BID SET
(ISSUED FOR BID)
MSC REPLACE AHUs, POD 1

MUSEUM SUPPORT CENTER (MSC)
4210 SILVER HILL ROAD
SUITLAND, MD 20746

SF PROJECT NUMBER: 1530103
URS PROJECT NUMBER: 60516569

FEBRUARY 02, 2024

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RYAN JAKUBCO
EPA ASBESTOS PROJECT DESIGNER
NO. VAPDR12202023-05
20 DECEMBER 2023

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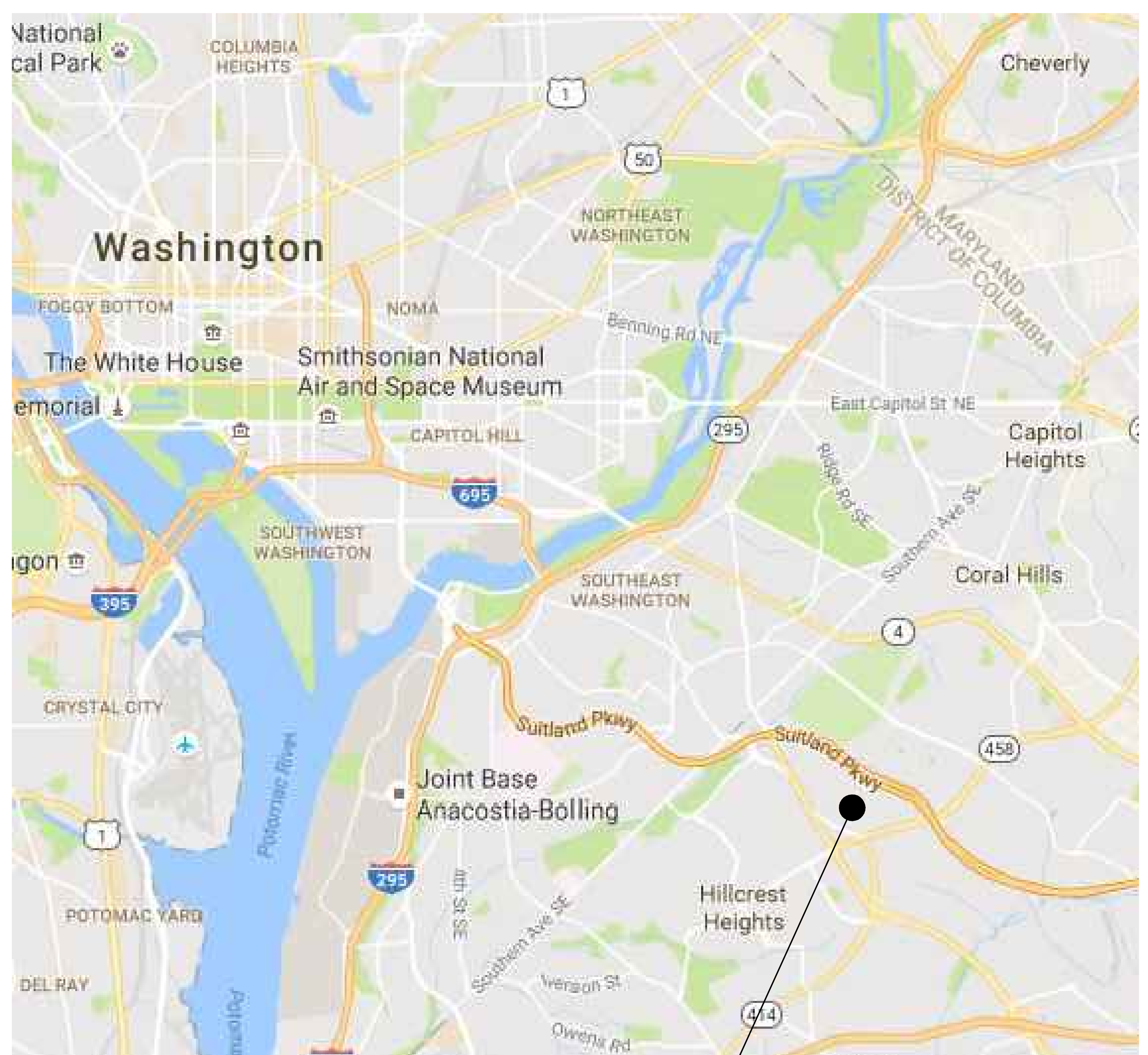
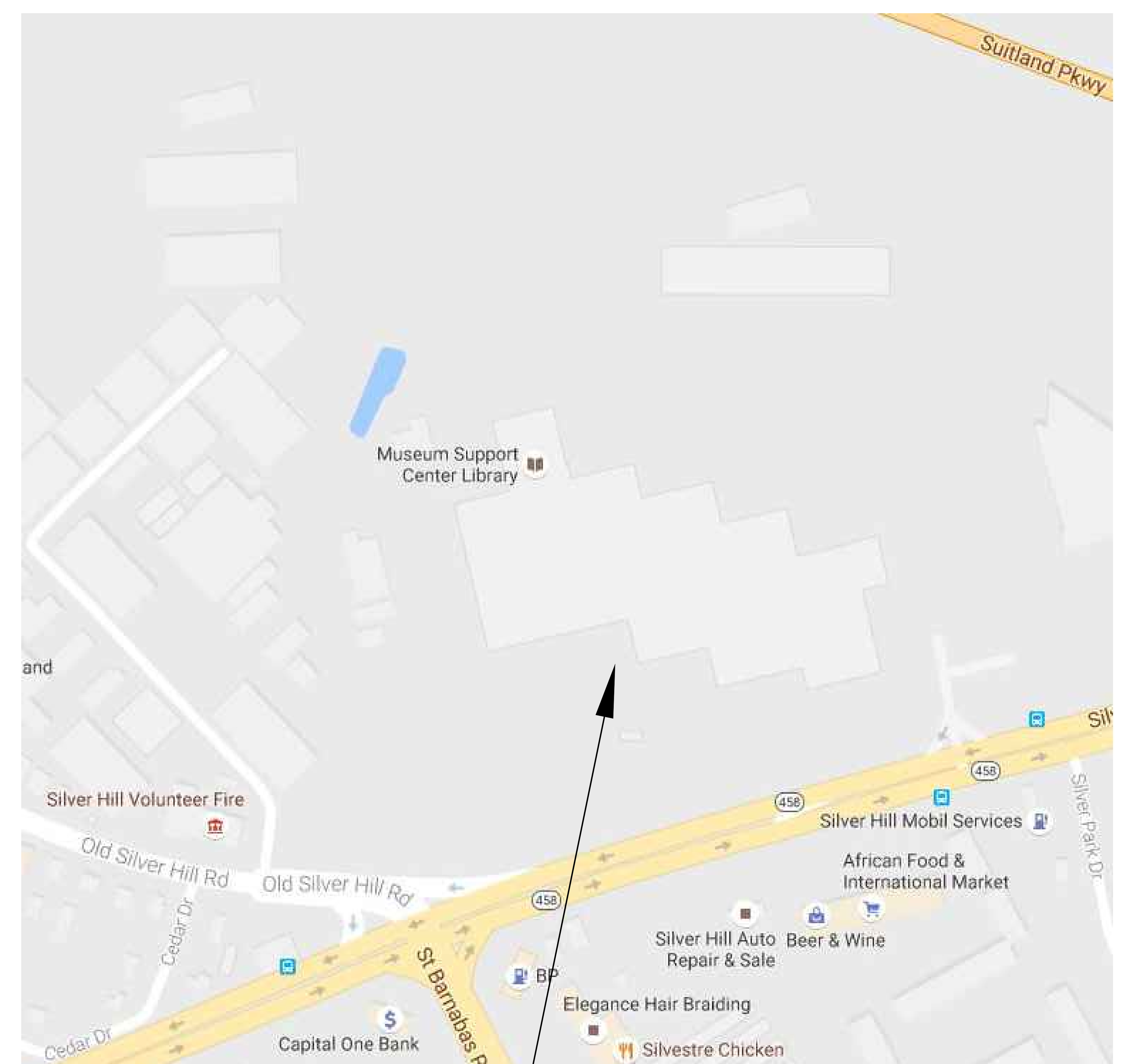
VICINITY MAP



PROJECT SITE

LOCATION MAP



PROJECT SITE

MUSEUM SUPPORT CENTER
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2020 K Street, NW
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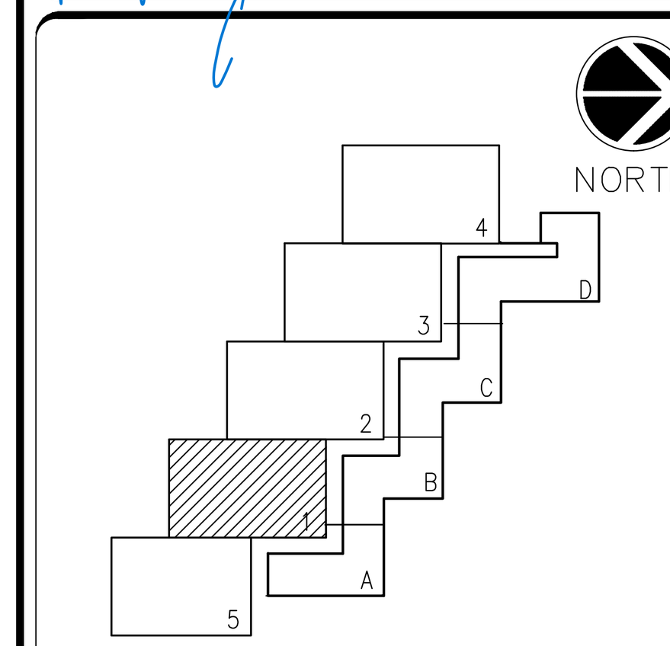
SMITHSONIAN FACILITIES
APPROVAL BLOCK

DM: ______
DESIGN CHIEF: ______
R.E.: ______
OPPM: ______
OFM&R: ______
OSHEM: ______
OPS: ______

THIS PROJECT IS APPROVED AS BEING IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF SMITHSONIAN INSTITUTION DIRECTIVE 410.

2/8/24

MICHAEL J. CARRANCHO, P.E., ASSOCIATE DIRECTOR, OEDC



KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	COVER SHEET
DRAWING TYPE	GENERAL
WORKING STAFF	DAR (DESIGNED BY), DAR (DRAWN BY), DP (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
1 OF 71	G	0	01

G-0-01.DWG
SCALE : 1:1

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
	GENERAL
G-0-01	COVER SHEET
G-0-02	TABLE OF CONTENTS
G-0-03	OVERALL BUILDING PLAN
G-0-04	CRANE AND STAGING PLAN
	ARCHITECTURE
A-0-01	COVER SHEET
AD-1.1-01	ARCHITECTURE POD-1 ROOF LEVEL – DEMOLITION
A-1.1-01	ARCHITECTURE POD-1 ROOF LEVEL – NEW WORK
A-5-01	DETAILS
A-5-02	DETAILS
	STRUCTURAL
S-0-01	STRUCTURAL ABBREVIATIONS AND GENERAL NOTES
S-0-02	GENERAL NOTES
S-1.1-01	MECHANICAL POD 1 ROOF LEVEL – NEW WORK
S-5-01	SECTIONS AND DETAILS
	MECHANICAL
M-0-01	COVER SHEET
MD-1.1-01	MECHANICAL POD 1 ROOF LEVEL – DEMO
MD-5-01	EXISTING AHU DETAIL
M-1.1-01	MECHANICAL POD 1 LEVEL 1– SENSOR LOCATIONS
M-1.1-01A	STREET CORRIDOR PARTIAL PLAN – LEVEL 1 (AHU-9)
M-1.1-02	MECHANICAL POD 1 LEVEL 2 – SENSOR LOCATIONS
M-1.1-02A	STREET CORRIDOR PARTIAL PLAN – LEVEL 2 (AHU-9)
M-1.1-03	MECHANICAL POD 1 LEVEL 3 – SENSOR LOCATIONS
M-1.1-04	MECHANICAL POD 1 ROOF LEVEL
M-3-01	MECHANICAL SECTIONS AHU-1, AHU-2, AHU-9
M-3-02	MECHANICAL SECTIONS AHU-1, AHU-2, AHU-9
M-3-03	TYPICAL SECTION DOMESTIC COLD WATER TO EXISTING
M-4.1-01	MECHANICAL POD 1 ROOF LEVEL – ENLARGED
M-4.1-02	PARTIAL ROOF LEVEL BENEATH AHU-1, AHU-2, AHU-9
MP-1-01	GENERAL PHASING PLAN
MP-1.1-01	POD 1 PHASING SEQUENCE PLAN
MP-1.1-02	POD 1 PHASING SEQUENCE PLAN
MP-1.1-03	POD 1 PHASING SEQUENCE PLAN
MP-1.1-04	POD 1 PHASING SEQUENCE PLAN
MP-1.1-05	POD 1 PHASING SEQUENCE PLAN
M-5-01	AHU DETAIL
M-5-02	AHU DETAIL
M-5-03	AHU DETAIL
M-5-04	AHU-DETAIL
M-5-05	AHU DETAIL
M-5-06	AHU PIPING ELEVATION DETAIL
M-5-07	AHU PIPING ELEVATION DETAIL
M-5-08	AHU PIPING ELEVATION DETAIL
M-5-09	MECHANICAL DETAILS
M-5-10	MECHANICAL DETAILS
M-5-11	DUCT SUPPORT UNDERNEATH AHU DETAIL
M-6-01	MECHANICAL SCHEDULES
M-6-02	MECHANICAL SCHEDULES
M-6-03	MECHANICAL SCHEDULES
M-6-04	MECHANICAL PIPING FLOW DIAGRAM
M-6-05	STREET CORRIDOR AIR PRESSURIZATION PLAN – LEVEL 1 (AHU-9)
M-6-06	STREET CORRIDOR AIR PRESSURIZATION PLAN – LEVEL 2 (AHU-9)
M-7-01	CONTROLS COVER SHEET
M-7-02	MECHANICAL CONTROLS
M-7-03	MECHANICAL CONTROLS
M-7-04	MECHANICAL CONTROLS
M-7-05	MECHANICAL CONTROLS
M-7-06	MECHANICAL CONTROLS

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
	ELECTRICAL
E-0-01	COVER SHEET
ED-1.1-01	POD 1 ROOF LEVEL – POWER – DEMO
ED-1.1-02	POD 1 ROOF LEVEL – LIGHTING PROTECTION – DEMO
ED-4.1-01	AHU ELECTRICAL ROOM – POD 1 – DEMO
ED-6-01	PARTIAL SINGLE LINE DIAGRAM – DEMO
E-1.1-01	ELECTRICAL POD 1 ROOF LEVEL – POWER – NEW WORK
E-1.1-02	POD 1 AHU ROOF LEVEL – LIGHTNING PROTECTION – NEW WORK
E-4.1-01	ENLARGED AHU ELECTRICAL PLANS – NEW WORK
E-4.1-02	ENLARGED AHU ELECTRICAL PLAN – NEW WORK
E-5-01	AC UNIT TYPICAL WIRING DIAGRAM
E-6-01	PARTIAL SINGLE LINE DIAGRAM – NEW WORK
E-6-02	PANEL BOARD SCHEDULES
E-6-03	PANEL BOARD SCHEDULES
	HAZMAT
HD-0-01	COVER SHEET
HD-1.1-01	HAZMAT POD 1 ROOF LEVEL – ASBESTOS LOCATIONS DRAWINGS

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KEY PLAN

GRAPHIC SCALE(S)

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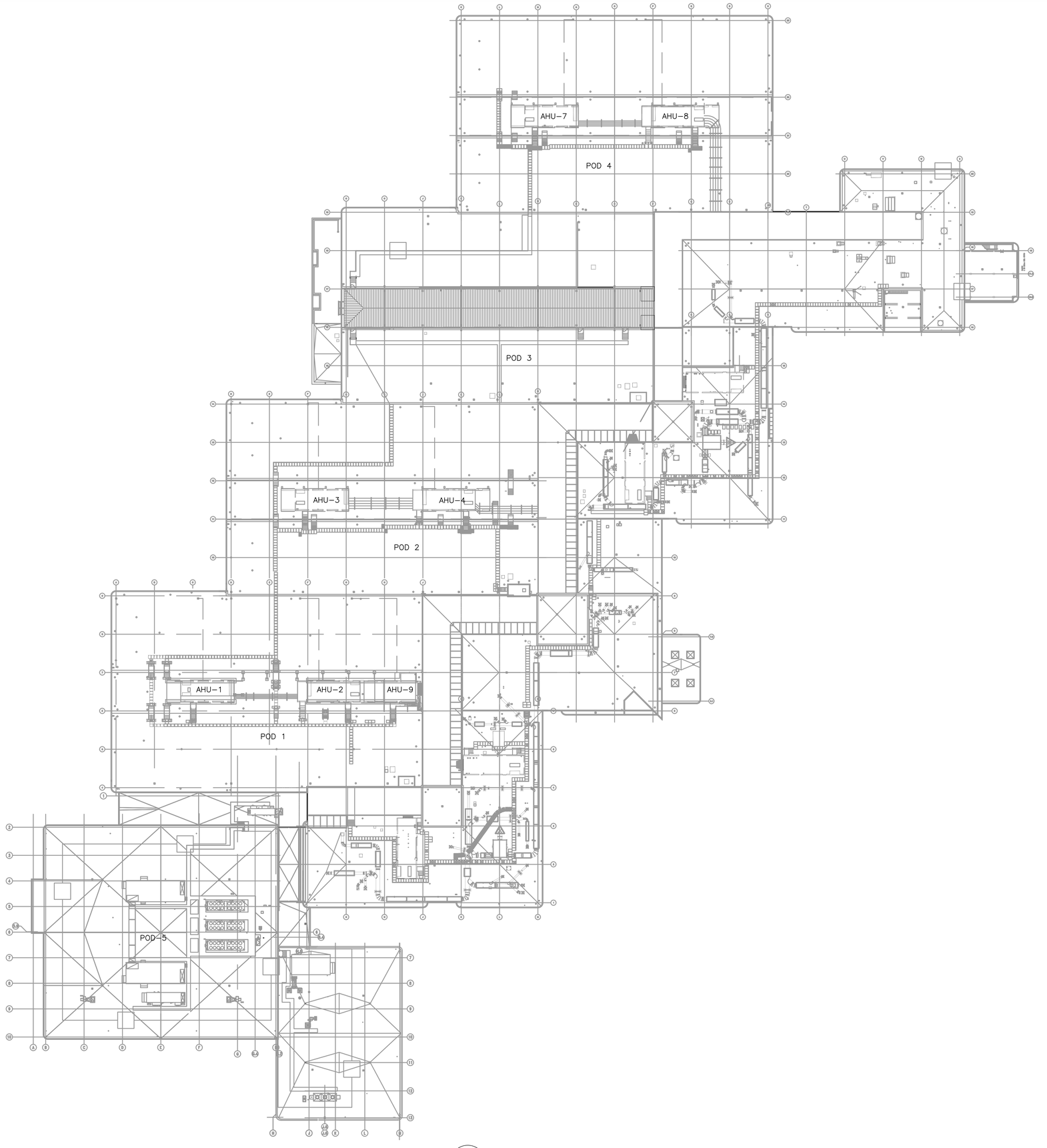
DRAWING TITLE	TABLE OF CONTENTS
DRAWING TYPE	GENERAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO. 2 OF 71

G	0	02
DISCIPLINE	TYPE	SEQUENCE

S-42-ENG
S-42-ENG



1 G-0-03 OVERALL BUILDING PLAN
SCALE: 1/32" = 1'-0"

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STATE OF MARYLAND
NO. 19381
ARCHITECT
2/2024

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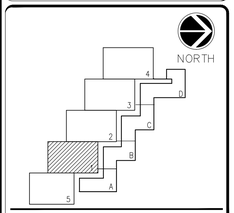

KEY PLAN

0 16 32 64
1/32" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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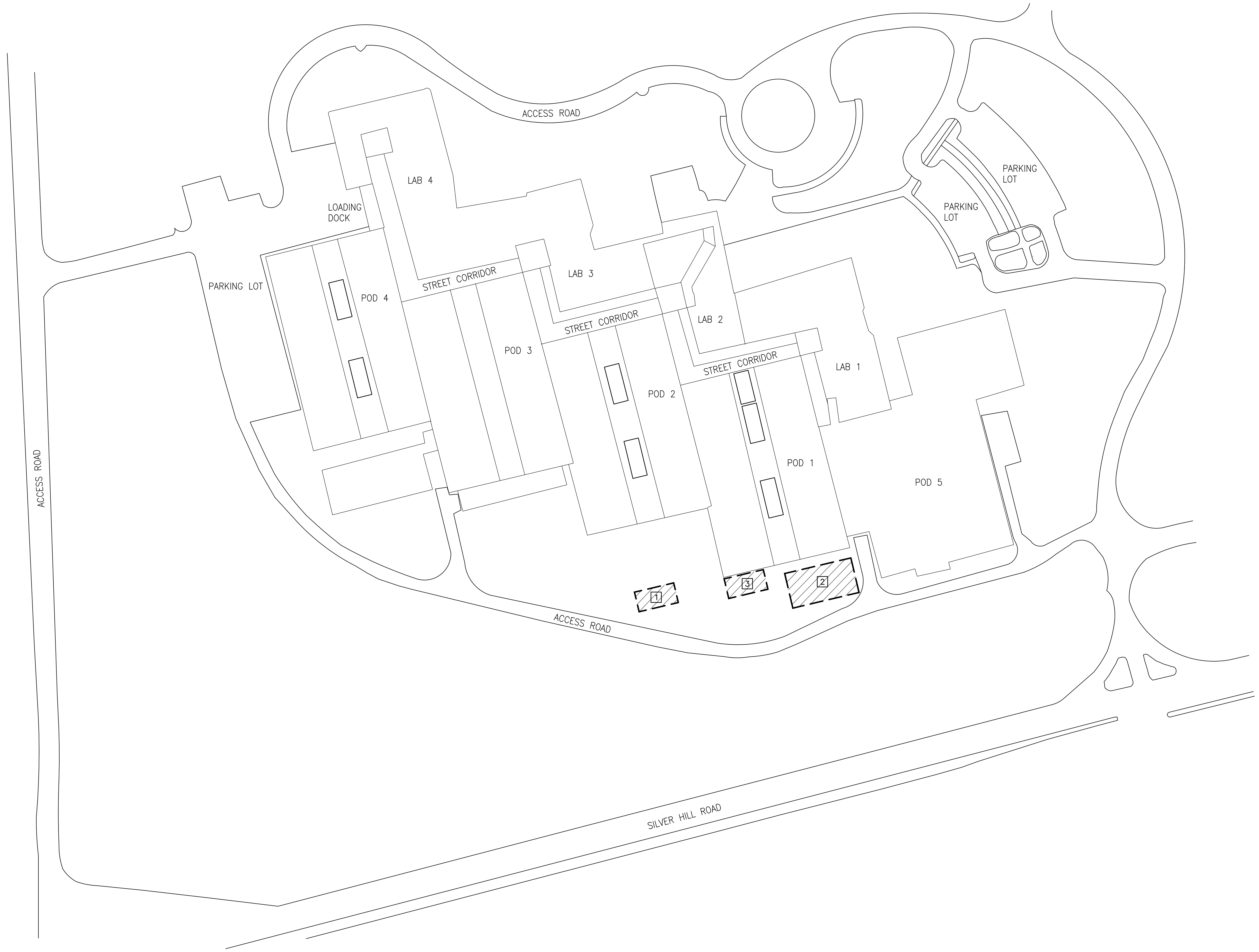
DRAWING TYPE	GENERAL
WORKING STAFF	DAR (DESIGNED BY) / DAR (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	3 OF 71
	G (DISCIPLINE) / 0 (TYPE) / 03 (SEQUENCE)

SCALE: 1:1



1 G-0-04 CRANE AND STAGING PLAN
SCALE: 1/64" = 1'-0"

CODED NOTES:

1. SUGGESTED CRANE LOCATION.
2. STAGING LOCATION FOR AHU'S.
3. TEMPORARY STAIR TO POD 1 ROOF.

GENERAL NOTES:

1. CONTRACTOR SHALL PROPOSE CRANE LOCATION AND STAGING PLAN AND OBTAIN APPROVAL FROM COTR.
2. PROVIDE TEMPORARY SCAFFOLDING/STAIR TOWER FROM GROUND UP TO POD 1 ROOF TO ACCESS ROOF. COORDINATE LOCATION WITH COTR.
3. CRANE LOCATION SHALL BE COORDINATED WITH GEOTHERMAL WELL FIELD TO BE CONSTRUCTED FOR POD 6. IT WAS UNKNOWN DURING THE DESIGN THAT POD 1 AHU REPLACEMENT WILL OCCUR DURING OR AFTER THE GEOTHERMAL WELL INSTALLATION.

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NORTH

KEY PLAN

0 32 64 128
1/64" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	CRANE AND STAGING PLAN
DRAWING TYPE	GENERAL
WORKING STAFF	KD (DESIGNED BY), KD (DRAWN BY), DP (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
4 OF 71	G	0	04

G-0-04.DWG
SCALE : 1:1

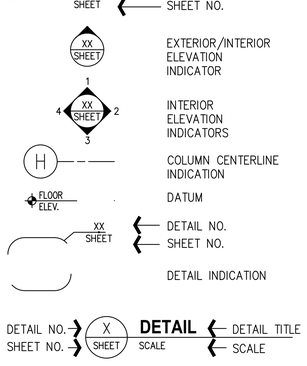
ARCHITECTURAL ABBREVIATIONS

A	
AB	ANCHOR BOLT
ACT	ACOUSTICAL TILE
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGGR	AGGREGATE
ANCH	ANCHOR
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ARE	ABOVE REFERENCE ELEVATION
AUX	AUXILIARY
B	
BET	BETWEEN
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BOT	BOTTOM
BSMT	BASEMENT
C	
CAP	CAPACITY
CERT	CERTIFIED
CIP	CAST IN PLACE
CL	CENTER LINE
CLNG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CTR	CENTER
D	
D	DIAMETER
DBL	DOUBLE
DEMO	DEMOLISH, DEMOLITION
DET	DETAIL
DIM	DIMENSION
DIV	DIVISION
DN	DOWN
DR	DOOR
DTL	DETAIL
DWG	DRAWING
E	
EA	EACH
ELECT	ELECTRICAL
ELEV	ELEVATION
EMERG	EMERGENCY
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
F	
F/F	FACE TO FACE
FDN	FOUNDATION
FP	FIRE PROOFING FR FRAME
FXT	FIXTURE
G	
GA	GAUGE
GALV	GALVANIZE
GEN	GENERAL
GWB	GYPSUM WALLBOARD
H	
HD	HEAD
HDR	HEADER
HDW	HARDWARE
HORZ	HORIZONTAL
HP	HIGH POINT
HT	HEIGHT
I	
IN	INCH(ES)
INCL	INCLUDE(ED)(ING)
INSUL	INSULATION
INT	INTERIOR
J	
JT	JOINT
K	
KIT	KITCHEN
L	
L	LENGTH
LB	POUND
LEV	LEVEL
LIN	LINEAR (LINEAL)
LP	LOW POINT
M	
MAS	MASONRY
MAX	MAXIMUM
MET	METAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
N	
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTS	NOT TO SCALE
O	
OC	ON CENTER
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
P	
PL	PLATE
P/L	PROPERTY LINE
PC	PRECAST CONCRETE
PERIM	PERIMETER
PERP	PERPENDICULAR
PNL	PANEL
PR	PAIR
PREFAB	PREFABRICATED
PTD	PAINTED
Q	
QTY	QUANTITY
R	
RAD	RADIUS
REBAR	REINFORCING BAR
REC	RECESS
REF	REFERENCE
REINF	REINFORCE
REQD	REQUIRED
RES	RESILIENT
REV	REVISION (REVISED)
RM	ROOM
RO	ROUGH OPENING
S	
SCHED	SCHEDULE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATIONS
STL	STEEL
T	
TBD	TO BE DETERMINED
TEMP	TEMPERATURE
THK	THICK
TOD	TOP OF DECK
TOM	TOP OF MASONRY
TOS	TOP OF SLAB OR STEEL
TOT	TOTAL
TYP	TYPICAL
U	
UNF	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
V	
VAR	VARIABLE, VARIES
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
W	
WD	WOOD
WT	WEIGHT
Y	
YD	YARD

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LOCATIONS IN FIELD.

GRAPHIC SYMBOLS



SHEET NAMING CONVENTION

AD–1.1–1

DISCIPLINE
A – ARCHITECTURE

PHASE
D – DEMOLITION

SERIES
0 – NO TYPE
1 – FLOOR PLANS
3 – SECTIONS
4 – ENLARGED PLANS
5 – DETAILS
6 – SCHEDULES/DIAGRAMS

POD #
0 – OVERALL PLAN
1 – POD 1
2 – POD 2
4 – POD 4

SEQUENCE

MATERIAL INDICATION

SECTION / DETAIL

- EARTH
- POROUS FILL/ GRAVEL
- CONCRETE
- CONCRETE MASONRY UNIT
- BATT INSULATION
- RIGID INSULATION
- STEEL
- WOOD BLOCKING
- PLYWOOD
- GROUT

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KEY PLAN

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DRAWING TYPE	ARCHITECTURE
WORKING STAFF	DESIGNED BY: JH; DRAWN BY: DZ; CHECKED BY:

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
5 OF 71	A	0	01

A-0-01-01

DEMOLITION NOTES

1. PRIOR TO DEMOLITION ON THE ROOF, VIBRATION MONITORS SHALL BE INSTALLED THROUGHOUT THE FOOTPRINT OF THE POD(ESPECIALLY THIRD FLOOR). SI WILL ENGAGE A THIRD PARTY CONTRACTOR TO INSTALL VIBRATION MONITORS FOR THE PROJECT. THE GENERAL CONTRACTOR SHALL MONITOR THE VIBRATION LEVELS DURING CONSTRUCTION. MOBILE STORAGE RACK COLLECTIONS ARE PARTICULARY VULNERABLE TO VIBRATION. VIBRATION THRESHOLDS AND MONITORING METHODS CAN BE USED FROM NMNH CONSTRUCTION GUIDELINES.
2. PRIOR TO DEMOLITION, PROTECTION FROM WATER, HEAT/SPARKS FROM HOT WORK AND FALL/DROPS MUST BE INSTALLED ABOVE AND AROUND THE OPEN STORAGE RACK SYSTEM ON ALL 3 FLOORS, ESPECIALLY THE THIRD FLOOR. PLASTIC SHEETING IS INSUFFICIENT. THESE COLLECTIONS CANNOT BE MOVED AND THE STORAGE SYSTEM DOES NOT HAVE ANY COVERINGS/PROTECTION FOR THE COLLECTION. MATERIALS AND METHODS SHOULD BE REVIEWED AND APPROVED WITH CONSERVATION, ANTHROPOLOGY AND MSC BUILDING MANAGEMENT.

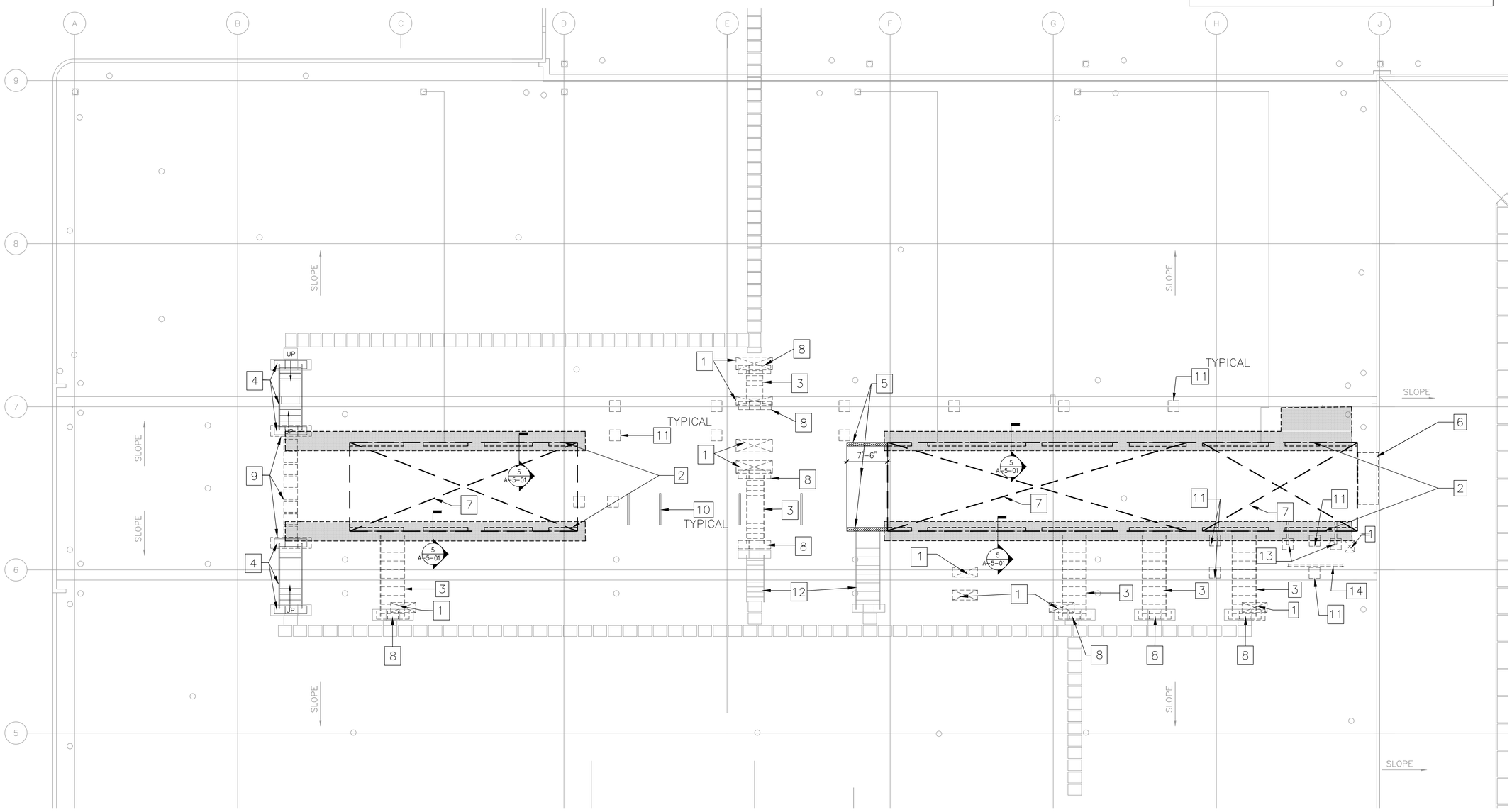
LEGEND

AREA OF ROOF DEMOLITION AT LOW CONCRETE WALLS. SEE DETAIL 4/A-5-01

ITEMS TO BE DEMOLISHED / REMOVED

NOTES

1. REMOVE ROOFING MEMBRANE, COVER BOARD AND ROOF INSULATION DOWN TO CONCRETE DECK. SEE DETAIL 4/A-5-01
2. REMOVE CONCRETE WALL DOWN TO CONCRETE DECK.(TYPICAL OF ALL WALLS UNDER HVAC UNIT). SEE DETAILS 1&2/S-5-01
3. REMOVE METAL STAIR
4. RELOCATE METAL STAIR AND CONCRETE PAVERS. SEE SHEET A-1.1-01 FOR NEW LOCATION
5. EXISTING CONCRETE WALL WITH ROOFING MEMBRANE AND ELECTRICAL CABINET ABOVE TO REMAIN. CONTINUOUS CONCRETE WALL TO BE SAWCUT THIS LOCATION
6. REMOVE EXISTING DUCT ENCLOSURE
7. REMOVE AHU UNITS ABOVE. SEE MECHANICAL FOR ADDITONAL REQUIREMENTS.
8. REMOVE CONCRETE PAVERS
9. REMOVE WALKWAY PADS
10. EXISTING PIPE SUPPORTS TO REMAIN. SEE MECHANICAL FOR PIPE DEMOLITION
11. REMOVE ROOFING MEMBRANE, COVER BOARD AND ROOF INSULATION DOWN TO CONCRETE SLAB TOPPING. SEE DETAIL 4/A-5-01 AND 3/S-5-01
12. EXISTING STAIRS TO REMAIN
13. REMOVE EXISTING PIPE SUPPORT AND CONCRETE PAVER AT BASE
14. REMOVE EXISTING PIPE SUPPORT BEAM. CUT PIPE COLUMN SUPPORTS 12" ABOVE ROOF AND PROVIDE WATERPROOF CAP.



1 AD-1.1-01 POD 1 DEMOLITION

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

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STATE OF MARYLAND
KEVIN VOLK
2/2/2024
No. 19381
ARCHITECT

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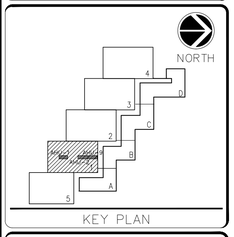

KEY PLAN

0 4 8 16

1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
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REVISION 6	
REVISION 7	

Smithsonian Institution

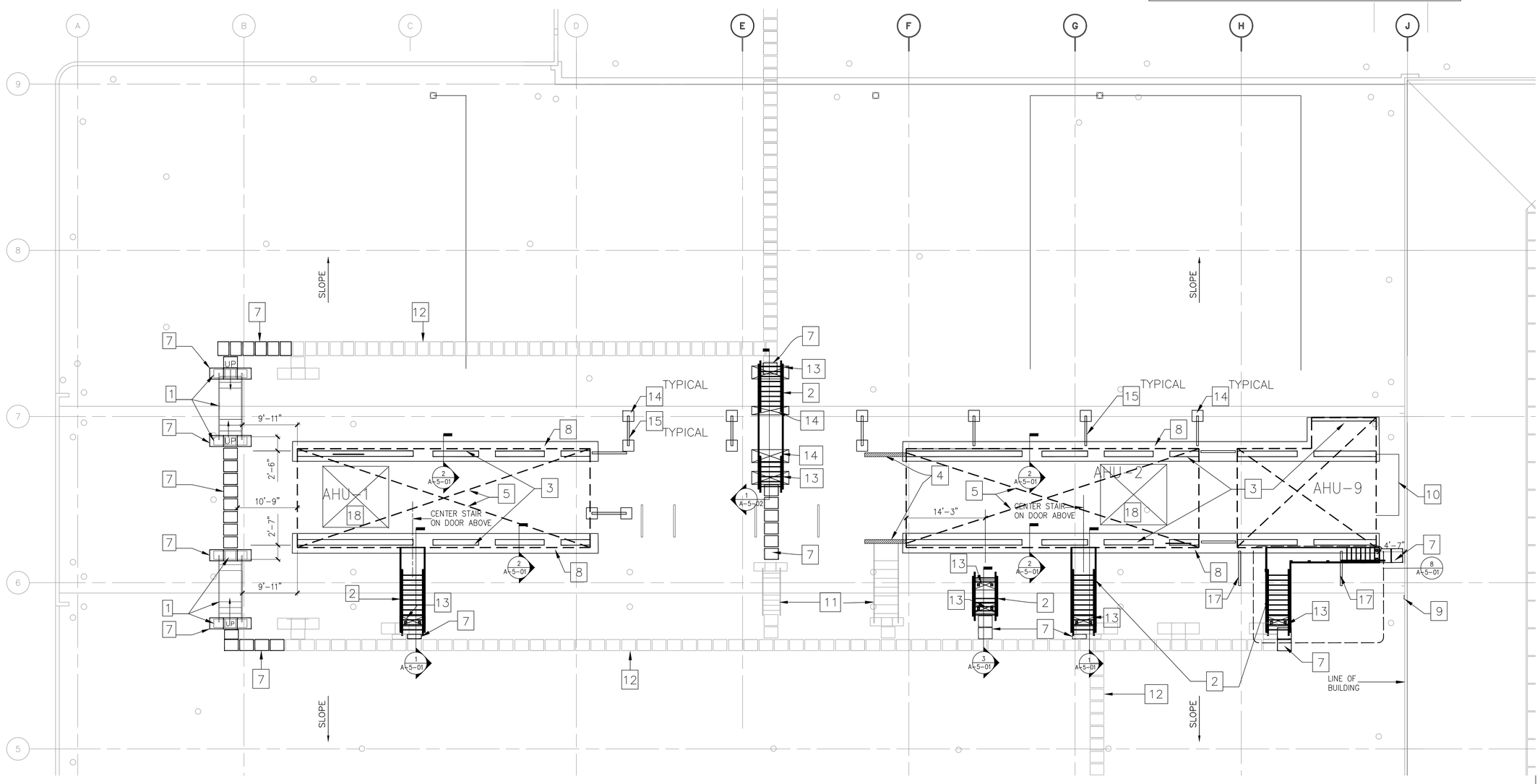
SMITHSONIAN FACILITIES
600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024-2520

BUILDING NAME / ADDRESS	MUSEUM SUPPORT CENTER 4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ARCHITECTURE POD 1 ROOF LEVEL – DEMOLITION
DRAWING TYPE	ARCHITECTURE
WORKING STAFF	KV (DESIGNED BY) / JH (CHECKED BY)
SHEET NO.	6 OF 71
	AD (DISCIPLINE) / 1.1 (TYPE) / 01 (SEQUENCE)

401-01.DWG

NOTES

1. RELOCATED STAIR AND CONCRETE PADS. BOLT STAIR TO CONCRETE PADS USING EXISTING ANGLES.
2. NEW METAL STAIR. SEE DETAILS ON SHEET A-5-01 AND A-5-02
3. NEW LOW CONCRETE WALL. SEE STRUCTURAL FOR DIMENSIONS.
4. EXISTING LOW CONCRETE WALL WITH ROOFING MEMBRANE AND ELECTRICAL SECTION ABOVE TO REMAIN. PATCH EXISTING ROOF MEMBRANE INTO NEW ROOF MEMBRANE AT NEW CONCRETE WALL.
5. NEW MECHANICAL UNIT ABOVE. SEE MECHANICAL FOR ADDITIONAL REQUIREMENTS
6. NOT USED
7. 24"x30" WALKWAY PAD
8. PROVIDE ROOFING AT NEW CONCRETE WALL. SEE DETAIL 2/A-5-01
9. PROVIDE PIPE PENETRATION SEALANT ASSEMBLY AT ACRYLIC PANEL. SEE DETAIL 7/A-5-01.
10. EXISTING METAL DUCTWORK ENCLOSURE TO REMAIN
11. EXISTING METAL STAIR TO REMAIN
12. EXISTING WALKWAY PADS TO REMAIN TYPICAL
13. AREA OF NEW ROOF. SEE DETAIL 9/A5-01
14. AREA OF NEW ROOF AT PIPE SUPPORT POSTS. SEE DETAIL 4/A-5-01 AND 3/S-5-01
15. PIPE SUPPORT RACK. SEE DETAIL 3/S-5-01.
16. PROVIDE NEW ROOFING AT NEW CONCRETE WALL. SEE 2/A-5-01.
17. PIPE SUPPORT RACK. SEE SHEET M-3-01 FOR PIPING THIS AREA.
18. PIPE SUPPORT RACK. SEE SHEET M-3-01 FOR PIPING THIS AREA.



1 / A-1.1-01 — POD 1 NEW WORK

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

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STATE OF MARYLAND — BRYAN HOWARD — No. 19381 — ARCHITECT — 2/20/24

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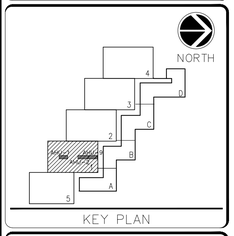

0 4 8 16

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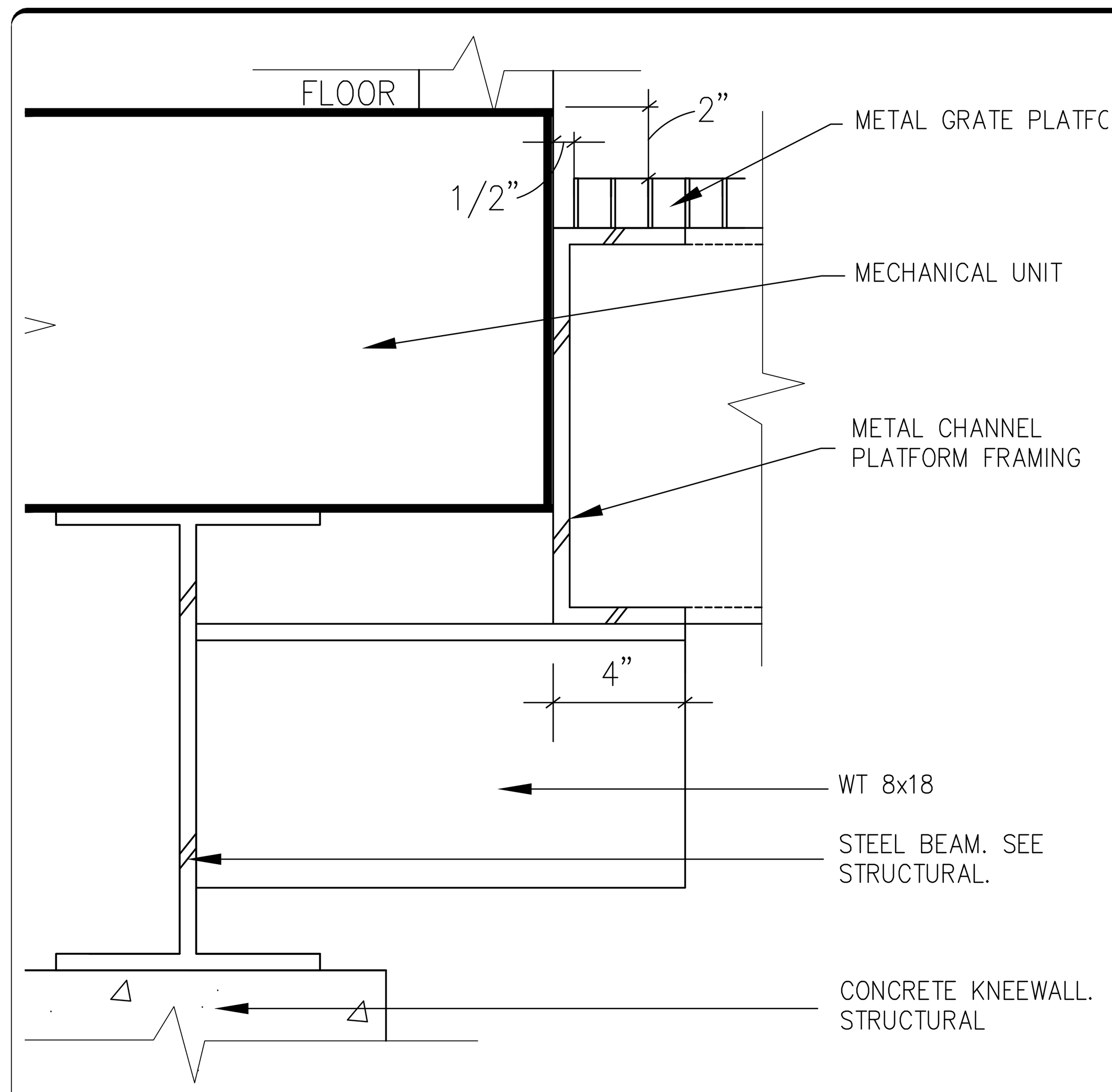
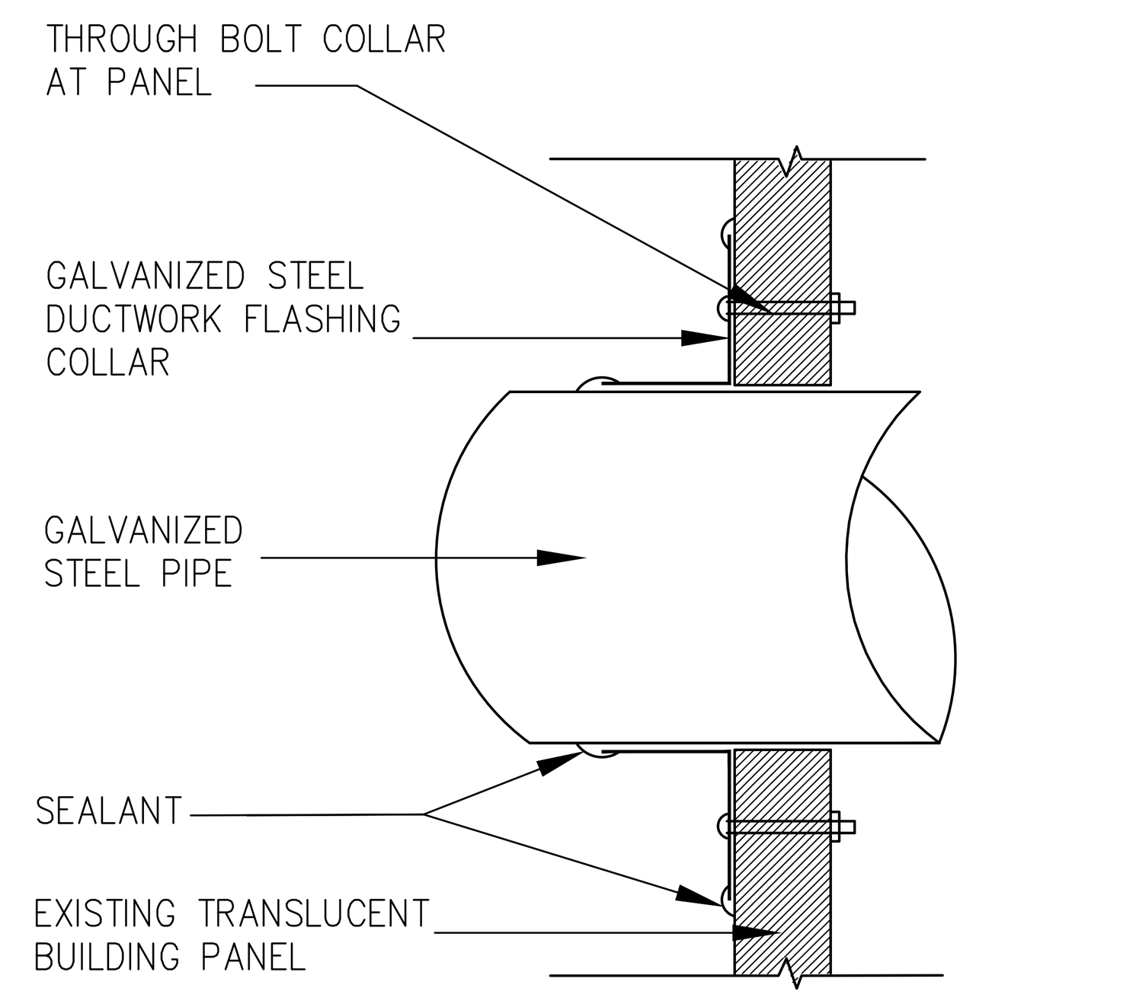
DRAWING TYPE	ARCHITECTURE
WORKING STAFF	DESIGNED BY: JH; DRAWN BY: DZ; CHECKED BY:

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
7 OF 71	A	1.1	01

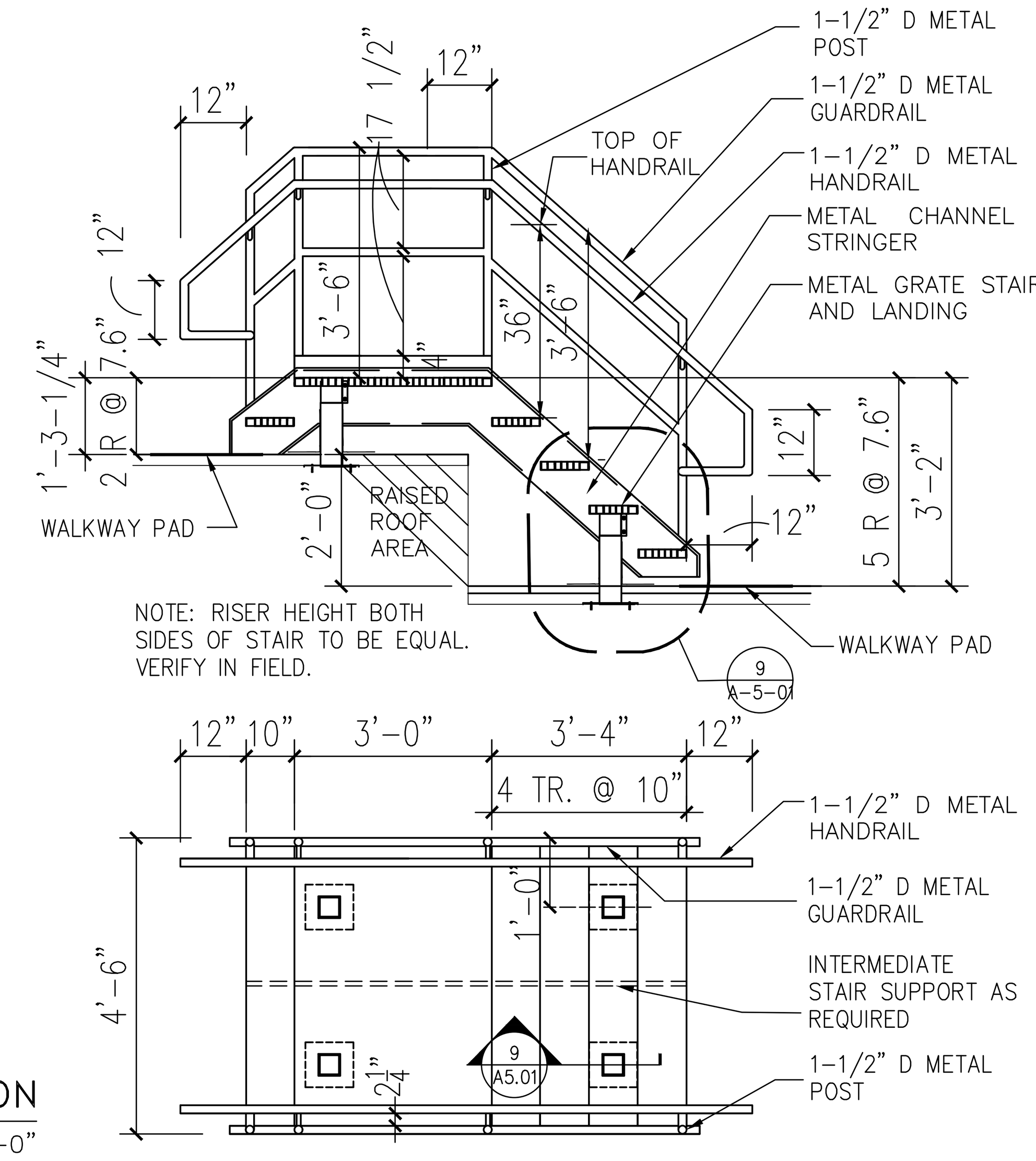
A-1.1-01.dwg



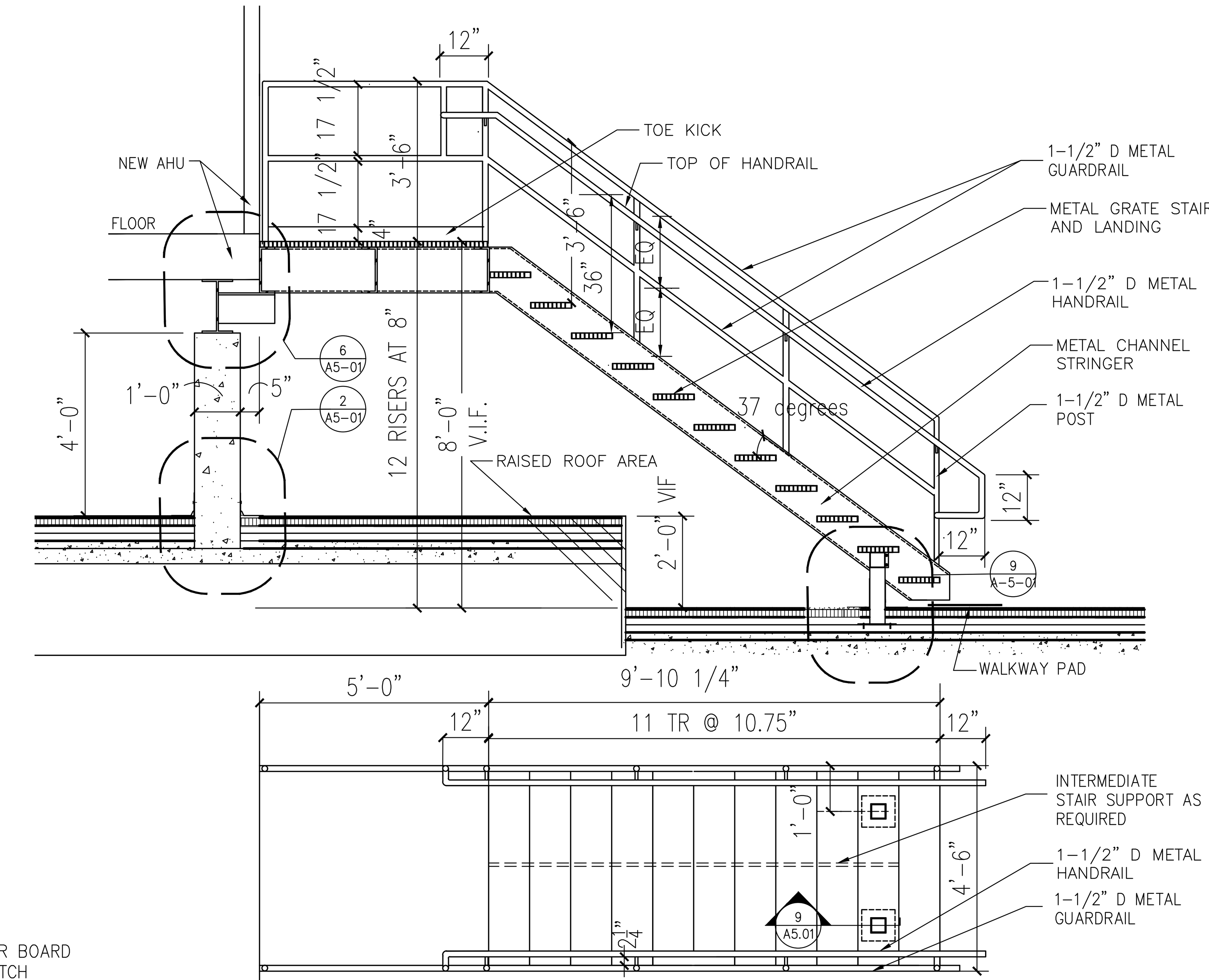
6 A-5-01 DETAIL AT STAIR PLATFORM
SCALE =3"=1'-0"



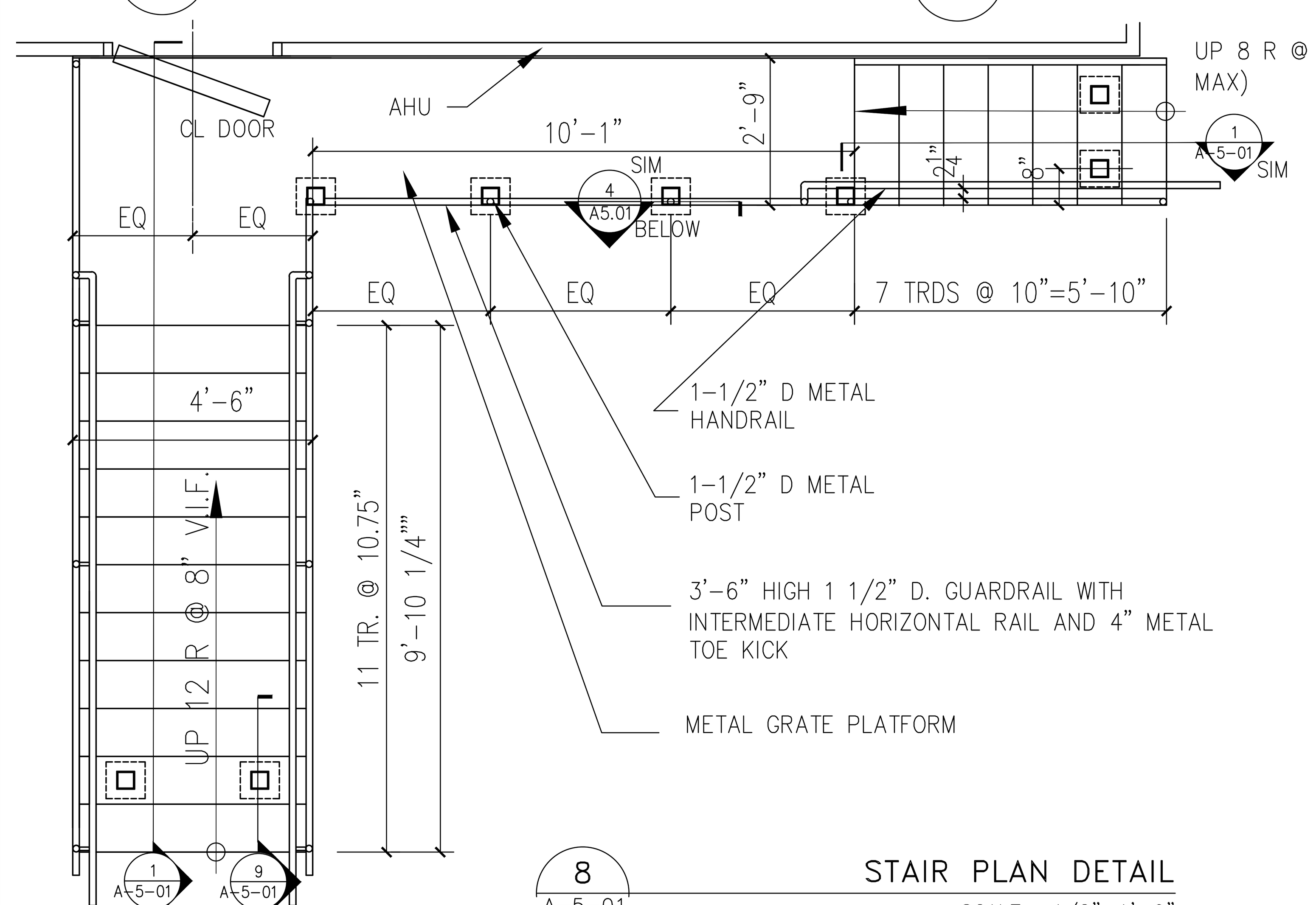
7 A-5-01 DETAIL AT DUCT PENETRATION
SCALE =3"=1'-0"



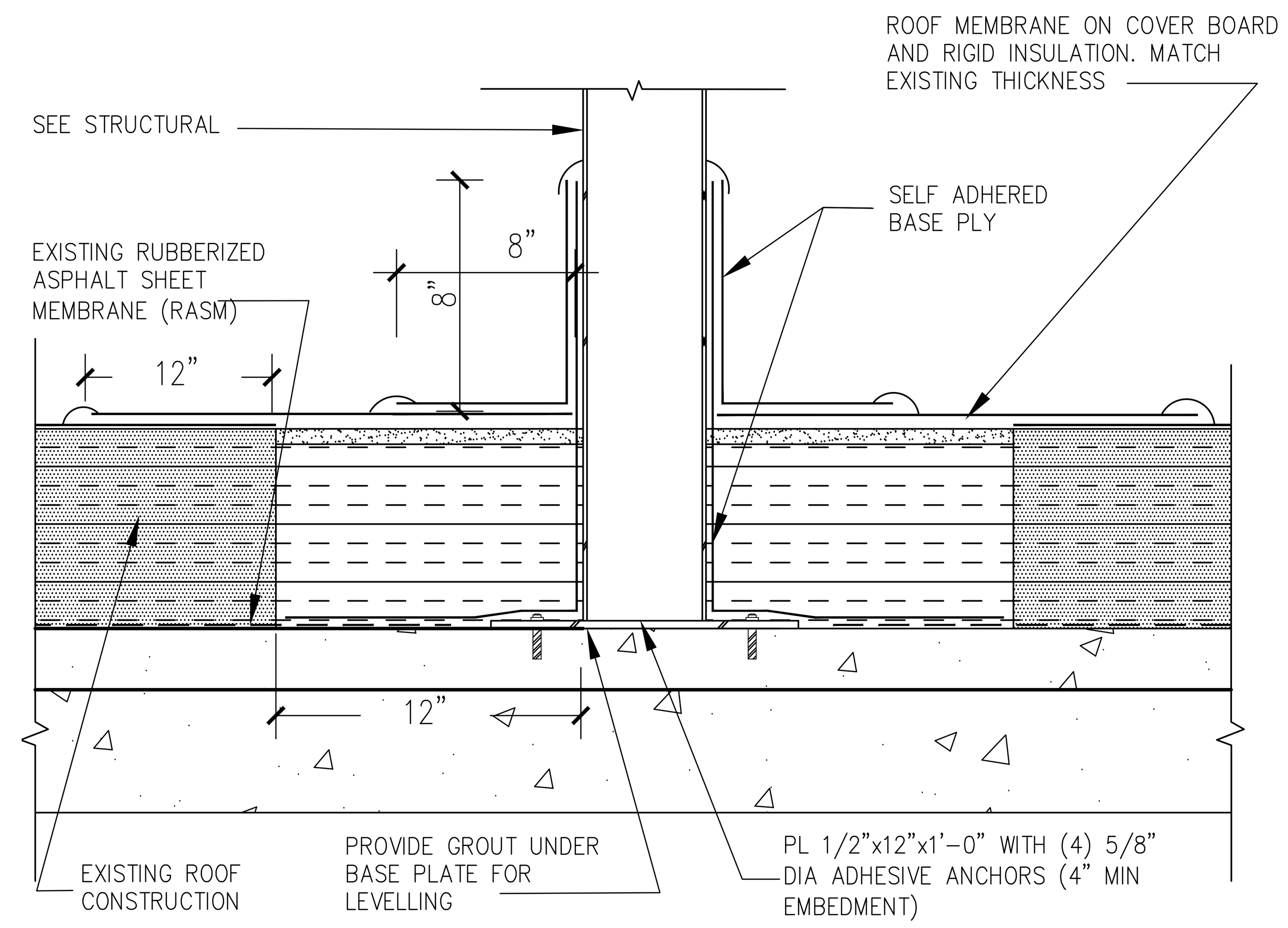
3 A-5-01 METAL PLATFORM STAIR SECTION
SCALE = 1/2"=1'-0"



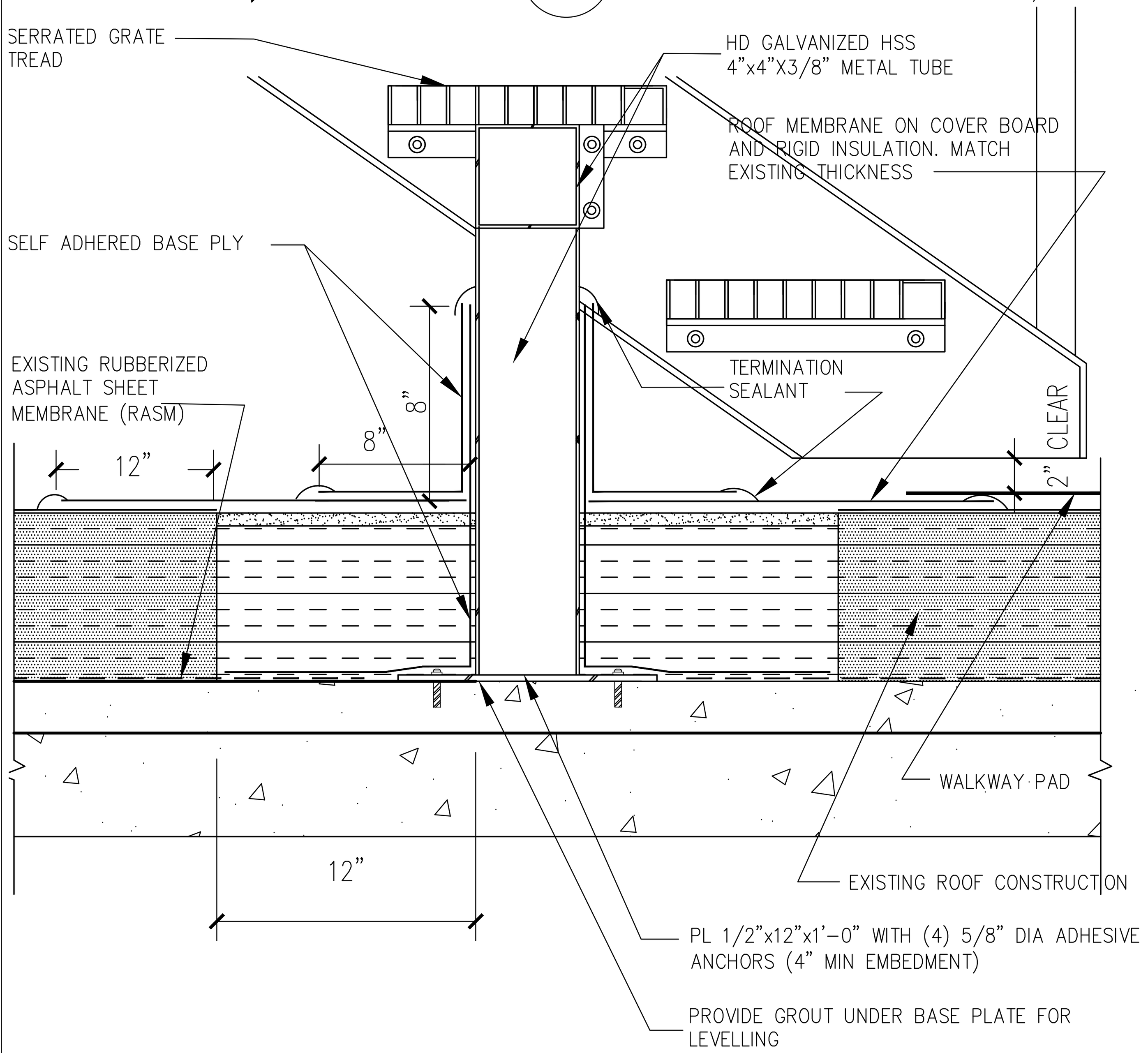
1 A-5-01 METAL STAIR SECTION
SCALE = 1/2"=1'-0"



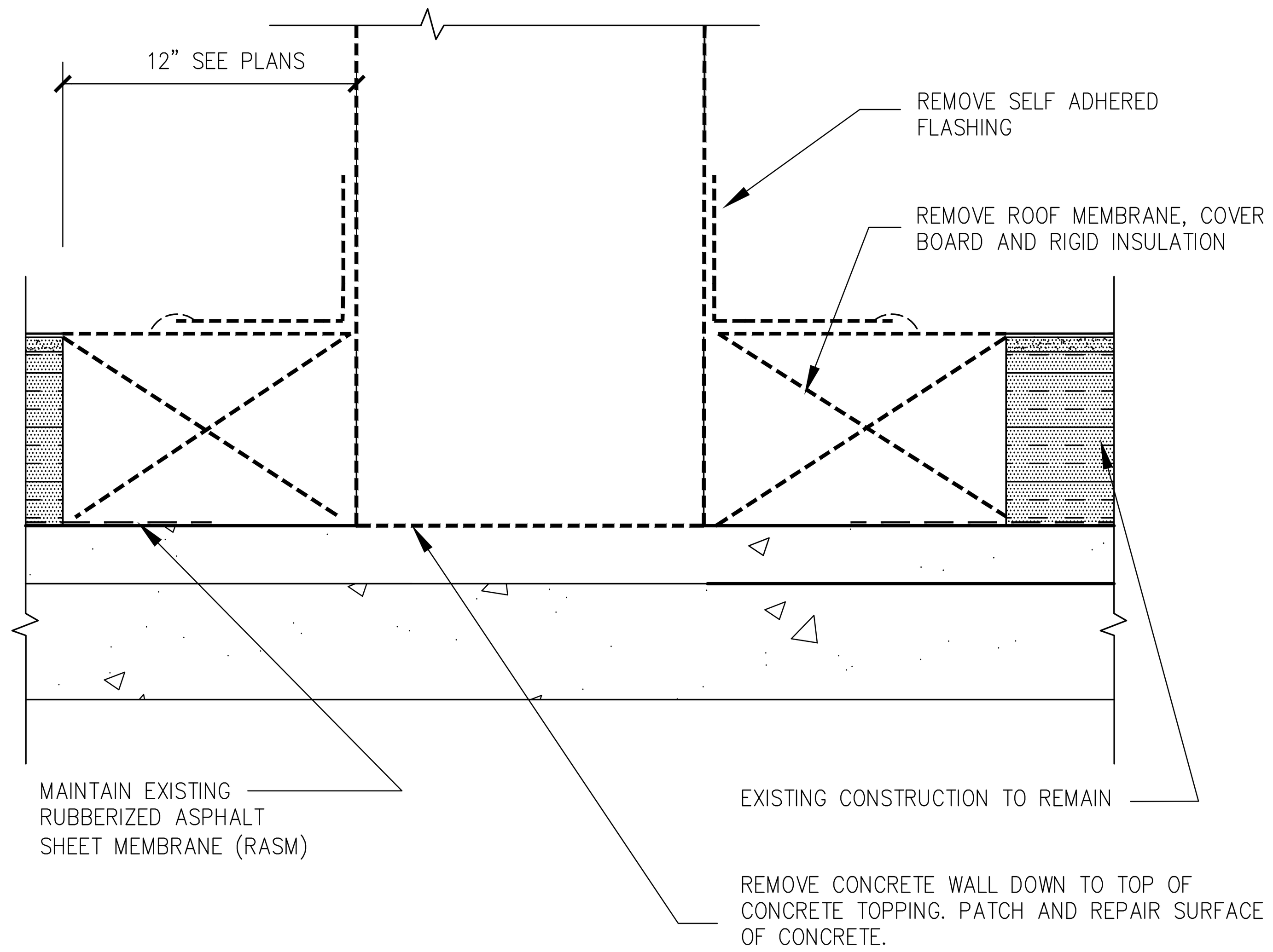
8 A-5-01 STAIR PLAN DETAIL
SCALE =1/2"=1'-0"



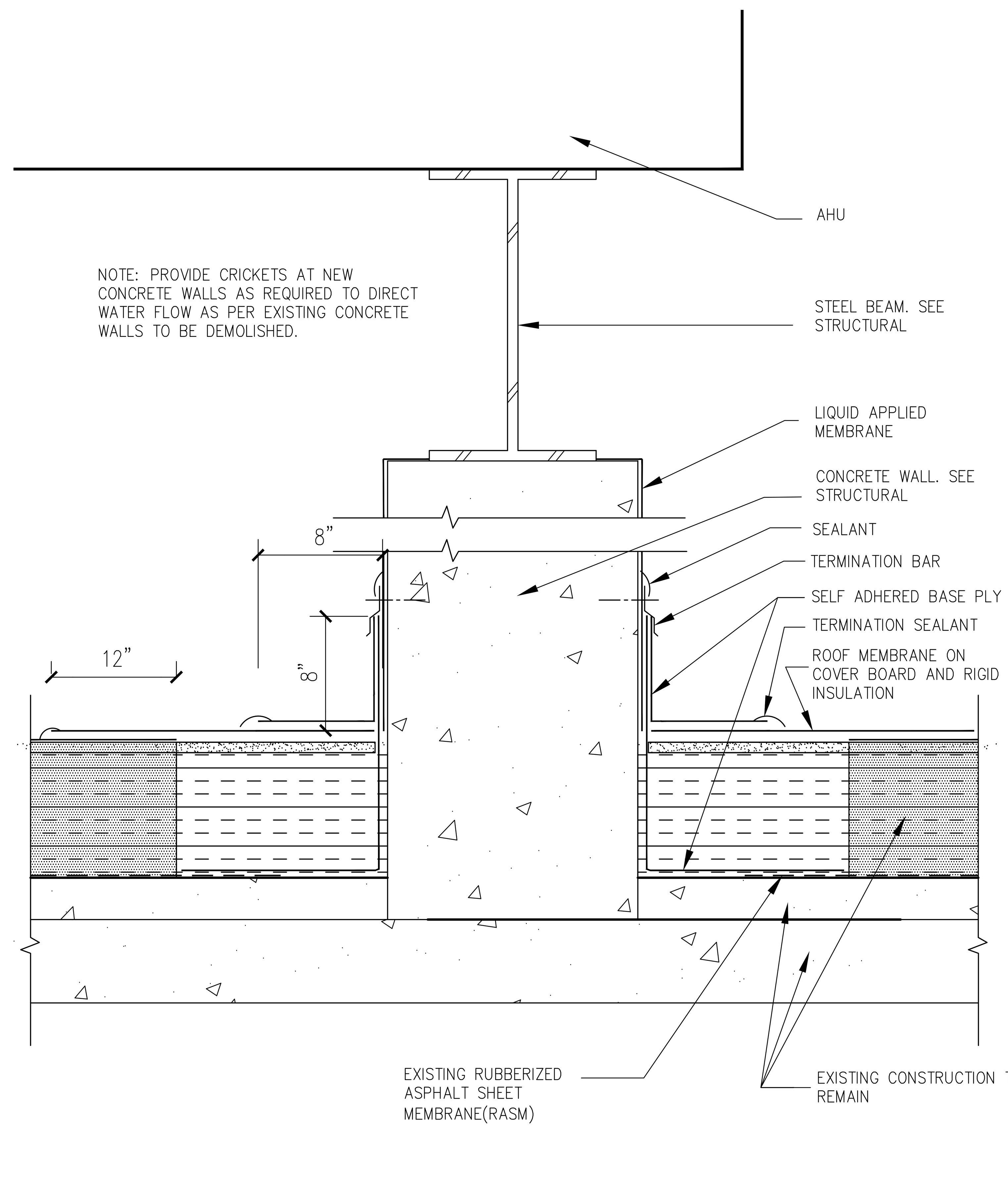
4 A-5-01 TYPICAL ROOF PENETRATION DETAIL
SCALE = 3"=1'-0"



9 A-5-01 STAIR SUPPORT DETAIL
SCALE = 3"=1'-0"



5 A-5-01 DEMO AT CONCRETE WALL
SCALE = 3"=1'-0"



2 A-5-01 SECTION AT CONCRETE WALL
SCALE = 3"=1'-0"

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STATE OF MARYLAND
ARCHITECT
No. 19381

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KEY PLAN

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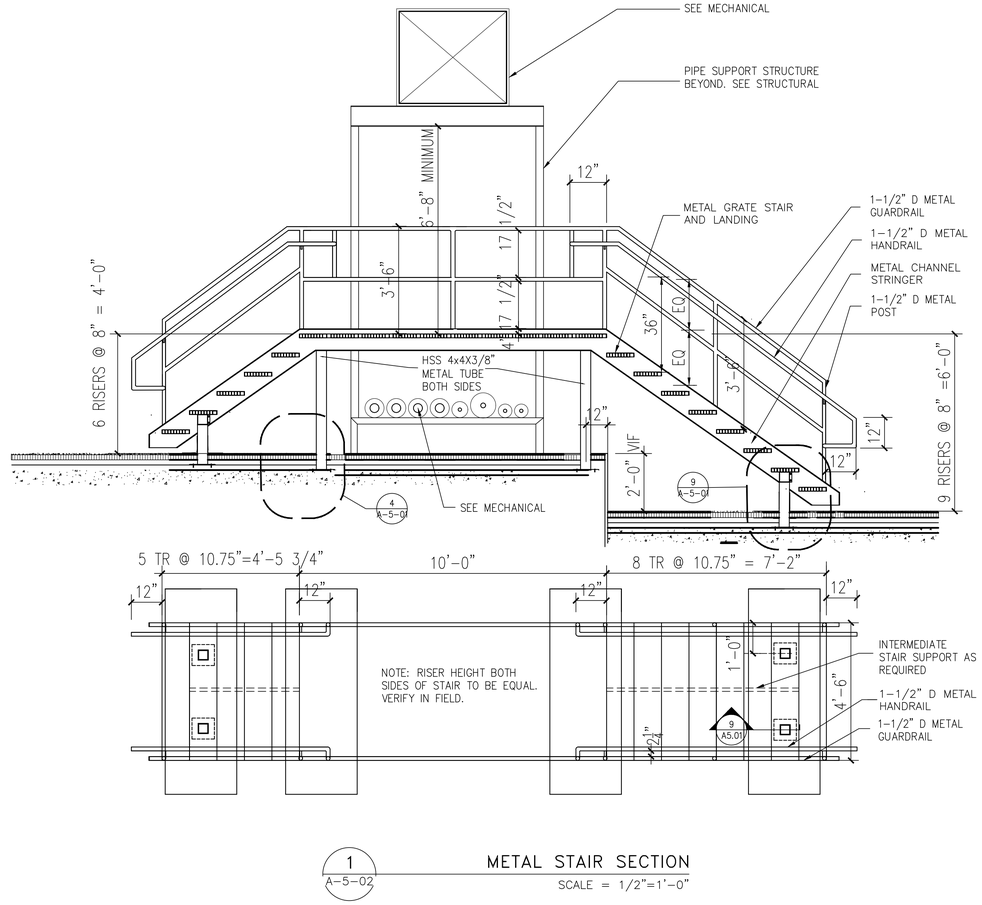
WORKING STAFF	DESIGNED BY: — DRAWN BY: JH CHECKED BY: DZ

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
8 OF 71	A	5	01



1 A-5-02 METAL STAIR SECTION

SCALE = 1/2"=1'-0"

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STATE OF MARYLAND · BRIAN HOWE · No. 19381 · ARCHITECT · 2/2/2024

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WORKING STAFF	JH (DRAWN BY) / DZ (CHECKED BY)

SHEET NO. 9 OF 71

A (DISCIPLINE) | 5 (TYPE) | 02 (SEQUENCE)

STRUCTURAL ABBREVIATIONS

A

&	AND
@	AT
A/E	AB ANCHOR BOLT
ABV	ABOVE
ACI	AMERICAN CONCRETE INSTITUTE
ADD'L	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
AGGR	AGGREGATE
AHU	AIR HANDLING UNIT
AISC	AMERICAN INSTITUTE OF STEEL CONTRACTORS
ALT	ALTERNATE
ANCH	ANCHOR
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL

B

B/	BOTTOM OF
BLDG	BUILDING
BLK	BLOCK
BM	BEAM
BOT	BOTTOM
BPL	BASEPLATE
BRG	BEARING
BTWN	BETWEEN

C

C/C	CENTER TO CENTER
CAP	CAPACITY
CFS	COLD-FORMED STEEL
CIP	CAST IN PLACE
CJ	CONTROL/CONSTRUCTION JOINT
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMP	COMPRESSION
COMPR	COMPRESSIBLE
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
CTR	CENTER

D

D	DEPTH
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DK	DECK
DL	DEAD LOAD
DN	DOWN
DO	DITTO
DWG	DRAWING
DWL	DOWEL

E

(E)	EXISTING
E/	END OF
EA	EACH
EE	EACH END
EF	EACH FACE
EJ	EXPANSION JOINT
EL.	ELEVATION
ELECT	ELECTRICAL
ENG	ENGINEER
EOR	ENGINEER OF RECORD
EOS	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EX	EXCAVATION
EXPAN	EXPANSION
EXT	EXTERIOR

F

F/F	FACE TO FACE
FD	FLOOR DRAIN
FDN	FOUNDATION
FF	FAR FACE
FIN	FINISH
FL	FULL LENGTH
FLR	FLOOR
FR	FRAME
FT	FEET
FTG	FOOTING
FTK	FOOT-KIP UNITS
FUT	FUTURE

G

GA	GAGE
GALV	GALVANIZE(D)
GC	GENERAL CONTRACTOR
GEN	GENERAL
GR	GRADE
GRD	GROUND

H

H	HOOK
HORIZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HSS	HOLLOW STRUCT TUBE SECTION
HT	HEIGHT
HVAC	HEATING – VENTILATING – AIR CONDITIONING

I

IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IF	INSIDE FACE
IM	INTERMEDIATE
IN	INCH(ES)
INCL	INCLUDE(ED)(ING)
INFO	INFORMATION
I-P	INCH-POUND UNITS

J

JT	JOINT

K

K	KIPS (1000 LBS)

L

L	LENGTH
LB	POUND
LE	LEFT END
LEV	LEVEL
LFRS	LATERAL FORCE RESISTING SYSTEM
LG	LONG
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LP	LOW POINT
LT	LEFT
LT WT	LIGHT WEIGHT
LW	LONG WAY

M

MAS	MASONRY
MAT	LMATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MEP	MECH, ELECT & PLUMBING
MFR	MANUFACTURER
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MPH	MILES PER HOUR

N

(N)	NEW
#	NUMBER
NF	NEAR FACE
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTS	NOT TO SCALE
N WT	NORMAL WEIGHT

O

O/O	OUT TO OUT
O.C.	ON CENTER
ODO	UTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
OPP HD	OPPOSITE HAND
OZ	OUNCE

P

PAR	PARALLEL
PCF	POUNDS PER CUBIC FT
PE	PROFESSIONAL ENGINEER
PED	PEDESTAL
PERIM	PERIMETER
PL	PLATE
PLMB	PLUMBING
PR	PAIR
PREFAB	PREFABRICATED
PROJ	PROJECTION
PSF	POUNDS PER SQ FT
PSI	POUNDS PER SQ IN
PT	POINT

Q

QTY	QUANTITY

R

RE	RIGHT END
REBAR	REINFORCING BAR
REC	RECESS
RECT	RECTANGULAR
REF	REFERENCE
REINF	REINFORCE
REQD	REQUIRED
REV	REVISE(REVISION)
RT	RIGHT

S

S	SPACING
SCHED	SCH'EDULE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SL	SLOPE
SLV	SLEEVE
SOG	SLAB ON GRADE
SPA	SPACE(S)(ING)
SPEC	SPECIFICATION
SQ	SQUARE
SST	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFEN(ER)
STL	STEEL
STRUCT	STRUCTURE(AL)
SYM	SYMMETRICAL

T

T	THICKNESS
T&B	TOP & BOTTOM
T/	TOP OF
THK	THICK
TOT	TOTAL
TYP	TYPICAL

U

UNO	UNLESS NOTED OTHERWISE

V

VB	VAPOR BARRIER
VERT	VERTICAL
VIF	VERIFY IN FIELD

W

W	WIDTH
W/	WITH
W/O	WITHOUT
WL	WIND LOAD
WP	WORK POINT
WS	WATER STOP
WT	WEIGHT
WWR	WELDED WIRE REINFORCEMENT

A. GENERAL CONDITIONS

1. STANDARDS AND CODES:

   INTERNATIONAL CODE COUNCIL: "INTERNATIONAL BUILDING CODE – IBC 2015".

   AMERICAN SOCIETY OF CIVIL ENGINEERS: "SEI/ASCE 7–10, ASCE STANDARD – MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES".

   AMERICAN CONCRETE INSTITUTE: "ACI 318–14, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY".

   AMERICAN INSTITUTE OF STEEL CONSTRUCTION: "STEEL CONSTRUCTION MANUAL", 13TH EDITION.

   AMERICAN WELDING SOCIETY: "AWS STRUCTURAL WELDING CODE".

2. EXISTING BUILDING REFERENCE DOCUMENTS, EXISTING STRUCTURAL DRAWINGS PREPARED BY MARTIN & CAGLEY, 7–1 THRU 7–28, DATED 7–8–80.

3. COORDINATE WITH ALL DRAWINGS FOR PERTINENT INFORMATION RELATED TO THE STRUCTURAL WORK. ANY CHANGES TO THE STRUCTURAL SYSTEMS SHALL BE REDESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MARYLAND AT NO COST TO THE OWNER AND SUBMITTED TO THE A/E FOR REVIEW. SUBMITTAL SHALL BE ACKNOWLEDGED IN WRITING BEFORE BEGINNING CONSTRUCTION.

4. EQUIPMENT FRAMING LOADS, OPENINGS AND STRUCTURE IN ANY WAY RELATED TO HVAC, PLUMBING, PROCESS OR ELECTRICAL REQUIREMENTS ARE SHOWN FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL OBTAIN APPROVAL OF THE PERTINENT TRADES BEFORE PROCEEDING WITH SUCH PORTION OF THE WORK. EXCESS COST RELATED TO VARIATION IN THESE REQUIREMENTS SHALL BE BORNE BY THE APPROPRIATE CONTRACTOR. THE SUBMITTALS SHALL BE STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF MARYLAND.

5. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS MAY BE NECESSARY.

6. DO NOT SCALE DRAWINGS. SEE THE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR ALL DIMENSIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS. ALL DIMENSIONS AND ELEVATIONS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE VERIFIED BY THE CONTRACTOR AND SHALL CONFORM TO THOSE SHOWN ON THE ARCHITECTURAL DRAWINGS. REPORT ALL DISCREPANCIES TO THE A/E FOR RESOLUTION BEFORE PROCEEDING.

7. THE CONTRACTOR SHALL SUPPORT, BRACE AND SECURE EXISTING STRUCTURES AS REQUIRED. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SAFETY OF EXISTING STRUCTURES DURING CONSTRUCTION. FIELD VERIFY ALL EXISTING DIMENSIONS WHICH AFFECT THE NEW CONSTRUCTION PRIOR TO FINAL DETAILING AND FABRICATION OF NEW STRUCTURAL ELEMENTS.

B. STRUCTURAL DESIGN LOADS: (NEW WORK ONLY)

1. LIVE LOADS: (PER ASCE 7–10)

ACCESS PLATFORMS	40 PSF

2. ROOF LIVE LOADS:

MINIMUM ROOF LIVE LOAD	30 PSF

3. SNOW LOADS:

GROUND SNOW LOAD, Pg	25 PSF
EXPOSURE CATEGORY	C
EXPOSURE OF ROOF	FULLY EXPOSED
SNOW EXPOSURE FACTOR, Ce	1.0
THERMAL FACTOR, Ct	1.0
RISK CATEGORY	II
SNOW IMPORTANCE FACTOR, Is	1.0
MINIMUM FLAT ROOF SNOW LOAD, Pf	20 PSF
UNBALANCED SNOW LOAD	(PER ASCE 7)
DRIFT SNOW LOAD	(PER ASCE 7)
RAIN-ON-SNOW SURCHARGE LOAD	(PER ASCE 7)

4. WIND LOADS:

ULTIMATE WIND SPEED (3-SECOND GUST)	115 MPH
NOMINAL WIND SPEED	89 MPH
WIND EXPOSURE CATEGORY	C
RISK CATEGORY	II
WIND IMPORTANCE FACTOR, Iw	1.0
DESIGN WIND PRESSURE ON COMPONENTS & CLADDING	(PER ASCE 7)
NET UPLIFT PRESSURE	(PER ASCE 7)

5. SEISMIC LOADS:

SEISMIC FORCE-RESISTING SYSTEMS:	
RISK CATEGORY	II
SEISMIC IMPORTANCE FACTOR	1.0
SITE CLASSIFICATION	D
MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION:	
0.2 SEC SPECTRAL RESPONSE ACCELERATION, Ss	0.17 (PER ASCE 7)
1.0 SEC SPECTRAL RESPONSE ACCELERATION, S1	0.05 (PER ASCE 7)
SEISMIC DESIGN CATEGORY	C
SPECTRAL RESPONSE COEFFICIENT, Ss	0.21
SPECTRAL RESPONSE COEFFICIENT, Sd1	0.14
SEISMIC RESPONSE COEFFICIENT, Cs	0.07
RESPONSE MODIFICATION FACTOR, R	3.0
BASIC STRUCTURAL SYSTEM:	STEEL SYSTEM NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE
ANALYSIS PROCEDURE:	EQUIVALENT LATERAL FORCE PROCEDURE
ARCHITECTURAL, MECHANICAL & ELECTRICAL COMPONENT SEISMIC DESIGN REQUIREMENTS:	(PER IBC 2015/ASCE 7)

C. CAST-IN-PLACE CONCRETE

1. CAST-IN-PLACE CONCRETE WORK SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE CODES AND STANDARDS, INCLUDING, BUT NOT LIMITED TO, ACI 301, ACI 315 AND ACI 318.

2. CONCRETE SHALL HAVE THE FOLLOWING MINIMUM COMPRESSIVE STRENGTHS AT 28 DAYS:

   4500 PSI WITH ENTRAINED AIR FOR ALL CONCRETE PERMANENTLY EXPOSED TO THE WEATHER. THE AMOUNT OF ENTRAINED AIR SHALL BE 6% ± 1%.

3. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615, GRADE 60.

4. WELDED WIRE REINFORCEMENT SHALL CONFORM TO ASTM A–185 DELIVERED IN FLAT SHEETS.

5. THE CONTRACTOR SHALL REVIEW ALL DRAWINGS FOR SIZE AND LOCATION OF ALL EMBEDDED ITEMS, SLEEVES, SLAB DEPRESSIONS, OPENINGS, ETC REQUIRED BY OTHER TRADES. RECONCILE THEIR EXACT SIZES AND LOCATIONS BEFORE PROCEEDING WITH THE WORK. ALL ITEMS SHALL BE FURNISHED AND INSTALLED PRIOR TO PLACEMENT OF CONCRETE. SECURE THE APPROVAL OF THE GOVERNMENT PRIOR TO PLACING OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS.

6. WHERE BAR LENGTHS ARE GIVEN ON THE DRAWINGS, THE LENGTH OF ANY HOOK, IF REQUIRED, IS NOT INCLUDED. USE STANDARD 90° BAR HOOK, UNO.

7. PROVIDE HORIZONTAL CONTROL/CONSTRUCTION JOINTS IN SLABS AND VERTICAL CONTROL/CONSTRUCTION JOINTS IN WALLS AS SHOWN ON THE DRAWINGS. ALL BEAMS, SPANDRELS AND SLABS SHALL BE CAST MONOLITHICALLY, EXCEPT FOR REQUIRED CONTROL/CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS. ARCHITECT SHALL SUBMIT ALTERNATE AND ADDITIONAL CONSTRUCTION JOINT LOCATIONS AND DETAILS TO THE GOVERNMENT FOR APPROVAL PRIOR TO CONSTRUCTION. AT LEAST 48 HOURS SHALL ELAPSE BETWEEN CASTING OF ADJOINING UNITS. REINFORCEMENT SHALL BE CONTINUOUS ACROSS CONSTRUCTION JOINTS UNLESS DETAILED OTHERWISE ON THE DRAWINGS. SUBMIT ALL CONSTRUCTION JOINT LOCATIONS WITH THE REINFORCING STEEL SHOP DRAWINGS.

8. WHERE CONSTRUCTION JOINTS ARE REQUIRED BUT ARE NOT INDICATED ON THE DRAWINGS, THEY SHALL BE LOCATED AT THE MID-SPAN OF SLABS AND WALLS AND SHALL BE SUBJECT TO REVIEW BY THE ARCHITECT. UNLESS NOTED OTHERWISE OR SHOWN ON THE DRAWINGS, PROVIDE A CONTINUOUS SHEAR KEY IN SLABS AND WALLS. THE MINIMUM KEY SIZE SHALL BE 1½" DEEP x ⅓ THE DEPTH OR WIDTH OF THE MEMBER.

9. PROVIDE ¾" CHAMFERS ON ALL EXPOSED CORNERS OF COLUMNS, BEAMS AND WALLS UNLESS OTHERWISE INDICATED ON THE ARCHITECTURAL DRAWINGS. MINIMUM CLEARANCES FOR REINFORCING STEEL SHALL CONFORM WITH THE TYPICAL REINFORCING BAR CLEARANCE TABLE.

10. WELDING OF REINFORCING STEEL IS NOT PERMITTED.

11. COMPLY WITH THE ARCHITECTURAL DRAWINGS FOR LOCATION AND EXTENT OF SPECIAL FINISHES OR TREATMENTS EXPOSED CONCRETE.

12. REINFORCING BAR LAP SPLICES AND ANCHORAGE LENGTHS SHALL CONFORM WITH TABLE #1, "MINIMUM LAP SPLICE AND ANCHORAGE DIMENSION TABLE".

13. REFER TO SPECIFICATION 03 30 000 FOR FURTHER INFORMATION.

TABLE #1A

MINIMUM LAP SPLICE AND ANCHORAGE DIMENSION TABLE

USE THIS TABLE FOR A615 GRADE 60–UNCOATED REINFORCING WHEN CONCRETE COVER IS LESS THAN OR EQUAL TO ONE BAR DIAMETER OR BAR SPACING IS LESS THAN OR EQUAL TO THREE (3) BAR DIAMETERS. IN ALL OTHER CASES USE TABLE #1B.

(4000 PSI CONCRETE)

BAR	TOP BARS		OTHER BARS	
SIZE	LAP	ANCH	LAP	ANCH
#3	18"	14"	16"	12"
#4	26"	20"	20"	15"
#5	40"	31"	31"	24"
#6	57"	44"	44"	34"
#7	77"	59"	59"	46"
#8	102"	78"	78"	60"
#9	129"	99"	99"	76"
#10	163"	126"	126"	97"
#11	(MC)	154"	154"	119"

TABLE #1B

MINIMUM LAP SPLICE AND ANCHORAGE DIMENSION TABLE

USE THIS TABLE FOR A615 GRADE 60–UNCOATED REINFORCING WHEN CONCRETE COVER IS GRATER THAN ONE (1) BAR DIAMETER AND BAR SPACING IS GRATER THAN THREE (3) BAR DIAMETERS.

(4000 PSI CONCRETE)

BAR	TOP BARS		OTHER BARS	
SIZE	LAP	ANCH	LAP	ANCH
#3	18"	14"	16"	12"
#4	24"	19"	19"	15"
#5	30"	23"	23"	18"
#6	40"	31"	31"	24"
#7	54"	42"	42"	32"
#8	71"	55"	55"	42"
#9	90"	69"	69"	53"
#10	114"	88"	88"	68"
#11	(MC)	108"	108"	83"

NOTES FOR TABLES #1A AND #1B:

FOR EPOXY COATED REINFORCING MULTIPLY THE TABLE VALUES BY 1.31 FOR TOP BARS AND 1.5 FOR ALL OTHER BARS.

FOR LIGHTWEIGHT CONCRETE MULTIPLY THE TABLE VALUES ABOVE BY 1.3

FOR BUNDLED BARS MULTIPLY THE TABLE VALUES ABOVE BY 1.2 (3 BAR BUNDLE), 1.33 (4 BAR BUNDLE).

(MC) DENOTES MECHANICAL COUPLER DEVELOPING 125% OF THE BAR YIELD STRENGTH. NO OTHER SPLICE WILL BE ACCEPTED.

WHEN LAPPING TWO DIFFERENT SIZE BARS, USE THE LAP DIMENSION OF THE SMALLER BAR OR THE ANCHORAGE DIMENSION OF THE LARGER BAR. USE WHICHEVER DIMENSION IS LARGER.

TOP BARS SHALL BE DEFINED AS BEAM AND SLAB HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE TOP REINFORCEMENT. HORIZONTAL REINFORCING IN WALLS SHALL BE CONSIDERED TOP BARS.

TABLE #2

TYPICAL REINFORCING BAR CLEARANCE TABLE

LOCATION	CLEARANCE
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
COLUMNS AND PIERS (VERTICAL REINFORCING)	2"
COLUMN AND PIER TIES	1½"
WALLS (INTERIOR FACE)	1"
WALLS (EXTERIOR FACE, #5 AND SMALLER)	1½"
WALLS (EXTERIOR FACE, #6 AND SMALLER)	2"
SURFACES EXPOSED TO LIQUIDS	2"
FRAMED SLABS (EXTERIOR, INCLUDING STAIRS) AND VAULTS	1½"
SLABS ON GRADE (BOTTOM REINFORCING)	1½"
SLABS ON GRADE (WELDED WIRE FABRIC)	⅓ SLAB THICKNESS FROM TOP OF SLAB

D. POST-INSTALLED ANCHORS

1. UNLESS NOTED OTHERWISE ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLOWING ANCHOR TYPES:

A. ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE MUST BE TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI355.4 AND ICC–ES AC308. PRE–APPROVED ADHESIVES:

   i. HILTI–HIT HY–200 WITH SAFE SET SYSTEM PER ICC–ES ESR–3187
   ii. SIMPSON STRONG–TIE SET XP PER ICC–ES ESR–2506

B. MECHANICAL ANCHORS FOR CRACKED AND UNCRACKED CONCRETE. PRE–APPROVED ANCHORS:

   i. HILTI KWIK HUS EZ SCREW ANCHOR PER ICC–ES ESR–3027
   ii. HILTI KWIK BOLT–TZ EXPANSION ANCHOR PER ICC–ES ESR–1917
   iii. SIMPSON STRONG TIE STRONG–BOLT 2 WEDGE ANCHOR PER ICC–ES ESR–3037

C. ADHESIVE ANCHORS FOR GROUTED MASONRY MUST BE TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ES AC58. ANCHORAGE TO UNGROUTED CELLS IS NOT PERMITTED. PRE–APPROVED ADHESIVE:

   i. HILTI HIT–HY 70 PER ICC–ES ESR–2682

D. MECHANICAL ANCHORS FOR GROUTED MASONRY. ANCHORAGE TO UNGROUTED CELLS IS NOT PERMITTED. PRE–APPROVED ANCHORS:

   i. HILTI KWIK HUS EZ SCREW ANCHOR PER ICC–ES ESR–3056
   ii. SIMPSON TITAN HD SCREW ANCHOR PER ICC–ES ESR–1056
   iii. KWIK BOLT–3 EXPANSION ANCHOR PER ICC–ES ESR 1385

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2/2/24

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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	STRUCTURAL ABBREVIATIONS AND GENERAL NOTES
DRAWING TYPE	STRUCTURAL
WORKING STAFF	JPA (DESIGNED BY) / VR (DRAWN BY) / MWZ (CHECKED BY)

SHEET NO. 13 OF 71

S (DISCIPLINE) | 0 (TYPE) | 01 (SEQUENCE)

E. STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC "SPECIFICATIONS FOR DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", LATEST EDITION.

2. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1, LATEST EDITION.

3. BOLTS AND BOLTED CONNECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" AS APPROVED BY THE COUNCIL ON RIVETED AND BOLTED JOINTS. ALL BOLTED CONNECTIONS SHALL USE AS A MINIMUM ¾" DIAMETER ASTM A325, TYPE SC WITH A MINIMUM 2 BOLTS PER CONNECTION UNLESS OTHERWISE REQUIRED BY DESIGN.

4. STRUCTURAL STEEL:
   ASTM A992 (Fy = 50 KSI) – ROLLED STEEL "W" SHAPES UNLESS NOTED ON THE DRAWINGS.
   ASTM A36 (Fy = 36 KSI) – ROLLED STEEL PLATES, CHANNELS, ANGLES, BARS AND RODS AS NOTED ON THE DRAWINGS.
   ASTM A53, TYPE E OR S, GRADE B – STEEL PIPE.
   ASTM A500, GRADE B – TUBING.

5. ANCHOR RODS (BOLTS) SHALL CONFORM TO ASTM F1554 GRADE 36. HARDENED STEEL WASHERS SHALL CONFORM TO ASTM F436.

6. WELDING ELECTRODES SHALL BE E70 XX (LOW HYDROGEN) OR BETTER. FOR WELDING SYMBOLS WITH NO LENGTH DIMENSION GIVEN, THE WELDING SHALL BE CONTINUOUS BETWEEN ABRUPT CHANGES IN DIRECTION. FILLET WELDS NOT OTHERWISE NOTED SHALL BE ¼" IN SIZE.

7. SUBMIT CONNECTION DESIGN CALCULATIONS SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER FOR ALL STRUCTURAL STEEL CONNECTIONS. FAILURE TO SUBMIT SUCH CALCULATIONS FOR REVIEW WITH OR PRIOR TO SUBMISSION OF SHOP DRAWINGS WILL BE CAUSE FOR REJECTION OF THE SHOP DRAWING SUBMITTAL. CONNECTION CALCULATIONS MUST CLEARLY SHOW A RATIONAL ANALYSIS PROCEDURE, INCLUDING LOCAL EFFECTS ON CONNECTED MEMBERS.

8. MOMENT CONNECTIONS INDICATED ON THE DRAWINGS SHALL BE DESIGNED FOR THE MOMENTS NOTED. IF NO DESIGN MOMENT IS INDICATED, THEN THE FULL CAPACITY OF THE SECTION MUST BE DEVELOPED.

9. VERIFY THE EXACT SIZE AND LOCATION OF ALL OPENINGS PRIOR TO FABRICATION OF STEEL FRAMING MEMBERS.

10. PROVIDE A NON-METALLIC, NON-SHRINK GROUT UNDER ALL COLUMN BASE PLATES AND BEAM BEARINGS.

11. REFER TO SPECIFICATION DIVISION 05 12 00, "STRUCTURAL STEEL", FOR FURTHER INFORMATION.

F. RENOVATION

1. THE EXISTING CONSTRUCTION SHOWN ON THESE DRAWINGS IS PROVIDED FOR REFERENCE ONLY.

2. EXISTING CONSTRUCTION SHALL BE CHECKED AGAINST THE ORIGINAL CONSTRUCTION DOCUMENTS AND VERIFIED IN THE FIELD PRIOR TO FABRICATION OR ERECTION OF ANY NEW CONSTRUCTION. REPORT DISCREPANCIES TO THE GOVERNMENT FOR CLARIFICATION PRIOR TO COMMENCING WORK.

3. DO NOT OVERLOAD THE EXISTING STRUCTURE.

4. PROVIDE ALL TEMPORARY SHORING, BRACING AND PROTECTION TO MAINTAIN STABILITY OF AND PREVENT COLLAPSE OF THE EXISTING STRUCTURE WHICH IS TO REMAIN.

5. PRIOR TO CORING, LOCATE REINFORCEMENT AND OBTAIN APPROVAL FOR CUTTING OF REINFORCEMENT OR RELOCATE CORE TO AVOID CUTTING OF REINFORCEMENT. DO NOT CORE THROUGH BEAMS OR ADJACENT TO COLUMNS WITHOUT PRIOR APPROVAL. UNLESS APPROVED OTHERWISE, PROVIDE A MINIMUM OF ONE CORE DIAMETER CLEAR BETWEEN ADJACENT CORES.

6. WHERE EXISTING REINFORCEMENT IS TO BE REUSED IN PLACE, THE CONCRETE SHALL BE REMOVED IN A MANNER WHICH MINIMIZES DAMAGE TO THE REINFORCEMENT. DAMAGED REINFORCEMENT SHALL BE REPLACED BY A METHOD ACCEPTABLE TO THE ENGINEER OF RECORD.

7. INSTALL ALL OPENING SUPPLEMENTAL REINFORCEMENT MEMBERS PRIOR TO CUTTING OPENING.

8. THE FACE OF ALL NEW PERMANENT CONCRETE SURFACES CUT FROM EXISTING CONCRETE SHALL BE CLEANED AND EXPOSED REINFORCEMENT SHALL BE CUT OFF.

9. FOR NEW CONCRETE CAST AGAINST EXISTING, ROUGHEN AND CLEAN THE CONTACT SURFACES AND APPLY APPROVED BONDING AGENT.

10. UNLESS NOTED OTHERWISE, NEW SLABS ARE TO MATCH ELEVATION OF ADJACENT EXISTING SLABS. FOUNDATIONS, COLUMNS AND OTHER ELEMENTS SHALL BE ADJUSTED TO MATCH ELEVATIONS OF EXISTING SLABS.

11. PRIOR TO WELDING TO EXISTING STEEL, DETERMINE STEEL GRADE AND TYPE. IF STEEL IS PREQUALIFIED IN ACCORDANCE WITH AWS D1.1, PROCEED WITH WELDING. IF STEEL IS NOT PREQUALIFIED, DETERMINE WELD PROCEDURES FOR EACH WELD TYPE AND POSITION.

G. SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE 2015 IBC, CHAPTER 17 BY A SPECIAL INSPECTOR TO PERFORM THE SPECIAL INSPECTIONS LISTED BELOW:

   - STRUCTURAL STEEL
   - CONCRETE CONSTRUCTION

H. DELEGATED DESIGN

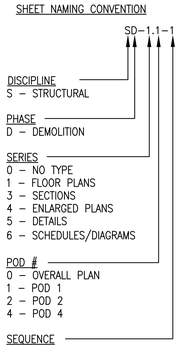
1. THE DESIGN OF THE FOLLOWING BUILDING ELEMENTS SHALL BE DELEGATED TO A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MARYLAND:

   MECHANICAL ENCLOSURE SUPPORT FRAMING
   STEEL STAIRS, LADDER AND RAILINGS

2. REFER TO THE SPECIFICATIONS AND THE DESIGN DRAWINGS FOR THE PERFORMANCE REQUIREMENTS, LAYOUT AND CONFIGURATION OF EACH BUILDING COMPONENT.

3. SUBMIT SHOP DRAWINGS, DETAILS AND CALCULATIONS FOR DELEGATED DESIGN COMPONENTS WITH THE STAMP AND SIGNATURE OF THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MARYLAND FOR THE REVIEW AND APPROVAL BY THE ARCHITECT.

I. SHEET NAMING CONVENTION



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DRAWING TYPE	STRUCTURAL
WORKING STAFF	JPA (DESIGNED BY) / VR (DRAWN BY) / MWZ (CHECKED BY)
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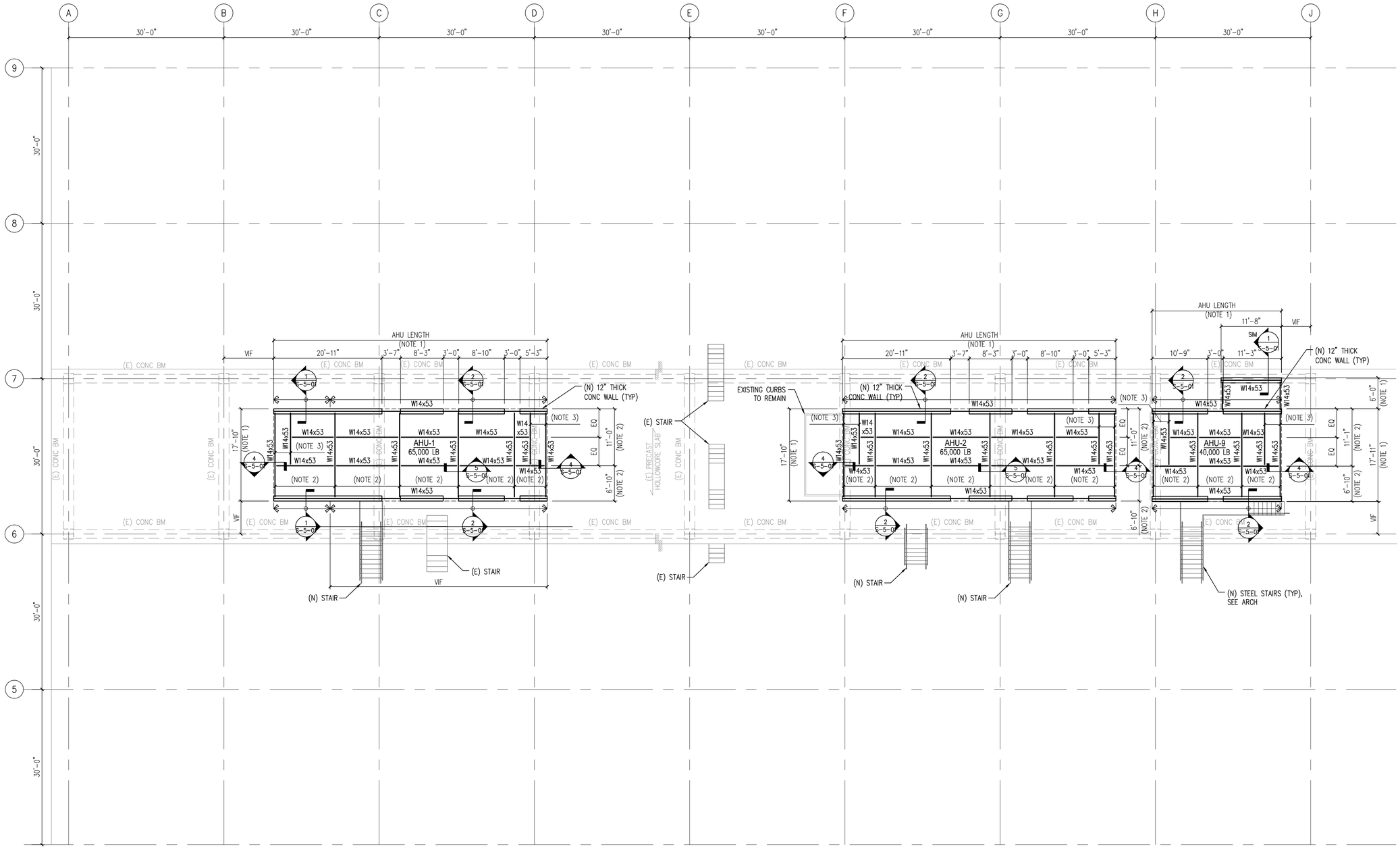

1 S-1.1-01 — POD 1 ROOF LEVEL – NEW WORK

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

NOTES:

1. CONFIRM FINAL APPROVED SIZE AND SUPPORT LAYOUT OF AIR HANDLING UNITS PRIOR TO PREPARATION OF SHOP DRAWINGS FOR KNEEWALLS.
2. VERIFY LOCATION OF AHU VESTIBULE WALL AND SPLIT LOCATIONS PRIOR TO PREPARATION OF SHOP DRAWINGS FOR STEEL FRAMING.
3. VERIFY DUCT SIZES AND PROVIDE ADEQUATE CLEARANCE FOR DUCT INSTALLATION PRIOR TO PREPARATION OF SHOP DRAWINGS FOR STEEL FRAMING.

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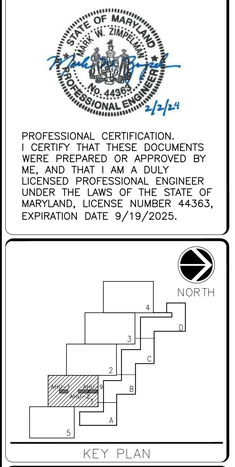

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1/8" = 1'-0"
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WORKING STAFF	JPA / VR / MWZ DESIGNED BY / DRAWN BY / CHECKED BY
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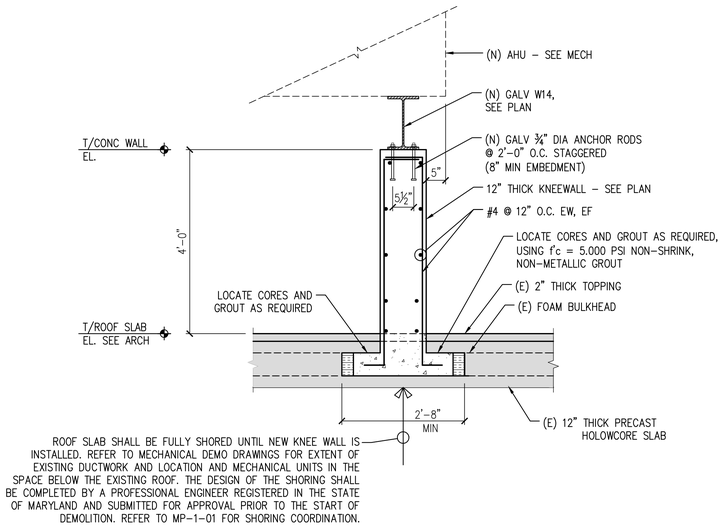
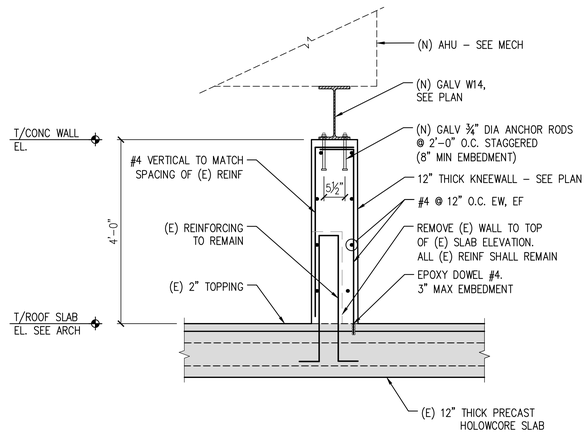
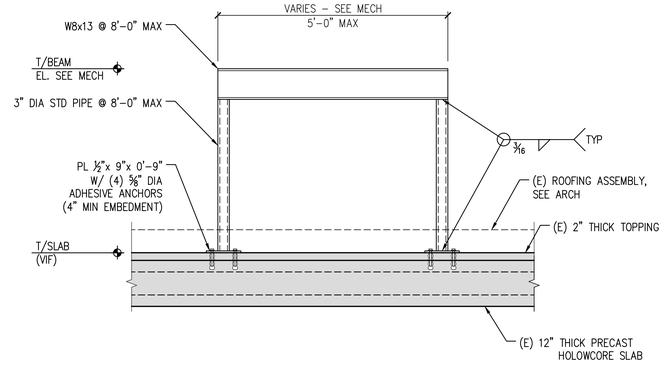


1 S–5–01 KNEE WALL DETAIL
SCALE: 3/4" = 1'–0"

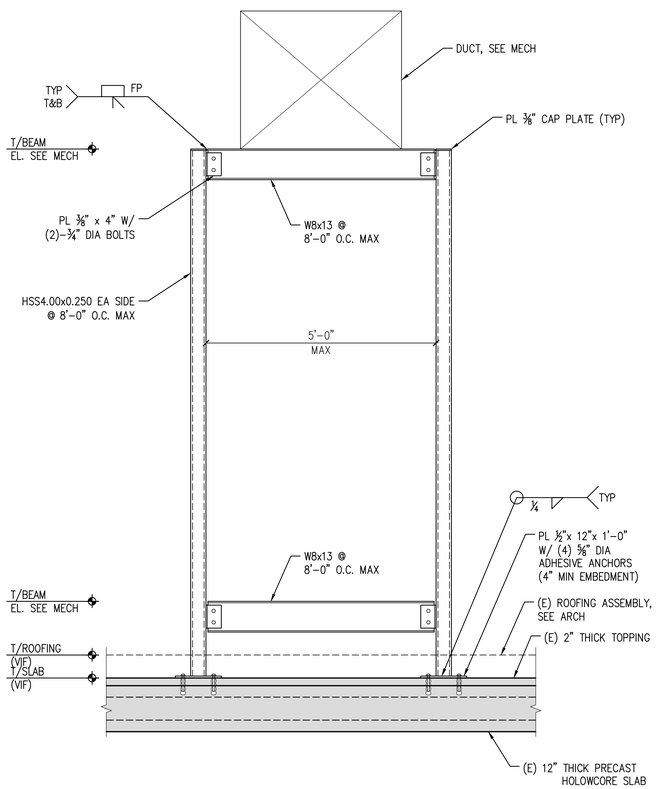


2 S–5–01 KNEE WALL DETAIL
SCALE: 3/4" = 1'–0"



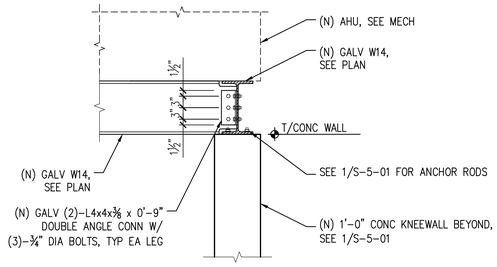
NOTE: 1. ALL STEEL TO BE HOT–DIPPED GALVANIZED.
2. SEE ARCH AND MEP FOR LOCATIONS.

3 S–5–01 TYPICAL PIPE SUPPORT DETAIL
SCALE: 3/4" = 1'–0"

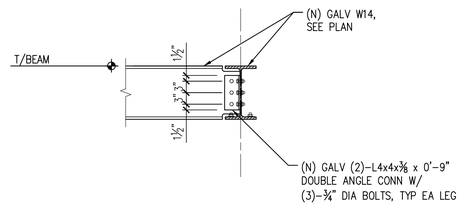


NOTE: 1. ALL STEEL TO BE HOT–DIPPED GALVANIZED.
2. SEE ARCH AND MEP DRAWINGS FOR LOCATION.

6 S–5–01 TYPICAL DUCT SUPPORT FRAME
SCALE: 3/4" = 1'–0"



4 S–5–01 CONNECTION DETAIL
SCALE: 3/4" = 1'–0"



5 S–5–01 CONNECTION DETAIL
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DRAWING TYPE	STRUCTURAL
WORKING STAFF	JPA (DESIGNED BY) · VR (DRAWN BY) · MWZ (CHECKED BY)

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MECHANICAL ABBREVIATIONS

ABV	AUTOMATIC BALANCING VALVE
ACH	AIR COOLED CHILLER
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER/ BOILER HORSEPOWER
BPV	BYPASS VALVE
BSF	BASIN FILTRATION SYSTEM
CA	COMPRESSED AIR
CC	COOLING COIL
CENT	CENTRIFUGAL
CF	CHEMICAL FEED (TREATMENT)
CLG	CEILING
COMPR	COMPRESSOR
COV	CHAIN OPERATED VALVE
CP	CONDENSATE PUMP DISCHARGE
CR	CONDENSATE RETURN
CRU	COMPUTER ROOM UNIT
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
CS	CLEAN STEAM
CT	COOLING TOWER
CV	CONTROL VALVE
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CW	COLD WATER DOMESTIC
D	DRAIN AND STEAM BLOWDOWN
DA	DIRECT ACTING
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
DO	DAMPER OPERATOR
DP	DEW POINT
DS	DUCT SILENCER (SOUND ATTENUATOR)
DWG(S)	DRAWING
EA	EXHAUST AIR/ EACH
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRICAL
ESP	EXTERNAL TO AHU STATIC PRESSURE
EDB	ENTERING DRY BULB TEMPERATURE
EWB	ENTERING WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EXIST (E)	EXISTING
F	FILTER
F&T	FLOAT AND THERMOSTATIC
FC	FLOW COMPUTER
FD	FIRE DAMPER OR FLOOR DRAIN
FHP	FAN UNIT HEAT PUMP
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
GALV	GALVANIZED
GUH	GAS UNIT HEATER
GV	GRAVITY VENT
HC	HEATING COIL
HDT	HORIZONTAL DRAW THRU
HP	HEAT PUMP
HWC	HOT WATER COIL (HEATING)
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
kW	KILOWATT
ID	INSIDE DIAMETER
IB	INVERTED BUCKET
LAT	LEAVING AIR TEMPERATURE
LDB	LEAVING DRY BULB TEMPERATURE
L/S	LITER PER SECOND
LPS	LOW PRESSURE STEAM
LR	LOW PRESSURE STEAM RETURN
LWB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
LV	LEVEL
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MIN	MINIMUM
MPS	MEDIUM PRESSURE STEAM
MR	MEDIUM PRESSURE STEAM RETURN
MUW	MAKE-UP WATER
NC	NORMALLY CLOSED
NIC	NOT IN CONTACT
NO	NORMALLY OPEN
NPSH	NET POSITIVE SUCTION HEAD
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
OC	ON CENTER
OPP	OPPOSITE
Pa	PASCAL (PRESSURE)
PHC	PREHEATING COIL
PL	PLACES
PLBG	PLUMBING
PRIM	PRIMARY
PRS	PRESSURE REDUCING STATION
RA	RETURN AIR
REA	REVERSE ACTING
REFR	REFRIGERATION
RHC	REHEATING COIL
RR	RETURN AIR OR EXHAUST AIR REGISTER
RV	REFRIGERANT VENT
SA	SUPPLY AIR
SAF	SUPPLY AIR FAN
SM	SQUARE METER
SH	STEAM GRID HUMIDIFIER
SP	STATIC PRESSURE
SPEC	SPECIFICATIONS
SR	SUPPLY AIR REGISTER
SS	STAINLESS STEEL
STRUCT	STRUCTURAL
SWBI	SINGLE WIDTH BACKWARD INCLINE FAN
T	THROAT
TAB	TESTING AND BALANCING
TCV	TEMPERATURE CONTROL VALVE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UD	UNDERCUT DOOR
UH	UNIT HEATER
V	VENT (ATMOSPHERIC RELIEF)
VAV	VARIABLE AIR VOLUME
VB	VARIABLE AIR VOLUME BOX
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
W	WATT(S)
W/	WITH
W/O	WITHOUT
WMS	WIRE MESH SCREEN
WP	WEATHERPROOF

EQUIPMENT DESIGNATOR

AHU	AIR HANDLING UNIT
UH	HOT WATER UNIT HEATER
CP	CONDENSATE PUMP
EF	EXHAUST FAN
DH	DEHUMIDIFIER
CHWC	CHILLED WATER COIL
HWC	HOT WATER COIL
HWP	PUMP – HOT WATER
SH	STEAM HUMIDIFIER
TCP	TEMPERATURE CONTROL PANEL
FM	FLOW METER

PIPE SUPPORT

U	UBOLT
G	GUIDE SUPPORT
A	ANCHOR
E	EXPANSION JOINT

MECHANICAL LEGEND

SUPPLY AIR TERMINALS

- SUPPLY AIR CEILING DIFFUSER – FOUR WAY UNLESS OTHERWISE NOTED
- SUPPLY AIR CEILING DIFFUSER – THREE WAY
- SUPPLY AIR CEILING DIFFUSER – TWO WAY
- SUPPLY AIR CEILING DIFFUSER – ONE WAY
- SUPPLY AIR SIDEWALL GRILLE/REGISTER
- ROUND SUPPLY AIR CEILING DIFFUSER

RETURN/EXHAUST AIR TERMINALS

- RETURN AIR CEILING DIFFUSER
- EXHAUST AIR CEILING DIFFUSER
- RETURN/EXHAUST AIR SIDEWALL REGISTER OR GRILLE

MECHANICAL LEGEND

DUCTWORK

- EXISTING TO REMAIN WORK
- DEMOLITION WORK
- NEW WORK
- ROUND DUCT UP
- ROUND DUCT DOWN
- SUPPLY AIR DUCT
- RETURN AIR DUCT
- EXHAUST AIR DUCT
- SUPPLY AIR DUCT UP
- SUPPLY AIR DUCT DOWN
- RETURN AIR DUCT UP
- EXHAUST AIR DUCT DOWN
- DOUBLE LINE DUCTWORK
- VANED ELBOW LONG SWEEP ELBOW 1-1/2 RADIUS TYPE
- TRANSITION (RECTANGULAR/SQUARE TO ROUND)
- TRANSITION
- BRANCH TAP W/ VOLUME DAMPER
- SPIN-IN TAP W/ VOLUME DAMPER
- RIGID DUCTWORK
- FLEXIBLE DUCT
- AD — ACCESS DOOR ON DUCTWORK
- AD — ACCESS DOOR ON DUCTWORK
- R — RISE IN DUCTWORK
- D — DROP IN DUCTWORK
- FLEXIBLE CONNECTOR
- VOLUME DAMPER
- Ø — ROUND DUCT
- SUPPLY DIFFUSER
- CONNECT TO EXISTING
- LIMIT OF DEMOLITION
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- FSD — COMBINATION FIRE/SMOKE DAMPER
- SB — SECURITY BARS
- DUCT MOUNTED STEAM HUMIDIFIER
- M — MOTORIZED DAMPER
- S — WALL SWITCH
- TH — SPACE TEMPERATURE THERMOSTAT
- T — UNIT MOUNTED THERMOSTAT
- H — SPACE HUMIDITY SENSOR
- SP — STATIC PRESSURE SENSOR
- AFMS — AIR FLOW MONITORING STATION
- SD — DUCT MOUNTED SMOKE DETECTOR
- T — TEMPERATURE SENSOR
- FS — FLOW SWITCH

PIPING SPECIALTIES AND CONNECTIONS

- DEMO PIPING
- NEW PIPING
- EXISTING PIPING
- TWO-WAY AUTOMATIC CONTROL VALVE
- THREE-WAY AUTOMATIC CONTROL VALVE
- GATE VALVE
- BUTTERFLY VALVE
- B — BUTTERFLY VALVE WITH BALANCING STOP
- GLOBE VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- STEAM TRAP
- CHECK VALVE
- BALL VALVE
- BALANCING VALVE
- PIPE UP
- BOTTOM TAKE-OFF
- TOP TAKE-OFF
- EXPANSION JOINT
- DIRECTION OF SLOPE DOWN
- RELIEF VALVE (ASME RATED)
- PRESSURE GAUGE
- MANUAL AIR VENT
- AV, D — AUTOMATIC AIR VENT (W/DRAIN PIPED TO FD)
- FLEXIBLE CONNECTOR
- UNION
- FLANGED END
- FLANGED CONNECTION
- CAPPED END
- PIPE ANCHOR, GUIDE OR UBOLT (SEE PLANS FOR SUPPORT LOCATIONS)
- THERMOMETER WELL
- THERMOMETER
- STRAINER WITH DRAIN VALVE
- CONNECTION, BOTTOM
- CONNECTION, TOP
- ELBOW, TURNED UP
- ELBOW, TURNED DOWN
- BUTTERFLY VALVE IN DROP OR RISE
- CIRCULATING PUMP
- CW — DOMESTIC COLD WATER
- CHWR — CHILLED WATER RETURN
- CHWS — CHILLED WATER SUPPLY
- HWR — HOT WATER RETURN
- HWS — HOT WATER SUPPLY
- MR — MEDIUM PRESSURE STEAM RETURN
- MPS — MEDIUM PRESSURE STEAM SUPPLY
- LR — LOW PRESSURE STEAM RETURN

ADDITIONAL SYMBOLS

- PLAN NUMBER; 1 / M-1.1-01 — FLOOR PLAN, SCALE: 1/8 = 1'-0" — DRAWING TITLE; SHEET NUMBER
- DETAIL NUMBER; A / M-5.0-01 — DETAIL, N.T.S. — DETAIL TITLE; SHEET NUMBER
- DRAWING REFERENCE
- 1 / M-1.1-04 | M-4.1-01 — DRAWING TO; DRAWING FROM
- MATCHLINE, SEE SHEET MT-4.02 — MATCH LINE
- NORTH
- 8 / 1400 / 1200 — EXISTING CFM; NEW CFM (FOR REFERENCE ONLY); REGISTER #

SHEET NAMING CONVENTION

MD-1.1-1

DISCIPLINE
M – MECHANICAL

PHASE
D – DEMOLITION
P – PHASING

SERIES
0 – NO TYPE
1 – FLOOR PLANS
3 – SECTIONS
4 – ENLARGED PLANS
5 – DETAILS
6 – SCHEDULES/DIAGRAMS
7 – CONTROLS

POD #
1 – POD 1
2 – POD 2
4 – POD 4

SEQUENCE

MECHANICAL GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING CODES, STANDARDS AND GUIDELINES:
   a) INTERNATIONAL BUILDING CODE (IBC) 2015
   b) INTERNATIONAL MECHANICAL CODE (IMC) 2015
   c) INTERNATIONAL PLUMBING CODE (IPC) 2015
   d) NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS 2015
   e) AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE) STANDARDS.
   f) SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION (SMACNA) STANDARDS
   g) SMITHSONIAN INSTITUTION (SI) GUIDELINES
2. THE DRAWINGS ARE NOT INTENDED FOR FINAL SYSTEM INSTALLATION AND ARE NOT TO BE SCALED. GENERAL ROUTING OF MAJOR DUCTWORK AND PIPING, THE GENERAL LOCATION OF EQUIPMENT, FIXTURES AND SPECIALTIES ARE INDICATED BUT DO NOT INDICATE ALL OFFSETS, TRANSITIONS, AND DETAILS REQUIRED FOR FINAL INSTALLATION. DETAILS OF PIPING, DUCT, AND EQUIPMENT ARE PROVIDED FOR CONVENIENCE AND INDICATE MINIMUM INSTALLATION REQUIREMENTS WITH RESPECT TO THE WORK OF THIS DIVISION. PROVIDE A COMPLETE SYSTEM INCLUDING ALL REQUIRED OFFSETS, TRANSITIONS, AND ADJUSTMENTS FOR THE LOCATION OF ALL STEAM, WATER, AND AIR DISTRIBUTION SYSTEMS REQUIRED FOR THE FINAL INSTALLATION.
3. THOROUGHLY REVIEW AND EXAMINE THE CONTRACT DOCUMENTS OF ALL DIVISIONS. ACCURATELY LAYOUT AND COORDINATE THE WORK REQUIRED USING THE DIMENSIONED ARCHITECTURAL AND STRUCTURAL CONTRACT DRAWINGS AND THE CONTRACT DRAWINGS OF ALL OTHER TRADES PRIOR TO PURCHASE AND INSTALLATION OF EQUIPMENT AND FABRICATION AND INSTALLATION OF SYSTEMS. COORDINATE AND SCHEDULE THE INSTALLATION OF ALL WORK UNDER THIS DIVISION WITH THE WORK OF ALL OTHER DIVISIONS INVOLVED TO PREVENT ANY CONFLICT OF WORK AND TO PROVIDE A WORKMANLIKE AND FIRST CLASS COMPLETED INSTALLATION.
4. REPORT ANY CONFLICTS OR DISCREPANCIES TO THE COTR AND SECURE THEIR APPROVAL PRIOR TO STARTING ANY ALTERATIONS AND/OR DEVIATIONS FROM THE CONSTRUCTION DOCUMENTS. REQUEST SUPPLEMENTARY INSTRUCTIONS FROM THE COTR IN ALL CASES OF DOUBT AS TO THE WORK INTENDED, OR IF ADDITIONAL INFORMATION IS NEEDED.
5. PROVIDE DETAILED AND DIMENSIONED COORDINATION DRAWINGS WITH ELEVATIONS FOR ALL AREAS INCLUDING MECHANICAL ROOF TOP UNITS, WHICH HAVE BEEN COORDINATED WITH ALL OTHER TRADES AT 1:50 SCALE. AT THE MINIMUM SHOWING ALL DUCTWORK, PIPING, SPECIALTIES, SUPPORTS, TERMINAL UNITS, AIR DISTRIBUTION DEVICES, EQUIPMENT, DAMPERS, ACCESS PANELS AND DOORS, CONTROLS, LIGHTING FIXTURES AND OTHER COMPONENTS. CONTRACTOR SHALL NOT INSTALL ANY DUCTWORK, PIPING, EQUIPMENT ETC. WITHOUT THE APPROVED COORDINATION DRAWINGS.
6. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, THE SPECIFICATIONS, AND REVIEWED SHOP DRAWINGS. SERVICE AND OPERATION CLEARANCES SHALL BE PROVIDED AROUND ALL EQUIPMENT IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND MANUFACTURER'S PRINTED REQUIREMENTS AND RECOMMENDATIONS.
7. ALL NEW BRANCH DUCTWORK TAKE-OFFS INCLUDING THOSE WITH 45 DEGREE FITTINGS SHALL BE PROVIDED WITH OPPOSED BLADE VOLUME DAMPERS INSTALLED PER SMACNA WHETHER SHOWN ON DRAWING OR NOT. INSTALL OPPOSED BLADE VOLUME DAMPERS INTO EXISTING BRANCH DUCTWORK AS NECESSARY TO BALANCE EXISTING SYSTEM. PROVIDE STANDOFF BRACKETS ON INSULATED DUCTS.
8. DUCT RUNOUTS SERVING INDIVIDUAL DIFFUSERS SHALL BE THE SAME SIZE AS THE DIFFUSER NECK SCHEDULED FOR THE DIFFUSER SERVED.
9. PROVIDE UL LISTED FIRE STOPPING MATERIAL AT PENETRATIONS OF FIRE RATED WALLS, FLOORS, PARTITIONS AND CEILINGS.
10. ALL SENSORS SHALL BE MOUNTED 60" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE
11. CONTRACTOR SHALL PATCH FLOOR SLAB AND WALL PENETRATION WHERE PIPING AND DUCT ARE BEING INSTALLED. FLOOR AND WALL PENETRATIONS SHALL BE SEALED WATER AND AIRTIGHT.
12. CONTRACTOR SHALL CONSTRUCT AND INSTALL ALL DUCTWORK IN ACCORDANCE WITH SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION (SMACNA) HVAC DUCT CONSTRUCTION STANDARDS.
13. PROVIDE TURNING VANES ON ALL DUCTWORK ELBOWS AS REQUIRED BY SMACNA (ANGLED 90°) WHETHER SHOWN ON DRAWING OR NOT.
14. DUCT SIZES INDICATED ON DRAWINGS REPRESENT CLEAR DIMENSIONS. (EXCLUDES SOUND LINING THICKNESS)
15. DUCTWORK AND PIPING WILL BE INSTALLED IN SPACE WITH EXISTING DUCTWORK AND PIPING. CONTRACTOR SHALL COORDINATE NEW DUCTWORK LAYOUT TO FIT INTO THE EXISTING AVAILABLE SPACE.
16. MANUAL AIR VENTS SHALL BE PROVIDED AT ALL HIGH POINTS & 3/4" DIA DRAINS WITH HOSE END CONNECTIONS AT ALL LOW POINTS IN THE HYDRONIC PIPING SYSTEM. BOTH VENTS & DRAINS SHALL BE PROVIDED IN ACCESSIBLE LOCATIONS.
17. PROVIDE SHUTOFF VALVES, UNIONS, AND/OR FLANGES AT ALL PIPE CONNECTIONS TO HVAC EQUIPMENT. INSTALL PIPING SUCH THAT COILS AND COMPONENTS CAN BE REMOVED WITHOUT DISMANTLING ALL PIPING.
18. ALL VALVES & FITTINGS SHALL BE LINE SIZE UNLESS NOTED OTHERWISE (EXCEPT CONTROL VALVES)
19. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR EQUIPMENT CONCRETE PADS AND EQUIPMENT SUPPORTS.
20. PROVIDE FLEXIBLE PIPE CONNECTORS AT INLETS AND OUTLETS OF ALL PUMPS AND COIL CONNECTIONS.
21. COORDINATE CHILLED WATER OUTAGE WITH COTR AT LEAST TWO WEEKS IN ADVANCE.
22. COORDINATE WITH COTR TO ACCESS SECURED AREAS SUCH AS MECHANICAL ROOMS AND OUTDOOR AIR-HANDLING UNITS EQUIPPED WITH SECURITY ALARM DEVICES.
23. PHASING SCHEDULE: REFER TO FLOOR PLANS FOR DETAILED PHASING.
24. PROVIDE PIPING EXPANSION JOINT AND ANCHORS ON HW AND STEAM PIPING AS REQUIRED.
25. UNIT SHUTDOWN SHALL BE LIMITED TO 8-10 HOURS. COORDINATE AND GET APPROVAL FROM COTR.
26. PROVIDE ALL PIPING WITH SUPPORT AND ACCESSORIES.
27. OUTDOOR PIPING INSULATION THICKNESS SHALL BE THE FOLLOWING AS A MINIMUM: CHILLED WATER PIPE 2" THICK CELLULAR GLASS, HOT WATER PIPE 2" THICK MINERAL FIBER, MEDIUM PRESSURE STEAM 4" THICK MINERAL FIBER, STEAM CONDENSATE 4" THICK MINERAL FIBER.
28. PROVIDE OUTDOOR PIPING, INCLUDING PIPING WITHIN CUSTOM AHU, WITH ALUMINUM JACKET.
29. CHILLED AND DOMESTIC WATER AND AC CONDENSATE PIPING LOCATED OUTDOOR SHALL BE HEAT TRACED.

MUSEUM SUPPORT CENTER
SMITHSONIAN INSTITUTION

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STATE OF MARYLAND — TROY ALLEN NEAL — No. 28411 — PROFESSIONAL ENGINEER — 02/02/2024

PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28411, EXPIRATION DATE 1/13/2025.

KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

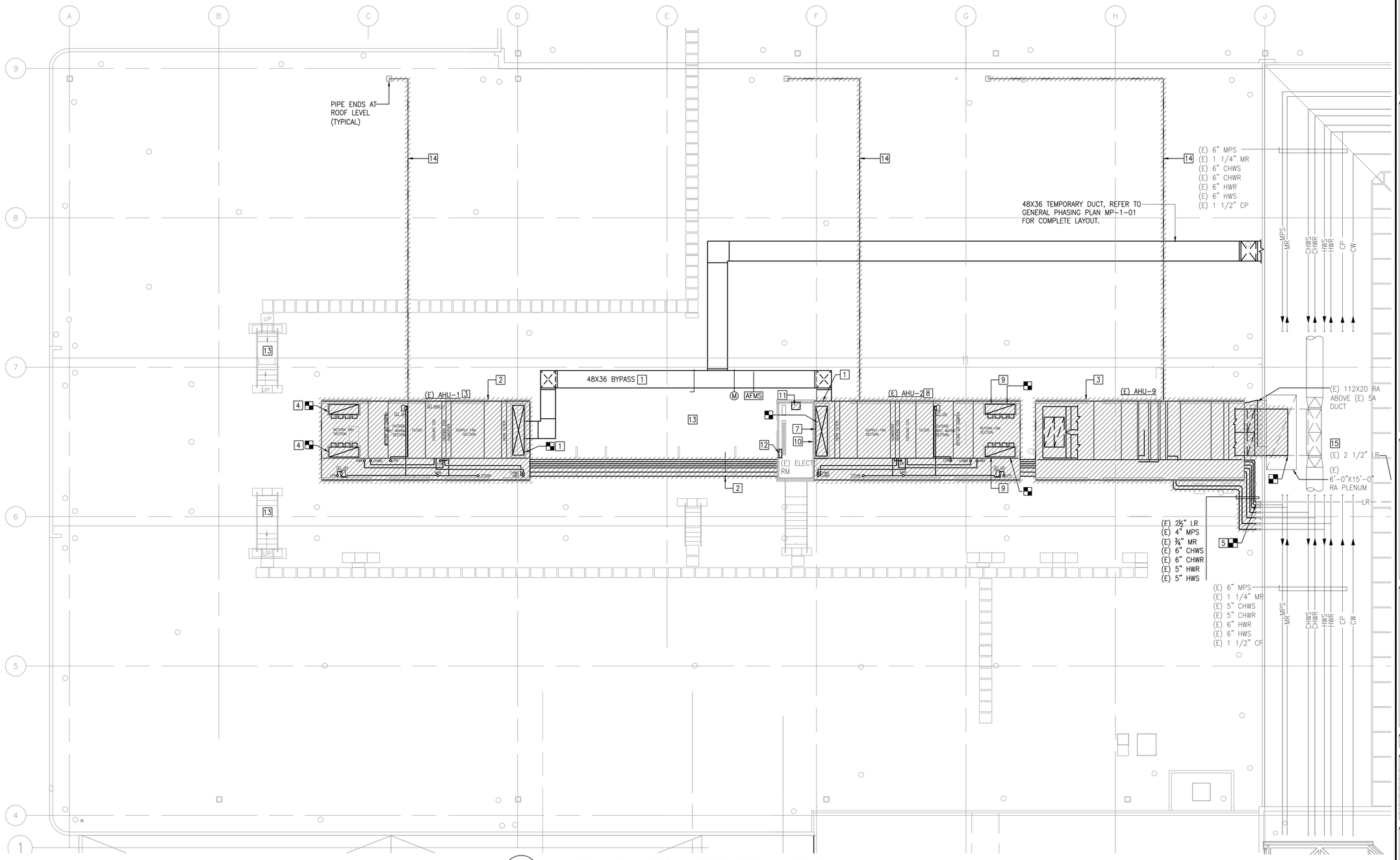
REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

Smithsonian Institution

SMITHSONIAN FACILITIES
600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024-2520

BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	COVER SHEET
DRAWING TYPE	MECHANICAL

DESIGNED BY	DRAWN BY	CHECKED BY
FDL	FDL	DP



A
MD-1.1-01

MECHANICAL POD 1 ROOF LEVEL – DEMO

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

GENERAL NOTES:

1. FOR DETAILED POD-1 PHASING SEQUENCE PLAN REFER TO DRAWINGS MP-1-01, MP-1.1-01, 02, 03, 04 AND 05.
2. ALL DEMOLITION AND NEW WORK SHALL BE PERFORMED DURING WINTER AND MILD WEATHER TIME, BETWEEN OCTOBER AND APRIL.
3. DEMOLITION AND INSTALLATION OF AHU SHALL BE PERFORMED DURING NIGHT TIME ON WEEKDAYS. WORK INSIDE NEW UNIT CAN BE PERFORMED DURING DAYTIME ON WEEKDAYS.
4. CONTRACTOR SHALL PROVIDE DOUBLE WALL DUCT WITH TEMPORARY CONNECTIONS BETWEEN AHU SUPPLY DUCTS. TEMPORARY AIR SUPPLY SHALL BE BALANCED TO PROVIDE 50% AIR SUPPLY TO BOTH SIDES OF THE POD FROM ONE AIR-HANDLING UNIT OPERATIONAL WHILE THE OTHER AIR-HANDLING UNIT BEING REPLACED. CONTRACTOR SHALL BE RESPONSIBLE TO ESTABLISH AIRFLOW PRIOR TO DEMOLISH EXISTING UNIT.
5. NEW AIR HANDLING UNIT SHALL BE COMMISSIONED PRIOR TO SECOND AIR-HANDLING UNIT SERVING THE SAME POD IS DEMOLISHED. AFTER BOTH AHUs INSTALLED THE TWO UNITS SHALL BE RECOMMISSIONED TOGETHER.
6. EXISTING ELECTRICAL CONDUITS SHALL BE PROVIDED WITH NEW SUPPORT SYSTEM AND ACCESSORIES AS A RESULT OF DEMOLITION OF EXISTING PIPE SUPPORT THAT ARE CURRENTLY USED ALSO BY EXISTING ELECTRICAL CONDUIT. AFTER REMOVING PIPE SUPPORTS PATCH AND RESTORE ROOF TO EXISTING CONDITIONS.
7. ANY WORK REQUIRES TO SHUT DOWN BOTH AIR-HANDLING UNITS, THE SHUT DOWN TIME AND DURATION SHALL BE COORDINATED WITH COTR. INTERRUPTION OF CONDITIONED AIR SUPPLY TO POD SHALL BE LIMITED 8 TO 12 HOURS.

CODED NOTES:

PHASE 1A (AHU-1 AND AHU-9):

1 REFER TO POD-1 PHASING SEQUENCE MP-1.1-01. REUSED THE EXISTING TEMPORARY UNIT (E)AC-T1 TO PROVIDE TEMPORARY SA TO POD-1 AREA SERVED BY AHU-1. PROVIDE DOUBLE WALL BYPASS DUCT BETWEEN (E) AHU-2 AND (E) AHU-1 WITH TEMPORARY CONNECTIONS TO UNITS WITH TEMPORARY MANUAL DAMPER AND MOTORIZED DAMPER . PROVIDE TEMPORARY RELIEF AIR DUCT TO EXISTING RA DUCT RISER UNDERNEATH THE UNIT. COORDINATE DUCT SUPPORTS WITH NEW PIPE SUPPORTS BELOW DUCT. REMOVE/RECONFIGURE EXISTING AHU DUCTS TO MAKE TEMPORARY CONNECTIONS. BYPASS DUCT PERMANENT CONNECTIONS WILL BE MADE TO NEW UNIT CASING. REMOVE EXISTING 120X28 SA DUCT 12 INCHES ABOVE ROOF LEVEL.

2 REMOVE EXISTING PIPING SERVING (E) AHU-1 AND CAP PIPES AT (E) AHU-2 TO SERVE THE POD-1 DURING THIS PHASE.

3 REMOVE EXISTING AIR HANDLING UNITS AHU-1 AND AHU-9 INCLUDING ASSOCIATED STEAM PIPING, CHILLED WATER PIPING, HOT WATER PIPING, CONTROLS, UNIT HEATER, ELECTRICAL WIRING AND ACCESSORIES. REMOVE ALL CONTROLS FROM BAS. IN AHU-9, REMOVE THE UNIT AND CLOSE THE VALVE WITHOUT CUTTING THE HYDRONIC PIPING UNDERNEATH THE UNIT. PROVIDE TEMPORARY SUPPORT FOR PIPES.

4 PROVIDE EIGTH 12X12 TEMPORARY RELIEF AIR DUCT ON TWO EXISTING RA DUCT RISER UNDERNEATH THE UNIT. PROVIDE TEMPORARY INSULATED CAP ON REMAINING RA DUCT.

5 REMOVE EXISTING PIPING INCLUDING SUPPORTS TO POINT INDICATED. CAP OFF PIPING OPENING.

PHASE 1B (AHU-2):

7 REFER TO PHASING SEQUENCE POD-1 MP-1.1-03 PROVIDE POD-1 AREA SERVED BY (E)AHU-2 WITH TEMPORARY SA FROM TEMPORARY UNIT (E)AC-T1. REMOVE FIRST THE (E) AHU-2 DISCHARGE PLENUM.

8 REMOVE EXISTING AIR HANDLING UNIT AHU-2 INCLUDING ASSOCIATED STEAM PIPING, CHILLED WATER PIPING, HOT WATER PIPING, CONTROLS, UNIT HEATER, PIPE SUPPORTS, ELECTRICAL WIRING AND ACCESSORIES. REMOVE ALL CONTROLS FROM BAS.

9 PROVIDE EIGHT 12X12 TEMPORARY RELIEF AIR DUCT ON TWO EXISTING RA DUCT RISER UNDERNEATH THE UNIT. DISCONNECT THE RA TO UNIT. PROVIDE TEMPORARY INSULATED CAP ON REMAINING DUCT.

10 REMOVE EXISTING PERFORATED PANEL AND INSULATION FROM ELECTRICAL ROOM WALL. INSTALL NEW INSULATION AND COVER WITH SHEET METAL.

11 REMOVE EXISTING EXHAUST FAN IN THE ELECTRICAL ROOM INCLUDING PNEUMATIC CONTROLS, ELECTRICAL WIRING AND ACCESSORIES. EXISTING LOUVER TO REMAIN.

12 REMOVE EXISTING 24X24 OA INTAKE DAMPER AND PNEUMATIC ACTUATOR. EXISTING LOUVER TO REMAIN.

13 REFER TO ARCHITECTURAL DRAWINGS AND RECONFIGURE/RELOCATE EXISTING PAVERS AND STAIRS TO ALLOW INSTALLATION OF NEW AHU AND PIPES.

14 DEMOLISH EXISTING DRAIN LINE ON TOP OF ROOF ATTACHED TO THE MEMBRANE ROOF WITH MEMBRANE PATCHES. DO NOT DISTURB MEMBRANE ROOF.

15 LOW PRESSURE CONDENSATE RETURN (LR) TO PUMP P-6 AND TO PUMPED CONDENSATE PIPE (CP).

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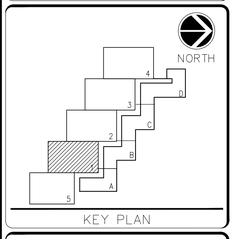
STATE OF MARYLAND
TODD ALLEN KOLB
No. 28411
PROFESSIONAL ENGINEER
02/02/2024

PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28411, EXPIRATION DATE 1/13/2025.



KEY PLAN

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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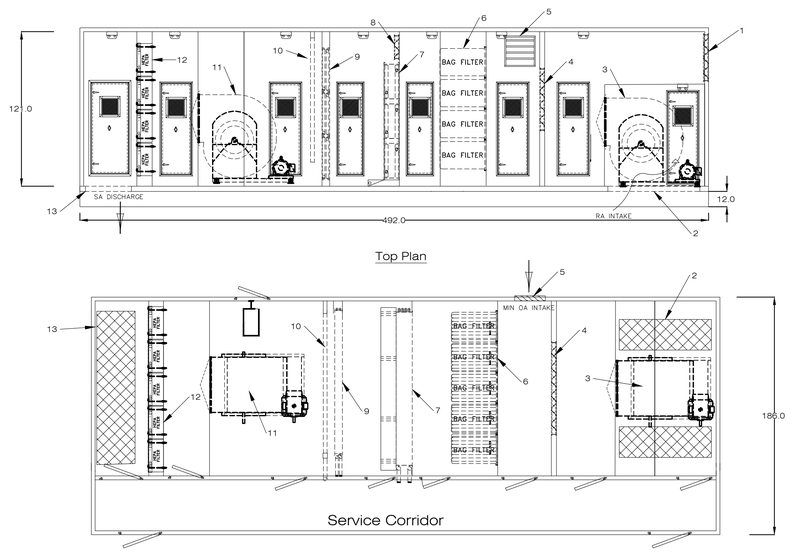
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 ROOF LEVEL – DEMO
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL / FDL / DP (DESIGNED BY / DRAWN BY / CHECKED BY)
SHEET NO.	15 OF 71

MD | 1.1 | 01
DISCIPLINE | TYPE | SEQUENCE

MSC-1.1-POD1
MD-1.1-01

GENERAL NOTES:

1. EXISTING UNITS ARE SHOWN TO IDENTIFY COMPONENTS OF THE UNITS. ENTIRE UNIT SHALL BE DEMOLISHED WITH ALL COMPONENTS AND ACCESSORIES.



Top Plan

Top Plan

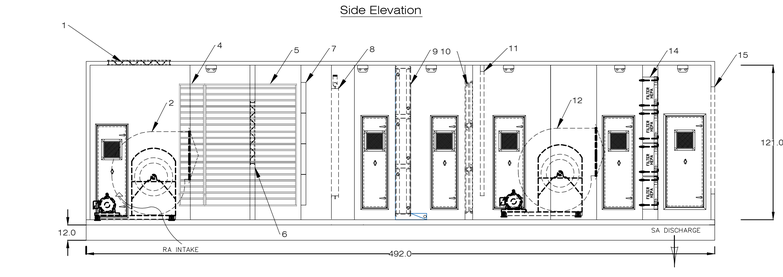
A
MD-5-01

EXISTING AHU-1 AND AHU-2 DETAIL

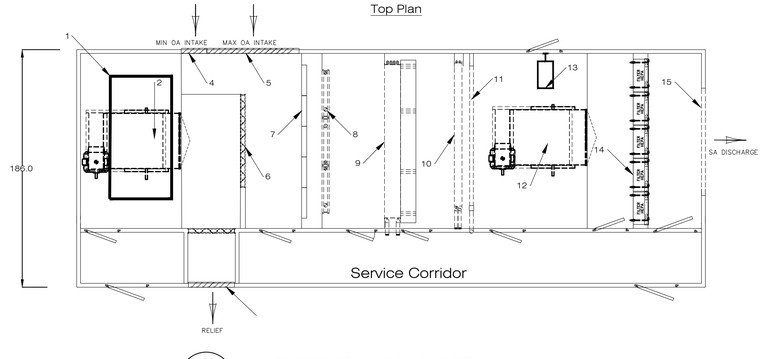
SCALE = 1/4"=1'-0"

EXISTING COMPONENT SCHEDULE

1 – PURGE RELIEF DAMPER/LOUVER
2 – RETURN AIR INTAKE, QTY.(2) (24" X 72")
3 – DWDI RETURN AIR FAN W/ 15 HP MOTOR
4 – RETURN AIR DAMPER
5 – OUTSIDE AIR DAMPER/LOUVER
6 – BAG FILTERS (4H X 5W)
7 – QTY. (3) CHILLED WATER COILS (27" X 120")
8 – BYPASS DAMPER
9 – QTY. (3) HOT WATER COILS (33" X 112")
10 – HUMIDIFIER MANIFOLD
11 – DWDI SUPPLY AIR FAN, 60 HP MOTOR
12 – FINAL BLOW THRU HEPA FILTERS (4H X 5W)
13 – SUPPLY AIR DISCHARGE
14 – PURGE MAXIMUM OA DOOR



Side Elevation



Top Plan

B
MD-5-01

EXISTING AHU-9 DETAIL

SCALE = 1/4"=1'-0"

EXISTING COMPONENT SCHEDULE

1 – RETURN AIR INTAKE, QTY.(2) (24" X72")
2 – DWDI RETURN AIR FAN W/ 15 HP MOTOR
3 – RELIEF DAMPER/LOUVER (FOR PURGE AND ECONOMIZER)
4 – MINIMUM OUTSIDE AIR DAMPER/LOUVER
5 – MAXIMUM OUTSIDE AIR DAMPER/LOUVER (FOR ECONOMIZER)
6 – RETURN AIR DAMPER
7 – 4H X 5W PLEATED FILTERS
8 – QTY. (3) VERTICAL STEAM PREHEAT COILS (30" X 72")
9 – QTY. (3) CHILLED WATER COILS (36" X 120")
10 – QTY.(3) HOT WATER COILS (27" X120")
11 – HUMIDIFIER MANIFOLD
12 – DWDI SUPPLY AIR FAN, 60 HP MOTOR
13 – PURGE MAXIMUM OA DOOR
14 – FINAL BLOW THRU HEPA FILTERS (4H X 5W)
15 – SUPPLY AIR DISCHARGE

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STATE OF MARYLAND
KEVIN L. ALLEN
No. 28411
PROFESSIONAL ENGINEER
6/21/2024

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KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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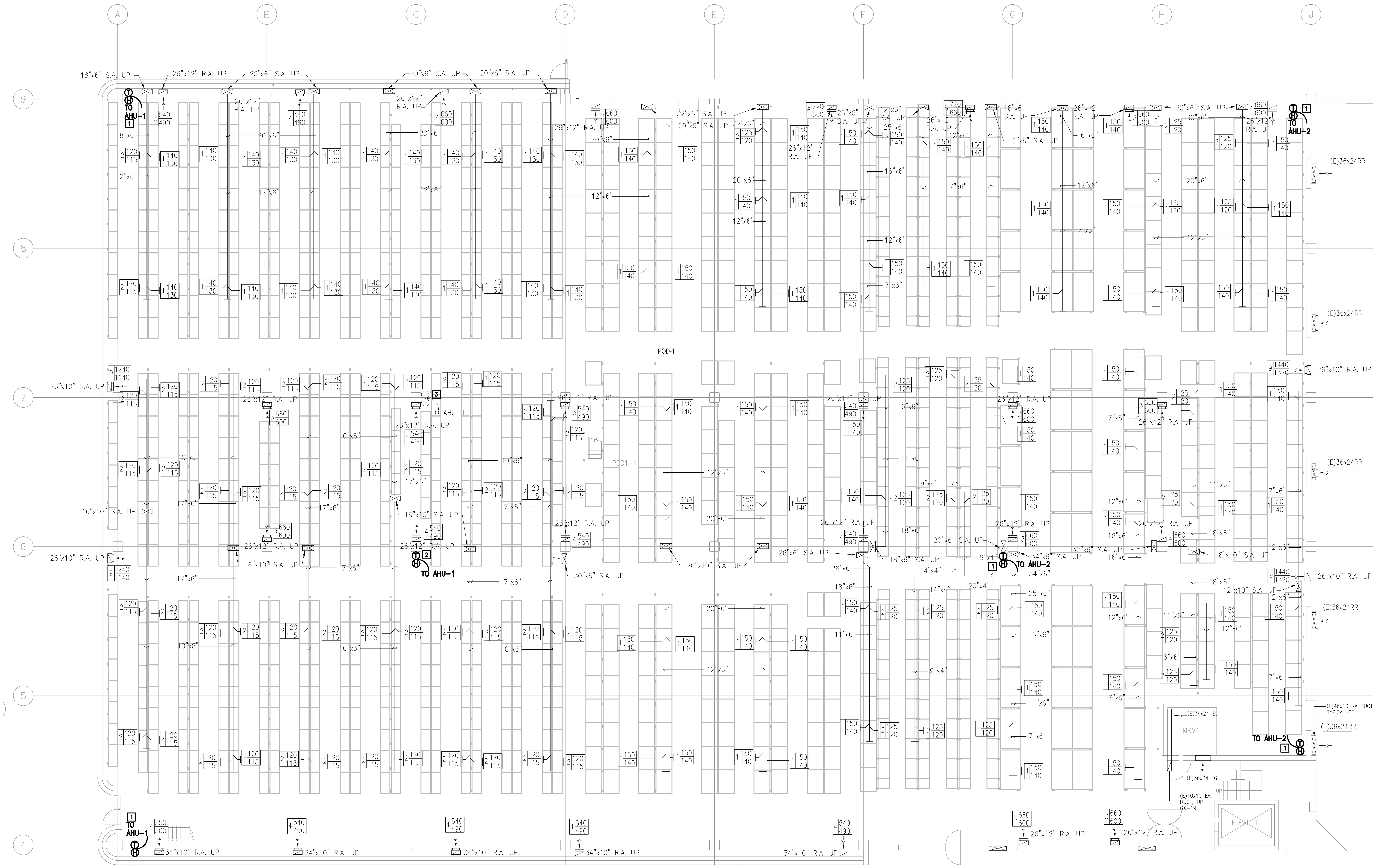
BUILDING NAME / ADDRESS	MUSEUM SUPPORT CENTER 4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL DETAILS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	16 OF 71
	MD (DISCIPLINE) / 5 (TYPE) / 01 (SEQUENCE)

MD-5-01.DWG

DUCT AND REGISTER INFORMATION SHOWN FOR REFERENCE ONLY, NO TAB TO BE PERFORMED IN THE POD AREA



A
M-1.1-01

MECHANICAL POD 1 LEVEL 1- SENSOR LOCATIONS

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

GENERAL NOTES:

1. ALL EXISTING COMBINATION TEMPERATURE AND HUMIDITY SENSORS SHALL BE REMOVED AND REPLACED.
2. ALL NEW COMBINATION TEMPERATURE AND HUMIDITY SENSORS SHALL BE INSTALLED ON A 2 INCH THICK INSULATED BLOCK.
3. TEMPERATURE/HUMIDITY SENSOR REPLACEMENT NEED TO BE COORDINATED WITH COTR TO HAVE SECURITY AND COLLECTION PRESERVATION PERSONALS PRESENT. IF SENSOR ACCESS AND REPLACEMENT REQUIRE COLLECTION PROTECTION THE MATERIAL AND METHOD OF THE PROTECTION NEED BE APPROVED BY COTR.

CODED NOTES:

1 REMOVE OLD COMBINATION TEMPERATURE AND HUMIDITY SENSORS AND REPLACE WITH NEW SENSORS.

2 PROVIDE COMBINATION TEMPERATURE AND HUMIDITY SENSOR AT NEW LOCATIONS.

3 REMOVE OLD COMBINATION TEMPERATURE AND HUMIDITY SENSORS.

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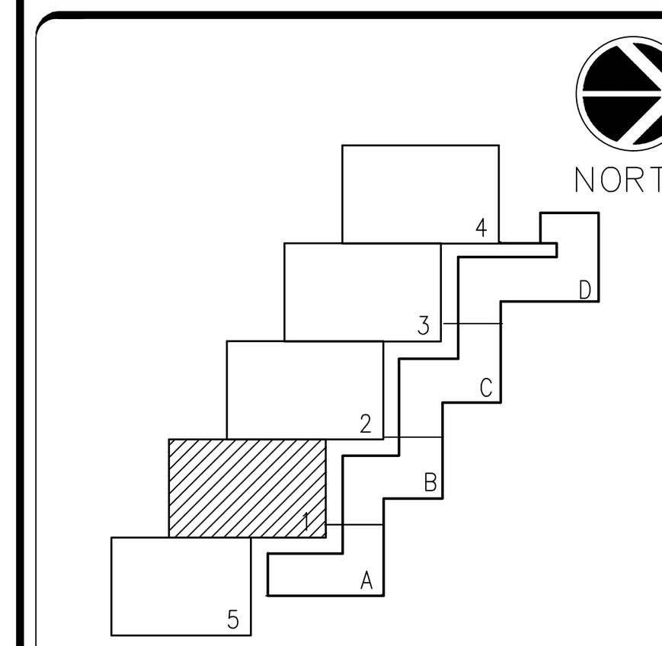

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

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02/02/24	BID SET

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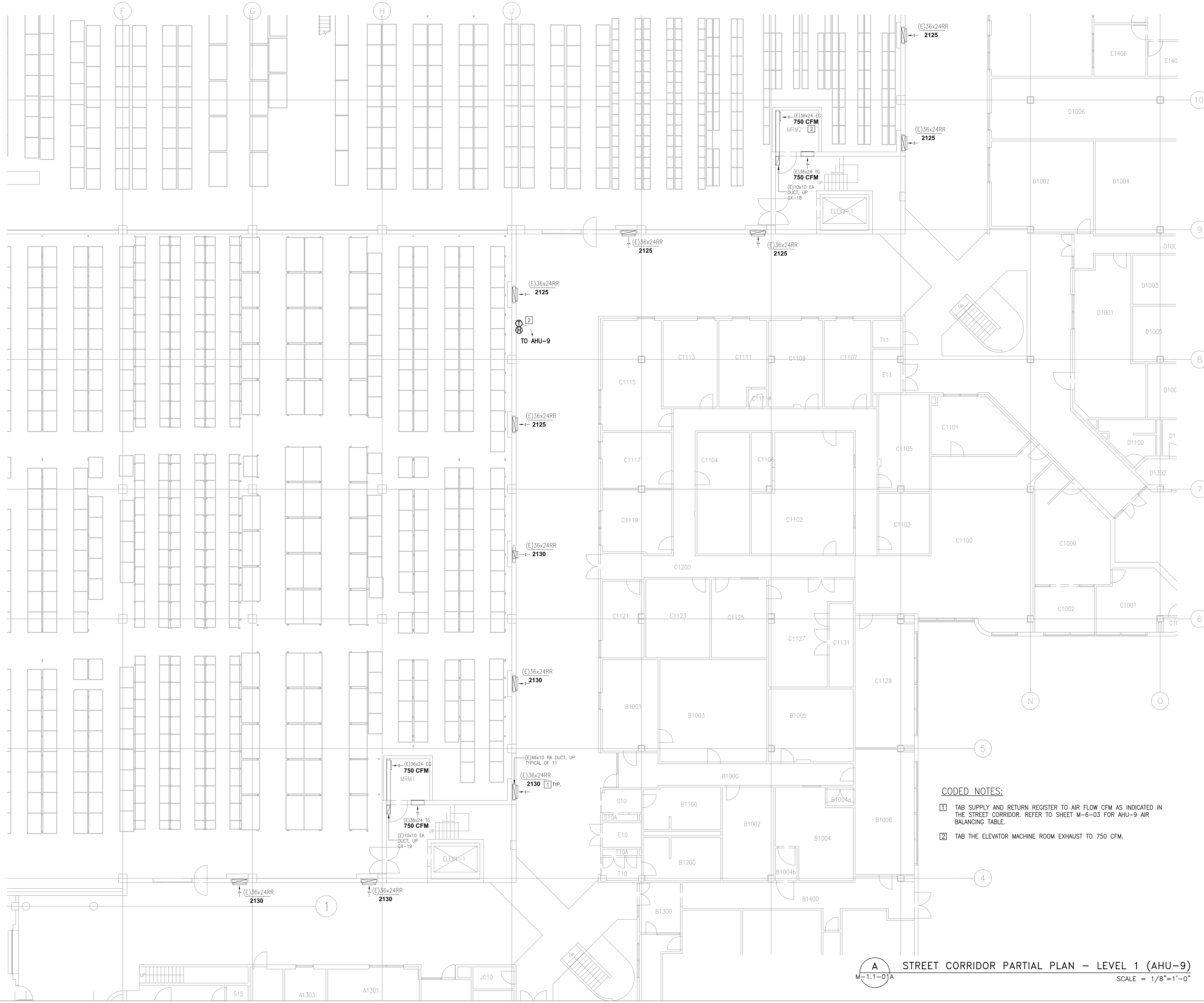
SI PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 LVL 1 - SENSOR LOCATION
DRAWING TYPE	MECHANICAL
DESIGNED BY / DRAWN BY / CHECKED BY	FDL / FDL / TM

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
17 OF 71	M	1.1	01



CODED NOTES:

1. TAB SUPPLY AND RETURN REGISTER TO AIR FLOW CFM AS INDICATED IN THE STREET CORRIDOR. REFER TO SHEET M-6-03 FOR AHU-9 AIR BALANCING TABLE.
2. TAB THE ELEVATOR MACHINE ROOM EXHAUST TO 750 CFM.

A
M-1.1-01A

STREET CORRIDOR PARTIAL PLAN – LEVEL 1 (AHU-9)

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

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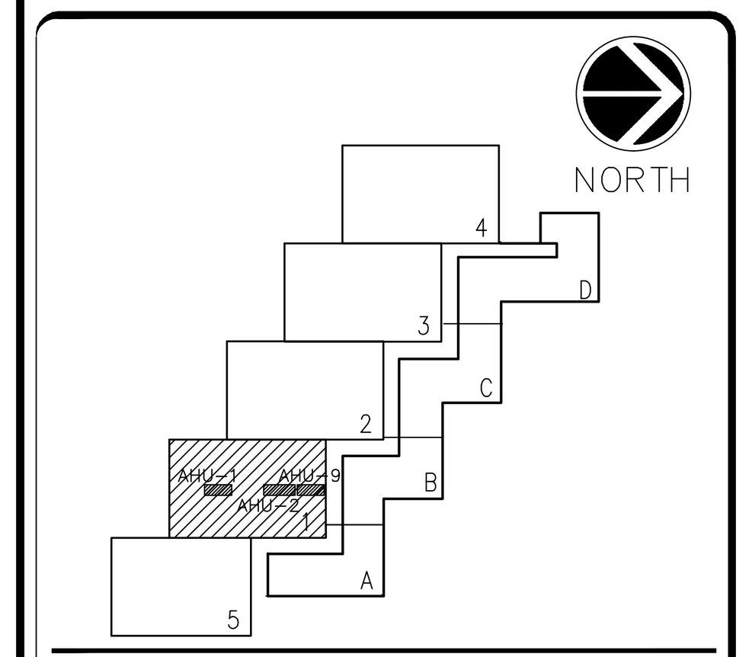

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
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PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	STREET CORRIDOR PARTIAL PLAN – LEVEL 1 (AHU-9)
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY), FDL (DRAWN BY), TM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
18 OF 71	M	1.1	01A

M-1.1-01A.DWG
SCALE : 1:1

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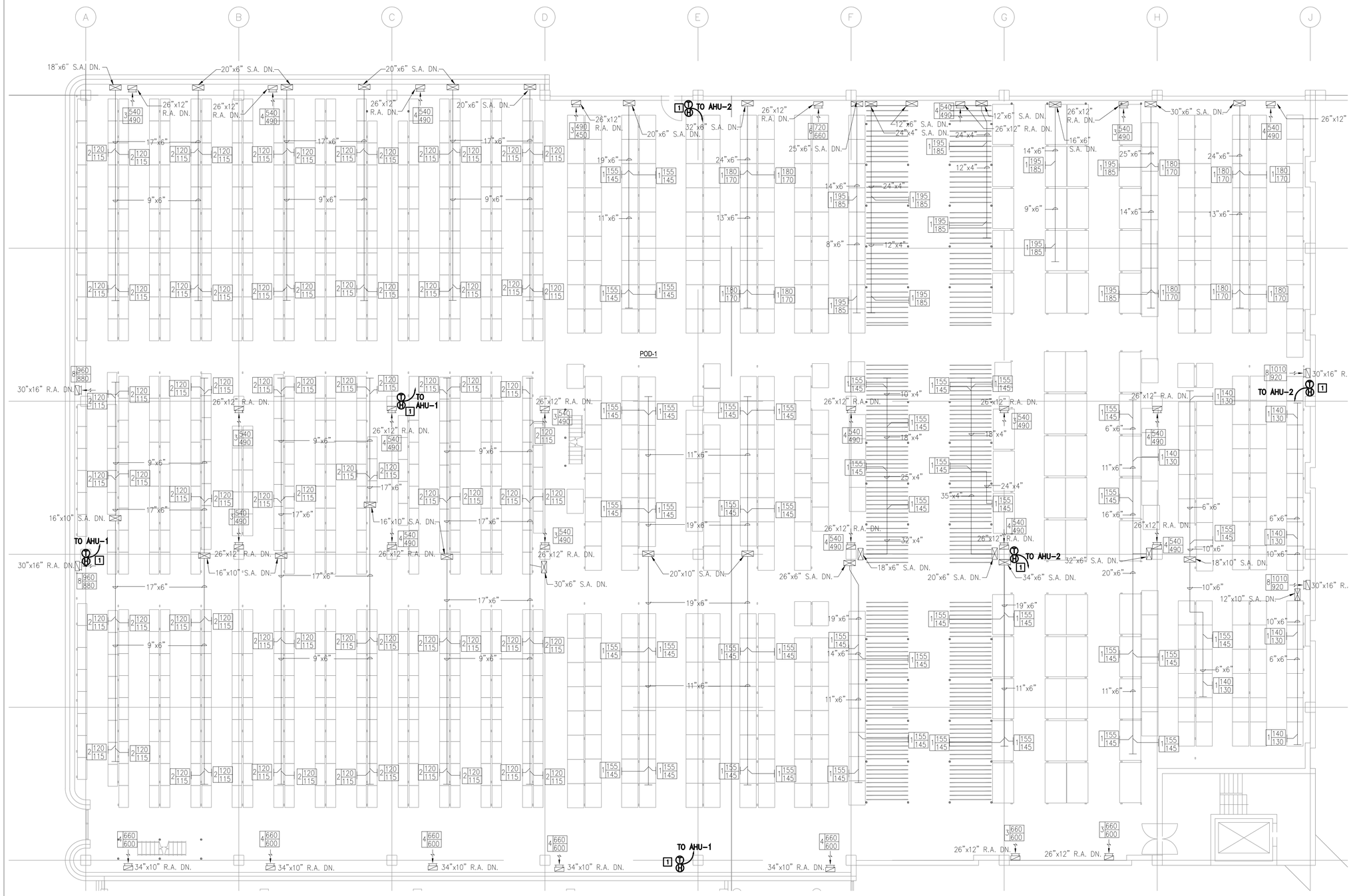

A M-1.1-02 MECHANICAL POD 1 LEVEL 2 – SENSOR LOCATIONS

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

GENERAL NOTES:

1. ALL EXISTING COMBINATION TEMPERATURE AND HUMIDITY SENSORS SHALL BE REMOVED AND REPLACED.
2. ALL NEW COMBINATION TEMPERATURE AND HUMIDITY SENSORS SHALL BE INSTALLED ON A 2 INCH THICK INSULATED BLOCK.
3. TEMPERATURE/HUMIDITY SENSOR REPLACEMENT NEED TO BE COORDINATED WITH COTR TO HAVE SECURITY AND COLLECTION PRESERVATION PERSONALS PRESENT. IF SENSOR ACCESS AND REPLACEMENT REQUIRE COLLECTION PROTECTION THE MATERIAL AND METHOD OF THE PROTECTION NEED BE APPROVED BY COTR.

CODED NOTES:

[1] REMOVE OLD COMBINATION TEMPERATURE AND HUMIDITY SENSORS AND REPLACE WITH NEW SENSORS.

[2] PROVIDE COMBINATION TEMPERATURE AND HUMIDITY SENSOR AT NEW LOCATIONS.

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STATE OF MARYLAND
KEVIN D. ALLEN HOWARD
No. 28411
PROFESSIONAL ENGINEER
02/02/2024

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NORTH

KEY PLAN

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
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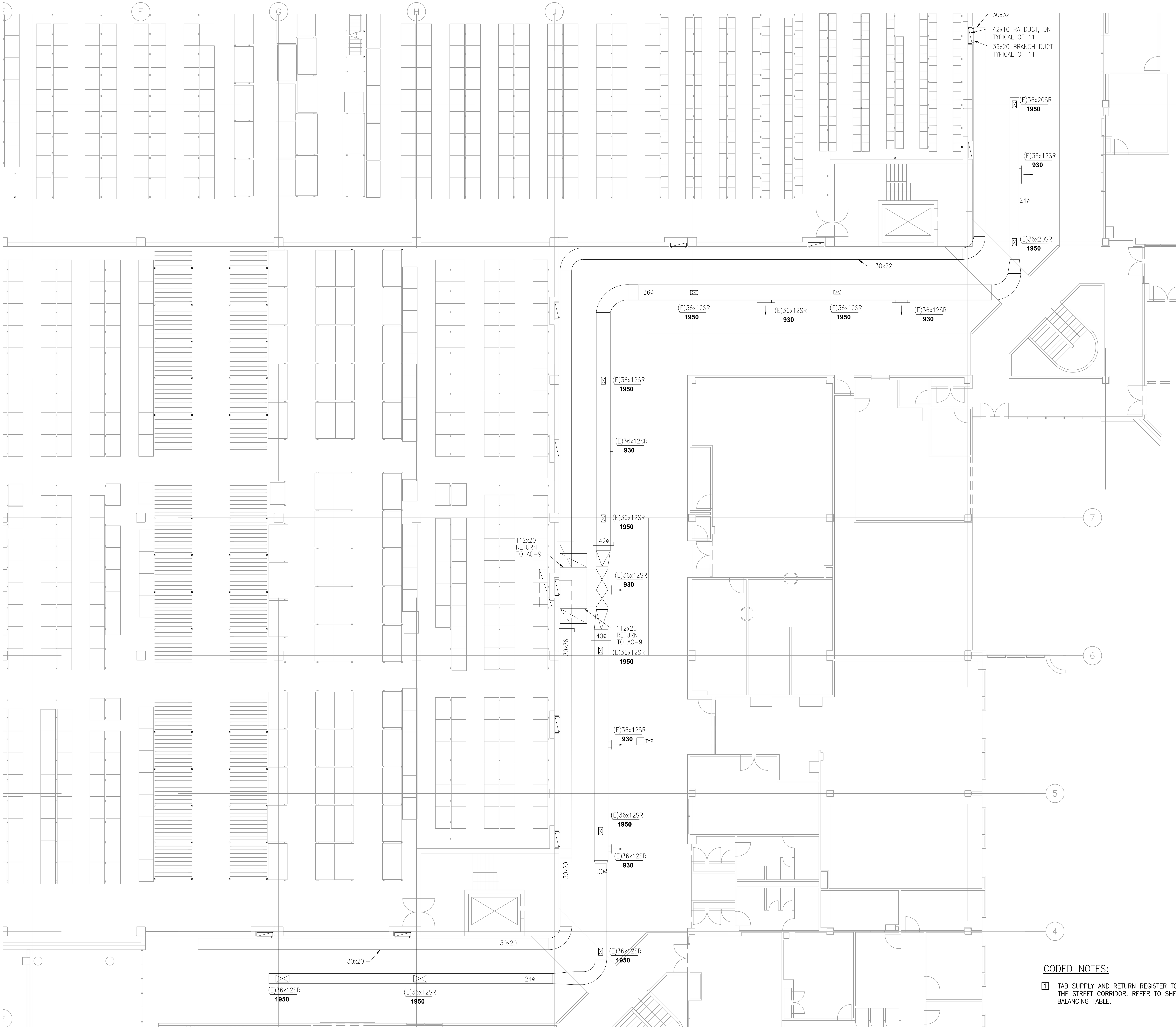
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 LVL 2 – SENSOR LOCATION
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL / KD / DP/TM (DESIGNED BY / DRAWN BY / CHECKED BY)

SHEET NO. 19 OF 71

M (DISCIPLINE) 1.1 (TYPE) 02 (SEQUENCE)



A
M-1.1-02A

STREET CORRIDOR PARTIAL PLAN – LEVEL 2 (AHU-9)

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

CODED NOTES:

1. TAB SUPPLY AND RETURN REGISTER TO AIR FLOW CFM AS INDICATED IN THE STREET CORRIDOR. REFER TO SHEET M-6-03 FOR AHU-9 AIR BALANCING TABLE.

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STATE OF MARYLAND — PROFESSIONAL ENGINEER — No. 28411 — 02/02/2024

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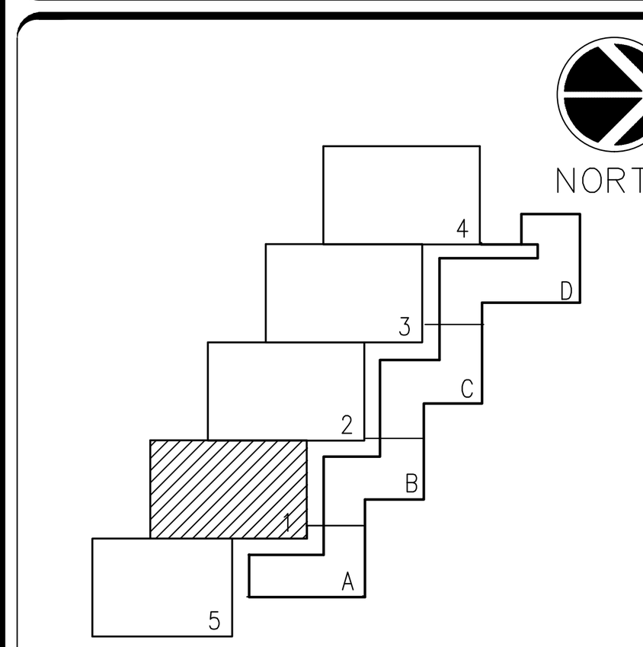

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	STREET CORRIDOR PARTIAL PLAN – LEVEL 2 (AHU-9)
DRAWING TYPE	MECHANICAL

DESIGNED BY	DRAWN BY	CHECKED BY
FDL	FDL	DP/TM

SHEET NO. 20 OF 71

DISCIPLINE	TYPE	SEQUENCE
M	1.1	02A

M-1.1-02A.DWG
SCALE : 1:1

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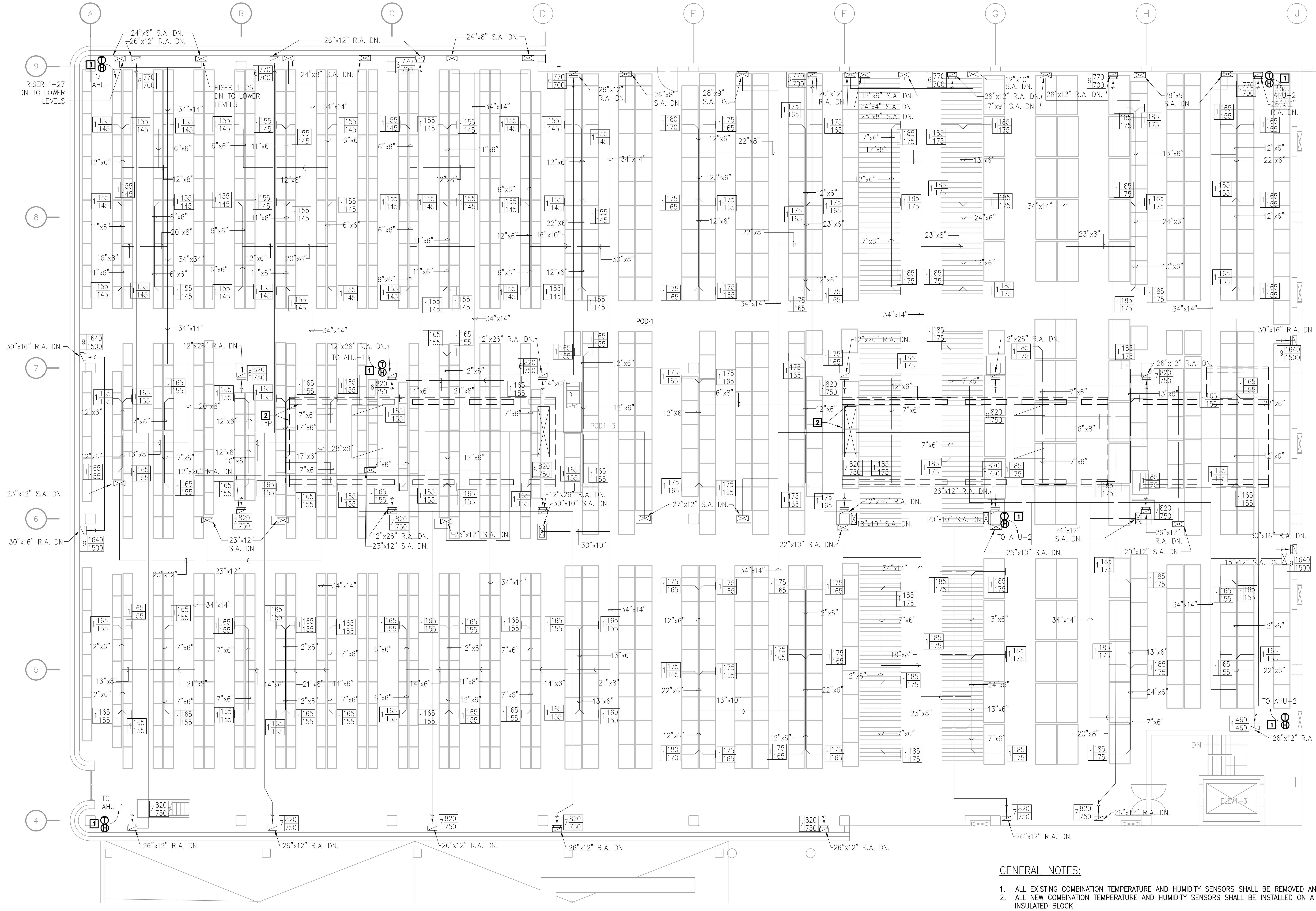

A
M-1.1-03

MECHANICAL POD 1 LEVEL 3 – SENSOR LOCATIONS

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

GENERAL NOTES:

1. ALL EXISTING COMBINATION TEMPERATURE AND HUMIDITY SENSORS SHALL BE REMOVED AND REPLACED.
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CODED NOTES:

[1] REMOVE OLD COMBINATION TEMPERATURE AND HUMIDITY SENSORS AND REPLACE WITH NEW SENSORS.

[2] OUTLINE OF STRUCTURAL KNEE WALL AND AHU ON ROOF. CONTRACTOR SHALL COORDINATE THE LOCATIONS OF TEMPORARY STRUCTURAL SHORING SYSTEMS REQUIRED TO CONSTRUCT THE NEW ROOF AHU KNEE WALLS. REFER TO STRUCTURAL DRAWINGS FOR NEW KNEE WALLS REQUIRE TEMPORARY ROOF SHORING. PROVIDE DELEGATED DESIGN FOR STRUCTURAL SHORING SYSTEM. PROVIDE TEMPORARY SHOWING SYSTEM LAYOUT DRAWINGS TO COTR SHOWING WHERE THE SYSTEMS WILL BE INSTALLED TO ALLOW SI TO RELOCATE ARTIFACTS AND SHELVES IMPACTED BY THE SHORING SYSTEMS. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SURE NOT TO DISTURB ANY OF THE ARTIFACTS STORED IN THE POD. THE SHORING SYSTEM SHALL BE DESIGNED TO ALLOW ALL EXISTING DUCTWORK OPERATION DURING THE AHU REPLACEMENT WORK.

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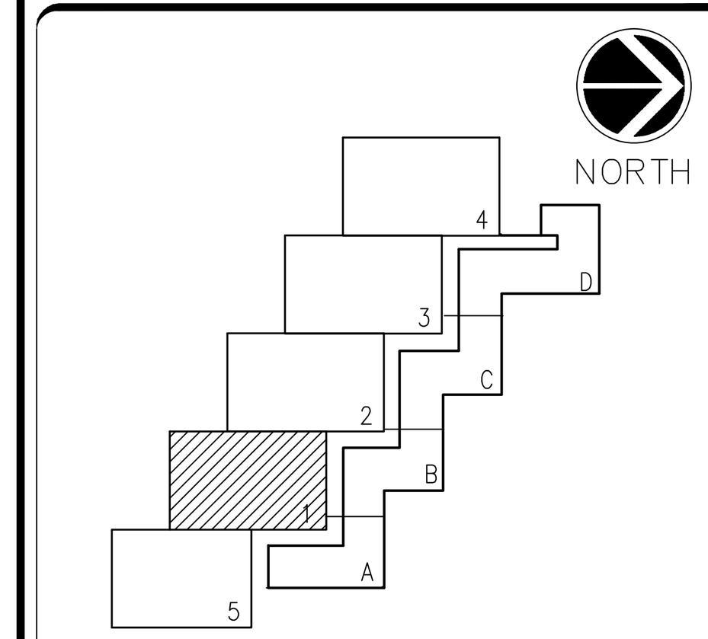

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	02/02/24
SUBMISSION	BID SET
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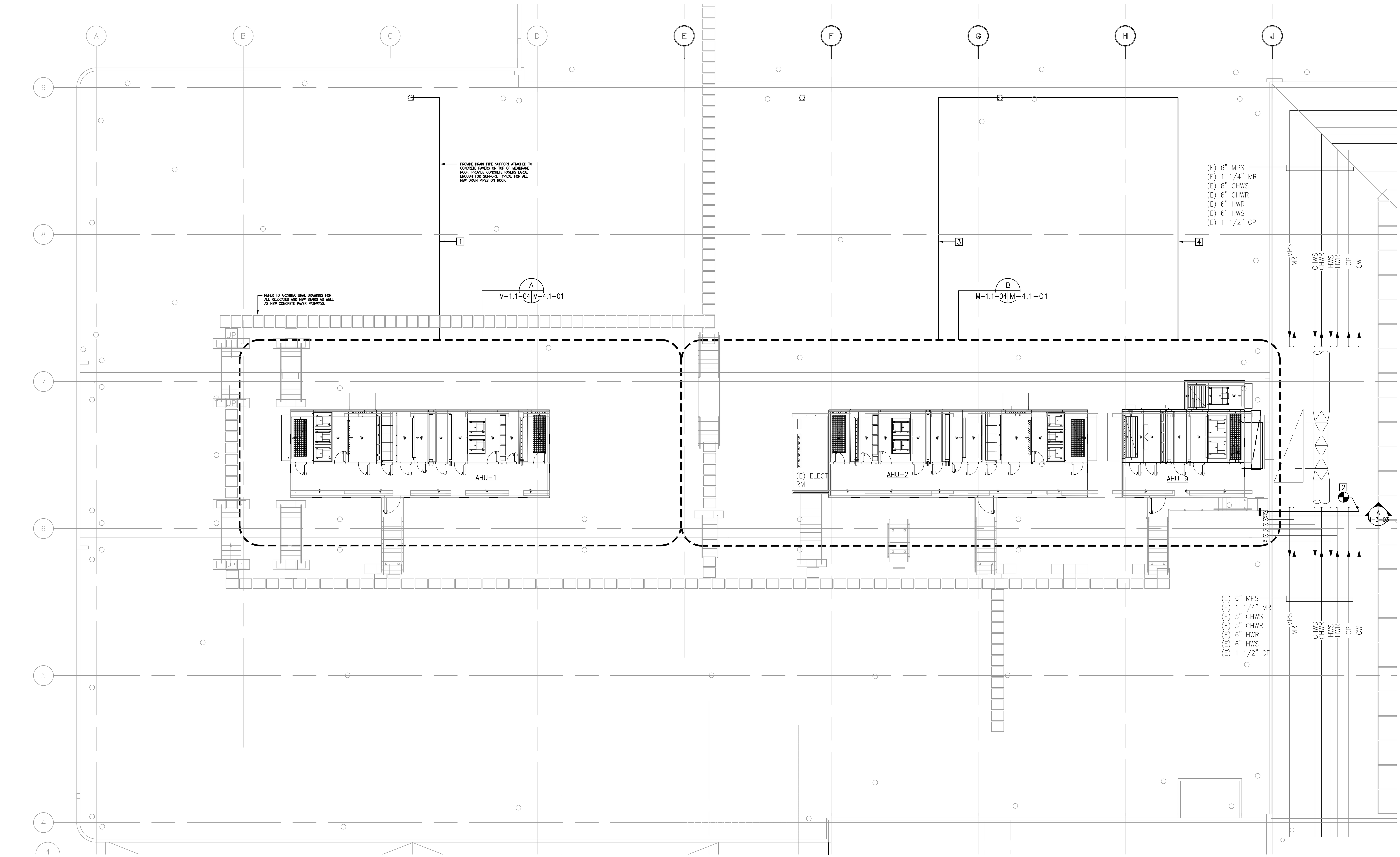
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 LVL 3 – SENSOR LOCATION
DRAWING TYPE	MECHANICAL
WORKING STAFF	DESIGNED BY: FDL; DRAWN BY: KD; CHECKED BY: TM



A MECHANICAL POD 1 ROOF LEVEL

M-1.1-04

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

GENERAL NOTES:

1. FOR DETAILED POD-1 PHASING SEQUENCE PLAN REFER TO DRAWINGS MP-1.1-01, 02, 03, 04 AND 05.
2. ALL DEMOLITION AND NEW WORK SHALL BE PERFORMED DURING WINTER AND MILD WEATHER, BETWEEN OCTOBER AND APRIL.
3. DEMOLITION AND INSTALLATION OF AHU SHALL BE PERFORMED DURING NIGHT TIME ON WEEKDAYS. WORK INSIDE NEW UNIT CAN BE PERFORMED DURING DAYTIME ON WEEKDAYS. CONTRACTOR HAS AN OPTION TO WORK ON WEEKENDS AT HIS DISCRETION AFTER COORDINATION WITH COTR. THE POD SHALL NOT BE WITHOUT CONDITIONED AIR SUPPLY FROM AHUs FOR MORE THAN FOUR HOURS. COORDINATE WITH COTR FOR MAXIMUM ALLOWED LENGTH OF TIME.
4. CONTRACTOR SHALL PROVIDE TEMPORARY HARD DUCT CONNECTION WITH VOLUME DAMPERS BETWEEN AHU SUPPLY PLENUMS AND EXISTING TO REMAIN SUPPLY DUCTS. TEMPORARY AIR SUPPLY SHALL BE BALANCED TO PROVIDE 50% AIR SUPPLY TO BOTH SIDES OF THE POD FROM ONE AIR-HANDLING UNIT OPERATIONAL WHILE THE OTHER AIR-HANDLING UNIT BEING REPLACED. CONTRACTOR SHALL BE RESPONSIBLE TO ESTABLISH AIRFLOW PRIOR TO DEMOLISH EXISTING UNIT.
5. NEW AIR HANDLING UNIT SHALL BE COMMISSIONED PRIOR TO SECOND AIR-HANDLING UNIT SERVING THE SAME POD IS DEMOLISHED.
6. EXISTING ELECTRICAL CONDUITS SHALL BE PROVIDED WITH NEW SUPPORT SYSTEM AND ACCESSORIES AS A RESULT OF DEMOLITION OF EXISTING PIPE SUPPORT THAT ARE CURRENTLY USED ALSO BY EXISTING ELECTRICAL CONDUIT.
7. SUPPORT ALL PIPES MAXIMUM EVERY TEN FEET. PROVIDE SHEET METAL PROTECTION OVER PIPE WHEREVER PIPE CROSSES WALKWAY PAVERS.

CODED NOTES: (REFER TO ENLARGED PLAN FOR CONTINUATION OF NEW WORK CODED NOTES.)

PHASE 1A (AHU-1):

[1] PROVIDE NEW 2" COMBINE DRAIN PIPE FOR A/C CONDENSATE AND HUMIDIFIER DRAIN (TYPE L, COPPER, INSULATED) TO ROOF DRAIN. PROVIDE ALUMINUM JACKET. PROVIDE 5 W/LF HEAT TRACE FOR PIPE. SLOPE DRAIN PIPE TO ROOF DRAIN WITH MINIMUM 1/8 INCH PER FOOT.

[2] PROVIDE NEW 1" DOMESTIC COLD WATER USING HOT TAPPING TO CONNECT TO EXISTING CW LINE IN THE STREET CORRIDOR. COORDINATE WITH COTR IN 2 WEEKS ADVANCE AND SHOULD BE DONE DURING OFF HOURS ONLY. REINSULATE DISTURBED EXISTING WITH THE SAME INSULATION.

PHASE 1B (AHU-2):

[3] PROVIDE NEW 2" COMBINE DRAIN PIPE FOR A/C CONDENSATE AND HUMIDIFIER DRAIN (TYPE L, COPPER, INSULATED) TO ROOF DRAIN. PROVIDE ALUMINUM JACKET. PROVIDE 5 W/LF HEAT TRACE FOR PIPE. SLOPE DRAIN PIPE TO ROOF DRAIN WITH MINIMUM 1/8 INCH PER FOOT.

PHASE 1C (AHU-9):

[4] PROVIDE NEW 2" CONDENSATE PIPE (TYPE L, COPPER, INSULATED) TO ROOF DRAIN. PROVIDE ALUMINUM JACKET. PROVIDE 5 W/LF HEAT TRACE FOR PIPE. SLOPE DRAIN PIPE TO ROOF DRAIN WITH MINIMUM 1/8 INCH PER FOOT.

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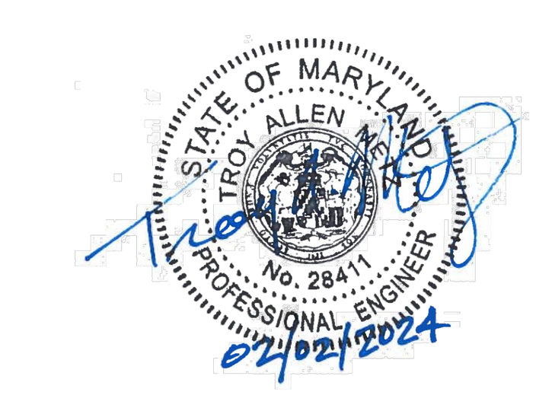

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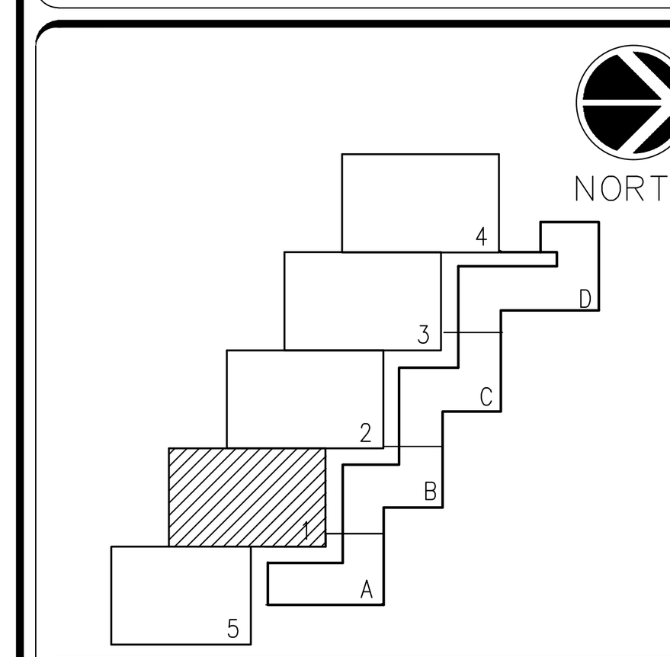

KEY PLAN

0 4 8 16

1/8" = 1'-0"

GRAPHIC SCALE(S)

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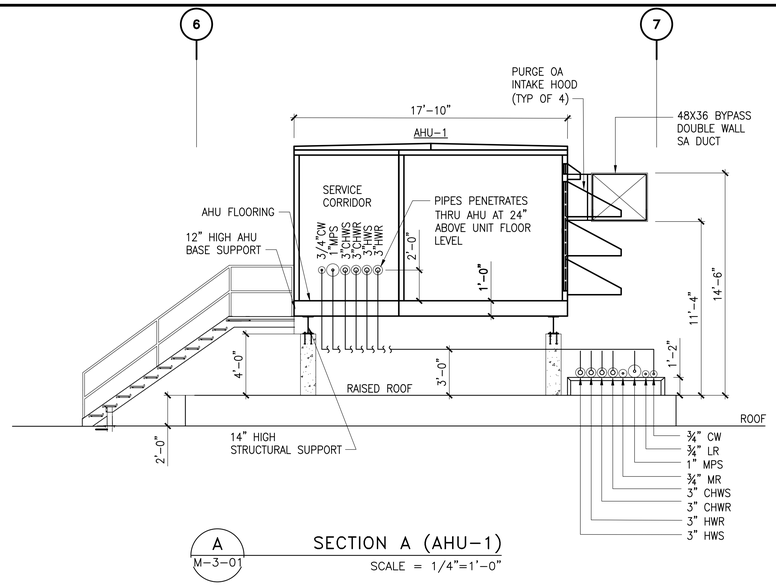
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 ROOF LEVEL
DRAWING TYPE	MECHANICAL

DESIGNED BY	DRAWN BY	CHECKED BY
FDL	FDL	DP

SHEET NO. 22 OF 71

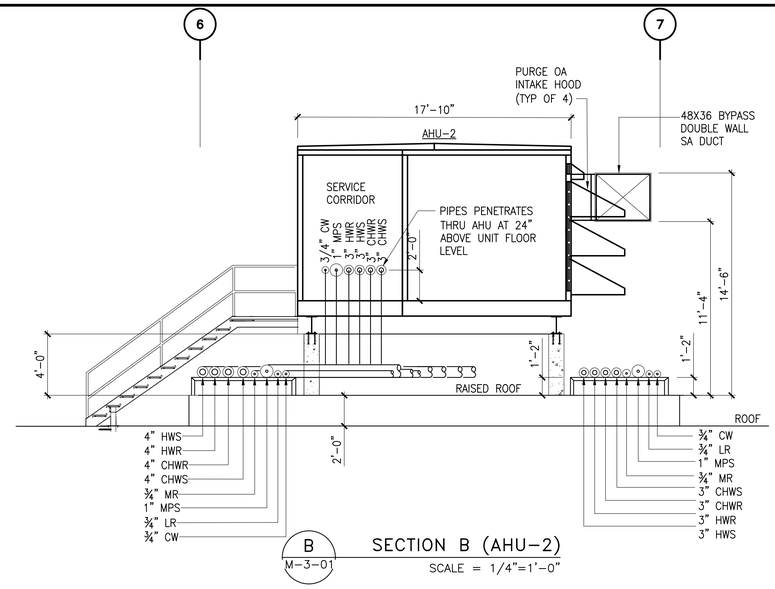
DISCIPLINE	TYPE	SEQUENCE
M	1.1	04

M-1.1-04.DWG



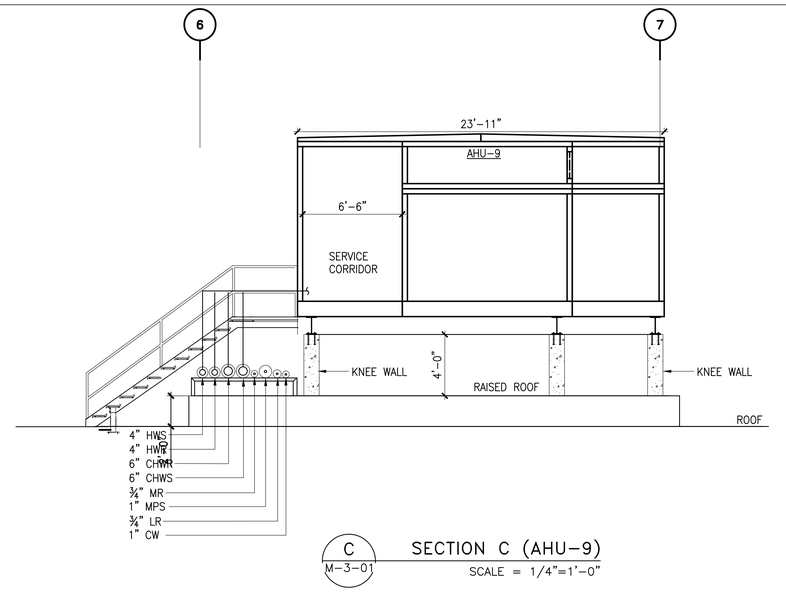
A M-3-01 SECTION A (AHU-1)

SCALE = 1/4"=1'-0"



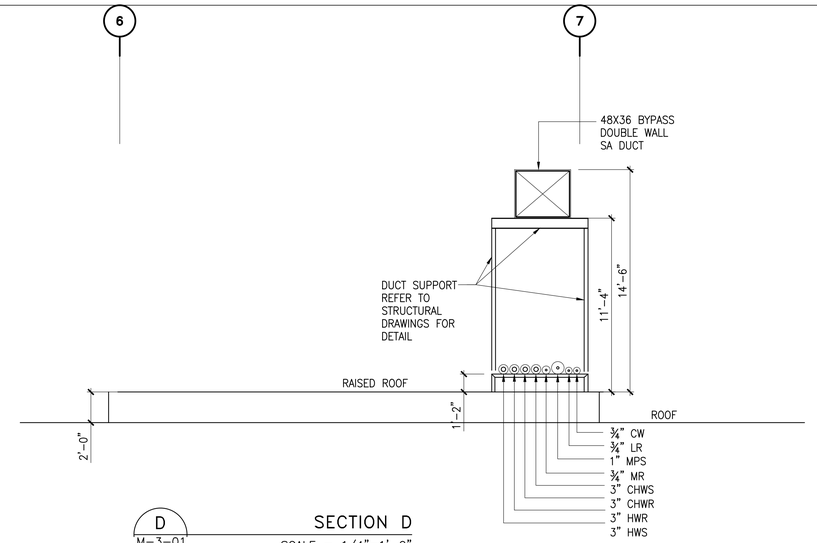
B M-3-01 SECTION B (AHU-2)

SCALE = 1/4"=1'-0"



C M-3-01 SECTION C (AHU-9)

SCALE = 1/4"=1'-0"



D M-3-01 SECTION D

SCALE = 1/4"=1'-0"

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STATE OF MARYLAND
TIMOTHY LEE LLEWELLYN
No. 28411
PROFESSIONAL ENGINEER
2/1/2024

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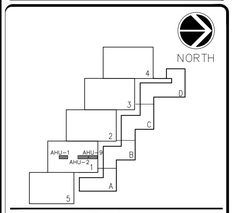

KEY PLAN

0 2 4 8

1/4" = 1'-0"

GRAPHIC SCALE(S)

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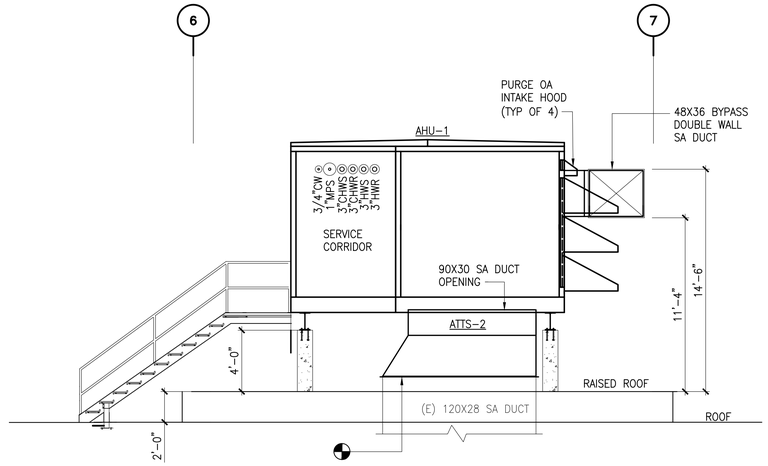
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL SECTIONS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	23 OF 71
	M (DISCIPLINE) / 3 (TYPE) / 01 (SEQUENCE)

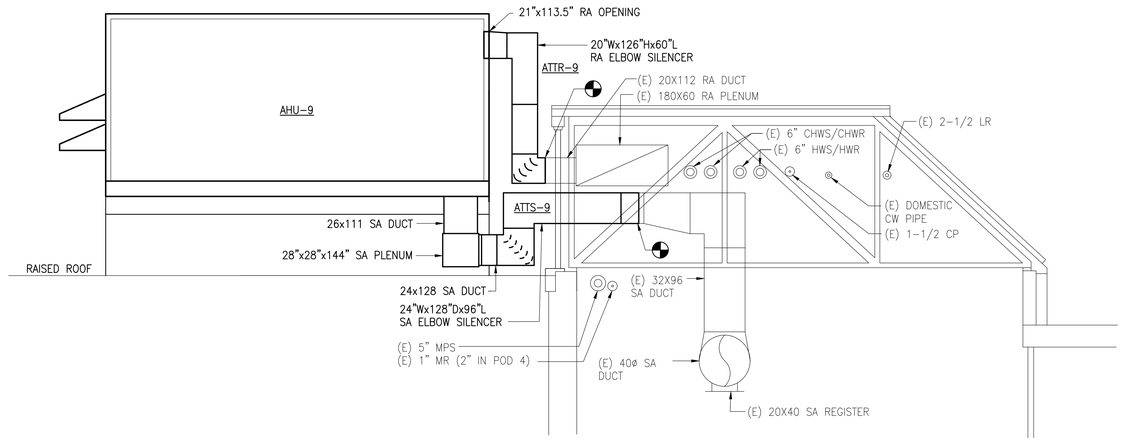
A-3-01 (MC)



A
M-3-02

SECTION A (AHU-1)

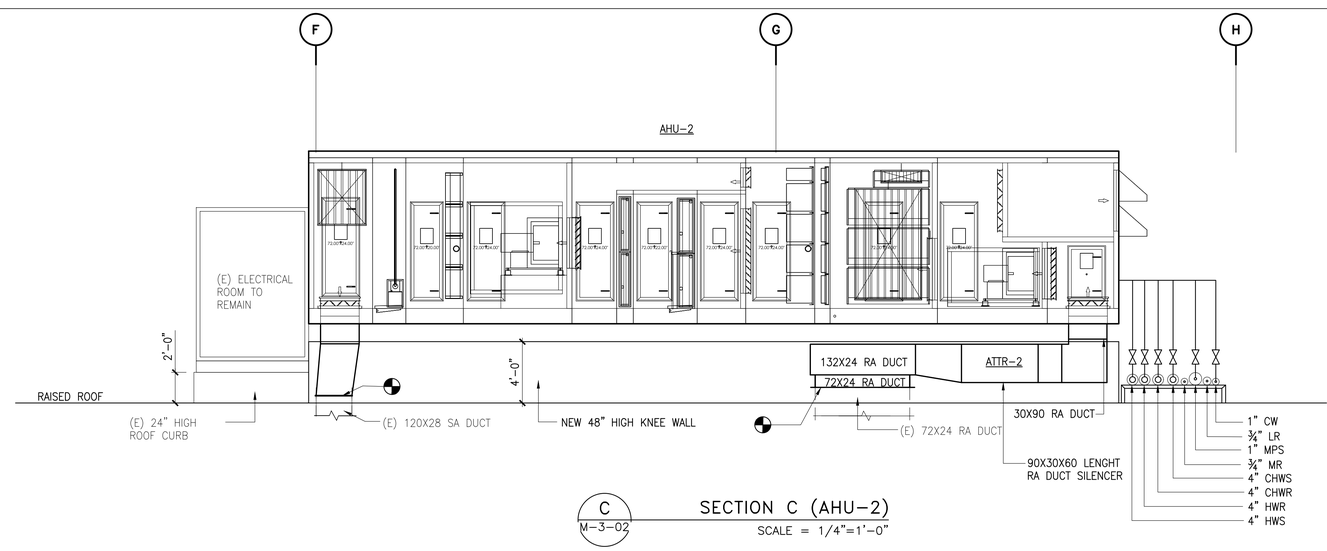
SCALE = 1/4"=1'-0"



B
M-3-02

SECTION B (AHU-9)

SCALE = 1/4"=1'-0"



C
M-3-02

SECTION C (AHU-2)

SCALE = 1/4"=1'-0"

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STATE OF MARYLAND
TROY D. LLEN
No. 28411
PROFESSIONAL ENGINEER
6/21/2024

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NORTH

KEY PLAN

0 2 4 8
1/4" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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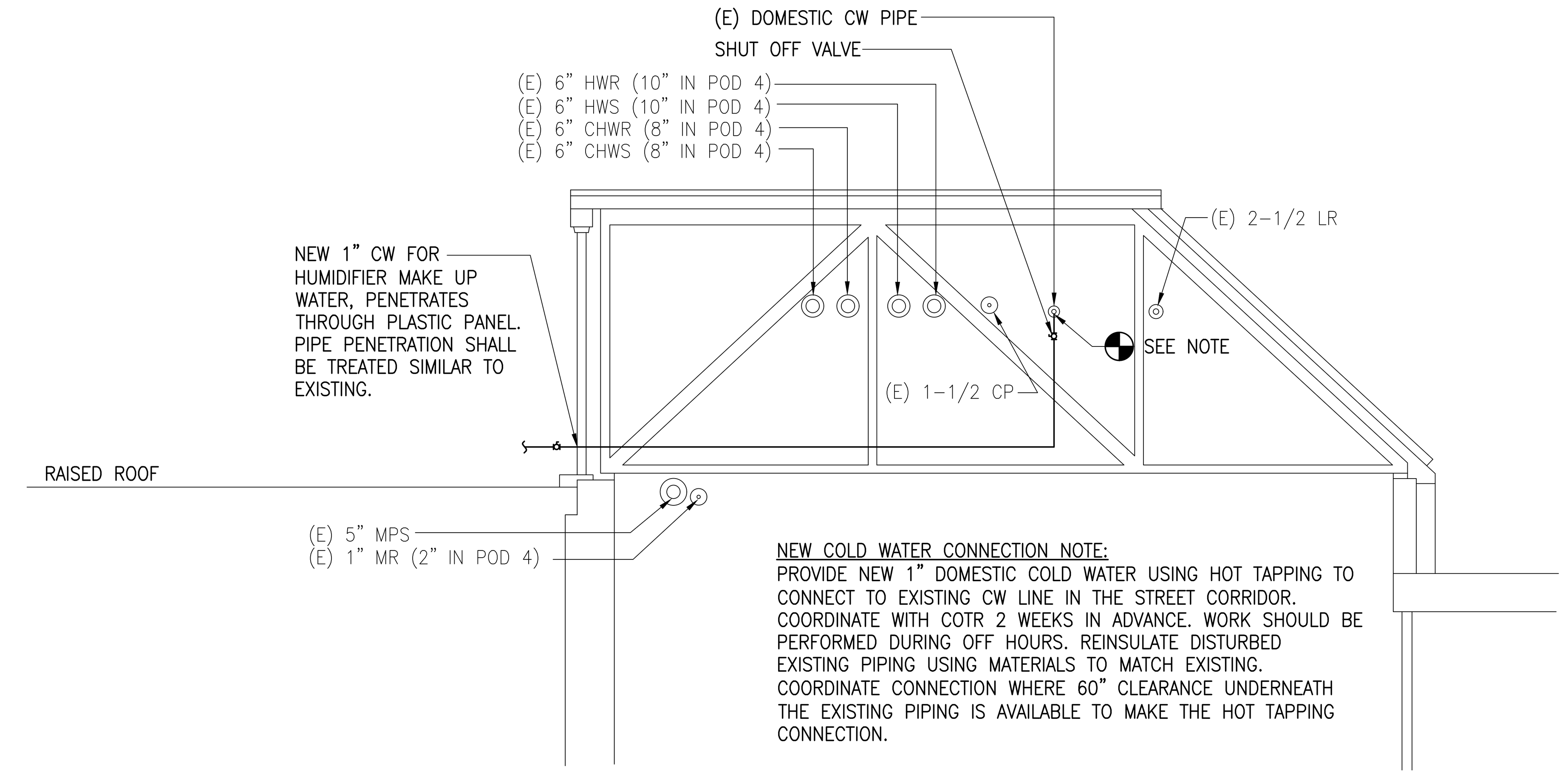
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL SECTIONS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL DESIGNED BY / FDL DRAWN BY / DP CHECKED BY
SHEET NO.	24 OF 71
	M DISCIPLINE / 3 TYPE / 02 SEQUENCE

A-3-02.DWG



NEW COLD WATER CONNECTION NOTE:
PROVIDE NEW 1" DOMESTIC COLD WATER USING HOT TAPPING TO CONNECT TO EXISTING CW LINE IN THE STREET CORRIDOR. COORDINATE WITH COTR 2 WEEKS IN ADVANCE. WORK SHOULD BE PERFORMED DURING OFF HOURS. REINSULATE DISTURBED EXISTING PIPING USING MATERIALS TO MATCH EXISTING. COORDINATE CONNECTION WHERE 60" CLEARANCE UNDERNEATH THE EXISTING PIPING IS AVAILABLE TO MAKE THE HOT TAPPING CONNECTION.

A
M-3-03
TYPICAL SECTION: DOMESTIC COLD WATER CONNECTION TO EXISTING
SCALE = 1/4"=1'-0"

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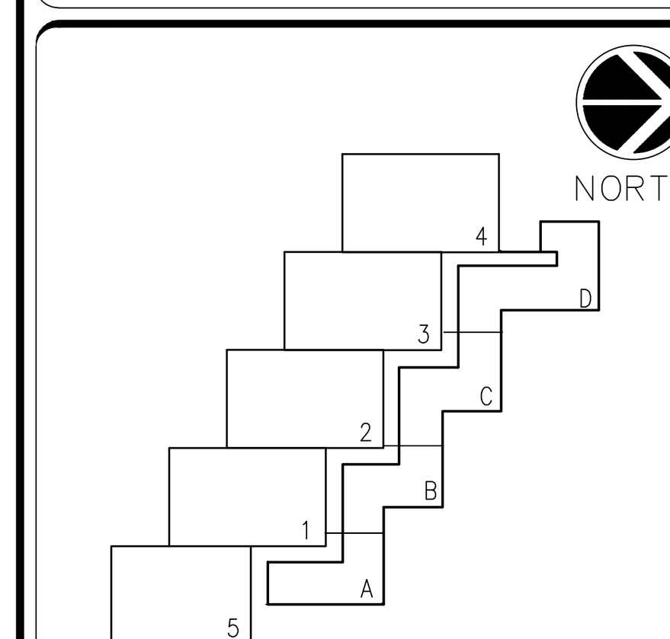

KEY PLAN

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1/4" = 1'-0"
GRAPHIC SCALE(S)

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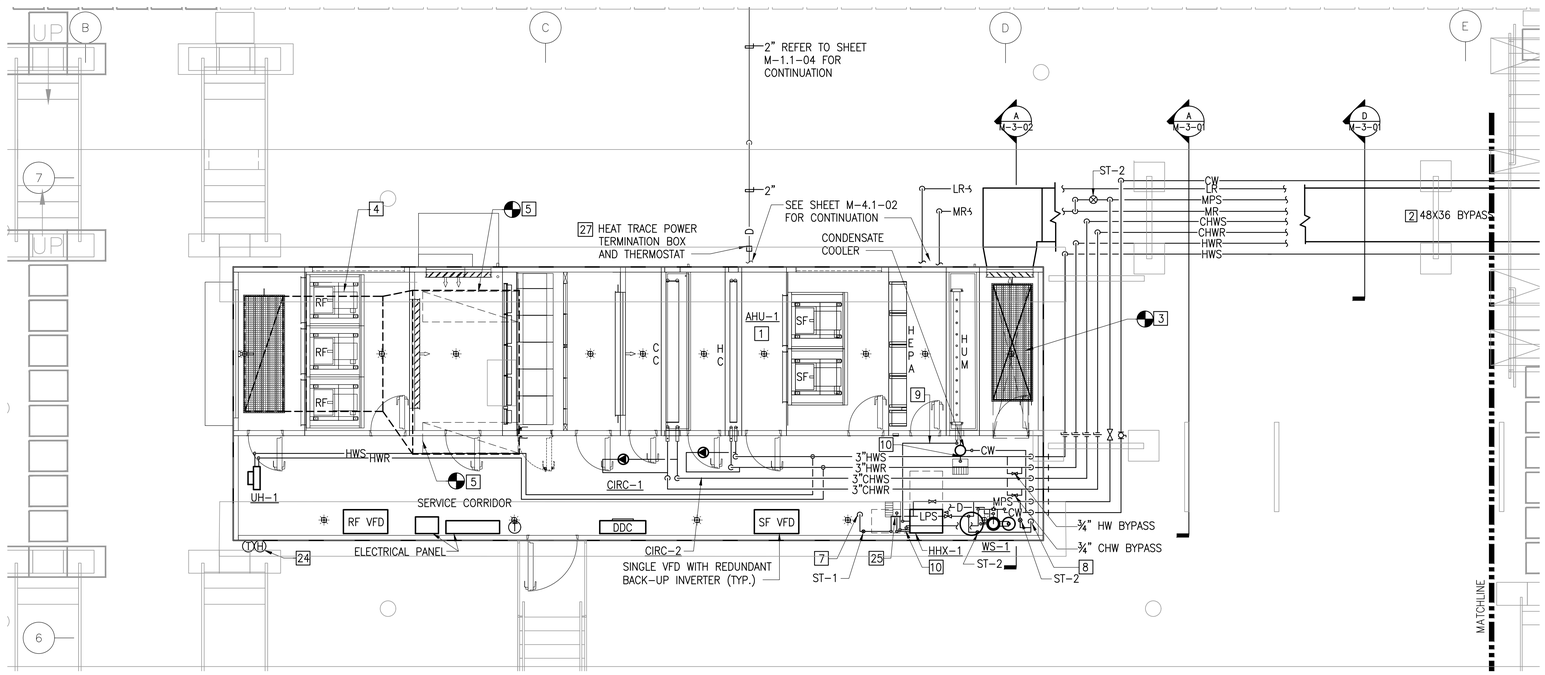
SHEET NO. 25 OF 71	M (DISCIPLINE) / 3 (TYPE) / 03 (SEQUENCE)



A M-4.1-01 POD 1 PARTIAL ROOF LEVEL (AHU-1) – ENLARGED

SCALE = 1/4"=1'-0"

GENERAL NOTES:

1. FOR POD 1 PHASING NOTES: REFER TO DRAWINGS MP-1.1-01, 02, 03, 04 AND 05

CODED NOTES:

PHASE 1A (AHU-1):

1. PROVIDE NEW CUSTOM BUILT AIR HANDLING UNIT AHU-1 INCLUDING STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, VFDs, ASSOCIATED CONTROLS, REQUIRED PIPING, SHUT OFF VALVES, ACCESSORIES, AND ELECTRICAL POWER REQUIREMENT. INSTALL UNIT ON CONCRETE KNEE WALL 48 INCHES HIGH FROM RAISED ROOF LEVEL.
2. DOUBLE WALL BYPASS SA DUCT.
3. CONNECT NEW 90X30 SUPPLY DUCT TO EXISTING 120X28 SA DUCT UNDERNEATH THE UNIT.
4. PROVIDE RETURN AIR PLENUM UNDERNEATH THE UNIT.
5. CONNECT EXISTING 72X24 RETURN DUCT TO RETURN AIR PLENUM.
6. PROVIDE NEW PIPING TO POINT INDICATED. FLUSH AND CLEAN ALL NEW PIPING THEN OPEN VALVES FOR OPERATION. INSTALL CONSTRUCTION STRAINERS IN ALL NEW PIPING. AFTER ONE WEEK OF OPERATION INSTALL FINAL STRAINERS. PROVIDE HEAT TRANCE ON ALL CHWS, CHWR, CW AND D PIPES.
7. ¾" LR, DN
8. ¾" MR, DN
9. 1 ¾" ATMOSPHERIC STAINLESS STEEL CLEAN STEAM PIPE
10. 1" HUMIDIFIER BLENDED CONDENSATE DRAIN (TYPE L, COPPER), DN TO FLOOR SINK.

PHASE 1B (AHU-2):

11. PROVIDE NEW CUSTOM BUILT AIR HANDLING UNIT AHU-2 INCLUDING STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, VFDs, ASSOCIATED CONTROLS, REQUIRED PIPING, SHUT OFF VALVES, ACCESSORIES, AND ELECTRICAL POWER REQUIREMENT. INSTALL UNIT ON CONCRETE KNEE WALL 48 INCHES HIGH FROM RAISED ROOF LEVEL.
12. CONNECT NEW 90X30 SUPPLY DUCT TO EXISTING 120X28 SA DUCT UNDERNEATH THE UNIT.
13. PROVIDE RA PLENUM UNDERNEATH THE UNIT
14. CONNECT EXISTING 72X24 RETURN DUCT TO RETURN AIR PLENUM
15. CONNECT UNIT PIPING TO PIPING INSTALLED IN PHASE 1A. FLUSH AND CLEAN NEW PIPING THEN OPEN THE VALVES FOR OPERATION. INSTALL CONSTRUCTION STRAINERS IN ALL NEW PIPING. AFTER ONE WEEK OF OPERATION INSTALL FINAL STRAINERS.
16. ¾" LR, DN
17. ¾" MR, DN
18. 1¾" ATMOSPHERIC STAINLESS STEEL CLEAN STEAM PIPE
19. 1" HUMIDIFIER BLENDED CONDENSATE DRAIN (TYPE L, COPPER), DN TO FLOOR DRAIN.

PHASE 1C (AHU-9):

20. PROVIDE NEW CUSTOM BUILT AIR HANDLING UNIT AHU-9 INCLUDING VFDs, ASSOCIATED CONTROLS, THE REQUIRED PIPING, SHUT OFF VALVES, ACCESSORIES, AND ELECTRICAL POWER REQUIREMENTS. INSTALL UNIT ON CONCRETE KNEE WALL 48 INCHES HIGH FROM RAISED ROOF LEVEL.

24 OUTDOOR AIR BAS TEMPERATURE/HUMIDITY SENSORS SHALL BE INSTALLED TO PROTECT THEM FROM DIRECT SUNLIGHT.

25 12" SQUARE HALF GRATE FLOOR SINK. COORDINATE ALL FLOOR DRAIN LOCATIONS. PROVIDE P-TRAP WITH ALL FLOOR DRAINS. HEAT TRACE AND INSULATE FLOOR DRAIN BODY. DO NOT RUN DRAIN PIPE TO FLOOR SINK CROSSING WALKWAY PATH OR PROVIDE STEP OVER PLATFORM OVER PIPE.

26 COORDINATE PIPE RUN AND ROUTE PIPES BELOW STAIRS.

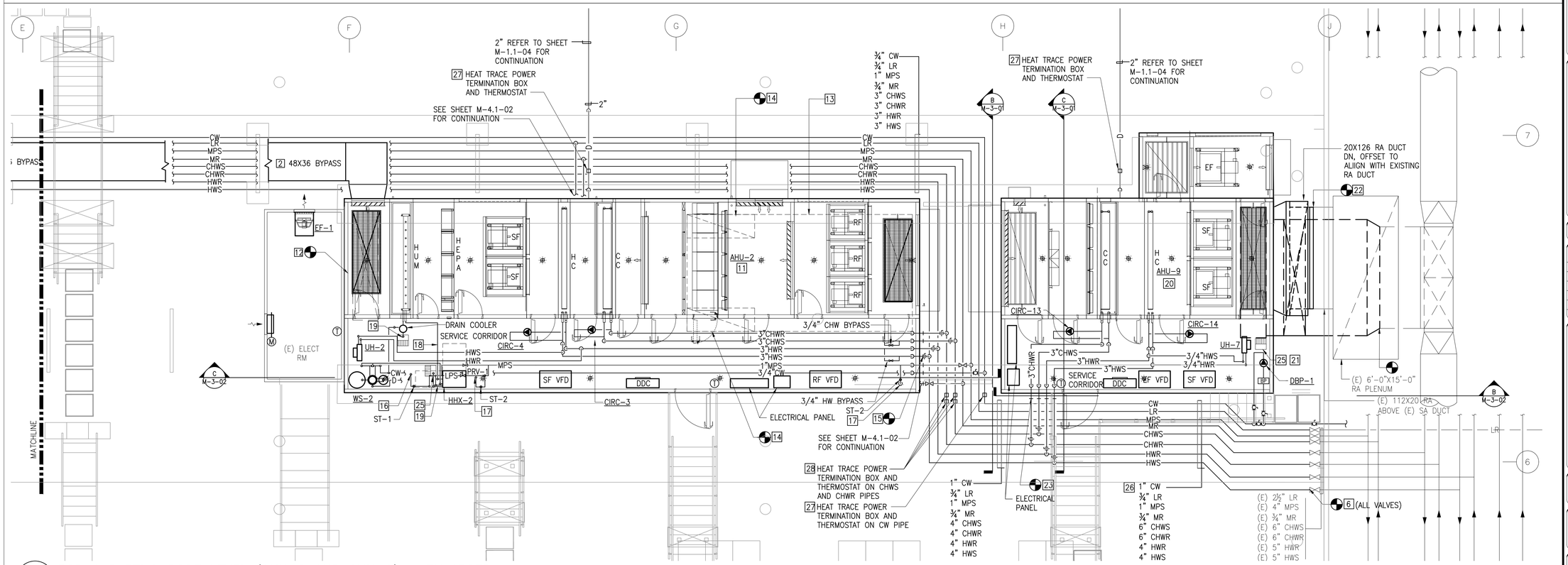
27 HEAT TRACE CAPACITY: 3 W/LF, 120V/1PH/60HZ, 20 AMPS.

28 HEAT TRACE CAPACITY EACH OF FOUR LOOPS: 5 W/LF, 120V/1PH/60HZ, 20 AMPS. PROVIDE PLATFORM OVER PIPES TO ACCESS ALL CONTROLS INCLUDING CW PIPE.

21 CONNECT NEW SUPPLY DUCT TO EXISTING 112X24 SA DUCT, BELOW RA DUCT, TO STREET CORRIDOR. CONTRACTOR SHALL VERIFY AND MAKE SURE THE EXISTING DUCT PENETRATION TO WALL IS WATER TIGHT.

22 CONNECT NEW RETURN DUCT TO EXISTING 112X20 RA DUCT TO STREET CORRIDOR. CONTRACTOR SHALL VERIFY AND MAKE SURE THE EXISTING DUCT PENETRATION TO WALL IS WATER TIGHT.

23 PROVIDE NEW PIPING, CONNECT TO PIPING INSTALLED IN PHASE 1A. FLUSH AND CLEAN ALL NEW PIPING, THEN OPEN VALVES FOR OPERATION. INSTALL CONSTRUCTION STRAINERS IN NEW PIPING. AFTER ONE WEEK OF OPERATION INSTALL FINAL STRAINERS.



B M-4.1-01 POD 1 PARTIAL ROOF LEVEL (AHU-2 AND AHU-9) – ENLARGED

SCALE = 1/4"=1'-0"

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STATE OF MARYLAND
ALLEN
No. 28411
PROFESSIONAL ENGINEER
1/13/2024

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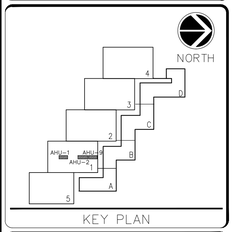

KEY PLAN

0 2 4 8
1/4" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
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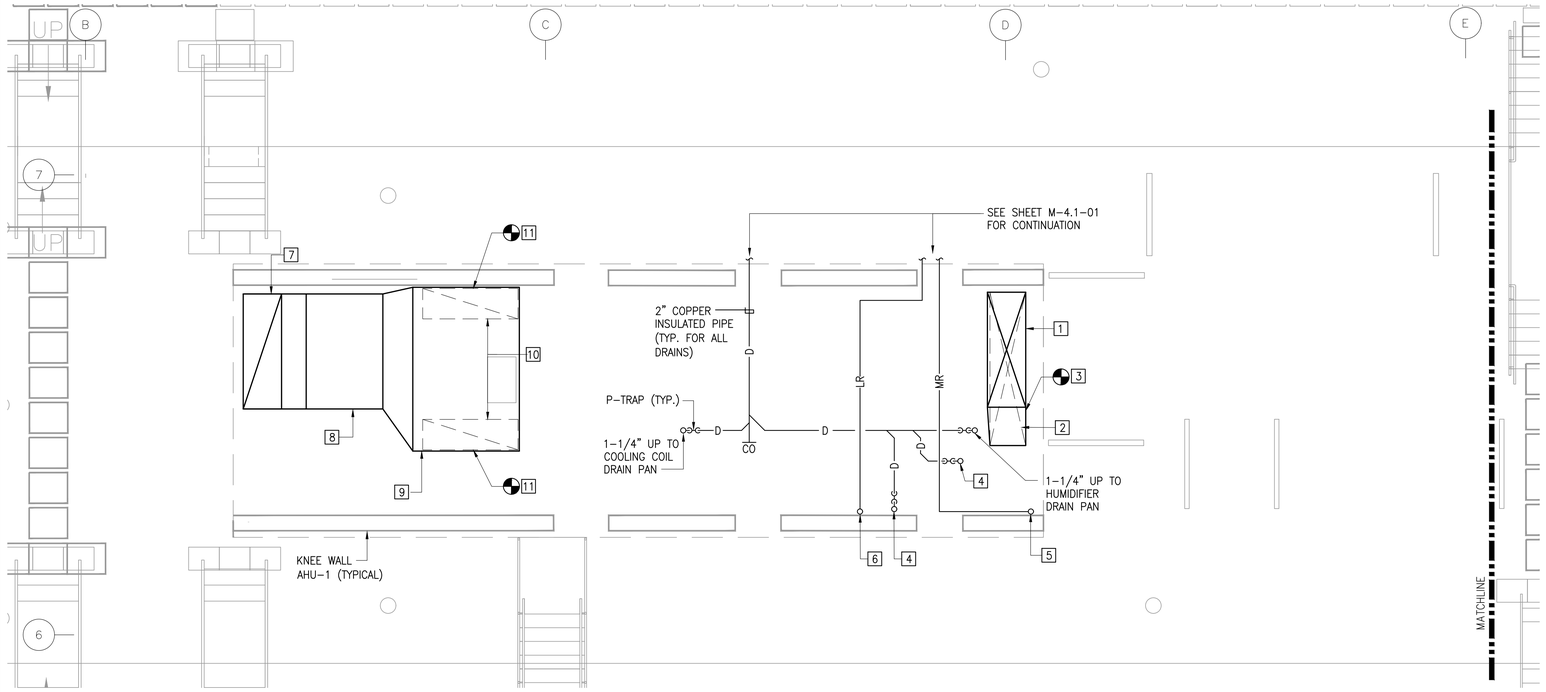
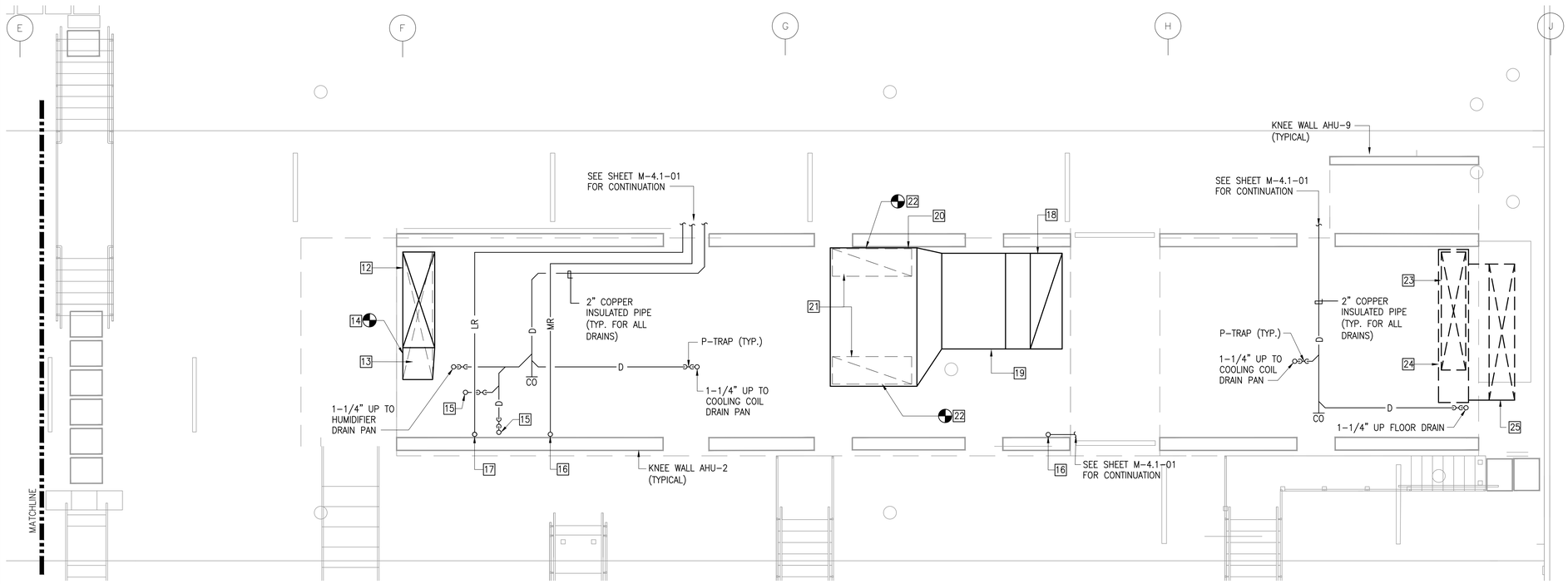
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 ROOF LEVEL – ENLARGED
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL / FDL / DP (DESIGNED BY / DRAWN BY / CHECKED BY)
SHEET NO.	26 OF 71
	M / 4.1 / 01 (DISCIPLINE / TYPE / SEQUENCE)

M-4.1-01.DWG



A M-4.1-02 POD 1 PARTIAL ROOF LEVEL BENEATH AHU-1 – ENLARGED

SCALE = 1/4"=1'-0"



B M-4.1-02 POD 1 PARTIAL ROOF LEVEL BENEATH AHU-2 AND AHU-9 – ENLARGED

SCALE = 1/4"=1'-0"

GENERAL NOTES:

1. FOR POD 1 PHASING NOTES: REFER TO DRAWINGS MP-1.1-01, 02, 03, 04 AND 05

CODED NOTES:

PHASE 1A (AHU-1):

1 90X30X72 LENGTH SA DUCT SILENCER, #10 GAGE CASING

2 (E) 120X28 SA DUCT DOWN TO POD 1.

3 DUCT SILENCER TRANSITION TO CONNECT THE 90X30 SA DUCT TO (E) 120X28 SA DUCT.

4 2" FROM FLOOR SINK DRAIN WITH P-TRAP FOR HUMIDIFIER, DISPENSER AND WATER SOFTENER.

5 ¾" MR, UP

6 ¾" LR, UP

7 90X30 RA DUCT, UP TO AHU-1

8 90X30X72 LENGTH RA DUCT SILENCER, #10 GAGE CASING

9 132X24 RA DUCT, #10 GAGE

10 (E) 72X24 RA DUCT, DN TO POD 1

11 CONNECT (E) 74X24 RA DUCT TO NEW 132X24 RA DUCT.

PHASE 1B (AHU-2):

12 90X30X72 LENGTH SA DUCT SILENCER, #10 GAGE CASING

13 (E) 120X28 SA DUCT DOWN TO POD 1.

14 DUCT SILENCER TRANSITION TO CONNECT THE 90X30 SA DUCT TO (E) 120X28 SA DUCT.

15 2" FROM FLOOR SINK DRAIN WITH P-TRAP FOR HUMIDIFIER, DISPENSER AND WATER SOFTENER.

16 ¾" MR, UP

17 ¾" LR, UP

18 90X30 RA DUCT, UP TO AHU-2

19 90X30X72 LENGTH RA DUCT SILENCER, #10 GAGE CASING

20 132X24 RA DUCT, #10 GAGE

21 (E) 72X24 RA DUCT, DN TO POD 1

22 CONNECT (E) 74X24 RA DUCT TO NEW 132X24 RA DUCT.

PHASE 1C (AHU-9):

23 111x26 UP TO SA DUCT AHU-9.

24 144"x28"x28" SA PLENUM.

25 128"Dx24"Wx96"L SA ELBOW SILENCER.

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STATE OF MARYLAND
STEVEN L. ALLEN
No. 28411
PROFESSIONAL ENGINEER
6/7/2024

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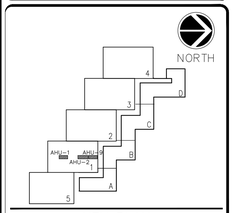

KEY PLAN

0 2 4 8
1/4" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
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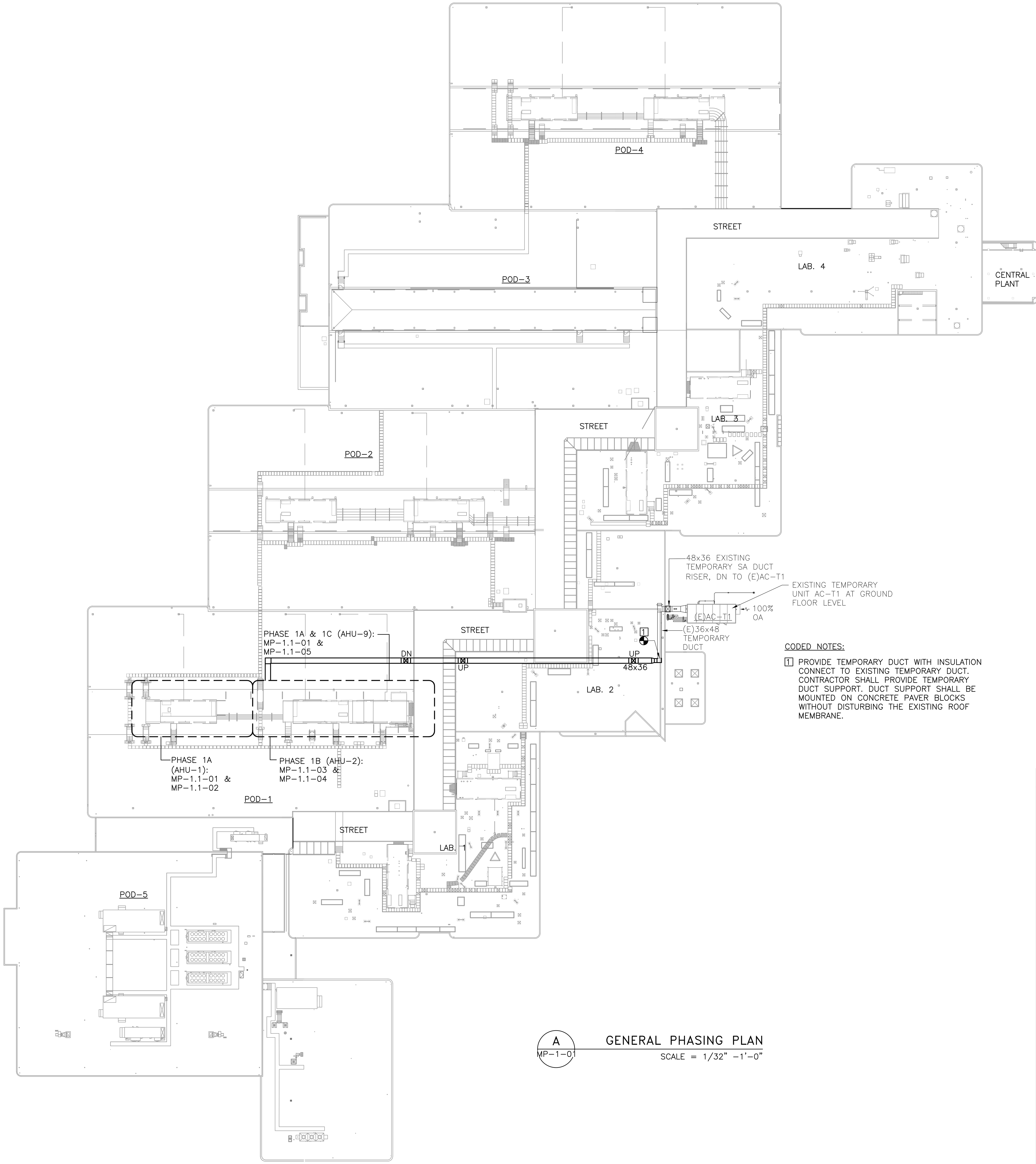
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 ROOF – BENEATH AHU
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	27 OF 71
	M (DISCIPLINE) / 4.1 (TYPE) / 02 (SEQUENCE)

M-4.1-02.DWG



CODED NOTES:

1. PROVIDE TEMPORARY DUCT WITH INSULATION CONNECT TO EXISTING TEMPORARY DUCT. CONTRACTOR SHALL PROVIDE TEMPORARY DUCT SUPPORT. DUCT SUPPORT SHALL BE MOUNTED ON CONCRETE PAVER BLOCKS WITHOUT DISTURBING THE EXISTING ROOF MEMBRANE.

A MP-1-01 GENERAL PHASING PLAN
SCALE = 1/32" -1'-0"

GENERAL NOTES:

1. THIS PHASING PLAN IS GENERAL GUIDELINES FOR CONTRACTOR TO PREPARE A DETAILED PHASING PLAN FOR COTR REVIEW AND APPROVAL THAT MINIMIZES THE SHUT DOWNS AND MAINTAINS THE POD DESIGN INDOOR CONDITIONS AT ALL TIME DURING CONSTRUCTION.
2. ALL DEMOLITION AND NEW WORK SHALL BE PERFORMED DURING COLD TO MILD WEATHER CONDITIONS BETWEEN OCTOBER AND APRIL TO REDUCE THE POD HEAT GAIN DURING HOT AND HUMID WEATHER CONDITIONS.
3. DEMOLITION AND INSTALLATION OF AIR HANDLING UNITS SHALL BE DONE DURING NIGHT TIME ON WEEKDAYS. NEW WORK WITHIN UNITS CAN BE PERFORMED DURING DAYTIME ON WEEKDAYS.
4. REFER TO DEMOLITION AND NEW WORK DRAWINGS FOR COMPLETE LAYOUTS AND PIPE SIZES.
5. CONTRACTOR SHALL COORDINATE THE LOCATIONS OF TEMPORARY STRUCTURAL SHORING SYSTEMS REQUIRED TO CONSTRUCT THE NEW ROOF AHU KNEE WALLS. REFER TO STRUCTURAL DRAWINGS FOR NEW KNEE WALLS REQUIRE TEMPORARY ROOF SHORING. PROVIDE DELEGATED DESIGN FOR STRUCTURAL SHORING SYSTEM. PROVIDE TEMPORARY SHOWING SYSTEM LAYOUT DRAWINGS TO COTR SHOWING WHERE THE SYSTEMS WILL BE INSTALLED TO ALLOW SI TO RELOCATE ARTIFACTS AND SHELVES IMPACTED BY THE SHORING SYSTEMS. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SURE NOT TO DISTURB ANY OF THE ARTIFACTS STORED IN THE POD. THE SHORING SYSTEM SHALL BE DESIGNED TO ALLOW ALL EXISTING DUCTWORK OPERATION DURING THE AHU REPLACEMENT WORK.
6. THE GOVERNMENT FURNISHED EXISTING TEMPORARY UNIT AC-T1 INSTALLED UNDER PREVIOUS PROJECT FOR LAB-1 TO LAB-4 WILL BE REUSED TO PROVIDE TEMPORARY AIR CONDITIONING OF 20,000 CFM DURING THE REPLACEMENT OF AHU-1 AND AHU-2. CONTRACTOR SHALL COORDINATE WITH COTR TO PROVIDE COMPLETE INFORMATION OF AC-T1 TO CONTRACTOR SUCH AS AS-BUILT DRAWING SHOWING EQUIPMENT SCHEDULES. MSC BUILDING FACILITY PERSONNEL SHALL BE RESPONSIBLE TO OPERATE AC-T1 WHEN NEEDED FOR POD-1. CONTRACTOR IS RESPONSIBLE TO VERIFY AC-T1 AND ASSOCIATED EQUIPMENT AND MAKE SURE IT IS OPERATIONAL FOR TEMPORARY SERVICE FOR POD-1 WHEN NEEDED. SIEMENS SHALL BE RESPONSIBLE TO MODIFY EXISTING CONTROL SEQUENCES TO PROVIDE CONSTANT AIR FLOW AND TO USE POD-1 TEMPERATURE/HUMIDITY SENSORS TO CONTROL UNIT SUPPLY TEMPERATURE TO POD-1.
7. THE STREET CORRIDOR SERVED BY AHU-9 WILL NOT HAVE AIR SUPPLY FROM EXISTING DUCTS. TO MAINTAIN SPACE CONDITIONERS IN THE CORRIDOR PROVIDE TEMPORARY AIR-CONDITIONING UNITS IN THE STREET CORRIDOR. COORDINATE WITH COTR FOR LOCATION OF THE TEMPORARY UNITS.

SUMMARY OF WORK:

1. PHASE 1A (AHU-1 & AHU-9) REFER TO SHEET MP-1.1-01 AND MP-1.1-02 FOR PHASING DETAIL: REUSE THE EXISTING TEMPORARY UNIT AC-T1 WITH 20,000 CFM 100% OA AIR UNIT INSTALLED UNDER PREVIOUS RECENT PROJECTS FOR LAB-1 TO LAB-4. CONNECT A NEW TEMPORARY DUCT TO EXISTING TEMPORARY DUCT ON LAB AREA ROOF AND ROUTE THE TEMPORARY DUCT TO POD-1 ROOF TO SERVE AHU-1 AND AHU-2 DURING THE REPLACEMENT OF THE UNITS. PROVIDE BYPASS DUCT BETWEEN AHU-1 AND AHU-2 WITH VOLUME AND MOTORIZED DAMPERS AS INDICATED. CONNECT THE TEMPORARY DUCT TO BYPASS SUPPLY DUCT TO SERVE AHU-1 AT 20,000 CFM WITH DAMPER OPEN TO AHU-1 AND DAMPER CLOSE FOR AHU-2. PROVIDE TEMPORARY RELIEF OPENINGS ON THE TWO RETURN AIR DUCT RISERS UNDERNEATH OF AHU-1. CLOSE THE MAIN VALVES, DISCONNECT PIPING FROM AHU-1, DRAIN AND CAP PIPING FOR (E) AHU-1. REMOVE (E) AHU-1 AND (E) AHU-9, ASSOCIATED CONTROLS, ELECTRICAL, PIPING AND ACCESSORIES. INSTALL NEW MAIN PIPING AND NEW AHU-1 AND DUCTWORK, CONTROLS, PIPING AND ACCESSORIES AS SHOWN ON PLAN, REMOVE THE TEMPORARY RELIEF OPENING AND PATCH THE OPENINGS AND CLOSE THE DAMPER FOR TEMPORARY SA. COORDINATE WITH SI FOR THE SHUT DOWN OF THE SYSTEM FOR 8 TO 12 HOURS, CONNECT NEW MAIN PIPING TO EXISTING PIPING AND RUN THE SYSTEM. COMMISSION NEW AHU-1.
2. PHASE 1B (AHU-2) REFER TO SHEET MP-1.1-03 AND MP-1.1-04 FOR PHASING DETAIL: SIMILAR TO AHU-1, PROVIDE TEMPORARY 20,000 CFM SUPPLY AIR TO AHU-2 THROUGH THE BYPASS DUCT AND TEMPORARY RELIEF OPENINGS TO EXISTING RA DUCT RISERS UNDERNEATH AHU-2. REMOVE (E) AHU-2, ASSOCIATED CONTROLS, PIPING, ELECTRICAL AND ACCESSORIES. INSTALL NEW AHU-2, CONTROLS, PIPING, ELECTRICAL AND ACCESSORIES. COMMISSION NEW AHU-2. DISCONNECT THE TEMPORARY DUCT CONNECTION TO BYPASS DUCT AND PATCH THE OPENING AIR TIGHT. (NOTE: THE TEMPORARY DUCT WILL BE REUSED FOR FUTURE CONNECTION FOR POD-2 AIR HANDLING UNITS.)
3. PHASE 1C (AHU-9) REFER TO SHEET MP-1.1-05 FOR PHASING DETAIL: INSTALL NEW AHU-9, CONTROLS, PIPING, ELECTRICAL AND ACCESSORIES. AND CONNECT TO MAIN PIPING. COMMISSION NEW AHU-9.

PHASING GENERAL PLAN

CONSTRUCTION PHASE	EXISTING UNIT REPLACEMENT DESCRIPTION	LOCATION	PHASES TO BE COMPLETED	REMARKS
PHASE 1A	AHU-1 & AHU-9 DEMO	POD 1	WINTER	
PHASE 1B	AHU-2	POD 1		
PHASE 1C	AHU-9	POD 1		

NOTES:

1. CONTRACTOR IS REQUIRED TO PROVIDE DETAILED, COORDINATED PHASING PLANS FOR COTR REVIEW AND APPROVAL BEFORE STARTING ANY WORK. USE GENERAL PHASING PLANS AS GUIDELINES.
2. BEFORE END OF EACH PHASE, UNITS SHALL BE COMMISSIONED ACCEPTED BY COTR, AND HAND OVER THEIR OPERATION TO COTR.
3. REFER TO MP SERIES PHASING DRAWINGS FOR DETAILED PROPOSED SEQUENCING. IT IS NOTED THAT CONTRACTOR IS REQUIRED TO PROVIDE COMPLETE DETAILED, COORDINATED PHASING SEQUENCE BEFORE THE START OF WORK FOR SI APPROVAL.
4. REFER TO CONTRACT DOCUMENTS FOR OTHER DETAILS.
5. THE FOLLOWING TESTS BE REQUIRED AFTER EACH PHASE: VERIFICATION THAT ALL INTERNAL COMPONENTS OF THE AHU HAVE BEEN INSTALLED AND ARE FUNCTIONAL. CONTRACTOR SHALL PERFORM AHU COMPONENTS FUNCTIONAL PERFORMANCE TESTING AND TAB MEASUREMENTS TO INCLUDE FULL HYDRONIC AND AIR FLOWS. ENSURE OPERATION OF ALL WATER FLOWS AND AIR CONTROL DEVICES. COMPLETION OF THESE ITEMS ARE REQUIRED PRIOR TO COMMISSIONING, ACCEPTANCE OF UNIT OPERATION AND TURNOVER TO SI OPERATION.
6. AFTER AIR-HANDLING UNITS IN THE POD ARE COMPLETED, CONTRACTOR SHALL UNIT LEVEL TAB FOR AIR AND HYDRONIC DEVICES. REPLACE EXISTING TEMPERATURE AND HUMIDITY SENSORS IN THE POD. CONTRACTOR SHALL COMPLETE ALL TAB REQUIREMENTS IN ACCORDANCE WITH PROJECT SPECIFICATIONS WHICH INCLUDES VERIFICATION OF CONTROLS.
7. PROVIDE TWO WEEK TREND FOR UNITS AND INDOOR SPACE CONDITIONS TO DEMONSTRATE THAT THE NEW UNITS ARE OPERATING SUFFICIENTLY TO MAINTAIN THE SPACE CONDITIONS PRIOR TO FINAL ACCEPTANCE.
8. AHU-1, AHU-2, AND AHU-9 SHALL BE COMMISSIONED AS EACH UNIT INSTALLATION FINISHED. AHU-1 AND AHU-2 SHALL BE RECOMMISSIONED TOGETHER TO MAKE SURE THE TWO UNITS OPERATE PROPERLY SERVING A SINGLE POD.

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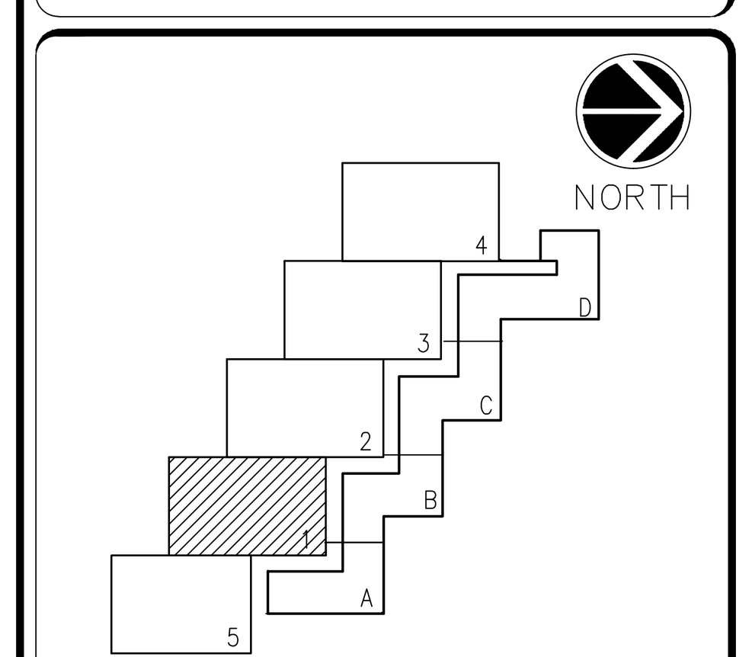

KEY PLAN

GRAPHIC SCALE(S)

DATE	02/02/24
SUBMISSION	BID SET
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
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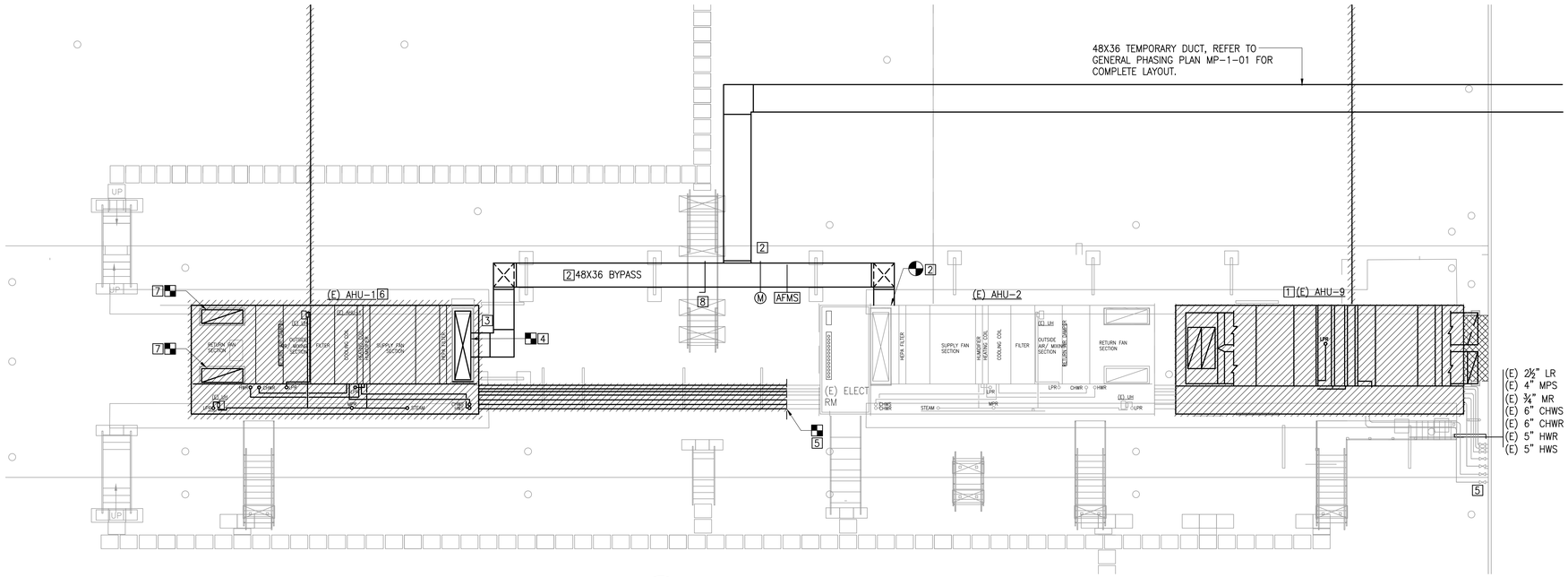
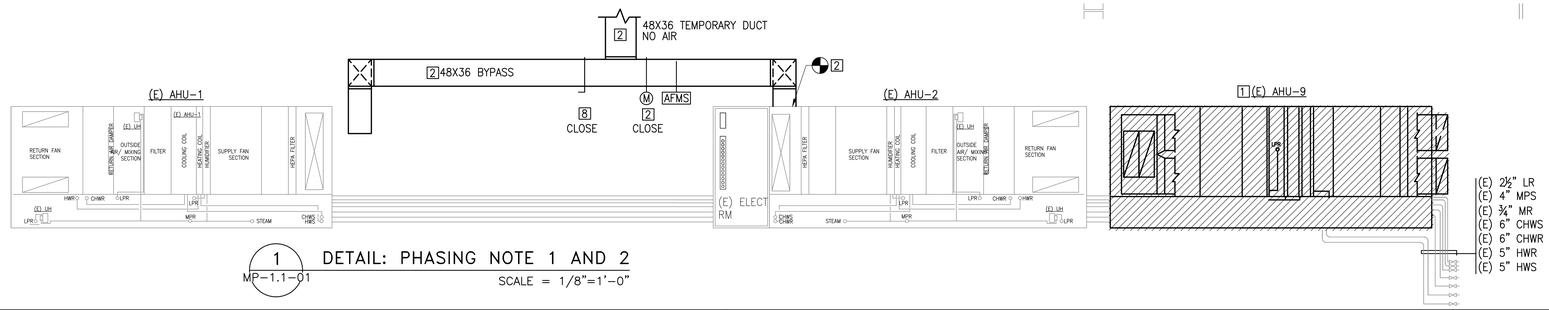
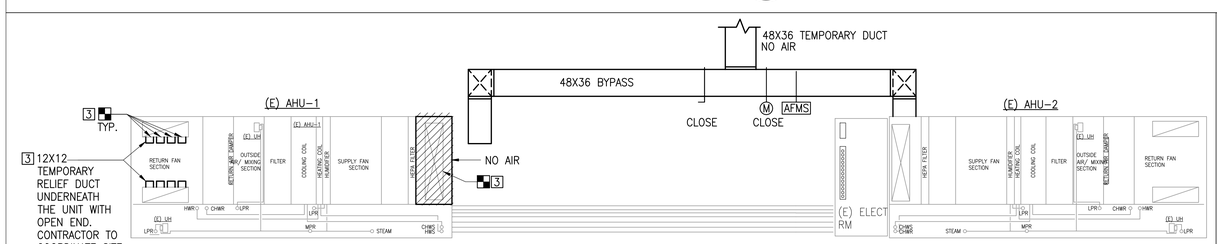
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	PHASING GENERAL PLAN
DRAWING TYPE	MECHANICAL
WORKING STAFF	DESIGNED BY: FDL / DRAWN BY: FDL / CHECKED BY: DP/TM



A PHASE 1A SEQUENCE 1 – POD 1
MP-1.1-01 SCALE = 1/8"=1'-0"



1 DETAIL: PHASING NOTE 1 AND 2
MP-1.1-01 SCALE = 1/8"=1'-0"



2 DETAIL: PHASING NOTE 3
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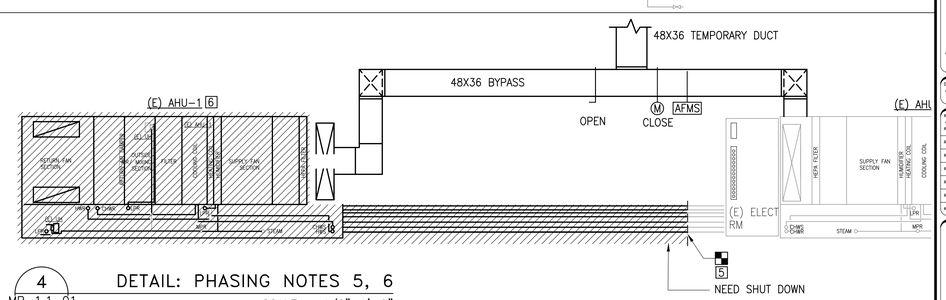
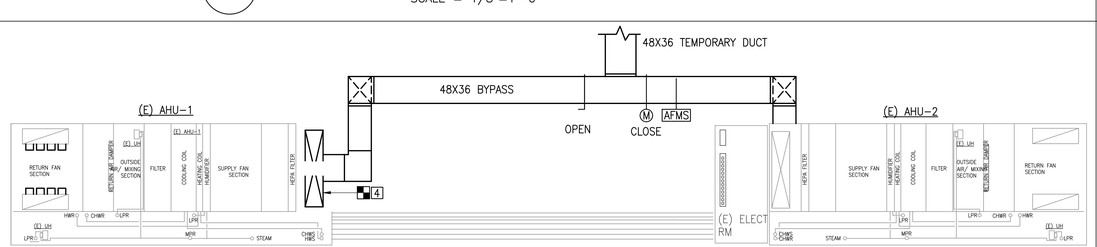
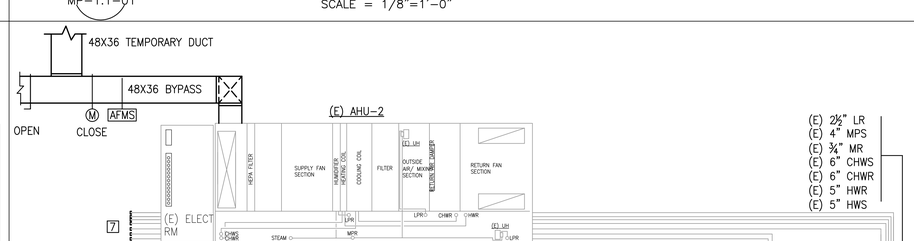


4 DETAIL: PHASING NOTES 5, 6
MP-1.1-01 SCALE = 1/8"=1'-0"



3 DETAIL: PHASING NOTE 4
MP-1.1-01 SCALE = 1/8"=1'-0"



5 DETAIL: PHASING NOTE 7
MP-1.1-01 SCALE = 1/8"=1'-0"

PHASING NOTES:

PHASE 1A (AHU-1) SEQUENCE #1:

1. FIRST DEMO (E) AHU-9, CLOSE THE VALVES SERVING THE UNIT WITHOUT CUTTING THE MAIN PIPING UNDERNEATH THE UNIT. REMOVE AHU-9 112X24 SA AND 112X20 RA DUCTS AS SHOWN ON THE DEMO DRAWINGS.
2. PROVIDE TEMPORARY DUCT AND DOUBLE WALL BYPASS DUCT WITH MANUAL DAMPER, CONTROL DAMPER AND AIR FLOW MEASURING STATION AS INDICATED IN PREPARATION FOR TEMPORARY SUPPLY OF 20,000 CFM TO POD-1 AREA SERVED BY (E) AHU-1. AFMS IS NOT USE DURING TEMPORARY OPERATION.
3. SHUT DOWN (E) AHU-1 AND FIRST DEMO THE EXISTING DISCHARGE PLENUM AS INDICATED. PREPARE DUCT FOR TEMPORARY BYPASS DUCT CONNECTION TO (E) AHU-1. PROVIDE TEMPORARY RELIEF AIR OPENINGS WITH WIREMESH SCREEN TO EXISTING TWO RA DUCT RISERS UNDERNEATH THE UNIT. DISCONNECT 72X24 RA DUCT CONNECTION TO UNIT AND PROVIDE TEMPORARY INSULATED CAPS ON REMAINING EXISTING RA DUCT.
4. PROVIDE TEMPORARY BYPASS DUCT CONNECTION TO (E) AHU-1 120X28 SUPPLY DUCT. OPEN THE MANUAL DAMPER FOR AHU-1. CONTRACTOR TO COORDINATE TO RUN THE EXISTING TEMPORARY UNIT AC-T1. (SEE MP-1-01 GENERAL NOTE 6)
5. CLOSE THE MAIN VALVES, REMOVE EXISTING PIPING SERVING (E) AHU-1, DRAIN THE REMAINING PIPES AND PREPARE TO CAP PIPES AT (E) AHU-2 TO SERVE THE POD-1 DURING THIS PHASE.
6. REMOVE EXISTING AIR HANDLING UNIT AHU-1 INCLUDING ASSOCIATED STEAM PIPING, CHILLED WATER PIPING, HOT WATER PIPING, CONTROLS, UNIT HEATERS, ELECTRICAL WIRING AND ACCESSORIES. REMOVE ALL CONTROLS FROM BAS.
7. WHILE REMOVING THE (E) AHU-1, CAP THE PIPING SERVING THE (E) AHU-2. PROVIDE DRIP LEG ON STEAM PIPE. OPEN THE MAIN VALVES.
8. MANUAL DAMPER WILL BE REMOVED AT THE END OF THE PROJECT WHEN AHU-1 AND AHU-2 ARE INSTALLED.

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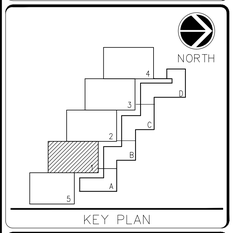

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

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A/E PROJECT NUMBER	60516569
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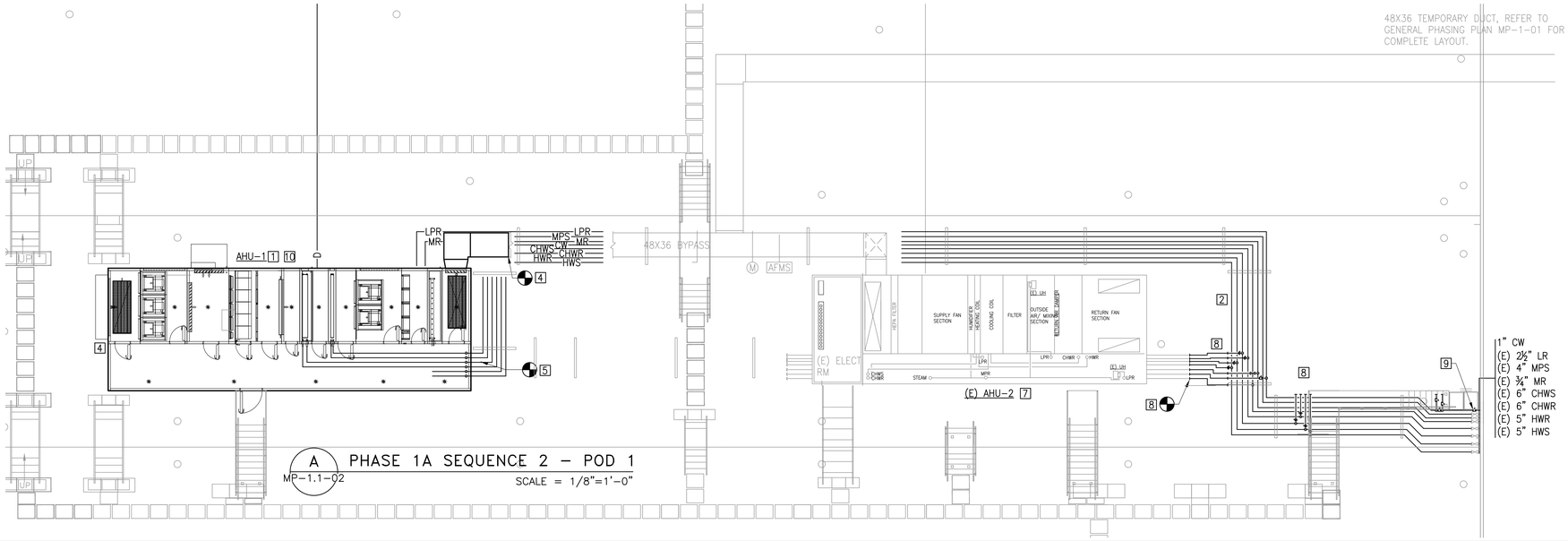
DRAWING TYPE	MECHANICAL
WORKING START	FDL / FDL / DP
	DESIGNED BY / DRAWN BY / CHECKED BY
SHEET NO.	MP / 1.1 / 01
29 OF 71	DISCIPLINE / TYPE / SEQUENCE



A PHASE 1A SEQUENCE 2 – POD 1
MP-1.1-02
SCALE = 1/8"=1'-0"

PHASING NOTES:

PHASE 1A (AHU-1) SEQUENCE # 2:

1 EXCEPT DISCHARGE PLENUM SECTION, INSTALL NEW CUSTOM BUILT AIR HANDLING UNIT AHU-1 INCLUDING STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, VFDs, ASSOCIATED CONTROLS, THE REQUIRED PIPING AND ACCESSORIES, AND ELECTRICAL POWER. THE UNIT WILL BE INSTALLED IN SECTIONS. THE DISCHARGE PLENUM SECTION WILL BE THE LAST SECTION TO BE INSTALLED AFTER DISCONNECTION OF TEMPORARY BYPASS DUCT.

2 INSTALL NEW PIPING WITH TEMPORARY CAP AS INDICATED WHILE THE NEW AHU-1 IS BEING CONSTRUCTED.

3 COORDINATE TO DEENERGIZED/STOP THE TEMPORARY UNIT AC-T1. REMOVE TEMPORARY BYPASS DUCT CONNECTION AS INDICATED. CLOSE THE MANUAL DAMPER. REMOVE THE TEMPORARY RELIEF DUCT, PATCH THE OPENING WITH SAME DUCT MATERIALS AND INSULATE THE RA DUCT.

4 INSTALL AHU DISCHARGE AIR PLENUM SECTION. PROVIDE PERMANENT CONNECTION TO BYPASS AIR DUCT. CONNECT NEW SUPPLY DUCT TO EXISTING. CONNECT THE RA DUCT TO AHU.

5 INSTALL PIPING TO AHU AS INDICATED.

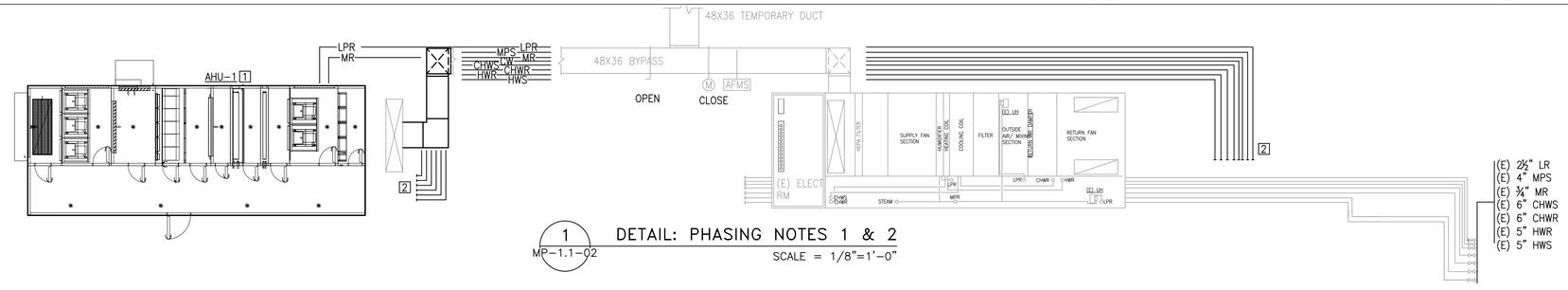
6 CLOSE THE EXISTING MAIN VALVES AND REMOVE EXISTING PIPING AS INDICATED.

7 KEEP THE (E) AHU-2 SUPPLY AND RETURN FAN OPERATIONAL WITHOUT COOLING AND HEATING. CLOSE THE OA INTAKE DAMPER. THE NEW AHU-1 SUPPLY AND RETURN FANS MAY ALSO ENERGIZED AT THIS POINT IN PREPARATION FOR TESTING AND AIR BALANCING.

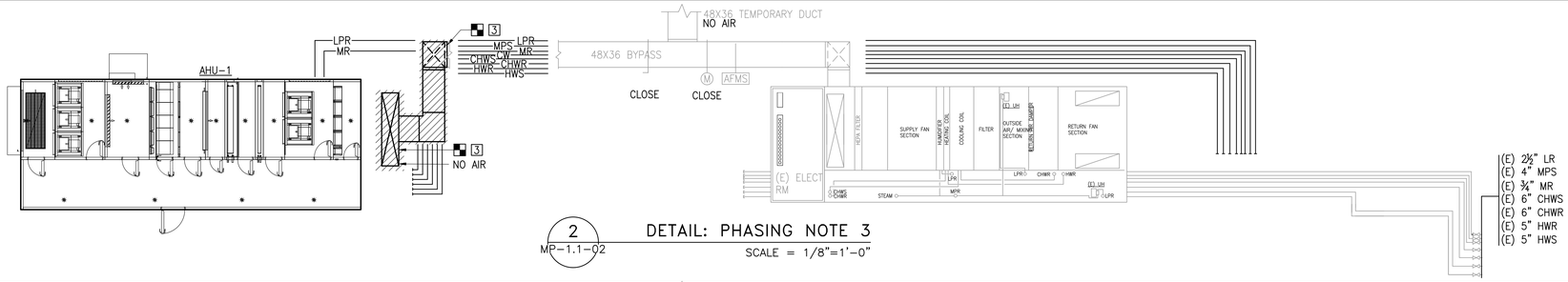
8 AFTER THE EXISTING PIPING HAVE BEEN REMOVED; PROVIDE NEW PIPING, CONNECT TO NEW PIPING INSTALLED IN PHASING NOTE 2, PROVIDE BRANCH PIPING TO AHU-2 AND AHU-9 WITH SHUT OFF VALVES, AND CONNECT TO EXISTING MAIN VALVES. TEMPORARY CONNECT AHU-2 TO NEW PIPES TO ALLOW UNIT OPERATION WHILE AHU-1 IS COMMISSIONED.

9 INSTALL DOMESTIC LINE FOR HUMIDIFIER MAKE UP WATER. OPEN THE MAIN VALVES.

10 PERFORM TESTING AND BALANCING, COMMISSION NEW AIR-HANDLING UNIT AND COMPONENTS, VERIFY NEW CONTROL INTERFACE WITH EXISTING SIEMENS BAS.



1 DETAIL: PHASING NOTES 1 & 2
MP-1.1-02
SCALE = 1/8"=1'-0"



2 DETAIL: PHASING NOTE 3
MP-1.1-02
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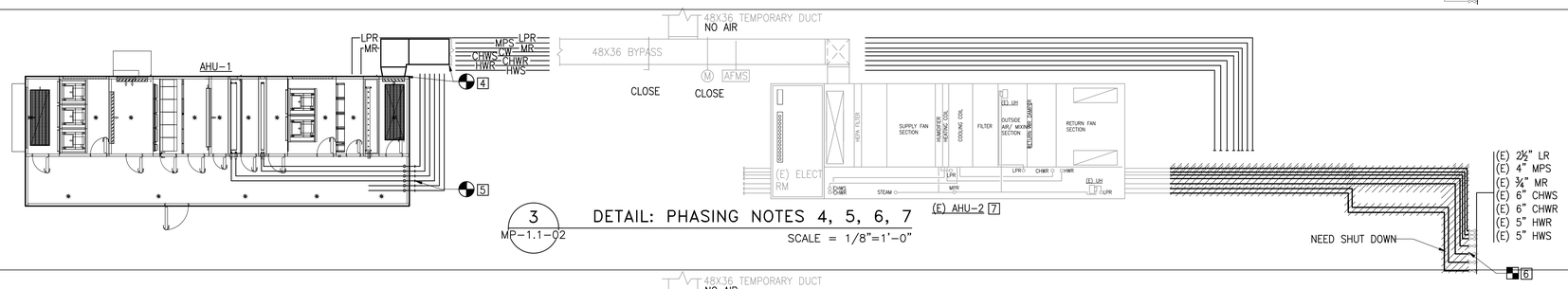
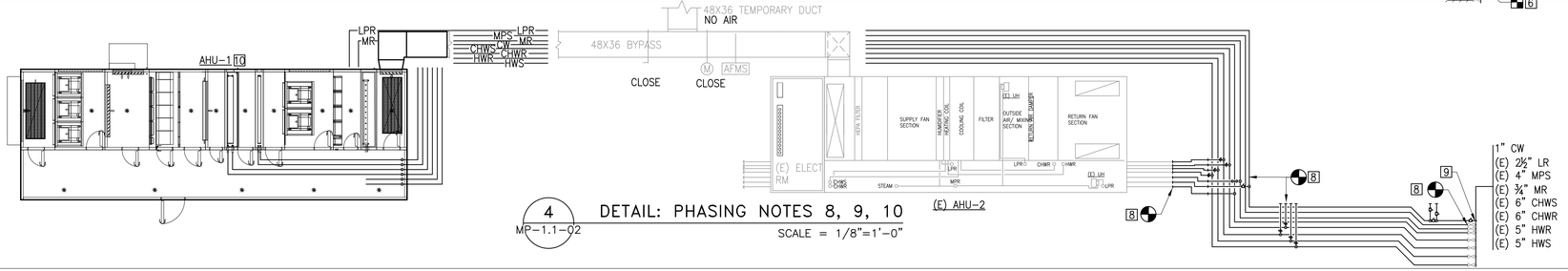


3 DETAIL: PHASING NOTES 4, 5, 6, 7
MP-1.1-02
SCALE = 1/8"=1'-0"



4 DETAIL: PHASING NOTES 8, 9, 10
MP-1.1-02
SCALE = 1/8"=1'-0"

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No. 28411
PROFESSIONAL ENGINEER
02/02/2024

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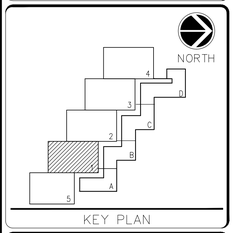

KEY PLAN

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

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02/02/24	BID SET

REVISION	REVISION
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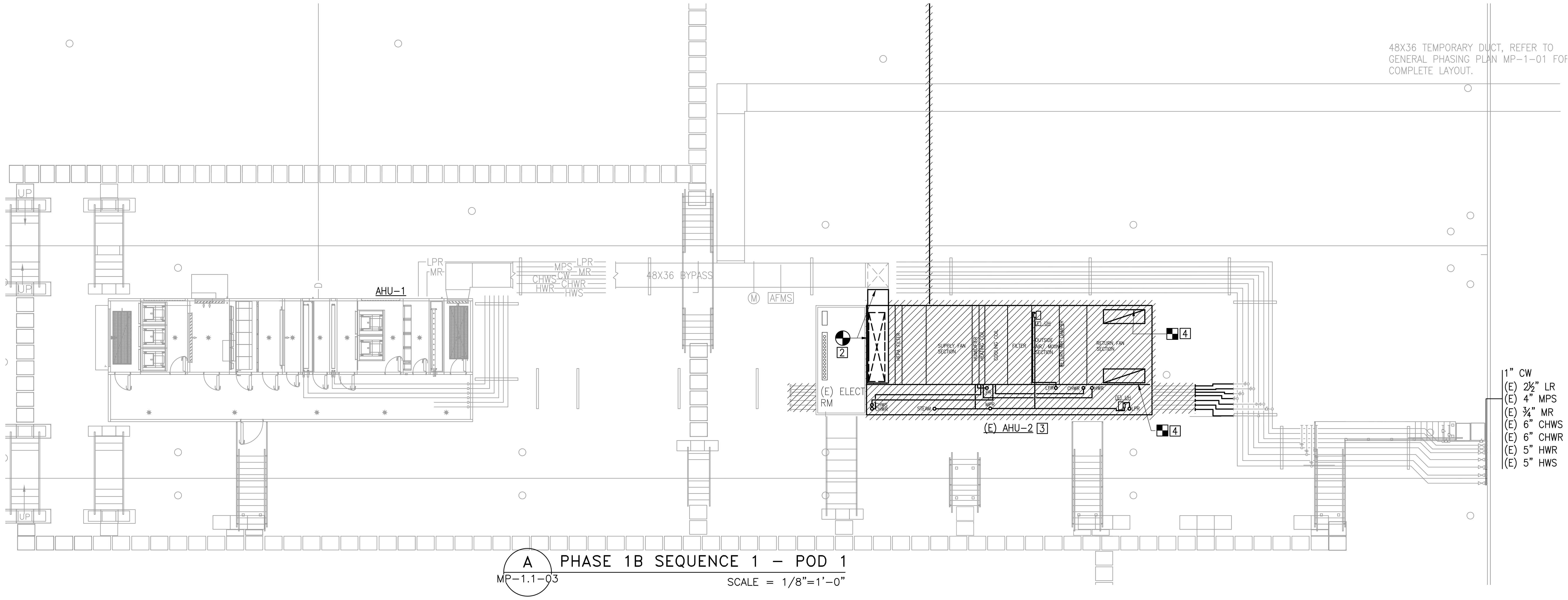
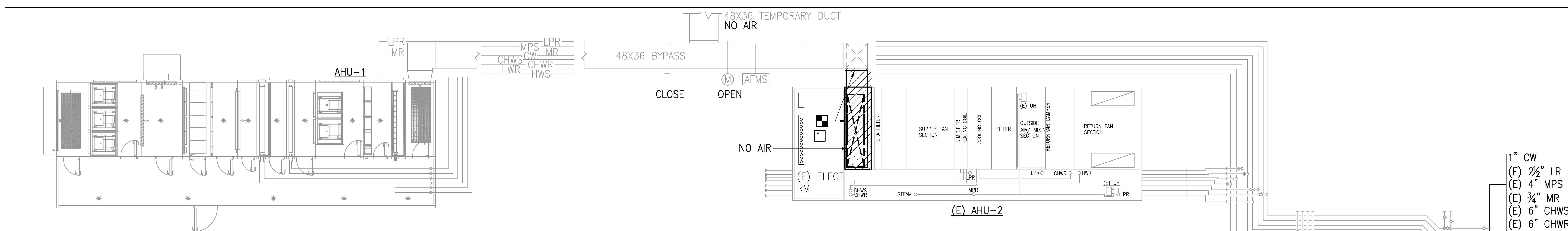
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	30 OF 71
	MP (DISCIPLINE) / 1.1 (TYPE) / 02 (SEQUENCE)

MP-1.1-02(30)



A PHASE 1B SEQUENCE 1 – POD 1
MP-1.1-03
SCALE = 1/8"=1'-0"



1 DETAIL: PHASING NOTE 1
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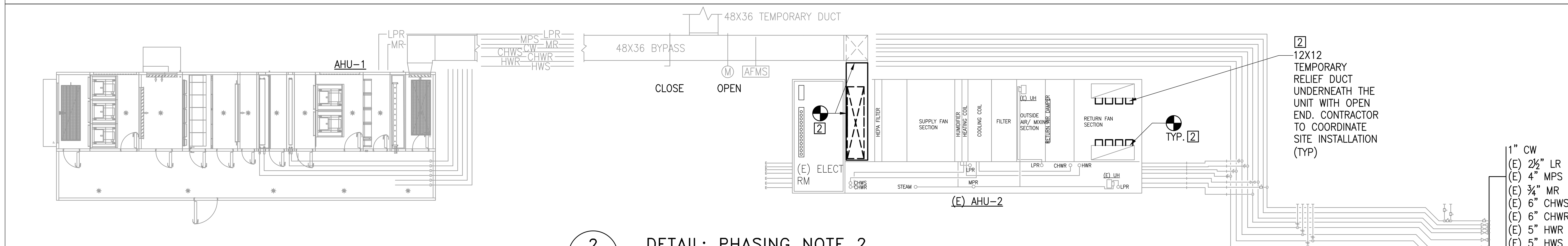

2 DETAIL: PHASING NOTE 2
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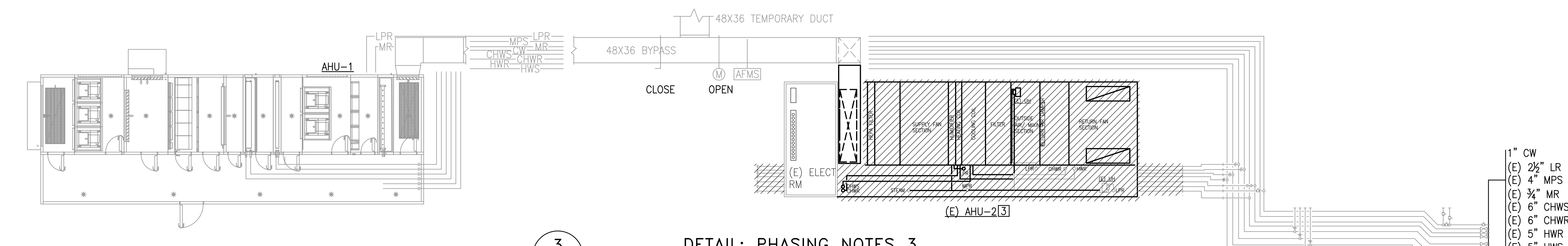

3 DETAIL: PHASING NOTES 3
MP-1.1-03
SCALE = 1/8"=1'-0"

PHASING NOTES:

PHASE 1B (AHU-2) SEQUENCE # 1:

1. SHUT DOWN (E) AHU-2. FIRST DEMO THE EXISTING AHU DISCHARGE PLENUM AS INDICATED. PREPARE FOR TEMPORARY BYPASS DUCT CONNECTION TO EXISTING AHU SUPPLY DUCT.
2. PROVIDE TEMPORARY BYPASS DUCT CONNECTION TO (E) AHU-2 120X28 SUPPLY DUCT. PROVIDE TEMPORARY RELIEF OPENINGS WITH WIREMESH SCREEN TO EXISTING TWO RA DUCT RISERS UNDERNEATH THE UNIT. DISCONNECT EXISTING RA DUCT CONNECTION TO UNIT AND PROVIDE TEMPORARY INSULATED CAP ON REMAINING RA DUCT. OPEN THE MOTORIZED DAMPER TO AHU-1. CONTRACTOR TO COORDINATE TO RUN THE EXISTING TEMPORARY UNIT AC-T1. (SEE MP-1-01 GENERAL NOTE 6)
3. AFTER THE TEMPORARY SUPPLY AIR FROM AC-T1 HAS BEEN ESTABLISHED FOR AHU-2 EXISTING SA DUCT, REMOVE (E) AHU-2 INCLUDING ASSOCIATED STEAM PIPING, CHILLED WATER PIPING, HOT WATER PIPING, CONTROLS, UNIT HEATER, ELECTRICAL WIRING AND ACCESSORIES. REMOVE ALL CONTROLS FROM BAS.

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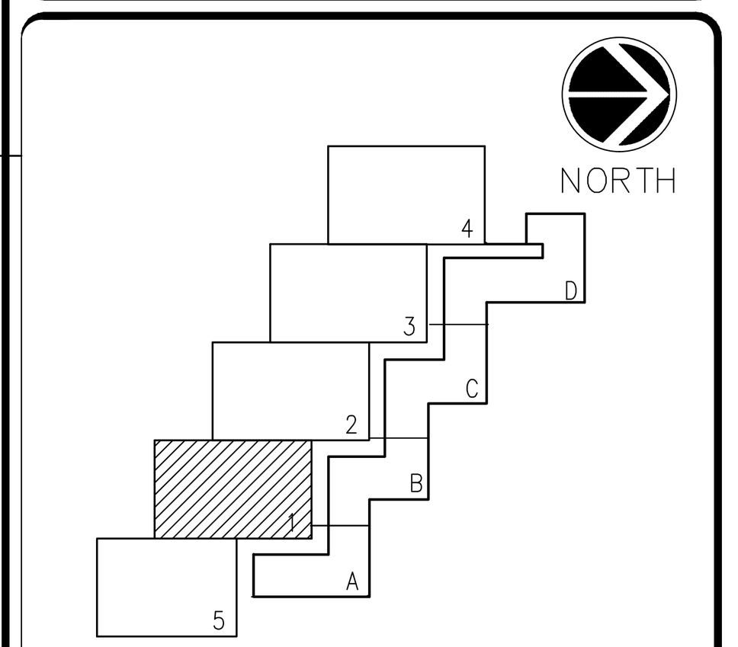

KEY PLAN

0 4 8 16
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SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
31 OF 71	MP	1.1	03

MP-1.1-03.DWG
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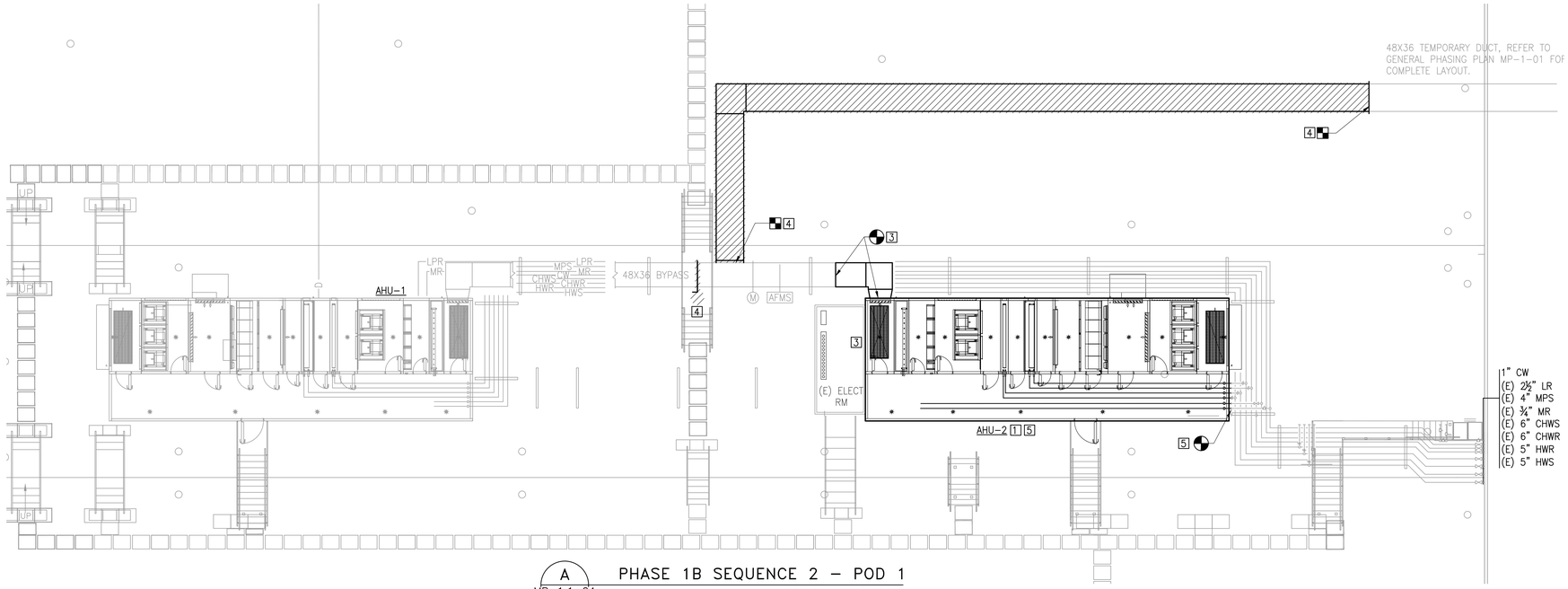

A
MP-1.1-04

PHASE 1B SEQUENCE 2 – POD 1

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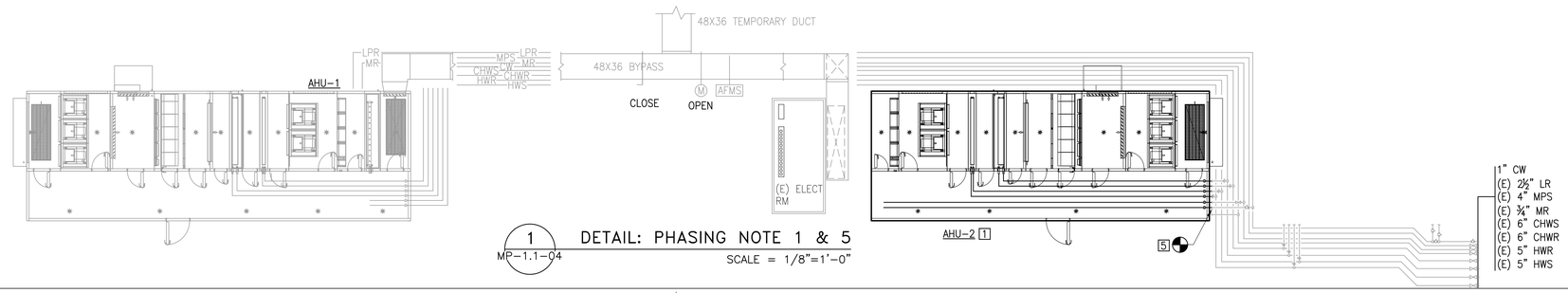

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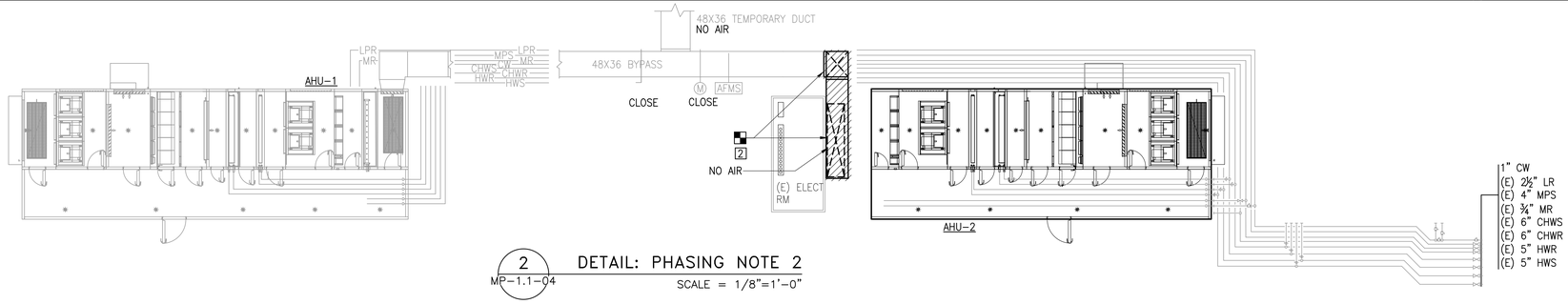
MP-1.1-04

DETAIL: PHASING NOTE 1 & 5

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



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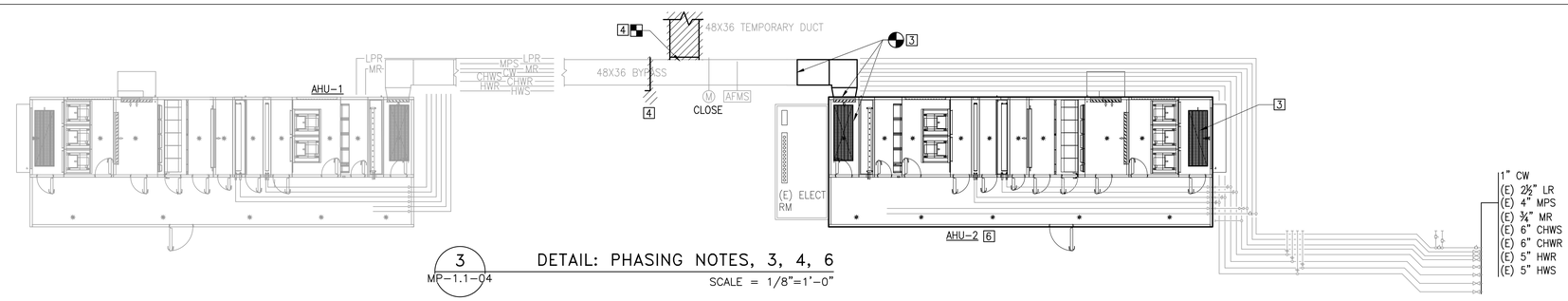
MP-1.1-04

DETAIL: PHASING NOTE 2

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



3
MP-1.1-04

DETAIL: PHASING NOTES, 3, 4, 6

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

PHASING NOTES:

PHASE 1B (AHU-2) SEQUENCE # 2:

1. EXCEPT DISCHARGE PLENUM SECTION, INSTALL NEW CUSTOM BUILT AIR HANDLING UNIT AHU-2 INCLUDING STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, VFDs, ASSOCIATED CONTROLS, THE REQUIRED PIPING AND ACCESSORIES, AND ELECTRICAL POWER. THE UNIT WILL BE INSTALLED IN SECTIONS. THE DISCHARGE PLENUM SECTION WILL BE THE LAST SECTION TO BE INSTALLED AFTER DISCONNECTION OF TEMPORARY BYPASS DUCT.
2. COORDINATE TO DE-ENERGIZE/STOP THE TEMPORARY UNIT AC-T1. REMOVE TEMPORARY BYPASS AIR DUCT CONNECTION TO AHU-2 AS INDICATED. CLOSE THE MOTORIZED DAMPER. REMOVE THE TEMPORARY RELIEF DUCT UNDERNEATH THE UNIT, PATCH THE OPENING WITH SAME DUCT MATERIALS AND INSULATE RA DUCT.
3. INSTALL AHU DISCHARGE PLENUM, CONNECT NEW SUPPLY DUCT TO EXISTING. PROVIDE PERMANENT BYPASS DUCT CONNECTION AS INDICATED. CONNECT RA DUCT TO UNIT.
4. DISCONNECT TEMPORARY DUCT FROM BYPASS DUCT AND DEMOLISH TEMPORARY DUCT UP TO POINT OF DISCONNECTION AS INDICATED AND CAP THE REMAINING TEMPORARY DUCT FOR FUTURE USE FOR POD 2 AHU REPLACEMENT. PATCH WITH DOUBLE WALL DUCT AIR TIGHT THE DUCT OPENING AT BYPASS DUCT CAUSE BY THE REMOVABLE OF TEMPORARY DUCT. REMOVE MANUAL DAMPER AS INDICATED.
5. INSTALL NEW PIPING, CONNECT TO AHU-2 FROM PRE-INSTALLED PIPING.
6. PERFORM TESTING AND BALANCING, COMMISSION NEW AIR-HANDLING UNIT AND COMPONENTS, VERIFY NEW CONTROL INTERFACE WITH EXISTING SIEMENS BAS. SET THE AFMS OF BYPASS DUCT TO 17,000 CFM WHICH IS 50% OF AHUs AIR FLOW RATE.

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02/02/2024

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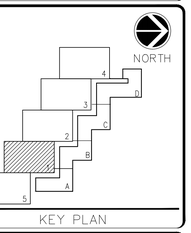

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
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REVISION 6	
REVISION 7	

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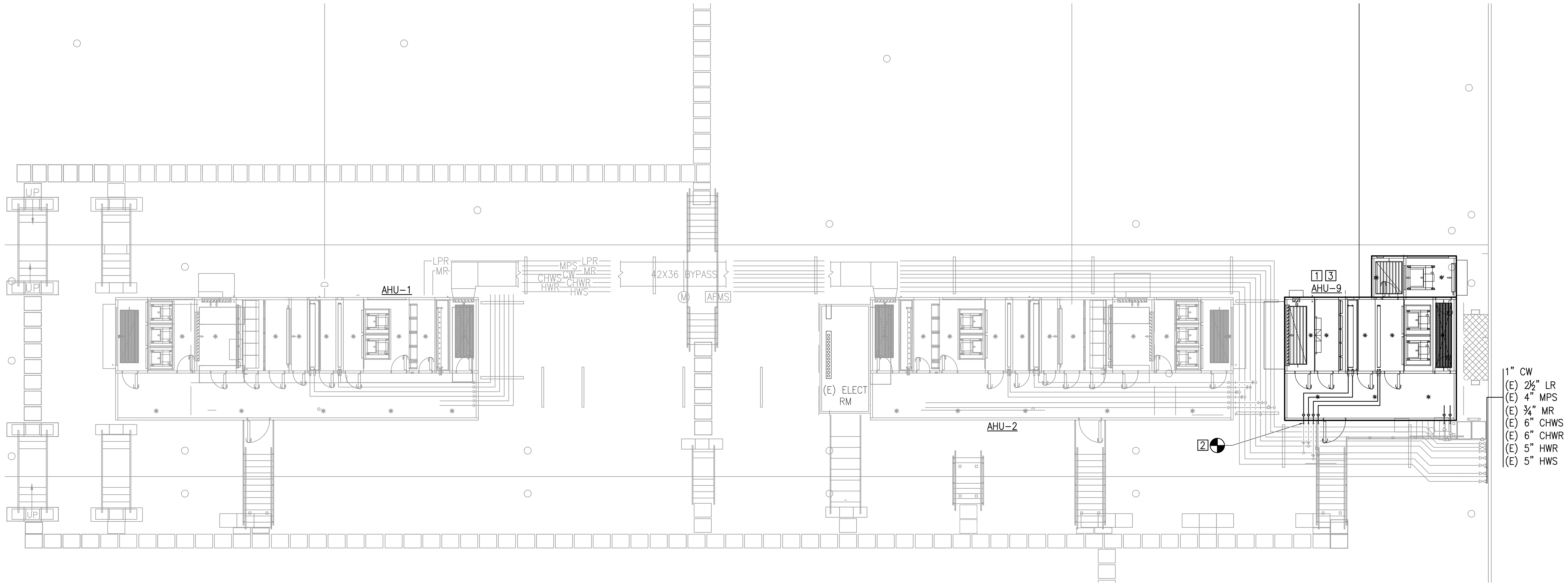
BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL POD 1 PHASING SEQUENCE PLAN
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	32 OF 71

MP (DISCIPLINE) | 1.1 (TYPE) | 04 (SEQUENCE)

MP-1.1-04



A
MP-1.1-05

PHASE 1C SEQUENCE 1 – POD 1

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

PHASING NOTES:

PHASE 1C (AHU-9) SEQUENCE # 1:

1. INSTALL NEW CUSTOM BUILT AIR HANDLING UNIT AHU-9 INCLUDING VFDs, ASSOCIATED CONTROLS, REQUIRED PIPING, ACCESSORIES, AND ELECTRICAL POWER.

2. INSTALL NEW PIPING, CONNECT TO AHU-9 FROM PRE-INSTALLED PIPING.

3. PERFORM TESTING AND BALANCING, COMMISSION NEW AIR-HANDLING UNIT AND COMPONENTS, VERIFY NEW CONTROL INTERFACE WITH EXISTING SIEMENS BAS.

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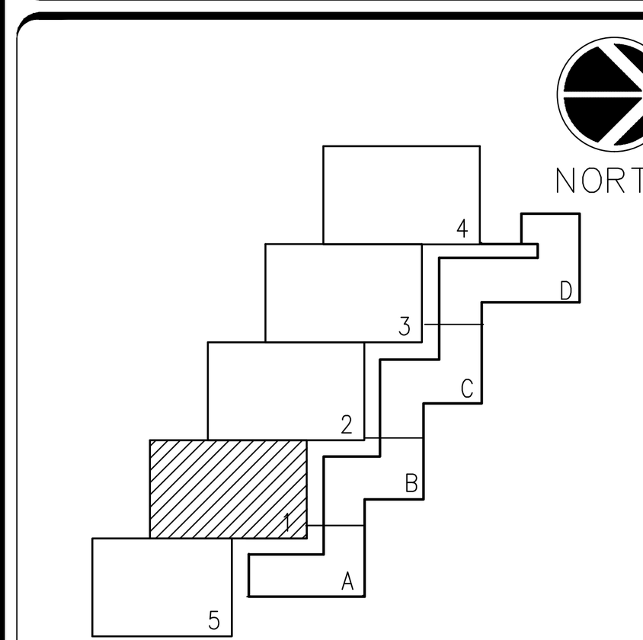

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1/8" = 1'-0"

GRAPHIC SCALE(S)

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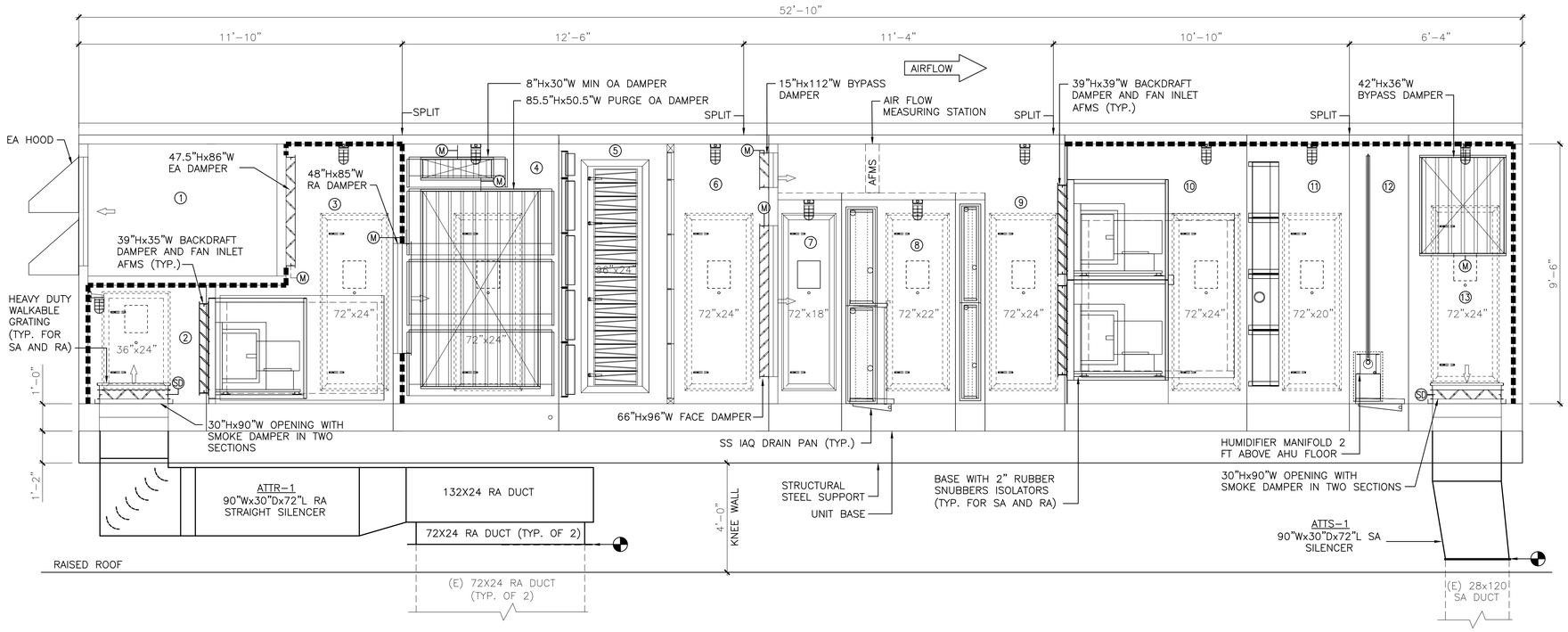
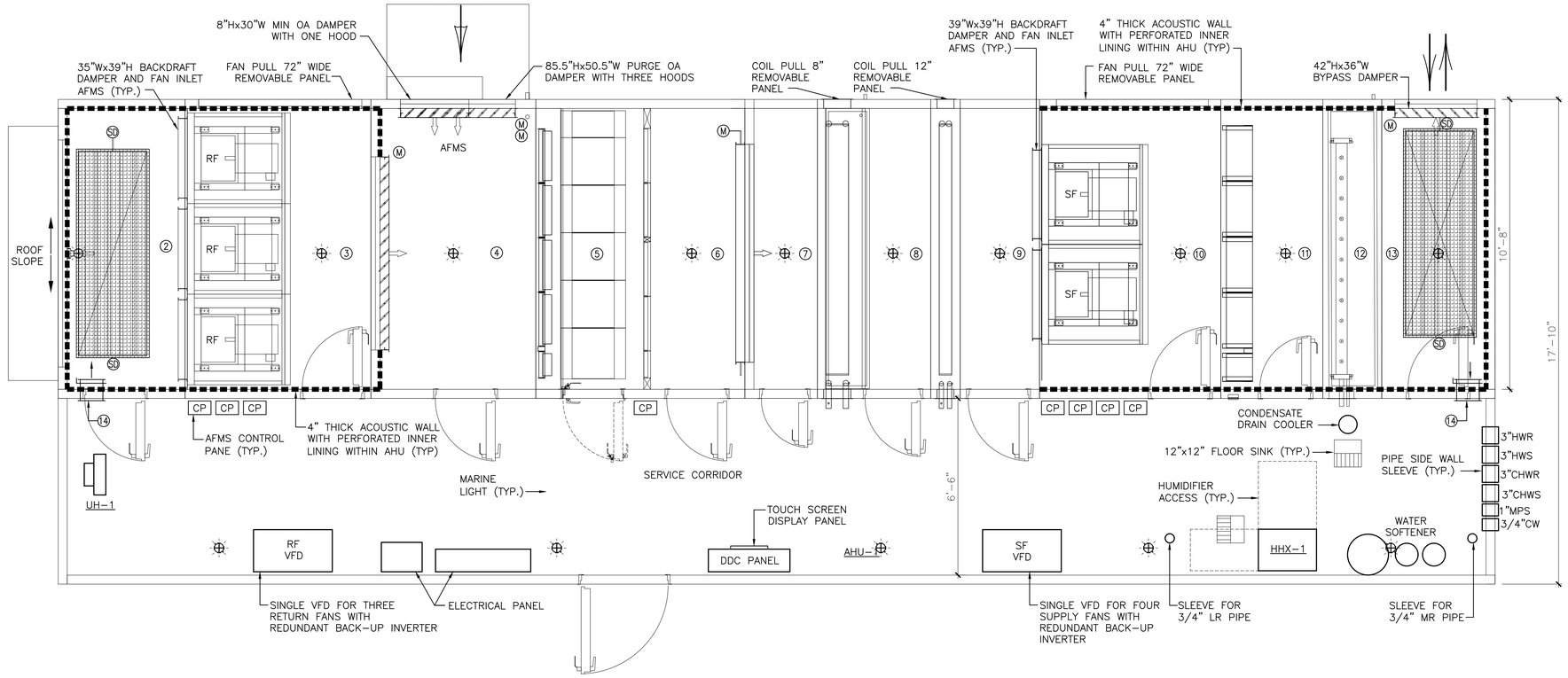
ELEVATION VIEW



TOP VIEW



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M-5-01

AHU-1 DETAIL

SCALE = 1/2"=1'-0"

GENERAL NOTES:

1. AIR HANDLING UNIT SHALL BE BUILT IN COMPLIANCE WITH ETL AND SHALL BEAR AN TUV LABEL.
2. UNIT SHALL BE UL LISTED AS WELL AS EACH COMPONENTS WHERE APPLICABLE SHALL BE UL LISTED AND SHALL HAVE UL LABEL.
3. PROVIDE 4" THICK INJECTED FOAM WALLS, ROOF AND FLOOR HEAVY DUTY CONSTRUCTION.
4. PROVIDE 12" HIGH HEAVY DUTY BASE SUPPORT.
5. PROVIDE ROOF SLOPPING TOWARDS LONG SIDE WALLS OF THE UNIT WITH 1/4" SLOPE, GUTTER AND FOUR DOWN SPOUT.
6. ALL NEW SA AND RA DUCTWORK SHALL BE DOUBLE WALL #10 GAUGE WITH 2" THICK SOUND LINING AND PERFORATED INNER WALL.
7. PROVIDE 4" THICK ACOUSTIC WALL WITH PERFORATED INNER LINING IN SUPPLY AND RETURN FAN SECTIONS TO MEET NC45 NOISE LIMIT IN THE SPACE.
8. SIZE AIR INTAKE AND RELIEF HOODS TO AIR FLOWS LISTED IN SCHEDULE.
9. ALL AHU FLOOR AND WALL PENETRATIONS SHALL BE COORDINATED WITH EQUIPMENT AND PIPE LAYOUT INSIDE THE AHU.

COMPONENT SCHEDULE

(1) PURGE CYCLE TUNNEL WITH 47.5"x86" EA DAMPER, 47.75"x100.25" EXTERIOR OPENING AND EA HOOD WITH WIRE MESH IN OPENING.

(2) RETURN AIR SECTION WITH 30"x90" RA OPENING AND COMBINATION SHUT OFF AND SMOKE DAMPERS IN 2 SECTIONS, ALUMINUM WALKING GRATE, AND 24"x36" ACCESS DOOR. RA INTAKE OPENING SHALL BE FIELD COORDINATE TO MAKE CONNECTION TO EXISTING DUCTWORK.

(3) RETURN FAN SECTION WITH (3) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 39"x34" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, 48"x85" RETURN AIR DAMPER, 24"x72" ACCESS DOOR, AND 6 FT WIDE FAN PULL REMOVABLE PANEL.

(4) MIXED AIR SECTION WITH 8"x30" MINIMUM OA DAMPER AND AIRFLOW STATION, 85.5"x50.5" PURGE CYCLE OA DAMPER, 48"x85" RETURN AIR DAMPER, FOUR (4) OA INLET HOODS WITH WIRE MESH AND 24"x72" ACCESS DOOR.

(5) FILTER SECTION WITH 24"x96" ACCESS DOOR.
- MERV-8 PRE-FILTERS: QTY. (16) 24"x24"x2" & (8) 12"x24"x2".
- MERV-14 INTERMEDIATE FILTERS: QTY. (16) 24"x24"x4" & (8) 12"x24"x4".
- GAS FILTER: QTY. (96) 6"X24"X18" & (16) 6"X12"X18" CASSETTES WITH 50/50 MIX OF COCONUT SHELL CARBON AND POTASSIUM PERMANGANATE. TOTAL GAS FILTER MEDIA CONTENT 2,300 POUNDS.
- MERV-8 POST-FILTERS: QTY.(16) 24"x24"x2" & (8) 12"x24"x2".

(6) BYPASS SECTION WITH 15"x112" BYPASS DAMPER, 66"x96" FACE DAMPER, AND 24"x72" ACCESS DOOR.

(7) CHILLED WATER COIL SECTION WITH QTY. (2) CHILLED WATER COILS W/ 14G SS DOUBLE WALL INSULATED PRIMARY PAN, SEAM WELDED 16G SS SECONDARY PAN. 1/4" THICK SS COIL SUPPORT RACK TO ALLOW FOR INDEPENDENT REMOVAL OF COILS, AND 18"x72" ACCESS DOOR.

(8) HOT WATER COIL SECTION WITH QTY.(2) HOT WATER COILS AND 22"x72" ACCESS DOOR.

(9) FAN INLET SECTION WITH 24"x72" ACCESS DOOR.

(10) SUPPLY FAN SECTION WITH (4) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 39"x39" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, 24"x72" ACCESS DOOR, AND 6 FT WIDE FAN PULL REMOVABLE PANEL.

(11) HEPA FILTER SECTION WITH 20"x72" ACCESS DOOR:
- HIGH CAPACITY, 99.97% HEPA FILTERS: (16) 24"x24"x11.5" & (4) 12"X24"X11.5".

(12) HUMIDIFIER MANIFOLD SECTION WITH SS INNER WALL, CEILING AND FLOOR.

(13) SUPPLY AIR SECTION WITH 30"x90" SA OPENING AND COMBINATION SHUT OFF AND SMOKE DAMPERS IN 2 SECTIONS, ALUMINUM WALKING GRATE, 36"x42" BYPASS DAMPER AND 24"x72" ACCESS DOOR. SA DISCHARGE OPENING SHALL BE FIELD COORDINATE TO MAKE CONNECTION TO EXISTING DUCTWORK.

(14) 10x10 REGISTERS IN SUPPLY AND RETURN SECTIONS. BALANCED TO 200 CFM TO CONDITION SERVICE CORRIDOR.

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STATE OF MARYLAND — STEVEN D. ALLEN — No. 28411 — PROFESSIONAL ENGINEER
02/02/2024

PROFESSIONAL CERTIFICATION.
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KEY PLAN

0 1 2 4
1/2" = 1'-0"
GRAPHIC SCALE(S)

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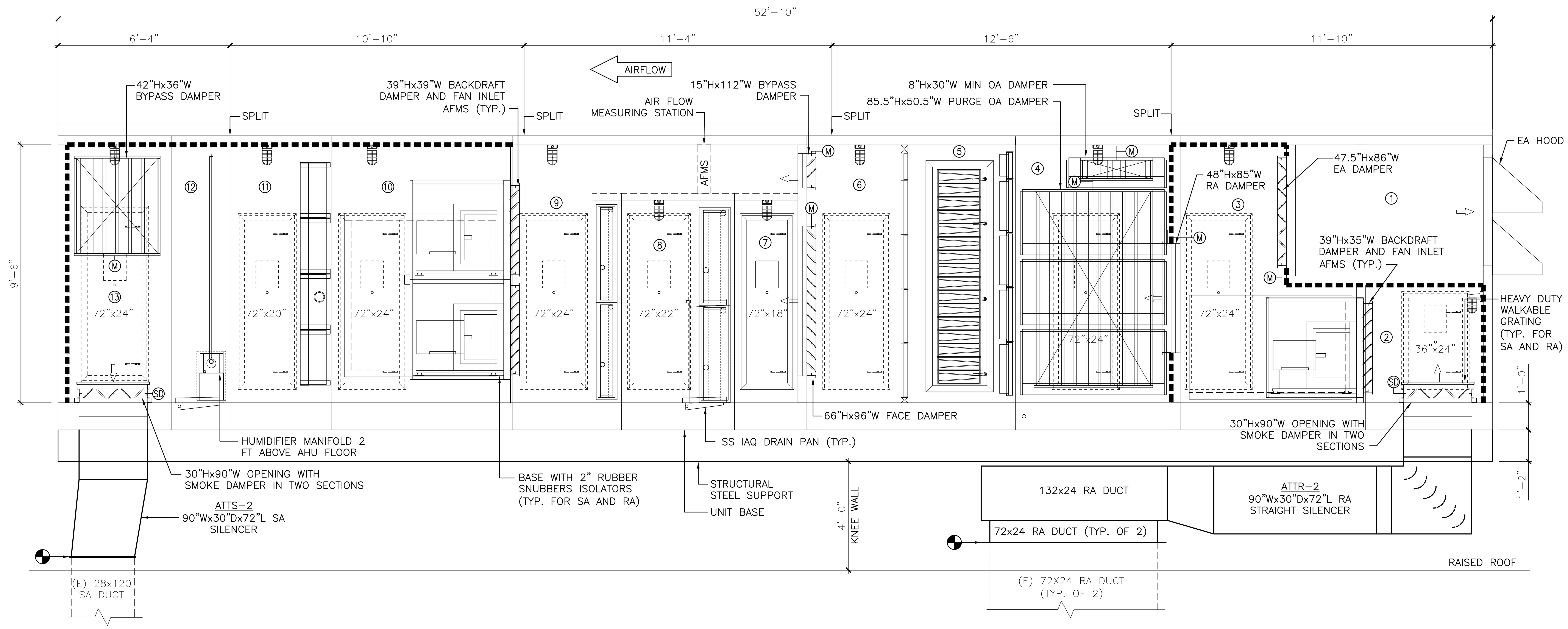
DRAWING TITLE	MECHANICAL DETAILS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO. 34 OF 71

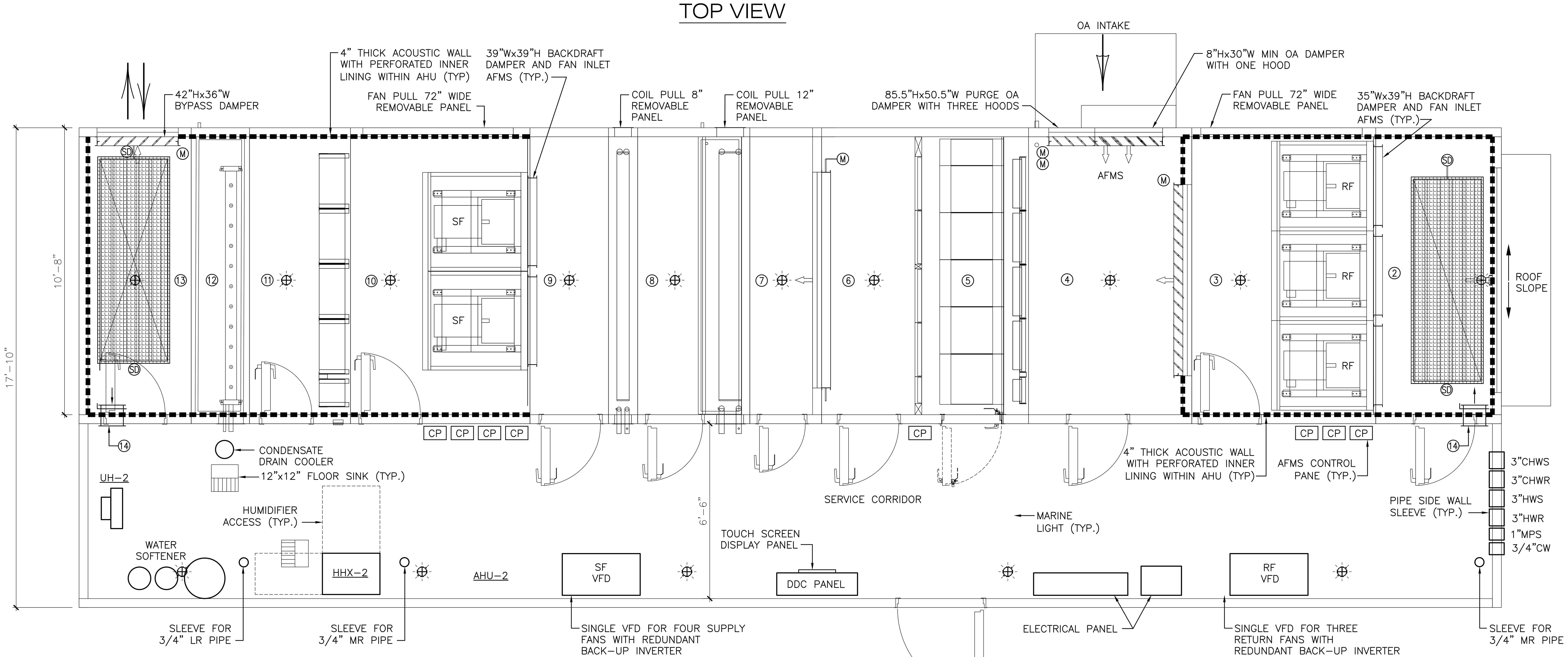
M (DISCIPLINE) 5 (TYPE) 01 (SEQUENCE)

24x36 (ARCH D)

ELEVATION VIEW



TOP VIEW



A M-5-02 AHU-2 DETAIL

SCALE = 1/2"=1'-0"

GENERAL NOTES:

1. AIR HANDLING UNIT SHALL BE BUILT IN COMPLIANCE WITH ETL AND SHALL BEAR AN TUV LABEL.
2. UNIT SHALL BE UL LISTED AS WELL AS EACH COMPONENTS WHERE APPLICABLE SHALL BE UL LISTED AND SHALL HAVE UL LABEL.
3. PROVIDE 4" THICK INJECTED FOAM WALLS, ROOF AND FLOOR HEAVY DUTY CONSTRUCTION.
4. PROVIDE 12" HIGH HEAVY DUTY BASE SUPPORT.
5. PROVIDE ROOF SLOPPING TOWARDS LONG SIDE WALLS OF THE UNIT WITH 1/4" SLOPE, GUTTER AND FOUR DOWN SPOUT.
6. ALL NEW SA AND RA DUCTWORK SHALL BE DOUBLE WALL #10 GAUGE WITH 2" THICK SOUND LINING AND PERFORATED INNER WALL.
7. PROVIDE 4" THICK ACOUSTIC WALL WITH PERFORATED INNER LINING IN SUPPLY AND RETURN FAN SECTIONS TO MEET NC45 NOISE LIMIT IN THE SPACE.
8. SIZE AIR INTAKE AND RELIEF HOODS TO AIR FLOWS LISTED IN SCHEDULE.
9. ALL AHU FLOOR AND WALL PENETRATIONS SHALL BE COORDINATED WITH EQUIPMENT AND PIPE LAYOUT INSIDE THE AHU.

COMPONENT SCHEDULE

1. PURGE CYCLE TUNNEL WITH 47.5"x86" EA DAMPER, 47.75"x100.25" EXTERIOR OPENING AND EA HOOD WITH WIRE MESH IN OPENING.
2. RETURN AIR SECTION WITH 30"x90" RA OPENING AND COMBINATION SHUT OFF AND SMOKE DAMPERS IN 2 SECTIONS, ALUMINUM WALKING GRATE, AND 24"x36" ACCESS DOOR. RA INTAKE OPENING SHALL BE FIELD COORDINATE TO MAKE CONNECTION TO EXISTING DUCTWORK.
3. RETURN FAN SECTION WITH (3) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 39"x34" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, 48"x85" RETURN AIR DAMPER, 24"x72" ACCESS DOOR, AND 72" WIDE FAN PULL REMOVABLE PANEL.
4. MIXED AIR SECTION WITH 8"x30" MINIMUM OA DAMPER AND AIRFLOW STATION, 85.5"x50.5" PURGE CYCLE OA DAMPER, 48"x85" RETURN AIR DAMPER, FOUR (4) OA INLET HOODS WITH WIRE MESH AND 24"x72" ACCESS DOOR.
5. FILTER SECTION WITH 24"x96" ACCESS DOOR.
   - MERV-8 PRE-FILTERS: QTY. (16) 24"x24"x2" & (8) 12"x24"x2".
   - MERV-14 INTERMEDIATE FILTERS: QTY. (16) 24"x24"x4" & (8) 12"x24"x4".
   - GAS FILTER: QTY. (96) 6"x24"x18" & (16) 6"X12"X18" CASSETTES WITH 50/50 MIX OF COCONUT SHELL CARBON AND POTASSIUM PERMANGANATE. TOTAL GAS FILTER MEDIA CONTENT 2,300 POUNDS.
   - MERV-8 POST-FILTERS: QTY.(16) 24"x24"x2" & (8) 12"x24"x2".
6. BYPASS SECTION WITH 15"x112" BYPASS DAMPER, 66"x96" FACE DAMPER, AND 24"x72" ACCESS DOOR.
7. CHILLED WATER COIL SECTION WITH QTY. (2) CHILLED WATER COILS W/ 14G SS DOUBLE WALL INSULATED PRIMARY PAN, SEAM WELDED 16G SS SECONDARY PAN. 1/4" THICK SS COIL SUPPORT RACK TO ALLOW FOR INDEPENDENT REMOVAL OF COILS, AND 18"x72" ACCESS DOOR.
8. HOT WATER COIL SECTION WITH QTY.(2) HOT WATER COILS AND 22"x72" ACCESS DOOR.
9. FAN INLET SECTION WITH 24"x72" ACCESS DOOR.
10. SUPPLY FAN SECTION WITH (4) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 39"x39" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, 24"x72" ACCESS DOOR, AND 72" WIDE FAN PULL REMOVABLE PANEL.
11. HEPA FILTER SECTION WITH 20"x72" ACCESS DOOR:
    - HIGH CAPACITY, 99.97% HEPA FILTERS: (16) 24"x24"x11.5" & (4) 12"X24"X11.5".
12. HUMIDIFIER MANIFOLD SECTION WITH SS INNER WALL, CEILING AND FLOOR.
13. SUPPLY AIR SECTION WITH 30"x90" SA OPENING AND COMBINATION SHUT OFF AND SMOKE DAMPERS IN 2 SECTIONS, ALUMINUM WALKING GRATE, 36"x42" BYPASS DAMPER AND 24"x72" ACCESS DOOR. SA DISCHARGE OPENING SHALL BE FIELD COORDINATE TO MAKE CONNECTION TO EXISTING DUCTWORK.
14. 10x10 REGISTERS IN SUPPLY AND RETURN SECTIONS. BALANCED TO 200 CFM TO CONDITION SERVICE CORRIDOR.

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STATE OF MARYLAND PROFESSIONAL ENGINEER No. 28411 — 02/02/2024

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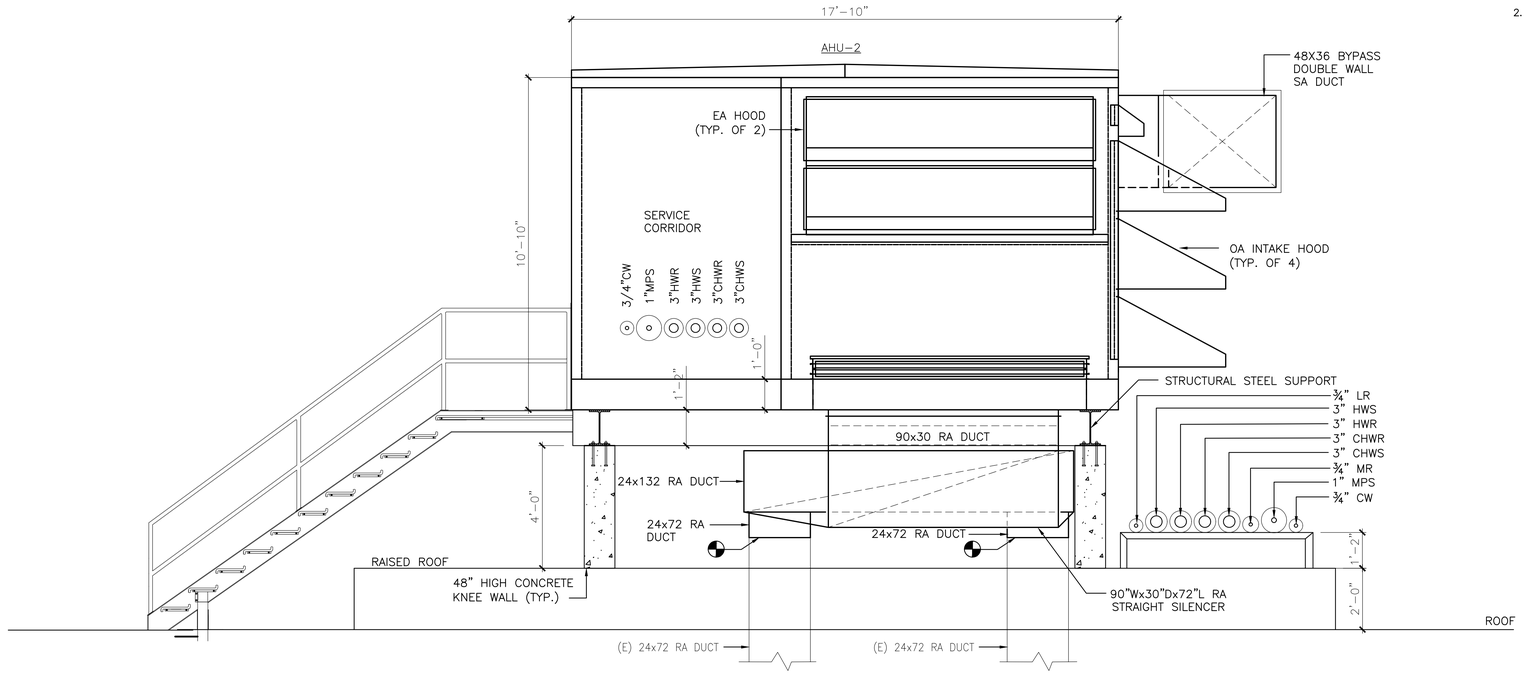
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO. 35 OF 71	M (DISCIPLINE) / 5 (TYPE) / 02 (SEQUENCE)

GENERAL NOTES:

1. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR AHU KNEE WALL AND STRUCTURAL STEEL SUPPORT AS WELL AS TYPICAL PIPE AND DUCT SUPPORT REQUIREMENTS.
2. VIEWS SHOW AHU-2 LAYOUT. AHU-1 LAYOUT IS SIMILAR WITH DIFFERENT PIPING CONFIGURATION FOR THE MIRRORED AHU.



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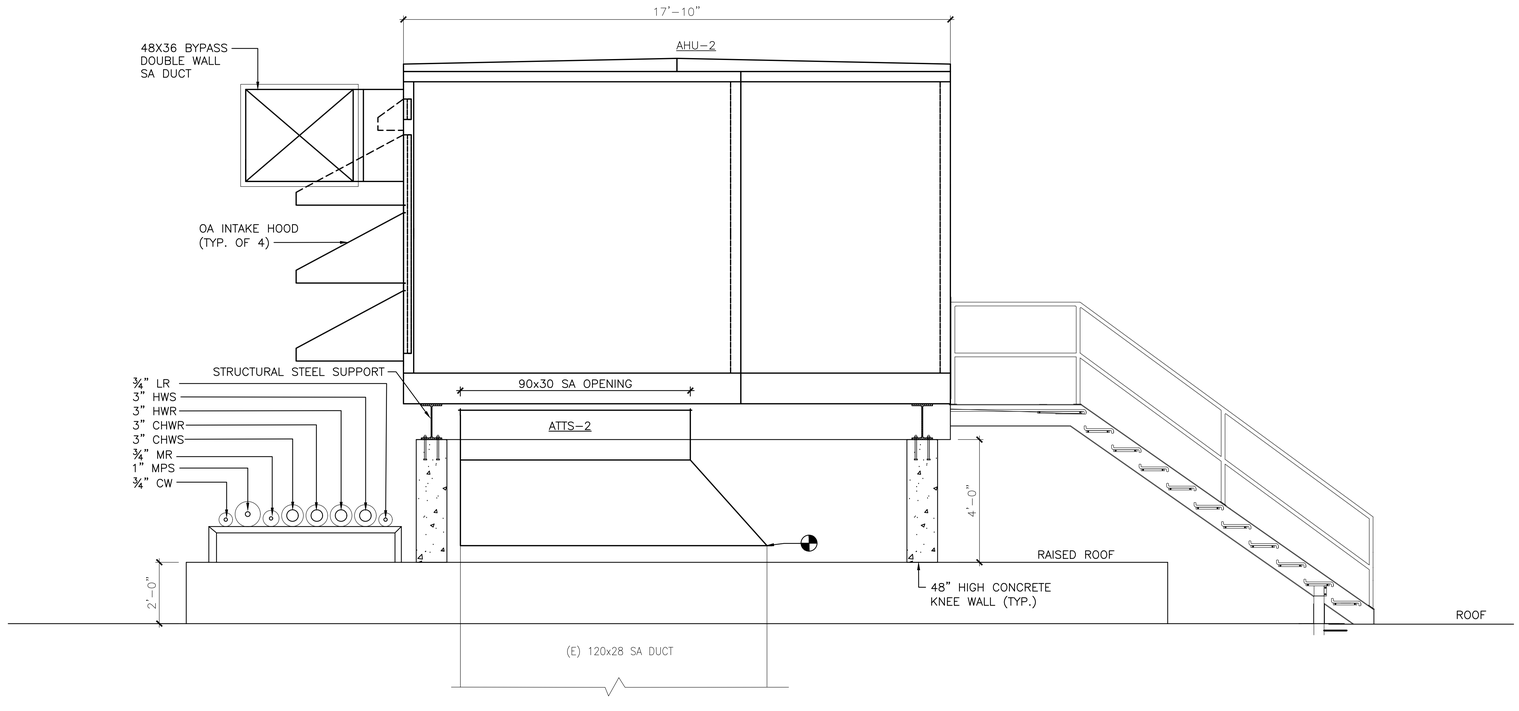
M-5-03

AHU-2 DETAIL: RIGHT SIDE VIEW

SCALE = 1/2"=1'-0"



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M-5-03

AHU-2 DETAIL: LEFT SIDE VIEW

SCALE = 1/2"=1'-0"

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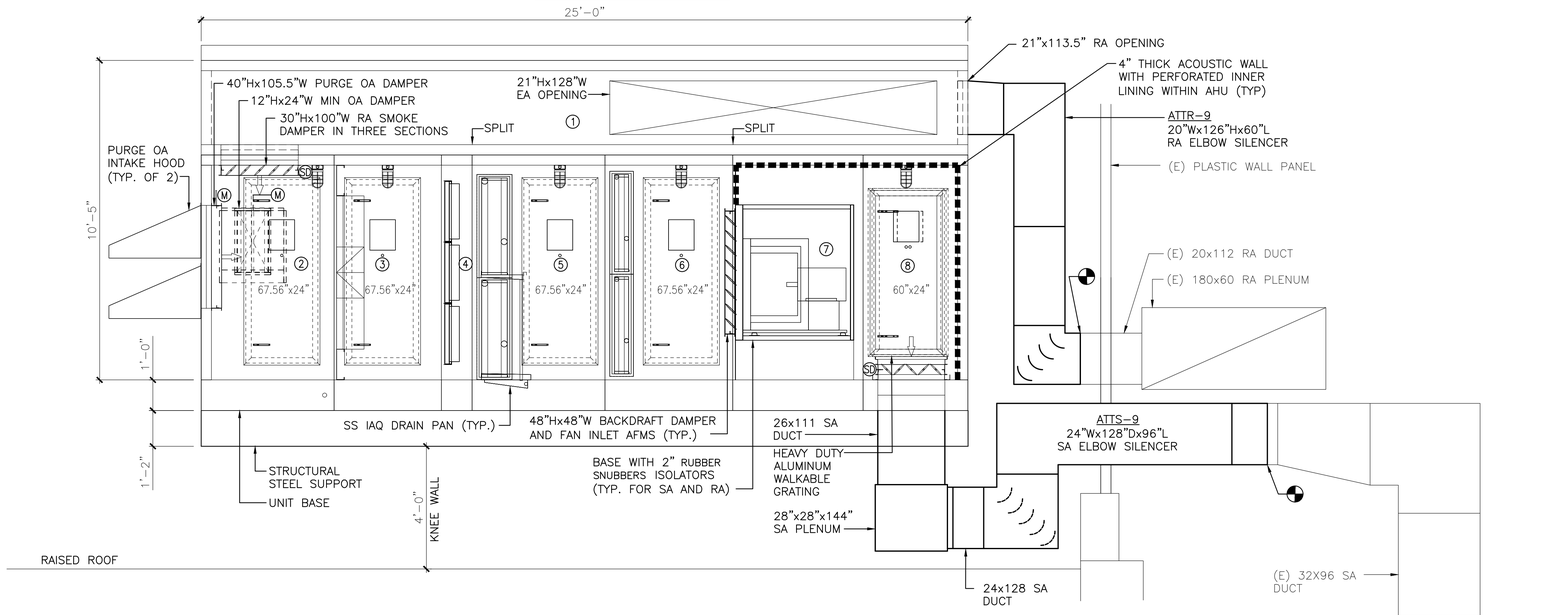
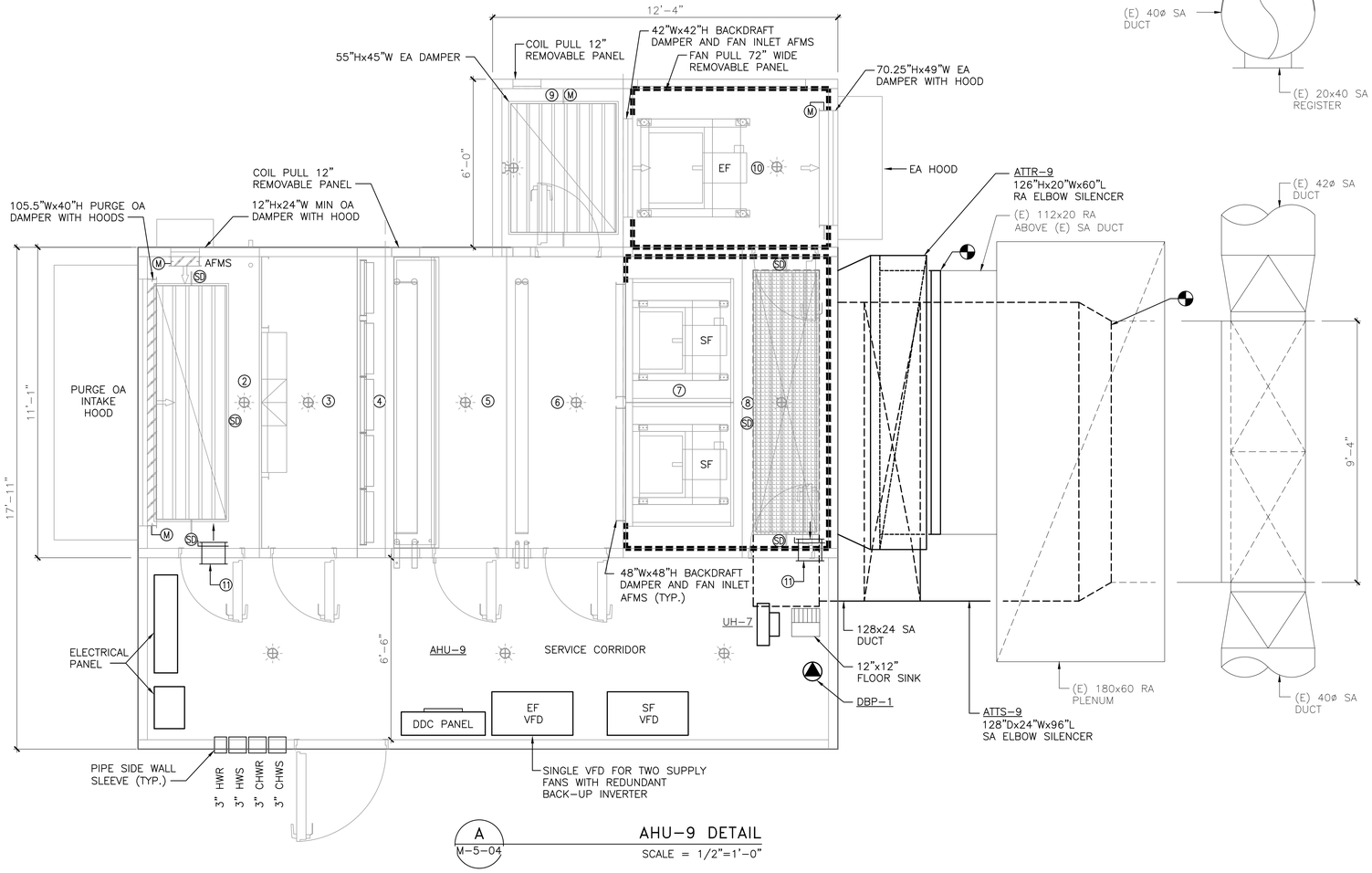
SHEET NO.	36 OF 71
	M (DISCIPLINE) / 5 (TYPE) / 03 (SEQUENCE)

BLK-01345
BLK-01346

ELEVATION VIEW



TOP VIEW



A
M-5-04

AHU-9 DETAIL

SCALE = 1/2"=1'-0"

GENERAL NOTES:

1. AIR HANDLING UNIT SHALL BE BUILT IN COMPLIANCE WITH TUV AND SHALL BEAR AN ETL LABEL.
2. UNIT SHALL BE UL LISTED AS WELL AS EACH COMPONENTS WHERE APPLICABLE SHALL BE UL LISTED AND SHALL HAVE UL LABEL.
3. PROVIDE 4" THICK INJECTED FOAM WALLS, ROOF AND FLOOR HEAVY DUTY CONSTRUCTION.
4. PROVIDE 12" HIGH HEAVY DUTY BASE SUPPORT.
5. PROVIDE ROOF SLOPPING TOWARDS LONG SIDE WALLS OF THE UNIT WITH 1/4" SLOPE, GUTTER AND FOUR DOWN SPOUT.
6. ALL NEW SA AND RA DUCTWORK SHALL BE DOUBLE WALL #10 GAUGE WITH 2" THICK SOUND LINING AND PERFORATED INNER WALL.
7. PROVIDE 4" THICK ACOUSTIC WALL WITH PERFORATED INNER LINING IN SUPPLY AND RETURN FAN SECTIONS TO MEET NC45 NOISE LIMIT IN THE SPACE.
8. SIZE AIR INTAKE AND RELIEF HOODS TO AIR FLOWS LISTED IN SCHEDULE.
9. ALL AHU FLOOR AND WALL PENETRATIONS SHALL BE COORDINATED WITH EQUIPMENT AND PIPE LAYOUT INSIDE THE AHU.

COMPONENT SCHEDULE:

1. RETURN AIR TUNNEL, 30"x100" RA SMOKE DAMPERS IN 3 SECTIONS, RA AND EA OPENINGS.
2. MIXED AIR SECTION WITH 24"x12" MINIMUM AND 40"X105.5" PURGE CYCLE OA DAMPERS, OA HOODS WITH WIRE MESH OPENINGS, AND 24"x67.56" ACCESS DOOR.
3. AIR BLENDER SECTION WITH 60"x60"x10.75" BLANDER AND 24"x67.56" ACCESS DOOR
4. FILTER SECTION WITH:
   - MERV-8 PRE-FILTERS: QTY.(15) 24"X24"X2".
   - MERV-14 INTERMEDIATE FILTERS: QTY.(15) 24"X24"X4".
5. CHILLED WATER COIL SECTION WITH QTY.(2) CHILLED WATER COILS W/ 14G SS DOUBLE WALL INSULATED PRIMARY PAN, SEAM WELDED 16G SS SECONDARY PAN. 1/4" THICK SS COIL SUPPORT RACK TO ALLOW FOR INDEPENDENT REMOVAL OF COILS, AND 24"x67.56" ACCESS DOOR.
6. HOT WATER COIL SECTION WITH QTY.(2) HOT WATER COILS, AND 24"x67.56" ACCESS DOOR.
7. SUPPLY FAN SECTION WITH (2) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 48"x48" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, AND 72" WIDE FAN PULL REMOVABLE PANEL.
8. SUPPLY AIR SECTION WITH 26"x111" SA OPENING AND COMBINATION SHUT OFF AND SMOKE DAMPERS IN 3 SECTIONS, ALUMINUM WALKING GRATE, AND 24"x60" ACCESS DOOR. SA DISCHARGE OPENING SHALL BE FIELD COORDINATE TO MAKE CONNECTION TO EXISTING DUCTWORK
9. EXHAUST/RELIEF SECTION WITH 45"x55" EXHAUST DAMPER AND 24"x60" ACCESS DOOR.
10. EXHAUST FAN SECTION WITH (1) DIRECT DRIVE PLENUM FANS, TEFC INVERTER DUTY, PREMIUM EFFICIENCY MOTORS, GROUNDING SHAFTS, RUBBER SNUBBERS ISOLATION, 42"x42" FAN INLET BACKDRAFT DAMPER AND THERMAL DISPERSION TYPE AFMS, 72" WIDE FAN PULL REMOVABLE PANEL AND 24"x60" ACCESS DOOR.
11. 10x10 REGISTERS IN SUPPLY AND RETURN SECTIONS. BALANCED TO 200 CFM TO CONDITION SERVICE CORRIDOR.

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Suite 300
Washington, D.C. 20006

STATE OF MARYLAND
STEVEN ALLEN KING
No. 28411
PROFESSIONAL ENGINEER
02/02/2024

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KEY PLAN

0 1 2 4
1/2" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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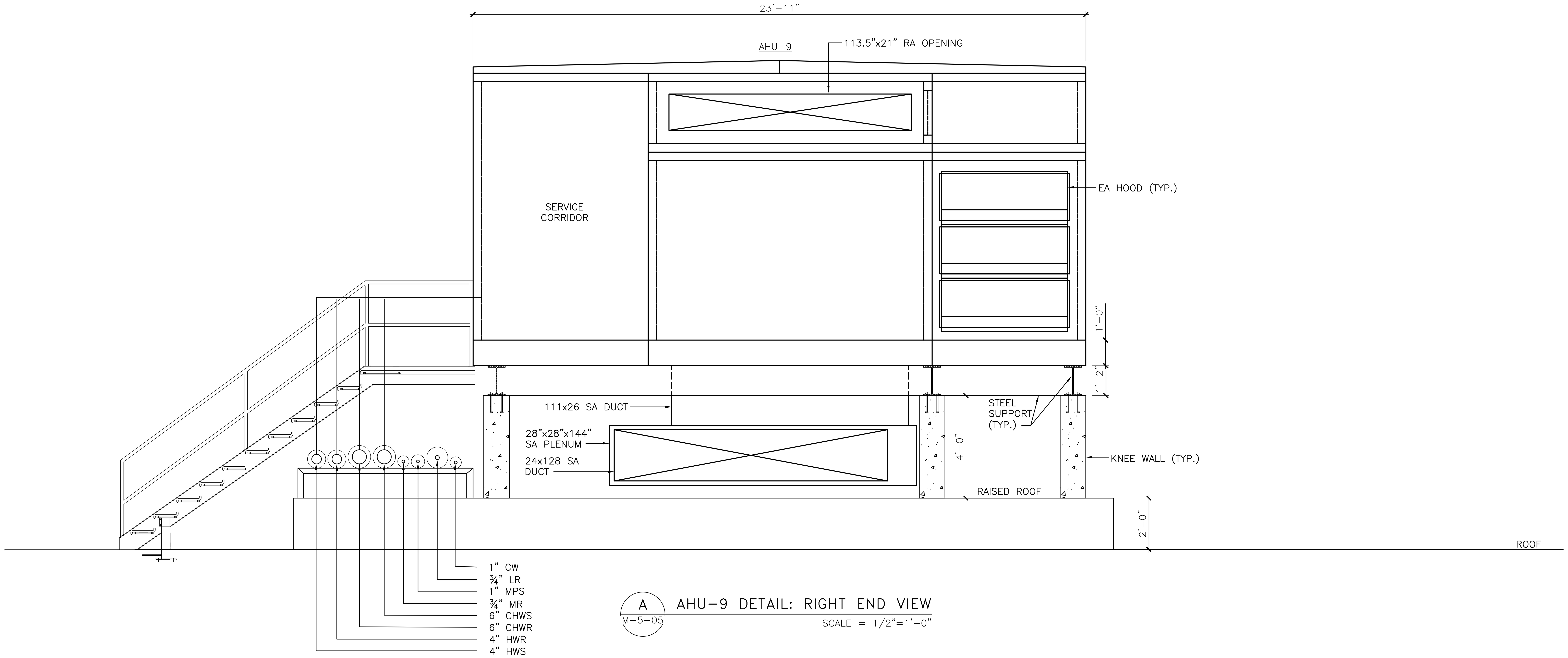
600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024-2520

BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL DETAILS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)
SHEET NO.	37 OF 71
	M (DISCIPLINE) / 5 (TYPE) / 04 (SEQUENCE)

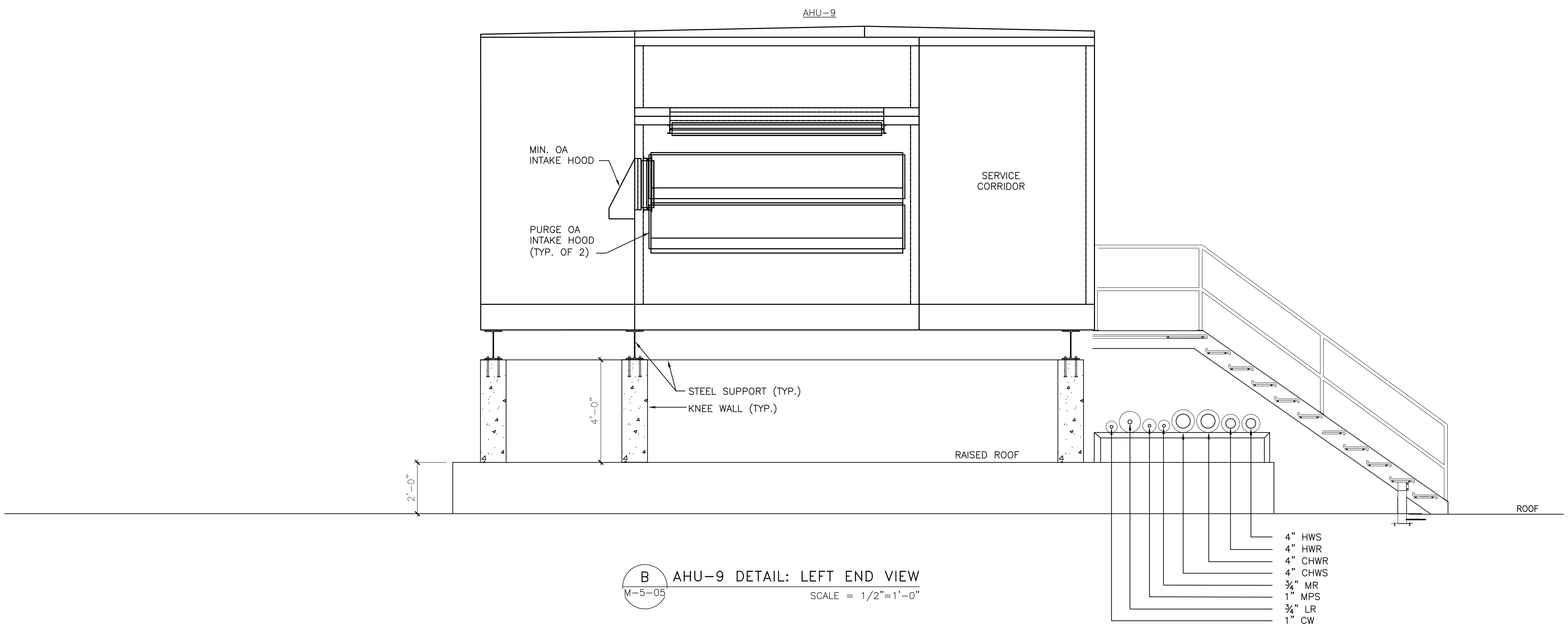
GENERAL NOTES:

1. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR AHU KNEE WALL AND STRUCTURAL STEEL SUPPORT AS WELL AS TYPICAL PIPE AND DUCT SUPPORT REQUIREMENTS.



A M-5-05 AHU-9 DETAIL: RIGHT END VIEW

SCALE = 1/2"=1'-0"



B M-5-05 AHU-9 DETAIL: LEFT END VIEW

SCALE = 1/2"=1'-0"

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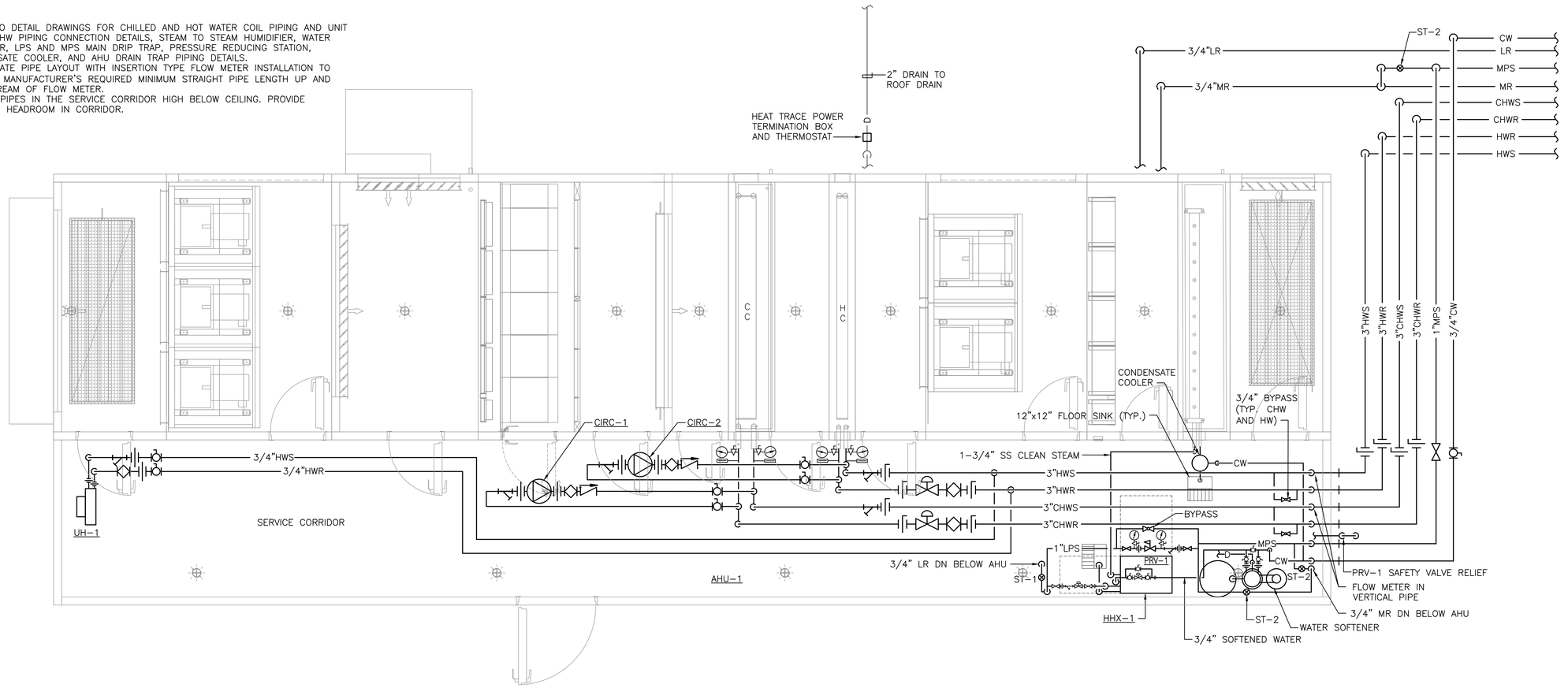
SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
38 OF 71	M	5	05

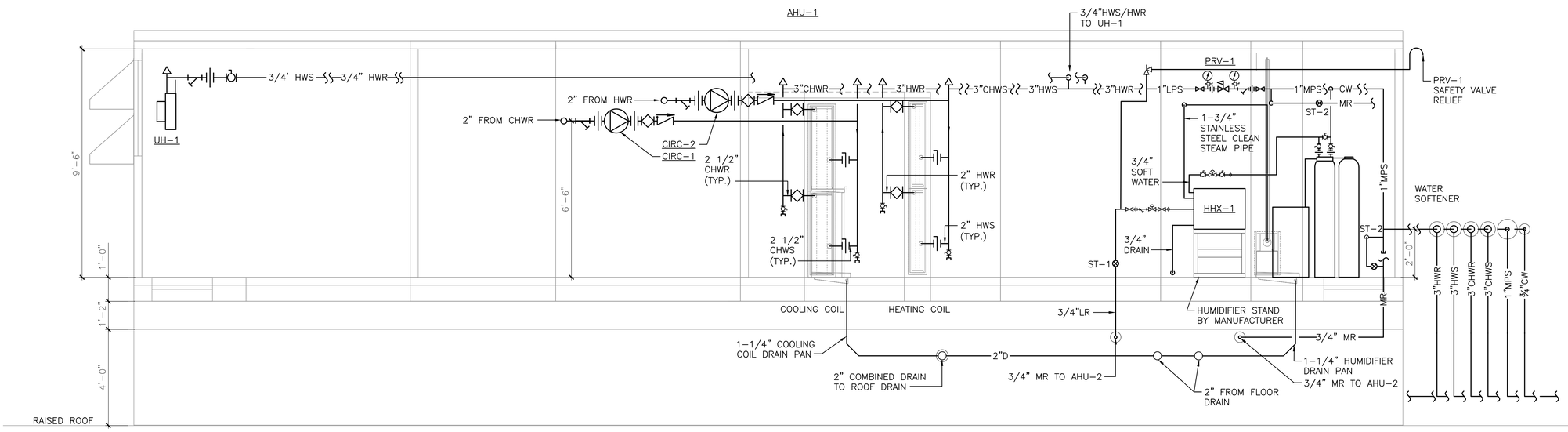
NOTES:

1. REFER TO DETAIL DRAWINGS FOR CHILLED AND HOT WATER COIL PIPING AND UNIT HEATER HW PIPING CONNECTION DETAILS, STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, LPS AND MPS MAIN DRIP TRAP, PRESSURE REDUCING STATION, CONDENSATE COOLER, AND AHU DRAIN TRAP PIPING DETAILS.
2. COORDINATE PIPE LAYOUT WITH INSERTION TYPE FLOW METER INSTALLATION TO PROVIDE MANUFACTURER'S REQUIRED MINIMUM STRAIGHT PIPE LENGTH UP AND DOWNSTREAM OF FLOW METER.
3. INSTALL PIPES IN THE SERVICE CORRIDOR HIGH BELOW CEILING. PROVIDE MAXIMUM HEADROOM IN CORRIDOR.



A M-5-06 AHU-1 PIPING PLAN DETAIL

SCALE = 1/2"=1'-0"



B M-5-06 AHU-1 PIPING ELEVATION DETAIL

SCALE = 1/2"=1'-0"

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STEVEN L. LLEN
No. 28411
PROFESSIONAL ENGINEER
6/10/2024

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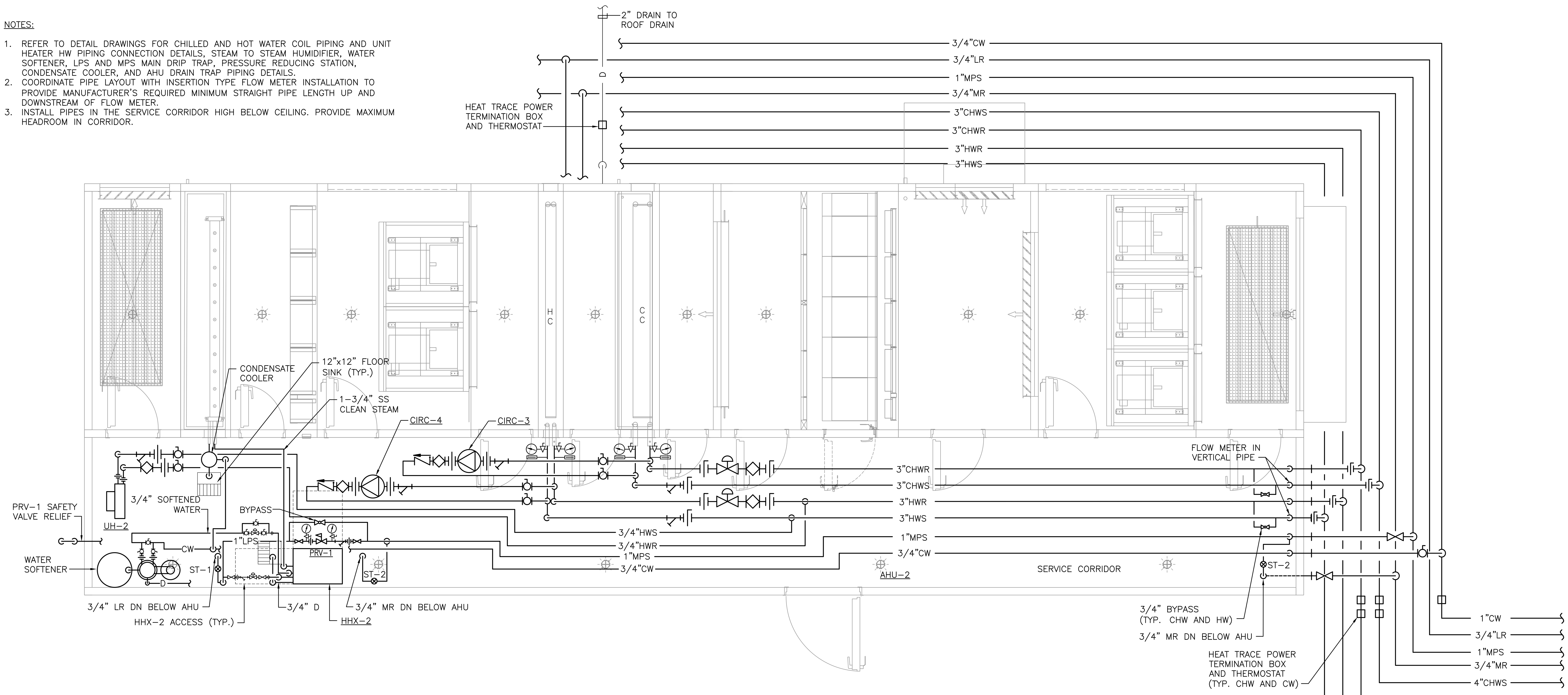
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO. 39 OF 71

M (DISCIPLINE) 5 (TYPE) 06 (SEQUENCE)

NOTES:

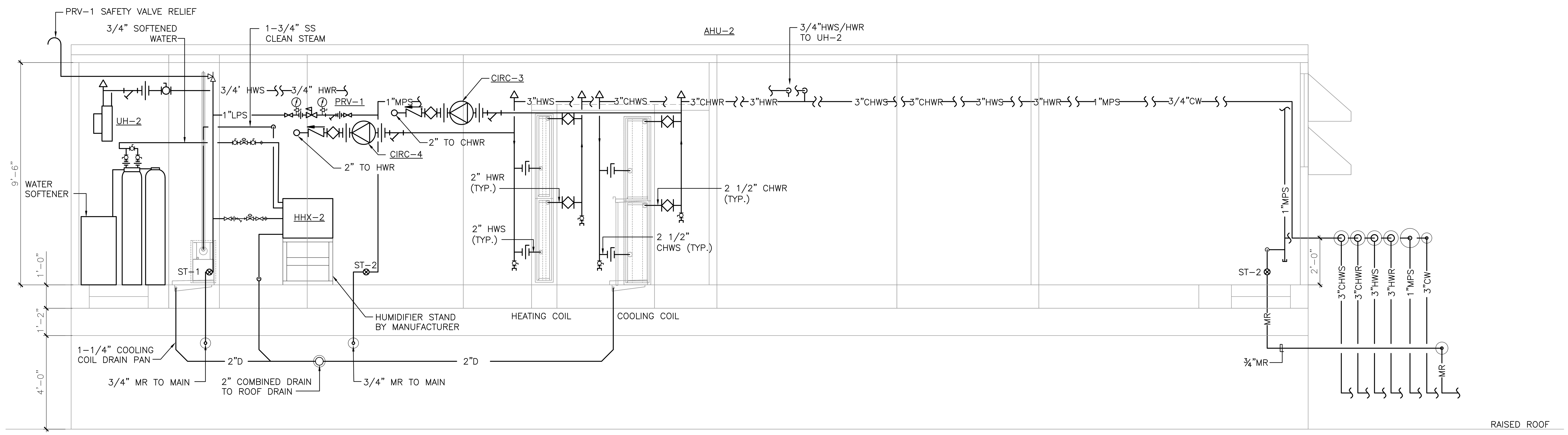
1. REFER TO DETAIL DRAWINGS FOR CHILLED AND HOT WATER COIL PIPING AND UNIT HEATER HW PIPING CONNECTION DETAILS, STEAM TO STEAM HUMIDIFIER, WATER SOFTENER, LPS AND MPS MAIN DRIP TRAP, PRESSURE REDUCING STATION, CONDENSATE COOLER, AND AHU DRAIN TRAP PIPING DETAILS.
2. COORDINATE PIPE LAYOUT WITH INSERTION TYPE FLOW METER INSTALLATION TO PROVIDE MANUFACTURER'S REQUIRED MINIMUM STRAIGHT PIPE LENGTH UP AND DOWNSTREAM OF FLOW METER.
3. INSTALL PIPES IN THE SERVICE CORRIDOR HIGH BELOW CEILING. PROVIDE MAXIMUM HEADROOM IN CORRIDOR.



A
M-5-07

AHU-2 PIPING PLAN DETAIL

SCALE = 1/2"=1'-0"



B
M-5-07

AHU-2 PIPING ELEVATION DETAIL

SCALE = 1/2"=1'-0"

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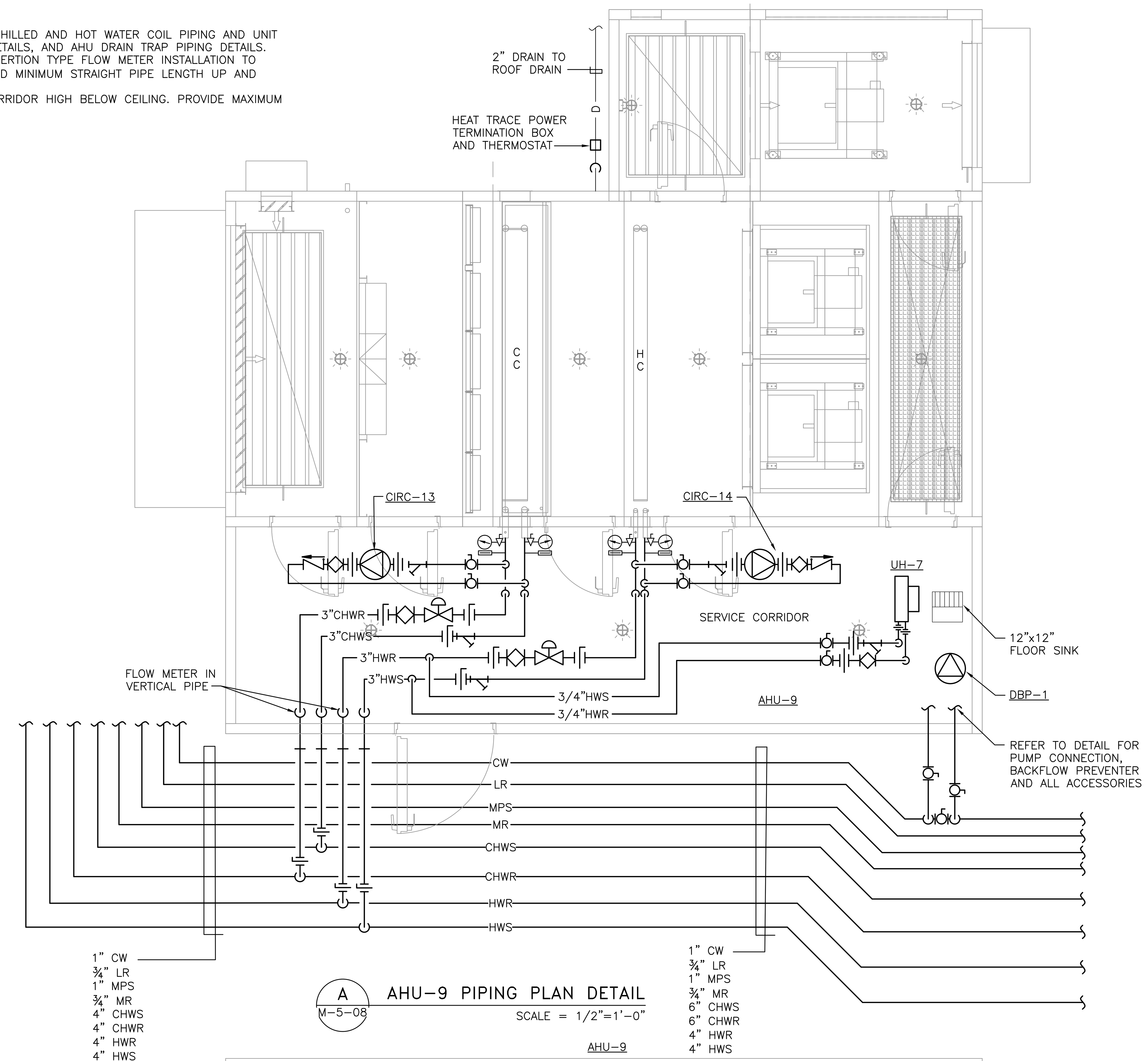
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO. 40 OF 71 — M (DISCIPLINE) 5 (TYPE) 07 (SEQUENCE)

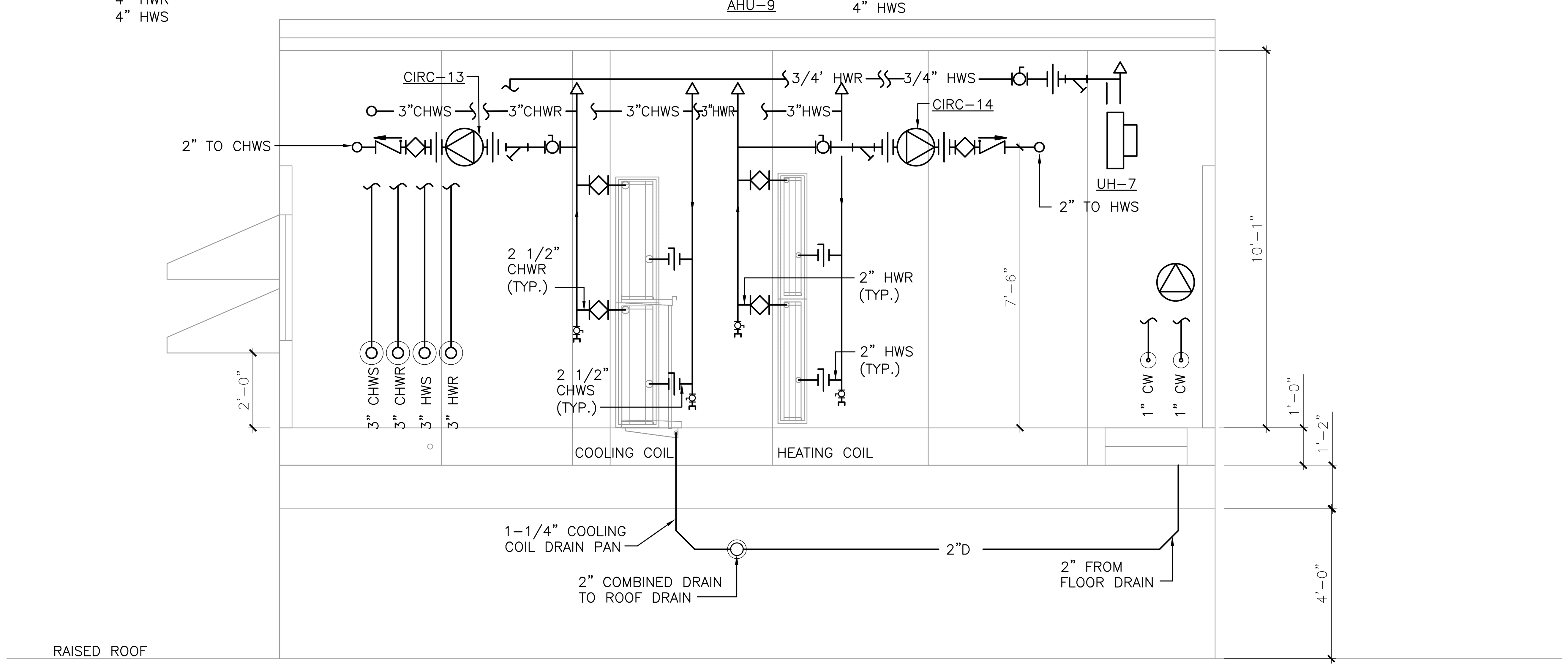
NOTES:

1. REFER TO DETAIL DRAWINGS FOR CHILLED AND HOT WATER COIL PIPING AND UNIT HEATER HW PIPING CONNECTION DETAILS, AND AHU DRAIN TRAP PIPING DETAILS.
2. COORDINATE PIPE LAYOUT WITH INSERTION TYPE FLOW METER INSTALLATION TO PROVIDE MANUFACTURER'S REQUIRED MINIMUM STRAIGHT PIPE LENGTH UP AND DOWNSTREAM OF FLOW METER.
3. INSTALL PIPES IN THE SERVICE CORRIDOR HIGH BELOW CEILING. PROVIDE MAXIMUM HEADROOM IN CORRIDOR.



A M-5-08 AHU-9 PIPING PLAN DETAIL

SCALE = 1/2"=1'-0"



B M-5-08 AHU-9 PIPING ELEVATION DETAIL

SCALE = 1/2"=1'-0"

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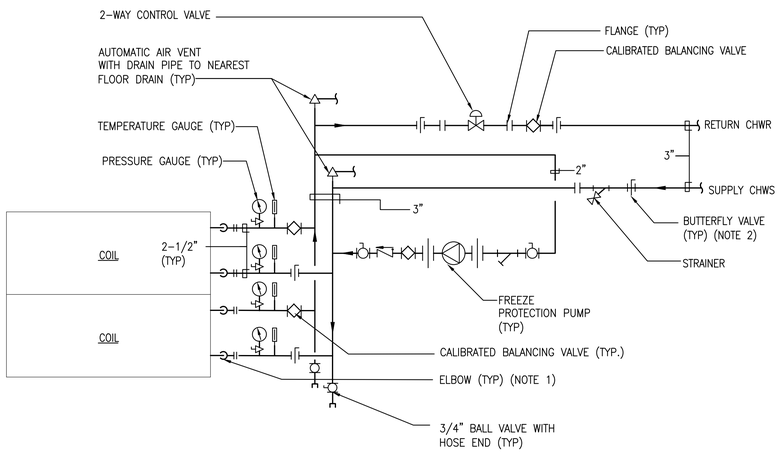
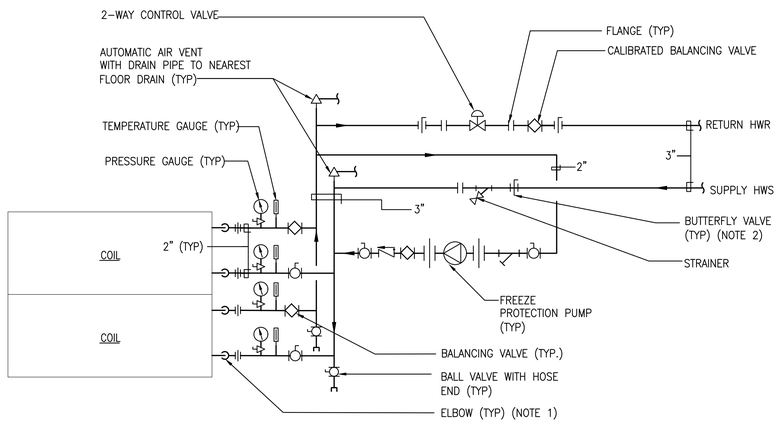
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
41 OF 71	M	5	08



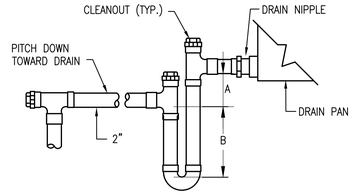
NOTES:
1. ARRANGE ALL HEADER CONNECTIONS SO AS NOT TO BLOCK COIL REMOVAL.
2. BALL VALVE MAY BE USED INSTEAD OF GATE VALVE WHERE PIPING IS 2"Ø OR SMALLER.
3. USE UNION FOR PIPE SIZES 2"Ø OR SMALLER.

1 M-5-09 AHU-1 AND 2 CHILLED WATER COIL PIPING DETAIL
SCALE = NTS



NOTES:
1. ARRANGE ALL HEADER CONNECTIONS SO AS NOT TO BLOCK COIL REMOVAL.
2. BALL VALVE MAY BE USED INSTEAD OF BUTTERFLY VALVE WHERE PIPING IS 2"Ø OR SMALLER.
3. USE UNION FOR PIPE SIZES 2"Ø OR SMALLER.

2 M-5-09 AHU-1 AND 2 HOT WATER COIL PIPING DETAIL
SCALE = NTS

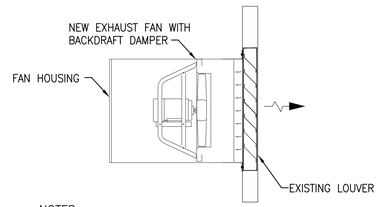


POSITIVE PRESSURE TRAP
A = MINIMUM 1 INCH
B = 1 INCH FOR EACH 1 INCH WG MAXIMUM TOTAL POSITIVE STATIC PRESSURE PLUS 1 INCH (MIN. OF 4 INCHES)

NEGATIVE PRESSURE TRAP
A = 1 INCH FOR EACH 1" WG OF MAXIMUM NEGATIVE STATIC PRESSURE PLUS 1 INCH (MIN. OF 2 INCHES)
B = HALF OF "A"

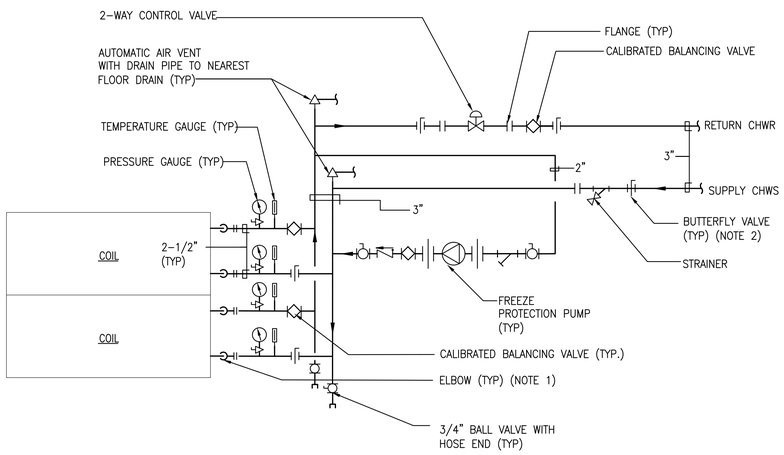
NOTES:
1. ALL RIDGED COPPER DRAIN PIPES BELOW AHU SHALL BE HEAT TRACED, INSULATED AND HAVE ALUMINUM PROTECTIVE JACKET.

3 M-5-09 P-TRAP PIPING DETAIL
SCALE = NTS



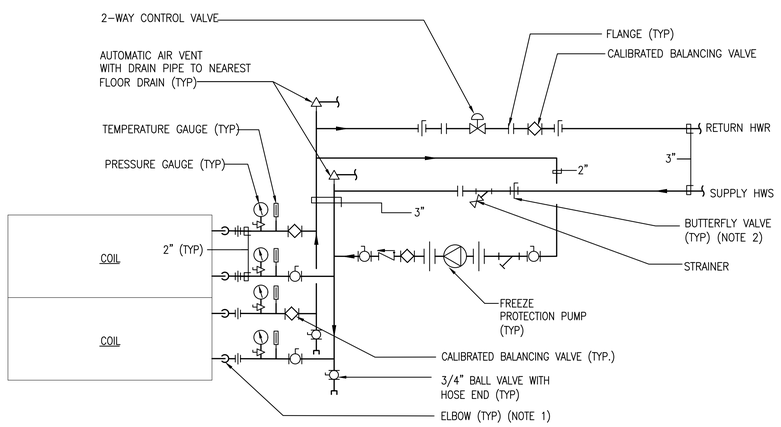
NOTES:
1. PROVIDE NEW MOUNTING TO CONNECT NEW FAN TO EXISTING LOUVER.
2. PROVIDE NEW MOTORIZED DAMPER FOR AIR INTAKE.

4 M-5-09 EXHAUST FAN DETAIL
SCALE = NTS



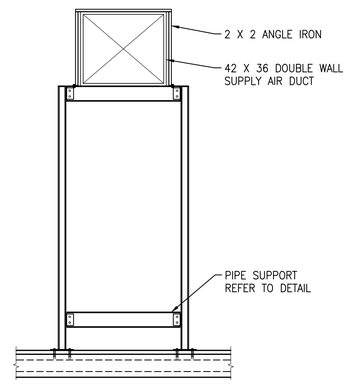
NOTES:
1. ARRANGE ALL HEADER CONNECTIONS SO AS NOT TO BLOCK COIL REMOVAL.
2. BALL VALVE MAY BE USED INSTEAD OF GATE VALVE WHERE PIPING IS 2"Ø OR SMALLER.
3. USE UNION FOR PIPE SIZES 2"Ø OR SMALLER.

5 M-5-09 AHU-9 CHILLED WATER COIL PIPING DETAIL
SCALE = NTS



NOTES:
1. ARRANGE ALL HEADER CONNECTIONS SO AS NOT TO BLOCK COIL REMOVAL.
2. BALL VALVE MAY BE USED INSTEAD OF BUTTERFLY VALVE WHERE PIPING IS 2"Ø OR SMALLER.
3. USE UNION FOR PIPE SIZES 2"Ø OR SMALLER.

6 M-5-09 AHU-9 HOT WATER COIL PIPING DETAIL
SCALE = NTS



NOTES:
1. REFER TO STRUCTURAL DRAWING FOR SUPPORT REQUIREMENTS.

7 M-5-09 DUCT SUPPORT DETAIL
SCALE = NTS

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STATE OF MARYLAND
FRANK D. LLEN
No. 28411
PROFESSIONAL ENGINEER
1/13/2024

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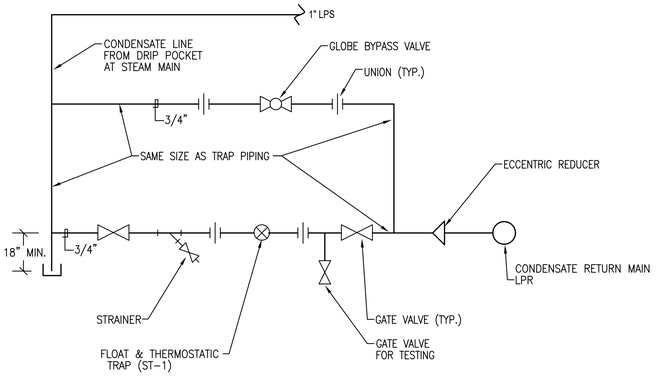
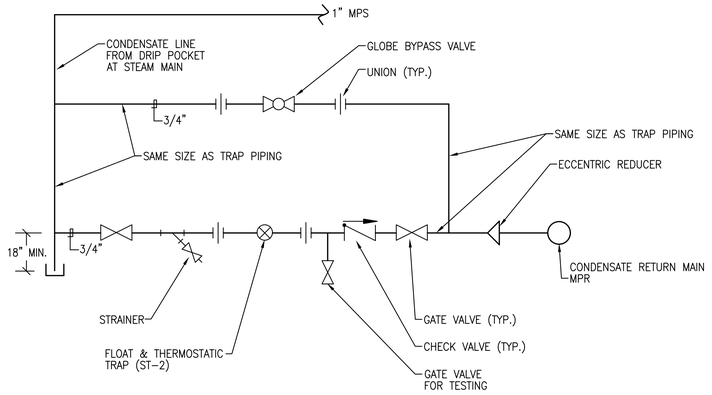
SHEET NO. 42 OF 71

M (DISCIPLINE) 5 (TYPE) 09 (SEQUENCE)



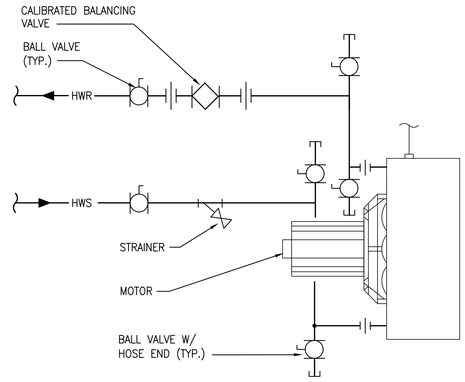
1 M-5-10 LOW PRESSURE DRIP PIPING DETAIL

SCALE = NTS



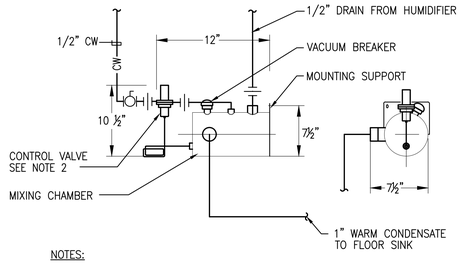
2 M-5-10 MEDIUM PRESSURE DRIP PIPING DETAIL

SCALE = NTS



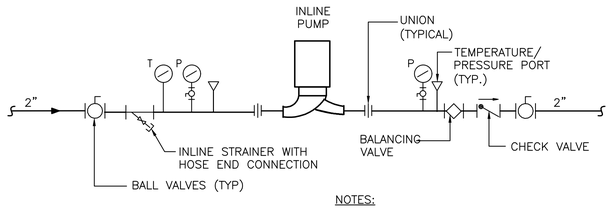
3 M-5-10 UNIT HEATER PIPING DETAIL

SCALE = NTS



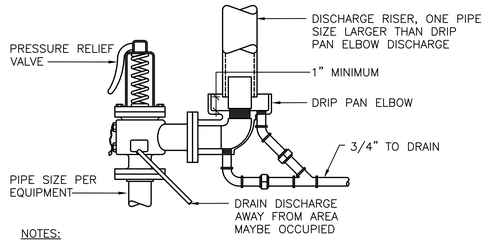
NOTES:

1. ALL SUPPORT MATERIALS SHALL BE STAINLESS STEEL.
2. VALVE OPENS TO TEMPER HOT LPR (212°F) TO 140°F TEMPERATURE.



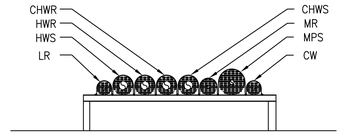
NOTES:

1. SUSPENDED INLINE PUMPS SHALL HAVE SUPPORT HANGERS ON THE PIPING ACCESSORIES SIDES OF THE UNIONS TO SUPPORT PIPES AND ACCESSORIES WHEN PUMPS ARE REMOVED FOR MAINTENANCE.



NOTES:

1. SAFETY VALVES AND PIPING PER ANSI B31.1 APPENDIX II.
2. DISCHARGE PIPE SHALL BE SUPPORTED INDEPENDENTLY FROM VALVE. SUPPORT SHALL BE ATTACHED TO ROOF STRUCTURE.
3. ROUTE DRAIN PIPE TO FLOOR DRAIN TO PREVENT TRIPPING HAZARD. COORDINATE ROUTING WITH COTR.



NOTES:

1. ALL INSULATION AT SUPPORT SHALL BE RIGID TO PREVENT COMPRESSION.
2. FOR PIPE SIZES REFER TO FLOOR PLANS.
3. REFER TO STRUCTURAL DRAWINGS FOR SUPPORT REQUIREMENTS.

4 M-5-10 HUMIDIFIER CONDENSATE COOLER DETAIL

SCALE = NTS

5 M-5-10 FREEZE PROTECTION PUMP PIPING DETAIL

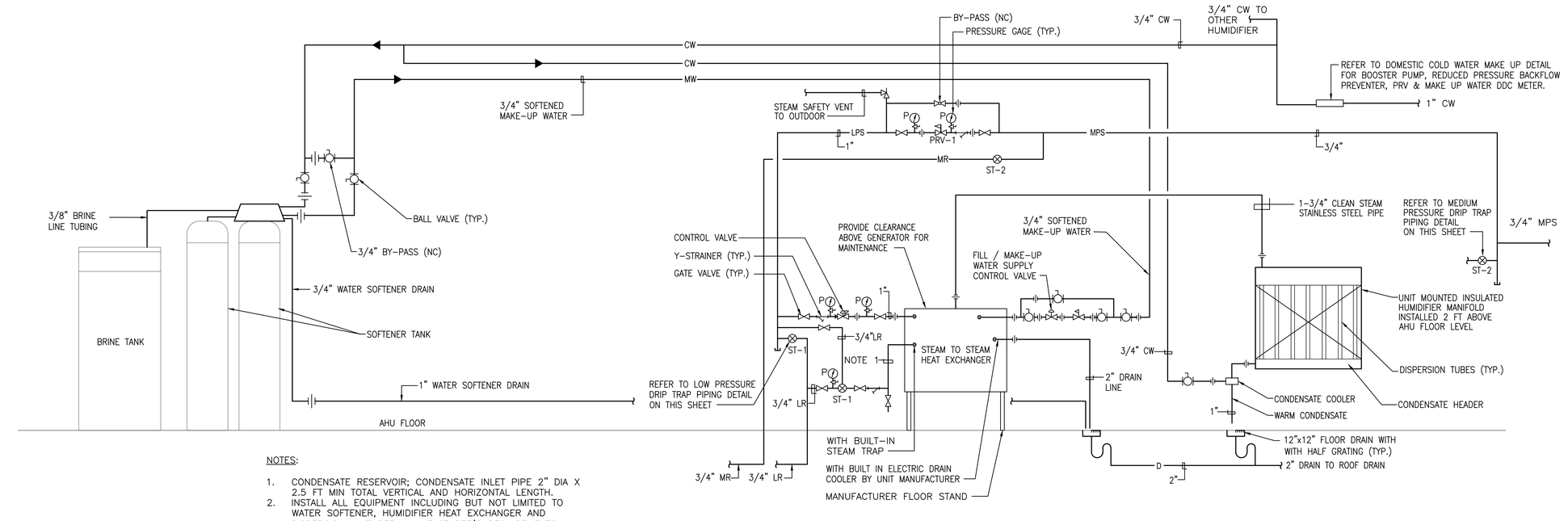
SCALE = NTS

6 M-5-10 STEAM SAFETY RELIEF VALVE DETAIL

SCALE = NTS

7 M-5-10 PIPING SUPPORT DETAIL

SCALE = NTS



NOTES:

1. CONDENSATE RESERVOIR; CONDENSATE INLET PIPE 2" DIA X 2.5 FT MIN TOTAL VERTICAL AND HORIZONTAL LENGTH.
2. INSTALL ALL EQUIPMENT INCLUDING BUT NOT LIMITED TO WATER SOFTENER, HUMIDIFIER HEAT EXCHANGER AND DISPERSION UNIT PER MANUFACTURER'S REQUIREMENTS.
3. REFER TO SCHEDULES FOR EQUIPMENT CAPACITIES/SIZES.

7 M-5-10 STEAM TO STEAM HEAT EXCHANGER HUMIDIFIER WITH WATER SOFTENER PIPING DETAIL

SCALE = NTS

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STATE OF MARYLAND — TIMOTHY M. LLEWELLYN — No. 28411 — PROFESSIONAL ENGINEER — 01/04/2024

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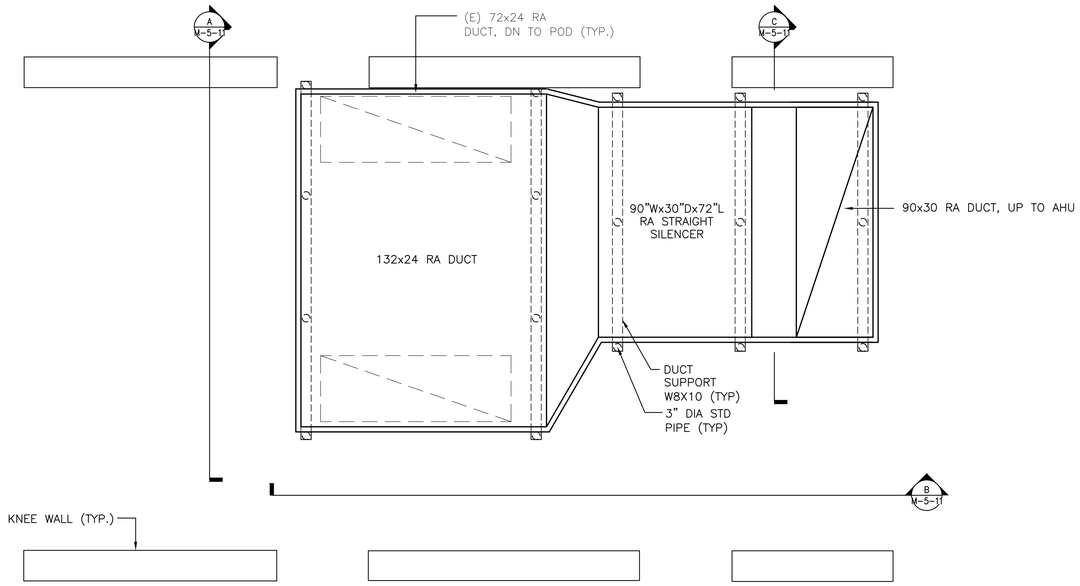
Washington, DC 20024-2520

BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL DETAILS
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL / FDL / TM (DESIGNED BY / DRAWN BY / CHECKED BY)

SHEET NO. 43 OF 71

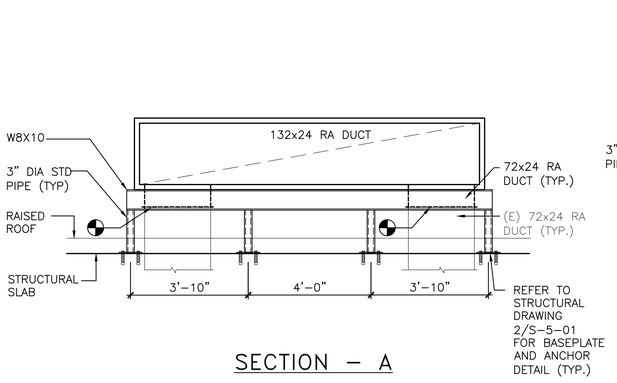
M | 5 | 10 (DISCIPLINE | TYPE | SEQUENCE)

A-5-10.DWG

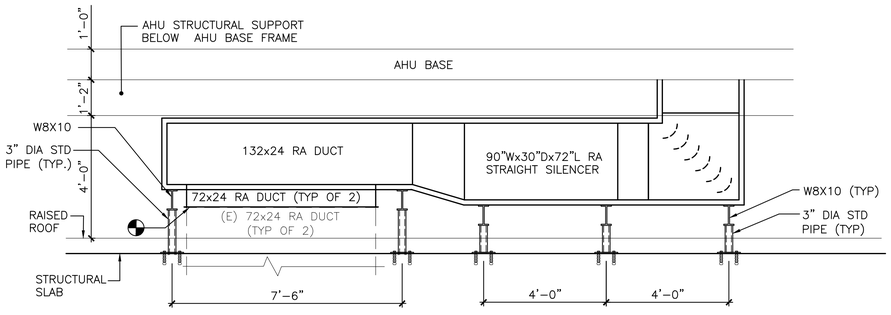


PLAN VIEW

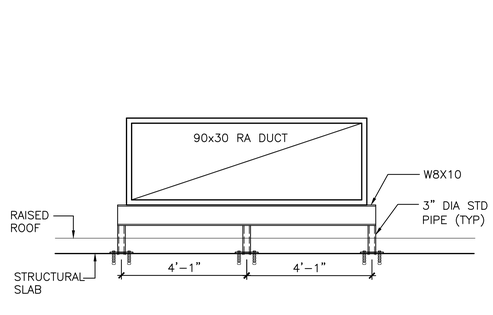
NOTES:
1. ALL NEW SUPPLY AND RETURN DUCTS FOR AHU-1, AHU-2 AND AHU-9 SHALL BE DOUBLE WALL CONSTRUCTION WITHOUT EXTERNAL INSULATION. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
2. REPAIR EXISTING DUCT INSULATION WHERE IT WAS DISTURBED TO MAKE NEW DUCT CONNECTIONS.



SECTION – A



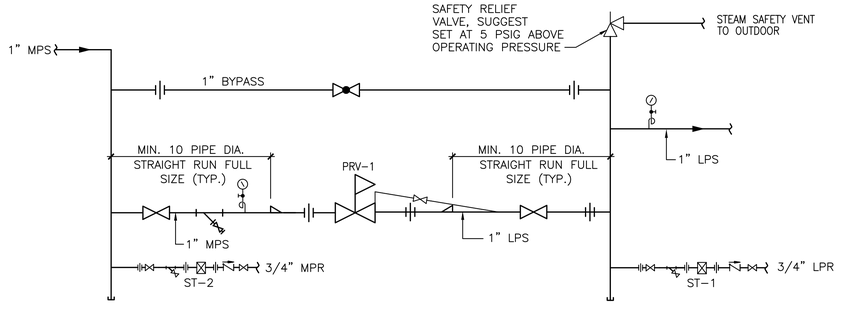
SECTION – B



SECTION – C

NOTES:
1. INLINE PUMP SHALL HAVE SUPPORTS ON THE PIPING ACCESSORIES SIDES OF THE UNIONS TO SUPPORT PIPES AND ACCESSORIES WHEN PUMPS ARE REMOVED FOR MAINTENANCE.

2 M-5-11 DOMESTIC COLD WATER BOOSTER PUMP PIPING DETAIL
SCALE = NTS



3 M-5-11 STEAM PRESSURE REDUCING STATION DETAIL
SCALE = NTS

MUSEUM SUPPORT CENTER
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2020 K Street, NW
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STATE OF MARYLAND
LEE
No. 28411
PROFESSIONAL ENGINEER
6/21/2024

PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28411, EXPIRATION DATE 1/13/2025.

KEY PLAN

0 1 2 4
1/2" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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SHEET NO. 44 OF 71

M (DISCIPLINE) 5 (TYPE) 11 (SEQUENCE)

M-5-11.DWG

CUSTOM OUTDOOR AIR HANDLING UNIT SCHEDULE

UNIT NO.	LOCATION	AREA SERVED	TOTAL AIR FLOW RATE: SA MAX. (CFM)	SA MIN. (CFM)	SA PURGE (CFM)	OA PURGE (CFM)	OA ECONOMIZER (CFM)	OA MIN. (CFM)	RA NORMAL (CFM)	RA PURGE (CFM)
AHU-1	ROOF POD 1	POD 1 SOUTH	34,000	34,000	24,000	24,000	N.A.	1,100	32,900	24,000
AHU-2	ROOF POD 1	POD 1 NORTH	34,000	34,000	24,000	24,000	N.A.	1,100	32,900	24,000
AHU-9	ROOF POD 1	STREET CORRIDOR	24,000	24,000	24,000	24,000	24,000	600	23,400	24,000

UNIT NO.	SUPPLY FAN DATA: TSP (IN. WG.)	ESP (IN. WG.)	FAN QTY.	FAN TYPE	AIRFLOW RATE PER FAN (CFM)	DRIVE	RPM	MOTOR DATA: HP EACH	BHP EACH	HP TOTAL	V	PH	HZ
AHU-1	7.68	2.30	4	PLENUM	8,500	DIRECT	2,082	15	14.03	56.13	460	3	60
AHU-2	7.68	2.30	4	PLENUM	8,500	DIRECT	2,082	15	14.03	56.13	460	3	60
AHU-9	5.94	3.0	2	PLENUM	12,000	DIRECT	1,759	20	15.46	30.92	460	3	60

UNIT NO.	RETURN/EXHAUST FAN DATA: FAN TYPE	TSP (IN. WG.)	ESP (IN. WG.)	FAN QTY.	FAN TYPE	AIRFLOW RATE PER FAN (CFM)	DRIVE	RPM	MOTOR DATA: HP EACH	BHP EACH	HP TOTAL	V	PH	HZ
AHU-1	RETURN	2.0	1.0	3	PLENUM	11,333	DIRECT	2,546	10	9.46	28.37	460	3	60
AHU-2	RETURN	2.0	1.0	3	PLENUM	11,333	DIRECT	2,546	10	9.46	28.37	460	3	60
AHU-9	EXHAUST	2.8	1.8	1	PLENUM	24,000	DIRECT	1,388	20	17.91	20	460	3	60

UNIT NO.	COOLING COIL CAPACITY: AIR FLOW RATE CFM	TOTAL CAP. (MBH)	SENSIBLE CAP. (MBH)	TOTAL FLUID (GPM)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	EWT (°F)	LWT (°F)	MAX FACE VEL. (FPM)	MAX. AIR PD (IN. H2O)	MAX. WATER PD (FT. H2O)	COIL SIZE: COIL QTY	ROWS	FPI
AHU-1	20,400	705	603	117	73.9	59.6	47	47	42.0	54.0	342	0.43	9.3	2	6	11
AHU-2	20,400	705	603	117	73.9	59.6	47	47	42.0	54.0	342	0.43	9.3	2	6	11
AHU-9	24,000	836	723	138	76.4	61	49	48	42.0	54.0	449	0.66	6.4	2	6	11

UNIT NO.	HEATING COIL NORMAL CAPACITY: SA FLOW RATE CFM	TOTAL CAP. (MBH)	EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	FACE VEL. (FPM)	TOTAL FLUID (GPM)	MAX. AIR PD (IN. H2O)	MAX. WATER PD (FT. H2O)
AHU-1	24,000	959	140	110	50	87	403	65	0.12	3.1
AHU-2	24,000	959	140	110	50	87	403	65	0.12	3.1
AHU-9	24,000	798	140	110	50	81	449	54	0.12	4.25

UNIT NO.	HEATING COIL PURGE CYCLE: OA FLOW RATE CFM	TOTAL CAP. (MBH)	EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	FACE VEL. (FPM)	TOTAL FLUID (GPM)	MAX. AIR PD (IN. H2O)	MAX. WATER PD (FT. H2O)	COIL SIZE: COIL QTY	ROWS	FPI
AHU-1	24,000	1,457	140	110	15	71	403	99	0.12	6.8	2	2	8
AHU-2	24,000	1,457	140	110	15	71	403	99	0.12	6.8	2	2	8
AHU-9	24,000	1,214	140	110	15	62	449	82	0.12	9.59	2	2	6.5

UNIT NO.	AUTOMATIC DAMPERS: SUPPLY AIR CFM	SUPPLY AIR DIMENSIONS (IN.)	OUTSIDE AIR MINIMUM CFM	OUTSIDE AIR MINIMUM DIMENSIONS (IN.)	OUTSIDE AIR PURGE OA CFM	OUTSIDE AIR PURGE OA DIMENSIONS (IN.)	RETURN AIR CFM	RETURN AIR DIMENSIONS (IN.)	PURGE RETURN CFM	PURGE RETURN DIMENSIONS (IN.)	PURGE EXHAUST CFM	PURGE EXHAUST DIMENSIONS (IN.)	CHW COIL FACE AND BYPASS: FACE CFM	FACE DIMENSIONS (IN.)	BYPASS CFM	BYPASS DIMENSIONS (IN.)	AHU SA BYPASS CFM	AHU SA BYPASS DIMENSIONS (IN.)
AHU-1	34,000	90 x 30	1,100	30 x 8	24,000	85.5x50.5	32,900	90 x 30	24,000	85 x 48	24,000	86 x 47.5	20,400	96 x 66	13,600	112 x 15	17,000	42 x 36
AHU-2	34,000	90 x 30	1,100	30 x 8	24,000	85.5x50.5	32,900	90 x 30	24,000	85 x 48	24,000	86 x 47.5	20,400	96 x 66	13,600	112 x 15	17,000	42 x 36
AHU-9	24,000	111 x 26	600	24 x 12	24,000	105.5x40	23,400	100 x 30	24,000	55 x 45	24,000	49 X 70.25	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

UNIT NO.	FILTER DATA WITH MIDLIFE PRESSURE DROP: PRE-FILTERS MERV	PRE-FILTERS SIZE (INCH)	PRE-FILTERS PRESSURE DROP (IN. H2O)	HIGH EFF. FILTERS MERV	HIGH EFF. SIZE (INCH)	HIGH EFF. PRESSURE DROP (IN. H2O)	CARBON FILTERS PRESSURE DROP (IN. H2O)	POST FILTERS MERV	POST FILTERS SIZE (INCH)	POST FILTERS PRESSURE DROP (IN. H2O)	FINAL FILTERS (HEPA) EFF.	FINAL SIZE (INCH)	FINAL PRESSURE DROP (IN. H2O)	BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
AHU-1	8	2	0.6	13	4	0.56	0.4	8	2	0.6	99.97%	12	1.88	TMI CLIMATE SOLUTIONS	
AHU-2	8	2	0.6	13	4	0.56	0.4	8	2	0.6	99.97%	12	1.88	TMI CLIMATE SOLUTIONS	
AHU-9	8	2	0.6	14	4	0.75	N.A.	N.A.	2	N.A.	N.A.	12	N.A.	TMI CLIMATE SOLUTIONS	

NOTES:

1. PROVIDE FAN MOTORS WITH SINGLE VARIABLE FREQUENCY DRIVE AND REDUNDANT BACK-UP INVERTER.
2. ALL INITIAL FILTER PRESSURE DROPS LISTED SHALL BE AT 500 FPM VELOCITY.
3. ALL AIR HANDLER CASINGS SHALL BE 4" THICK DOUBLE WALL WITH INJECTED FOAM INSULATION WITH TUBULAR STEEL (OR APPROVED EQUAL) INFRASTRUCTURE FRAME.
4. AHU FLOOR SHALL BE DOUBLE WALL 3/8" THICK ALUMINUM TREAD PLATE INSULATED WITH MINIMUM 5 INCH THICK SPRAY FOAM INSULATION WITH MINIMUM R-30.
5. AHU ROOF SHALL BE PITCHED FROM CENTER AT 1/4" SLOPE. PROVIDE GUTTERS AND DOWNSPOUT.
6. UNITS SHALL INCLUDE PRE-ENGINEERED SERVICE CORRIDORS.
7. PROVIDE SA AND RA PLENUM WITH ACOUSTIC PANELS.
8. PROVIDE ALL SUPPLY AND RETURN FANS WITH BACKDRAFT DAMPERS AT FAN INLET.
9. PRE-FAB UNIT WITH ALL PIPING, ELECTRICAL PANEL, DDC PANEL, HUMIDIFIER AND WATER SOFTENER EITHER FIELD OR FACTORY INSTALLED.
10. CUSTOM BUILT AHU SHALL HAVE MULTIPLE SHIPPING SPLITS WITH SEPARATE SPLIT FOR DISCHARGE PLENUM SECTION.
11. AHU-1, 2, & 9 WHEN ONE FAN IS NOT WORKING, UNIT WILL OPERATE AT REDUCED FLOW WITH THE SAME MOTOR HP.
12. ALL INTERNAL COMPONENTS IN THE AIR HANDLER WHICH INCLUDES PIPING, INSULATION, COILS, FANS, VFD, DDC PANELS, VIBRATION ISOLATORS, PRESSURE, TEMPERATURE AND FLOW INSTRUMENTS AND CONTROLS, DAMPERS, UNIT HEATERS, VALVES, HUMIDIFIERS, WATER SOFTENERS, SLEEVE AND SLEEVE SEALS, WIRING, LIGHTNING PROTECTION BRACKETS, PANELS CONDUITS, ETC. SHALL BE FACTORY OR FIELD INSTALLED BY THE AIR HANDLING UNIT MANUFACTURER OR BY GC. THIS IS PROPOSED TO MINIMIZE THE DOWNTIME FOR INSTALLING THE EQUIPMENT. THE TESTING FOR THE AHU INSTALLED EQUIPMENT AND COMPONENTS SHALL BE DONE IN THE MANUFACTURER'S FACILITY AND WITNESSED BY SI PERSONNEL, DESIGN TEAM AND OWNER'S REPRESENTATIVES.
13. INDICATED FAN MOTORS HP ARE MINIMUM HP.
14. INDICATED FAN MOTOR STATIC PRESSURES (SP) ARE MINIMUM SP.
15. AHU POWER SHALL BE FROM EMERGENCY PANELS BUT MSC WILL MANUALLY DECIDE WHICH UNIT TO OPERATE ON EMERGENCY POWER PER THEIR CURRENT EXISTING PRACTICE USING MANUAL CONTROLS IN BMS ROOM.
16. DDC CONTROL PANELS SHALL BE CONNECTED TO EMERGENCY POWER.

AHU-1/AHU-2 PREDICTIVE UNIT SOUND DATA SHEET

LOCATION	TYPE	SOUND POWER LEVELS: 63	125	250	500	1000	2000	4000	8000	SOUND PRESSURE LEVELS: LwA	@ 5ft.	REMARKS
OUTSIDE AIR OPENING	CALCULATED	82 dB	87 dB	88 dB	87 dB	73 dB	64 dB	59 dB	55 dB	86 dBA	72 dBA	
RETURN AIR OPENING	CALCULATED	89 dB	92 dB	89 dB	88 dB	83 dB	82 dB	79 dB	76 dB	90 dBA	75 dBA	
SUPPLY AIR OPENING	CALCULATED	91 dB	92 dB	88 dB	85 dB	76 dB	68 dB	60 dB	59 dB	85 dBA	71 dBA	
RELIEF AIR OPENING	CALCULATED	92 dB	96 dB	96 dB	101 dB	97 dB	95 dB	91 dB	88 dB	102 dBA	88 dBA	
CASING RADIATED	CALCULATED	86 dB	80 dB	75 dB	72 dB	62 dB	57 dB	42 dB	45 dB	72 dBA	58 dBA	

1. SOUND POWER LEVELS PER OCTAVE BAND, HZ (dB, RE 10^-12 WATTS)
2. SOUND PRESSURE LEVELS @ DISTANCE, FT (dBA, RE 20 μPa)

AHU-9 PREDICTIVE UNIT SOUND DATA SHEET

LOCATION	TYPE	SOUND POWER LEVELS: 63	125	250	500	1000	2000	4000	8000	SOUND PRESSURE LEVELS: LwA	@ 5ft.	REMARKS
OUTSIDE AIR OPENING	CALCULATED	78 dB	86 dB	87 dB	85 dB	75 dB	70 dB	67 dB	64 dB	84 dBA	70 dBA	
RETURN AIR OPENING	CALCULATED	85 dB	92 dB	99 dB	98 dB	93 dB	89 dB	84 dB	80 dB	99 dBA	84 dBA	
SUPPLY AIR OPENING	CALCULATED	87 dB	92 dB	88 dB	87 dB	78 dB	72 dB	67 dB	67 dB	87 dBA	72 dBA	
RELIEF AIR OPENING	CALCULATED	90 dB	97 dB	102 dB	101 dB	95 dB	88 dB	84 dB	74 dB	101 dBA	86 dBA	
CASING RADIATED	CALCULATED	81 dB	76 dB	71 dB	69 dB	58 dB	51 dB	44 dB	41 dB	69 dBA	54 dBA	

1. SOUND POWER LEVELS PER OCTAVE BAND, HZ (dB, RE 10^-12 WATTS)
2. SOUND PRESSURE LEVELS @ DISTANCE, FT (dBA, RE 20 μPa)

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KEY PLAN

GRAPHIC SCALE(S)

DATE: 02/02/24 | SUBMISSION: BID SET

REVISION 1–7

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DRAWING TITLE: MECHANICAL SCHEDULES
DRAWING TYPE: MECHANICAL
DESIGNED BY: FDL | DRAWN BY: FDL | CHECKED BY: DP

STEAM TO STEAM HEAT EXCHANGER HUMIDIFIER SCHEDULE

UNIT NO.	LOCATION	UNIT SERVED	AIR FLOW RATES		SOURCE STEAM CAPACITY (LBS/HR)	CLEAN STEAM GENERATED (LBS/HR)	SOURCE STEAM PRESSURE (PSIG)	DUCT SIZE (IN X IN)	ABSORPTION DISTANCE (INCH)	ELECTRICAL DATA V / PH / HZ	BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
			TOTAL (CFM)	OUTSIDE AIR (TO BE HUMIDIFIED) (CFM)								
HHX-1	AHU-1 SERVICE CORRIDOR	AHU-1	34000	1100	58	50	15	124 X 114	1	120/1/60	NORTEC B+ 50	
HHX-2	AHU-2 SERVICE CORRIDOR	AHU-2	34000	1100	58	50	15	124 X 114	1	120/1/60	NORTEC B+ 50	

1. PROVIDE WITH MANUFACTURER ELECTRIC DRAIN COOLER WITH ALL ACCESORIES AND CONTROL VALVE PLUS SENSORS TO REDUCE THE HUMIDIFIER DRAIN WATER TO 140°F BEFORE ENTERING THE PLUMBING SYSTEM.
2. HUMIDIFIER SHALL BE MANIFOLDED STAINLESS STEEL CONTRUCTION WITH STAINLESS STEEL HEAT EXCHANGER.
3. HUMIDIFIER SHALL BE EQUIPPED WITH MICROPROCESSOR CONTROLLER WITH INTERFACE TO BAS.
4. PROVIDE COMPLIANCE PACKAGE SYSTEM INCLUDING HUMIDIFIER, HEAT EXCHANGER, DRAIN COOLER, AND CONTROL FOR SATISFACTORY SYSTEM OPERATION.

WATER SOFTENER (WATER TREATMENT) SCHEDULE

TAG	UNIT SERVED	LOCATION	TOTAL NUMBER OF TANKS	REGENERATION			TANK SIZE		RESIN QUANTITY (CUBIC FT)	BRINE TANK SALT CAP. (LBS)	BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
				GAL/MIN	BACKWASH FLOW (GPM)	BRINE REFILL (GPM)	BRINE DIA. X HEIGHT (NO. OF TANK)	SOFTENER DIA. X HEIGHT (NO. OF TANK)				
WS-1	AHU-1	AHU-1 SERVICE CORRIDOR	3	102/90	3	0.70	18 X 35 (1)	10 X 54 (2)	1.5	250	KINETICO/ NORTEC CP 210S OD	
WS-2	AHU-2	AHU-2 SERVICE CORRIDOR	3	102/90	3	0.70	18 X 35 (1)	10 X 54 (2)	1.5	250	KINETICO/ NORTEC CP 210S OD	

1. WATER SOFTENER SHALL REMOVE HARDNESS TO LESS THAN 1/2 GPG. THE SYSTEM SHALL INCLUDE TWO TANKS. THIS DUPLEX CONFIGURATION SHALL BE FLEXIBLE TO OPERATE IN ALTERNATING OR PARALLEL MODE. IN ALTERNATING MODE, ONE TANK WILL BE IN ON-LINE DURING SERVICE. IN PARALLEL MODE, BOTH TANKS WILL BE IN ON-LINE DURING SERVICE. WITH EITHER MODE, DURING REGENERATION CYCLES, ONE TANK SHALL PROVIDE WATER TO SERVICE AND TO THE REGENERATING TANK. A WATER METER SHALL INITIATE SYSTEM REGERATION. THE WATER METER SHALL MEASURE THE PROCESSED VOLUME AND BE ADJUSTABLE. SERVIDE FLOW SHALL BE DOWNFLOW AND REGENERATION FLOW SHALL BE UPFLOW.

EXISTING AIR DEVICES SCHEDULE

TAG	DUTY	NOMINAL SIZE (INCHES)	NECK SIZE (INCHES)	TYPE	REMARKS
1	SUPPLY	24 X 4	24 X 4	SIDEWALL REGISTER	
2	SUPPLY	18 X 4	18 X 4	SIDEWALL REGISTER	
3	RETURN	8 X 30	8 X 30	SIDEWALL REGISTER	
4	RETURN	24 X 10	24 X 10	SIDEWALL REGISTER	
5	RETURN	10 X 24	10 X 24	SIDEWALL REGISTER	
6	RETURN	10 X 30	10 X 30	SIDEWALL REGISTER	
7	RETURN	24 X 12	24 X 12	SIDEWALL REGISTER	
8	RETURN	24 X 12	24 X 12	SIDEWALL REGISTER	
9	RETURN	24 X 18	24 X 18	SIDEWALL REGISTER	
10	SUPPLY		18 ø	CEILING ROUND DIFFUSER	
11	RETURN	26 X 26	26 X 26	SIDEWALL REGISTER	
12	SUPPLY	36 X 20	36 X 20	SIDEWALL REGISTER	
13	SUPPLY	36 X 12	36 X 12	SIDEWALL REGISTER	
14	RETURN	36 X 24	36 X 24	SIDEWALL REGISTER	

CIRCULATING PUMP SCHEDULE

TAG	LOCATION	SERVICE	TYPE	CAPACITY (GPM)	TOTAL PRESSURE (FT. H2O)	MOTOR DATA						BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
						HP	BHP	RPM	VOLTS	PH	HZ		
CIRC-1	AHU-1	COOLING COIL	IN-LINE CENTRIFUGAL	40	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
CIRC-2	AHU-1	HEATING COIL	IN-LINE CENTRIFUGAL	35	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
CIRC-3	AHU-2	COOLING COIL	IN-LINE CENTRIFUGAL	40	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
CIRC-4	AHU-2	HEATING COIL	IN-LINE CENTRIFUGAL	35	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
CIRC-13	AHU-9	COOLING COIL	IN-LINE CENTRIFUGAL	50	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
CIRC-14	AHU-9	HEATING COIL	IN-LINE CENTRIFUGAL	35	20	1/2	0.42	1725	460	3	60	BELL & GOSSETT e-90	
DBP-1	AHU-9	AHU-1 & 2	IN-LINE MULTI STAGE	6	60	1	0.42	3600	460	3	60	GOULDS e-SV	NUMBER OF STAGES: 3

NOTE:
1. ALL PUMPS SHALL BE CONNECTED TO EMERGENCY POWER.

EXHAUST FAN SCHEDULE

TAG	LOCATION	SERVICE	TYPE	DRIVE	CFM	ESP (IN. WC)	MOTOR DATA			ELECTRICAL DATA			BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
							HP	BHP	RPM	VOLTS	PH	HZ		
EF-1	AHU-2 ELECT. RM.	AHU-2	PROPELLER SIDEWALL	DIRECT	1500	0.35	0.25	0.20	1750	120	1	60	GREENHECK - SE1	

NOTE:
1. PROVIDE WITH MANUFACTURER'S SPEED CONTROLLER.
2. PROVIDE WITH MANUFACTURER WALL HOUSING WITH MOTOR ACCESS INSIDE THE ELECTRICAL ROOM.
3. PROVIDE WITH BACKDRAFT DAMPER.
4. PROVIDE WITH DISCONNECT SWITCH FACTORY MOUNTED.

UNIT HEATERS SCHEDULE

TAG	LOCATION	SERVICE	TYPE	SUPPLY FAN DATA			ELECTRICAL DATA				HOT WATER HEATING COIL DATA							BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
				AIR FLOW RATE (CFM)	MOTOR POWER (W)	MOTOR RPM	MCA	VOLTS	PH	HZ	CAPACITY (MBH)	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	FLOWRATE (GPM)	MAX WPD (FT WG)		
UH-1	AHU-1	AHU-1	PROPELLER HORIZONTAL	580	25	1550	1.5	120	1	60	14.2	50	102	140	110	1.5	2.2	TRANE S-A25	
UH-2	AHU-2	AHU-2	PROPELLER HORIZONTAL	580	25	1550	1.5	120	1	60	14.2	50	102	140	110	1.5	2.2	TRANE S-A25	
UH-7	AHU-9	AHU-9	PROPELLER HORIZONTAL	580	25	1550	1.5	120	1	60	14.2	50	102	140	110	1.5	2.2	TRANE S-A25	

NOTES:
1. PROVIDE WALL THERMOSTAT FOR ALL UNIT HEATERS.
2. PROVIDE DISCONNECT SWITHCH.

LIGHTING LOAD

DESCRIPTION	WATTS/ FT²
CORRIDOR	.66
POD 1, 2, 4	.95

PEOPLE HEAT LOAD

DESCRIPTION	HEAT LOAD (BTU/HR/PERSON)	
	SENSIBLE	LATENT
WALKING/STANDING	250	200

BUILDING ENVELOPE

DESCRIPTION	R-VALUE (FT²-°F-HR/BTU)	
EXTERIOR WALL	16.73	
ROOF	31.11	
	U-VALUE (BTU/FT²-°F-HR)	
SLAB ON GRADE	.1	
DOOR	.3	
	U-VALUE (BTU/FT²-°F-HR)	SHADING COEFFICIENT (SC)
WINDOW	.57	.887
PLASTIC PANEL	.49	.38

OUTDOOR DESIGN CONDITIONS

SUMMER		WINTER	
DRY BULB (°F)	WET BULB (°F)	DRY BULB (°F)	WET BULB (°F)
95	78	15	N/A

SPACE TEMPERATURE/HUMIDITY SETPOINTS

SPACE	SUMMER			WINTER		
	DB (°F)	RH (%)	DP (°F)	DB (°F)	RH (%)	DP (°F)
POD 1, 2, AND 4	70	45	47	70	45	47
STREET CORRIDOR	75	40	49	70	NA	NA
ELECTRICAL ROOM	85					

NOTES:
1. TEMPERATURE TOLERANCE IS +/-4°F
2. RELATIVE HUMIDITY TOLERANCE IS +/-8% RH

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STEVEN L. ALLEN
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PROFESSIONAL ENGINEER
2/14/2024

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ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL SCHEDULES
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)

SHEET NO. 46 OF 71

M (DISCIPLINE) 6 (TYPE) 02 (SEQUENCE)

A-4-03.DWG

PRESSURE REDUCING VALVE SCHEDULE

TAG	SERVICE	CAPACITY (LBS/HR)	INLET TEMPERATURE (°F)	INLET PRESSURE (PSIG)	DISCHARGE PRESSURE (PSIG)	BASIS OF DESIGN	REMARK
PRV-1	STEAM	62	281	35	15	HOFFMAN – 2100	

NOTES:
1. PROVIDE PRV WITH STEAM SAFETY PRESSURE RELIEF VALVE 1-1/4" INLET 1-1/2" OUTLET SET AT 5 PSI ABOVE STEAM WORKING PRESSURE PER MANUFACTURER RECOMMENDATION.

STEAM TRAP SCHEDULE

TAG	SERVICE	SIZE (INCH)	STEAM TRAP TYPE	MAXIMUM OPERATING PRESSURE	CAPACITY (LBS/HR)	MAXIMUM DIFFERENTIAL PRESSURE (PSIG)	BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
ST-1	STEAM	3/4	CAST IRON FLOAT & THERMOSTATIC	15	650	2	SPIRAX SARCO FT-15	
ST-2	STEAM	3/4	CAST IRON FLOAT & THERMOSTATIC	75	365	2	SPIRAX SARCO FT-75	

SOUND ATTENUATOR SCHEDULE

TAG	UNIT SERVED	QUANTITY	SIZE			DESIGN AIR FLOW (CFM)	MAX. PRESSURE DROP (IN.WG.)	CONFIGURATION	MINIMUM DYNAMIC INSERTION LOSS, dB — OCTAVE BAND CENTER FREQUENCY, HZ								BASIS OF DESIGN
			WIDTH (INCH)	HEIGHT (INCH)	LENGTH (INCH)				63	125	250	500	1000	2000	4000	8000	
ATTS-1	AHU-1 SUPPLY	1	90	30	72	34,000	0.19	STRAIGHT	5	12	18	19	15	10	10	8	VIBRO ACOUSTIC, RD
ATTR-1	AHU-1 RETURN	1	90	30	72	32,900	0.17	STRAIGHT	5	13	19	20	15	11	10	8	VIBRO ACOUSTIC, RD
ATTS-2	AHU-2 SUPPLY	1	90	30	72	34,000	0.19	STRAIGHT	5	12	18	19	15	10	10	8	VIBRO ACOUSTIC, RD
ATTR-2	AHU-2 RETURN	1	90	30	72	32,900	0.17	STRAIGHT	5	13	19	20	15	11	10	8	VIBRO ACOUSTIC, RD
ATTS-9	AHU-9 SUPPLY	1	24	128	96	24,000	0.20	ELBOW	6	16	21	34	41	37	30	21	VIBRO ACOUSTIC, RED
ATTR-9	AHU-9 RETURN	1	20	126	60	23,400	0.34	ELBOW	6	8	14	19	31	27	24	19	VIBRO ACOUSTIC, RED

NOTES:
1. SOUND ATTENUATOR SELECTION SHALL BE BASED ON MAINTAINING NC45 IN SPACES SERVED BY THE ASSOCIATED AIR-HANDLING UNITS.
2. ATTENUATOR TYPE SHALL BE RECTANGULAR, DISSIPATIVE, STRAIGHT OR ELBOW AS NOTED IN THE SCHEDULE.
3. LENGTH SHOWN FOR ELBOW SILENCER IS CENTERLINE LENGTH.
4. PRESSURE DROP SHALL BE PER ASTM E477-20 PLUS SYSTEM EFFECTS FOR NEARBY DUCT ELEMENTS.
5. MINIMUM DYNAMIC INSERTION LOSS SHALL BE DETERMINED PER ASTM E477-20 IN NVLAP ACCREDITED ACOUSTIC LABORATORY.
6. PROVIDE HTL CASING REQUIRED TO CONTROL BREAKOUT.
7. ATTS-1/ATTS-2 SILENCER MEETS NC45: TRANSITIONAL SILENCER INLET 90" x 30" AND OUTLET 120" x 28"

AHU-1 AND AHU-2 AIR BALANCING TABLE

UNIT	NORMAL MODE			PURGE MODE			REMARKS
	SUPPLY (CFM)	RETURN (CFM)	OA (CFM)	SUPPLY (CFM)	RELIEF (CFM)	OA (CFM)	
AHU-1	34,000	33,400	600	24,000	24,000	24,000	
AHU-1	34,000	33,400	600	24,000	24,000	24,000	

NOTES:
1. AHU-1 AND AHU-2 SHALL BE BALANCED AFTER EACH UNIT INSTALLED AND REBALANCED WHEN BOTH UNITS OPERATE TOGETHER.

AHU-9 STREET CORRIDOR AIR BALANCING TABLE

DESCRIPTION	SUPPLY (CFM)	RETURN (CFM)	OA (CFM)	STREET CORRIDOR EXHAUST			TRANSFER AIR TO CORRIDOR FROM				SURPLUS (CFM)	REMARKS
				ELEV RMS (CFM)	TOILET/ JAN. (CFM)	ELECT. RM (CFM)	POD 1 (CFM)	LAB-1 (CFM)	POD 2 (CFM)	LAB-2 (CFM)		
FIRST FLOOR	24,000	23,400	600	1,500	700	200	800	700	800	450	2,050	
SECOND FLOOR		N.A.		N.A.	650	100	300	400	300	850		

NOTES:
1. AHU-9 STREET CORRIDOR SURPLUS AIR = OA + TRANSFER AIR FROM POD AND LAB – EXHAUST

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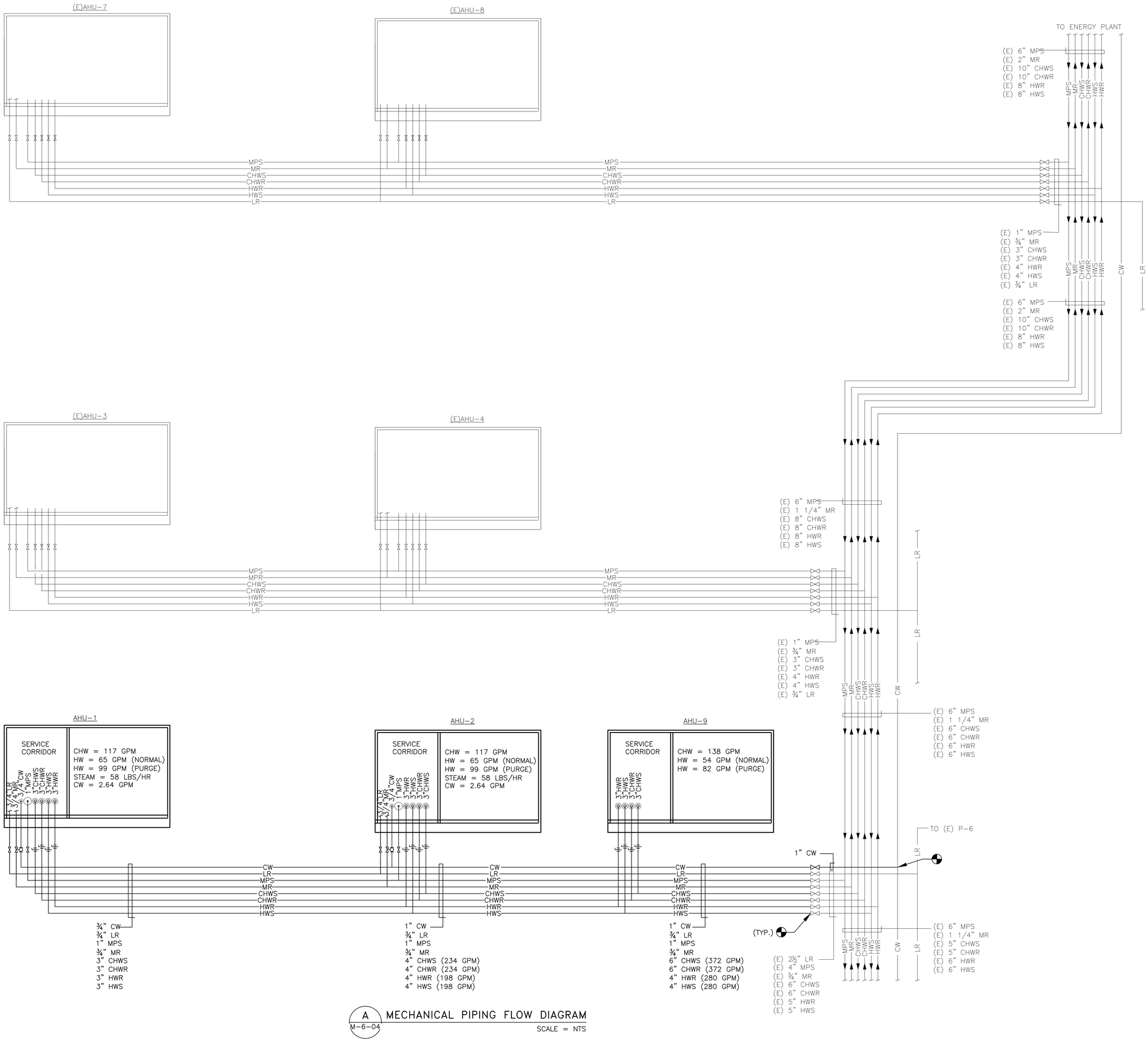
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP (CHECKED BY)



A M-6-04 MECHANICAL PIPING FLOW DIAGRAM

SCALE = NTS

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NORTH

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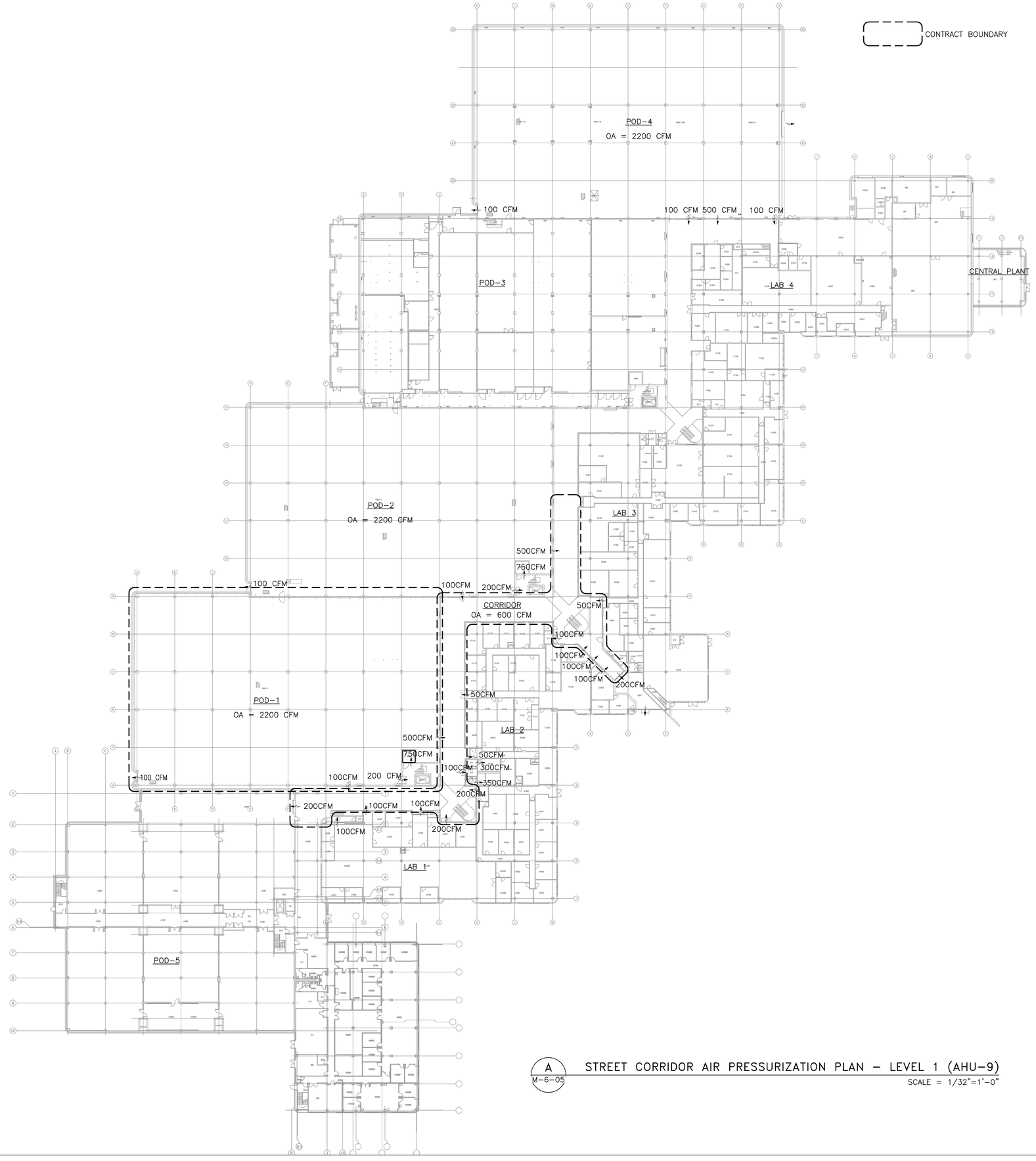
A/E PROJECT NUMBER	60516569
DRAWING TITLE	MECHANICAL PIPING FLOW DIAGRAM
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL / FDL / DP (DESIGNED BY / DRAWN BY / CHECKED BY)

SHEET NO. 48 OF 71

M (DISCIPLINE) 6 (TYPE) 04 (SEQUENCE)



A
M–6–05

STREET CORRIDOR AIR PRESSURIZATION PLAN – LEVEL 1 (AHU–9)

SCALE = 1/32"=1'–0"

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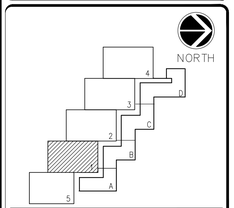

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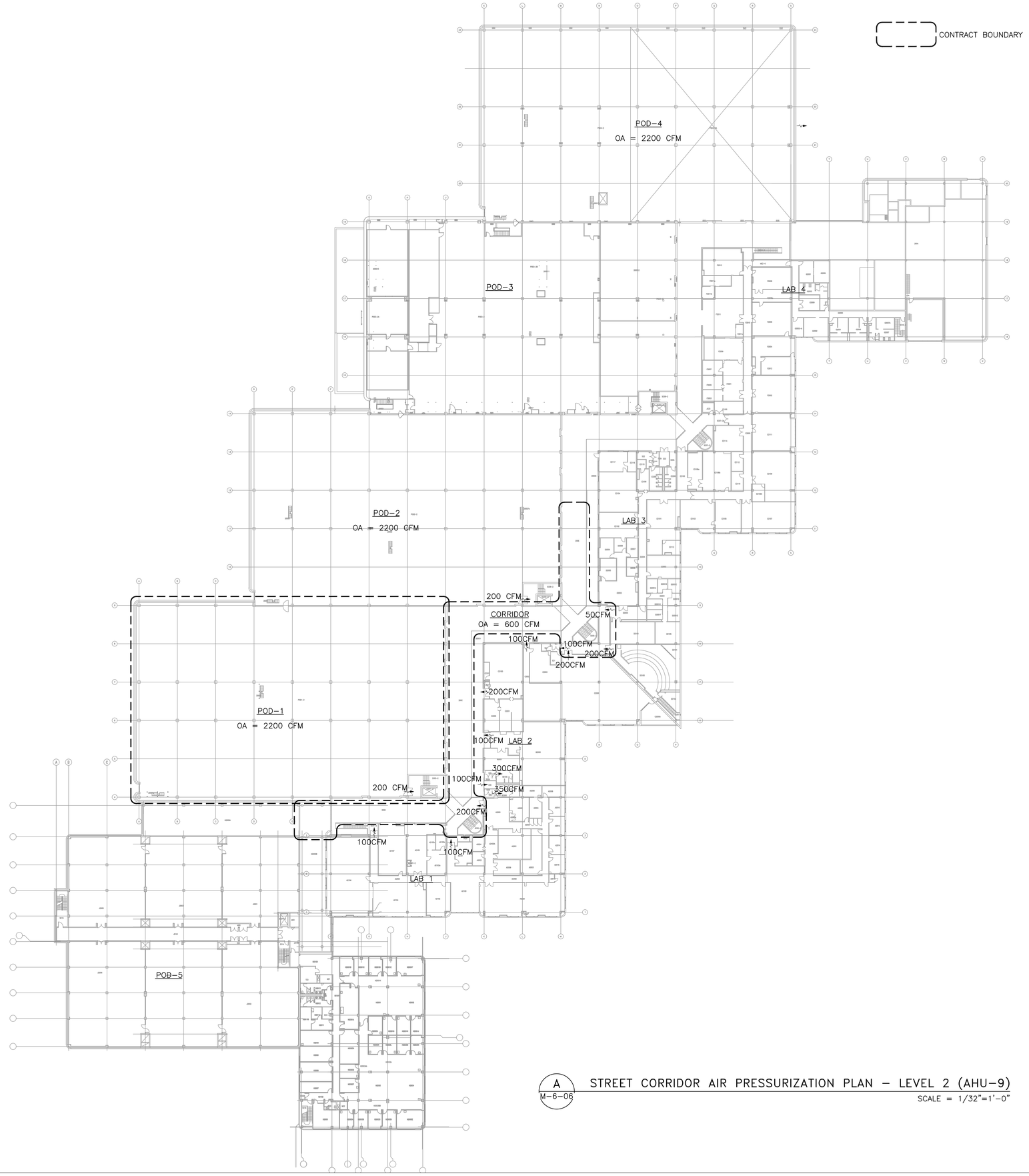
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	STREET CORR. AIR PRESS. PLAN – LEVEL 1 (AHU–9)
DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP/TM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
49 OF 71	M	6	05



A M–6–06 STREET CORRIDOR AIR PRESSURIZATION PLAN – LEVEL 2 (AHU–9)

SCALE = 1/32"=1'–0"

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DRAWING TYPE	MECHANICAL
WORKING STAFF	FDL (DESIGNED BY) / FDL (DRAWN BY) / DP/TM (CHECKED BY)

SHEET NO. 50 OF 71

M	6	06
DISCIPLINE	TYPE	SEQUENCE

MECHANICAL CONTROLS LEGEND

SYMBOL	DESCRIPTION
AF–1	AIR FLOW PICKUP – TERMINAL UNIT
	AXIAL VANE FAN
	CENTRIFUGAL FAN
	CENTRIFUGAL FAN W/BELL INLET MOUNTED AFMS
	CONDENSER/COMPRESSOR
DX	DIRECT EXPANSION COOLING COIL
	ENERGY RECOVERY WHEEL
AFMS–1 AF–1	AIR FLOW MONITORING STATION
FM–1	FLOW METER – LIQUID
	GAS DETECTOR AND GAS DETECTOR REMOTE UNIT
C	COILING COIL
H	HOT WATER COIL
	INLINE PUMP
NC VA–1 M	MOTORIZED CONTROL VALVE – 2–WAY
DA–1 LCS	MOTORIZED DAMPER WITH DAMPER ACTUATOR – TERMINAL UNIT
DA–1 NO LS–1	MOTORIZED DAMPER WITH DAMPER ACTUATOR AND POSITION SWITCH – OPPOSED BLADE
VFD–1	VARIABLE FREQUENCY DRIVE
	MOTOR STARTER
HM–1	HUMIDIFIER MANIFOLD AND CONTROLLER
	EXHAUST FAN WITH GRAVITY BACK DRAFT DAMPER

MECHANICAL CONTROLS LEGEND

SYMBOL	DESCRIPTION
AX–1	AUXILIARY CONTACT
FS	FLOW SWITCH – LIQUID
CO2–1	CARBON DIOXIDE SENSOR – PROBE
CM	CONTROL MODULE (FIRE ALARM SYSTEM)
CS–1	CURRENT SWITCH
SD–1	DUCT SMOKE DETECTOR
ED–1	ENABLE/DISABLE
FR–1	FIELD RELAY
H–1	HUMIDITY SENSOR – DUCT
H	HUMIDITY SENSOR
FZ–1	LOW TEMPERATURE LIMIT SWITCH WITH MANUAL RESET
PS–1 HIGH LOW	PRESSURE DIFFERENTIAL SENSOR
PS–1	PRESSURE SWITCH WITH MANUAL RESET
PC–1	PULSED CONTACT
RS–1	ROTATION SENSOR
SS–1	START/STOP
SP–1	SUCTION PRESSURE
SW	SWITCH/PUSH BUTTON
T–1	TEMPERATURE SENSOR – AVERAGING AIR
WT–1	TEMPERATURE SENSOR – IMMERSION WATER
T–1	TEMPERATURE SENSOR – PROBE AIR
T	TEMPERATURE SENSOR
VI–1	VOLTAGE INPUT
VO–1	VOLTAGE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
NET	NETWORK COMMUNICATION INPUT/OUTPUT
– – – – – – – –	DDCS CONTROL SYSTEM WIRING
– – – – – – – –	ELECTRONIC INTERLOCK WIRING
M	ELECTRIC MOTOR
P	PRESSURE – LIQUID

MECHANICAL CONTROLS LEGEND

ABBREVIATION	DESCRIPTION
AC	AIR CONDITIONING
ACCUM.	ACCUMULATION
ADJ	ADJUSTMENT
AHU	AIR HANDLING UNIT
ALRM	ALARM
B	BOILER
BAS	BUILDING AUTOMATION SYSTEM
CAV	CONSTANT AIR VOLUME
CFM	CUBIC FEET PER MINUTE
COV	CHANGE OF VALUE
CP	CIRCULATION PUMP
CR	CRITICAL
CTRL	CONTROL
DDCS	DIRECT DIGITAL CONTROL SYSTEM
DHWS	DOMESTIC HOT WATER SUPPLY
DIFF	DIFFERENTIAL
DX	DIRECT EXPANSION
EA	EXHAUST AIR
ED	ENABLE/DISABLE
EF	EXHAUST FAN
EUH	ELECTRIC UNIT HEATER
FACP	FIRE ALARM CONTROL PANEL
FIP	FAIL IN PLACE
G	GENERAL
GPM	GALLONS PER MINUTE
GUH	GAS FIRED UNIT HEATER
GWH	GAS FIRED WATER HEATER
HTG	HEATING
HW	HOT WATER
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HWUH	HOT WATER UNIT HEATER
I/O	INPUT/OUTPUT
IRC	GAS FIRED RADIANT HEATER
LCS	LAST COMMANDED STATE
MOD	MODULATING
NC	NORMALLY CLOSED
NG	NATURAL GAS
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OAH	OUTDOOR AIR HUMIDITY
OAT	OUTDOOR AIR TEMPERATURE
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
REC	RECOVERY
RSC	ROTARY SCREW COMPRESSOR
SA	SUPPLY AIR
TEMP	TEMPERATURE
VFD	VARIABLE FREQUENCY DRIVE

GENERAL NOTES:

1. MOUNT THE CENTER OF SENSORS LOCATED WITHIN THE SPACE 60" ABOVE THE FLOOR FOR FORWARD REACH AND 48" MAXIMUM FOR SIDE REACH AS REQUIRED BY THE AMERICANS WITH DISABILITIES ACT (ADA). COORDINATE LOCATION OF TEMPERATURE SENSORS, HUMIDITY SENSORS, AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION.
2. SETPOINT ADJUSTMENT: THE SET POINTS LISTED IN THE SEQUENCE OF OPERATION ARE INITIAL SETTINGS, WHICH SHALL BE ADJUSTABLE. CONTROL SET POINTS SHALL BE INCLUDED ON THE GRAPHICAL DISPLAYS FOR EACH SYSTEM, ALONG WITH THE ANALOG VALUE OF EACH CONTROLLED VARIABLE. AN OPERATOR WITH THE PROPER PASSWORD SHALL BE ABLE TO RAISE OR LOWER THESE CONTROL SET POINTS THROUGH THE SYSTEM GRAPHIC DISPLAY. IT SHALL NOT BE NECESSARY TO REVISE THE SYSTEM CONTROL PROGRAMS TO ADJUST CONTROL SET POINTS.
3. ALARM LIMITS: ALARM LIMITS SHALL BE PROGRAMMED INTO THE SYSTEM WHERE REQUIRED BY THE SEQUENCE OF OPERATION. ALARM LIMITS SHALL BE INITIALLY SET BY THE CONTROL SYSTEM INSTALLER AS INDICATED. THE ALARM LIMITS SHALL BE CHANGED DURING START–UP, AS REQUIRED, TO MEET ACTUAL OPERATING CONDITIONS.
4. CONTROLS CONTRACTOR TO COORDINATE CONNECTION TO FIRE ALARM SYSTEM WITH FIRE ALARM CONTRACTOR.
5. CONTROL SYSTEM IS AN EXISTING SIEMENS CONTROL SYSTEM WHICH WILL BE RECONFIGURED AND PROVIDED WITH NEW CONTROLS FOR NEW EQUIPMENT. NEW CONTROL POINTS AND WIRING SHALL BE PROVIDED FOR NEW SYSTEMS.
6. REFER TO DRAWING M.6.02 FOR OUTDOOR AND INDOOR DESIGN CONDITIONS FOR TEMPERATURE AND HUMIDITY.

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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	COVER SHEET
DRAWING TYPE	MECHANICAL
WORKING STAFF	PR (DESIGNED BY) · PR (DRAWN BY) · DP/TM (CHECKED BY)
SHEET NO.	51 OF 71
	M (DISCIPLINE) · 7 (TYPE) · 01 (SEQUENCE)

M-2-1.DWG
M-2-1.TXT

GENERAL NOTES:

1. FOR DIRECT DIGITAL CONTROL SYSTEM (DDCS) SYMBOLS AND ABBREVIATIONS SEE SHEET M-7-1.
2. CONTROL MODULES AND DUCT SMOKE DETECTORS FURNISHED AND INSTALLED AS PART OF THE FIRE ALARM SYSTEM UNDER DIVISION 28.
3. ALL SPACE AND HUMIDITY SENSORS SUPPLIED AND MONITORED BY THESE UNITS SHALL BE REPLACED. SEE MECHANICAL FLOOR PLANS FOR SENSOR LOCATIONS.
4. REFER TO MECHANICAL SCHEDULE ON M.6.01 AND AHU DETAILS FOR COORDINATION.

CODED NOTES:

[1] INTERLOCK UNIT WITH FIRE ALARM SYSTEM THROUGH A CONTROL MODULE (CM) TO STOP THE SUPPLY AND RETURN FANS WHEN THE SUPPLY OR RETURN DUCT SMOKE DETECTOR SENSES PARTICLES OF COMBUSTION. THIS INTERLOCK SHALL BE HARD WIRED AND NOT PERFORMED THROUGH THE DDCS.

[2] HARDWIRE INTERLOCK FAN WITH ASSOCIATED PRESSURE SENSORS TO SHUT OFF FAN WHEN SENSORS TRIPS.

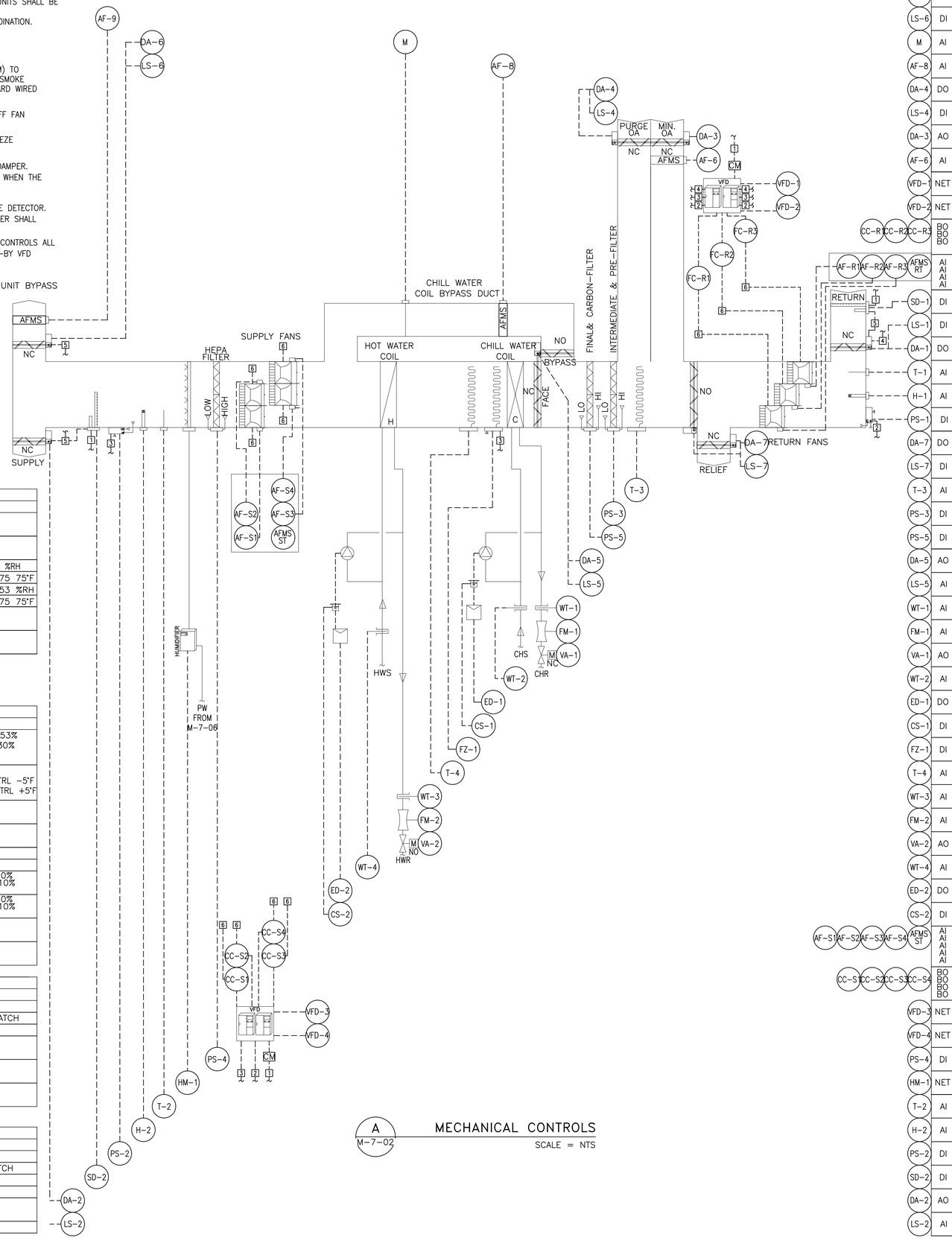
[3] HARDWIRE INTERLOCK FANS WITH FREEZESTAT. WHEN SENSORS INDICATES FREEZE CONDITION, FANS SHALL SHUTDOWN.

[4] THE RETURN DAMPER SHALL BE HARDWIRE-INTERLOCKED WITH THE RETURN DAMPER. WHEN THE FAN IS ENABLED, THE DAMPER SHALL BE COMMANDED TO OPEN. WHEN THE DAMPER STATUS HAS PROVEN OPEN, THE VFD SHALL BE ALLOWED TO RUN.

[5] THE DAMPER SHALL BE HARDWIRE-INTERLOCKED WITH THE ASSOCIATED SMOKE DETECTOR. WHEN DUCT SMOKE DETECTOR SENSES PARTICLES OF COMBUSTION, THE DAMPER SHALL CLOSE.

[6] VFD WITH PRIMARY AND STAND-BY INVERTERS. THE PRIMARY VFD INVERTER CONTROLS ALL FANS IN THE SET. UPON A FAILURE OF PRIMARY VFD INVERTER, THE STAND-BY VFD INVERTER CONTROLS ON FANS IN THE SET.

AIR HANDLING UNIT CONTROLS: AHU-1 & 2



A
M-7-02
MECHANICAL CONTROLS
SCALE = NTS

DDCS POINTS LIST					
	TYPE	DESCRIPTION	QTY	TREND	ALARM
[H]	AI	OUTDOOR AIR (NEAR AHU-1) HUMIDITY SENSOR	1	15 MIN	
[T]	AI	OUTDOOR AIR (NEAR AHU-1) TEMPERATURE SENSOR	1	15 MIN	
[H]	AI	AHU-1 SPACE HUMIDITY	9	15 MIN	LO/HI: 30/53 %RH
[T]	AI	AHU-1 SPACE TEMPERATURE	9	15 MIN	LO/HI: 65/75 75°F
[H]	AI	AHU-2 SPACE HUMIDITY	9	15 MIN	LO/HI: 30/53 %RH
[T]	AI	AHU-2 SPACE TEMPERATURE	9	15 MIN	LO/HI: 65/75 75°F
[H]	AI	OUTDOOR AIR HUMIDITY SENSOR	1	15 MIN	
[T]	AI	OUTDOOR AIR TEMPERATURE SENSOR	1	15 MIN	

DDCS SOFTWARE POINTS				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
AV	AVERAGE SPACE HUMIDITY	15 MIN	DE-HUMID: 45% HUMIDIFY: 37%	G-HIGH: 53% G-LOW: 30%
AV	AVERAGE SPACE TEMP.	15 MIN	TEMP CTRL: 70°F CLG MAX: CTRL +2°F HEATING: CTRL -2°F	G-LOW: CTRL -5°F G-HIGH: CTRL +5°F
AV	OUTDOOR AIR HUMIDITY (AVE. OF AHU-1 & AHU-8)			
AV	OUTDOOR AIR TEMPERATURE (AVE. OF AHU-1 & AHU-8)			
AV	CHILLED WATER SUPPLY TEMP.			
AV	HEATING WATER SUPPLY TEMP.			
AV	RETURN AIR FLOW (AF-1 + AF-2)	15 MIN	RA: TBD RA=SA SP - OA SP	G-HI: +10% G-LO: -10%
AV	SUPPLY AIR FLOW (AF-3 + AF-4)	15 MIN	SA: TBD	G-HI: +10% G-LO: -10%
AV	CHILLED WATER LOAD	YES		
AV	HOT WATER LOAD	YES		

VARIABLE FREQUENCY DRIVE INTERFACE				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
DO	COMMAND (START/STOP)			
DI	STATUS (RUNNING/STOP)			CR-MISMATCH
DI	FAULT OR ALARM (ON/OFF)			CR
AO	CONTROL OUTPUT (HZ)	15 MIN		
AI	STATUS FREQUENCY (HZ)	15 MIN		
AI	POWER (KW)	YES		

HUMIDIFIER INTERFACE				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
DO	COMMAND (START/STOP)			
DI	STATUS (RUNNING/STOP)			G-MISMATCH
DI	FAULT OR ALARM (ON/OFF)			G
AO	CONTROL SETPOINT (%RH)	15 MIN	SEE ABOVE	
AO	CONTROL VALUE (%RH) AVERAGED SPACE HUMIDITY		SEE ABOVE	
AI	STATUS (%)	15 MIN		

DDCS POINTS LIST				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
AI	UNIT BYPASS AIR FLOW MONITORING STATION	15 MIN	UBA: 50% OF SA	
DO	UNIT BYPASS SMOKE DAMPER CONTROL	COV		
DI	UNIT BYPASS DAMPER POSITION SWITCH			G-MISMATCH
AI	BYPASS AIR FLOW METER	15 MIN		
AI	BYPASS AIR FLOW MONITORING STATION	15 MIN	BA MIN: 40% OF SA BA MAX: 70% OF SA	
DO	100% OUTDOOR AIR PURGE DAMPER CONTROL	COV		
DI	100% OUTDOOR AIR PURGE DAMPER POSITION SWITCH			G-MISMATCH
AO	MINIMUM OUTDOOR AIR DAMPER CONTROL	15 MIN		
AI	MINIMUM OUTDOOR AIR FLOW MONITORING STATION	15 MIN	OA: TBD	G-HI: +10% G-LO: -10%
NET	RETURN FAN VFD INTERFACE			
NET	RETURN FAN VFD INTERFACE			
BO	CONTROL CONTACTOR-RF 1			
BO	CONTROL CONTACTOR-RF 2			
BO	CONTROL CONTACTOR-RF 3			
AI	RETURN FAN AFMS - TOTAL	15 MIN		
AI	AIR FLOW - RETURN FAN 1	15 MIN		
AI	AIR FLOW - RETURN FAN 2	15 MIN		
AI	AIR FLOW - RETURN FAN 3	15 MIN		
DI	RETURN AIR SMOKE DETECTOR			CR
DI	RETURN SMOKE DAMPER POSITION SWITCH			G-MISMATCH
DO	RETURN SMOKE DAMPER CONTROL	COV		
AI	RETURN AIR TEMPERATURE SENSOR	15 MIN		
AI	RETURN AIR HUMIDITY SENSOR	15 MIN		
DI	RETURN AIR LOW PRESSURE SWITCH			
DO	RETURN OR RELIEF DAMPER CONTROL	COV		
DI	RETURN OR RELIEF POSITION SWITCH			G-MISMATCH
AI	MIXED AIR TEMPERATURE TEMPERATURE SENSOR	15 MIN		
DI	DIRTY INTERMEDIATE & PRE-FILTER PRESSURE SWITCH			G
DI	DIRTY FINAL& CARBON-FILTER PRESSURE SWITCH			G
AO	COILING COIL FACE & BYPASS DAMPER CONTROL	15 MIN		
AI	COILING COIL FACE & BYPASS DAMPER POSITION SWITCH	15 MIN		
AI	CHILLED WATER RETURN TEMPERATURE SENSOR	15 MIN		
AI	CHILLED WATER RETURN FLOW SENSOR	15 MIN		
AO	CHILLED WATER RETURN CONTROL VALVE	15 MIN		
AI	CHILLED WATER SUPPLY TEMPERATURE SENSOR	15 MIN		
DO	FREEZE PROTECTION PUMP ENABLE/DISABLE	COV		
DI	FREEZE PROTECTION PUMP CURRENT SENSOR			G-MISMATCH
DI	LOW TEMPERATURE LIMIT SWITCH WITH MANUAL RESET		37°F	CR
AI	COOLING COIL DISCHARGE TEMPERATURE SENSOR	15 MIN	CLG COIL MIN: 47°F CLG COIL MAX: 47°F	
AI	HOT WATER RETURN TEMPERATURE SENSOR	15 MIN		
AI	HOT WATER RETURN FLOW SENSOR	15 MIN		
AO	HOT WATER REHEAT CONTROL VALVE	15 MIN		
AI	HOT WATER SUPPLY TEMPERATURE SENSOR	15 MIN		
DO	FREEZE PROTECTION PUMP ENABLE/DISABLE	COV		
DI	FREEZE PROTECTION PUMP CURRENT SENSOR			G-MISMATCH
AI	SUPPLY FAN AFMS - TOTAL	15 MIN		
AI	AIR FLOW - SUPPLY FAN 1	15 MIN		
AI	AIR FLOW - SUPPLY FAN 2	15 MIN		
AI	AIR FLOW - SUPPLY FAN 3	15 MIN		
AI	AIR FLOW - SUPPLY FAN 4	15 MIN		
BO	CONTROL CONTACTOR-SF 1			
BO	CONTROL CONTACTOR-SF 2			
BO	CONTROL CONTACTOR-SF 3			
BO	CONTROL CONTACTOR-SF 4			
NET	SUPPLY FAN VARIABLE FREQUENCY DRIVE INTERFACE			
NET	SUPPLY FAN VARIABLE FREQUENCY DRIVE INTERFACE			
DI	HEPA DIRTY FILTER PRESSURE SWITCH			G
NET	HUMIDIFIER INTERFACE			
AI	SUPPLY AIR TEMPERATURE SENSOR	15 MIN		
AI	SUPPLY AIR HUMIDITY SENSOR	15 MIN		
DI	SUPPLY AIR HIGH PRESSURE SWITCH			CR
DI	SUPPLY AIR SMOKE DETECTOR			CR
AO	MODULATING SUPPLY SMOKE DAMPER CONTROL	15 MIN		
AI	SUPPLY SMOKE DAMPER POSITION SWITCH	15 MIN		

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PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28411, EXPIRATION DATE 1/13/2025.

KEY PLAN

GRAPHIC SCALE(S)

DATE 02/02/24 | SUBMISSION BID SET

REVISION
REVISION 1
REVISION 2
REVISION 3
REVISION 4
REVISION 5
REVISION 6
REVISION 7

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BUILDING NAME / ADDRESS: MUSEUM SUPPORT CENTER, 4210 SILVER HILL ROAD, SUITLAND, MD 20746
PROJECT TITLE: MSC REPLACE AHUs POD 1
SF PROJECT NUMBER: 1530103
A/E PROJECT NUMBER: 60516569
DRAWING TITLE: AIR HANDLING UNIT TYPICAL
DRAWING TYPE: MECHANICAL CONTROLS
WORKING STAFF: PR (DESIGNED BY) | PR (DRAWN BY) | DP/TM (CHECKED BY)

SHEET NO. 52 OF 71
M (DISCIPLINE) | 7 (TYPE) | 02 (SEQUENCE)

SEQUENCE OF OPERATION: AHU-1 & 2

GENERAL

1. THE SUPPLY FANS SHALL OPERATE TO PROVIDE CONSTANT VOLUME AIR FLOW. THE RETURN FANS SHALL OPERATE TO MAINTAIN A LOWER CONSTANT VOLUME AIR FLOW OFFSET BY THE OUTDOOR AIR INTAKE VOLUME OR FIXED SPEED.
2. THE SYSTEM CONSISTS OF PURGE OUTSIDE AIR TUNNEL DAMPER, RETURN AIR SECTION, RETURN FANS WITH VFDS, MIXED AIR SECTION, AIRFLOW STATION, OUTDOOR AIR DAMPER, MERV-8 PRE-FILTERS, MERV-14 INT-FILTERS, CARBON FILTER, MERV-8 POST-FILTER, BYPASS SECTION, CHILLED WATER COIL, BLENDER SECTION, HOT WATER COIL, SUPPLY FANS WITH VFDS, HUMIDIFIER MANIFOLD, AND HEPA FILTER.
3. THE VARIABLE FREQUENCY DRIVES (VFD) FOR SUPPLY AND RETURN FANS ARE INTENDED FOR BALANCING THE UNIT AND TO PROVIDE THE AIR FLOW REQUIRED FOR NORMAL OPERATION AND PURGE OPERATION. THE PRIMARY AND STAND-BY VFD INVERTERS ARE WIRED TO OPERATE ALL FANS IN THE SUPPLY SET OR RETURN SET OF FANS. WHEN THE PRIMARY VFD INVERTER FAILS, THE STAND-BY VFD INVERTER TAKES OVER CONTROL OF THE FANS.
4. UNIT SHALL HAVE SMOKE DETECTORS IN BOTH THE SUPPLY DUCT AND RETURN DUCTS. THERE SHALL BE A SMOKE DAMPER IN THE SUPPLY DUCT AND IN THE RETURN DUCT.
5. UNIT SHALL HAVE A RETURN AIR LOW PRESSURE SWITCH, SUPPLY AIR HIGH PRESSURE SWITCH, AND A LOW TEMPERATURE FREEZE PROTECTION SENSOR (FREEZESTAT).
6. UNIT SHALL HAVE FULL DDC CONTROLLED OPERATION THROUGH BUILDING AUTOMATION SYSTEM (BAS).
7. UNIT SHALL HAVE CONTROLLED OPERATION FROM CONTROL GRAPHIC ON DDC PANEL AT UNIT.
8. FACE AND BYPASS DAMPER LOCATED UPSTREAM SIDE OF COOLING COIL ARE INVERSELY OPERATED.
9. SMOKE DAMPERS SHALL BE USED AS ISOLATION DAMPERS. SUPPLY SMOKE DAMPER SHALL BE USED AS A MODULATING DAMPER DURING UNIT BYPASS MODE.

MODE: FAN HAND-OFF-AUTO OPERATION

1. HAND-OFF-AUTO SETTINGS SHALL BE PROVIDED AS PART OF THE VFD THROUGH THE DRIVE'S KEYPAD.
2. IN THE HAND MODE, THE FAN SHALL START AND RUN CONTINUOUSLY AFTER THE SMOKE DAMPERS ARE PROVEN OPEN, THE FAN SPEED SHALL BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE VFD CONTROL PANEL.
3. IN THE OFF MODE, THE FAN SHALL BE STOPPED.
4. IN THE AUTO MODE, THE FAN SHALL BE STARTED AND STOPPED AS DESCRIBED UNDER "OPERATION MODES".

MODE: UNIT OFF

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE.
2. FAN CONTROL: THE SUPPLY AND RETURN FANS SHALL BE DISABLED.
3. DAMPER CONTROL: THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON DAMPER POSITION SCHEDULE.
4. VALVE CONTROL: THE CHILLED WATER VALVE AND HOT WATER VALVE SHALL GO TO THE CLOSED POSITION.

MODE: UNIT ON

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE. THE UNIT SHALL RUN CONTINUOUSLY IN THIS MODE UNLESS UNIT FAILS OR ANOTHER MODE IS INITIATED.
2. REFER TO MECHANICAL SCHEDULE FOR AIRFLOW VALUES
3. FAN CONTROL:
   a. AFTER THE RETURN AND SMOKE DAMPERS HAVE PROVEN OPEN, THE SUPPLY FAN AND RETURN FAN SHALL RAMP UP TOGETHER AND THEN MAINTAIN SETPOINTS.
   b. THE SUPPLY FAN SHALL MODULATE ITS SPEED TO MAINTAIN SUPPLY AIR FLOW SETPOINT [SA AIRFLOW: SEE MECH DWG] WHEN AIR FLOW CONTROL IS SELECTED OR AT FIXED SPEED, IF FIXED SPEED CONTROL IS SELECTED. FIXED SPEED CONTROL IS INTENDED FOR WHEN AIR FLOW MEASURING STATION IS NOT OPERATIONAL OR VALUES ARE NOT RELIABLE.
      -DURING NORMAL OPERATION, SUPPLY FANS' VFD SHALL MODULATE TOGETHER TO MAINTAIN SETPOINT.
      -WHILE AIRFLOW IS WITHIN THROTTLE RANGE +/- 5% OF DESIGN AIR FLOW CFM, THE VFD SPEED SHALL REMAIN UNCHANGED.
   c. THE RETURN FAN SHALL MODULATE ITS SPEED TO MAINTAIN RETURN AIR FLOW SETPOINT [RA AIRFLOW: SEE MECH DWG] WHEN AIR FLOW CONTROL IS SELECTED OR AT FIXED SPEED OFFSET, IF FIXED SPEED OFFSET CONTROL IS SELECTED.
      -THE RETURN AIR SETPOINT SHALL BE A CALCULATED VALUE EQUAL TO THE SUPPLY FAN AIRFLOW SETPOINT [SA AIRFLOW: SEE MECH DWG] MINUS [OA AIRFLOW: SEE MECH DWG].
      -DURING NORMAL OPERATION, THE RETURN FANS' VFD SHALL MODULATE TOGETHER TO MAINTAIN SETPOINT.
      -WHILE AIRFLOW IS WITHIN THROTTLE RANGE +/- 5% OF DESIGN AIR FLOW CFM, THE VFD SPEED SHALL REMAIN UNCHANGED.
4. FAN CONTROL CONTACTOR:
   4.1. NORMAL OPERATION OPERATES ALL FANS. CONTROL CONTACTORS ARE INTENDED TO ALLOW OPERATOR TO REDUCE THE CAPACITY OF THE FAN WALL SYSTEM OR DISABLE AN INDIVIDUAL THAT IS NOT OPERATING PROPERLY.
   4.2. WHEN VFD IS STOPPED, THE OPERATOR MAY SELECT ANY NUMBER OF FANS THAT WILL BE ALLOWED TO RUN.
   4.3. WHEN VFD IS OPERATING, THE OPERATOR MAY DISABLE ANY FAN BUT WILL NOT BE ABLE TO ENABLE AN INDIVIDUAL FAN WITHOUT CONFIRMATION. WHEN OPERATOR ATTEMPTS TO ENABLE INDIVIDUAL FAN WHILE VFD IS OPERATING, GENERATE CONFIRMATION POPUP WINDOW, "WARNING, CONFIRM FAN ENABLE. ENABLING FAN WHILE FAN IS OPERATING MAY TRIP FAN'S VFD DRIVE. RECOMMEND COMMANDING VFD TO STOP AND RESTARTING WITH INCREASED NUMBER OF FANS ENABLED."
5. DAMPER CONTROL:
   a. THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON DAMPER POSITION SCHEDULE.
   b. MINIMUM OUTDOOR AIR DAMPER [DA-3] SHALL OPEN AND MODULATE TO MAINTAIN OUTDOOR AIR FLOW SETPOINT [OA AIRFLOW: SEE MECH DWG]. WHILE AIRFLOW IS WITHIN THROTTLE RANGE +/- 5% OF DESIGN AIR FLOW CFM, THE DAMPER POSITION SHALL REMAIN UNCHANGED.
   c. THE FACE AND BYPASS DAMPER [DA-5] SHALL MODULATE BASED ON TEMPERATURE OR HUMIDITY CONTROL.
5. FACE AND BYPASS DAMPER TEMPERATURE CONTROL:
   a. WHEN THE FOLLOWING CONDITION ARE MET, FACE AND BYPASS DAMPER TEMPERATURE CONTROL SHALL BE ENABLED:
      -AVERAGE OUTDOOR AIR TEMPERATURE (AHU-1 AND AHU-8), IS BELOW 50°F FOR 15 MINUTES,
      -AND DEHUMIDIFICATION CONTROL IS NOT ENABLED.
   b. THE FACE AND BYPASS DAMPER [DA-5] SHALL MODULATE THE BYPASS AIR FLOW TO MAINTAIN THE BYPASS AIR MEASURED AT AFMS-5 FROM [BA MIN: 40% OF SA] TO [BA MAX: 70% OF SA] TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT [TEMP CTRL: 70°F].
      -WHEN THE AVERAGE SPACE TEMPERATURE RISES ABOVE [TEMP CTRL: 70°F], THE BYPASS AIR FLOW SETPOINT SHALL DECREASE SLOWLY TO A MINIMUM OF [BA MIN: 40% OF SA].
      -WHEN THE AVERAGE SPACE TEMPERATURE DROPS BELOW [TEMP CTRL: 70°F] SETPOINT, THE BYPASS AIR FLOW SETPOINT SHALL INCREASE SLOWLY TO A MAXIMUM VALUE OF [BA MAX: 70% OF SA].
      -WHEN AVERAGE SPACE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE DAMPER POSITION SHALL REMAIN UNCHANGED.
   c. THE COOLING COIL DISCHARGE TEMPERATURE [T-4] SETPOINT SHALL SLOWLY REDUCE TO [CLG COIL MIN: 47°F] AND [VA-1] SHALL MODULATE TO MAINTAIN CONSTANT SETPOINT OF [CLG COIL MIN: 47°F].
      -WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1.0°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   d. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN TO MAINTAIN AVERAGE SPACE TEMPERATURE HEATING SETPOINT OF 68°F (ADJUSTABLE BUT MAY NOT BE GREATER THAN [TEMP CTRL SETPOINT -2°F]). WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1.0°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
6. COOLING COIL DISCHARGE RESET TEMPERATURE CONTROL:
   a. WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET, COOLING COIL DISCHARGE TEMPERATURE CONTROL SHALL BE ENABLED TO REDUCE COOLING CAPACITY WHEN LESS COOLING IS REQUIRED.
      -AVERAGE OUTDOOR AIR TEMPERATURE (AHU-1 AND AHU-8), IS BELOW 50°F FOR 15 MINUTES,
      -AND THE BYPASS AIR FLOW SETPOINT SHALL EQUALS MAXIMUM VALUE OF [BA MAX: 70% OF SA] FOR 15 MINUTES,
      -AND THE AVERAGE SPACE TEMPERATURE IS ABOVE [TEMP CTRL: 70°F],
      -AND DEHUMIDIFICATION CONTROL IS NOT ENABLED.
   b. THE FACE AND BYPASS DAMPER SHALL MODULATE TO MAINTAIN A CONSTANT BYPASS AIR FLOW OF [BA MAX: 70% OF SA].
   c. THE COOLING COIL DISCHARGE TEMPERATURE [T-4] SETPOINT SHALL MODULATE BETWEEN [CLG COIL MIN: 47°F] AND [CLG COIL MAX: 57°F] TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT OF [TEMP CTRL: 70°F]. WHEN SPACE TEMPERATURE RISES ABOVE SET POINT, DECREASE SET POINT. WHEN SPACE TEMPERATURE DROPS, INCREASE SET POINT.
      -WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1.0°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   d. IF THE AVERAGE SPACE TEMPERATURE RISES ABOVE [TEMP CTRL: 70°F] AND COOLING COIL DISCHARGE TEMPERATURE SETPOINT EQUALS [CLG COIL MIN: 47°F] FOR 15 MINUTES, COOLING COIL DISCHARGE RESET TEMPERATURE CONTROL SHALL BE DISABLED AND FACE AND BYPASS DAMPER TEMPERATURE CONTROL SHALL BE ENABLED.
7. DEHUMIDIFICATION CONTROL:
   a. WHEN THE AVERAGE SPACE HUMIDITY RISES ABOVE SPACE DE-HUMIDIFICATION SETPOINT [DE-HUMID: 45%], DEHUMIDIFICATION CONTROL SHALL BE ENABLED.
   b. THE FACE AND BYPASS AIR FLOW SETPOINT SHALL DECREASE SLOWLY TO MINIMUM BYPASS AIR FLOW SETPOINT OF [BA MIN: 40% OF SA].
   c. THE COOLING COIL DISCHARGE TEMPERATURE [T-4] SETPOINT SHALL SLOWLY REDUCE TO [CLG COIL MIN: 47°F] AND [VA-1] SHALL MODULATE TO MAINTAIN CONSTANT SETPOINT OF [CLG COIL MIN: 47°F].
   d. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT OF 68°F (ADJUSTABLE BUT MAY NOT BE GREATER THAN [TEMP CTRL SETPOINT -2°F]).
   e. WHEN THE AVERAGE SPACE HUMIDITY DROPS TO 41% ([DE-HUMID: 45%] MINUS 4% RH), THE FOLLOWING SHALL OCCUR:
      -DEHUMIDIFICATION CONTROL SHALL BE DISABLED,
      -AND FACE AND BYPASS DAMPER CONTROL SHALL BE ENABLED,
      -AND HUMIDIFY CONTROL SHALL BE DISABLED FOR 60 MINUTES.
8. HUMIDIFY CONTROL:
   a. WHEN THE AVERAGE SPACE HUMIDITY DROPS BELOW HUMIDIFY SETPOINT [HUMIDIFY: 37%], THE HUMIDIFIER SHALL BE ENABLED AND MODULATE TO MAINTAIN SPACE HUMIDITY.
      -WHEN AVERAGE SPACE HUMIDITY REACHES INCREASE TO 41% ([HUMIDIFY: 37%], PLUS 4% RH), THE HUMIDIFIER SHALL BE DISABLED.
      -THE HUMIDIFIER SHALL HAVE A MINIMUM ON AND OFF TIME OF 10 MINUTES TO PREVENT SHORT CYCLING.
      -WITH THE EXCEPTION OF DEHUMIDIFICATION MODE, THE HUMIDIFY MODE SHALL OPERATE INDEPENDENTLY OF OTHER MODES. HUMIDIFICATION MODE AND DEHUMIDIFICATION MODE SHALL NOT OPERATE AT THE SAME TIME.

MODE: UNIT BYPASS (TEMPORARY OPERATION)

1. GENERAL CONTROL: THE MODE SHALL BE MANUALLY INITIATED FROM A BAS INTERFACE. BYPASS SHALL NOT BE AUTOMATICALLY ENABLED. THE FOLLOWING ARE RECOMMEND CONDITIONS FOR THE USER TO INITIATE BYPASS CONTROL OR FOR THE FOLLOWING CONDITIONS:
   a. FREEZESTAT ACTIVATED.
   b. RETURN SMOKE DAMPER OR SUPPLY SMOKE DAMPER FAIL TO OPEN.
   c. HIGH OR LOW PRESSURE SWITCHES ACTIVATE.
   d. ALL FANS HAVE FAILED TO START.
   e. DURING CONSTRUCTION TRANSITION PERIOD.
   f. UNIT SHUT DOWN FOR MAINTENANCE.
   g. HYDRONIC SYSTEM FAILURE IN THE UNIT.
2. FAN CONTROL FOR BYPASSED UNIT: THE SUPPLY AND RETURN FANS SHALL BE DISABLED.
3. DAMPER CONTROL:
   a. FOR THE BYPASSED UNIT, THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON THE DAMPER POSITION SCHEDULE.
   b. FOR THE ACTIVE UNIT, THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON THE DAMPER POSITION SCHEDULE.
      -THE SUPPLY DAMPER SHALL MODULATE TO MAINTAIN UNIT BYPASS AIR (UBA) SETPOINT [UBA: 50% OF SA] MEASURED AT UNIT BYPASS AIR FLOW MEASURING STATION (AF-7). THE SETPOINT IS UPDATED BASED ON ONE HALF THE TOTAL OF SUPPLY AIR MEASURED AT (AF-3) & (AF-4). USE CONTINUOUS UPDATING MODULATING SETPOINT CONTROL WITH DEADBAND (INITIALLY +/- 50 CFM) BUT USING SETPOINT RESET STRATEGY WHERE SET POINT IS RESET AT SET DURATION IS AN ACCEPTABLE ALTERNATIVE CONTROL STRATEGY.

MODE: PURGE MODE

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE. THE PURGE MODE SHALL HAVE A USER ADJUSTABLE DURATION. AFTER THE DURATION HAS EXCEEDED, THE UNIT SHALL RETURN TO NORMAL OPERATION. THE PURGE MODE SHALL BE TRENDED BASED ON CHANGE OF VALUE.
2. THE SUPPLY AND RELIEF/EXHAUST AIR FLOW SETPOINTS SHALL BE REDUCED FROM NORMAL OPERATION. SEE MECHANICAL SCHEDULE FOR AIRFLOW REQUIREMENTS.
3. FAN & DAMPER CONTROL:
   a. THE SUPPLY AND RETURN FAN SHALL RAMP DOWN TO MINIMUM SPEED.
   b. THE DAMPERS SHALL GO TO THE DAMPER POSITION INDICATED ON THE DAMPER POSITION SCHEDULE.
   c. AFTER THE DAMPERS HAVE MOVED INTO POSITION, THE RETURN AND SUPPLY FAN SHALL RAMP UP AND MAINTAIN SETPOINTS AS DESCRIBED IN FAN CONTROL IN UNIT ON MODE.

MODE: PEAK DEMAND

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE. THE PEAK DEMAND MODE SHALL HAVE A USER ADJUSTABLE DURATION. AFTER THE DURATION HAS EXCEEDED, THE UNIT SHALL RETURN TO NORMAL OPERATION. WHEN PEAK DEMAND IS DISABLED, THE SUPPLY FAN AIRFLOW SETPOINT SHALL INCREASE SLOWLY TO ORIGINAL VALUE, SPACE TEMPERATURE SETPOINT AND COOLING COIL SETPOINT SHALL DECREASE SLOWLY TO PREVENT EXCESSIVE SPIKE IN DEMAND.
2. FAN CONTROL:
   a. THE SUPPLY FANS AIRFLOW SETPOINT [SA: TBD] SHALL BE REDUCED BY 25%.
   b. THE RETURN FAN SHALL TRACK THE SUPPLY FAN SPEED AS INDICATED IN UNIT ON MODE.
3. DAMPER CONTROL: DAMPERS SHALL OPERATE AS INDICATED IN UNIT ON MODE.
4. TEMPERATURE CONTROL:
   a. THE AVERAGE SPACE TEMPERATURE SETPOINT SHALL BE INCREASED TO 72°F (CURRENT SET POINT PLUS 2°F(ADJ.)).
   b. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT OF 66°F (CURRENT SET POINT MINUS 2°F(ADJ.)).
   c. THE THROTTLE RANGES AND BASIC CONTROLS SHALL OPERATE AS INDICATED IN UNIT ON MODE.
5. HUMIDITY CONTROL: HUMIDITY CONTROL SHALL OPERATE AS INDICATED IN IN UNIT ON MODE.

MODE: FREEZE PROTECTION

1. WHEN OUTDOOR AIR TEMPERATURE SENSOR NEAR AHU-8 OR SENSOR NEAR AHU-1 SENSES A TEMPERATURE BELOW 42°F, THE CHILLED WATER AND HOT WATER REHEAT FREEZE PROTECTION PUMPS SHALL BE ENABLED.
   a. THE PUMPS SHALL HAVE MINIMUM ON/OFF TIME OF 10 MINUTES TO PREVENT SHORT CYCLING.
   b. WHEN OUTDOOR AIR TEMPERATURE SENSOR NEAR AHU-8 OR SENSOR NEAR AHU-1 ABOVE 42°F FOR 10 MINUTES, THE PUMPS SHALL BE DISABLED.
   c. DURING PURGE MODE, THE FREEZE PROTECTION PUMPS SHALL BE ENABLED AS PREVIOUSLY DESCRIBED AND THE CHILLED WATER CONTROL VALVE [VA-1] AND THE HOT WATER CONTROL VALVE [VA-2] SHALL BE COMMANDED TO 100% OPEN.
2. FREEZESTAT: THE FREEZESTAT SHALL BE SET TO TRIP AT 37°F AND IT SHALL REQUIRE A MANUAL RESET AT THE UNIT. ON A FREEZE ALARM SIGNAL, THE FOLLOWING SHALL OCCUR:
   a. SUPPLY AND RETURN FANS SHALL SHUT OFF.
   b. THE DAMPERS SHALL GO TO THE DAMPER POSITION INDICATED ON THE DAMPER POSITION SCHEDULE.
   c. THE CHILLED WATER CONTROL VALVE [VA-1] AND THE HOT WATER CONTROL VALVE [VA-2] SHALL BE COMMANDED TO 100% OPEN.
   d. IF CENTRAL PLANT PUMPS ARE OFF, THE CHILLED WATER AND HOT WATER REHEAT FREEZE PROTECTION PUMPS SHALL BE ENABLED WITHOUT ANY DELAYS.

SAFETIES, ALARMS, AND INTERLOCKS

1. GENERAL ALARMS INDICATED WITH "G" IN POINTS LIST ALARM COLUMN SHALL GENERATE AN ALARM IN THE BAS. WHEN ALARM CONDITION CLEARS, THE ALARM SHALL BE DISABLED. ACTIVATION AND DEACTIVATION OF ALARM SHALL BE LOGGED.
   a. ALL GENERAL ALARMS SHALL BE DISABLED WHEN THE UNIT HAS BEEN PLACED IN UNIT OFF MODE OR UNIT DISABLE MODE.
   b. WHEN UNIT HAS BEEN PLACED IN ON MODE, THE GENERAL ALARMS SHALL BE DISABLED FOR 10 MINUTE STARTUP DELAY.
   c. AFTER STARTUP DELAY, THE ALARMS SHALL HAVE A 3 MINUTE DELAY.
   d. THE DELAY TIMES SHALL BE ADJUSTED DURING STARTUP AND COMMISSIONING TO PREVENT NUISANCE ALARMS.
2. CRITICAL (CR) ALARMS INDICATED IN THE POINTS LIST ALARM COLUMNS SHALL BE GENERATE AN ALARM IN THE BAS AND SHALL PROVIDE NOTIFICATION OF ALARM. ALARM NOTIFICATION SHALL HAVE STANDARD NOTIFICATION MEANS INCLUDING EMAILING AND TEXTING.
3. FAN, SMOKE DAMPER, AND SMOKE DETECTOR INTERLOCKS:
   a. SUPPLY AND RETURN SMOKE DETECTORS SHALL BE HARDWIRED INTERLOCKED WITH UNIT'S SMOKE DETECTORS. (SUPPLY, BYPASS, AND RETURN.)
   b. WHEN SMOKE IS DETECTED, SUPPLY, RETURN, AND BYPASS SMOKE DAMPERS SHALL CLOSE.
4. THE SUPPLY AND RETURN FAN SHALL BE HARDWIRED INTERLOCKED WITH THE RETURN SMOKE DAMPER AND ASSOCIATED AIR DAMPER LIMIT SWITCHES.
   a. SUPPLY AND RETURN FANS SHALL NOT START UNTIL RETURN SMOKE DAMPERS ARE PROVEN OPEN.
5. THE SUPPLY AND RETURN FAN SHALL BE PROGRAMMED INTERLOCKED WITH THE SUPPLY AND BYPASS SMOKE DAMPER AND ASSOCIATED AIR DAMPER LIMIT SWITCHES.
   a. SUPPLY AND RETURN FANS SHALL NOT START WHILE BOTH THE BYPASS AND SUPPLY DAMPERS ARE CLOSED.
6. FIRE ALARM: UPON THE RECEIPT OF A FIRE ALARM SIGNAL FROM THE FACP OR A SMOKE DUCT DETECTOR IN THE AHU SUPPLY DUCT OR RETURN DUCT, THE SUPPLY AND RETURN FANS SHALL STOP AND THE UNIT'S SMOKE DAMPERS SHALL CLOSE. AFTER THE FIRE ALARM CONDITION HAS BEEN CLEARED AND THE FIRE ALARM SYSTEM HAS BEEN RESET, THE AIR HANDLING UNIT AND ASSOCIATED SMOKE DAMPERS SHALL BE RETURNED TO THEIR SCHEDULED OPERATION.
7. HIGH STATIC SWITCH: A HIGH-LIMIT STATIC-PRESSURE SWITCH IN THE SUPPLY FAN DISCHARGE SHALL STOP THE SUPPLY AND RETURN FANS AND INITIATE A HIGH-STATIC ALARM WHEN THE STATIC PRESSURE EXCEEDS THE SET POINT: 9 INCH W.G. (ADJ).
8. LOW STATIC SWITCH: A LOW-LIMIT STATIC-PRESSURE SWITCH IN THE RETURN DUCT SHALL STOP THE RETURN AND SUPPLY FANS AND INITIATE A LOW-STATIC ALARM WHEN THE STATIC PRESSURE FALLS BELOW THE SET POINT: -4 INCHES W.G. (ADJ).
9. MISMATCH ALARMS: WHEN A COMMAND STATUS CHANGES AND A 3 MINUTE DELAY HAS EXPIRED, GENERATE A MISMATCH ALARM IF THE COMMAND DOES NOT MATCH STATUS.
10. INDOOR AIR QUALITY ALARM: AN ALARM SHALL BE INITIATED IF THE MINIMUM OUTDOOR AIR IS +/-10% OF SETPOINT.

DAMPER POSITION SCHEDULE

DAMPER DESCRIPTION	OFF, FIRE, OR FREEZE.	ON	BYPASS CTRL		PURGE
			OFF UNIT	ACTIVE UNIT	
DA-1 RETURN SMOKE	CLOSE	OPEN	CLOSE	OPEN	OPEN
DA-2 SUPPLY SMOKE	CLOSE	OPEN	OPEN	50% AF	OPEN
DA-3 MINIMUM OUTDOOR AIR	CLOSE	MOD.	CLOSE	MOD.	OPEN
DA-4 100% OUTDOOR AIR PURGE	CLOSE	CLOSE	CLOSE	CLOSE	OPEN
DA-5 COILING COIL FACE &	CLOSE	MOD.	CLOSE	MOD.	CLOSE
BYPASS	OPEN	MOD.	OPEN	MOD.	OPEN
DA-6 UNIT BYPASS	CLOSE	CLOSE	OPEN	OPEN	CLOSE
DA-7 RETURN OR	OPEN	OPEN	OPEN	OPEN	CLOSE
RELIEF	CLOSE	CLOSE	CLOSE	CLOSE	OPEN

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KEY PLAN

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ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	AIR HANDLING UNIT TYPICAL AHU
DRAWING TYPE	MECHANICAL CONTROLS
WORKING STAFF	DESIGNED BY: PR; DRAWN BY: PR; CHECKED BY: DP/TM

GENERAL NOTES:

1. FOR DIRECT DIGITAL CONTROL SYSTEM (DDCS) SYMBOLS AND ABBREVIATIONS SEE SHEET M-7-1.
2. CONTROL MODULES AND DUCT SMOKE DETECTORS FURNISHED AND INSTALLED AS PART OF THE FIRE ALARM SYSTEM UNDER DIVISION 28.
3. ALL SPACE AND HUMIDITY SENSORS SUPPLIED AND MONITORED BY THESE UNITS SHALL BE REPLACED. SEE MECHANICAL FLOOR PLANS FOR SENSOR LOCATIONS.
4. REFER TO MECHANICAL SCHEDULE ON M.6.01 AND AHU DETAILS FOR COORDINATION.

CODED NOTES:

[1] INTERLOCK UNIT WITH FIRE ALARM SYSTEM THROUGH A CONTROL MODULE (CM) TO STOP THE SUPPLY AND EXHAUST FANS WHEN THE SUPPLY OR RETURN DUCT SMOKE DETECTOR SENSES PARTICLES OF COMBUSTION. THIS INTERLOCK SHALL BE HARD WIRED AND NOT PERFORMED THROUGH THE DDCS.

[2] HARDWIRE INTERLOCK FAN WITH ASSOCIATED PRESSURE SENSORS TO SHUT OFF FAN WHEN SENSORS TRIPS. EXHAUST WITH LOW PRESSURE AND SUPPLY WITH HIGH PRESSURE SWITCH.

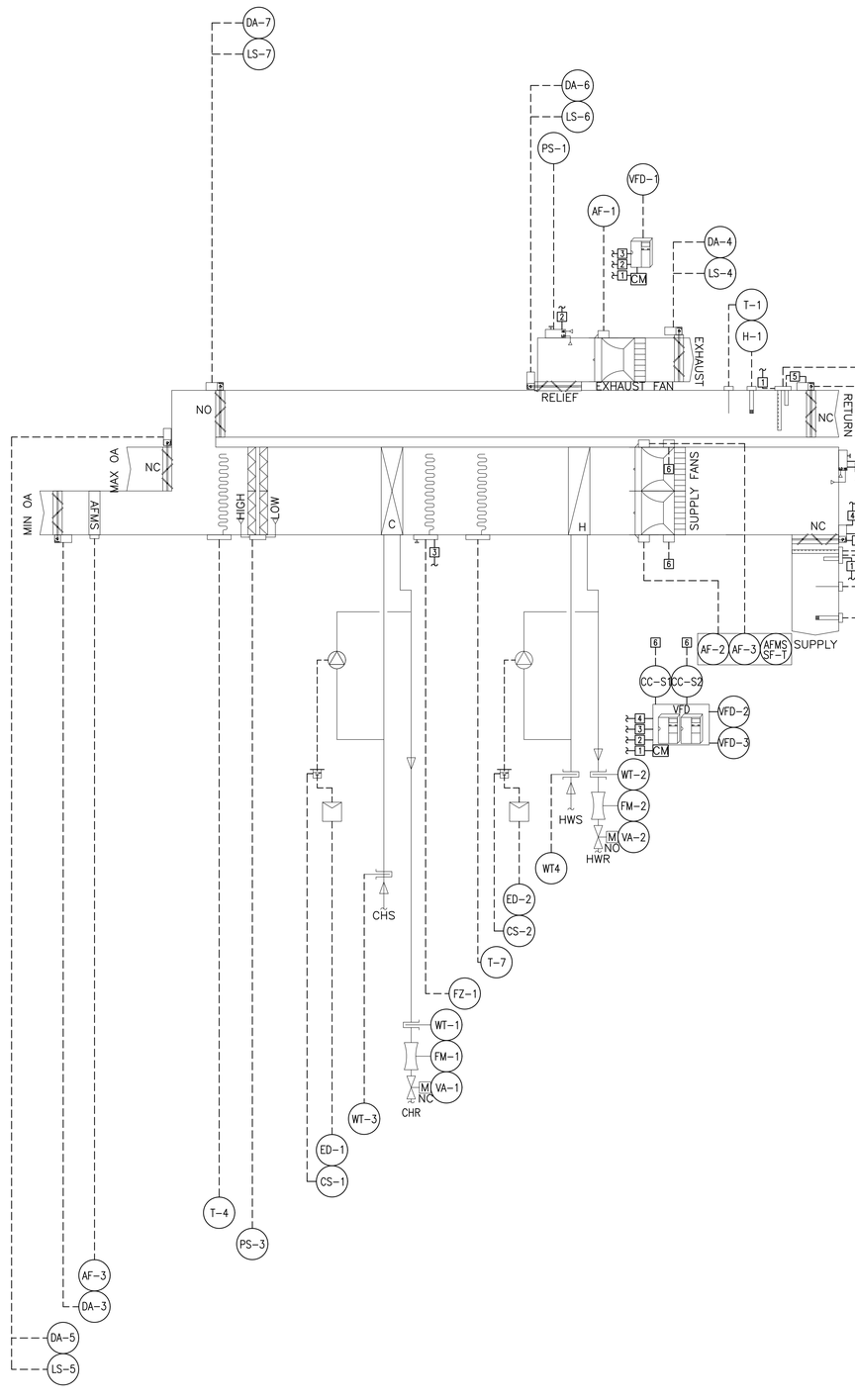
[3] HARDWIRE INTERLOCK FANS WITH FREEZESTAT. WHEN SENSORS INDICATES FREEZE CONDITION, FANS SHALL SHUTDOWN.

[4] THE DAMPER SHALL BE HARDWIRE-INTERLOCKED WITH THE SUPPLY FAN. WHEN THE FAN IS ENABLED, THE DAMPER SHALL BE COMMANDED TO OPEN. WHEN THE DAMPER STATUS HAS PROVEN OPEN, THE VFD SHALL BE ALLOWED TO RUN.

[5] THE DAMPER SHALL BE HARDWIRE-INTERLOCKED WITH THE ASSOCIATED SMOKE DETECTOR. WHEN DUCT SMOKE DETECTOR SENSES PARTICLES OF COMBUSTION, THE DAMPER SHALL BE CLOSE.

[6] WIRE THE VFD'S TWO INVERTERS AS PRIMARY AND STAND-BY. THE PRIMARY VFD INVERTER CONTROLS ALL FANS IN THE SET. UPON A FAILURE OF PRIMARY VFD INVERTER, THE STAND-BY VFD INVERTER CONTROLS ALL FANS IN THE SET.

AIR HANDLING UNIT CONTROLS: AHU-9



DDCS POINTS LIST					
	TYPE	DESCRIPTION	QTY	TREND	ALARM
[H]	AI	SPACE HUMIDITY	1	15 MIN	LO/HI: 30/53 %RH
[T]	AI	SPACE TEMPERATURE	1	15 MIN	LO/HI: 65/75 75°F

DDCS SOFTWARE POINTS				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
AV	AVERAGE SPACE TEMP.	15 MIN	REHEAT: 68°F COOLING: 68°F	G-HIGH: 78°F G-LOW: 63°F
AV	OUTDOOR AIR DEW POINT (CALCULATED FROM AVERAGED OUTDOOR AIR TEMPERATURE AND OUTDOOR AIR HUMIDITY)	15 MIN	ECON: 50°F DP	
AV	OUTDOOR AIR HUMIDITY (AVERAGE OF AHU-1 & AHU-8)			
AV	OUTDOOR AIR TEMPERATURE (AVERAGE OF AHU-1 & AHU-8)		ECON MAX OA: 65°F ECON MIN OA: 50°F	
AV	CHILLED WATER SUPPLY TEMP.			
AV	HEATING WATER SUPPLY TEMP.			
AV	CHILLED WATER LOAD	YES		
AV	HOT WATER LOAD	YES		
AV	SUPPLY AIR FLOW (AF-2+AF-3)	15 MIN	SA: 24,000 CFM	

VARIABLE FREQUENCY DRIVE INTERFACE				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
DO	COMMAND (START/STOP)			
DI	STATUS (RUNNING/STOP)			CR-MISMATCH
DI	FAULT OR ALARM (ON/OFF)			CR
AO	CONTROL SETPOINT (HZ)	15 MIN		
AI	STATUS FREQUENCY (HZ)	15 MIN		
AI	POWER (KW)	YES		

A M-7-04 MECHANICAL CONTROLS
SCALE = NTS

DDCS POINTS LIST					
	TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
DA-7	DO	RETURN DAMPER CONTROL	COV		
LS-7	DI	RETURN DAMPER POSITION SWITCH			G-MISMATCH
DA-6	DO	RELIEF DAMPER CONTROL	COV		
LS-6	DI	RELIEF DAMPER POSITION SWITCH			G-MISMATCH
PS-1	DI	EXHAUST AIR LOW PRESSURE SWITCH			
VFD-1	NET	EXHAUST FAN VFD INTERFACE			
AF-1	AI	EXHAUST FAN INLET AIR FLOW MONITORING STATION	15 MIN	EA: 23,400 CFM	
DA-4	DO	EXHAUST DAMPER CONTROL	COV		
LS-4	DI	EXHAUST DAMPER POSITION SWITCH			G-MISMATCH
T-1	AI	RETURN AIR TEMPERATURE SENSOR	15 MIN		
H-1	AI	RETURN AIR HUMIDITY SENSOR	15 MIN	DE-HUMID: 40%	G-HIGH: 53%
SD-1	DI	RETURN AIR SMOKE DETECTOR			CR
DA-1	DO	RETURN SMOKE DAMPER CONTROL	COV		
LS-1	DI	RETURN SMOKE DAMPER POSITION SWITCH			G-MISMATCH
PS-2	DI	SUPPLY AIR HIGH PRESSURE SWITCH			CR
DA-2	DO	SUPPLY SMOKE DAMPER CONTROL	COV		
LS-2	DI	SUPPLY SMOKE DAMPER POSITION SWITCH			G-MISMATCH
SD-2	DI	SUPPLY AIR SMOKE DETECTOR			CR
T-2	AI	SUPPLY AIR TEMPERATURE SENSOR	15 MIN		
H-2	AI	SUPPLY AIR HUMIDITY SENSOR	15 MIN		
AF-2 AF-3 AFMS SF-T	AI AI AI	AFMS - SUPPLY FAN TOTAL AIR FLOW AIR FLOW AIR FLOW	15 MIN 15 MIN 15 MIN		
CC-S1 CC-S2	BO BO	CONTROL CONTACTOR-SF 1 CONTROL CONTACTOR-SF 2			
VFD-2	NET	SUPPLY FAN VARIABLE FREQUENCY DRIVE INTERFACE			
VFD-3	NET	SUPPLY FAN VARIABLE FREQUENCY DRIVE INTERFACE			
WT-2	AI	HOT WATER RETURN TEMPERATURE SENSOR			
FM-2	AI	HOT WATER RETURN FLOW SENSOR	15 MIN		
VA-2	AO	HOT WATER REHEAT CONTROL VALVE	15 MIN		
WT-4	AI	CHILLED WATER SUPPLY TEMPERATURE SENSOR	15 MIN		
ED-2	DO	FREEZE PROTECTION PUMP ENABLE/DISABLE			
CS-2	DI	FREEZE PROTECTION PUMP CURRENT SENSOR			G-MISMATCH
T-7	AI	COOLING COIL DISCHARGE TEMPERATURE SENSOR	15 MIN	CLG COIL: 49°F	
FZ-1	DI	SWITCH WITH MANUAL RESET			CR-MISMATCH
WT-1	AI	CHILLED WATER RETURN TEMPERATURE SENSOR			
FM-1	AI	CHILLED WATER RETURN FLOW SENSOR	15 MIN		
VA-1	AO	CHILLED WATER RETURN CONTROL VALVE	15 MIN		
WT-3	AI	HOT WATER SUPPLY TEMPERATURE SENSOR	15 MIN		
ED-1	DO	FREEZE PROTECTION PUMP ENABLE/DISABLE	COV		
CS-1	DI	FREEZE PROTECTION PUMP CURRENT SENSOR			G-MISMATCH
T-4	AI	MIXED AIR TEMPERATURE SENSOR	15 MIN		
PS-3	DI	DIRTY FILTER ASSEMBLY PRESSURE SWITCH			G
AF-3	AI	MINIMUM OUTDOOR AIR FLOW MONITORING STATION		OA: 600 CFM	G-HI: NA G-LO: NA
DA-3	DO	MINIMUM OUTDOOR AIR DAMPER CONTROL			G-MISMATCH
DA-5	DO	MAX OA DAMPER CONTROL	COV		
LS-5	DI	MAX OA DAMPER POSITION SWITCH			G-MISMATCH

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SHEET NO.	54 OF 71
	M (DISCIPLINE) / 7 (TYPE) / 04 (SEQUENCE)

SCALE: AS NOTED

SEQUENCE OF OPERATION: AHU-9

GENERAL

1. THE SUPPLY FANS SHALL OPERATE TO PROVIDE CONSTANT VOLUME AIR FLOW. THE EXHAUST FAN SHALL REMAIN OFF DURING NORMAL OPERATION AND ENABLED DURING ECONOMIZER OPERATION.
2. THE SYSTEM CONSISTS OF RETURN AIR TUNNEL, RETURN DAMPER, RELIEF DAMPER, MIXED AIR SECTION WITH MINIMUM AND MAXIMUM OA LOUVER/DAMPER, FILTER WITH MERV-8 PRE-FILTERS AND MERV-14 INT-FILTERS, HOT WATER COIL, CHILLED WATER COIL, SUPPLY FANS, AND EXHAUST FAN.
3. THE VARIABLE FREQUENCY DRIVES (VFD) FOR SUPPLY FANS AND EXHAUST FAN ARE INTENDED FOR BALANCING THE UNIT AND TO PROVIDE THE AIR FLOW REQUIRED FOR NORMAL OPERATION AND PURGE OPERATION. THE PRIMARY AND STAND-BY VFD ARE WIRED TO OPERATE ALL SUPPLY FANS. WHEN THE PRIMARY VFD FAILS, THE STAND-BY VFD TAKES OVER CONTROL OF THE FANS.
4. UNIT SHALL HAVE SMOKE DETECTORS IN BOTH THE SUPPLY DUCT AND RETURN DUCTS. THERE SHALL BE A SMOKE DAMPER IN THE SUPPLY DUCT AND IN THE RETURN DUCT.
5. UNIT SHALL HAVE A RETURN AIR LOW PRESSURE SWITCH, SUPPLY AIR HIGH PRESSURE SWITCH, AND A LOW TEMPERATURE FREEZE PROTECTION SENSOR (FREEZESTAT).
6. UNIT SHALL HAVE FULL DDC CONTROLLED OPERATION THROUGH BUILDING AUTOMATION SYSTEM (BAS).
7. UNIT SHALL HAVE A GRAPHICAL REPRESENTATION TO SHOW UNIT STATUS ON UNIT'S DDC PANEL.
8. SMOKE DAMPERS SHALL ALSO BE USED AND AS ISOLATION DAMPERS WHEN UNIT IS OFF.

MODE: FAN HAND-OFF-AUTO OPERATION

1. HAND-OFF-AUTO SETTINGS SHALL BE PROVIDED AS PART OF THE VFD THROUGH THE DRIVE'S KEYPAD.
2. IN THE HAND MODE, THE FAN SHALL START AND RUN CONTINUOUSLY AFTER THE SMOKE DAMPERS ARE PROVEN OPEN, THE FAN SPEED SHALL BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE VFD CONTROL PANEL.
3. IN THE OFF MODE, THE FAN SHALL BE STOPPED.
4. IN THE AUTO MODE, THE FAN SHALL BE STARTED AND STOPPED AS DESCRIBED UNDER "OPERATION MODES".

MODE: UNIT OFF

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE.
2. FAN CONTROL: THE SUPPLY FANS AND EXHAUST FAN SHALL BE DISABLED.
3. DAMPER CONTROL: THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON DAMPER POSITION SCHEDULE.
4. VALVE CONTROL: THE CHILLED WATER VALVE AND HOT WATER VALVE SHALL GO TO THE CLOSED POSITION.

MODE: UNIT ON NORMAL

1. GENERAL CONTROL: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE. THE UNIT SHALL RUN CONTINUOUSLY IN THIS MODE UNLESS UNIT FAILS OR ANOTHER MODE IS INITIATED.
2. FAN CONTROL:
   a. AFTER THE RETURN AND SUPPLY FIRE DAMPERS HAVE PROVEN OPEN, THE SUPPLY FANS RAMP UP AND MODULATES TOGETHER TO MAINTAIN SETPOINT FOR CONSTANT AIR FLOW.
   b. THE SUPPLY FANS' VFDS SHALL MODULATE THEIR SPEEDS TOGETHER TO MAINTAIN SUPPLY AIR FLOW SETPOINT [SA AIRFLOW: 24,000 CFM] BASED ON THE SUM OF FAN INLET AIR FLOW MONITORING STATIONS [AF-2] AND [AF-3].
      -WHILE AIRFLOW IS WITHIN THROTTLE RANGE +/-5% CFM, THE VFD SPEED SHALL REMAIN UNCHANGED.
   c. IF ONE OF THE SUPPLY FANS GOES INTO ALARM OR FAILS TO START, THE ACTIVE FAN'S VFD SHALL MODULATE ITS SPEED TO MAINTAIN SUPPLY AIR FLOW SETPOINT [SA AIRFLOW: 24,000 CFM] BASED ON ITS ASSOCIATED FAN INLET AIR FLOW MONITORING.
3. FAN CONTROL CONTACTOR:
   3.1. NORMAL OPERATION OPERATES ALL FANS. CONTROL CONTACTORS ARE INTENDED TO ALLOW OPERATOR TO REDUCE THE CAPACITY OF THE FAN WALL SYSTEM OR DISABLE AN INDIVIDUAL THAT IS NOT OPERATING PROPERLY.
   3.2. WHEN VFD IS STOPPED, THE OPERATOR MAY SELECT ANY NUMBER OF FANS THAT WILL BE ALLOWED TO RUN.
   3.3. WHEN VFD IS OPERATING, THE OPERATOR MAY DISABLE ANY FAN BUT WILL NOT BE ABLE TO ENABLE AN INDIVIDUAL FAN WITHOUT CONFIRMATION. WHEN OPERATOR ATTEMPTS TO ENABLE INDIVIDUAL FAN WHILE VFD IS OPERATING, GENERATE CONFIRMATION POPUP WINDOW, "WARNING, CONFIRM FAN ENABLE. ENABLING FAN WHILE FAN IS OPERATING MAY TRIP FAN'S VFD DRIVE. RECOMMEND COMMANDING VFD TO STOP AND RESTARTING WITH INCREASED NUMBER OF FANS ENABLED."
4. DAMPER CONTROL:
   a. THE DAMPERS SHALL GO TO THE POSITIONS INDICATED ON DAMPER POSITION SCHEDULE.
   b. MINIMUM OUTDOOR AIR DAMPER [DA-3] SHALL OPEN AND MODULATE TO MAINTAIN OUTDOOR AIR FLOW SETPOINT [OA AIRFLOW: 600 CFM] MEASURED AT AFMS. WHILE AIRFLOW IS WITHIN THROTTLE RANGE +/-5% CFM, THE DAMPER POSITION SHALL REMAIN UNCHANGED.
4. TEMPERATURE CONTROL:
   a. THE COOLING COIL [VA-1] SHALL MODULATE TO MAINTAIN AVERAGE SPACE TEMPERATURE AT COOLING COIL SETPOINT [COOLING: 75°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   b. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT AT HEATING SETPOINT [HEATING: 68°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
5. HUMIDITY CONTROL:
   a. WHEN THE RETURN AIR HUMIDITY [H-1] RISES ABOVE DE-HUMIDIFICATION SETPOINT OF [DE-HUMID: 40%] FOR A MINIMUM OF 10 MINUTES, THE COOLING COIL SPACE TEMPERATURE CONTROL SHALL BE DISABLED AND THE COOLING COIL SHALL MODULATE TO MAINTAIN COOLING COIL DISCHARGE TEMPERATURE OF [CLG COIL: 49°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-0.5°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   b. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT AT HEATING SETPOINT [HEATING: 68°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   c. WHEN RETURN AIR HUMIDITY DROPS TO 35% RH ([DE-HUMID: 40%] MINUS 5%) FOR A MINIMUM OF 15 MINUTES, THE COOLING COIL SHALL MAINTAIN SPACE TEMPERATURE AS DESCRIBED IN PREVIOUS TEMPERATURE CONTROL SECTION.

MODE: UNIT ON ECONOMIZER

1. ACTIVATION CONTROL: WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET FOR A MINIMUM 15 MINUTES:
   a. OUTDOOR AIR ENTHALPY IS LOWER THAN RETURN AIR ENTHALPY,
   b. AND OUTDOOR AIR TEMPERATURE IS LESS THAN 65°F,
   c. AND OUTDOOR AIR TEMPERATURE IS GREATER THAN 50°F,
   d. AND OUTDOOR AIR DEW POINT TEMPERATURE IS LESS THAN 50°F,
   e. AND, SPACE HUMIDITY IS BELOW SPACE HUMIDITY SETPOINT 40% RH.
2. ECONOMIZER FAN AND DAMPER CONTROL:
   a. THE SUPPLY FAN'S VFD SHALL RAMP THE SUPPLY FAN SPEED DOWN TO MINIMUM SPEED TO PROTECT THE EXHAUST FAN FROM ROTATING AND GOING INTO ALARM DURING THE TRANSITION TO ECONOMIZER AND TO PROTECT AGAINST PRESSURIZATION OF THE DUCT.
   b. THE RETURN DAMPER [DA-7] SHALL CLOSE, RELIEF DAMPER [DA-6] SHALL OPEN, AND EXHAUST AIR DAMPER [DA-4], AND MAX OUTSIDE AIR DAMPER [DA-5] SHALL OPEN.
   c. WHEN THE RELIEF AIR DAMPER [DA-6] AND EXHAUST AIR DAMPER [DA-4] HAVE BOTH PROVEN OPEN BY LIMIT SWITCH [LS-4] & [LS-6], THE EXHAUST FAN SHALL BE ENABLED AT MINIMUM SPEED, WHEN THE EXHAUST FAN HAS PROVEN ON THROUGH THE VFD, THE SUPPLY FAN'S VFDS AND EXHAUST FAN'S VFD SHALL RAMP UP SLOWLY TOGETHER.
   d. THE SUPPLY FANS SHALL OPERATE AS INDICATED IN UNIT ON MODE FAN CONTROL TO MAINTAIN SUPPLY AIR FLOW SETPOINT [SA AIRFLOW: 24,000 CFM].
   e. EXHAUST FAN'S VFD SHALL MODULATE SPEED BASED ON FAN INLET AIR FLOW MONITORING STATION [AF-1] TO MAINTAIN EXHAUST AIR FLOW SETPOINT OF 23,400 CFM WHICH EQUALS [SA AIRFLOW: 24,000 CFM] MINUS [OA AIRFLOW: 600 CFM].
3. TEMPERATURE CONTROL:
   a. THE COOLING COIL [VA-1] SHALL MODULATE TO MAINTAIN AVERAGE SPACE TEMPERATURE AT COOLING COIL SETPOINT [COOLING: 75°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
   b. THE HOT WATER REHEAT CONTROL VALVE [VA-2] SHALL MODULATE TO MAINTAIN TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT AT HEATING SETPOINT [HEATING: 68°F]. WHILE TEMPERATURE IS WITHIN THROTTLE RANGE +/-1°F, THE VALVE POSITION SHALL REMAIN UNCHANGED.
4. DE-ACTIVATION CONTROL: MODE SHALL BE DISABLED WHEN ANY OF THE FOLLOWING OCCUR FOR A MINIMUM OF 10 MINUTES:
   a. WHEN SPACE HUMIDITY RISES ABOVE DEHUMIDIFICATION SETPOINT [DE-HUMID: 40%],
   b. OR OUTDOOR AIR ENTHALPY IS HIGHER THAN RETURN AIR ENTHALPY,
   c. OR OUTDOOR AIR TEMPERATURE IS GREATER THAN 67°F,
   d. OR OUTDOOR AIR TEMPERATURE IS LESS THAN 48°F,
   e. OR OUTDOOR AIR DEW POINT IS GREATER THAN 50°F.
5. ECONOMIZER DISABLE FAN AND DAMPER CONTROL:
   a. THE SUPPLY FANS' VFDS AND EXHAUST FAN VFD SHALL RAMP DOWN TO MINIMUM SPEED TO PROTECT AGAINST OVER PRESSURIZATION OF THE SYSTEM. WHEN THE VFDS HAVE RAMPED DOWN TO MINIMUM SPEED, THE EXHAUST FAN SHALL BE DISABLED.
   b. THE MAX OA DAMPER [DA-5], THE RELIEF AIR DAMPER [DA-6], AND EXHAUST AIR DAMPER [DA-4] SHALL BE COMMANDED CLOSE AND THE RETURN AIR DAMPER [DA-7] SHALL OPEN.
   c. WHEN THE RETURN AIR DAMPER [DA-7] HAS PROVEN OPEN, THE SUPPLY FAN SHALL RAMP IT'S SPEED UP TO [SA AIRFLOW: 24,000 CFM] AND OPERATE AS INDICATED IN UNIT ON FAN CONTROL.
6. ECONOMIZER DISABLE VALVE CONTROL: THE COOLING COIL VALVE AND PRE-HEAT VALVE TEMPERATURE CONTROL SHALL BE ENABLED AS INDICATED UNIT ON MODE.

MODE: PURGE MODE

1. PURGE ENABLE: THE MODE SHALL BE INITIATED FROM A BAS INTERFACE. THE PURGE MODE SHALL HAVE AN ADJUSTABLE DURATION. WHEN THE DURATION TIME HAS EXCEEDED, THE UNIT SHALL RETURN TO NORMAL OPERATION.
   a. PURGE FAN & DAMPER CONTROL SHALL OPERATE AS INDICATED IN THE ECONOMIZER FAN AND DAMPER CONTROL.
   b. THE PUMPS SHALL BE ENABLED AS INDICATED IN FREEZE PROTECTION MODE.
2. PURGE DISABLE: THE PURGE MODE SHALL HAVE AN ADJUSTABLE DURATION. WHEN THE DURATION TIME HAS EXCEEDED OR HAS BEEN DISABLED FROM THE GRAPHIC INTERFACE, THE UNIT SHALL RETURN TO NORMAL OPERATION.
   a. PURGE DISABLE FAN & DAMPER CONTROL SHALL OPERATE AS INDICATED IN THE ECONOMIZER DISABLE FAN AND DAMPER CONTROL.
   b. THE COOLING COIL AND PRE-HEAT VALVE SHALL MODULATE AS INDICTED IN UNIT ON NORMAL MODE.

MODE: FREEZE PROTECTION

1. WHEN MIXED AIR TEMPERATURE [T-4] SENSES A TEMPERATURE BELOW 42°F, THE CHILLED WATER AND HOT WATER REHEAT FREEZE PROTECTION PUMPS SHALL BE ENABLED.
   a. THE PUMPS SHALL HAVE MINIMUM ON/OFF TIME OF 10 MINUTES TO PREVENT SHORT CYCLING.
   b. WHEN MIXED AIR TEMPERATURE [T-4] SENSES A TEMPERATURE ABOVE 42°F FOR 10 MINUTES, THE PUMPS SHALL BE DISABLED.
2. DURING PURGE MODE, WHEN MIXED AIR TEMPERATURE [T-4] SENSES A TEMPERATURE BELOW 42°F, THE CHILLED WATER AND HOT WATER REHEAT FREEZE PROTECTION PUMPS SHALL BE ENABLED AS PREVIOUSLY INDICATED AND CHILLED AND HOT WATER VALVES [VA-1] & [VA-2] SHALL BE COMMANDED TO FULL OPEN.
3. FREEZESTAT: THE FREEZESTAT SHALL BE SET TO TRIP AT 37°F AND IT SHALL REQUIRE A MANUAL RESET AT THE UNIT. ON A FREEZE ALARM SIGNAL, THE FOLLOWING SHALL OCCUR:
   a. SUPPLY AND EXHAUST FANS SHALL SHUT OFF.
   b. THE DAMPERS SHALL GO TO THE DAMPER POSITION INDICATED ON THE DAMPER POSITION SCHEDULE.
   c. THE CHILLED WATER CONTROL VALVE [VA-1] AND THE HOT WATER CONTROL VALVE [VA-2] SHALL BE COMMANDED TO 100% OPEN.
   d. IF PUMPS ARE OFF, THE CHILLED WATER AND HOT WATER REHEAT FREEZE PROTECTION PUMPS SHALL BE ENABLED WITHOUT ANY DELAYS.

SAFETIES, ALARMS, AND INTERLOCKS

1. GENERAL ALARMS INDICATED WITH G IN POINTS LIST ALARM COLUMN SHALL GENERATE AN ALARM IN THE BAS. WHEN ALARM CONDITION CLEARS, THE ALARM SHALL BE DISABLED. ACTIVATION AND DEACTIVATION OF ALARM SHALL BE LOGGED.
   a. ALL GENERAL ALARMS SHALL BE DISABLED WHEN THE UNIT HAS BEEN PLACED IN UNIT OFF MODE OR UNIT DISABLE MODE.
   b. WHEN UNIT HAS BEEN PLACED IN ON MODE, THE GENERAL ALARMS SHALL BE DISABLED FOR 10 MINUTE STARTUP DELAY.
   c. AFTER STARTUP DELAY, THE ALARMS SHALL HAVE A 3 MINUTE DELAY.
   d. THE DELAY TIMES SHALL BE ADJUSTED DURING STARTUP AND COMMISSIONING TO PREVENT NUISANCE ALARMS.
2. CRITICAL(CR) ALARMS INDICATED THE POINTS LIST ALARM COLUMNS SHALL BE GENERATE AN ALARM IN THE BAS AND SHALL PROVIDE NOTIFICATION OF ALARM. ALARM NOTIFICATION SHALL HAVE STANDARD NOTIFICATION MEANS INCLUDING EMAILING AND TEXT.
3. FAN, SMOKE DAMPER, AND SMOKE DETECTOR INTERLOCKS:
   a. SUPPLY AND RETURN SMOKE DETECTORS SHALL BE HARDWIRED INTERLOCKED WITH UNIT'S SMOKE DETECTORS.
   b. WHEN SMOKE IS DETECTED, BOTH SMOKE DAMPERS SHALL CLOSE.
4. THE SUPPLY AND EXHAUST FAN SHALL BE INTERLOCKED WITH THE SUPPLY AND RETURN SMOKE DAMPER AND ASSOCIATED AIR DAMPER LIMIT SWITCHES.
   a. THE FANS SHALL NOT START UNTIL SUPPLY AND RETURN SMOKE DAMPERS ARE PROVEN OPEN.
5. FIRE ALARM: UPON THE RECEIPT OF A FIRE ALARM SIGNAL FROM THE FACP OR A SMOKE DUCT DETECTOR IN THE AHU SUPPLY DUCT OR RETURN DUCT, THE SUPPLY FANS AND EXHAUST FAN SHALL STOP AND THE UNIT'S SMOKE DAMPERS SHALL CLOSE. AFTER THE FIRE ALARM CONDITION HAS BEEN CLEARED AND THE FIRE ALARM SYSTEM HAS BEEN RESET, THE AIR HANDLING UNIT AND ASSOCIATED SMOKE DAMPERS SHALL BE RETURNED TO THEIR SCHEDULED OPERATION.
6. HIGH STATIC SWITCH: A HIGH-LIMIT STATIC-PRESSURE SWITCH IN THE SUPPLY FAN DISCHARGE SHALL STOP THE SUPPLY FAN AND INITIATE A HIGH-STATIC ALARM WHEN THE STATIC PRESSURE EXCEEDS THE SET POINT: 9 INCH W.G. (ADJ).
7. LOW STATIC SWITCH: A LOW-LIMIT STATIC-PRESSURE SWITCH IN THE RETURN DUCT SHALL STOP THE EXHAUST FAN AND INITIATE A LOW-STATIC ALARM WHEN THE STATIC PRESSURE FALLS BELOW THE SET POINT: -4 INCHES W.G. (ADJ).
8. MISMATCH ALARMS: WHEN A COMMAND STATUS CHANGES AND A 3 MINUTE DELAY HAS EXPIRED, GENERATE A MISMATCH ALARM IF THE COMMAND DOES NOT MATCH STATUS.

DAMPER POSITION SCHEDULE			
DAMPER DESCRIPTION	OPERATIONAL MODE POSITION		
	OFF, FIRE, OR FREEZE.	ON NORMAL	PURGE OR ECONOMIZER
DA-1 RETURN SMOKE	CLOSE	OPEN	OPEN
DA-2 SUPPLY SMOKE	CLOSE	OPEN	OPEN
DA-3 MINIMUM OUTDOOR AIR	CLOSE	MOD.	OPEN
DA-4 EXHAUST	CLOSE	CLOSE	OPEN
DA-5 MAXIMUM OUTDOOR AIR	CLOSE	CLOSE	OPEN
DA-6 RELIEF	CLOSE	CLOSE	OPEN
DA-7 RETURN	OPEN	OPEN	CLOSE

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KEY PLAN

GRAPHIC SCALE(S)

DATE	02/02/24
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BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	AIR HANDLING UNIT AHU-9
DRAWING TYPE	MECHANICAL CONTROLS
WORKING STAFF	PR (DESIGNED BY) / PR (DRAWN BY) / DM/TM (CHECKED BY)

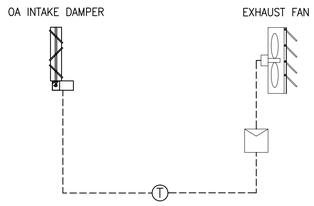
SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
55 OF 71	M	7	05

M-7-05.DWG
SCALE : 1:1

GENERAL NOTES:

1. FOR DIRECT DIGITAL CONTROL SYSTEM (DDCS) SYMBOLS AND ABBREVIATIONS SEE SHEET M-7-01.

EXHAUST FAN CONTROLS DIAGRAM: EF-1



SEQUENCE OF OPERATION: EF-1

GENERAL

1. THE ELECTRICAL ROOM EXHAUST FAN AND INTAKE DAMPER SHALL BE LOCALLY CONTROLLED BY A WALL MOUNTED THERMOSTAT.

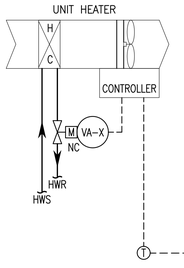
TEMPERATURE CONTROL

1. WHEN SPACE TEMPERATURE RISES ABOVE 85°F, THE INTAKE DAMPER SHALL OPEN AND THE EXHAUST FAN SHALL BE COMMANDED TO START.
2. WHEN SPACE TEMPERATURE DROPS BELOW 85°F, THE EXHAUST FAN SHALL BE COMMANDED TO STOP AND THE INTAKE DAMPER SHALL CLOSE.

A / M-7-06 — MECHANICAL CONTROLS: EF-1

SCALE = NTS

UNIT HEATER CONTROLS DIAGRAM



DDCS POINTS LIST				
TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
AI	SPACE TEMPERATURE		55°F	40°F

SEQUENCE OF OPERATION: UNIT HEATER

GENERAL

1. THE UNIT HEATER SHALL BE LOCALLY CONTROLLED AND SPACE TEMPERATURE SHALL BE MONITORED BY DDCS.

TEMPERATURE CONTROL

1. WHEN SPACE TEMPERATURE RISES ABOVE 55°F, THE VALVE SHALL CLOSE AND THE FAN SHALL STOP.
2. WHEN SPACE TEMPERATURE DROPS BELOW 55°F, THE FAN SHALL START AND THE VALVE SHALL OPEN.

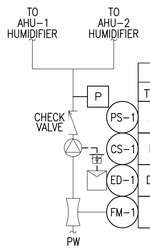
ALARMS

1. WHEN SPACE TEMPERATURE DROPS BELOW 40°F, AN ALARM SHALL BE GENERATED THROUGH THE DDCS.

B / M-7-06 — MECHANICAL CONTROLS: UNIT HEATERS UH-1, UH-2 AND UH-7

SCALE = NTS

HUMIDIFIER SUPPLY WATER BOOSTER PUMP CONTROLS DIAGRAM



DDCS POINTS LIST					
	TYPE	DESCRIPTION	TREND	SETPOINTS	ALARM
PS-1	AI	HUMIDIFIER SUPPLY WATER PRESSURE SENSOR	15 MIN	RUN: TBD STOP: TBD	
CS-1	DI	BOOSTER PUMP CURRENT SENSOR			G-MISMATCH
ED-1	DO	BOOSTER PUMP ENABLE/DISABLE	COV		
FM-1	P	HUMIDIFIER'S POTABLE WATER FLOW METER	ACCUM.		

SEQUENCE OF OPERATION: UNIT HEATER

GENERAL

1. THE BOOSTER PUMP MAINTAINS WATER PRESSURE TO THE HUMIDIFIERS AND WATER METER TRACK WATER CONSUMPTION.

PRESSURE CONTROL

1. WHEN EITHER HUMIDIFIER SUPPLY VALVE OPENS, THE PRESSURE WILL BEGIN TO DROP. WHEN PRESSURE DROPS BELOW THE PRESSURE RUN SET POINT, THE DDCS COMMANDS THE PUMP TO RUN. ESTABLISH PRESSURE SET POINT DURING START UP AND COMMISSIONING.
2. WHEN BOTH HUMIDIFIER SUPPLY VALVES ARE CLOSED, THE PRESSURE WILL BEGIN TO RISE. WHEN THE PRESSURE RISES ABOVE THE PRESSURE STOP SET POINT, THE DDCS COMMAND THE PUMP TO STOP.

MONITORING

1. THE DDCS MONITORS THE POTABLE WATER FLOW METER. PROVIDE WATER METER CONSUMPTION TABLE:
   - 1.1. SHOW CURRENT DAILY, CURRENT WEEKLY, CURRENT MONTHLY AND MONTHLY TOTALS FOR EACH MONTH OF CURRENT YEAR, AND CURRENT YEARLY CONSUMPTION TOTALS.
   - 1.2. SHOW EACH MONTHLY TOTAL FOR PREVIOUS YEAR AND PREVIOUS 2ND YEAR.
   - 1.3. SHOW YEARLY TOTAL FOR PREVIOUS YEAR AND PREVIOUS 2ND YEAR.

ALARMS

1. WHEN PUMP IS COMMAND TO RUN AND STATUS INDICATION BY CURRENT SWITCH DOES NOT INDICATED PUMP IS RUNNING AFTER 60 SECOND DELAY, GENERATE MISMATCH ALARM. ADJUST ALARM DELAY DURATION AS NEEDED DURING STARTUP AND COMMISSIONING.
2. 1.WHEN PUMP IS COMMAND TO STOP AND STATUS INDICATION BY CURRENT SWITCH DOES NOT INDICATED PUMP HAS STOPPED AFTER 60 SECOND DELAY, GENERATE MISMATCH ALARM. ADJUST ALARM DELAY DURATION AS NEEDED DURING STARTUP AND COMMISSIONING.

C / M-7-06 — MECHANICAL CONTROLS: BOOSTER PUMP

SCALE = NTS

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A/E PROJECT NUMBER	60516569
DRAWING TITLE	EXHAUST FAN EF-1, 2, & 3
DRAWING TYPE	MECHANICAL CONTROLS
WORKING STAFF	PR (DESIGNED BY) / PR (DRAWN BY) / DP/TM (CHECKED BY)

SHEET NO. 56 OF 71

M (DISCIPLINE) 7 (TYPE) 06 (SEQUENCE)

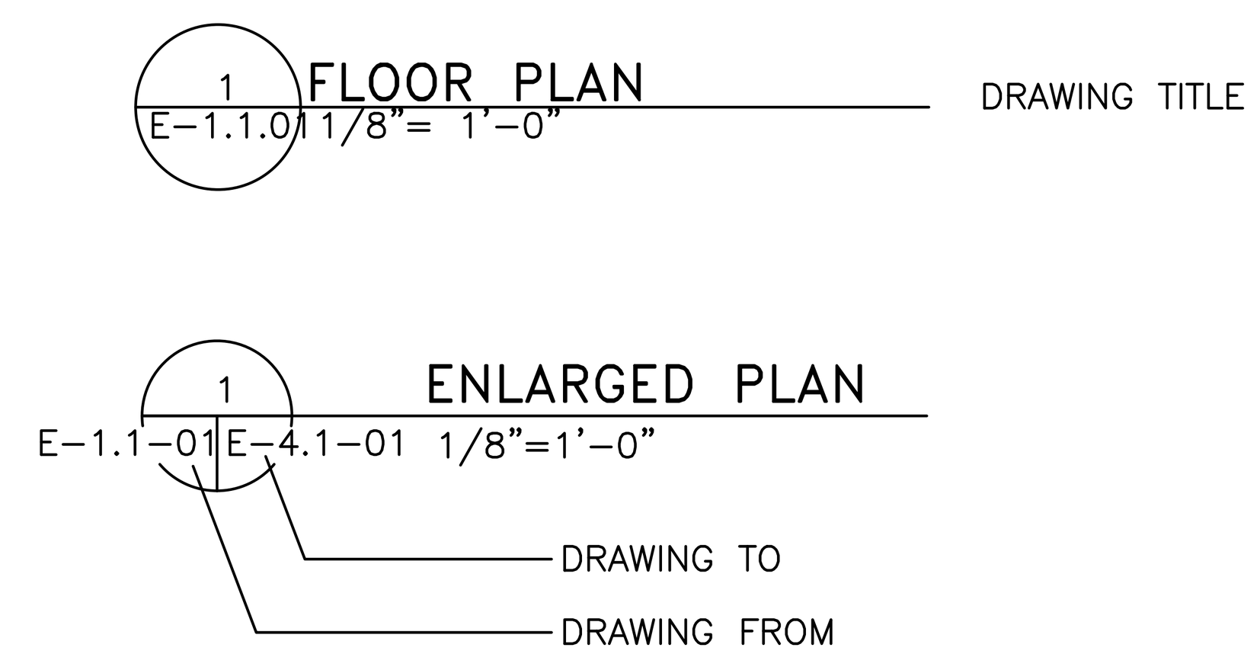
ELECTRICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AIC	AMP INTERRUPTING CAPACITY
APPROX	APPROXIMATE
ARCH	ARCHITECT
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
CKT	CIRCUIT
CKT BKR	CIRCUIT BREAKER
CLG	CEILING
CLO	CLOSET
C	CONDUIT
DET	DETAIL
DS	DISCONNECT SWITCH
DIST PNL	DISTRIBUTION PANEL
DWG	DRAWING
ECB	ENCLOSED CIRCUIT BREAKER
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
EF	EXHAUST FAN
EXIST	EXISTING
FCU	FAN COIL UNIT
FLR	FLOOR
FT	FEET OR FOOT
G, GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GI	GALVANIZED IRON
HP	HORSEPOWER
HT	HEIGHT
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
JB	JUNCTION BOX
kcmil	THOUSAND CIRCULAR MILS
kVA	KILOVOLT AMPERE
kW	KILOWATT
LT	LIGHT
LTG	LIGHTING
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MTD	MOUNTED
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NO	NORMALLY OPEN
OC	ON CENTER
PB	PULL BOX
PLBG	PLUMBING
PLYWD	PLYWOOD
PNL	PANELBOARD
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RF	RETURN FAN
REQD	REQUIRED
RM	ROOM
SI	SMITHSONIAN INSTITUTION
SCHED	SCHEDULE
SF	SUPPLY FAN OR SQUARE FOOT
SPEC	SPECIFICATION
SQ	SQUARE
STOR	STORAGE
SW	SWITCH
SWBD	SWITCHBOARD
TEL	TELEPHONE
TEMP	TEMPORARY
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT AMPERE
WP	WEATHERPROOF
XFMR	TRANSFORMER

ELECTRICAL SYMBOLS

- PANELBOARD, 480Y/277 VOLTS
- PANELBOARD, 208Y/120 VOLTS
- 1 / 3 — BRANCH CIRCUIT WIRING. ARROW INDICATES NUMBER OF CIRCUIT HOMERUNS TO PANELBOARD. CROSS MARK INDICATES NUMBER OF PHASE AND NEUTRAL CONDUCTORS. A FLAGGED CROSS MARK INDICATES EQUIPMENT GROUNDING CONDUCTOR. PROVIDE 2#12 +1#12G–3/4"C WHEN NOT NOTED
- SPLIT HOMERUN TO PANELBOARD
- 60/50 — DISCONNECT SWITCH. RATING AS INDICATED. 60/50 INDICATES 60A SWITCH WITH 50A FUSE. 60/NF INDICATES 60A SWITCH NON–FUSED. SHADED SYMBOL INDICATES SWITCH SUPPLIED WITH EQUIPMENT. POLES AND VOLTAGE AS REQUIRED
- MOTOR STARTER OR CONTROLLER, SIZED FOR LOAD SERVED. SHADED SYMBOL INDICATES MOTOR STARTER OR CONTROLLER SUPPLIED WITH EQUIPMENT
- COMBINATION MOTOR CONTROLLER OR STARTER AND DISCONNECT SWITCH. SHADED SYMBOL INDICATES COMBINATION MOTOR CONTROLLER/STARTER AND DISCONNECT SWITCH SUPPLIED WITH EQUIPMENT
- (M) — MOTOR CONNECTION. NUMERAL INDICATES HOSRESPOWER. "F" INDICATES FRACTIONAL HORSEPOWER, 120V 1 PH
- ENCLOSED CIRCUIT BREAKER, SIZE AS NOTED ON PLANS
- X — KEYED NOTE
- GP — GROUND FAULT PROTECTION
- DRAWOUT CIRCUIT BREAKER
- CIRCUIT BREAKER
- TRANSFORMER
- S_T — MANUAL MOTOR STARTER WITH THERMAL OVERLOAD PROTECTION
- MOTOR CIRCUIT PROTECTOR CONNECTED TO THE MCC BUS
- AIR TERMINAL
- \$ — LIGHT SWITCH
- DUPLEX RECEPTACLE
- WALL PACK LIGHTING FIXTURE
- CEILING MOUNTED LIGHTING FIXTURE
- ENCLOSED CIRCUIT BREAKER

ELECTRICAL LEGEND



SYMBOLS LEGEND

- EXISTING TO BE REMOVED
- EXISTING TO REMAIN
- NEW WORK

SHEET NAMING CONVETION

ED–1.1–1

DISCIPLINE
E – ELECTRICAL

PHASE
D – DEMOLITION
(BLANK) – NEW WORK

SERIES
1 – FLOOR PLANS
4 – ENLARGED PLANS
5 – DETAILS
6 – SCHEDULES/DIAGRAMS

POD #
1 – POD 1
2 – POD 2
4 – POD 4

SEQUENCE
1, 2, 3, ETC.

ELECTRICAL GENERAL NOTES

1. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) 2023, SMITHSONIAN INSTITUTION (SI) GUIDELINES, AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL CODES.
2. INFORMATION SHOWN ON THESE DRAWINGS ARE DOCUMENTED VIA FIELD OBSERVATIONS AND FROM EXISTING DRAWINGS PROVIDED BY SMITHSONIAN INSTITUTION (SI).
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE ACCURACY OF ALL EQUIPMENT SHOWN ON THESE DRAWINGS PRIOR TO ANY NEW WORK BEING PERFORMED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL OTHER TRADES.
5. CONTRACTOR SHALL VERIFY ALL EQUIPMENT REQUIREMENTS BEFORE INSTALLING CONDUIT AND/OR CONDUCTOR FROM POWER SOURCE TO EQUIPMENT TERMINATION.
6. EXACT LOCATION, MOUNTING HEIGHT, AND TYPE OF TERMINATION FROM JUNCTION BOX, STUB–UPS, DISCONNECT SWITCHES, ETC. SHALL BE DETERMINED FROM ARCHITECTURAL DRAWINGS, SHOP DRAWINGS, EQUIPMENT CUTSHEETS, OR DETAILS BEFORE CONDUIT ROUGH–IN.
7. GROUNDING OF ALL CONDUIT, PANELBOARD, BOXES, AND EQUIPMENT SHALL CONFORM TO THE LATEST APPLICABLE EDITION OF THE NATIONAL ELECTRICAL CODE. CONTINUITY OF METAL RACEWAYS SHALL BE INSURED BY THE USE OF DOUBLE LOCKNUTS. GROUNDING CONNECTOR SHALL BE OF PRESSURE TYPE SIMILAR AND EQUAL TO BURNDY OR O–Z.
8. ALL CONDUCTORS SHALL BE COPPER WITH INSULATION RATED 75°C TYPE THHN, THWN, OR THW.
9. CONTRACTOR SHALL DERATE CONDUCTORS PER NATIONAL ELECTRICAL CODE IF MORE THAN THREE PHASE CONDUCTORS ARE INSTALLED IN A SINGLE CONDUIT.
10. ALL CONNECTORS AND/OR COUPLERS SHALL BE COMPRESSION TYPE STEEL. CAST IRON FITTINGS ARE NOT ACCEPTABLE.
11. ALL RACEWAYS SHALL BE CONCEALED WHERE POSSIBLE. WHERE RACEWAYS CANNOT BE CONCEALED, IT SHALL BE INSTALLED PER THE ARCHITECT'S DIRECTION.
12. ALL EXPOSED WIRE AND/OR CABLE RUNNING IN AIR PLENUMS SHALL BE UL LISTED FOR SUCH USE.
13. FURNISH ALL LABOR, MATERIAL SERVICES, AND SKILLED SUPERVISION NECESSARY FOR THE CONSTRUCTION, ERECTION, INSTALLATION, CONNECTION, TESTING, AND ADJUSTMENT OF ALL CIRCUIT AND ELECTRICAL EQUIPMENT SPECIFIED HEREIN, SHOWN OR NOTED ON THE DRAWINGS AND DELIVERY TO THE OWNER COMPLETE IN ALL RESPECTS READY FOR USE.
14. ALL ELECTRICAL WORK SHALL BE NEW EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.
15. ALL CUTTING AND PATCHING SHALL BE PERFORMED IN A WORKMANLIKE MANNER ACCEPTABLE TO THE ARCHITECT/OWNER.
16. ALL CONDUIT PENETRATING WALLS SHALL BE CAULKED ON BOTH SIDES WITH RESILIENT NON–HARDENING SEALANT.
17. PROVIDE NECESSARY POWER TO ALL EQUIPMENT INCLUDING, ARCHITECTURAL, MECHNICAL, FIRE PROTECTION, PLUMBING, AND CONTROL CIRCUITS INCLUDING FIRE ALARM, SIGNALS, AND OTHER HVAC EQUIPMENT.
18. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PROPER INSTALLATION OF ALL EQUIPMENT.
19. ALL EQUIPMENT SHALL BE UL LISTED AND APPROVED.
20. PROVIDE JUNCTION BOXES AS REQUIRED FOR CONDUIT RUNS.
21. ALL NEW ELECTRICAL CONNECTIONS SHALL BE CLEARLY LABELED WITH CIRCUIT NUMBER AND SOURCE PANELBOARD INFORMATION,
22. CONTRACTOR SHALL PROVIDE UPDATED TYPE PANELBOARD SCHEDULES AFTER INSTALLATION OF ALL NEW BRANCH CIRCUITS.
23. ALL NEWLY INSTALLED CONDUIT SHALL BE RUN PARALLEL AND/OR PERPENDICULAR TO THE BASE BUILDING STRUCTURAL ELEMENTS.
24. CONTRACTOR SHALL PROVIDE TORQUE REPORTS ON ALL NEW ELECTRICAL PANEL TERMINATIONS.
25. ALL SECURITY EQUIPMENT SHALL REMAIN IN OPERATING ORDER UNDER NORMAL AND/OR EMERGENCY POWER AT ALL TIMES. NO POWER INTERRUPTION TO SECURITY EQUIPMENT, UNLESS PREVIOUSLY APPROVED, IS PERMITTED. COORDINATE WITH OPS SECURITY OPERATIONS.
26. CONTRACTOR SHALL RE–CERTIFY AND PROVIDE UL MASTER LABEL FOR LIGHTNING PROTECTION SYSTEM AT THE COMPLETION OF THE PROJECT.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMPS QTY	LAMPS TYPE	VOLTAGE	MOUNTING	BASIS OF DESIGN (OR APPROVED EQUAL)	REMARKS
A	EXTERIOR LED WALL PACK LIGHTING FIXTURE WITH PHOTOCELL	–	27W LED	120	WALL / SURFACE	EATON LIGHTING – LUMARK LDWP–GL–3B–120V–ED–PE–7040	–

FIRE ALARM SYMBOLS

- DD — NEW ADDRESSABLE DUCT SMOKE DETECTOR
- RM — NEW AHU SHUTDOWN RELAY MODULE
- #cd — NEW FIRE ALARM STROBE – #cd INDICATES CANDELA RATING, WALL MOUNTED UNLESS NOTED OTHERWISE (WP–WEATHERPROOF)

FIRE ALARM GENERAL NOTES

1. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH NFPA 72 "NATIONAL FIRE ALARM AND SIGNALING CODE" 2022, SMITHSONIAN INSTITUTION (SI) GUIDELINES, AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL CODES.
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3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE ACCURACY OF ALL EQUIPMENT SHOWN ON THESE DRAWINGS PRIOR TO ANY NEW WORK BEING PERFORMED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH MECHANICAL AND ELECTRICAL WORK.
5. ALL FIRE ALARM WORK SHALL BE NEW EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.
6. ALL CUTTING AND PATCHING SHALL BE PERFORMED IN A WORKMANLIKE MANNER ACCEPTABLE TO THE ARCHITECT/OWNER.
7. ALL CONDUIT PENETRATING WALLS SHALL BE CAULKED ON BOTH SIDES WITH RESILIENT NON–HARDENING SEALANT.
8. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PROPER INSTALLATION OF ALL EQUIPMENT.
9. ALL FIRE ALARM EQUIPMENT SHALL BE UL LISTED AND APPROVED.
10. DUE TO THE MULTIPLE PHASES OF THIS PROJECT, EXISTING FIRE ALARM CONTROL PANELS SHALL BE REPROGRAMMED AS AIR HANDLING UNITS ARE DEMOLISHED TO PREVENT NUISANCE TROUBLE ALARMS FROM REMOVED FIRE ALARM DEVICES. NEW FIRE ALARM DEVICES SHALL BE INSTALLED ON CLOSEST SLC AND NOTIFICATION APPLIANCE CIRCUITS.
11. THE CONTRACTOR SHALL MINIMIZE DOWNTIME OF EXISTING FIRE ALARM DEVICES NOT IN THE AREA WORK. CONTRACTOR SHALL PROVIDE ANY ADDITIONAL CONDUIT AND WIRING TO MAINTAIN DEVICES NOT IN THE AREA OF WORK OPERATIONAL. CONTRACTOR SHALL INFORM OWNER OF SYSTEM DOWNTIMES PRIOR TO PERFORMING WORK.
12. EXISTING FIRE ALARM CONTROL PANEL IS A SIEMENS XLS FIREFINDER PANEL LOCATED IN ROOM G1101. ALL NEW DEVICES AND EQUIPMENT SHALL BE COMPATIBLE WITH EXISTING SYSTEM.
13. DUCT SMOKE DETECTORS SHALL BE INSTALLED ON THE SUPPLY AND RETURN SIDE OF THE AHU'S ON ALL AHUs EXCEPT ON AHU 9. AHU 9 SHALL ONLY HAVE DUCT SMOKE DETECTOR ON THE SUPPLY SIDE.

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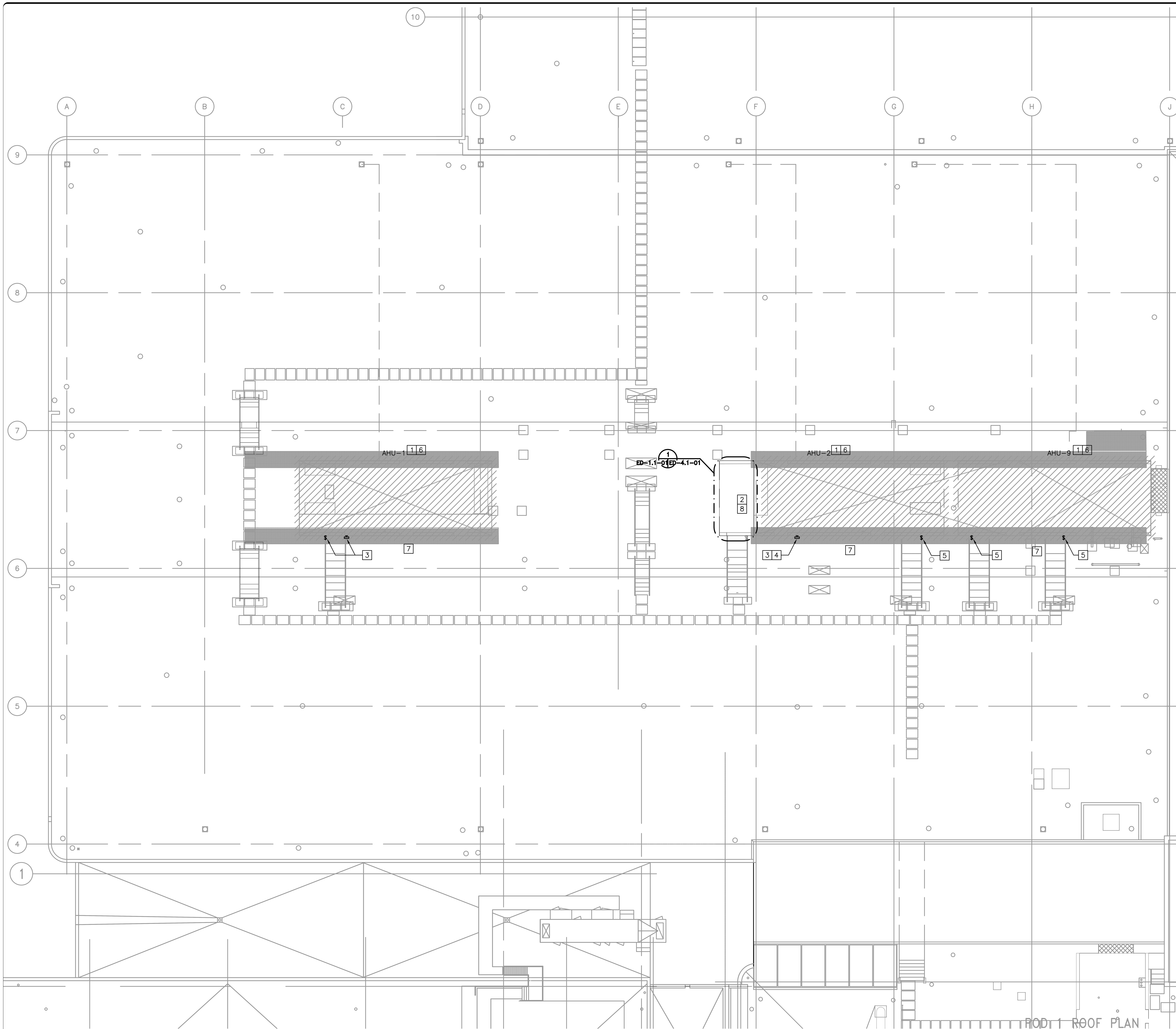
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
57 OF 71	E	0	01

E–0–01.DWG
SCALE : 1:1



1
ED-1.1-01

POD 1 ROOF LEVEL – POWER – DEMO

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

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

SHEET NOTES

1. REMOVE POWER CONNECTION TO AIR HANDLER UNIT. REMOVE ALL WIRING AND CONDUIT BACK TO THE SOURCE
2. ALL ELECTRICAL EQUIPMENT, INCLUDING, BUT NOT LIMITED TO, PANELBOARDS, TRANSFORMERS, DISCONNECT SWITCHES, ETC. IN ELECTRICAL ROOM ARE EXISTING TO REMAIN, UNLESS OTHERWISE NOTED
3. IDENTIFY CIRCUIT POWERING LIGHT FIXTURE AND SWITCH PRIOR TO DEMOLITION OF LIGHT FIXTURE AND SWITCH. RETAIN BRANCH CIRCUIT NUMBER FOR RE-CONNECTION OF NEW LIGHT FIXTURE. REFER TO NEW WORK FOR ADDITIONAL INFORMATION
4. REMOVE LIGHT FIXTURE. REMOVE WIRING AND CONDUIT BACK TO THE NEAREST JUNCTION BOX
5. REMOVE LIGHT SWITCH ALONG WITH THE REMOVAL OF THE AHU ENCLOSURE
6. REMOVE ALL FIRE ALARM DEVICES AND EQUIPMENT, INCLUDING ALL CONDUIT AND WIRING INSIDE THE AHU ENCLOSURE. REVISE EXISTING CIRCUITS AND PROGRAMMING SO FIRE ALARM DEVICES OUTSIDE THE AREA OF WORK CONTINUE TO FUNCTION DURING AHU WORK
7. REMOVE ANY EXTERIOR NOTIFICATION DEVICES, INCLUDING ALL CONDUIT AND WIRING ON THE EXTERIOR OF THE AHU ENCLOSURE
8. NOTIFICATION APPLIANCES IN THIS ELECTRICAL AREA SHALL BE EXISTING TO REMAIN. APPLIANCES SHALL REMAIN ACTIVE THROUGH DEMOLITION WORK. PROVIDE TEMPORARY CONDUIT AND WIRING AS NECESSARY TO MAINTAIN APPLIANCES ACTIVE

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2/2/2024

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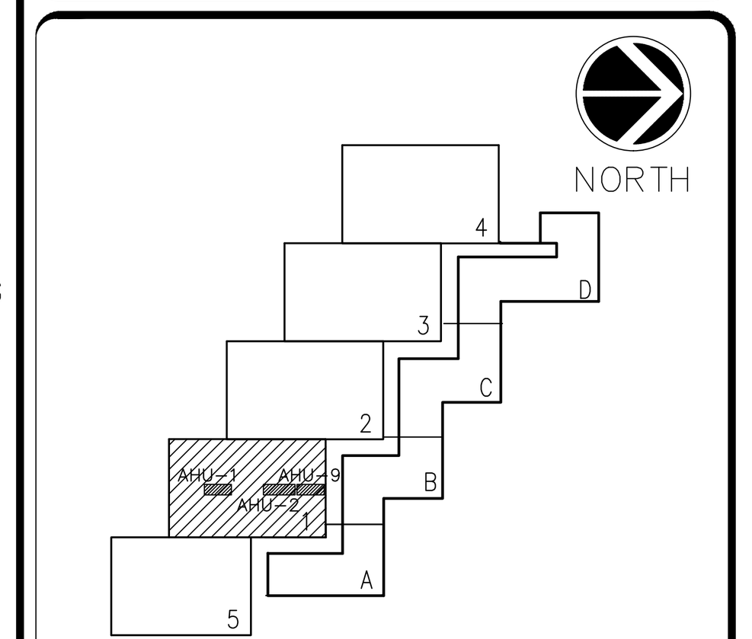

0 4 8 16

1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
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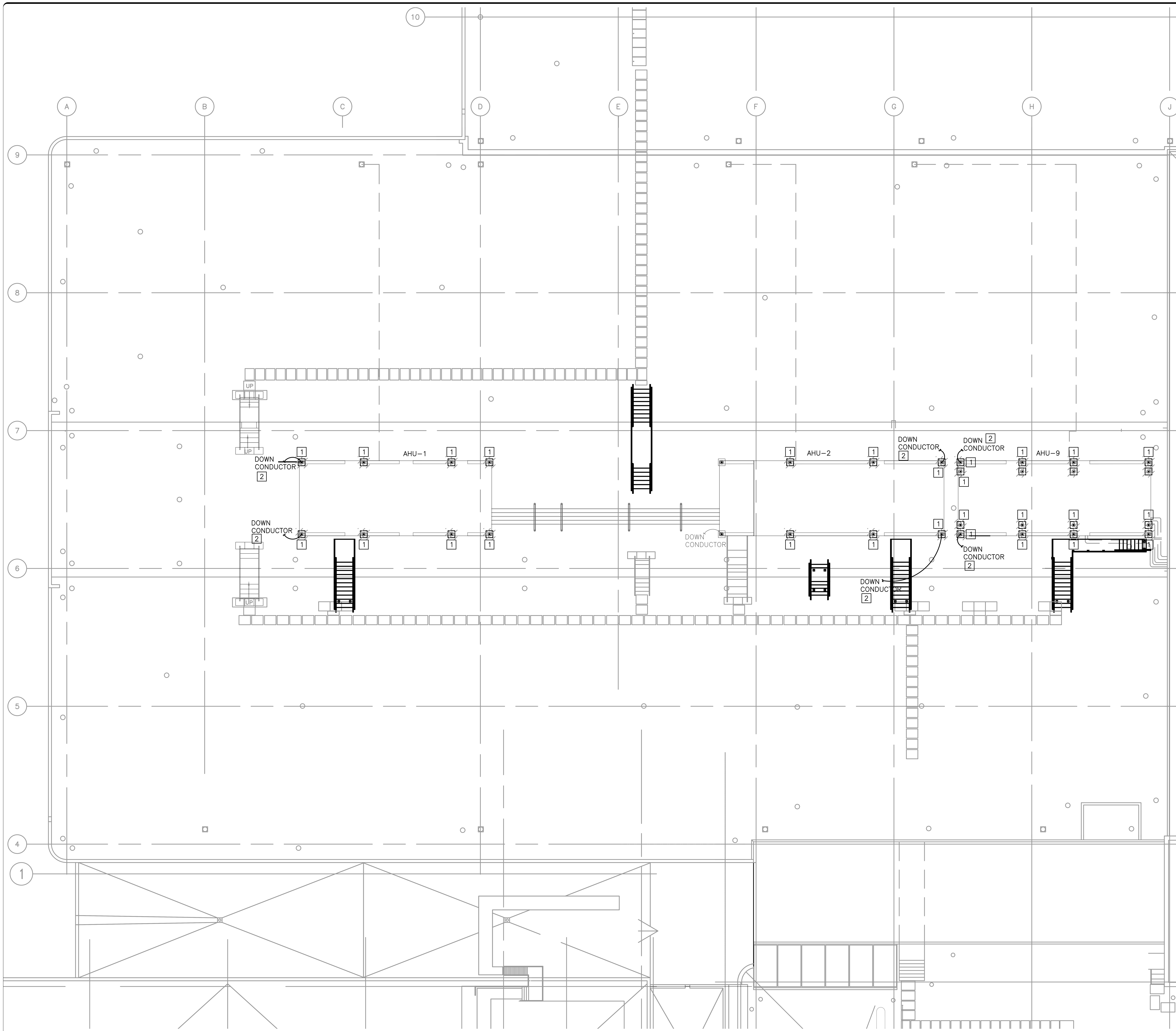
BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ELECTRICAL POD 1 ROOF LEVEL – POWER – DEMO
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
58 OF 71	ED	1.1	01

ED-1.1-01.DWG
SCALE : 1:1



1 ED-1.1-02 POD 1 ROOF LEVEL – LIGHTING PROTECTION – DEMO

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

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

SHEET NOTES

1. REMOVE LIGHTNING ARRESTER ALONG WITH THE REMOVAL OF THE AIR HANDLING UNIT ENCLOSURE
2. DISCONNECT EXISTING DOWN CONDUCTOR FROM LIGHTNING PROTECTION CABLE ON THE ROOF

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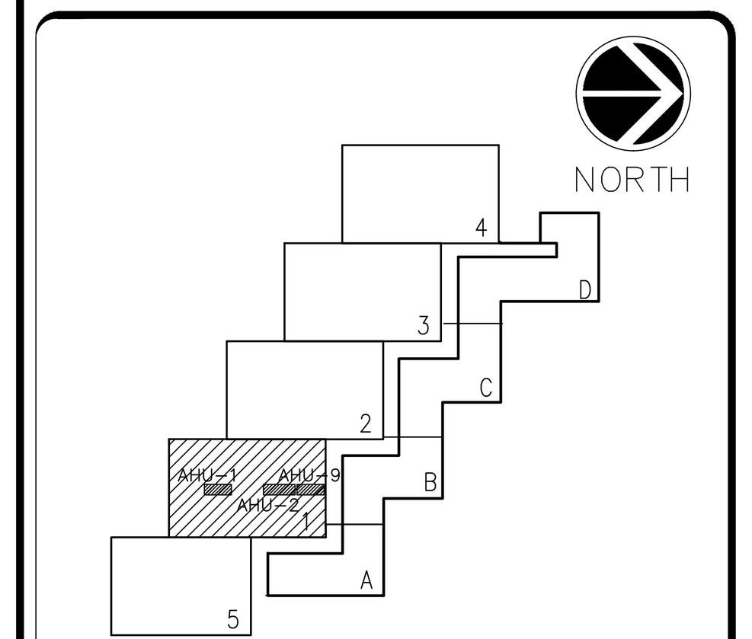

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	POD 1 AHU ROOF LEVEL LIGHTNING PROT. – DEMO
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
59 OF 71	ED	1.1	02

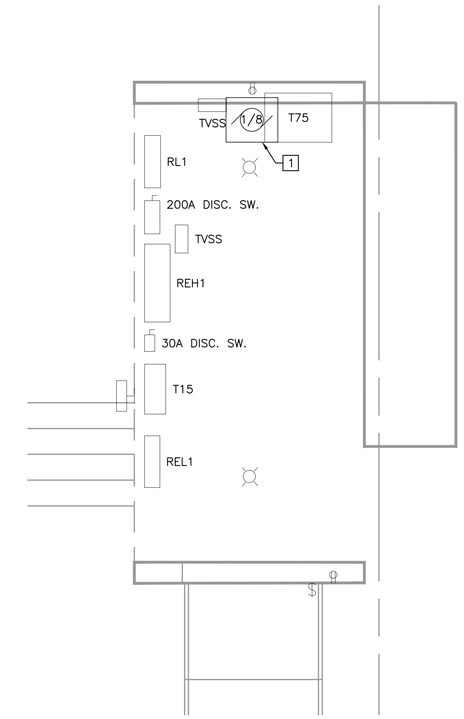
ED-1.1-02.DWG
SCALE : 1:1

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. ALL ELECTRICAL EQUIPMENT INSIDE AIR HANDLER UNIT'S ELECTRICAL ROOM IS EXISTING TO REMAIN, UNLESS OTHERWISE NOTED.

SHEET NOTES

[1] DISCONNECT EXISTING BRANCH CIRCUIT WIRING SERVING EXHAUST FAN. RETAIN WIRING FOR RECONNECTION TO REPLACEMENT FAN. REFER TO NEW WORK FOR ADDITIONAL INFORMATION



1
E0-4.1-01

AHU ELECTRICAL ROOM – POD 1 – DEMO

SCALE: 1/2" = 1'-0"

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DAVID M. ROSENBERG
REGISTERED
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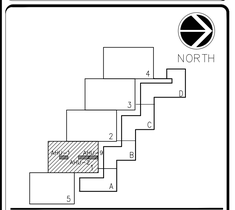

KEY PLAN

0 1 2 4
1/2" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
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SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ENLARGED AHU ELECTRICAL ROOM – POD 1 – DEMO
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.
60 OF 71

ED	4.1	01
DISCIPLINE	TYPE	SEQUENCE

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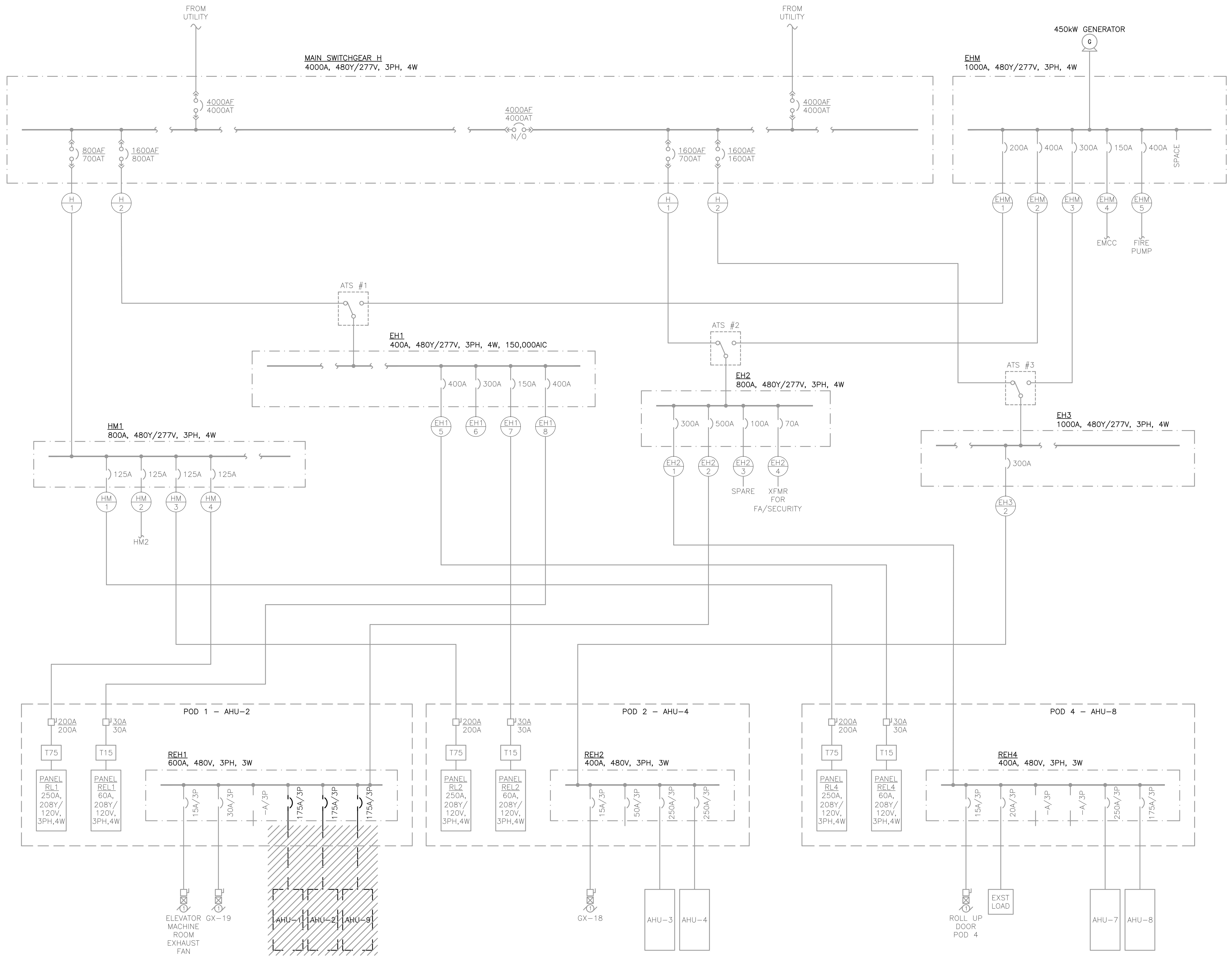
REV: 0



1 ED-6-01 PARTIAL SINGLE LINE DIAGRAM – DEMO

SCALE: NOT TO SCALE

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERA NOTES, SYMBOLS, AND ABBREVIATIONS.
2. NOT ALL CIRCUIT BREAKERS FOR EVERY DISTRIBUTION PANEL, SWITCHGEAR, PANELBOARD, ETC. ARE SHOWN. ONLY CIRCUIT BREAKERS RELEVANT TO THE SCO OF WORK ARE SHOWN.
3. ALL PANELBOARDS, TRANSFORMERS, DISCONNECT SWITCHES, CIRCUIT BREAKERS ETC. SHOWN ARE EXISTING TO REMAIN, UNLESS OTHERWISE NOTED.

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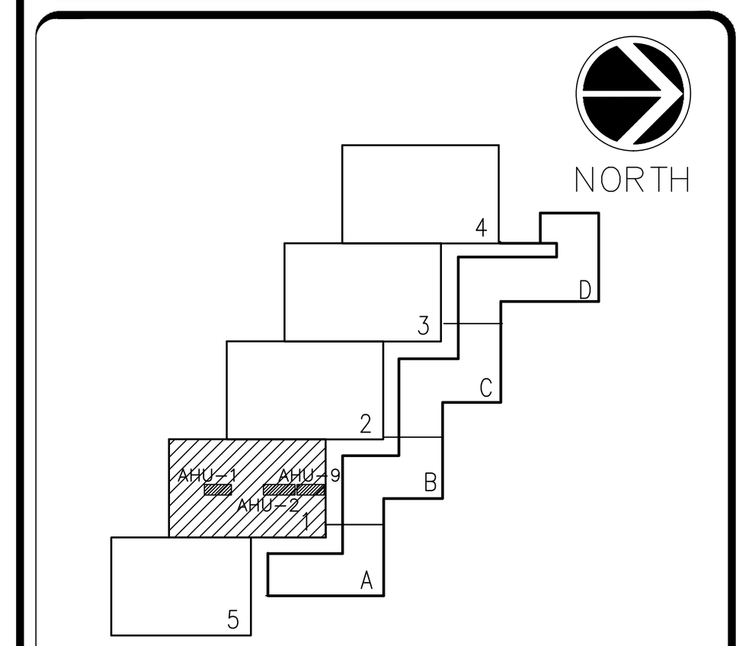

KEY PLAN

GRAPHIC SCALE(S)

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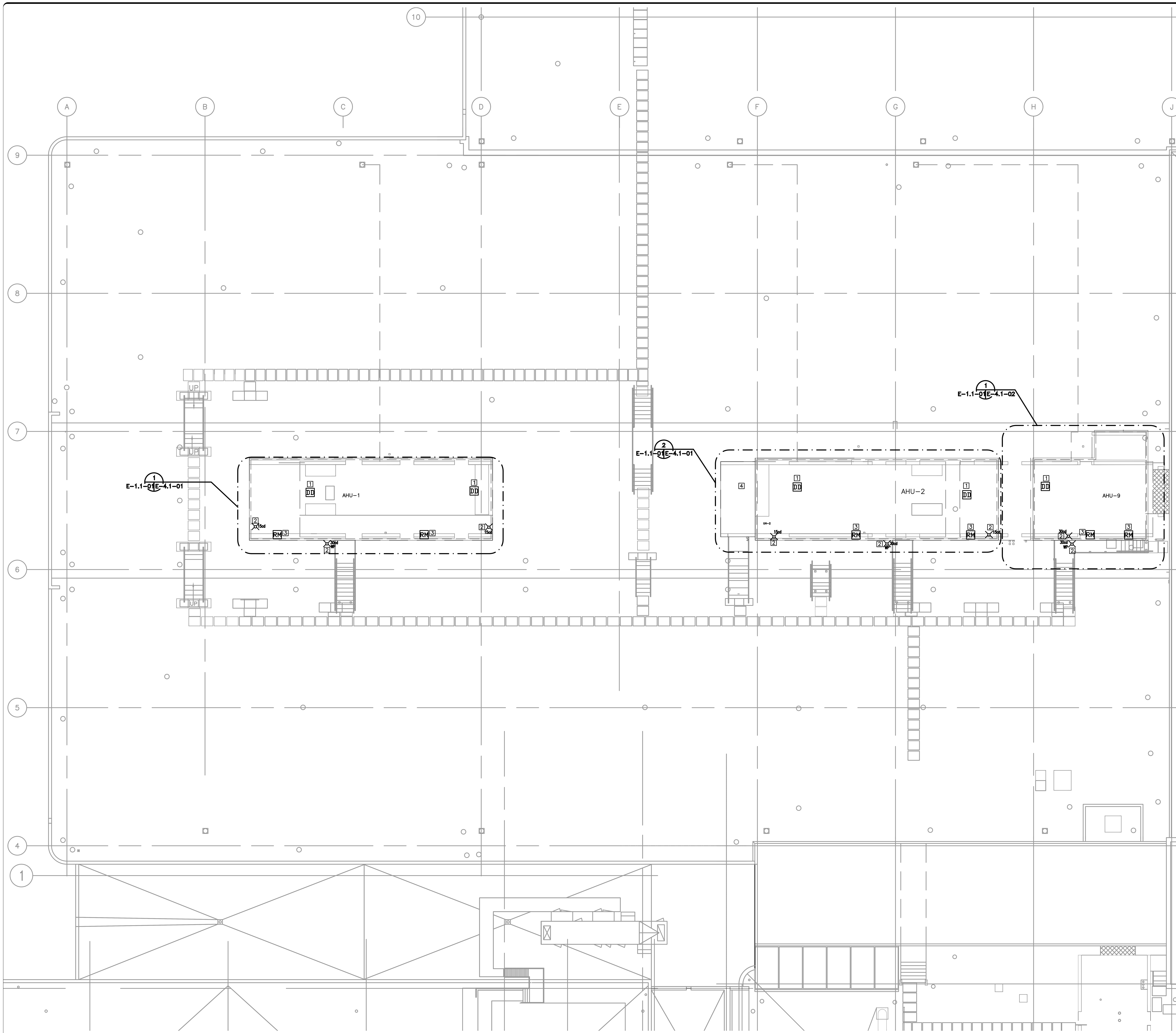
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	PARTIAL SINGLE LINE DIAGRAM – DEMO
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
61 OF 71	ED	6	01

ED-6-01.DWG
SCALE : 1:1



1 ELECTRICAL POD 1 ROOF LEVEL – POWER – NEW WORK
E-1.1-01
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. REFER TO DRAWING E-0-01 FOR LIGHT FIXTURE SCHEDULE.

SHEET NOTES

1. PROVIDE PHOTOELECTRIC TYPE DUCT SMOKE DETECTOR(S) WITH PERFORATED SAMPLING TUBE FOR NEW AIR HANDLING UNIT. DUCT DETECTOR SHALL BE A COMPLETE UNIT CONSISTING OF HOUSING, DETECTOR, AND RELAY FOR SIGNALING THE FIRE ALARM CONTROL PANEL. PROVIDE REMOTE TEST SWITCH AND INDICATOR LIGHT WITH IDENTIFICATION SIGNAGE. LOCATION SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. COORDINATE LOCATIONS WITH MECHANICAL DRAWINGS
2. CONNECT NEW NOTIFICATION APPLIANCES TO EXISTING NEARBY NOTIFICATION CIRCUITS DEDICATED TO THIS POD AND ROOF DEVICES
3. PROVIDE NEW RELAY MODULE FOR AHU SUPPLY/RETURN FAN SHUTDOWN. LOCATE NEAR VFD PANEL AND CONNECT TO FACP.
4. EXISTING NOTIFICATION APPLIANCES IN THIS AREA SHALL REMAIN ACTIVE THROUGH NEW WORK. PROVIDE NECESSARY CONDUIT AND WIRING NEEDED TO MAINTAIN THESE DEVICES ACTIVE

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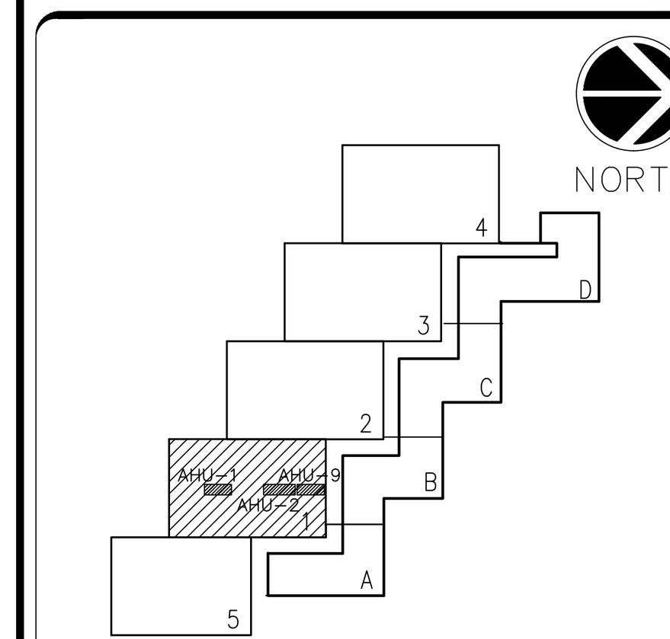

KEY PLAN

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
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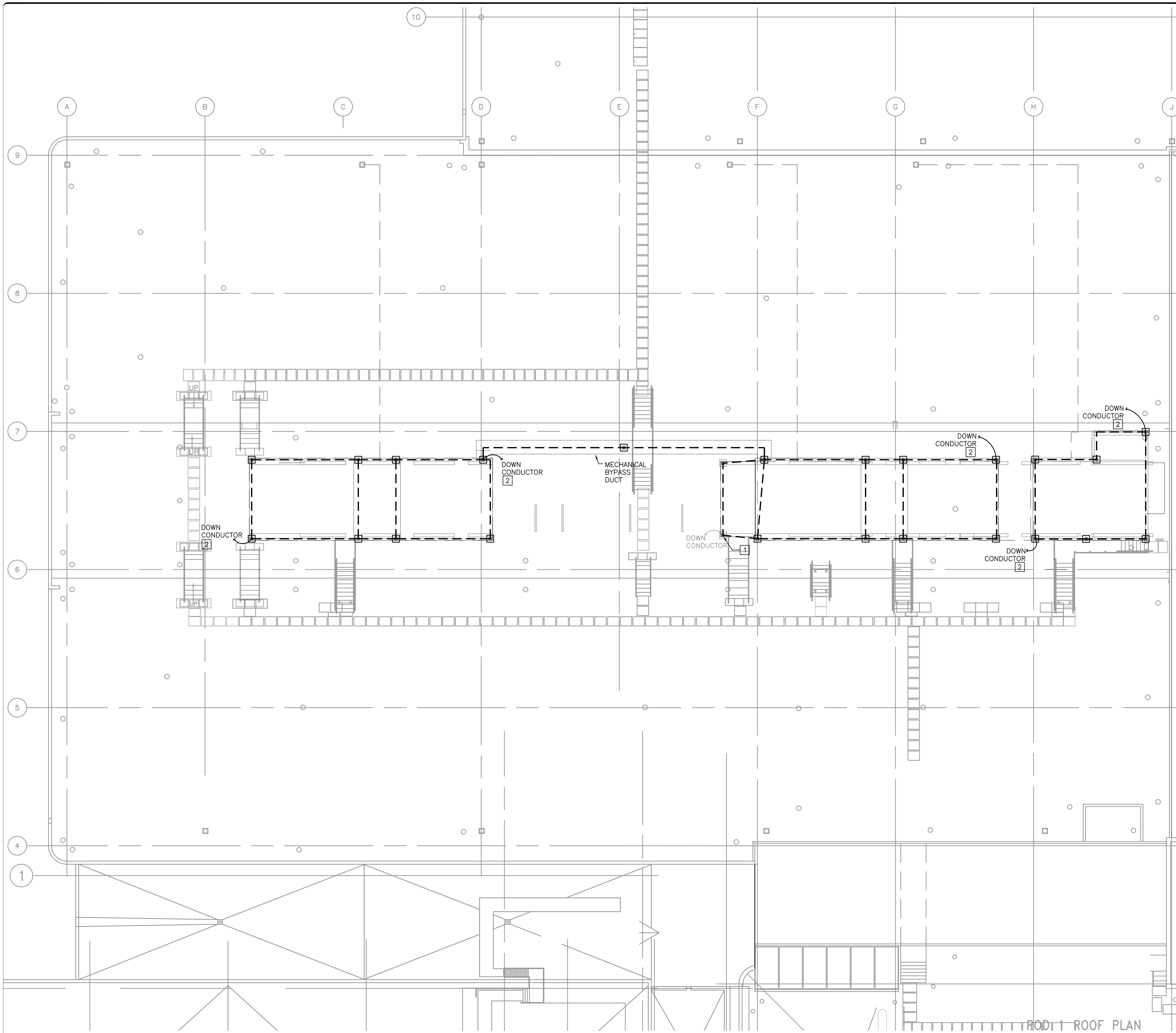
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ELECTRICAL POD 1 ROOF LEVEL – POWER – NEW
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
62 OF 71	E	1.1	01

E-1.1-01.DWG
SCALE : 1:1



1 POD 1 AHU ROOF LEVEL – LIGHTNING PROTECTION – NEW WORK
E-1.1-02
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. CONTRACTOR SHALL RE-CERTIFY AND PROVIDE UL MASTERL LABEL FOR LIGHTNING PROTECTION SYSTEM AT THE COMPLETION OF THE PROJECT.

SHEET NOTES

1. CONNECT LIGHTNING PROTECTION CABLE TO EXISTING LIGHTNING ARRESTER
2. INSTALL DOWN CONDUCTOR. CONNECT DOWN CONDUCTOR TO NEAREST EXISTING LIGHTNING PROTECTION CABLE ON ROOF OF BUILDING

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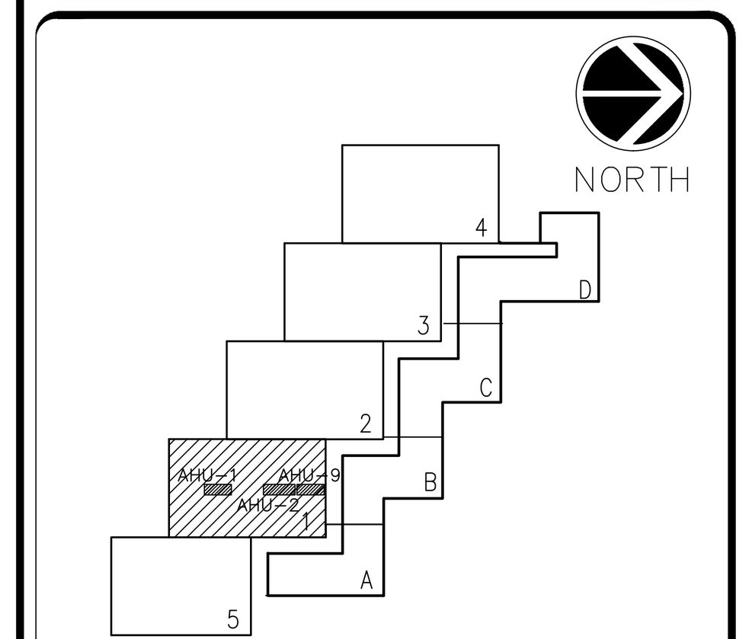

KEY PLAN

0 4 8 16
1/8" = 1'-0"

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

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BUILDING NAME	MUSEUM SUPPORT CENTER
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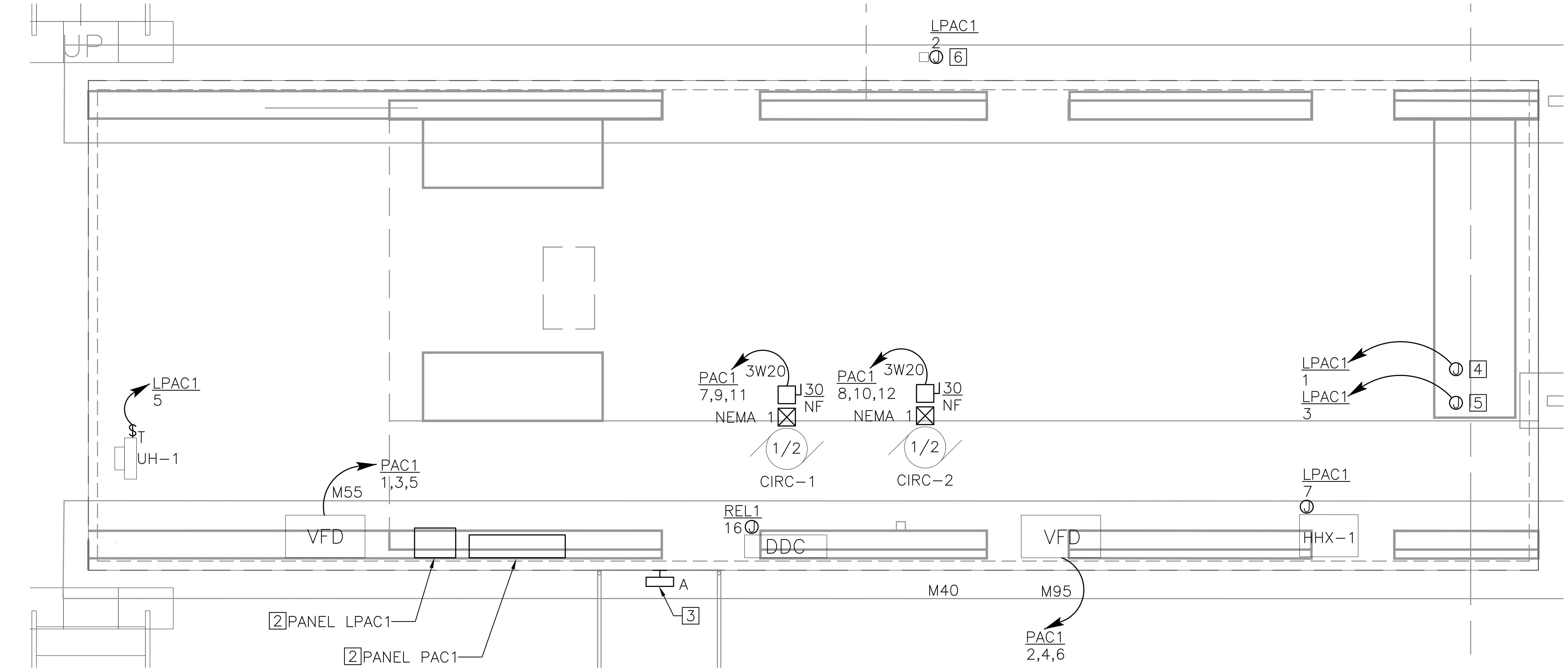
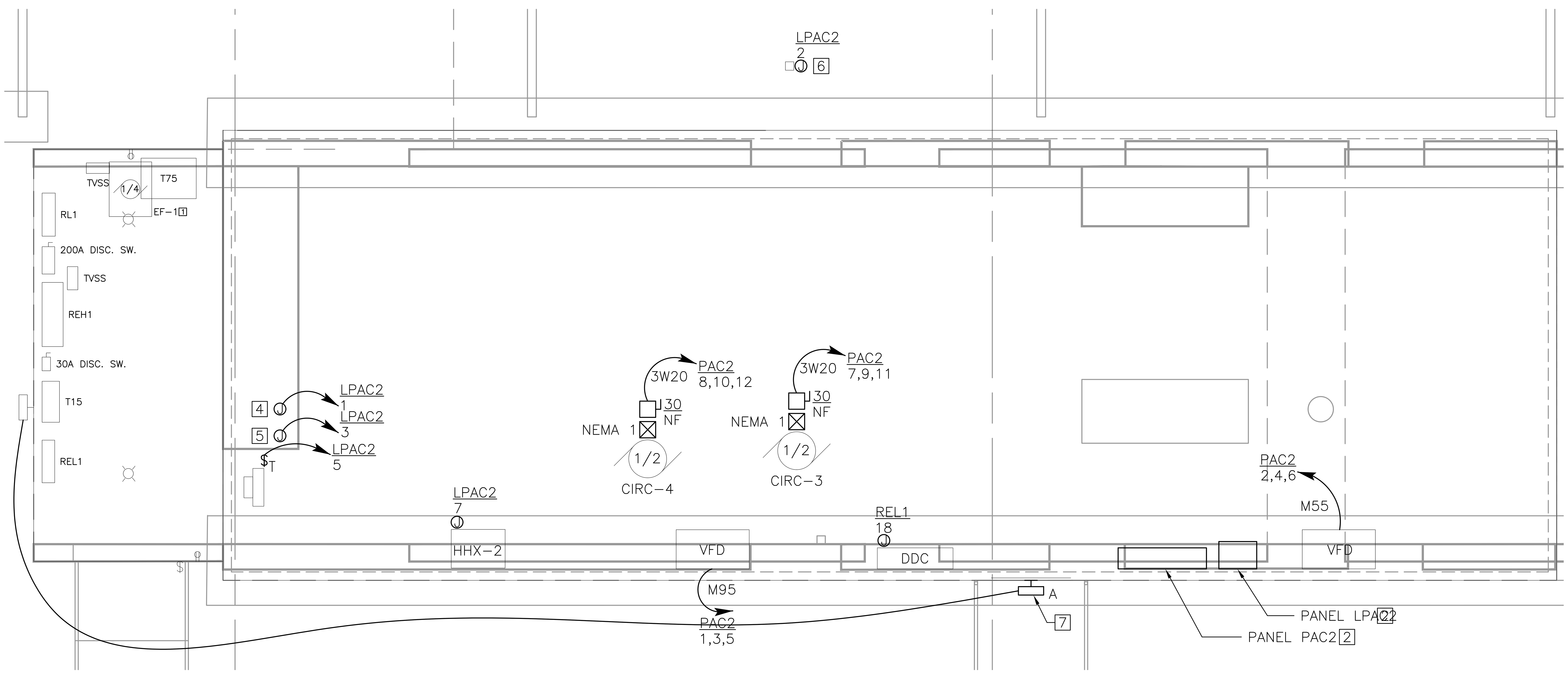
PROJECT TITLE	MSC REPLACE AHUs POD 1
SI PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	POD 1 AHU ROOF LEVEL LIGHTNING PROT. – NEW
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
63 OF 71	E	1.1	02



1 ENLARGED AHU-1 – NEW WORK (E-4.1-01)
SCALE: 1/2" = 1'-0"



1 ENLARGED AHU-2 – NEW WORK (E-4.1-01)
SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. ALL ELECTRICAL EQUIPMENT INSIDE AIR HANDLER UNIT'S ELECTRICAL ROOM IS EXISTING TO REMAIN, UNLESS OTHERWISE NOTED.

SHEET NOTES

1. CONNECT EXHAUST FAN TO RETAINED BRANCH CIRCUIT SERVING THE OLD EXHAUST FAN
2. COORDINATE EXACT LOCATION OF ELECTRICAL EQUIPMENT WITH AHU ENCLOSURE MANUFACTURER AND MECHANICAL DRAWINGS
3. INSTALL LIGHT FIXTURE. CONNECT TO RETAINED BRANCH CIRCUIT
4. INSTALL LIGHT FIXTURE. CONNECT TO EXISTING LIGHTING CIRCUIT AS SHOWN
4. FOR AHU LIGHTS
5. FOR AHU RECEPTACLES
6. FOR HEAT TRACE POWER CONNECTION
7. INSTALL LIGHT FIXTURE. CONNECT TO EXISTING LIGHTING CIRCUIT AS SHOWN

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STATE OF MARYLAND – REGISTERED PROFESSIONAL ENGINEER
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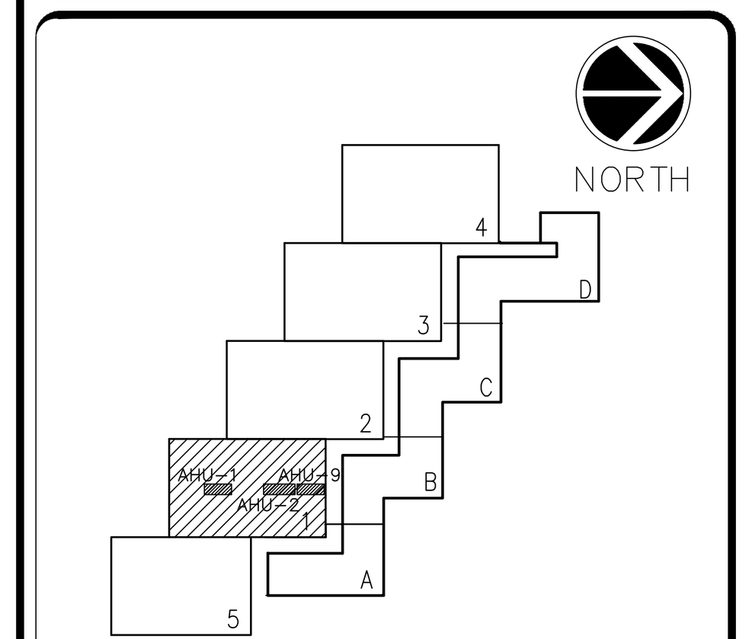

KEY PLAN

0 1 2 4
1/2" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
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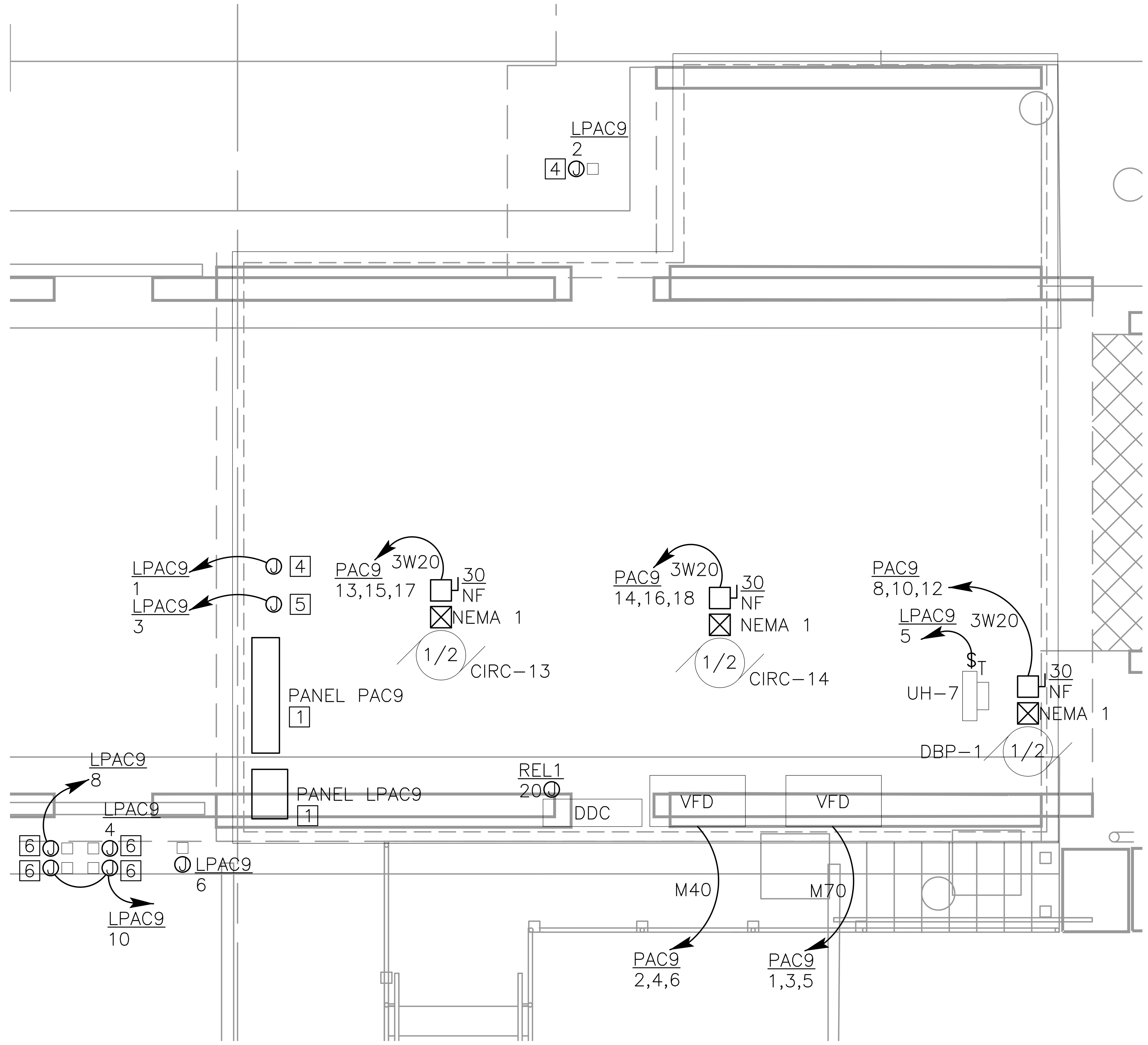
PROJECT TITLE	MSC REPLACE AHUs POD 1
SI PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ENLARGED AHU ELECTRICAL PLANS – NEW
DRAWING TYPE	ELECTRICAL
DESIGNED BY / DRAWN BY / CHECKED BY	DMR / DAR / AM



1 E-4.1-02 ENLARGED AHU-9 ELECTRICAL PLAN – NEW WORK

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. REFER TO DRAWING E-0-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. ALL ELECTRICAL EQUIPMENT INSIDE AIR HANDLER UNIT'S ELECTRICAL ROOM IS EXISTING TO REMAIN, UNLESS OTHERWISE NOTED.

SHEET NOTES

1. COORDINATE EXACT LOCATION OF ELECTRICAL EQUIPMENT WITH AHU ENCLOSURE MANUFACTURER AND MECHANICAL DRAWINGS
3. INSTALL LIGHT FIXTURE. CONNECT TO RETAINED BRANCH CIRCUIT
4. INSTALL LIGHT FIXTURE. CONNECT TO EXISTING LIGHTING CIRCUIT AS SHOWN
4. FOR AHU LIGHTS
5. FOR AHU RECEPTACLES
6. FOR HEAT TRACE
7. INSTALL LIGHT FIXTURE. CONNECT TO EXISTING LIGHTING CIRCUIT AS SHOWN

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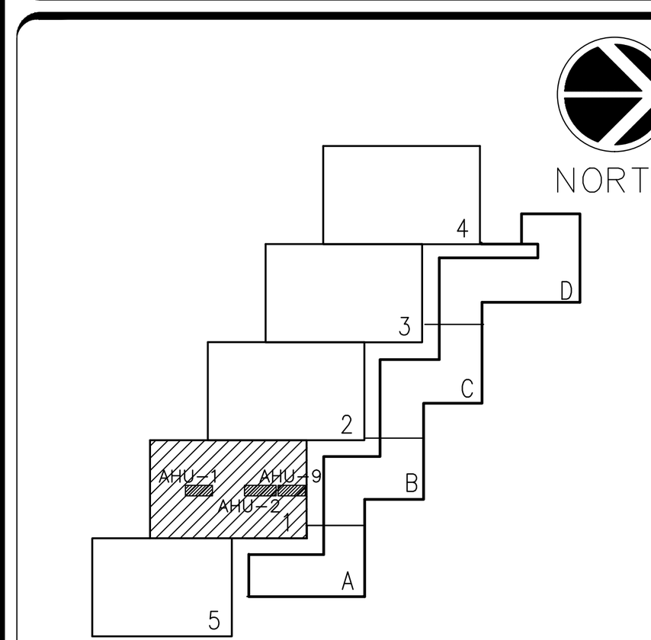

0 1 2 4

1/2" = 1'-0"

GRAPHIC SCALE(S)

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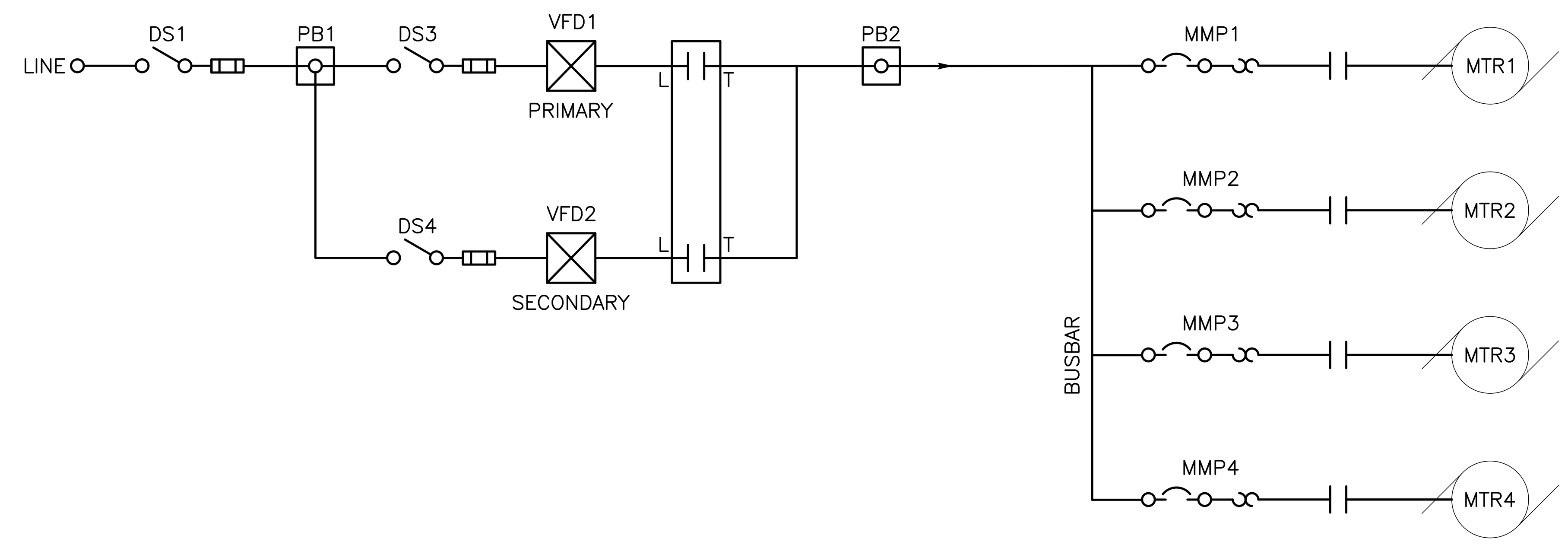
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	ENLARGED AHU ELECTRICAL PLAN – NEW
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY), DAR (DRAWN BY), AM (CHECKED BY)

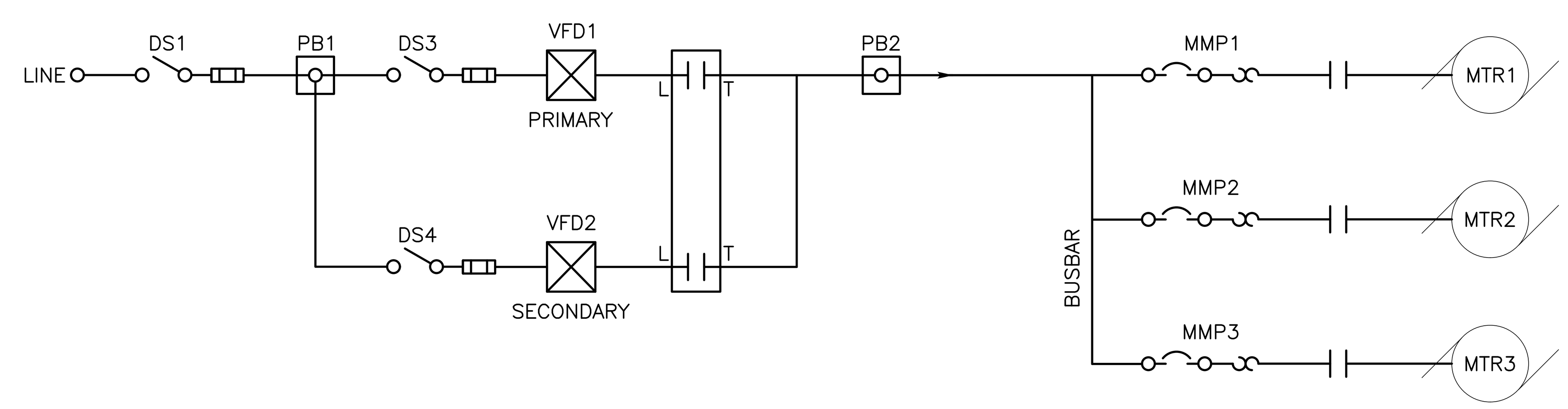
SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
65 OF 71	E	4.1	02

E-4.1-02.DWG
SCALE : 1:1



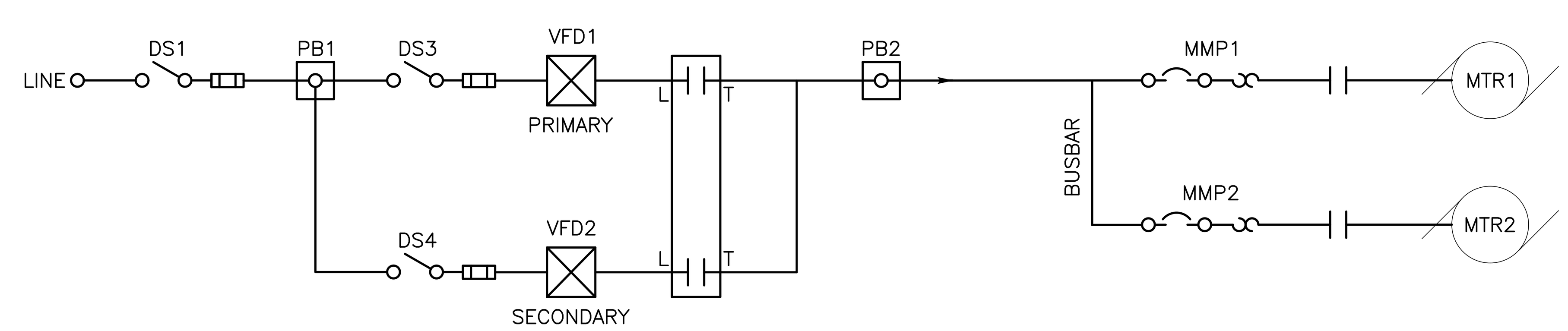
4 E-5-01 AHU-1 & 2 SUPPLY FAN WIRING SCHEMATIC

SCALE: NOT TO SCALE



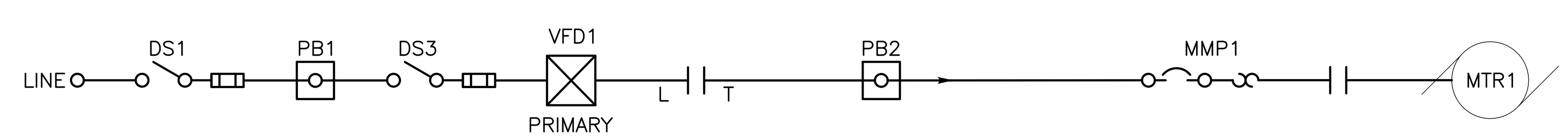
4 E-5-01 AHU-1 & 2 RETURN FAN WIRING SCHEMATIC

SCALE: NOT TO SCALE



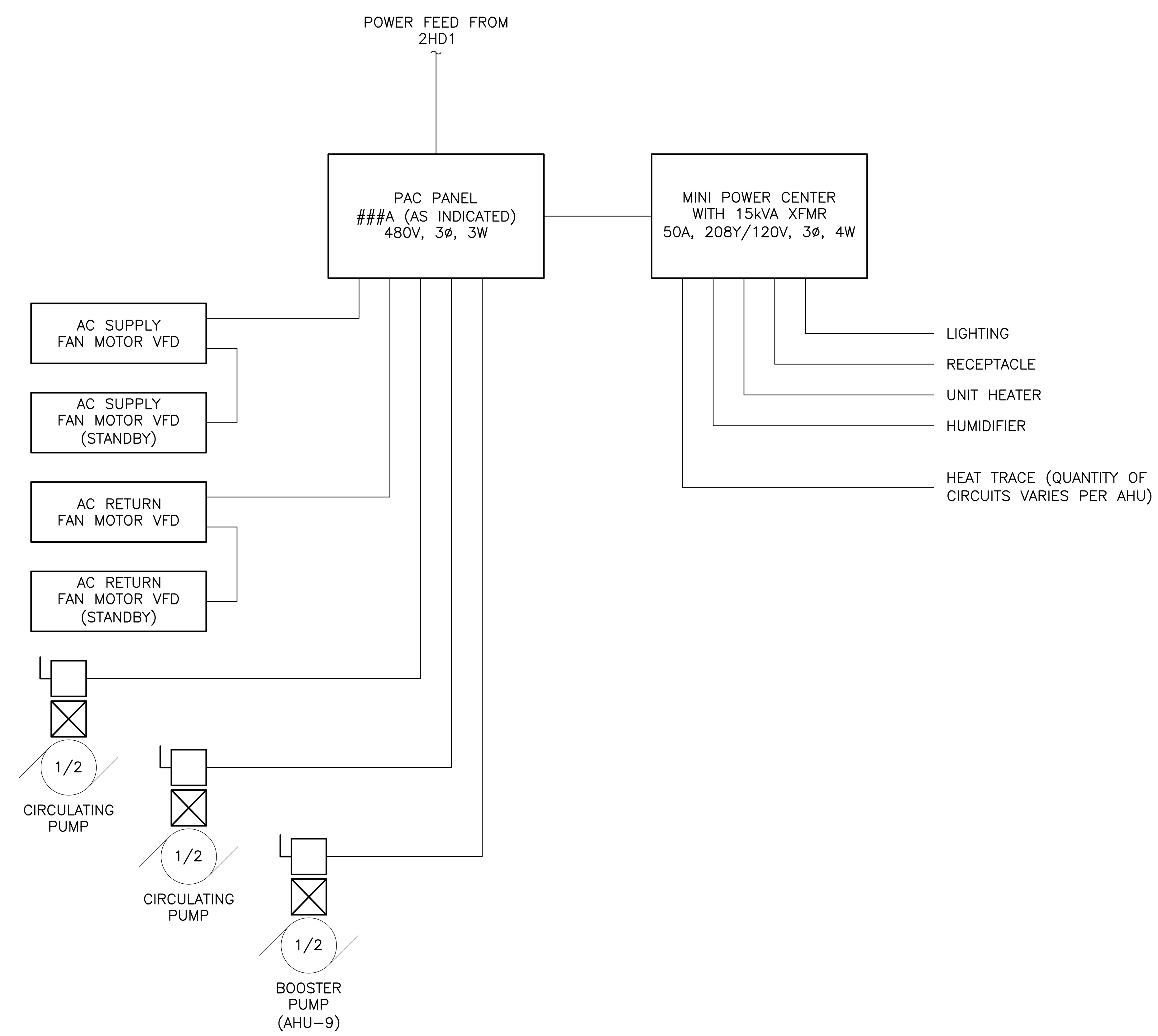
3 E-5-01 AHU-9 SUPPLY FAN WIRING SCHEMATIC

SCALE: NOT TO SCALE



2 E-5-01 AHU-9 EXHAUST FAN WIRING SCHEMATIC

SCALE: NOT TO SCALE



1 E-5-01 AC UNIT TYPICAL WIRING DIAGRAM

SCALE: NOT TO SCALE

GENERAL NOTES

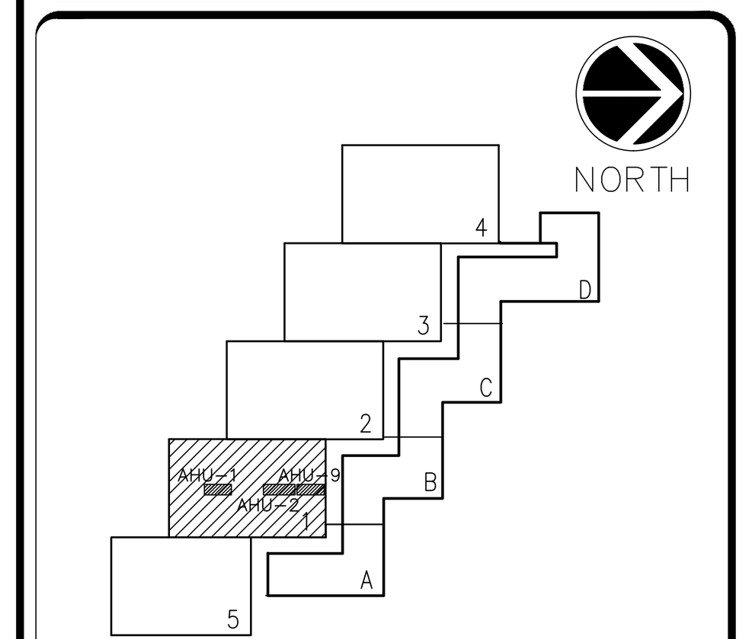
1. REFER TO DRAWING E-0.1-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. WIRING AND CONDUIT BETWEEN AC PANEL AND ALL AUXILIARY EQUIPMENT, I.E. BETWEEN AC PANEL AND SUPPLY FAN VFDs, RETURN FAN VFDs, CIRCULATING PUMP, HEAT TRACE AND MINI POWER CENTER SHALL BE PROVIDED AND INSTALLED UNDER DIVISION 26 INCLUDING BETWEEN MINI POWER CENTER AND LIGHTING, RECEPTACLE, UNIT HEATER, HUMIDIFIER, AND DDC.

MUSEUM SUPPORT CENTER
SMITHSONIAN INSTITUTION

URS|HCA
URS Group, Inc./Hartman-Cox Architects LLP JV
2020 K Street, NW
Suite 300
Washington, D.C. 20006

2/2/2024

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 10760, EXPIRATION DATE 1/12/2026.



KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

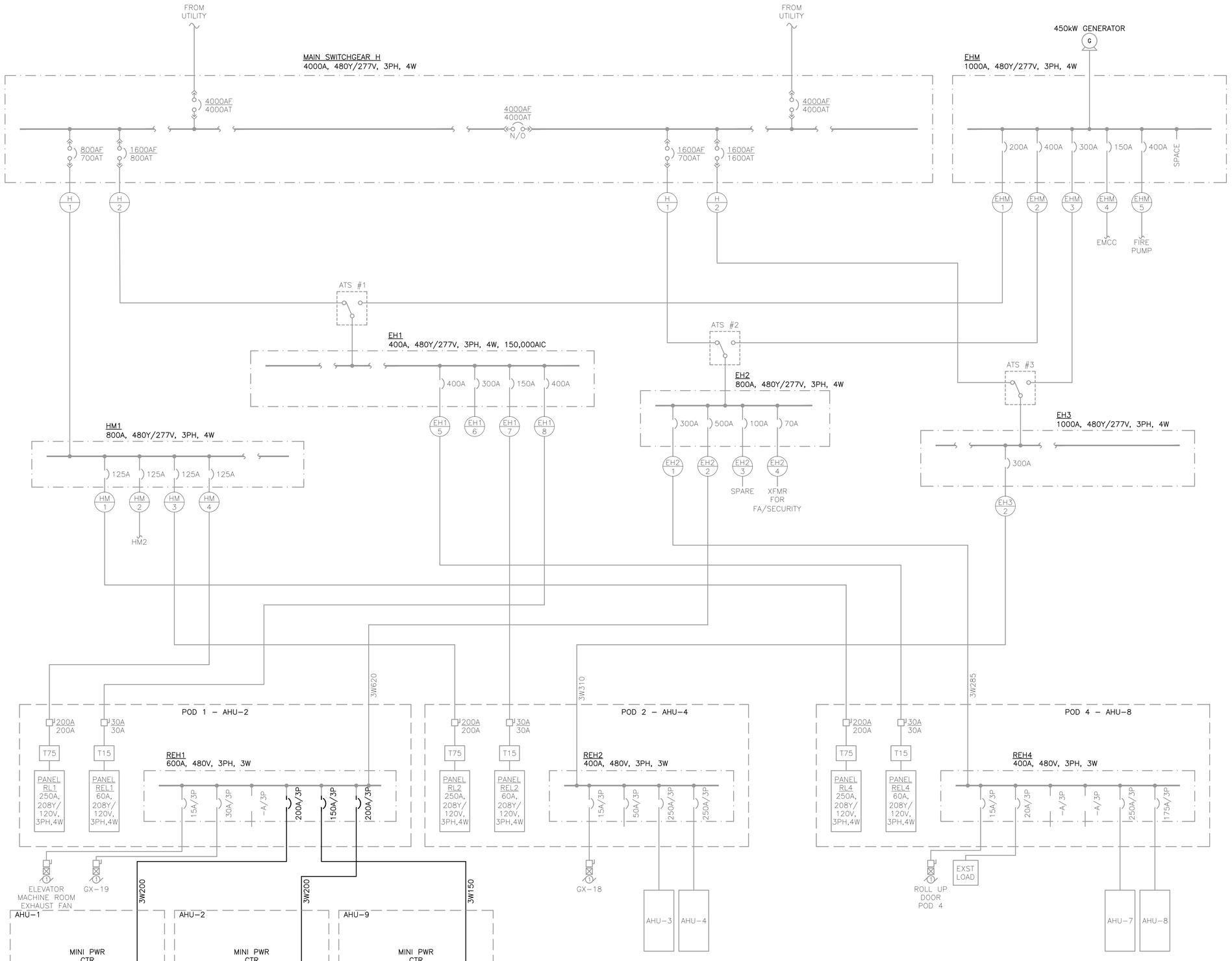
Smithsonian Institution

SMITHSONIAN FACILITIES
600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024-2520

BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	AC UNIT TYPICAL WIRING DIAGRAM
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) DAR (DRAWN BY) AM (CHECKED BY)

SHEET NO.	DISCIPLINE	TYPE	SEQUENCE
66 OF 71	E	5	01

E-5-01.DWG
SCALE : 1:1



1 E–6–01 PARTIAL SINGLE LINE DIAGRAM – NEW WORK

SCALE: NOT TO SCALE

GENERAL NOTES

1. REFER TO DRAWING E–0–01 FOR GENERA NOTES, SYMBOLS, AND ABBREVIATIONS.
2. NOT ALL CIRCUIT BREAKERS FOR EVERY DISTRIBUTION PANEL, SWITCHGEAR, PANELBOARD, ETC. ARE SHOWN. ONLY CIRCUIT BREAKERS RELEVANT TO THE SCO OF WORK ARE SHOWN.
3. ALL PANELBOARDS, TRANSFORMERS, DISCONNECT SWITCHES, CIRCUIT BREAKERS ETC. SHOWN ARE EXISTING TO REMAIN, UNLESS OTHERWISE NOTED.
4. FOR FEEDER SCHEDULE, REFER TO DRAWI E–6.0–02

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STATE OF MARYLAND – REGISTERED PROFESSIONAL ENGINEER

2/2/2024

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NORTH

KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024–2520

BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	PARTIAL SINGLE LINE DIAGRAM – NEW WORK
DRAWING TYPE	ELECTRICAL
WORKING STAFF	DMR (DESIGNED BY) / DAR (DRAWN BY) / AM (CHECKED BY)

SHEET NO. 67 OF 71

E (DISCIPLINE) 6 (TYPE) 01 (SEQUENCE)

E–6–01MC
E–6–01MC

FEEDER SCHEDULE

WIRE DESIGNATION	# OF SETS, 3-WIRE AND GROUND	CONDUIT
3W20	3#12 + 1#12G	3/4" C
3W30	3#10 + 1#10G	3/4" C
3W40	3#8 + 1#10G	3/4" C
3W150	3#1/0 + 1#6G	1 1/2" C
3W175	3#2/0 + 1#6G	2" C
3W200	3#3/0 + 1#6G	2" C
3W255	3#250kcmil + 1#4G	2 1/2" C
3W285	3#300kcmil + 1#3G	2 1/2" C
3W310	3#350kcmil + 1#3G	3" C
3W620	(2) 3#350kcmil + 1#1G	3" C
4W55	4#6 + 1#10G	3/4" C
4W175	4#2/0 + 1#6G	2" C
4W255	4#250kcmil + 1#4G	2 1/2" C
M20	3#12 + 1#10G	3/4" C
M30	3#10 + 1#10G	3/4" C
M40	3#8 + 1#8G	3/4" C
M55	3#6 + 1#8G	3/4" C
M70	3#4 + 1#8G	1" C
M95	3#2 + 1#6G	1 1/4" C

STANDARD THREE PHASE TRANSFORMER SCHEDULE

PRIMARY: 480V DELTA, 3PH, 3 WIRE			TRANSFORMER DESIGNATION	SIZE (KVA)	SECONDARY: 208Y/120V 3PH, 4 WIRE			GROUNDING ELECTRODE CONDUCTOR/ CONDUIT	REMARKS
FULL LOAD AMP	CKT BKR/ POLES	PRIMARY FEEDER			FULL LOAD AMP	CKT BKR/ POLES	SECONDARY FEEDER (# OF SETS)		
18.04	25A/3P	3W30	T15	15	41.64	50A/3P	4#6 + 1#10G - 3/4"C	1#8-3/4"C	

PANEL: REH1

LOCATION: AHU-2 ELECTRICAL ROOM
AIC RATING: 22,000
VOLTAGE: 480Y/277 — 3 PHASE, 3 WIRE
STATUS: NEW [ ] EXISTING [X]
MOUNTING: FLUSH [ ] SURFACE [X]
PANEL SIZE: 600A MAIN: MLO

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1	3	15	(EXISTING) ELEVATOR MACHINE ROOM EXHAUST FAN			0.56		0.56			0.56					0.56		(EXISTING) GX-19	30	3	2
3						0.56			0.56			0.56				0.56					4
5						0.56				0.56			0.56			0.56					6
7	3	-	SPACE					0.00			37.6			0.00	1.40	35.5	0.72	PANEL PAC1 (LOCATED IN AHU-1 ENCLOSURE)	175	3	8
9									0.00			36.2		0.72	0.00	35.5	0.00				10
11										0.00			35.7	0.00	0.00	35.7	0.00				12
13	3	175	PANEL PAC9 (LOCATED IN AHU-9 ENCLOSURE)	0.00	1.40	23.3	1.57	26.3			37.6			0.00	1.40	35.5	0.72	PANEL PAC2 (LOCATED IN AHU-2 ENCLOSURE)	175	3	14
15				0.72	0.00	23.3	1.38		25.4			36.2		0.72	0.00	35.5	0.00				16
17				0.00	0.00	23.5	1.00			24.5			35.7	0.00	0.00	35.7	0.00				18
SUBTOTAL (KVA)				0.72	1.40	71.8	3.9	26.8	26.0	25.1	76	73	72	1.44	2.80	215	1.44	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 2.2 (kVA-10)x0.5 = 0.0 kVA+10 = 2.2 kVA
LTG LOAD= 4.2 kVAx125% = 5.3
MTR LOAD= 287 kVAx100% = 286.9
CKT LOAD= 5.4 kVAx100% = 5.4
A 103 kVA
B 99 kVA
C 97 kVA
REMARKS

TOTAL DEMAND	TOTAL C.L.	DEMAND VOLTAGE AMPS	TOTAL DEMAND
299.7 kVA	298.6 kVA	299.7 kVA / 0.83 = 361.0	361.0 AMPS

PANEL: REL1

LOCATION: AHU-2 ELECTRICAL ROOM
AIC RATING: 10,000
VOLTAGE: 208Y/120 — 3 PHASE, 4 WIRE
STATUS: NEW [ ] EXISTING [X]
MOUNTING: FLUSH [ ] SURFACE [X]
PANEL SIZE: 100A MAIN: 60A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO	
	3	60	MAIN					0.00			1.00				1.00			(EXISTING) POD LTS	20	1	2	
									0.00			0.00						SPARE	20	1	4	
										0.00			0.00					SPARE	20	1	6	
1	1	20	(EXISTING) POD LTS		1.00			1.00			0.50						0.50	(EXISTING) MPX A (POD 1)	20	1	8	
3	1	20	SPARE						0.00			0.00						SPARE	20	1	10	
5	1	20	SPARE							0.00			0.00					SPARE	20	1	12	
7	1	20	(EXISTING) MICRONIC CONTROL				0.50	0.50			1.00						1.00	(EXISTING) LOAD	20	1	14	
9	1	20	SPARE						0.00			**0.50**					**0.50**	**JB - DDC PANEL - AHU-1**	**20**	**1**	**16**	1
11	1	20	SPARE							0.00			**0.50**				**0.50**	**JB - DDC PANEL - AHU-2**	**20**	**1**	**18**	1
13	3	50	(EXISTING) TRAILER				3.00	3.00			**0.50**						**0.50**	**JB - DDC PANEL - AHU-9**	**20**	**1**	**20**	1
15							3.00		3.00			0.00						SPACE	-	1	22	
17							3.00			3.00			0.00					SPACE	-	1	24	
19	1	-	SPACE					0.00			0.00							SPACE	-	1	26	
21	1	-	SPACE						0.00			2.00					2.00	(EXISTING) LOAD	30	2	28	
23	1	-	SPACE							0.00			2.00				2.00				30	
SUBTOTAL (KVA)				0.00	1.00	0.00	9.50	4.50	3.00	3.00	3.00	2.50	2.50	0.00	1.00	0.00	7.00	SUBTOTAL (KVA)				

DEMAND LOAD
REC LOAD= 0.0 (kVA-10)x0.5 = 0.0 kVA+10 = 0.0 kVA
LTG LOAD= 2.0 kVAx125% = 2.5
MTR LOAD= 0.0 kVAx100% = 0.0
CKT LOAD= 16.5 kVAx100% = 16.5
A 7.5 kVA
B 5.5 kVA
C 5.5 kVA
REMARKS

TOTAL DEMAND	TOTAL C.L.	DEMAND VOLTAGE AMPS	TOTAL DEMAND
19.0 kVA	18.5 kVA	19.0 kVA / 0.36 = 52.8	52.8 AMPS

GENERAL NOTES

1. REFER TO E-0.1-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

SHEET NOTES

1. PROVIDE CIRCUIT BREAKER WITH POLE AND RATING AS SHOWN. MATCH AIC RATING OF EXISTING PANEL

REH1
REL1

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Suite 300
Washington, D.C. 20006

2/2/2024

PROFESSIONAL CERTIFICATION.
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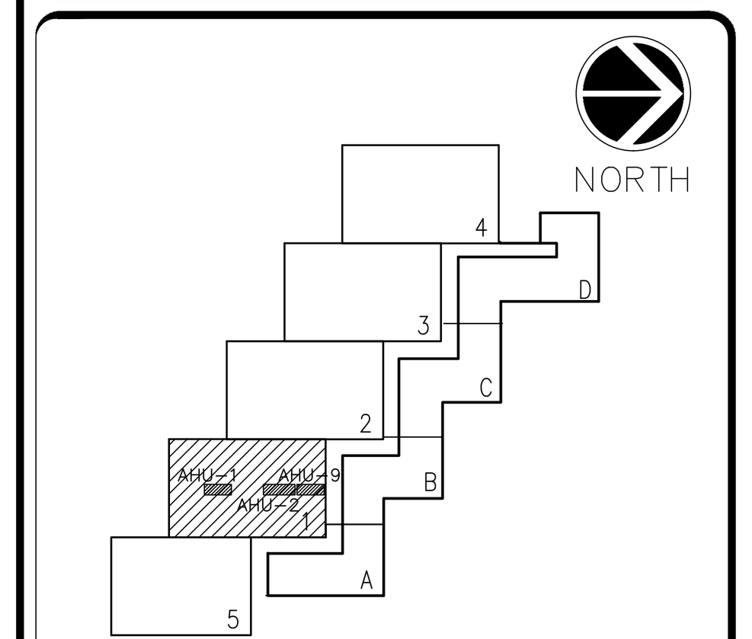

KEY PLAN

GRAPHIC SCALE(S)

DATE: 02/02/24
SUBMISSION: BID SET
REVISION: REVISION 1, REVISION 2, REVISION 3, REVISION 4, REVISION 5, REVISION 6, REVISION 7

Smithsonian Institution
SMITHSONIAN FACILITIES
600 Maryland Avenue S.W. Suite 5001
Washington, DC 20024-2520

BUILDING NAME: MUSEUM SUPPORT CENTER
ADDRESS: 4210 SILVER HILL ROAD, SUITLAND, MD 20746
PROJECT TITLE: MSC REPLACE AHUs POD 1
SF PROJECT NUMBER: 1530103
A/E PROJECT NUMBER: 60516569
DRAWING TITLE: PANELBOARD SCHEDULES
DRAWING TYPE: ELECTRICAL
WORKING STAFF: DMR (DESIGNED BY), DAR (DRAWN BY), AM (CHECKED BY)
SHEET NO. 68 OF 71
E (DISCIPLINE) 6 (TYPE) 02 (SEQUENCE)
E-6-02.DWG
SCALE : 1:1

GENERAL NOTES

1. REFER TO E-0.1-01 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

PANEL: PAC1

LOCATION: AHU-1 — AIC RATING: 22,000 — VOLTAGE 480V — 3 PHASE — 3 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 225A — MAIN: 200A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1						11.64		11.64			23.28					23.28					2
3	3	70	AHU-1 RETURN FAN			11.64			11.64			23.28				23.28		AHU-1 SUPPLY FAN	125	3	4
5						11.64				11.64			23.28			23.28					6
7						0.29		0.29			0.29					0.29					8
9	3	15	CIRC-1			0.29			0.29			0.29				0.29		CIRC-2	15	3	10
11						0.29				0.29			0.29			0.29					12
13								0.00			0.00										14
15	3	70	SPARE						0.00			0.00						SPARE	125	3	16
17										0.00			0.00								18
19								0.00			0.00										20
21	3	15	SPARE						0.00			0.00						SPARE	15	3	22
23										0.00			0.00								24
25								0.00			0.00										26
27	3	20	SPARE						0.00			0.00						SPARE	20	3	28
29										0.00			0.00								30
31								0.00			2.12			0.00	1.40	0.00	0.72				32
33	3	20	SPARE						0.00			0.72		0.72	0.00	0.00	0.00	XFMR LPAC1	25	3	34
35										0.00			0.18	0.00	0.00	0.18	0.00				36
37								0.00			0.00										38
39	3	20	SPARE						0.00			0.00						SPARE	25	3	40
41										0.00			0.00								42
SUBTOTAL (KVA)				0.00	0.00	35.8	0.00	11.9	11.9	11.9	25.7	24.3	23.8	0.72	1.40	70.9	0.7	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.7 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.7 kVA
LTG LOAD= 1.4 kVAx125% = 1.8
MTR LOAD= 107 kVAx100% = 107
CKT LOAD= 0.7 kVAx100% = 0.7
A 37.6 kVA — B 36.2 kVA — C 35.7 kVA
REMARKS
TOTAL DEMAND 109.9 kVA — TOTAL C.L. 109.5 kVA — DEMAND 109.9 kVA / VOLTAGE 0.83 = AMPS 132.4 — TOTAL DEMAND 132.4 AMPS

PANEL: LPAC1

LOCATION: AC-1 — AIC RATING: 10,000 — VOLTAGE 208Y/120 — 3 PH — 4 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 100A — MAIN: 50A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1	1	20	LIGHTING		1.40			1.40			0.57						0.57	HEAT TRACE	20	1	2
3	1	20	RECEPTACLES	0.72					0.72			0.00						SPARE	20	1	4
5	1	20	UH-1			0.18				0.18			0.00					SPARE	20	1	6
7	1	20	HHX-1				0.15	0.15			0.0							SPARE	20	1	8
9	1	20	SPARE						0.0			0.0						SPARE	20	1	10
11	1	20	SPARE							0.0			0.0					SPARE	20	1	12
13	1	20	SPARE					0.0			0.0							SPARE	20	1	14
15	1	20	SPARE						0.0			0.0						SPARE	20	1	16
17	1	20	SPARE							0.0			0.0					SPARE	20	1	18
SUBTOTAL (KVA)				0.72	1.40	0.18	0.15	1.55	0.72	0.18	0.57	0.00	0.00	0.0	0.0	0.0	0.6	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.72 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.72 kVA
LTG LOAD= 1.40 kVAx125% = 1.75
MTR LOAD= 0.18 kVAx100% = 0.18
CKT LOAD= 0.72 kVAx100% = 0.72
A 2.12 kVA — B 0.72 kVA — C 0.18 kVA
REMARKS
TOTAL DEMAND 3.37 kVA — TOTAL C.L. 3.02 kVA — DEMAND 3.37 kVA / VOLTAGE 0.36 = AMPS 9.36 — TOTAL DEMAND 9.36 AMPS

PANEL: PAC2

LOCATION: AHU-2 — AIC RATING: 22,000 — VOLTAGE 480V — 3 PHASE — 3 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 225A — MAIN: 200A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1						23.28		23.28			11.64					11.64					2
3	3	125	AHU-2 SUPPLY FAN			23.28			23.28			11.64				11.64		AHU-2 RETURN FAN	70	3	4
5						23.28				23.28			11.64			11.64					6
7						0.29		0.29			0.29					0.29					8
9	3	15	CIRC-3			0.29			0.29			0.29				0.29		CIRC-4	15	3	10
11						0.29				0.29			0.29			0.29					12
13								0.00			0.00										14
15	3	125	SPARE						0.00			0.00						SPARE	70	3	16
17										0.00			0.00								18
19								0.00			0.00										20
21	3	15	SPARE						0.00			0.00						SPARE	15	3	22
23										0.00			0.00								24
25								0.00			0.00										26
27	3	20	SPARE						0.00			0.00						SPARE	20	3	28
29										0.00			0.00								30
31								0.00			2.12			0.00	1.40	0.00	0.72				32
33	3	20	SPARE						0.00			0.72		0.72	0.00	0.00	0.00	XFMR LPAC2	25	3	34
35										0.00			0.18	0.00	0.00	0.18	0.00				36
37								0.00			0.00										38
39	3	20	SPARE						0.00			0.00						SPARE	25	3	40
41										0.00			0.00								42
SUBTOTAL (KVA)				0.00	0.00	70.7	0.00	23.6	23.6	23.6	14.1	12.7	12.1	0.72	1.40	36.0	0.72	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.7 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.7 kVA
LTG LOAD= 1.4 kVAx125% = 1.8
MTR LOAD= 107 kVAx100% = 107
CKT LOAD= 0.7 kVAx100% = 0.7
A 37.6 kVA — B 36.2 kVA — C 35.7 kVA
REMARKS
TOTAL DEMAND 109.9 kVA — TOTAL C.L. 109.5 kVA — DEMAND 109.9 kVA / VOLTAGE 0.83 = AMPS 132.4 — TOTAL DEMAND 132.4 AMPS

PANEL: LPAC2

LOCATION: AC-2 — AIC RATING: 10,000 — VOLTAGE 208Y/120 — 3 PH — 4 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 100A — MAIN: 50A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1	1	20	LIGHTING		1.40			1.40			0.57						0.57	HEAT TRACE	20	1	2
3	1	20	RECEPTACLES	0.72					0.72			0.00						SPARE	20	1	4
5	1	20	UH-2			0.18				0.18			0.00					SPARE	20	1	6
7	1	20	HHX-2				0.15	0.15			0.0							SPARE	20	1	8
9	1	20	SPARE						0.0			0.0						SPARE	20	1	10
11	1	20	SPARE							0.0			0.0					SPARE	20	1	12
13	1	20	SPARE					0.0			0.0							SPARE	20	1	14
15	1	20	SPARE						0.0			0.0						SPARE	20	1	16
17	1	20	SPARE							0.0			0.0					SPARE	20	1	18
SUBTOTAL (KVA)				0.72	1.40	0.18	0.2	1.55	0.72	0.18	0.57	0.00	0.00	0.0	0.0	0.0	0.57	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.72 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.72 kVA
LTG LOAD= 1.40 kVAx125% = 1.75
MTR LOAD= 0.18 kVAx100% = 0.18
CKT LOAD= 0.72 kVAx100% = 0.72
A 2.12 kVA — B 0.72 kVA — C 0.18 kVA
REMARKS
TOTAL DEMAND 3.37 kVA — TOTAL C.L. 3.02 kVA — DEMAND 3.37 kVA / VOLTAGE 0.36 = AMPS 9.36 — TOTAL DEMAND 9.36 AMPS

PANEL: PAC9

LOCATION: AHU-9 — AIC RATING: 22,000 — VOLTAGE 480V — 3 PHASE — 3 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 225A — MAIN: 150

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1						14.96		15.0			7.5					7.48					2
3	3	100	AHU-9 SUPPLY FAN			14.96			15.0			7.5				7.48		AHU-9 EXHAUST FAN	70	3	4
5						14.96				15.0			7.5			7.48					6
7						0.29		0.29			0.29					0.29					8
9	3	15	CIRC-13 (1/2HP)			0.29			0.29			0.29				0.29		DBP-1 (1/2HP)	15	3	10
11						0.29				0.29			0.29			0.29					12
13								0.00			0.29					0.29					14
15	3	100	SPARE						0.00			0.29				0.29		CIRC-14 (1/2HP)	15	3	16
17										0.00			0.29			0.29					18
19								0.00			2.97			0.00	1.40	0.00	1.57				20
21	3	15	SPARE						0.00			2.10		0.72	0.00	0.00	1.38	XFMR LPAC9	25	3	22
23										0.00			1.18	0.00	0.00	0.18	1.00				24
25								0.00			0.00										26
27	3	20	SPARE						0.00			0.00						SPARE	25	3	28
29										0.00			0.00								30
31								0.00			0.00										32
33	3	20	SPARE						0.00			0.00						SPARE	50	3	34
35										0.00			0.00								36
37								0.00			0.00										38
39	3	20	SPARE						0.00			0.00						SPARE	15	3	40
41										0.00			0.00								42
SUBTOTAL (KVA)				0.00	0.00	45.8	0.0	15.3	15.3	15.3	11.0	10.2	9.2	0.72	1.40	24.4	3.95	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.7 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.7 kVA
LTG LOAD= 1.4 kVAx125% = 1.8
MTR LOAD= 70.1 kVAx100% = 70.1
CKT LOAD= 3.9 kVAx100% = 3.9
A 26.3 kVA — B 25.4 kVA — C 24.5 kVA
REMARKS
TOTAL DEMAND 76.5 kVA — TOTAL C.L. 76.2 kVA — DEMAND 76.5 kVA / VOLTAGE 0.83 = AMPS 92.2 — TOTAL DEMAND 92.2 AMPS

PANEL: LPAC9

LOCATION: AC-9 — AIC RATING: 10,000 — VOLTAGE 208Y/120 — 3 PH — 4 WIRE
STATUS: X NEW / EXISTING — MOUNTING: FLUSH / X SURFACE
PANEL SIZE: 100A — MAIN: 50A

CKT NO	POLE	TRIP	LOAD	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD (kVA) A	B	C	LOAD (kVA) A	B	C	ITEM LOAD (kVA) REC	LTG	MTR	CKT	LOAD	TRIP	POLE	CKT NO
1	1	20	LIGHTING		1.40			1.40			0.57						0.57	HEAT TRACE	20	1	2
3	1	20	RECEPTACLES	0.72					0.72			1.00					1.00	HEAT TRACE	20	1	4
5	1	20	UH-7			0.18				0.18			1.00				1.00	HEAT TRACE	20	1	6
7	1	20	SPARE					0.00			1.0						1.00	HEAT TRACE	20	1	8
9	1	20	SPARE						0.0			0.4					0.38	HEAT TRACE	20	1	10
11	1	20	SPARE							0.0			0.0					SPARE	20	1	12
13	1	20	SPARE					0.0			0.0							SPARE	20	1	14
15	1	20	SPARE						0.0			0.0						SPARE	20	1	16
17	1	20	SPARE							0.0			0.0					SPARE	20	1	18
SUBTOTAL (KVA)				0.72	1.40	0.18	0.0	1.40	0.72	0.18	1.57	1.38	1.00	0.0	0.0	0.0	3.95	SUBTOTAL (KVA)			

DEMAND LOAD
REC LOAD= 0.72 (kVA-10)x0.5 = 0.0 — kVA+10 = 0.72 kVA
LTG LOAD= 1.40 kVAx125% = 1.75
MTR LOAD= 0.18 kVAx100% = 0.18
CKT LOAD= 3.95 kVAx100% = 3.95
A 2.97 kVA — B 2.10 kVA — C 1.18 kVA
REMARKS
TOTAL DEMAND 6.60 kVA — TOTAL C.L. 6.25 kVA — DEMAND 6.60 kVA / VOLTAGE 0.36 = AMPS 18.32 — TOTAL DEMAND 18.32 AMPS

PAC1	LPAC1
PAC2	LPAC2
PAC9	LPAC9

MUSEUM SUPPORT CENTER
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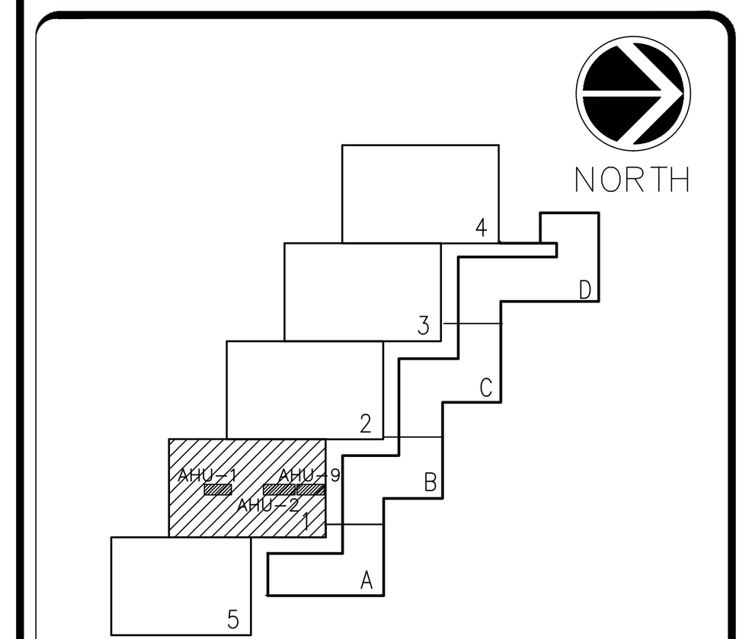
PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 10760, EXPIRATION DATE 1/12/2026.



KEY PLAN

GRAPHIC SCALE(S)

DATE: 02/02/24 — SUBMISSION: BID SET

REVISION: REVISION 1, REVISION 2, REVISION 3, REVISION 4, REVISION 5, REVISION 6, REVISION 7

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Washington, DC 20024-2520

BUILDING NAME: MUSEUM SUPPORT CENTER
ADDRESS: 4210 SILVER HILL ROAD, SUITLAND, MD 20746
PROJECT TITLE: MSC REPLACE AHUs POD 1
SF PROJECT NUMBER: 1530103
A/E PROJECT NUMBER: 60516569
DRAWING TITLE: PANELBOARD SCHEDULES
DRAWING TYPE: ELECTRICAL
WORKING STAFF: DMR (DESIGNED BY) — DAR (DRAWN BY) — AM (CHECKED BY)

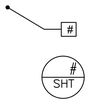
SHEET NO. 69 OF 71 — E (DISCIPLINE) — 6 (TYPE) — 03 (SEQUENCE)

E-6-03.DWG
SCALE : 1:1

HAZMAT ABBREVIATIONS

ACM	ASBESTOS CONTAINING MATERIAL
AHERA	ASBESTOS HAZARD EMERGENCY RESPONSE ACT
AHU	AIR HANDLING UNIT
CF	CUBIC FEET
CFR	CODE OF FEDERAL REGULATION
CMU	CONCRETE MASONRY UNIT
DEHP	DI-2-ETHYLHEXYL PHTHALATE
EA	EACH
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
GAL	GALLON
HA	HOMOGENEOUS AREA
HAZMAT	HAZARDOUS MATERIAL
HEPA	HIGH EFFICIENCY PARTICULATE AIR
HID	HIGH INTENSITY DISCHARGE
HG	MERCURY
LB	POUNDS
LF	LINEAR FEET
LLR	LOW LEVEL RADIOACTIVE
NAD	NO ASBESTOS DETECTED
NA	NOT ANALYZED
N/A	NOT APPLICABLE
ND	NOT DETECTED
NESHAP	NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS
NOB	NON-FRIABLE ORGANICALLY BOUND
NTS	NOT TO SCALE
OD	OUTER DIAMETER
OSHA	U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PB	LEAD
PCB	POLYCHLORINATED BIPHENYL
PLM	POLARIZED LIGHT MICROSCOPY
RACM	REGULATED ACM (PER NESHAP 40 CFR 61 SUBPART M)
RFP	REQUEST FOR PROPOSAL
SF	SQUARE FEET
TBD	TO BE DETERMINED
TEM	TRANSMISSION ELECTRON MICROSCOPY
TRACE	<1% ASBESTOS BY PLM OR TEM
UPS	UNINTERRUPTIBLE POWER SUPPLY

HAZMAT LEGEND



ASBESTOS ITEM NUMBER INDICATES SPECIFIED MATERIAL IS LOCATED IN THE GENERAL AREA.

DETAIL REFERENCE. "#" DENOTES DETAIL NUMBER. "SHT" DENOTES SHEET NUMBER

HAZMAT GENERAL NOTES

1. ALL WORK WILL BE PERFORMED AS INDICATED IN THE CONTRACT DOCUMENTS. THE ABATEMENT CONTRACTOR SHALL REMOVE AND DISPOSE OF SPECIFIED MATERIALS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. ALL QUANTITIES ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL MATERIAL QUANTITIES AND CONDITIONS.
3. ALL SPECIFIED ASBESTOS CONTAINING MATERIALS (ACM) AND ASSUMED ACM SHALL BE REMOVED OR CONTROLLED IN ACCORDANCE WITH SPECIFICATION SECTION 028213 – ASBESTOS ABATEMENT PROCEDURES.
4. WHEN SUSPECT MATERIALS ARE ENCOUNTERED FOR WHICH ASBESTOS SAMPLING DATA IS NOT AVAILABLE, CONTRACTOR SHALL SAMPLE AND TEST EACH SUSPECTED MATERIAL. THE SAMPLING AND TESTING SHALL BE PERFORMED IN THE MANNER DESCRIBED IN GENERAL NOTE 7.
5. IN ACCORDANCE WITH THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS, THE OSHA ASBESTOS CONSTRUCTION STANDARD, AND THE NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS (NESHAP), ASSUMED ACMS MAY BE DETERMINED TO BE NEGATIVE (NON-ACM) ONLY THROUGH SAMPLING AND ANALYSIS. THIS INCLUDES THE RECOMMENDATION THAT SPECIAL CASE MATERIALS (NON-FRIABLE ORGANICALLY BOUND (NOB) MATERIALS), SUCH AS MASTICS, BE ANALYZED BY TRANSMISSION ELECTRON MICROSCOPY (TEM) TO CONFIRM THE ABSENCE OF ASBESTOS IF ALL POLARIZED LIGHT MICROSCOPY (PLM) ANALYSES ARE NEGATIVE. THE CONTRACTOR SHALL ADDRESS AND COMPLY WITH THE SAMPLING AND ANALYSES OF SUSPECT MATERIALS IN IN ACCORDANCE WITH SPEICFICATION SECTION 028213 – ASBESTOS ABATEMENT PROCEDURES.
6. OTHER HAZARDOUS MATERIALS (HAZMAT) SHALL BE REMOVED INCLUDE HIGH INTENSITY LAMPS FOR FIRE STROBES; LOW-LEVEL RADIOACTIVE SOURCES (SMOKE DETECTORS); MERCURY-CONTAINING PRESSURE GUAGES, THERMOMETERS, AND THERMOSTATS, THESE MATERIALS SHOULD BE HANDLED IN CONFORMANCE WITH ALL STATE OF MARYLAND AND FEDERAL REGULATIONS IN SPECIFICATION SECTION 028406 – OTHER UNIVERSAL AND SPECIAL WASTES REMOVAL AND DISPOSAL. IF SUSPECT HAZARDOUS MATERIALS ARE ENCOUNTERED IN AREAS NOT INDICATED TO CONTAIN THESE MATERIALS, DEMOLITION ACTIVITIES SHALL CEASE AND SAMPLING OR ASSESSMENTS SHALL BE CONDUCTED.
7. ALL ASSUMED ACM SHALL BE SAMPLED AND TESTED PRIOR TO DISTURBANCE BY AN ASBESTOS HAZARD EMERGENCY RESPONSE ACT (AHERA) ACCREDITED INSPECTOR APPROVED BY THE CONTRACTING OFFICER AND LICENSED IN THE STATE OF MARYLAND. TRAINING AND LICENSING REQUIREMENTS ARE REFERRED TO IN SPECIFICATION SECTION 028213 – ASBESTOS ABATEMENT PROCEDURES.

HAZMAT SCHEDULES

ASBESTOS ABATEMENT SCHEDULE

MATERIAL DESCRIPTION	ITEM NUMBER	SAMPLE NUMBERS	NOB YES/NO	ACM YES/NO	MATERIAL LOCATIONS	ESTIMATED QUANTITY	UNIT	CONDITION	ACTION	SYMBOL
PIPE GASKETS	1	ASSUMED	NO	YES	AHU #1, AHU #2, AHU #9	66	EA	GOOD	REMOVE	1
WHITE VIBRATION DAMPNER	2	ASSUMED	NO	YES	AHU #1, AHU #2	4	EA	GOOD	REMOVE	2

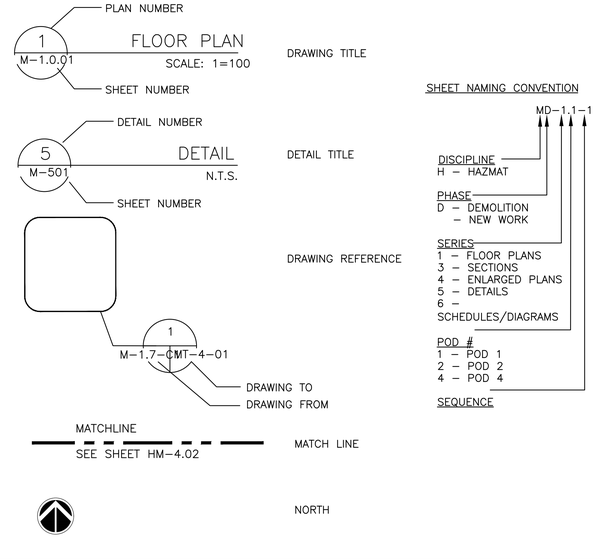
NOTE: THE SCHEDULE ABOVE IS APPLICABLE TO POD 1, UNITS AHU #1, AHU #2, AND AHU #9 ONLY

OTHER HAZARDOUS MATERIALS DESIGN SCHEDULE

LOCATIONS	MATERIAL/COMPONENT DESCRIPTION	POTENTIAL HAZARDOUS OR REGULATED SUBSTANCE	QUANTITY	UNIT OF MEASURE	ACTION
AHU #1, AHU #2, #9	FIRE STROBE	LLR, HG	9	EA	REMOVE
AHU #1, AHU #2, AHU #9	THERMOMETER	HG	6	EA	REMOVE
AHU #1, AHU #2, AHU #9	PRESSURE GAUGE	HG	12	EA	REMOVE
AHU #1, AHU #2, AHU #9	THERMOSTAT	HG	15	EA	REMOVE

NOTE: THE SCHEDULE ABOVE IS APPLICABLE TO POD 1, UNITS AHU #1, AHU #2, AND AHU #9 ONLY

ADDITIONAL SYMBOLS



MUSEUM SUPPORT CENTER
SMITHSONIAN INSTITUTION

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Washington, D.C. 20006

RYAN JAKUBCO
EPA ASBESTOS PROJECT DESIGNER
NO. VAPDR12202023-05
20 DECEMBER 2023

PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED AHERA PROJECT DESIGNER UNDER THE LAWS OF THE STATE OF MARYLAND, ACCREDITATION NUMBER VAPDR12202023-05, EXPIRATION DATE 12/20/2024.

KEY PLAN

GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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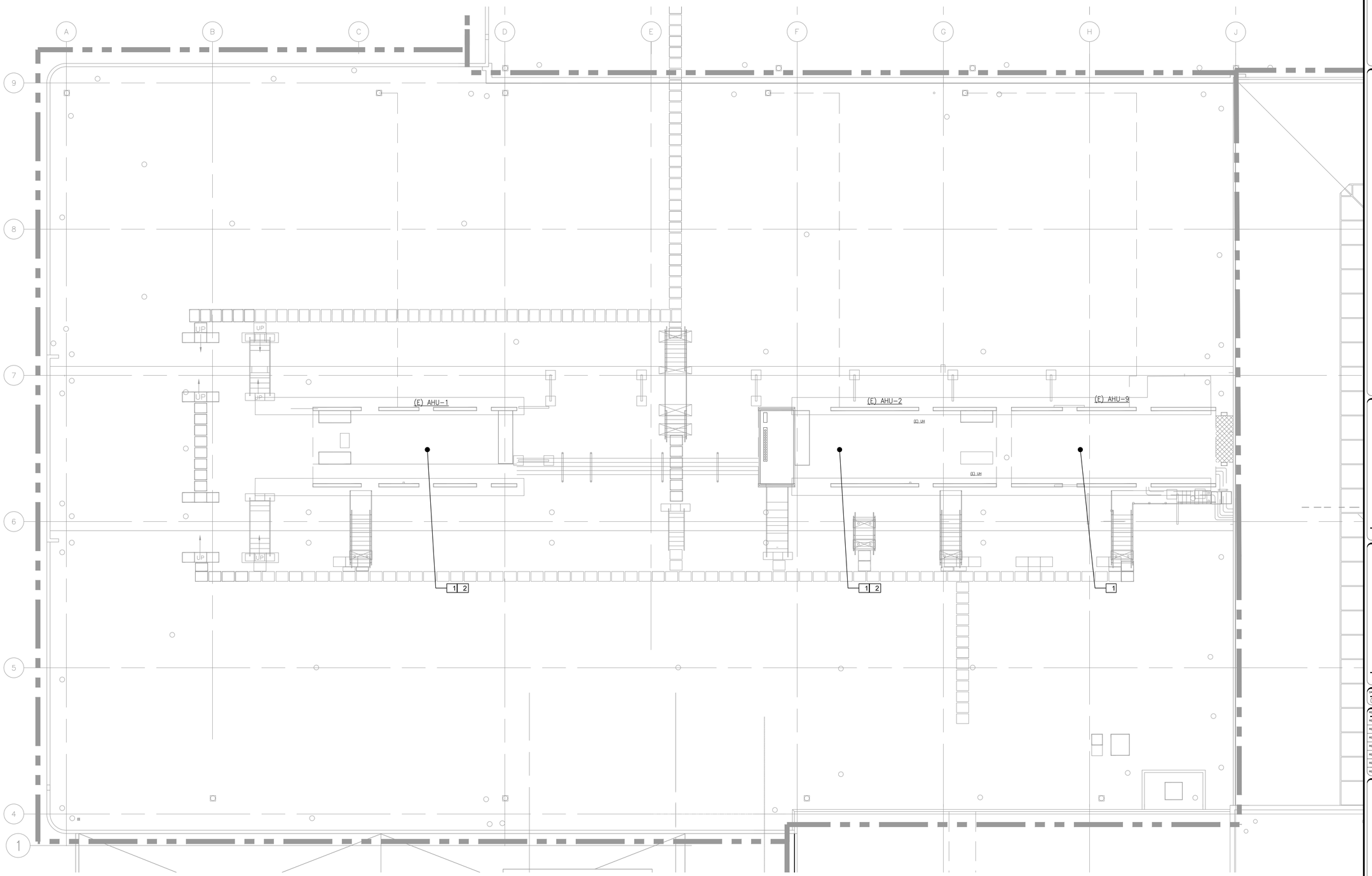
BUILDING NAME	MUSEUM SUPPORT CENTER
ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	COVER SHEET
DRAWING TYPE	HAZMAT
WORKING STAFF	BB/SH (DESIGNED BY) · KD/DH (DRAWN BY) · TM/RJ (CHECKED BY)
SHEET NO.	70 OF 71
	HD (DISCIPLINE) · 0 (TYPE) · 01 (SEQUENCE)

SCALE: 1:1



A HAZMAT POD 1 ROOF LEVEL – ASBESTOS LOCATIONS DRAWINGS
HD-1.1-01
SCALE = 1/8"=1'-0"

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Washington, D.C. 20006

CODED NOTES

1 PIPE GASKETS. REFER TO ASBESTOS ABATEMENT SCHEDULE ON DRAWING HD-0-01 FOR DETAILS.

2 WHITE VIBRATION DAMPNERS. REFER ASBESTOS ABATEMENT SCHEDULE ON DRAWING HD-0-01 FOR DETAILS.

RYAN JAKUBCO
EPA ASBESTOS PROJECT DESIGNER
NO. VAPDR12202023-05
20 DECEMBER 2023

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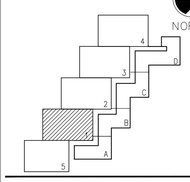
NORTH



KEY PLAN

0 4 8 16
1/8" = 1'-0"
GRAPHIC SCALE(S)

DATE	SUBMISSION
02/02/24	BID SET

REVISION	REVISION
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	
REVISION 6	
REVISION 7	

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ADDRESS	4210 SILVER HILL ROAD SUITLAND, MD 20746
PROJECT TITLE	MSC REPLACE AHUs POD 1
SF PROJECT NUMBER	1530103
A/E PROJECT NUMBER	60516569
DRAWING TITLE	HAZMAT POD 1 ROOF LEVEL – ASBESTOS
DRAWING TYPE	HAZMAT
WORKING STAFF	BB/SH (DESIGNED BY) · KD/DH (DRAWN BY) · TM/RJ (CHECKED BY)
SHEET NO.	71 OF 71
	HD (DISCIPLINE) · 1.1 (TYPE) · 01 (SEQUENCE)

HD-1.1-01