

MECHANICAL SPECIFICATIONS

SECTION 23010 – MECHANICAL GENERAL PROVISIONS:

1. THE WORK SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THESE REFERENCED CODES AND STANDARDS:
- 1.1. LOCAL AUTHORITY HAVING JURISDICTION (AHJ) REQUIREMENTS
- 1.2. VUSBC – 2021 VIRGINIA UNIFORM STATEWIDE BUILDING CODE, INCLUDING:
- 1.2.1. 2021 VIRGINIA CONSTRUCTION CODE
- 1.2.2. 2021 VIRGINIA MECHANICAL CODE
- 1.2.3. 2021 VIRGINIA ENERGY CONSERVATION CODE
- 1.2.4. NFPA 70–20 – NATIONAL ELECTRICAL CODE
- 1.3. ADAAG – AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
- 1.4. ANSI – AMERICAN NATIONAL STANDARDS INSTITUTE
- 1.5. ASHRAE – AMER. SOC. OF HEATING, REFRIG. AND AIR COND. ENGINEERS
- 1.6. ASTM – AMERICAN SOCIETY FOR TESTING AND MATERIALS
- 1.7. NFPA – NATIONAL FIRE PROTECTION ASSOCIATION
- 1.8. OSHA – OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
- 1.9. SMACNA – SHEET METAL AND AIR COND. CONTRACTORS NAT'L ASSOCIATION
- 1.10. UL – UNDERWRITERS LABORATORIES, INC.
2. CONFORM TO THE BUILDING CODE AND LOCAL AUTHORITIES HAVING JURISDICTION (AHJ). OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND FEES REQUIRED.
3. CONFORM TO DIV 0, DIV 1 AND THE GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT.
4. COORDINATE SCHEDULE FOR ALL WORK WITH AND FOR APPROVAL BY THE OWNER.
5. COORDINATE WORK FROM OTHER TRADES AND BUILDING STRUCTURE PRIOR TO INSTALLATION. MAKE MINOR ADJUSTMENTS AS REQUIRED FACILITATING THE WORK.
6. ALL EQUIPMENT, MATERIALS AND SYSTEMS SHALL BE LISTED AND CLASSIFIED BY UNDERWRITERS LABORATORIES, INC. (UL), AS SUITABLE FOR USE INTENDED.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE "MEANS AND METHODS" OF THE WORK. WORK SHALL CONFORM TO THE NECA 1 – "STANDARD OF INSTALLATION" AND SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER.
8. INSTALL AND APPLY ALL EQUIPMENT AND MATERIALS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. PROVIDE SUBMITTALS WHERE INDICATED.
9. INSTALL AND PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE, DIRT, AND DEBRIS AND CLEAN AND REPAIR AS REQUIRED. DO NOT USE COMPRESSED AIR FOR CLEANING.
10. WARRANTY: PROVIDE WARRANTY ON WORKMANSHIP AND MATERIALS. WARRANTY SHALL COVER ALL COSTS FOR PARTS, LABOR, ASSOCIATED TRAVEL, AND EXPENSES FOR A PERIOD OF ONE YEAR FROM COMPLETION OF SYSTEM ACCEPTANCE. WARRANTY SHALL APPLY EQUALLY TO BOTH HARDWARE AND SOFTWARE. PERSONNEL SUPPORTING THIS WARRANTY AGREEMENT SHALL PROVIDE ON-SITE OR OFF-SITE SERVICE IN A TIMELY MANNER AFTER FAILURE NOTIFICATION TO THE VENDOR. THE MAXIMUM ACCEPTABLE RESPONSE TIME TO PROVIDE THIS SERVICE AT THE SITE SHALL BE 24 HOURS, MONDAY THROUGH FRIDAY AND 48 HOURS ON SATURDAY AND SUNDAY.
11. SUBMITTALS:
- 11.1. PROVIDE SUBMITTALS ON EQUIPMENT AND MATERIALS.
- 11.2. PROVIDE SUBMITTALS ON CERTIFICATION OF VRF SYSTEM INSTALLERS AND TEST AND BALANCE FIRM.
- 11.3. SUBMITTAL REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE PLANS AND SPECIFICATIONS.
- 11.4. OPERATION OF THE SYSTEMS REMAINS THE RESPONSIBILITY OF THE CONTRACTOR.
- 11.5. REVIEW OF A SPECIFIC ITEM DOES NOT INCLUDE OR IMPLY APPROVAL OF AN ASSEMBLY (OF WHICH THE ITEM IS A COMPONENT).
- 11.6. ALL DEVIATIONS FROM THE PROJECT ENGINEERING DRAWINGS AND SPECIFICATIONS SHALL BE EXPLICITLY NOTED IN SUBMITTALS BY COVER LETTER OR WILL BE CONSIDERED NON-COMPLIANT AND REJECTED, REGARDLESS OF SUBMITTAL REVIEW STATUS. DEVIATIONS DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE CONTRACT DOCUMENTS UNLESS SEPARATELY NEGOTIATED WITH THE OWNER.
- 11.7. THE CONTRACTOR, BY SUBMITTING A PROPOSED SUBSTITUTION, ACCEPTS ALL RESPONSIBILITY FOR COORDINATING ALL CHANGES AND ABSORBING ALL COSTS DUE TO PROPOSED SUBSTITUTED EQUIPMENT TO INCLUDE, BUT NOT LIMITED TO: COORDINATION WITH AND CHANGES AFFECTING OTHER TRADES, ADDITIONAL CIRCUITS, IMPACT OF ADDITIONAL LOADS, CIRCUIT CHARACTERISTICS, AND SINGLE-POINT CONNECTION KITS.

SECTION 23080–INSULATION:

1. ALL PRODUCTS IN THE CONDITIONED AIRSTREAM (INCLUDING PLENUMS) SHALL BE NONCOMBUSTIBLE AND SHALL COMPLY WITH NFPA 90A FLAME/SMOKE/FUEL CONTRIBUTION RATING OF 25/50/0 AND COMPLY WITH UL181 EROSION LIMITATIONS. FIRE HAZARD RATINGS SHALL BE DETERMINED BY NFPA–255 "METHOD OF TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS", ASTM E84, OR UL723.
2. INSTALL INSULATION PER MANUFACTURERS INSTRUCTIONS.
3. ON SUPPLY AIR AND OUTSIDE AIR DUCTS ENSURE THAT THE VAPOR BARRIER IS CONTINUOUS AND SEALED AT ALL PENETRATIONS.
4. DUCTS EXPOSED TO WEATHER SHALL BE PAINTED OR PROVIDED WITH SUITABLE UV RESISTANT, WEATHER–PROOF MEMBRANE. ALL JOINTS (TRANSVERSE AND LATERAL SHALL BE WRAPPED IN ALUMINUM TAPE (FLEX–CLAD 400 OR EQUAL).
5. PIPING EXPOSED TO WEATHER SHALL BE PROVIDED WITH A UV RESISTANT, WEATHER–PROOF MEMBRANE.
6. BLANKET FIBERGLASS: FLEXIBLE FIBROUS GLASS, FLAME RETARDANT FACTORY LAMINATED FOL– SKRIM–KRAFT (FSK) VAPOR BARRIER, 2" STAPLING FLANGE, MAXIMUM VAPOR PERMEANCE OF .02 PERM/IN., MINIMUM DENSITY OF 1.0 LB/CF, MAXIMUM CONDUCTIVITY PER 1" THICKNESS OF .28 AT 75F MEAN TEMPERATURE, BASED ON KNAUF DUCT WRAP.
7. RIGID BOARD (FIBERGLASS): RIGID FIBROUS GLASS, FLAME RETARDANT FACTORY LAMINATED FOL– SKRIM–KRAFT (FSK) VAPOR BARRIER, 2" STAPLING FLANGE, MAXIMUM VAPOR PERMEANCE OF .02 PERM/IN., MINIMUM DENSITY OF 6.0 LB/CF, MAXIMUM CONDUCTIVITY PER 1" THICKNESS OF .23 AT 75F MEAN TEMPERATURE.
8. CLOSED CELL ELASTOMERIC (SMALL PIPE SIZES UP TO 5 INCHES): FLEXIBLE, ELASTOMERIC, CLOSED CELLULAR, TUBULAR MOLDED TO ACCOMMODATE PIPING, SMOOTH OUTER SURFACE SUITABLE FOR PAINTING WITH VINYL LACQUER TYPE COATING, WATER RESISTANT, NON– ABSORBENT, OZONE RESISTANT, MINIMUM DENSITY OF 4 LB/CF, MAXIMUM CONDUCTIVITY PER 1" THICKNESS OF .27 AT 75F MEAN TEMPERATURE, BASED ON ARMSTRONG AP ARMAFLEX AND SELF–SEAL ARMAFLEX 2000.
9. SCHEDULE (INSULATION BASED ON KNAUF):

SUPPLY DUCTWORK:

EXPOSED	NONE (APARTMENTS)
ABOVE CEILINGS	1–1/2" BLANKET TYPE, R–6 MIN.
GRILLE BOOTS	1–1/2" BLANKET TYPE, R–6 MIN.

RETURN/TRANSFER DUCTWORK:

ALL	1" LINER, R–6 MIN.
GRILLE BOOTS	1" LINER, R–6 MIN.

OUTSIDE AIR DUCTWORK:

ALL	2" 1LB DENSITY BLANKET, R–8 MIN.
-----	----------------------------------

EXHAUST DUCTWORK:

OTHER EXHAUST	NONE
---------------	------

PIPING:

INDOOR REF PIPING	1" CLOSED CELL ELASTOMERIC
OUTDOOR REF PIPING	1–1/2" CLOSED CELL ELASTOMERIC W/ WEATHERPROOF JACKET

SECTION 23820–DUCTWORK ACCESSORIES:

1. WALL CAPS (ROOF): PROVIDE ALUMINUM WALL CAP ON SIDE OF DUCT CURB (REFER TO DETAIL) FOR DRYER/TOILET EXHAUST AND OUTSIDE AIR INTAKES. PROVIDE WITH BACKDRAFT DAMPER ON DRYER AND TOILET EXHAUST DUCTS. PROVIDE WITH BIRD SCREEN ON TOILET AND OUTSIDE AIR INTAKES.
2. SLOPED ROOF INLETS/OUTLETS (LOW VOLUME): 24 GAUGE CRQO STEEL WITH BLACK ELECTRICALLY–BONDED EPOXY FINISH. FOR USE ON ROOFS WITH A 20 DEGREE OR GREATER SLOPE. PROVIDE WITH BACKDRAFT DAMPER ON DRYER AND TOILET EXHAUST DUCTS. PROVIDE WITH BIRD SCREEN ON TOILET AND OUTSIDE AIR INTAKES.
3. CEILING MOUNTED RADIATION DAMPER: INSULATED, 2–BLADE, 22 GA GALVANIZED STEEL FRAME AND BLADES, SPRING OPERATED WITH 212F FUSIBLE LINK. RADIATION DAMPERS SHALL BE LABELED AS DYNAMICALLY RATED TO CLOSE AGAINST AIRFLOW.
4. VOLUME DAMPERS (MANUAL): BLADES AND FRAME SHALL BE OF EXTRUDED ALUMINUM OR GALVANIZED STEEL CONSTRUCTION. PROVIDE SINGLE BLADE DAMPERS PER SMACNA FIG 2–12, FIGURE B ON RECTANGULAR DUCTS LESS THAN 30" IN WIDTH AND 12" OR LESS IN DEPTH AND MULTI–BLADE DAMPERS PER SMACNA FIGURE 2–13, FIGURE A ON LARGER RECTANGULAR DUCTS. ROUND DUCT VOLUME DAMPERS SHALL BE SINGLE BLADE MOUNTED ON A CONTINUOUS SHAFT. EQUIP WITH LOCKING QUADRANT AND END BEARINGS. PROVIDE HANDLE EXTENSION ON EXTERNALLY INSULATED DUCTWORK.
5. LOUVERS: 4 INCH DEEP EXTRUDED ALUMINUM LOUVER WITH BIRD SCREEN, FLANGED FRAME, AND DRAINABLE BLADES. LOUVER TO HAVE AT LEAST 46% FREE AREA MINIMUM. LOUVER COLOR TO BE SELECTED BY THE ARCHITECT. PROVIDE COLOR SAMPLES WITH SUBMITTALS.

SECTION 23770–SPLIT SYSTEM AIR CONDITIONERS:

OUTDOOR STANDARD SPLIT SYSTEM HEAT PUMP (HP):

1. STANDARD EFFICIENCY, SPLIT SYSTEM HEAT PUMP. COMPRESSOR TO BE INTERNALLY PROTECTED AGAINST HIGH PRESSURE, TEMPERATURE, AND EXTERNALLY BY A FACTORY INSTALLED HIGH PRESSURE SWITCH. PROVIDE REMOVABLE ACCESS PANEL TO ELECTRICAL BOX. FURNISH FULLY CHARGED AND FACTORY WIRED. UNIT SHALL OPERATE WITH R–410A. PROVIDE WITH 5–YEAR LIMITED PARTS WARRANTY AND 5–YEAR LIMITED COMPRESSOR WARRANTY.
2. CONSTRUCTED OF PRE–PAINTED STEEL, INTERNALLY PROTECTED HERMETIC COMPRESSOR WITH INTERNAL DISCHARGE LINE SOLID CORE FILTER DRIER, CRANKCASE HEATER, AND HARD START KITS (FOR UNITS WITH REFRIGERANT LINE LENGTHS OVER 100 FT). CONDENSER COILS CONSTRUCTED OF COPPER TUBING AND ENHANCED ALUMINUM COILS.
3. INSTALL UNIT ON PLASTIC HOUSEKEEPING PAD (WITH NEOPRENE BETWEEN PAD AND ROOF) OR 4x4 WEATHER TREATED LUMBER WITH NEOPRENE PADS BETWEEN UNIT AND LUMBER.

OUTDOOR MINI–SPLIT HEAT PUMP (HP):

1. HIGH EFFICIENCY, COMPACT MINI–SPLIT SYSTEM HEAT PUMP. DC TWIN ROTARY COMPRESSOR, DC INVERTER CONTROL, 4–FACE HEAT EXCHANGER, LARGE PROPELLER FAN. PROVIDE REMOVABLE ACCESS PANEL TO ELECTRICAL BOX. FURNISH FULLY CHARGED AND FACTORY WIRED. UNIT SHALL OPERATE WITH R–410A. PROVIDE WITH 5–YEAR LIMITED PARTS WARRANTY AND 5–YEAR LIMITED COMPRESSOR WARRANTY.
2. INSTALL UNIT ON HOUSEKEEPING PAD WITH NEOPRENE BETWEEN PAD AND ROOF.
3. THE POWER/CONTROL WIRING BETWEEN THE INDOOR AND OUTDOOR UNITS SHALL BE RATED FOR THE PROPOSED INSTALLATION (I.E. WALL CAVITY, CONCEALED, ETC.)

INDOOR STANDARD SPLIT SYSTEM AIR HANDLING UNIT (AHU):

1. COMPACT AND STURDY CABINET IS PROTECTED WITH A DURABLE FINISH AND INSULATED TO PREVENT SWEATING. PROVIDE WITH ALUMINUM FIN COILS AND ELECTRIC HEATERS. ELECTRIC HEATER SHALL BE CONTROLLED TO PREVENT OPERATION WHEN THE HEAT PUMP CAN PROVIDE HEATING LOAD.
2. FOR UNITS MOUNTED VERTICALLY, PROVIDE FLOAT SWITCH ON CONDENSATE OVERFLOW CONNECTION. FOR UNITS MOUNTED HORIZONTALLY PROVIDE CONDENSATE DRAIN PAN UNDER UNIT WITH FLOAT OR WATER DETECTOR WITHIN THE PAN. UPON A DETECTION OF WATER IN THE PAN OR CONDENSATE OVERFLOW CONNECTION, UNIT SHALL BE SHUT DOWN
3. THERMOSTATS:
- 3.1. PROVIDE NON–PROGRAMMABLE DIGITAL THERMOSTAT FOR ALL RESIDENTIAL UNITS. PROVIDE 7–DAY PROGRAMMABLE THERMOSTATS FOR ALL UNITS SERVING NON–APARTMENT SPACES. THERMOSTATS SHALL HAVE ALL FUNCTIONALITY REQUIREMENTS UNDER VECC SECTION R403.1.1.
- 3.2. PROVIDE 7–DAY PROGRAMMABLE THERMOSTATS FOR ALL UNITS SERVING NON–RESIDENTIAL SPACES. THERMOSTATS SHALL HAVE ALL FUNCTIONALITY REQUIREMENTS UNDER VECC SECTION C403.2.4. (C403.2.4.2, C403.2.4.2.1, .2, .3) INCLUDING THERMOSTATIC SETBACK, AUTOMATIC SETBACK/SHUTDOWN, AND AUTOMATIC RESTART.
4. PROVIDE DUCTED INDOOR UNIT WITH SUPPLY AND RETURN PLENUMS AS INDICATED. PLENUMS TO BE SIZED AS SMALL AS POSSIBLE FOR CONNECTIONS. LINE WITH 1" INSULATION FOR SOUND DAMPENING.
5. PROVIDE WITH INTERNAL FILTER RACK AND 1"THICK FILTER.

INDOOR MINI–SPLIT SYSTEM AIR HANDLING UNIT (AHU):

1. CEILING CASSETTE UNIT – COMPACT CASSETTE AHU CAPABLE OF FITTING INTO A STANDARD CEILING TILE. PROVIDE WITH FRESH AIR KIT TO PROVIDE VENTILATION AIR TO THE SPACE.
2. POWER WIRING FOR INDOOR UNIT(S) IS FED FROM OUTDOOR UNIT. RUN WIRING WITH REFRIGERANT LINE SETS.
3. THERMOSTATS:
- 3.1. PROVIDE PROGRAMMABLE DIGITAL THERMOSTAT FOR ALL RESIDENTIAL UNITS. THERMOSTATS SHALL HAVE ALL FUNCTIONALITY REQUIREMENTS UNDER VECC SECTION R403.1.1.
- 3.2. PROVIDE 7–DAY PROGRAMMABLE THERMOSTATS FOR ALL UNITS SERVING NON–RESIDENTIAL SPACES. THERMOSTATS SHALL HAVE ALL FUNCTIONALITY REQUIREMENTS UNDER VECC SECTION C403.2.4. (C403.2.4.2, C403.2.4.2.1, .2, .3) INCLUDING THERMOSTATIC SETBACK, AUTOMATIC SETBACK/SHUTDOWN, AND AUTOMATIC RESTART. CONTRACTOR TO SET UP THERMOSTATS SUCH THAT THE RETURN AIR TEMPERATURE IS READ FROM THE WALL THERMOSTAT AND NOT THE RETURN AIR INTAKE.
- 3.3. CONTRACTOR TO SET UP ESP SETTING ON THERMOSTAT TO 0.35" ESP FOR DUCTED UNITS.
4. CONTRACTOR TO SET UP ESP SETTING ON THERMOSTAT TO 0.35" ESP FOR DUCTED UNITS.
5. AS REQUIRED BY THE MANUFACTURER PROVIDE ZONE VALVE BOXES TO SERVE MULTIPLE INDOOR UNITS. DESIGN BASED ON FUJITSU MODEL UTY–RNRU2S.
6. PROVIDE WITH REMOVABLE, CLEANABLE, MILDEW RESISTANT AIR FILTER.

SECTION 23890–METAL DUCTWORK:

1. UNLESS OTHERWISE NOTED, RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED OF HOT ROLLED STEEL CONTINUOUSLY ANNEALED AND HOT DIPPED GALVANIZED SHEET OR COIL, MINIMUM G–90, 0.90 OZ/SF COATING SUITABLE FOR FORMING WITHOUT FLAKING OR PEELING; SUITABLE FOR WELDING OR SOLDERING. ZINC COATING SHALL NOT BE IMPAIRED FROM DOUBLE SEAMING, BREAKING OR ROLL FORMING. 14 GA. AND LIGHTER CONFORMING TO ASTM A 527; 13 GA AND HEAVIER CONFORMING TO ASTM A 526.
2. DRYER VENT SHALL BE 26 GA. MINIMUM.
3. UNLESS OTHERWISE NOTED, ROUND DUCTWORK SHALL BE CONSTRUCTED OF G–90 GALVANIZED STEEL WITH THE FOLLOWING MINIMUM GAUGES: <15" DIA. = 24 GAUGE, 15"–26" DIA. = 22 GAUGE.
4. INSULATED ROUND FLEXIBLE DUCT (MAX LENGTH 8') IS ALLOWED FOR BRANCH CONNECTIONS TO DIFFUSERS AND GRILLES ABOVE LAY-IN CEILINGS. INSULATED ROUND FLEXIBLE DUCTWORK SHALL BE UL181, CLASS 1 AND SUITABLE FOR LOW PRESSURE APPLICATIONS OF NOT LESS THAN 3" W.C. CONNECT TO METAL DUCT WITH STAINLESS STEEL DRAW BANDS.
5. ALL DUCT SIZES SHOWN ON PLANS ARE INSIDE CLEAR (AIRFLOW) DIMENSIONS. NO ALLOWANCE HAS BEEN MADE FOR DUCT LINER OR DOUBLE WALL DUCTWORK WHERE REQUIRED.
6. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
7. PROVIDE ALL HANGERS AND SUPPORTS AS REQUIRED.
8. PROVIDE DOUBLE WALL TURNING VANES IN ALL LOW PRESSURE SUPPLY , RETURN, AND EXHAUST DUCTS . TURNING VANES ARE NOT REQUIRED WHERE RADIUS ELBOW FITTINGS WITH R=1.5 OR GREATER ARE USED.
9. SEAL DUCT JOINTS AIR TIGHT. PROVIDE AIR TIGHT SEAL WITH VOLUME DAMPERS AT ALL TAPS OFF MAIN DUCT TO DIFFUSERS.
10. SCHEDULE:
- | SYSTEM | SECTION | PRESSURE CLASS | SEAL CLASS |
|----------------|---------|----------------|------------|
| LP SUPPLY | ALL | 2" | A |
| RETURN–RELIEF | ALL | 2" | C |
| GEN. EXHAUST | ALL | 2" | C |
| DRYER VENT | ALL | 2" | SPOT WELD |
| COMBUSTION AIR | ALL | 2" | C |

SECTION 23830–FANS:

1. FANS SHALL BE UL LISTED AND AMCA CERTIFIED. ELECTRICAL DEVICES SHALL CONFORM TO NEMA STANDARDS. WIRING SHALL CONFORM TO NEC.
2. MOTORS SHALL BE NON–OVERLOADING, HIGH EFFICIENCY TYPE. MOTORS DESIGNED FOR VARIABLE SPEED SHALL BE DESIGNED AND RATED FOR USE WITH VFDs.
3. CEILING MOUNTED EXHAUST FAN (WITHIN UNRATED DROPPED CEILING): FORWARD CURVED INJECTION MOLDED POLYPROPYLENE FAN WHEEL, 22 GAUGE GALVANIZED STEEL INLET BOX, ISOLATED MOUNTED DIRECT MOTOR, MOUNTED TO ONE PIECE GALVANIZED STAMPED STEEL INTEGRAL MOTOR MOUNT/INLET, BACKDRAFT DAMPER, AND WHITE HIGH IMPACT STYRENE INJECTED MOLDED GRILLE. BASIS OF DESIGN: COOK MODEL GC.
4. CEILING MOUNTED EXHAUST FAN (WITHIN RATED DROPPED CEILING): FORWARD CURVED INJECTION MOLDED POLYPROPYLENE FAN WHEEL, 22 GAUGE GALVANIZED STEEL INLET BOX, ISOLATED MOUNTED DIRECT MOTOR, MOUNTED TO ONE PIECE GALVANIZED STAMPED STEEL INTEGRAL MOTOR MOUNT/INLET, BACKDRAFT DAMPER, AND WHITE HIGH IMPACT STYRENE INJECTED MOLDED GRILLE. PROVIDE WITH INTEGRAL RADIATION DAMPER. BASIS OF DESIGN: COOK MODEL GC.

SECTION 23850–GRILLES, REGISTERS, AND DIFFUSERS:

1. PROVIDE AS INDICATED IN THE GRD SCHEDULE. PROVIDE ALL GRDs WITH INTEGRAL VOLUME DAMPERS OR WITH VOLUME EXTRACTORS AS INDICATED. COLOR OF THE GRILLES TO BE DETERMINED BY ARCHITECT. PERFORMANCE OF THE GRILLES IS A MAXIMUM OF 700 FPM OR A NC LEVEL OF 30 OR LESS FOR SIZE AND CFM INDICATED.
2. INSTALL WITH AIR TIGHT CONNECTION TO DUCTWORK. COORDINATE MOUNTING CONDITIONS WITH ARCHITECTURAL.
3. CONFORM WITH ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENTS.

SECTION 23767–HEATERS:

ELECTRIC UNIT HEATERS:

1. WALL ELECTRIC HEATERS (WH) – RECESSED WALL MOUNTED ELECTRIC UNIT HEATER WITH INTEGRAL THERMOSTAT, LOUVERED FRONT COVER, DISCONNECT SWITCH, AND HEATING ELEMENT.
2. UNIT ELECTRIC HEATERS (UH) – CEILING OR WALL HUNG WITH INTEGRAL THERMOSTAT, FAN, LOUVERED FRONT COVER, DISCONNECT SWITCH, AND HEATING ELEMENT.

MECHANICAL GENERAL NOTES:

SCOPE:

PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TRANSPORTATION, AND OTHER SERVICES NECESSARY TO SATISFACTORILY COMPLETE ALL MECHANICAL WORK INDICATED ON THE CONTRACT DOCUMENTS. ALL SPECIFICATIONS, NOTES, OR SYMBOLS MAY NOT BE APPLICABLE FOR THIS TENANT. CONTRACTOR SHALL CAREFULLY REVIEW PLANS AND DETAILS FOR ACCURATE EXTENT OF WORK REQUIRED.

PERMITS:

CONTRACTOR SHALL BE RESPONSIBLE FOR PROCUREMENT OF ALL APPLICABLE BUILDING PERMITS, INSPECTIONS, AND OTHER REQUIRED ADMINISTRATIVE DUTIES TO COMPLETE ALL INDICATED WORK REQUIREMENTS.

DESIGN CONSIDERATIONS:

OUTDOOR TEMPERATURE:	SUMMER: 95F DB, 75F WB WINTER: 17F DB
INDOOR TEMPERATURE	SUMMER: 75F DB, 45–60% R.H. WINTER: 70F DB

*HUMIDITY WILL VARY WITH OUTDOOR CONDITION

VENTILATION AND DISTRIBUTION:

MECHANICAL VENTILATION WILL BE PROVIDED PER THE VIRGINIA MECHANICAL CODE SECTION 403 AND TABLE 403.3.

STANDARDS:

ALL MATERIALS WITH ELECTRICAL REQUIREMENTS SHALL BE UL LISTED FOR THE INTENDED APPLICATION.

PHASING AND WORK PERFORMANCE:

THE CONTRACTOR SHALL COORDINATE ALL PHASING AND STAGING/STORAGE OF MATERIALS AND WORK WITH THE GENERAL CONTRACTOR. A WRITTEN GUARANTEE FOR THE PERIOD OF AT LEAST ONE YEAR AFTER SUBSTANTIAL COMPLETION SHALL BE TURNED OVER TO THE OWNER ON ALL MATERIALS AND WORK DONE BY THE CONTRACTOR. ALL MATERIALS INSTALLED SHALL ALSO BE PROVIDED WITH THE MAXIMUM AVAILABLE GUARANTEE FROM THE MANUFACTURER.

CLEAN UP AND PROTECTION OF AREA:

THE CONTRACTOR SHALL CLAIM ALL RESPONSIBILITY FOR PROTECTION OF THE AREAS INVOLVED, INCLUDING ANY AREAS INVOLVED IN THE TRANSPORTATION AND STORAGE OF EQUIPMENT DURING CONSTRUCTION. THE CONTRACTOR SHALL CONSISTENTLY MAINTAIN A WORK ENVIRONMENT THAT IS CLEAN AND PROTECTED FROM UNAUTHORIZED PERSONS AND DAMAGE DUE TO CONSTRUCTION. AFTER COMPLETION OF ALL CONSTRUCTION, THE CONTRACTOR SHALL CLEAN ALL AREAS INVOLVED IN THE CONSTRUCTION PROCESS, TO THE OWNER'S APPROVAL. ALL REFUSE INVOLVED DUE TO CONSTRUCTION SHALL BE PROPERLY AND PROMPTLY DISPOSED OF AT AN ON SITE LOCATION.

- THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO SHOW THE GENERAL ROUTING, LOCATION, AND SIZE OF EQUIPMENT, PIPING AND/OR DUCTWORK. THE CONTRACTOR SHALL MAKE ALLOWANCES FOR ALL MATERIALS AND LABOR NECESSARY TO MAKE FINAL CONNECTIONS. NOT ALL NECESSARY OFFSETS OR FITTINGS ARE SHOWN, BUT SHALL BE PROVIDED WHERE REQUIRED. THE CONTRACTOR SHALL PROVIDE ALL ACCESSORIES, SUPPORTS, AND HANGERS TO ALLOW FOR COMPLETE AND FUNCTIONAL SYSTEMS. ALL WORK SHALL MEET OR EXCEED PUBLISHED OR ACCEPTED STANDARDS OF QUALITY WORKMANSHIP, AND SHALL BE IN ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND/OR INSTALLATION INSTRUCTIONS. THE INTENT OF THESE CONTRACT DOCUMENTS IS TO PROVIDE COMPLETE FUNCTIONING SYSTEMS.

- INSTALL ALL DEVICES IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- APPLIANCES SHALL BE INSTALLED WITH THE CLEARANCES FROM UNPROTECTED COMBUSTIBLE MATERIALS AS INDICATED ON THE APPLIANCE LABEL AND IN THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- COORDINATE THE PROPER GRILLE STYLE AND FRAME STYLE WITH THE FINAL APPROVED CEILING CONSTRUCTION AND INSTALL GRILLES, REGISTERS, AND DIFFUSERS.
- DUE TO THE SMALL SCALE OF THE DRAWINGS, THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY TO COORDINATE THE AIR OUTLET AND INLET LOCATIONS WITH THE CEILING PLANS, LIGHTING PLANS, SECTIONS AND/OR DETAILS.
- PROVIDE SUBMITTALS ON ALL EQUIPMENT AND CONTROLS FOR APPROVAL.
- PROVIDE OWNER TRAINING ON ALL EQUIPMENT.
- PROVIDE START–UP OF ALL EQUIPMENT.

- WELDING, CUTTING, OR BURNING: THE CONTRACTOR SHALL PROVIDE THE OWNER A MINIMUM OF 72 HOURS ADVANCE NOTICE PRIOR TO PERFORMING ANY WELDING, CUTTING, OR BURNING WITHIN THE BUILDING. NO WELDING, CUTTING, OR BURNING SHALL OCCUR WITHOUT GENERAL CONTRACTOR APPROVAL. WHERE WELDING, CUTTING, OR BURNING ARE NECESSARY, NON–COMBUSTIBLE SHIELDS SHALL BE USED AND SUITABLE FIRE EXTINGUISHING EQUIPMENT SHALL BE MAINTAINED NEARBY.

- FABRICATION OF STEEL SUPPORTS: FABRICATE FROM STEEL ANGLES, CHANNELS OR PLATES IN ACCORDANCE WITH ASTM.
- THERMOSTAT LOCATIONS ARE GENERAL. THERMOSTATS SHALL BE LOCATED ADJACENT TO DOORS OR NEAR RETURN GRILLES. COORDINATE FINAL THERMOSTAT LOCATIONS WITH ARCHITECT AND/OR OWNER.

MECHANICAL DRAWING LIST

M.001 - MECHANICAL SPECIFICATIONS AND NOTES
M.002 - MECHANICAL ABBREVIATIONS, LEGEND, SCHEDULES AND DETAILS
M.003 - MECHANICAL DETAILS
M.201 - MECHANICAL OVERALL FIRST FLOOR PLAN
M.202 - MECHANICAL OVERALL SECOND FLOOR PLAN
M.203 - MECHANICAL OVERALL THIRD FLOOR PLAN
M.204 - MECHANICAL OVERALL ROOF PLAN
M.220 - MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA A
M.221 - MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA B
M.222 - MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA C
M.223 - MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA A
M.224 - MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA B
M.225 - MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA C
M.226 - MECHANICAL PARTIAL THIRD FLOOR PLAN - AREA A&B

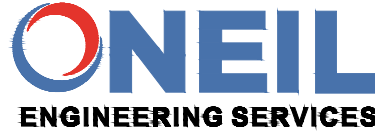


VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS

#	DATE	DESCRIPTION
	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWhatan, VIRGINIA 23139
PHONE: 804-372-3501


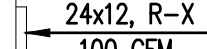

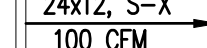



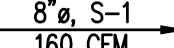






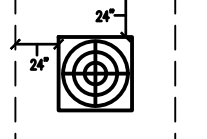




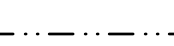



PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	AS NOTED
DRAWN BY:	JCW
APPROVED BY:	JCW

MECHANICAL
NOTES AND
SPECIFICATIONS

SHEET:

M.001

MECHANICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DUCT SIZE (FIRST FIGURE IS OF SIDE SHOWN DIMENSION)		SIDEWAYS RETURN
	FLEXIBLE CONNECTION		SIDEWAYS SUPPLY
	TRANSITION		DIFFUSER TO BE PROVIDED WITH RADIATION DAMPER
	FIRE DAMPER W/ ACCESS DOOR		DIFFUSER TAG WITH AIRFLOW
	AIR TIGHT CONNECTION OFF DUCT MAIN		DOOR UNDERCUT
	4-WAY THROW SUPPLY DIFFUSER WITH FLEX DUCT CONNECTION		THERMOSTAT (48" AFF)
	RETURN DIFFUSER		SMOKE DETECTOR
	HEAT PUMP WITH COIL AND MAINTENANCE CLEARANCE BOUNDARY LINE; REFER TO MANUFACTURER'S MANUAL.		OCCUPANCY SENSOR
			ACCESS DOOR IN SIDE OF WALL OR DUCT
			EQUIPMENT NUMBER
			1-HOUR RATED WALL
			2-HOUR RATED WALL
			MATCH LINE
			ZONE DAMPER
			MOTORIZED DAMPER; USED FOR BYPASS AIR

MECHANICAL ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A	AMPERES	GA	GAUGE
AD	ACCESS DOOR	HP	HORSEPOWER
AHU	AIR HANDLING UNIT	HZ	FREQUENCY
BTU	BRITISH THERMAL UNIT	KW	KILOWATT
BTUH	BRITISH THERMAL UNIT PER HOUR	LAT	LEAVING AIR TEMPERATURE
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
DB	DRYBULB	NTS	NOT TO SCALE
DE	DRYER EXHAUST	OA	OUTSIDE AIR
DN	DOWN	PD	PRESSURE DROP
DWG	DRAWING	PH	PHASE
DX	DIRECT EXPANSION	PSI	POUNDS PER SQUARE INCH
EA	EXHAUST AIR	PVC	POLYVINYL CHLORIDE
EAT	ENTERING AIR TEMPERATURE	RA	RETURN AIR
EF	EXHAUST FAN	RL	REFRIGERANT LIQUID
ESP	EXTERNAL STATIC PRESSURE	RPM	REVOLUTIONS PER MINUTE
°F	DEGREE FAHRENHEIT	RS	REFRIGERANT SUCTION
FD	FIRE DAMPER	SA	SUPPLY AIR
FLA	FULL LOAD AMPERES	TYP	TYPICAL
FPM	FEET PER MINUTE	WB	WET BULB
FT	FEET	WH	WALL HEATER

MINI-SPLIT SET-UP REQUIREMENTS

- SET UP UNIT OPERATION IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AND THE ITEMS LISTED BELOW.
- CONTRACTOR TO SET UP THERMOSTATS SUCH THAT THE RETURN AIR TEMPERATURE IS READ FROM THE WALL THERMOSTAT AND NOT THE RETURN AIR INTAKE.
- CONTRACTOR SHALL SET UP UNITS SO THAT THE ESP SETTING ON THE THERMOSTAT IS SET TO 0.35" ESP FOR DUCTED UNITS.
- SUBMIT WRITTEN VERIFICATION (SIMPLE E-MAIL WILL SUFFICE) THAT UNITS HAVE BEEN SET UP PER THE ABOVE.

ELECTRIC UNIT HEATER SCHEDULE:

UNIT NO.	SERVING	UNIT TYPE	TOTAL CAPACITY (BTUH)	AIR DATA		ELECTRIC DATA				SELECTION BASED ON		REMARKS
				CFM	EAT °F	KW	FLA	VOLT	PH	MANUFACTURER	MODEL	
WH-1	STAIRWELLS/ENTRY VESTIBULES	WALL MTD	6142	100	64	1.8	15	120	1	BERKO	FRA1812	

FAN SCHEDULE - GENERAL

UNIT NO.	SERVING	TYPE	AIRFLOW (CFM)	ESP (IN. W.C.)	FAN RPM	MOTOR DATA				SELECTION BASED ON		REMARKS
						HP	RPM	VOLTS	PH	MANUFACTURER	MODEL	
EF-1	RESIDENTIAL BATHROOMS	CEILING OR WALL MTD	50	0.35	750	27W	750	120	1	COOK	GC-128	NOTES 1,2
EF-2	COMMERCIAL BATHROOMS	CEILING MTD	75	0.39	900	34W	900	120	1	COOK	GC-146	NOTES 1,2
EF-3	RESIDENTIAL KITCHENS	CEILING OR WALL MTD	50	0.36	1160	53W	1160	120	1	COOK	GC-128	NOTES 1,3
NOTES: 1. PROVIDE WITH INTEGRAL RADIATION DAMPER WHERE LOCATED IN RATED CEILING ASSEMBLY. 2. ON/OFF CONTROL BY WALL SWITCH. 3. CONTINUOUS OPERATION.												

GRILLE, REGISTER AND DIFFUSER SCHEDULE:

UNIT NO.	TYPE			SERVICE			MOUNTING DATA				CONSTRUCTION DATA										SELECTION BASED ON		REMARKS			
	G	R	D	SA	RA	EA	CEILING	DUCT	FLOOR	WALL	SHAPE	MATERIAL	COLOR	ACCESSORIES				PATTERN						MANUFACTURER	MODEL	
														VD	RC	VE	P	1-W	2-W	3-W	4-W	E/R				
S-1	X			X			X			X	RECT.	STEEL	WHITE	X								X		KRUEGER	880	DOUBLE DEFLECTION 3/4" BLADE SPACING
S-2	X			X				X			RECT.	ALUMINUM	MATCH DUCT			X			X					KRUEGER	5DMGDR	DOUBLE DEFLECTION 3/4" BLADE SPACING
R-1	X				X					X	RECT	STEEL	TBD	X								X		KRUEGER	S80-4FF	35° DEFLECTION, 2" FILTER FRAME. PROVIDE WITH 2" MERV 8 FILTER.

SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE

UNIT NO.	TYPE	SUPPLY FAN DATA			COOLING DATA				HEATING DATA			UNIT ELECTRIC DATA				SELECTION BASED ON		OUTDOOR UNIT	REMARKS
		NOMINAL CFM RANGE	ESP Delta P IN H ₂ O	OA CFM	CAPACITY MBH	EAT °F		SEER @ARI	CAPACITY MBH	INDOOR EAT DB °F	OUTDOOR COND. DB °F	VOLT	PH	MCA	MOCP	MANUFACTURER	MODEL		
						DB °F	WB °F												
AHU-CORR 1	COMPACT CASSETTE	360	0.0	70	12.0	80	67	23	16.0	70	47	208	1	-	-	FUJITSU	AOU36RLXFZ1	AOUH12LUAS1	NOTE 1,2
AHU-CORR 2	COMPACT CASSETTE	360	0.0	70	12.0	80	67	23	16.0	70	47	208	1	-	-	FUJITSU		AOUH12LUAS1	NOTE 1,2
AHU-CORR 3	COMPACT CASSETTE	320	0.0	40	9.0	80	67	23.5	12.0	70	47	208	1	-	-	FUJITSU		AOUH09LUAS1	NOTE 1,2
AHU-ENTRY 1	COMPACT CASSETTE	320	0.0	25	9.0	80	67	23.5	12.0	70	47	208	1	-	-	FUJITSU	AOU36RLXFZ1	AOUH09LUAS1	NOTE 1,2
AHU-ENTRY 2	COMPACT CASSETTE	320	0.0	25	9.0	80	67	23.5	12.0	70	47	208	1	-	-	FUJITSU		AOUH09LUAS1	NOTE 1,2
AHU-ENTRY 3	COMPACT CASSETTE	320	0.0	25	9.0	80	67	23.5	12.0	70	47	208	1	-	-	FUJITSU		AOUH09LUAS1	NOTE 1,2
AHU-AMEN	COMPACT CASSETTE	320	0.0	100	9.0	80	67	23.5	12.0	70	47	208	1	-	-	FUJITSU	AOUH09LUAS1	AOUH09LUAS1	NOTE 1,2
NOTES:																			
1. SINGLE ZONE ORIENTATION.																			
2. ELECTRIC FED FROM OUTDOOR UNIT.																			

SPLIT SYSTEM OUTDOOR UNIT SCHEDULE

UNIT NO.	SERVING AHU	UNIT DATA					FAN MOTOR(S)		COMPRESSOR(S)		UNIT ELECTRIC DATA				SELECTION BASED ON		INDOOR UNIT	REMARKS
		COOLING CAPACITY MBH	COND. EAT °F	S. SUCT. °F	SEER	REFRIG. TYPE	NO.	TOTAL CFM	NO.	STEPS	MCA	MOCP	VOLT	PH	MANUFACTURER	MODEL		
HP-CORR 1	AHU-CORR 1/ AHU-CORR 2/ AHU-ENTRY 3	36	95	45	19	R410A	1	2119	1	1	24.6	30	208	1	FUJITSU	AOU36RLXFZ1	AOUH12LUAS1/ AOUH12LUAS1/ AOUH09LUAS1	
HP-ENTRY	AHU-ENTRY1/ AHU-ENTRY2/ AHU-ENTRY3	36	95	45	19	R410A	1	2119	1	1	24.6	30	208	1	FUJITSU	AOU36RLXFZ1	AOUH09LUAS1/ AOUH09LUAS1/ AOUH09LUAS1	
HP-AMEN	AHU-AMEN	9	95	45	22.5	R410A	1	906	1	1	9.3	15	208	1	FUJITSU	AOUH09LUAS1	AOUH09LUAS1	

SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE - CONVENTIONAL

UNIT TAG	SERVING	SUPPLY FAN DATA					COOLING DATA				HEATING DATA				ELEC. HEATING COIL DATA				UNIT ELECTRIC DATA				SELECTION BASED ON		REMARKS
		NOMINAL CFM RANGE	ESP Delta P IN H ₂ O	OA CFM	HP	RPM	TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH	EAT °F		SEER @ARI	CAPACITY MBH	INDOOR EAT DB °F	OUTDOOR COND. DB °F	KW (240V)	VOLT	PH	NO. STEPS	VOLT	PH	MCA	MOCP	MANUFACTURER	MODEL	
AHU-A	TYPE A APARTMENTS	600	0.5	SEE UNIT SCHEDULE	1/3	-	17.18	13.09	80	67	15	17.6	70	47	5	208	1	1	208	1	24.1	25	CARRIER	FMA5X1800AL	PAIRED WITH EHK205B ELECTRIC HEAT KIT W/ CIRCUIT BREAKER FOR INDOOR
AHU-B	TYPE B APARTMENTS	758	0.5		1/3	-	22.02	16.31	80	67	15	23.35	70	47	5	208	1	1	208	1	24.1	25	CARRIER	FMA5X2400AL	PAIRED WITH EHK205B ELECTRIC HEAT KIT W/ CIRCUIT BREAKER FOR INDOOR
AHU-LOBBY	MAIN LOBBY	1200	0.5		1/2	-	34.73	26.33	80	67	15	34.47	70	47	7.5	208	1	1	208	1	40.6	45	CARRIER	FJ5ANXB36L00	PAIRED WITH KFFEH0801N08 HEATER NON FUSED FOR INDOOR
AHU-MAIN 1	MAIN AMENITY	1600	0.5	175	3/4	-	46.82	36.12	80	67	15	47.13	70	47	10	208	1	1	208	1	51.6	60	CARRIER	FJ5ANXC48L00	PAIRED WITH KFFEH0901N10 HEATER NON FUSED FOR INDOOR
AHU-MAIN 2	MAIN AMENITY	1600	0.5	175	3/4	-	46.82	36.12	80	67	15	47.13	70	47	10	208	1	1	208	1	51.6	60	CARRIER	FJ5ANXC48L00	PAIRED WITH KFFEH0901N10 HEATER NON FUSED FOR INDOOR

SPLIT SYSTEM OUTDOOR UNIT SCHEDULE (15 SEER) - CONVENTIONAL

UNIT TAG	SERVING	UNIT DATA					FAN DATA				COMPRESSOR(S)				UNIT ELECTRIC DATA				SELECTION BASED ON		PAIRED WITH		REMARKS
		CAPACITY MBH	COND. EAT °F	S. SUCT. °F	SEER	REFRIG. TYPE	NO.	HP	RPM	TOTAL CFM	NO.	STEPS	LRA	RLA	MCA	MOCP	VOLT	PH	MANUF.	MODEL	MANUF.	MODEL	
HP-A	AHU-A	18.0	95	45	15	R454B	1	1/3	-	-	1	1	45.1	8.3	10.9	15	208	1	CARRIER	27SCA518A003	CARRIER	FMA5X1800AL	
HP-B	AHU-B	24.0	95	45	15	R454B	1	1/3	-	-	1	1	64.4	10.3	13.5	20	208	1	CARRIER	27SCA524A003	CARRIER	FMA5X2400AL	
HP-LOBBY	AHU-LOBBY	36.0	95	45	15	R454B	1	1/2	-	-	1	1	86.0	14.4	19.2	30	208	1	CARRIER	27SCA536A003	CARRIER	FJ5ANXB36L00	
HP-MAIN 1	AHU-MAIN 1	48.0	95	45	15	R454B	1	3/4	-	-	1	1	126.0	22.4	29.4	50	208	1	CARRIER	27SCA548A003	CARRIER	FJ5ANXC48L00	
HP-MAIN 2	AHU-MAIN 2	48.0	95	45	15	R454B	1	3/4	-	-	1	1	126.0	22.4	29.4	50	208	1	CARRIER	27SCA548A003	CARRIER	FJ5ANXC48L00	

HVAC APT UNIT SCHEDULE FIRST FLOOR

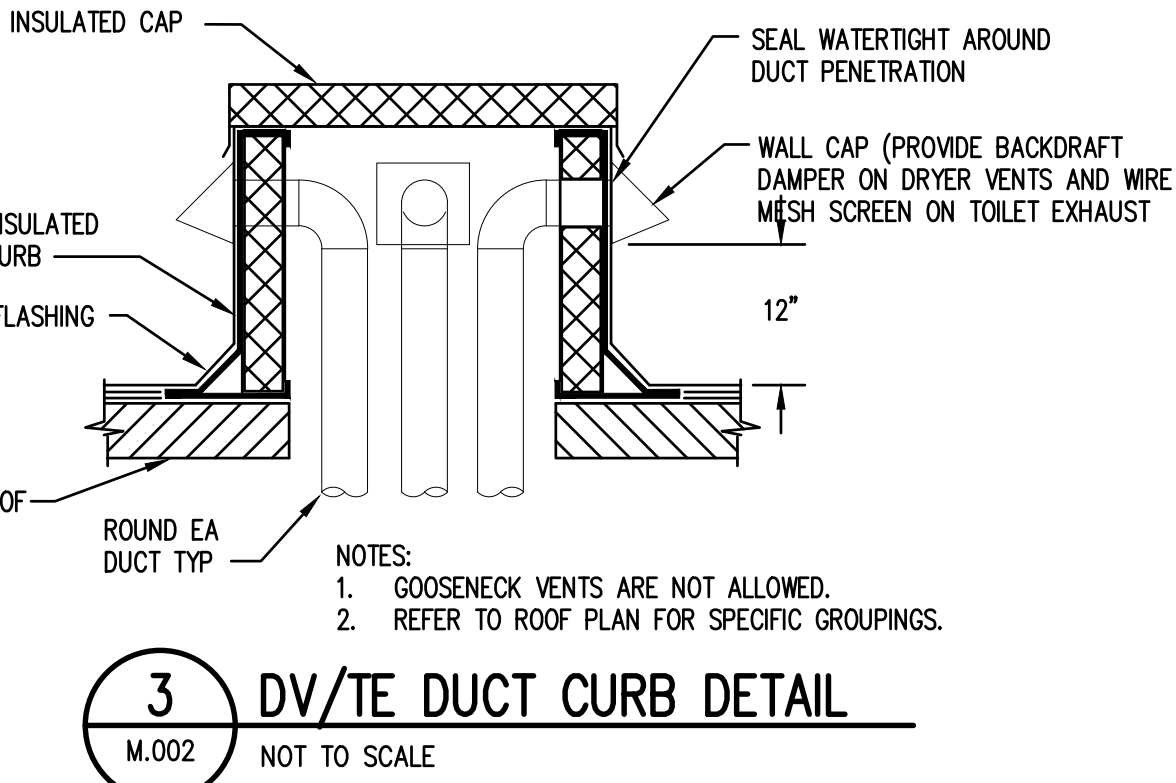
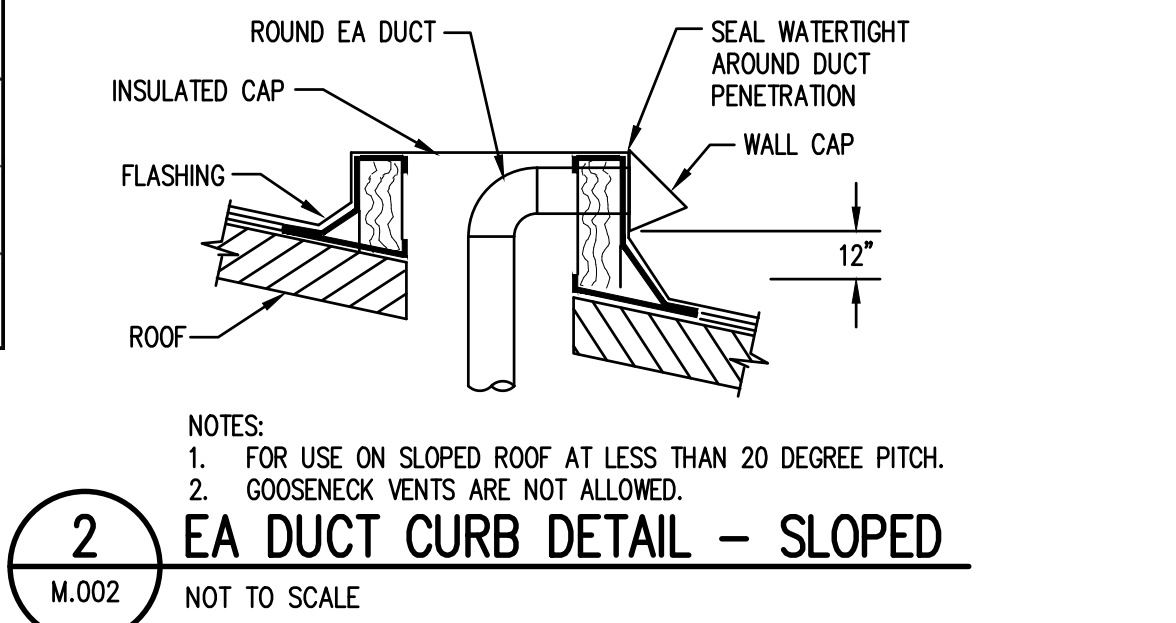
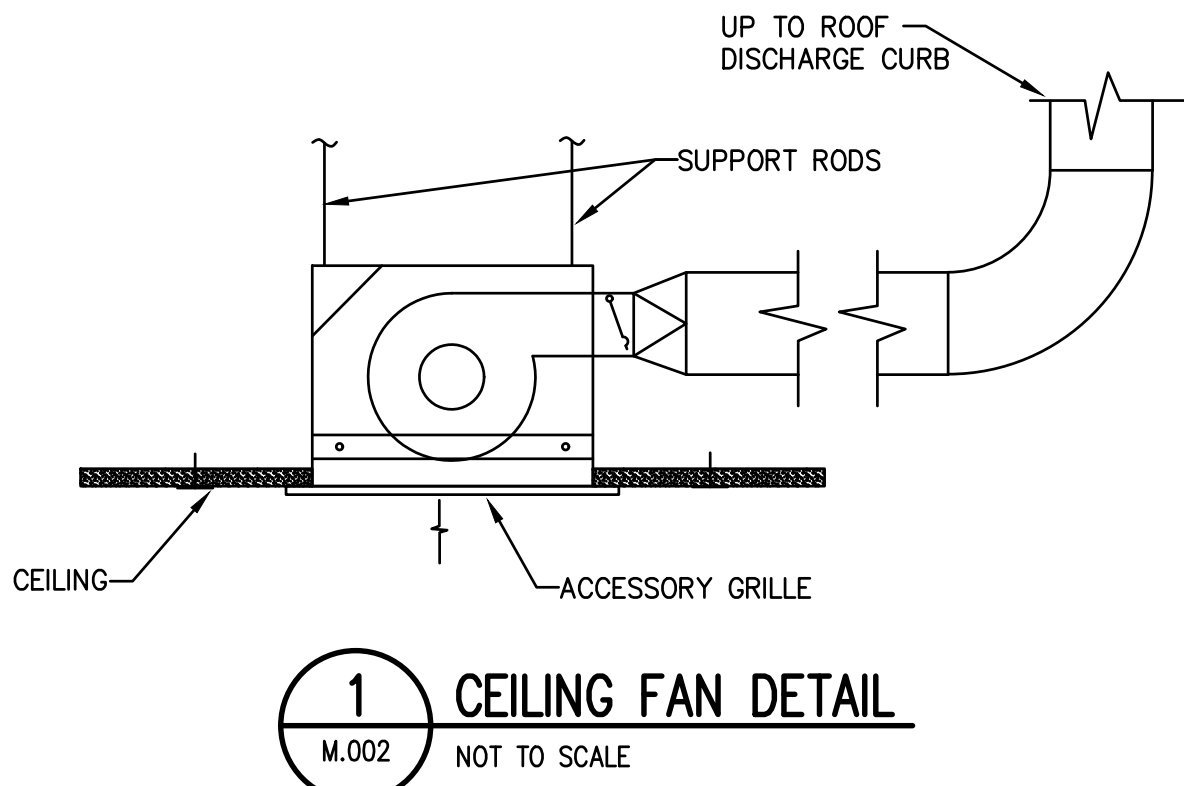
UNIT NUMBER	AHU TYPE	HP TYPE	OA INTAKE
101	B	B	30
102	A	A	30
103	B	B	30
104	A	A	30
105	A	A	30
106	A	A	30
107	A	A	30
108	A	A	30
109	A	A	30
110	A	A	30
111	A	A	30

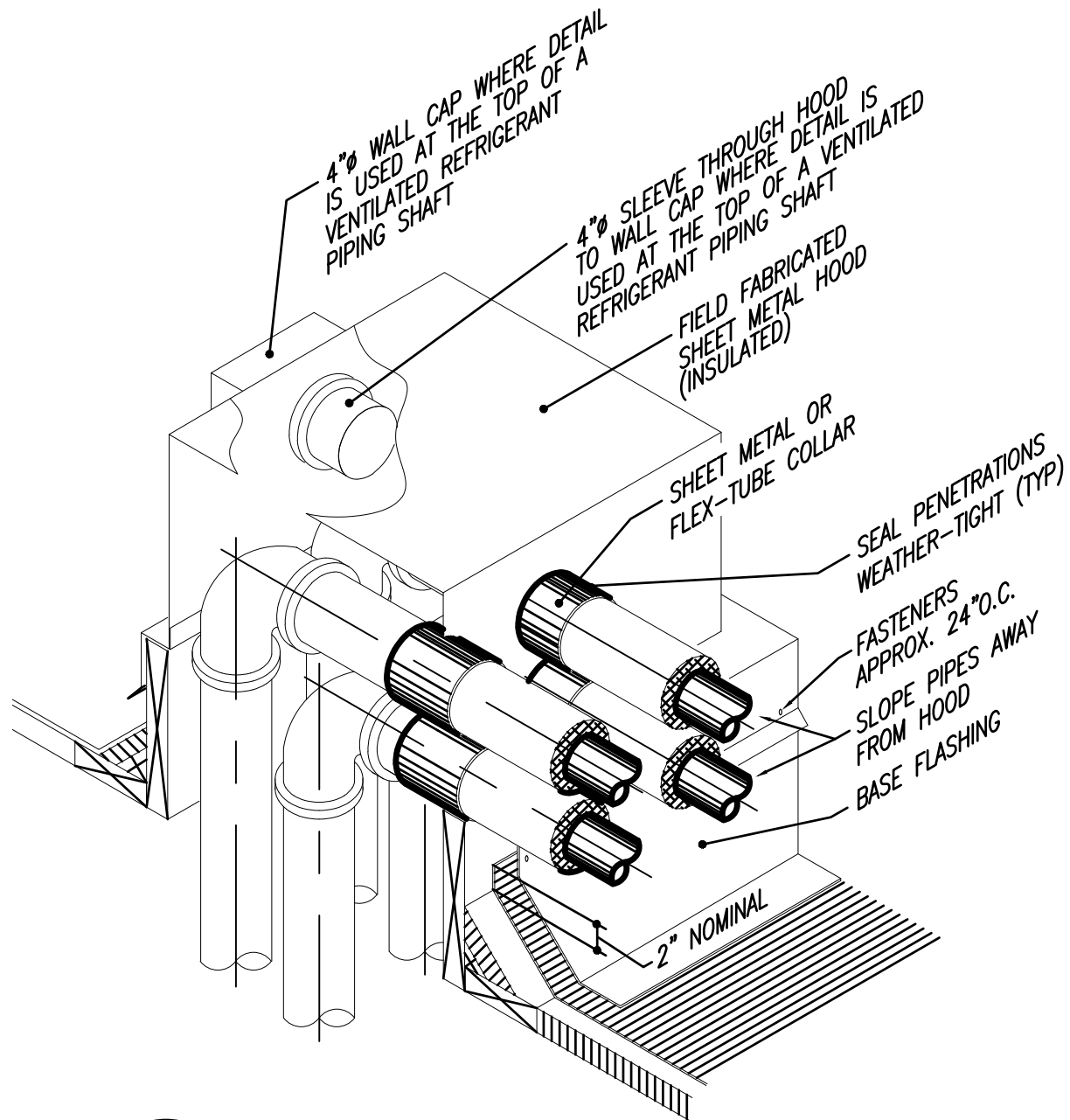
HVAC APT UNIT SCHEDULE SECOND FLOOR

UNIT NUMBER	AHU TYPE	HP TYPE	OA INTAKE
201	B	B	30
202	A	A	30
203	A	A	30
204	A	A	30
205	A	A	30

HVAC APT UNIT SCHEDULE THIRD FLOOR

UNIT NUMBER	AHU TYPE	HP TYPE	OA INTAKE
301	B	B	45
302	B	B	30
303	A	A	30



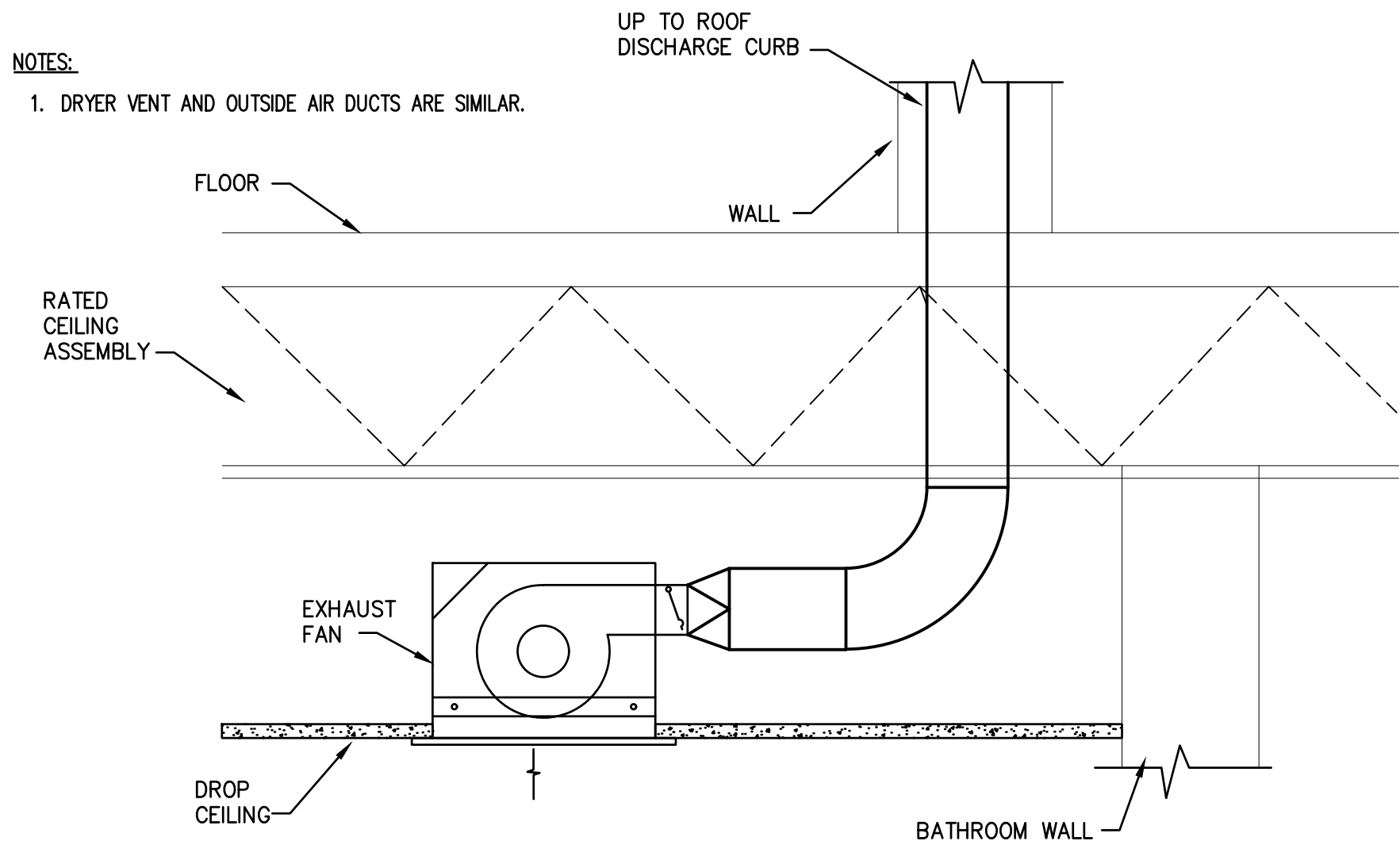


1 REFRIGERANT PIPING ROOF DETAIL
M.003 NOT TO SCALE

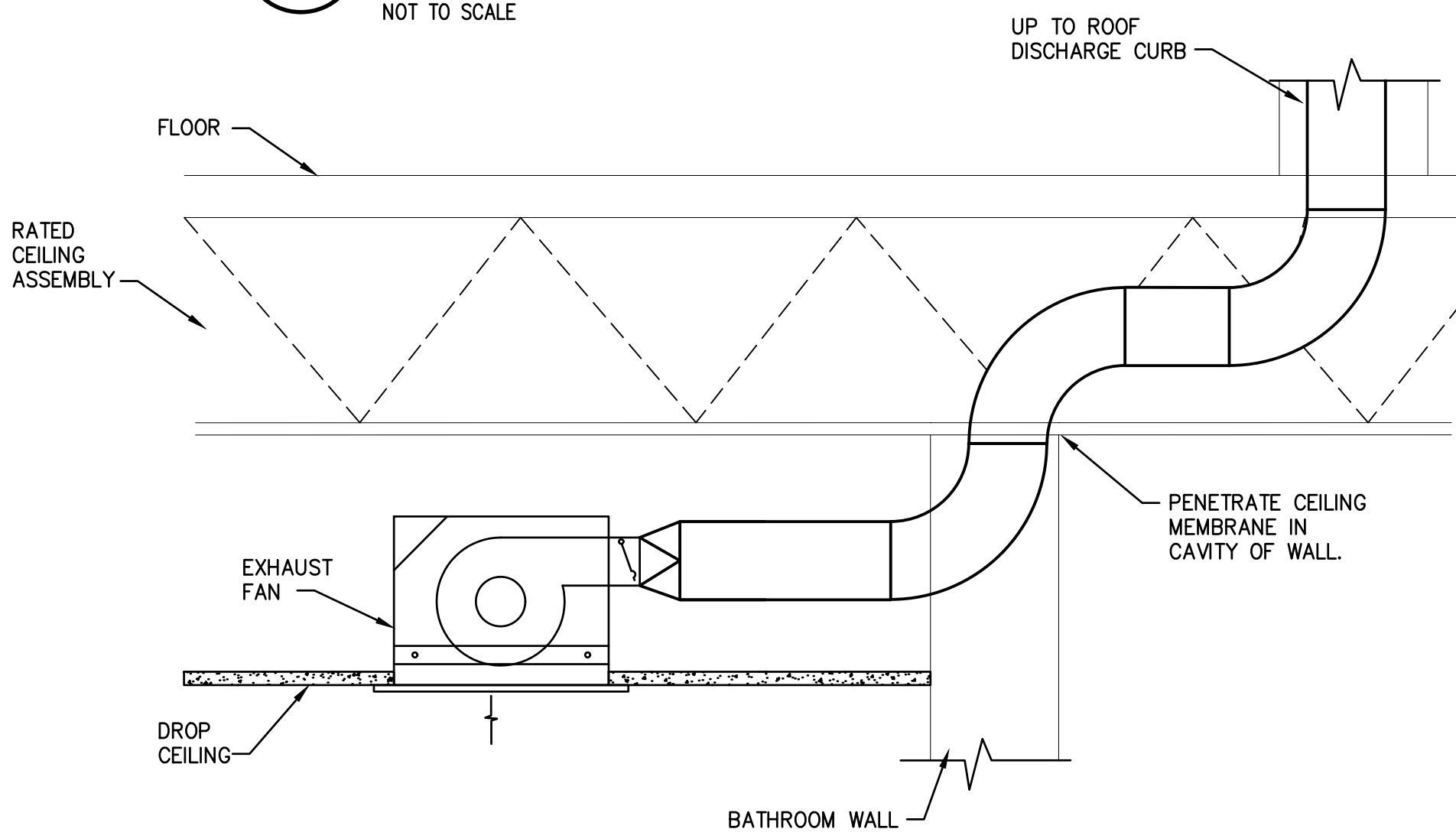
NOTE:
1. PROVIDE 4" VENT AS INDICATED WHERE DETAIL IS USED AT THE TOP OF A VENTILATED REFRIGERANT PIPING SHAFT.

NOTES:

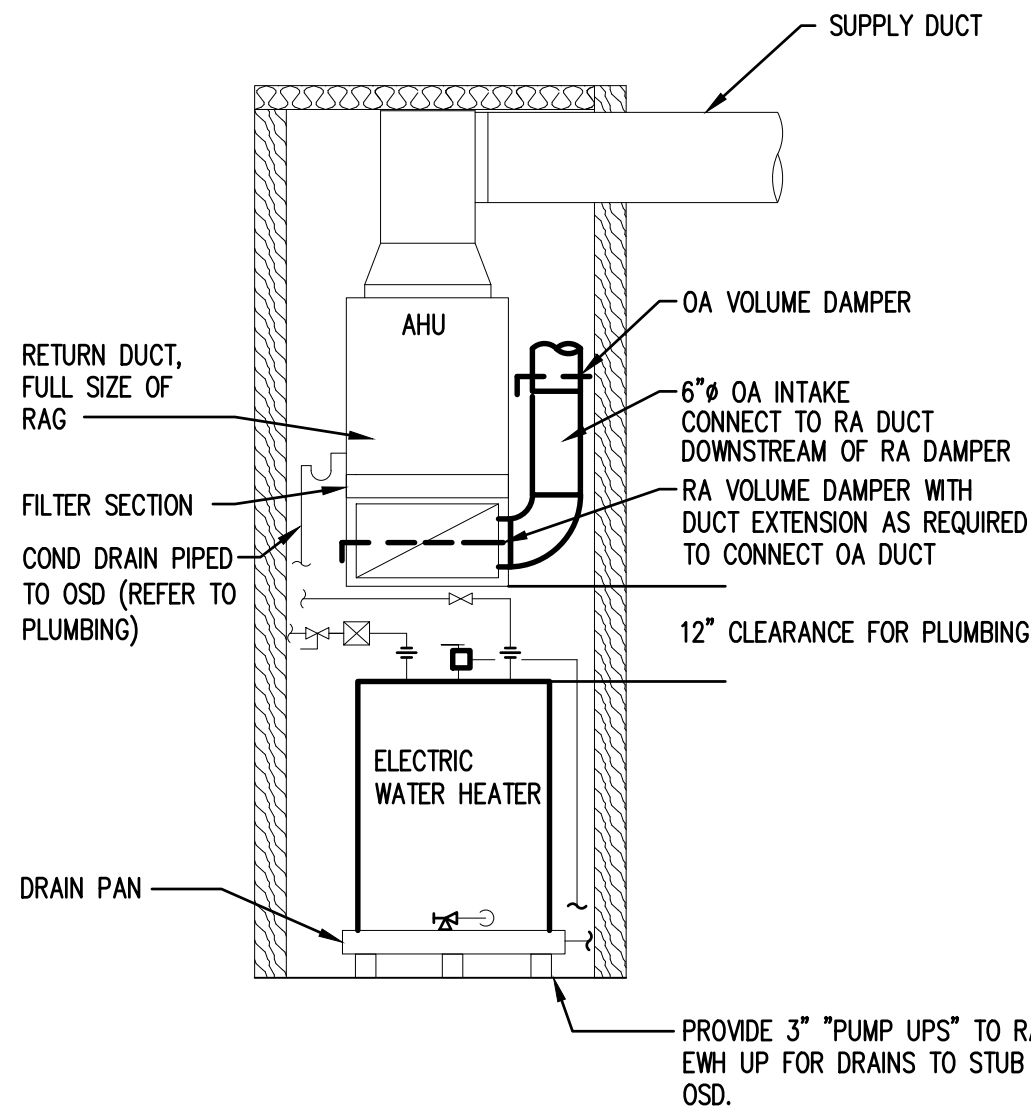
1. DRYER VENT AND OUTSIDE AIR DUCTS ARE SIMILAR.



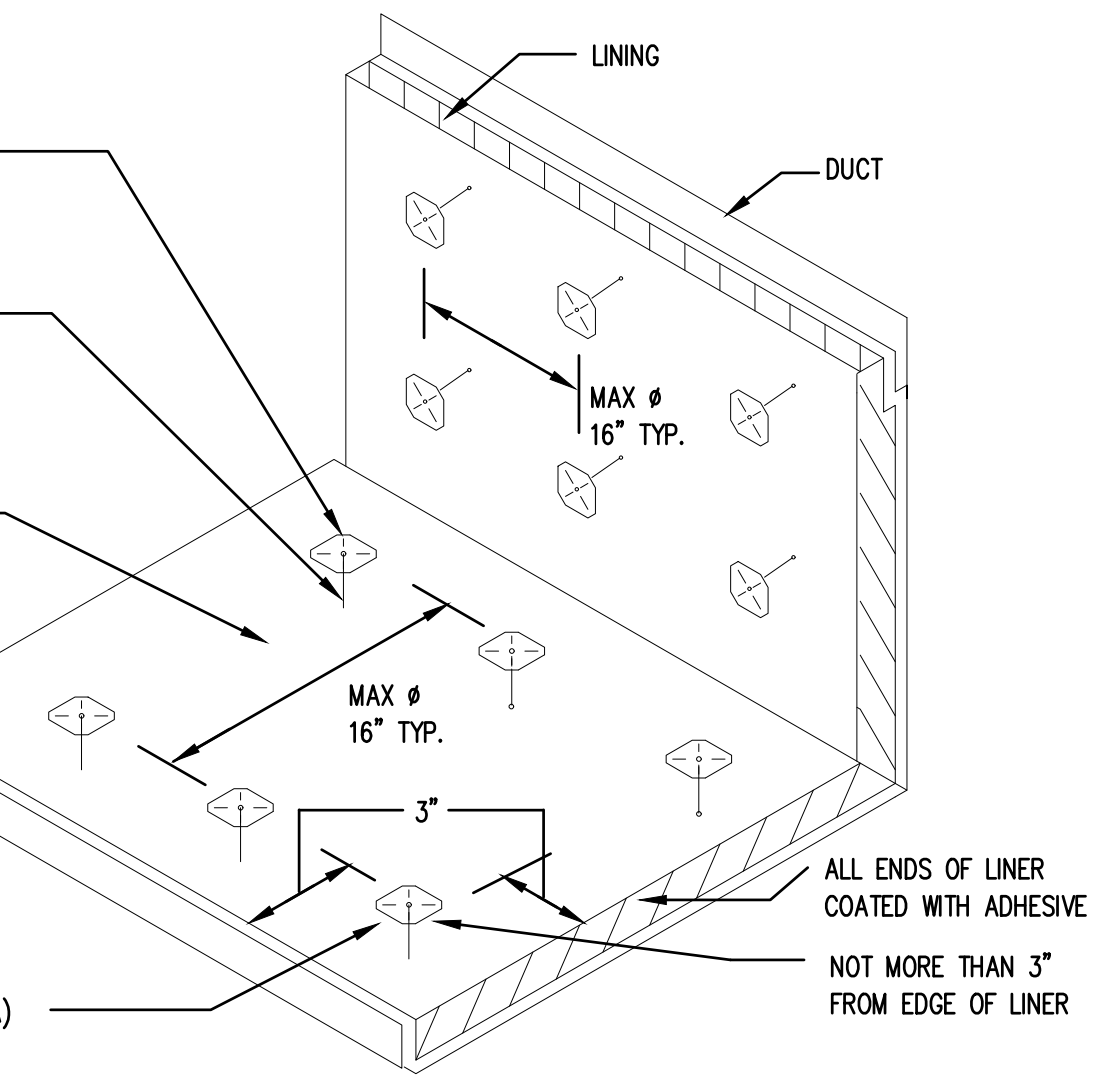
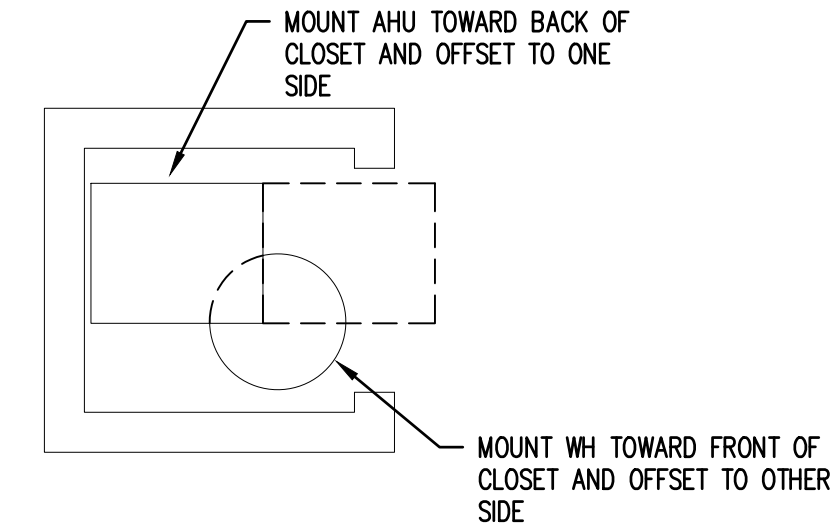
5 EXHAUST DUCT - THROUGH PENETRATION OF RATED CEILING ASSEMBLY
M.003 NOT TO SCALE



6 EXHAUST DUCT - MEMBRANE PENETRATION OF RATED CEILING ASSEMBLY
M.003 NOT TO SCALE

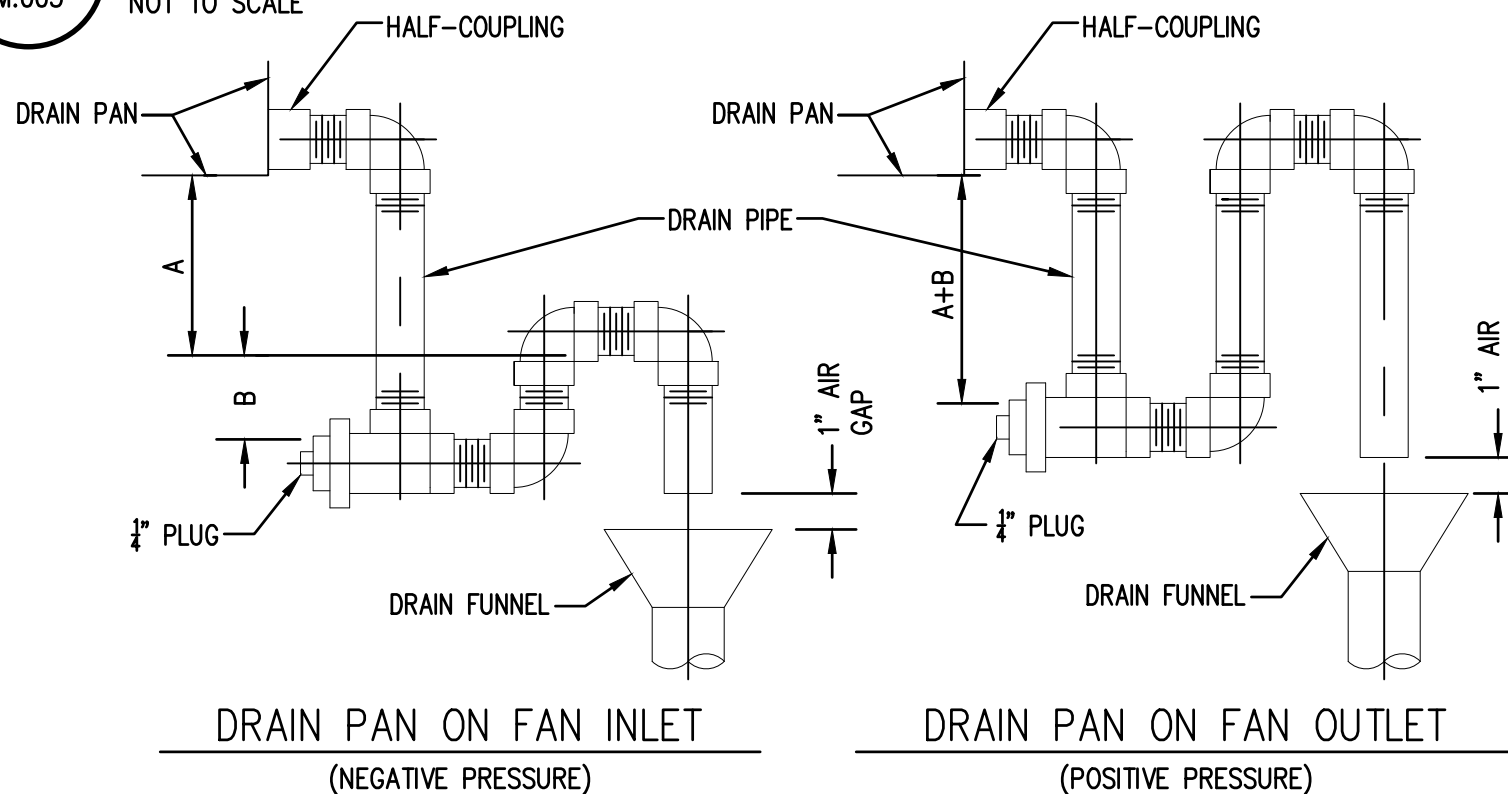


2 INDOOR AHU MOUNTED ABOVE WATER HEATER CLOSET LAYOUT
M.003 NOT TO SCALE



DETAIL A

7 SOUND LINING INSTALLATION DETAIL
M.003 NOT TO SCALE

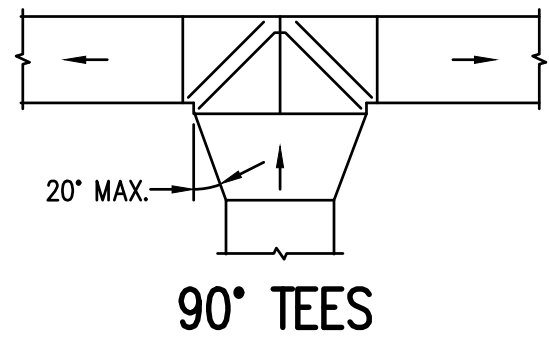


NOTE:
1. DRAIN PIPE TO BE SAME SIZE AS UNIT OUTLET, BUT NOT LESS THAN 1" PIPE SIZE.
2. "A"=SYSTEM STATIC IN INCHES AT DRAIN POINT.
"B"=1/2 SYSTEM STATIC IN INCHES AT DRAIN POINT.

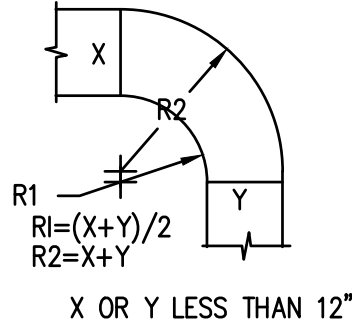
8 CONDENSATE DRAIN DETAIL
M.003 NOT TO SCALE

NOTES:

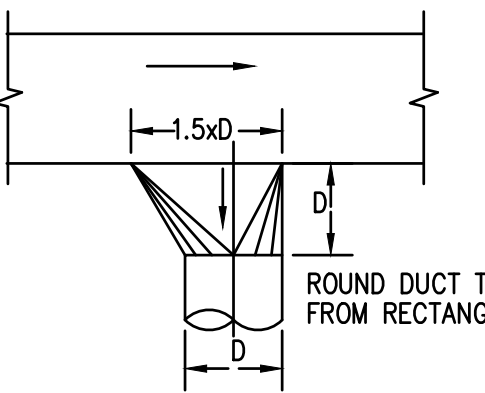
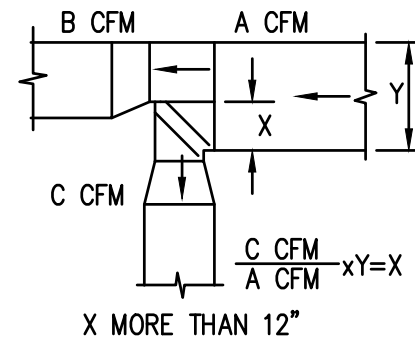
1. MOUNT INDOOR AHU IN VERTICAL POSITION. PROVIDE FRAME AS NEEDED TO SUPPORT UNIT.
2. PIPE CONDENSATE DRAIN DOWN TO OPEN SITE DRAIN IN MECHANICAL CLOSET.
3. PROVIDE LINED SUPPLY AND RETURN DUCT ON RECTANGULAR DUCTS WITHIN 5' OF AHU.
4. PROVIDE FLOAT SWITCH IN AHU DRAIN PAN OVERFLOW CONNECTION. FLOAT SWITCH TO SHUT DOWN UNIT IF CONDENSATE LEVEL ACTIVATES SWITCH.
5. ALLOW SUFFICIENT SPACE FOR MAINTENANCE, INCLUDING FILTER REPLACEMENT.
6. PROVIDE LINED RETURN AIR PLENUM WITH FILTER FOR RA/OA DUCTS TO CONNECT TO.
7. EXTEND RETURN DUCT AS REQUIRED TO CONNECT OA DUCT AND MOUNT RA DAMPER.
8. ADJUST OA/RA DAMPERS AS REQUIRED TO ACHIEVE TO SCHEDULED OA FLOW.



OFFSETS

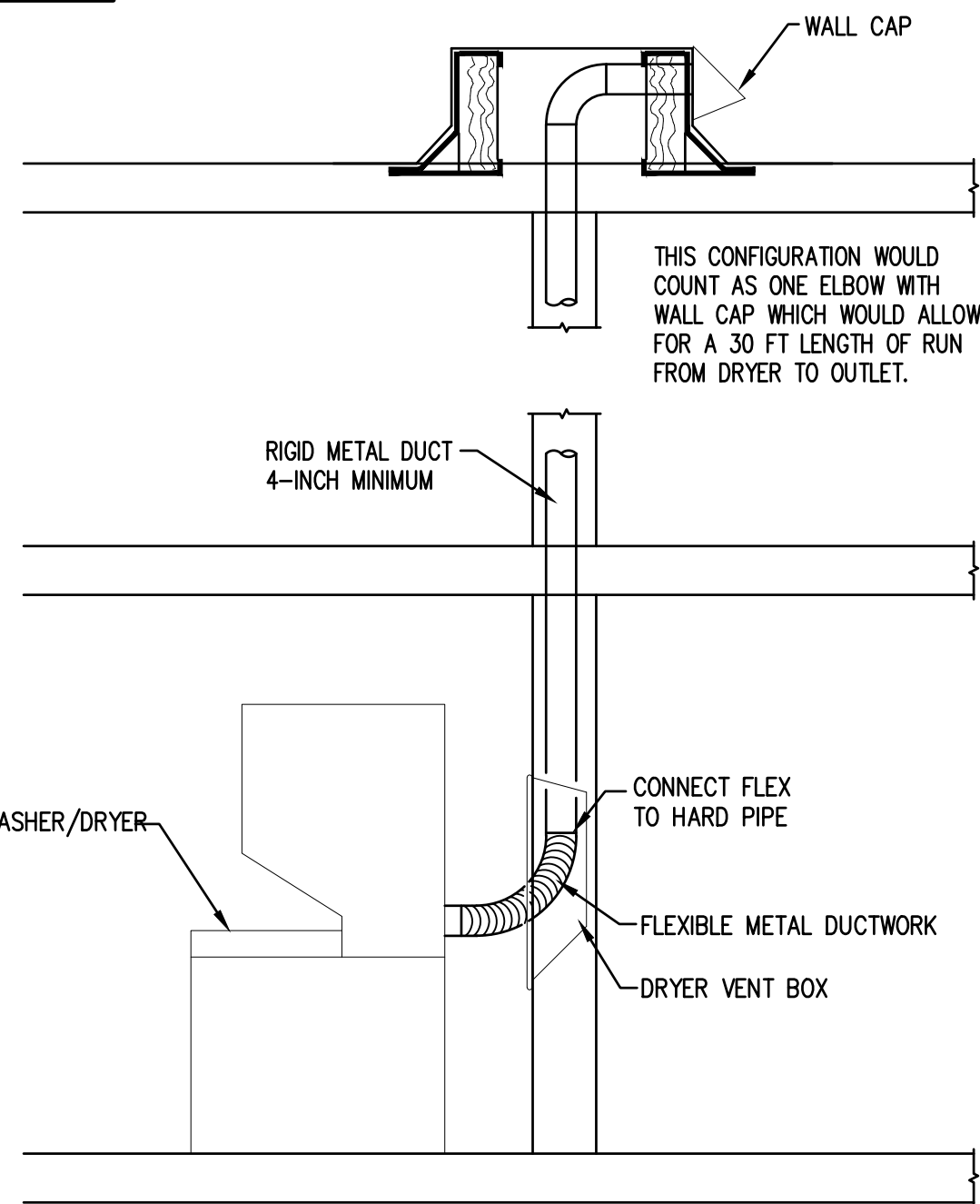


90° RADIUS ELBOWS



BRANCH TAKEOFFS

3 DUCT DETAILS
M.003 NOT TO SCALE



BELOW IS THE CHART ON THE MAXIMUM DRYER LENGTHS PER THE DRYER MANUFACTURER. IT IS UP TO THE HVAC CONTRACTOR TO VERIFY LINE LENGTHS PER THE INSTALLED PRODUCT AND COMPARE TO THE CHART BELOW. NOTE THAT THE LONGEST RUN IS AFFECTED BY THE TYPE OF WALL CAP USED. THE PREFERRED WALL CAP TYPE IS SHOWN UNDER WALL CAP SPECIFICATION. SMALLER OR DIFFERENT CONFIGURATIONS OF THE WALL CAP WILL AFFECT THE LINE LENGTH OF THE DRYER EXHAUST AND NEED TO BE EVALUATED PRIOR TO INSTALLATION.

NUMBER OF 90° ELBOWS	LINE LENGTH ALLOWED
0	35 FT
1	30 FT
2	25 FT

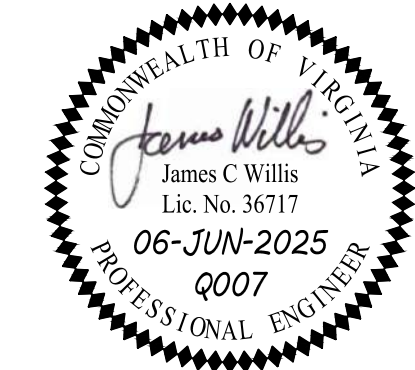
NOTE: (2) 45° ELBOWS = (1) 90° ELBOW

9 DRYER DETAIL (STANDARD)
M.003 NOT TO SCALE

AHU NOTES:

1. MOUNT INDOOR AIR HANDLING UNIT IN VERTICAL POSITION. PROVIDE FRAME AS NEEDED TO SUPPORT UNIT.
2. PROVIDE RETURN AIR PLENUM WITH FILTER FOR RA/OA DUCTS TO CONNECT TO.
3. PIPE CONDENSATE DRAIN DOWN TO FLOOR DRAIN IN MECHANICAL CLOSET.
4. PROVIDED LINED RETURN AND SUPPLY PLENUMS.
5. PROVIDE FLOAT SWITCH IN AHU DRAIN PAN OVERFLOW CONNECTION. FLOAT SWITCH TO SHUT DOWN UNIT IF CONDENSATE LEVEL ACTIVATES SWITCH.
6. FOR DUCTED RETURNS, EXTEND DUCT RETURN DUCT TO RETURN GRILLE. FOR NON-DUCTED RETURNS, PROVIDE WMS OVER INLET. REFER TO PLANS.

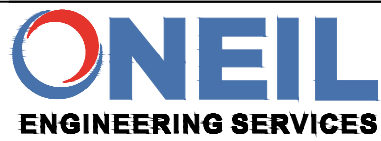
4 VERTICALLY MOUNTED AHU DETAIL
M.003 NOT TO SCALE



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWhatan, VIRGINIA 23139
PHONE: 804-372-3501

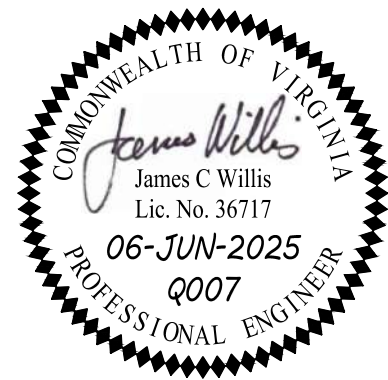
PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	AS NOTED
DRAWN BY:	JCW
APPROVED BY:	JCW

MECHANICAL
DETAILS

SHEET:

M.003

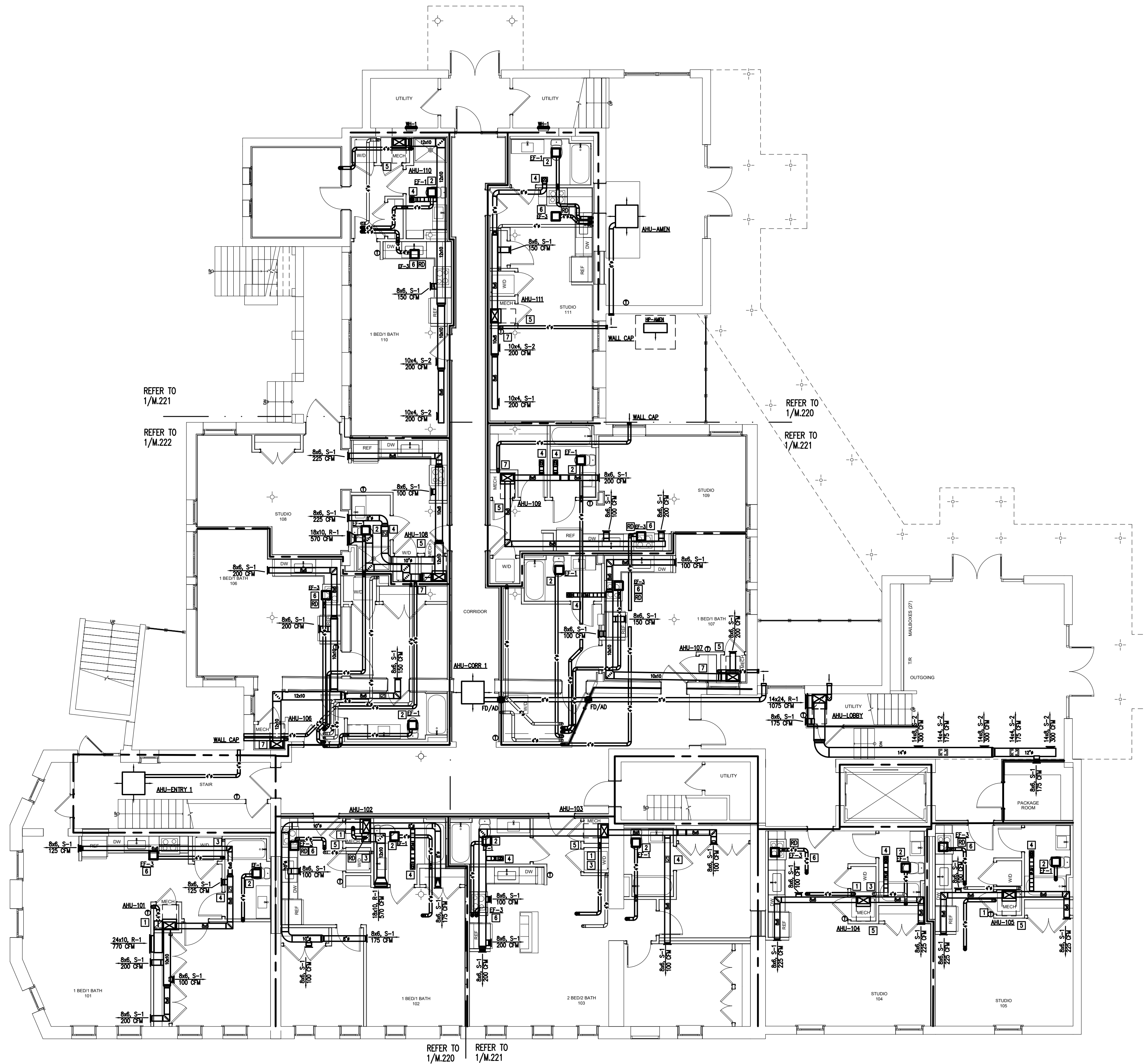
VENABLE ST



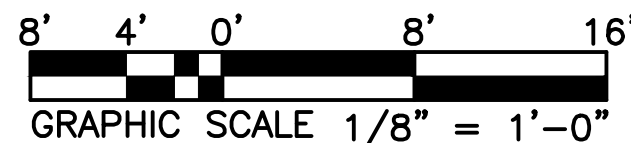
VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

PLAN REFERENCE NOTES:

- 1 4"Ø OA INTAKE TO ROOF CURB.
- 2 4"Ø TOILET EA TO ROOF CURB.
- 3 4"Ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK
TO AHU. REFER TO ARCHITECTURALS.
- 6 4"Ø KITCHEN EA TO ROOF CURB.
- 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.

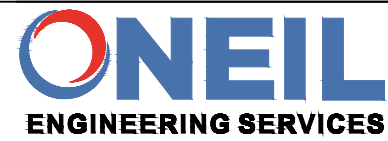


1 MECHANICAL OVERALL 1ST FLOOR PLAN
M.201 1/8" = 1'-0"



REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/8" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

MECHANICAL OVERALL
1ST FLOOR PLAN

SHEET:

M.201

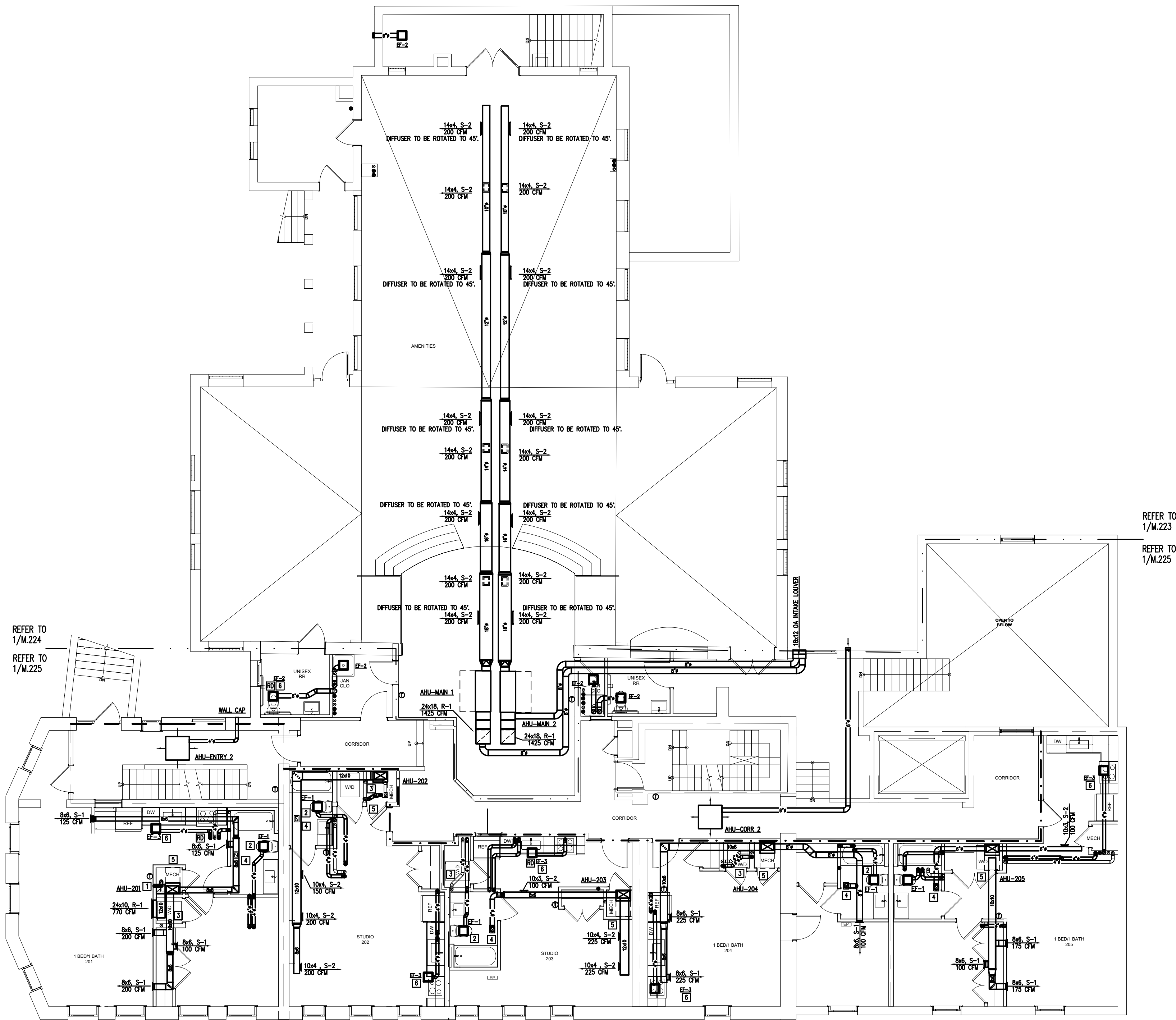
VENABLE ST



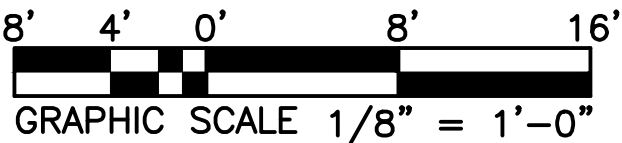
VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

PLAN REFERENCE NOTES:

- 1 4"Ø OA INTAKE TO ROOF CURB.
- 2 4"Ø TOILET EA TO ROOF CURB.
- 3 4"Ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4"Ø KITCHEN EA TO ROOF CURB.
- 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.

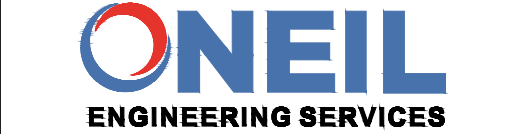


1 MECHANICAL OVERALL 2ND FLOOR PLAN
M.202 1/8" = 1'-0"



REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

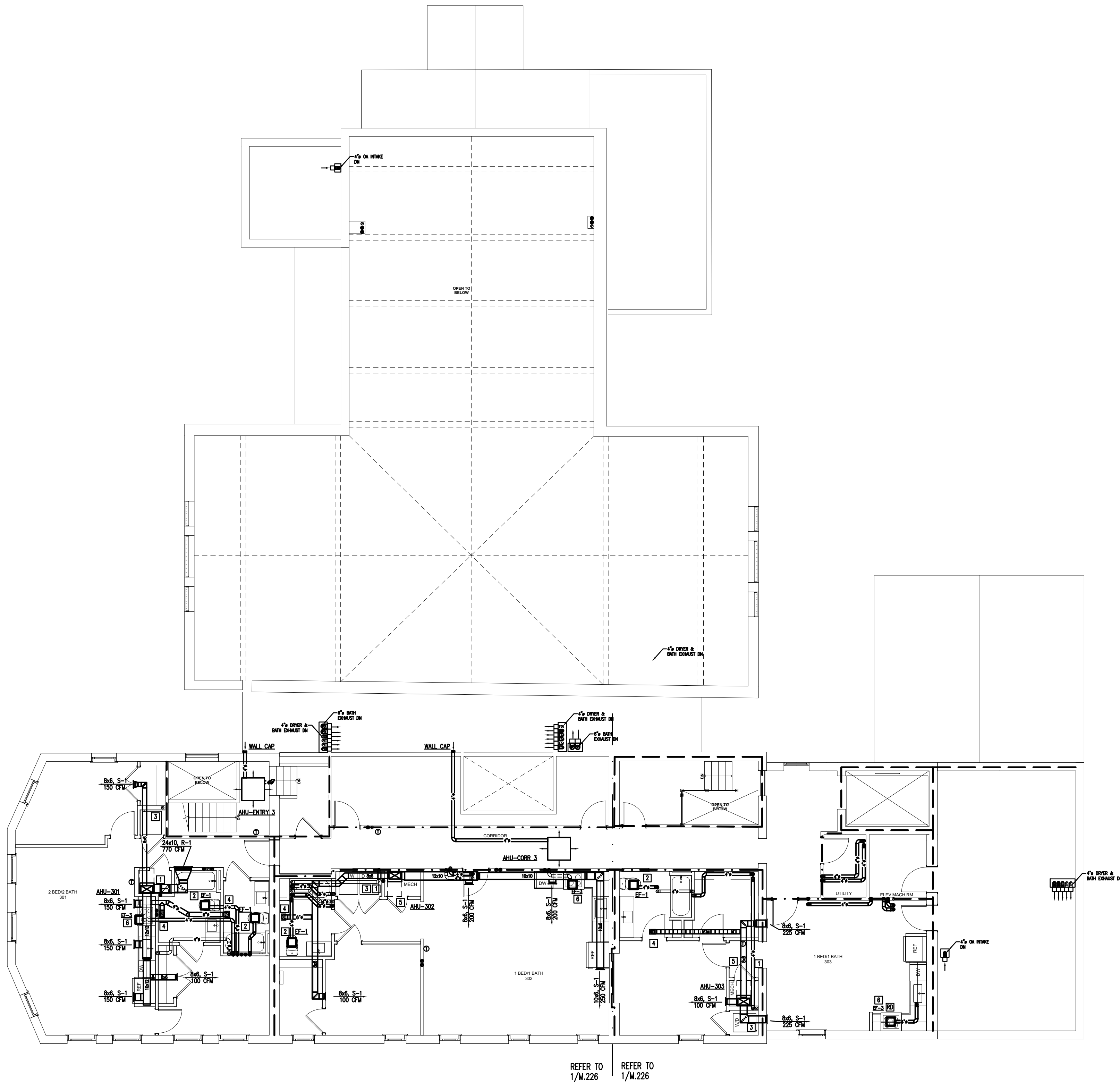
PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/8" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

MECHANICAL OVERALL
2ND FLOOR PLAN

SHEET:

M.202

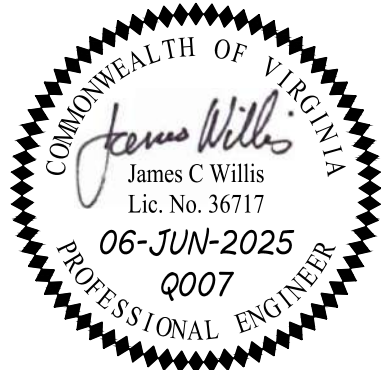
VENABLE ST



1 MECHANICAL OVERALL 3RD FLOOR PLAN
M.203 1/8" = 1'-0"

PLAN REFERENCE NOTES:

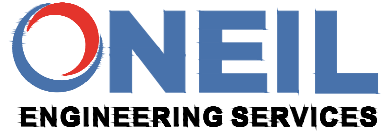
- 1 4"Ø OA INTAKE TO ROOF CURB.
- 2 4"Ø TOILET EA TO ROOF CURB.
- 3 4"Ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4"Ø KITCHEN EA TO ROOF CURB.
- 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



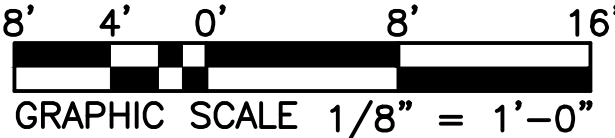
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/8" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

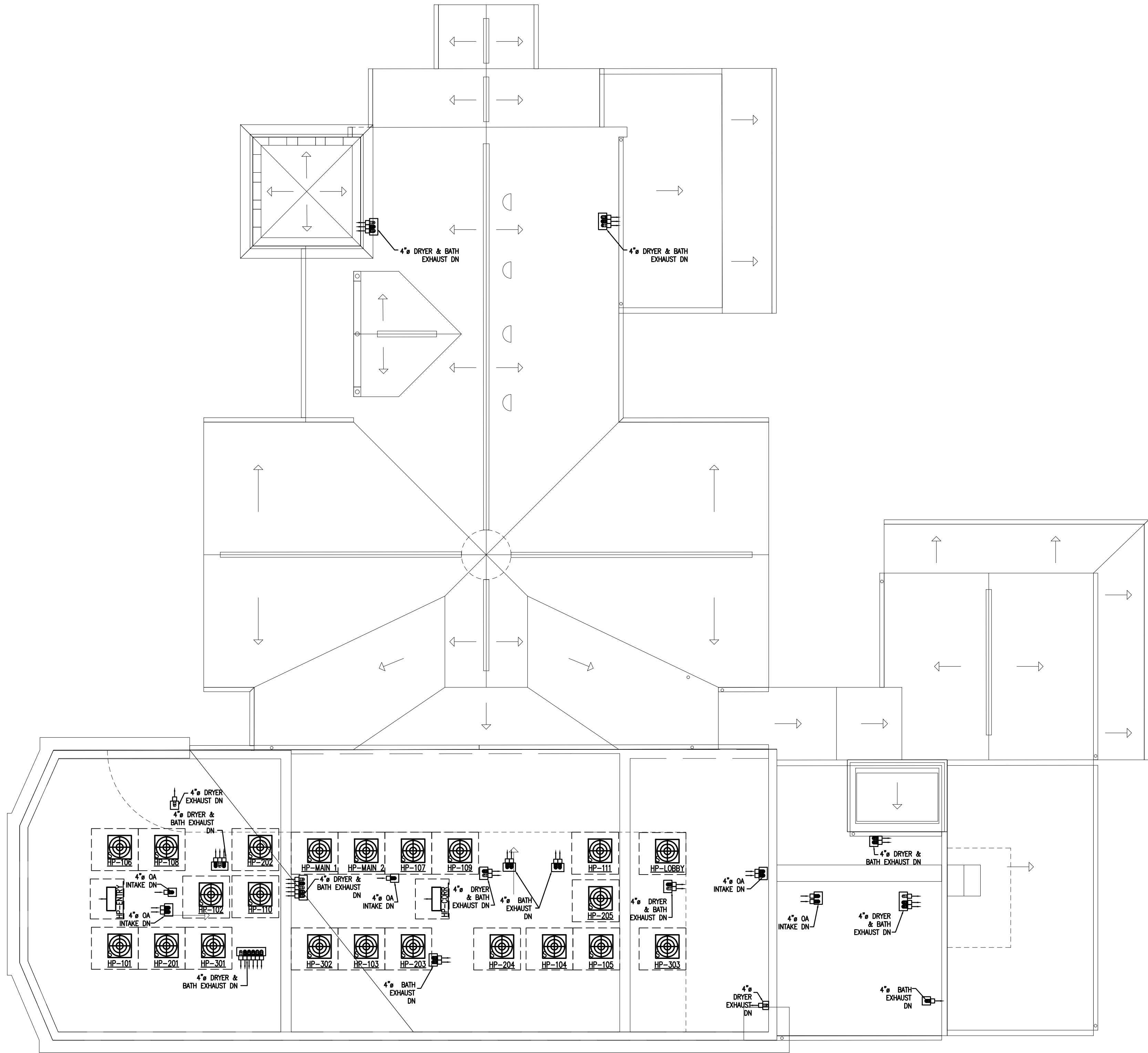
MECHANICAL OVERALL
3RD FLOOR PLAN

SHEET:

M.203



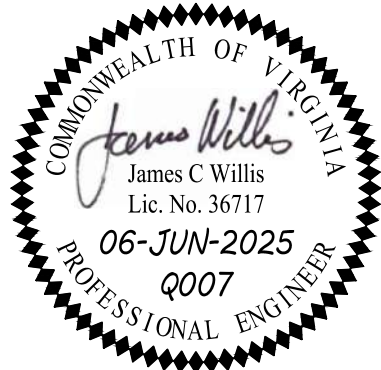
VENABLE ST



1 MECHANICAL ROOF PLAN
M.204 1/8" = 1'-0"

PLAN REFERENCE NOTES:

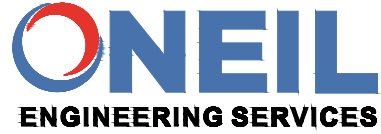
- 1 4"ø OA INTAKE TO ROOF CURB.
- 2 4"ø TOILET EA TO ROOF CURB.
- 3 4"ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4"ø KITCHEN EA TO ROOF CURB.
- 7 4"ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



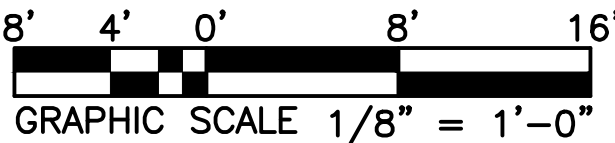
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/8" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

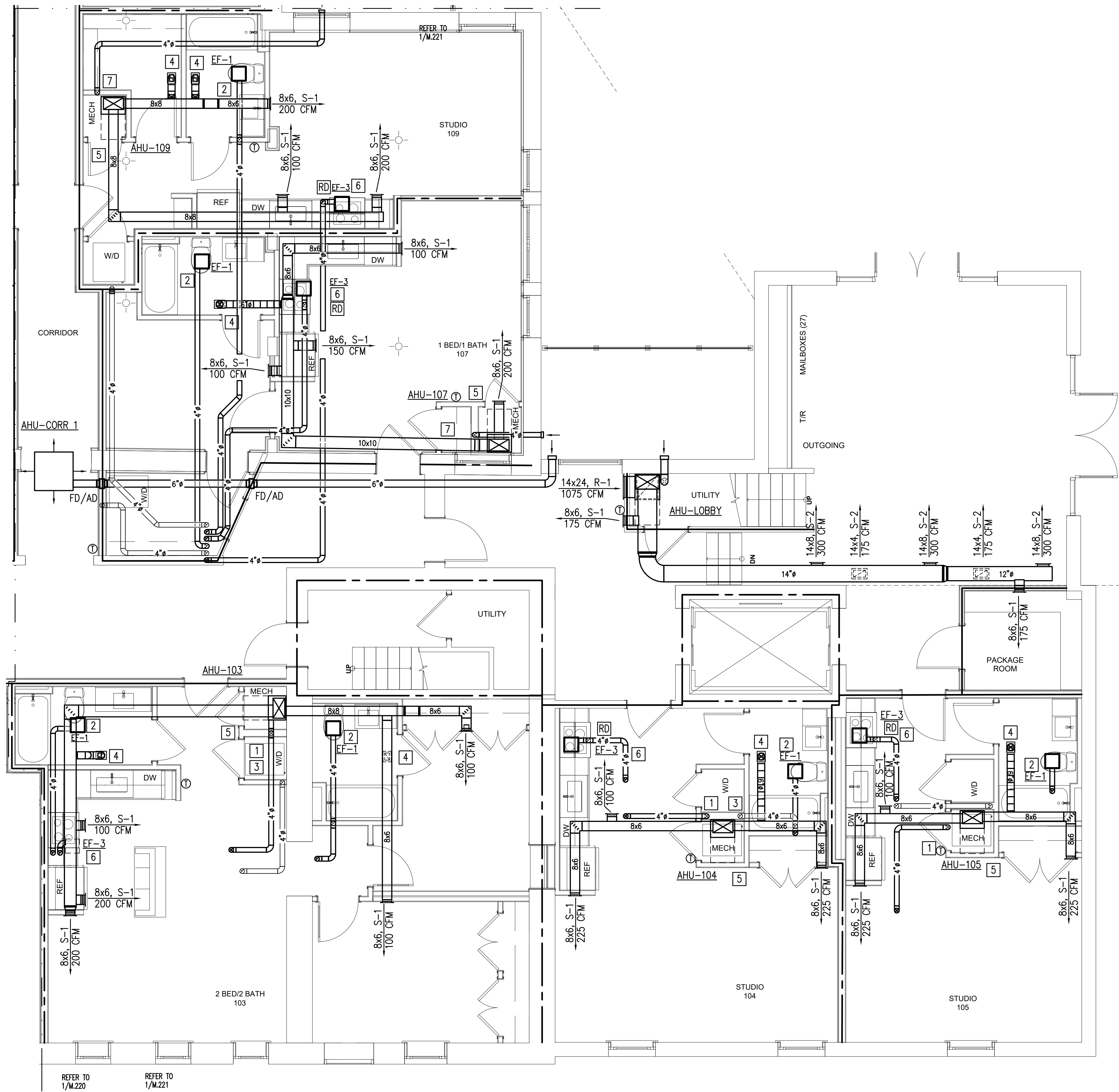
MECHANICAL OVERALL
ROOF PLAN

SHEET:

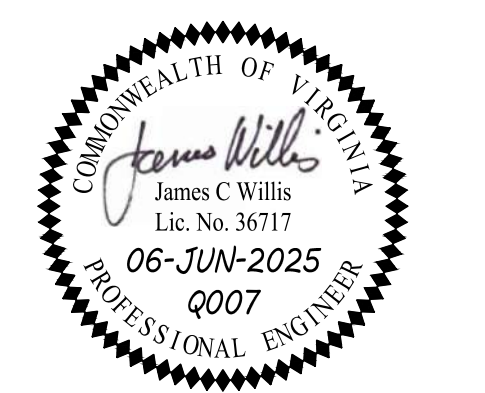
M.204



VENABLE ST



- PLAN REFERENCE NOTES:**
- 1 4"ø OA INTAKE TO ROOF CURB.
 - 2 4"ø TOILET EA TO ROOF CURB.
 - 3 4"ø DRYER EA TO ROOF CURB.
 - 4 8x6, S-1 50 CFM
 - 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
 - 6 4"ø KITCHEN EA TO ROOF CURB.
 - 7 4"ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



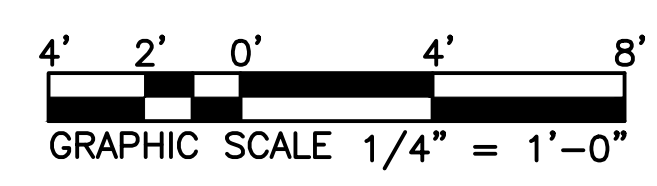
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

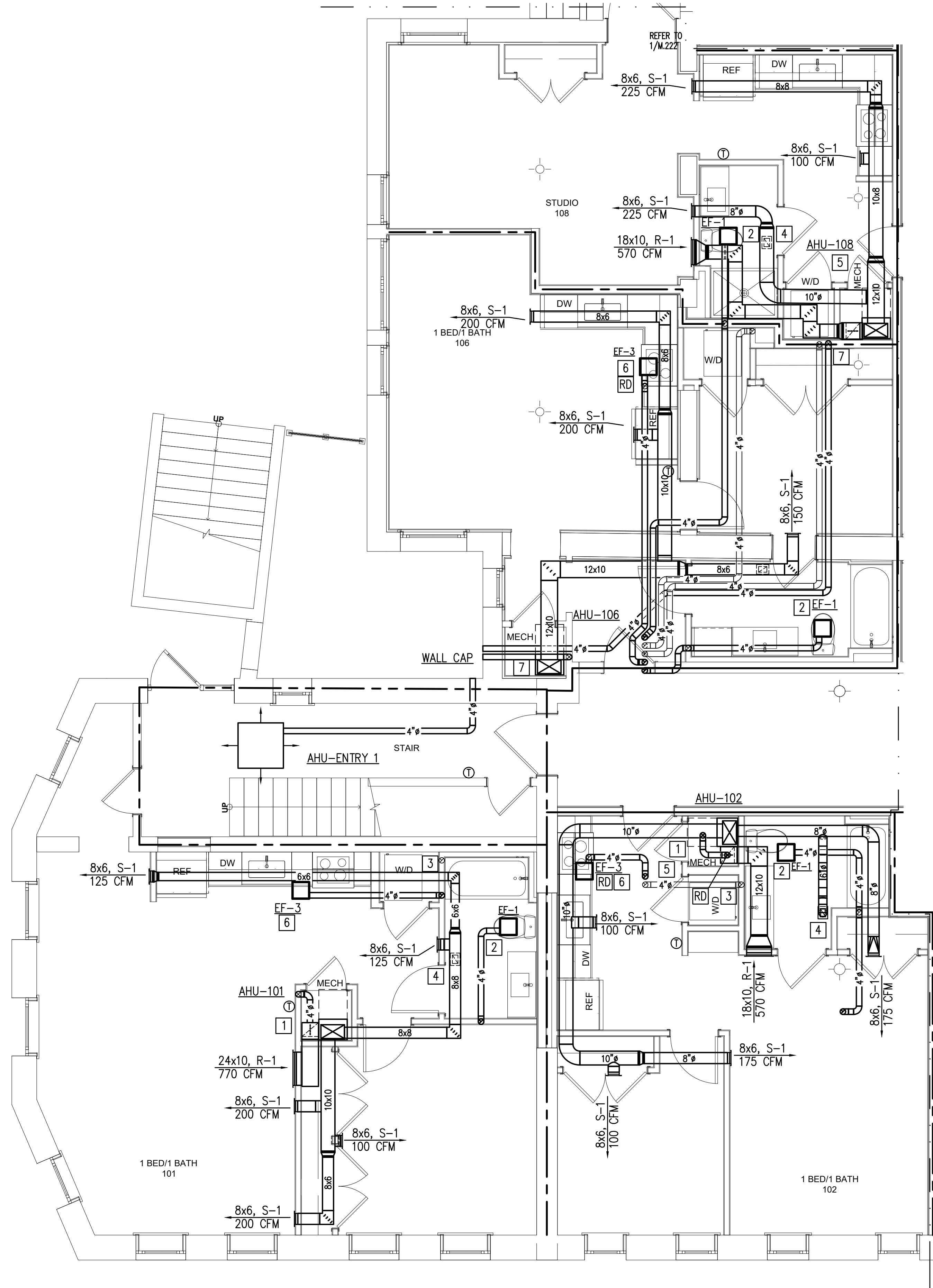
**MECHANICAL PARTIAL
FIRST FLOOR PLAN -
AREA A**

SHEET:
M.220

1 MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA A
M.220 1/4" = 1'-0"



VENABLE ST



1 MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA B
M.221 1/4" = 1'-0"

PLAN REFERENCE NOTES:

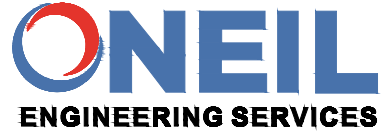
- 1 4"ø OA INTAKE TO ROOF CURB.
- 2 4"ø TOILET EA TO ROOF CURB.
- 3 4"ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK
TO AHU. REFER TO ARCHITECTURALS.
- 6 4"ø KITCHEN EA TO ROOF CURB.
- 7 4"ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



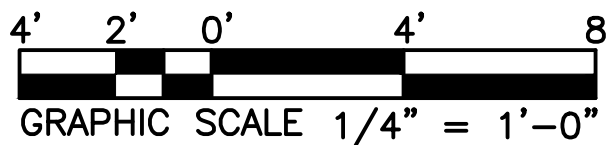
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

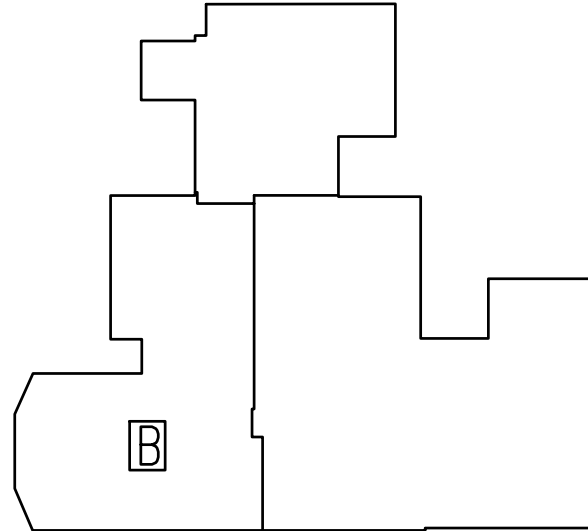
MECHANICAL PARTIAL
FIRST FLOOR PLAN -
AREA B

SHEET:

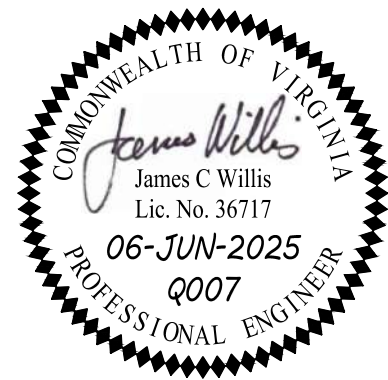
M.221



KEY PLAN

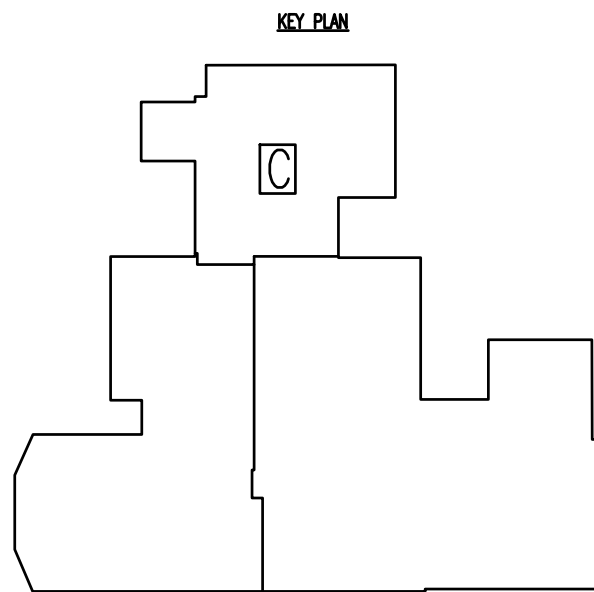
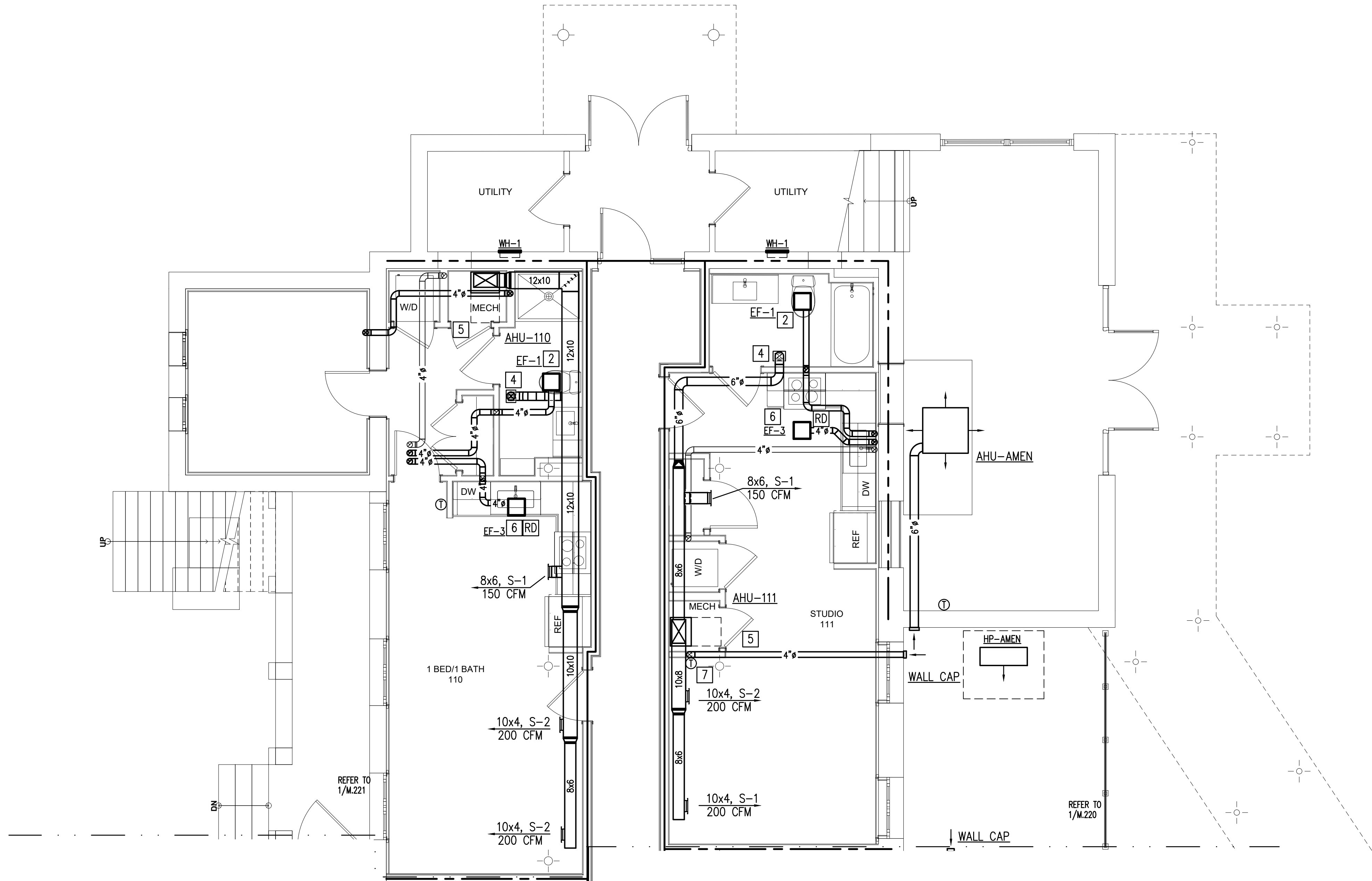


VENABLE ST

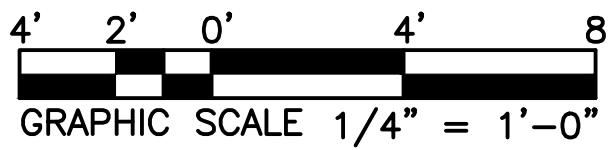


VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

- PLAN REFERENCE NOTES:**
- 4"Ø OA INTAKE TO ROOF CURB.
 - 4"Ø TOILET EA TO ROOF CURB.
 - 4"Ø DRYER EA TO ROOF CURB.
 - 8x6, S-1
50 CFM
 - LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
 - 4"Ø KITCHEN EA TO ROOF CURB.
 - 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.

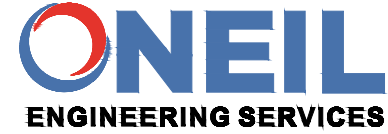


1 MECHANICAL PARTIAL FIRST FLOOR PLAN - AREA C
M.222 1/4" = 1'-0"



REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

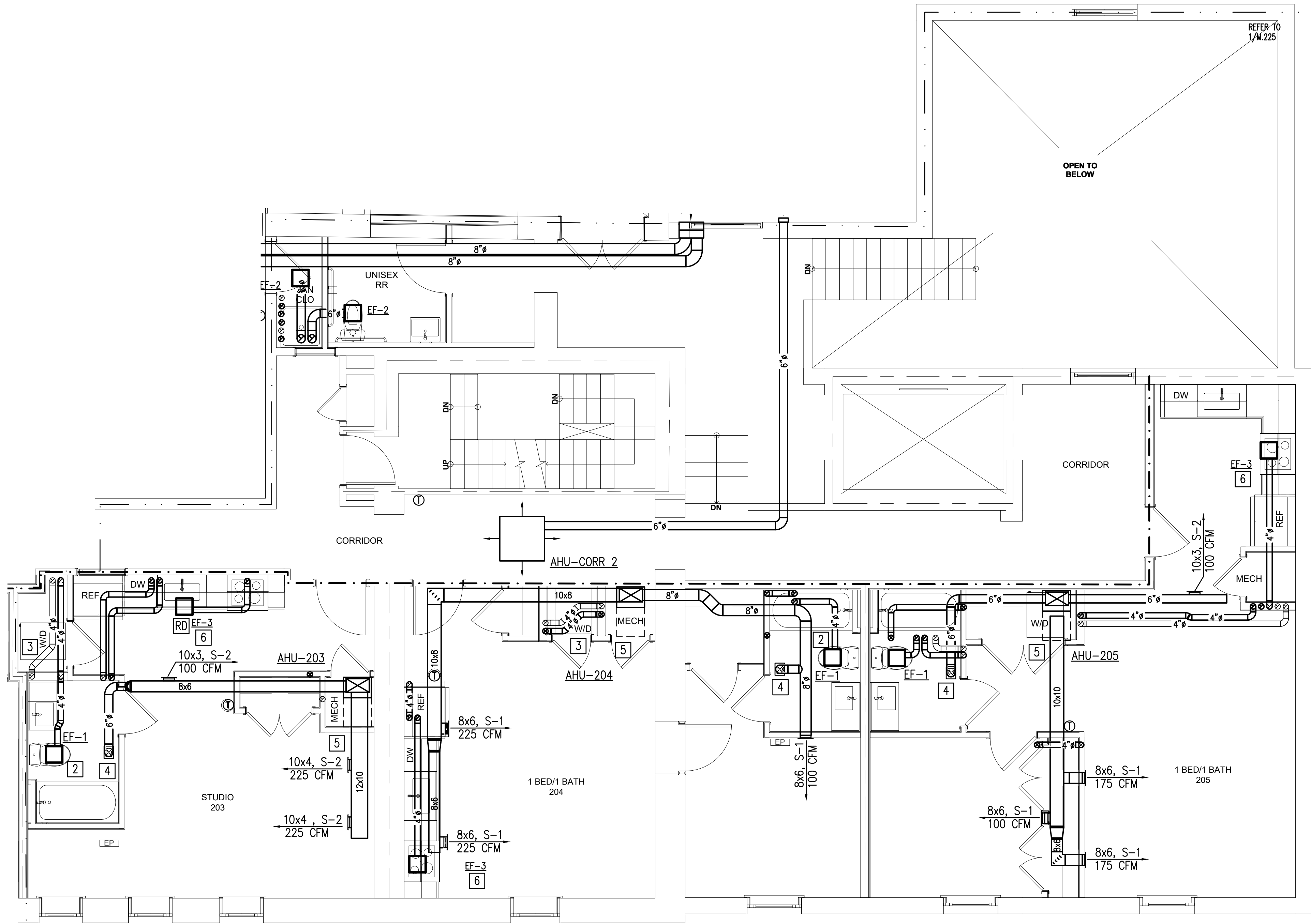
PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

MECHANICAL PARTIAL
FIRST FLOOR PLAN -
AREA C

SHEET:

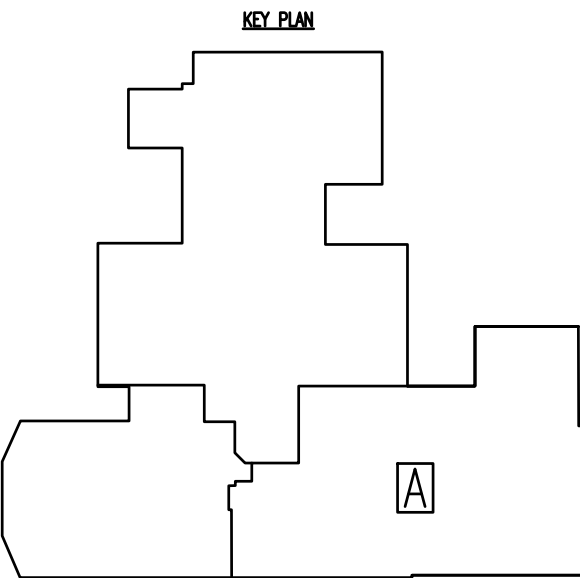
M.222

VENABLE ST



PLAN REFERENCE NOTES:

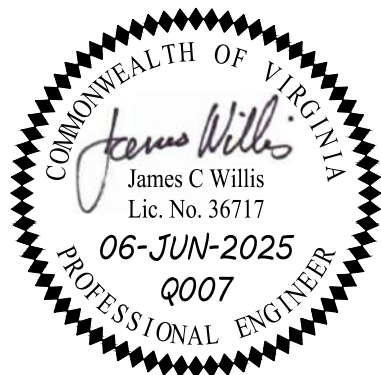
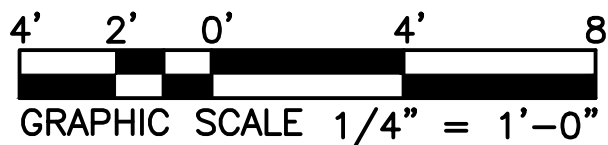
- 1 4"Ø OA INTAKE TO ROOF CURB.
- 2 4"Ø TOILET EA TO ROOF CURB.
- 3 4"Ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4"Ø KITCHEN EA TO ROOF CURB.
- 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



REFER TO
1/M.223

REFER TO
1/M.224

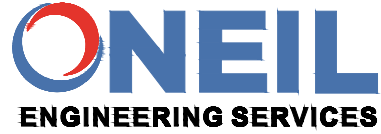
1 MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA A
M.223 1/4" = 1'-0"



VENABLE STREET CHURCH
2101 Venable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



1480 OAKBRIDGE COURT
POWhatan, VIRGINIA 23139
PHONE: 804-372-3501

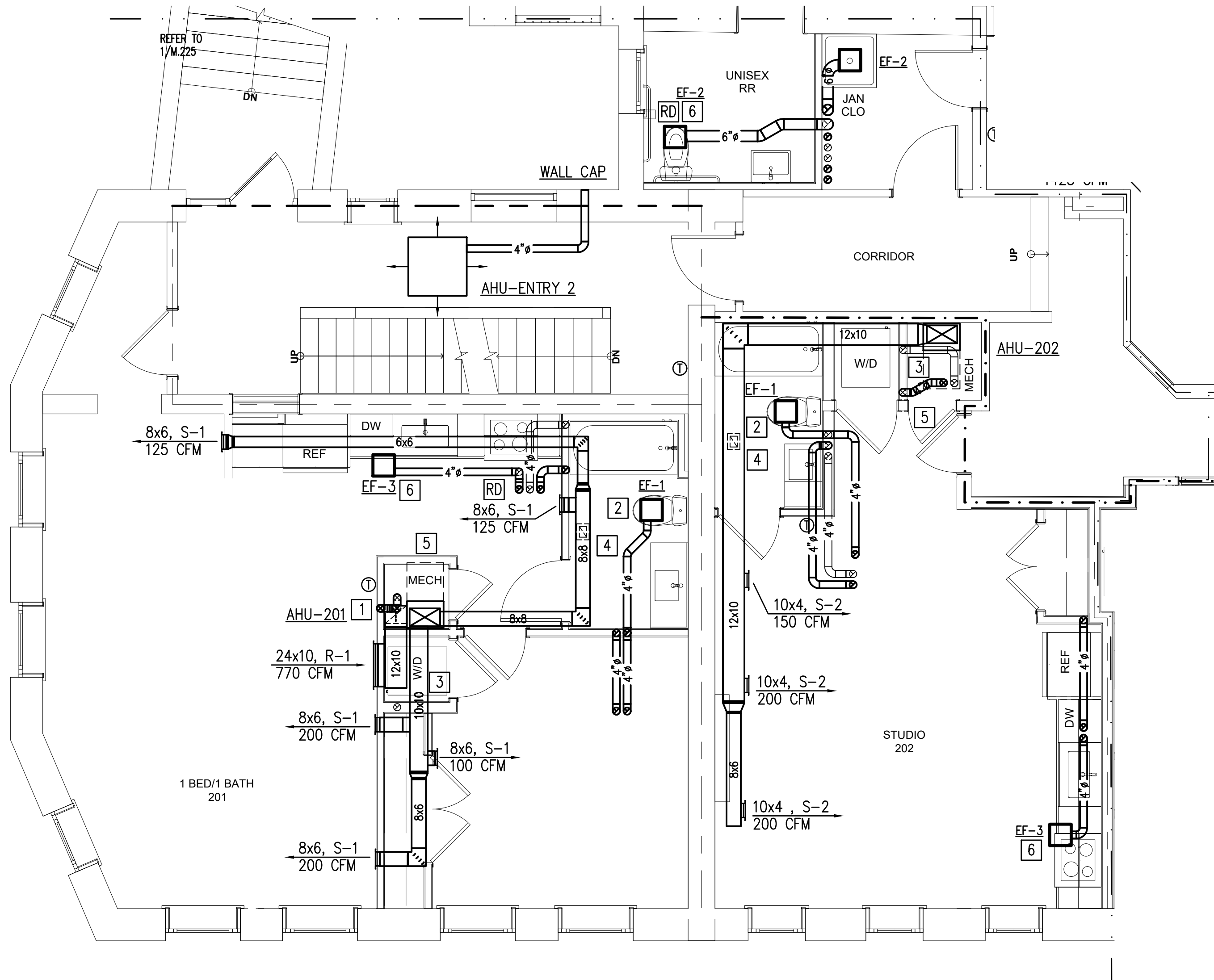
PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

MECHANICAL PARTIAL
SECOND FLOOR PLAN -
AREA A

SHEET:

M.223

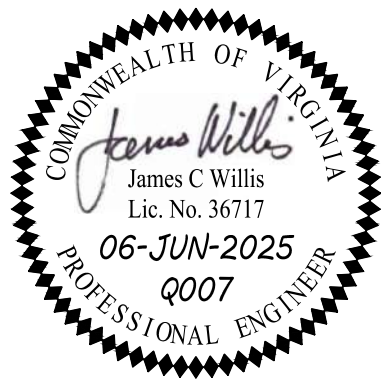
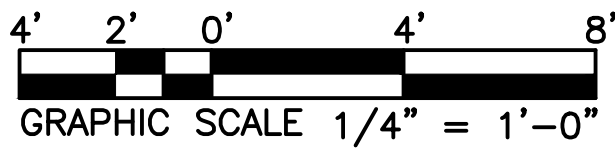
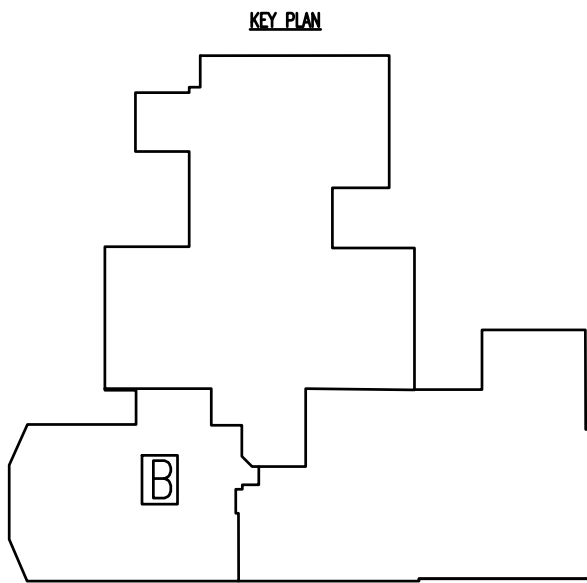
VENABLE ST



1 MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA B
M.224 1/4" = 1'-0"

PLAN REFERENCE NOTES:

- 1 4"Ø OA INTAKE TO ROOF CURB.
- 2 4"Ø TOILET EA TO ROOF CURB.
- 3 4"Ø DRYER EA TO ROOF CURB.
- 4 8x6, S-1
50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4"Ø KITCHEN EA TO ROOF CURB.
- 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Venable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



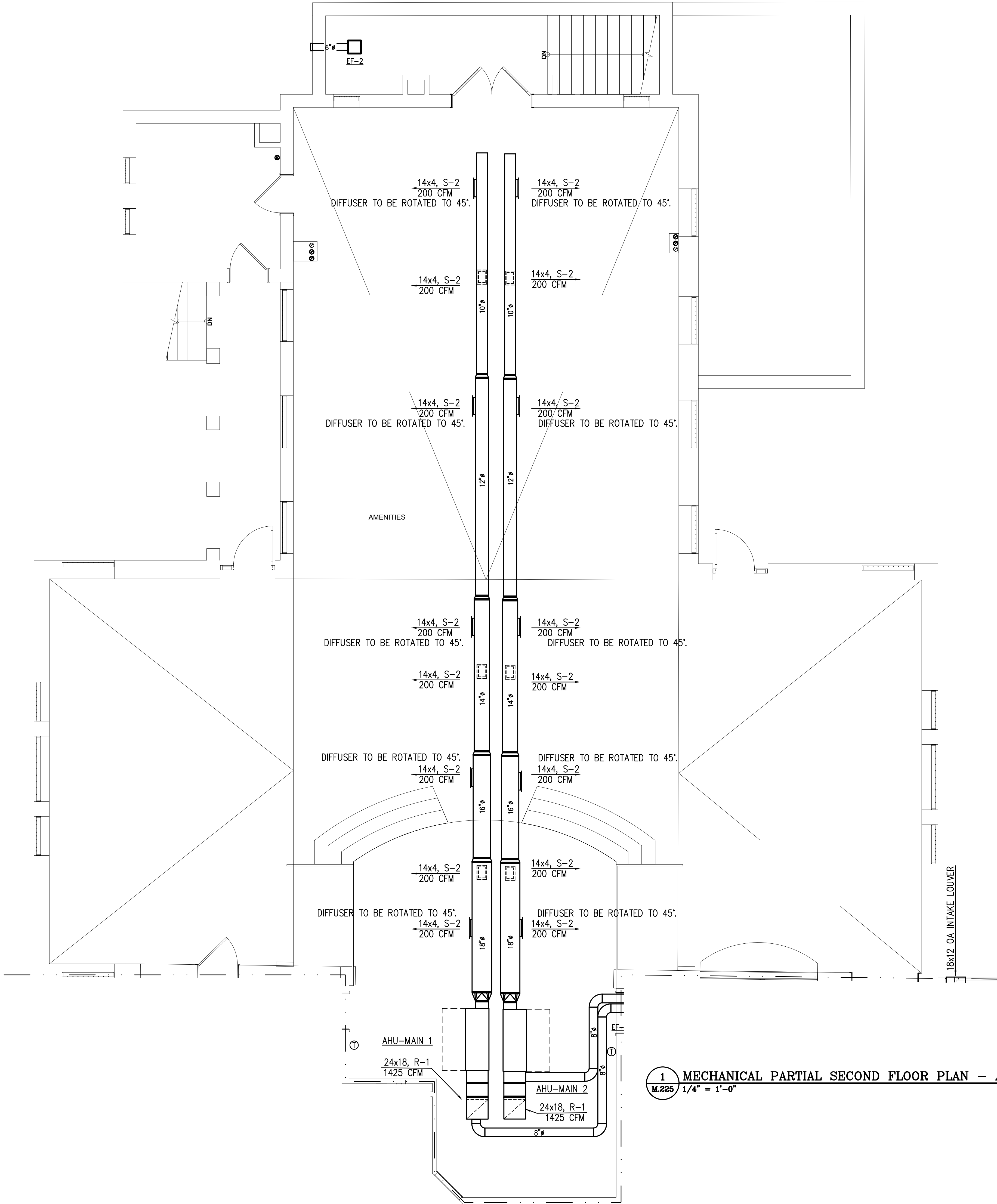
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

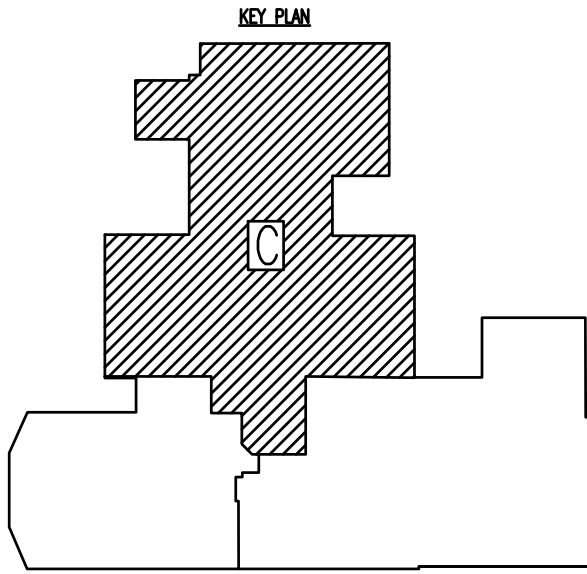
**MECHANICAL PARTIAL
SECOND FLOOR PLAN -
AREA B**

SHEET:
M.224

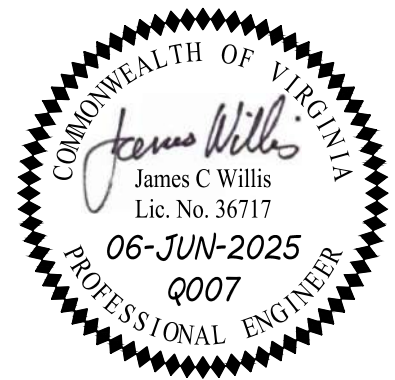
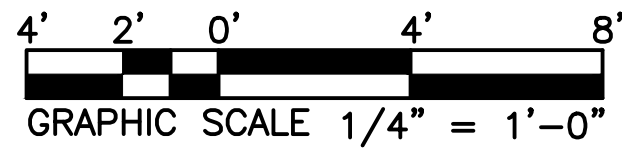
VENABLE ST



- PLAN REFERENCE NOTES:**
- 1 4"Ø OA INTAKE TO ROOF CURB.
 - 2 4"Ø TOILET EA TO ROOF CURB.
 - 3 4"Ø DRYER EA TO ROOF CURB.
 - 4 8x6, S-1 50 CFM
 - 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
 - 6 4"Ø KITCHEN EA TO ROOF CURB.
 - 7 4"Ø OA INTAKE TO RUN SIDEWALL TO WALL CAP.



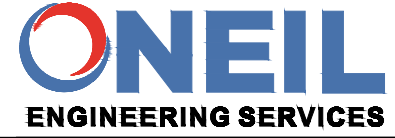
1 M.225 MECHANICAL PARTIAL SECOND FLOOR PLAN - AREA B
1/4" = 1'-0"



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



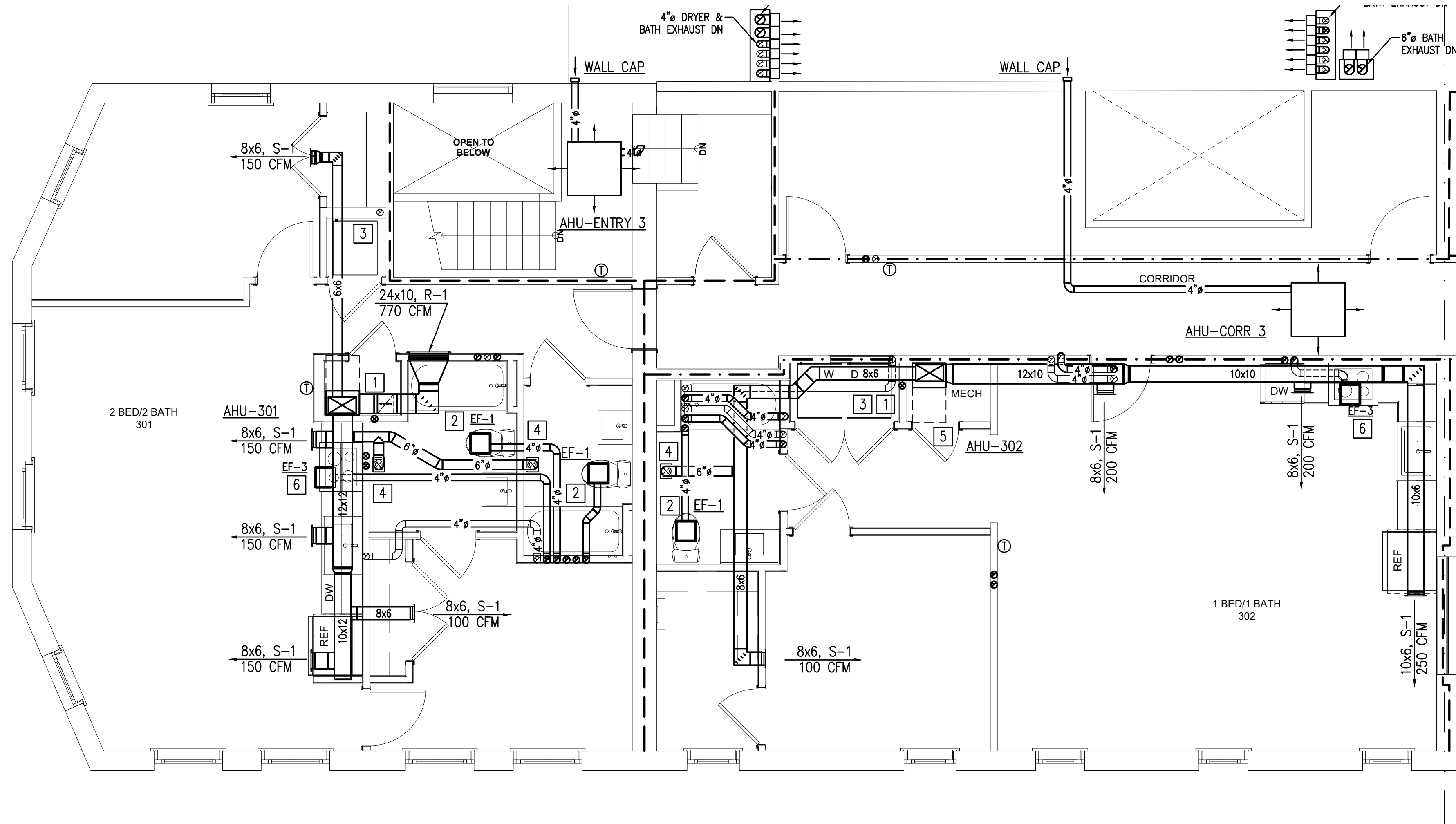
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

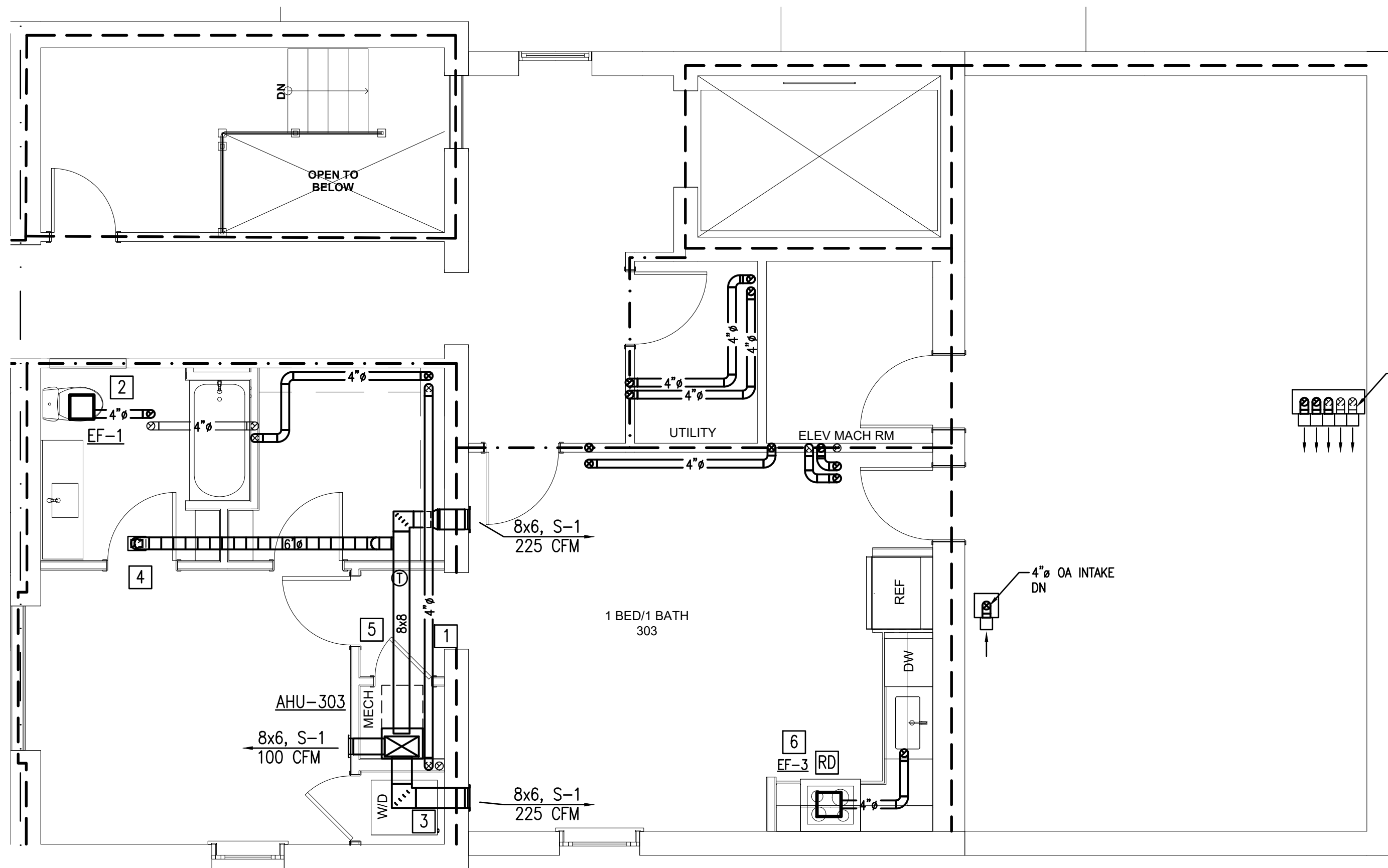
MECHANICAL PARTIAL
SECOND FLOOR PLAN -
AREA C

SHEET:
M.225

VENABLE ST



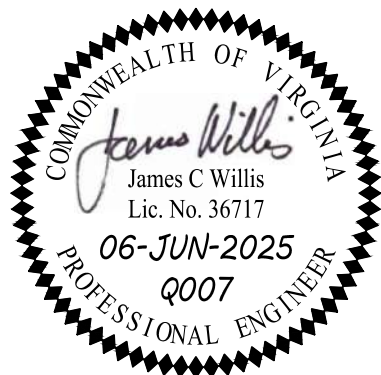
1 MECHANICAL PARTIAL 3RD FLOOR PLAN - AREA A
M.226 1/4" = 1'-0"



1 MECHANICAL PARTIAL THIRD FLOOR PLAN - AREA B
M.226 1/4" = 1'-0"

PLAN REFERENCE NOTES:

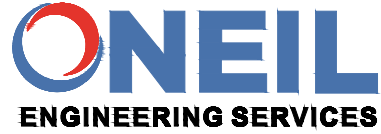
- 1 4" OA INTAKE TO ROOF CURB.
- 2 4" TOILET EA TO ROOF CURB.
- 3 4" DRYER EA TO ROOF CURB.
- 4 8x6, S-1 50 CFM
- 5 LOUVERED DOOR TO ALLOW RETURN AIR BACK TO AHU. REFER TO ARCHITECTURALS.
- 6 4" KITCHEN EA TO ROOF CURB.
- 7 4" OA INTAKE TO RUN SIDEWALL TO WALL CAP.



VENABLE STREET CHURCH
2101 Vanable St.
Richmond, VA 23223

REVISIONS		
#	DATE	DESCRIPTION
1	06-JUN-2025	ISSUE FOR PERMIT

COPYRIGHT © ONEIL ENGINEERING SERVICES
ALL RIGHTS RESERVED.



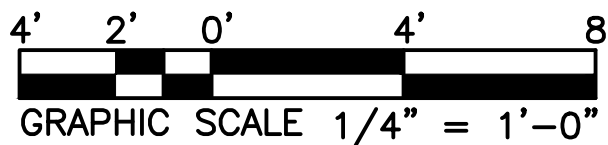
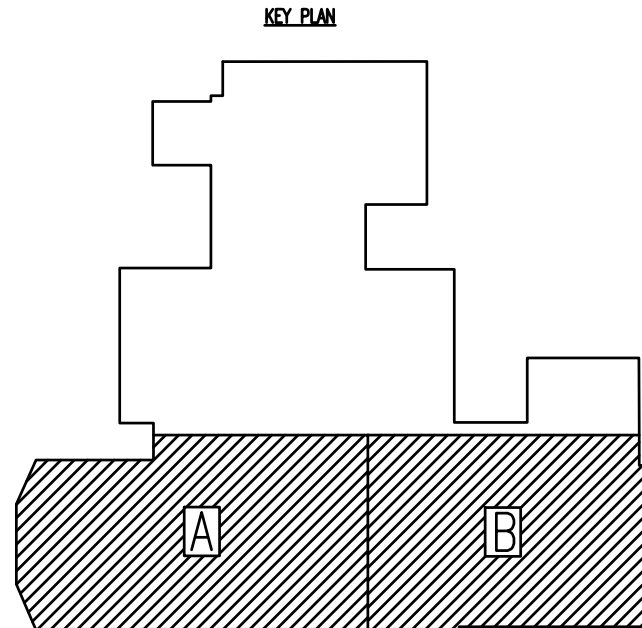
1480 OAKBRIDGE COURT
POWHATAN, VIRGINIA 23139
PHONE: 804-372-3501

PROJECT #:	Q007
DATE:	06-JUN-2025
SCALE:	1/4" 1'-0"
DRAWN BY:	RAC
APPROVED BY:	JCW

MECHANICAL PARTIAL
THIRD FLOOR PLAN -
AREA A&B

SHEET:

M.226



VENABLE ST