

OA DESIGN CRITERIA
HALDANE ELEMENTARY/MIDDLE SCHOOL

AHU-1 & AHU-2 – CAFETERIA
CAFETERIA OCCUPANT DENSITY = 100/1000 SQUARE FEET
RP=7.5 CFM/PERSON
PZ=172 PEOPLE (POSTED MAX OCCUPANCY)
RA=0.18 CFM/SQ.FT.
AZ=2450 SQ.FT.
VBZ=1731 CFM
EZ=0.9 (SEE NOTE)
VOZ=1923 CFM
MIN TOTAL OUTSIDE AIR REQUIRED – 1,923 CFM*

NOTE: RETURN GRILLE IS LOCATED BETWEEN "FLOOR" (EZ=1.0) AND "CEILING" (EZ=0.8) AND THEREFORE DOES NOT MEET EITHER DESCRIPTION. AN AVERAGED EZ VALUE OF 0.9 WILL BE USED. SEE AIR DISTRIBUTION NOTES BELOW.
* TOTAL OA SUPPLIED BY ONE INDIVIDUAL AHU OR BY BOTH AHUS COLLECTIVELY.

AHU-3 NURSE'S OFFICE
NURSE'S OFFICE OCCUPANT DENSITY = 10/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=1 PERSON
RA=0.18 CFM/SQ.FT.
AZ=530 SQ.FT.
VBZ=125.4 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=126 CFM
PARTIAL OUTSIDE AIR REQUIRED – 126 CFM

WORK IS PART OF ALT HVAC-2 ONLY

HEALTH OFFICE 114A OCCUPANT DENSITY = 5/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=1 PERSON
RA=0.06 CFM/SQ.FT.
AZ=115 SQ.FT.
VBZ=11.9 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=12 CFM
PARTIAL OUTSIDE AIR REQUIRED – 12 CFM

HEALTH OFFICE 114B OCCUPANT DENSITY = 5/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=1 PERSON
RA=0.06 CFM/SQ.FT.
AZ=125 SQ.FT.
VBZ=12.5 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=13 CFM
PARTIAL OUTSIDE AIR REQUIRED – 13 CFM

WORK IS PART OF ALT HVAC-1 ONLY

AHU-4 MAIN OFFICE
MAIN OFF./ WAITING AREA OCC. DENSITY = 30/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=18 PEOPLE
RA=0.06 CFM/SQ.FT.
AZ=600 SQ.FT.
VBZ=126 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=126 CFM
PARTIAL OUTSIDE AIR REQUIRED – 126 CFM

PRINCIPAL'S OFFICE OCCUPANT DENSITY = 5/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=1 PERSON
RA=0.06 CFM/SQ.FT.
AZ=200 SQ.FT.
VBZ=17 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=17 CFM
PARTIAL OUTSIDE AIR REQUIRED – 17 CFM

CONFERENCE ROOM OCCUPANT DENSITY = 50/1000 SQ. FT.
RP=5 CFM/PERSON
PZ=8 PERSON
RA=0.06 CFM/SQ.FT.
AZ=150 SQ.FT.
VBZ=49 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=49 CFM
PARTIAL OUTSIDE AIR REQUIRED – 49 CFM

UV-1 MUSIC ROOM
MUSIC ROOM OCCUPANCY DENSITY = 35/1000 SQ. FT.
RP=10 CFM/PERSON
PZ=25 PEOPLE
RA=0.06 CFM/SQ.FT.
AZ=715 SQ.FT.
VBZ=292.9 CFM
EZ=1.0 (CEILING SUPPLY OF COOL AIR)
VOZ=293 CFM
MIN OUTSIDE AIR REQUIRED COOLING– 293 CFM

NOTE: RETURN GRILLE IS LOCATED BETWEEN "FLOOR" (EZ=1.0) AND "CEILING" (EZ=0.8) AND THEREFORE DOES NOT MEET EITHER DESCRIPTION. AN AVERAGED EZ VALUE OF 0.9 WILL BE USED. SEE AIR DISTRIBUTION NOTES BELOW.

UV-2 BAND ROOM
BAND ROOM OCC. DENSITY = 35/1000 SQ. FT.
ALT. USED AS CONF. RM. – OCC. DENSITY = 50/1000 SQ. FT.
RP=10 CFM/PERSON
PZ=48 PEOPLE
RA=0.06 CFM/SQ.FT.
AZ=1350 SQ.FT.
VBZ=561 CFM
EZ=0.9 (HEATING, 1.0 COOLING)
VOZ=561 CFM (COOLING)
VOZ=623 CFM (HEATING)
MIN TOTAL OUTSIDE AIR REQUIRED COOLING – 561 CFM
MIN TOTAL OUTSIDE AIR REQUIRED HEATING – 623 CFM

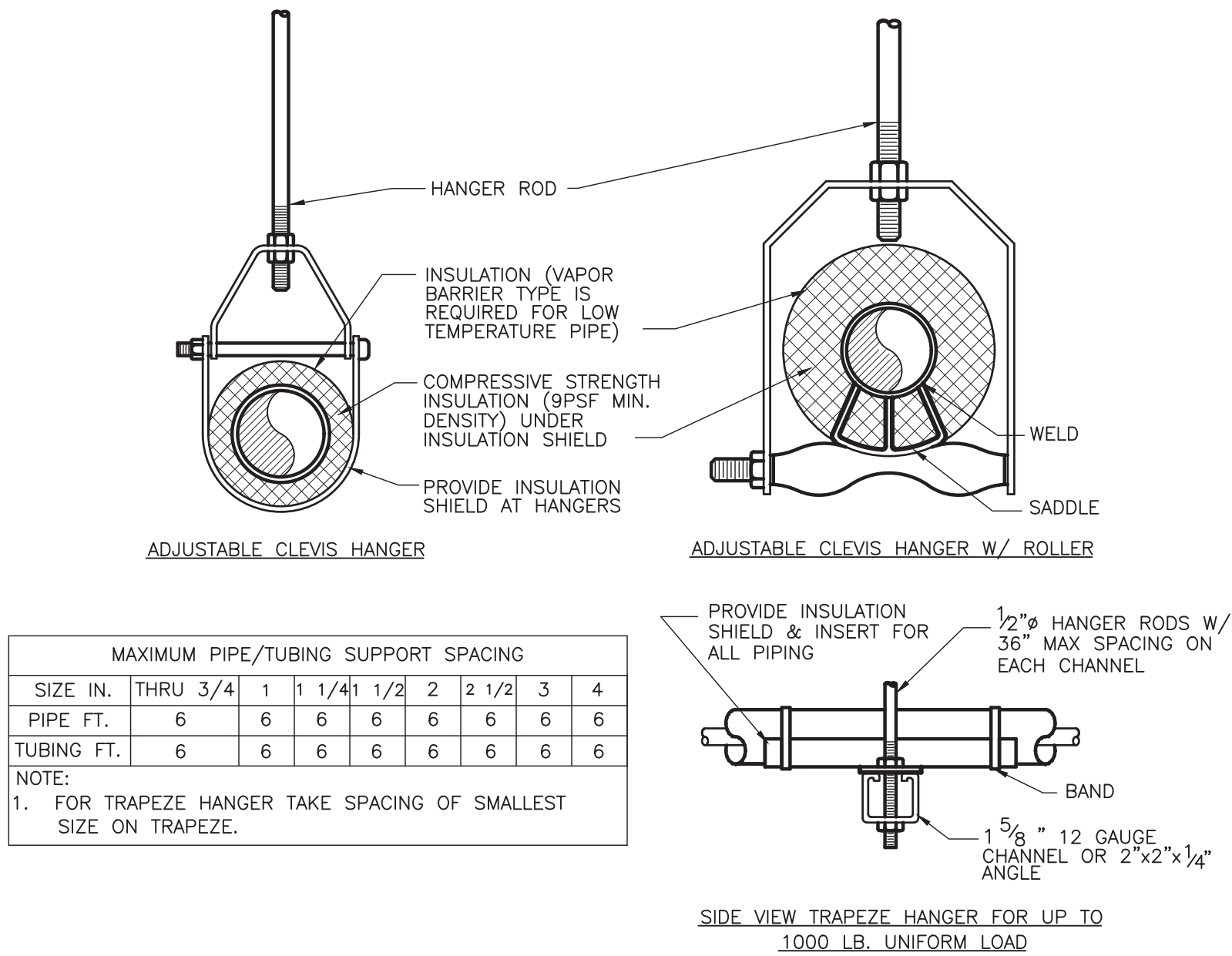
NOTE: RETURN GRILLE IS LOCATED BETWEEN "FLOOR" (EZ=1.0) AND "CEILING" (EZ=0.8) AND THEREFORE DOES NOT MEET EITHER DESCRIPTION. AN AVERAGED EZ VALUE OF 0.9 WILL BE USED. SEE AIR DISTRIBUTION NOTES BELOW.

OCCUPANCY CLASSIFICATION DERIVED FROM NYSCM TABLE 403.3.1.1
RP=OUTDOOR AIRFLOW RATE PER PERSON (NYSCM TABLE 403.3.1.1)
PZ=QTY. OF OCCUPANTS IN SPACE
RA=OUTDOOR AIRFLOW RATE PER UNIT AREA (NYSCM TABLE 403.3.1.1)
AZ=OCCUPIABLE FLOOR AREA
VBZ=REQUIRED OUTDOOR AIRFLOW RATE IN BREATHING ZONE
EZ=ZONE AIR DISTRIBUTION EFFECTIVENESS (NYSCM TABLE 403.3.1.1.2)
VOZ=ZONE OUTDOOR AIRFLOW RATE
VBZ=(RPxPZ)+(RAXAZ) VOZ=VBZ/EZ

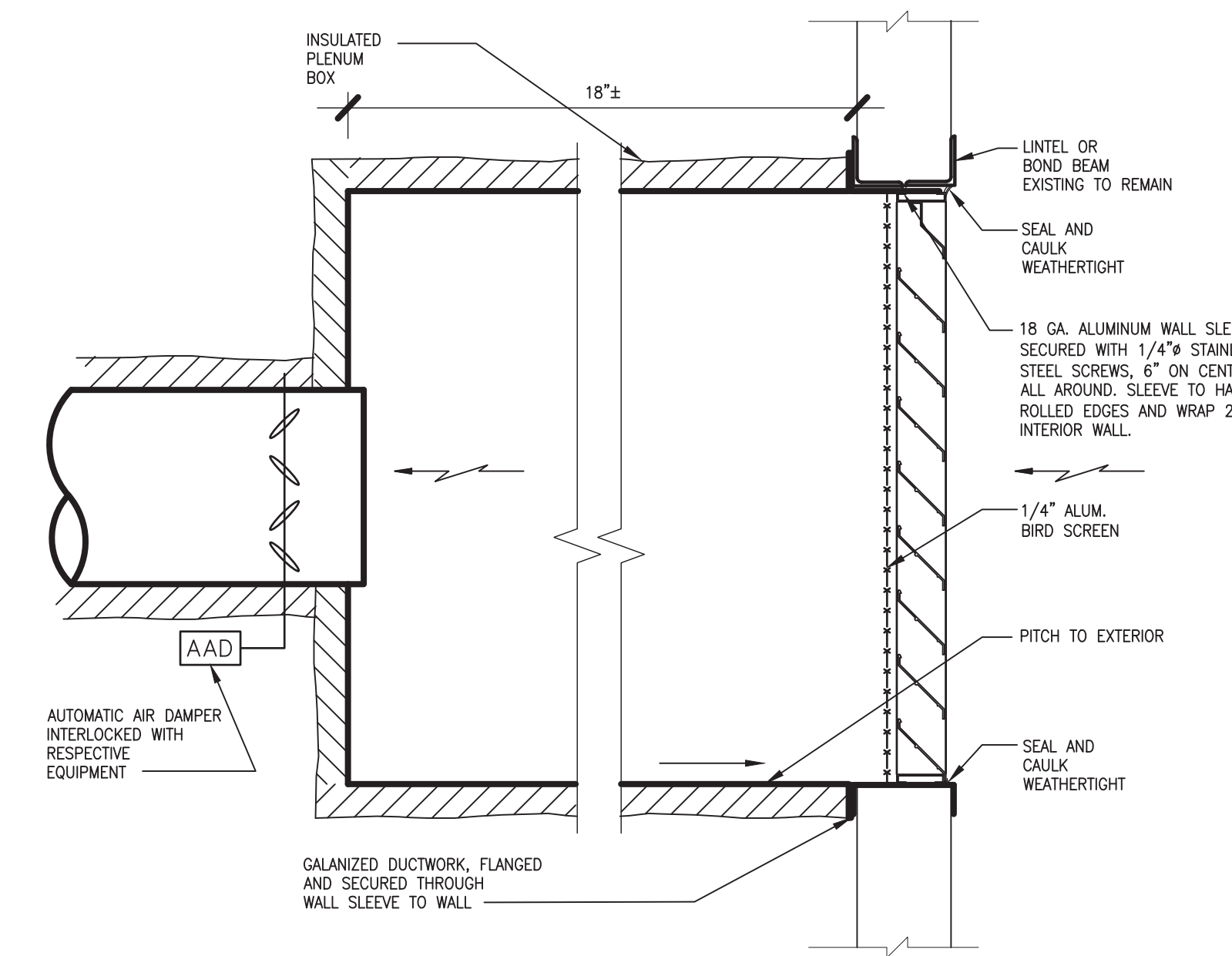
NYSCM TABLE 403.3.1.1.1.2 ZONE AIR DISTRIBUTION EFFECTIVENESS a,b,c,d	
AIR DISTRIBUTION CONFIGURATION	EZ
CEILING OR FLOOR SUPPLY OF COOL AIR	1.0(a)
CEILING OR FLOOR SUPPLY OF WARM AIR AND FLOOR RETURN	1.0
CEILING SUPPLY OF WARM AIR AND CEILING RETURN	0.8(b)
FLOOR SUPPLY OF WARM AIR AND CEILING RETURN	0.7
MAKEUP AIR DRAWN IN ON THE OPPOSITE SIDE OF THE ROOM FROM THE EXHAUST OR RETURN	0.8
MAKEUP AIR DRAWN IN NEAR TO THE EXHAUST OR RETURN LOCATION	0.5

- a. "COOL AIR" IS AIR COOLER THAN SPACE TEMPERATURE.
b. "WARM AIR" IS AIR WARMER THAN SPACE TEMPERATURE.
c. "CEILING" INCLUDES ANY POINT ABOVE THE BREATHING ZONE.
d. "FLOOR" INCLUDES ANY POINT BELOW THE BREATHING ZONE.
e. ZONE AIR DISTRIBUTION EFFECTIVENESS OF 1.2 SHALL BE PERMITTED FOR SYSTEMS WITH A FLOOR SUPPLY OF COOL AIR AND CEILING RETURN, PROVIDED THAT LOW-VELOCITY DISPLACEMENT VENTILATION ACHIEVES UNIDIRECTIONAL FLOW AND THERMAL STRATIFICATION.
f. ZONE AIR DISTRIBUTION EFFECTIVENESS OF 1.0 SHALL BE PERMITTED FOR SYSTEMS WITH A CEILING SUPPLY OF WARM AIR, PROVIDED THAT SUPPLY AIR TEMPERATURE IS LESS THAN 15°F ABOVE SPACE TEMPERATURE AND PROVIDED THAT THE 150-FOOT-PER-MINUTE SUPPLY AIR JET REACHES TO WITHIN 4-1/2 FEET OF FLOOR LEVEL.

NYSED EZ CLASSIFICATION NOTE: "FLOOR" REFERS TO THE AREA LOCATED 0-3 INCHES AFF. "CEILING" REFERS TO THE AREA LOCATED 72 INCHES AFF AND ABOVE. THOSE LOCATED BETWEEN 3 INCHES AND 72 INCHES AFF ARE NOTED ABOVE.

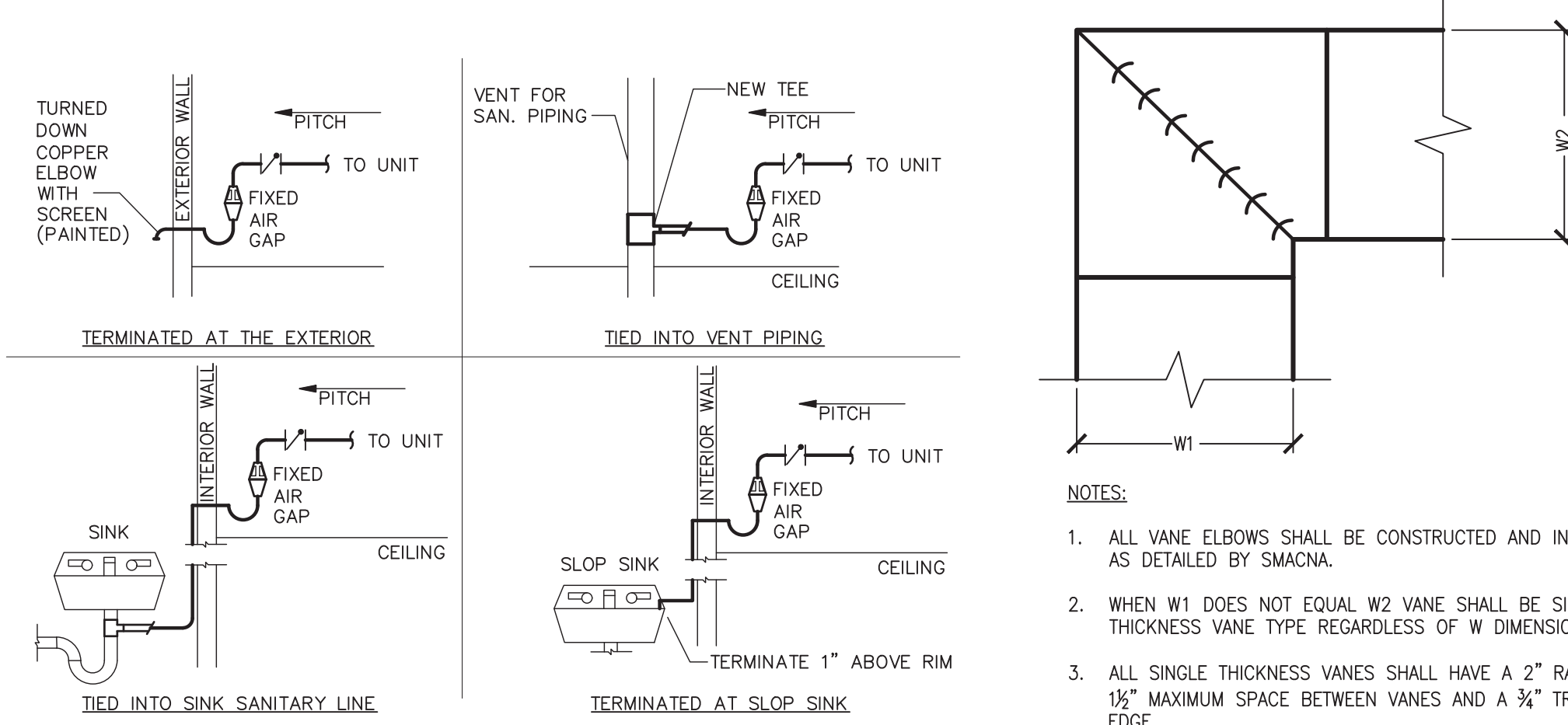


1 PIPE SUPPORT DETAIL
SCALE: NONE



- NOTES:
1. ALL HARDWARE SHALL BE CORROSION RESISTANT AND HAVE FINISH TO MATCH ADJACENT SURFACE WHERE EXPOSED TO VIEW.
2. PROVIDE LOUVER NOTED ON ARCH DRAWINGS OR APPROVED EQUAL. MUST ALLOW PROPER OUTDOOR AIR AND RELIEF AIR FLOW.

2 LOUVER DETAIL
SCALE: NONE

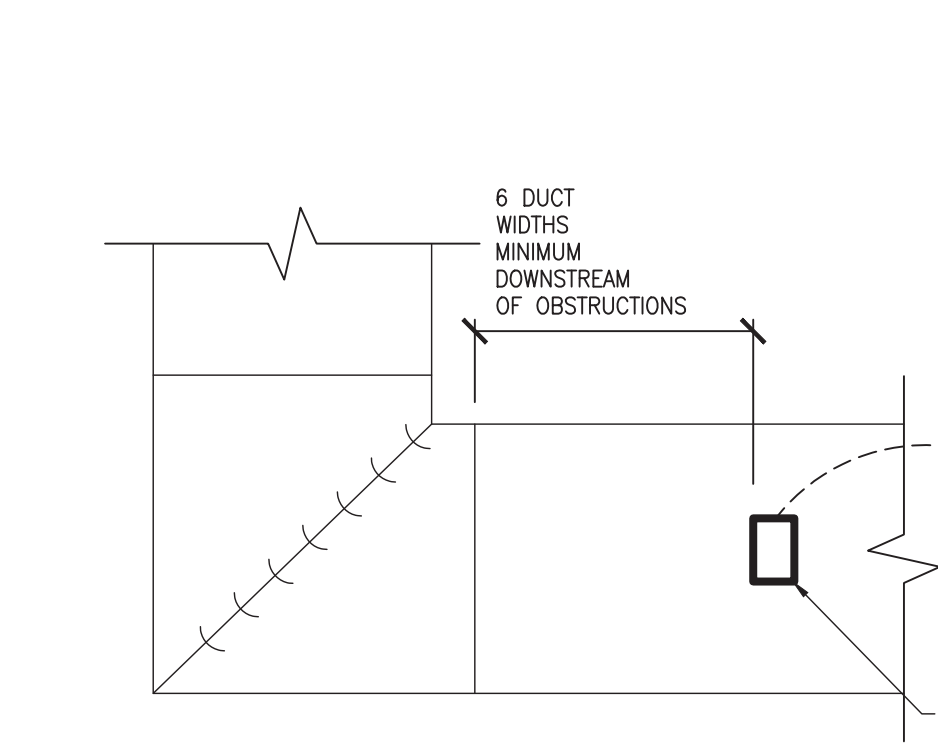


NOTE: RUN 3/4" CONDENSATE PIPING WITH TRAP AND VENT FROM ALL DX COILS TO LOCATION SPECIFIED. PROVIDE INSULATION AND SUPPORT

5 CONDENSATE LINE INSTALLATION
SCALE: NONE

COORDINATION NOTE:
1. COORDINATION- IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL AND MECHANICAL CONTRACTORS TO COORDINATE THEIR WORK. THE HVAC CONTRACTOR SHALL TAKE THE LEAD IN THE COORDINATION EFFORT AND PRODUCE THE COORDINATION DRAWINGS. COORDINATION DRAWINGS SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO STARTING ANY WORK. CEILING SPACE IS VERY LIMITED AND DUCTWORK/PIPING INSTALLATION AND LOCATION IS CRITICAL. THE PURPOSE OF THESE DRAWINGS IS TO COORDINATE THE LOCATIONS OF ALL PIPING, DUCTWORK, AND ASSOCIATED ELECTRICAL EQUIPMENT. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED AND LOCATED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC). MECHANICAL EQUIPMENT CANNOT INFILTRATE THE ELECTRICAL EQUIPMENT'S WORKING CLEARANCE AND WORKING SPACE, NOR CAN IT BE INSTALLED DIRECTLY ABOVE OR BELOW TO THE STRUCTURE, AS IDENTIFIED WITHIN THE NEC ARTICLE 110 "REQUIREMENTS FOR ELECTRICAL INSTALLATION". THIS COORDINATION IS REQUIRED FOR ALL PHASES OF THIS PROJECT. FAILURE TO FOLLOW THIS PROCEDURE DOES NOT RELIEVE THE CONTRACTOR FROM THE DUTIES AND WILL NOT CONSTITUTE A REASON FOR A CHANGE ORDER.

3 DUCTWORK SQUARE VANE ELBOWS DETAIL
SCALE: NONE



- NOTES:
1. DETECTORS SHALL BE FURNISHED/WIRED BY ELECTRICAL CONTRACTOR AND INSTALLED BY HVAC CONTRACTOR.

4 DUCTWORK SMOKE DETECTOR INSTALLATION
SCALE: NONE

INSULATION SCHEDULE

TYPE	EQUIPMENT OR SYSTEM SERVED	INSULATION CLASS (a)			JACKETING CLASS (b)			THICKNESS (IN)					
								NOMINAL PIPE SIZE (IN)					DUCTWORK (c)
		INTERIOR CONCEALED	INTERIOR EXPOSED	EXTERIOR	INTERIOR GENERAL	EQUIPMENT ROOMS	EXTERIOR	<1"	1"-<1 1/2"	1 1/2"- <4"	4 "- <8"	≥8" & UP	
A	RS, RL	FE	FE	FE	0	0	4	0.5	1.5	1.5	1.5	1.5	
B	DOW, COOLING COIL CONDENSATE	FE	--	--	0	--	--	0.5	0.5	1.0	1.0	1.0	
C	HWS, HWR	FG	--	--	1	--	--	1.5	1.5	2	2	2	
D	DUCTWORK	FG (d)	--	--	2	--	--	--	--	--	--	--	1.5(g)
E	BOILER BREECHING	--	CS	--	--	--	3	--	--	--	--	--	2 (i)
(a) FG -- FIBROUS GLASS FE -- FLEXIBLE ELASTOMERIC UR -- URETHANE CS -- CALCIUM SILICATE FR -- FIRE RATED		(b) 0 -- NONE 1 -- ALL SERVICE 2 -- ALUMINUM FOIL 3 -- CANVAS 4 -- POLYVINYL CHLORIDE 5 -- STAINLESS STEEL 6 -- ALUMINUM 7 -- EPDM		(c) SUPPLY AIR OUTSIDE AIR MIXED AIR RETURN AIR (d) BLANKET (e) RIGID BOARD		(f) EXCEPT SUPPLY AIR WITHIN CONDITIONED SPACE (g) INSULATE EXHAUST AIR 15'-0" FROM EXTERIOR PENETRATION (i) TWO LAYERS, 3 IN TOTAL							

ALL INSULATION TO COMPLY WITH 2015 NYS ENERGY CONSERVATION CONSTRUCTION CODE

RETURN GRILLE, SUPPLY DIFFUSER, AND WALL CAP SCHEDULE

QTY	MARK	SERVICE	MODEL	SIZE	MATERIAL	MANUFACTURER FINISH	NOTES
	RG-1	RETURN	TITUS 300 RL	24"x24"	STEEL	WHITE	1,2,3,5,7
	RG-2	RETURN	TITUS 350 RL	10"x6"	STEEL	WHITE	3,4,5,8
	RG-3	RETURN	TITUS 350 RL	12"x8"	STEEL	WHITE	3,4,5,8
	SD-1	SUPPLY	TITUS TMS	24"x24"	STEEL	WHITE	1,2,3,5,7
	SD-2	SUPPLY	TITUS 300 RL	10"x6"	STEEL	WHITE	3,4,5,8
	SD-3	SUPPLY	TITUS 300 RL	12"x8"	STEEL	WHITE	3,4,5,8
	SD-4	SUPPLY	TITUS TDC	8"x8"	STEEL	WHITE	3,4,5,8
	WC-1	OUTSIDE AIR INTAKE	BROAN 610FA	10" ROUND	ALUMINUM	NATURAL	3,4,5,6
NOTE 1: PROVIDE APPROPRIATE SIZED NECK TO CONNECT TO NEW DUCT. SEAL AND MAKE CONNECTIONS AIR TIGHT. NOTE 2: PROVIDE GRILLE OR DIFFUSER TO FIT IN A FULL SPACE IN DROP CEILING GRID. NOTE 3: PROVIDE DAMPERS AS NECESSARY TO AID IN AIR BALANCING. NOTE 4: CONNECT TO NEW DUCT THROUGH WALL. SEAL DUCT CONNECTIONS AND MAKE AIR TIGHT. SEAL AREA AROUND EXTERIOR WALL PENETRATIONS TO MAKE FLUSH AND WEATHERTIGHT. NOTE 5: PROVIDE MODEL INDICATED OR APPROVED EQUAL. SUBMIT PROPOSED MODELS TO ENGINEER FOR APPROVAL. NOTE 6: CONNECT TO 10" ROUND DUCT. MUST INCLUDE MESH SCREEN. NOTE 7: LAY IN T-BAR GRID TYPE. FRAME TO REST ON GRID. NOTE 8: TYPE TO SCREW INTO EXPOSED DUCT OR DUCT FLANGE AT WALL PENETRATIONS.							

UNIT VENTILATOR SCHEDULE

QTY	MARK	SERVICE	MODEL	NOMINAL AIR FLOW (CFM)	COOLING (BTU)	HEATING (BTU)	SUPPLY/RETURN/ OUTSIDE AIR CONFIGURATION	FILTERS	POWER (HP)	VOLTS/HERTZ/PHASE	NOTES
1	UV-1	MUSIC ROOM (COOLING)	MAGIC AIRE UHF3	1000	28650		BOTTOM/BOTTOM/REAR	MERV-8	1/3	208/60/1	1,2,3,4,5
1	UV-2	BAND ROOM (HEATING & COOLING)	MODINE CMP60	1800	57000	54000	TOP/FRONT/REAR	MERV-13	3/4	208/60/3	3,6
NOTE 1: SECURELY HANG FROM STRUCTURE USING STEEL THREADED RODS AND FRAMING. MUST INSTALL UNIT TO ALLOW FOR MAINTENANCE CLEARANCES AND FILTER CHANGES. NOTE 2: INSTALL UNIT FLUSH WITH BOTTOM OF DROP CEILING NOTE 3: PROVIDE DAMPERS AS NECESSARY TO AID IN AIR BALANCING. NOTE 4: MERV-13 FILTER(S) MAY BE USED AT THE OWNER'S DISCRETION, NO OFFICIAL TEST DATA IS AVAILABLE TO ASSURE PERFORMANCE ON THIS UNIT. NOTE 5: PROVIDE CONDENSATE DRAIN PUMP AND SECONDARY DRAIN PAN. PROVIDE INSULATED 3/4" POLY CONDENSATE LINE TO RUN ABOVE DROP CEILING. PITCH LINE AND DISCHARGE TO A NEARBY VENT LINE IN ROOM 106. NOTE 6: PROVIDE MERV-13 FILTER, ECONOMIZER W/OA DAMPER, DUCT SHROUD, AND "STUDY PACKAGE" CASE--INSULATION OPTIONS.											

AIR HANDLING UNIT SCHEDULE

QTY	MARK	SERVICE	MODEL	NOMINAL CAPACITY	TYPE	VOLTS/HERTZ/PHASE/HP	FILTERS	ASSOCIATED EQUIPMENT	NOTES
1	AHU-1	CAFETERIA (HEATING)	MAGIC AIRE HCA20	2000 CFM	HOT WATER	208V/60/1/1.0	MERV-13		1,2
1	AHU-2	CAFETERIA (HEATING)	MAGIC AIRE HCA20	2000 CFM	HOT WATER	208V/60/1/1.0	MERV-13		1,2
1	AHU-3 (ALT HVAC-2)	NURSE'S OFFICE (COOLING)	AAON H3-ARB	800 CFM	DX COIL	208V/60/1/1.0	MERV-13	CONDENSER ACCU-1	1,2,3,5
1	AHU-4 (ALT HVAC-1)	MAIN OFFICE (COOLING)	AAON H3-ARB	800 CFM	DX COIL	208V/60/1/1.0	MERV-13	CONDENSER ACCU-2	1,2,3,4
NOTE 1: SECURELY HANG FROM STRUCTURE USING STEEL THREADED RODS AND FRAMING. MUST INSTALL UNIT TO ALLOW FOR MAINTENANCE CLEARANCES AND FILTER CHANGES. NOTE 2: PROVIDE RETURN AIR DUCT SMOKE DETECTOR AND TIE INTO UNIT POWER FEED AND AIR INTAKE DAMPERS. NOTE 3: PROVIDE CONDENSATE DRAIN PAN AND SECONDARY DRAIN PAN. PROVIDE CONDENSATE DRAIN PUMP AND HARDWARE TO THE UNIT. NOTE 4: PROVIDE INSULATED 3/4" POLY CONDENSATE LINE TO RUN ABOVE DROP CEILING. PITCH LINE AND DISCHARGE INTO SLOP SINK IN ROOM 106. ALLOW FOR 1 INCH AIR GAP. NOTE 5: PROVIDE INSULATED 3/4" POLY CONDENSATE LINE TO RUN ABOVE DROP CEILING. PITCH LINE AND TIE INTO SANITARY OR VENT PIPING FOR SINK IN NURSE'S BATHROOM 112A.									

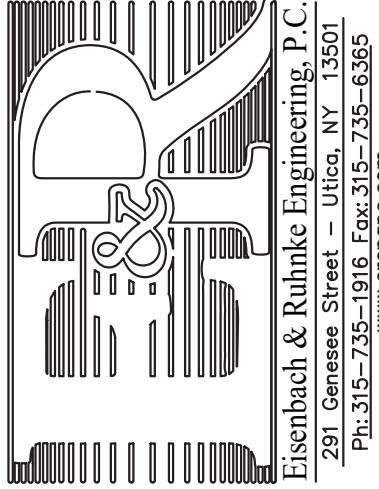
CONDENSER SCHEDULE

QTY	MARK	SERVICE	MODEL	NOMINAL CAPACITY	REFRIGERANT	VOLTS/HERTZ/PHASE	NOTES
1	ACCU-1 (ALT HVAC-2)	NURSE'S OFFICE AHU-3	AAON CB-B-024	24000 BTU (2 TON)	R410A	208/60/1	1,2,3,4,5
1	ACCU-2 (ALT HVAC-1)	MAIN OFFICE AHU-4	AAON CB-B-024	24000 BTU (2 TON)	R410A	208/60/1	1,2,3,4,5
1	ACCU-3	MUSIC ROOM UV-1	AAON CB-B-036	36000 BTU (3 TON)	R410A	208/60/1	2,3,4,5
NOTE 1: GC SHALL PROVIDE PLANTINGS OR FENCING AROUND UNIT. COORDINATE WITH DISTRICT. NOTE 2: OBSERVE REQUIRED AND RECOMMENDED CLEARANCES FOR UNIT DURING PLACEMENT. NOTE 3: PROVIDE WEATHERPROOF PAD FOR UNIT. NOTE 4: PROVIDE REFRIGERANT SUCTION AND REFRIGERANT LIQUID LINES. PROVIDE INSULATION FOR THESE LINES. NOTE 5: INSTALL AND CHARGE UNIT ACCORDING TO MANUFACTURER RECOMMENDATIONS.							

DUCT HEATER SCHEDULE

QTY	MARK	SERVICE	MODEL	KW	DUCT SIZE (IN)	CALCULATED OA REQUIREMENT (CFM)	VOLTS/HERTZ/PHASE	NOTES
1	DH-1	MUSIC ROOM UV-1	RENEW AIRE EK	4	16x8	293	208/60/3	1
1	DH-2 (ALT HVAC-1)	MAIN OFFICE AHU-4	RENEW AIRE EK	4	12x6	192	208/60/3	1
1	DH-3 (ALT HVAC-2)	NURSE'S OFFICE AHU-3	RENEW AIRE EK	4	12x6	151	208/60/3	1
NOTE 1: INSTALL UNIT ACCORDING TO MANUFACTURER RECOMMENDATIONS.								

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S.E.D. CONTROL NUMBER:
MAIN BUILDING
48-04-01-04-0-001-023
HIGH SCHOOL ANNEX
48-04-01-04-0-016-007

PROJECT TITLE
HALDANE ELEMENTARY SCHOOL DISTRICT
MECHANICAL UPGRADE AND RELATED WORK
PACKAGE NO. 2
15 CHAMBERLAIN DR. COLD SPRING, NY 10516
DRAWING TITLE
SCHEDULES AND DETAILS

DATE
09/13/2021
SHEET SIZE
30"x42"
SCALE
AS NOTED
DRAWN BY
F & D
DATE
BID
ISSUED TO
DRAWING NO.
M500
FILE NO.
19338.02