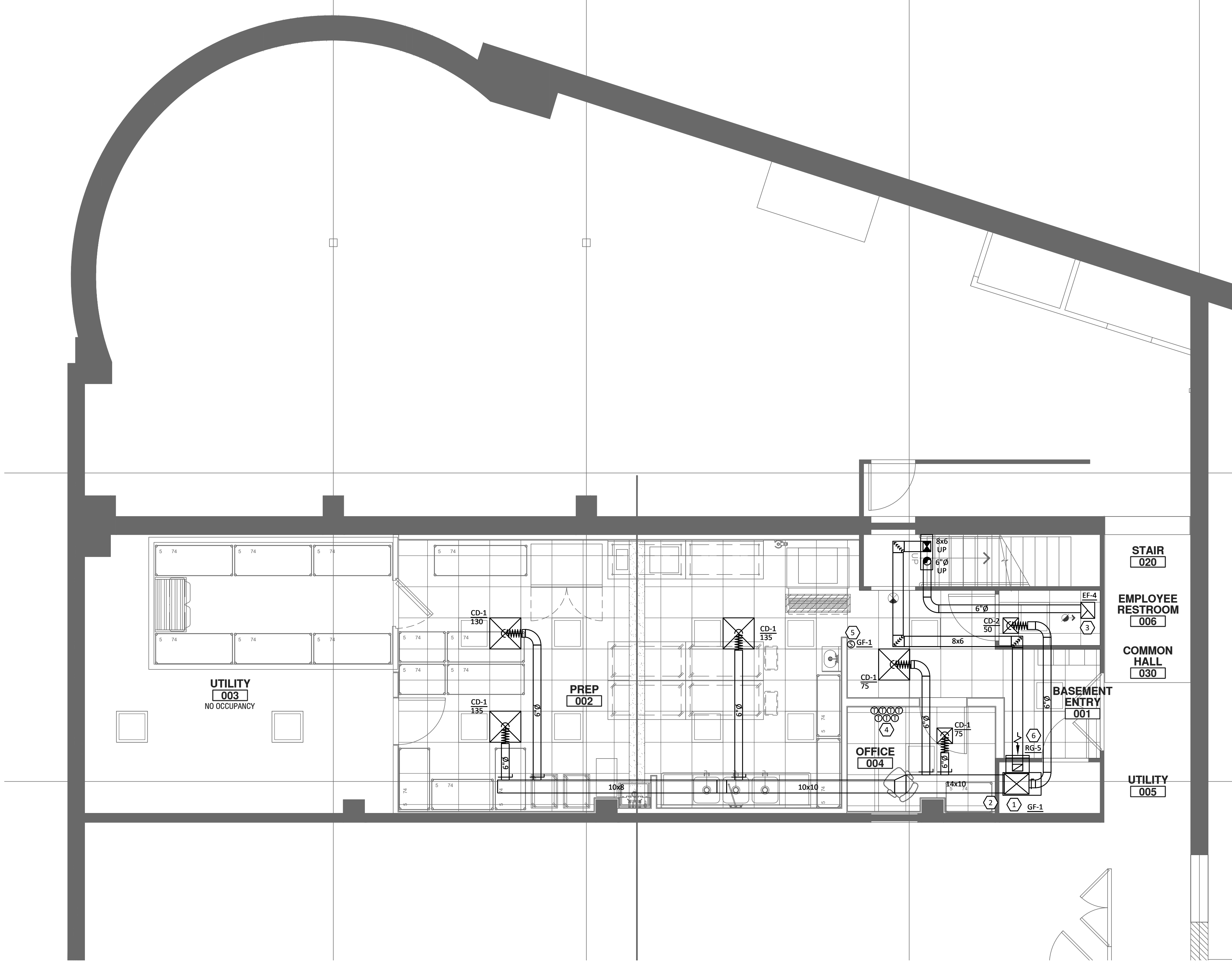




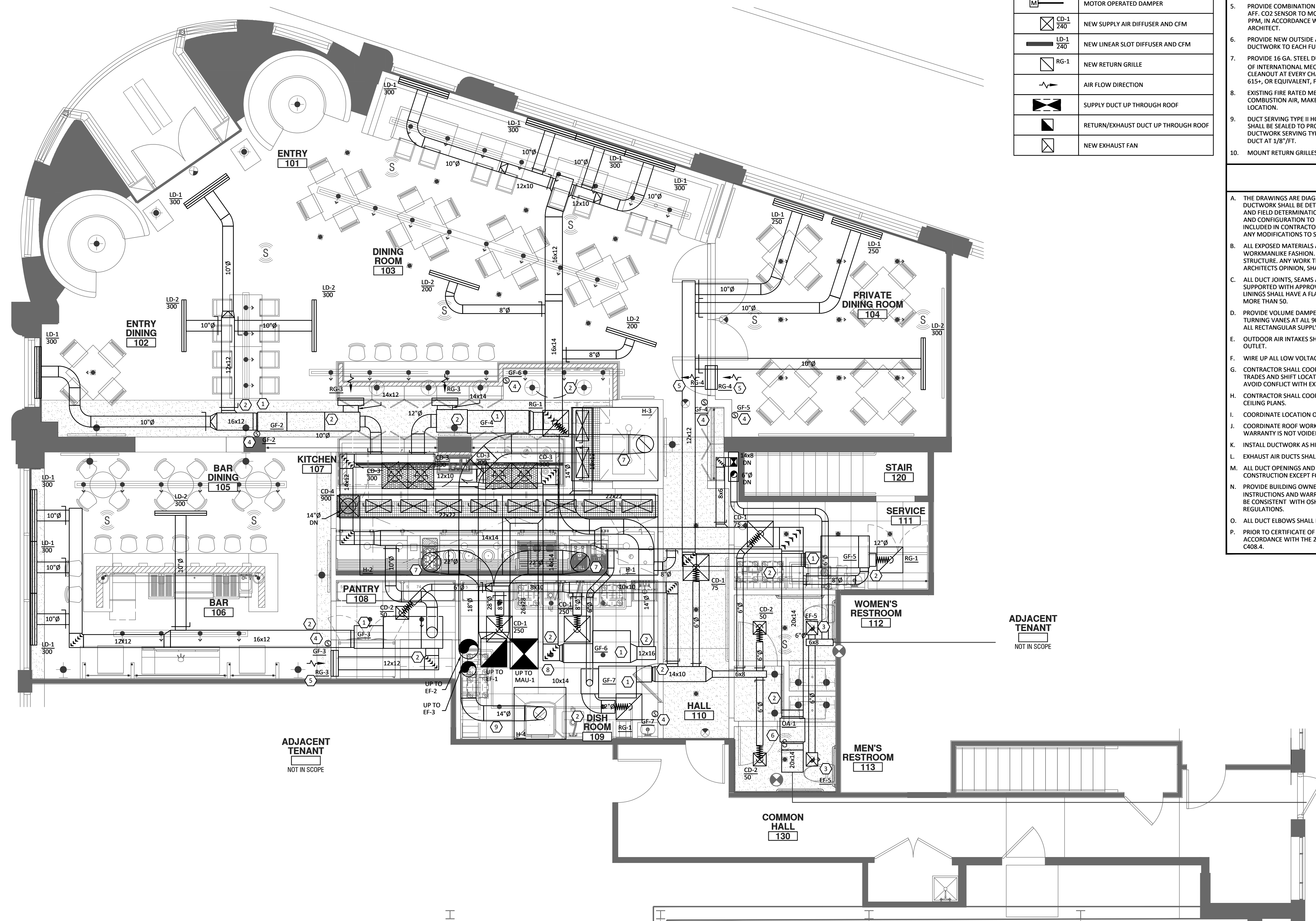
HVAC LEGEND	
	DRAWING NOTE SYMBOL
	NEW RECTANGULAR DUCTWORK AND SIZE
	NEW ROUND DUCTWORK AND SIZE
	BALANCING/VOLUME DAMPER
	FLEX DUCT
	THERMOSTAT
	NEW SUPPLY AIR DIFFUSER AND CFM
	NEW RETURN GRILLE
	SUPPLY DUCT UP THROUGH ROOF
	RETURN/EXHAUST DUCT UP THROUGH ROOF
	NEW EXHAUST FAN

- KEYED NOTES**
- PROVIDE CONDENSING GAS FURNACE AND LOCATE ON LEVEL 2" CONCRETE PAD BY GC. ALL FILTER ACCESS TO BE ON THE SIDE OF FURNACE. ROUTE 2"x2" COMBUSTION AIR INTAKE AND FLUE VENT TO CONCENTRIC VENT KIT INTO CHASE UP TO ROOF. SIZE AND INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. LOCATE CONCENTRIC VENT KIT MINIMUM TEN FEET AWAY FROM AIR INTAKE AND EXHAUST VENTS AND PAINT TO MATCH WALL COLOR. ROUTE 3/4" CONDENSATE DRAIN LINE WITH TRAP TO FLOOR DRAIN/ MOP SINK. PROVIDE CONDENSATE PUMP AS REQUIRED. COORDINATE FLOOR DRAIN LOCATION WITH PLUMBING PLAN.
 - INTERNALLY LINE FIRST 10 FEET OF SUPPLY, OUTSIDE AIR AND RETURN AIR DUCTWORK WITH JOHN'S MANVILLE, OR EQUIVALENT, 1 INCH THICK SPIRACOUSTIC FIBERGLASS DUCT LINER. DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS.
 - PROVIDE NEW EXHAUST FAN, CONTROLLED BY LIGHT SWITCH, AND ROUTE EXHAUST DUCTWORK TO FIRST FLOOR. REFER TO SHEET M1.0 FOR CONTINUATION.
 - PROVIDE PROGRAMMABLE THERMOSTAT FOR ALL GAS FURNACES AND MOUNT ON WALL 4 FEET A.F.F.
 - PROVIDE REMOTE SENSOR AND MOUNT ON WALL 5 FEET A.F.F. COORDINATE COLOR WITH ARCHITECT.
 - PROVIDE RETURN GRILLE AND INSTALL LOW ON WALL. ROUTE DUCT TO BOTTOM OF FURNACE AND THE OUTSIDE AIR DUCT INTO TOP OF RETURN.

- GENERAL NOTES**
- THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
 - ALL EXPOSED MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED IN A FIRST-CLASS AND WORKMANLIKE FASHION. DUCTWORK SHALL RUN PARALLEL AND/ OR PERPENDICULAR TO MAIN BUILDING STRUCTURE. ANY WORK THAT IS NOT DONE IN A FIRST-CLASS OR WORKMANLIKE FASHION, IN THE ARCHITECT'S OPINION, SHALL BE REDONE AT THE CONTRACTOR'S EXPENSE.
 - ALL DUCT JOINTS, SEAMS AND CONNECTIONS SHALL BE SECURELY FASTENED AND SEALED. DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING TEN FEET. DUCT COVERINGS AND LININGS SHALL HAVE A FLAME-SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX NOT MORE THAN 50.
 - PROVIDE VOLUME DAMPERS AT ALL ROUND BRANCH DUCT TAKE-OFFS THAT ARE ACCESSIBLE. PROVIDE TURNING VANES AT ALL 90 DEGREE SQUARE ELBOWS IN SUPPLY AIR DUCTS. PROVIDE 45 DEGREE HEEL AT ALL RECTANGULAR SUPPLY AND RETURN BRANCH DUCT TAKE-OFFS.
 - OUTDOOR AIR INTAKES SHALL BE 10'-0" MINIMUM AWAY FROM ANY EXHAUST AND PLUMBING VENT OUTLET.
 - WIRE UP ALL LOW VOLTAGE (24V) THERMOSTATS.
 - CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY. PROVIDE TRANSITIONS IN DUCTWORK TO AVOID CONFLICT WITH EXISTING DUCTWORK AND OTHER STRUCTURES.
 - CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
 - COORDINATE LOCATION OF ALL EXTERIOR LOUVER OR OUTLET WITH ARCHITECTURAL ELEVATION PLAN.
 - COORDINATE ROOF WORK WITH BUILDING OWNER'S ROOFING CONTRACTOR TO ASSURE THAT THE ROOF WARRANTY IS NOT VOIDED.
 - INSTALL DUCTWORK AS HIGH AS POSSIBLE.
 - EXHAUST AIR DUCTS SHALL BE EQUIPPED WITH BACKDRAFT DAMPERS.
 - ALL DUCT OPENINGS AND OTHER AIR DISTRIBUTION OPENINGS SHALL BE COVERED DURING CONSTRUCTION EXCEPT FOR TESTING AND INSPECTION.
 - PROVIDE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND WARRANTIES /WRITTEN GUARANTEE FOR EACH SYSTEM. O&M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR TITLE 8, SECTION 5142 AND OTHER RELATED REGULATIONS.
 - ALL DUCT ELBOWS SHALL BE LONG RADIUS OR MITERED.
 - PRIOR TO CERTIFICATE OF OCCUPANCY, SYSTEM COMMISSIONING STATEMENTS SHALL BE PROVIDED IN ACCORDANCE WITH THE 2018 NCECC SEC. C408.1 FOR MECHANICAL SYSTEMS THROUGH AND INCLUDING C408.4.



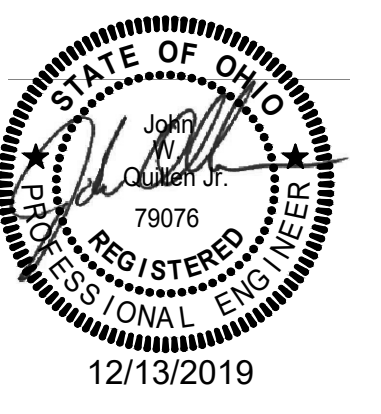
1
M1.0 MECHANICAL PLAN BASEMENT
 1/4" = 1'-0"



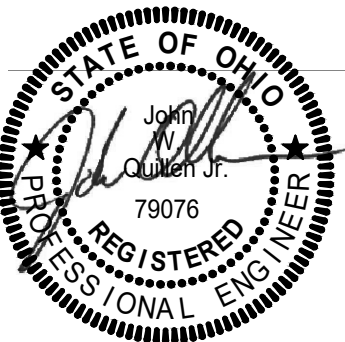
HVAC LEGEND	
	DRAWING NOTE SYMBOL
	NEW RECTANGULAR DUCTWORK AND SIZE
	NEW ROUND DUCTWORK AND SIZE
	BALANCING/VOLUME DAMPER
	FLEX DUCT
	THERMOSTAT
	REMOTE SENSOR
	MOTOR OPERATED DAMPER
	NEW SUPPLY AIR DIFFUSER AND CFM
	NEW LINEAR SLOT DIFFUSER AND CFM
	NEW RETURN GRILLE
	AIR FLOW DIRECTION
	SUPPLY DUCT UP THROUGH ROOF
	RETURN/EXHAUST DUCT UP THROUGH ROOF
	NEW EXHAUST FAN

- | KEYED NOTES | |
|-------------|---|
| 1. | PROVIDE CONDENSING GAS FURNACE AND LOCATE ON ANGLE IRON FRAME ABOVE CEILING. MOUNT FRAME TO STRUCTURE WITH ANCHORS, THREADED RODS AND SPRING VIBRATION ISOLATORS. ALL FILTER ACCESS TO BE ON THE SIDE OF FURNACE. ROUTE 2 1/2" COMBUSTION AIR INTAKE AND FLUE VENT INTO CHASE AND TO CONCENTRIC VENT KIT THROUGH ROOF. SIZE AND INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. LOCATE CONCENTRIC VENT KIT MINIMUM TEN FEET AWAY FROM AIR INTAKE AND EXHAUST VENTS AND PAINT TO MATCH WALL COLOR. ROUTE 3/4" CONDENSATE DRAIN LINE WITH TRAP TO FLOOR DRAIN/ MOP SINK. PROVIDE CONDENSATE PUMP AS REQUIRED. COORDINATE FLOOR DRAIN LOCATION WITH PLUMBING PLAN. FOR UNITS ABOVE CEILINGS, PROVIDE AUXILIARY DRAIN PAN WITH HIGH LEVEL ALARM UNDER COOLING COIL, IN ACCORDANCE WITH SECTION 307.2.3 OF IMC. HIGH LEVEL ALARM SHALL SHUT UNIT OFF UPON DETECTION OF CONDENSATE IN THE OVERFLOW DRAIN PAN. |
| 2. | INTERNALLY LINE FIRST 10 FEET OF SUPPLY, OUTSIDE AIR AND RETURN AIR DUCTWORK WITH JOHN'S MANVILLE, OR EQUIVALENT, 1 INCH THICK SPIRACOUSTIC FIBERGLASS DUCT LINER. DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. |
| 3. | PROVIDE NEW EXHAUST FAN, CONTROLLED BY LIGHT SWITCH, AND ROUTE EXHAUST DUCTWORK TO EXISTING EXHAUST DUCTWORK. FIELD VERIFY EXACT SIZE AND LOCATION. |
| 4. | PROVIDE REMOTE SENSOR AND MOUNT ON WALL 5 FEET A.F.F. COORDINATE COLOR WITH ARCHITECT. |
| 5. | PROVIDE COMBINATION REMOTE TEMPERATURE SENSOR AND CO2 SENSOR AND INSTALL ON WALL 5' AFF. CO2 SENSOR TO MODULATE OUTDOOR AIR DAMPER TO MAINTAIN MAXIMUM CO2 LEVELS OF 800 PPM, IN ACCORDANCE WITH SECTION 6.2.7 OF ASHRAE STANDARD 62.1. COORDINATE COLOR WITH ARCHITECT. |
| 6. | PROVIDE NEW OUTSIDE AIR SUPPLY FAN ABOVE CEILING. FILTER ACCESS IN BACK OF UNIT. ROUTE DUCTWORK TO EACH FURNACE AS INDICATED. |
| 7. | PROVIDE 16 GA. STEEL DUCT, WITH SEAMS WELDED LIQUID TIGHT, IN ACCORDANCE WITH SECTION 506.3 OF INTERNATIONAL MECHANICAL CODE AND SLOPE DUCT AT 1/8" FT TOWARDS HOOD. PROVIDE CLEANOUT AT EVERY CHANGE OF DIRECTION, AND AS REQUIRED BY NFPA 96. PROVIDE 2 LAYERS OF 3M 615+, OR EQUIVALENT, FIRE BARRIER DUCT WRAP ON EXHAUST DUCT BETWEEN HOOD AND ROOF. |
| 8. | EXISTING FIRE RATED MECHANICAL SHAFT TO BE USED FOR EXHAUST DUCTWORK VENT AND COMBUSTION AIR, MAKEUP AIR DUCTWORK, AND REFRIGERANT LINE SETS. FIELD VERIFY EXACT SIZE AND LOCATION. |
| 9. | DUCT SERVING TYPE II HOOD SHALL BE MADE OF ALUMINUM. JOINTS, SEAMS, AND PENETRATIONS SHALL BE SEALED TO PROVIDE A SMOOTH INNER SURFACE AND SHALL BE WATER TIGHT. HORIZONTAL DUCTWORK SERVING TYPE II HOOD SHALL BE SLOPED DOWN IN THE DIRECTION OF THE HOOD. SLOPE DUCT AT 1/8" FT. |
| 10. | MOUNT RETURN GRILLES HIGH ON WALL. PAINT RETURN GRILLE TO MATCH WALL COLOR. |

- | GENERAL NOTES | |
|---------------|--|
| A. | THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION. |
| B. | ALL EXPOSED MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED IN A FIRST-CLASS AND WORKMANLIKE FASHION. DUCTWORK SHALL RUN PARALLEL AND/OR PERPENDICULAR TO MAIN BUILDING STRUCTURE. ANY WORK THAT IS NOT DONE IN A FIRST-CLASS OR WORKMANLIKE FASHION, IN THE ARCHITECT'S OPINION, SHALL BE REDONE AT THE CONTRACTOR'S EXPENSE. |
| C. | ALL DUCT JOINTS, SEAMS AND CONNECTIONS SHALL BE SECURELY FASTENED AND SEALED. DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING TEN FEET. DUCT COVERINGS AND LININGS SHALL HAVE A FLAME-SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX NOT MORE THAN 50. |
| D. | PROVIDE VOLUME DAMPERS AT ALL ROUND BRANCH DUCT TAKE-OFFS THAT ARE ACCESSIBLE. PROVIDE TURNING VANES AT ALL 90 DEGREE SQUARE ELBOWS IN SUPPLY AIR DUCTS. PROVIDE 45 DEGREE HEEL AT ALL RECTANGULAR SUPPLY AND RETURN BRANCH DUCT TAKE-OFFS. |
| E. | OUTDOOR AIR INTAKES SHALL BE 10'-0" MINIMUM AWAY FROM ANY EXHAUST AND PLUMBING VENT OUTLET. |
| F. | WIRE UP ALL LOW VOLTAGE (24V) THERMOSTATS. |
| G. | CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY. PROVIDE TRANSITIONS IN DUCTWORK TO AVOID CONFLICT WITH EXISTING DUCTWORK AND OTHER STRUCTURES. |
| H. | CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS. |
| I. | COORDINATE LOCATION OF ALL EXTERIOR LOUVER OR OUTLET WITH ARCHITECTURAL ELEVATION PLAN. |
| J. | COORDINATE ROOF WORK WITH BUILDING OWNER'S ROOFING CONTRACTOR TO ASSURE THAT THE ROOF WARRANTY IS NOT VOIDED. |
| K. | INSTALL DUCTWORK AS HIGH AS POSSIBLE. |
| L. | EXHAUST AIR DUCTS SHALL BE EQUIPPED WITH BACKDRAFT DAMPERS. |
| M. | ALL DUCT OPENINGS AND OTHER AIR DISTRIBUTION OPENINGS SHALL BE COVERED DURING CONSTRUCTION EXCEPT FOR TESTING AND INSPECTION. |
| N. | PROVIDE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND WARRANTIES / WRITTEN GUARANTEE FOR EACH SYSTEM. O&M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR TITLE 8, SECTION 5142 AND OTHER RELATED REGULATIONS. |
| O. | ALL DUCT ELBOWS SHALL BE LONG RADIUS OR MITERED. |
| P. | PRIOR TO CERTIFICATE OF OCCUPANCY, SYSTEM COMMISSIONING STATEMENTS SHALL BE PROVIDED IN ACCORDANCE WITH THE 2018 NCECC SEC. C408.1 FOR MECHANICAL SYSTEMS THROUGH AND INCLUDING C408.4. |



1
M1.1 MECHANICAL PLAN FIRST FLOOR
 1/4" = 1'-0"



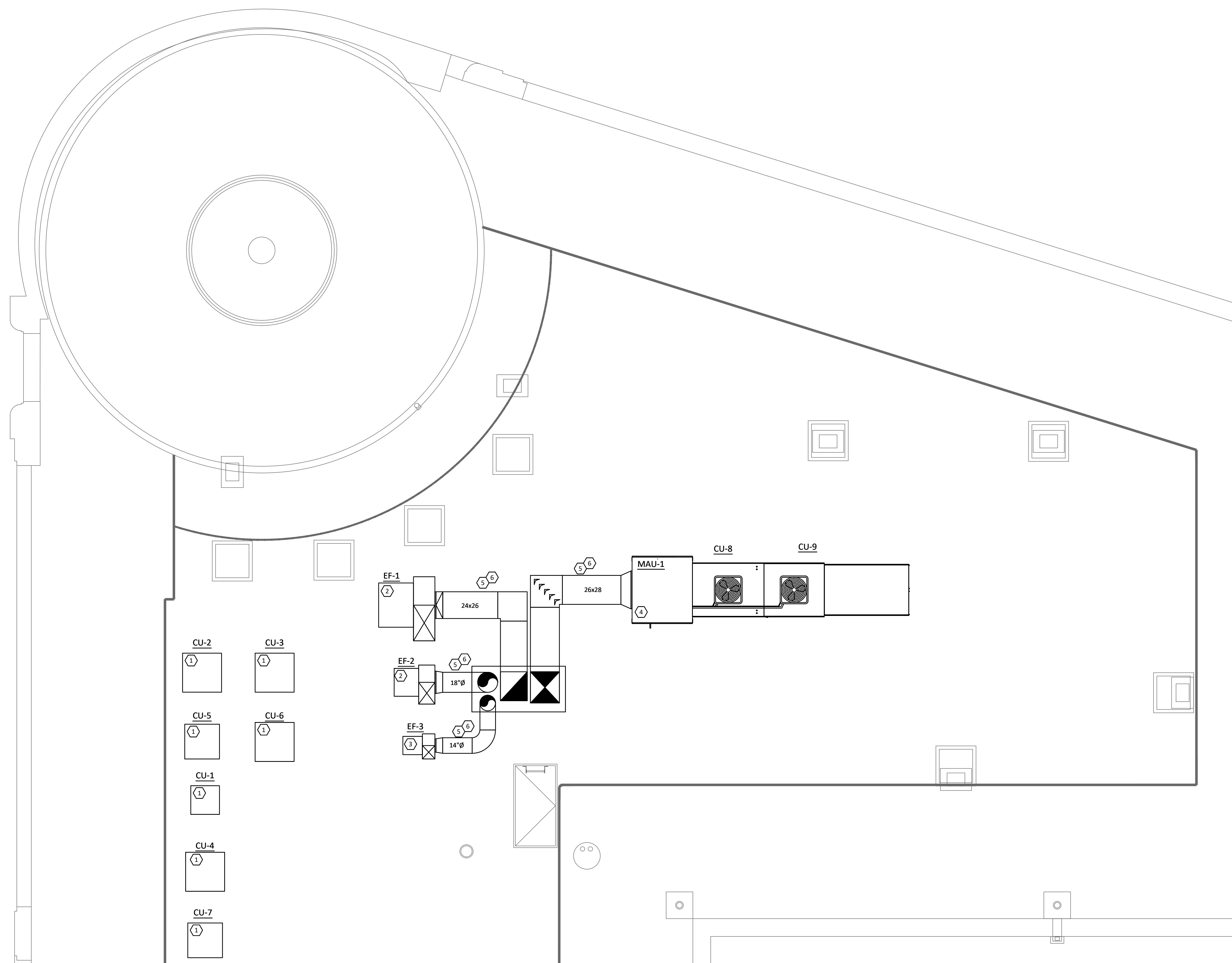
12/13/2019

HVAC LEGEND	
	DRAWING NOTE SYMBOL
	NEW RECTANGULAR DUCTWORK AND SIZE
	SUPPLY DUCT UP THROUGH ROOF
	RETURN/EXHAUST DUCT UP THROUGH ROOF

KEYED NOTES	
1.	PROVIDE CONDENSING UNIT AND LOCATE ON ROOF ON ANVIL INTERNATIONAL HAYDON H-BLOCK ROOFTOP SUPPORT SYSTEM WITH PAD ACCESSORY, OR EQUIVALENT, EQUIPMENT SUPPORTS. MAINTAIN UNIT MINIMUM REQUIRED SERVICE AND AIRFLOW CLEARANCE. ROUTE REFRIGERANT LIQUID AND SUCTION LINES BETWEEN CONDENSING UNIT AND FURNACE COILING COIL AND SEAL PENETRATIONS WEATHER-TIGHT. PROVIDE PATE, OR EQUIVALENT, PIPE CURB FOR ALL ROOF PENETRATIONS. ROUTE AND SIZE LINES AND ACCESSORIES PER MANUFACTURER'S GUIDELINES. PROVIDE A FULLY CHARGED SYSTEM AND INSULATE ALL REFRIGERANT PIPING WITH ARMAFLEX INSULATION.
2.	UTILITY SET EXHAUST FAN FURNISHED BY KITCHEN CONSULTANT AND INSTALLED ON ROOF BY MECHANICAL CONTRACTOR. DISCHARGE OPENING SHALL BE NO LESS THAN 40" ABOVE THE ROOF. PROVIDE 16 GA. STEEL DUCT, WITH SEAMS WELDED LIQUID TIGHT, IN ACCORDANCE WITH SECTION 506.3 OF INTERNATIONAL MECHANICAL CODE AND SLOPE DUCT AT 1/4" FT TOWARDS HOOD. PROVIDE CLEANOUT AT EVERY CHANGE OF DIRECTION, EVERY 20' HORIZONTALLY AND AS REQUIRED BY NFPA 96. PROVIDE 2 LAYERS OF 3M 615+, OR EQUIVALENT, FIRE BARRIER DUCT WRAP ON EXHAUST DUCT BETWEEN HOOD AND ROOF.
3.	UTILITY SET EXHAUST FAN FURNISHED BY KITCHEN CONSULTANT AND INSTALLED ON ROOF BY MECHANICAL CONTRACTOR. MAINTAIN UNIT MINIMUM REQUIRED SERVICE AND AIRFLOW CLEARANCE.
4.	NEW MAKE UP AIR UNIT, CURB, CONTROL WIRING, AND STAND ALONE CONTROLS FURNISHED BY KITCHEN CONSULTANT AND INSTALLED BY MECHANICAL CONTRACTOR FOR UNIT OPERATION. ROUTE SUPPLY DUCT ALONG ROOF. UTILIZE PATE, OR EQUIVALENT DUCT SUPPORTS AND ROUTE DUCT THROUGH ROOF. UTILIZE ROOF CURB FOR DUCT PENETRATION. FLASH DUCT PENETRATION FOR A WEATHERPROOF SEAL. MAINTAIN MINIMUM 10' SEPARATION BETWEEN MAKEUP AIR UNIT INTAKE AND ALL EXHAUST FANS AND VENT THROUGH ROOFS.
5.	INSULATE ALL EXTERIOR DUCTWORK WITH RIGID FIBERGLASS BOARD INSULATION WITH OUTDOOR JACKET. INSULATION SHALL HAVE MINIMUM INSTALLED "R" VALUE OF 6.0. PROVIDE A SELF-ADHESIVE OUTDOOR JACKET FOR ALL EXPOSED DUCTWORK OUTSIDE. JACKET SHALL HAVE LAMINATED VAPOR BARRIER AND WATERPROOFING MEMBRANE CONSISTING OF A RUBBERIZED BITUMINOUS RESIN ON A CROSS LAMINATED POLYETHYLENE FILM COVERED WITH STUCCO-EMBOSSED ALUMINUM-FOIL FACING.
6.	PROVIDE ANVIL INTERNATIONAL HAYDON H-BLOCK ROOFTOP SUPPORT SYSTEM WITH PAD ACCESSORY, OR EQUIVALENT, DUCT SUPPORT FOR ALL EXTERIOR DUCTWORK. INSTALL DUCT SUPPORT IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. COORDINATE DUCT SUPPORT TYPE WITH ROOF CONSTRUCTION.
7.	COORDINATE EXACT LOCATION OF EXISTING ROOFTOP UNIT PRIOR TO BEGINNING WORK.

GENERAL NOTES	
A.	THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
B.	ALL EXPOSED MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED IN A FIRST-CLASS AND WORKMANLIKE FASHION. DUCTWORK SHALL RUN PARALLEL AND/OR PERPENDICULAR TO MAIN BUILDING STRUCTURE. ANY WORK THAT IS NOT DONE IN A FIRST-CLASS OR WORKMANLIKE FASHION, IN THE ARCHITECT'S OPINION, SHALL BE REDONE AT THE CONTRACTORS EXPENSE.
C.	ALL DUCT JOINTS, SEAMS AND CONNECTIONS SHALL BE SECURELY FASTENED AND SEALED. DUCTS SHALL BE SUPPORTED WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING TEN FEET. DUCT COVERINGS AND LININGS SHALL HAVE A FLAME-SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX NOT MORE THAN 50.
D.	PROVIDE VOLUME DAMPERS AT ALL ROUND BRANCH DUCT TAKE-OFFS THAT ARE ACCESSIBLE. PROVIDE TURNING VANES AT ALL 90 DEGREE SQUARE ELBOWS IN SUPPLY AIR DUCTS. PROVIDE 45 DEGREE HEEL AT ALL RECTANGULAR SUPPLY AND RETURN BRANCH DUCT TAKE-OFFS.
E.	OUTDOOR AIR INTAKES SHALL BE 10'-0" MINIMUM AWAY FROM ANY EXHAUST AND PLUMBING VENT OUTLET.
F.	WIRE UP ALL LOW VOLTAGE (24V) THERMOSTATS.
G.	CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY. PROVIDE TRANSITIONS IN DUCTWORK TO AVOID CONFLICT WITH EXISTING DUCTWORK AND OTHER STRUCTURES.
H.	CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
I.	COORDINATE LOCATION OF ALL EXTERIOR LOUVER OR OUTLET WITH ARCHITECTURAL ELEVATION PLAN.
J.	COORDINATE ROOF WORK WITH BUILDING OWNER'S ROOFING CONTRACTOR TO ASSURE THAT THE ROOF WARRANTY IS NOT VOIDED.
K.	INSTALL DUCTWORK AS HIGH AS POSSIBLE.
L.	EXHAUST AIR DUCTS SHALL BE EQUIPPED WITH BACKDRAFT DAMPERS.
M.	ALL DUCT OPENINGS AND OTHER AIR DISTRIBUTION OPENINGS SHALL BE COVERED DURING CONSTRUCTION EXCEPT FOR TESTING AND INSPECTION.
N.	PROVIDE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND WARRANTIES /WRITTEN GUARANTEE FOR EACH SYSTEM. O&M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR TITLE 8, SECTION 5142 AND OTHER RELATED REGULATIONS.
O.	ALL DUCT ELBOWS SHALL BE LONG RADIUS OR MITERED.

ROOF PENETRATIONS	
COORDINATE ROOF WORK WITH BUILDING OWNER'S ROOFING CONTRACTOR TO ASSURE THAT THE ROOF WARRANTY IS NOT VOIDED.	



1 MECHANICAL PLAN ROOF
M1.2 1/4" = 1'-0"

VENTILATION SCHEDULE															
THE APERTURE - WALNUT HILLS, OH															
Table 403.3.1.1															
ROOM #	ROOM NAME	SQFT	CATEGORY	CFM/P	CFM/SQFT	people	CFM	CFM	Vbz	Ez	Vbz/Ez	Vpz	OA	22%	Voz /
001	BASEMENT ENTRY	68	CORRIDOR	5	0.06	0	0	4	4	0.8	5	17	17	0.07	0.90
002	PREP	418	KITCHEN	7.5	0.12	2	15	50	65	0.8	81	400	92	0.20	0.90
004	OFFICE	62	OFFICE	5	0.06	1	5	4	9	0.8	11	75	17	0.15	0.90
006	EMPLOYEE RESTROOM	23	RESTROOM	0	0	0	0	0	0	0.8	0	50	12	0.00	0.90
	GF-1	571				3					97	600	138		108
														28%	
102	ENTRY DINING	353	DINING	7.5	0.18	26	195	64	259	0.8	323	1200	336	0.27	1.00
	GF-2	353		8		26					323	1200	336		323
														26%	
106	BAR	404	DINING	7.5	0.18	23	173	73	245	0.8	306	1200	312	0.26	1.00
	GF-3	404		8		23					306	1200	312		306
														33%	
103	DINING ROOM	568	DINING	7.5	0.18	41	308	102	410	0.8	512	1600	528	0.32	1.00
	GF-4	568				41					512	1600	528		512
														28%	
104	PRIVATE DINING	300	DINING	7.5	0.18	16	120	54	174	0.8	218	800	224	0.27	1.00
	GF-5	300				16					218	800	224		218
														16%	
107	KITCHEN	365	KITCHEN	7.5	0.12	5	38	44	81	0.8	102	1200	192	0.08	1.00
	GF-6	365				5					102	1200	192		102
														33%	
108	PANTRY	70	STORAGE	0	0.12	2	0	8	8	0.8	11	50	17	0.21	0.90
109	DISH ROOM	186	KITCHEN	7.5	0.12	4	30	22	52	0.8	65	500	80	0.13	0.90
110	HALL	145	CORRIDOR	0	0.12	2	0	17	17	0.8	22	75	12	0.29	0.90
111	SERVICE	102	CORRIDOR	0	0.12	2	0	12	12	0.8	15	75	12	0.20	0.90
112	WOMENS RESTROOM	48	RESTROOM	0	0	0	0	0	0	0.8	0	50	8	0.00	0.90
113	MENS RESTROOM	48	RESTROOM	0	0	0	0	0	0	0.8	0	50	8	0.00	0.90
	GF-7	599				10					113	800	137		126

GAS FURNACE SCHEDULE															
TAG	MANUFACTURER	MODEL	GAS HEATING CAPACITY			SUPPLY FAN			ELECTRICAL DATA				WEIGHT (LBS.)	REMARKS	
			INPUT MBH	OUTPUT MBH	AFUE %	CFM	ESP IN. W.C.	O.S.A CFM	FAN (H.P.)	VOLTS	PHASE	MCA			MOCP
GF-1	TEMPSTAR	N95SN040	40	39	96	800	0.7	140	0.50	120	1	10.3	15	127	A,B,C,D,E
GF-2	TEMPSTAR	N95SN060	60	58	96	1200	0.7	340	0.75	120	1	12.9	15	139	A,B,C,D,E
GF-3	TEMPSTAR	N95SN060	60	58	96	1200	0.7	315	0.75	120	1	12.9	15	139	A,B,C,D,E
GF-4	TEMPSTAR	N95SN080	80	78	96	1600	0.7	530	1.00	120	1	16.3	20	155	A,B,C,D,E
GF-5	TEMPSTAR	N95SN060	60	58	96	800	0.7	225	0.50	120	1	9.8	15	129	A,B,C,D,E
GF-6	TEMPSTAR	N95SN060	60	58	96	1200	0.7	195	0.75	120	1	12.9	15	139	A,B,C,D,E
GF-7	TEMPSTAR	N95SN060	60	58	96	800	0.7	140	0.50	120	1	9.8	15	129	A,B,C,D,E

REMARKS:
A. ALL HVAC EQUIPMENT TO BE FIELD LABELED TO IDENTIFY WHICH AREAS OF THE BUILDING THEY SERVE.
B. MERV 8 PLEATED FILTER.
C. CONDENSING GAS FURNACE.
D. DISCONNECT SWITCH.
E. CASED COOLING COIL.

CONDENSING UNIT SCHEDULE															
TAG	MANUFACTURER	MODEL	NOMINAL TONNAGE	NET TOT BTUH	NET SENS BTUH	SEER	ELECTRICAL				WEIGHT (LBS.)	REMARKS			
							VOLTAGE	PHASE	FLA	MCA			MOCP		
CU-1	TEMPSTAR	NXA618GKA	1.5	18,118	13,235	16.0	208	1	-	11.8	20	125	A,B,C,D,E		
CU-2	TEMPSTAR	NXA636GKB	3.0	33,295	24,367	15.0	208	1	-	17.5	30	165	A,B,C,D,E		
CU-3	TEMPSTAR	NXA636GKB	3.0	33,295	24,367	15.0	208	1	-	17.5	30	165	A,B,C,D,E		
CU-4	TEMPSTAR	NXA648GKA	4.0	44,043	33,196	15.0	208	1	-	26.1	40	264	A,B,C,D,E		
CU-5	TEMPSTAR	NXA624GKA	2.0	23,576	17,534	15.0	208	1	-	17.7	30	165	A,B,C,D,E		
CU-6	TEMPSTAR	NXA636GKB	3.0	33,295	24,367	15.0	208	1	-	17.5	30	165	A,B,C,D,E		
CU-7	TEMPSTAR	NXA624GKA	2.0	23,576	17,534	15.0	208	1	-	17.7	30	165	A,B,C,D,E		
CU-8	CAPTIVE AIRE	A4-D.1000-920-MPU	5.0	59,050	44,288	14.0	208	3	17.4	21.4	30	-	A,B,C,D,E,F		
CU-9	CAPTIVE AIRE	A4-D.1000-920-MPU	5.0	59,050	44,288	14.0	208	3	17.4	21.4	30	-	A,B,C,D,E,F		

REMARKS:
A. ALL HVAC EQUIPMENT TO BE FIELD LABELED TO IDENTIFY WHICH AREAS OF THE BUILDING THEY SERVE.
B. COOLING CAPACITY BASED ON 80°F EDB67°F EWB AND 95°F CONDENSING TEMPERATURE.
C. COMPRESSOR START ASSIST, LIQUID SOLENOID VALVE, THERMOSTATIC EXPANSION VALVE(RPB), TIME-DELAY RELAY
D. PROVIDE CRANKCASE HEATER WHEN INTERCONNECTING TUBE LENGTH EXCEEDS 50 FT.
E. FREEZE PROTECTION REQUIRED FOR SYSTEMS OPERATING IN LOW DESIGN TEMPERATURES.
F. MOUNTED ON MAU.

MAKEUP AIR UNIT SCHEDULE																						
TAG	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP.	RPM	H.P.	B.H.P.	Ø	VOLT	FLA	COOLING COIL ENTERING DB TEMP.	COOLING COIL ENTERING WB TEMP.	COOLING COIL LEAVING DB TEMP.	COOLING COIL LEAVING WB TEMP.	COOLING COIL TOTAL CAPACITY	COOLING COIL SENSIBLE CAPACITY	COOLING COIL LATENT CAPACITY	WEIGHT (LBS.)	SONES	BURNER EFFICIENCY(%)
MAU-1	A4-D.1000-920-MPU	920	A4-D.1000	6,000	7,550	0.500	633	5.000	3.192	3	208	15.0	90.0°F	74.0°F	79.4°F	69.8°F	118.1 MBH	82.8 MBH	35.3 MBH	2,651	18.7	92

TAG	INPUT BTUs	OUTPUT BTUs	TEMP. RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE
MAU-1	566,858	521,509	65 deg F	7 in. w.c. - 14 in. w.c.	Natural

AIR DEVICE SCHEDULE								
TAG	MANUFACTURER	MODEL	FUNCTION	FACE SIZE	BORDER TYPE	MATERIAL	FINISH	REMARKS
CD-1	PRICE	SPD	SUPPLY	24x24	SURFACE/LAY-IN	STEEL	WHITE	A,B,C
CD-2	PRICE	SPD	SUPPLY	12x12	SURFACE/LAY-IN	STEEL	WHITE	A,B,C
CD-3	PRICE	PDDR	SUPPLY	24x24	LAY-IN	STEEL	WHITE	A,B
CD-4	PRICE	PDDR	SUPPLY	20x20	LAY-IN	STEEL	WHITE	A,B
LD-1	PRICE	TBDI3100	SUPPLY	48" LONG	SURFACE	STEEL	WHITE	A,B,D,E
LD-2	PRICE	TBDI3100	SUPPLY	48" LONG	SURFACE	STEEL	WHITE	A,B,D,F
RG-1	PRICE	630L	RETURN	24x24	SURFACE/LAY-IN	ALUMINUM	WHITE	B
RG-2	PRICE	630L	RETURN	24x12	LAY-IN	ALUMINUM	WHITE	B
RG-3	PRICE	630L	RETURN	24x14	SURFACE	ALUMINUM	WHITE	B
RG-4	PRICE	630L	RETURN	24x14	SURFACE	ALUMINUM	WHITE	-
RG-5	PRICE	630L	RETURN	18x12	SURFACE	ALUMINUM	WHITE	-

REMARKS:
A. PROVIDE VOLUME DAMPERS IN TAKEOFFS WHERE ACCESSIBLE. WHERE DAMPERS ARE NOT ACCESSIBLE, PROVIDE OPPOSED BLADE DAMPER AT DIFFUSER.
B. COORDINATE FRAME TYPE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
C. PLAQUE DIFFUSER.
D. INSULATED PLENUM.
E. (3) 1" SLOTS, 1 DIRECTED VERTICALLY ACROSS EXTERIOR WINDOW AND 2 INTO SPACE.
F. (2) 1" SLOTS, BOTH SLOTS DIRECTED AWAY FROM EACH OTHER IN SPACE.

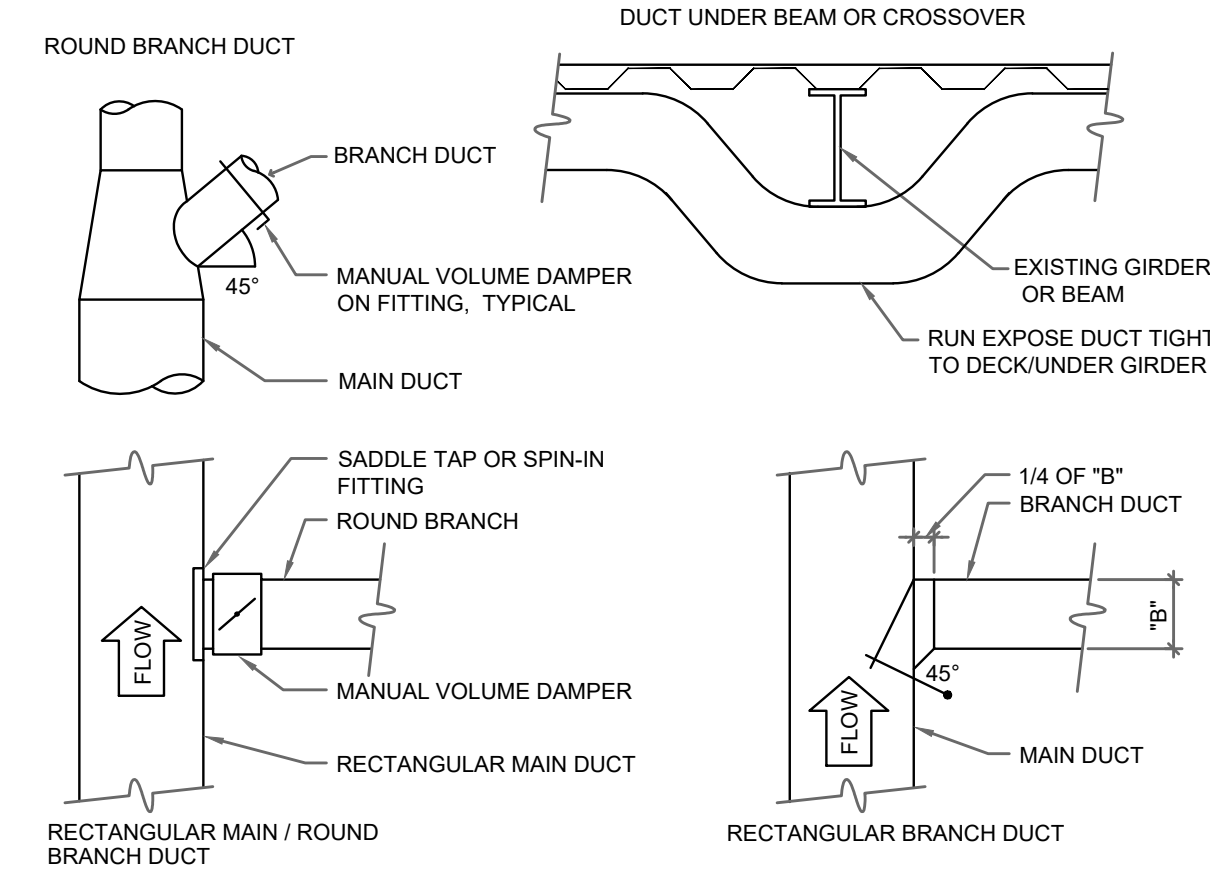
HOOD INFORMATION																	
HOOD NO.	TAG	MODEL	LENGTH	MAX COOKING TEMP.	EXHAUST PLENUM						TOTAL SUPPLY CFM	HOOD CONSTRUCTION	HOOD CONFIG.				
					TOTAL EXH. CFM	WIDTH	LENG.	HEIGHT	DIA.	VEL.			S.P.	END TO END	ROW		
1	H-1	5424 ND-2-PSP-F	11' 11"	600	3,200				4"	18"	3,200	1,811	-1.092'	2,700	430 SS 100%	LEFT	ALONE
2	H-2	5424 ND-2-PSP-F	11' 0"	600	2,950				4"	18"	2,950	1,669	-0.929'	2,550	430 SS 100%	RIGHT	ALONE
3	H-3	8024 ND-2-PSP-F	6' 0"	700	2,100				4"	16"	2,100	1,504	-1.208'	1,400	430 SS 100%	ALONE	ALONE
4	H-4	4824 VHB-G	4' 0"	700	800				4"	12"	800	1,019	-0.118'	0	430 SS 100%	ALONE	ALONE

AIR BALANCE SCHEDULE					
UNIT	EXHAUST		SUPPLY		OA CFM
	CFM	UNIT	CFM	UNIT	
EF-1	6,150	GF-1	600	140	
EF-2	2,100	GF-2	1,200	340	
EF-3	800	GF-3	1,200	315	
EF-4	75	GF-4	1,600	530	
EF-5	75	GF-5	800	225	
EF-6	75	GF-6	1,200	195	
		GF-7	800	140	
		MAU-1	7,550	7,550	
TOTAL	9,275		TOTAL	9,435	

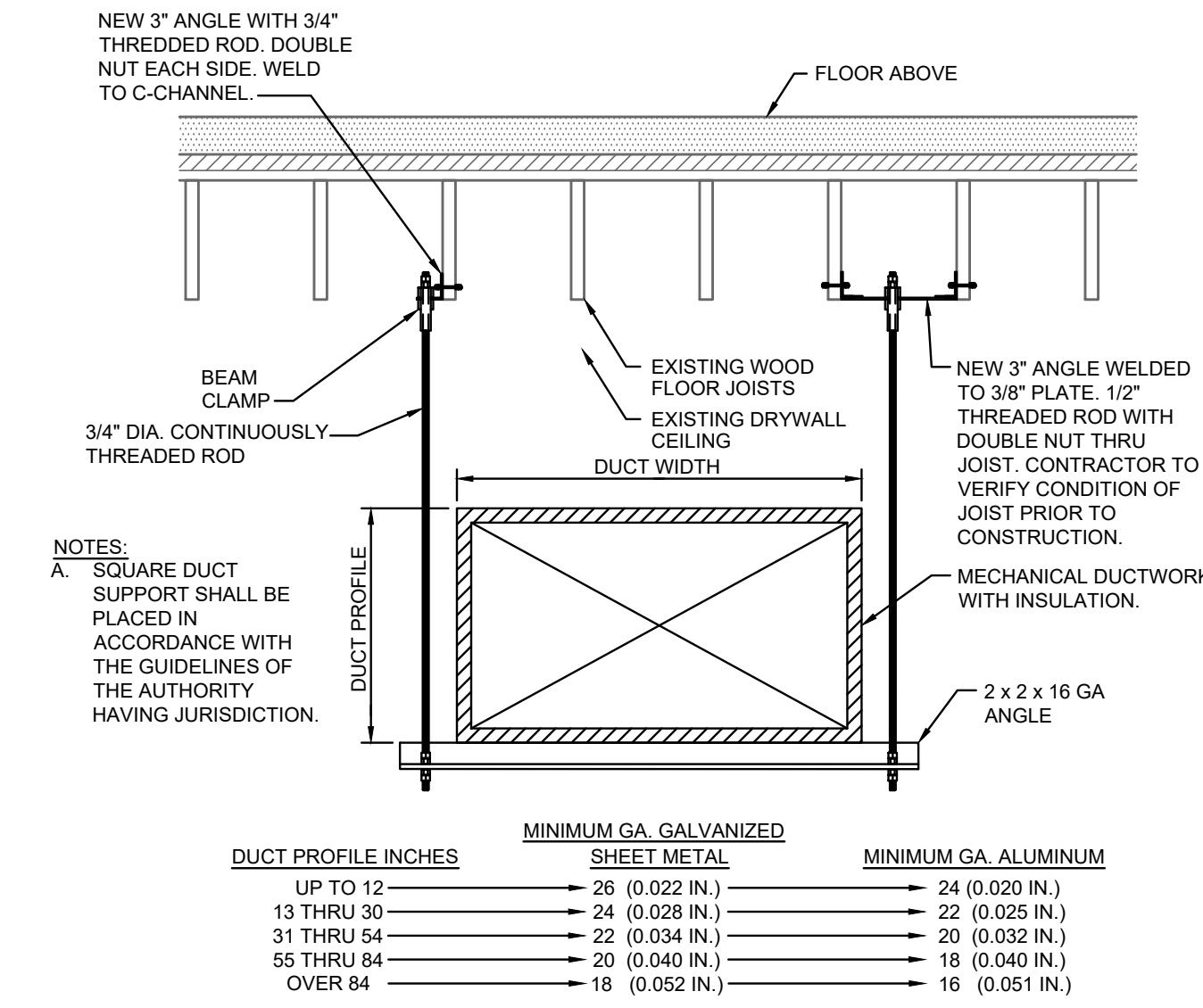
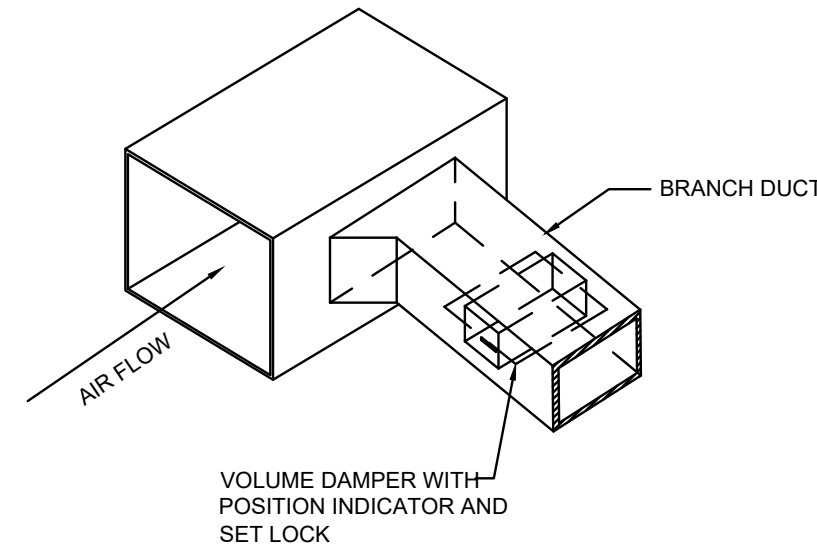
RESTAURANT IS 160 CFM POSITIVE

OUTSIDE AIR/EXHAUST FAN SCHEDULE															
TAG	MANUFACTURER	MODEL	CFM	ESP	RPM	WATTS	VOLTAGE	PHASE	FLA	WEIGHT (LBS.)	SONES	REMARKS			
EF-1	CAPTIVEAIRE	USB30DD-RM	6,150	1.875	876	-	208	3	22.3	1,004	26	A,B,C,D,I			
EF-2	CAPTIVEAIRE	USB18DD-RM	2,100	1.625	1,208	-	208	3	5.7	397	16.6	A,B,C,D,I			
EF-3	CAPTIVEAIRE	USB11DD-RM	800	0.75	1,518	-	120	1	5.6	176	-	A,C,D,I			
EF-4	GREENHECK	SP-890	75	0.25	700	21	120	1	0.18	10	1.2	D,E,F,G,H			
EF-5	GREENHECK	SP-890	75	0.25	700	21	120	1	0.18	10	1.2	D,E,F,G,H			
EF-6	GREENHECK	SP-890	75	0.25	700	21	120	1	0.18	10	1.2	D,E,F,G,H			
OA-1	GREENHECK	BSQ-140	1,885	1.0	1,451	-	208	3	3.5	111	14.1	D,F,H			

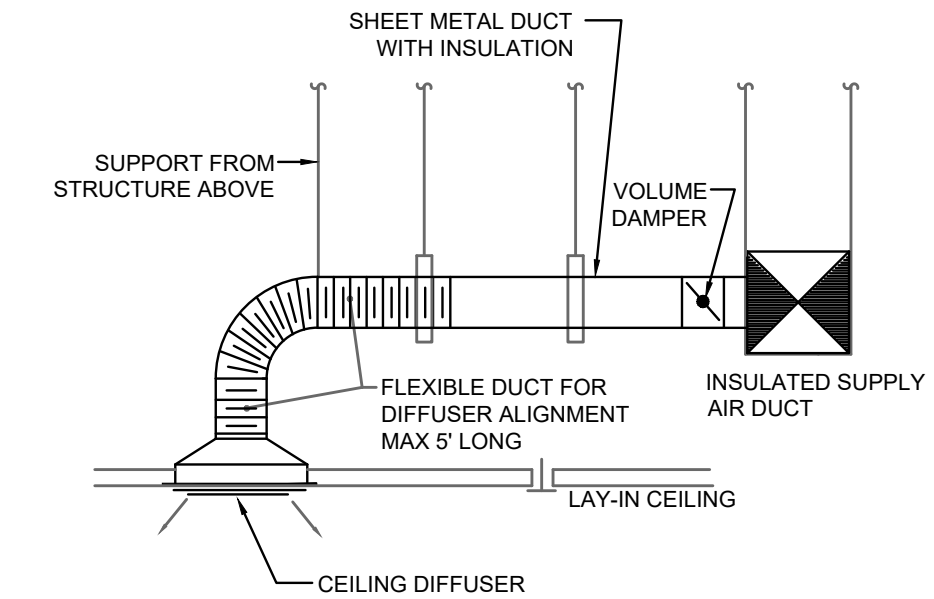
REMARKS:
A. FAN TO BE INTERLOCKED WITH MAU-1.
B. GREASE CUP.
C. VARIABLE SPEED CONTROL.
D. DISCONNECT SWITCH.
E. FAN TO BE ACTIVATED BY LIGHT SWITCH.
F. BACKDRAFT DAMPER.
G. ALUMINUM GRILLE WITH WHITE ENAMEL FINISH.
H. HANGING VIBRATION ISOLATORS.
I. DRAIN OUTLET.



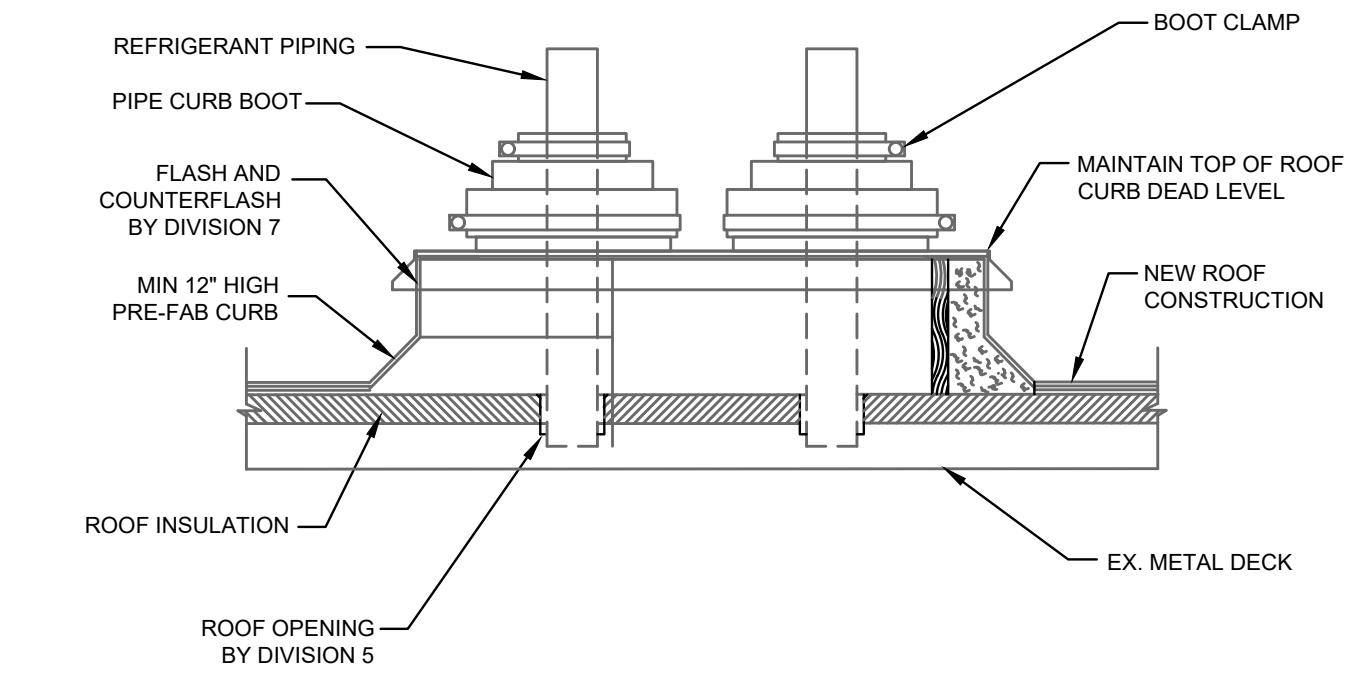
7 BRANCH DUCT TAKEOFF DETAIL
SCALE: NONE



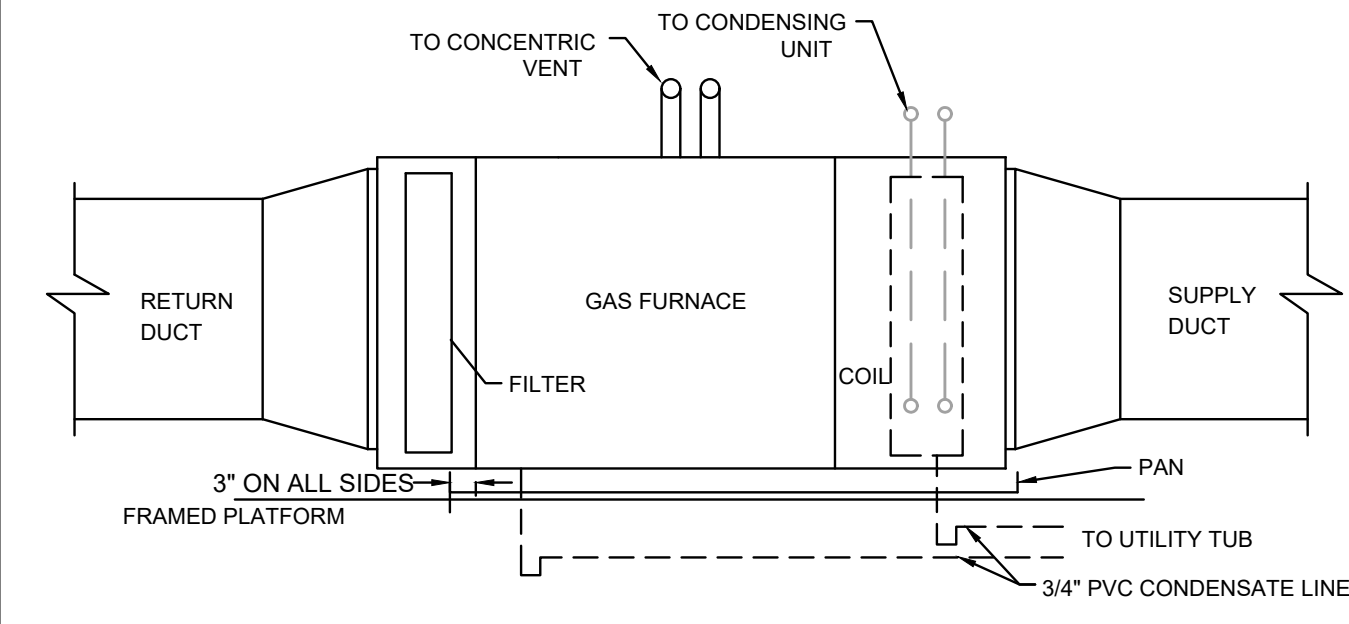
4 RECT DUCT SUPPORT DETAIL
SCALE: NONE



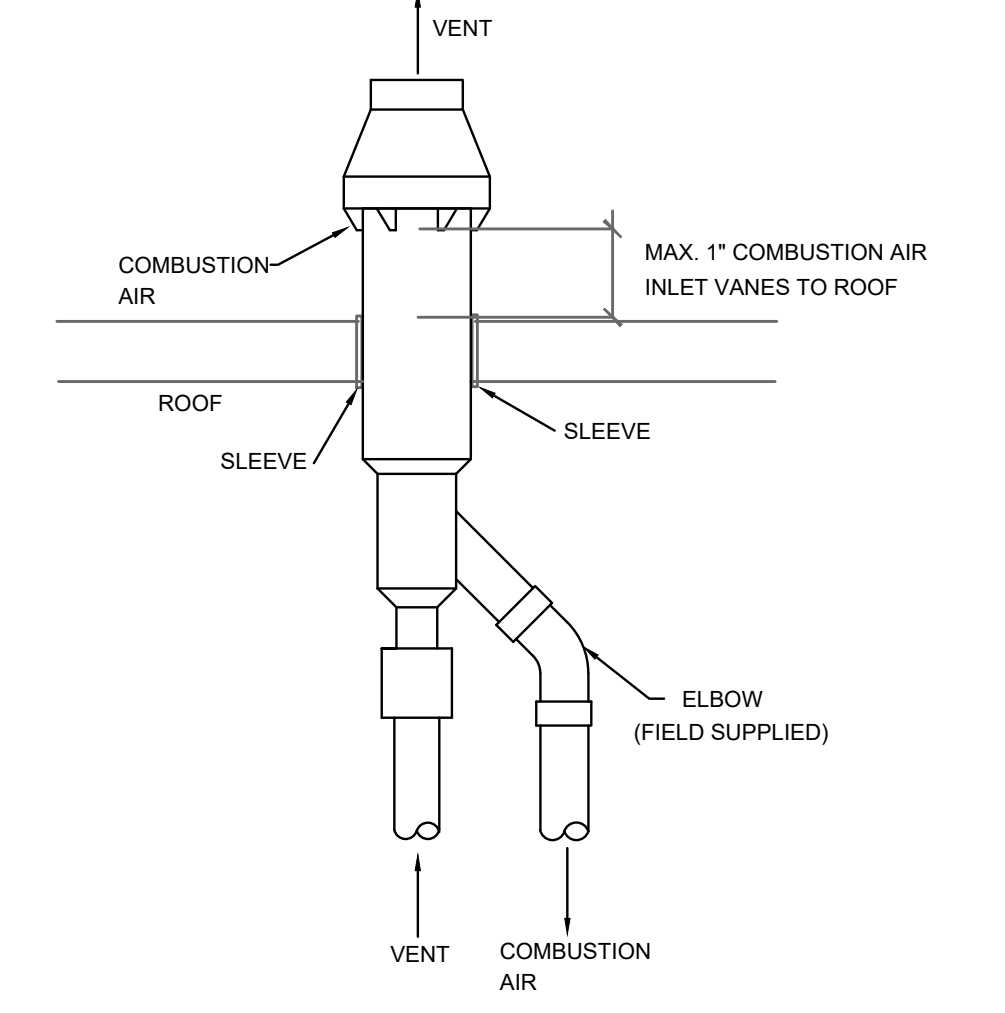
5 CEILING DIFFUSER DETAIL
SCALE: NONE



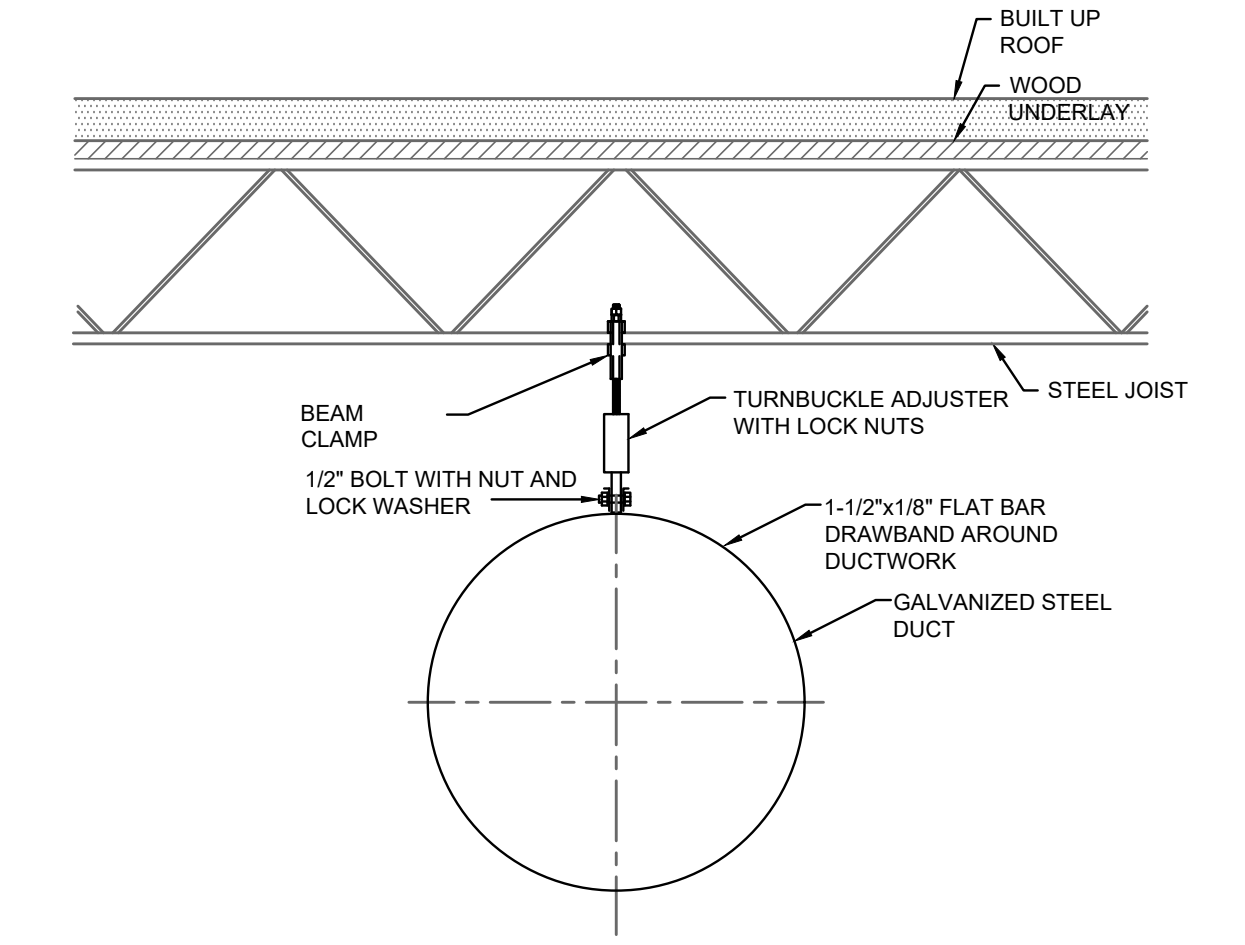
6 PIPING PENETRATION DETAIL
SCALE: NONE



1 CONDENSING FURNACE DETAIL
SCALE: NONE



2 CONCENTRIC TERMINAL ROOF DETAIL
SCALE: NONE



3 ROUND DUCT SUPPORT DETAIL
SCALE: NONE

DIVISION 23 MECHANICAL SPECIFICATIONS

23 05 01 COMMON REQUIREMENTS FOR HVAC

ALL MECHANICAL WORK AND TESTS SHALL BE DONE IN STRICT ACCORDANCE WITH THE LATEST STATE, COUNTY, AND LOCAL REGULATIONS, LAWS, AND ORDINANCES WHICH MAY BE APPLICABLE.

BEFORE SUBMITTING A BID, EXAMINE DOCUMENTS OF ALL OTHER TRADES, VISIT THE SITE AND GET ACQUAINTED WITH ALL CONDITIONS THAT MAY IN ANY WAY AFFECT THE EXECUTION OF THIS CONTRACT. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT SIZE AND LOCATIONS OF ALL OPENINGS REQUIRED. VERIFY INSTALLATION MAY BE MADE IN COMPLETE ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS. IN THE EVENT OF DISCREPANCY, IMMEDIATELY NOTIFY THE PROFESSIONAL ENGINEER OF RECORD. DO NOT PROCEED WITH THE INSTALLATION IN AREAS OF DISCREPANCY UNTIL ALL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

IT IS NOT THE INTENT OF THE DRAWINGS THAT EXISTING CONDITIONS BE ACCURATELY SHOWN. EXISTING MECHANICAL WORK IS SHOWN TO LIMITED EXTENT ON DRAWINGS AND IS SHOWN FOR GENERAL REFERENCE ONLY. LOCATIONS AND INFORMATION WERE DERIVED FROM CURSORY SITE VISUAL OBSERVATIONS OR FROM DOCUMENTS THAT WERE PREPARED FOR PREVIOUSLY INSTALLED WORK WHEN AVAILABLE.

THE WORK COVERED BY THESE SPECIFICATIONS SHALL CONSIST OF PROVIDING ALL NEW MATERIAL, LABOR, EQUIPMENT, AND SERVICES NECESSARY FOR A COMPLETE MECHANICAL INSTALLATION AS SPECIFIED HEREIN. WORK IN THIS SECTION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING ITEMS:

- SPLIT SYSTEMS
- TOILET EXHAUST FANS
- KITCHEN HOOD AND EXHAUST FAN
- LOW VOLTAGE THERMOSTATS/REMOTE SENSORS
- DUCT
- DAMPERS
- DIFFUSERS, REGISTERS, AND LOUVERS

WHENEVER THE WORDS "CONTRACTOR" APPEAR ON MECHANICAL DRAWINGS OR IN THESE SPECIFICATIONS, IT SHALL REFER TO THE MECHANICAL SUB-CONTRACTOR. WHENEVER THE WORD "PROVIDE" APPEARS IN THESE DOCUMENTS, IT SHALL BE INTERPRETED TO MEAN "FURNISH AND INSTALL".

COORDINATE ALL WORK WITH THE OWNER TO MINIMIZE INTERRUPTION OF BUILDING OPERATION.

COORDINATE THE INSTALLATION OF MECHANICAL ITEMS WITH THE SCHEDULES FOR WORK OF ALL OTHER TRADES TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

THIS CONTRACTOR SHALL VERIFY AND SATISFY HIMSELF THAT ALL EQUIPMENT FURNISHED WILL PROPERLY FIT IN THE SPACE PROVIDED, THAT IT WILL FUNCTION PROPERLY, AND THAT ALL PARTS OF EQUIPMENT REQUIRING SERVICE ARE READILY ACCESSIBLE.

ALL PIPING SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING WALLS AND FRAMING SYSTEM. ALL VERTICAL RUNS SHALL BE HELD AGAINST WALLS, COLUMNS, ETC., AS POSSIBLE TO PERMIT MAKING OF PIPE JOINTS.

CONTRACTOR SHALL PROVIDE A GUARANTEE IN WRITTEN FORM STATING THAT ALL WORK SHALL BE FREE OF DEFECTS OR ERRORS, AND ALL EQUIPMENT, MATERIALS, OR PARTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF OWNER'S FINAL ACCEPTANCE AND SHALL REPAIR, REVISE OR REPLACE AT NO COST TO THE OWNER ANY SUCH DEFECTS OCCURRING WITHIN THE GUARANTEE PERIOD.

CONTRACTOR SHALL ALSO STATE IN WRITTEN FORM THAT ANY ITEMS OR OCCURRENCES ARISING DURING THE GUARANTEE PERIOD WILL BE ATTENDED TO IN A TIMELY MANNER AND WILL IN NO CASE EXCEED THREE (3) WORKING DAYS FROM DATE OF NOTIFICATION BY OWNER.

PROVIDE A COMPLETE INSTALLATION IN CONFORMANCE WITH THE FOLLOWING STANDARDS.

- AGA: AMERICAN GAS ASSOCIATION
- ASHRAE: AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
- NFPA: NATIONAL FIRE PROTECTION ASSOCIATION
- SMACNA: SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
- STATEWIDE BUILDING CODE
- INTERNATIONAL MECHANICAL CODE

CONTRACTOR SHALL DO ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF THIS WORK. ALL OPENINGS IN WALLS, FLOORS OR CEILINGS SHALL BE PROPERLY SEALED AND RESTORED IN KIND. FLASH AND COUNTERFLASH AT ROOF OPENINGS.

ALL EQUIPMENT SHALL BE LISTED AND LABELED, UNLESS OTHERWISE APPROVED.

ALL WIRING SHALL MEET THE REQUIREMENTS LISTED IN THE ELECTRICAL SPECIFICATIONS. ALL CONTROL AND INTERLOCK WIRING AND CONDUIT (120V OR 24V) SHALL BE BY THE MECHANICAL CONTRACTOR.

EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE CONDITIONS OF LISTING AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THIS CODE.

CLEANING: THIS CONTRACTOR SHALL REMOVE FROM THE PREMISES ALL ACCUMULATION OF DIRT, DEBRIS, WASTE MATERIALS AND RUBBISH CAUSED BY HIS EMPLOYEES OR WORK, AT LEAST ONCE A WEEK, EXCEPT THAT COMBUSTIBLE MATERIALS SHALL BE REMOVED DAILY.

DURING PROGRESS OF THE WORK, MAINTAIN ON DRAWINGS AT THE SITE, AN ACCURATE RECORD OF THE INSTALLATION OF THE MECHANICAL SYSTEM, INDICATING ALL ITEMS WHICH HAVE BEEN CHANGED OR ADDED.

APPLY FOR AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY LOCAL AUTHORITY, FOR THE APPROVAL OF WORK.

A CERTIFICATE OF FINAL INSPECTION AND APPROVAL SHALL BE SUBMITTED WITH THE CONTRACTOR'S REQUEST FOR FINAL PAYMENT. NO FINAL PAYMENT WILL BE APPROVED WITHOUT THIS CERTIFICATE.

GUARANTEE ALL WORKMANSHIP, MATERIAL, AND EQUIPMENT AND REPLACE ANY FOUND DEFECTIVE WORK WITHOUT COST TO THE OWNER, FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.

EXISTING CONDITIONS

DO NOT REUSE REMOVED MECHANICAL MATERIALS UNLESS SPECIFICALLY INDICATED ON DRAWINGS. EXISTING SYSTEMS MAY BE UTILIZED ONLY TO THE EXTENT INDICATED ON DRAWINGS.

IF REQUIRED TO ACCOMMODATE CONSTRUCTION RELATED ACTIVITIES TEMPORARILY REMOVE, STORE IN PROTECTED LOCATION ON SITE, AND REINSTALL CONFLICTING MECHANICAL EQUIPMENT, OR DEVICES THAT ARE TO REMAIN OR TO BE RELOCATED.

WHERE THE TERM "DEMOLITION" IS USED HEREIN, INTERPRET IT TO MEAN "DEMOLITION" OR "SELECTIVE DEMOLITION" WHERE APPLICABLE.

PROVIDE MECHANICAL DEMOLITION WORK AS REQUIRED TO ACCOMMODATE PROJECT DEMOLITION AND AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION. DISCONNECT AND REMOVE WORK TO BE ABANDONED, AND AS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES, IN AREAS AFFECTED BY THIS PROJECT.

LEGALLY DISPOSE OF MATERIALS TO SALVAGED OR RETAINED.

23 05 03 SUBMITTALS FOR MECHANICAL SYSTEMS

DESIGN BASIS MANUFACTURERS OF MATERIAL AND EQUIPMENT ARE SPECIFIED AND PLANS ARE DETAILED ACCORDING TO THIS MATERIAL. CONTRACTOR SHALL BASE HIS BID ON FURNISHING AND INSTALLING THIS MAKE OF MATERIAL AND EQUIPMENT.

AN ACCEPTABLE MANUFACTURER'S NAME AND MODEL NUMBER OF A PRODUCT MAY BE PROVIDED IN THESE DOCUMENTS. THIS IS THE EQUIPMENT INCLUDED DURING THE DESIGN PROCESS AND FORMS THE BASIS OF A STANDARD OF QUALITY. WHERE MORE THAN ONE MAKE OF MATERIAL OR EQUIPMENT IS SPECIFIED, THE CONTRACTOR SHALL STATE IN HIS BID WHICH MAKE HE PROPOSES TO FURNISH AND INSTALL. SHOP DRAWING APPROVAL SHALL BE OBTAINED PRIOR TO SHIPMENT OF EQUIPMENT.

VERIFY THE MODEL NUMBER OR PRODUCT IS STILL ACCURATE AND MEETS ALL REQUIREMENTS SHOWN ON THE DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN THE REQUIREMENTS AND THE PRODUCT OR MODEL NUMBER, THE STRICTER OF THE TWO SHALL GOVERN.

SUBMIT SHOP DRAWINGS AND/OR PRODUCT DATA (ELECTRONIC COPIES) ON THE FOLLOWING ITEMS FOR REVIEW BEFORE FABRICATION OR SHIPMENT:

- SPLIT SYSTEMS
- TOILET EXHAUST FANS
- KITCHEN HOOD AND EXHAUST FAN
- LOW VOLTAGE THERMOSTATS/REMOTE SENSORS
- DUCT
- DAMPERS
- DIFFUSERS, REGISTERS, AND LOUVERS

MAINTENANCE MANUALS: THE MANUALS SHALL INCLUDE WIRING DIAGRAMS, MAINTENANCE AND OPERATING INSTRUCTIONS, PARTS LISTINGS, AND COPIES OF OTHER SUBMITTALS INDICATED FOR INCLUSION.

REVIEW AND CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS, PRODUCT DATA: CATALOGS, CUT SHEETS, CHARTS, AND OTHER ITEMS DURING CONSTRUCTION PHASE SUBMITTAL REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS, FOR PROVIDING A COMPLETE AND FUNCTIONING PROJECT, NOR SHALL THEY RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS OR ERRORS OF ANY SORT. THIS REVIEW IS FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED IN THE CONTRACT DOCUMENTS. CONTRACTOR REMAINS RESPONSIBLE FOR DETERMINING THE ACCURACY AND COMPLETENESS OF OTHER DETAILS SUCH AS DIMENSIONS AND QUANTITIES, FOR SUBSTANTIATING

INSTRUCTIONS FOR INSTALLATIONS, VERIFYING MATERIALS REQUIRED, OBTAINING FIELD MEASUREMENTS AND RELATED CRITERIA, COORDINATING WORK WITH OTHER DISCIPLINES AND PERFORMING WORK IN COMPLIANCE WITH THE CONTRACT DOCUMENTS.

ANY CHANGES TO ITEMS SPECIFIED MUST BE SUBMITTED IN WRITING AS A SUBSTITUTION, WITH COMPLETE DOCUMENTATION OF PRICE DIFFERENTIAL AND EQUIPMENT DETAILS. ANY SUBSTITUTIONS PROVIDED SHALL BE REVIEWED AT MARQUE ENGINEERING'S HOURLY RATES. REVIEW SHALL BE PAID FOR BY THE CONTRACTOR TO MARQUE ENGINEERING AT NO COST TO THE OWNER. BY USING PRE-APPROVED SUBSTITUTIONS, THE CONTRACTOR ACCEPTS ALL RESPONSIBILITY AND ASSOCIATED COSTS FOR ALL REQUIRED MODIFICATIONS TO THE CONTRACT DOCUMENTS TO INCLUDE BUT NOT LIMITED TO MATERIAL OR EQUIPMENT COSTS FOR THEIR OR OTHER TRADES, AND ENSURING THAT SUBSTITUTED MATERIALS AND EQUIPMENT TO BE FURNISHED FIT INTO SPACE AVAILABLE.

EXTENSIVE REVISIONS NECESSITATED TO THE CONTRACT DOCUMENTS, OR SUBSTITUTION ACTIONS RELATED TO ANY SPECIFIED PRODUCT NOT ABLE TO BE PROVIDED DUE TO A FAILURE TO COMMENCE WORK, RELEASE PRODUCT OR COORDINATE CONSTRUCTION ACTIVITIES SHALL BE PROVIDED AT MARQUE ENGINEERING'S HOURLY RATES. COSTS SHALL BE BORN BY THE CONTRACTOR AT NO COST TO THE OWNER.

23 05 29 HANGERS AND SUPPORTS

SUPPORT ALL PIPING, DUCTWORK AND EQUIPMENT BY HANGERS OR BRACKETS. FURNISH STRUCTURAL STEEL MEMBERS WHERE REQUIRED TO SUPPORT PIPING AND EQUIPMENT. NO PORTION OF PIPING OR VALVES SHALL BE SUPPORTED BY EQUIPMENT.

DUCTWORK - SUPPORT BY MEANS OF HANGERS AS FOLLOWS:

DUCT WIDTH 30 OR LESS
HANGER SIZE (16 GAUGE)

TYPE MAX SPACING 8

A PAIR OF HANGERS SHALL BE LOCATED AT EVERY TRANSVERSE JOINT AND ELSEWHERE ACCORDING TO THE TABLE.

23 05 93 HVAC SYSTEM TESTING ,ADJUSTING AND BALANCING FOR HVAC

ALL SYSTEMS AND EQUIPMENT SHALL BE CAREFULLY ADJUSTED TO PROVIDE COMFORTABLE AND UNIFORM CONDITIONS IN EACH AND EVERY SPACE TO THE OWNER'S SATISFACTION. PROVIDE ANY REQUIRED DRIVES TO SATISFY QUANTITIES INDICATED. PROVIDE A CERTIFIED AIR BALANCE OF THE DIFFUSERS AND AIR HANDLERS.

AIR SYSTEM:

AIR BALANCE AND TESTING SHALL NOT BEGIN UNTIL THE SYSTEM HAS BEEN COMPLETED AND IS IN FULL WORKING ORDER. CONTRACTOR SHALL PUT ALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEM AND EQUIPMENT INTO FULL OPERATION AND SHALL CONTINUE THE OPERATION OF SAME DURING EACH WORKING DAY OF TESTING AND BALANCING. CONTRACTOR SHALL SUBMIT WITHIN 30 DAYS AFTER RECEIPT OF CONTRACT, COPIES OF SUBMITTAL DATA FOR THE TESTING AND BALANCING OF THE AIR CONDITIONING, HEATING, AND VENTILATING SYSTEMS. THE AIR BALANCE AND TESTING AGENCY SHALL PROVIDE PROOF OF HAVING SUCCESSFULLY COMPLETED AT LAST FIVE PROJECTS OF SIMILAR SIZE AND SCOPE.

CONTRACTOR SHALL PROCURE THE SERVICES OF AN INDEPENDENT AIR BALANCE AND TESTING AGENCY, APPROVED BY THE ENGINEER, AND A MEMBER OF AABC OR NEBB, WHICH SPECIALIZES IN THE BALANCING AND TESTING OF HEATING VENTILATION AND AIR CONDITIONING SYSTEMS, TO BALANCE, ADJUST AND TEST AIR MOVING EQUIPMENT AND AIR DISTRIBUTION OR EXHAUST SYSTEMS AS HEREIN SPECIFIED.

ALL WORK BY THIS AGENCY SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A QUALIFIED HEATING AND AIR CONDITIONING ENGINEER EMPLOYED BY THIS AGENCY. ALL INSTRUMENTS USED BY THIS AGENCY SHALL BE ACCURATELY CALIBRATED AND MAINTAINED IN GOOD WORKING ORDER.

23 07 13 DUCT INSTALLATION

INSULATE ALL SUPPLY, DIFFUSER PLENUMS, AND OUTSIDE AIR DUCTWORK OF ALL UNITS WITH OWENS CORNING "ALL SERVICE" TYPE I 150 GLASS FIBER INSULATION UNLESS OTHERWISE NOTED. INSULATION SHALL BE 1-1/2" THICK (2" THICK FOR SUPPLY AND RETURN IN TRUSS SPACE). 1.5 PCF. DENSITY WITH FRK JACKET .002 THICK REINFORCED ALUMINUM FOIL VAPOR BARRIER. INSULATION SHALL CONFORM TO NFPA 90A AND 90B PER ASTM E-84 FOR FLAME SPREAD AND SMOKE DEVELOPED RATING.

INSULATE ALL EXTERIOR SUPPLY AND RETURN DUCTWORK WITH RIGID FIBERGLASS BOARD INSULATION WITH OUTDOOR JACKET. INSULATION SHALL BE 2" THICK WITH A K' VALUE OF 0.23 AT 75 F. INSTALL ON DUCTWORK USING IMPALE ANCHORS AND WIRES. SEAL VAPOR BARRIER WITH VAPOR BARRIER ADHESIVE.

PROVIDE INSULATION ON ALL CONCEALED SUPPLY, RETURN DUCTWORK. ALL LINERS, INSULATION AND ADHESIVES SHALL HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50.

RIGID FIBERGLASS DUCTWORK INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE II, WITHOUT FACING AND WITH VAPOR BARRIER ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING SCRIM, ALUMINUM FOIL, AND VINYL FILM. INSULATION SHALL HAVE A MINIMUM R VALUE AS REQUIRED BY CODE.

FLEXIBLE FIBERGLASS DUCTWORK INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II, WITHOUT FACING AND WITH VAPOR BARRIER ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING SCRIM, ALUMINUM FOIL, AND VINYL FILM. INSULATION SHALL HAVE A MINIMUM R VALUE AS REQUIRED BY CODE.

VAPOR BARRIER MATERIAL FOR DUCTWORK: PAPER-BACKED ALUMINUM-FOIL, EXCEPT AS OTHERWISE INDICATED; STRENGTH AND PERMEABILITY RATING EQUIVALENT TO FACTORY-APPLIED VAPOR BARRIERS ON ADJOINING DUCTWORK INSULATION, WHERE AVAILABLE; WITH FOLLOWING ADDITIONAL CONSTRUCTION CHARACTERISTICS:

HIGH PUNCTURE RESISTANCE: LOW VAPOR TRANSMISSION (FOR DUCTS IN EXPOSED AREAS: MECH. ROOMS, ETC.)
MODERATE PUNCTURE RESISTANCE: MEDIUM VAPOR TRANSMISSION (FOR DUCTS IN CONCEALED AREAS).

INSTALLATION IS NOT PERMITTED ABOVE DRYWALL CEILINGS AND INACCESSIBLE CEILINGS.

23 09 93 SEQUENCE OF OPERATION

CONDENSING FURNACE

STARTUP

THE UNIT SHALL OPERATE ON A 7 DAY/NIGHT PROGRAMMABLE THERMOSTAT. DURING STARTUP, THE FAN SHALL RUN WITH THE DAMPERS IN THE FULL RECIRCULATION POSITION. PROVIDE OCCUPIED CHANGEOVER SEQUENCE WITH OPTIMUM START FUNCTION. WHEN THE RETURN AIR TEMPERATURE REACHES OCCUPIED SETPOINT (ADJUSTABLE), THE MINIMUM OUTSIDE AIR DAMPER SHALL OPEN TO THE CONTROLLED MINIMUM OUTDOOR AIR POSITION.

SUPPLY FAN CONTROL

THE SUPPLY FAN SPEED SHALL BE CONSTANT AND SET TO THE REQUIRED CFM.

SPACE TEMPERATURE CONTROL

PROVIDE LOCAL WALL MOUNTED ROOM TEMPERATURE THERMOSTAT WITH DIGITAL DISPLAY OF ROOM TEMPERATURE AND SETPOINT (+/- DEG. F. ADJUSTABLE), AND OVERRIDE FEATURE. PROVIDE REMOTE SENSOR TO MONITOR SPACE TEMPERATURE AND MAINTAIN THERMOSTAT SETPOINT.

MINIMUM OUTSIDE AIR CONTROL

DURING OCCUPIED MODE THE MINIMUM OUTSIDE AIR DAMPER SHALL BE OPEN. PROVIDE MOTORIZED OUTDOOR AIR DAMPER.

COOLING CONTROL

COOLING SHALL BE CONTROLLED TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A CALL FOR COOLING THE HEATING SHALL BE OFF. ON A FURTHER CALL FOR COOLING, ENABLE THE ECONOMIZER MODE. ON A FURTHER CALL FOR COOLING, DISABLE THE ECONOMIZER MODE AND THE MECHANICAL COOLING SHALL BE STAGED ON.

HEATING CONTROL

HEATING SHALL BE CONTROLLED TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A CALL FOR HEATING, THE MECHANICAL COOLING SHALL BE OFF. ON A FURTHER CALL FOR HEATING, THE ECONOMIZER MODE SHALL BE DISABLED. ON A FURTHER CALL FOR HEATING THE GAS HEATING SHALL BE STAGED ON.

UNOCCUPIED MODE

DURING THE UNOCCUPIED MODE OF OPERATION, THE RTU CONDENSING FURNACE SHALL GO INTO NIGHT SETBACK MODE. AT NIGHT SETBACK/SHUTDOWN THE RTU CONDENSING FURNACE SHALL GO TO FAIL SAFE POSITION. FAIL SAFE POSITION IS DEFINED BY THE FOLLOWING: THE SUPPLY FAN IS OFF, THE OUTDOOR AIR INTAKE DAMPER IS CLOSED, THE HEATING IS OFF AND THE MECHANICAL COOLING IS OFF. THE SUPPLY FAN SHALL CYCLE IN CONJUNCTION WITH EITHER THE HEATING OR COOLING SYSTEM TO MAINTAIN A MINIMUM/MAXIMUM SPACE TEMPERATURE DEPENDING ON THE SEASON.

LOW VOLTAGE THERMOSTATS SHALL BE PROVIDED AND WIRED BY THE HVAC CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE 4" SQUARE X 1- 1/2" DEEP WALL OUTLET BOXES (WITH SINGLE-GANG RINGS) FOR ALL THERMOSTATS/SENSORS. ELECTRICAL CONTRACTOR SHALL PROVIDE ONE 3/4" EMPTY CONDUIT FROM EACH THERMOSTAT/SENSOR LOCATION, TURNED OUT ABOVE ACCESSIBLE CEILING (IN JOIST SPACE OR AGAINST OVERHEAD SLAB/DECK). HVAC/TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE ALL OTHER NECESSARY CONDUIT, RACEWAY AND WIRING RELATED WORK. CONDUIT SHALL BE IDENTIFIED IN CEILING CAVITY AND SHALL BE PROVIDED WITH SWEEP BENDS, BUSHINGS AND DRAGLINE.

EXHAUST FANS SHALL BE TIED TO LIGHT SWITCH, WHICH SHALL BE FURNISHED, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR. WHEN ACTIVATED, EXHAUST FAN MOTOR DAMPER SHALL OPEN AND FAN SHALL START.

KITCHEN HOOD EXHAUST FANS: PROVIDE HEAT DETECTOR IN HOOD COLLAR INTERLOCKED TO FAN OPERATION. KITCHEN HOOD EXHAUST SYSTEM SHALL BE INITIATED BY THE HEAT DETECTOR. PROVIDE INDICATOR LIGHT ON FACE OF HOOD. AT STARTUP, ENERGIZE EXHAUST FAN MOTOR. INTERLOCK TO MAKEUP AIR SYSTEM (WHETHER DEDICATED

MAKEUP AIR OR MAKEUP AIR FROM HVAC SYSTEM), SO THAT MAKEUP AIR IS PROVIDED WHENEVER EXHAUST FAN IS RUNNING. EXHAUST FAN SHALL RUN CONTINUOUSLY AT CONSTANT SPEED. AT SHUTDOWN, THE EXHAUST FAN SHALL STOP.

PROVIDE ALL CONTROLS AND WIRING FOR COMPLETE INTERLOCK AND OPERATION OF KITCHEN HOOD, EXHAUST FAN, ROOFTOP UNIT, ETC. AND ALL ASSOCIATED MOTOR DAMPERS.

ALL DUCT SMOKE DETECTORS WILL BE FURNISHED BY ELECTRICAL CONTRACTOR, INSTALLED BY THE HVAC CONTRACTOR, AND WIRED BY THE ELECTRICAL CONTRACTOR PER LOCAL CODES. HVAC CONTRACTOR WILL INTERLOCK FAN WITH SMOKE DETECTOR.

MOTOR OPERATED DAMPERS: ALL FRESH AIR INTAKES AND EXHAUST LOUVERS SHALL HAVE MOTOR OPERATED DAMPERS. DAMPERS SHALL BE LOW LEAK WITH BLADE AND EDGE SEALS. MOTOR OPERATED DAMPERS SHALL BE PROVIDED, INSTALLED AND WIRED BY THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED. PROVIDE ALL NECESSARY TRANSFORMERS, CONTACTORS, CONTROLS AND WIRING FOR INTERLOCKING EQUIPMENT TO MOTOR OPERATED DAMPERS.

23 22 00 CONDENSATE DRAIN PIPING

INSTALL TRAP AT EVAPORATOR COIL DRAIN. EXTEND DRAIN LINE FROM COIL TRAP TO DRAIN. PIPING SHALL BE STANDARD WEIGHT, PVC PIPE AND FITTINGS AND WITH JOINTS OF PVC SOLVENT CEMENT. PROVIDE CLEANOUTS THROUGHOUT RUN AND AT TOPS OF TRAPS.

23 30 00 AIR DISTRIBUTION SYSTEM

CEILING AIR DIFFUSERS:

SQUARE: SQUARE HOUSING, CORE OF SQUARE CONCENTRIC LOUVERS, SQUARE OR ROUND DUCT CONNECTION.

LINEAR:

EXTRUDED ALUMINUM CONTINUOUS SLOT, SINGLE OR MULTIPLE.

DIFFUSER MOUNTINGS:

SURFACE MOUNT: DIFFUSER SHALL HAVE ROLLED EDGE BELOW FINISHED CEILING FOR SURFACE MOUNTING OR DIFFUSER SHALL BE FURNISHED WITH ACCESSORY PLASTER FRAME.

LAY-IN:

DIFFUSER HOUSING SIZED TO FIT BETWEEN CEILING EXPOSED SUSPENSION TEE BARS AND REST ON TOP SURFACE OF TEE BAR.

DIFFUSER ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

DIFFUSER ACCESSORIES: PLASTER RING; PERIMETER RING DESIGNED TO ACT AS PLASTER STOP AND DIFFUSER ANCHOR.

DIFFUSER FINISHES: WHITE ENAMEL; SEMI-GLOSS WHITE ENAMEL PRIME FINISH.

CEILING AND WALL REGISTERS & GRILLES:

STEEL CONSTRUCTION: MANUFACTURER'S STANDARD STAMPED SHEET STEEL FRAME AND ADJUSTABLE BLADES.

REGISTER AND GRILLE FINISHES: WHITE ENAMEL; SEMI-GLOSS WHITE ENAMEL PRIME FINISH.

REGISTER AND GRILLE ACOUSTIC PERFORMANCE: NC LESS THAN OR EQUAL TO 30

23 31 13 METAL DUCTS

CONSTRUCTION, INSTALLATION AND SUPPORT OF ALL DUCTWORK SHALL CONFORM TO THE LATEST EDITION OF SMACNA "HVAC DUCT CONSTRUCTION STANDARD-METAL AND FLEXIBLE".

ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ACHIEVE AIR-TIGHT (5% LEAKAGE FOR SYSTEMS RATED 3" AND UNDER; 1% FOR SYSTEMS RATED OVER 3") AND NOISELESS (NO OBJECTIONABLE NOISE) SYSTEMS. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY AT CONNECTIONS, WITHIN 1/8" MISALIGNMENT TOLERANCE AND WITH INTERNAL SURFACES SMOOTH.

SUPPORT VERTICAL DUCTS AT EVERY FLOOR. SUPPORT DUCT WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING 10 FEET.

DUCTS SHALL BE GALVANIZED SHEET METAL OF STANDARD GAUGES. DUCTWORK SHALL HAVE A MINIMUM THICKNESS OF 24 GAUGE. ALL DUCT ELBOWS SHALL BE EITHER FULL RADIUS OR WITH TURNING VANES.

WHERE DUCTWORK IS INDICATED TO BE EXPOSED IN OCCUPIED SPACES, PROVIDE MATERIALS WHICH ARE FREE FROM VISUAL IMPERFECTIONS INCLUDING PITTING, SEAM MARKS, ROLLER MARKS, STAINS AND DISCOLORATIONS, AND OTHER IMPERFECTIONS, INCLUDING THOSE WHICH WOULD IMPAIR PAINTING.

EXPOSED DUCTWORK WHICH IS TO BE PAINTED SHALL HAVE PAINT GRIP APPLIED.

PROVIDE VOLUME DAMPERS IN ALL BRANCH DUCTS OR AS REQUIRED FOR BALANCING TO REQUIRED AIR FLOWS.

PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15 DEG. CHANGE OF DIRECTION PER SECTION. UNLESS DETAILED OTHERWISE, USE 45 DEG. LATERALS AND 45 DEG. ELBOWS FOR BRANCH TAKEOFF CONNECTIONS. WHERE 90 DEG. BRANCHES ARE INDICATED, PROVIDE CONICAL TYPE TEES.

PROVIDE DUCT SEALANT AND/OR CEMENT WHICH IS NON-HARDENING, NON-MIGRATING MASTIC OR OF LIQUID ELASTIC SEALANT, TYPE APPLICABLE FOR FABRICATION/INSTALLATION DETAIL, AS COMPOUNDED AND RECOMMENDED BY MANUFACTURER SPECIFICALLY FOR SEALING JOINTS AND SEAMS IN DUCTWORK.

FLEXIBLE DUCTS SHALL EITHER BE SPIRAL-WOUND SPRING STEEL WITH FLAMEPROOF VINYL SHEATHING OR CORRUGATED ALUMINUM. THE MAXIMUM LENGTH OF FLEX DUCT ON THE SUPPLY ELBOWS IS 5 FEET. FLEX IS NOT ALLOWED FOR RETURN, RELIEF OR EXHAUST APPLICATIONS.

FLEXIBLE DUCTS SHALL CONFORM TO THE REQUIREMENTS OF UL 181 FOR CLASS 0 OR CLASS 1 FLEXIBLE AIR DUCTS AND SHALL BE SO IDENTIFIED.

WHERE INSTALLED IN UNOCCUPIED SPACES OTHER THAN RETURN AIR PLENUMS, PROVIDE 1" THICK 1-1/2 LB. CONTINUOUS FLEXIBLE FIBERGLASS SHEATH WITH VINYL VAPOR BARRIER JACKET.

SHOP FABRICATE DUCTWORK IN 4, 8, 10 OR 12-FT LENGTHS, OR REQUIRED TO COMPLETE RUNS.

FABRICATE DUCTWORK WITH DUCT LINER IN EACH SECTION OF DUCT WHERE INDICATED. LAMINATE LINER TO INTERNAL SURFACES OF DUCT IN ACCORDANCE WITH INSTRUCTIONS BY MANUFACTURERS OF LINING AND ADHESIVE, AND FASTEN WITH MECHANICAL FASTENERS. DUCT LINER TO BE 3-LB DENSITY FOR ACOUSTIC REQUIREMENTS 1" THICK OR AS NOTED. SIZE OF DUCTWORK SHOWN ON THE DRAWINGS IS FREE NET AREA, OUTSIDE DIMENSION OF DUCTS WILL NEED TO BE INCREASED IF LINED DUCT IS USED.

DAMPERS WITH LOCKING DEVICE, WHERE ACCESSIBLE, SHALL BE RUSKIN MD-35, OPPOSED BLADE FOR RECTANGULAR DUCTS 12 INCHES AND ABOVE, AND MODEL MD-25 PARALLEL BLADE FOR DUCTS 10 INCHES AND BELOW, AND MODEL MDRS-25 FOR ROUND DUCTS. INSTALL PER MANUFACTURER'S INSTRUCTIONS. SINGLE BLADE ROUND DAMPERS WITH LOCKING DEVICE SHALL BE IN SPIN-IN COLLARS.

FIRE DAMPERS SHALL BE RUSKIN MODEL 180, STYLE B WITH BLADE PACKAGE OUT OF AIR STREAM. HORIZONTAL, INSTALL WHERE INDICATED ON DRAWINGS AND AS REQUIRED BY AUTHORITY HAVING LOCAL JURISDICTION.

ELECTRIC MOTORIZED DAMPER SHALL BE SIZED TO OPERATE WITH SUFFICIENT RESERVE POWER TO PROVIDE SMOOTH MODULATING ACTION OR TWO-POSITION ACTION. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

23 38 13.00 - COMMERCIAL KITCHEN HOODS AND DUCTWORK

TYPE I HOOD

REFER TO CAPTIVE AIRE DRAWINGS FOR SPECIFICATIONS.

INSPECTION

GENERAL: EXAMINE AREAS AND CONDITIONS UNDER WHICH EQUIPMENT IS TO BE INSTALLED. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

INSTALLATION

COORDINATE WORK WITH WORK OF ROOFING, WALLS, AND CEILINGS, AS NECESSARY FOR PROPER INTERFACING. DUCT CONNECTIONS TO BE PROVIDED BY THE HVAC CONTRACTOR.

REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS.

ELECTRICAL WIRING:

INSTALL ELECTRICAL DEVICES FURNISHED BY MANUFACTURER BUT NOT SPECIFIED TO BE FACTORY-MOUNTED. FURNISH COPY OF MANUFACTURER'S WIRING DIAGRAM SUBMITTAL TO ELECTRICAL INSTALLER.

VERIFY THAT ELECTRICAL WIRING INSTALLATION IS IN ACCORDANCE WITH MANUFACTURER'S SUBMITTAL AND INSTALLATION REQUIREMENTS OF DIVISION-16 SECTIONS.

ENSURE THAT ROTATION IS IN DIRECTION INDICATED AND INTENDED FOR PROPER PERFORMANCE.

DO NOT PROCEED WITH CENTRIFUGAL FAN START-UP UNTIL WIRING INSTALLATION IS ACCEPTABLE TO FAN INSTALLER.

FIELD QUALITY CONTROL

TESTING: AFTER INSTALLATION OF HOOD EXHAUST SYSTEM HAS BEEN COMPLETED, TEST EACH SYSTEM TO DEMONSTRATE PROPER OPERATION OF UNITS AT PERFORMANCE REQUIREMENTS SPECIFIED. WHEN POSSIBLE, FIELD CORRECT MALFUNCTIONING UNITS, THEN RETEST TO DEMONSTRATE COMPLIANCE. REPLACE UNITS WHICH CANNOT BE SATISFACTORILY CORRECTED.

PROVIDE TESTING, PERMITS AND APPROVALS AS REQUIRED BY STATE AND LOCAL AUTHORITIES.

ADJUSTING AND CLEANING

CLEAN FACTORY-FINISHED SURFACES.

REPAIR ANY MARRED OR SCRATCHED SURFACES.

TYPE I KITCHEN GREASE DUCT SPECIFICATION

FURNISH SINGLE WALL 16 GAUGE CARBON STEEL DUCTWORK WITH CONTINUOUS LIQUID TIGHT WELDS. ALL DUCTWORK SHALL BE WRAPPED WITH A FIRE RESISTIVE MATERIAL. THE DUCT WRAP SYSTEM SHALL BE UL LISTED PER ASTM E 2336 FOR ZERO CLEARANCE TO COMBUSTIBLES AND SHALL MAINTAIN A FLAME/SMOKE RATING LESS THAN 25/50.

THE TERMINATION OF KITCHEN EXHAUST OUTLETS SHALL NOT BE LESS THAN 10 FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS BUILDINGS, ADJACENT PROPERTY LINES AND AIR INTAKES.

OUTLET SHALL NOT BE LESS THAN 10 FEET VERTICALLY ABOVE ADJOINING GRADE LEVEL AND 40" ABOVE THE ROOF LEVEL.

THE EXHAUST FAN SHALL BE INSTALLED A MINIMUM OF 10'-0" FROM ANY ROOF EDGE REGARDLESS OF LOCATION INDICATED ON PLANS, UNLESS A SCREEN WALL OR RAILING IS INSTALLED PER THE LOCAL BUILDING CODE. SEE THE ARCHITECTURAL PLANS FOR COORDINATION.

TYPE II KITCHEN HOOD

HOOD TO BE CONSTRUCTED OF MINIMUM 24 GAUGE STAINLESS STEEL, USING THE STANDING SEAM METHOD FOR OPTIMUM STRENGTH. ALL SEAMS, JOINTS AND PENETRATIONS OF THE HOOD ENCLOSURE SHALL BE WELDED AND/OR LIQUID TIGHT. LIGHTER MATERIAL GAUGES, ALTERNATE MATERIAL TYPES AND FINISHES ARE NOT ACCEPTABLE.

PROVIDE VAPOR PROOF, U.L. LISTED INCANDESCENT LIGHT FIXTURES WHICH SHALL BE PRE-WIRED TO A JUNCTION BOX SITUATED AT THE TOP OF THE HOOD FOR FIELD CONNECTION. WIRING SHALL CONFORM TO THE REQUIREMENTS OF NFPA 70. THE CANOPY HOOD SHALL BE BUILT IN ACCORDANCE WITH NFPA 96, UMC, AND SHALL BEAR THE NSF SEAL OF APPROVAL.

TYPE II KITCHEN HOOD DUCT SPECIFICATION

FURNISH SINGLE WALL RIGID DUCT MADE OF ALUMINUM AND SLOPED BACK TO HOOD. DUCTWORK SUBJECT TO POSITIVE PRESSURE OR MOISTURE-LADEN AIR SHALL BE CONSTRUCTED, JOINED AND SEALED IN ACCORDANCE WITH INTERNATIONAL MECHANICAL CODE.

THE TERMINATION OF KITCHEN EXHAUST OUTLETS SHALL NOT BE LESS THAN 10 FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS BUILDINGS, ADJACENT PROPERTY LINES AND

