

ASHRAE 62-2001 COMPLIANCE			
ASHRAE APPLICATION TYPE	FOOD AND BEVERAGE SERVICE		
TOTAL OCCUPANCY	= 10 PERSONS		
OUTDOOR AIR RATE, R_p	= 20 CFM / PERSON		
OUTDOOR AIR REQUIRED	= 200 CFM		
OUTDOOR AIR SUPPLIED	= 300 CFM		

DOMESTIC WATER HEATER SCHEDULE (ELECTRIC)						
TAG	MAKE AND MODEL	CAPACITY [US GAL]	INLET / OUTLET	ELECTRICAL	WEIGHT [LBS]	
DWH-1	AO SMITH DSE-40-9	40	1 1/2" / 1 1/2"	208/160	9.0	475
NOTE: CONVERT NON-SIMULTANEOUS TO SIMULTANEOUS ELECTRIC COIL CONFIGURATION. BOTH HEATING ELEMENTS SHALL COME ON SIMULTANEOUSLY.						

GREASE INTERCEPTOR SIZING: GI-1						
Fixture	Dimensions [in]			Drain Rate [GPM]		
KS-1	18	x	18	x	14	14.7
	18	x	18	x	14	14.7
	TOTAL			29.5		
	GREASE INTERCEPTOR			ENDURA 3925A02LO		
	GREASE CAPACITY			50 LBS / 25 GPM		

GREASE INTERCEPTOR SIZING: GI-2						
Fixture	Dimensions [in]			Drain Rate [GPM]		
PS-1	26	x	24	x	14	28.4
	TOTAL			28.4		
	GREASE INTERCEPTOR			ENDURA 3925A02LO		
	GREASE CAPACITY			50 LBS / 25 GPM		

FAN COIL / HEAT PUMP SCHEDULE											
TAG	MAKE & MODEL	NOMINAL COIL SIZE	AIR		HEATING		COOLING		ELECTRICAL		WEIGHT [LBS]
			SUPPLY AIR [CFM]	E.S.P. [IN. WC]	RATED CAPACITY (MBH)	ELECTRIC HEAT (KW)	TOTAL COOLING (MBH)	SENSIBLE COOLING (MBH)	V/PH/HZ	MCA/MOP	
FC-1	DAIKIN FBQ24PBHU	2 TON	688	0.8	-	7.0	24.0	18.7	208/160	1.8 / 15	80
HP-1	DAIKIN RZQ24TAVJU	2 TON	-	0.5	27.0	-	24.0	18.7	208/160	16.5 / 25	172
CW ACCESSORIES											
4) INSULATED HOUSING											7) ACCESS DOOR
1) FILTERS											5) FLEXIBLE DUCT CONNECTIONS
2) EC MOTOR											6) ADJUSTABLE PULLEY
3) VIBRATION ISOLATORS											HEATER

KITCHEN EXHAUST HOOD										
Tag	Manufacturer	Type	Max Cook Temp	Exhaust CFM	Supply CFM	Length	Hood Construction	End to End Hood Config.	Rowhood Config.	
KEH-1	CAPTIVE AIRE	TYPE I	600°F	2406	200	8'-9"	430 SS WHERE EXPOSED	LEFT	ALONE	
KEH-2	CAPTIVE AIRE	TYPE I	600°F	2406	200	8'-9"	430 SS WHERE EXPOSED	RIGHT	ALONE	

KITCHEN EXHAUST FAN										
Tag	Manufacturer	Model	Exhaust CFM	ESP [W.C.]	Electrical			Weight [LBS]	Notes	
KEF-1	CAPTIVE AIRE	USBI24DD-RM	4812	2.0	208/3/60	5	15.8	748	ALL	

NOTES:

- 1. GREASE BOX
- 3. DISCHARGE EXTENSION
- 2. INLET SERVICE DUCT CONNECT
- 4. ROOF CURB RAIL

6. MOTORIZED BACKDRAFT DAMPER

7. LOW FIRE START

8. VFD IN VENTED WEATHER PROOF ENCLOSURE CW SEPARATE 120 V WIRING PACKAGE

MAKE-UP AIR UNIT

TAG	MAKE	MODEL	SERVICE	SUPPLY AIR		HEATING [MBH]			ELECTRICAL		WEIGHT [LBS]	
				CFM	E.S.P.	INPUT	OUTPUT	TEMP RISE	V/PH/HZ	HP		
MAU-1	CAPTIVE AIR	A2-D 250-20D	KEH-1, KEH-2	4,661	0.5	276,549	254,425	55°F	208/3/60	5	15	685

NOTES:

- 1. REVERSE INTERLOCK WITH KEF-1

- 2. BACK INLET / FRONT DISHARGE / LEFT HAND ACCESS

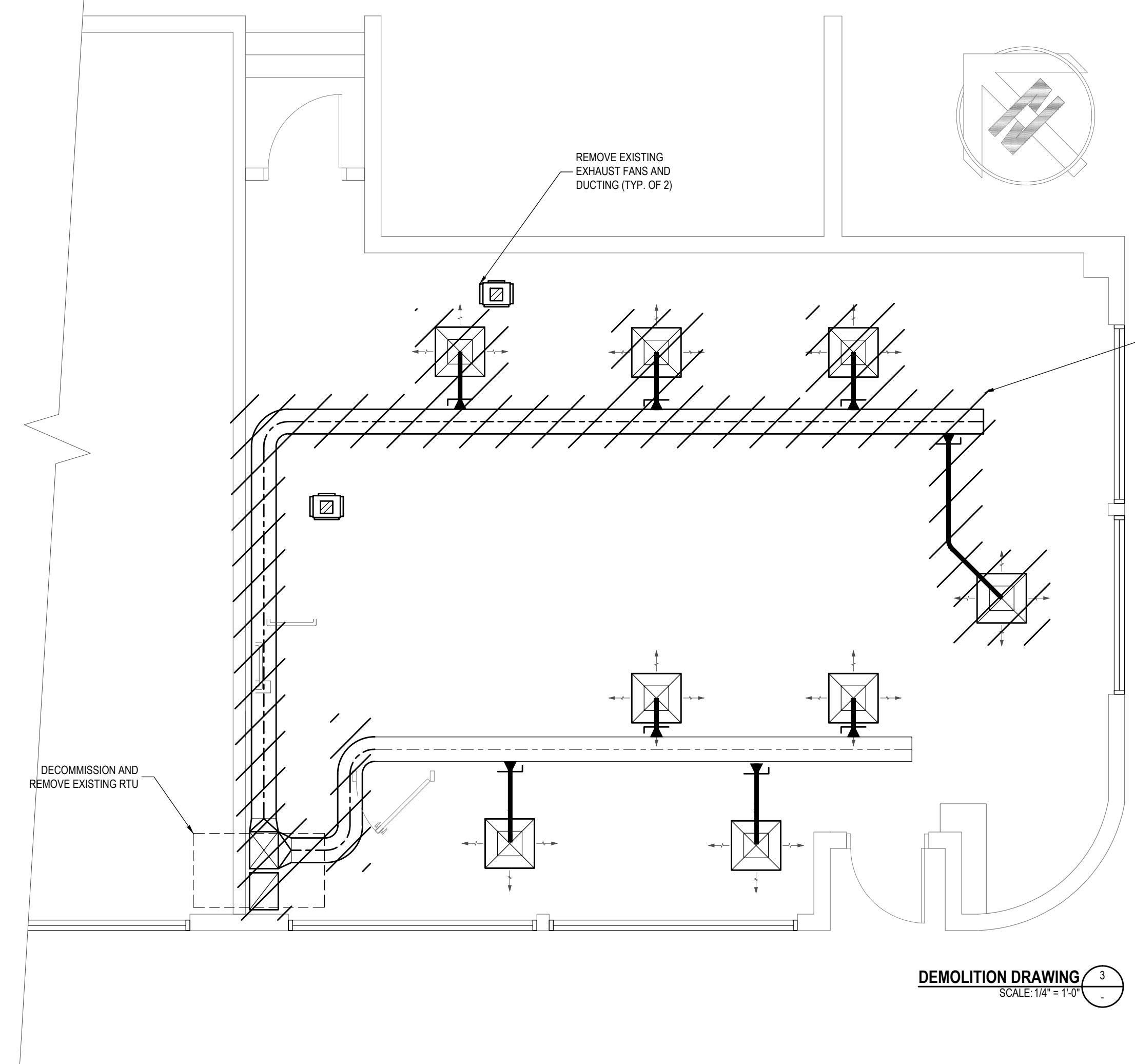
- 3. PROVIDE ROOF CURB

- 4. INTAKE HOOD CW BIRDSCREEN

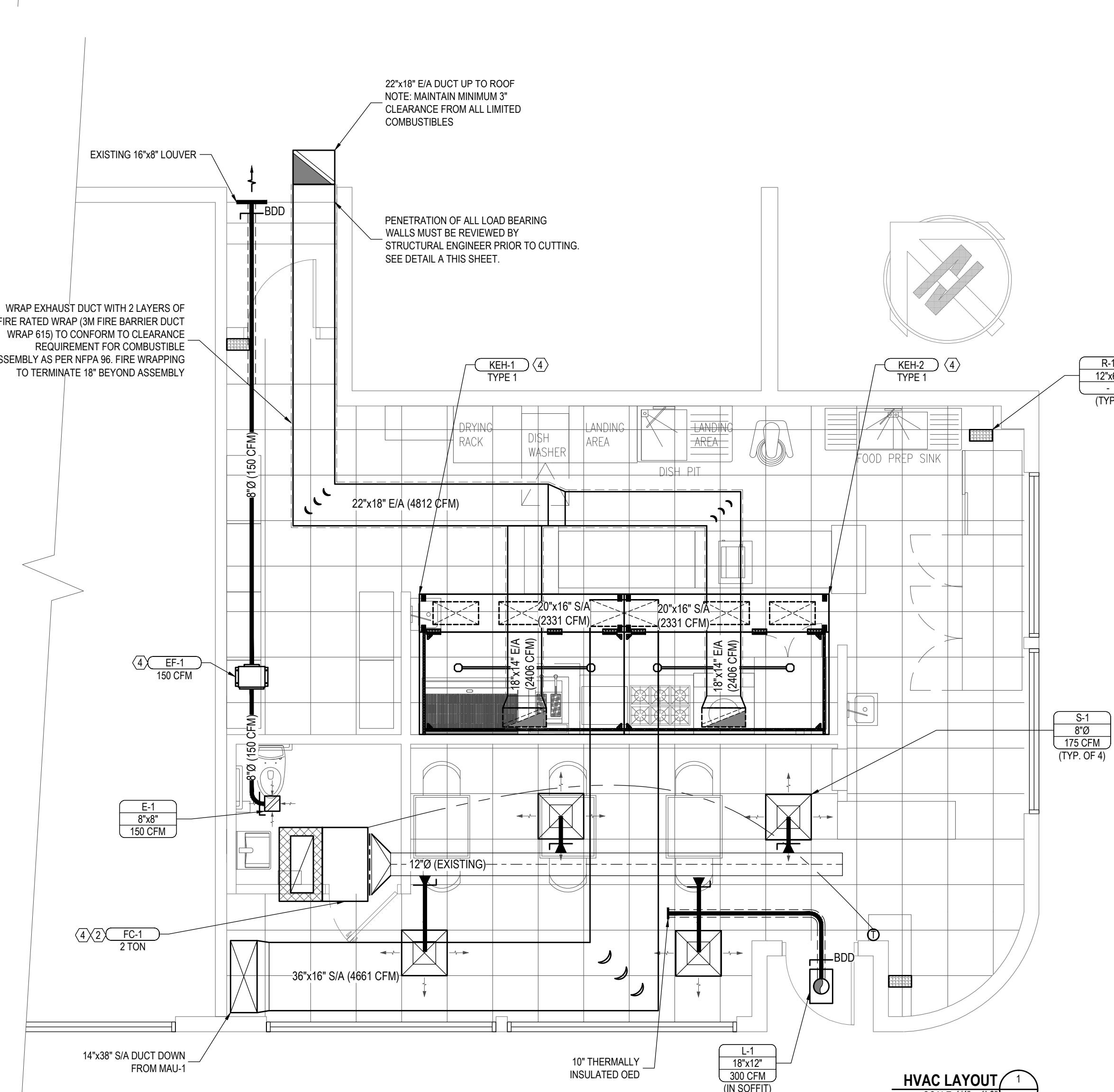
- 5. PROVE 2" MERV8 FILTERS.

FAN SCHEDULE

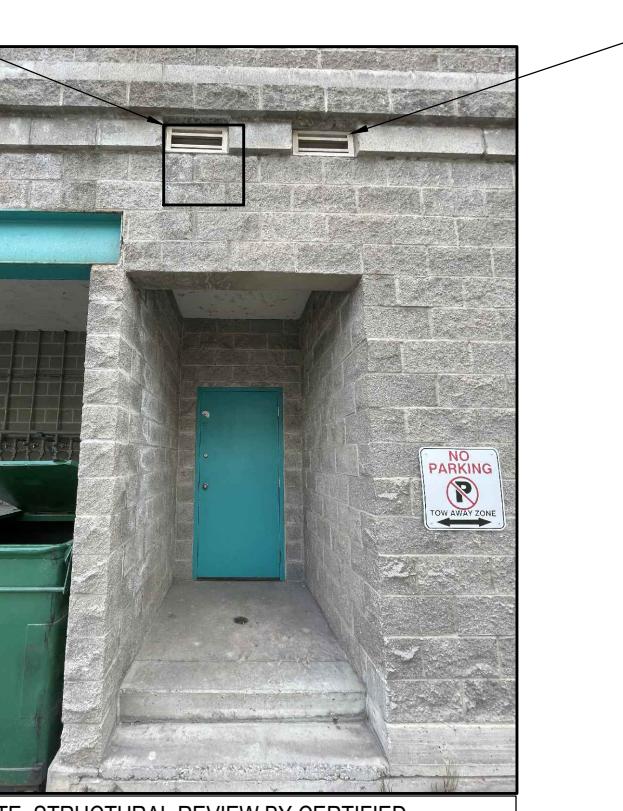
Tag	Make	Model	Location	CFM	E.S.O.	Weight [LBS]	Sones	Options	Control		Electrical		Remarks
									Control Type	Device	V/PH/HZ	Watts	
EF-1	GREENHECK	CSP-A390-VG	CEILING SPACE	150	0.25	24	0.7	BDD, BS	A	TC	208/1/60	25	ON TIMECLOCK TO RUN OPERATE DURING OCCUPIED HOURS
EP: EXPLOSION PROOF MOTOR	RC: ROOF CURB	VG: VARIGREEN MOTOR							CO	CARBON MONOXIDE	E	E	
FIL: FILTERS	IL: INTERLOCKED WITH	BS: BIRD SCREEN							ITL	INTERLOCKED	E		



DEMOLITION DRAWING 3
SCALE: 1/4" = 1'-0" -



HVAC LAYOUT
SCALE: 1/4" = 1'-0"



RE: STRUCTURAL REVIEW BY CERTIFIED
PROFESSIONAL REQUIRED BEFORE CUTTING OF
STRUCTURAL WALLS.

EXHAUST LOUVER LAYOUT  A
SCALE: NTS -

HVAC NOTES

GENERAL EQUIPMENT

1. MECHANICAL CONTRACTOR TO PROVIDE STRUCTURAL SEISMIC RESTRAINS FOR ALL MECHANICAL AND PLUMBING EQUIPMENT TO THE SATISFACTION OF THE SEISMIC ENGINEER. COORDINATE MOUNTING TO BUILDING STRUCTURE WITH THE BUILDING STRUCTURAL ENGINEER.
2. PROVIDE GAS LINE REDUCERS AS REQUIRED FOR FINAL CONNECTION TO EQUIPMENT.

ROOF EQUIPMENT

1. ALL EXHAUST AIR AND PLUMBING VENTS SHALL BE A MINIMUM OF 10'-0" (3.05M) FROM ALL ROOF OPENINGS AND/OR O/A INTAKES.
2. COORDINATE WITH GENERAL CONTRACTOR'S ROOFING CONTRACTOR TO PROVIDE 1" (25mm) THICK RIGID INSULATION TO ALL ROOF CURBS.
3. ROOF EQUIPMENT LAYOUT IS BASED ON SPECIFIED EQUIPMENT. WHERE ALTERNATE EQUIPMENT IS USED, ADHERE TO CLEARANCES REQUIRED BY MANUFACTURER AND ALL APPLICABLE CODES.
4. ROOF OPENINGS IN DECKING SHALL BE CUT TO THE SIZE OF THE ACTUAL DUCT DROP THROUGH ROOF (NOT THE SIZE OF THE ROOF CURB). AT THE START OF CONSTRUCTION, PROVIDE EXACT DIMENSIONS (BASED ON APPROVED SHOP DRAWINGS) OF REQUIRED ROOF OPENINGS TO GENERAL CONTRACTOR FOR PROPER COORDINATION, TYPICAL FOR ALL MECHANICAL EQUIPMENT ROOF OPENINGS.

INSULATION

1. DUCTWORK SHALL BE INSTALLED WITH 10' LONG OF THERMAL INSULATION FROM EXTERIOR WALLS / ROOF OPENINGS.
2. FIRST 10' OF SUPPLY AND RETURN AIR DUCTWORK SHALL BE LINED ON ALL SURFACES WITH ACOUSTIC INSULATION.

DUCTWORK, GRILLES, & DIFFUSERS

1. ALL GOOSENECKS ON ROOF AND LOUVERS ON EXTERNAL WALLS SHALL BE C/W INSECT SCREENS.
2. PROVIDE BALANCING DAMPERS FOR ALL DIFFUSERS & GRILLES FOR BALANCING, UNLESS OTHERWISE SPECIFIED.
3. WHEN USING FLEX DUCT, DUCT SIZE SHALL BE INCREASED BY ONE SIZE LIMITED TO A MAX LENGTH OF 5 FEET.
4. SUPPLY AIR DIFFUSERS IN OPEN AREAS TO BE INSTALLED AT PARTITION WALL HEIGHT.
5. IF RE-USING EXISTING COMPONENTS, GENERAL CONDITION AND NECK SIZE OF DIFFUSERS MUST BE CONFIRMED.
6. FIRE-STOPPING SHALL COMPLY WITH CAN4-S115-M STANDARD.

THERMOSTATS

1. MOUNT ALL THERMOSTATS AT 5'-0" A.F.F UNLESS NOTED OTHERWISE.
2. COORDINATE LOCATION OF THERMOSTATS WITH TENANT / OWNER BEFORE BEGINNING THE WORK. THERMOSTATS SHALL NOT BE INSTALLED BEHIND PERMANENT FIXTURES / MILLWORK. MAKE ALLOWANCES FOR RELOCATING THERMOSTATS AS REQUESTED BY OWNER OR OWNER'S REPRESENTATIVE.
3. PROVIDE INSULATED BACKING FOR ALL THERMOSTATS MOUNTED ON EXTERIOR WALLS OR COLD SURFACES (IF ANY).

KEY NOTES - HVAC

- ① MOUNT ALL ROOF CURBS AS PER MANUFACTURER'S SPECIFICATIONS.
- ② CONDENSATE DRAIN C/W TRAP AS PER MANUFACTURER'S REQUIREMENTS.
- ③ GAS PRESSURE REGULATOR C/W GAS COCK ABOVE ROOF. EXTEND ALL GAS PRESSURE REGULATOR VENTS TO A MINIMUM OF 10'-0" (3.05m) FROM ALL ROOF OPENINGS / OA INTAKES WHERE REQUIRED BY GAS AUTHORITY. MAKE FINAL CONNECTION TO UNIT.
- ④ PROVIDE SEISMIC RESTRAINTS TO THE SATISFACTION OF THE SEISMIC ENGINEER ON ALL MECHANICAL EQUIPMENT.
- ⑤ MAINTAIN CLEARANCES AS PER MANUFACTURER'S INSTALLATION MANUAL.

DIFFUSERS AND GRILLES SCHEDULE				
TAG	DESCRIPTION	MODEL	SIZE	AIRFLOW
S-1	SQUARE PLAQUE DIFFUSER	EH PRICE 24 x 24 / SPD / B12	8"	150 - 300 CFM
			10"	301 - 400 CFM
			12"	400 - 500 CFM
R-1	RETURN AIR GRILLE (NON DUCTED)	EH PRICE 80 / TB / A / B12 (EGGCRATE)	6" x 6"	UP TO 150 CFM
			12" x 6"	151 - 350 CFM
			12" x 12"	351 - 650 CFM
			24" x 12"	651 - 1,200 CFM
			24" x 24"	1,201-2,500 CFM
			48" x 20"	2,501-4,000 CFM
E-1	EXHAUST AIR GRILLE (DUCTED)	EH PRICE 530 / F / L / A / B12	6" x 6"	UP TO 100 CFM
			8" x 8"	101 - 200 CFM
			12" x 12"	201 - 375 CFM
			14" x 14"	375 - 575 CFM
DG-1	DOOR GRILL	EH PRICE STG1 SERIES	1" DOOR UNDERCUT	UPTO 150 CFM
			24" x 20"	151 - 300 CFM
			26" x 24"	301- 400 CFM
			USE TRANSFER AIR DUCT	401 AND ABOVE
L-1	LOUVER	EH PRICE DE439 SERIES	12" X 12"	0 - 200 CFM
			18" X12"	201 - 400 CFM
			18" X 18"	401 - 600 CFM
			24" X 18"	601 - 800 CFM

NOTES:
1. NOISE CRITERIA WILL BE NC 20 OR BELOW.
2. FLEX DUCT SHALL BE ONE SIZE LARGER DIFFUSER NECK SIZE AND HAVE A MAXIMUM OF 5 FEET.

3	July 29 2021	RE-ISSUED FOR BUILDING PERMIT
2	June 23 2021	ISSUED FOR BUILDING PERMIT
1	June 21 2021	ISSUED FOR CLIENT REVIEW ONLY

NO.	DATE	DESCRIPTION
DESTROY ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE.		

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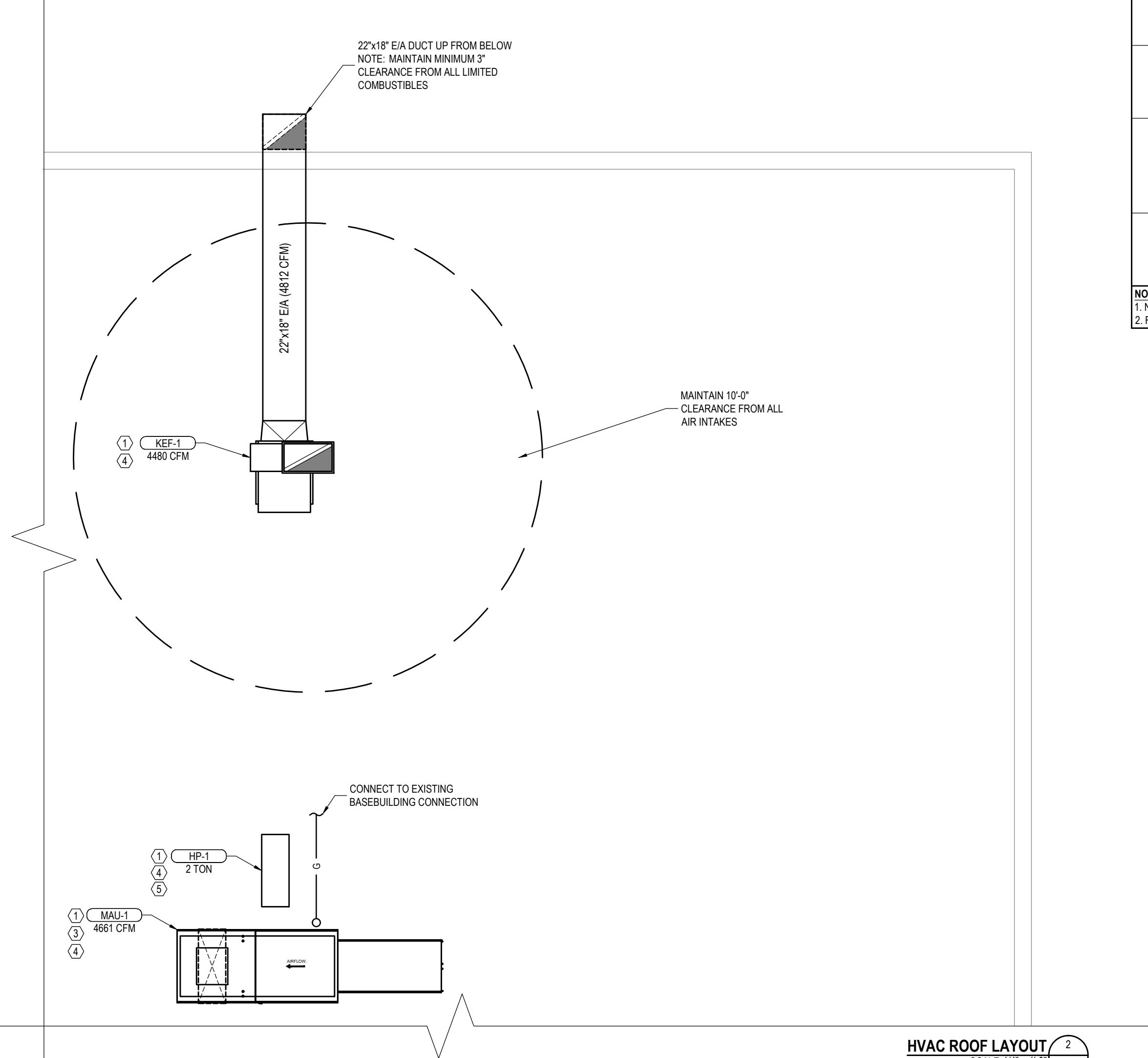
TITLE

HVAC LAYOUT

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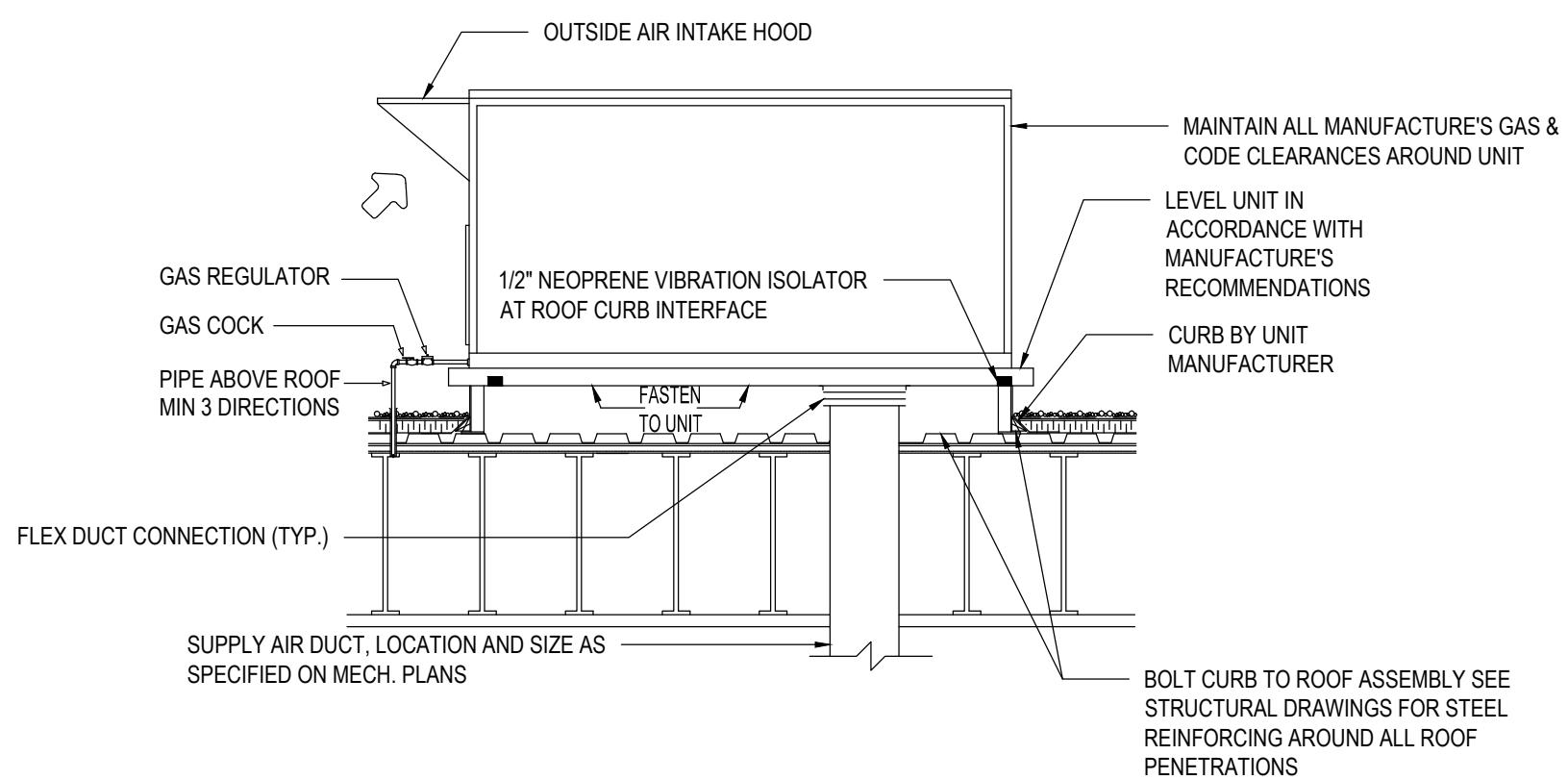
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HVAC ROOF LAYOUT

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

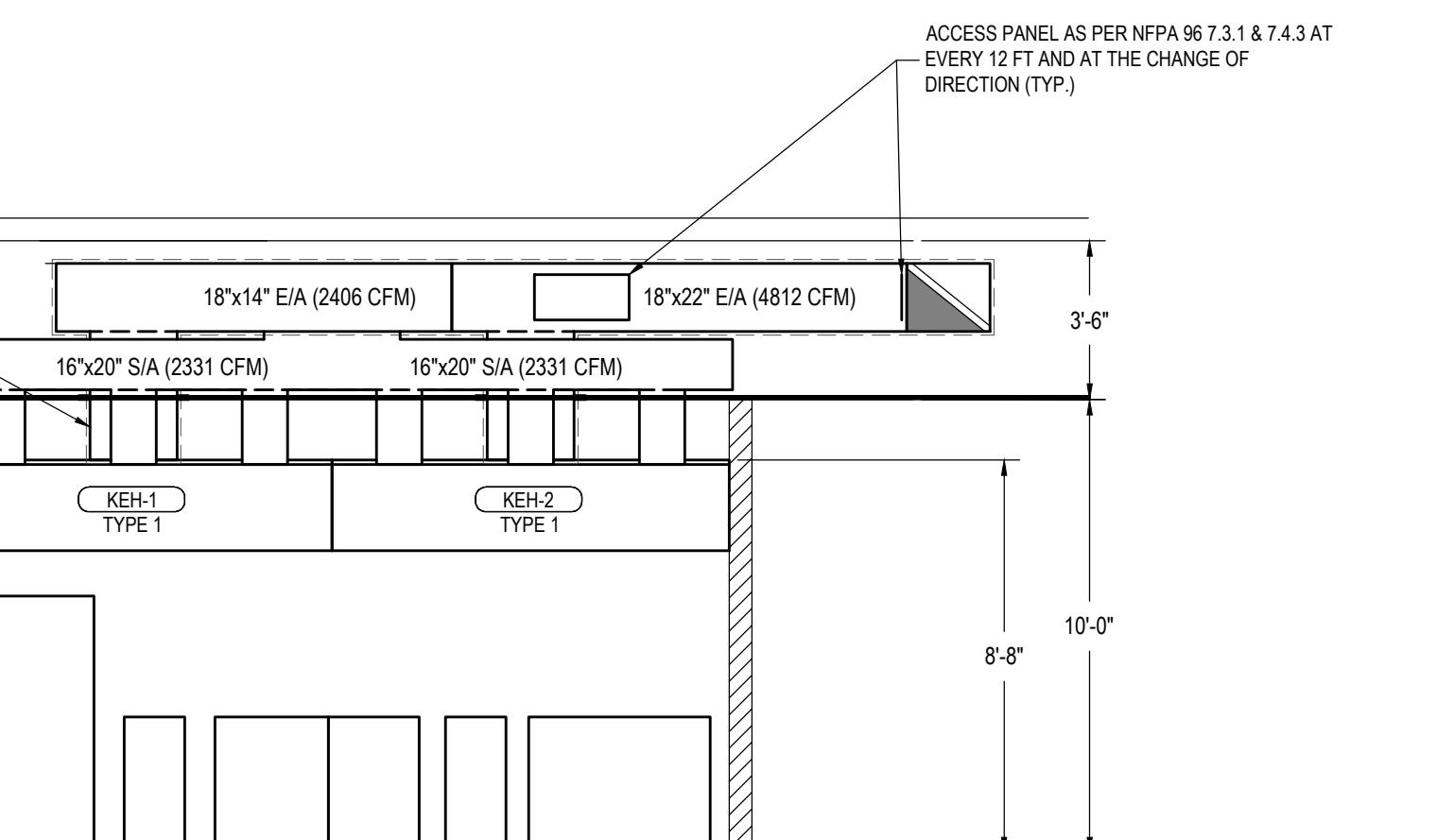


MAKE-UP AIR UNIT DETAIL A

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

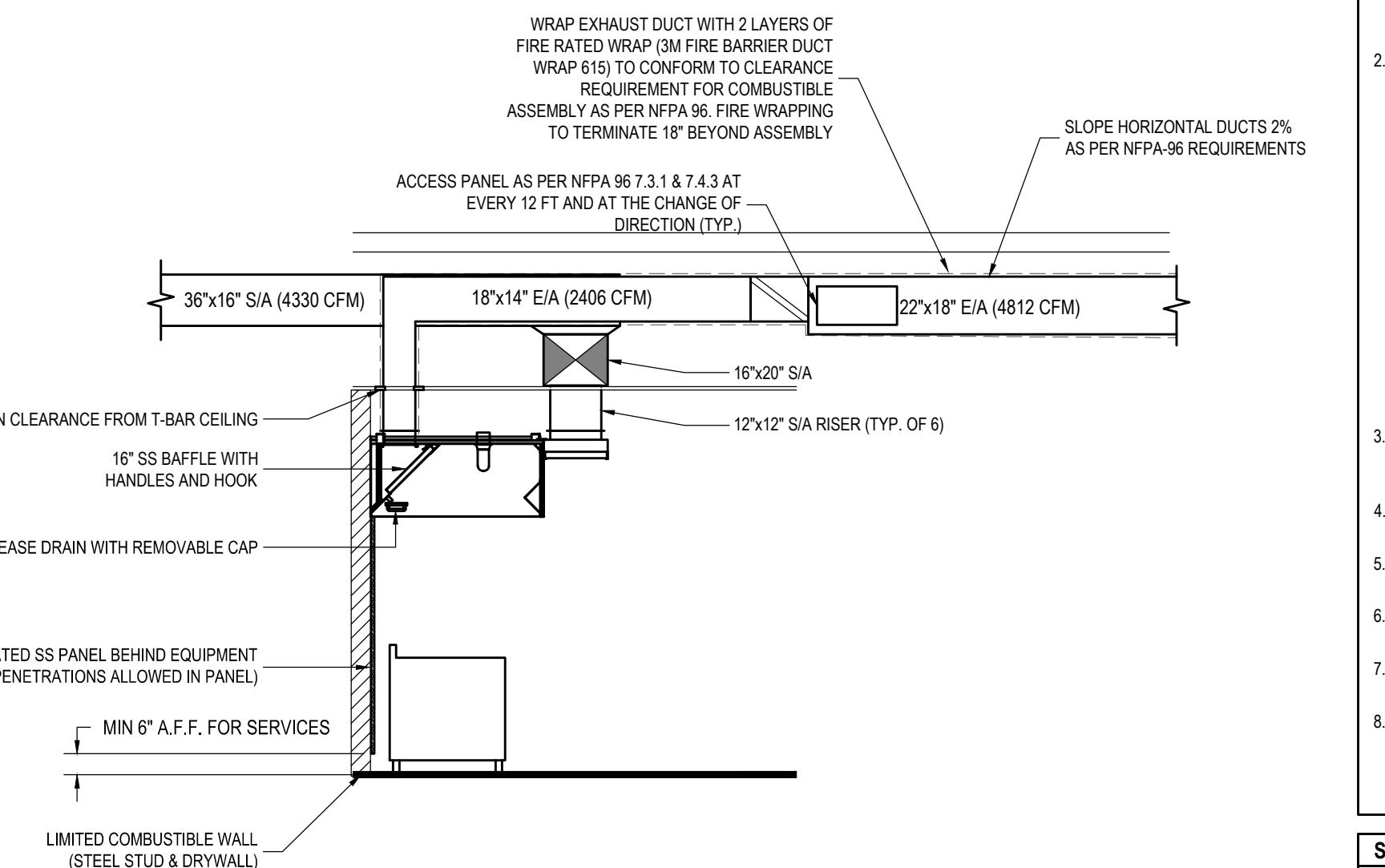
NOTE: BOLT CURB TO ROOF ASSEMBLY SEE STRUCTURAL DRAWINGS FOR STEEL REINFORCING AROUND ALL ROOF PENETRATIONS

INSTALLER MUST CONFIRM HOOD IS INSTALLED SUCH THAT THE SPECIFIED WALL ACTING AS AN END PANEL IS MATED TIGHT TO THE CORRECT END OF HOOD TO ACHIEVE A REDUCED MINIMUM EXHAUST CFM LISTING. NON-COMPLIANCE WILL NULLIFY THE STI LISTING, VOID THE MANUFACTURER'S WARRANTY, AND HOLD THE CONTRACTOR LIABLE FOR ANY AND ALL LOSSES, COSTS, AND EXPENSES RELATED TO THE NON-COMPLIANCE OF THE MANUFACTURER'S SPECIFIED INSTRUCTION. THE WALL ACTING AS AN END PANEL MUST EXTEND NO LESS THAN 20" FROM THE INTERSECTING WALL ON WHICH HOOD IS MOUNTED AND MUST EXTEND NO LESS THAN 20" UNDER BOTTOM OF HOOD TO BE ELIGIBLE FOR REDUCED MINIMUM EXHAUST CFM LISTING. (TYP)



KEH - FRONT VIEW 2

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



KEH - SIDE VIEW 1

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

AIR FLOW SUMMARY			
EQUIPMENT TAG	SUPPLY AIR [CFM]	EXHAUST AIR [CFM]	OUTSIDE AIR [CFM]
RELIEF OED	300	-	300
MAU-1	4662	-	4662
EF-1	-	150	-
KEF-1	-	4812	-
TOTAL	4962	4962	4962

COMMERCIAL KITCHEN VENTILATION SYSTEM NOTES

HVAC NOTES

- DUCTWORK:
 - ALL COMMERCIAL KITCHEN DUCTWORK SHALL COMPLY WITH BCBC 2018 AND NFPA REQUIREMENTS (NFPA 96-2011).
 - TYPE I KITCHEN EXHAUST DUCTS TO BE 16 GA CARBON STEEL ALL WELDED LIQUID/AIR TIGHT.
 - THE PROTECTION AROUND GREASE DUCTS (OR CLEARANCE) SHALL CONTINUE UP THROUGH THE ROOF ASSEMBLY TO 450mm (18") ABOVE THE ROOF.
 - NO DAMPERS ARE TO BE INSTALLED IN THE EXHAUST SYSTEM.
 - MANTAIN MINIMUM CLEARANCES BETWEEN KITCHEN EXHAUST DUCT / HOOD WITH OTHER BUILDING COMPONENTS: 18" TO COMBUSTIBLE, 3" TO LIMITED COMBUSTIBLE, 0" TO NON-COMBUSTIBLE.
 - ALL NFPA 96 KITCHEN EXHAUST DUCTWORK ELBOWS TO BE FULL RADIUS CW ACCESS PANELS. GREASE DUCT SERVICE / INSPECTION OPENINGS SHALL BE REQUIRED WITHIN 18" (450mm) OF THE DAMPER IN THE EXHAUST COLLAR OF A GREASE HOOD.
 - PROVIDE 1/4" (6mm) SERVICE INSPECTION OPENINGS, UNLESS OTHERWISE NOTED, EVERY 12' (3.6m) OR CHANGE IN DIRECTION, OR AS INDICATED ON THE DRAWINGS.
 - THE EDGE OF ALL OPENINGS SHALL BE MINIMUM 1-1/2" (38mm) FROM ALL OUTSIDE EDGES OF THE DUCT OR WELDED SEAM.
 - SLOPE ALL KITCHEN EXHAUST DUCTWORK BACK TO HOODS MINIMUM 2% FOR HORIZONTAL DUCTS LESS THAN OR EQUAL TO 75 FT.
 - ALL DUCT WORK TO BE LEAK TESTED. ALL NFPA 96 EXHAUST DUCTS TO BE 100% WATER TIGHT. LEAK TESTED CW LEAK TEST REPORT, PROVIDE COMPLETED SUCCESSFUL TEST REPORT TO CONSULTANT PRIOR TO COMPLETION OF CEILINGS.
- ACCESS PANELS:
 - NFPA 96 2011 COMPLIANT
 - GREASE TIGHT
 - 40mm [1-1/2"] MINIMUM FROM BOTTOM OF DUCT.
 - IN DUCT SIDES - SAME GAUGE AS DUCT (MINIMUM) AT ALL DIRECTION / SIZE CHANGES
 - 6m (20 FT) MAXIMUM SPACED IN HORIZONTAL RUNS
 - HAVE A GASKET OR SEALANT RATED FOR 1500°F AND SHALL BE GREASE TIGHT.
 - FASTENERS MADE OF CARBON OR STAINLESS STEEL
 - A SIGN SHALL BE PLACED ON ALL CEILING ACCESS PANELS STATING: "ACCESS PANEL - DO NOT OBSTRUCT."
 - GREASE DUCT SERVICES / INSPECTION OPENINGS SHALL BE PROTECTED BY AN APPROVED ACCESS PANELS. OPENINGS SHALL NOT BE REQUIRED IN PORTIONS OF DUCT THAT ARE ACCESSIBLE FROM DUCT ENTRY OR DISCHARGE.
- SEPARATION DISTANCE: OUTDOOR INTAKE FOR MAKE-UP AIR UNIT AND ROOF TOP UNITS SHALL BE AT LEAST 3000mm (10 FT.) AWAY FROM ANY PLUMBING VENT, EXHAUST DISCHARGE, FLUE & ETC.
- KITCHEN EXHAUST FAN WIRING TO BE EXTERNAL (WIRING MUST NOT BE INSTALLED IN THE AIRSTREAM)
- INSTALLATION MUST INCLUDE MEANS FOR INSPECTING, CLEANING, AND SERVICING THE EXHAUST FAN.
- MAKE UP AIR UNIT TO HAVE AIR VOLUME OF MINIMUM 90% OF THE EXHAUST AIR VOLUME OF THE EXHAUST FAN.
- GREASE FILTERS SHALL BE UL LISTED. THE INSTALLATION SHALL BE TIGHT FITTING AND FIRMLY HELD IN PLACE WITH STAINLESS STEEL BRACKETS.
- FOR DIRECT GAS-FIRED MAKE-UP AIR UNITS ONLY AIR FLOW SWITCH SHALL BE INSTALLED AT WELDED BRACKET ON EXHAUST DUCT, SUCH THAT THE GAS BURNER OF MAKE-UP AIR UNIT WILL BE ABLE TO FIRE UP ONLY AFTER KITCHEN HOOD EXHAUST FAN HAS STARTED AND AIR FLOW IS CONFIRMED.

SEQUENCE OF OPERATION

THE HOOD CONTROL PANEL IS CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY GIVEN TIME:

AUTOMATIC: THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR. FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD, DEPENDING ON THE JOB CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC. THESE TERMS REFER TO WHETHER A VARIABLE MOTOR (SUCH AS ECM MOTORS OR VFD DRIVEN MOTORS) MODULATE WITH TEMPERATURE. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS "STATIC", THE FAN WILL MODULATE WITHIN A USER-DEFINED RANGE BASED ON THE DIFFERENTIAL. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS "STATIC", FANS WILL RUN AT A SET SPEED CALCULATED FOR THE DRIVE. DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN EEC 403.2.8.

MANUAL: THE SYSTEM OPERATES BASED ON HUMAN INPUT FROM AN HM.

SCHEDULE: A WEEKLY SCHEDULE CAN BE SET TO RUN FANS FOR A SPECIFIED PERIOD THROUGHOUT THE DAY. THERE ARE THREE OCCUPIED TIMES PER DAY TO ALLOW FOR THE USER TO SET UP A TIME THAT IS SUITABLE TO THEIR NEEDS. ANY TIME THAT IS WITHIN THE DEFINED OCCUPIED TIME, THE SYSTEM WILL RUN AT MODULATION MODE AND FOLLOW THE FAN PROCEDURE ALGORITHM BASED ON TEMPERATURE DURING THIS TIME. DURING UNOCCUPIED TIME, THE SYSTEM WILL HAVE AN EXTRA OFFSET TO PREVENT UNINTENDED ACTIVATION OF THE SYSTEM DURING A TIME WHERE THE SYSTEM IS NOT BEING OCCUPIED.

OTHER: THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (DDC, BMS OR HARD-WIRED INTERLOCK).

FIRE: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO TO RUN, THE HOOD MAKE-UP AIR WILL SHUTDOWN, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE SHUNT TRIP BREAKER PROVIDED BY THE ELECTRICAL. FUEL GAS WILL SHUT DOWN VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.

Demand Control Ventilation Hood Control Panel Specifications

CONTROLS SHALL BE LISTED BY ETL UL508A AND SHALL COMPLY WITH DEMAND VENTILATION SYSTEM TURNDOWN REQUIREMENTS OUTLINED IN EEC 403.2.8 (2015).

THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.

TEMPERATURE PROBE(S) LOCATED IN THE EXHAUST DUCT RISER(S) SHALL BE CONSTRUCTED OF STAINLESS STEEL.

A DIGITAL CONTROLLER SHALL BE PROVIDED TO ACTIVATE THE HOOD EXHAUST FANS DYNAMICALLY BASED ON A DIFFERENTIAL BETWEEN THE AMBIENT AND DUCT TEMPERATURE SENSORS. THIS FUNCTION SHALL MEET THE REQUIREMENTS OF IMC 507.1.

A DIGITAL CONTROLLER SHALL PROVIDE ADJUSTABLE HYSTERESIS SETTINGS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND/OR THE HEAT IN THE EXHAUST SYSTEM IS REDUCED.

A DIGITAL CONTROLLER SHALL PROVIDE AN ADJUSTABLE MINIMUM FAN RUN-TIME SETTING TO PREVENT FAN CYCLING.

VARIABLE FREQUENCY DRIVES (VFDs) SHALL BE PROVIDED FOR FANS AS REQUIRED. THE DIGITAL CONTROLLER SHALL MODULATE THE VFDs BETWEEN A MINIMUM SETPOINT AND A MAXIMUM SETPOINT ON DEMAND. THE DUCT TEMPERATURE SENSOR INPUT(S) TO THE DIGITAL CONTROLLER SHALL BE USED TO CALCULATE THE SPEED REFERENCE SIGNAL.

THE VFD SPEED RANGE OF OPERATION SHALL BE FROM 0% TO 100% FOR THE SYSTEM, WITH THE ACTUAL MINIMUM SPEED SET AS REQUIRED TO MEET MINIMUM VENTILATION REQUIREMENTS.

AN INTERNAL ALGORITHM TO THE DIGITAL CONTROLLER SHALL MODULATE SUPPLY FAN VFD SPEED PROPORTIONAL TO ALL EXHAUST FANS THAT ARE LOCATED IN THE SAME FAN GROUP AS THE SUPPLY FAN.

THE SYSTEM SHALL OPERATE IN PREP MODE DURING LIGHT COOKING LOAD OR COOL DOWN MODE WHEN SUFFICIENT HEAT REMAINS UNDERNEATH THE HOOD SYSTEM AFTER COOKING OPERATIONS HAVE COMPLETED. OPERATION DURING EITHER OF THESE PERIODS WILL DISABLE THE SUPPLY FANS AND PROVIDE AN EXHAUST FAN SPEED THAT IS EQUAL TO THE MINIMUM VENTILATION REQUIREMENT.

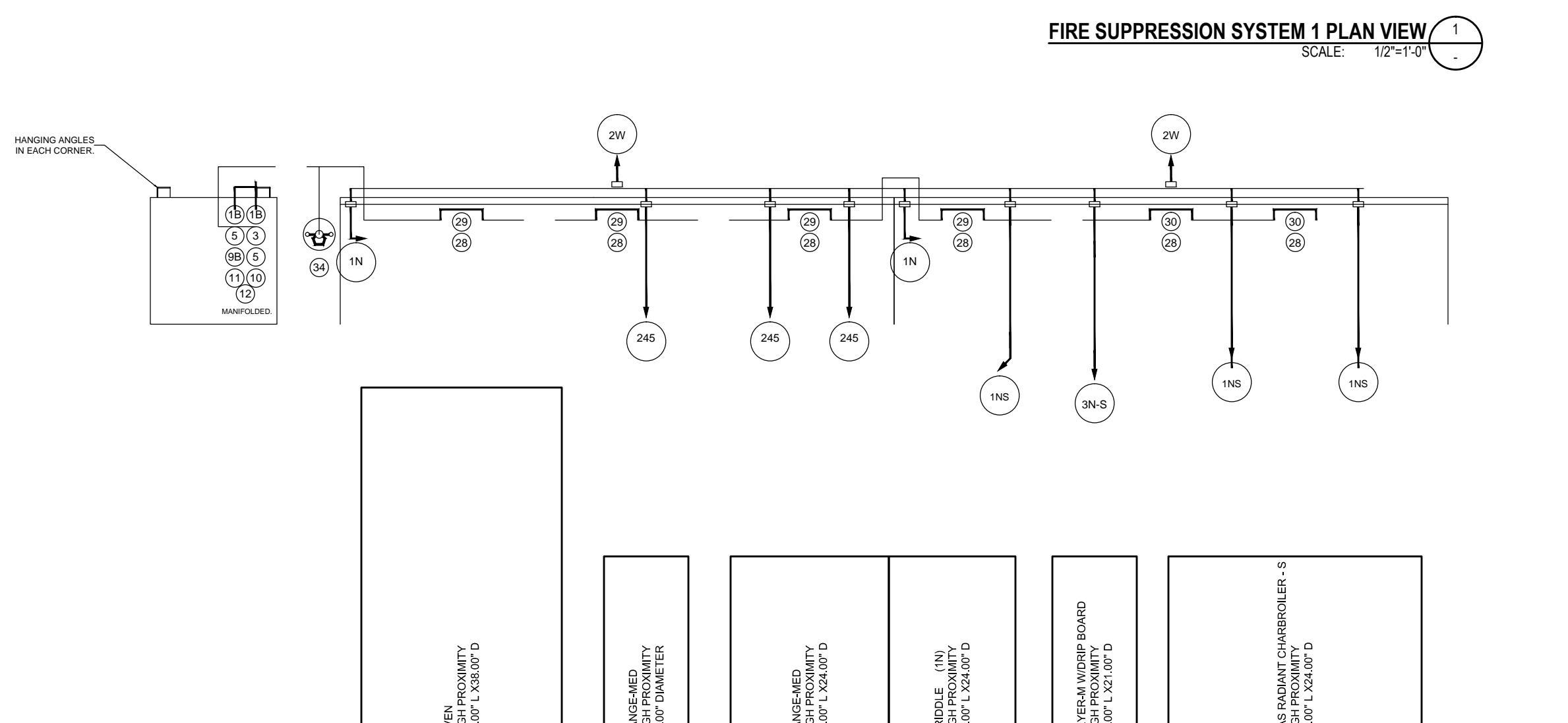
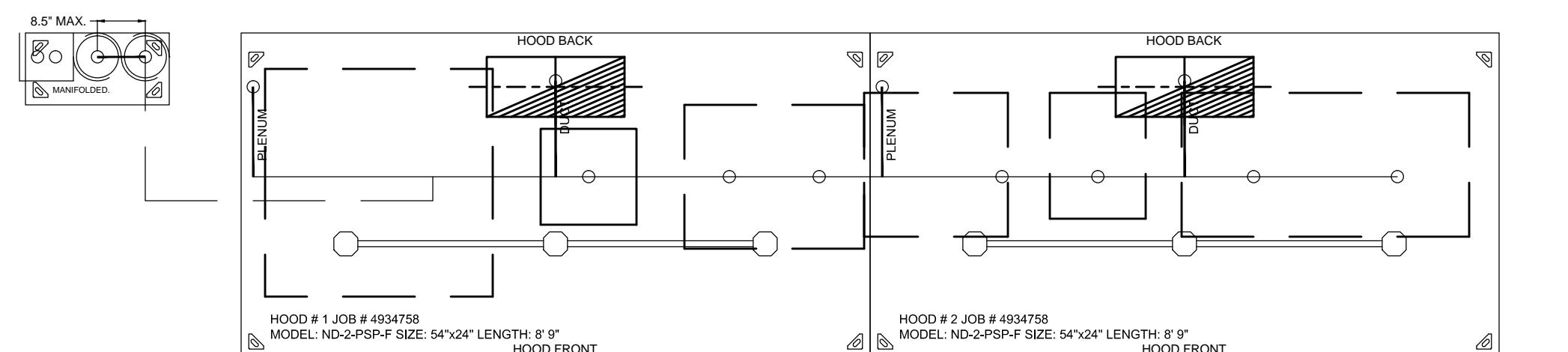
A DIGITAL CONTROLLER SHALL DISABLE THE SUPPLY FAN(S), ACTIVATE THE EXHAUST FAN(S), ACTIVATE THE APPLIANCE SHUNT TRIP, AND DISABLE AN ELECTRIC GAS VALVE AUTOMATICALLY WHEN FIRE CONDITION IS DETECTED ON A COVERED HOOD.

A DIGITAL CONTROLLER SHALL ALLOW FOR EXTERNAL BMS FAN CONTROL VIA RT CONTACT (EXTERNAL CONTROL SHALL NOT OVERRIDE FAN OPERATION LOGIC AS REQUIRED BY CODE).

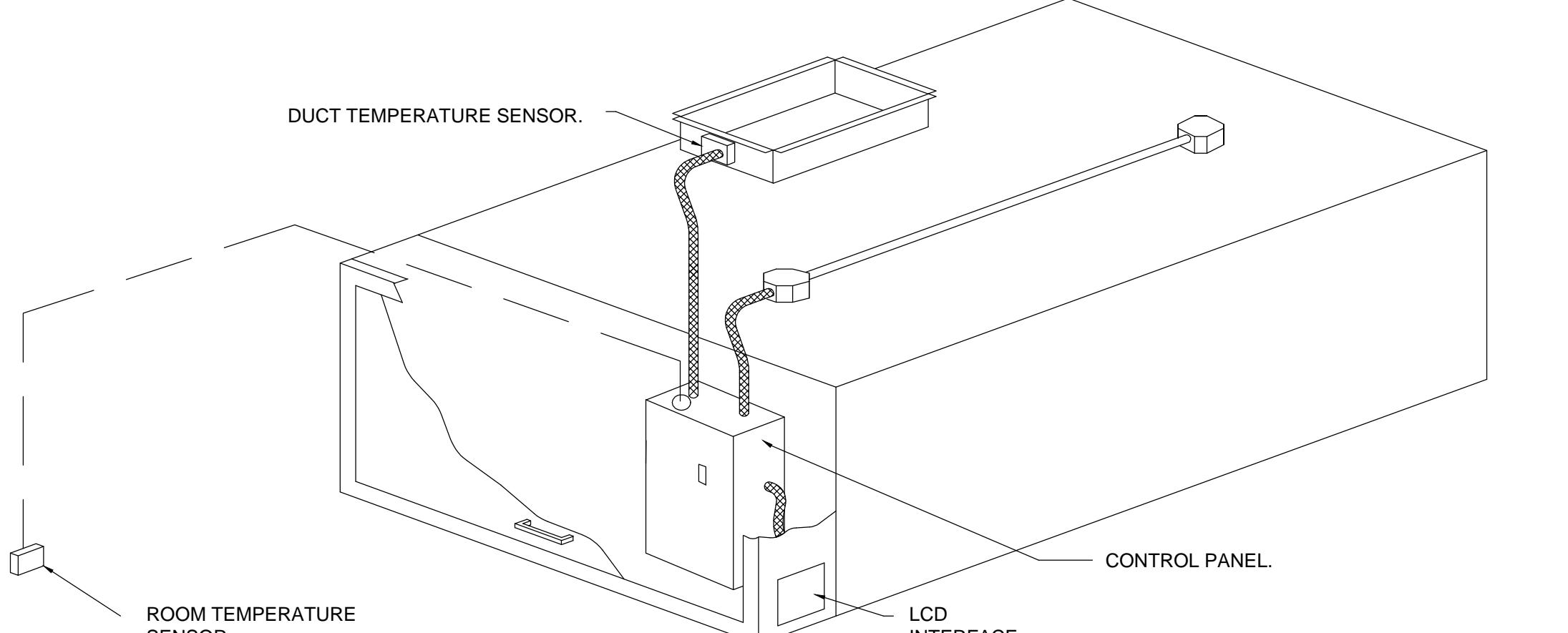
AN LCD INTERFACE SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

- ON/OFF PUSH BUTTON FAN & LIGHT SWITCH ACTIVATION.
- INTEGRATED GAS VALVE RESET FOR ELECTRONIC GAS VALVES (NO RESET RELAY REQUIRED).
- VFD FAULT DISPLAY WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
- DUCT TEMPERATURE SENSOR FAILURE DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
- MIS-WIRED DUCT TEMPERATURE SENSOR DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
- A SINGLE LOW VOLTAGE CAT 5 RJ45 WIRING CONNECTION.
- AN ENERGY SAVINGS INDICATOR THAT UTILIZES MEASURED KWH FROM THE VFDs.

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1	June 21 2021	ISSUED FOR CLIENT REVIEW ONLY
No.	DATE	DESCRIPTION
DESTROY ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE.		
REVISIONS		
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Tag <small>Engineering Inc.</small> <small>#401, 1460 64 Avenue</small> <small>Surrey, BC V3S 1X7</small> <small>PH: 604.790.0579</small> <small>www.tagengineering.ca</small>		
29 Jul, 2021		
PROJECT		
TRAIL RESTAURANT		
102-1100 BAY AVENUE TRAIL, BC		
TITLE		
COMMERCIAL KITCHEN VENTILATION		
DRAWN	---	CHECKED SS
SCALE	PROJECT No. 13506	
AS NOTED		DRAWING NO.
DATE 29 Jul, 2021		M2.2



FIRE SUPPRESSION SYSTEM 1 FRONT VIEW (2)
SCALE: 1/2=1'-0"



TYPICAL HOOD CONTROL PANEL INSTALLATION (A)
SCALE: N.T.S.

LEGEND - FIRE CABINET ANSUL SYSTEM	
1A	1.5 GALLON TANK
1B	3 GALLON TANK
2	OEM AUTOMAN RELEASE
3	OEM REGULATED RELEASE
4	OEM REGULATED ACTUATOR
5	ANSULEX LIQUID AGENT (3 GAL.)
6	ANSULEX LIQUID AGENT (1.5 GAL.)
7	CARTRIDGE (101-20)
8	CARTRIDGE (101-10)
9	CARTRIDGE (101-30)
9A	CARTRIDGE (LT-A-101-30)
9B	DOUBLE TANK CARTRIDGE
10	TEST LINK
11	DOUBLE MICROSWITCH
12	HOSE ASSEMBLY
110A	DUCT NOZZLE (430913)
2W	DUCT NOZZLE (419337)
1W	NOZZLE ASSEMBLY (419336)
1F	NOZZLE ASSEMBLY (419333)
1N	NOZZLE ASSEMBLY (419335)
1/2N	NOZZLE ASSEMBLY (41934)
3N	NOZZLE ASSEMBLY (419338)
245	NOZZLE ASSEMBLY (419340)
230	NOZZLE ASSEMBLY (419339)
2120	NOZZLE ASSEMBLY (419340)
290	NOZZLE ASSEMBLY (419342)
260	NOZZLE ASSEMBLY (419341)
28	DETECTOR BRACKET
29	LOW TEMP FUSIBLE LINK
30	HIGH TEMP FUSIBLE LINK
MGV	MECHANICAL GAS VALVE
EGV	ELECTRICAL GAS VALVE
34	REMOTE MANUAL PULL STATION
S	SWIVEL ADAPTOR

FIRE SUPPRESSION SYSTEM NOTES	
1.	THE INSTALLER OF THE FIRE SUPPRESSION SYSTEM SHALL CERTIFY TO THE CITY BUILDING INSPECTOR THAT THE INSTALLATION COMPLIES WITH:
1.1.	UL 300 STANDARDS.
1.2.	ULC/ORD-C1254.6-1995
1.3.	NFPA 17A, 2009 EDITION.
1.4.	NFPA 17A, 2009 EDITION.
1.5.	THE TERMS OF THE EQUIPMENT LISTINGS AND
1.6.	THE MANUFACTURER'S INSTRUCTIONS.
2.	WET CHEMICAL FIRE SUPPRESSION SYSTEM SHALL BE BY ANSUL AS NOTED IN THE SCHEDULE.
3.	THE RESTAURANT FIRE SUPPRESSION SYSTEM SHALL BE THE PRE-ENGINEERED TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION NETWORK. IT SHALL BE LISTED WITH UNDERWRITERS LABORATORIES CANADA, INC. (ULC)
4.	THE SYSTEM SHALL BE CAPABLE OF AUTOMATIC DETECTION AND ACTUATION WITH LOCAL OR REMOTE MANUAL ACTUATION. ACCESSORIES SHALL BE AVAILABLE FOR MECHANICAL OR ELECTRICAL GAS LINE SHUT-OFF APPLICATIONS.
5.	THE EXTINGUISHING AGENT SHALL BE A POTASSIUM CARBONATE, POTASSIUM ACETATE-BASED FORMULATION DESIGNED FOR FLAME KNOCKDOWN AND SECUREMENT OF GREASE RELATED FIRES. IT SHALL BE AVAILABLE IN PLASTIC CONTAINERS WITH INSTRUCTIONS FOR LIQUID AGENT HANDLING AND USAGE.
6.	THE REGULATED RELEASE MECHANISM SHALL BE COMPATIBLE WITH A FUSIBLE LINK DETECTION SYSTEM. THE FUSIBLE LINK SHALL BE SELECTED AND INSTALLED ACCORDING TO THE OPERATING TEMPERATURE IN THE VENTILATING SYSTEM. THE FUSIBLE LINK SHALL BE SUPPORTED BY A DETECTOR BRACKET/LINKAGE ASSEMBLY.
7.	COORDINATE WITH MECHANICAL FOR SEQUENCE OF OPERATION. SEQUENCE OF OPERATION WILL BE DONE AND COORDINATED WITH LOCAL AHJ (BY OTHERS).
8.	REMOTE MANUAL PULL STATION TO ACTIVATE THE FIRE SUPPRESSION SYSTEM SHALL BE INSTALLED AT 48" ABOVE THE FINISHED FLOOR AND INSTALLED IN THE PATH OF EXIT OR EGRESS FROM THE KITCHEN AREA AND CLEARLY IDENTIFY THE HAZARD PROTECTED.

WET CHEMICAL FIRE SUPPRESSION SYSTEM	
SYSTEM 1	
SYSTEM SIZE:	ANSUL-R102-3.0/3.0
TOTAL FLOW POINTS REQUIRED:	18
INSTALLATION:	WALL UTILITY CABINET LEFT

SEQUENCE OF OPERATION	
REFER TO M-2	

3	July 29 2021	RE-ISSUED FOR BUILDING PERMIT
2	June 23 2021	ISSUED FOR BUILDING PERMIT
1	June 21 2021	ISSUED FOR CLIENT REVIEW ONLY
No.	DATE	DESCRIPTION
DESTROY ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE.		

REVISIONS
THIS DRAWING SHALL ONLY BE USED WHEN SIGNED FOR THE PURPOSE SPECIFIED BELOW.

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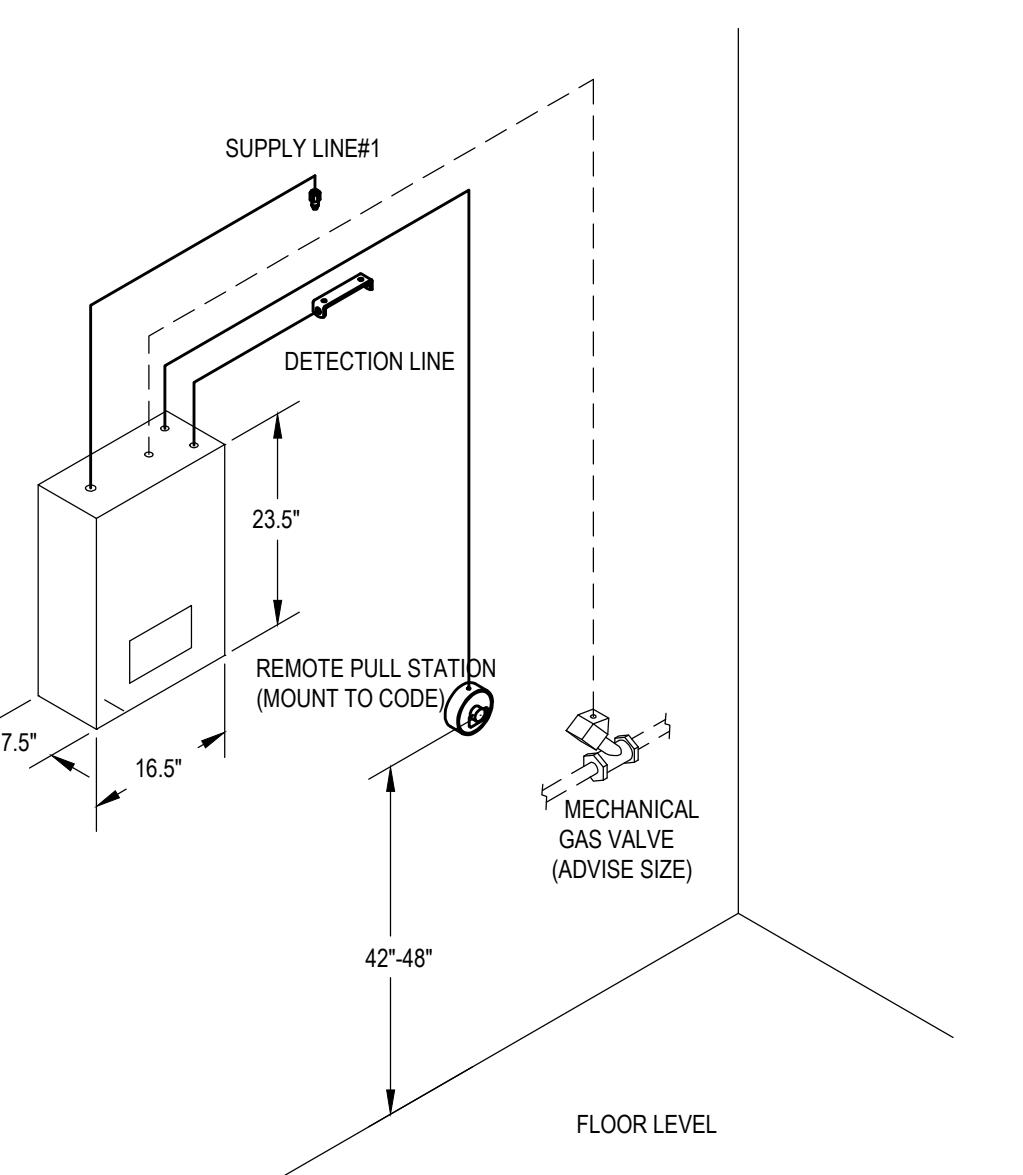
TAG
ENGINEERING INC.
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29 Jul, 2021

PROJECT
TRAIL RESTAURANT
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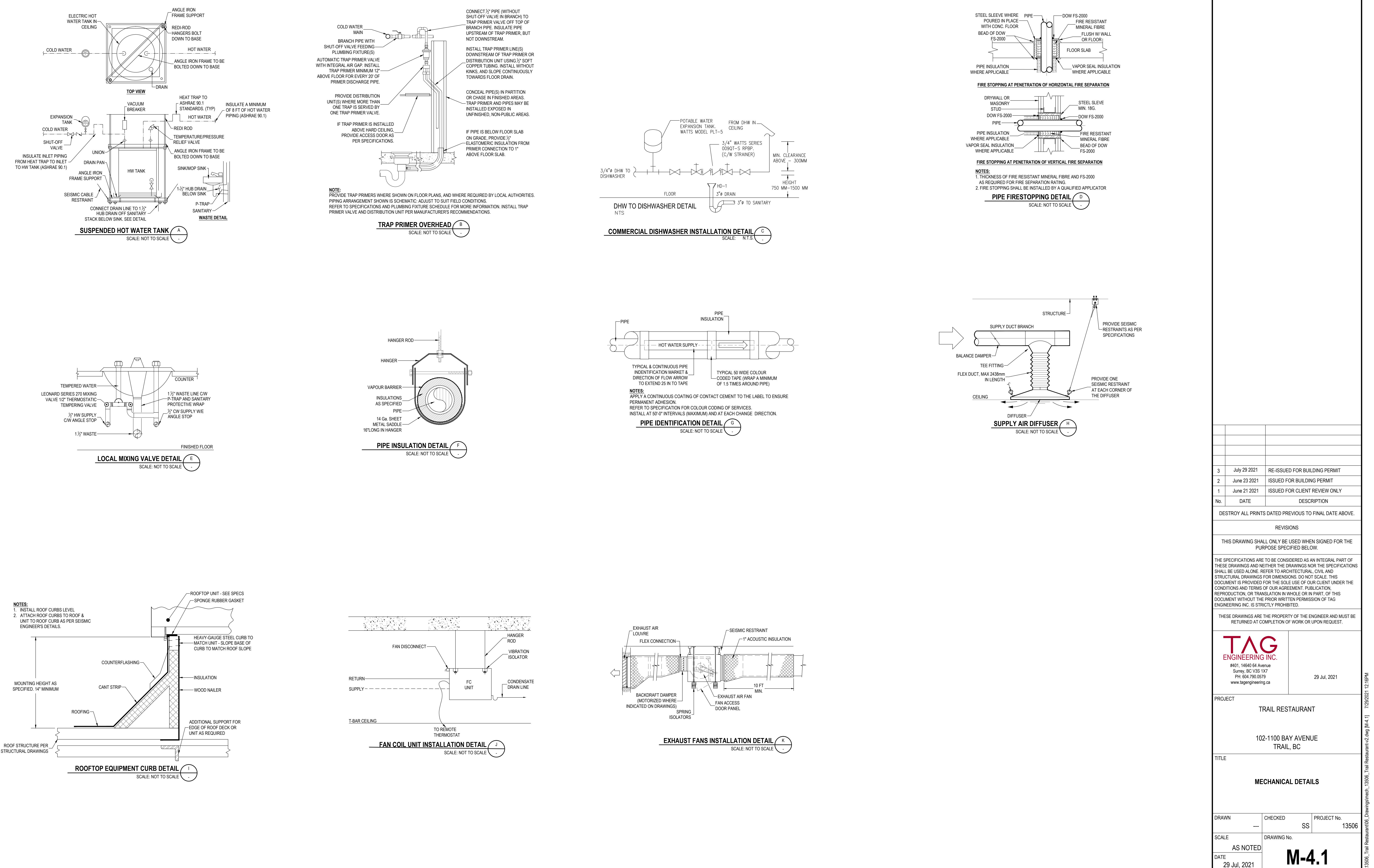
TITLE
COMMERCIAL KITCHEN
FIRE SUPPRESSION

DRAWN --- CHECKED SS PROJECT No. 13506
SCALE AS NOTED DRAWING No. M-2.3
DATE 29 Jul, 2021



PULL STATION DETAIL (B)
SCALE: N.T.S.

M-2.3



GENERAL REQUIREMENTS																	
1.1 GENERAL REQUIREMENTS <ol style="list-style-type: none"> For the purpose of this specification, the following terms shall be understood to mean: <ul style="list-style-type: none"> 2. "Consultant" - the person(s) representing the Mechanical Consulting Engineering firm of TAG ENGINEERING INC. 3. "Contractor" - the company awarded the contract to execute the work as defined herein and reflected on the drawings. 4. Should any conflicts occur between layouts shown on drawings and applicable codes, the code requirements shall be adhered to. Should the Contractor have any doubts or queries regarding the interpretation or requirements of the design, such queries shall be addressed to the Consultant promptly in writing to obtain resolution. 5. These specifications and drawings shall be read in conjunction with the terms and conditions of the General Contract Documents. 6. Contract documents are diagrammatic only. They are to establish scope, material and quality. They are not detailed installation drawings. Minor details usually not shown or specified and any incidental accessories required for proper installation of the system are to be included in the work. 7. All work and materials shall conform to the requirements as set out in the Base Building Tenant/Landlord agreement. 8. This Contractor shall visit the site prior to tender and shall become thoroughly familiar with site conditions. Problems arising from a failure to do so shall not constitute a contract change. 9. All controls shall be done by Base Building Controls Contractor. 10. Air & water balancing shall be performed by an independent air testing and balance agency which specializes in testing and balancing of heating, ventilating and cooling systems. 																	
1.2 QUERIES <ol style="list-style-type: none"> Tenders finding discrepancies, ambiguities or omissions in the drawings and/or specification documents or being uncertain of the intent, meaning or description of work or systems or interpretation thereof, should address their queries to the Consultant in writing prior to close of tender. If such a request is not made, tenders will be deemed to be based upon the interpretation that may be subsequently given by the Consultant after award of contract. All queries should be addressed to: <p>TAG ENGINEERING INC. Bus: (604) 790-0579 Email: info@tagengineering.ca</p> 																	
1.3 REGULATIONS <ol style="list-style-type: none"> All work shall be installed in accordance with but not be limited to approved editions of: <ul style="list-style-type: none"> British Columbia Building Code & Plumbing Code (latest edition) City of Vancouver Building By-Law (For Buildings in Vancouver) Canadian Standard Association (CSA) Canadian Gas Association (CGA) Workers Compensation Board Factory Mutual Fire Insurance Companies, NFPA Base Building Construction Guidelines ASHRAE 90.1 (latest edition) 																	
1.4 INTENT <ol style="list-style-type: none"> The intent of this specification is to provide a complete and fully operating mechanical systems in accordance with applicable codes. The Contractor shall make provisions for labor, material and equipment necessary to complete the mechanical work. Conform to manufacturer's instructions, details and procedures for equipment installations. Install equipment in locations and routes shown, close to building structure with minimum interference with other services or free space. Remove and replace improperly installed equipment. Equipment shall match or exceed quality of the base building equipment. 																	
1.5 INSURANCE <ol style="list-style-type: none"> The Contractor shall provide and show proof of, at his expense, Comprehensive General Liability Insurance of not less than \$50,000,000 including non-owned car coverage, contractual liability and containing a cross liability clause. Coverage shall include loss or damage the Contractor may cause to any works, building, equipment, structural, on the Owner's property. The insurance may or may not contain a deductible clause not to exceed \$500.00. The Contractor shall carry full employee's liability insurance for the whole of the work in accordance with the Workers' Compensation Act. 																	
1.6 LIABILITY <ol style="list-style-type: none"> Assume responsibility for laying out work and for damage caused by improper execution of work. Protect finished and unfinished work from damage. Take responsibility for condition of materials and equipment supplied and protect until work is completed and accepted. Existing elevations, dimensions and existing features shall be verified before laying out the work. Starting the work shall be held to imply that the Contractor has verified them to be correct. Any additional costs arising out of any rectifications shall be borne by the Contractor. 																	
1.7 COORDINATION AND COOPERATION <ol style="list-style-type: none"> The Contractor shall coordinate the work of all Subcontractors with efficient and continuous supervision. Each Sub-contractor shall identify in writing to the Contractor any existing services deemed to be unacceptable or defective prior to commencement of their work. The installation of systems specified in Division 15 and 16, including the inter-related operation and functioning between components of a system and between systems shall be coordinated between the contractors performing the work of division 15 and 16. Install all equipment, piping and ductwork to obtain ceiling heights specified or shown on the architectural drawings. In case of conflict, notify the Engineer before fabricating and installing any item referred to above. Carry out any required adjustment. 																	
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1.11 STANDARDS OF MATERIALS, EQUIPMENT AND INSTALLATION <ol style="list-style-type: none"> Equipment shall not exceed space limitations in any dimension. Replace any equipment or apparatus which does not meet this specification at no cost. Assume full responsibility for the expense of redesign and adjustment to other parts of the building when proposing the use of approved equal or alternate equipment. Provide equipment from the specified manufacturers. All mechanical equipment shall have the approved manufacturers name permanently fixed to it. Equipment on alternate & approved manufacturers list must be equal in quality and performance to the model specified. Equipment which is not equal will be replaced with the specified equipment at no cost to the owner. The equipment manufacturer shall ensure that the strength and anchorage of the internal components of the equipment exceeds the force level used to restrain and anchor the equipment unit itself to the supporting structure. Materials shall be new and of uniform pattern throughout. Acceptable Products/Suppliers/Manufacturers: <table border="1"> <tr> <th>ITEM</th> <th>ACCEPTABLE PRODUCTS/SUPPLIERS/MANUFACTURERS</th> </tr> <tr> <td>Grilles, Diffusers And Registers</td> <td>ETI Prox, Trico, Nubro, Hart</td> </tr> <tr> <td>Insulation - Duct/Piping</td> <td>Fiberglas, Kraus, Johns-Manville, Armstrong, Armacell, Mansen</td> </tr> <tr> <td>Jacketing Material</td> <td>Chidens, Fiberglas, Johns-Manville</td> </tr> <tr> <td>Pipe Fittings And Flanges</td> <td>Crane, Grinnell, Jenkins, Victaulic</td> </tr> <tr> <td>Pipe Supports And Hangers</td> <td>Unistrut, Mystr, L.E. Taylor, Grinnell, Sarco</td> </tr> <tr> <td>Testing & Balancing Equipment</td> <td>Must use Base Building Balancing Contractor</td> </tr> <tr> <td>Vibration Control Equipment</td> <td>Vibro-Acoustics, Lo-Rez, Vibration, Korfund, Mason</td> </tr> </table> 		ITEM	ACCEPTABLE PRODUCTS/SUPPLIERS/MANUFACTURERS	Grilles, Diffusers And Registers	ETI Prox, Trico, Nubro, Hart	Insulation - Duct/Piping	Fiberglas, Kraus, Johns-Manville, Armstrong, Armacell, Mansen	Jacketing Material	Chidens, Fiberglas, Johns-Manville	Pipe Fittings And Flanges	Crane, Grinnell, Jenkins, Victaulic	Pipe Supports And Hangers	Unistrut, Mystr, L.E. Taylor, Grinnell, Sarco	Testing & Balancing Equipment	Must use Base Building Balancing Contractor	Vibration Control Equipment	Vibro-Acoustics, Lo-Rez, Vibration, Korfund, Mason
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1.12 GUARANTEE <ol style="list-style-type: none"> Provide the Client with a written guarantee warranting apparatus furnished to remain in serviceable condition for a period of one (1) year from date of Substantial Completion. 																	
1.13 STANDARD OF WORKMANSHIP <ol style="list-style-type: none"> Only employ tradesmen properly licensed for work. 																	
1.14 SHOP DRAWINGS, ALTERNATIVE MATERIALS & EQUIPMENT <ol style="list-style-type: none"> Contract documents are based on materials and equipment specified. Approval by Consultant of equipment submitted as equal to that specified does not relieve the Contractor of any responsibility. Shop drawings shall be submitted to the consultant in electronic (.pdf) format, as coordinated after award of contract. Where submittals are derived from digital originals, do not print and re-scan documents; submittals made as such will be immediately rejected. Submit a schedule of shop drawings within one week after award of contract. Group submittals by specification division as appropriate. Submit material safety data sheet (MSDS) for all applicable products. Submit shop drawings to Consultant on all equipment specified for review. Do not order equipment or materials until Consultant has reviewed and approved shop drawings. 																	
1.15 RECORD DRAWINGS <ol style="list-style-type: none"> Maintain an updated set of white prints of drawings and specifications on site, complete with red-line record of all changes and deviations daily. At end of construction, all of the above changes shall be transferred by the Consultant at the Contractor's cost to a set of "AutoCAD" system disks containing the mechanical drawings and revised accordingly. These disks shall then be used to provide two sets of white prints. Prints shall all be handed over by the Sub-Contractor to the Owner. The revised "AutoCAD" disk shall be retained by the Consultant. The cost per drawing sheet for transferring information to the record drawings by the Consultant shall be \$400.00 per drawing. Should the Contractor undertake major re-routing of services where the original layout is appropriate or should major changes in the scope of work occur, additional charges may apply. Costs for printing are not included. The as-built daily marked-up prints shall conform to the standards of the contract drawings and shall include all details from revision drawings, supplementary drawings, change orders, addenda and site revisions, etc. Each white print drawing sheet shall be marked: <p>"We hereby certify that these drawings represent the building, as-built"</p> <p>With signatures immediately below of authorized personnel of this Sub-Contractor.</p>																	
1.16 SUBSTANTIAL PERFORMANCE INSPECTION <ol style="list-style-type: none"> Prior to the contractor requesting an inspection for substantial performance all the following items must be provided to permit beneficial use by the owner. <ul style="list-style-type: none"> Comply with requirements in general contract conditions. As-built drawings submitted. 3 Balancing reports (Air). All systems shall be certified by the contractor as complete and fully operational. A complete list of items which the contractor has not finished, or are deficient shall be provided. If, in the opinion of the consultant, this list indicates the project is excessively incomplete, a substantial completion inspection will not be performed. Spinkler contractor to submit material and test certificates and schedule "C" from the sprinkler design engineer. 																	
1.17 O & M MANUALS <ol style="list-style-type: none"> Instruct the building operators in the operation and preventative maintenance of each piece of equipment and system supplied and installed. Complete and turn over documentation prior to substantial performance. Submit 2 sets of O & M MANUALS in 3-ring binders and shall include the following: <ul style="list-style-type: none"> Description of operation of mechanical systems Shop drawing of all equipment and list of tagged valves Extended warranties AND Contractor's warranty certificate Maintenance and operation instructions List of manufacturers source and trade names Balancing report of air & water systems Copies of record drawings List of inspection and test certificates Seismic engineer's letters of assurance (schedules) Fire protection engineer's letters of assurance (schedules) Final gas inspection acceptance certificate 																	
1.18 COORDINATION WITH DIVISION 23 (16) - ELECTRICAL <ol style="list-style-type: none"> Contractor shall review all equipment requiring electrical hook-up with Electrical Contractor and electrical drawings prior to ordering equipment. Ensure proper electrical characteristics are determined for all affected and related work. Contractor to provide NEC (National Electrical Code) horizontal and vertical clearances for all installed equipment. Offset mechanical work to comply with this requirement. 																	
PERFORMANCE VERIFICATION																	
1.1 PERFORMANCE VERIFICATION OF INSTALLED EQUIPMENT <ol style="list-style-type: none"> The contractor shall conduct acceptance tests to demonstrate that the equipment and systems meet the specified requirements. Installed mechanical equipment whose performance is questioned by the consultant, may be subject to performance verification as specified herein. When performance verification is requested, equipment shall be tested to determine compliance with specified performance requirements. The consultant will determine by whom testing shall be carried out. When requested, the contractor shall arrange for services of an independent testing agency. Test equipment and materials where specified or required by authorities having jurisdiction to demonstrate proper and safe operation. Provide notice to Consultant before tests. Test procedures shall be in accordance with applicable portions of ASME, ASHRAE, SMACNA, NFPA, CSA and other recognized test codes as far as field conditions permit. 																	
1.2 AIR AND WATER BALANCING & TESTING <ol style="list-style-type: none"> Air and water balancing and testing shall be undertaken by an independent testing agency and form part of the tenant's work and at the tenant's expense. The Contractor is responsible for the inspection of the complete HVAC systems, to see that they are in accordance with the intent of the plans and specifications. During the inspection: <ol style="list-style-type: none"> Adjust fan drives to get required and rated CFM and specified RPM. Adjust temperature and fan control sequence. Adjust the entire installation to minimize noise and vibration from fans, compressors, starters and relays. Eliminate any dust pulsation by use of diffusers or additional supports as required. Correct any equipment or component which is generating objectionable noise in the opinion - of the Owner or by local authorities. Ensure there are no air leaks. Ensure the ductwork is properly supported. Ensure all duct connections are securely fastened to their respective collars or other fittings so they will not come off under maximum system pressure. Diffusers and grilles shall be balanced to +/- 10% of quantities noted on the drawings. Perimeter air systems shall be re-balanced if any HVAC renovations are carried out. Provide four (4) copies of balancing report to include the following: <ol style="list-style-type: none"> Fan Data Sheets (supply, return, and exhaust) make, model, serial number motor HP, voltage, rated amp, running amp, fan pulley size - motor pulley size and number and size of belts. Air Outlet Sheet outlet number, outlet make, model area factor, required velocity, required CFM, actual velocity, actual CFM. Single line schematic with outlets numbered corresponding to air outlet sheets. The Balancing Contractor shall make necessary adjustments, replace motor and fan sheaves and belts upon balancing of existing and new air systems. 																	
SITE INSPECTIONS <ol style="list-style-type: none"> Prior to re-installation of the ceiling, boarding of walls, backfill of underground piping, notify the Consultant and arrange for a review of the work. The contractor shall notify the consultant in writing for the following minimum, but not limited to, inspections: (required to provide a schedule 'C' for occupancy) <ol style="list-style-type: none"> All below grade piping prior to backfilling. All HVAC & Plumbing rough-in prior to wall and ceiling finish. Fire stopping of all openings. Drop test all fire dampers and demonstrate access. Final occupancy inspection and verification of all equipment being fully operational. All work shall be approved by any other regulatory body having jurisdiction where required. The contractor is to provide copies of all permits, inspection reports and certificates to the consultant. The contractor is to provide the consultant reasonable notice (minimum of 2 days for local sites) prior to calling an inspection. Final Review. For undertaking final review, the following shall be completed: <ol style="list-style-type: none"> All systems shall be fully operational As-built drawings supplied Operating & Maintenance Manuals submitted Two (2) days notification (in writing) is required to be given to the consultants prior to review being undertaken All deficiencies shall be completed within two (2) weeks of an agreed period of time after final review and a letter shall be submitted to the Consultant within that time advising of such. Failure to complete work may result in work being done by the Owner and the costs deducted from final payment. 																	
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1.10 CUTTING & PATCHING <ol style="list-style-type: none"> The Mechanical Contractor shall make provision and be responsible for: <ol style="list-style-type: none"> Identifying all openings and holes required for the passage of mechanical services through structures and dividing walls. Such identification shall be via marked up drawings showing opening locations, sizes, and levels - 2 copies of the drawing to be submitted to the Consultant's office for review prior to any cutting commencing. If required, the Contractor is to clearly mark on the intended openings for cutting. The Contractor shall wherever possible review existing base building structural drawings to avoid requesting openings through post-tension cabling or structural slabs. Unless builders work is excluded from this scope of work, the Mechanical Contractor shall include and be responsible for the cutting, patching and making good for all openings required for the installation of his services including costs involved with x-raying and provision of protective coverings. The Mechanical Contractor shall supply in good time all sleeves required to be built in for the routing of mechanical services. All coring, drilling, x-raying and other noisy work shall occur before or after designated business hours of 6 am to 6 pm, Monday through Friday and 7 am to 1 pm on Saturdays. This includes the use of Ramses, Hill or other explosive type listening devices during designated business hours as outlined above. If the slab is post tensioned. Penetration up to 1/2" in the slab is permitted. Any penetration in the slab over 1/2" must be x-rayed with the x-rays signed off by the structural consultant and the construction manager before coring. 																	
1.11 STANDARDS OF MATERIALS, EQUIPMENT AND INSTALLATION <ol style="list-style-type: none"> Equipment shall not exceed space limitations in any dimension. Replace any equipment or apparatus which does not meet this specification at no cost. Assume full responsibility for the expense of redesign and adjustment to other parts of the building when proposing the use of approved equal or alternate equipment. Provide equipment from the specified manufacturers. All mechanical equipment shall have the approved manufacturers name permanently fixed to it. Equipment on alternate & approved manufacturers list must be equal in quality and performance to the model specified. Equipment which is not equal will be replaced with the specified equipment at no cost to the owner. The equipment manufacturer shall ensure that the strength and anchorage of the internal components of the equipment exceeds the force level used to restrain and anchor the equipment unit itself to the supporting structure. Materials shall be new and of uniform pattern throughout. Acceptable Products/Suppliers/Manufacturers: <table border="1"> <tr> <th>ITEM</th> <th>ACCEPTABLE PRODUCTS/SUPPLIERS/MANUFACTURERS</th> </tr> <tr> <td>Grilles, Diffusers And Registers</td> <td>ETI Prox, Trico, Nubro, Hart</td> </tr> <tr> <td>Insulation - Duct/Piping</td> <td>Fiberglas, Kraus, Johns-Manville</td> </tr> <tr> <td>Jacketing Material</td> <td>Chidens, Fiberglas, Johns-Manville</td> </tr> <tr> <td>Pipe Fittings And Flanges</td> <td>Crane, Grinnell, Jenkins, Victaulic</td> </tr> <tr> <td>Pipe Supports And Hangers</td> <td>Unistrut, Mystr, L.E. Taylor, Grinnell, Sarco</td> </tr> <tr> <td>Testing & Balancing Equipment</td> <td>Must use Base Building Balancing Contractor</td> </tr> <tr> <td>Vibration Control Equipment</td> <td>Vibro-Acoustics, Lo-Rez, Vibration, Korfund, Mason</td> </tr> </table> 		ITEM	ACCEPTABLE PRODUCTS/SUPPLIERS/MANUFACTURERS	Grilles, Diffusers And Registers	ETI Prox, Trico, Nubro, Hart	Insulation - Duct/Piping	Fiberglas, Kraus, Johns-Manville	Jacketing Material	Chidens, Fiberglas, Johns-Manville	Pipe Fittings And Flanges	Crane, Grinnell, Jenkins, Victaulic	Pipe Supports And Hangers	Unistrut, Mystr, L.E. Taylor, Grinnell, Sarco	Testing & Balancing Equipment	Must use Base Building Balancing Contractor	Vibration Control Equipment	Vibro-Acoustics, Lo-Rez, Vibration, Korfund, Mason
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1.12 GUARANTEE <ol style="list-style-type: none"> Provide the Client with a written guarantee warranting apparatus furnished to remain in serviceable condition for a period of one (1) year from date of Substantial Completion. 																	
1.13 STANDARD OF WORKMANSHIP <ol style="list-style-type: none"> Only employ tradesmen properly licensed for work. 																	
1.14 SHOP DRAWINGS, ALTERNATIVE MATERIALS & EQUIPMENT <ol style="list-style-type: none"> Contract documents are based on materials and equipment specified. Approval by Consultant of equipment submitted as equal to that specified does not relieve the Contractor of any responsibility. Shop drawings shall be submitted to the consultant in electronic (.pdf) format, as coordinated after award of contract. Where submittals are derived from digital originals, do not print and re-scan documents; submittals made as such will be immediately rejected. Submit a schedule of shop drawings within one week after award of contract. Group submittals by specification division as appropriate. Submit material safety data sheet (MSDS) for all applicable products. Submit shop drawings to Consultant on all equipment specified for review. Do not order equipment or materials until Consultant has reviewed and approved shop drawings. 																	
1.15 RECORD DRAWINGS <ol style="list-style-type: none"> Maintain an updated set of white prints of drawings and specifications on site, complete with red-line record of all changes and deviations daily. At end of construction, all of the above changes shall be transferred by the Consultant at the Contractor's cost to a set of "AutoCAD" system disks containing the mechanical drawings and revised accordingly. These disks shall then be used to provide two sets of white prints. Prints shall all be handed over by the Sub-Contractor to the Owner. The revised "AutoCAD" disk shall be retained by the Consultant. The cost per drawing sheet for transferring information to the record drawings by the Consultant shall be \$400.00 per drawing. Should the Contractor undertake major re-routing of services where the original layout is appropriate or should major changes in the scope of work occur, additional charges may apply. Costs for printing are not included.</																	