### CONTROL SEQUENCE FOR FURNACE(S) AND CONDENSING UNIT(S)

THE FURNACE SHALL BE A HIGH FEFICIENT, GAS FIRED, DIRECT VENT, SEALED COMBUSTION UNIT EQUIPPED WITH ELECTRIC IGNITION. THE FURNACE SHALL BE CONTROLLED BY A PROGRAM-ABLE THERMOSTAT LOCATED WHERE SHOWN ON THE PLAN. A FAN SWITCH WITHIN THE THERMOSTAT SHALL ACT AS AN "OCCUPIED" (FAN-ON), "UNOCCUPIED" (FAN-AUTO) SWITCH. A TIME CLOCK OR TIMER INTEGRAL OF THE THERMOSTAT SHALL OPEN A SPRING RETURN CONTROL DAMPER DURING PRESET OCCUPIED PERIODS. THE DAMPER SHALL SPRING SHUT DURING UNOCCUPIED PERIODS.

DURING OCCUPIED PERIODS THE TIME CLOCK SHALL PROVIDE POWER TO OPEN THE FRESH AIR CONTROL DAMPER. THE THERMOSTAT SHALL AUTOMATICALLY SET TO THE "FAN ON" POSITION. WHEN SET TO THE "FAN ON" POSITION THE INTERLOCKED EXHAUST FAN(S) SHALL OPERATE. AND THE UNIT BLOWER SHALL OPERATE CONTINUOUSLY TO PROVIDE VENTILATION AND AIR CIRCULATION TO THE AREA TO BE SERVED.

UPON A CALL FOR HEAT BY THE THERMOSTAT, THE UNITS INDUCED DRAFT BLOWER SHALL OPERATE. WHEN DRAFT FAN OPERATION IS PROVEN THE UNITS ELECTRIC IGNITION COMPONENTS SHALL BE ACTIVATED TO OPEN THE MAIN GAS VALVE AND PROVIDE HEAT TO THE AREA WHEN THE THERMOSTAT IS SATISFIED THE GAS VALVE SHALL CLOSE, THE UNITS FORCED DRAFT BLOWERS SHALL POST PURGE AND STOP, AND THE UNITS MAIN BLOWER SHALL CONTINUE TO OPERATE.

UPON A CALL FOR COOLING BY THE THERMOSTAT, THE COMPRESSOR IN THE CONDENSING UNIT SHALL OPERATE TO PROVIDE COOLING TO THE AREA. WHEN THE THERMOSTAT IS SATISFIED THE COMPRESSOR SHALL STOP, HOWEVER THE UNIT BLOWER SHALL CONTINUE TO OPERATE.

DURING UNOCCUPIED PERIODS THE THERMOSTAT SHALL SET TO THE "FAN AUTO" POSITION. THE THERMOSTAT SHALL BE SET-BACK TO A HIGHER POSITION FOR COOLING AND A LOWER POSITION FOR HEATING. THE TIME CLOCK SHALL REMOVE POWER FROM THE CONTROL DAMPER AND IT SHALL SPRING HUT, EXHAUST FANS SHALL REMAIN OFF. THE UNIT BLOWER SHALL REMAIN OFF UNLESS THERE IS EITHER A CALL FOR HEATING OR COOLING BY THE THERMOSTAT.

UPON A CALL FOR HEAT BY THE THERMOSTAT, THE UNITS INDUCED DRAFT BLOWER SHALL OPERATE. UPON A DRAFT FAN OPERATION THE UNITS ELECTRIC IGNITION COMPONENTS SHALL BE ACTIVATED TO OPEN MAIN GAS VALVE. THE UNITS MAIN BLOWER SHALL REMAIN OFF UNTIL THE SETTING OF THE FAN CONTROL, LOCATED WITHIN THE UNIT, HAS BEEN REACHED, AT WHICH TIME THE BLOWER SHALL START TO DELIVER HEAT TO THE AREA SERVED. WHEN THE THERMOSTAT IS SATISFIED THE GAS VALVE SHALL CLOSE, AND THE INDUCED DRAFT BLOWER SHALL POST PURGE AND STOP. UNITS MAIN BLOWER SHALL FUNCTION UNTIL THE FAN CONTROL SENSES THAT THE RESIDUAL HEAT FROM WITHIN THE UNIT HAS BEEN DISSIPATED, AT WHICH TIME THE BLOWER SHALL STOP.

UPON A CALL FOR COOLING BY THE THERMOSTAT, THE COMPRESSOR IN THE CONDENSING UNIT SHALL BE ACTIVATED, AND THE BLOWER ON THE FURNACE SHALL START TO DELIVER COOLING TO THE AREA. WHEN THE THERMOSTAT IS SATISFIED, THE COMPRESSOR SHALL DEACTIVATE AND THE UNIT BLOWER

### CONTROL SEQUENCE, DUCTLESS MINI-SPLIT

THE DUCTLESS MINI SPLIT SHALL CYCLE HEATING OR COOLING AS DIRECTED BY ASSOCIATED THERMOSTAT

- I. ALL WORK SHALL CONFORM TO STATE AND LOCAL CODES WHETHER OR NOT SPECIFICALLY SHOWN 2. THE HVAC DESIGNER SHALL BE RESPONSIBLE FOR HVAC PLAN SUBMITTAL. IT SHALL BE THE HVAC CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH ALL STATE AND LOCAL CODES, ALL JOBSITE SAFETY STANDARDS, TIMELY EQUIPMENT DELIVERY, PROJECT HOUSEKEEPING AND CLEAN UP, AND
- ALL OTHER JOBSITE SUPERVISORY RESPONSIBILITIES. 3. JOIST NOTCHING, STUD CUTTING AND NOTCHING, AS WELL AS BORED HOLES IN WOOD FRAMING ASSOCIATED WITH THE INSTALLATION OF HVAC EQUIPMENT AND ITS DISTRIBUTION SYSTEM SHALL BE LIMITED AS DEFINED IN IMC-302.3/ IFGC-302.3 4. ALL HVAC PLANS AND DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC. THE HVAC CONTRACTOR
- CONSULT AND COOPERATE WITH THE GENERAL CONTRACTOR, AND THE CONTRACTORS OF ALL OTHER TRADES, AS WELL AS THE BUILDING OWNER(S) SO AS TO AVOID EQUIPMENT AND DUCTWORK COLLISION, AS WELL AS OTHER PROJECT CONTROVERSIES. THE GENERAL CONTRACTOR AND THE HVAC CONTRACTOR SHALL VERIFY ANY AND ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCED-
- ING WITH THE INSTALLATION OF THE HVAC SYSTEM. 5. ANY VARIATION FROM THESE PLANS AND/OR SPECIFICATIONS WITHOUT THE EXPRESS WRITTEN
- CONSENT OF THE HVAC DESIGNER, SHALL RELIEVE THE DESIGNER OF ANY RESPONSIBILITY FOR THE SATISFACTORY OPERATION OF THE ENTIRE HVAC SYSTEM. 6. EQUIPMENT MANUFACTURER SUBSTITUTIONS SHALL NOT BE ALLOWED WITHOUT THE CONSENT OF THE HVAC DESIGNER. MANUFACTURERS AS SPECIFIED IN THE EQUIPMENT SCHEDULES SHALL BE CONSID-ERED AS STRICT EQUIPMENT SPECIFICATIONS AND MUST BE FURNISHED AND INSTALLED WITHOUT SUBSTITUTION. EQUIPMENT MANUFACTURER SUBSTITUTIONS UNBENOUNCED TO THE HVAC
- SHALL ABSOLVE THE DESIGNER OF THE RESPONSIBILITY OF THE ADEQUATE PERFORMANCE OF THE 7. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY/ALL LINE VOLTAGE WIRING, (1 I 5 VOLT OR HIGHER). THE HVAC CONTRACTOR SHALL FURNISH AND INSTALL ANY/ALL 24 VOLT CONTROL
- 8. THE STRUCTURAL ENGINEER SHALL DETERMINE WHETHER THE BUILDING STRUCTURE CAN SUPPORT THE WEIGHT OF THE SUSPENDED EQUIPMENT, ROOF MOUNTED EQUIPMENT, PIPING, AND DUCTWORK. IF

STRUCTURE IS UNABLE TO SUPPORT THE WEIGHT OF THE EQUIPMENT AND/OR DUCTWORK AND PIPING, IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ADEQUATELY REINFORCE THE STRUCTURE TO SUPPORT THE WEIGHT. 9. PROVIDE EQUIPMENT APPLIANCES INSTALLED AT GRADE LEVEL WITH A LEVEL CONCRETE PAD, SLAB, OR OTHER APPROVED MATERIAL EXTENDING ABOVE THE ADJOINING GRADE, OR SUSPEND THE EQUIP-

10. IN ROOMS WHERE RETURN AIR GRILLE IS NOT LOCATED, THE DOOR MUST BE UNDERCUT BY I"

MENT A MINIMUM OF 3" ABOVE THE ADJOINING GRADE.

- HVAC CONTRACTOR SHALL FURNISH AND INSTALL HVAC EQUIPMENT AS SPECIFIED ON THE PLANS. EQUIPMENT SUBSTITUTIONS SHALL NOT BE ALLOWED WITHOUT THE EXPRESS WRITTEN CONSENT OF THE HVAC DESIGNER. SUBSTITUTIONS REQUIRE FOUR (4) SETS OF SUBMITTAL DATA. FOLIPMENT SHALL BE ENCLOSED SUSPENDED OR GUARDED AS SHOWN ON THE PLANS F
- AS WELL AS ALL STATE AND LOCAL CODES WHETHER OR NOT INDICATED ON THE PLANS.

  ALL CLEARANCES AROUND EQUIPMENT SHALL COMPLY WITH MANUFACTURER'S RECOMMENDATIONS AS WELL AS STATE AND LOCAL CODES WHETHER OR NOT INDICATED ON THE PLANS. CLEARANCES SHALI ALLOW EASE OF ACCESS AND MAINTENANCE FOR ALL EQUIPMENT AS INSTALLED. EQUIPMENT CLEAR-ANCES SHALL MEET THE FOLLOWING MINIMUM CRITERIA: -IMC 401, OUTSIDE AIR INTAKE OPENINGS SHALL BE A MINIMUM OF 12" VERTICALLY FROM THE ADJOINING GRADE LEVEL, ABOVE ADJOINING ROOF SURFACES, OR ABOVE THE BOTTOM OF AN AREA WAY.
- IFGC 503, VENT TERMINALS FOR DIRECT VENT APPLIANCES WITH AN INPUT OF OVER 50,000 BTU/ SHALL HAVE AT LEAST A 12" VENT TERMINATION CLEARANCE FROM ANY OPENING INTO THE BUILDING UNLESS THE APPLIANCE LISTING PROVIDES A DIFFERENT CLEARANCE CRITERIA. -IFGC 65, PROVIDE GAS METERS SUCH THAT THEY WILL BE LOCATED A MINIMUM OF 3' FROM SOURCES OF IGNITION, (CONDENSING UNITS AND APPLIANCES THAT MAY SPARK).
  -IMC 501.2.1(3), PROVIDE ENVIRONMENTAL AIR EXHAUST DUCT OUTLETS THREE FEET FROM PROPERTY
- LINES, THREE FEET FROM BUILDING OPERABLE OPENINGS, AND TEN FEET FROM MECHANICAL AIR INTAKES. EQUIPMENT SHALL BE MOUNTED, OR SUSPENDED STRAIGHT AND TRUE WITH REGARD TO WALLS, FLOORS, AND CEILING. EQUIPMENT SUSPENDED FROM CEILINGS, ROOF JOISTS STEEL OR CONCRETE SHALL BE SUPPORTED WITH SUITABLE HANGERS, STEEL ANGLE IRON RODS, AND SPRING VIBRATION ISOLATORS ROOF-MOUNTED EQUIPMENT SHALL BE MOUNTED ON ROOF-CURBS. GENERAL AND MECHANICAL CON-TRACTOR TO COORDINATE THESE INSTALLATIONS. FLASHING TO CURBS TO BE PROVIDED BY ROOFING
- HVAC CONTRACTOR SHALL PROVIDE TWO (2) SETS OF OPERATIONS AND MAINTENANCE MANUALS FOR ANY MAJOR HVAC EQUIPMENT PROVIDED. MANUALS ARE TO BE KEPT ON FILE BY OWNER, AS WELL AS NEAR
- IT SHALL BE THE BUILDING OWNER'S RESPONSIBILITY TO SECURE A PROFESSIONAL CONTRACTOR OR INDIVIDUAL TO PROVIDE MAINTENANCE, INSPECTION, AND REPAIR OF THE HVAC EQUIPMENT. MAINTENANCE AND INSPECTION SERVICE SHOULD BE PERFORMED ON AN ANNUAL BASIS OR MORE FREQUENTLY GENERAL MAINTENANCE (SUCH AS FILTER REPLACEMENT) SHOULD BE PERFORMED AS NEEDED. THE HVAC SYSTEM SHALL HAVE AIR FILTERS THAT ARE LOCATED IN CONVENIENT LOCATIONS FOR MAINTENANCE.
  THERMOSTATS AND ROOM CONDITIONING CONTROL DEVICES SHALL BE MOUNTED 48" ABOVE THE FLOOR IN ORDER TO COMPLY WITH "THE PERSONS WITH DISABILITIES ACT." THERMOSTATS SERVING LOW
- RISE RESIDENTIAL BUILDINGS, (THREE STORIES OR LESS) AND COMMERCIAL BUILDINGS SHALL BE PROGRAMMABLE SETBACK TYPE. THERMOSTAT FUNCTION SHALL COMPLY WITH IECC 403.1 \$ 503.2.4. IMC 307.2. I/IFGC 307.2, PROVIDE A MEANS TO CONVEY CONDENSATE FROM COOLING COILS AND EVAP-ORATORS FROM A DRAIN PAN OUTLET TO AN APPROVED PLACE OF DISPOSAL. DISCHARGE INTO A STREET, ALLEY, OR OTHER AREA OF NUISANCE IS NOT ALLOWED. COMPONENTS OF THE CONDENSATE DISPOSAL SYSTÉM SHALL BE AN APPROVED MATERIAL AS LISTED IN IMC 307.2.2. CONDENSATE WASTE AND DRAIN LINE SHALL NOT BE LESS THAN 3/4"INTERNAL DIAMETER AND SHALL NOT DECREASE IN SIZE FROM THE DRAIN PAN CONNECTION TO THE PLACE OF CONDENSATE DISPOSAL. WHERE DRAIN PIPES FROM MORE THAN ONE UNIT ARE TO BE MANIFOLDED TOGETHER FOR CONDENSATE DRAINAGE, THE PIPE OR TUBING SHALL BE SIZED IN ACCORDANCE WITH AN APPROVED METHOD. ALL HORIZONTAL SECTIONS OF THE
- DRAIN PIPING SHALL BE INSTALLED IN UNIFORM ALIGNMENT AT A UNIFORM SLOPE NON SEALED COMBUSTION GAS FIRED APPLIANCES SHALL BE LOCATED IN A FIRE RATED MECHANICAL ROOM, OR COMPLY WITH THE INTERNATIONAL MECHANICAL CODE WITH REGARD TO PERMISSIBLE EQUIP-IO. ANY ELECTRIC HEATING EQUIPMENT INSTALLED IN RESTROOMS OR UTILITY ROOMS SHALL BE INSTALLED A
- I I. UNIT HEATERS SHALL BE INSTALLED PER IMC-304.6 \$ 7 WITH REGARD TO INSTALLATION HEIGHT, AND LOCATION. UNITS SHALL BE INSTALLED A MINIMUM OF 8' ABOVE THE FLOOR. WHERE MOTOR VEHICLES APPLIANCES SHALL BE INSTALLED A MINIMUM OF 1 FEET HIGHER ABOVE THE FLOOR THAN THE HEIGHT OF THE TALLEST VEHICLE. RESIDENTIAL CLOTHES DRYER NOTES

IMC 504. I INSTALLATION. CLOTHES DRYERS SHALL BE EXHAUSTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. DRYER EXHAUST SYSTEMS SHALL BE INDEPENDENT OF ALL OTHER SYSTEMS AND SHALL CONVEY THE MOISTURE AND ANY PRODUCTS OF COMBUSTION TO THE OUT-

IMC 504.2 WHERE CLOTHES DRYER EXHAUST DUCT PENETRATES A WALL OR CEILING MEMBRANE, THE ANNULAR SPACE SHALL BE SEALED WITH NONCOMBUSTIBLE MATERIAL, APPROVED FIRE CAULKING, OR A NONCOMBUSTIBLE DRYER EXHAUST DUCT WALL RECEPTACLE. DUCTS THAT EXHAUST CLOTHES DRYERS SHALL NOT PENETRATE OR BE LOCATED WITHIN ANY FIRE-BLOCKING, DRAFT STOPPING, OR ANY WALL, FLOOR/CEILING OR OTHER ASSEMBLY REQUIRED BY THE BUILDING CODE TO BE FIRE-RESISTANCE RATED, UNLESS SUCH DUCT IS CONSTRUCTED OF GALVANIZED STEEL OR ALUMINUM OF THE THICKNESS SPECIFIED IN TABLE 603.4 AND FIRE RESISTANCE RATING IS MAINTAINED IN ACCORDANCE WITH THE

IMC 504.3 CLEAN-OUT. EACH VERTICAL RISER SHALL BE PROVIDED WITH A MEANS FOR CLEAN-OUT. IMC 504.4 EXHAUST MATERIAL. DRYER EXHAUST DUCTS FOR CLOTHES DRYERS SHALL TERMINATE ON THE OUTSIDE OF THE BUILDING AND SHALL BE EQUIPPED WITH A BACKDRAFT DAMPER. SCREENS SHALL NOT BE INSTALLED IN THE DUCT TERMINATION. DUCTS SHALL NOT BE CONNECTED OR INSTAL-LED WITH SHEET METAL SCREWS OR OTHER FASTENERS THAT WILL OBSTRUCT THE FLOW. CLOTHES DRYER EXHAUST DUCTS SHALL NOT BE CONNECTED TO A GAS VENT CONNECTOR, GAS VENT, OR CHIMNEY. CLOTHES DRYER EXHAUST DUCTS SHALL NOT EXTEND INTO OR THROUGH DUCTS OR

IMC 504.8.2 DUCT INSTALLATION. EXHAUST DUCT SHALL BE SUPPORTED AT 4' INTERVALS AND SECURED IN PLACE. THE INSERT END OF THE DUCT SHALL EXTEND INTO THE ADJOINING DUCT FIT-TING IN THE DIRECTION OF THE AIRFLOW, DUCTS SHALL NOT BE JOINED WITH SCREWS OR SIMILAR FASTENERS THAT PROTRUDE MORE THAN 1/8 INCH INTO THE INSIDE OF THE DUCT. IT IS IMPORTANT TO NOTE THAT DUCT TAPE AND OTHER MEANS "SEALS" THE DUCTFROM LEAKS, WHILE MECHANICAL FASTENERS ACTUALLY SECURES THE DUCT FOR PLACEMENT AND CONNECTION.

IMC 504.8.3 TRANSITION DUCTS USED TO CONNECT THE DRYER TO THE EXHAUST DUCT SYSTEM SHALL BE A SINGLE LENGTH THAT IS LISTED AND LABELED IN ACCORDANCE WITH UL 2 I 58A. TRANSITION DUCTS SHALL

504.8.4. I SPECIFIED LENGTH. THE MAXIMUM LENGTH OF EXHAUST DUCT SHALL BE 35 FEET FROM THE CONNECTION TO THE TRANSITION DUCT FROM THE DRYER TO THE OUTLET TERMINAL. WHERE FITTINGS ARE USED, THE MAXIMUM LENGTH OF THE EXHAUST DUCT SHALL BE REDUCED IN ACCORDANCE

NOT BE GREATER THAN & FEET IN LENGTH AND SHALL NOT BE CONSEALED WITHIN CONSTRUCTION.

504.7 PROTECTION REQUIRED. PROTECTIVE SHIELD PLATES SHALL BE PLACED WHERE NAILS AND SCREWS FROM FINISH OR OTHER WORK ARE LIKELY TO PENETRATE THE CLOTHES DRYER DUCT. SHIELD LATES SHALL BE PLACED ON THE FINISHED FACE OF ALL FRAMING MEMBERS WHERE LESS THAN 1-1/4" BETWEEN THE DUCT AND THE FINISHED FACE OF THE FRAMING MEMBER. THE PROTECTIVE SHIELD SHALL BE CONSTRUCTED OF STEEL, AND HAVE A THICKNESS OF .062 INCH AND EXTEND A MINIMUM OF TWO INCHES ABOVE SOLE PLATES AND BELOW TOP PLATES.

FROM IMC 501.3.1, ENVIRONMENTAL AIR DUCT EXHAUST SHALL TERMINATE A MINIMUM OF 3' FROM PROPERTY LINES AND OPERABLE OPENINGS INTO BUILDINGS FOR ALL OCCUPANCIES OTHER THAN GROUP "U". ALSO, ENVIRONMENTAL EXHAUST SHALL TERMINATE A MINIMUM OF 10' FROM ANY MECH-

## DUCTWORK, AIR DISTRIBUTION NOTES

- I. ALL DUCTWORK SHALL BE INSTALLED STRAIGHT AND TRUE IN A QUALITY WORKMANLIKE FASHION, DUCT-WORK DIMENSIONS AS LISTED ON THE PLAN INDICATE "INSIDE" FREE AREA SQUARE INCH DIMENSIONS ALL DUCTS SHALL BE CONSTRUCTED TO ALLOW UNRESTRICTED AIR FLOW. ANY DUCT AS ILLUSTRATED FOR THE TRANSMISSION OF AIR SHALL BE DEDICATED FOR THAT PURPOSE AND SHALL NOT BE USED
- 2. ALL DUCTWORK SHALL CONFORM TO ASHRAE AND SMACNA STANDARDS WITH REGARDS TO DUCT GAUGES, FURNING VANES, THE INSTALLATION OF THE TURNING VANES AND/OR EXTRACTORS, AND MOUNTED AND BRACING. SEE DUCT CONSTRUCTION SCHEDULE.

	RECTANGULAR D	UCT CONSTRUCTION SCHEDULE	
LONGEST SIDE INCHES	U.S. STD. GUAGE	BRACING ANGLE SIZE	INCHES SPACING
THROUGH   2"	26 GAUGE		
13" THROUGH 18"	24 GAUGE		
19" THROUGH 30"	24 GAUGE	" x  " x  /8"	48"
31" THROUGH 48"	22 GAUGE	" x  " x  /8"	48"
49" THROUGH 54"	20 GAUGE	- /2" x  - /2" x  /8"	48"
55" THROUGH 60"	18 GAUGE	- /2" x  - /2" x  /8"	48"
61" THROUGH 96"	18 GAUGE	- /2" x  - /2" x  /4"	48"
97" THROUGH 120"	18 GAUGE	2" x 2" x 1/4"	30"

3. STEEL OR ALUMINUM DUCTWORK INSULATION SHALL CONFORM WITH IECC 403.2.1 \$ 503.2.7. AS WELL AS SMACNA SEAL CLASS "C". FRESH AIR DUCTWORK, AND ANY DUCTWORK EXTERIOR OF THE BUILDING SHALL BE INSULATED WITH MATERIAL NO LESS THAN R-8.O. DUCTWORK NOT INSTALLED WITHIN THE CONDITIONED SPACE SHALL BE INSULATED WITH MATERIAL NO LESS THAN R-4

		DUCT II	NSULTATION SCH	HEDULE				
	LOCATION							
SERVICE	OUTSIDE BUILDING ENVELOPE	ATTIC	ABOVE CEILING BUT BELOW ATTIC	INTERIOR WALL CAVITY OR CHASE	WALL CAVITY OR CHASE ON EXTERIOR WALL	IN GROUND UNDER THE SLAB	EXPOSED IN OCCUPIED SPACE	
SUPPLY	R-8	R-8	R-6	R-6	R-6	R-8	NONE	
RETURN	R-8	R-8	R-6	R-6	R-6	R-8	NONE	
EXHAUST	NONE	R-6	R-6	R-6	R-6	R-6	NONE	
FRESH AIR	NONE R-6 R-8 R-8 R-6 R-8							

- MINIMUM VALUES FOR INSTALLED INSULATION. PRE-APPLICATION VALUES MAY NEED TO BE HIGHER IN ORDER TO MEET INSTALLED VALUE REQUIREMENTS. CONTINUOUS VAPOR BARRIER IS REQUIRED ON ALL INSULATED DUCTWORK,
  ALL DUCTWORK OUTSIDE OF THE BUILDING ENVELOPE MUST BE SEALED WEATHERTIGHT WITH
  AN APPROVED WEATHER COATING SUCH AS "ALUMAGUARD GO" BY POLYGUARD PRODUCTS.
- 4. ALL JOINTS, LONGITUDINAL (ORIENTED IN THE DIRECTION OF AIRFLOW) AND TRANSVERSE (ORIENTED PERPENDICULAR TO AIRFLOW) SEEMS AND CONNECTIONS IN DUCTWORK, SHALL BE SECURELY FASTENED AND SEALED WITH WELDS. GASKETS. MASTICS (ADHESIVES) MASTIC-PLUS-EMBEDDED FABRIC SYSTEMS, OR TAPES. TAPES AND MASTICS USED TO SEAL DUCTWORK SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL-181A OR UL-181B. DUCT CONNECTIONS TO FLANGES OF AIR DISTRIBUTION SYSTEM EQUIPMENT SHALL BE SEALED AND MECHANICALLY FASTENED. CRIMP JOINTS FOR ROUND DUCTS SHALL HAVE A CONTACT LAP OF AT LEAST 1.5" AND SHALL BE MECHANICALLY. ITY FASTENED BY MEANS OF AT LEAST THREE SHEET METAL SCREWS OR RIVETS EQUALLY SPACED AROUND THE JOINT. DUCT TAPE IS NOT PERMITTED AS A SEALANT ON ANY METAL DUCTS.
- 5. THE HVAC CONTRACTOR SHALL CONSULT WITH THE GENERAL CONTRACTOR AND/OR THE BUILDING OWNER(S) TO DETERMINE THE EXACT LOCATION OF REGISTERS, GRILLES, AND DIFFUSERS. HVAC DRAWINGS INDICATE QUANTITIES AND AIR FLOW SPECIFICATIONS, HOWEVER, LOCATIONS ARE
- 6. THE HVAC CONTRACTOR OR RECOGNIZED BALANCING CONTRACTOR SHALL BE RESPONSIBLE FOR BALANCING THE ENTIRE SYSTEM SO THAT THE SUPPLY AIR, RETURN AIR, EXHAUST AIR, AND FRESH AIR ARE WITHIN +/- I 0% OF THE AIR QUANTITIES SHOWN ON THE PLAN. THE HVAC CONTRACTOR SHALL FURNISH THE HVAC DESIGNER WITH TWO COPIES OF THE BALANCE DATA. A COPY OF THE BALANCE DATA SHALL BE RETAINED AT THE PROJECT SITE AND AVAILABLE FOR INSPECTION. THE AIR SYSTEMS SHALL BE BALANCED IN SUCH A MANNER AS TO MINIMIZE LOSSES FROM DAMPER THROTTLING BY ADJUSTING FAN SPEED, AND ADJUSTING DAMPERS TO MEET AIR FLOW CONDITIONS. BALANCING ROCEDURES SHALL BE ACCEPTABLE TO THE DEPARTMENT OF SAFFTY AND PROFESSIONAL SERVIC AND THE IMC. THE HVAC CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY VOLUME, CONTROL, AND BACKDRAFT DAMPERS REQUIRED FOR INSTALLATION AND BALANCING.
- 7. INSULATED FLEXIBLE SUPPLY AIR DUCT RUNS SHALL NOT EXCEED FIVE (5) FEET IN LENGTH, INSULATED FLEXIBLE DUCTWORK SHALL BE SUSPENDED WITH MINIMUM I " THICK BAND CLAMPS INSTALLED IN MAX-IMUM 5 FOOT INTERVALS. FLEXIBLE DUCT SHALL BE INSTALLED TIGHT AND SECURE WITH A MAXIMUM SAG
- 8. HVAC CONTRACTOR SHALL FURNISH AND INSTALL PLEATED FILTERS, WITH AN AVERAGE ARRESTANCE OF 65% OR GREATER, OR HIGHER EFFICIENT FILTER MEDIA TYPES. FILTERS SHALL BE EASILY ACCESSIBLE
- IN FILTER RACK OR FILTER GRILLES. 9. IN ROOMS WHERE RETURN AIR GRILLE IS NOT LOCATED, THE DOOR MUST BE UNDERCUT BY I"

# GAS PIPING NOTES

OF 1/2" PER FOOT OF SUPPORT BRACING.

- I. HVAC CONTRACTOR SHALL VERIFY NATURAL GAS METER LOCATION WITH LOCAL UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL LAYOUT, DESIGN, AND VERIFICATION OF GAS PIPE SIZING AND LOCATION BEFORE INSTALLATION OF GAS FIRED APPLIANCES. 2. ALL GAS PIPING SHALL BE RUN STRAIGHT AND TRUE AND BE INSTALLED IN A QUALITY WORKMANLIKE
- 3. GAS PIPING SHALL CONFORM TO ALL STATE AND LOCAL CODES, AS WELL AS NATIONAL FUEL GAS CODE RECOMMENDATIONS, NFPA 54.

  4. HVAC CONTRACTOR SHALL FURNISH AND INSTALL SCHEDULE 40 STEEL GAS PIPING AND FITTINGS. HVAC CONTRACTOR SHALL INSTALL ALL NECESSARY VALVES, FITTINGS, REGULATORS, AND SAFETY AND OPER-
- ATING DEVICES. THE HVAC CONTRACTOR SHALL PROVIDE AND INSTALL AN APPROVED GAS SHUT-OFF 5. CONCEALED GAS PIPING WITHIN BUILDINGS MAY BE INSTALLED USING ELBOWS, TEES, AND COUPLINGS PER IFGC CH. 4 / NFPA 54. PER THE SAME CODES, CONCEALED GAS PIPING SYSTEMS CANNOT CONSIST OF UNIONS, TUBING FITTINGS, RUNNING THREADS, RIGHT \$ LEFT COUPLINGS, BUSHINGS, SWING JOINTS
- ALLOWED PER DEPT. OF COMMERCE.

  6. GAS PIPING MUST BE PRESSURE TESTED FOR LEAKS PER IFGC CHAPTER 4, AND NFPA 54, CHAPT 8. THE TEST MUST BE PERFORMED AT 1.5 TIMES THE PROPOSED MAXIMUM WORKING PRESSURE, BUT NOT

AND COMPRESSION COUPLINGS MADE BY COMBINATIONS OF FITTINGS. ALSO, CONCEALED VALVES ARE NOT

- LESS THAN 3psig IRRESPECTIVE OF DESIGN PRESSURE. THE PRESSURE TEST MUST BE GREATER THAN 1/2 HOUR FOR EACH 500 CUBIC FEET OF PIPE VOLUME OR FRACTION THEREOF.
  GAS FIRED APPLIANCES CONNECTED TO A GAS PIPING SYSTEM MUST HAVE AN ACCESSIBLE MANUAL GAS SHUT-OFF VALVE WITH NONDISPLACABLE VALVE OR A LISTED GAS CONVENIENCE OUTLET PER IFGC CHAPTER 4 AND NFPA. THE SHUTOFF VALVE MUST BE WITHIN SIX FEET OF THE APPLIANCE THAT IT SERVES. VALVES MUST BE INSTALLED UPSTREAM OF THE CONNECTOR.
- 8. EACH ABOVE GROUND PORTION OF A GAS PIPING SYSTEM WHICH IS LIKELY TO BECOME ENERGIZED SHALL BE ELECTRICALLY CONTINUOUS AND BONDED TO A DESIGNED, PERMANENT, LOW IMPEDANCE EFFECTIVE GROUND FAULT CURRENT PATH. THE GROUNDING WIRE SHALL BE PROVIDED AND INSTALLED

BY A LICENSED ELECTRICAL CONTRACTOR OR INSTALLER.

# VENTING NOTES:

- I. ALL GAS FIRED APPLIANCE VENTING SHALL COMPLY WITH STATE AND LOCAL CODES AND BE DONE IN A QUALITY WORKMANLIKE FASHION.

  ALL VENTING SHALL STRICTLY COMPLY WITH MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
- 3. ALL FRESH AIR INTAKE OPENINGS SHALL BE A MINIMUM OF 10' AWAY FROM ANY HAZARDOUS OR NOXIOUS CONTAMINANTS SUCH AS EXHAUST VENTS, SOIL VENT PIPES, APPLIANCE VENTS, GAS METERS, STREETS, ALLEYS, PARKING LOTS, AND LOCATING DOCKS PER IMC CODES. OUTSIDE AIR EXHAUST AND FRESH AIR NTAKE OPENINGS SHALL BE A MINIMUM OF TEN FEET FROM LOT LINES OR BUILDINGS. THE LOWEST SIDE OF ANY FRESH AIR INTAKE SHALL BE BE LOCATED A MINIMUM OF 12 INCHES VERTICALLY FROM THE ADJOINING GRADE LEVEL, ABOVE ADJOINING ROOF SURFACES, OR ABOVE THE BOTTOM OF AN
- 4. ALL GAS FIRED APPLIANCE VENTING SHALL COMPLY WITH MANUFACTURER'S RECOMMENDATIONS AND INST-RUCTIONS WITH REGARD TO TERMINATIONS. CLEARANCES FROM VENT TERMINATIONS TO FRESH-AIR INTAKES, DOORS AND WINDOWS SHALL BE STRICTLY OBSERVED. PER IFGC 503.3.3.6 AND SPS 364,040 I (4) VENTING TERMINATION SYSTEMS MUST BE GREATER THAN SEVEN FEET ABOVE ADJACENT PUBLIC WALKWAYS, VENT TERMINATION SYSTEMS MUST ALSO BE GREATER THAN OR EQUAL TO TEN FEET FROM ANY INTAKE OPENING, OR A MINIMUM OF TWO FEET ABOVE ANY INTAKE OPENING. VENT TERMINATION

SYSTEMS MUST ALSO BE A MINIMUM OF TEN FEET FROM ANY ADJACENT LOT LINE.

							FURI	NACE SCHEDULE								
UNIT NO.	FUEL TYPE		MBH OUTPUT	TOTAL CFM	OUTSIDE AIR CFM	RETURN AIR CFM			MOTOR H.P.	MIN. CIR. AMPS.		MFG.'S NAME	MFG.'S NUMBER	AFUE EFF.	UNIT WEIGHT	AREA SERVED
F-I	NAT. GAS	98.0	95.0	1600	225	1375	.5"	115/60/1ph	-	15	20	RHEEM	R95T(-)1001521M	95.0%	152 LBS.	
F-2	NAT. GAS	98.0	95.0	2000	N/A	2000	.5"	115/60/1ph		15	20	RHEEM	R95T(-)1001521M	95.0%	152 LBS.	

DIRECT VENT SEALED COMBUSTION APPLIANCE REQUIRES TH832 | R | OO | THERMOSTAT

F-2 REQUIRES 8 INCH FRESH AIR DAMPER WITH 24V ACTUATOR

							CONDENS	SING UNIT & COOL	ING COIL SCHEDULE		
UNIT NO.		NOM. TONS	SEER		MIN.CIRC. AMPACITY	UNIT VOLTAGE		MFG.'S NUMBER	COOLING COIL MODEL NO.	WEIGHT LBS.	REMARKS
C-I	48.0	4.0	13	30	19.0	208/230/60/1ph	RHEEM	RA1348AJINA	RG52960DZ10B	195	
C-2	60.0	5.0	13	35	22.0	208/230/60/1ph	RHEEM	RAI360AJINA	RG52960DZ10B	228	

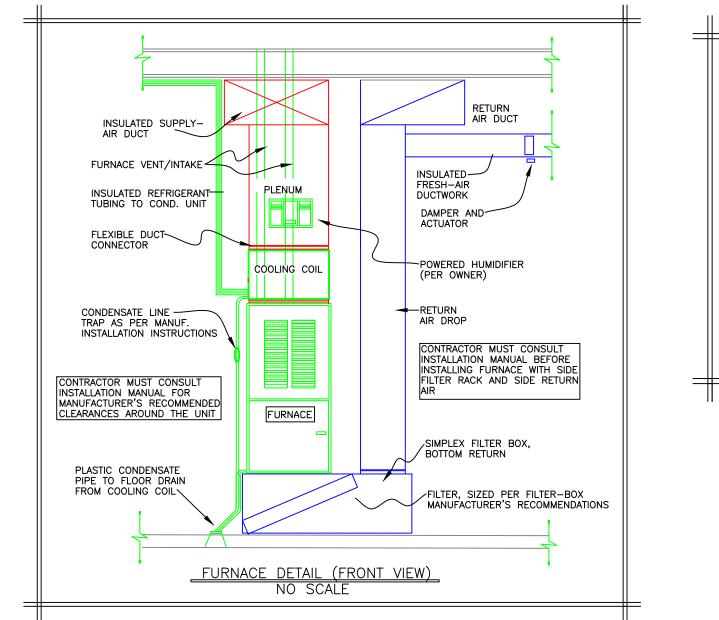
				MI	NI-SPLIT SCHE	DULE					
UNIT NO.	UNIT VOLTAGE	TONS	CLG BTU	HTG BTU @ 47 OAT	HTG BTU @ 17 OAT	MINIMUM AMPACITY	COOLING AMPS	HEATING AMPS	MFG.		REMARKS
DS-I	115-60-1	.75	9000	9500	6800	17	10.87	10.36	FRIEDRICH	FSHSR09AIA	

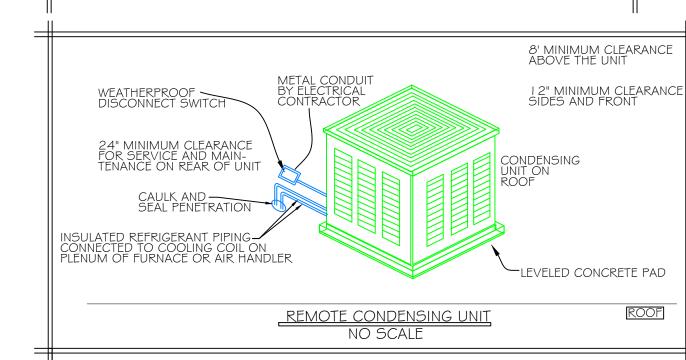
OUTDOOR UNIT # FSHSR09A | A & INDOOR UNIT # FSHSW09A | A REQUIRES 50' CIB 14/4 STR BC 600 V WIRING KIT, 1/4" X 3/8" X 1/2" INS MINI-SPLIT FLARE LINE SET

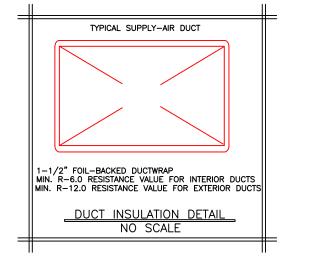
				(	CEILING EXHAUS	T FAN SCHEDUL	.E		
UNIT NO.	CFM	S.P.	SONES	AMPS	VOLTAGE	CONNECTION DUCT SIZE	MFG.'S NAME	MFG.'S NUMBER	AREA SERVED
CEF	75	.5"	1.5	.3 AMPS	120/60/1ph	4" DUCT	BROAN	AE80B	UPPER LEVEL RESTROOMS
IEF- I	225	.375"	N/A	65 WATTS	120/60/1ph	6" DUCT	S¢P	TD-150	LOWER LEVEL RESTROOMS

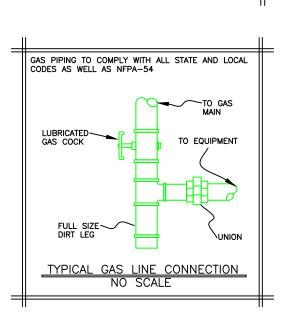
FROM IMC 501.3.1, FOR ENVIRONMENTAL AIR DUCT EXHAUST, LOCATE A MINIMUM OF 3' PROPERTY LINES, AND 3' FROM OPERABLE OPENINGS INTO BUILDINGS FOR ALL OCCUPANCIES OTHER THAN GROUP "U", AND 10' FROM ANY MECHANICAL AIR INTAKES. EXHAUST FAN(S) SHALL BE EQUIPPED WITH INTEGRAL BACKDRAFT DAMPER

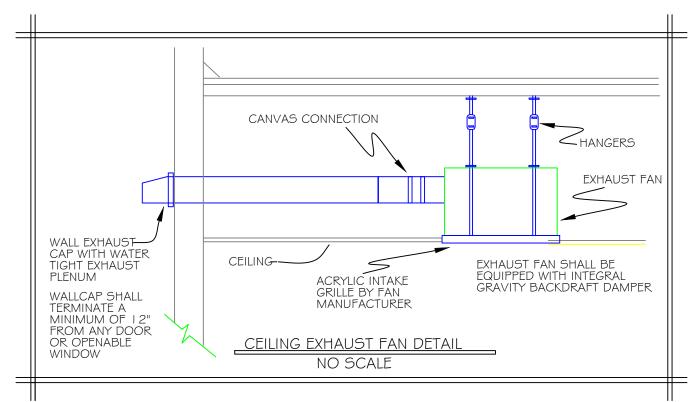
			DIFFL	JSER AND GRILL	E SCHEDULE		
GRILLE NO.	GRILLE SIZE	GRILLE CONFIGURATION	MFG.'S NAME	MFG.'S NUMBER	DAMPER	FINISH	REMARKS
S-1	16X3	SPIRAL DUCT SUPPLY	SHOEMAKER	USR52-16X3	INTEGRAL	STEEL	CEILING/SIDEWALL SUPPLY DIFFUSER.
5-2	10X3	SPIRAL DUCT SUPPLY	SHOEMAKER	USR52-10X3	INTEGRAL	STEEL	CEILING/SIDEWALL SUPPLY DIFFUSER
5-3	6X4	SIDEWALL/CLG SUP.	SHOEMAKER	850W 6X4	INTEGRAL	STEEL	CEILING/SIDEWALL SUPPLY DIFFUSER
R-I	30X30	SIDEWALL/CLG. RTN.	SHOEMAKER	#1050	NONE	STEEL	CEILING/SIDEWALL RETURN AIR GRILLE
R-2	36X14	SIDEWALL/CLG. RTN.	SHOEMAKER	#1050	NONE	STEEL	CEILING/SIDEWALL RETURN AIR GRILLE
E-I	8" ROUND	CEILING EXHAUST	LIFEBREATHR	EAG8CPU	INTERNAL	PVC	CEILING EXHAUST AIR GRILLE

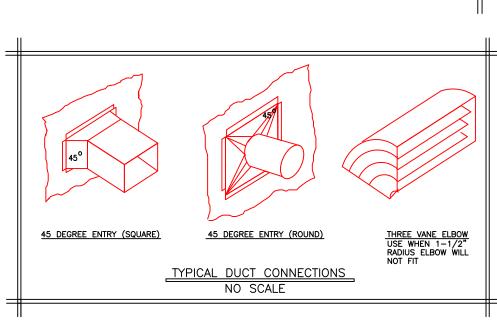


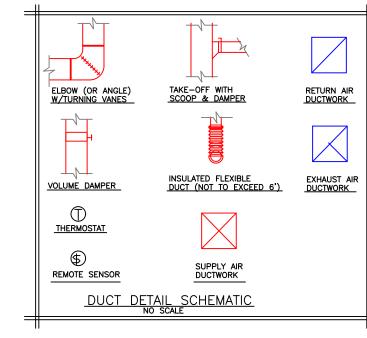














PLAN INDEX								
SHEET NO.	DESCRIPTION							
M-1 OF 4	NOTES, DETAILS, SCHEDULES							
M-2 OF 4	FIRST FLOOR HVAC DUCTWORK LAYOUT							
M-3 OF 4	SECOND FLOOR HVAC DUCTWORK LAYOUT							
M-4 OF 4	ROOF HVAC LAYOUT							

SIG

 $\Omega$ 

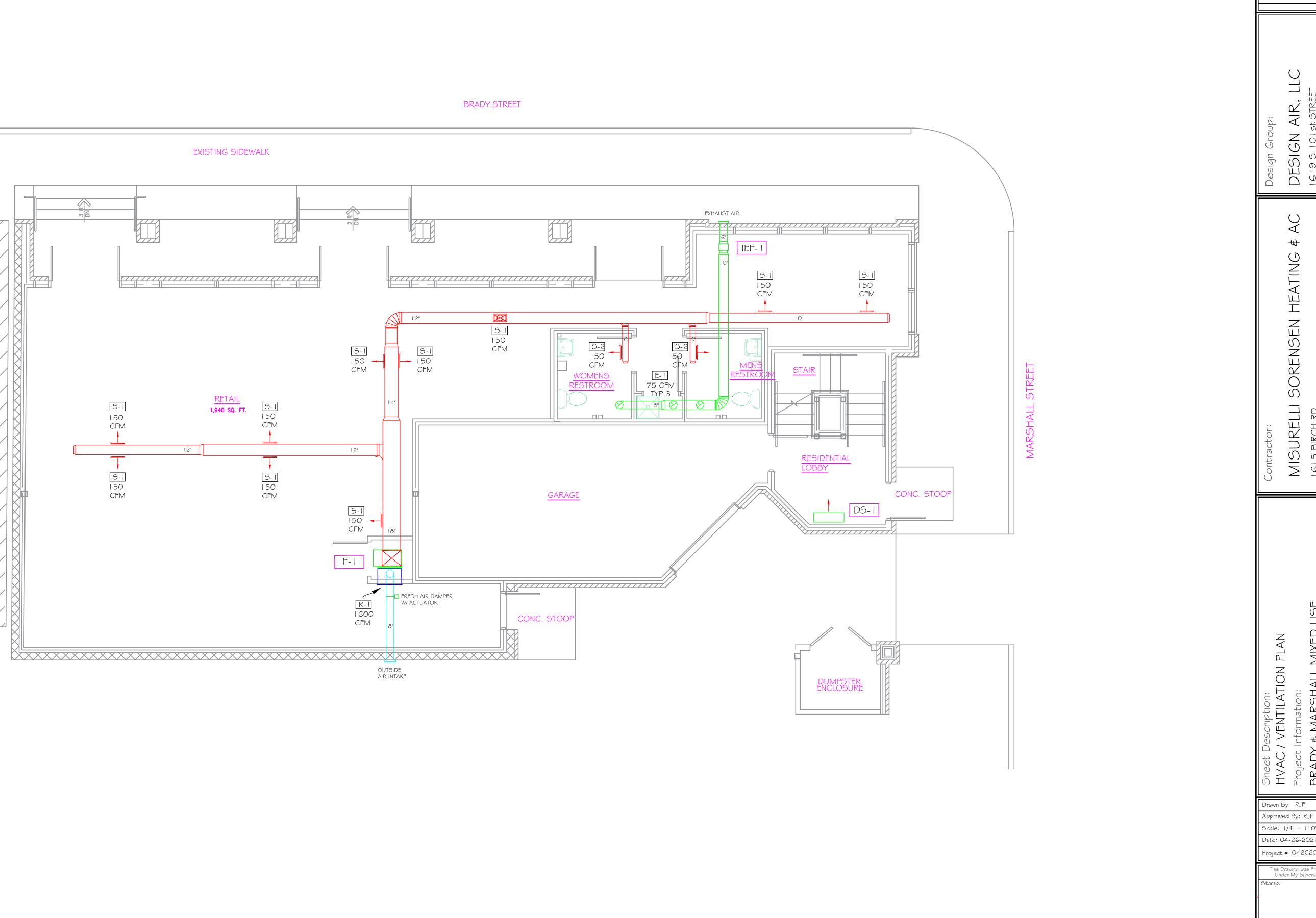
rawn By: RJF pproved By: RJF Scale: 1/4" = 1'-0"Date: 04-26-2021 roject # 04262021

his Drawing was Prepared

WISCONS RONALDJ FRANK #2306-7 MILWAUKEE

SHEET NUMBER:

SHEET: 1 OF 4



FURNACE F-I BALANCE

PEOPLE=20

20 X 7.5= 150 CFM MIN. O.A. REQUIRED 150 CFM

|EF-1|E.A. = 225 CFM

TOTAL EXHAUST AIR 225 CFM

OUTSIDE AIR

F-1 O.A.= 225 CFM

TOTAL O.A. = 225 CFM

TOTAL O.A = 225 CFM TOTAL E.A. - 225 CFM O CFM

HVAC DUCTWORK LAYOUT FIRST FLOOR

DESIGN AIR, LLC 1619 S 101 St STREET WEST ALLIS, WI. 53214

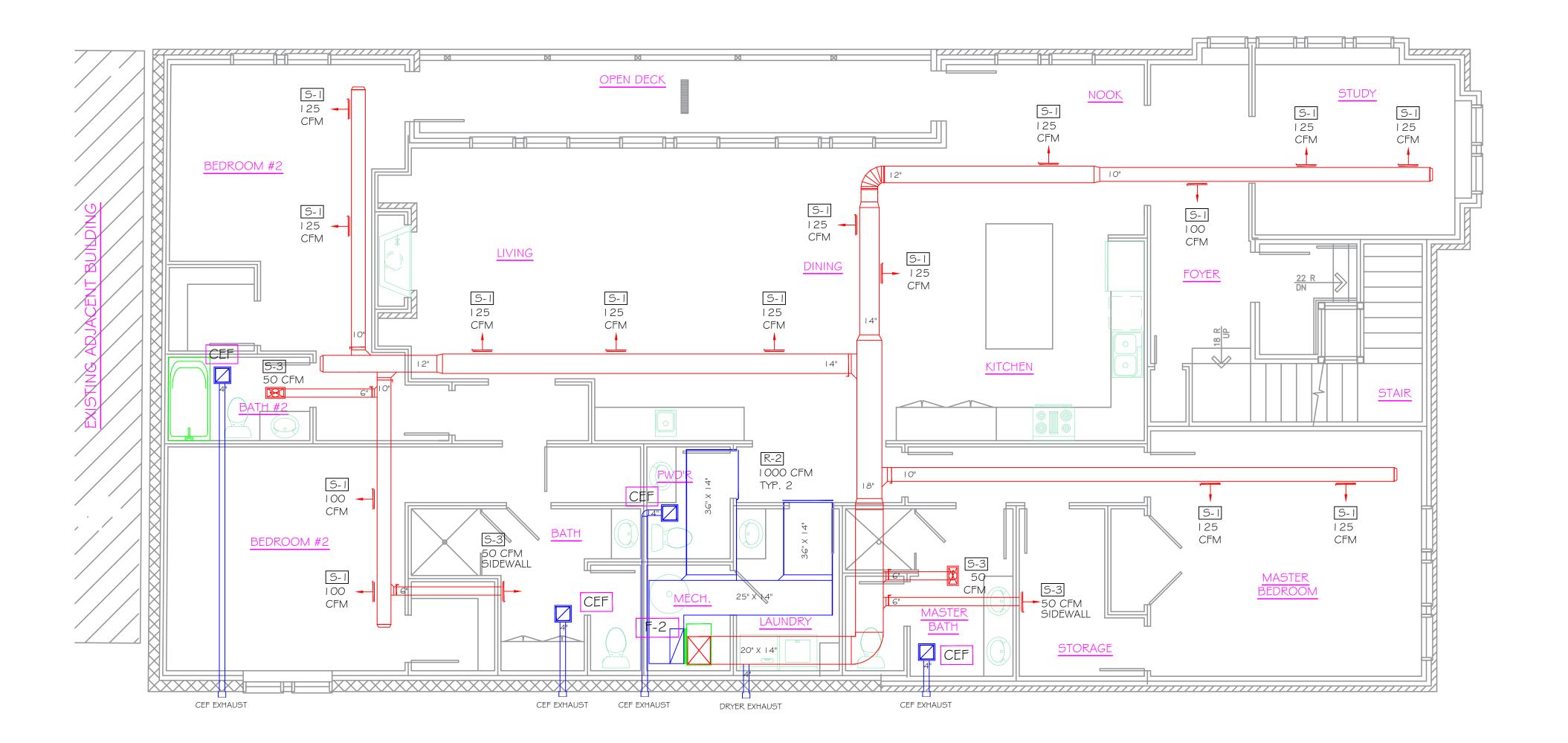
SORENSEN HEATING MISURELLI (1615 BIRCH RD. KENOSHA, WISCON

/ VENTILATION PLAN Information:

Scale: 1/4" = 1'-0" Date: 04-26-2021 Project # 0426202

This Drawing was Prepared Under My Supervision

SHEET NUMBER:



HVAC DUCTWORK LAYOUT SECOND FLOOR NORTH

DESIGN AIR, LLC 1619 S 101 St STREET WEST ALLIS, WI. 53214

SORENSEN HEATING

MISURELLI SIGNES BIRCH RD.
KENOSHA, WISCON

vescription:

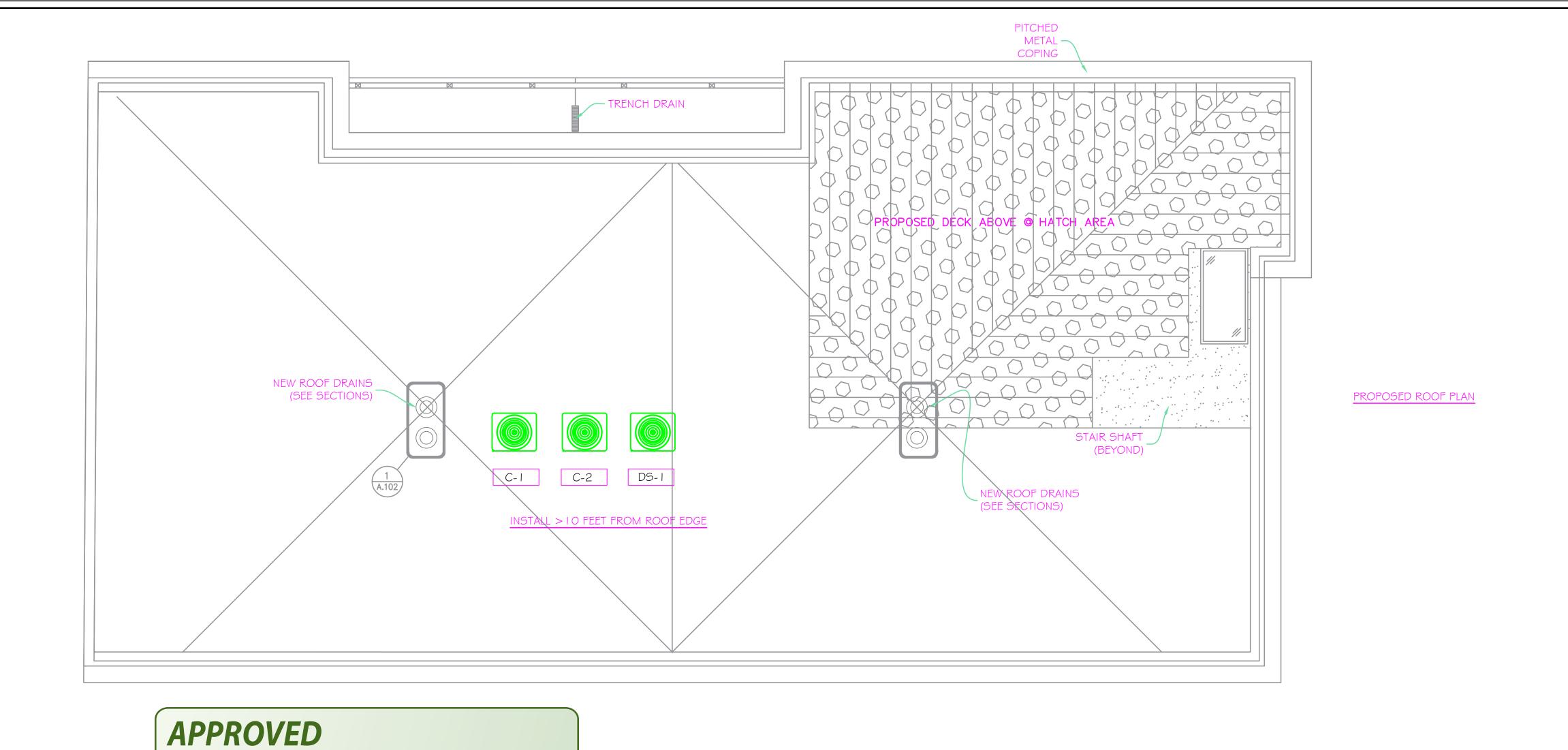
// VENTILATION PLAN
t Information:

Drawn By: RJF

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

Project # 0426202

SHEET NUMBER:



+36" A.F.F. DECK RAILING OPEN DECK

PROPOSED ROOF DECK



By Tim Askin - Milwaukee HPC at 2:34 pm, Nov 15, 2021

Sheet Description: HVAC / VENTILATION PLAN Project Information: BRADY ≉ MARSHALL MIXED I Drawn By: RJF

SORENSEN HEATING

MISURELLI (1615 BIRCH RD. KENOSHA, WISCOL

Approved By: RJF

Scale: 1/4" = 1'-0" Date: 04-26-2021

Project # 0426202

SHEET NUMBER: