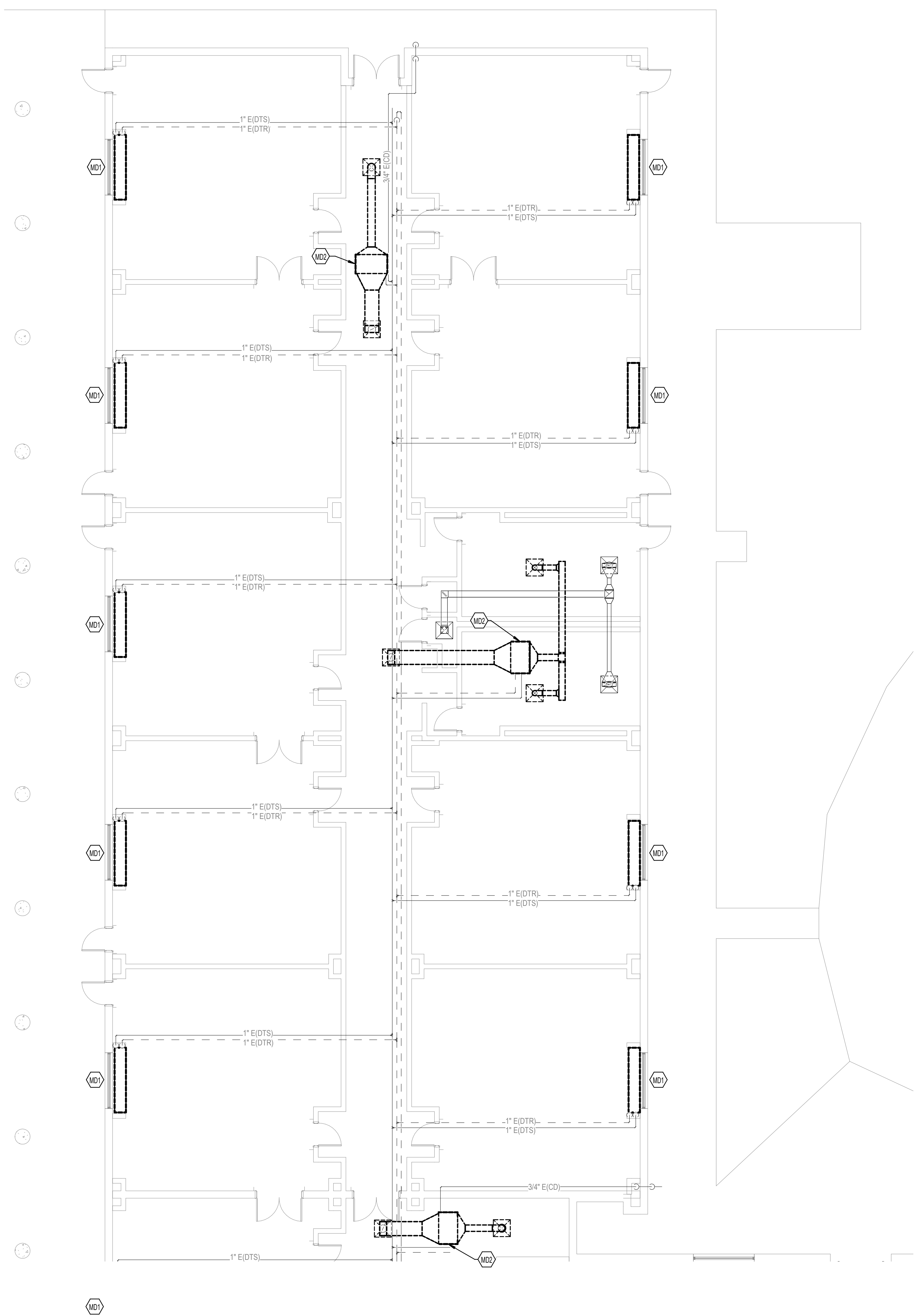
EAST HEIGHTS ELEMENTARY RENOVATION

MECHANICAL DEMOLITION PLAN - PHASE 1 - AREA D

SHEET NUMBER

M2.13



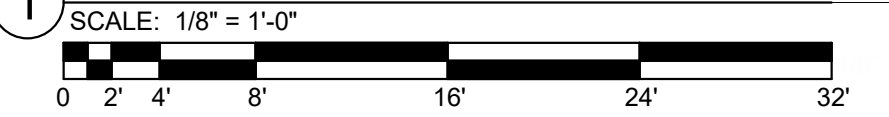


**TAGGED NOTES**

MD1 EXISTING UNIT VENTILATOR TO BE DEMOLISHED COMPLETELY. REMOVE OUTSIDE LOUVER, PATCH AND REPAIR WALL. REFER TO ARCHITECTURAL PLANS.

MD2 EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ETC. TO BE DEMOLISHED COMPLETELY.

MECHANICAL DEMOLITION PLAN - PHASE 1 -  
 AREA E  
 SCALE: 1/8" = 1'-0"



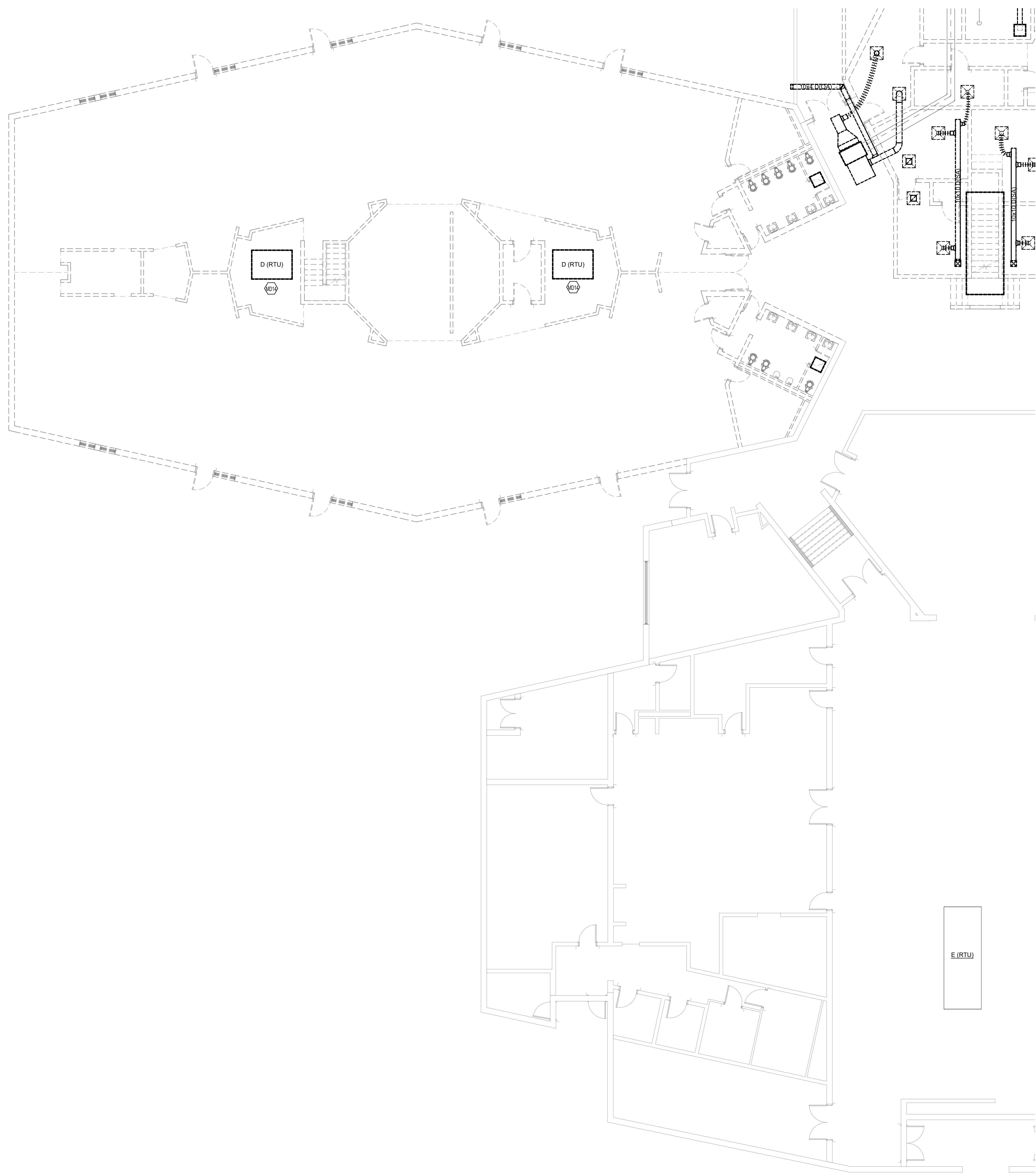
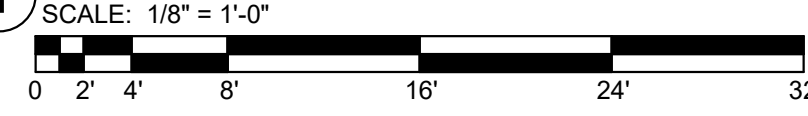
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			DRAWN BY	DNH	
			CHECKED BY	HCH	
			DATE		2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 1 - AREA E



MECHANICAL DEMOLITION PLAN - PHASE 2 -  
 AREA B  
 SCALE: 1/8" = 1'-0"



**TAGGED NOTES**  
 MD14 ROOFTOP UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ROOF CURB, ETC. TO BE DEMOLISHED COMPLETELY.

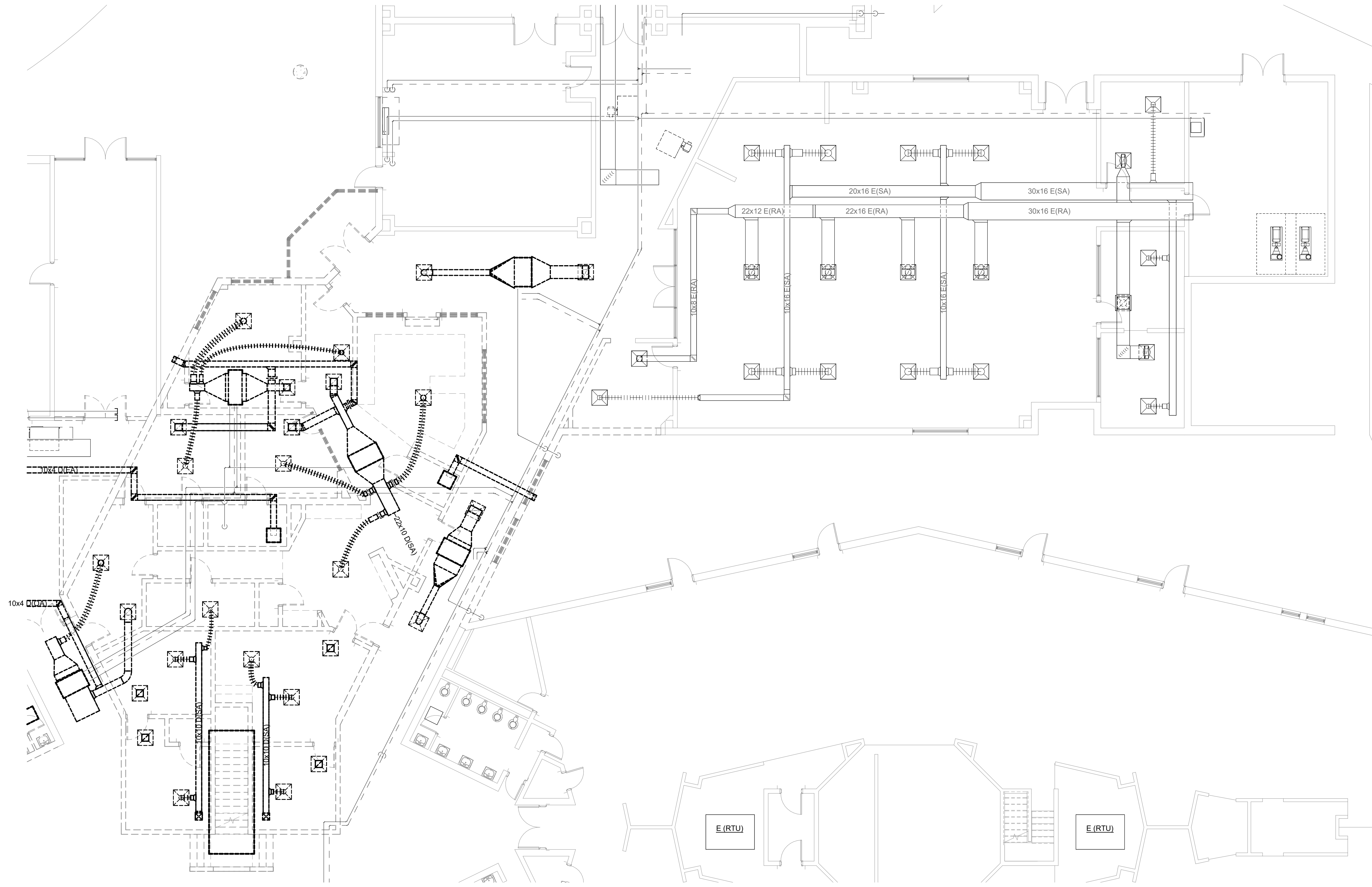
<small>ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. DATE OF DECLASSIFICATION IS INDEFINITE. AUTHORITY: 50 CFR 172.162-2.446. E-Mail: <a href="mailto:office@rbsdesigngroup.com">office@rbsdesigngroup.com</a></small>	<small>DATE OF DECLASSIFICATION IS INDEFINITE. AUTHORITY: 50 CFR 172.162-2.446. E-Mail: <a href="mailto:office@rbsdesigngroup.com">office@rbsdesigngroup.com</a></small>
<small>ALTERNATIVE 1: 1/24/2024          ALTERNATIVE 2: 1/24/2024          ALTERNATIVE 3: 1/24/2024          ALTERNATIVE 4: 1/24/2024          ALTERNATIVE 5: 1/24/2024          ALTERNATIVE 6: 1/24/2024          ALTERNATIVE 7: 1/24/2024          ALTERNATIVE 8: 1/24/2024          ALTERNATIVE 9: 1/24/2024          ALTERNATIVE 10: 1/24/2024          ALTERNATIVE 11: 1/24/2024          ALTERNATIVE 12: 1/24/2024          ALTERNATIVE 13: 1/24/2024          ALTERNATIVE 14: 1/24/2024          ALTERNATIVE 15: 1/24/2024          ALTERNATIVE 16: 1/24/2024          ALTERNATIVE 17: 1/24/2024          ALTERNATIVE 18: 1/24/2024          ALTERNATIVE 19: 1/24/2024          ALTERNATIVE 20: 1/24/2024          ALTERNATIVE 21: 1/24/2024          ALTERNATIVE 22: 1/24/2024          ALTERNATIVE 23: 1/24/2024          ALTERNATIVE 24: 1/24/2024          ALTERNATIVE 25: 1/24/2024          ALTERNATIVE 26: 1/24/2024          ALTERNATIVE 27: 1/24/2024          ALTERNATIVE 28: 1/24/2024          ALTERNATIVE 29: 1/24/2024          ALTERNATIVE 30: 1/24/2024          ALTERNATIVE 31: 1/24/2024          ALTERNATIVE 32: 1/24/2024          ALTERNATIVE 33: 1/24/2024          ALTERNATIVE 34: 1/24/2024          ALTERNATIVE 35: 1/24/2024          ALTERNATIVE 36: 1/24/2024          ALTERNATIVE 37: 1/24/2024          ALTERNATIVE 38: 1/24/2024          ALTERNATIVE 39: 1/24/2024          ALTERNATIVE 40: 1/24/2024          ALTERNATIVE 41: 1/24/2024          ALTERNATIVE 42: 1/24/2024          ALTERNATIVE 43: 1/24/2024          ALTERNATIVE 44: 1/24/2024          ALTERNATIVE 45: 1/24/2024          ALTERNATIVE 46: 1/24/2024          ALTERNATIVE 47: 1/24/2024          ALTERNATIVE 48: 1/24/2024          ALTERNATIVE 49: 1/24/2024          ALTERNATIVE 50: 1/24/2024          ALTERNATIVE 51: 1/24/2024          ALTERNATIVE 52: 1/24/2024          ALTERNATIVE 53: 1/24/2024          ALTERNATIVE 54: 1/24/2024          ALTERNATIVE 55: 1/24/2024          ALTERNATIVE 56: 1/24/2024          ALTERNATIVE 57: 1/24/2024          ALTERNATIVE 58: 1/24/2024          ALTERNATIVE 59: 1/24/2024          ALTERNATIVE 60: 1/24/2024          ALTERNATIVE 61: 1/24/2024          ALTERNATIVE 62: 1/24/2024          ALTERNATIVE 63: 1/24/2024          ALTERNATIVE 64: 1/24/2024          ALTERNATIVE 65: 1/24/2024          ALTERNATIVE 66: 1/24/2024          ALTERNATIVE 67: 1/24/2024          ALTERNATIVE 68: 1/24/2024          ALTERNATIVE 69: 1/24/2024          ALTERNATIVE 70: 1/24/2024          ALTERNATIVE 71: 1/24/2024          ALTERNATIVE 72: 1/24/2024          ALTERNATIVE 73: 1/24/2024          ALTERNATIVE 74: 1/24/2024          ALTERNATIVE 75: 1/24/2024          ALTERNATIVE 76: 1/24/2024          ALTERNATIVE 77: 1/24/2024          ALTERNATIVE 78: 1/24/2024          ALTERNATIVE 79: 1/24/2024          ALTERNATIVE 80: 1/24/2024          ALTERNATIVE 81: 1/24/2024          ALTERNATIVE 82: 1/24/2024          ALTERNATIVE 83: 1/24/2024          ALTERNATIVE 84: 1/24/2024          ALTERNATIVE 85: 1/24/2024          ALTERNATIVE 86: 1/24/2024          ALTERNATIVE 87: 1/24/2024          ALTERNATIVE 88: 1/24/2024          ALTERNATIVE 89: 1/24/2024          ALTERNATIVE 90: 1/24/2024          ALTERNATIVE 91: 1/24/2024          ALTERNATIVE 92: 1/24/2024          ALTERNATIVE 93: 1/24/2024          ALTERNATIVE 94: 1/24/2024          ALTERNATIVE 95: 1/24/2024          ALTERNATIVE 96: 1/24/2024          ALTERNATIVE 97: 1/24/2024          ALTERNATIVE 98: 1/24/2024          ALTERNATIVE 99: 1/24/2024          ALTERNATIVE 100: 1/24/2024</small>	<small>DATE OF DECLASSIFICATION IS INDEFINITE. AUTHORITY: 50 CFR 172.162-2.446. E-Mail: <a href="mailto:office@rbsdesigngroup.com">office@rbsdesigngroup.com</a></small>

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HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 2 - AREA B



TAGGED NOTES



MECHANICAL DEMOLITION PLAN - PHASE 2 -  
 AREA D  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

**RBS DESIGN GROUP**  
 ARCHITECTURE

2230 West 12th Street, Suite 100  
 Denver, CO 80202  
 Phone: (303) 733-1234  
 Fax: (303) 733-1235  
 Email: office@rbsdesigngroup.com

No.	Description	Date	Job Number	Year	Drawn By	Checked By	Date
1			202111A	2021	XHER23	DRH	
						HCH	2/12/2024

NOT FOR CONSTRUCTION

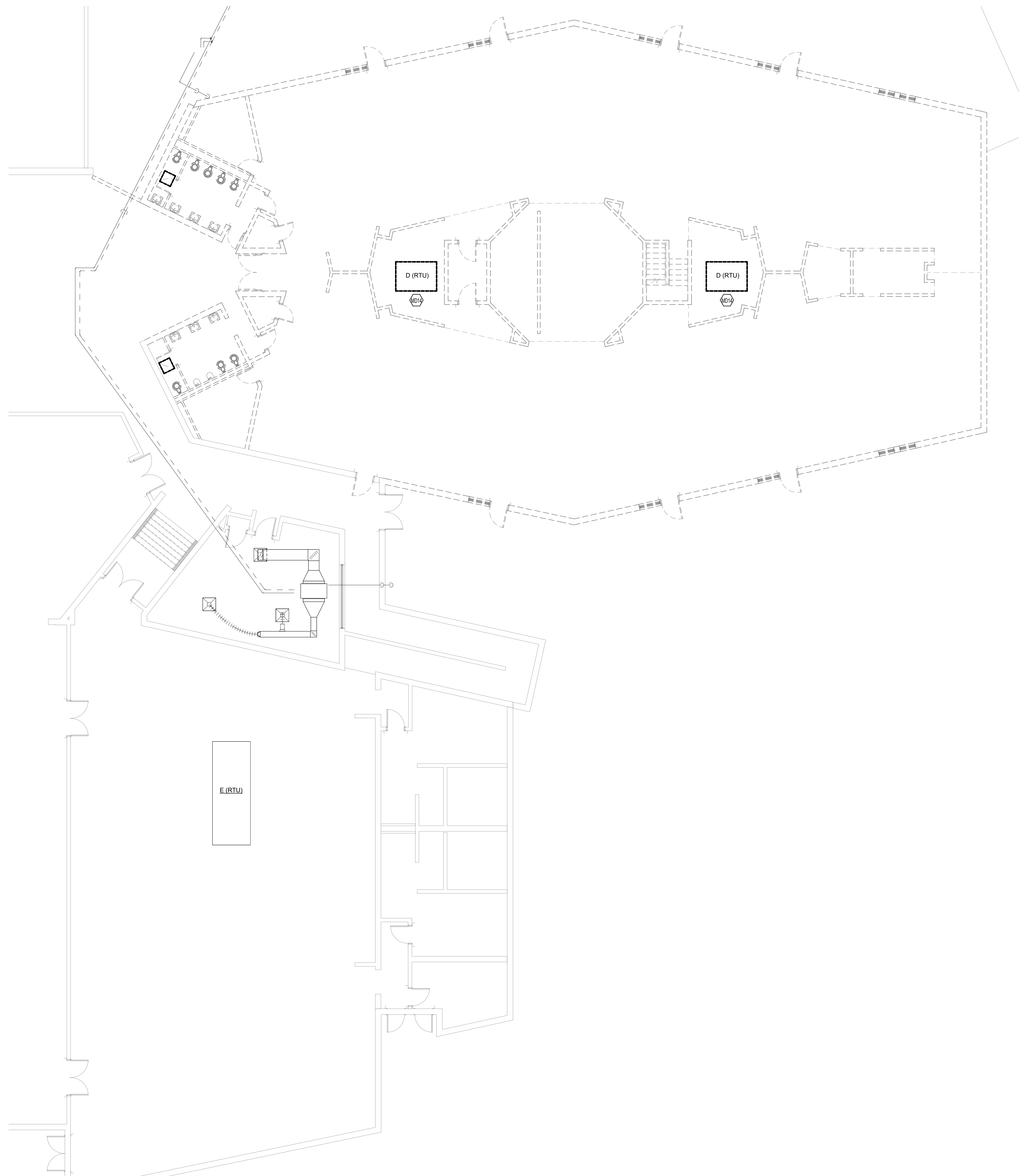
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 2 - AREA D

SHEET NUMBER  
**M2.23**

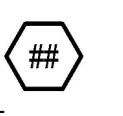




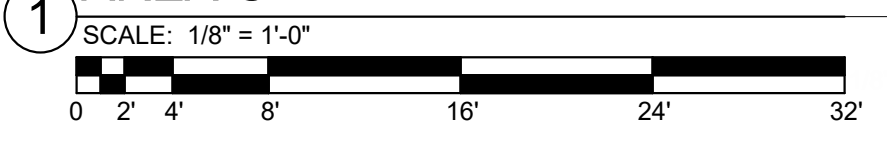




**TAGGED NOTES**  
 MD14 ROOFTOP UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ROOF CURB, ETC. TO BE DEMOLISHED COMPLETELY.



**MECHANICAL DEMOLITION PLAN - PHASE 4 - AREA C**



**RBS DESIGN GROUP**  
 ARCHITECTURE

2330 W. 10th Street, Suite 100, Boise, ID 83725  
 Phone: (208) 333-1234 Fax: (208) 333-1234  
 Email: office@rbsdesigngroup.com

No.	Description	Date	Job Number	Year	Drawn By	Checked By	Date

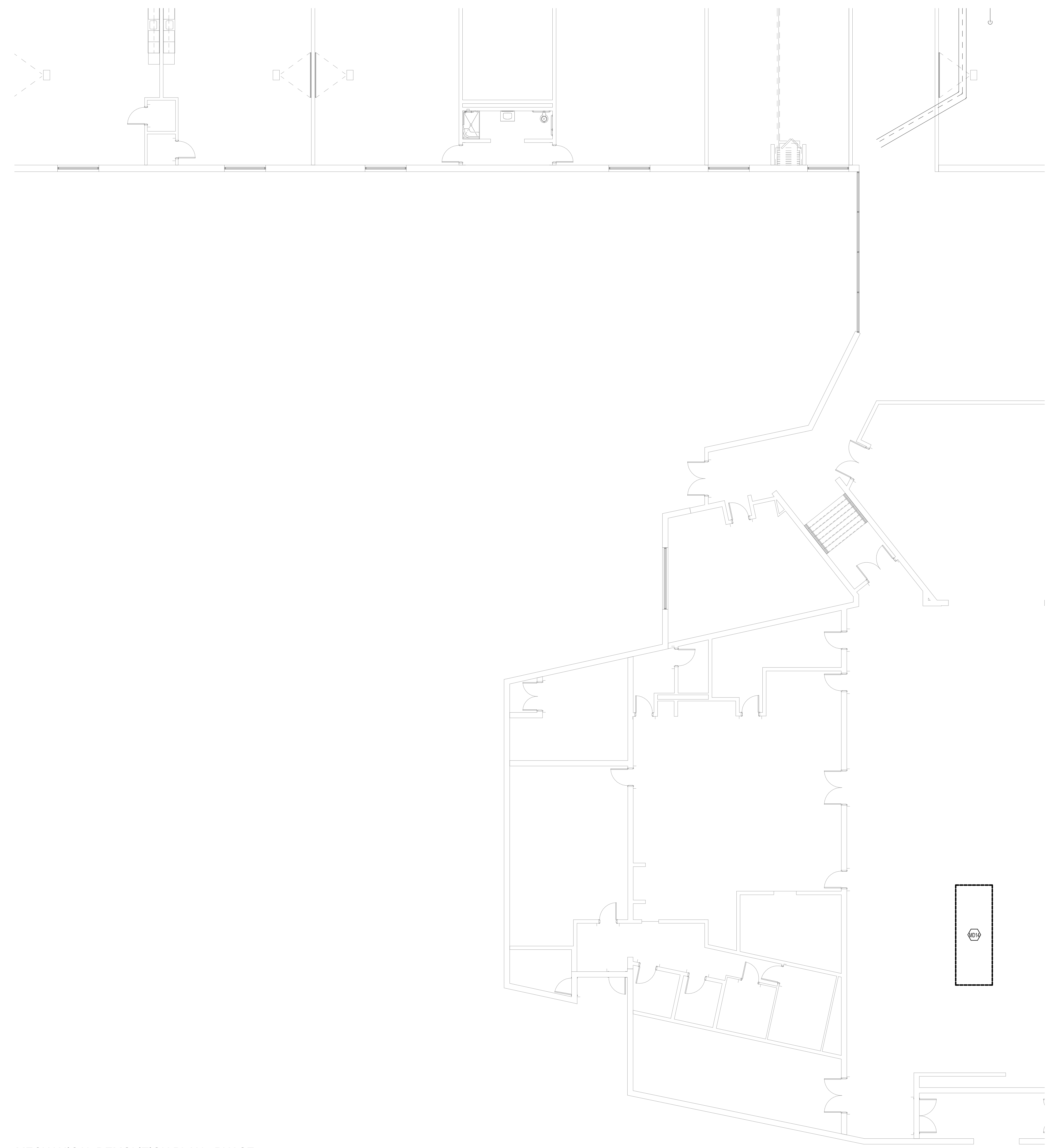
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 4 - AREA C

SHEET NUMBER  
**M2.42**



**TAGGED NOTES**  
 MD14 ROOFTOP UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ROOF CURB, ETC. TO BE DEMOLISHED COMPLETELY.



MECHANICAL DEMOLITION PLAN - PHASE 5 -  
 AREA B  
 1 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'



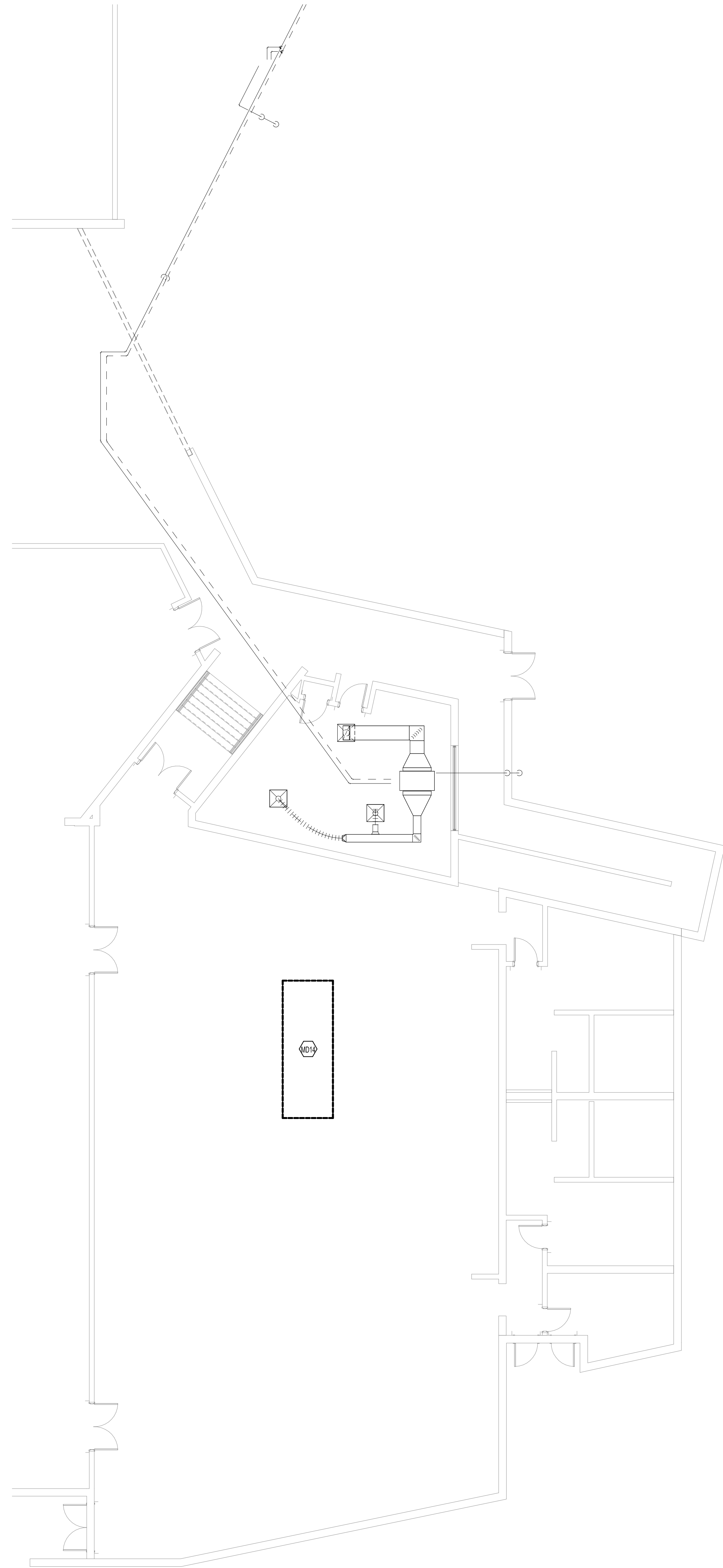
<b>ALUMINUM</b>		<b>JOB NUMBER</b>		<b>DATE</b>	
RBS DESIGN GROUP ARCHITECTURE 1200 BAYVIEW AVENUE, SUITE 200 ANN ARBOR, MI 48106-1500 PHONE: 734.769.1200 FAX: 734.769.1201 WWW.RBSDESIGNGROUP.COM		Y2011A1 XHER23		2/12/2024	
<b>MECHANICAL</b>		<b>DRAWN BY</b>		<b>DATE</b>	
RBS DESIGN GROUP ARCHITECTURE 1200 BAYVIEW AVENUE, SUITE 200 ANN ARBOR, MI 48106-1500 PHONE: 734.769.1200 FAX: 734.769.1201 WWW.RBSDESIGNGROUP.COM		DRI		2/12/2024	
<b>NO. / DESCRIPTION</b>		<b>CHECKED BY</b>		<b>DATE</b>	
		HCH		2/12/2024	

NOT FOR CONSTRUCTION

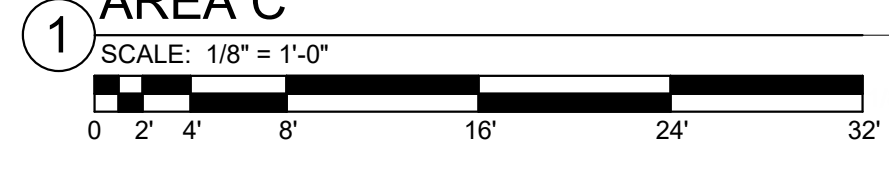
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 5 - AREA B

SHEET NUMBER  
**M2.51**





MECHANICAL DEMOLITION PLAN - PHASE 5 -  
AREA C



**TAGGED NOTES**  
 MD14 ROOFTOP UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, ROOF CURB, ETC. TO BE DEMOLISHED COMPLETELY.



**RBS DESIGN GROUP**  
 ARCHITECTURE

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 Portland, Oregon 97205  
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<b>ALUMINUM</b>	<b>JOB NUMBER</b>	Y2011A
	<b>DRAWN BY</b>	XHER23
	<b>CHECKED BY</b>	HCN
	<b>DATE</b>	2/12/2024

NOT FOR CONSTRUCTION

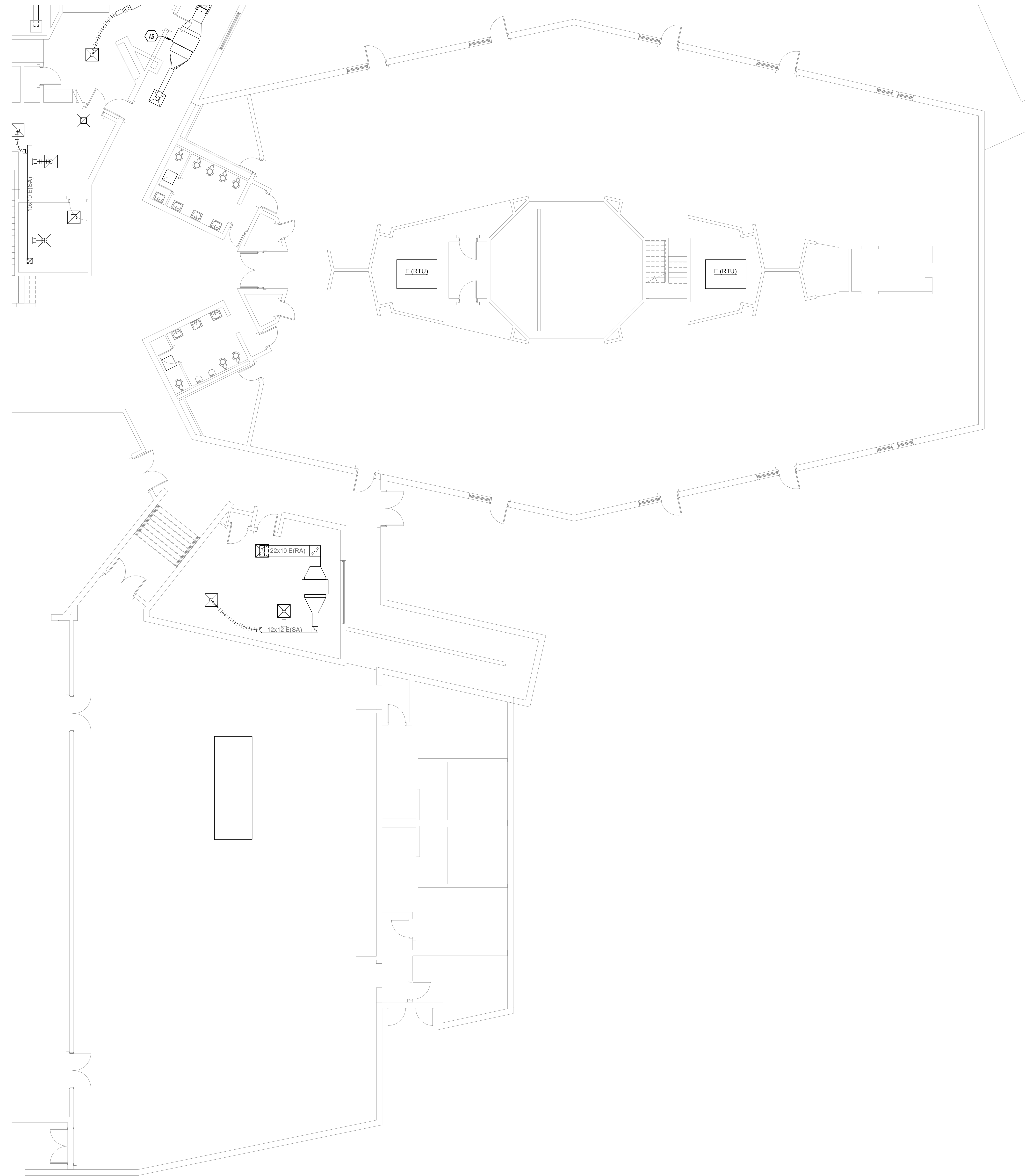
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL DEMOLITION PLAN - PHASE 5 - AREA C

SHEET NUMBER  
**M2.52**

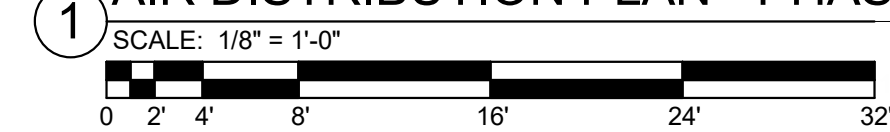








1 AIR DISTRIBUTION PLAN - PHASE 1 - AREA C



**GENERAL HVAC DESIGN NOTES:**

- A. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL MANUAL BALANCING DAMPERS IN THE DUCTWORK PER RUNDOUT DETAIL FOR ALL GRILLES, REGISTERS, AND DIFFUSERS WHICH LIST A CFM. IN ALL CASES DAMPERS ARE TO BE INSTALLED IN AN ACCESSIBLE LOCATION.
- B. ELECTRICAL PANELS SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS. NO DUCT OR PIPING SHALL BE ROUTED OVER ELECTRICAL PANELS.
- C. PRIOR TO BALANCING, BALANCE CONTRACTOR SHALL HAVE A PRE-BALANCE MEETING ON-SITE WITH ENGINEER TO REVIEW BALANCING PROCEDURE FOR SYSTEM.
- D. REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRESTOPPING ACCORDINGLY.

**TAGGED NOTES**

- A5 EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, PIPING, ETC. TO REMAIN.



<b>ALUMINUM LATHING</b> PROVIDE ALUMINUM LATHING TO ALL EXISTING CONCRETE SURFACES TO BE FINISHED WITH GYPSUM BOARD OR PLASTER.	
<b>WOOD JOIST BRACING</b> PROVIDE WOOD JOIST BRACING TO ALL EXISTING WOOD JOIST ROOF STRUCTURE.	
<b>JOB NUMBER</b> V201144 X18283	<b>DATE</b> 08/11/2024
<b>DRAWN BY</b> DPH	<b>CHECKED BY</b> HCN
<b>DATE</b> 8/11/2024	<b>DATE</b> 8/11/2024

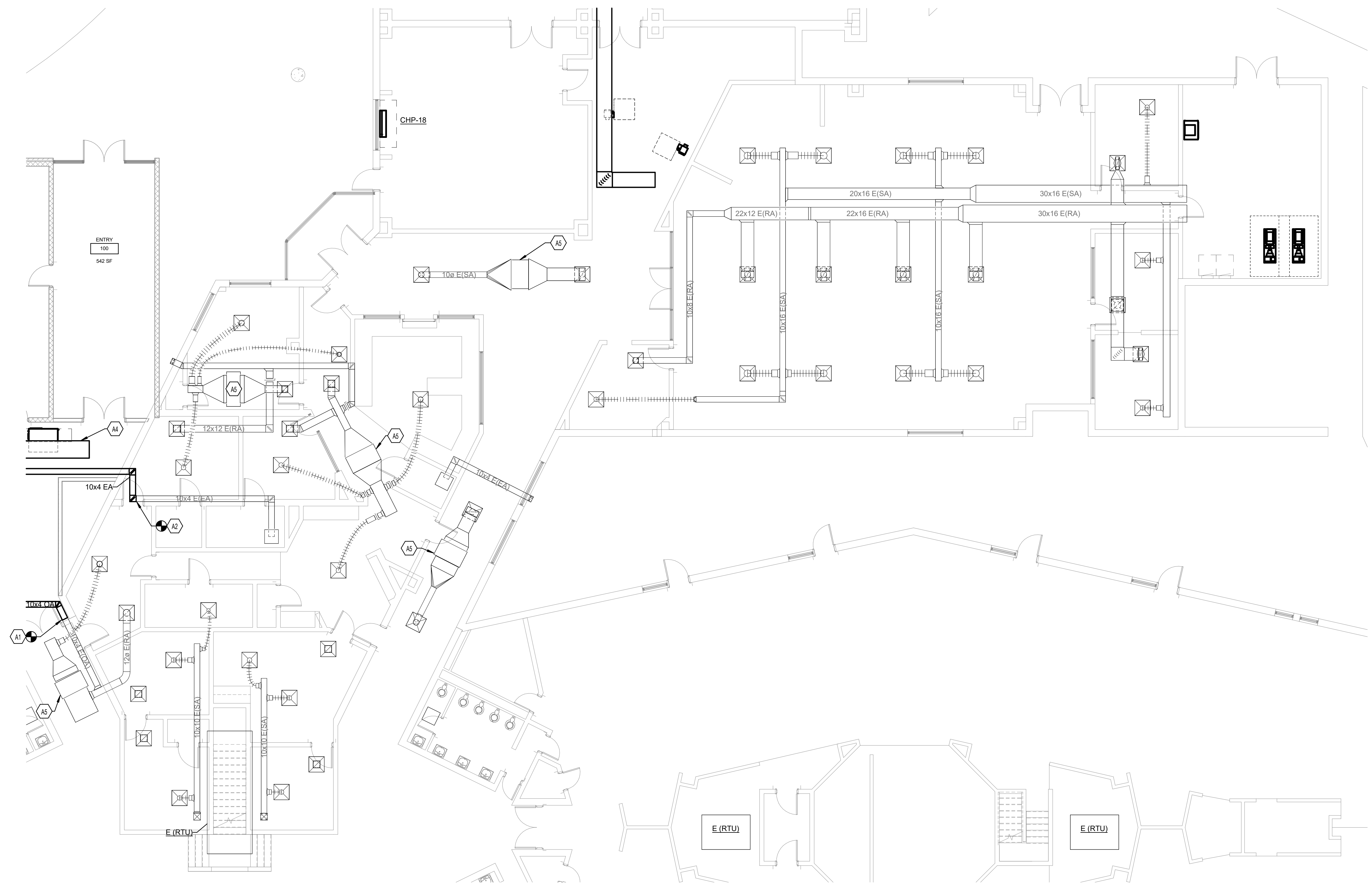
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 1 - AREA C

SHEET NUMBER

M3.12





1 AIR DISTRIBUTION PLAN - PHASE 1 - AREA D  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

- GENERAL HVAC DESIGN NOTES:**
- IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL MANUAL BALANCING DAMPERS IN THE DUCTWORK PER RUNOUT DETAIL FOR ALL GRILLES, REGISTERS, AND DIFFUSERS WHICH LIST A CFM. IN ALL CASES DAMPERS ARE TO BE INSTALLED IN AN ACCESSIBLE LOCATION.
  - ELECTRICAL PANELS SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS. NO DUCT OR PIPING SHALL BE ROUTED OVER ELECTRICAL PANELS.
  - PRIOR TO BALANCING, BALANCE CONTRACTOR SHALL HAVE A PRE-BALANCE MEETING ON-SITE WITH ENGINEER TO REVIEW BALANCING PROCEDURE FOR SYSTEM.
  - REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRESTOPPING ACCORDINGLY.

- TAGGED NOTES** #
- OUTSIDE AIR DUCT TO BE RECONNECTED AT POINT INDICATED. PROVIDE SOFFIT GRILLE AT WALL PENETRATION. WALL PENETRATION TO BE SEALED AIR TIGHT.
  - EXHAUST AIR DUCT TO BE RECONNECTED AT POINT INDICATED. PROVIDE SOFFIT GRILLE AT WALL PENETRATION. WALL PENETRATION TO BE SEALED AIR TIGHT.
  - CAP AND SEAL OUTSIDE AIR DUCT FOR FUTURE EXPANSION.
  - EXISTING FAN COIL UNIT, ASSOCIATED DUCTWORK, DIFFUSERS, PIPING, ETC. TO REMAIN.

No.	Description	Date	Job Number	Year	Sheet
1			2024114	14	XHER23
					DRN
					HCH
					DATE
					2/12/2024

NOT FOR CONSTRUCTION

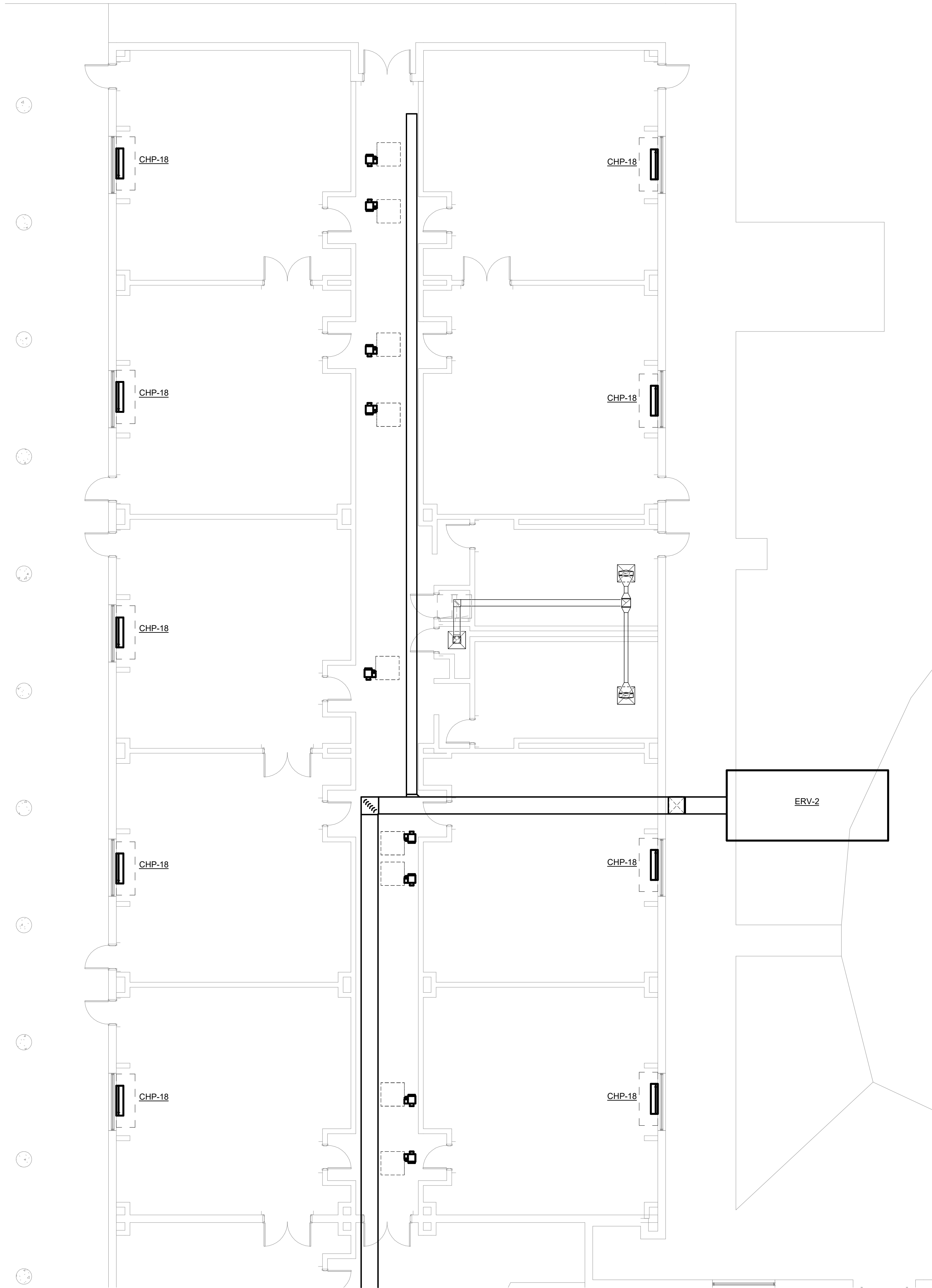
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 1 - AREA D

SHEET NUMBER

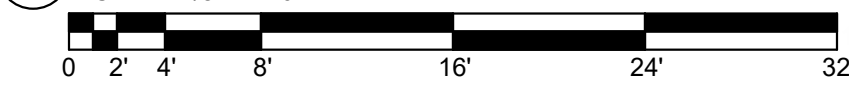
M3.13



TAGGED NOTES



1 AIR DISTRIBUTION PLAN - PHASE 1 - AREA E  
 SCALE: 1/8" = 1'-0"

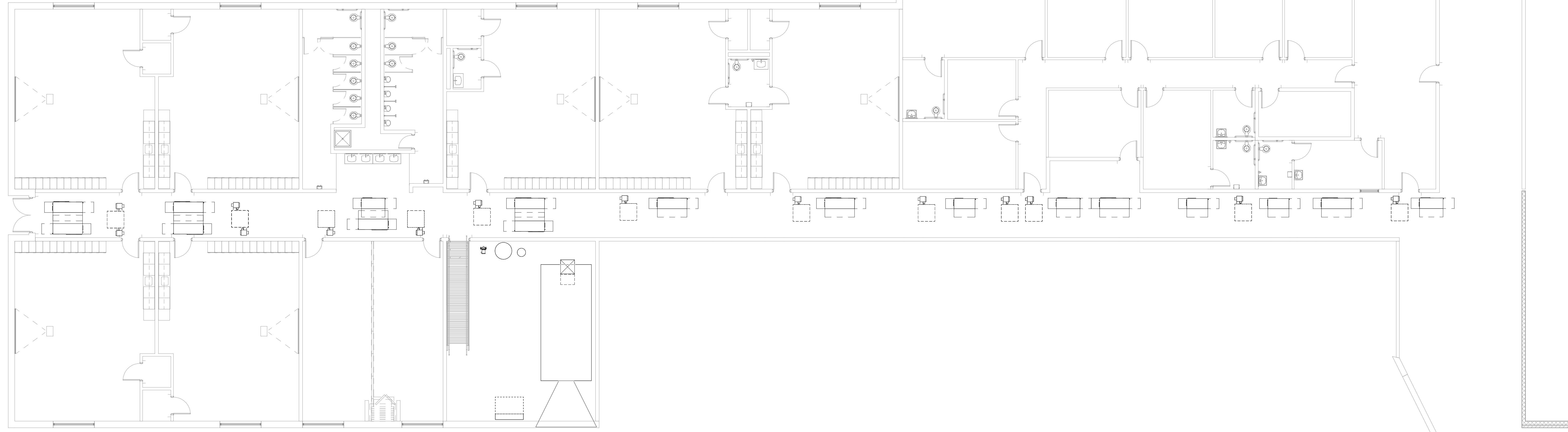


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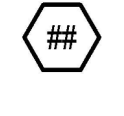
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 1 - AREA E





TAGGED NOTES



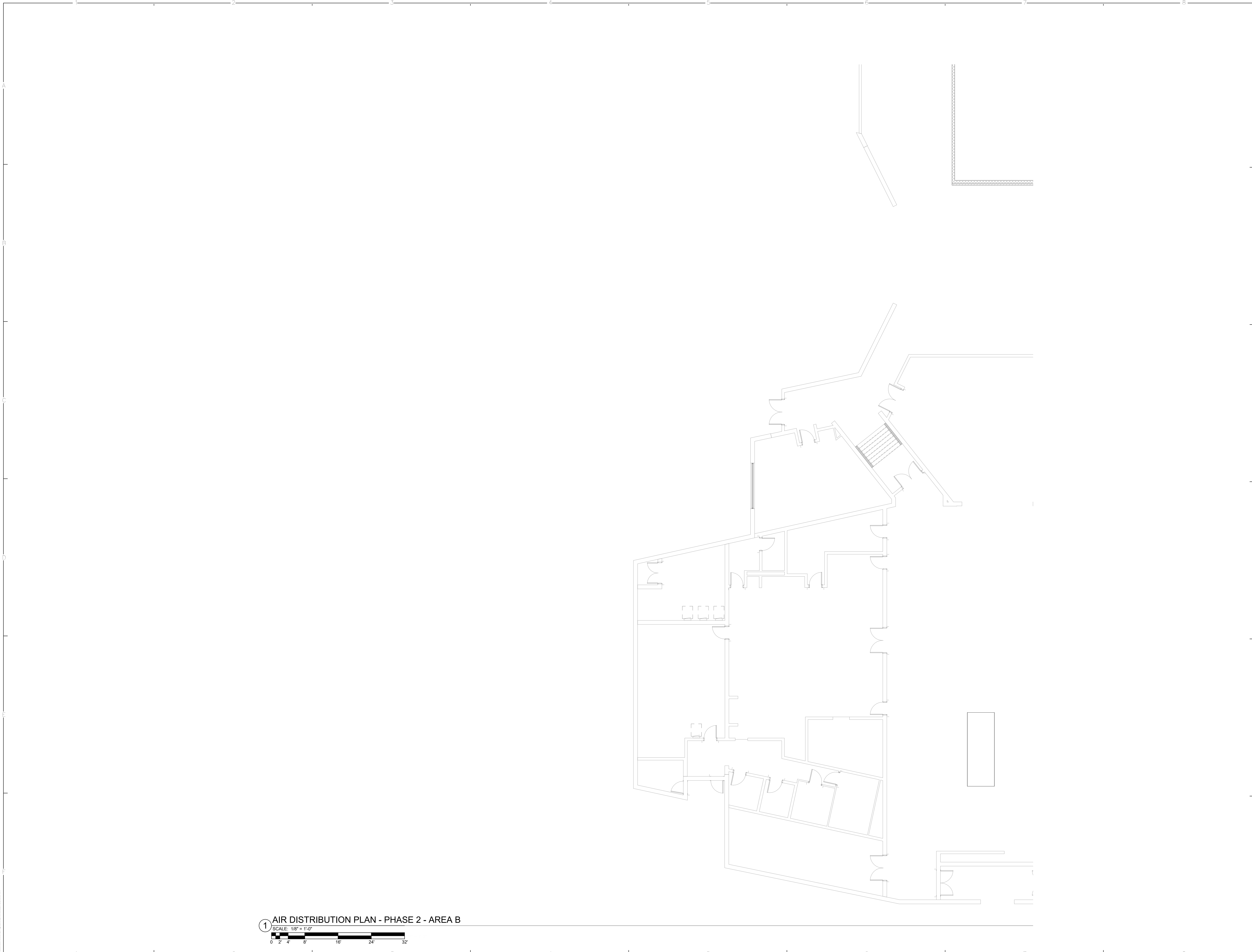
1 AIR DISTRIBUTION PLAN - PHASE 2 - AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

No.	Description	Date	Job Number	Drawn By	Checked By	Scale	Date
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NOT FOR CONSTRUCTION

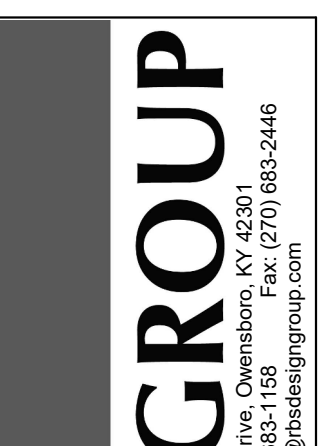
HENDERSON COUNTY SCHOOLS  
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 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 2 - AREA A



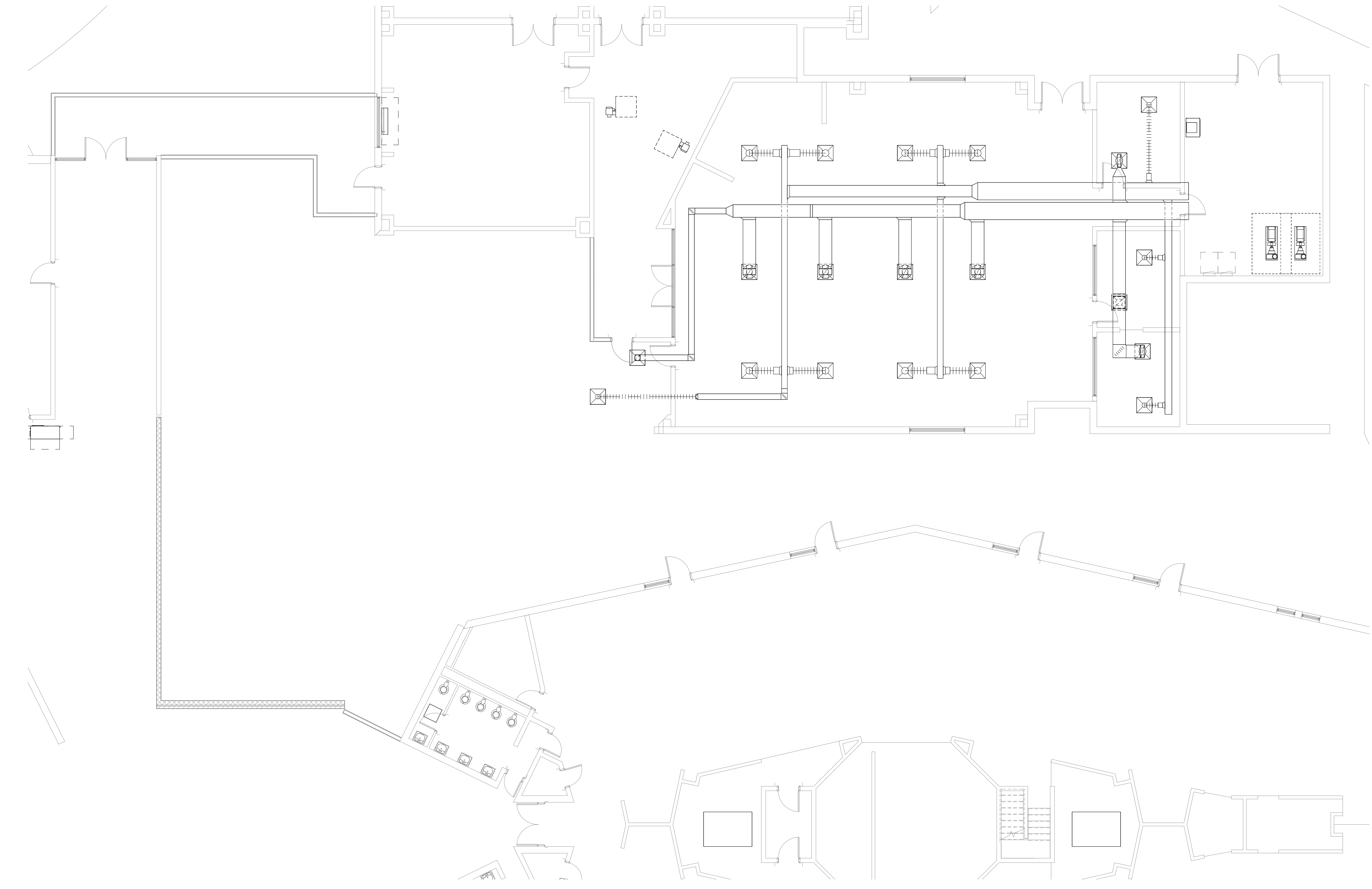


1 AIR DISTRIBUTION PLAN - PHASE 2 - AREA B  
 SCALE: 1/8" = 1'-0"



 <b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           2330 West 10th Street, Suite 100            Denver, Colorado 80202            Phone: (303) 733-1234            Fax: (303) 733-1235            Email: office@rbsdesigngroup.com         </small>	
<small>           ALL INFORMATION CONTAINED            HEREIN IS THE PROPERTY OF            RBS DESIGN GROUP, INC. AND            IS TO BE USED ONLY FOR THE            PROJECT AND SITE SPECIFICALLY            IDENTIFIED HEREON. NO PART            OF THIS DOCUMENT IS TO BE            REPRODUCED OR TRANSMITTED            IN ANY FORM OR BY ANY            MEANS, ELECTRONIC OR            MECHANICAL, INCLUDING            PHOTOCOPYING, RECORDING,            OR BY ANY INFORMATION            STORAGE AND RETRIEVAL            SYSTEM, WITHOUT THE            WRITTEN PERMISSION OF            RBS DESIGN GROUP, INC.         </small>	<small>           PROJECT NUMBER: 2021114            XHER23            DRAWN BY: DPH            CHECKED BY: HCN            DATE: 2/12/2024         </small>
<small>           No.   Description   Date         </small>	<small>           NOT FOR            CONSTRUCTION         </small>
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION <b>FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 2 - AREA B</b>	
SHEET NUMBER <b>M3.21</b>	





1 AIR DISTRIBUTION PLAN - PHASE 2 - AREA D  
 SCALE: 1/8" = 1'-0"  
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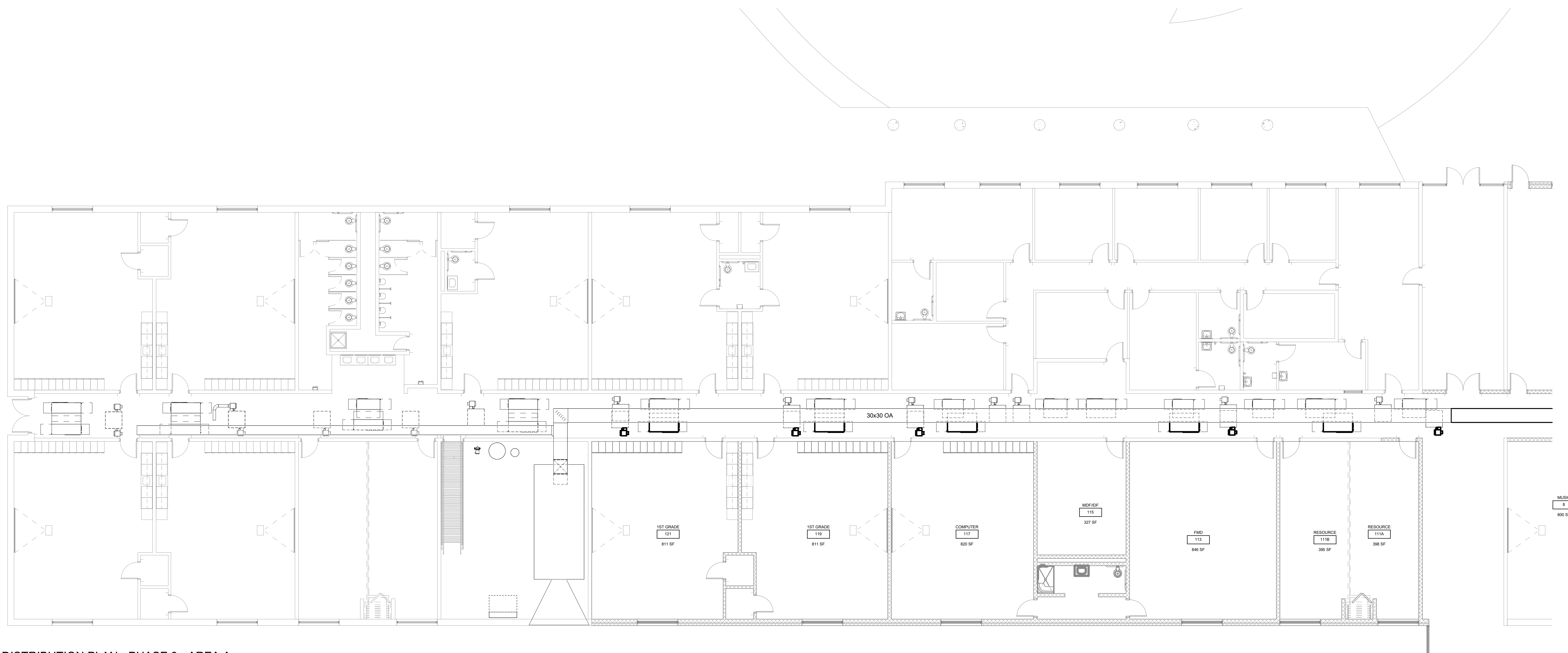
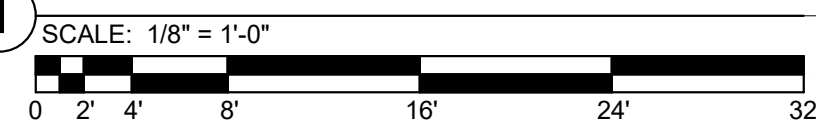
No.	Description	Date	Job Number	Drawn By	Checked By	Date
			YS2114A XHER23	DRH	HCH	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 2 - AREA D



1 AIR DISTRIBUTION PLAN - PHASE 3 - AREA A



No.	Description	Date	Job Number	Drawn By	Checked By	Date
			2021144	XHER23	DNH	2/12/2024
					HCH	

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 3 - AREA A

SHEET NUMBER

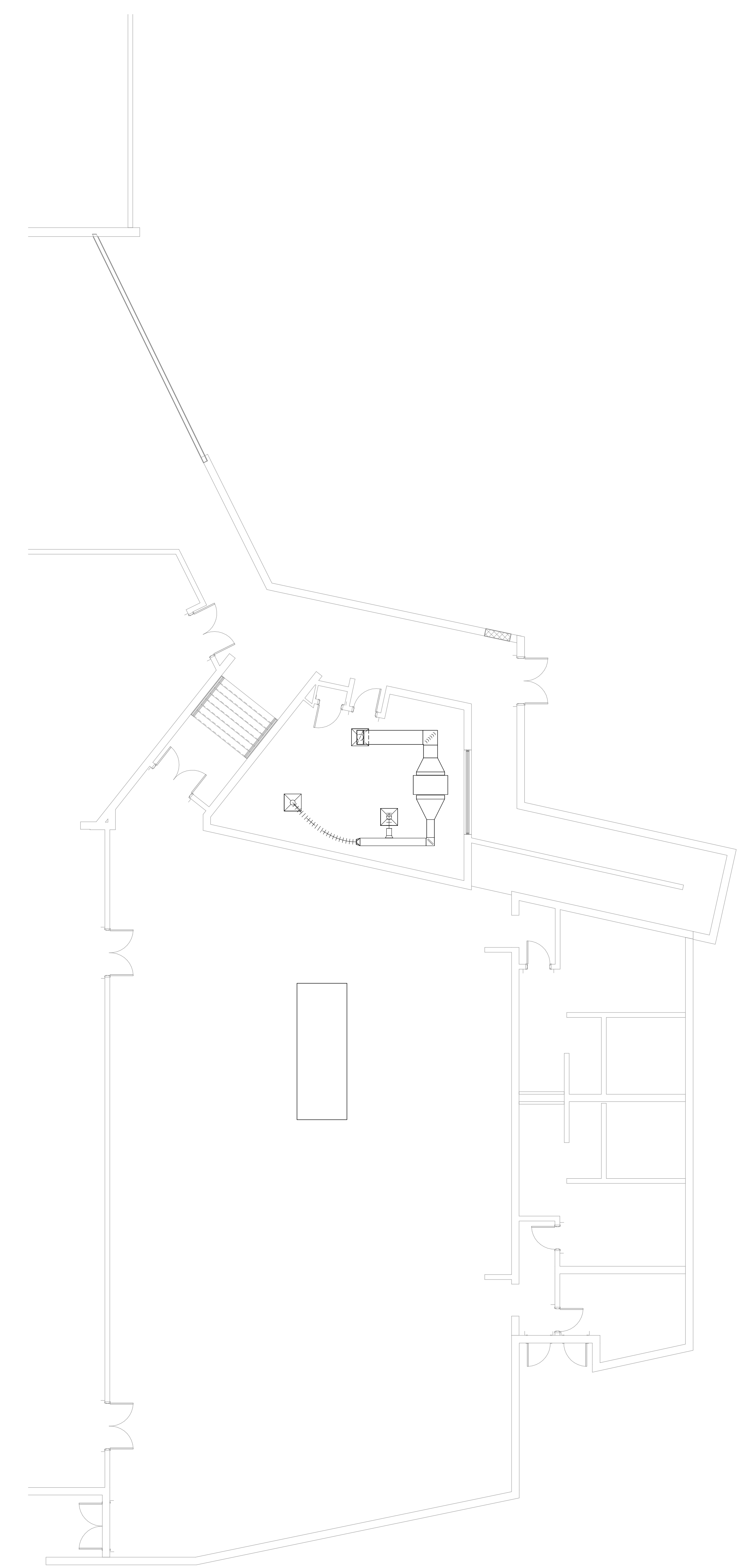
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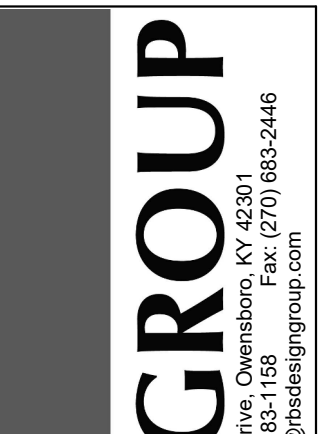




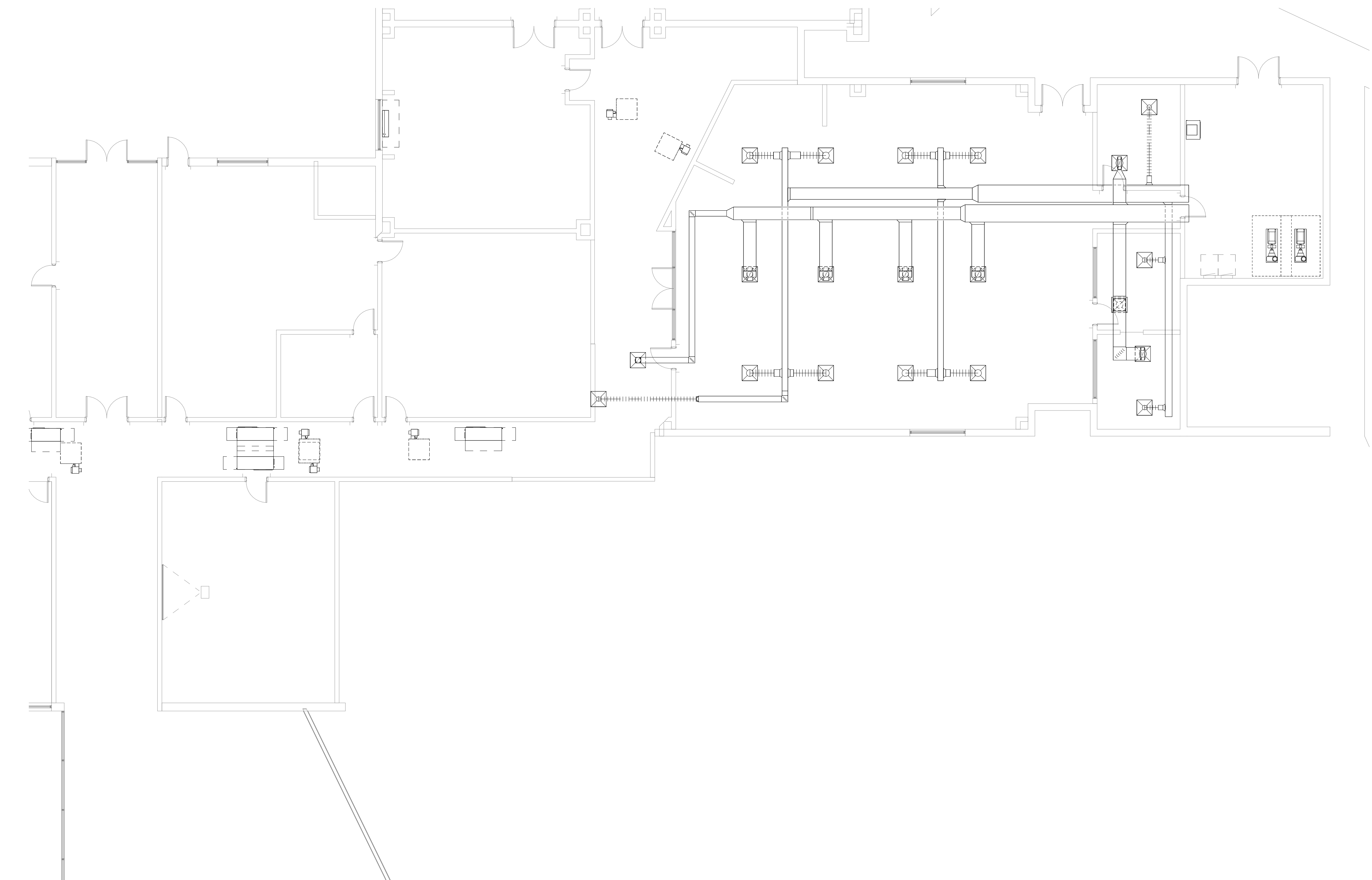




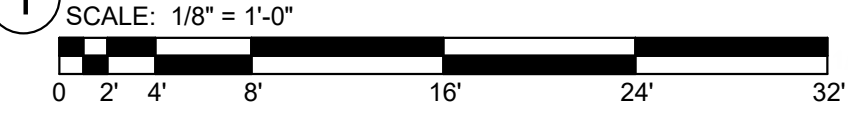
1 AIR DISTRIBUTION PLAN - PHASE 4 - AREA C  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

 <b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           10000 RIVERSIDE DRIVE, SUITE 100            GREENSBORO, NC 27409            TEL: 336.733.1234            FAX: 336.733.1235            WWW.RBSDESIGNGROUP.COM            EMAIL: OFFICE@RBSDESIGNGROUP.COM         </small>	
<small>           PROJECT NO.: 2024-001            PROJECT NAME: HENDERSON COUNTY SCHOOLS            EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION            EAST HEIGHTS ELEMENTARY RENOVATION            FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 4 - AREA C         </small>	<small>           JOB NUMBER: 2024114            XHER23            DRAWN BY: DPH            CHECKED BY: HCN            DATE: 2/12/2024         </small>
<small>           NOT FOR CONSTRUCTION         </small>	
<small>           SHEET NUMBER  <b>M3.42</b> </small>	





1 AIR DISTRIBUTION PLAN - PHASE 4 - AREA D  
 SCALE: 1/8" = 1'-0"

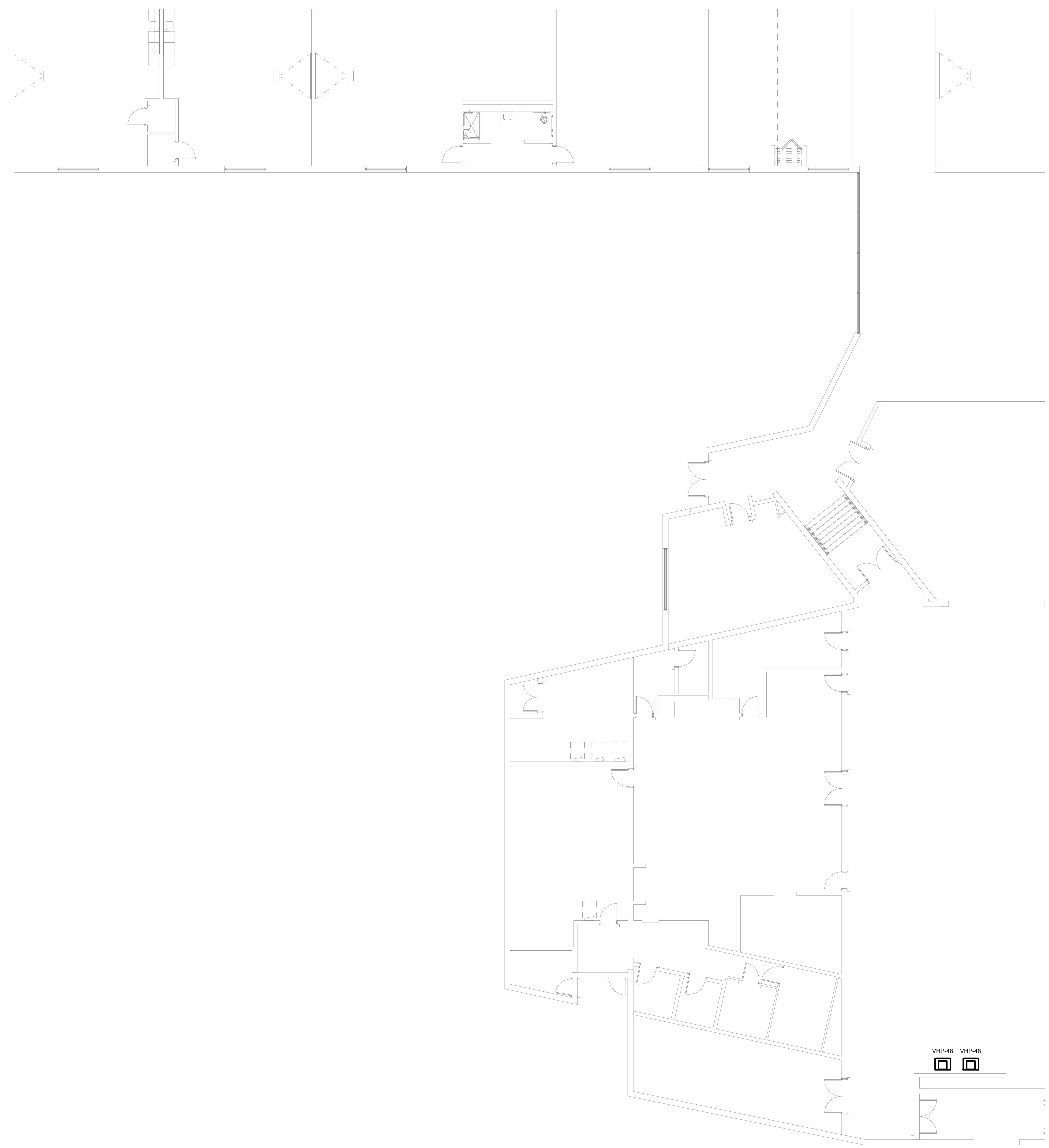
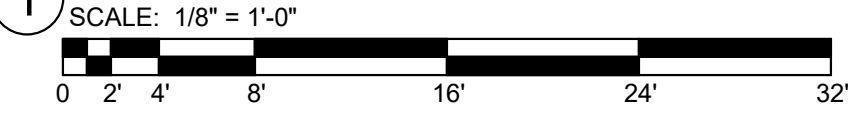


No.	Description	Date	Job Number	Drawn By	Checked By	Scale	Date
1			2024114	XHER23	DRH		2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 4 - AREA D

1 AIR DISTRIBUTION PLAN - PHASE 5 - AREA B  
 SCALE: 1/8" = 1'-0"

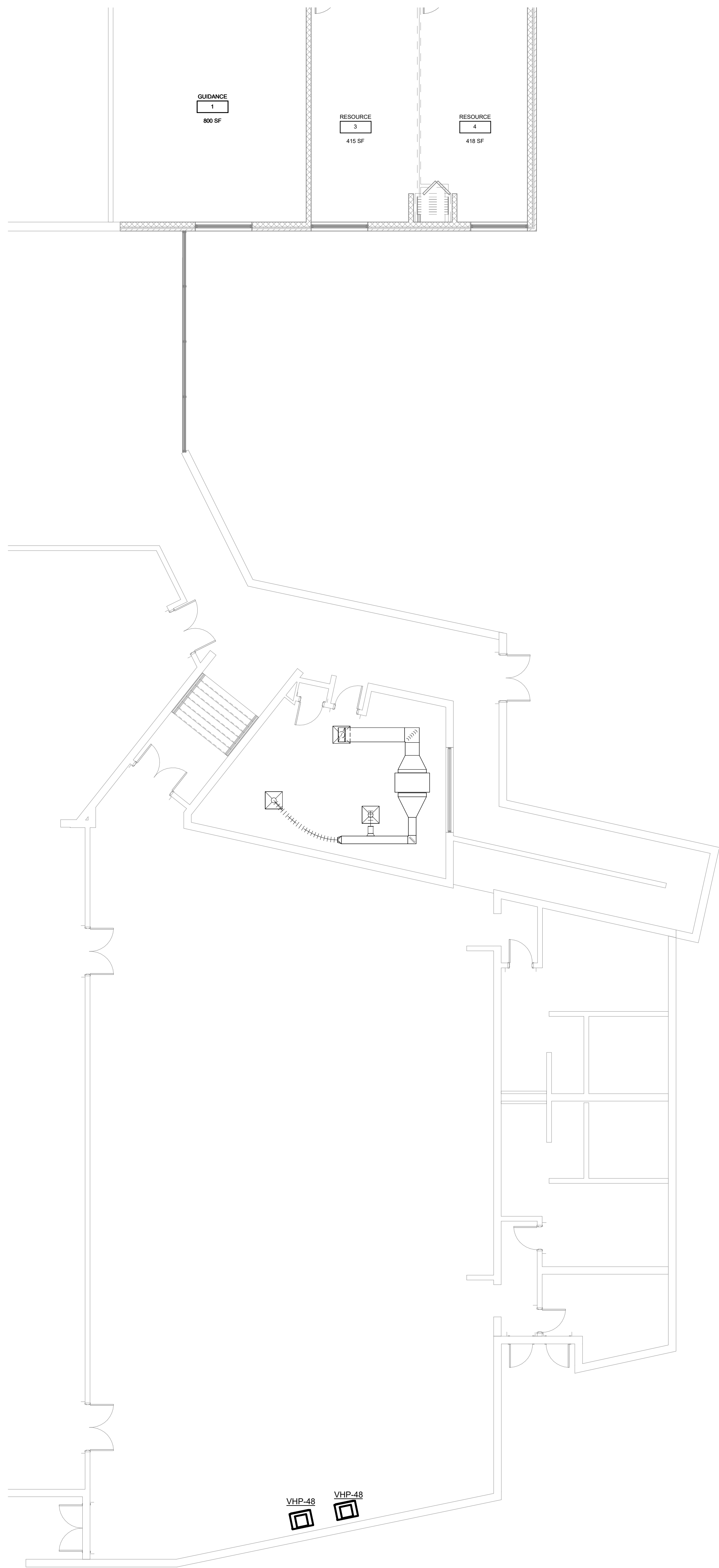


TAGGED NOTES

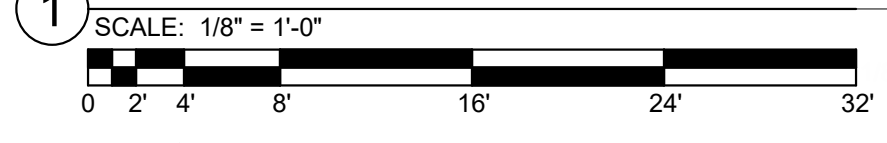


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No.   Description   Date	JOB NUMBER   Y2011A   XHER23 DRAWN BY   DPH CHECKED BY   HCN DATE   2/12/2024
NOT FOR CONSTRUCTION	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION <b>FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 5 - AREA B</b>	
SHEET NUMBER	
<b>M3.51</b>	





1 AIR DISTRIBUTION PLAN - PHASE 5 - AREA C



**GENERAL HVAC DESIGN NOTES:**

- A. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL MANUAL BALANCING DAMPERS IN THE DUCTWORK PER RUNOUT DETAIL FOR ALL GRILLES, REGISTERS, AND DIFFUSERS WHICH LIST A CFM. IN ALL CASES DAMPERS ARE TO BE INSTALLED IN AN ACCESSIBLE LOCATION.
- B. ELECTRICAL PANELS SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS. NO DUCT OR PIPING SHALL BE ROUTED OVER ELECTRICAL PANELS.
- C. PRIOR TO BALANCING, BALANCE CONTRACTOR SHALL HAVE A PRE-BALANCE MEETING ON-SITE WITH ENGINEER TO REVIEW BALANCING PROCEDURE FOR SYSTEM.
- D. REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRESTOPPING ACCORDINGLY.

**TAGGED NOTES**



**RBS DESIGN GROUP**  
ARCHITECTURE

**ALUMINUM MATERIALS**  
 100% RECYCLED ALUMINUM  
 ANODIZED FINISH  
 1/8\"/>

**ALUMINUM MATERIALS**  
 100% RECYCLED ALUMINUM  
 ANODIZED FINISH  
 1/8\"/>

**ALUMINUM MATERIALS**  
 100% RECYCLED ALUMINUM  
 ANODIZED FINISH  
 1/8\"/>

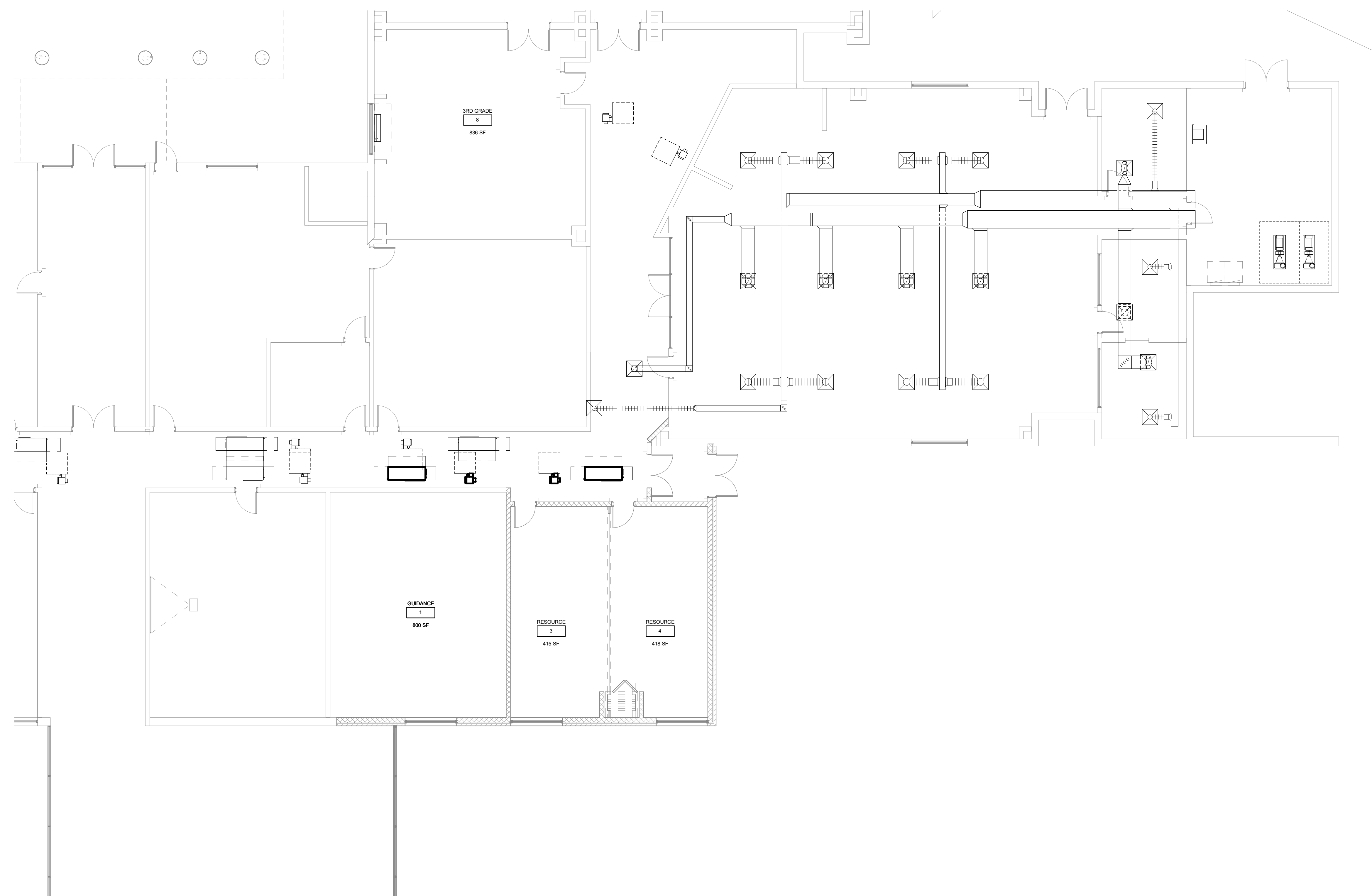
No.	Description	Date	Job Number	Drawn By	Checked By	Date
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					HCH	2/12/2024

NOT FOR CONSTRUCTION

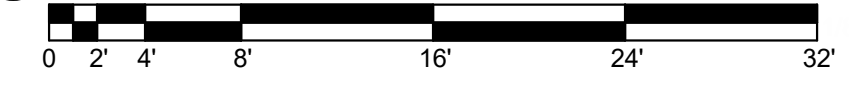
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 5 - AREA C

SHEET NUMBER

M3.52



1 AIR DISTRIBUTION PLAN - PHASE 5 - AREA D  
 SCALE: 1/8" = 1'-0"



- GENERAL HVAC DESIGN NOTES:**
- IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL MANUAL BALANCING DAMPERS IN THE DUCTWORK PER RUNOUT DETAIL FOR ALL GRILLES, REGISTERS, AND DIFFUSERS WHICH LIST A CFM. IN ALL CASES DAMPERS ARE TO BE INSTALLED IN AN ACCESSIBLE LOCATION.
  - ELECTRICAL PANELS SHOWN FOR REFERENCE ONLY. REFER TO ELECTRICAL DRAWINGS. NO DUCT OR PIPING SHALL BE ROUTED OVER ELECTRICAL PANELS.
  - PRIOR TO BALANCING, BALANCE CONTRACTOR SHALL HAVE A PRE-BALANCE MEETING ON-SITE WITH ENGINEER TO REVIEW BALANCING PROCEDURE FOR SYSTEM.
  - REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRESTOPPING ACCORDINGLY.

TAGGED NOTES



No.	Description	Date	Job Number	Year/Rev	Drawn By	Checked By	Date

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR AIR DISTRIBUTION PLAN - PHASE 5 - AREA D

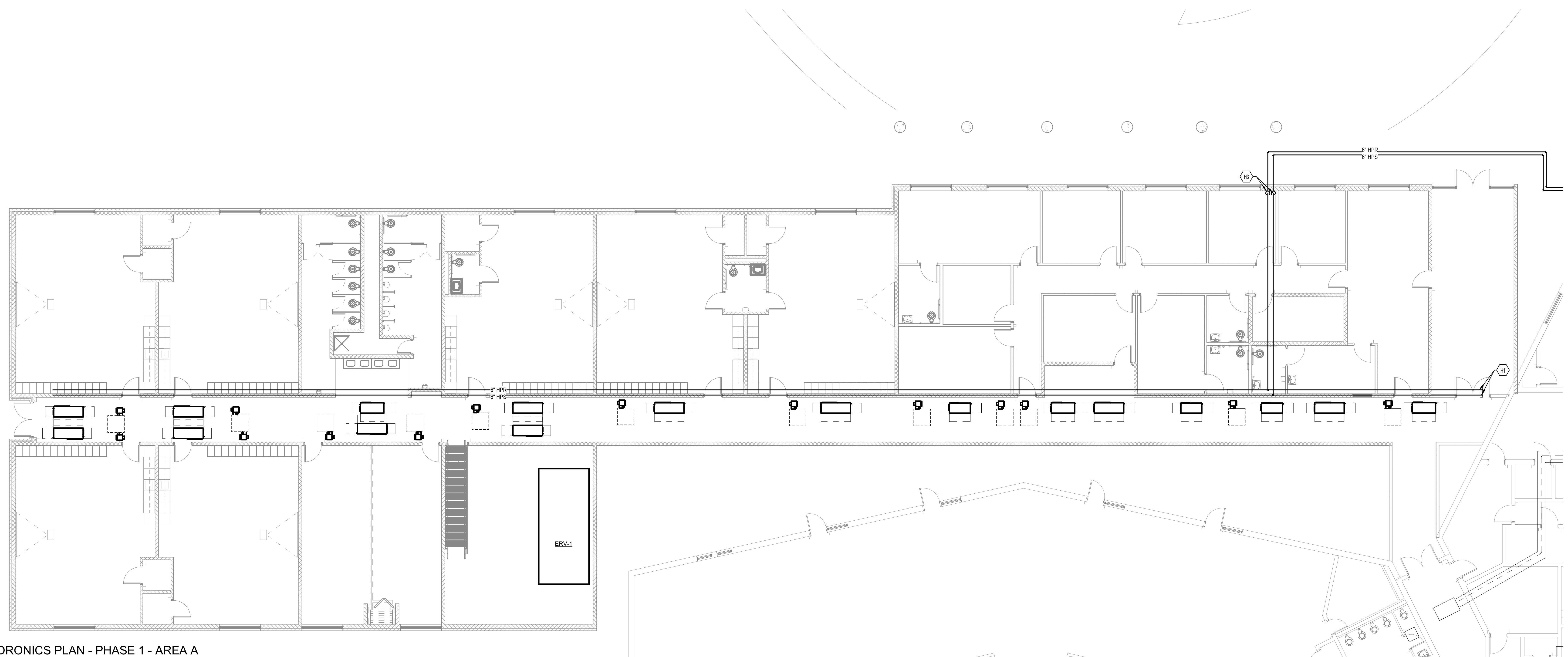
SHEET NUMBER

**M3.53**



- GENERAL HYDRONIC DESIGN NOTES:**
- A. REFER TO HPS/HPR RUNOUT SIZES ON EQUIPMENT SCHEDULE FOR CONDENSATE RUNOUT SIZES.
  - B. REFER TO HVAC CONTROLS SHEETS FOR ADDITIONAL INFORMATION ON THERMOSTATS AND CO2 SENSORS.
  - C. REFER TO TYPICAL VAL DEVICE MOUNTING DETAIL FOR ADDITIONAL INFORMATION REGARDING DEVICE MOUNTING.
  - D. COORDINATE ALL MECHANICAL EQUIPMENT AND HYDRONIC PIPING WITH STRUCTURAL DRAWINGS.
  - E. REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRE STOPPING ACCORDINGLY.

- TAGGED NOTES** #
- H1 CAP AND SEAL HEAT PUMP SUPPLY/RETURN PIPING FOR FUTURE EXPANSION
  - H3 HEAT PUMP SUPPLY/RETURN PIPING TO COME UP IN CHASE AT POINT INDICATED.

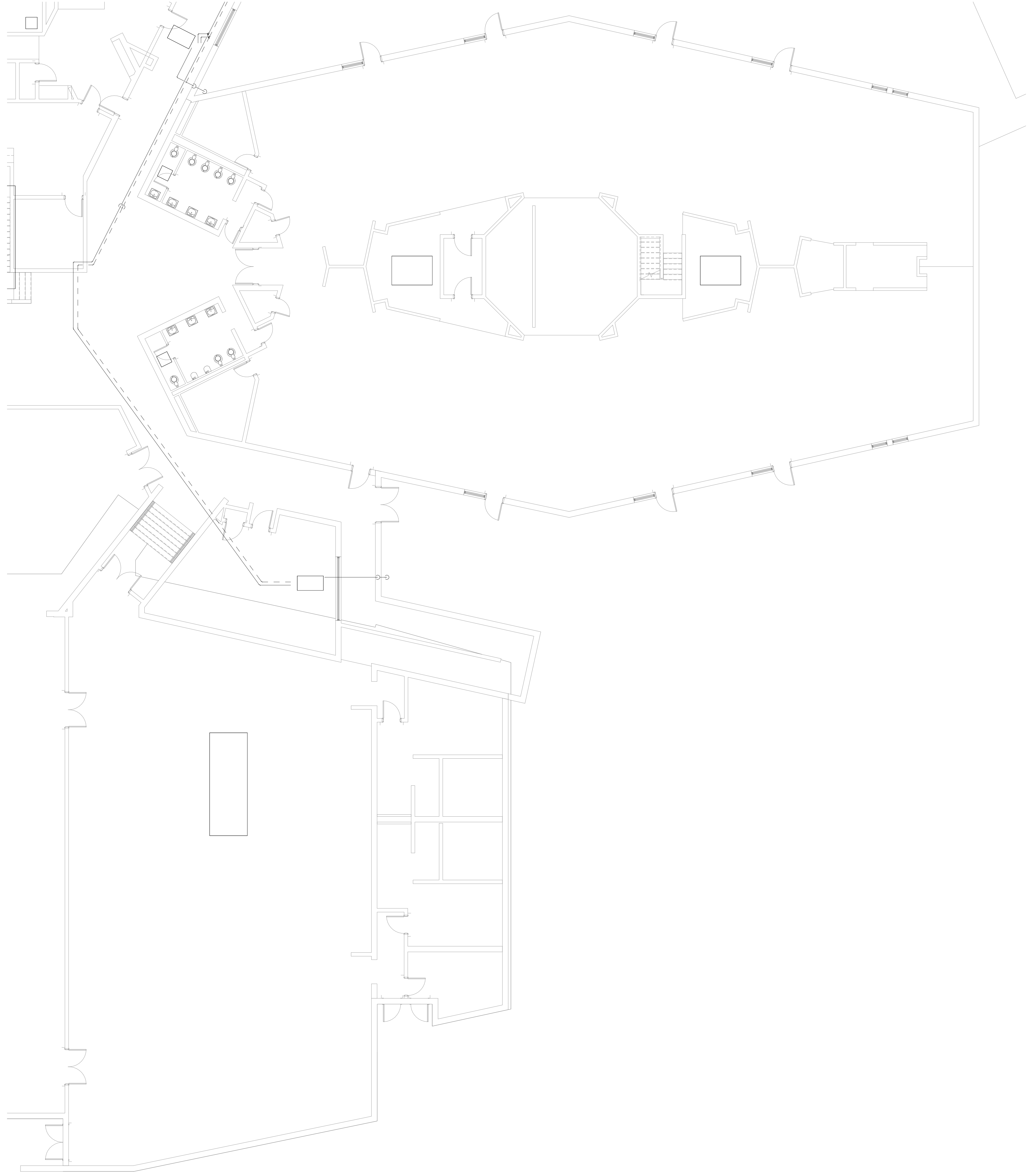


1 HYDRONICS PLAN - PHASE 1 - AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

ALUMINUM	2024	2/12/2024
DESIGNER	YVES HERRZ	DATE
DRAWN BY	DNH	DATE
CHECKED BY	HCH	DATE
DATE	2/12/2024	

NOT FOR CONSTRUCTION

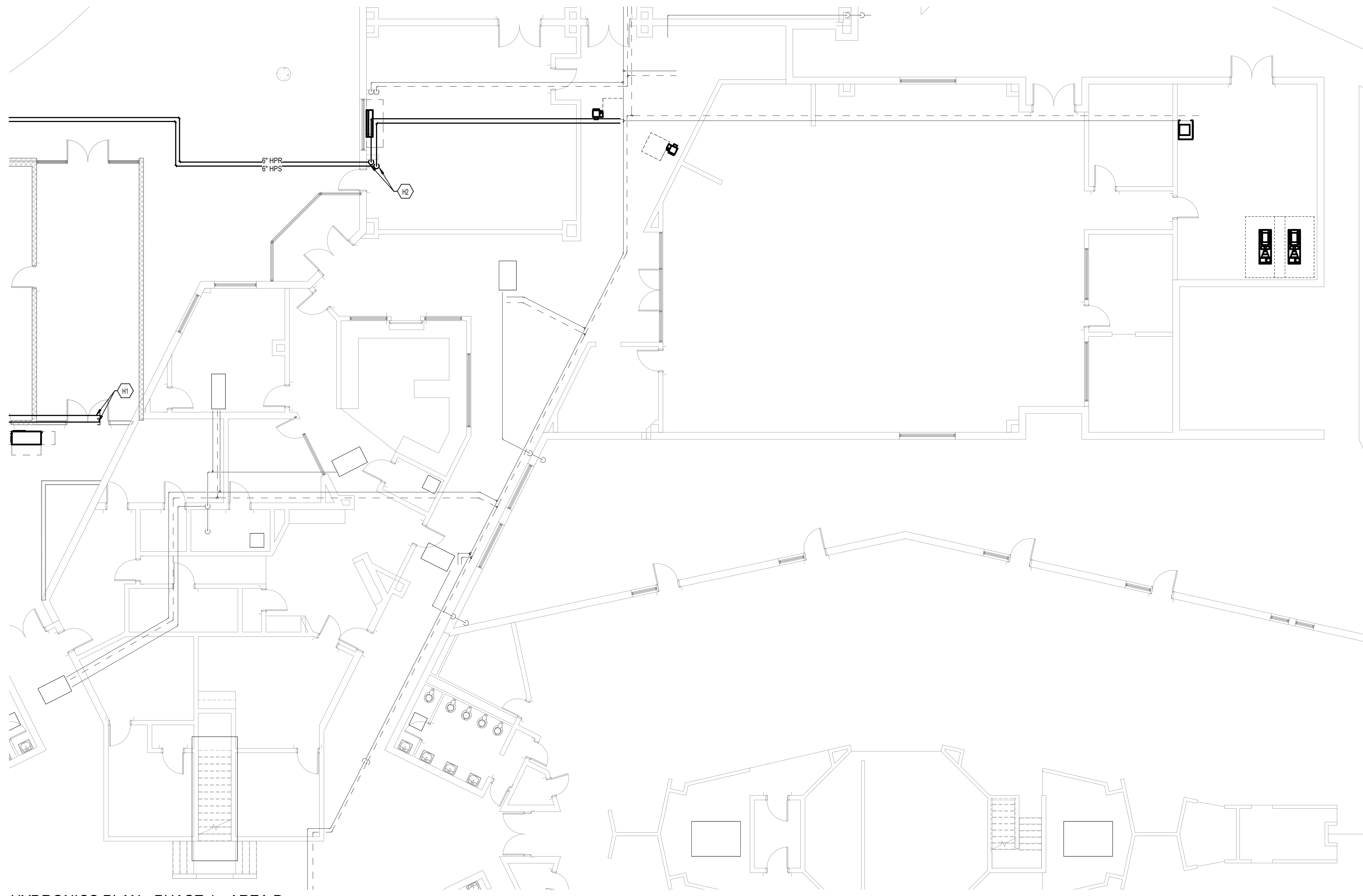
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 1 - AREA A



1 HYDRONICS PLAN - PHASE 1 - AREA C  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

		<b>RBS DESIGN GROUP</b> ARCHITECTURE <small>12345 Main Street, Suite 100, Raleigh, NC 27601          Phone: (703) 555-1234 Fax: (703) 555-5678          Email: office@rbsdesigngroup.com</small>	
No.   Description   Date	JOB NUMBER Y2011A1 XHER23	DRAWN BY DRH	CHECKED BY HCH
DATE	DATE	DATE	DATE
NOT FOR CONSTRUCTION		DATE: 2/12/2024	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION FIRST FLOOR HYDRONICS PLAN - PHASE 1 - AREA C			
SHEET NUMBER <b>M4.12</b>			



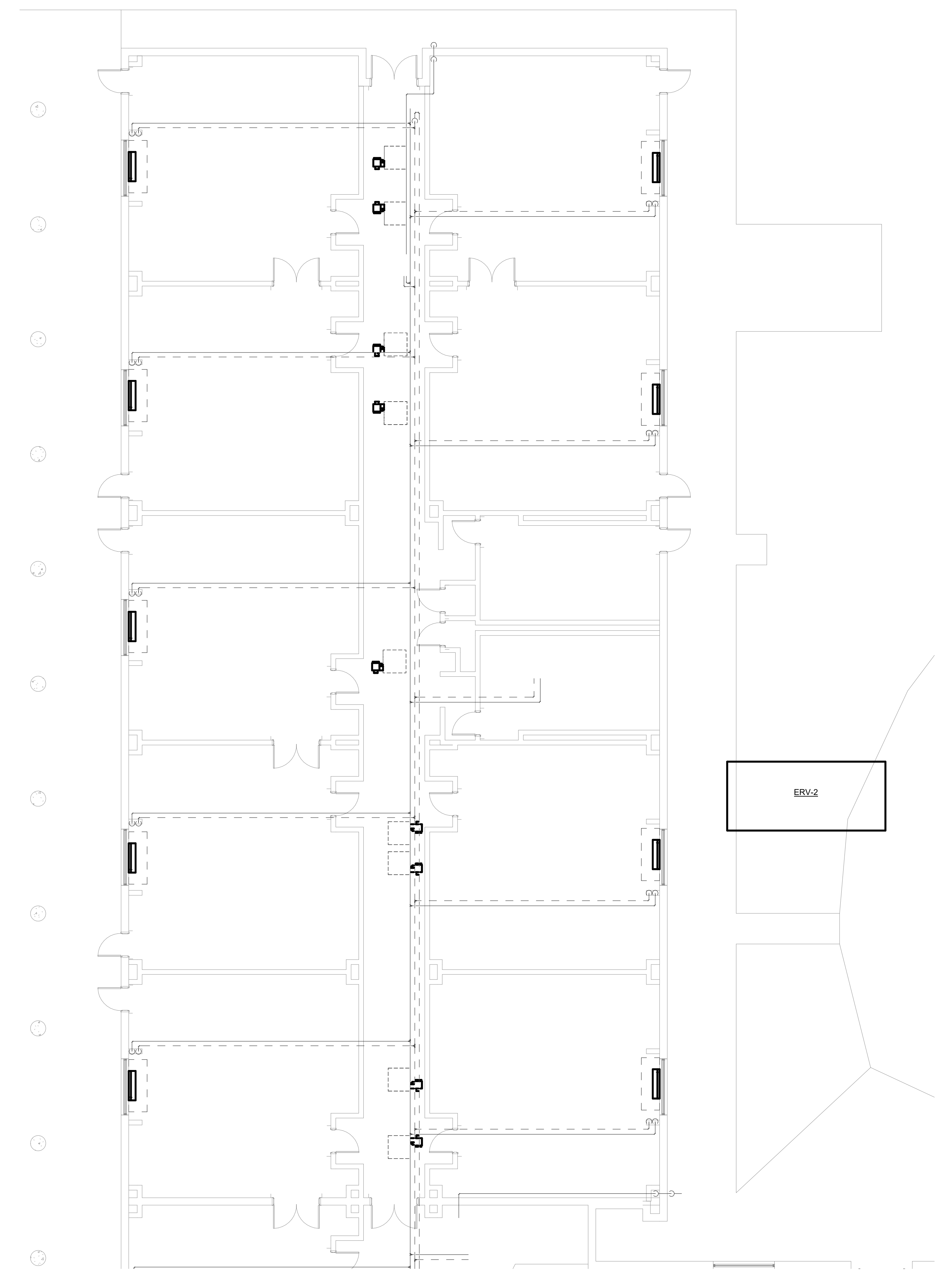


1 HYDRONICS PLAN - PHASE 1 - AREA D  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

No.	Description	Date	Job Number	Drawn By	Checked By	Date
1			YS2011A	XHER23	DR1	2/12/2024

NOT FOR CONSTRUCTION

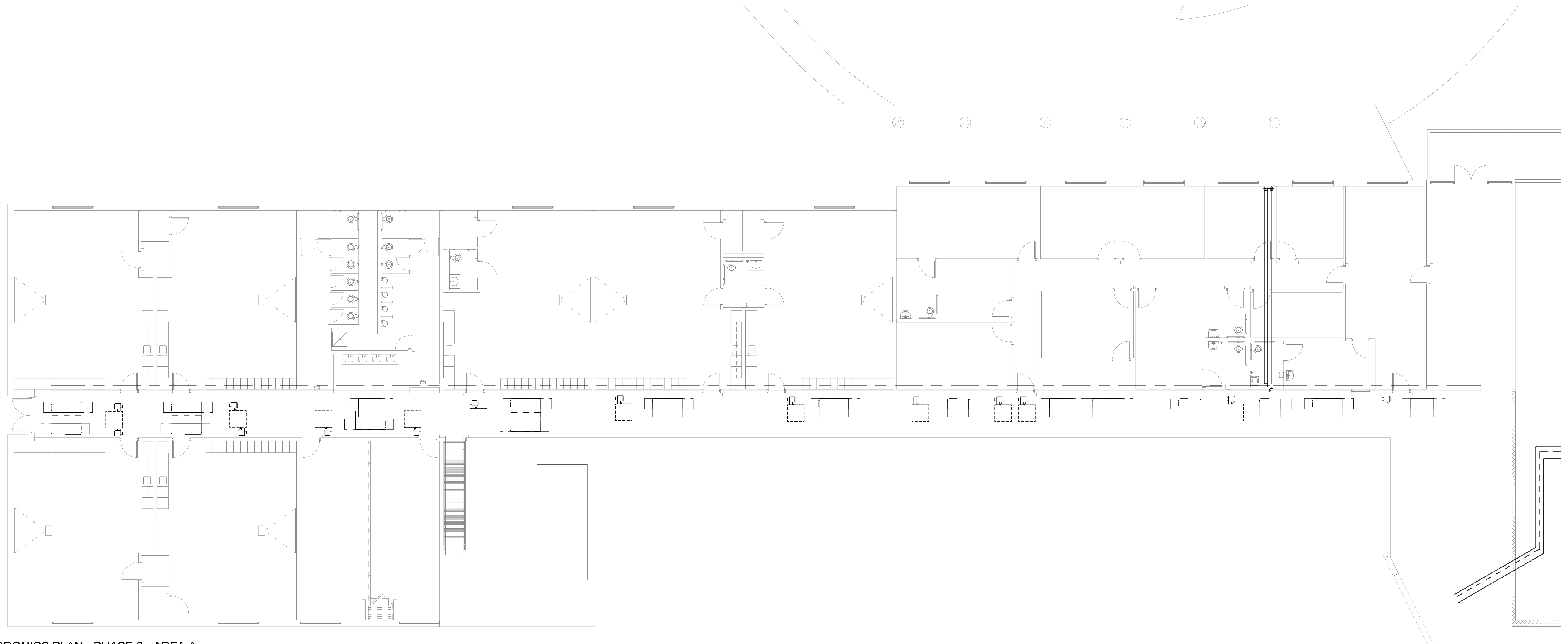
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 1 - AREA D



1 HYDRONICS PLAN - PHASE 1 - AREA E  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

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No.	Description	Date	Job Number
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			Drawn By
			DNH
			Checked By
			HCH
			Date
			2/12/2024
NOT FOR CONSTRUCTION			
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION FIRST FLOOR HYDRONICS PLAN - PHASE 1 - AREA E			
SHEET NUMBER		M4.14	





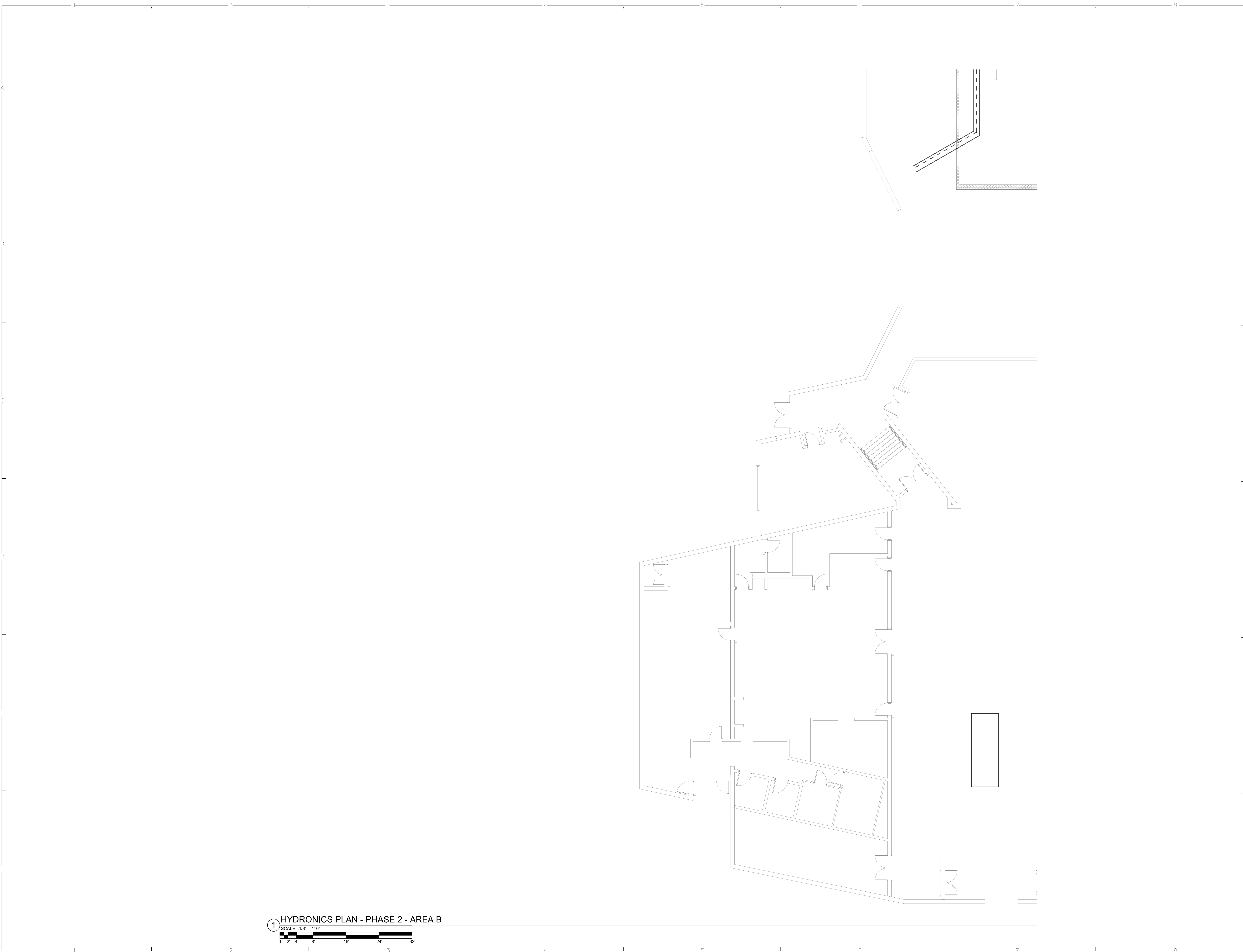
1 HYDRONICS PLAN - PHASE 2 - AREA A  
 SCALE: 1/8" = 1'-0"



No.	Description	Date	Job Number	Drawn By	Checked By	Date
1			2024114	XHER23	DR1	2/12/2024
					HCH	

NOT FOR CONSTRUCTION

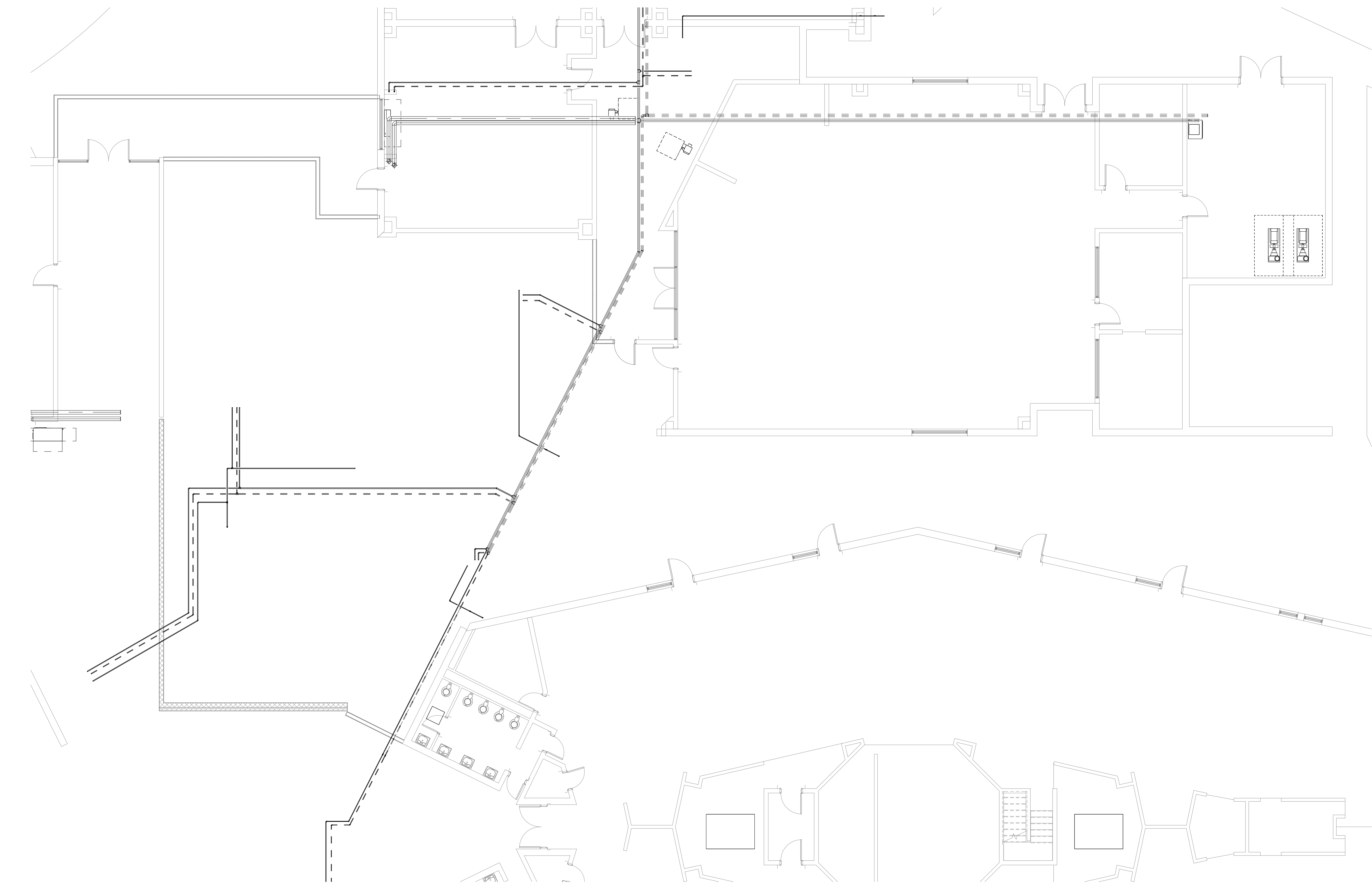
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 2 - AREA A



① HYDRONICS PLAN - PHASE 2 - AREA B  
 SCALE: 1/8" = 1'-0"

<b>RBS DESIGN GROUP</b> ARCHITECTURE	
2330 West 10th Street, Suite 100, Phoenix, AZ 85015 Phone: (602) 998-1234 Fax: (602) 998-5678 Email: office@rbsdesigngroup.com	
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<b>JOB NUMBER</b> Y20114A XHER23	<b>DATE</b> 2/12/2024
<b>DRAWN BY</b> DPH	<b>CHECKED BY</b> HCH
<b>CHECKED BY</b> HCH	<b>DATE</b> 2/12/2024
NOT FOR CONSTRUCTION	
<b>HENDERSON COUNTY SCHOOLS</b> <b>EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION</b> <b>EAST HEIGHTS ELEMENTARY RENOVATION</b> <b>FIRST FLOOR HYDRONICS PLAN - PHASE 2 - AREA B</b>	
SHEET NUMBER	
<b>M4.21</b>	



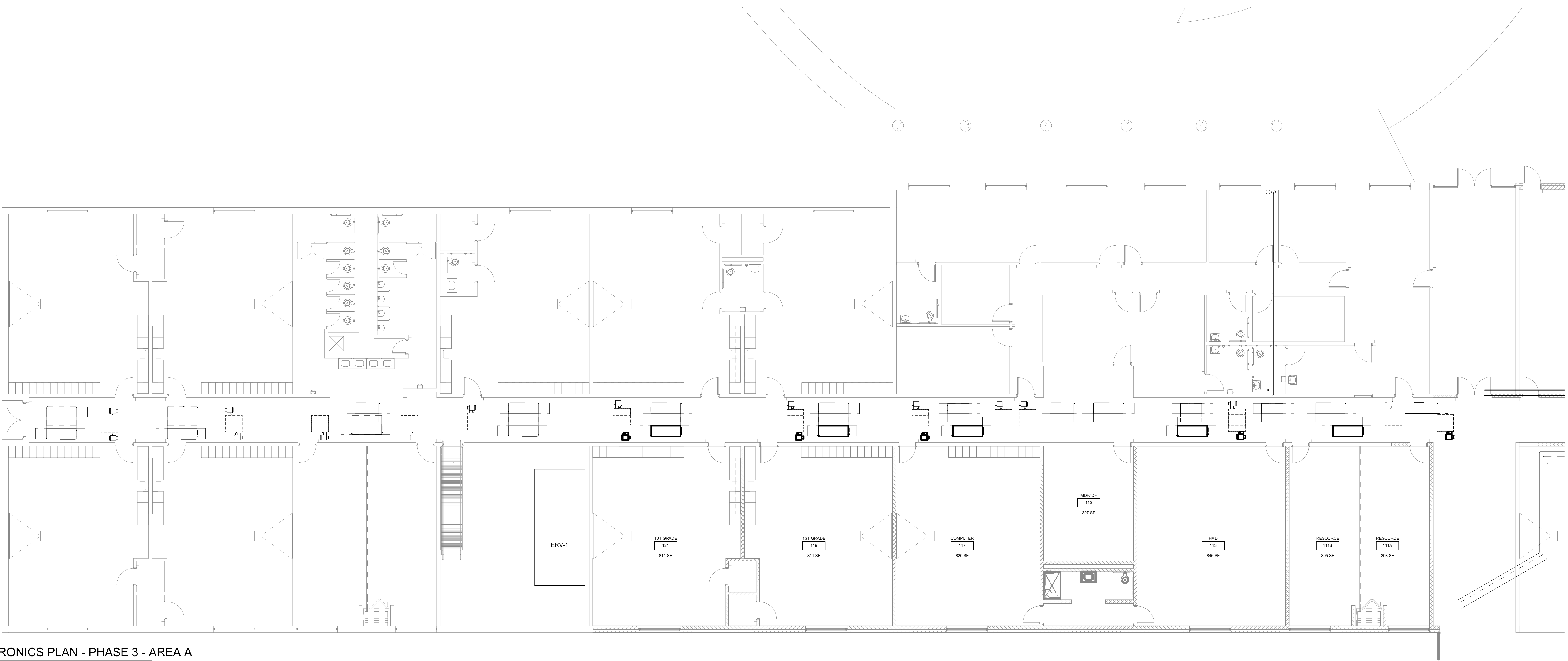


1 HYDRONICS PLAN - PHASE 2 - AREA D  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

No.	Description	Date	Job Number	Drawn By	Checked By	Scale	Date
1			YS2114A XHER23	DRH	HCH		2/12/2024

NOT FOR  
 CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 2 - AREA D



- GENERAL HYDRONIC DESIGN NOTES:**
- A. REFER TO HPS/HPR RUNOUT SIZES ON EQUIPMENT SCHEDULE FOR CONDENSATE RUNOUT SIZES.
  - B. REFER TO HVAC CONTROLS SHEETS FOR ADDITIONAL INFORMATION ON THERMOSTATS AND CO2 SENSORS.
  - C. REFER TO TYPICAL VAL DEVICE MOUNTING DETAIL FOR ADDITIONAL INFORMATION REGARDING DEVICE MOUNTING.
  - D. COORDINATE ALL MECHANICAL EQUIPMENT AND HYDRONIC PIPING WITH STRUCTURAL DRAWINGS.
  - E. REFER TO ARCHITECTURAL PLANS FOR ALL RATED WALLS. COORDINATE REQUIRED FIRE STOPPING ACCORDINGLY.

TAGGED NOTES #

**1** HYDRONICS PLAN - PHASE 3 - AREA A  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

RBS DESIGN GROUP

ARCHITECTURE

1525 W. 10TH AVENUE, SUITE 200, DENVER, CO 80202  
 TEL: 303.733.8800 FAX: 303.733.8801  
 WWW.RBSDESIGNGROUP.COM

No.	Description	Date	Drawn By	Checked By	Date

JOB NUMBER: Y201144  
 XHER23

DATE: 2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS

EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION

EAST HEIGHTS ELEMENTARY RENOVATION

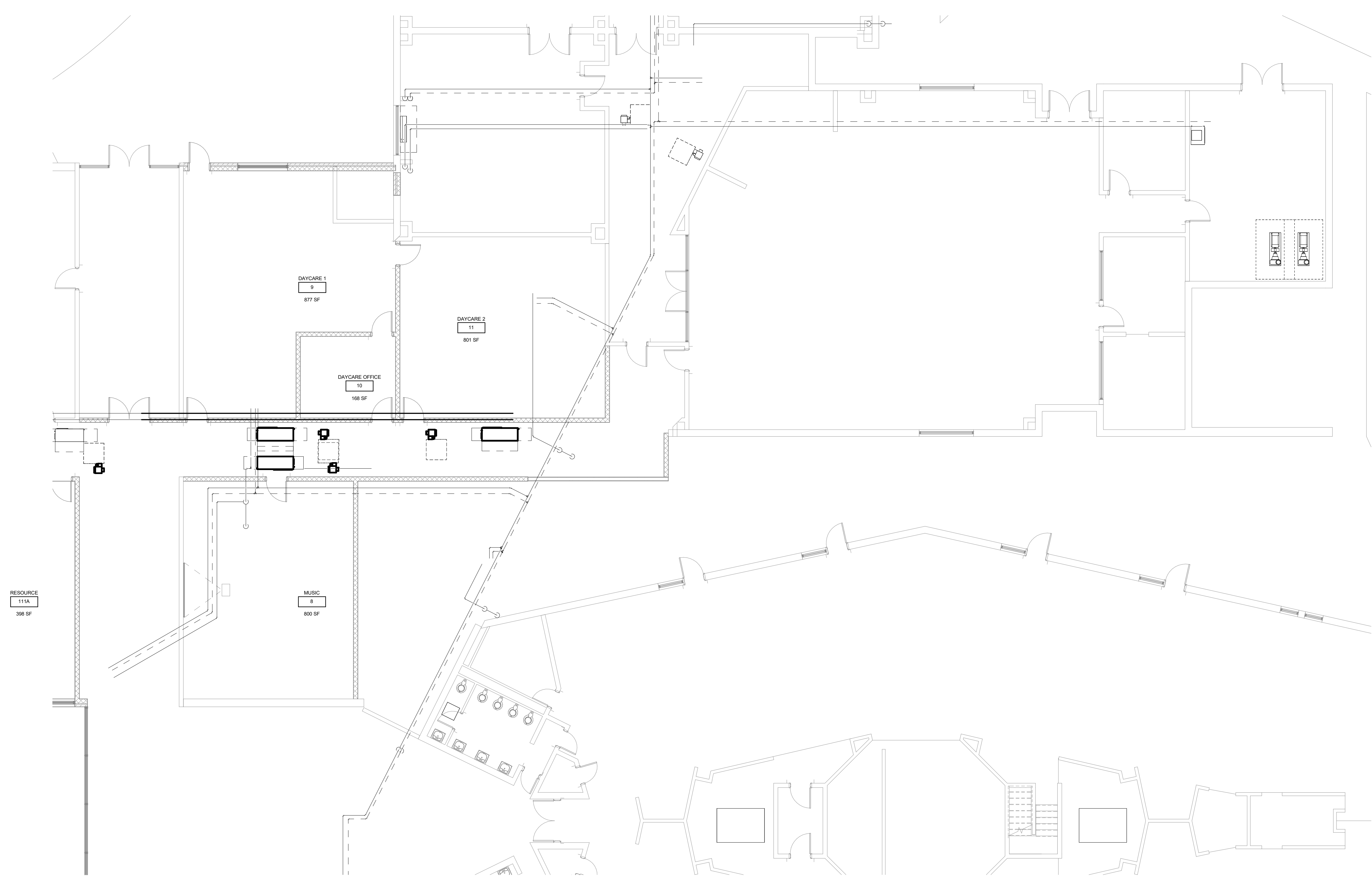
FIRST FLOOR HYDRONICS PLAN - PHASE 3 - AREA A

SHEET NUMBER

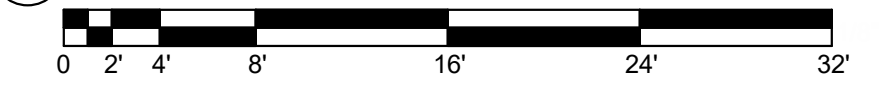
M4.30







1 HYDRONICS PLAN - PHASE 3 - AREA D  
 SCALE: 1/8" = 1'-0"

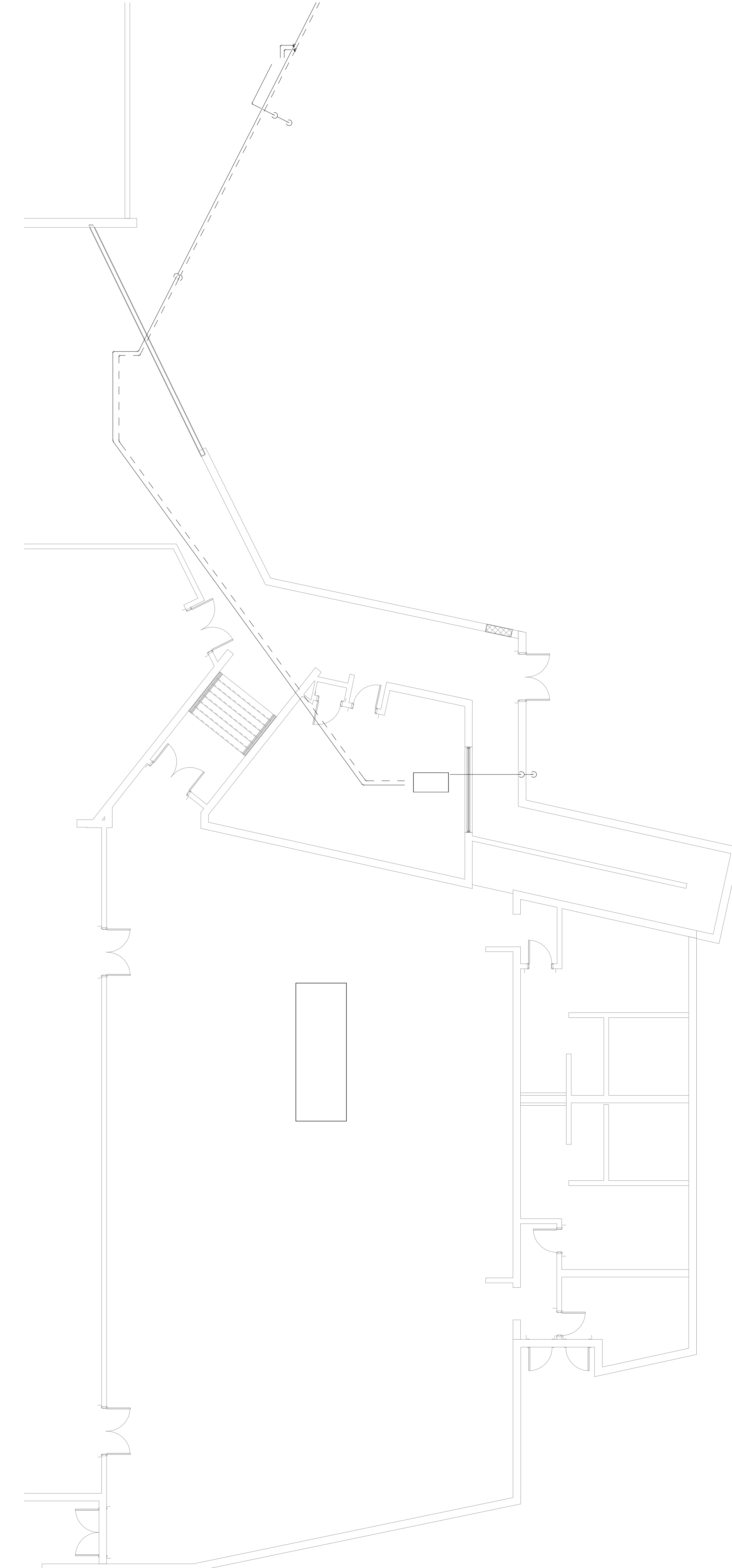


No.	Description	Date	Job Number	Drawn By	Checked By	Date
1			YS2114A XHER23	DRH	HCH	2/12/2024


NOT FOR CONSTRUCTION

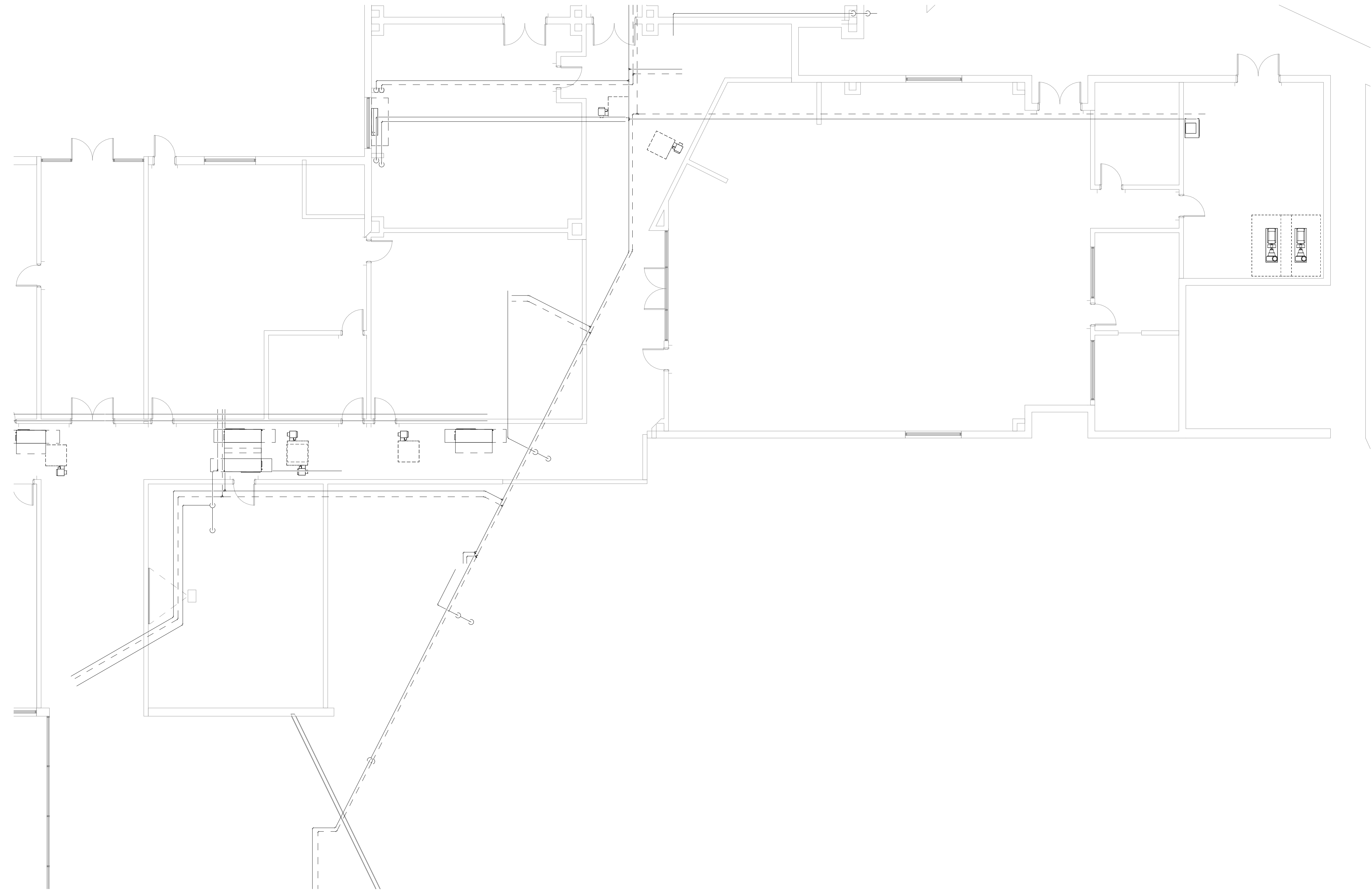
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 3 - AREA D



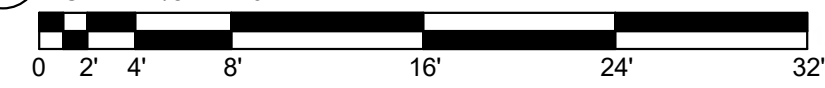


1 HYDRONICS PLAN - PHASE 4 - AREA C  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

 <b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           1000 RIVERSIDE AVENUE, SUITE 200            FARMINGDALE, NY 11735            TEL: 631-465-2448            FAX: 631-465-2449            WWW.RBSDESIGNGROUP.COM            EMAIL: OFFICE@RBSDESIGNGROUP.COM         </small>	
<small>           ALL INFORMATION CONTAINED HEREIN IS THE PROPERTY OF RBS DESIGN GROUP ARCHITECTURE. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. ANY REUSE OR DISTRIBUTION OF THIS INFORMATION WITHOUT THE WRITTEN PERMISSION OF RBS DESIGN GROUP ARCHITECTURE IS STRICTLY PROHIBITED.         </small>	<small>           RBS DESIGN GROUP ARCHITECTURE            1000 RIVERSIDE AVENUE, SUITE 200            FARMINGDALE, NY 11735            TEL: 631-465-2448            FAX: 631-465-2449            WWW.RBSDESIGNGROUP.COM            EMAIL: OFFICE@RBSDESIGNGROUP.COM         </small>
<small>           JOB NUMBER: Y201144            XHER23         </small>	<small>           DRAWN BY: DPH            CHECKED BY: HCN            DATE: 2/12/2024         </small>
<small>           No.   Description   Date         </small>	<small>           NOT FOR CONSTRUCTION         </small>
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION <b>FIRST FLOOR HYDRONICS PLAN - PHASE 4 - AREA C</b>	
SHEET NUMBER <b>M4.42</b>	



① HYDRONICS PLAN - PHASE 4 - AREA D  
 SCALE: 1/8" = 1'-0"



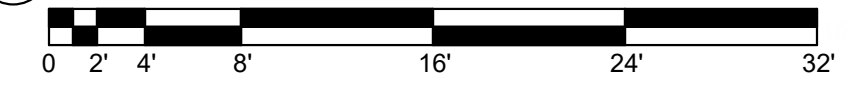
No.	Description	Date	Job Number	Year	Drawn By	Checked By	Scale	Date
1			2024114	2024	DRH	HCH		2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 4 - AREA D



1 HYDRONICS PLAN - PHASE 5 - AREA B  
 SCALE: 1/8" = 1'-0"



SHEET NUMBER  
**M4.51**

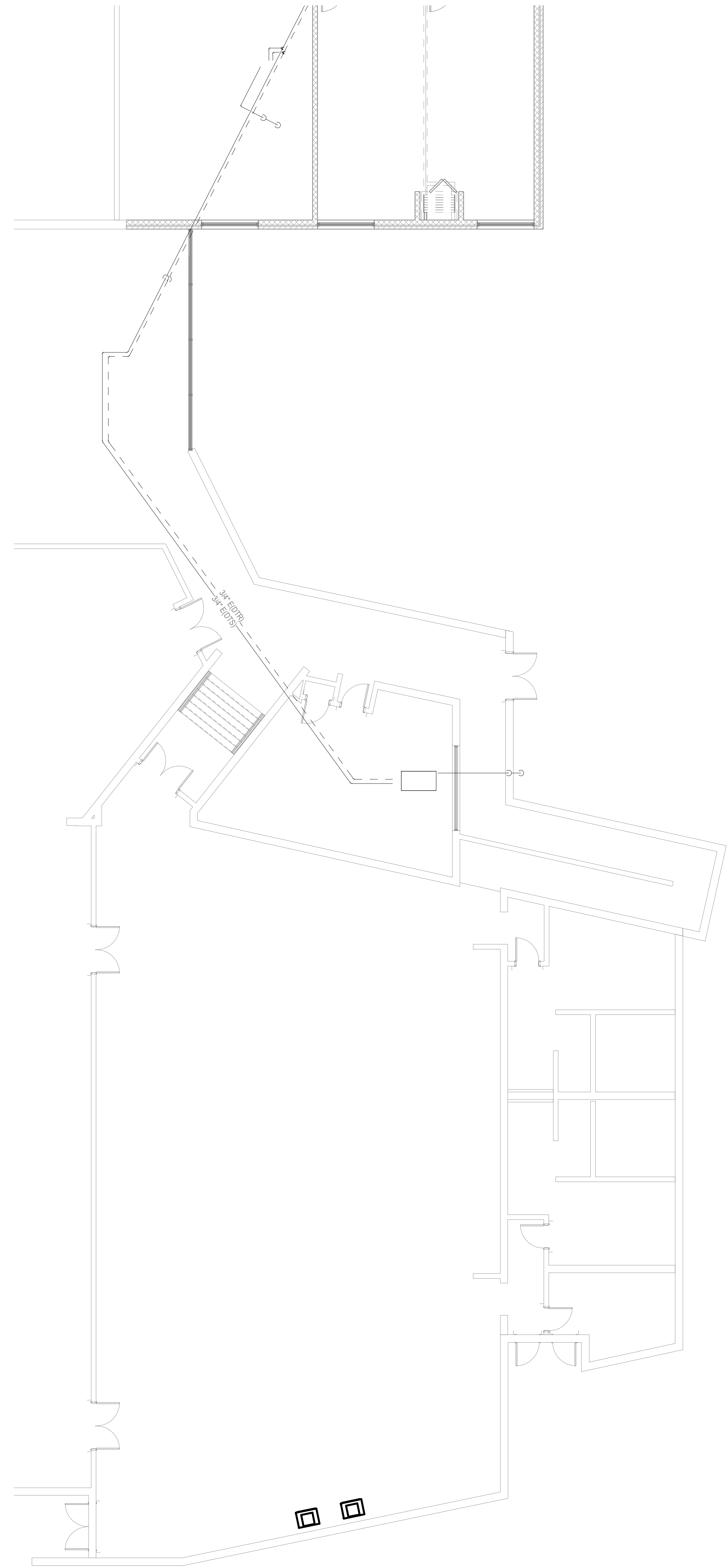
HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 FIRST FLOOR HYDRONICS PLAN - PHASE 5 - AREA B

NOT FOR  
 CONSTRUCTION

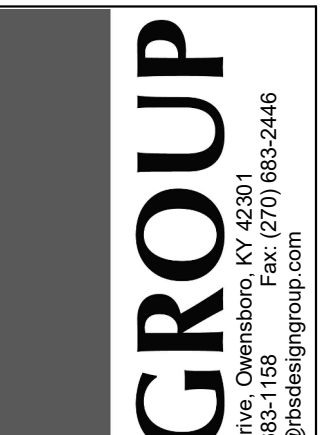
No.	Description	Date	Job Number	Drawn By	Checked By	Date
			Y201144 XHER23	DRH	HCH	2/12/2024

**RBS DESIGN GROUP**  
 ARCHITECTURE

1200 West 12th Street, Suite 100  
 Denver, Colorado 80202  
 Phone: (303) 733-1200  
 Fax: (303) 733-1201  
 Email: office@rbdesigngroup.com

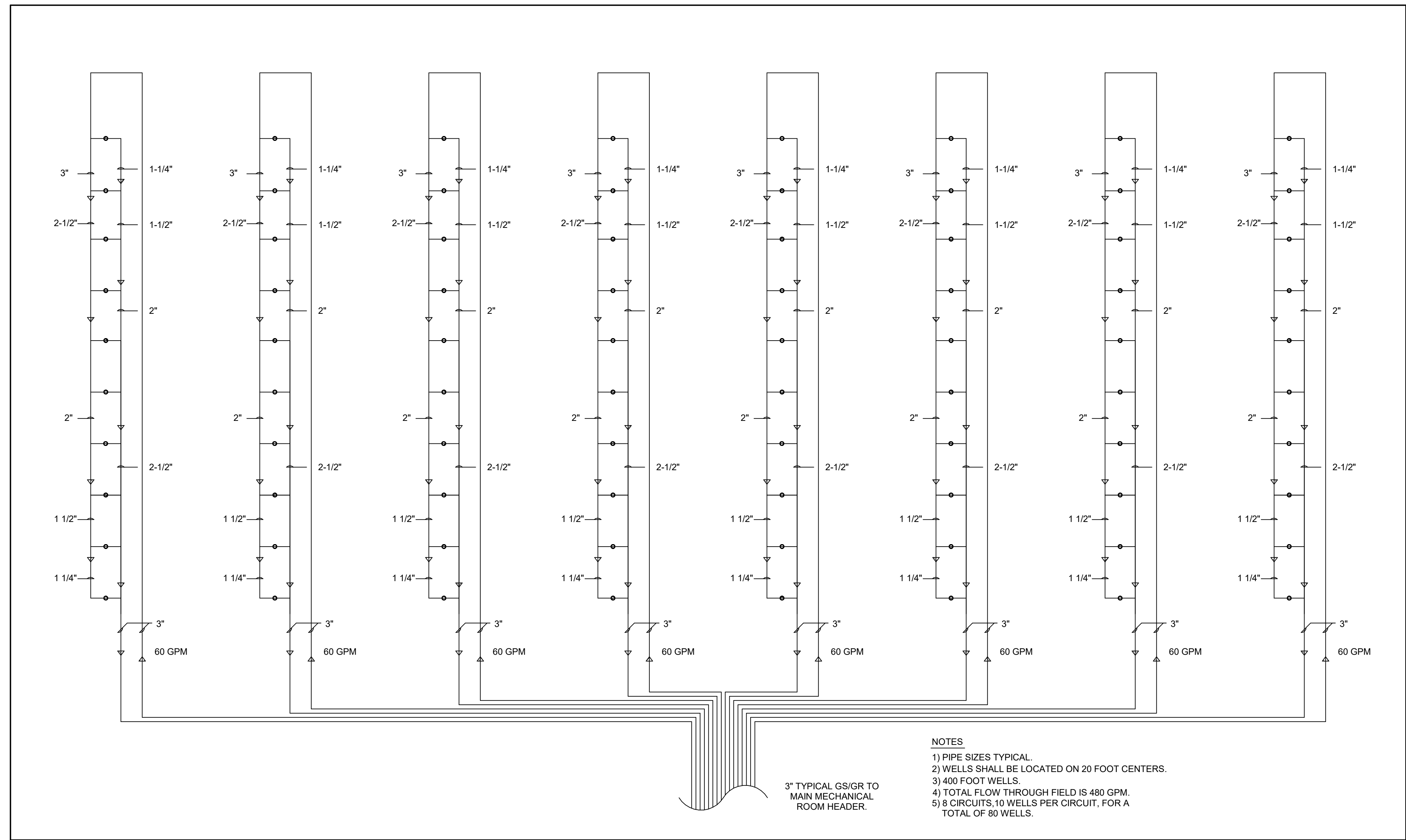


1 HYDRONICS PLAN - PHASE 5 - AREA C  
 SCALE: 1/8" = 1'-0"  
 0 2' 4' 8' 16' 24' 32'

 <b>RBS DESIGN GROUP</b> ARCHITECTURE	
<small>           10000 RIVERSIDE DRIVE, SUITE 100            GREENSBORO, NC 27409            TEL: 336.733.1234            FAX: 336.733.1235            WWW.RBSDESIGNGROUP.COM            E-MAIL: OFFICE@RBSDESIGNGROUP.COM         </small>	
JOB NUMBER Y2011A XHER23	DRAWN BY DRH
CHECKED BY HCH	DATE 2/12/2024
NOT FOR CONSTRUCTION	
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION FIRST FLOOR HYDRONICS PLAN - PHASE 5 - AREA C	
SHEET NUMBER <b>M4.52</b>	

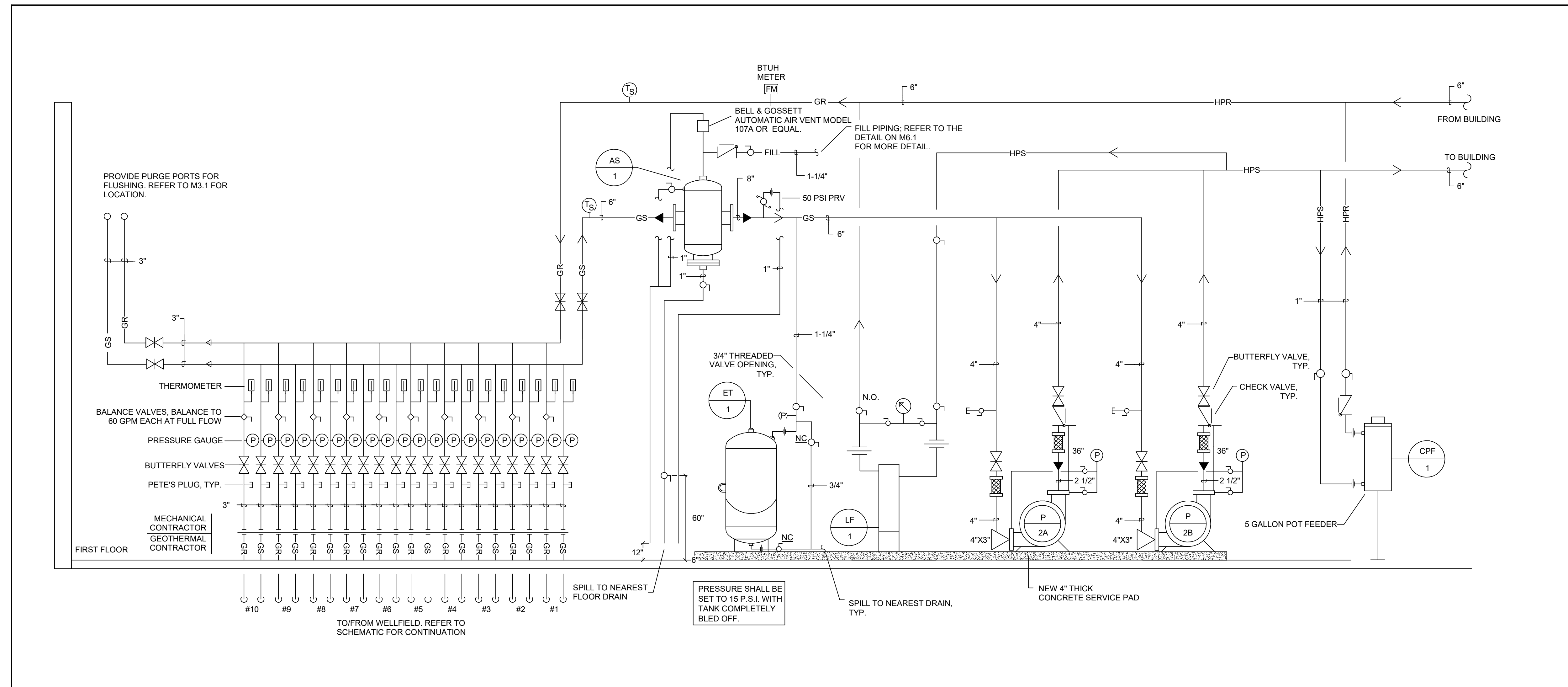






NOTES  
 1) PIPE SIZES TYPICAL.  
 2) WELLS SHALL BE LOCATED ON 20 FOOT CENTERS.  
 3) 400 FOOT WELLS.  
 4) TOTAL FLOW THROUGH FIELD IS 480 GPM.  
 5) 8 CIRCUITS, 10 WELLS PER CIRCUIT, FOR A TOTAL OF 80 WELLS.

1 GEOTHERMAL WELLFIELD PIPING SCHEMATIC  
 SCALE: NONE

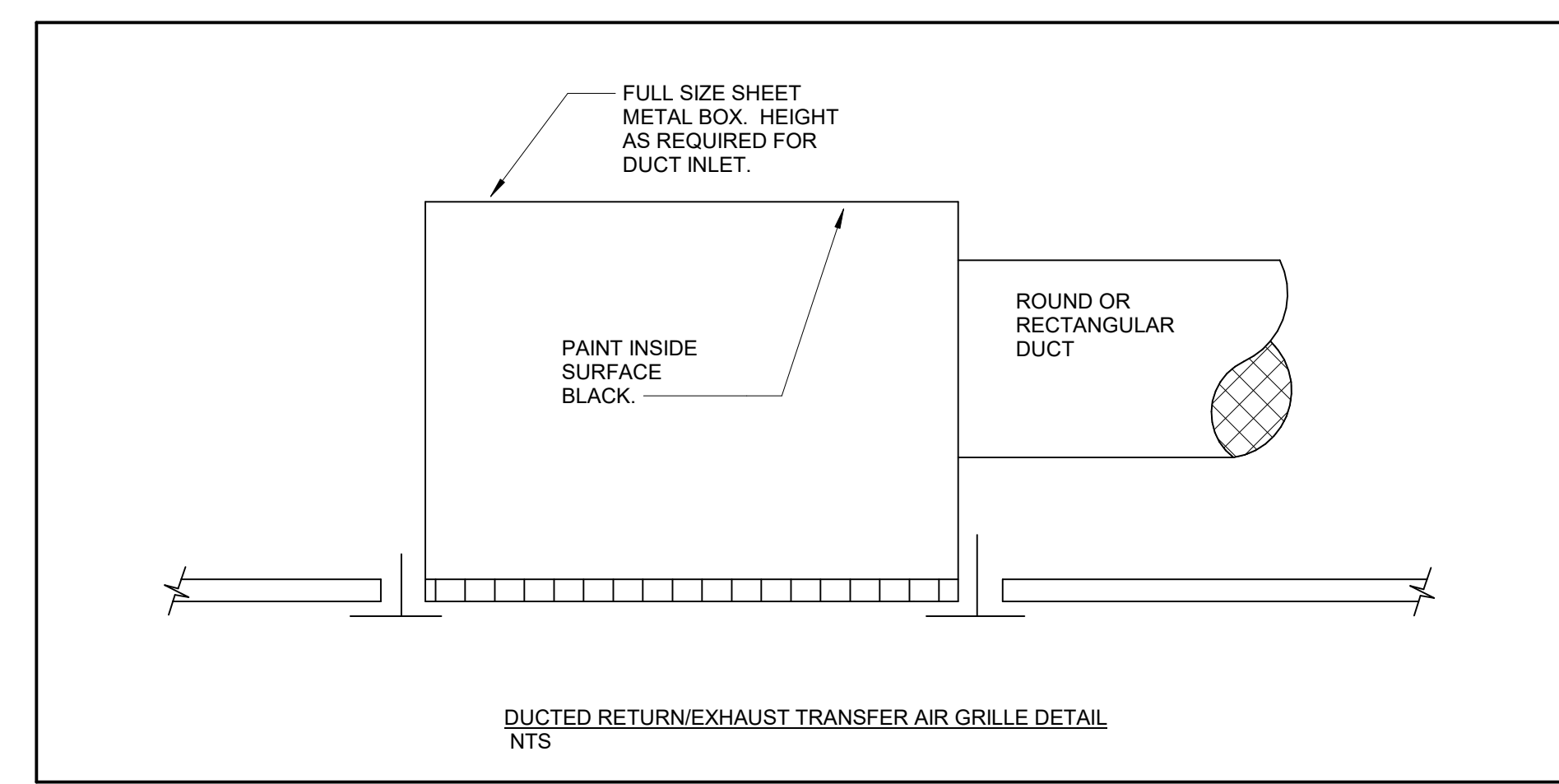
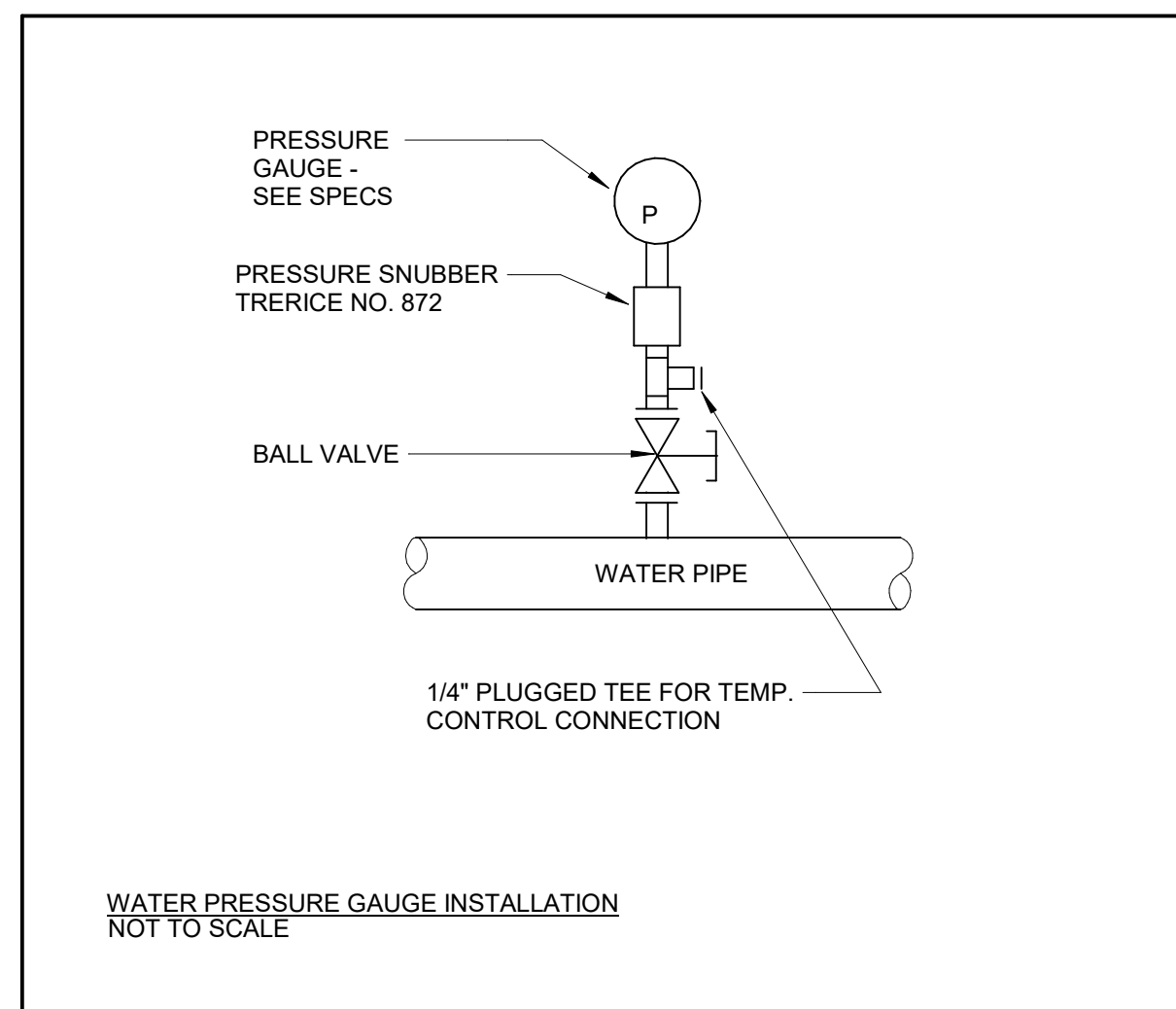
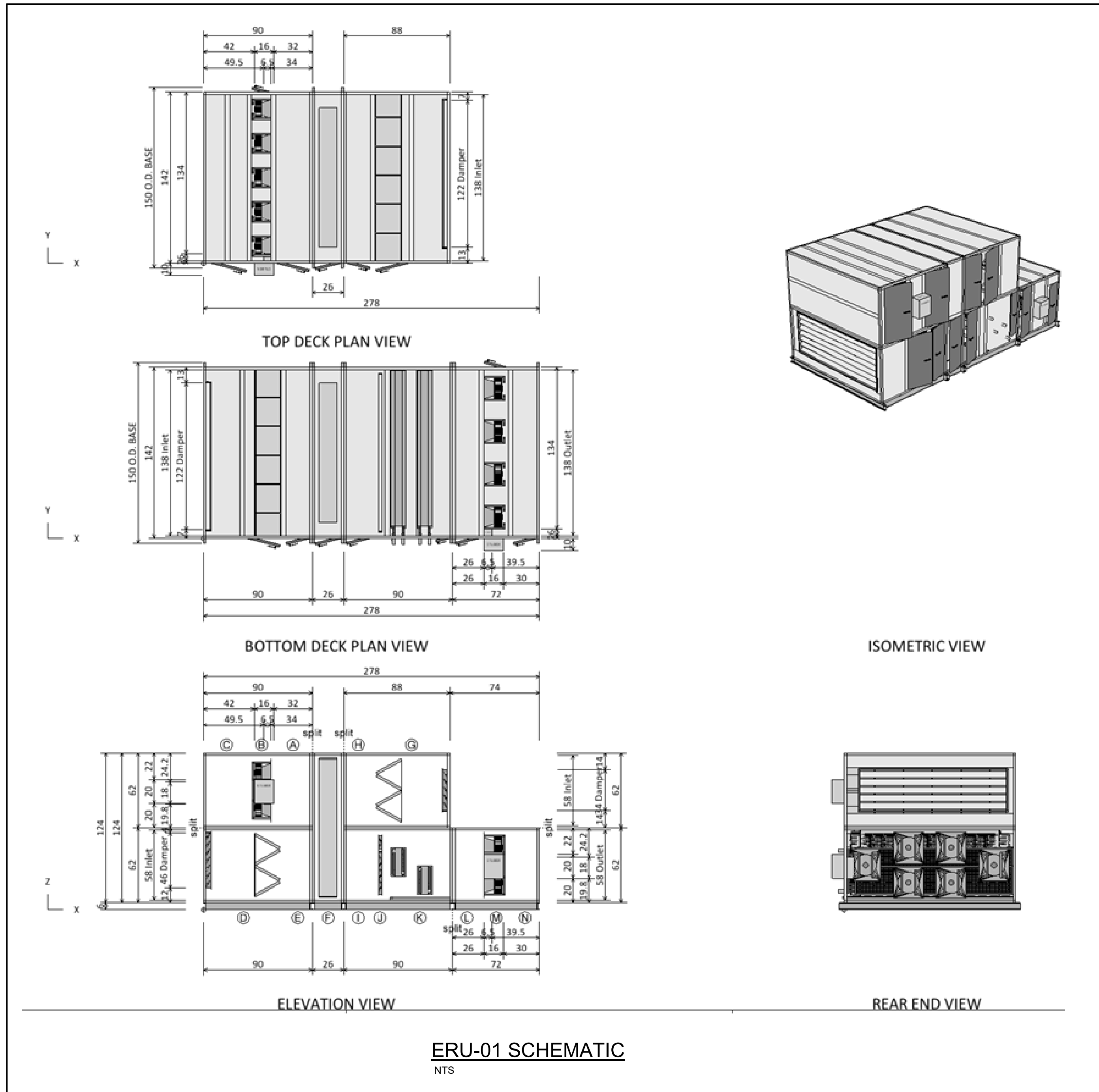
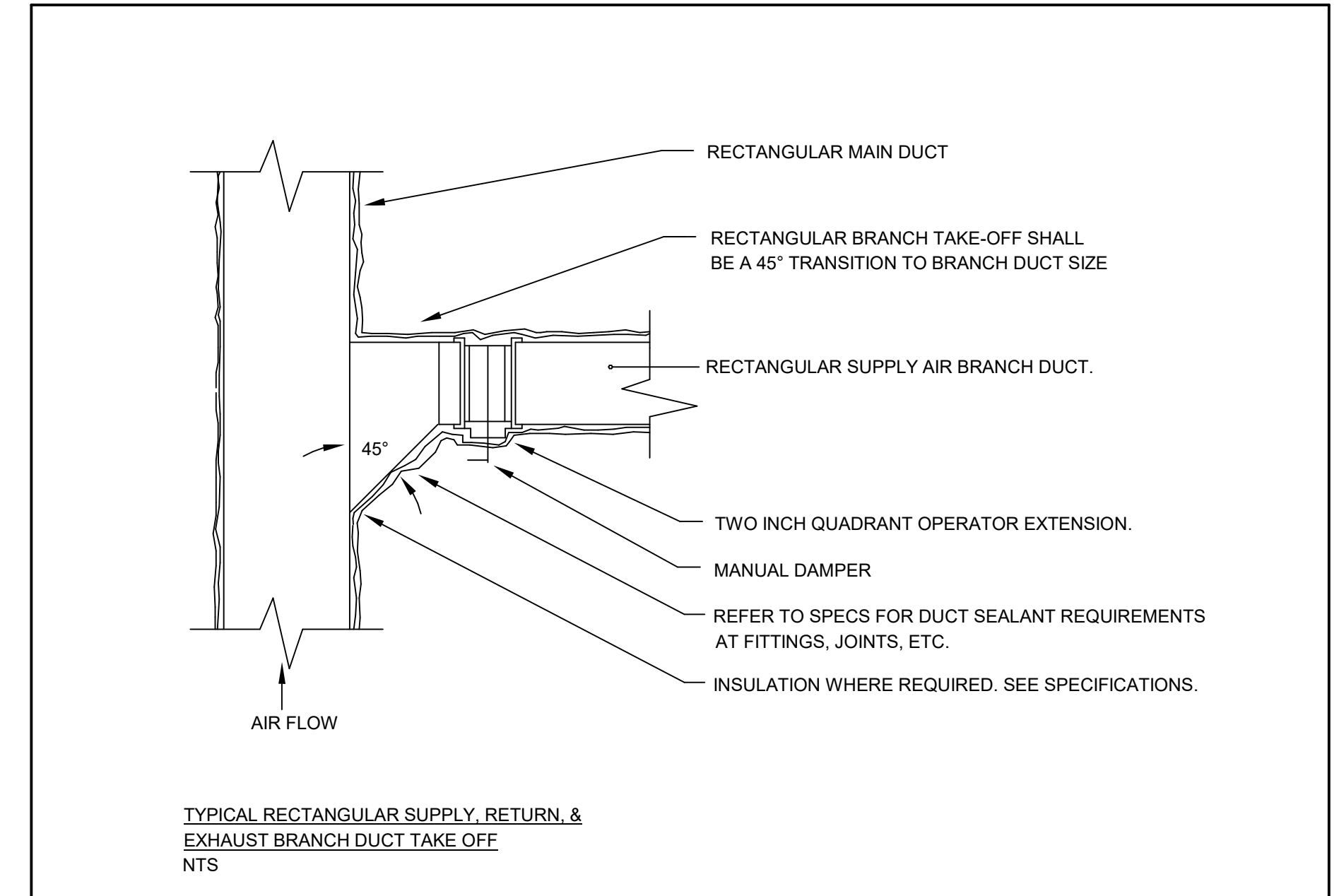
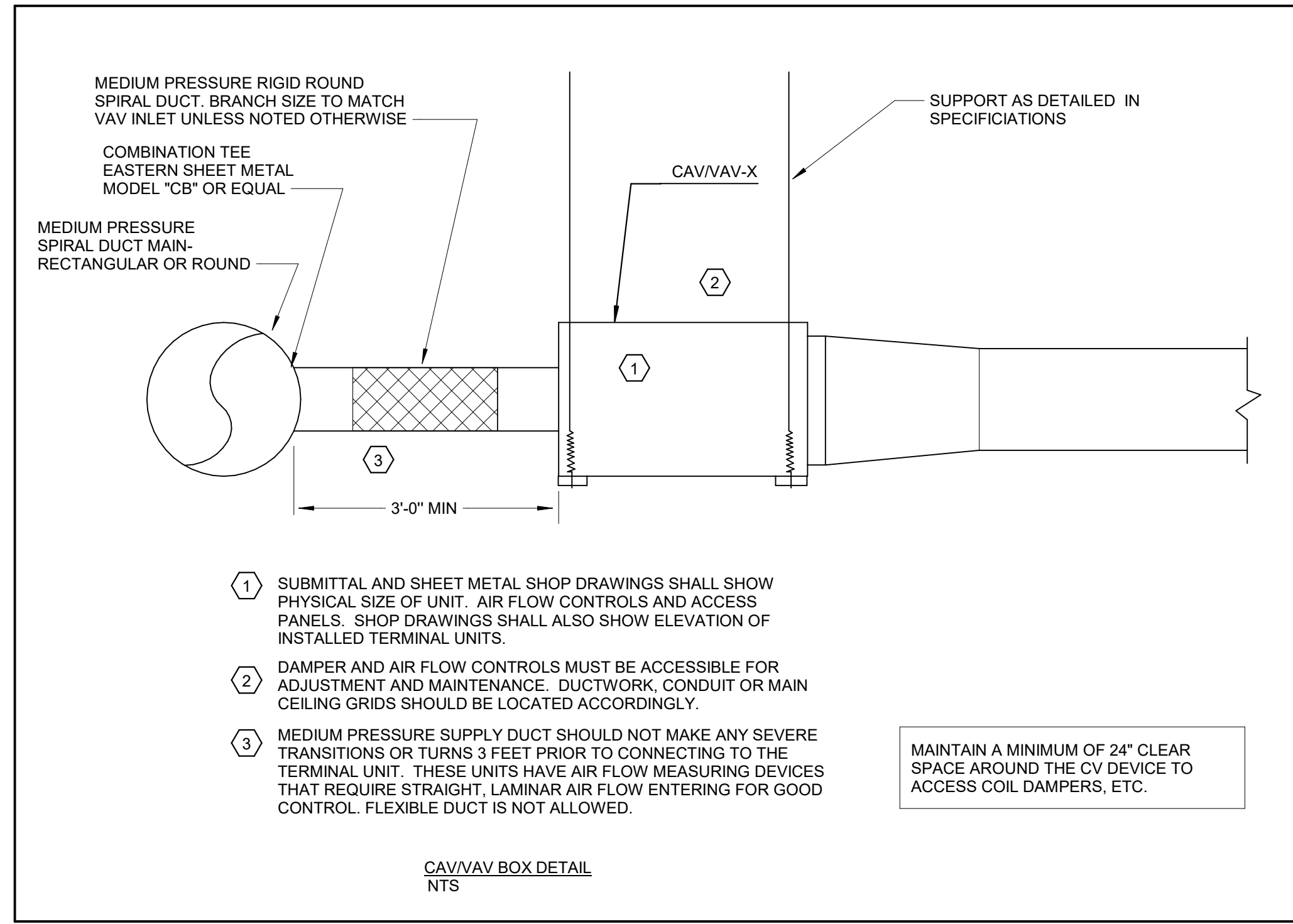
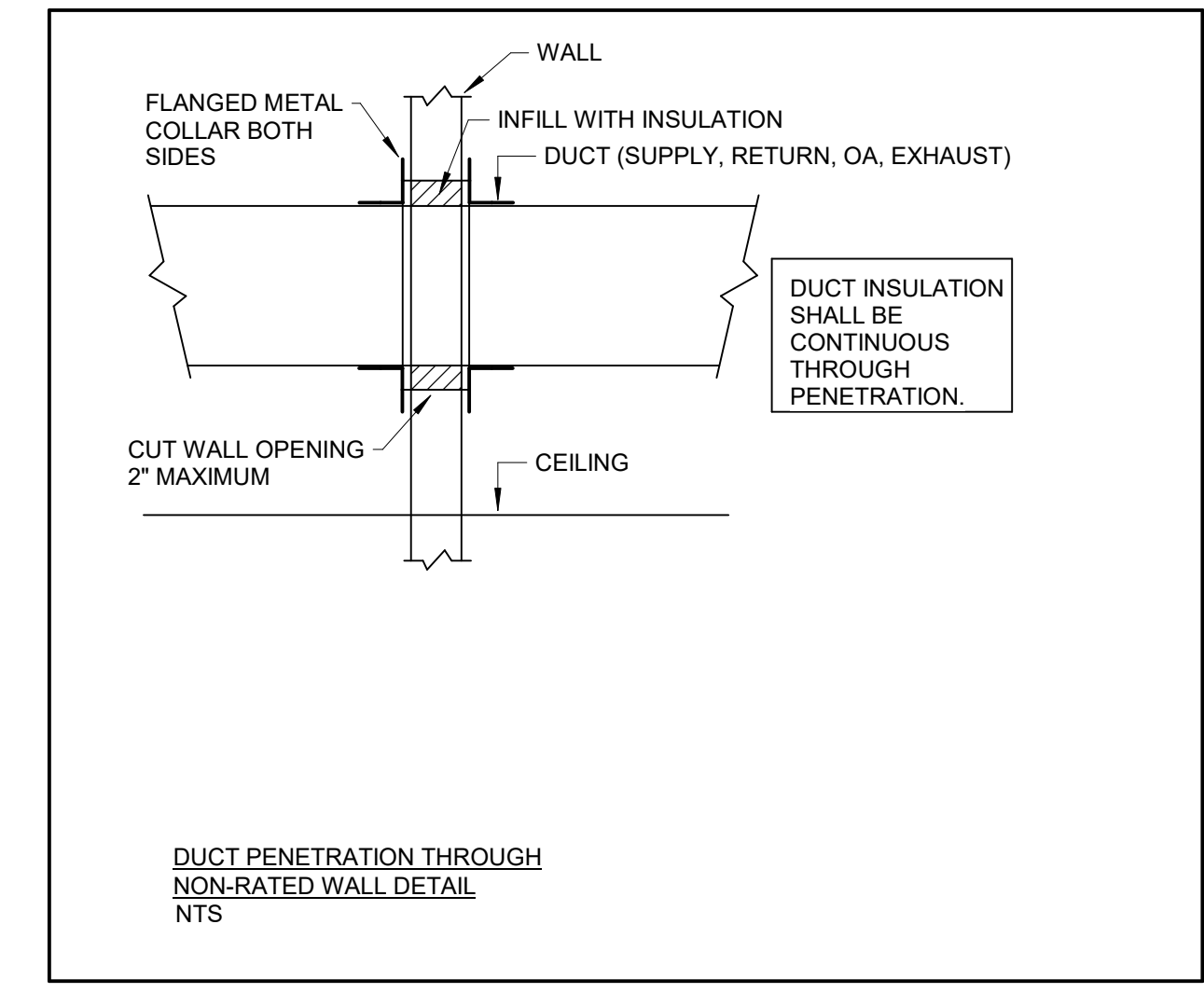
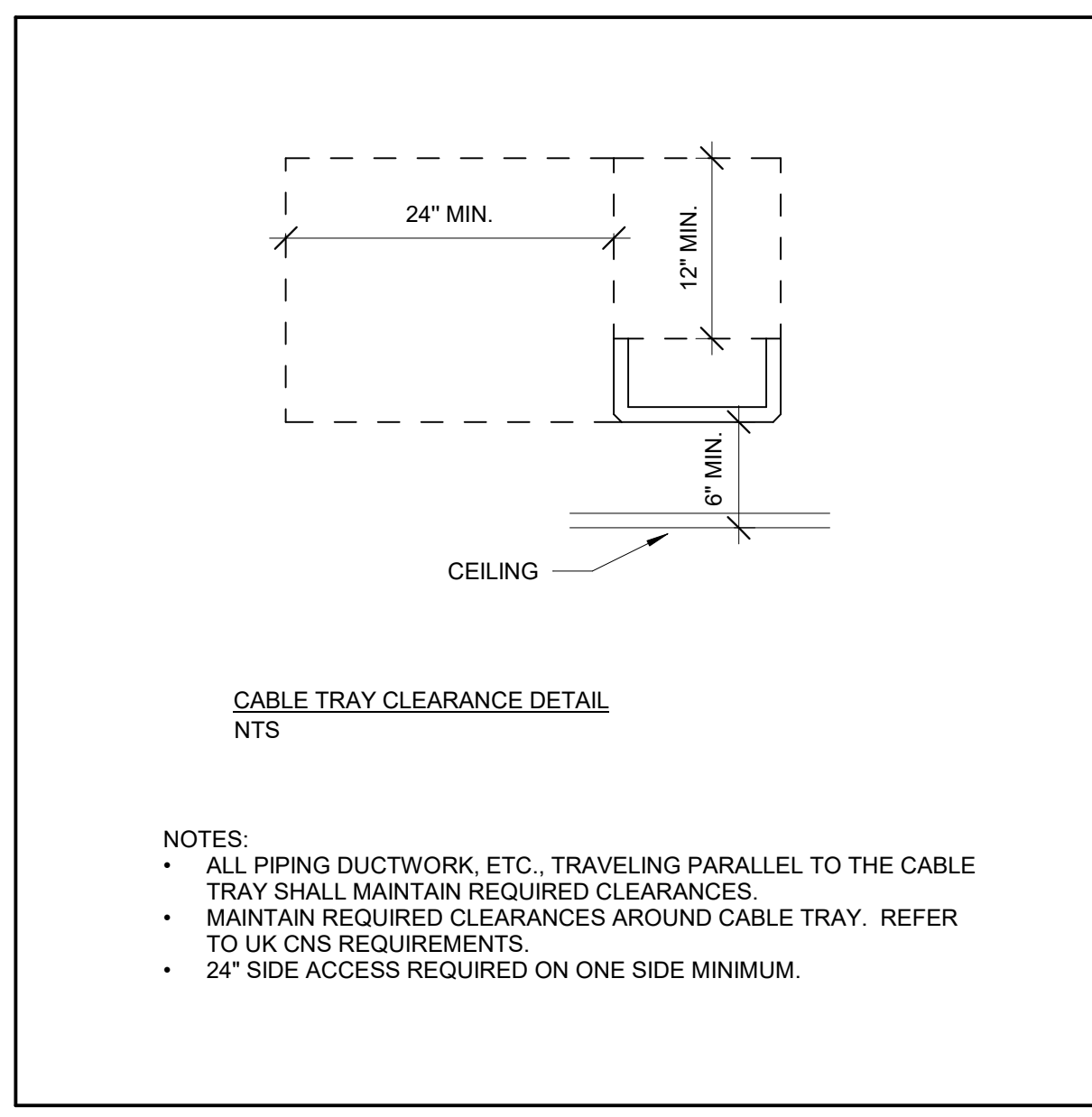
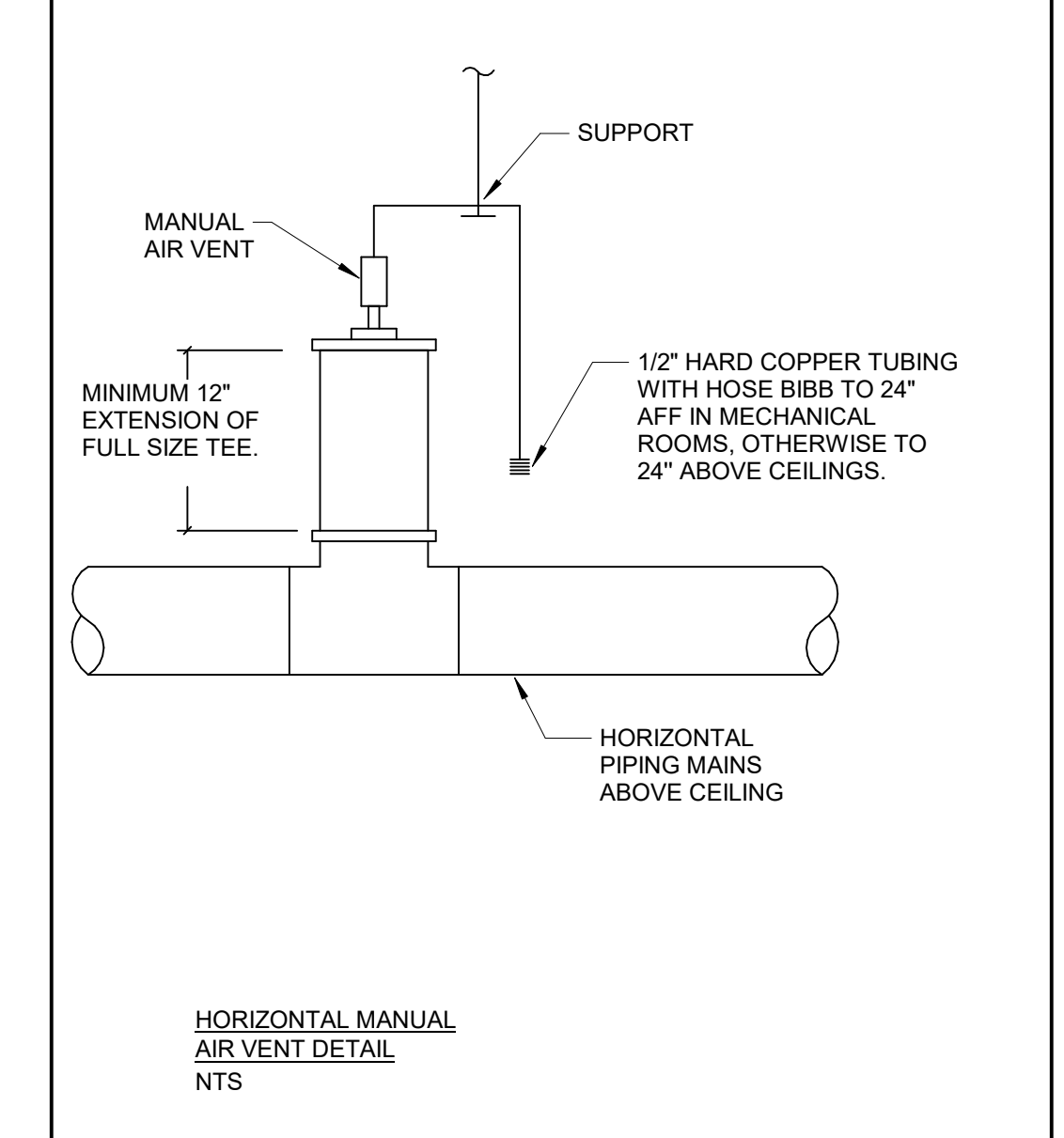
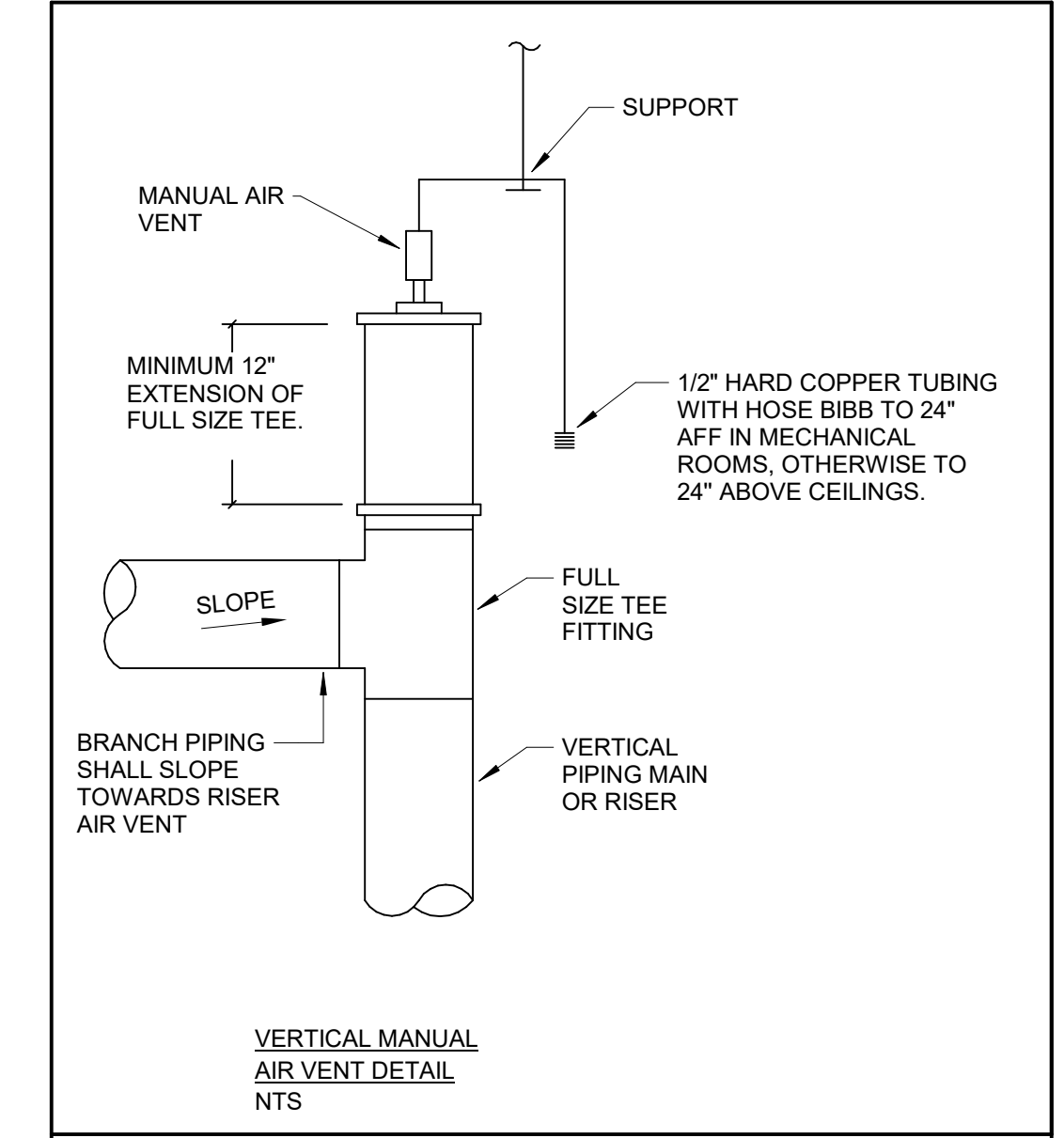
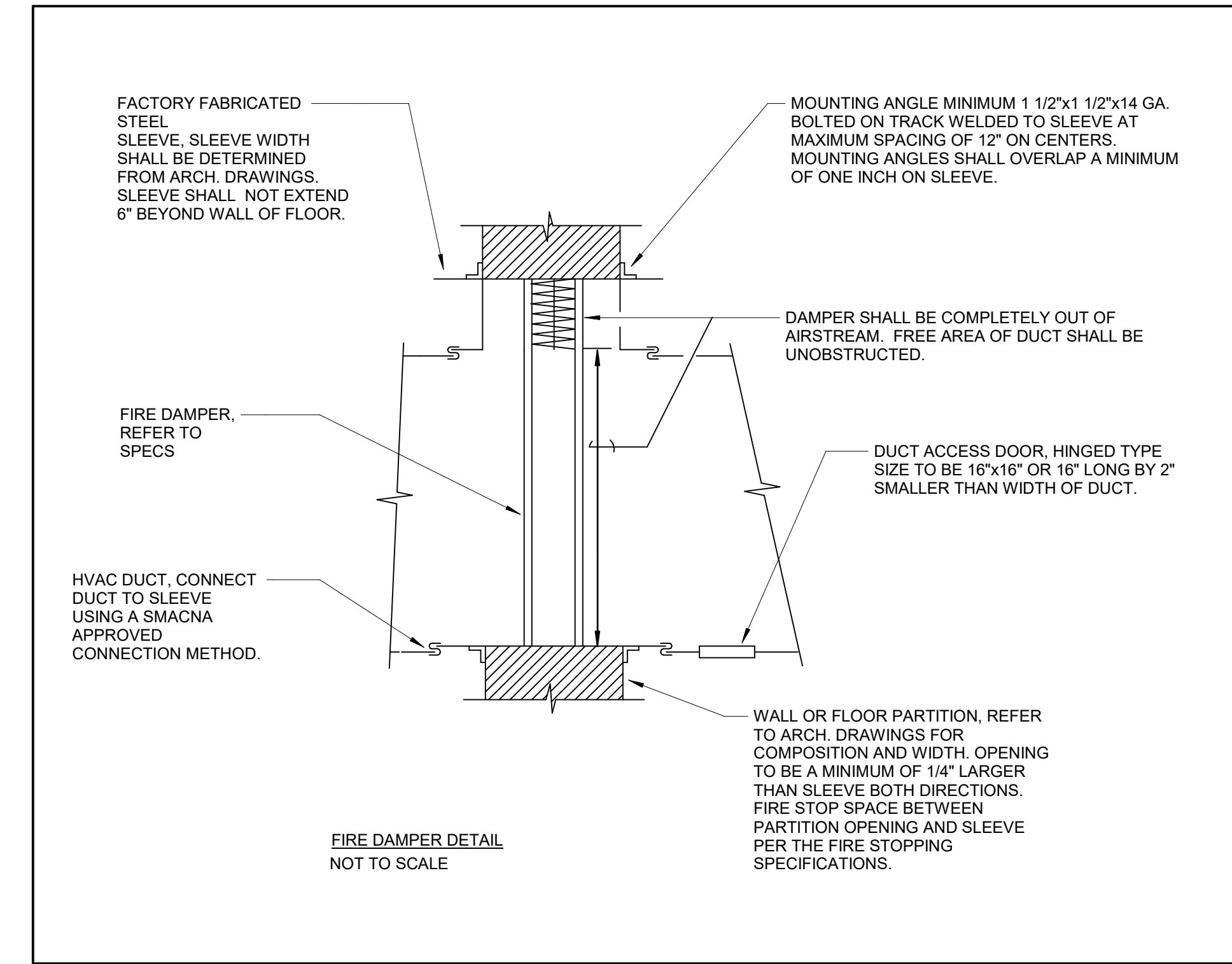
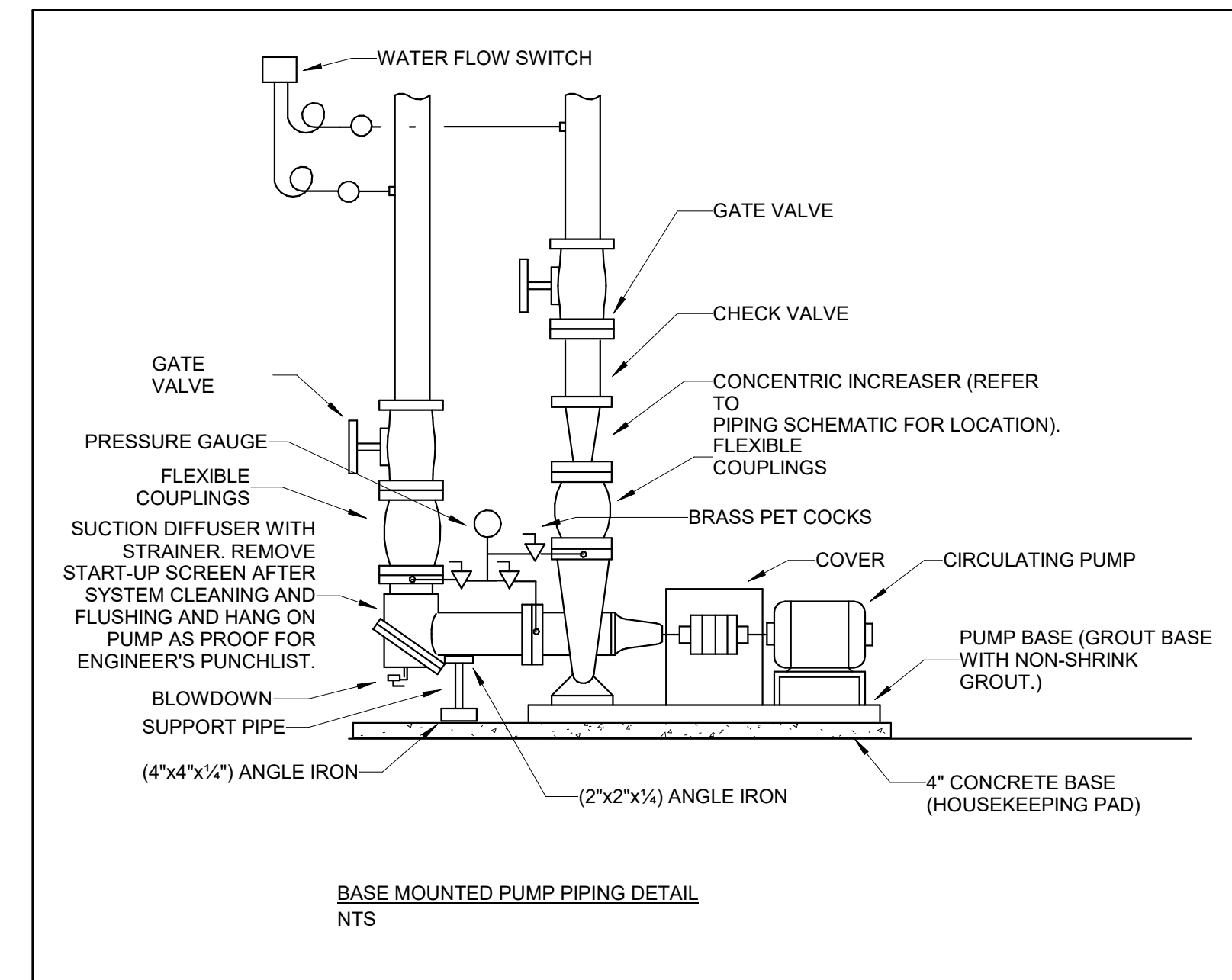
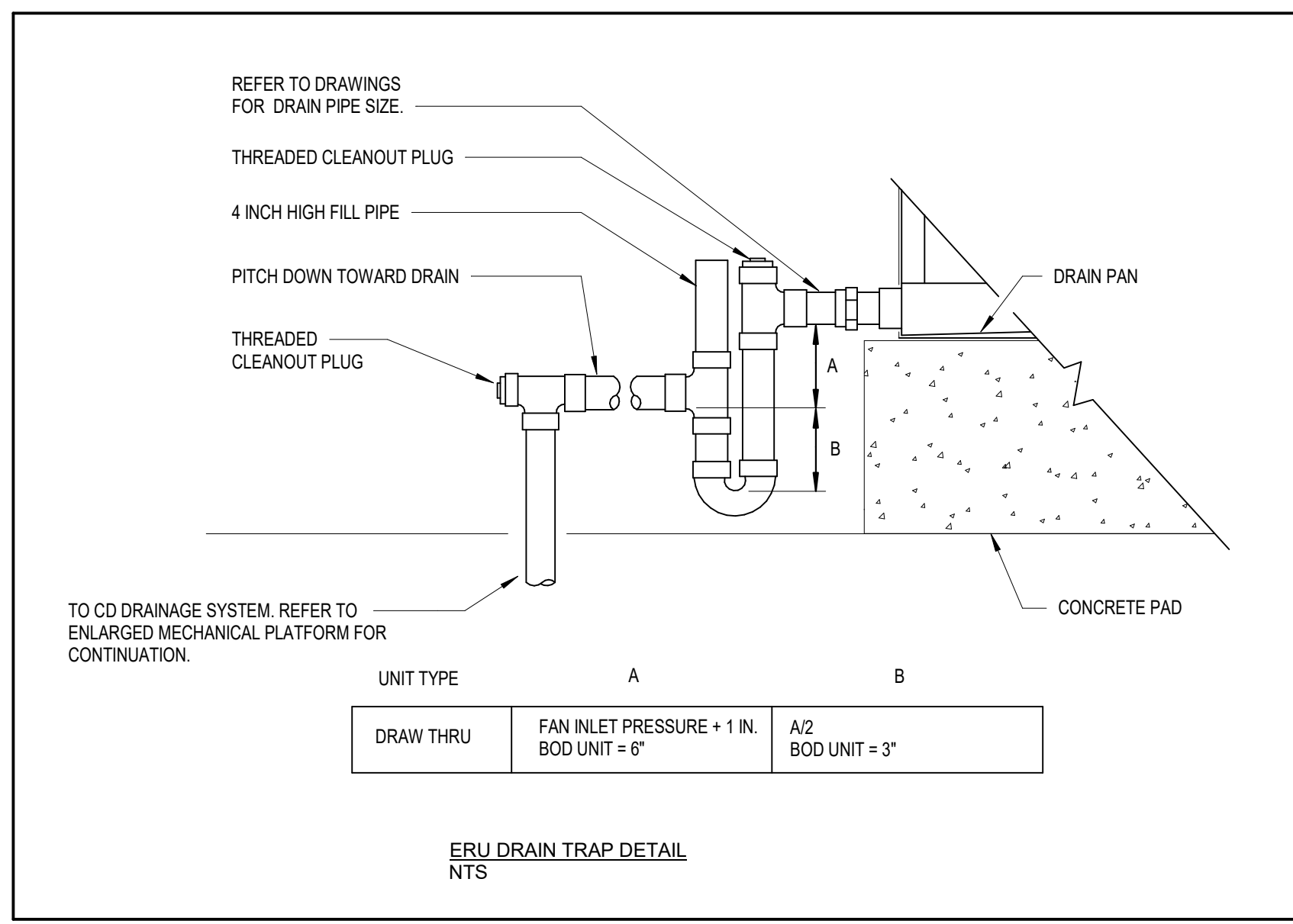


2 GEOTHERMAL PIPING SCHEMATIC - MECHANICAL ROOM HEADER  
 SCALE: NONE

PROJECT NUMBER	20241141
DATE	11/20/24
DRAWN BY	XHERZ
CHECKED BY	HCH
DATE	11/20/24

NOT FOR CONSTRUCTION

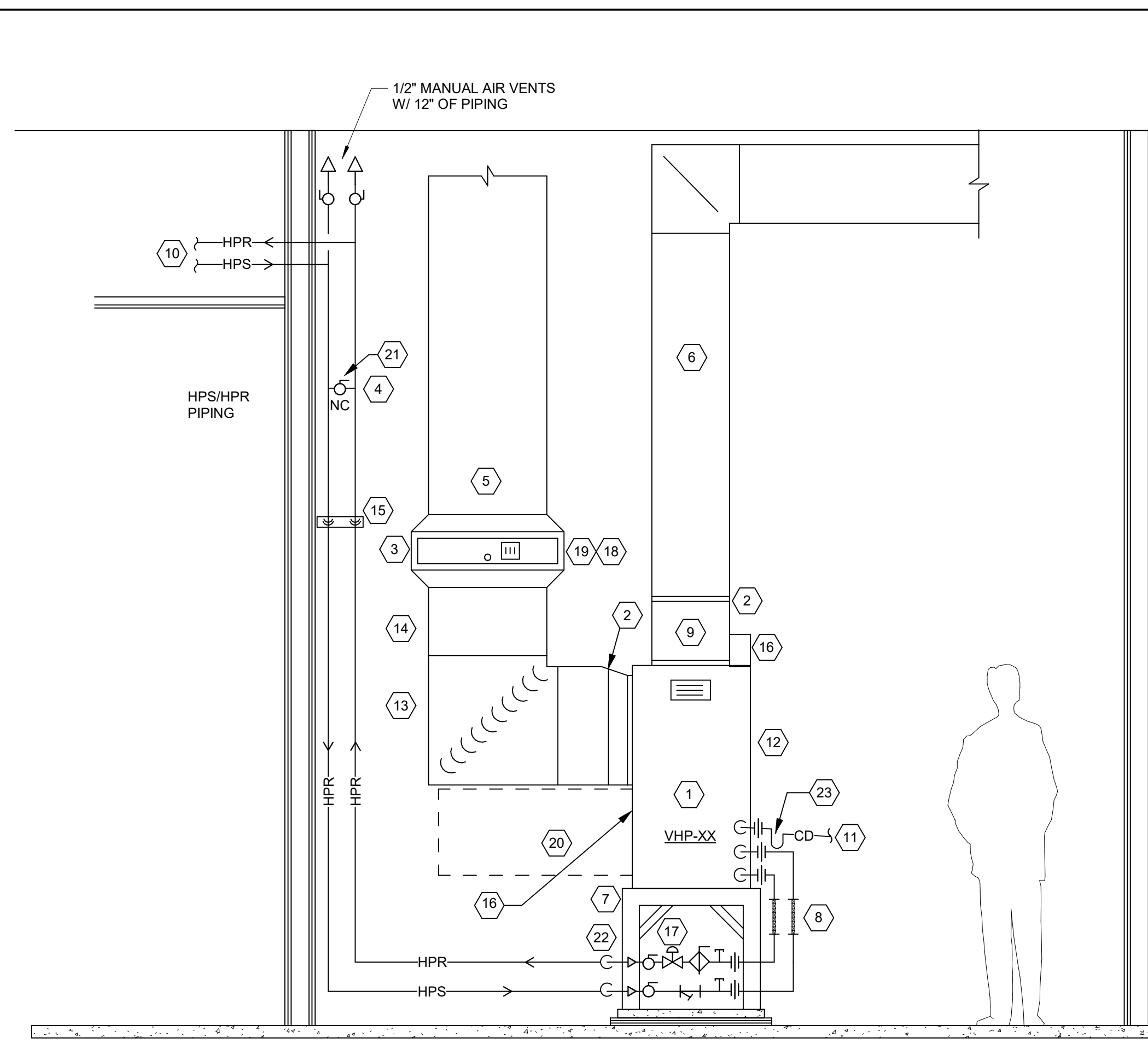
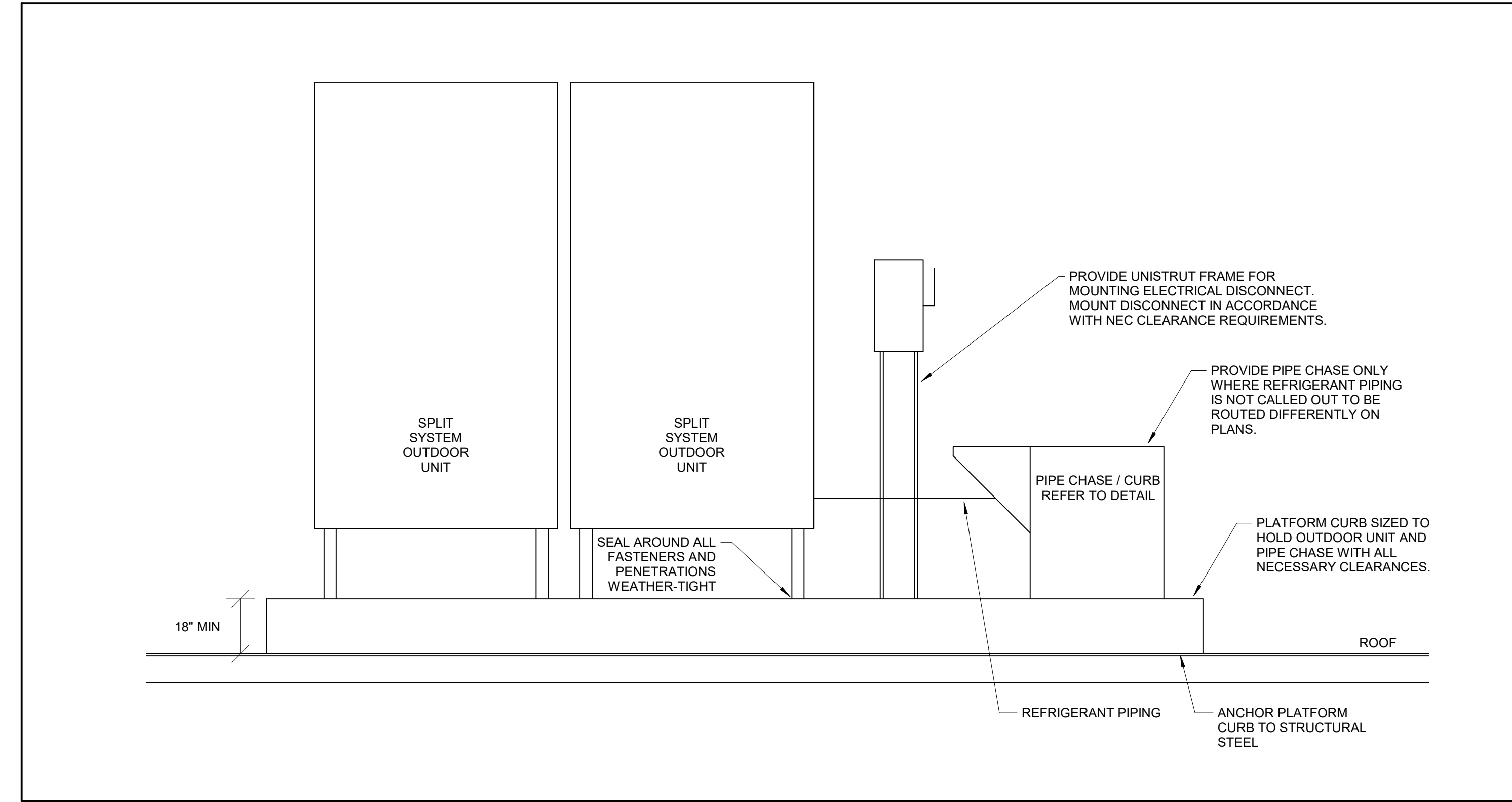
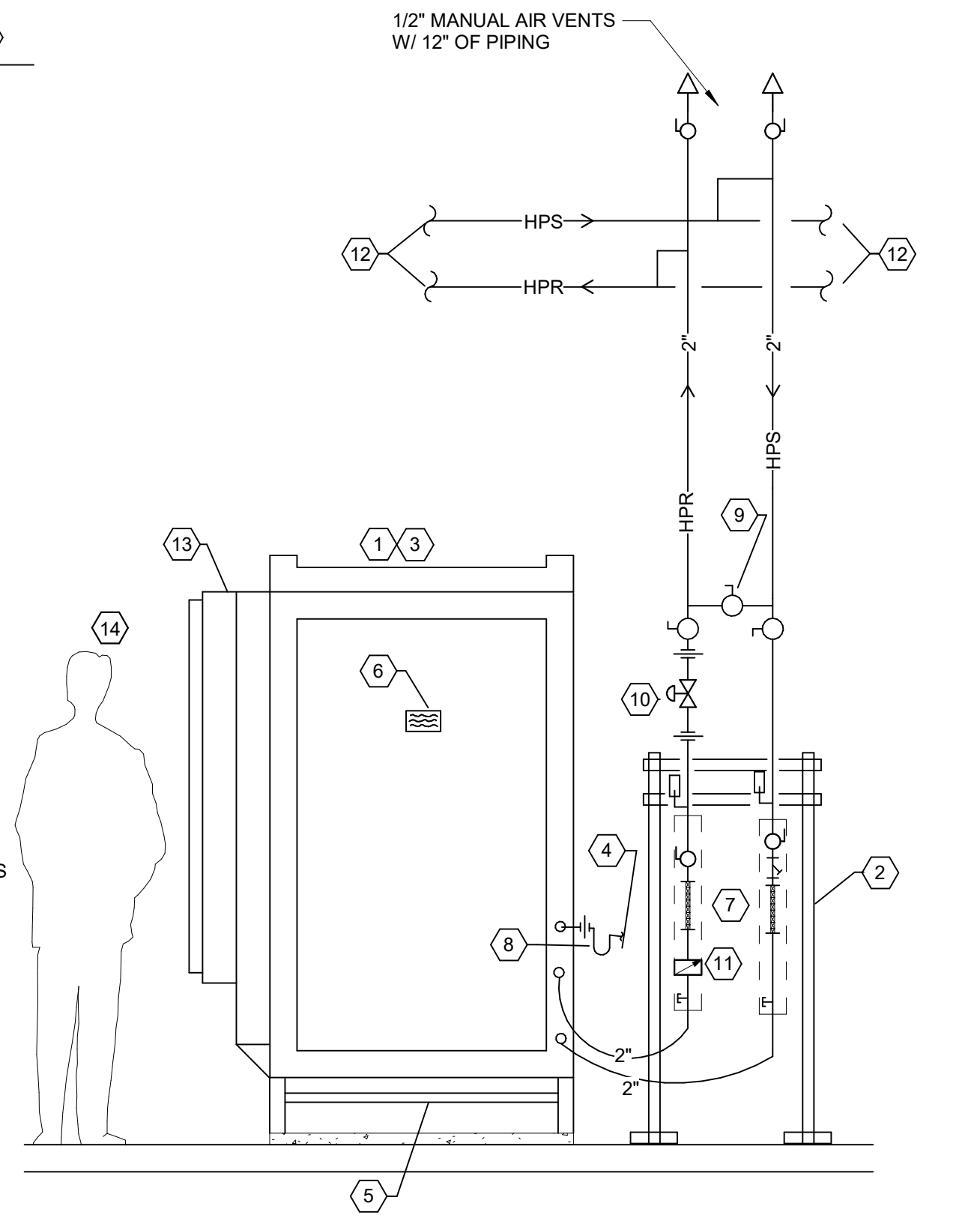






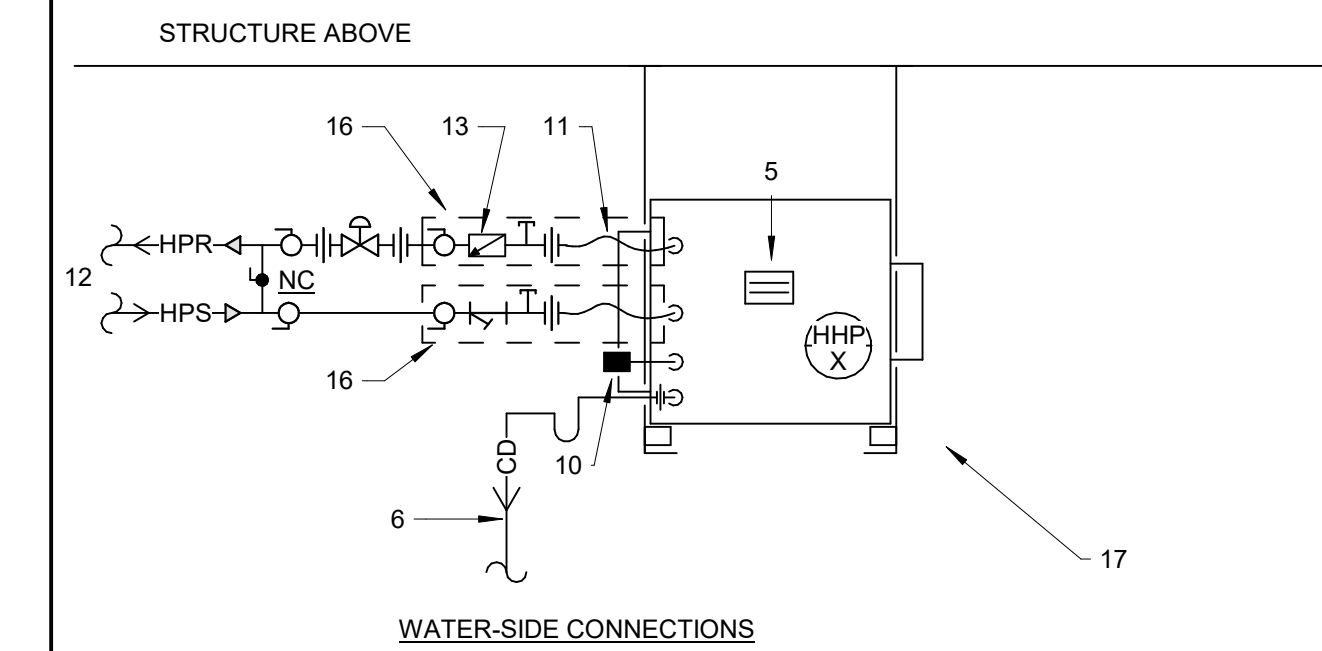
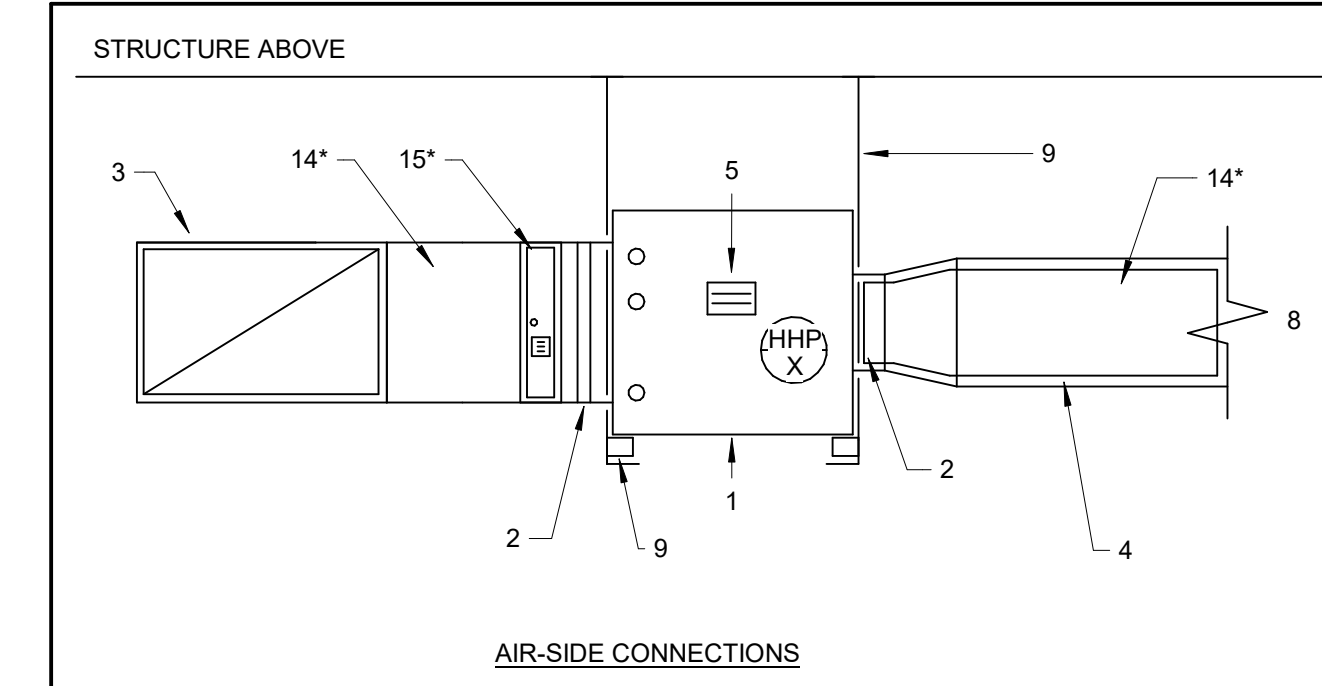


- TAG NOTES: (X)  
 1. TRANSITION SA DUCTWORK TO UNIT OPENING.  
 2. PROVIDE FLEXIBLE CONNECTION AT UNIT.  
 3. PROVIDE UNISTRUT RACK SECURED TO FLOOR.  
 4. RACK SHALL BE CONSTRUCTED TO SUPPORTS  
 VERTICAL PIPE DROPS.  
 5. REFER TO THE DRAWINGS FOR DUCT SIZE AND  
 CONTINUATION.  
 6. PROVIDE MANUFACTURER'S RECOMMENDED  
 CONDENSATE DRAIN PIPE. REFER TO THE DRAWINGS  
 FOR CONTINUATION.  
 7. MOUNT UNIT ON 4" CONCRETE PAD FOR LARGE  
 VERTICAL HEAT PUMPS. CAREFULLY COORDINATE  
 UNIT AND DUCT CONNECTIONS WITH STRUCTURE.  
 8. PROVIDE MOUNTING BRACKETS WITH VIBRATION  
 ISOLATION GROMMETS TO SECURE UNIT TO  
 CONCRETE PAD. PROVIDE VIBRATION ISOLATION PAD  
 (RUBBER/ORK) BETWEEN BOTTOM OF UNIT AND  
 CONCRETE STAND.  
 9. IDENTIFICATION PLACARD TO INCLUDE HEAT PUMP  
 TAG.  
 10. PROVIDE HOSE KITS PER SPECIFICATIONS.  
 11. CONDENSATE DRAIN TRAP SIZED PER  
 MANUFACTURER'S INSTRUCTIONS. REFER TO  
 DRAWINGS FOR CONTINUATION.  
 12. BALL VALVE BYPASS FOR FLUSHING LINES. DO NOT  
 FLUSH LINES THRU HOSE KITS. CONTROL VALVE, OR  
 HEAT PUMPS. CLOSE BALL VALVE AFTER SYSTEM  
 FLUSHING IS COMPLETE. DO NOT INSTALL BYPASS  
 LINE DIRECTLY ABOVE THE POWER DISCONNECT.  
 13. AUTOMATIC 2-WAY VALVE PROVIDED BY UNIT  
 MANUFACTURER.  
 14. AUTOMATIC BALANCING VALVE PROVIDED ON HOSE  
 KIT.  
 15. REFER TO DRAWINGS FOR CONTINUATION OF  
 PIPING. REFER TO PIPING RUNOUT SCHEDULE FOR  
 SIZING.  
 16. PROVIDE KOCH FILTER SINGLE STAGE SIDE ACCESS  
 HOUSING FILTER RACK. PROVIDE (X4) 24"x24" FILTERS  
 IN A 48"x48" SEPARATE FILTER HOUSING FOR VHP-96  
 AND VSHIP-120 INSTALLED IN RETURN DUCTWORK.  
 17. TRANSITION DUCTWORK TO AND FROM HOUSING AS  
 REQUIRED. FILTERS SHALL BE MERV13  
 18. VERTICAL HEAT PUMP MOCK-UP REQUIRED.  
 19. CONTRACTOR TO SECURE AND INSTALL ADVANCE  
 MOCK-UP UNIT AND INSTALL COMPLETE FOR REVIEW  
 IN THE FIELD PRIOR TO FULL INSTALL OF UNITS  
 THROUGHOUT PROJECT.



HEAT PUMP DETAIL TAG NOTES: (X)

- VERTICAL HEAT PUMP UNIT. DO NOT BLOCK ACCESS PANEL FOR HEAT PUMP UNIT WITH ANY OBJECT.
- PROVIDE FLEXIBLE CANVAS CONNECTIONS AT UNIT CONNECTION. TRANSITION DUCTWORK TO UNIT OPENING AS NEEDED.
- SIDE ACCESS FILTER SECTION. REFER TO SPECIFICATION
- PROVIDE FULL SIZE BYPASS CONNECTION FROM SUPPLY TO RETURN PIPING FOR FLUSHING AND AIR REMOVAL. CLOSE BYPASS VALVE UPON COMPLETION OF FLUSHING AND PURGING. FLUSH PRIOR TO OPERATION. DO NOT CONNECT ANY UNITS UNTIL FLUSHING IS COMPLETE.
- RETURN DUCTWORK. REFER TO DRAWINGS FOR DUCT SIZE.
- SUPPLY DUCTWORK. REFER TO DRAWINGS FOR DUCT SIZE.
- MOUNT UNIT ON 24" TALL 2X2X2 PAINTED ANGLE IRON STAND. PROVIDE MOUNTING BRACKETS WITH VIBRATION ISOLATING GROMMETS TO SECURE UNIT TO STAND. BOLT STAND TO FLOOR SLAB (OR CONCRETE PAD WHERE INDICATED ON FLOOR PLANS.) PROVIDE VIBRATION ISOLATION NEOPRENE PAD BETWEEN BOTTOM OF UNIT AND STAND.
- FLEXIBLE HOSE KITS, SIZE PER SPECIFICATIONS.
- TRANSITION FROM FULL SIZE OF UNIT OUTLET TO DUCT SIZE INDICATED ON THE DRAWINGS.
- REFER TO DRAWINGS FOR CONTINUATION OF PIPING. REFER TO THE PIPING RUNOUT SCHEDULE FOR SIZING.
- ROUTE PIPING TO CONDENSATE MAIN. REFER TO HYDRONIC PIPING PLANS FOR CONTINUATION. REFER TO HEAT PUMP PIPING RUNOUT SCHEDULE FOR SIZE.
- MAINTAIN MANUFACTURER'S REQUIRED CLEARANCE ON SIDE OF HEAT PUMP TO ALLOW FOR MAINTENANCE ACCESS.
- PROVIDE TRANSITION ELBOW WITH VANES FROM SIDE ACCESS FILTER TO RETURN DUCT DEPTH.
- TRANSITION DUCT FROM ELBOW TO DUCT SIZE INDICATED ON PLANS.
- SECURELY SUPPORT PIPING FROM WALL. UTILIZE VIBRATION ISOLATION SUPPORTS AT PIPING SUPPORT.
- FACTORY MOUNTED DISCONNECT.
- 2-WAY CONTROL VALVE. REFER TO CONTROL DRAWINGS.
- RETURN AIR PLENUM FULL SIZE OF FILTER. ONLY 24"x24" FILTERS WILL BE ACCEPTABLE. PROVIDE PERMANENT PLACARD AT FILTER SECTION INDICATING FILTER SIZES, QUANTITIES, MANUFACTURER/MODEL NUMBER, TOTAL DESIGN AIRFLOW AND CLEAN PRESSURE DROP.
- FOR MODELS VHP 0-36. INSTALL 1, 24"x24" FILTER. FOR MODELS VHP 42-72 INSTALL AN ARRAY OF 2, 24"x24" FILTERS.
- MAINTAIN 24" CLEARANCE ON SIDE OF HEAT PUMP TO ALLOW FOR ACCESS TO COMPRESSORS.
- ALL HEAT PUMPS SHALL BE PROVIDED WITH MEANS FOR BYPASS DURING FLUSHING. HEAT PUMP CLOSETS WITH MULTIPLE HEAT PUMPS SHALL BE PROVIDED WITH A SINGLE BYPASS VALVE. REFER TO MECHANICAL DRAWINGS FOR LOCATIONS.
- ROUTE PIPING TIGHT TO STAND. PROVIDE SUPPORT FROM STAND TO SECURE PIPE.
- SIZE CONDENSATE TRAP PER MANUFACTURER'S REQUIREMENTS.



HEAT PUMP DETAIL TAG NOTES: X

- HORIZONTAL HEAT PUMP UNIT. DO NOT BLOCK ACCESS PANEL FOR HEAT PUMP UNIT WITH ANY OBJECT. VERIFY ON FLOOR PLANS REQUIRED CONFIGURATION. (STRAIGHT THROUGH OR END SUPPLY OUTLET)
- PROVIDE FLEXIBLE CANVAS CONNECTIONS FOR SIZING
- RETURN DUCT. REFER TO FLOOR PLANS FOR SIZING
- SUPPLY DUCT. REFER TO FLOOR PLANS FOR SIZING
- IDENTIFICATION PLACARD. REFER TO SPECIFICATION SECTION ### FOR MORE INFORMATION. THE PLACARD SHALL INCLUDE THE ELECTRIC PANEL NAME AND CIRCUIT NUMBER FEEDING THE EQUIPMENT. ROUTE CONDENSATE DRAIN AS INDICATED ON THE FLOOR PLANS. REFER TO RUNOUT SCHEDULE FOR PROPER SIZING.
- SUPPLY DUCTWORK. REFER TO FLOOR PLANS FOR DUCT SIZE.
- SUPPORT FROM OVERHEAD STRUCTURE WITH THREADED ROD.
- PROVIDE VIBRATION ISOLATORS AT UNIT SUPPORT LOCATIONS.
- PROVIDE CONDENSATE OVERFLOW SENSOR PIPED TO HEAT PUMP CONDENSATE OVERFLOW CONNECTION.
- FLEXIBLE HOSE KITS, REFER TO SPECIFICATIONS FOR FURTHER REQUIREMENTS.
- REFER TO FLOOR PLANS FOR CONTINUATION OF HSIHR PIPING. REFER TO THE PIPING RUNOUT SCHEDULE FOR PROPER SIZING.
- AUTOMATIC BALANCING VALVE
- REFER TO SPECIFICATIONS FOR DETAILS ON EXPOSED DUCTWORK INSTALLATION
- MANUFACTURER PROVIDED 2" MERV 13 FILTER
- PROVIDE HOSE KITS PER SPECIFICATIONS
- HORIZONTAL HEAT PUMP MOCK-UP REQUIRED. CONTRACTOR TO SECURE AND INSTALL AN ADVANCE MOCK-UP UNIT AND INSTALL COMPLETE FOR REVIEW IN THE FIELD PRIOR TO FULL INSTALL OF UNITS THROUGHOUT PROJECT.
- \*ONLY APPLIES TO EXPOSED UNITS SERVING A STAIRWELL

NO.	DESCRIPTION	DATE	JOB NUMBER	Y2011A4	DATE
				XHER23	
			DRAWN BY	DRH	
			CHECKED BY	HCH	
			DATE	2/12/2024	

NOT FOR CONSTRUCTION







**MECHANICAL CONTROL LEGEND**

AFM	ABOVE FINISHED FLOOR	SETPT	SETPOINT
AFMS	AIR FLOW MONITORING STATION	SF	SUPPLY FAN
AI	ANALOG INPUT	SFA	SUPPLY FAN ARRAY
AO	ANALOG OUTPUT	STS	STATUS
BAS	BUILDING AUTOMATION SYSTEM	SW	SOFT WATER
BP	BOOSTER PUMP	TCC	TEMPERATURE CONTROL CONTRACTOR
CDF	100 CUBIC FEET NATURAL GAS	TEMP	TEMPERATURE
CMD	COMMAND	UC	UNOCCUPIED COOLING SETPOINT
CO2	CARBON DIOXIDE	UH	UNOCCUPIED HEATING SETPOINT
CR	CONDENSER RETURN	VFD	VARIABLE FREQUENCY DRIVE
CS	CONDENSER SUPPLY	Ta	AVERAGING TEMPERATURE SENSOR
CSR	CURRENT SENSOR RELAY	Ts	INSERTION TEMPERATURE SENSOR
CWR	CHILLED WATER RETURN	H	HUMIDITY SENSOR
CWS	CHILLED WATER SUPPLY	h	ENTHALPY SENSOR
DAT	DISCHARGE AIR TEMPERATURE	LL	LOW LIMIT TEMPERATURE SENSOR
DI	DIGITAL INPUT	P	PRESSURE SENSOR
DO	DIGITAL OUTPUT	DP	DUCT STATIC PRESSURE SENSOR
DP	DEWPOINT	DPSW	DIFFERENTIAL PRESSURE SWITCH
DR	DAMPER	ES	DAMPER END SWITCH
EA	EXHAUST AIR PATH	DPS	DIFFERENTIAL PRESSURE SENSOR
ED	FACE AND BYPASS DAMPER	C	START/STOP COMMAND
HL	HIGH LIMIT	M	MOTORIZED DAMPER
HP	HEAT PUMP	F	FLOW METER
HR	HEAT PUMP RETURN	CS	CURRENT SENSOR
HS	HEAT PUMP SUPPLY	SD	DUCT MOUNTED SMOKE DETECTOR
HWR	HOT WATER RETURN	COS	CONDENSATE OVERFLOW SWITCH
HWS	HOT WATER SUPPLY	DSP-HL	DUCT STATIC PRESSURE HIGH LIMIT
LL	LOW LIMIT	DSP-LL	DUCT STATIC PRESSURE LOW LIMIT
LPC	LOW PRESSURE CONDENSATE	ZN-DP	ZONE DEW POINT
LPS	LOW PRESSURE STEAM	ZN-OC	ZONE OCCUPANCY SENSOR
MAT	MIXED AIR TEMPERATURE	ZN-T	ZONE TEMPERATURE -48°F AFF
MAU	MAKE-UP AIR UNIT	H/W	HEATING COIL
MIN	MINIMUM	CO2	CARBON DIOXIDE SENSOR
NSW	NON-SOFTENED WATER	C/W	CHILLED WATER COIL
NCV	NORMALLY CLOSED	E/R	ENERGY RECOVERY COIL
OC	OCCUPIED COOLING SETPOINT	HUMID	HUMIDIFIER
OCH	OCCUPIED HEATING SETPOINT		
OA	OUTSIDE AIR PATH		
OAD	OUTSIDE AIR DAMPER		
OAH	OUTSIDE AIR HUMIDITY		
OAT	OUTSIDE AIR TEMPERATURE		
OCC	OCCUPANCY		
OVR	VERRIDE VIA USER INTERFACE		
PRESS	PRESSURE		
RA	RETURN AIR PATH		
RF	RETURN FAN		
RH	RELATIVE HUMIDITY		
SA	SUPPLY AIR PATH		

**GENERAL CONTROL REQUIREMENTS:**

- ALL EQUIPMENT SHALL HAVE BACNET COMPATIBLE CONTROLLERS UNLESS OTHERWISE NOTED. ALL BACNET CONTROLLED EQUIPMENT SHALL BE CONNECTED WITH THE BASE FRONT END WITH REMOTE ACCESS FOR FACILITY OPERATORS.
- ALL HARDWARE, EQUIPMENT, AND THE BAS FRONT END MUST FULLY COMPLY WITH THE CONTROLS SPECIFICATIONS.
- A VALVE EXERCISE PROGRAM SHALL BE INCLUDED AS PART OF THE DDC SYSTEM TO OPEN AND CLOSE AUTOMATIC CONTROL VALVES AND ACTUATORS 2 FULL STROKES DURING AN UNOCCUPIED PERIOD EVERY WEEK.
- ALL POINT NAMES SHALL HAVE A STANDARDIZED NAMING CONVENTION TO BE COORDINATED AND APPROVED BY CMTA.
- ALL EQUIPMENT TO HAVE UNIQUE TAG, COORDINATE NAMING WITH MECHANICAL PLANS AND EQUIPMENT LABELING.
- FOR UNITS THAT SERVE THE SAME SPACE, LEADER/FOLLOWER PROGRAMMING LOGIC OR OTHER PROGRAMMING METHODS SHALL BE IMPLEMENTED TO AVOID SIMULTANEOUS HEATING AND COOLING. ALL FANS AND PUMPING MONITORED BY THE BAS SHALL HAVE RUN HOURS ACCUMULATED.
- GRAPHICS SHALL INCLUDE A SUMMARY TABLE FOR EACH EQUIPMENT TYPE WITH MORE THAN 1 PIECE OF EQUIPMENT. COORDINATE PERTINENT OPERATING PARAMETERS FOR EACH SYSTEM TYPE WITH CMTA.
- PROVIDE CMTA ACCESS TO ALL DATA, PROGRAMMING LOGIC, WIRE SHEETS, ETC. ALL SHALL BE EXPOSED TO CMTA FOR REVIEW COMMENT, AND TROUBLESHOOTING. PROVIDE CMTA WITH ALL ACCESS, LICENSES, ETC. AS REQUIRED. A CONTROLS PROGRAMMING SOFTWARE PACKAGE SHALL BE PROVIDED TO CMTA AND THE OWNER FOR ACCESS TO UNITARY CONTROLS PROGRAMMING LOGIC.
- PROVIDE ALL INSTALLATION, SUPERVISION, LABOR, AND MATERIAL (IE CONDUIT, WIRE, CABLE, ETC) AS REQUIRED TO INSTALL THE ENTIRE CONTROLS SYSTEM PER DOCUMENT REQUIREMENTS.
- PROVIDE ENGINEERED DRAWINGS, STARTUP, DATABASE PROGRAMMING, STANDARD COLOR GRAPHICS, INCLUDING THERMOGRAPHIC SITE PLAN, EQUIPMENT, FLOORPLANS, ETC.
- ALL EXPOSED WIRING, WIRING IN WALLS, HARD CEILINGS, AND MECHANICAL ROOMS SHALL BE IN CONDUIT. ALL CONCEALED WIRING SHALL BE PLENUM RATED WIRE NEATLY SUPPORTED UTILIZING BRIDAL RINGS.
- INCLUDE 1-YEAR PARTS WARRANTY, 1-YEAR LABOR WARRANTY, AND ONE YEAR JACE SOFTWARE MAINTENANCE AGREEMENT (SMA) FROM THE SIGNED DATE OF FINAL COMPLETION OF EACH SCHOOL. REFER TO COMMISSIONING REQUIREMENTS FOR ADDITIONAL VERIFICATION AND TESTING REQUIREMENTS AND INCLUDE ALL COSTS REQUIRED TO ACCOMMODATE COMMISSIONING OF BUILDING CONTROL SYSTEM. REFER TO RELATED COMMISSIONING SPECIFICATION FOR FURTHER DETAIL.
- ALL DEVICES THAT ARE ON THE BAS MUST HAVE A WARNING LABEL ON THE EQUIPMENT THAT IS CONTROLLED USING REMOTE PROGRAMMING AND CAN START AT ANY TIME.
- ALL THERMOSTATS TO HAVE UNOCCUPIED OVERRIDE BUTTON THAT GIVES OCCUPANT 90 MINUTES (ADJ.) OF OCCUPIED OPERATION WHEN PRESSED. THERMOSTATS SHALL HAVE AN OVERRIDE AND SHALL DISPLAY ROOM TEMPERATURE BUT ABLE TO BE PROGRAMMED TO SHOW ONLY SETPOINT IF DESIRED. ALL THERMOSTATING WILL MONITOR TEMPERATURE. ALL THERMOSTATS SHALL HAVE A WARMER/COOLER WHEEL OR SLIDE FOR OCCUPANCY ADJUSTMENT AT THE SPACE THAT SHALL BE LIMITED BY OPERATOR PROGRAMMING, WHERE SPECIFIED IN THE INDIVIDUAL FACILITY BID PACKAGE SECTION. THERMOSTATS SHALL MONITOR SPACE TEMPERATURE AND/OR RELATIVE HUMIDITY.
- ENSURE THAT ALL SPARE-MOUNTED CO2 SENSORS, HUMIDISTATS, THERMOSTATS, ETC PROVIDED HAVE NO DIGITAL DISPLAY

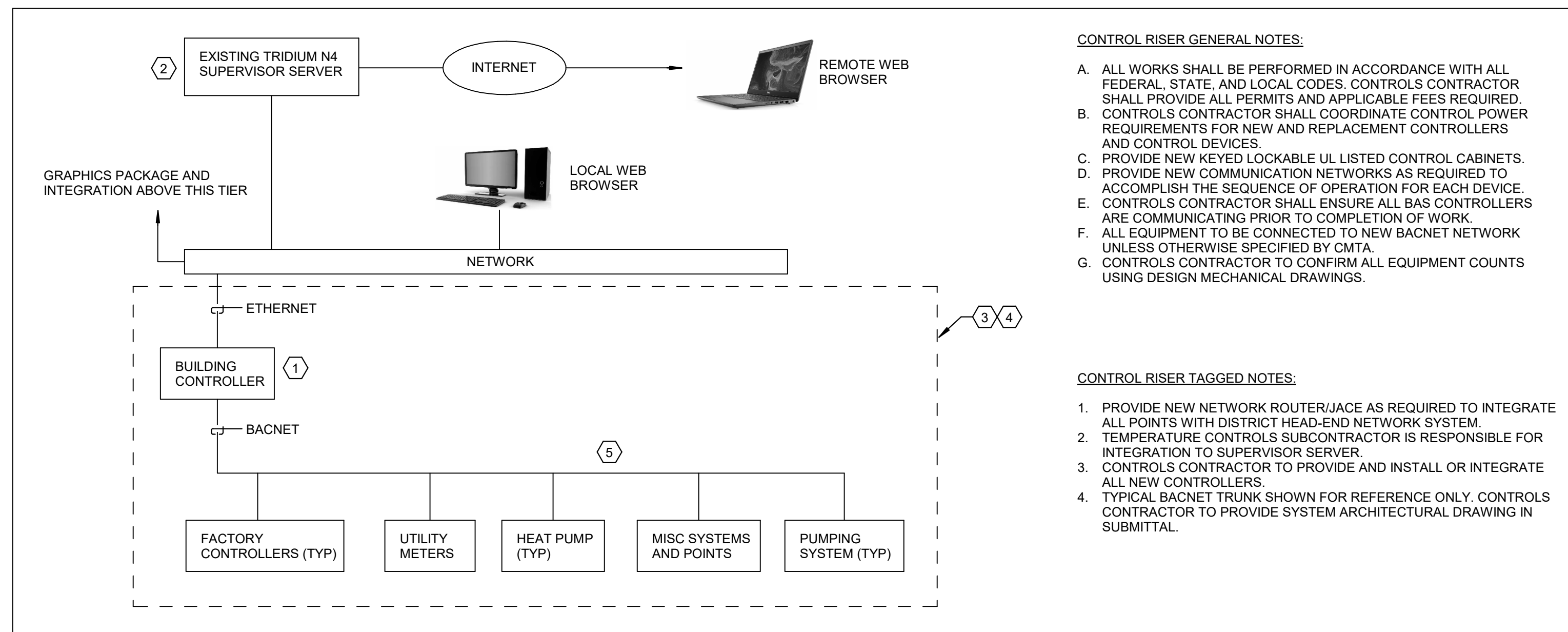
**CONTROL GRAPHIC REQUIREMENTS:**

- SETPOINTS & SOFT SETBACK: EACH UNIT USED FOR SPACE CONDITIONING SHALL, ON THE GRAPHIC, SHOW CURRENT HEATING AND COOLING SETPOINT, UNOCCUPIED AND OCCUPIED HEATING AND COOLING SETPOINT, AND TIME FOR WHICH SPACE SHALL CHANGE STATUS (IE FROM OCCUPIED TO UNOCCUPIED OR UNOCCUPIED TO OCCUPIED). THESE SETPOINTS SHALL BE ADJUSTABLE ON THE GRAPHIC PAGE. ALL TEMPERATURE ADJUSTMENT VALUES (TEMPERATURE RESETS, DEMAND LIMITING, OCCUPANT ADJUST, ETC.) SHALL BE SHOWN ON THE GRAPHICS.
- TRENDS ON GRAPHICS: ALL TRENDED POINTS SHALL BE MADE AVAILABLE THROUGH THE GRAPHICAL INTERFACE.
- SAMPLES FOR REVIEW: PROVIDE A SAMPLE OF EACH FOR REVIEW WITH SUBMITTALS OR UNDER SEPARATE COVER.
- ANIMATION LINKED TO STATUS: ANY ANIMATION SUCH AS FLOWING PIPE ARROWS SHALL BE LINKED TO THE STATUS OF THE EQUIPMENT. FOR EXAMPLE, DO NOT SHOW MOVING PIPE ARROWS FOR PUMPS THAT ARE OFF.
- COLORS: USE BACKGROUND COLOR AS DIRECTED BY CMTA (WHITE OR BLACK).
- ALARMS: EQUIPMENT GRAPHICS PAGE SHALL HAVE SECTION THAT CLEARLY DISPLAYS ANY SYSTEM RELATED ALARMS IN EFFECT.
- GRAPHICS SHALL HAVE ROOM NAMES, ROOM NUMBERS, AND UNIT DESCRIPTIONS SHOWN. THE GRAPHICS SHALL SHOW OUTSIDE AIR TEMPERATURE AND THE CURRENT FACILITY ELECTRIC DEMAND LEVEL (KW). BOUNDARIES SHALL BE DEPICTED OF WHAT UNITS SERVE WHICH AREAS. COLOR CODING OR BOUNDARY OUTLINE OR OTHER APPROVED METHOD. CMTA SHALL BE PROVIDED WITH AN EXAMPLE AND APPROVE THE METHOD USED. GRAPHICS SHALL INCLUDE SECTION THAT CLEARLY DISPLAYS CURRENT ALARMS WITH LINK TO ASSOCIATED SYSTEM.

**CONTROLS POINTS LIST CLARIFICATION:**

ALL POINTS LISTS WITHIN THIS DOCUMENT INCLUDE THE DESIGNATIONS AV AND BV. THESE REPRESENT ANALOG VALUES AND BINARY VALUES RESPECTIVELY. THESE DESIGNATIONS WILL DIFFER BY EQUIPMENT AS FOLLOWS:

- IF EQUIPMENT IS FURNISHED WITH A FACTORY BACNET CONTROLLER, ALL AVAILABLE POINTS ARE BROUGHT IN THROUGH INTEGRATION BY CONTROLS CONTRACTOR. POINTS ALL FUNCTION AS SOFTWARE POINTS EVEN IF SENSOR REQUIRED TO BE FIELD INSTALLED AND WILL ALL BE DESIGNATED AS VIRTUAL POINTS. AV/BV SENSORS WILL BE FURNISHED WITH THE EQUIPMENT, UNLESS OTHERWISE NOTED. CONFIRM AVAILABLE POINTS AND CONFIGURATION WITH CMTA UPON EQUIPMENT SELECTION.
- IF EQUIPMENT IS FURNISHED WITH A TERMINAL STRIP FOR CONNECTION TO A THIRD PARTY CONTROLLER BY THE CONTROLS CONTRACTOR, THE INPUTS AND OUTPUTS FUNCTION AS HARDWARE POINTS WHILE THE VIRTUAL POINTS FUNCTION AS SOFTWARE POINTS. CONFIRM AVAILABLE POINTS AND CONFIGURATION WITH CMTA UPON EQUIPMENT SELECTION.



**CONTROL RISER GENERAL NOTES:**

- ALL WORKS SHALL BE PERFORMED IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL CODES. CONTROLS CONTRACTOR SHALL PROVIDE ALL PERMITS AND APPLICABLE FEES REQUIRED.
- CONTROLS CONTRACTOR SHALL COORDINATE CONTROL POWER REQUIREMENTS FOR NEW AND REPLACEMENT CONTROLLERS AND CONTROL DEVICES.
- PROVIDE NEW KEYPAD LOCKABLE UL LISTED CONTROL CABINETS.
- PROVIDE NEW COMMUNICATIONS AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF OPERATION FOR EACH DEVICE.
- CONTROLS CONTRACTOR SHALL ENSURE ALL BAS CONTROLLERS ARE COMMUNICATING PRIOR TO COMPLETION OF WORK.
- ALL EQUIPMENT TO BE CONNECTED TO NEW BACNET NETWORK UNLESS OTHERWISE SPECIFIED BY CMTA.
- CONTROLS CONTRACTOR TO CONFIRM ALL EQUIPMENT COUNTS USING DESIGN MECHANICAL DRAWINGS.

**CONTROL RISER TAGGED NOTES:**

- PROVIDE NEW NETWORK ROUTER/JACE AS REQUIRED TO INTEGRATE ALL POINTS WITH DISTRICT HEAD-END NETWORK SYSTEM.
- TEMPERATURE CONTROLS SUBCONTRACTOR IS RESPONSIBLE FOR INTEGRATION TO SUPERVISOR SERVER.
- CONTROLS CONTRACTOR TO PROVIDE AND INSTALL OR INTEGRATE ALL NEW CONTROLLERS.
- TYPICAL BACNET TRUNK SHOWN FOR REFERENCE ONLY. CONTROLS CONTRACTOR TO PROVIDE SYSTEM ARCHITECTURAL DRAWING IN SUBMITTAL.

**BUILDING TRENDS NOTES:**

- CONTROLS CONTRACTOR SHALL IDENTIFY AND PROVIDE GRAPHS FOR ALL TRENDS INDICATED WITHIN TABULAR FORM AS INDICATED WITH BUTTON FOR GRAPH. REFER TO THE REQUIRED BUILDING TRENDS TABLE.
- REFER TO ELECTRICAL SPECIFICATIONS - ELECTRICAL CONTRACTOR TO PROVIDE ENERGY METER SYSTEM FOR MONITORING OF ELECTRICAL LOADS. BAS CONTRACTOR TO INTERFACE WITH MAIN ELECTRIC METER AND PULL POINTS TO ACCOMPLISH THE TRENDS LISTED UNDER THE REQUIRED BUILDING TRENDS.
- SAMPLING RESOLUTION FREQUENCY OF ALL TRENDS TO BE NO LESS THAN 15 MIN.
- DAILY VALUE INDICATES THE APPLICABLE VALUE RECORDED FROM THAT DAY. YESTERDAY VALUE INDICATES EQUIVALENT VALUE FROM THE PREVIOUS DAY. MONTHLY VALUE INDICATES THE CALENDAR 'MONTH-TO-DATE' VALUE. LAST MONTH INDICATES THE EQUIVALENT VALUE FROM THE PREVIOUS CALENDAR MONTH. YEARLY VALUE INDICATES THE CALENDAR 'YEAR-TO-DATE' VALUE. LAST YEAR INDICATES THE EQUIVALENT VALUE FROM THE PREVIOUS CALENDAR YEAR. GRAPH TRENDS INDICATES THAT A BUTTON SHALL BE REQUIRED ON THE TRENDS SCREEN WHICH WILL TAKE THE BUILDING OPERATOR TO A GRAPH OF THE RELEVANT VALUE. REFER TO NOTES FOR SPECIFIC GRAPH REQUIREMENTS.
- SYSTEM SHALL BE CAPABLE OF RECORDING AND STORING ALL RELEVANT TRENDS AND DATA FOR A FIVE YEAR PERIOD.
- GRAPH SHALL BE A LINE GRAPH WHICH SHOWS THE RELEVANT VALUE ON THE Y-AXIS AND HAS OPTIONS FOR THE X-AXIS TO GRAPH AT A DAILY RESOLUTION FOR EACH OF THE PAST 30 DAYS, A MONTHLY RESOLUTION FOR EACH OF THE LAST 12 MONTHS, OR A YEARLY RESOLUTION FOR EACH OF THE LAST 5 YEARS. FOR THE DAILY AND MONTHLY RESOLUTION LEVELS, THE LINE GRAPH SHALL INCLUDE A LINE REPRESENTATIVE OF NOT ONLY THE CURRENT MONTH/YEAR BUT ALSO THE PREVIOUS MONTH/YEAR.
- DATA POINT WILL BE A TOTAL CUMULATIVE RUNTIME VALUE. BAS TO PROVIDE ADDITIVE TIMER TO ACHIEVE DATA POINT.
- ALL BUILDING TRENDS TO BE ACCESSED THROUGH A 'BUILDING TRENDS' SCREEN ACCESSIBLE TO THE BUILDING OPERATOR WHICH SHOWS A TABLE SIMILAR TO THE BUILDING TRENDS SCHEDULE SHOWN HERE. HOWEVER THE ACTUAL CALCULATED VALUES SHALL BE LISTED IN THE DAILY VALUE/YESTERDAY/MONTHLY VALUE/LAST MONTH/YEARLY VALUE/LAST YEAR COLUMNS AND A BUTTON LINK WILL BE PROVIDED TO THE GRAPH TRENDS COLUMN.
- FOR INSTANTANEOUS POINTS SUCH AS FLOW AND KW, DAILY VALUE INDICATES THE APPLICABLE VALUE RECORDED AT THAT PARTICULAR 15 MIN RESOLUTION WINDOW. YESTERDAY VALUE INDICATES THE EQUIVALENT VALUE FROM THE SAME TIME ON THE PREVIOUS DAY. MONTHLY VALUE INDICATES THE CALENDAR 'MONTH-TO-DATE' MAXIMUM VALUE. LAST MONTH INDICATES THE EQUIVALENT MAXIMUM VALUE FROM THE PREVIOUS CALENDAR MONTH. YEARLY VALUE INDICATES THE CALENDAR 'YEAR-TO-DATE' MAXIMUM VALUE. LAST YEAR INDICATES THE EQUIVALENT MAXIMUM VALUE FROM THE PREVIOUS CALENDAR YEAR. GRAPH TRENDS INDICATES THAT A BUTTON SHALL BE REQUIRED ON THE TRENDS SCREEN WHICH WILL TAKE THE BUILDING OPERATOR TO A GRAPH OF THE RELEVANT VALUE. REFER TO NOTES FOR SPECIFIC GRAPH REQUIREMENTS.
- ELECTRICITY AND GAS CONSUMPTION DATA POINT WILL BE A TOTAL CUMULATIVE KWH OR CCF USAGE VALUE OVER THE TIME PERIOD INDICATED.

\*ALL POINTS REQUIRED TO EITHER CALCULATE OR DESCRIBE THE TRENDS LISTED SHALL BE PROVIDED WITH A NAMING CONVENTION OF THE CONTRACTOR'S CHOOSING. NAMING CONVENTIONS TO BE RECORDED IN A SUMMARY DOCUMENT WHICH INCLUDES AT MINIMUM THE POINT NAME, ANY SENSORS OR METERS ASSOCIATED WITH THE POINT AND WHICH BUILDING SYSTEM THEY ARE A COMPONENT OF. ANY CALCULATION ASSOCIATED WITH THE POINT AND A CLEAR POINT DESCRIPTION.  
 \*\*CONTROLS CONTRACTOR TO CAREFULLY REVIEW REQUIRED TRENDS AND PROVIDE SUFFICIENT STORAGE SPACE TO STORE DATA COLLECTED AT THE RESOLUTION INDICATED OVER THE TIME PERIODS INDICATED.  
 \*\*\*PROVIDE OPTION FOR USER TO EXPORT TREND DATA TO CSV FILE.

**EQUIPMENT SCHEDULING REQUIREMENTS:**

**EQUIPMENT SCHEDULES:**

EVERY SYSTEM SHALL OPERATE ACCORDING TO A USER DEFINABLE SCHEDULE. COORDINATE FINAL SCHEDULES AND GROUPS WITH CMTA PRIOR TO IMPLEMENTATION. COORDINATE FINAL SCHEDULING CAPABILITY WITH OTHER BID REQUIREMENTS.

**NORMAL SCHEDULE** - THESE ARE THE BASIC NORMAL WEEKLY SCHEDULES THAT ARE ENTERED AND RETAINED. THESE MAY BE PUT AT ANY LEVEL CHOSEN BY THE USER. EQUIPMENT, ZONE, SCHOOL, OR DISTRICT) AND MUST BE ADJUSTABLE. AN ADJUSTABLE STAGED OR OPTIMAL START ALGORITHM MUST BE INCLUDED TO ENABLE SPACES TO MEET NORMAL SCHEDULE OCCUPIED SETPOINT BY NORMAL SCHEDULE START TIME.

**HOLIDAY SCHEDULE** - THESE SCHEDULES PUT EQUIPMENT, ZONES, SCHOOLS, OR THE DISTRICT IN UNOCCUPIED MODE WHILE 'NORMAL' SCHEDULES REMAIN INTACT. WHEN SCHOOL IS CANCELED OR OVER BREAKS, MANY TIMES, THESE ARE PUT IN AT DISTRICT OR SCHOOL LEVEL. HOLIDAY TAKES PRIORITY OVER 'NORMAL' SO THAT SCHOOLS/ZONES/EQUIPMENT OPERATE AS UNOCCUPIED.

**OVERRIDE SCHEDULES** - TURNS EQUIPMENT OR AREAS TO OCCUPIED MODE WHILE 'HOLIDAY' OR 'NORMAL' IS RETAINED. OVERRIDE TAKE PRIORITY OVER 'HOLIDAY' AND 'NORMAL'.

**VENTILATION SCHEDULE** - THIS SCHEDULE SHALL CONTROL THE OPERATION OF THE SCHEDULED BUILDING EXHAUST FANS AND OUTSIDE AIR VENTILATION EQUIPMENT AND DAMPERS. THIS SCHEDULE SHALL CLOSE THE VENTILATION OFF AND TURN OFF THE BUILDING EXHAUST FANS DURING UNOCCUPIED PERIODS TO ENABLE BETTER TEMPERATURE AND HUMIDITY CONTROL. DURING THE SUMMER WHEN THE ECONOMIZER IS ENABLED, VENTILATION WILL BE ALLOWED.

**SUMMER MODE OPERATION** - DURING THE SUMMER MONTHS, THE BUILDING SHALL OPERATE AT REDUCED OCCUPANCY LOAD. THIS MODE SHALL ONLY AFFECT SPECIFIED EQUIPMENT WITHIN THE BUILDING THAT HAS REGULAR SUMMER OCCUPANCY. REMAINING EQUIPMENT WITHIN THE BUILDING SHALL OPERATE UNDER THEIR OWN SCHEDULE GROUPS IN THE UNOCCUPIED MODE TO CONTROL SPACE TEMPERATURE AND HUMIDITY WHILE IN SETBACK. COORDINATE FINAL SCHEDULE GROUPS WITH CMTA PRIOR TO IMPLEMENTATION.

**SNOW DAY OPERATION** - FUNCTIONALITY SHALL BE BUILT INTO THE CONTROLS TO ALLOW FOR THE OVERRIDE OF ALL SCHEDULES INTO AN UNOCCUPIED STATE DUE TO THE SUDDEN CANCELLATION OF SCHOOL OR SIMILAR EVENT. SYSTEM OVERRIDE SWITCHES SHALL REMAIN IN PLACE AS STATED IN EACH SYSTEMS CONTROL SEQUENCE TO ALLOW FOR ISOLATED SPACES TO BE PLACED IN OCCUPIED MODE DURING SCHEDULED UNOCCUPIED HOURS.

SYSTEM SHALL HAVE ABILITY TO PUT A BUILDING, GROUP, OR PIECE OF EQUIPMENT INTO OVERRIDE. FOR EXAMPLE, THIS WOULD APPLY TO TYPICAL K-12 SUMMER OPERATION. ALL SCHOOLS ARE TYPICALLY TURNED TO UNOCCUPIED VIA A HOLIDAY THAT OVERRIDES THE NORMAL SCHEDULE. HOWEVER, SCHOOL EVENTS WILL REQUIRE CERTAIN AREAS OR PIECES OF EQUIPMENT TO BE TURNED ON AT ANY GIVEN SCHOOL. THE OVERRIDE FUNCTION ALLOWS THESE TO BE TURNED ON, WHILE THE DISTRICT WIDE SUMMER HOLIDAY REMAINS IN FORCE FOR ALL SCHOOLS.

**BASE/DEFAULT TIME IN ALL SCHEDULES SHALL BE UNOCCUPIED.** IF THERE IS NO EVENT, OR NO SCHEDULE, THE ITEM IS TO BE UNOCCUPIED. DO NOT REQUIRE THE USER TO PUT IN BOTH UNOCCUPIED TIME AND OCCUPIED TIME FOR SCHEDULES. ONLY OCCUPIED TIME IS TO BE INPUT BY USER. IF A PIECE OF EQUIPMENT IS TO BE OCCUPIED/ENABLED 24 HOURS PER DAY, THE SCHEDULE SHALL BE PUT IN AS 24 HOURS PER DAY. DO NOT CHANGE DEFAULT TO OCCUPIED.

**BASE BUILDING GROUPS ARE AS FOLLOWS:**  
**GYMNASIUM:** INCLUDES HEAT PUMPS SERVING SPACES 154, 154B, 154A, VA-2, AND 155.  
**AUDITORIUM:** INCLUDES HEAT PUMPS SERVING SPACES 156, 158, VA-3, AND 155.  
**BAND:** INCLUDES HEAT PUMPS SERVING SPACES 163, 169, 159E, 159C, 1635, 163D, 163B, 163A, C105.  
**ADMN:** ALL HEAT PUMPS WITHIN ADMN AREA AND VA-1 AND ADJACENT ENTRY LOBBY.  
**MEDIA CENTER:** INCLUDES HEAT PUMP SERVING SPACE 107.  
**KITCHEN:** INCLUDES HEAT PUMPS SERVING SPACES 149, 149C, 150, 149F, AND C104.  
**NOBLE CLASSROOM GROUP:** INCLUDES ALL HEAT PUMPS SERVING EDUCATIONAL SPACES WITHIN AREA C, FIRST AND SECOND FLOORS.  
**SOUTH CLASSROOM GROUP:** INCLUDES ALL HEAT PUMPS SERVING EDUCATIONAL SPACES WITHIN AREA E, FIRST AND SECOND FLOORS.  
**CENTRAL CLASSROOM GROUP:** INCLUDES ALL HEAT PUMPS SERVING EDUCATIONAL SPACES WITHIN AREAS D AND F, FIRST AND SECOND FLOORS.

SEE EXAMPLE SCHEDULE BELOW:

**BUILDING VITAL SIGNS MONITORING:**

- Intent: It is the intent of these drawings that the building controls contractor provide graphics that present the major components of the building performance. With this graphic, the owner can examine how the building is performing compared to a baseline performance of the first year. All this information shall be provided in a single graphical screen. Similar to the screenshot shown below.
- The 5 major vital signs that shall be monitored are the building energy usage, energy demand, building comfort, average CO2 level, and domestic water usage. Controls contractor shall measure these values over a 1 year period and use these values as a baseline value to establish a grading system.
- A link will be provided from the main building vital signs interface to the required building trends table. Refer to required building trends for additional detail.
- A grading system shall be developed to provide the owner with information on how the building is performing in the current year compared to the baseline year. The grading system shall be scaled based on the information below:
- Energy usage grading scale: The controls contractor shall measure the KWH consumption over a year long period as a baseline. This baseline shall be used as a benchmark to compare yearly KWH and establish the following grading scale:
  - The total building KWH usage over a year long period is less than the baseline building KWH usage.
  - The total building KWH usage over a year long period is 0-10% greater the baseline building KWH usage.
  - The total building KWH usage over a year long period is 10-20% greater the baseline building KWH usage.
  - The total building KWH usage over a year long period is 20-30% greater the baseline building KWH usage.
  - The total building KWH usage over a year long period is greater than 30% of the baseline building KWH usage.
- Energy demand grading scale: The controls contractor shall measure the KW demand of the building over a year long period and record the highest KW value over this time period as the baseline building peak demand. The yearly peak energy used shall be compared to the baseline peak energy usage to establish the following grading scale:
  - The peak KW demand over a year long period is less than the baseline peak KW demand.
  - The peak KW demand over a year long period is 0-10% greater than the baseline peak KW demand.
  - The peak KW demand over a year long period is 10-20% greater than the baseline peak KW demand.
  - The peak KW demand over a year long period is 20-30% greater than the baseline peak KW demand.
  - The peak KW demand over a year long period is greater than 30% of the baseline peak KW demand.
- Building comfort grading scale: The controls contractor shall take an average of all building setpoints in the system and compare that to an instantaneous average all the actual temperatures in the building. The controls contractor shall measure the temperature differential between the average building setpoint and the average building temperature. These values shall be averaged over a yearly period and be used to form the grading scale shown below:
  - The average building temperature is within 1°F of the building setpoint.
  - The average building temperature is within 2°F of the building setpoint.
  - The average building temperature is within 3°F of the building setpoint.
  - The average building temperature is within 4°F of the building setpoint.
  - The average building temperature is greater than or less than 4°F of the building setpoint.
- Building ventilation grading scale: The controls contractor shall take an average of the building CO2 level over a yearly period and use this information to establish the following grading scale:
  - The average building CO2 level is less than or equal to 1,300 ppm.
  - The average building CO2 level is between 1,300 ppm and 1,500 ppm.
  - The average building CO2 level is between 1,500 ppm and 1,700 ppm.
  - The average building CO2 level is between 1,700 ppm and 1,900 ppm.
  - The average building CO2 level is greater than 1,900 ppm.
- Building domestic water usage grading scale: The controls contractor shall measure the total gallons of water used over a year long period as a baseline. This baseline shall be used as a benchmark to compare yearly water consumption and establish the following grading scale:
  - The total gallons of water used is less than baseline.
  - The total gallons of water used is 0-10% greater than baseline.
  - The total gallons of water used is 10-20% greater than baseline.
  - The total gallons of water used is 20-30% greater than baseline.
  - The total gallons of water used is greater than 30% of the baseline water usage.

**HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 MECHANICAL CONTROLS**

**RBS DESIGN GROUP  
 ARCHITECTURE**

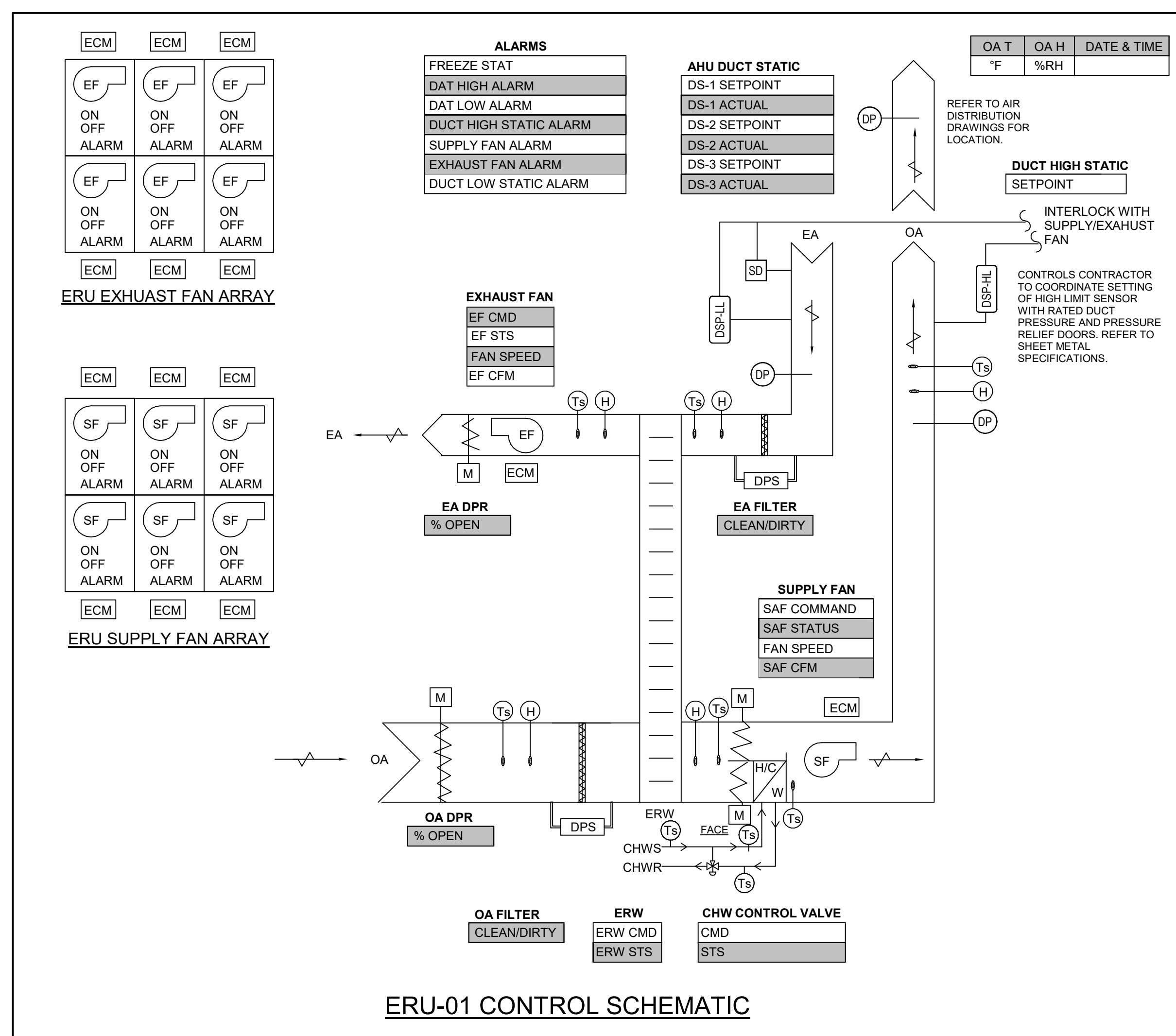
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ALLOTT/LEWIS	DATE	2/12/2024
YOUTH CENTER	DRAWN BY	
	CHECKED BY	
	DATE	

NOT FOR CONSTRUCTION

SHEET NUMBER  
**M9.0**





**ERU-1 SEQUENCE OF OPERATION**

1. General:  
 A. ERU-1 is the sole unit responsible for the ventilation of WC High School. It is a 30k CFM air handler with a demand control ventilation sequence of control which coordinates with networked VAV boxes to vary the supply of ventilation air to meet building occupancy schedules, etc. Refer to VAV box sequence of control for additional detail.  
 B. The unit is sized with diversity and balance specifications for additional details on unit balance.  
 C. The unit will be provided with complete field mounted controls. EC motors provided by manufacturer will require some interface with supplied motor control panel. The controls contractor shall coordinate with manufacturer during shop drawing review period to ensure that all coordination required to achieve the sequence of operation takes place prior to the ordering of equipment.  
 D. Unit conditioning is provided by dedicated combination chilled/hot water heating system. Refer to related controls schematic, this sheet for details.

2. Occupancy Schedule:  
 A. Refer to Controls General Notes for occupancy Schedule.  
 B. The unit shall be placed in unoccupied mode from the DDC control system. Refer to scheduling requirements for additional information.

3. Supply and Exhaust Fan Control:  
 A. Both supply and exhaust fan array are to be provided with a networked airflow monitoring system which will calculate for each fan and for the total array the CFM of each fan at all times. Accuracy to be +/- 1%.  
 B. Supply and Exhaust fan will be started and stopped from the local DDC Panel per the schedule. When the start command is issued the outside air and exhaust air dampers will open. When the dampers are full open, an end switch will engage an EP which will then allow the fan to start. If the end switch fails to engage the EP the fan will not be allowed to start. If for this or any other reason the supply fan status does not match the commanded value an alarm will be generated. When the supply fan status indicates the fan has started, the control sequence will be enabled.  
 C. The supply and exhaust fan shall be controlled from their respective EC motors and associated motor control panel. Controls contractor to provide wiring, sensors, and programming to detect both.  
 D. The supply fan will operate to maintain duct static pressure. Refer to the control drawings for the number of duct mounted static pressure sensors which shall control the supply fan to maintain a duct static pressure setpoint of 0.6" (adj.) at all locations. Convection oven static pressure setpoint with TAB contractor. Pressure setpoint shall be as low as feasible to maintain proper system operation. The locations of the duct static pressure sensors are also shown on the drawings. Fan supply static pressure optimization shall be utilized by polling of associated VAV and VAV air valve positions and adjusting the supply fan static pressure control using a PID loop.  
 E. The exhaust fan shall normally operate off of a 3000 cfm (adj.) differential from supply fan airflow. Coordinate setting of fan speeds at both maximum and minimum flows. Refer to test and balance specification for additional detail and provide support to test and balance contractor as required. Typical all air balance support. Fan speeds shall adjust proportionally between these two values.  
 F. Exhaust fan offset overrides. In the event that additional exhaust is added via temporary sources, the following additional exhaust shall be automatically added to the default exhaust fan offset value. Please note that all such overrides are to be automatically cancelled should the outside air temperature fall below 30 degrees (adj) or rise above 90 degrees (adj).  
 a. The BAS shall monitor the status of fume hood exhaust fans - EF-1 and 2. In the event that either fume hood is activated, increase offset for exhaust offset an additional 750 cfm (adj.) per fan.  
 b. The BAS shall monitor the status of the main Kitchen hood exhaust fan. Refer to foodservice drawings. In the event that the kitchen hood exhaust fan is activated, increase offset for exhaust fan an additional 1200 cfm (adj.).  
 c. The BAS shall monitor the status of the convection oven Kitchen hood exhaust fan. Refer to foodservice drawings. In the event that the convection oven kitchen hood exhaust fan is activated, increase offset for exhaust fan an additional 1500 cfm (adj.).  
 d. The BAS shall monitor the status of the Dishwasher Hood exhaust fan. Refer to foodservice drawings. In the event that the dishwasher hood exhaust fan is activated, increase offset for exhaust fan an additional 1200 cfm (adj.).  
 e. The BAS shall monitor the status of each of the culinary arts Hood exhaust fans. Refer to foodservice drawings. In the event that either culinary arts hood exhaust fan is activated, increase offset for exhaust fan an additional 1500 cfm (adj.) per fan.  
 f. The BAS shall monitor the status of welding exhaust fan EF-6. In the event that the welding exhaust fan is activated, increase offset for exhaust offset an additional 2,000 cfm (adj.).

4. Supply Air Temperature Controls - Cooling:  
 A. Mode determination shall only take place when the unit is in occupied mode. When the coil EAT is greater than or equal to 80°F (adj.), cooling mode shall be enabled.  
 B. When the unit determines that cooling is required, send a signal to the chilled/hot water system to initiate cooling mode.  
 C. When unit CHWS temperature sensor detects a water temperature of less than or equal to 48°F (adj.), modulate the 3-way chilled water control valve as required to maintain 60°F (adj.) bypass air temperature downstream of coil.  
 D. For bypass damper modulation, refer to dehumidification mode sequence.

5. Dehumidification Mode:  
 A. This mode shall be activated if the exhaust air dewpoint is 65°F (adj.) or higher.  
 B. The CHWS must be in cooling mode. The three way control valve shall modulate to maintain a leaving coil temperature of 55°F. The ERV coil face and bypass dampers shall modulate to control to a unit LAT of 65°F (adj.). The face and bypass dampers must be programmed to limit bypass airflow to 60% maximum. In dehumidification mode, discharge air temperature setpoint may be allowed to drift to meet this requirement.  
 C. The unit shall release from dehumidification mode and return to its previous state once the exhaust dewpoint falls below 60°F.

6. Supply Air Temperature Controls - Heating:  
 A. Mode determination shall only take place when the unit is in occupied mode. When the coil EAT is less than or equal to 60°F (adj.), heating mode shall be enabled.  
 B. When the unit determines that heating is required, send a signal to the chilled/hot water system to initiate heating mode.  
 C. When unit CHWS temperature sensor detects a water temperature of greater than or equal to 100°F (adj.), modulate 3-way hot water control valve as required to maintain 70°F (adj.) unit discharge air temperature. Bypass damper will be closed.

7. Freeze Protection: If the leaving coil temperature falls below 40°F (adj.) then the supply fan and exhaust fan shall shut down, the outside air damper and exhaust air damper shall close. This shall require a manual reset.

8. Energy Recovery Wheel Control:  
 A. Upon entering the occupied mode of operation, the controller shall enable the energy recovery sequence if one of the following conditions is met:  
 a. The outdoor air temperature is 5 degrees (adj.) below the return air temperature.  
 b. The outdoor air temperature is 5 degrees (adj.) above the return air temperature.  
 c. When return air dewpoint is 5°F (adj.) less than outdoor air dewpoint

9. Over Pressurization Control: A static pressure sensor shall be located at the ERU supply air outlet in the discharge ductwork. If the pressure in the supply plenum exceeds 4.0" W.G. (adj.) the fan shall be shut down. Upon correction of the problem, the system shall be reset and unit shall return to normal operation. This shall be a manual reset.

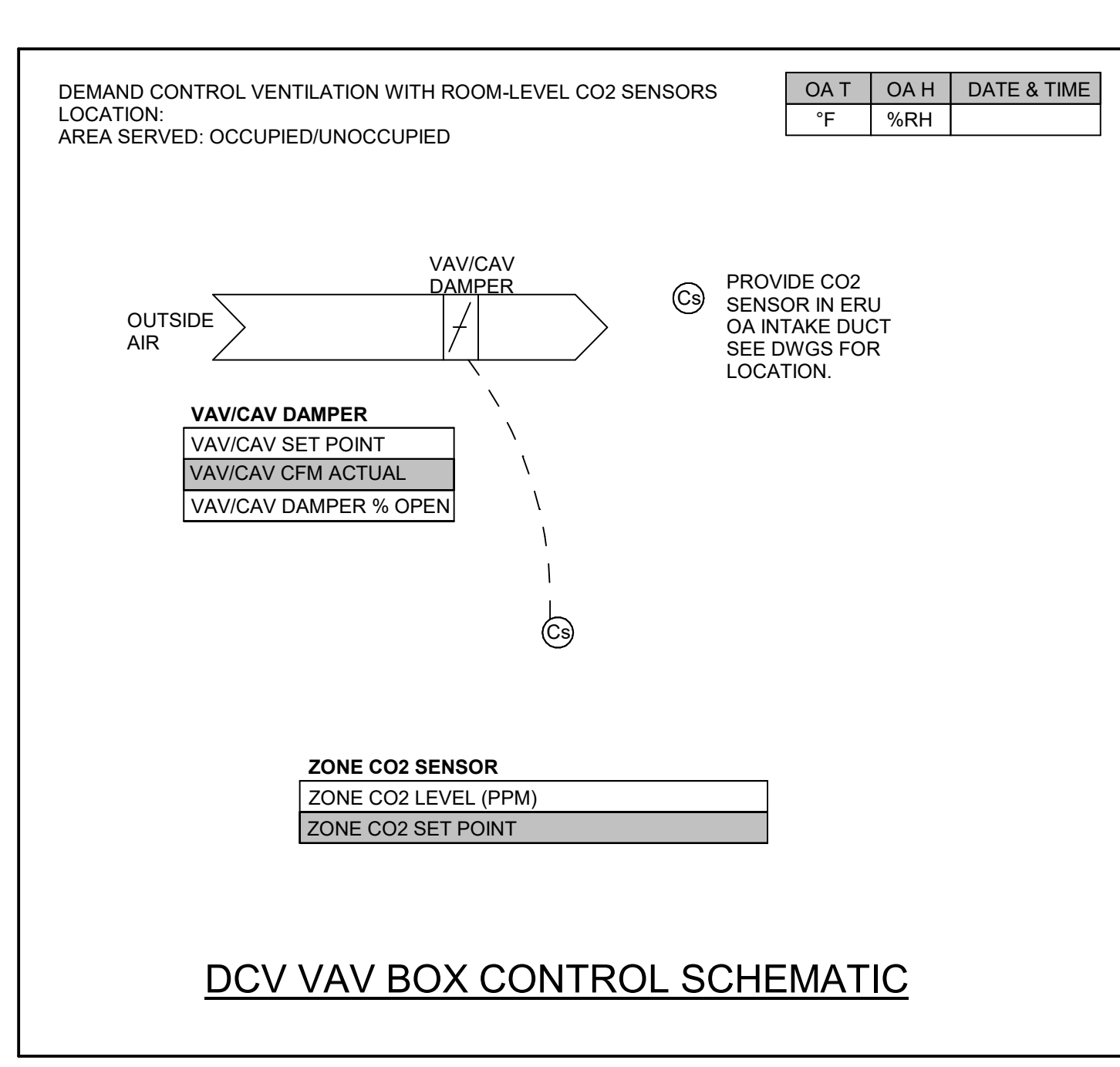
10. Under Pressurization Control: A static pressure sensor shall be located at the ERU supply air outlet in the discharge ductwork. If the pressure in the supply plenum exceeds -4.0" W.G. (adj.) the fan shall be shut down. Upon correction of the problem, the system shall be reset and unit shall return to normal operation. This shall be a manual reset.

11. Unoccupied Mode: In the unoccupied mode, the ERU shall be "off". The outside air damper and exhaust air damper shall be closed. The exhaust fan, the supply fan, and the energy recovery wheel shall be disabled.

12. Smoke Shutdown: Smoke detectors shall be located in the exhaust air stream. If smoke is detected, the supply and exhaust fans shall de-activate and an audio/visual alarm shall activate. Upon correction of the problem, the system shall be reset and unit shall return to normal operation. The smoke detectors shall provide a supervisory signal to the Fire Alarm System.

13. Filter Monitoring: Each filter in the air handler will be provided with an analogue input which tracks the actual pressure drop across the filter. Coordinate alarm for each filter such that is adjustable by the user. Initial setpoint to be at 0.5" WC (adj.) greater than the initial filter pressure drop with clean filters. Coordinate with test and balance contractor to obtain this setpoint and program accordingly.

\* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
 \*\* Refer to Trends schematic for all required trends associated with fans.

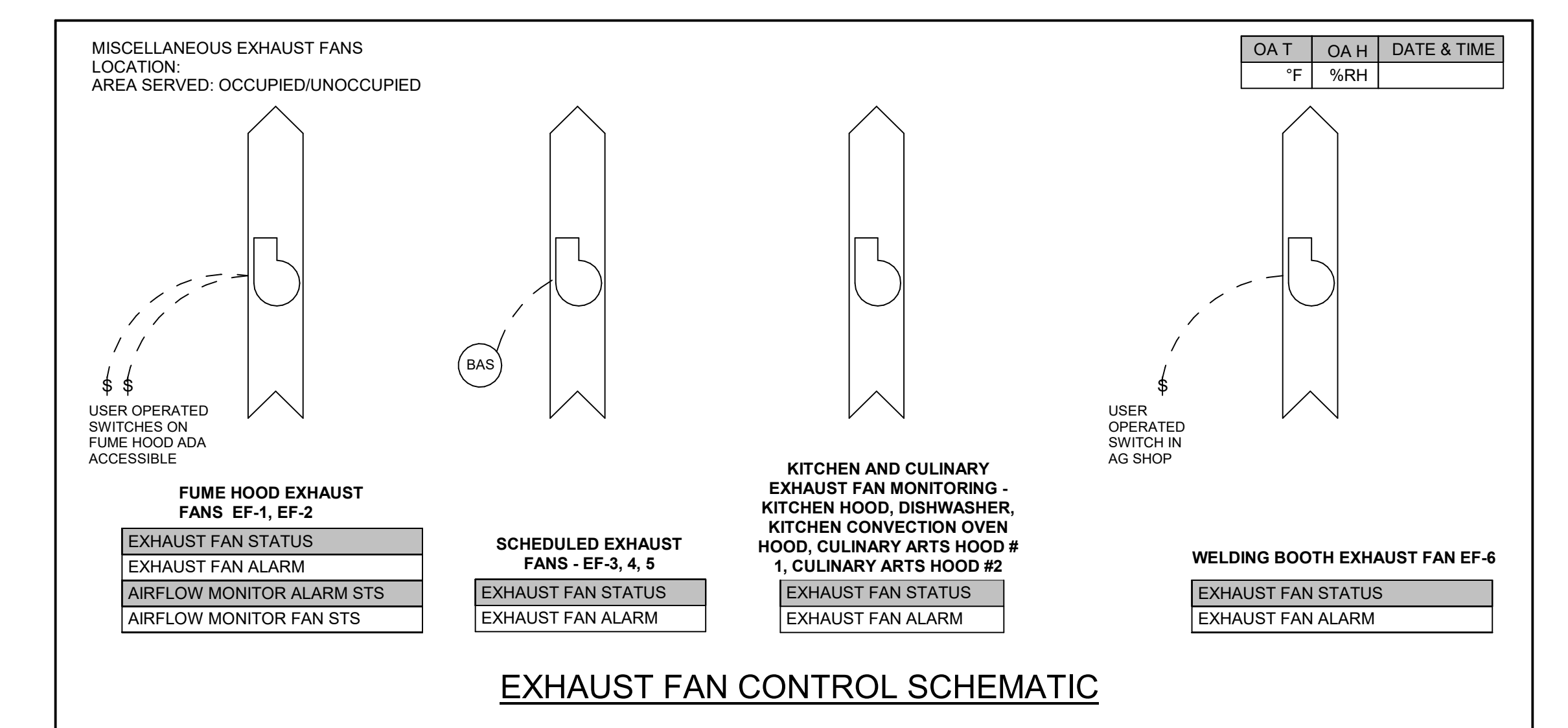


**DEMAND CONTROL VENTILATION SEQUENCE OF OPERATION**

1. General:  
 A. Networked VAV boxes exist in all occupied spaces and operate in conjunction with ERU-1 to ensure that ventilation air is delivered to the various occupied zones as required by the actual building usage.  
 B. Coordinate the balance and calibration of all VAV boxes with test and balance contractor. Refer to test and balance specifications for additional details.  
 C. Refer to VAV Min/Max Schedule for required programmed airflows (both minimum and maximum).  
 D. Refer to VAV Min/Max Schedule for required programmed airflows (both minimum and maximum).  
 E. Unit conditioning is provided by dedicated combination chilled/hot water heating system. Refer to related controls schematic, this sheet for details.

2. Sequence of Operation:  
 A. Room-level CO2 sensor shall monitor local CO2 levels in each zone. Refer to drawings for locations.  
 B. Outdoor air CO2 sensor shall provide a baseline CO2 reading for maintaining zone CO2 offsets. Refer to drawings for location.  
 C. Each zone shall calculate the differential CO2 ppm (Zone CO2 - Outdoor Air CO2) and shall modulate between the box minimum and maximum values as required to maintain 700 ppm CO2 setpoint (adj.).  
 D. When CO2 differential setpoint is satisfied, if the VAV minimum is zero, the box shall close.  
 E. CAV boxes shall maintain programmed CFM at all times and shall hold last position upon shut down of ERU-1.  
 F. VAV Makeup Air Minimum Setting Override: Select VAV boxes must be programmed to have a minimum override setting which overrides the VAV box minimum setting in the event that a certain exhaust fan is detected as operational. (Refer to exhaust fan sequence of operation for required exhaust fan monitoring) If the exhaust fan is detected as being deactivated, the VAV box override is to automatically release and the VAV box shall resume control to CO2 setpoint. Refer to below list of boxes which must incorporate overrides on the VAV MIN value:  
 a. Kitchen VAV Minimum Overrides: The VAV boxes serving the cafeteria shall have their minimum airflows increased by the following amounts depending upon the status of the associated exhaust fan:  
 • Main Kitchen Hood: 1250 cfm  
 • Dishwasher exhaust fan: 1250 cfm  
 • Convection Oven Hood Exhaust fan: 1500 cfm  
 b. Culinary Arts VAV Minimum Overrides: Should a single of these fans be activated, the VAV boxes serving rooms 148, 147 shall be overridden to 600 CFM. Should both fans be activated, the VAV boxes serving 104 and 105 shall have their VAV box minimums overridden to 600 CFM.  
 c. Laboratory VAV Minimum Overrides: Should a single fume hood exhaust fan be activated, the minimum for VAV serving room 205 shall be overridden to 600 CFM. Should two of these exhaust fans be activated, the VAV box serving room 205 shall be overridden to 600 CFM.  
 d. AG Shop VAV Minimum Overrides: Should the welding exhaust fan be activated, VAV boxes serving 135, 135A, 135B, and 136 shall be overridden to 600 CFM minimum.  
 e. Economizer Reset: The BAS shall monitor the status of the economizers serving the cafeteria and kitchen heat pumps. If economizer mode is active, the VAV box minimum shall not be overridden.  
 f. Storm Shelter Failure State: All VAV Boxes in storm shelter shall fail closed upon a loss of power. Coordinate with supplier and control accordingly.

\* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
 \*\* Refer to Trends schematic for all required trends associated with fans.



**EXHAUST FAN SEQUENCE OF OPERATION**

1. General:  
 A. Exhaust fans throughout the project are provided by both the mechanical contractor and the kitchen contractor. In all cases, the controls contractor shall provide controls, sensors, etc as required to fully monitor all fans as called for in the sequence of operation.  
 B. Refer to ERU-01 and VAV box control schematics for additional programming related to monitoring of exhaust fan status.

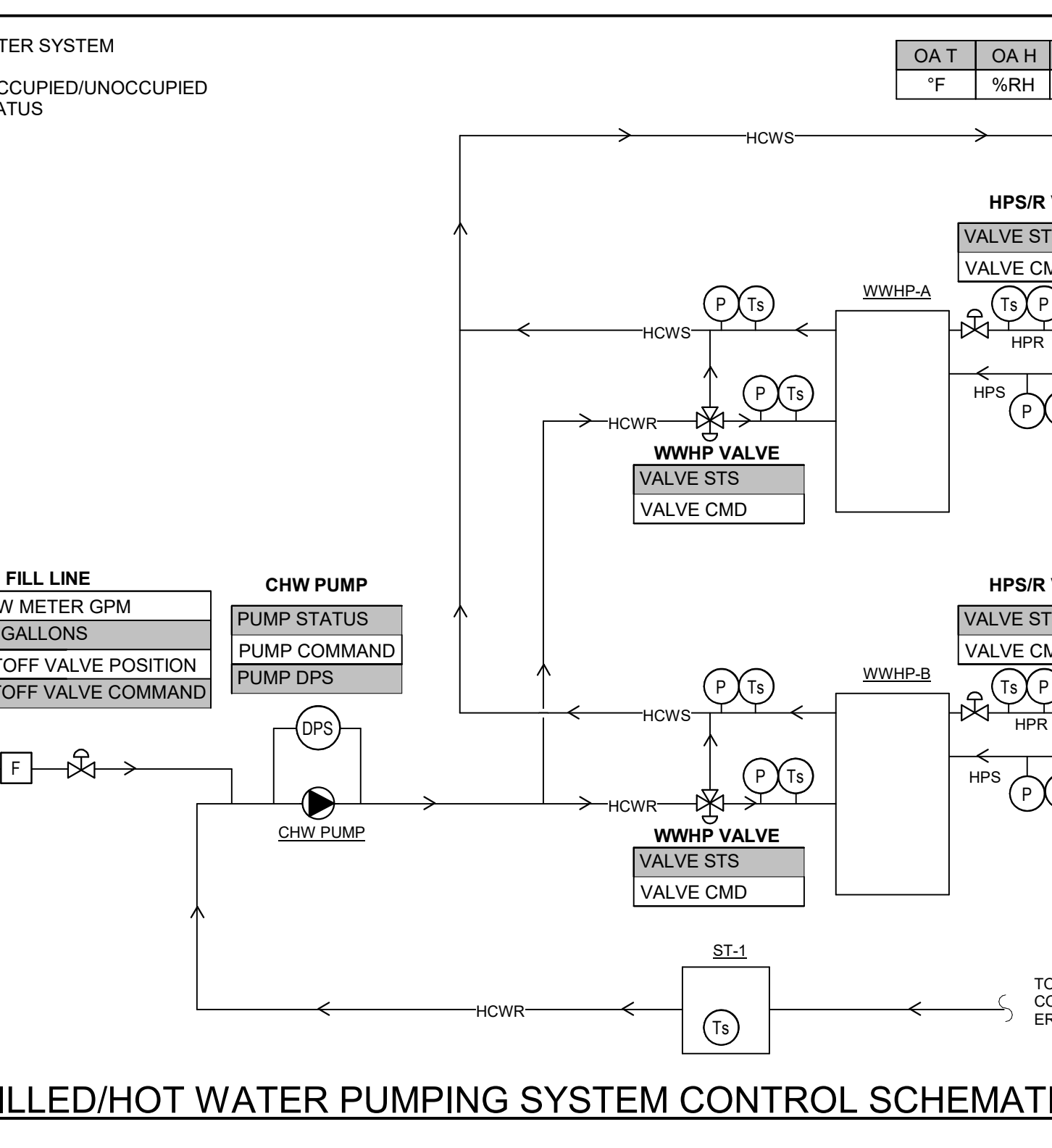
2. Fume Hood Exhaust Fans:  
 A. Fan shall be operated by user activated switch mounted at fume hood. Electrician to provide and wire switches to control exhaust fan operation.  
 B. BAS to monitor fan status via current sensor.  
 C. Fume hood is provided with an airflow monitoring device. The controls contractor is to monitor the airflow monitoring device and display any airflow alarm to the BAS. In addition, the controls contractor is to send a signal to the airflow monitor to communicate fan status to the monitor. Coordinate control of airflow monitor with required calibration. Refer to test and balance specification.  
 D. BAS to monitor fan command and status and if the fan is detected as running during a period when the building is scheduled unoccupied, provide alarm.

3. Scheduled Exhaust Fans:  
 A. Exhaust fans to be controlled via building schedule, as input by the user. The following schedules will apply:  
 a. EF 3, 4: Exhaust fans 3 and 4 will be programmed to operate 24/7/365. The controls contractor will still provide full scheduling capability to allow the user to change this schedule if desired.  
 b. EF 5: Exhaust fan will be scheduled to match the overall building schedule. If occupied, the fan shall run. If unoccupied the fan shall be off.  
 B. Should command not equal status, provide fan malfunction alarm.

4. Kitchen Hood and Culinary Exhaust Fans - refer to food service drawings.  
 A. Exhaust fans provided by kitchen equipment vendor and will operate via hardwired switches. Refer to foodservice drawings.  
 B. Provide current sensor to determine fan status of all fans and report to BAS.  
 C. BAS to monitor fan status and provide alarm if fan status indicates that the fan is running during a period when the building is scheduled unoccupied.

5. Welding Booth Exhaust Fan:  
 A. Fan shall be operated by user-activated switch mounted at Ag Shop. Electrician to provide and wire switches to control exhaust fan operation.  
 B. BAS to monitor fan status via current sensor.  
 C. BAS to monitor fan command and status and if fan is detected as running during a period when the building is scheduled unoccupied, provide alarm.

\* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
 \*\* Refer to Trends schematic for all required trends.



**CHILLED/HOT WATER PUMPING SYSTEM SEQUENCE OF OPERATION**

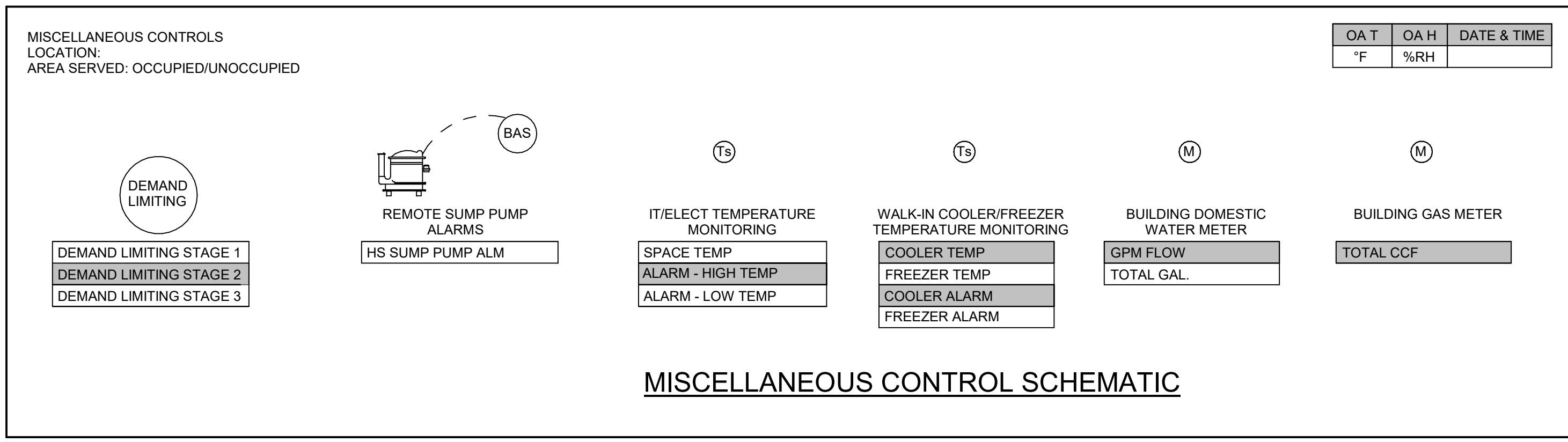
1. General:  
 A. The Chilled/Hot Water pumps system is a dedicated water loop which serves to provide heating and cooling for ERU-01 as needed to provide supplementary conditioning for the ventilation air. Refer to ERU-01 sequence of control for additional information.  
 B. WWHPs to be provided with factory mounted controller. BAS to interface with factory mounted controller and pull at minimum the points listed specified and report all alarms to building operator. All such alarms shall be itemized and displayed with both the manufacturer code and description. Obtain manufacturer's list of alarms and program accordingly.  
 C. onboard water to water heat pump controller.  
 D. Water to Water to Water heat pumps to operate in a Lead/Lag relationship to provide conditioning. Lead/Lag positions shall switch every 24 operating hours.

2. Cooling mode:  
 A. Upon a call for cooling from ERU-1, pump P-2 shall activate and 2-way HPS/R valve shall open on lead WWHP to full flow.  
 B. When onboard factory controller proves flow to both sides of heat pump, WWHP activates into cooling mode per factory control and stages as required to maintain a storage tank temperature of 45°F (adj.). Should lead WWHP not be adequate to maintain the required tank temperature, lag WWHP shall initiate per the above sequence and stage as required to maintain water loop setpoint.  
 C. When cooling is no longer required WWHP will stage down per factory sequence, first Lag and then Lead heat pump. HPS/R valves shall shut as applicable in sequence with heat pump units. When shut-down of WWHP units is complete, pump P-2 will be turned off.  
 D. Provide alarm should supply temperature fall above 50 degrees (adj.).

3. Heating mode:  
 A. Upon a call for heating from ERU-1, pump P-2 shall activate and 2-way HPS/R valve shall open on lead WWHP to full flow.  
 B. When onboard factory controller proves flow to both sides of heat pump, WWHP activates into heating mode per factory control and stages as required to maintain a storage tank temperature of 80°F (adj.). Should lead WWHP not be adequate to maintain the required tank temperature, lag WWHP shall initiate per the above sequence and stage as required to maintain water loop setpoint.  
 C. When heating is no longer required WWHP will stage down per factory sequence, first Lag and then Lead heat pump. HPS/R valves shall shut as applicable in sequence with heat pump units. When shut-down of WWHP units is complete, pump P-2 will be turned off.  
 D. Provide alarm should supply temperature fall below 75 degrees (adj.).

4. Fill Line Monitoring:  
 A. A flow meter and emergency 2-way shutoff valve shall be provided on the fill line to the combination chilled/hot water system. Flow meter shall monitor total flow to system. Should total flow to system exceed 5 gallons within a 24 hour period, 2-way fill valve emergency shut-off shall shut and the building operator shall receive an alarm to his remote device for manual reset of system.

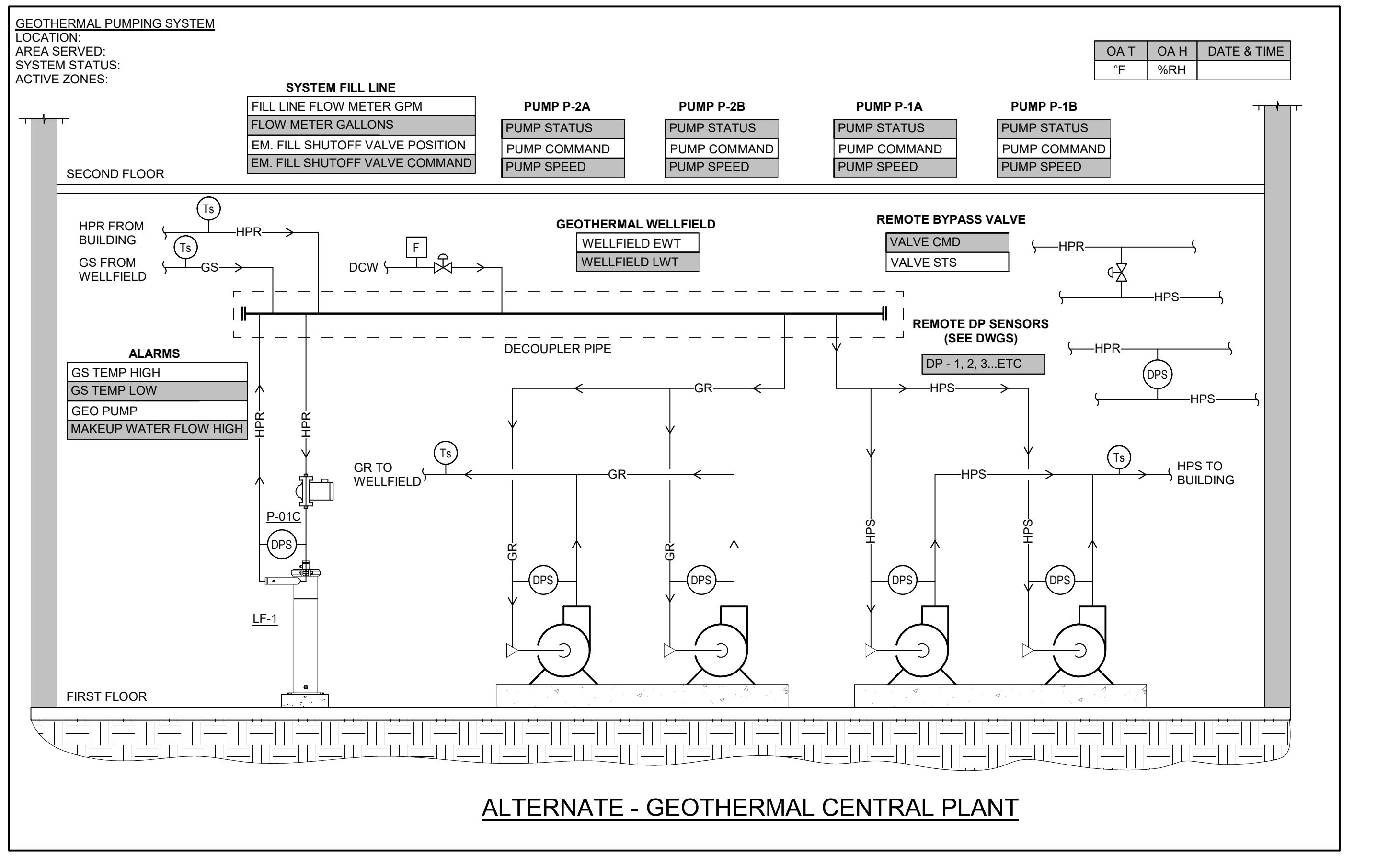
\* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
 \*\* Refer to Trends schematic for all required trends associated with fans.



**MISCELLANEOUS CONTROL SEQUENCE OF OPERATION**

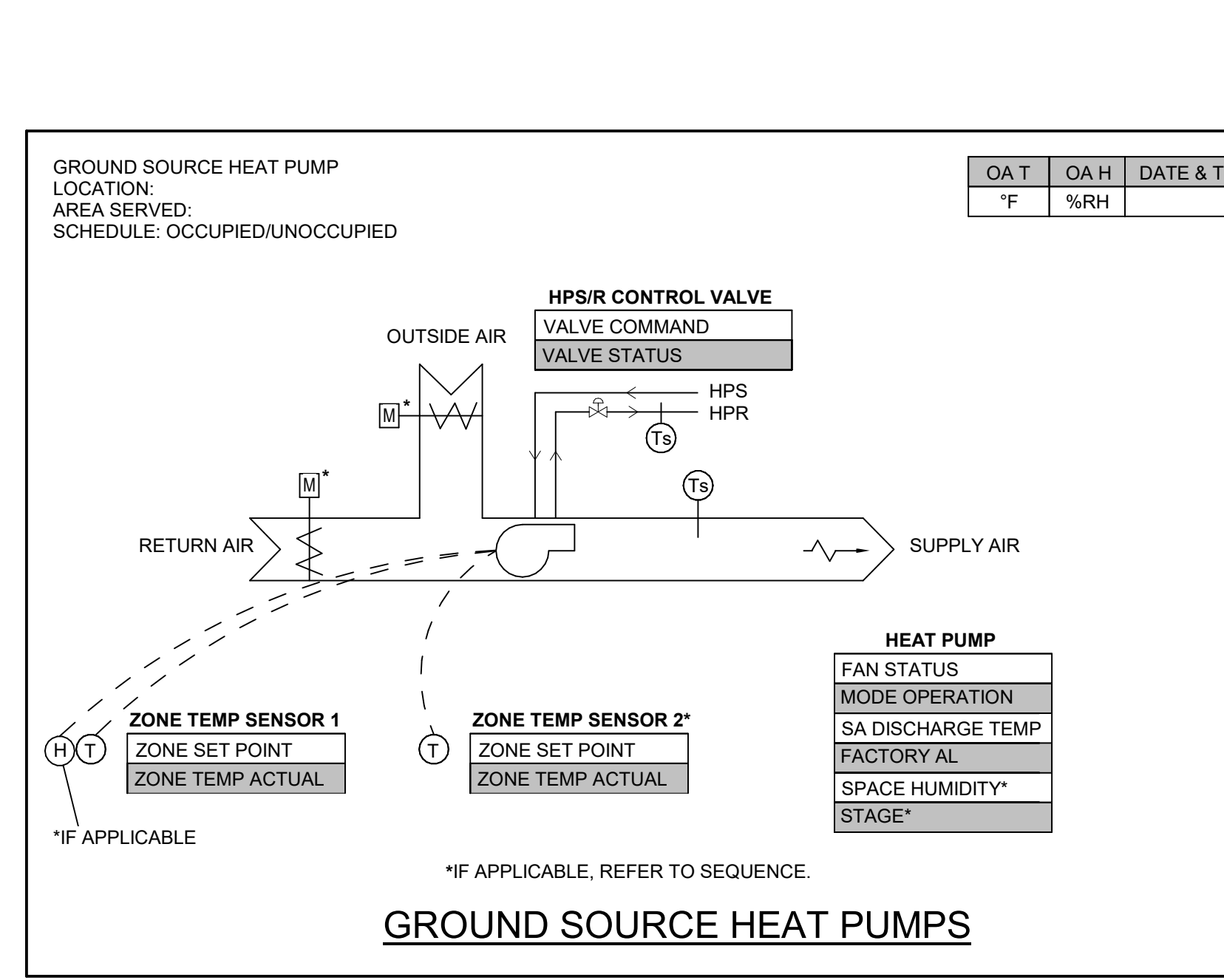
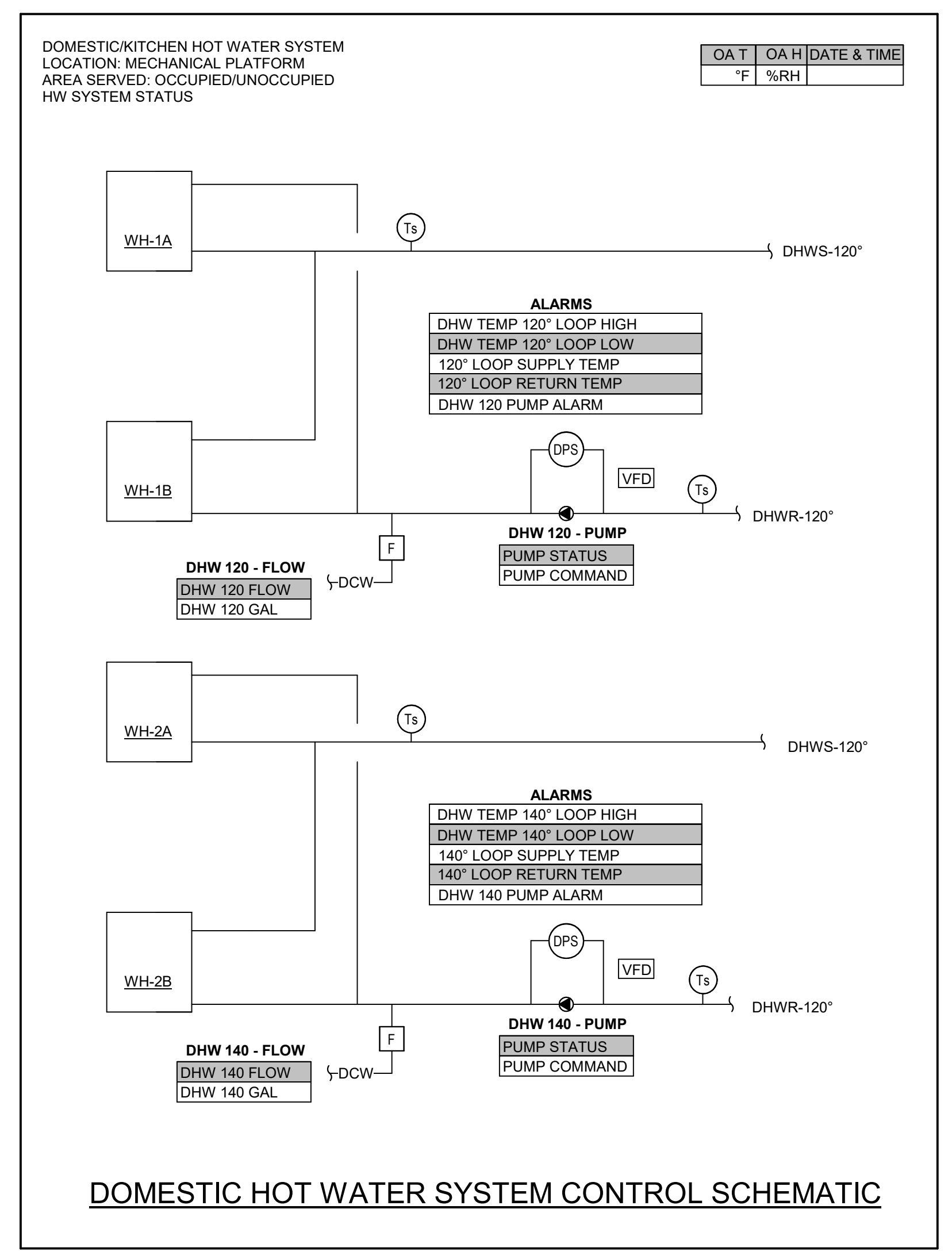
- Demand Limiting Control:** Additional programming shall be provided such that the HVAC system can respond to cut electrical power demand in three stages as input by the user. The demand limiting stages shall be as follows:
  - Demand Limiting Stage 1:** Under this stage, All heat pumps serving corridor spaces, back of house spaces, the auditorium, gymnasium, and kitchen shall be adjusted upwards/downwards as required by 2 deg (adj) to reduce power demand.
  - Demand Limiting Stage 2:** Under this stage, all heat pumps mentioned in stage 1 as well as all remaining heat pumps will be adjusted upwards/downwards as required by 2 deg (adj) to reduce power demand.
  - Demand Limiting Stage 3:** Under this stage, all heat pumps shall have their setpoints adjusted upwards/downwards as required by 4 deg (adj) to further limit power demand.
- Sump Pump Alarm Monitoring:** Provide monitoring for alarm dry contacts on sump pumps and alert building operator in the event of sump pump alarm. Refer to plumbing drawings for locations.
- Elect Temperature Monitoring:** Mini-split units to operate on their own controls. Provide temperature control wiring between indoor unit and outdoor unit per manufacturer requirements and wiremount unit temperature sensor. Additionally, provide supplemental temperature sensor in each IDF close/elect room served by a mini-split. If room temperature exceeds 79°F (adj) or fall below 64°F (adj) send alarm to BAS.
- Walk-in Cooler/Freezer Temperature Monitoring:** provide monitoring of walk-in cooler and walk-in freezer. Refer to controls specification for required immersion type cooler and freezer temperature sensor. If freezer temperature rises above 5°F (adj) or cooler temperature rises above 40°F (adj), send alarm to BAS. In addition, freezers come with control interface. Provide data connection to building management system and pull in all available points and alarms. Refer to food service drawings for additional information.
- Domestic Water Usage:** Provide inline water meter to monitor flow and record water usage of building. Refer to building trend requirements.
- Natural Gas Usage:** Provide inline gas meter to monitor flow of natural gas to building. Refer to building trend requirements.

\* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
\*\* Refer to Trends schematic for all required trends.



**ALTERNATE - GEOTHERMAL CENTRAL PLANT SEQUENCE OF OPERATION:**

- GENERAL:**
  - THE SYSTEM SHALL OPERATE UNDER THE CONTROL OF A LOCAL STAND-ALONE, MICROPROCESSOR BASED BAS CONTROLLER FIELD INSTALLED IN THE MAIN MECHANICAL ROOM.
  - TWO PRIMARY SYSTEM PUMPS ARE TO VARY FLOW TO BUILDING HEAT PUMPS AS REQUIRED TO MAINTAIN BUILDING LOOP PRESSURE SETPOINT.
  - TWO PRIMARY GEOTHERMAL PUMPS ARE TO VARY FLOW TO THE GEOTHERMAL WELLFIELD AS REQUIRED TO MAINTAIN A DIFFERENTIAL WELLFIELD TEMPERATURE SETPOINT.
- BUILDING LOOP PUMPS SEQUENCE OF OPERATION:**
  - PUMPS SHALL OPERATE IN A LEADLAG ARRANGEMENT, ROTATING THE LEAD PUMP EVERY 12 HOURS (ADJ) OF RUNTIME.
  - OCCUPIED OPERATION:**
    - REFER TO RELATED BUILDING SCHEDULES. SHOULD ANY ZONE BE SCHEDULED AS OCCUPIED, THE PUMPING SYSTEM SHALL RUN ACCORDING TO THE FOLLOWING SCHEDULE.
    - SHOULD MORE THAN 5 HEAT PUMPS (ADJ) REQUIRE TO RUN, THE PUMPS SHALL INITIATE AND RUN PER SEQUENCE.
    - IN THE EVENT THAT LESS THAN 5 HEAT PUMPS (ADJ) REQUIRE TO RUN, THE BUILDING PUMPS SHALL BE OFF AND ALL HEAT PUMPS SHALL BE PREVENTED FROM RUNNING.
    - OCCUPIED OVERRIDE: SHOULD ANY SINGLE ZONE FALL GREATER THAN 2 DEGREES OUT OF SETPOINT WHEN SYSTEM IS OFF, INITIATE SYSTEM AND RUN TO MAINTAIN BUILDING PRESSURE.
  - UNOCCUPIED OPERATION:**
    - SHOULD MORE THAN 15 HEAT PUMPS (ADJ) REQUIRE TO RUN, THE PUMPS SHALL INITIATE AND RUN PER SEQUENCE.
    - IN THE EVENT THAT LESS THAN 15 HEAT PUMPS (ADJ) REQUIRE TO RUN, THE BUILDING PUMPS SHALL BE OFF AND ALL HEAT PUMPS SHALL BE PREVENTED FROM RUNNING.
    - UNOCCUPIED OVERRIDE: IN THE EVENT THAT EITHER A SPECIFIC ZONE TEMPERATURE FALLS BELOW 50 DEGREES OR A BUILDING HEAT PUMP IS MANUALLY OVERRIDDEN TO ITS OVERRIDE FUNCTION, THE BUILDING PUMPS SHALL BE INITIATED EVEN IF THE MINIMUM HEAT PUMP LIMIT FOR OCCUPIED OPERATION IS NOT MET.
  - WHEN COMMANDED TO RUN PER THE ABOVE CONDITIONS, THE BUILDING PUMPS SHALL ACTIVATE AND SHALL VARY FLOW TO MAINTAIN A REMOTE PRESSURE SETPOINT OF XX PSI (ADJ). PLEASE NOTE THAT PSI SETPOINT MUST BE SET IN COORDINATION WITH THE TEST AND BALANCE CONTRACTOR AND SHOULD BE OPTIMIZED. REFER TO TEST AND BALANCE SPECIFICATION AND SET ACCORDINGLY. MULTIPLE PRESSURE SENSORS ARE LOCATED THROUGHOUT (REFER TO DRAWINGS) SYSTEM TO CONTROL TO WORST-CASE DIFFERENTIAL PRESSURE.
  - MINIMUM FLOW BYPASS VALVE: THE BAS SHALL MONITOR THE TOTAL NUMBER OF ACTIVE ZONES WHICH ARE CALLING FOR WATERFLOW FROM THE SYSTEM. IF THIS TOTAL NUMBER OF ACTIVE ZONES FALLS BELOW 30 (ADJ.), THE REMOTE BYPASS VALVE SHALL BE OPENED. SHOULD THE ACTIVE ZONES RISE ABOVE THIS SETPOINT, THE REMOTE BYPASS VALVE SHALL BE CLOSED.
  - BUILDING LOOP PUMP FILTER: THE BUILDING LOOP PUMP IS PROVIDED WITH A DEDICATED CARTRIDGE FILTER WITH ASSOCIATED PUMP. PUMP SHALL RUN ANY TIME MAIN LOOP PUMPS ARE OPERATIONAL AND WILL BE OFF ANY TIME MAIN LOOP PUMPS ARE OFF. DIFFERENTIAL PRESSURE SENSOR TO BE PROVIDED ACROSS FILTER. CALIBRATE WITH TEST AND BALANCE CONTRACTOR AND RECORD INITIAL PRESSURE SETPOINT. SHOULD INITIAL PRESSURE SETPOINT RAISE BY MORE THAN 10 PSI (ADJ.), PROVIDE A NOTICE TO BUILDING OPERATOR TO CHANGE FILTER.
  - BUILDING SYSTEM FILL LINE MONITORING: BUILDING FILL LINE IS TO BE PROVIDED WITH FLOW METER AND SHUT-OFF VALVE. FLOW METER SHALL TAKE A ROLLING TOTAL GALLONS MAKEUP WATER FOR THE PAST 24 HOURS. SHOULD THIS VALUE EXCEED 5 GALLONS (ADJ.), SHUT MAKEUP WATER VALVE AND PROVIDE ALARM TO BUILDING OPERATOR.
- GEOTHERMAL LOOP PUMPS SEQUENCE OF OPERATION:**
  - PUMPS SHALL OPERATE IN A LEADLAG ARRANGEMENT, ROTATING THE LEAD PUMP EVERY 12 HOURS (ADJ) OF RUNTIME.
  - OCCUPIED OPERATION:**
    - IF THE BUILDING LOOP SUPPLY TEMPERATURE IS BETWEEN 55 DEGREES (ADJ.) AND 65 DEGREES (ADJ.), THE GEOTHERMAL LOOP PUMPS SHALL BE OFF.
    - IF THE BUILDING LOOP SUPPLY TEMPERATURE FALLS OUTSIDE THESE PARAMETERS, THE GEOTHERMAL LOOP PUMPS WILL INITIATE TO MINIMUM SPEED AND INCREASE SPEED AS REQUIRED TO MAINTAIN A DIFFERENTIAL TEMPERATURE ACROSS THE WELLFIELD OF 10 DEGREES (ADJ.).
  - UNOCCUPIED OPERATION:**
    - IF THE BUILDING LOOP SUPPLY TEMPERATURE IS BETWEEN 40 DEGREES (ADJ.) AND 90 DEGREES (ADJ.), THE GEOTHERMAL LOOP PUMPS SHALL BE OFF.
    - IF THE BUILDING LOOP SUPPLY TEMPERATURE FALLS OUTSIDE THESE PARAMETERS, THE GEOTHERMAL LOOP PUMPS WILL INITIATE TO MINIMUM SPEED AND INCREASE SPEED AS REQUIRED TO MAINTAIN A DIFFERENTIAL TEMPERATURE ACROSS THE WELLFIELD OF 10 DEGREES (ADJ.). ONCE INITIATED IN UNOCCUPIED MODE, THE GEOTHERMAL LOOP PUMPS WILL RUN ACCORDING TO A 5 DEGREE (ADJ.) DEADBAND TO BRING BUILDING TEMPERATURE TO WITHIN EITHER 45 OR 85 DEGREES PRIOR TO BEING DEACTIVATED.



**GROUND SOURCE HEAT PUMP SEQUENCE OF OPERATION**

- General:**
  - All ground source heat pumps to be provided with field mounted controls provided by Controls Contractor. Coordinate control panel requirements with heat pump unit manufacturer.
  - Unit Scheduling:** Each unit shall be placed into the occupied / unoccupied mode based upon the user adjustable schedule at the network controller.
  - Loss of Communication:** If communication is lost between the network controller and the heat pump controller, then the heat pump controller shall maintain its last known status (occupied or unoccupied) until communication is restored. If the heat pump override is activated, the heat pump must activate into occupied mode.
  - Coordination with Fire Alarm:** Fire Alarm Contractor will be providing a smoke detector in return ductwork of all heat pumps greater than 2,000 CFM (Larger than 5 tons). Coordinate wiring of unit with fire alarm contractor so that if smoke is detected, the system will shut off. Upon correction of the problem and a reset from the building Fire Alarm Panel, the system shall be able to automatically reset and return to normal operation.
  - Occupied Mode:** During the occupied mode, the heat pump shall cycle as required to satisfy space thermostat sensor setpoint  $\pm 1$  °F. The unit shall automatically changeover from heating to cooling. For the two stage units, the fan/compressor will cycle between high/low/off based on space demand. When space temperature is satisfied, fan and compressor shall not be off.
  - Unoccupied Mode:** During the unoccupied mode, the heat pump shall not operate unless the space temperature falls below unoccupied heating setpoint of 60°F (adj.) or rises above the unoccupied cooling setpoint 80°F (adj.).
  - Unit Override:** Provide a pushbutton override in all sensors. If the network controller is in the unoccupied mode when a pushbutton override is activated, then the activated heat pump shall be placed into the occupied mode. This does not include the outside air system. When the pushbutton override is activated, then the heat pump shall be placed into occupied operation for 1 hour (adj.).
  - Factory Alarm:** Wire the unit alarm contact in with the field mounted controls. Upon an alarm from the heat pump through this contact, the unit must be capable of being reset via the BAS.
  - Condensate Overflow:** The condensate overflow switches shall be internally wired by equipment manufacturer from the factory.
  - Temperature Averaging Control:** Areas with multiple thermostats on a single heat pump shall average the zone temperatures to determine mode and stage of unit.
  - Water Source Control Valve:** Two-Way HPS/R control valve shall be provided by controls contractor. Open and prove flow as required to initiate heat pump compressors.
  - Gymnasium Heat Pump Control:** The high school gymnasium is served by (4) heat pumps. Heat pumps to operate in a lead, lag, lag, lag manner with the lead heat pump rotating every 24 hours of runtime. Lead heat pump shall stage as required to meet space setpoint. If not possible, initiate the next heat pump in line, etc until all heat pumps are enabled. Stage down in reverse order. Provide control such that during building warmup or building cool-down, only the lead pump will operate.
  - Reheat Control:** Refer to the project's heat pump schedule for units provided with hot gas reheat control. Provide combination humidity sensor in the space for the units identified. Primary source of control in occupied mode as indicated above shall be to meet space setpoint. If setpoint is satisfied, but the dewpoint of the relative humidity is greater than 60% (adj.), activate reheat coil to dehumidify to meet this dewpoint setpoint.
  - Economizer Control:** When OA temperature falls below 65 °F (adj.) and the zone calls for cooling, cooling compressors shall be deactivated. HPS/HPR valve shall be closed. Motorized OA and RA dampers shall modulate and mix air as required to maintain 55°F discharge air temperature to zone. Fans will stage to maintain zone temperature setpoint. For heat pumps serving gym, a single OA damper and RA damper is to be provided with Economizer control: 154-1, 154-2, 154-3, 154-4, 155, 155, and 149.
  - Back of House Heat Pump Control:** This sequence of control will apply to all heat pumps serving mechanical rooms, electrical rooms, and other back of house areas. In these instances, the heat pumps will not follow occupied/unoccupied schedule. Cooling setpoint to be 80°F (adj.) and heating setpoint to be 60°F (adj.).
  - Ag Shop Heat Pump Control:** The Ag shop heat pump is to be provided with a link to the roll-up door to indicate status. Should the roll-up door be open, cooling mode shall be deactivated. This shall not apply to heating mode. Should the outside air temperature be below 32 degrees adjustable and the roll-up door status indicates as open for longer than 5 minutes (adj) provide alarm to building operator.
  - Optimized Start:** Provide optimized start for heat pumps to allow heat pumps to optimize their start times in morning warm-up/cool-down. Algorithm shall ensure that heat pumps meet setpoint as dictated by the schedule. Programming shall stagger start of heat pumps to limit building demand charges. Coordinate final groupings of heat pumps with engineer.
  - Bipolar Ionization:** BPI device provided with unit. Route points to controller and display on graphic as detailed.
- \* Alarms which indicate a notification in points list above shall provide a mobile notification to building operator. All other alarms shall be visible in the building alarms report but will not provide mobile notification to owner.  
\*\* Refer to Trends schematic for all required trends.

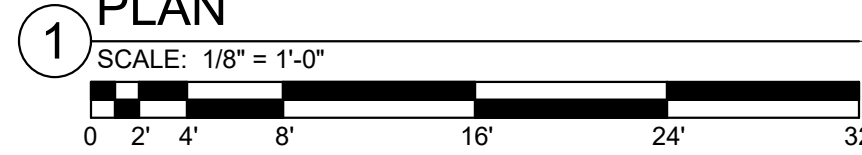
**DOMESTIC HOT WATER SYSTEM (WH-1A, WH-1B, WH-2A, WH-2B) SEQUENCE OF OPERATION:**

- General:**
  - High school domestic hot water is provided via two independent water heating systems - a 120 degree domestic hot water system which supplies general purpose domestic hot water to most fixtures throughout the building and a 140 degree domestic hot water system which supplies 140 degree domestic hot water to select fixtures within the culinary and kitchen areas of the high school. Each system consists of redundant gas hot water heaters paired with a hot water recirculating pump.
  - Water Heaters operate independently on their own controls. Provide wire to monitor dry alarm contact for each and report to BAS.
- Recirculating pumps sequence of operation:**
  - The domestic hot water system and the kitchen hot water system shall be enabled whenever the building or an applicable zone of control is scheduled to be occupied. Refer to zones of control as outlined on sheet M8.0.
  - When the domestic hot water system is enabled, the domestic hot water recirculating pumps which serve both the 120 degree and 140 degree hot water systems shall run constantly. When the building is scheduled unoccupied, the pumps shall be off. Pumps shall have a building warming feature where they start and run 2 hours (adj.) before the building is scheduled to be occupied.
- Alarms:**
  - BAS shall monitor the water supply temp of the 120 degree water system and alarm if setpoint exceeds 125°F (adj) when occupied.
  - BAS shall monitor the water supply temp of the 140 degree water system and alarm if setpoint exceeds 145°F (adj) when occupied.
  - BAS shall monitor the water supply temp of the 120 degree water system and alarm if setpoint falls below 110°F (adj) when occupied.
  - BAS shall monitor the water supply temp of the 140 degree water system and alarm if setpoint falls below 130°F (adj) when occupied.





PHASE 1 - AREA D - LIGHTING DEMOLITION  
PLAN



ALUMINUM LETTERS	JOB NUMBER	Y2011A
DATE	DRAWN BY	XHERZ
NO. / DESCRIPTION	CHECKED BY	DNH
	DATE	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA D - LIGHTING DEMOLITION PLAN

SHEET NUMBER

E2.10











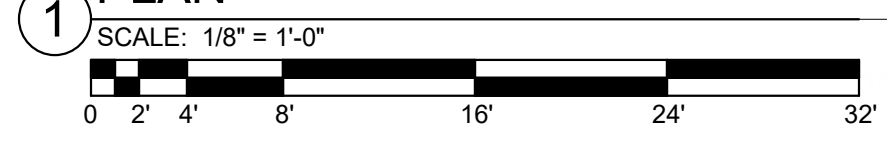








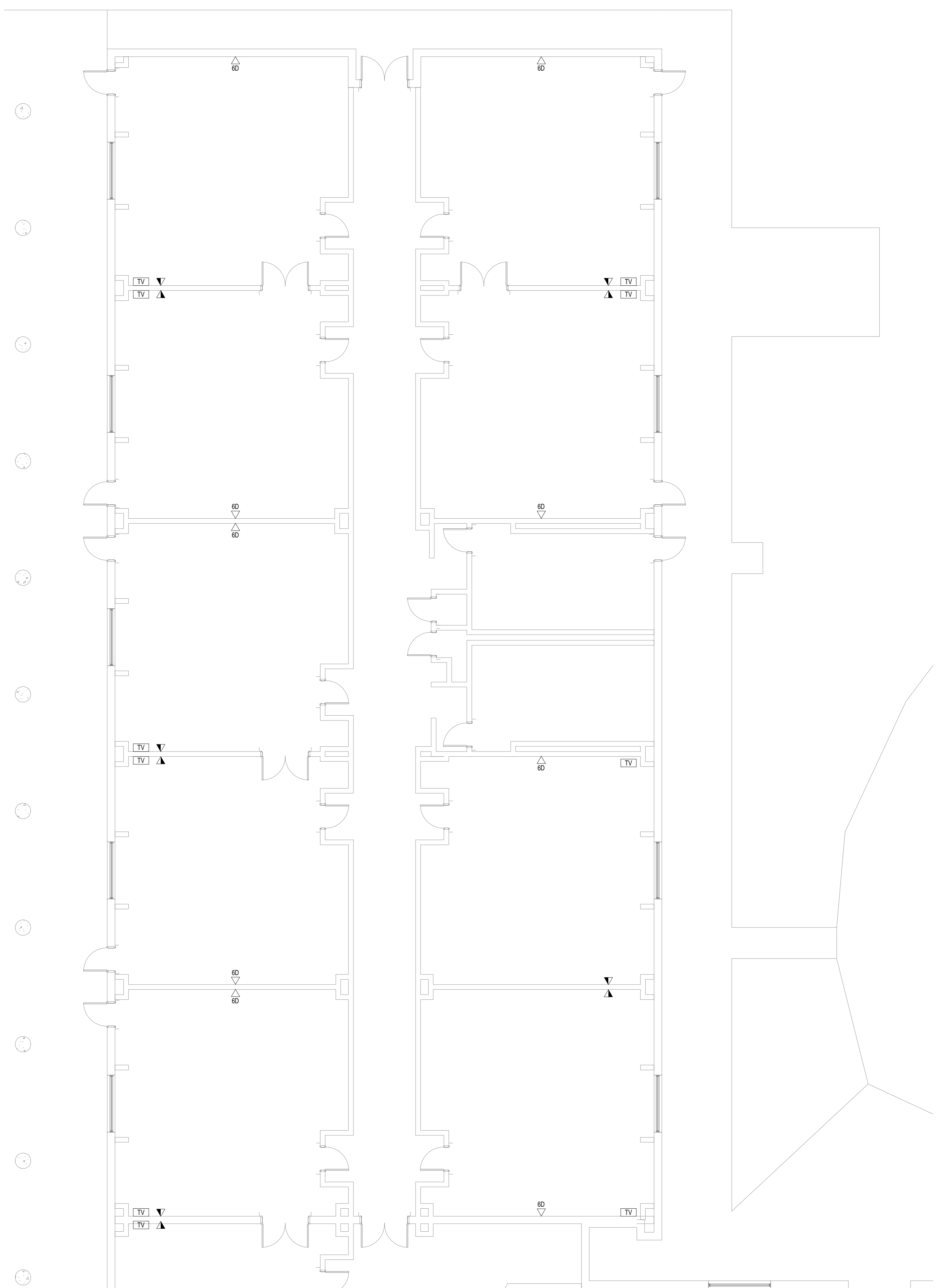
PHASE 1 - AREA D - DEMOLITION SYSTEMS  
PLAN



No.	Description	Date	Job Number	Drawn By	Checked By	Date
			Y2011A XHER23	DRH	HCH	2/12/2024

NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA D - SYSTEMS DEMOLITION PLAN



PHASE 1 - AREA E - DEMOLITION SYSTEMS  
PLAN

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



No.	Description	Date	Job Number	Drawn By	Checked By	Date
1			YS2114A XHER23	DRH	HCH	2/12/2024

NOT FOR  
CONSTRUCTION

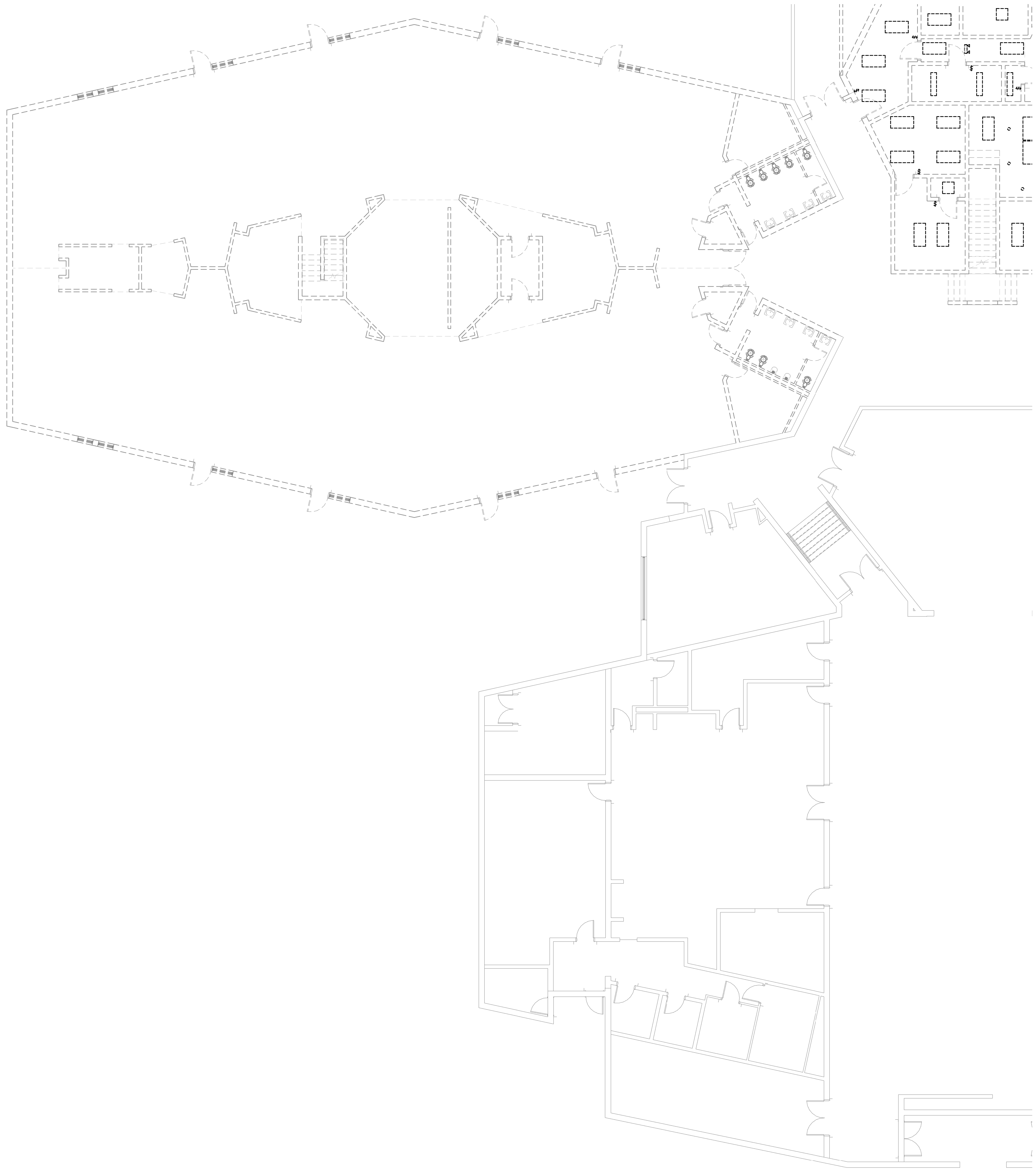
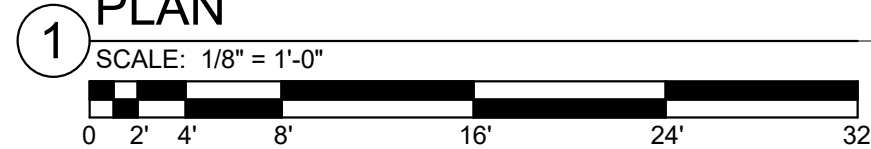
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA E - SYSTEMS DEMOLITION PLAN

SHEET NUMBER

**E2.17**



PHASE 2 - AREA B - LIGHTING DEMOLITION  
PLAN



HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 2 - AREA B - LIGHTING DEMOLITION PLAN

SHEET NUMBER

E2.20

NOT FOR  
CONSTRUCTION

No.	Description	Date	Job Number	Year	Drawn By	Checked By	Date
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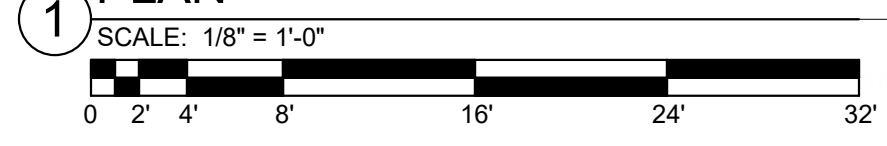
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**RBS DESIGN GROUP**  
ARCHITECTURE

2330 West 12th Street, Suite 100  
Tomball, TX 77375  
Phone: 281.352.2448  
Fax: 281.352.2449  
Email: office@rbsdesigngroup.com



PHASE 2 - AREA D - LIGHTING DEMOLITION  
PLAN



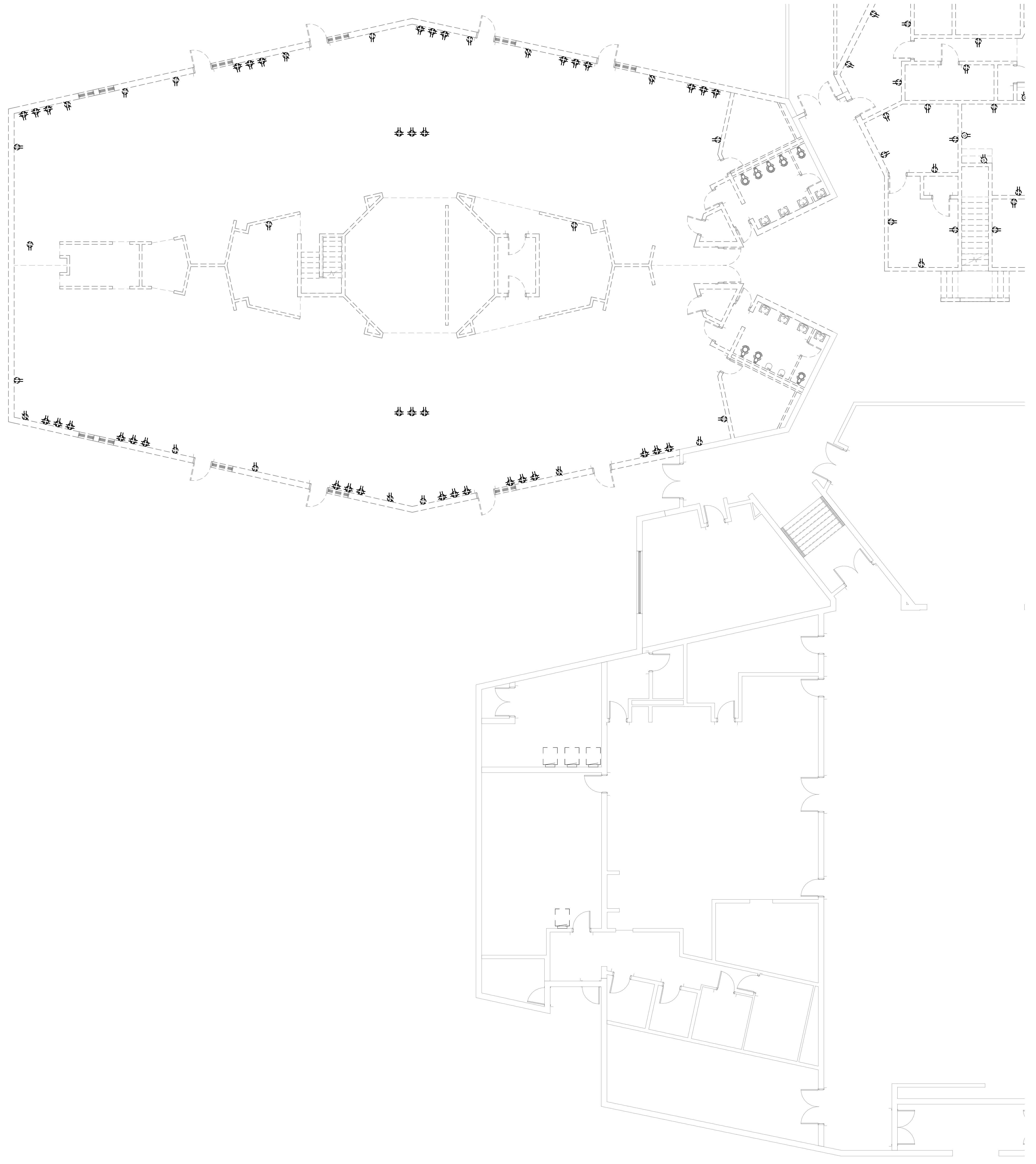
No.	Description	Date	Job Number	Drawn By	Checked By	Date

NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 2 - AREA D - LIGHTING DEMOLITION PLAN



PHASE 2 - AREA B - DEMOLITION POWER PLAN  
 1 SCALE: 1/8" = 1'-0"



HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PHASE 2 - AREA B - POWER DEMOLITION PLAN

SHEET NUMBER

E2.22

NOT FOR CONSTRUCTION

No.	Description	Date	Job Number	Drawn By	Checked By	Date
			Y201144	XHER23	DRH	
					HCH	2/12/2024

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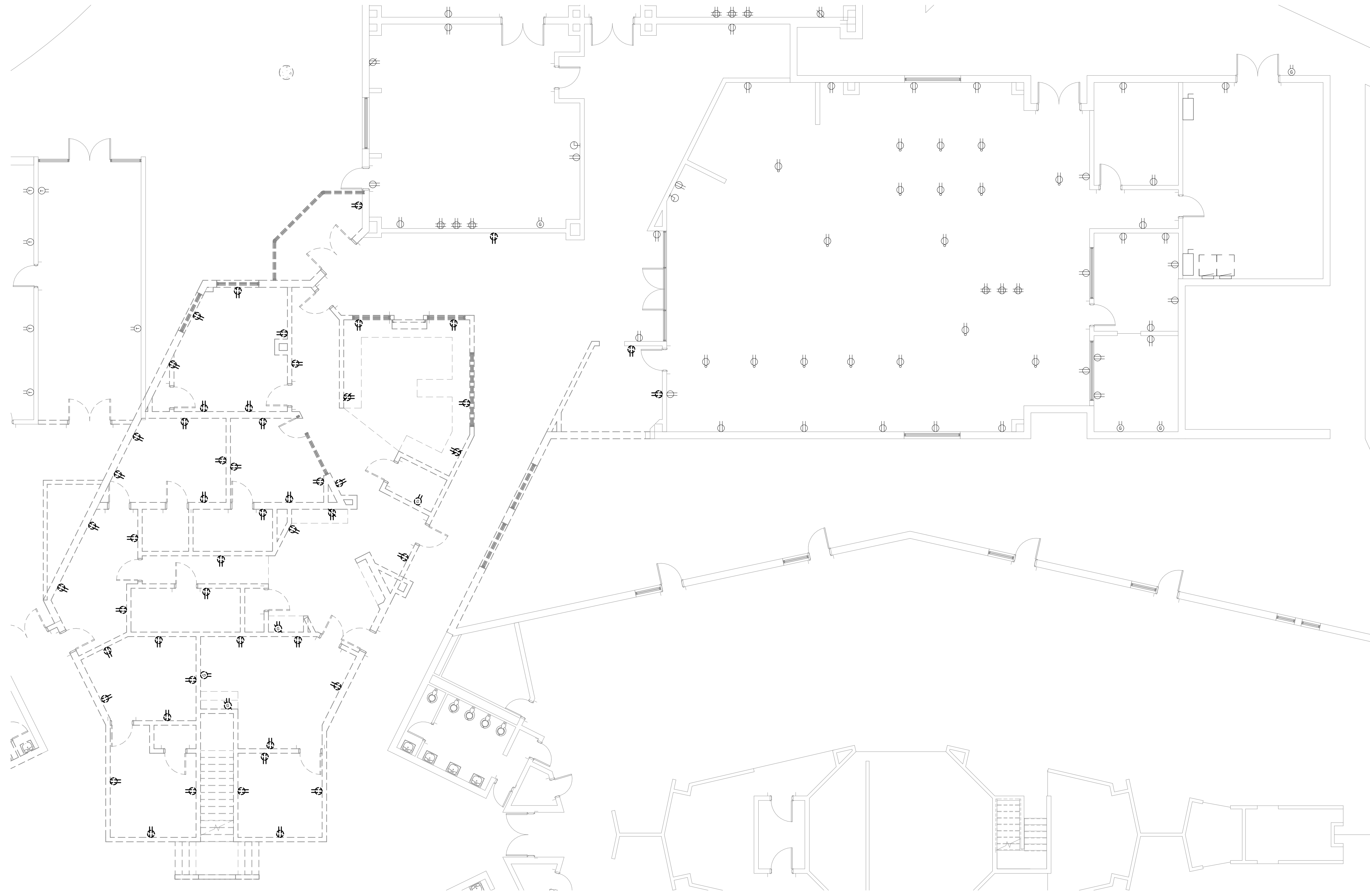
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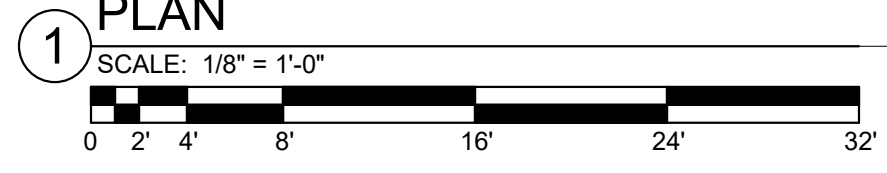
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PHASE 2 - AREA D - DEMOLITION POWER  
PLAN



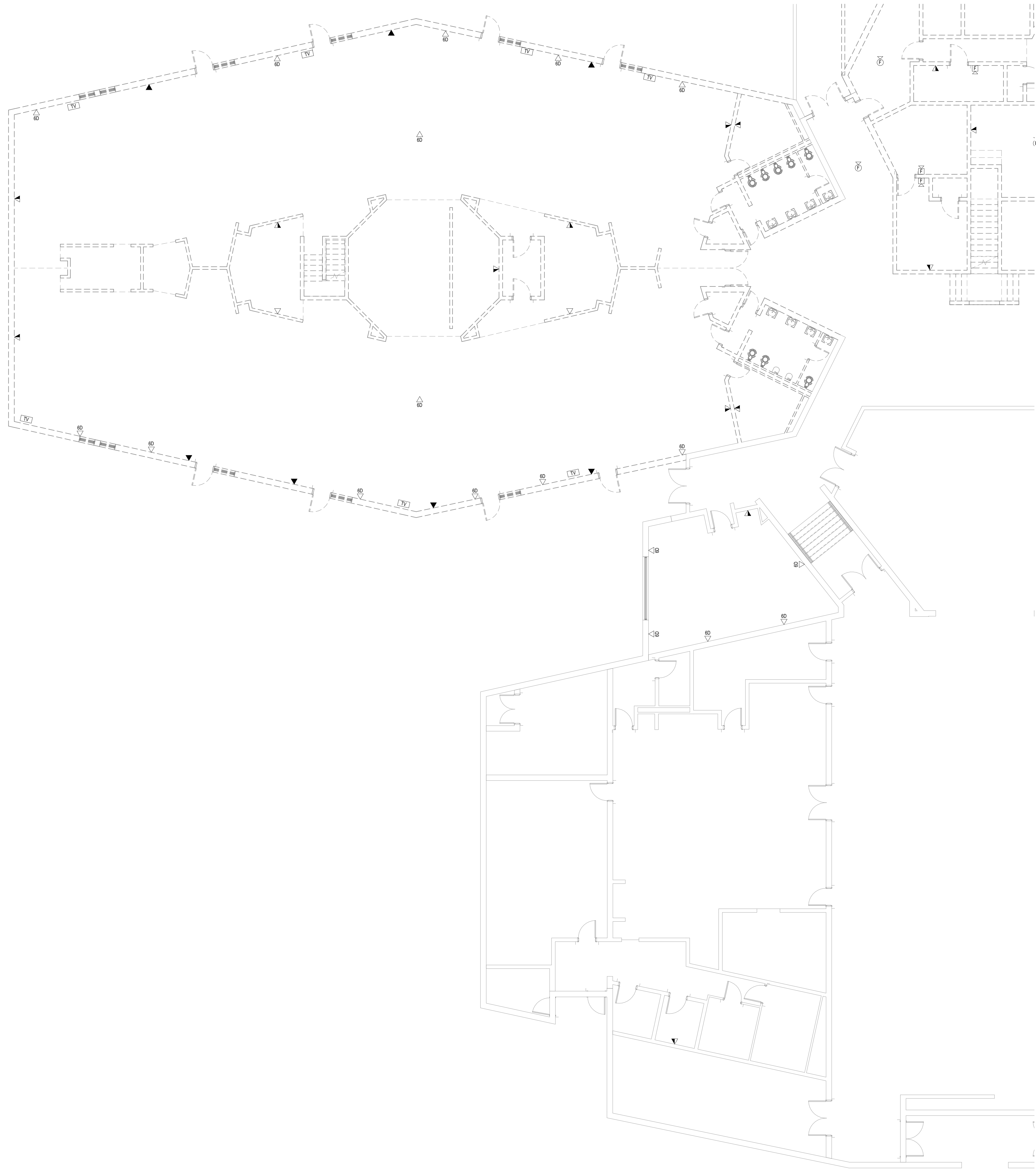
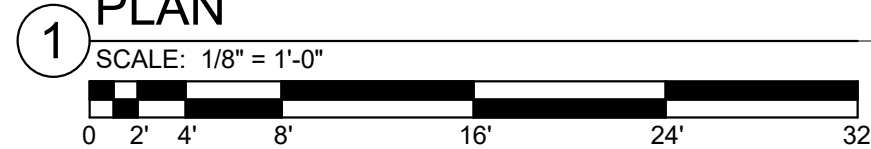
No.	Description	Date	Job Number	Drawn By	Checked By	Date
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NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 2 - AREA D - POWER DEMOLITION PLAN



PHASE 2 - AREA B - DEMOLITION SYSTEMS  
 PLAN



HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PHASE 2 - AREA B - SYSTEMS DEMOLITION PLAN

SHEET NUMBER

E2.24

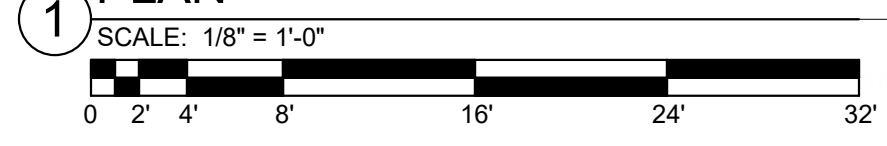
NOT FOR  
 CONSTRUCTION

No.	Description	Date	Job Number	Drawn By	Checked By	Date
			2021144	XHER23	DRH	
					HCH	2/12/2024

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PHASE 2 - AREA D - DEMOLITION SYSTEMS  
PLAN



No.	Description	Date	Job Number	Drawn By	Checked By	Date
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NOT FOR  
CONSTRUCTION

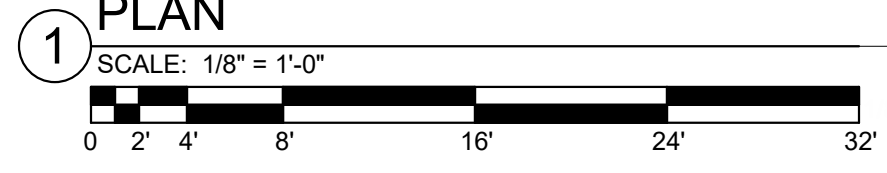
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 2 - AREA D - SYSTEMS DEMOLITION PLAN







PHASE 1 - AREA D - NEW WORK LIGHTING  
PLAN

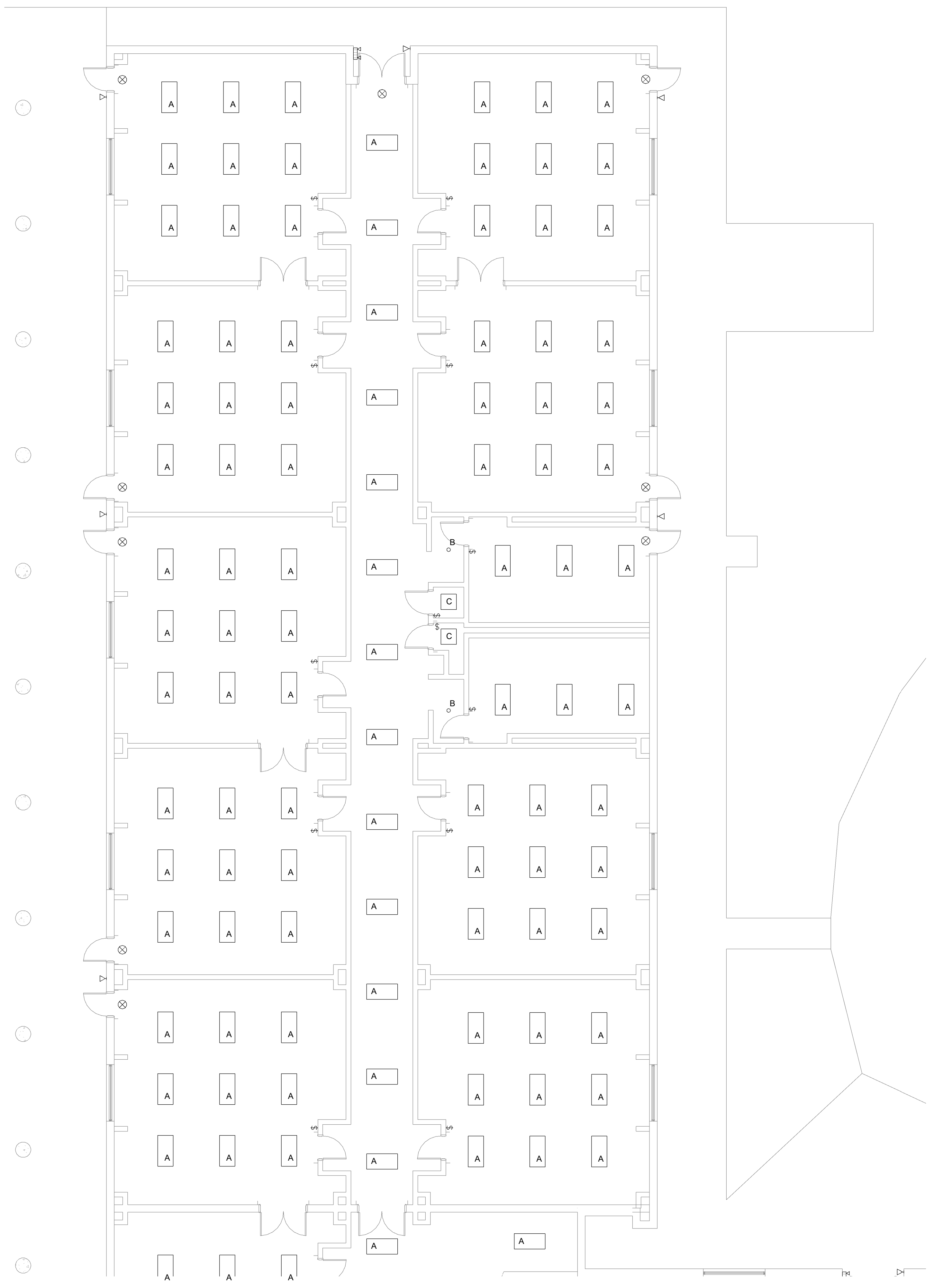


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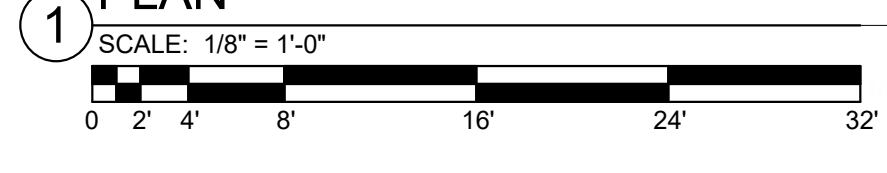
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA D - NEW WORK LIGHTING PLAN





PHASE 1 - AREA E - NEW WORK LIGHTING PLAN



ALUMINUM	JOB NUMBER	YS01144
DATE	DRAWN BY	XHER23
DESCRIPTION	CHECKED BY	DKH
	DATE	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA E - NEW WORK LIGHTING PLAN

ALUMINUM	DATE
DESCRIPTION	DATE
NO.	DESCRIPTION
1	2/12/2024

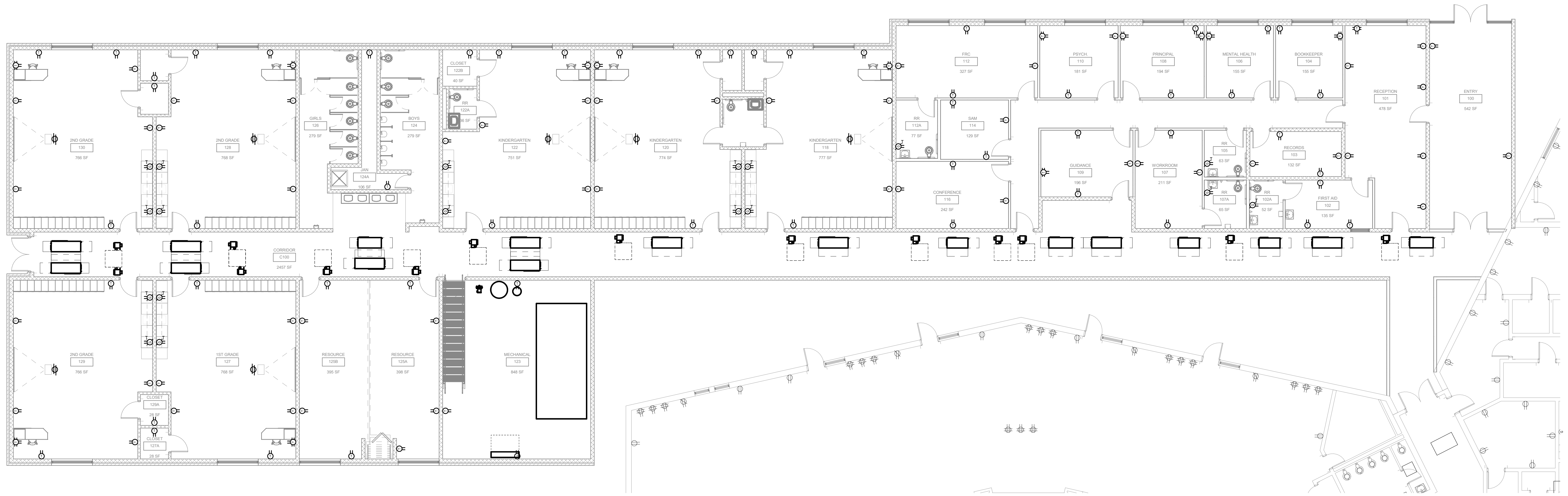
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DATE	XHER23
DRAWN BY	DRH
CHECKED BY	HCH
DATE	2/12/2024

NOT FOR CONSTRUCTION

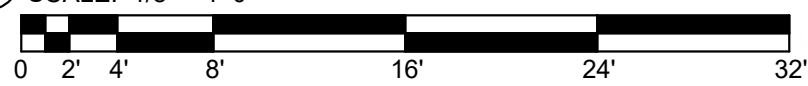
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
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PHASE 1 - AREA A - NEW WORK POWER PLAN

SHEET NUMBER

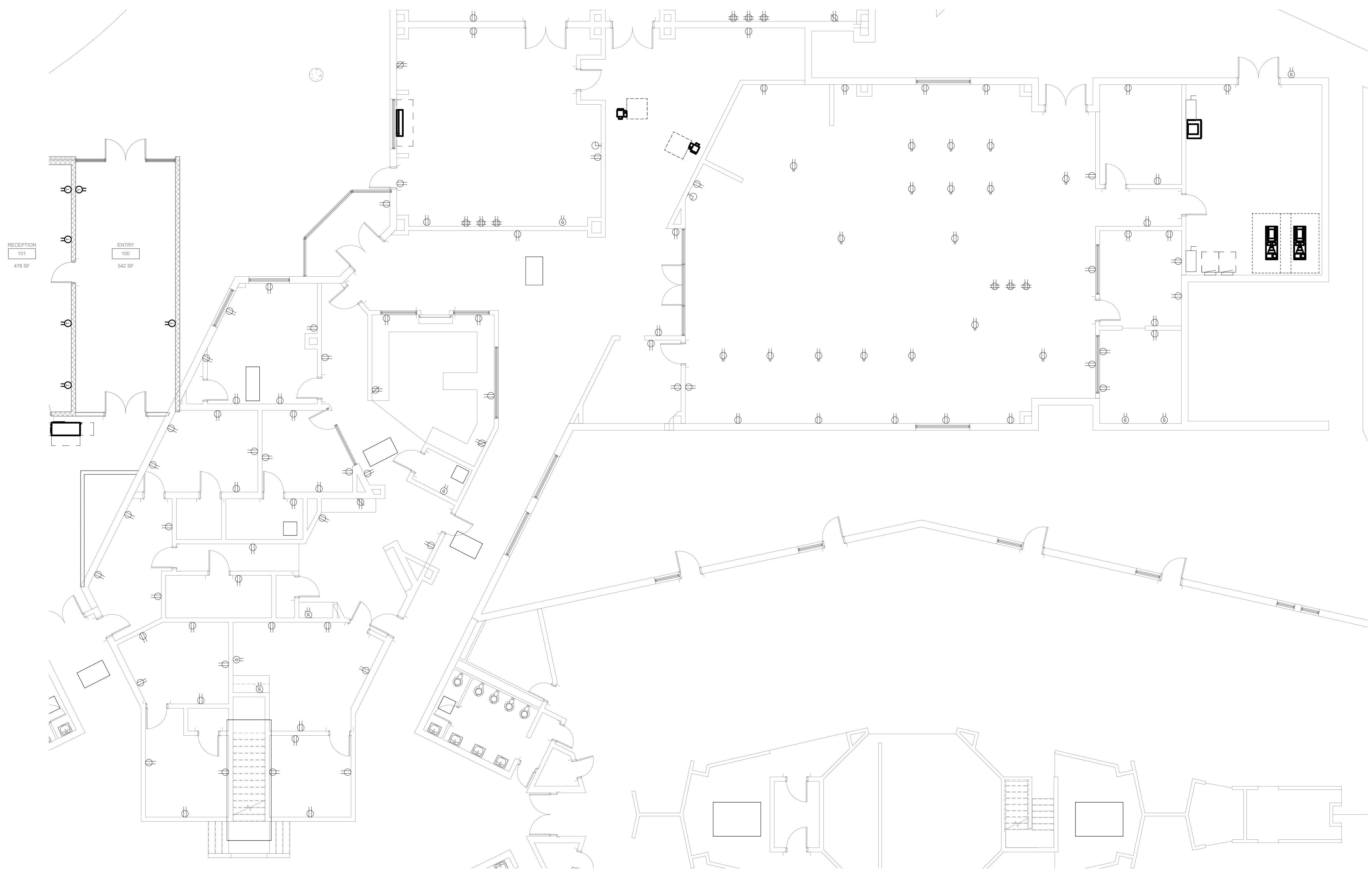
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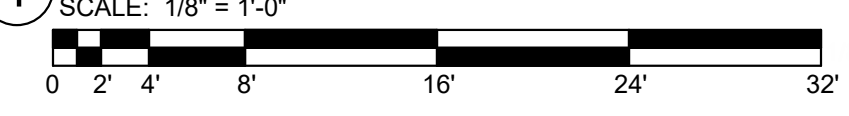
1 PHASE 1 - AREA A - NEW WORK POWER PLAN  
SCALE: 1/8" = 1'-0"







1 PHASE 1 - AREA D - NEW WORK POWER PLAN  
 SCALE: 1/8" = 1'-0"

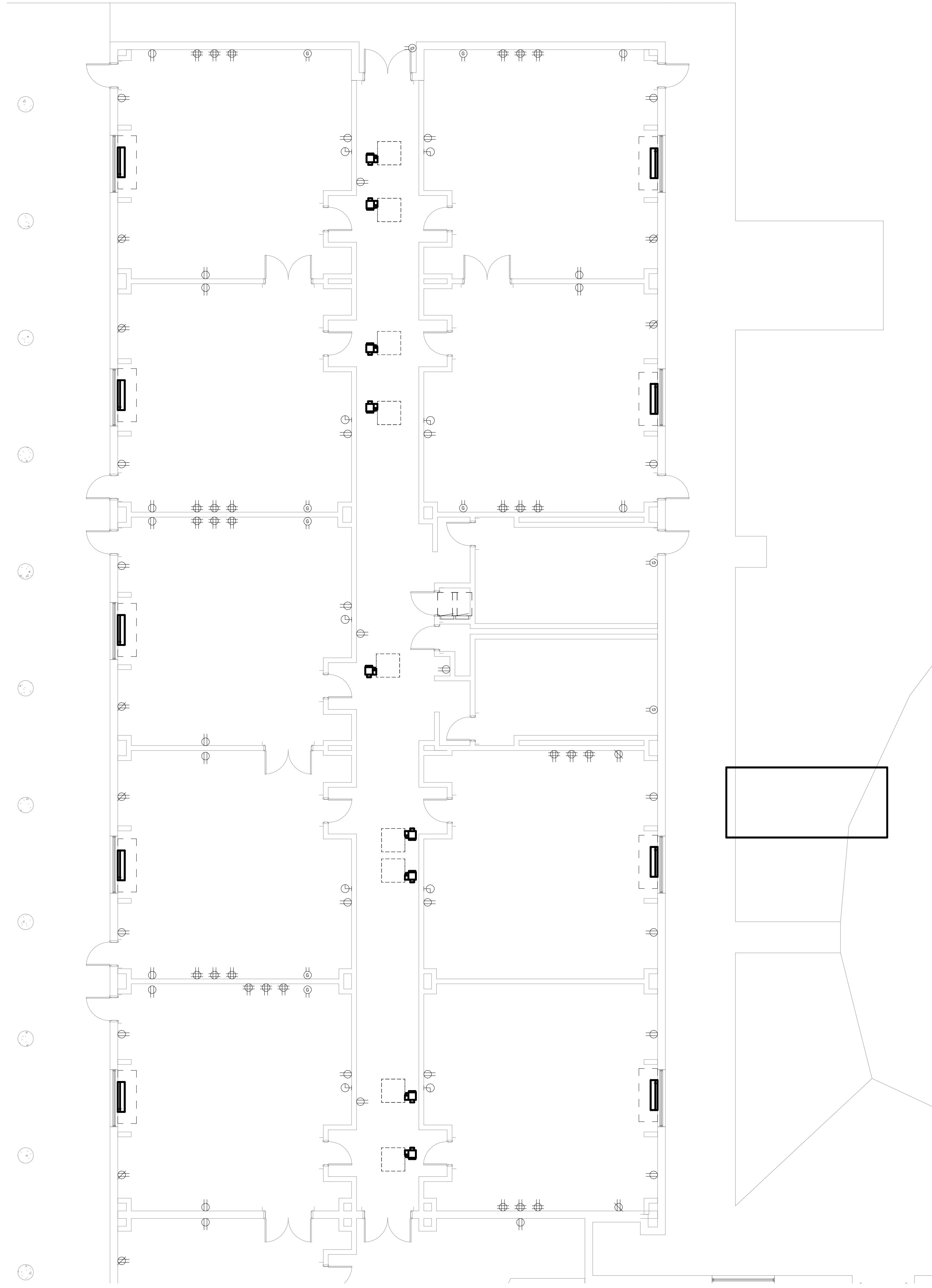
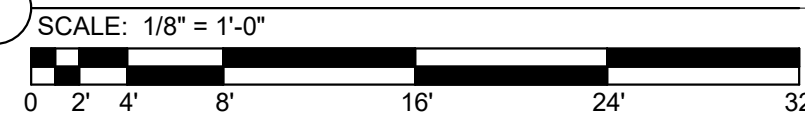


ALUMINUM LETTERS	JOB NUMBER	Y2011A4
DATE	DRAWN BY	XHER23
DESCRIPTION	CHECKED BY	HCN
	DATE	2/12/2024

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PHASE 1 - AREA D - NEW WORK POWER PLAN

1 PHASE 1 - AREA E - NEW WORK POWER PLAN



SHEET NUMBER  
**E4.12**

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA E - NEW WORK POWER PLAN

NOT FOR  
CONSTRUCTION

No.	Description	Date	JOB NUMBER	Y2011A1 XHER23

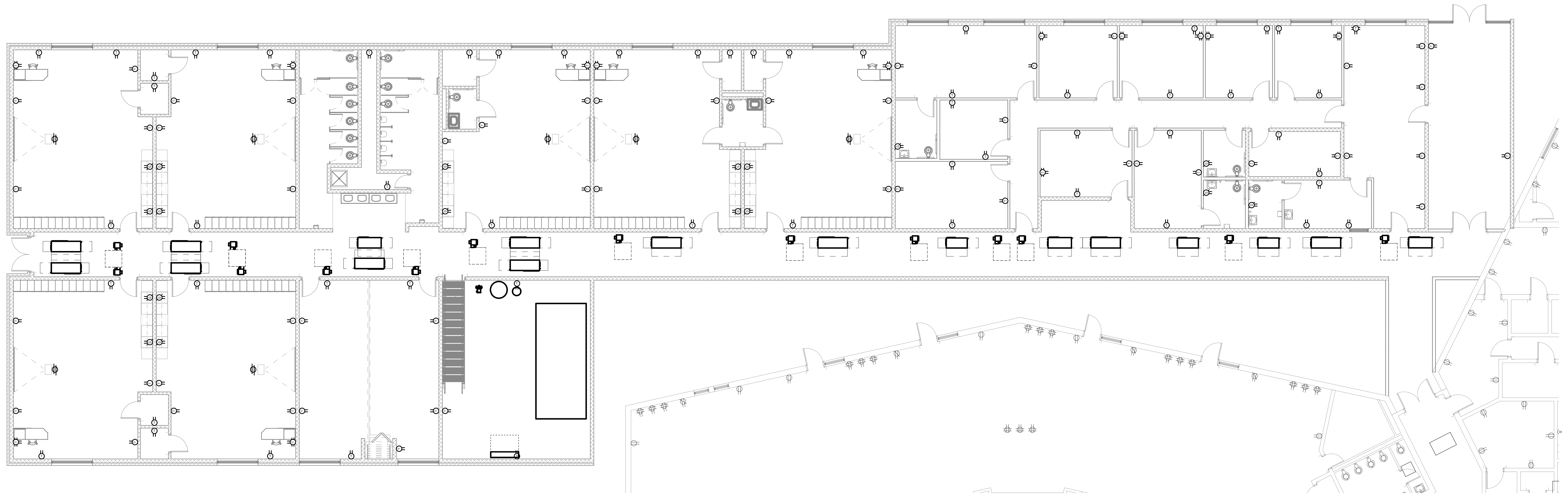
**RBS DESIGN GROUP**  
ARCHITECTURE

ALABAMA LICENSE  
RBS DESIGN GROUP, INC.  
2000 UNIVERSITY BLVD., SUITE 100  
MONTGOMERY, AL 36102  
PH: 205.833.1234  
FAX: 205.833.1235  
WWW.RBSDG.COM  
E-MAIL: OFFICE@RBSDG.COM

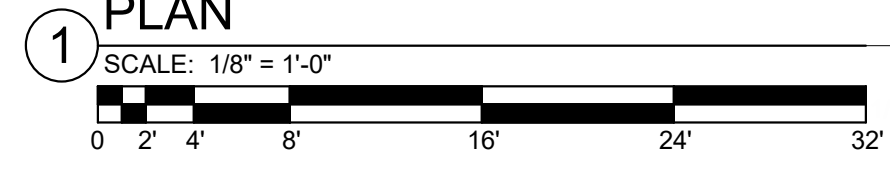
REGISTERED PROFESSIONAL ARCHITECT  
RBS DESIGN GROUP, INC.  
2000 UNIVERSITY BLVD., SUITE 100  
MONTGOMERY, AL 36102  
PH: 205.833.1234  
FAX: 205.833.1235  
WWW.RBSDG.COM  
E-MAIL: OFFICE@RBSDG.COM

DATE: 2/12/2024





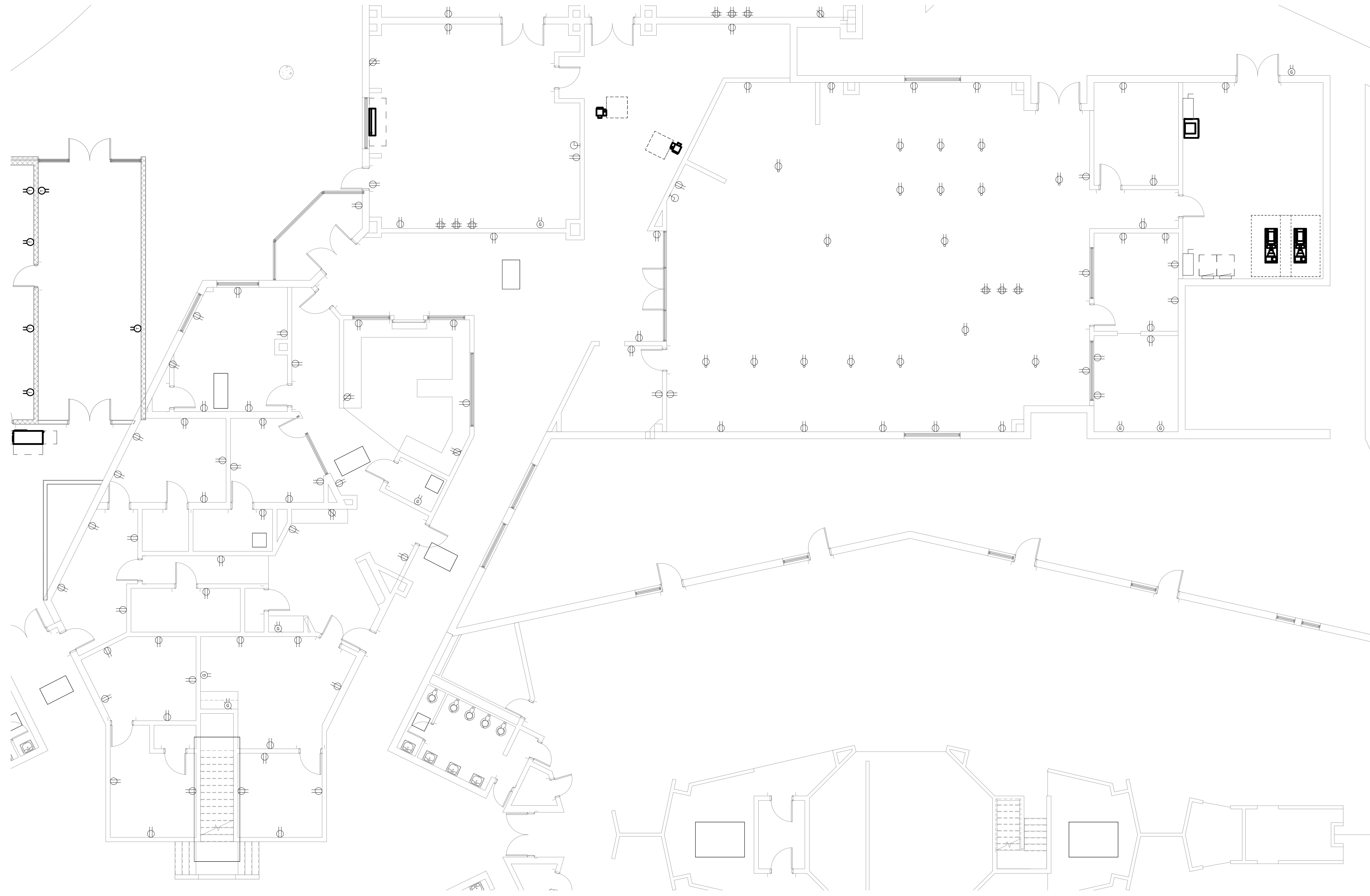
PHASE 1 - AREA A - NEW WORK HVAC POWER PLAN



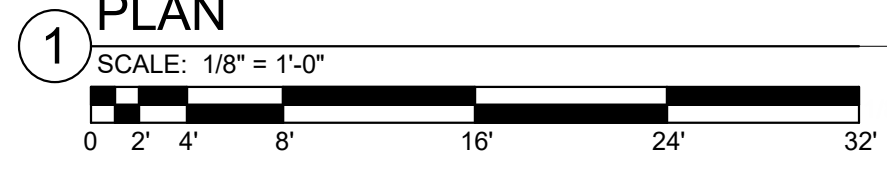
No.	Description	Date	Job Number	Drawn By	Checked By	Date

NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA A - HVAC NEW WORK PLAN



PHASE 1 - AREA D - NEW WORK HVAC POWER  
PLAN



No.	Description	Date	Job Number	Drawn By	Checked By	Date
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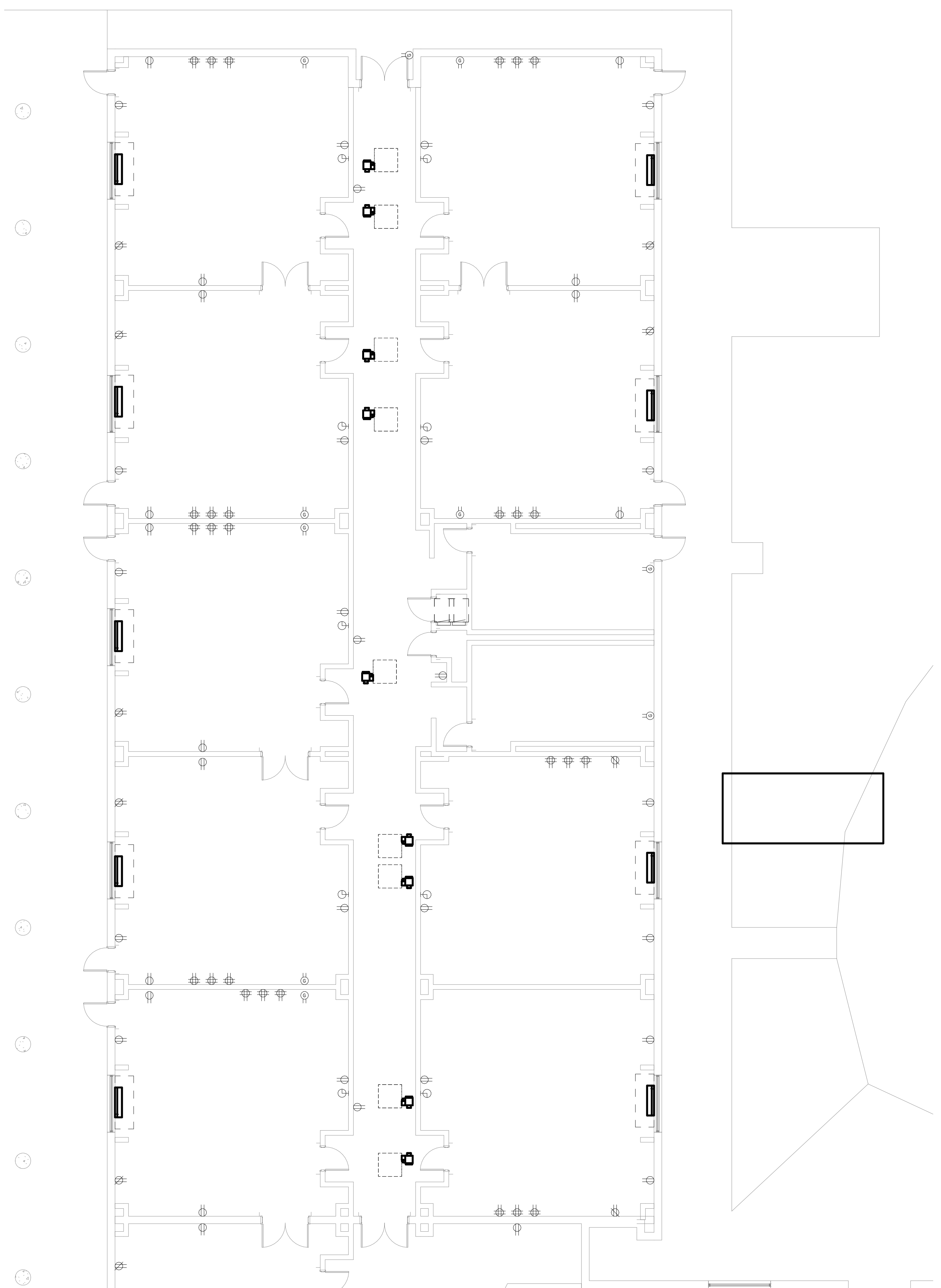
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HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA D - HVAC NEW WORK PLAN

SHEET NUMBER

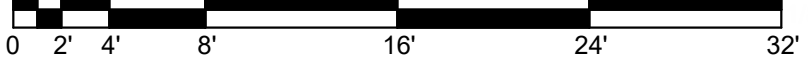
**E5.14**





PHASE 1 - AREA E - NEW WORK HVAC POWER PLAN

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



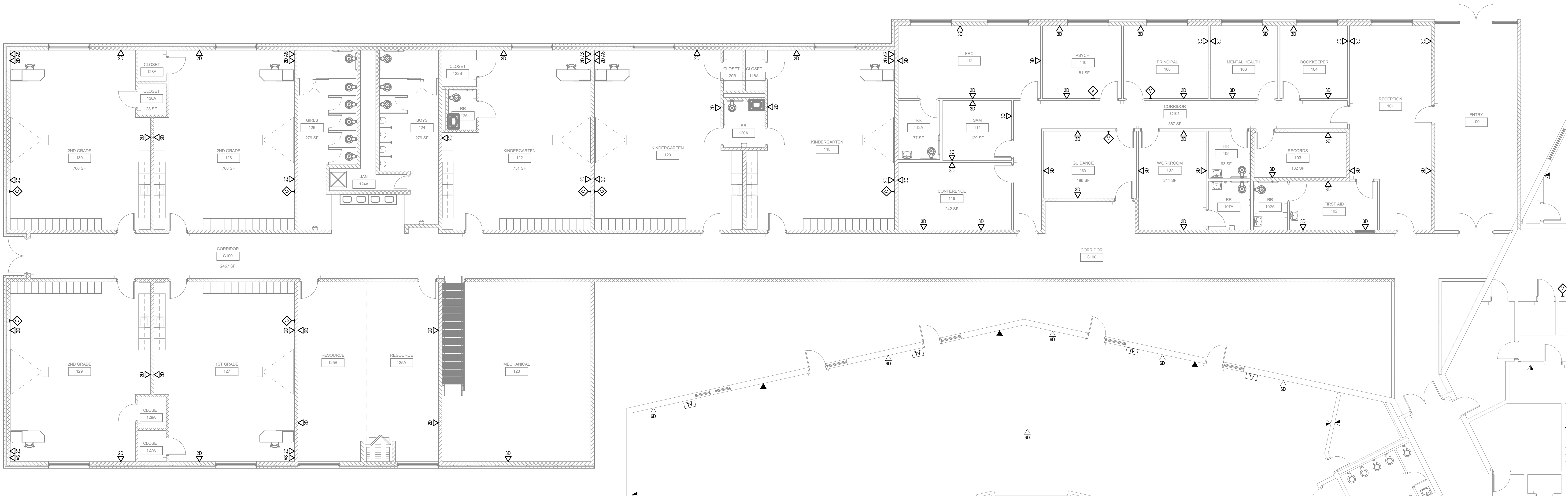
ALUMINUM	JOB NUMBER	YS21144
ALUMINUM	DRAWN BY	XHER23
ALUMINUM	CHECKED BY	HCN
ALUMINUM	DATE	2/12/2024

NOT FOR CONSTRUCTION

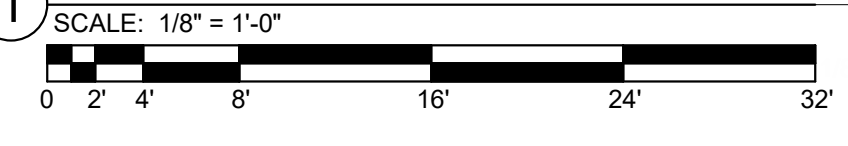
HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA E - HVAC NEW WORK PLAN

SHEET NUMBER

**E5.15**



PHASE 1 - AREA A - NEW WORK SYSTEMS  
 PLAN  
 SCALE: 1/8" = 1'-0"



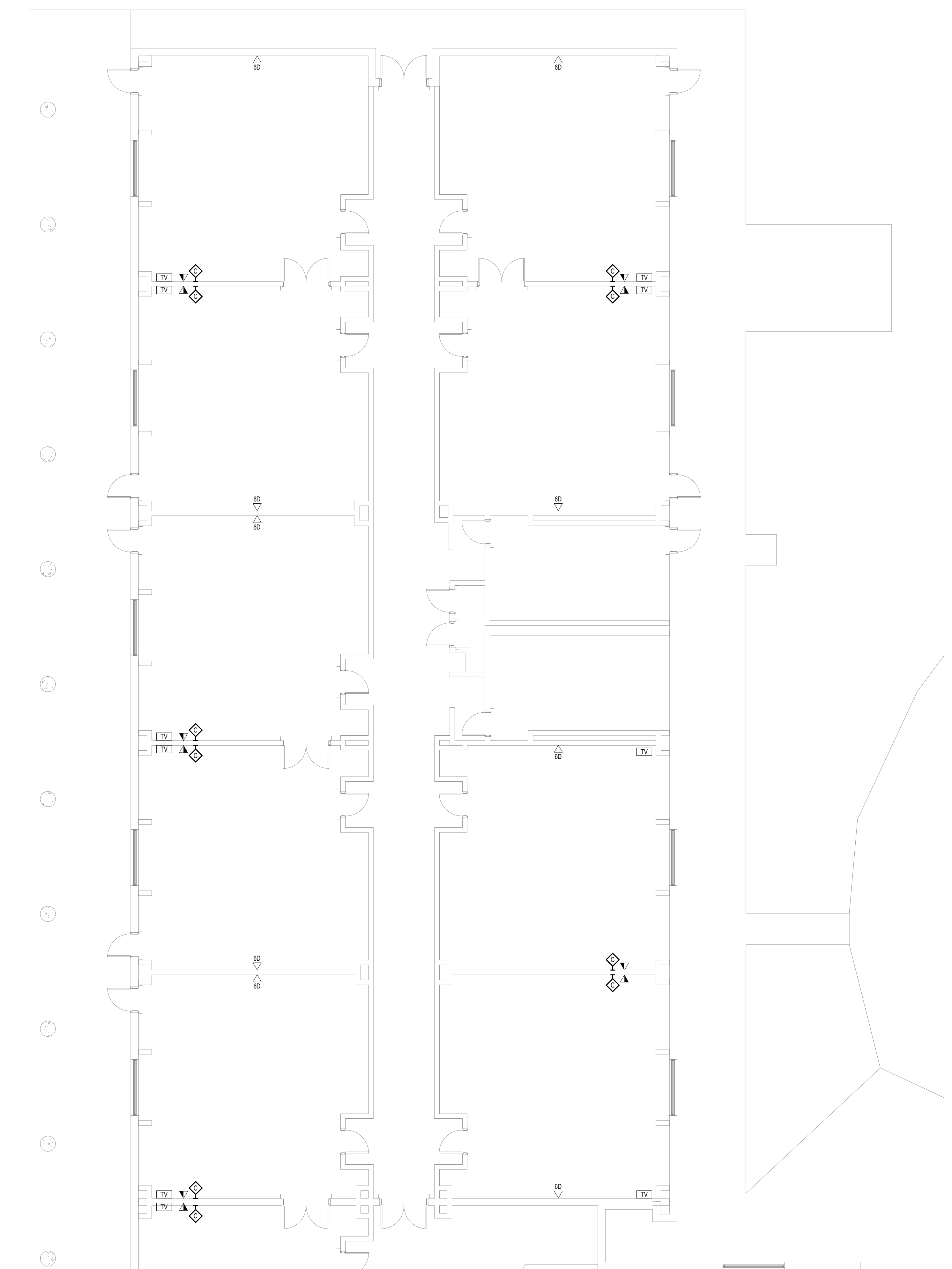
NO.	Description	Date	Job Number	Drawn By	Checked By	Date
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NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
 EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
 EAST HEIGHTS ELEMENTARY RENOVATION  
 PHASE 1 - AREA A - NEW WORK SYSTEMS PLAN

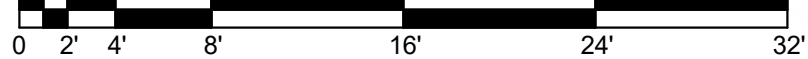






PHASE 1 - AREA E - NEW WORK SYSTEMS  
PLAN

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



No.	Description	Date	Job Number	Drawn By	Checked By	Date
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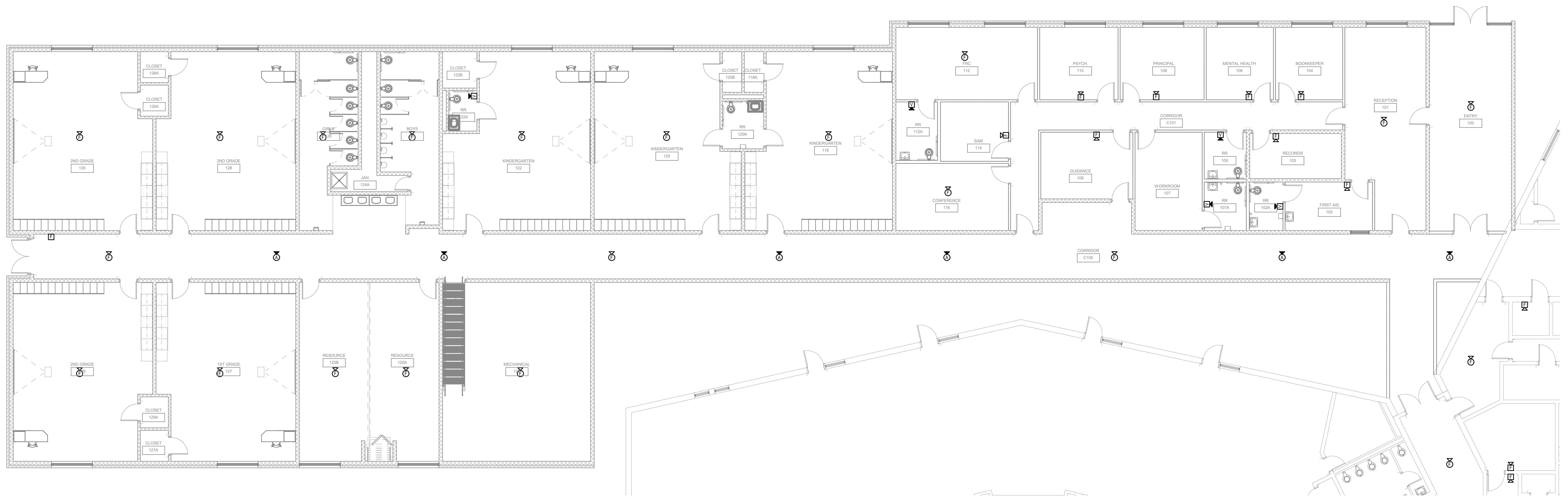
NOT FOR  
CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA E - NEW WORK SYSTEMS PLAN

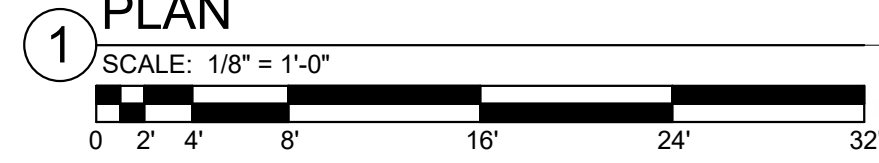
SHEET NUMBER

**E6.12**





PHASE 1 - AREA A - NEW WORK FIRE ALARM PLAN



ALUMINUM	Y2011A4	Y2011A4	Y2011A4
DESCRIPTION	DATE	BY	CHECKED
NO.	DESCRIPTION	DATE	BY
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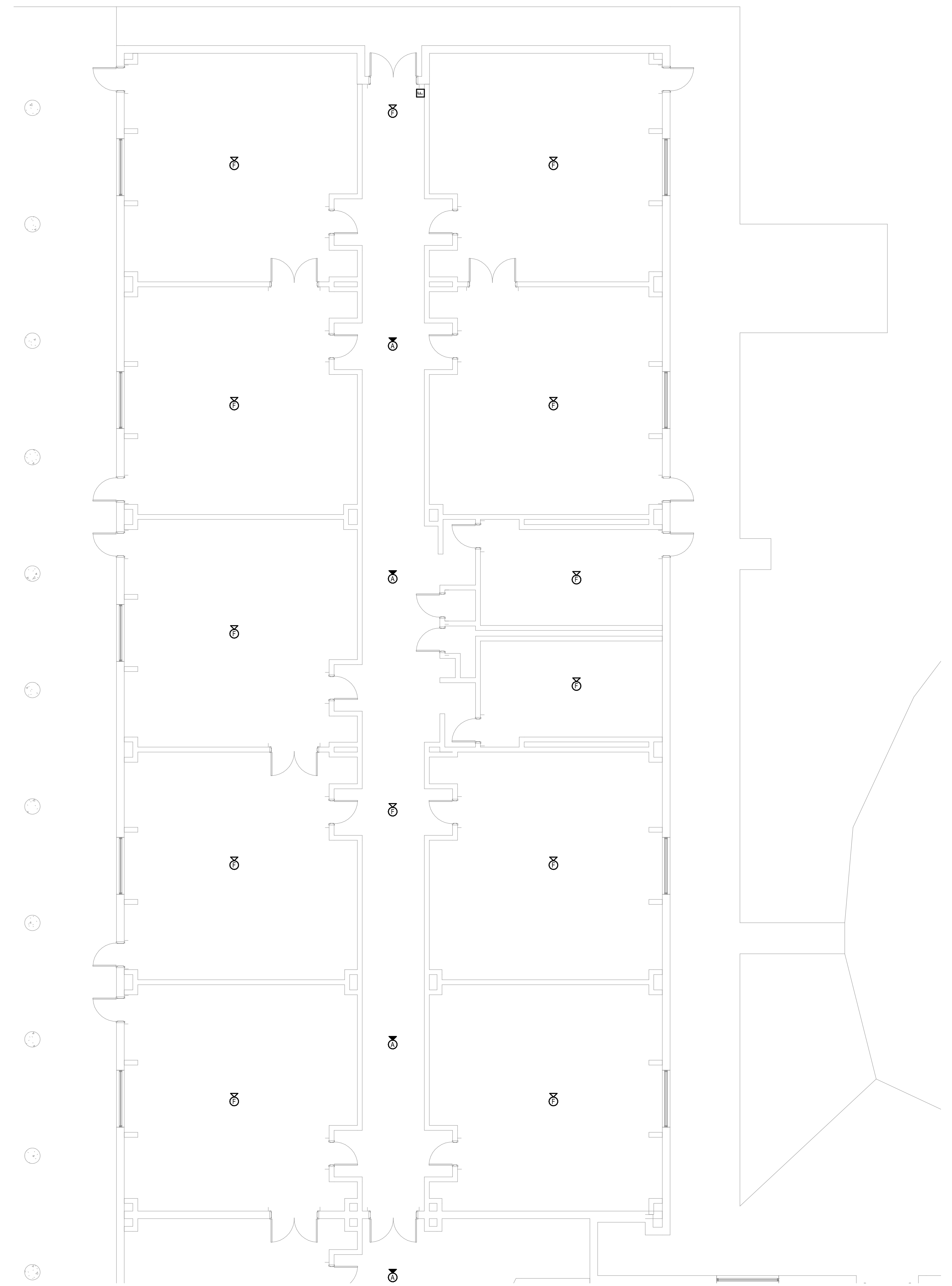
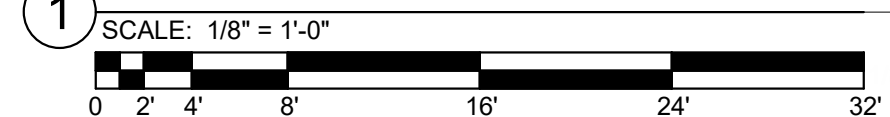
NOT FOR CONSTRUCTION

HENDERSON COUNTY SCHOOLS  
EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION  
EAST HEIGHTS ELEMENTARY RENOVATION  
PHASE 1 - AREA A - NEW WORK FIRE ALARM PLAN





PHASE 1 - AREA E - NEW WORK FIRE ALARM PLAN  
 SCALE: 1/8" = 1'-0"



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No.	Description	Date	Job Number
			YS0114A
			XHER23
			DRAWN BY
			DNH
			CHECKED BY
			HCH
			DATE
			2/12/2024
HENDERSON COUNTY SCHOOLS EAST HEIGHTS ELEMENTARY SCHOOL RENOVATION EAST HEIGHTS ELEMENTARY RENOVATION PHASE 1 - AREA E - NEW WORK FIRE ALARM PLAN		NOT FOR CONSTRUCTION	
SHEET NUMBER		<b>E7.12</b>	