

SHELBY COUNTY  
ANIMAL SERVICES BUILDING  
381 MCDOW ROAD  
COLUMBIANA, ALABAMA

MECHANICAL ENGINEER:

MW / Davis Dumas  
& Associates, Inc.



CONSULTING ENGINEERS

4500 Southlake Park, Suite 200  
Hoover, Alabama 35244  
Phone: (205) 252-0246  
www.mwdda.com  
Project # 221046

ELECTRICAL ENGINEER:

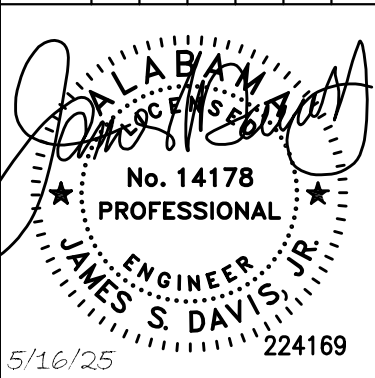


2148 PELHAM PARKWAY, BLDG. 100B  
PELHAM, AL 35124  
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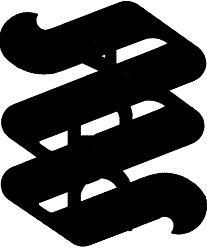


SITE PLAN

REVISIONS			
#	DATE	DESCRIPTION	BY



SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA



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SHEET TITLE  
COVER  
PAGE

DRAWN BY	CHECKED BY
JAG	JSD
DATE	MAY 16, 2025
JOB NUMBER	224169
SHEET NUMBER	1
COVER	OF 19



HVAC DUCTWORK LEGEND

	NEW DUCTWORK – WIDTH(IN.) X HEIGHT(IN.)
	EXISTING DUCTWORK TO REMAIN
	EXISTING DUCTWORK OR EQUIPMENT TO BE REMOVED
	CEILING RETURN GRILLE
	LOUVERED FACE CEILING DIFFUSER
	CEILING RETURN OR EXHAUST, REGISTER OR GRILLE
	LAY-IN LOUVERED FACE CEILING DIFFUSER
	SURFACE MOUNTED LOUVERED FACE CEILING DIFFUSER
	ACCESS DOOR IN DUCT
	SUPPLY AIR DUCT SECTION
	RETURN OR EXHAUST AIR DUCT SECTION
	ROUND 90° ELBOW
	ROUND, 45° ELBOW
	RECTANGULAR, 90° ELBOW WITH TURNING VANES
	RECTANGULAR, 45° ELBOW
	DUCT TURNING DOWN
	DUCT TURNING UP
	RISE OR DROP IN DUCT
	FIRE DAMPER (PROVIDE ACCESS DOOR IN DUCT)
	NEW CONNECTION TO EXISTING DUCT

HVAC PIPING LEGEND

	NEW PIPING
	EXISTING PIPING TO REMAIN
	EXISTING PIPING TO BE REMOVED

HVAC CONTROL LEGEND

	SPACE THERMOSTAT
	SINGLE POINT TEMPERATURE SENSOR
	AVERAGING TEMPERATURE SENSOR
	FREEZESTAT
	ANALOG OUTPUT
	ANALOG INPUT
	DIGITAL OUTPUT
	DIGITAL INPUT
	SMOKE DETECTOR
	VARIABLE FREQUENCY DRIVE
	STARTER
	CURRENT TRANSDUCER
	DUCT STATIC PRESSURE SENSOR
	DIFFERENTIAL PRESSURE SENSOR
	SIGNAL TO FIRE ALARM SYSTEM
	SIGNAL FROM FIRE ALARM SYSTEM
	PNEUMATIC OPERATOR
	MOTOR OPERATOR
	MAGNETIC STARTER
	DIRECTION OF FLOW
	PIPE MOUNTED TEMPERATURE SENSOR
	2-WAY AUTOMATIC VALVE
	3-WAY AUTOMATIC VALVE

HVAC ABBREVIATIONS

ACC	ACCESS
ACD	ACCESS DOOR
AD	AUTOMATIC DAMPER
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ARCH	ARCHITECTURAL
ARR	ARRANGEMENT
AUX	AUXILIARY
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
CFM	CUBIC FEET/MINUTE
CL	CLASS
CW	CLOCKWISE
CCW	COUNTER CLOCKWISE
CONC	CONCRETE
CONN	CONNECT
CP	CONTROL PANEL
CU	CONDENSING UNIT
DIM	DIMENSION
DISC	DISCONNECT
DL	DOOR LOUVER
DPR	DAMPER
DIA	DIAMETER
DR	DOOR
DN	DOWN
DWG	DRAWING
DOM	DOMESTIC
EAT	ENTERING AIR TEMPERATURE
EX	EXISTING
EXRL	EXISTING RELOCATE
EXR	EXISTING REMOVE
EXP	EXPANSION TANK
EMG	EXPANDED METAL GRILLE
FD	FIRE DAMPER
FF	FLOOR TO FLOOR
FLR	FLOOR
FTB	FLOOR TO BOTTOM
FO	FAIL OPEN
FZS	FREEZESTAT
FC	FAIL CLOSE
GALV	GALVANIZED
HP	HEAT PUMP
HS	HUMIDITY SENSOR
HTR	HEATER
JT	JOINT
LAT	LEAVING AIR TEMPERATURE
LP	LOW PRESSURE
MAN	MANUAL
MAT	MIXED AIR TEMPERATURE
MBH	1000 BTU/HR
MECH	MECHANICAL
MET	METAL
MD	MANUAL DAMPER
MTR	MOTOR
MFD	MECHANICAL FLOOR DRAIN
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OD	OUTSIDE DIAMETER
OSA	OUTSIDE AIR
PSIG	POUNDS PER SQUARE INCH GAGE
ΔP	DIFFERENTIAL PRESSURE
SDT	SMOKE DETECTOR
RA	RETURN AIR
RH	RELIEF HOOD
SA	SUPPLY AIR
SD	SMOKE DAMPER
SFD	COMBINATION SMOKE/FIRE DAMPER
STRUCT	STRUCTURAL
SR	SUPPLY REGISTER
T'STAT	THERMOSTAT
TEMP	TEMPORARY
TS	TEMPERATURE SENSOR
UH	UNIT HEATER

DEMOLITION NOTES:

- THE DEMOLITION WORK SHALL BE SCHEDULED WITH THE NEW INSTALLATION WORK AS TO MINIMIZE ANY DOWN TIME TO THE EXISTING SYSTEMS.
- CONTRACTOR SHALL DISPOSE OF DEMOLISHED MATERIALS IN A TIMELY MANNER. DEMOLISHED MATERIALS SHALL NOT CLUTTER WORK AREAS.
- DEMOLITION SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT LAWS, CODES IN EFFECT IN THE JURISDICTION IN WHICH THE WORK IS TO OCCUR, AND THE SPECIFICATIONS.

CONTRACTOR SHALL COORDINATE WITH THE OWNER AND BUILDING TENANT FOR THE REMOVAL OF ALL FURNITURE AND OTHER ITEMS REQUIRED TO BE REMOVED FROM THE BUILDING OR RELOCATED WITHIN THE BUILDING FOR THE EXECUTION OF THE PROJECT WORK. TEMPORARY ONSITE STORAGE OF ANY FURNITURE OR OTHER ITEMS REMOVED FROM THE BUILDING SHALL BE PROVIDED BY THE CONTRACTOR. FURNITURE AND OTHER ITEMS REMOVED SHALL BE PROTECTED DURING STORAGE. ITEMS SHALL BE RETURNED TO THE BUILDING AFTER WORK IS COMPLETED BY THE CONTRACTOR.

GENERAL NOTES & SPECIFICATIONS

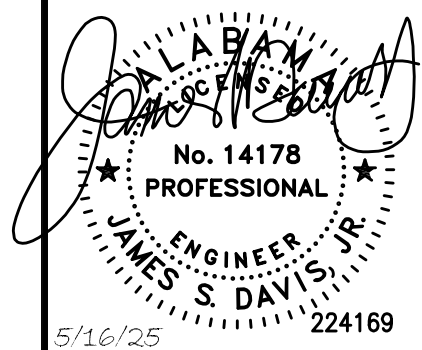
- ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL CODES.
- CONTRACTOR SHALL FIELD VERIFY ALL FIELD CONDITIONS AND LOCATIONS OF ALL NEW AND EXISTING DUCTWORK, PIPING, AND EQUIPMENT SHOWN ON DRAWINGS PRIOR TO BID. CONTRACTOR SHALL VERIFY CLEARANCES AND ROUTING PRIOR TO FABRICATION AND INSTALLATION. NOT CHANGE ORDERS WILL BE APPROVED FOR ANY ITEMS NOT FIELD VERIFIED PRIOR TO FABRICATION AND INSTALLATION.
- CONTRACTOR SHALL CLOSELY COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL AND ELECTRICAL WORK, ETC. SHOWN OR SPECIFIED ON OTHER CONTRACT DOCUMENTS AND DRAWINGS.
- EQUIPMENT SHALL BE AS SCHEDULED ON DRAWINGS. WHERE ACCEPTABLE ALTERNATE MANUFACTURER'S ARE LISTED, EQUIPMENT SHALL BE OF EQUAL QUALITY AND CAPACITY AS THE EQUIPMENT SCHEDULED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ARRANGEMENT CHANGES REQUIRED TO ACCOMMODATE USE OF ALTERNATE EQUIPMENT. SUBSTITUTION OF OTHER EQUIPMENT SHALL BE SUBMITTED FOR APPROVAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATION.
- MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND SUBJECT TO REQUIREMENTS OF THE ARCHITECTURAL DRAWINGS AND CONDITIONS EXISTING IN THE FIELD. MECHANICAL DRAWINGS INDICATE GENERALLY THE LOCATION OF COMPONENTS AND ARE NOT INTENDED TO SHOW ALL FITTINGS OR ALL DETAILS OF THE WORK.
- FOLLOW THE DRAWINGS CLOSELY, COORDINATE DIMENSIONS WITH ARCHITECTURAL DRAWINGS AND FIELD CONDITIONS. DO NOT SCALE MECHANICAL DRAWINGS FOR LOCATIONS OF SYSTEM COMPONENTS. THE MECHANICAL CONTRACTOR SHALL VERIFY ALL NEW ROUTINGS, AND TIE-INS PRIOR TO THE FABRICATION AND INSTALLATION OF ANY DUCTWORK OR PIPING.
- MAKE NO CHANGES WITHOUT THE PRIME CONSULTANT'S WRITTEN PERMISSION. IN CASE OF DOUBT, OBTAIN PRIME CONSULTANT'S DECISION BEFORE PROCEEDING WITH WORK. FAILURE TO FOLLOW THIS INSTRUCTION SHALL MAKE THE CONTRACTOR LIABLE FOR DAMAGE TO OTHER WORK AND RESPONSIBLE FOR REMOVING AND REPAIRING DEFECTIVE OR MISLOCATED WORK IN PROPER MANNER.
- DO NOT SCALE DRAWINGS TO LOCATE DIFFUSERS AND EQUIPMENT. COORDINATE WITH NEW AND EXISTING LIGHTING, TELEPHONE EQUIPMENT, ELECTRICAL CONDUIT, SMOKE DETECTORS, VESDA, CABLE RACK, CEILING GRIDS, AND EXISTING FIELD CONDITIONS.
- PRIOR TO PREPARING SUBMITTALS VERIFY ALL EQUIPMENT VOLTAGES WITH THE ELECTRICAL DRAWINGS, AND ELECTRICAL CONTRACTOR AND REPORT ANY INCONSISTENCIES TO THE ARCHITECT AS SOON AS POSSIBLE AND BEFORE ORDERING ANY EQUIPMENT.
- IF SYSTEMS INTERFERE OR CONFLICT, THE ARCHITECT SHALL DECIDE WHICH EQUIPMENT TO RELOCATE REGARDLESS OF WHICH WAS INSTALLED FIRST.
- PROTECT MECHANICAL EQUIPMENT FROM DAMAGE DURING CONSTRUCTION WHEN INSTALLATION IS COMPLETE, CLEAN EQUIPMENT AND MAKE READY FOR PAINTING.
- INSTALL ALL EQUIPMENT TO PROVIDE NORMAL (AND CODE REQUIRED) SERVICE ACCESS TO ALL COMPONENTS INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. IF MANUFACTURER'S INSTRUCTIONS CONFLICT WITH CONTRACT DOCUMENTS OBTAIN ARCHITECT'S DECISION BEFORE PROCEEDING.
- FURNISH ACCESS DOORS FOR VALVES, FIRE DAMPERS, DAMPERS, CONTROLS, AIR VENTS, TRAP CLEAN OUTS, AND OTHER ITEMS LOCATED ABOVE NON-LIFTOUT CEILINGS OR BEHIND PARTITIONS OR WALLS. DOORS IN FIRE RATED WALLS, AND CEILINGS: UL LABELED WITH FIRE RATING EQUAL TO FIRE RATING OF WALL OR CEILING. COORDINATE WALL AND CEILING FIRE RATINGS WITH ARCHITECTURAL DRAWINGS, AND CONDITIONS EXISTING IN THE FIELD.
- WHEN WORKING ON EXISTING DUCTWORK SYSTEMS THE CONTRACTOR SHALL INSTALL TEMPORARY FILTER MEDIA OVER ALL NEW AND EXISTING SUPPLY AIR DIFFUSERS PRIOR TO THE START OF WORK.
- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING WALL PENETRATIONS AT FIRE RATED WALLS WHERE DUCTWORK, PIPING OR HVAC WIRING CONDUIT IS INSTALLED. FIRE STOPPING SHALL BE PERFORMED IMMEDIATELY AFTER THE WORK IS INSTALLED. DO NOT LEAVE PENETRATIONS UNPROTECTED OVERNIGHT.
- PRIOR TO SUBMITTING A PROPOSAL THE CONTRACTOR SHALL VISIT THE SITE AND THOROUGHLY FAMILIARIZE HIMSELF WITH THE PROJECT. ANY QUESTIONS OR CLARIFICATIONS SHALL BE SUBMITTED TO THE DESIGN TEAM PRIOR TO SUBMITTING A PROPOSAL.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SITE SAFETY, SECURITY AND COMPLIANCE WITH OSHA SAFETY GUIDELINES.
- RECTANGULAR SUPPLY AND RETURN DUCTWORK SHALL BE GALVANIZED SHEET METAL. IF DUCTWORK IS REQUIRED TO PENETRATE RATED WALLS, FIRE DAMPERS AND DUCTWORK ACCESS DOORS SHALL BE PROVIDED AND INSTALLED AT ALL PENETRATIONS OF RATED WALLS. ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, AND SEALED IN STRICT ACCORDANCE WITH SMACNA STANDARDS FOR 2" PRESSURE CLASS, SEAL CLASS B DUCTWORK. DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR DIMENSIONS AND DO NOT INCLUDE THE THICKNESS OF INSULATION. THICKNESS OF ALL INSULATION TO MEET 2015 ENERGY CODE C403.2.9.
- ALL INSULATION SHALL COMPLY WITH NFPA 90A. USE INSULATION AND ADHESIVES WITH UL AND ASTM E-84 FLAME SPREAD RATING NOT OVER 25 WITHOUT EVIDENCE OF CONTINUED PROGRESSIVE COMBUSTION, AND SMOKE DEVELOPED RATING NOT EXCEEDING 50 FOR PIPE COVERING LOCATED IN AIR DUCTS OR PLENUMS AND NOT EXCEEDING 150 FOR ALL OTHER PIPE, DUCT, AND EQUIPMENT INSULATION.
- FLEXIBLE DUCT SHALL BE PRE-INSULATED EQUAL TO THERMAXLEY MK-E. PROVIDE SPIN-IN CONNECTORS WITH BALANCING DAMPERS AND STANDOFFS AT CONNECTION TO RECTANGULAR DUCTS. MAXIMUM LENGTH OF FLEXIBLE DUCT RUNS SHALL NOT EXCEED EIGHT FEET.
- ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE INSULATED. EXTERNAL FIBERGLASS DUCTWORK INSULATION SHALL BE MINIMUM 2" THICK AND MINIMUM R-VALUE TO BE 6.0 AND 8.0 IN ATTIC SPACES. FLEXIBLE GLASS FIBER INSULATION WITH FOIL-SCRM-KRAFT (FSK) FACING, FLAME SPREAD CLASSIFICATION, 25 OR LESS, SMOKE DEVELOPED RATING NOT EXCEEDING 50. MINIMUM DENSITY, 1 LB./CU. FT., MAXIMUM THERMAL CONDUCTIVITY AT 75°F MEAN TEMPERATURE 0.26 BTU/(HR)(SQ. FT.)(°F/IN). ALL DUCTWORK INSULATION SHALL BE SEALED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND INSTRUCTIONS. ALL SUPPLY AND RETURN DUCTWORK SERVING AC-1 & AC-2 SHALL BE PROVIDED WITH INTERNAL DUCT LINER INSULATION. LINER INSULATION SHALL BE GLASS FIBER ACOUSTICAL/THERMAL INSULATION COMPLYING WITH NFPA 90A AND UL 181 AND HAVING AN EROSION RESISTANT HEAVY COATING ON THE AIR SIDE TREATED WITH AN ANTI-MICROBIAL AGENT WHICH DOES NOT SUPPORT MOLD, BACTERIA NOR FUNGUS GROWTH WHEN TESTED IN ACCORDANCE WITH ASTM C1071, ASTM G21 AND G22. NRC NOT LESS THAN 1-1/2" THICK AND MINIMUM DENSITY 1-1/2 LB./CU. FT., AND MAXIMUM FRICTION CORRECTION FACTOR AT 2000 FPM AVERAGE VELOCITY 1.15 (PER TMA TEST METHOD AHS-152-76U). MINIMUM THERMAL CONDUCTANCE R6 (ASTM C177) KNAUF "DUCT LINER E-M", CERTAINTED "TOUGH GUARD" OR APPROVED EQUAL.
- TEST AND BALANCE ALL SYSTEMS TO WITHIN +10% AND -5% OF ALL AIR VALUES SHOWN BY AN ABC OR NEBB CERTIFIED TEST AND BALANCE AGENCY. SUBMIT A WRITTEN TEST REPORT TO THE ENGINEER.
- CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF ALL DUCTWORK AND PIPING FOR APPROVAL BY ARCHITECT AND ENGINEER PRIOR TO FABRICATION AND SHALL PROVIDE SUBMITTALS OF ALL EQUIPMENT, GRILLES, DIFFUSERS, DUCTWORK, INSULATION, ETC. FOR APPROVAL PRIOR TO ORDER.

AIR DEVICE LEGEND

MARK	DESCRIPTION	(X)	MODEL #
LD(X)	LOUVER FACE 24"X24" LAY-IN CEILING DIFFUSER. 4-WAY THROW UNLESS NOTED OTHERWISE. CFM SHOWN.	SQUARE NECK SIZE	TITUS TDC-AA
		NECK SIZE	
		6 X 6	
		9 X 9	
		12 X 12	
E(X)	CEILING EXHAUST GRILLE. 1/2" X 1/2" X 1/2" ALUMINUM CORE	SQUARE NECK SIZE	TITUS 50F
R(X)	CEILING RETURN GRILLE. 1/2" X 1/2" X 1/2" ALUMINUM CORE	SQUARE NECK SIZE	TITUS 50F

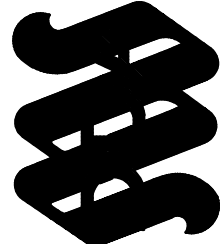
REVISIONS

BY	DESCRIPTION	DATE



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SHEET TITLE  
HVAC  
LEGENDS

DRAWN BY	CHECKED BY
JAG	JSD
DATE	MAY 16, 2025
JOB NUMBER	224169
SHEET NUMBER	2
M1	OF 19



INDOOR - DUCTLESS SPLIT SYSTEM - SECOND FLOOR OFFICE SPACE												
MARK	AREA SERVED	TYPE	OUTDOOR UNIT	MAX CFM	CAPACITY (MBH)		CIRCUIT BREAKER CAPACITY (AMPS)	MIN. CIRCUIT AMPS	MOTOR V/Φ/Hz	ACCESSORIES	SEER	DESIGN BASIS MODEL
					COOLING 95° F	HEATING 47° F						
FCU-11	OFFICE	(B)	HP-2	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-12	OFFICE	(B)	HP-2	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2

TYPES:

- (A) WALL MOUNTED CASSETTE UNIT  
(B) CEILING MOUNTED CASSETTE UNIT

ACCESSORIES:

- (1) WIRED THERMOSTAT.  
(2) INDOOR UNIT POWERED SEPARATE FROM OUTDOOR UNIT.  
(3) FRESH AIR INTAKE KIT. BALANCE EACH UNIT TO 50 CFM OF OUTSIDE AIR.  
(4) MERV 13 FILTER KIT.

OUTDOOR - DUCTLESS SPLIT SYSTEM - SECOND FLOOR OFFICE SPACE							
MARK	COOLING	HEATING	UNIT TYPE	CIRCUIT BREAKER CAPACITY (AMPS)	MIN. CIRCUIT AMPS	MOTOR V/Φ/Hz	DESIGN BASIS MODEL
	TOTAL MBH	TOTAL MBH					
HP-2	36.0	42.0	HEAT PUMP	30	29.8	208/1/60	FUJITSU AOU36RLAVM4

SINGLE POINT POWER.  
MOUNT OUTDOOR UNIT ON MANUFACTURER RECOMMENDED PLATFORM STANDS ON 6" CONCRETE PAD.  
PROVIDE ALUMINUM JACKET ON OUTDOOR REFRIGERANT PIPING.  
PROVIDE A 1-YEAR MANUFACTURER LABOR WARRANTY.

INDOOR - DUCTLESS SPLIT SYSTEM - FIRST FLOOR												
MARK	AREA SERVED	TYPE	OUTDOOR UNIT	MAX CFM	CAPACITY (MBH)		CIRCUIT BREAKER CAPACITY (AMPS)	MIN. CIRCUIT AMPS	MOTOR V/Φ/Hz	ACCESSORIES	SEER	DESIGN BASIS MODEL
					COOLING 95° F	HEATING 47° F						
FCU-1	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-2	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-3	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-4	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-5	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-6	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-7	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-8	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-9	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2
FCU-10	FRONT HOUSE	(B)	HP-1	353	12.0	13.5	15	0.51	208/1/60	(1)(2)(3)(4)	11.6	FUJITSU AUUA12TLAV2

TYPES:

- (A) WALL MOUNTED CASSETTE UNIT  
(B) CEILING MOUNTED CASSETTE UNIT

ACCESSORIES:

- (1) WIRED THERMOSTAT.  
(2) INDOOR UNIT POWERED SEPARATE FROM OUTDOOR UNIT.  
(3) FRESH AIR INTAKE KIT. BALANCE EACH UNIT TO 50 CFM OF OUTSIDE AIR.  
(4) MERV 13 FILTER KIT.

OUTDOOR - DUCTLESS SPLIT SYSTEM - FIRST FLOOR							
MARK	COOLING	HEATING	UNIT TYPE	CIRCUIT BREAKER CAPACITY (AMPS)	MIN. CIRCUIT AMPS	MOTOR V/Φ/Hz	DESIGN BASIS MODEL
	TOTAL MBH	TOTAL MBH					
HP-1	120.0	135.0	HEAT PUMP	50	47	208/3/60	FUJITSU AOU120RLAVL

SINGLE POINT POWER.  
MOUNT OUTDOOR UNIT ON MANUFACTURER RECOMMENDED PLATFORM STANDS ON 6" CONCRETE PAD.  
PROVIDE ALUMINUM JACKET ON OUTDOOR REFRIGERANT PIPING.  
PROVIDE A 1-YEAR MANUFACTURER LABOR WARRANTY.

ENERGY RECOVERY UNIT																													
MARK	SERVES	SUPPLY FAN				EXHAUST FAN				COOLING COIL				NATURAL GAS HEAT		ENTHALPY CORE SUMMER CONDITIONS				ELECTRICAL			DESIGN BASIS						
		CFM	W.G. EXT.	W.G. S.P. TOT.	MOTOR HP	CFM	W.G. EXT.	W.G. S.P. TOT.	MOTOR HP	SENSIBLE (MBH)	TOTAL (MBH)	AIR FDB	ENT. FWB	MBH INPUT	MBH OUTPUT	OSA FDB/FWB	RET. AIR FDB/FWB	SUP. AIR FDB/FWB	EFFECTIVENESS	V/ø/Hz	MCA	MOCF							
ERU-1	BUILDING	4,120	1.0	2.452	(1) 3	4,600	0.5	1.335	(1) 1.5	121.5	196.7	82.4	69.0	300	243	95.0/78.0	75.0/62.5	82.4/69.0	70.7	208/3/60	102.3	150.0	VALENT VXC-212-FH-17.5I-J-C2						
<div>① CUSTOM HORIZONTAL DRAW-THRU WITH INTERNAL FAN ISOLATION, DOUBLE WALL CONSTRUCTION OF 2" - 4 # INSULATION</div> <div>GENERAL NOTES:<div>1. MAXIMUM COOLING COIL AIR PRESSURE DROP = 1.0" W.G.</div><div>2. MAXIMUM HEATING COIL AIR PRESSURE DROP = 0.5" W.G.</div></div>																ENTHALPY CORE WINTER CONDITIONS													
																OSA FDB/FWB	RET. AIR FDB/FWB	SUP. AIR FDB/FWB	EFFECTIVENESS										
																20.0/16.6	70.0/55.9	51.7/43.5	74.4										
FILTER TYPES:																													

- (1) CUSTOM HORIZONTAL DRAW-THRU WITH INTERNAL FAN ISOLATION, DOUBLE WALL CONSTRUCTION OF 2" - 4 # INSULATION

FILTER TYPES:

- (A) 2" MERV 8

ACCESSORIES:

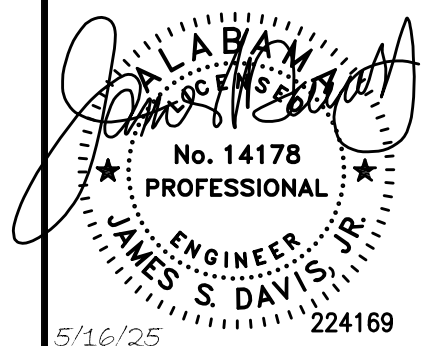
- (1) MARINE LIGHT AND MAN ACCESS DOOR FOR SUPPLY FAN, EVAP., COIL & FILTER SECTIONS.  
(2) AUTOMATIC OUTSIDE AIR DAMPER

GENERAL NOTES:

1. MAXIMUM COOLING COIL AIR PRESSURE DROP = 1.0" W.G.  
2. MAXIMUM HEATING COIL AIR PRESSURE DROP = 0.5" W.G.  
3. SUPPLY FAN SHALL BE 18 IN. AF, WITH INTERNAL SPRING ISOLATION BASE.  
4. EXHAUST FAN SHALL BE 14 IN. PLENUM WITH INTERNAL ISOLATION BASE.  
5. ALL UNIT SECTIONS TO HAVE ACCESS DOORS.  
6. CONTRACTOR TO VERIFY COIL CONNECTION HAND PRIOR TO ORDERING UNIT.  
7. UNIT TEMPERATURE AND HUMIDITY IS CONTROLLED FROM EXHAUST.

REVISIONS

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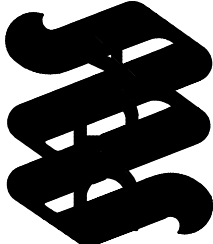


5/16/25

224169

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MCDOW ROAD-  
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COLUMBIA, ALABAMA

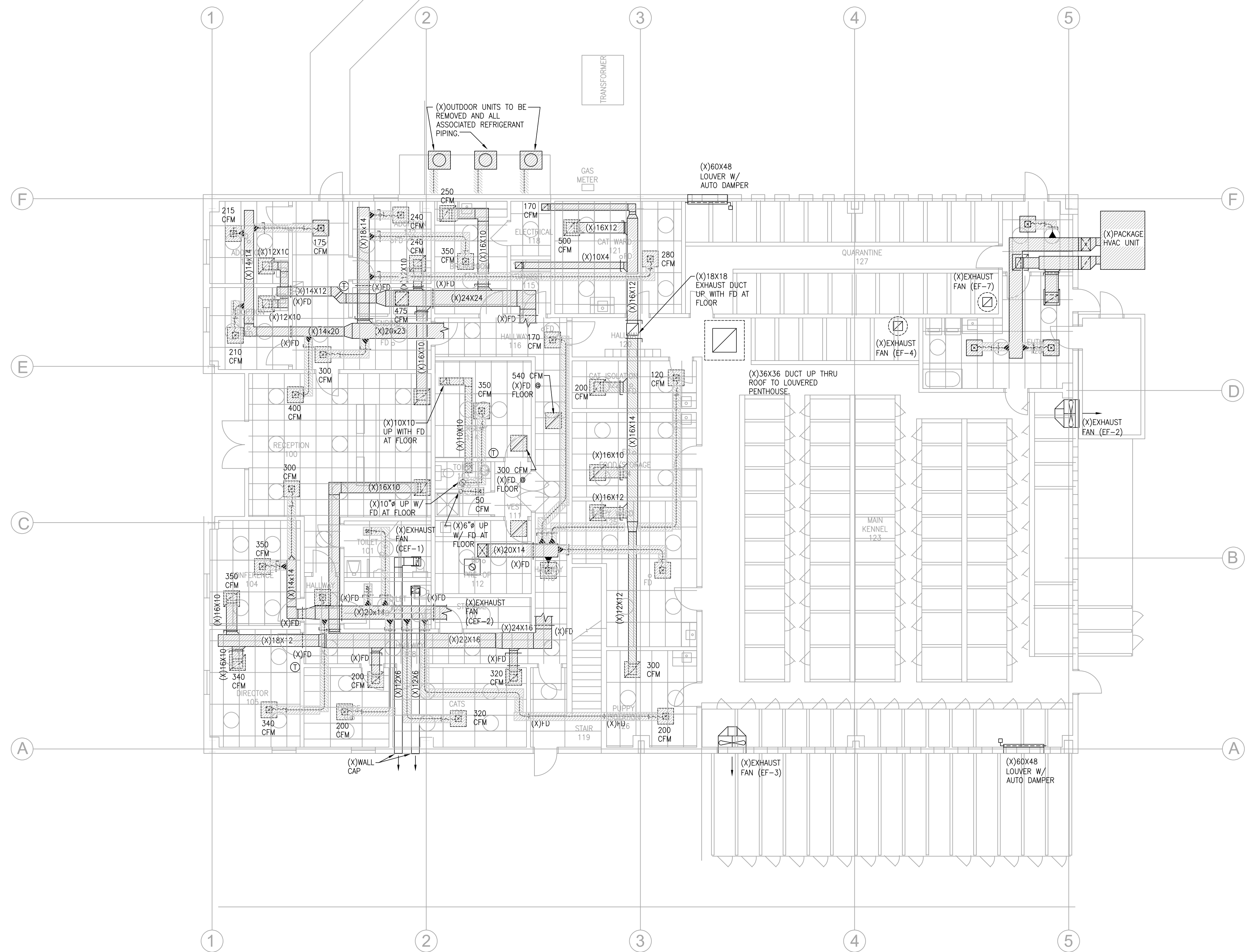
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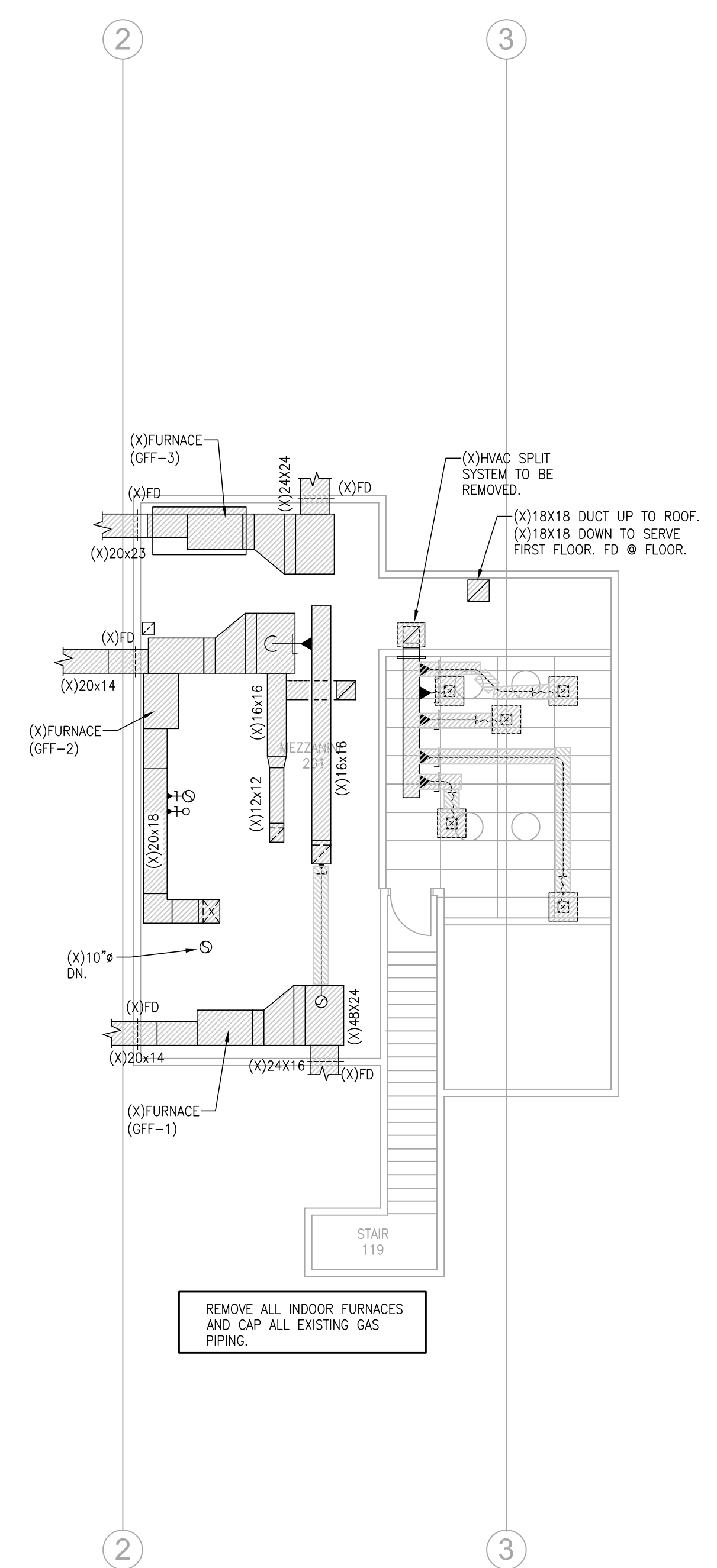
SHEET TITLE  
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SCHEDULES

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JOB NUMBER	
224169	
SHEET NUMBER	3
M2	OF 19



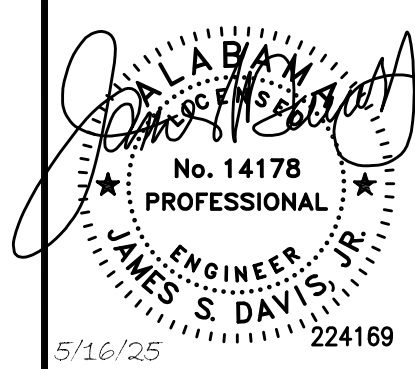


 **FIRST FLOOR - DEMOLITION HVAC**  
SCALE: 1/8" = 1'-0"



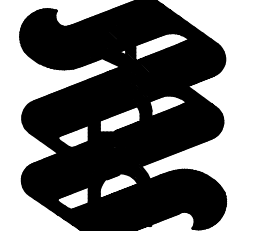
 **SECOND FLOOR - DEMOLITION HVAC**  
SCALE: 1/8" = 1'-0"

REVISIONS	
#	DESCRIPTION



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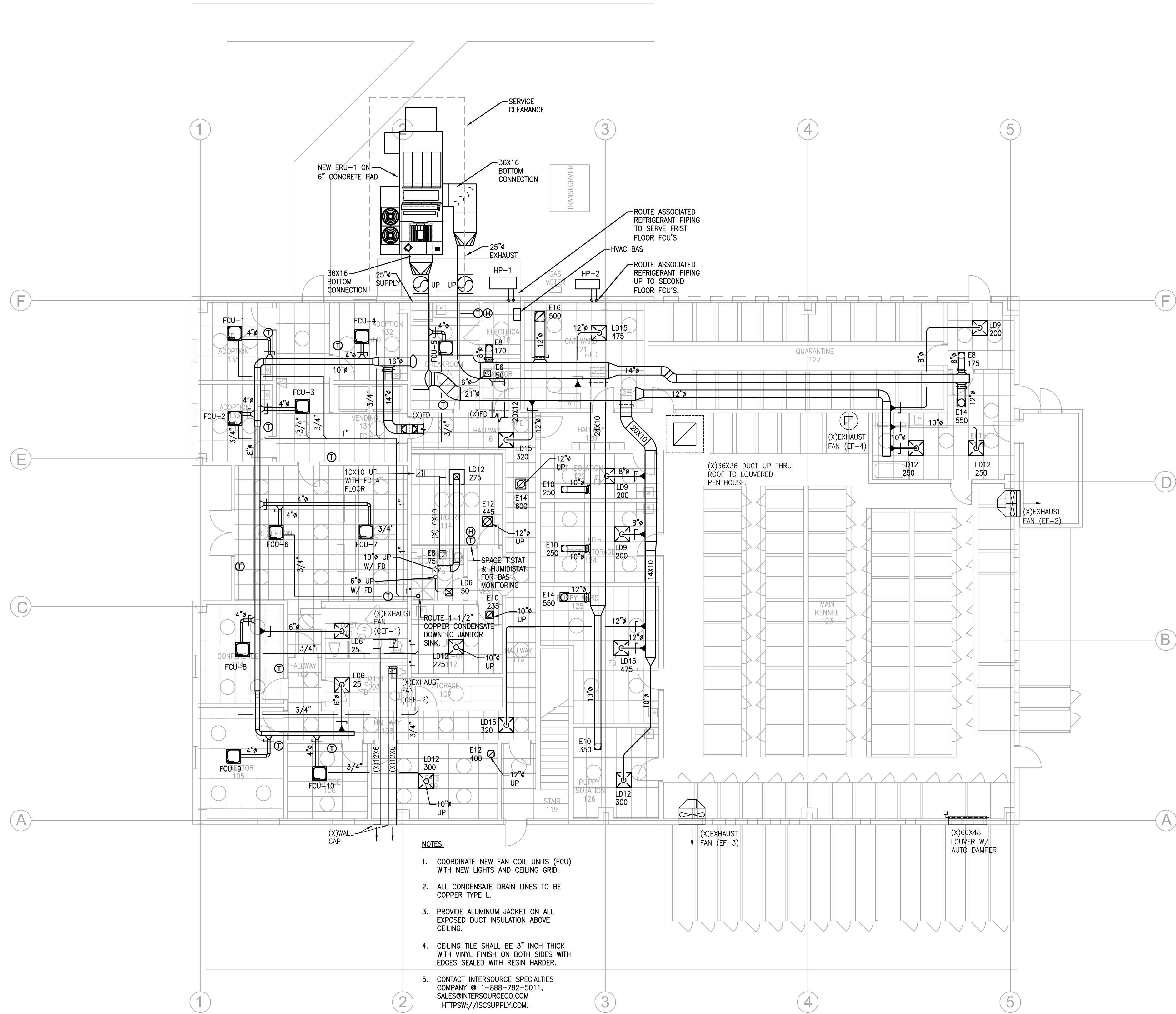
MW / Davis Dumas & Assoc., Inc.  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Birmingham, AL 35244  
Phone (205) 252-0246  
Fax (205) 251-8506



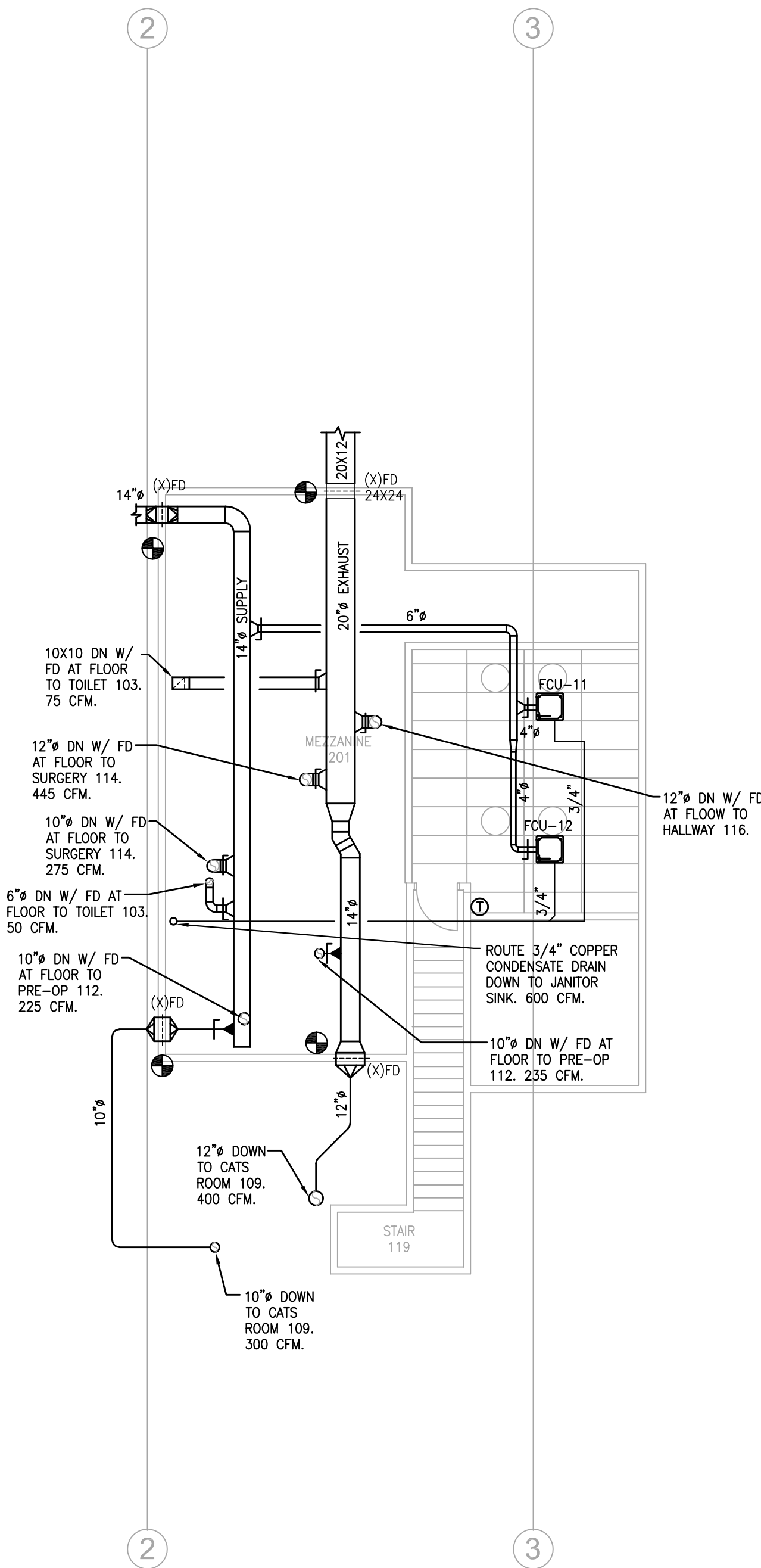
SHEET TITLE  
**1ST & 2ND  
FLOOR  
DEMOLITION  
HVAC**

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DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M3	4 OF 19

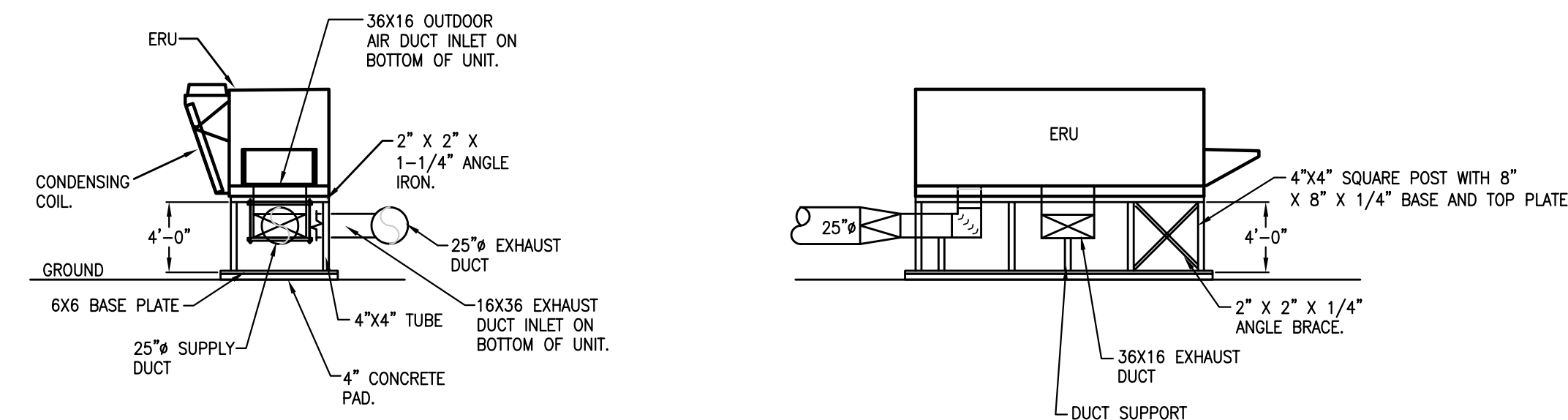




**FIRST FLOOR - NEW HVAC**  
SCALE: 1/8" = 1'-0"



**SECOND FLOOR - NEW HVAC**  
SCALE: 1/8" = 1'-0"



REVISIONS	
#	DESCRIPTION

5/16/25

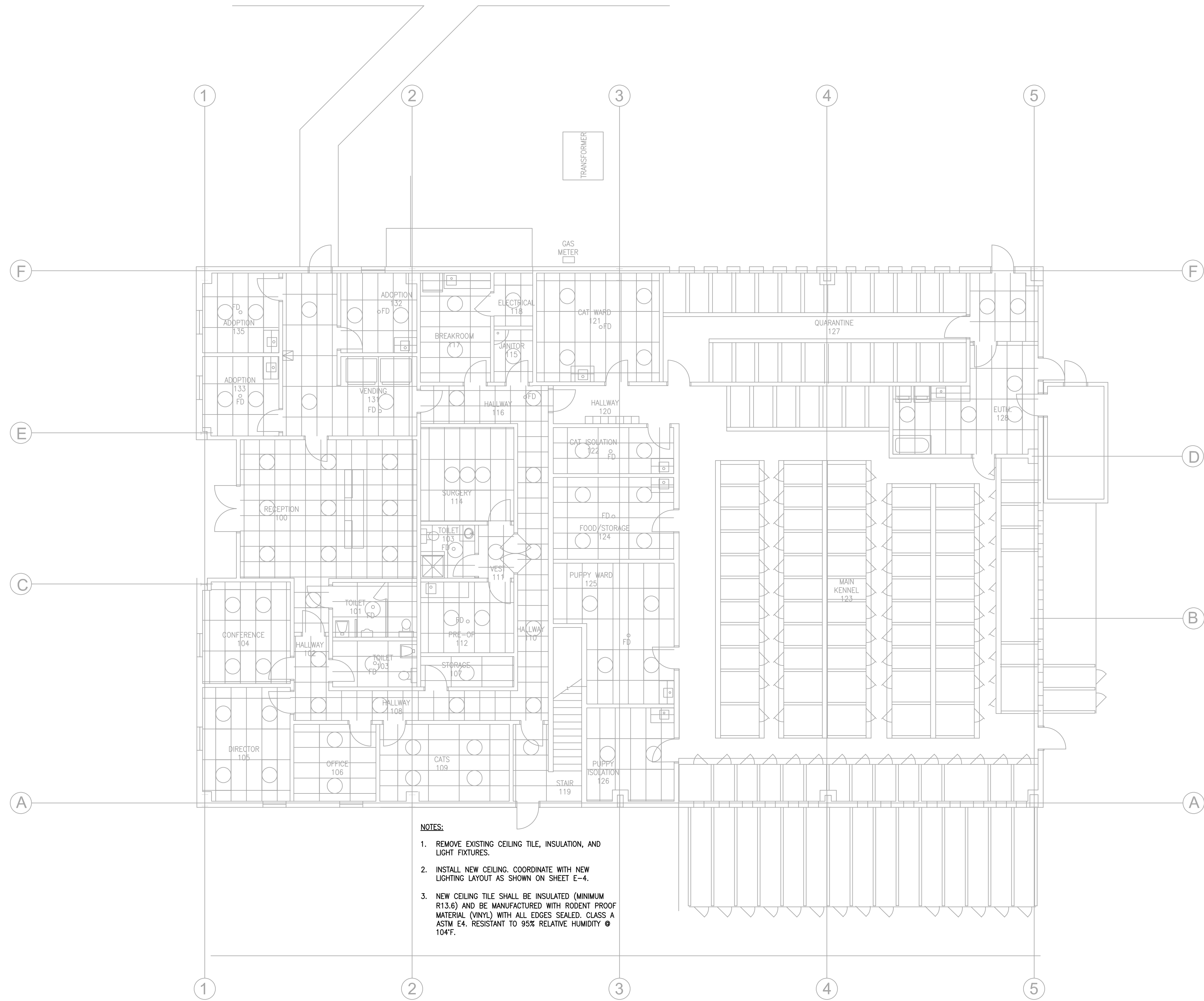
**SHELBY COUNTY ANIMAL SERVICE BUILDING**  
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SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

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CONSULTING ENGINEERS  
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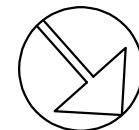
**SHEET TITLE**  
1ST & 2ND  
FLOOR NEW  
HVAC

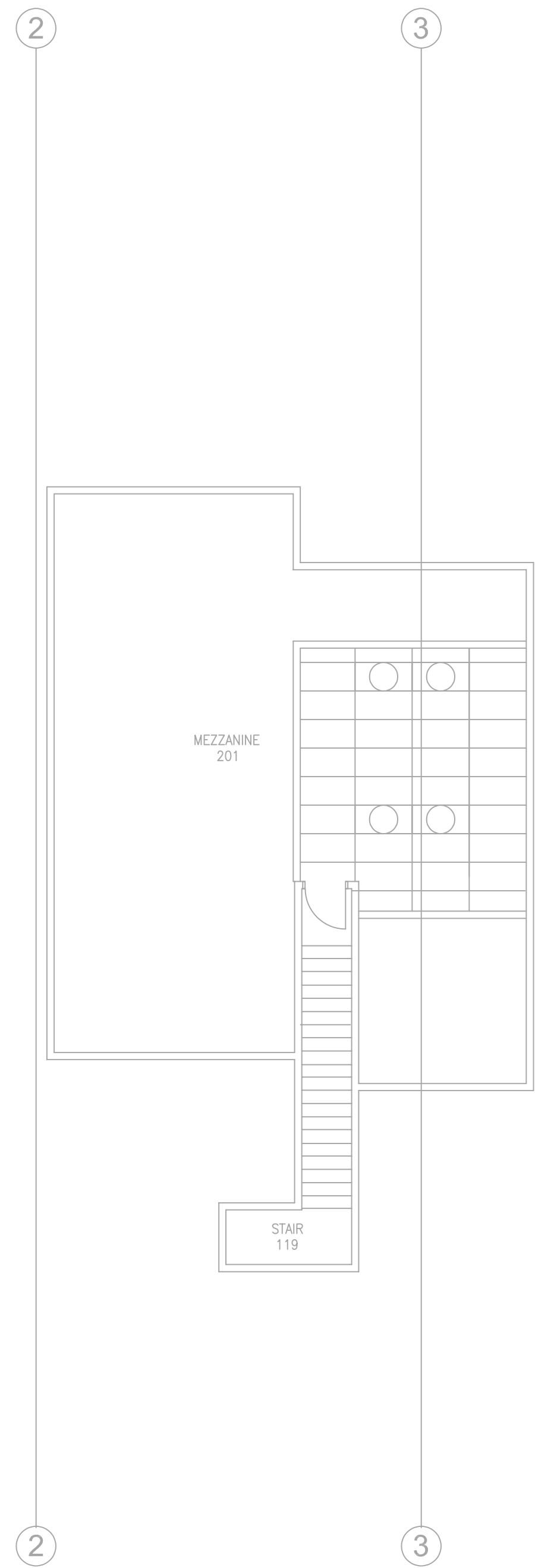
DRAWN BY	CHECKED BY
JAG	JSD
DATE	MAY 16, 2025
JOB NUMBER	224169
SHEET NUMBER	5
M4	OF 19






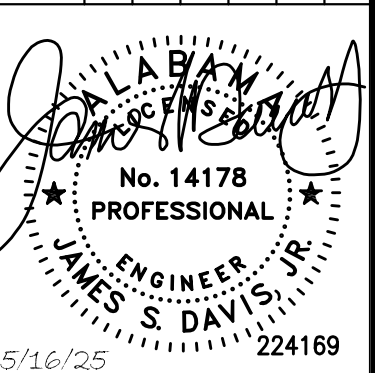
- NOTES:**
1. REMOVE EXISTING CEILING TILE, INSULATION, AND LIGHT FIXTURES.
  2. INSTALL NEW CEILING. COORDINATE WITH NEW LIGHTING LAYOUT AS SHOWN ON SHEET E-4.
  3. NEW CEILING TILE SHALL BE INSULATED (MINIMUM R13.6) AND BE MANUFACTURED WITH RODENT PROOF MATERIAL (VINYL) WITH ALL EDGES SEALED. CLASS A ASTM E-4. RESISTANT TO 95% RELATIVE HUMIDITY @ 104°F.

 **FIRST FLOOR - NEW RCP**  
SCALE: 1/8" = 1'-0"



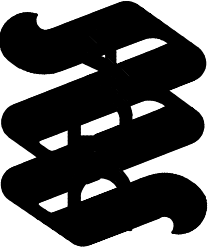
 **SECOND FLOOR - NEW RCP**  
SCALE: 1/8" = 1'-0"

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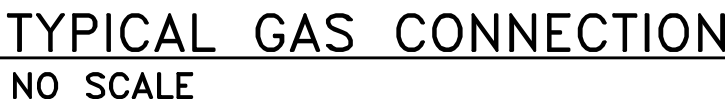
SHEET TITLE  
**REFLECTIVE  
CEILING  
PLAN**

DRAWN BY	CHECKED BY
JAG	JSD
DATE	MAY 16, 2025
JOB NUMBER	224169
SHEET NUMBER	M5
6	OF 19



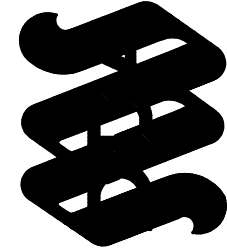


1. LOCATIONS OF EX. UTILITIES SHOWN ON PLANS ARE APPROXIMATE. VERIFY WITH LOCAL UTILITY PRIOR TO BIDDING.
2. CONTRACTOR SHALL VERIFY EXACT LOCATION, SIZE AND ELEVATION OF ALL EXISTING SERVICES PRIOR TO INSTALLING ANY NEW PIPE.
3. WHEREVER DISSIMILAR METALS ARE CONNECTED A DIELECTRIC CONNECTOR SHALL BE USED.
4. COORDINATE ALL PIPE ROUTING TO AVOID CONFLICTS WITH STRUCTURAL, MECHANICAL, AND ELECTRICAL FEATURES OF BUILDING.
5. ALL PIPE VALVES AND FITTINGS SHALL BE MADE IN THE USA

A circular professional engineer seal for the State of Alabama. The outer ring contains the text "ALABAMA" at the top and "ENGINEER" at the bottom. Inside the ring, the text "No. 14178" and "PROFESSIONAL" are centered. Below "PROFESSIONAL", the name "JAMES S. DAVIS, JR." is written in a semi-circle. The seal is signed with a cursive signature across the top and right. The number "224169" is printed to the right of the seal, and the date "5/16/25" is printed to the left.

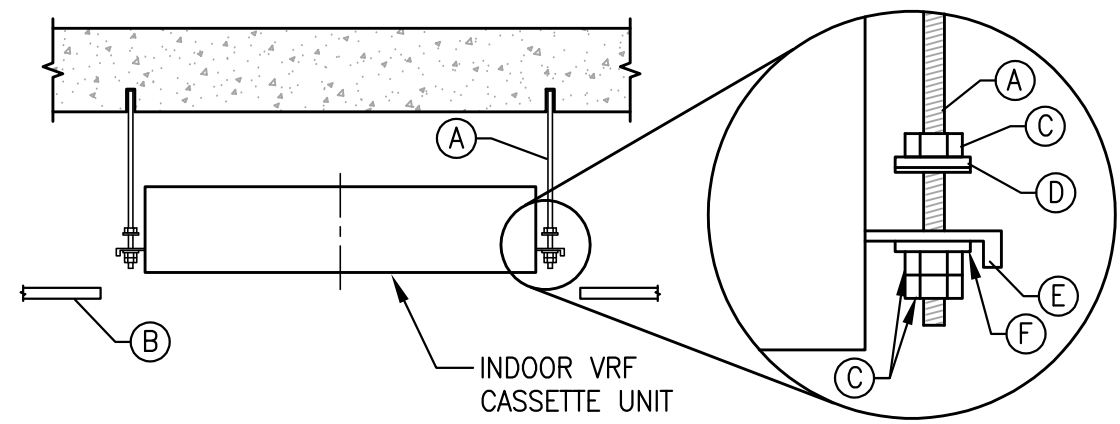
SHELBY COUNTY ANIMAL SERVICE BUILDING  
381 MCDOW ROAD  
SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA

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CONSULTING ENGINEERS  
4500 Southlake Park, Suite 200  
Hoover, Alabama 35244  
**Phone (205) 252-0246**  
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SHEET TITLE  
1ST FLOOR  
PLUMBING  
PLAN

DRAWN BY TCA		CHECKED BY JSD	
DATE MAY 16, 2025			
JOB NUMBER 224169			
SHEET NUMBER M6		7	
		OF 19	

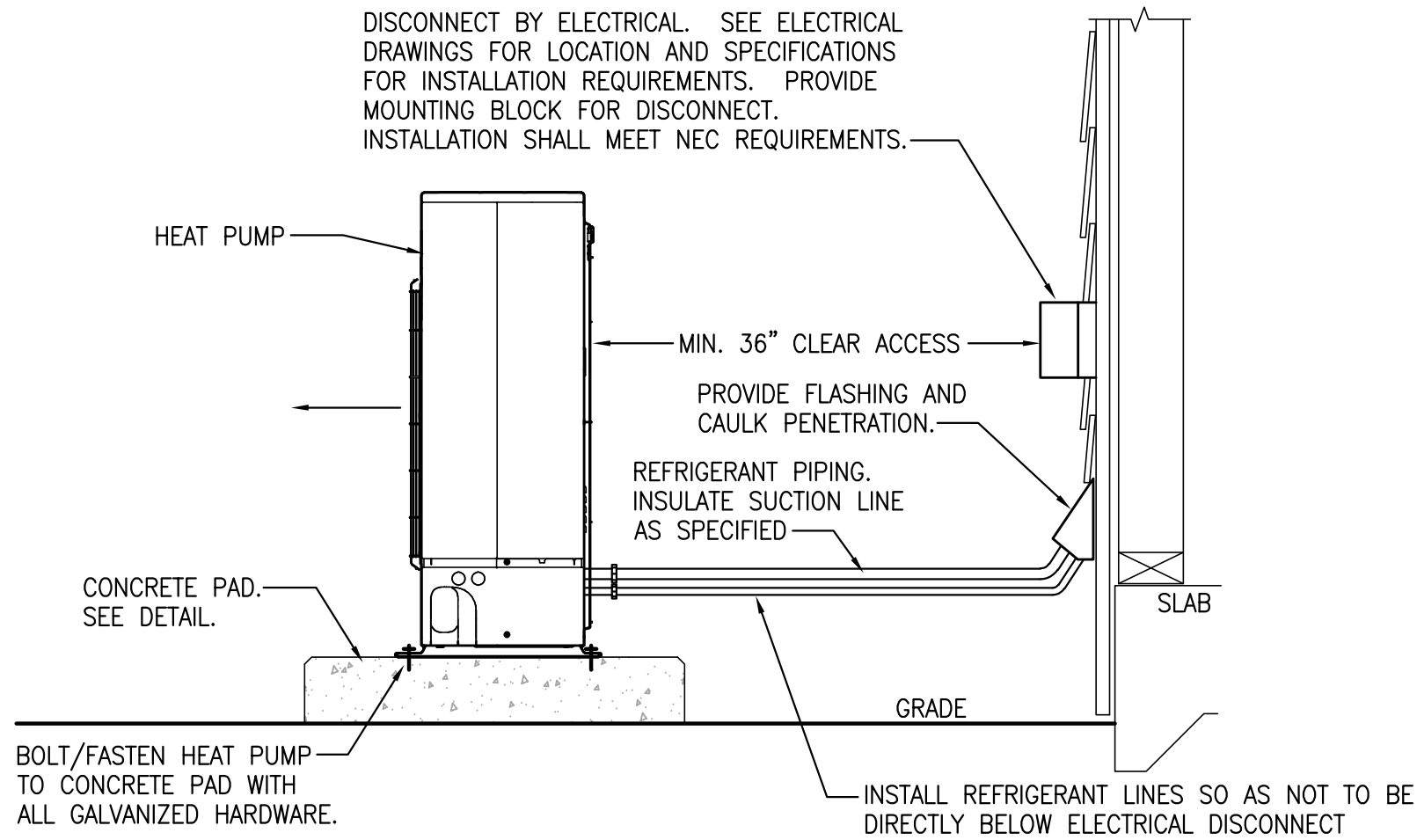


- (A) GALVANIZED THREADED ROD (D) WASHER WITH INSULATION  
(B) CEILING (E) MOUNTING PLATE  
(C) GALVANIZED NUT (F) WASHER WITHOUT INSULATION

NOTE:  
INSTALL INDOOR VRF CEILING CASSETTES IN STRICT ACCORDANCE WITH THE MANUFACTURER'S  
INSTALLATION INSTRUCTIONS AND REQUIREMENTS. COORDINATE EXACT LOCATION AND ELEVATION  
WITH CEILING TYPE AND HEIGHT AS REQUIRED. CONTRACTOR SHALL UTILIZE CEILING INSTALLATION  
TEMPLATE FROM UNIT MANUFACTURER TO ENSURE PROPER UNIT ALIGNMENT AND PLACEMENT.  
SIZE THREADED ROD AS REQUIRED FOR UNIT WEIGHT. MANUFACTURER'S INSTALLATION GUIDELINES  
SUPERSEDE THIS DETAIL WHERE REQUIREMENTS EXCEED THOSE INDICATED.

### VRF CEILING CASSETTE MOUNTING DETAIL

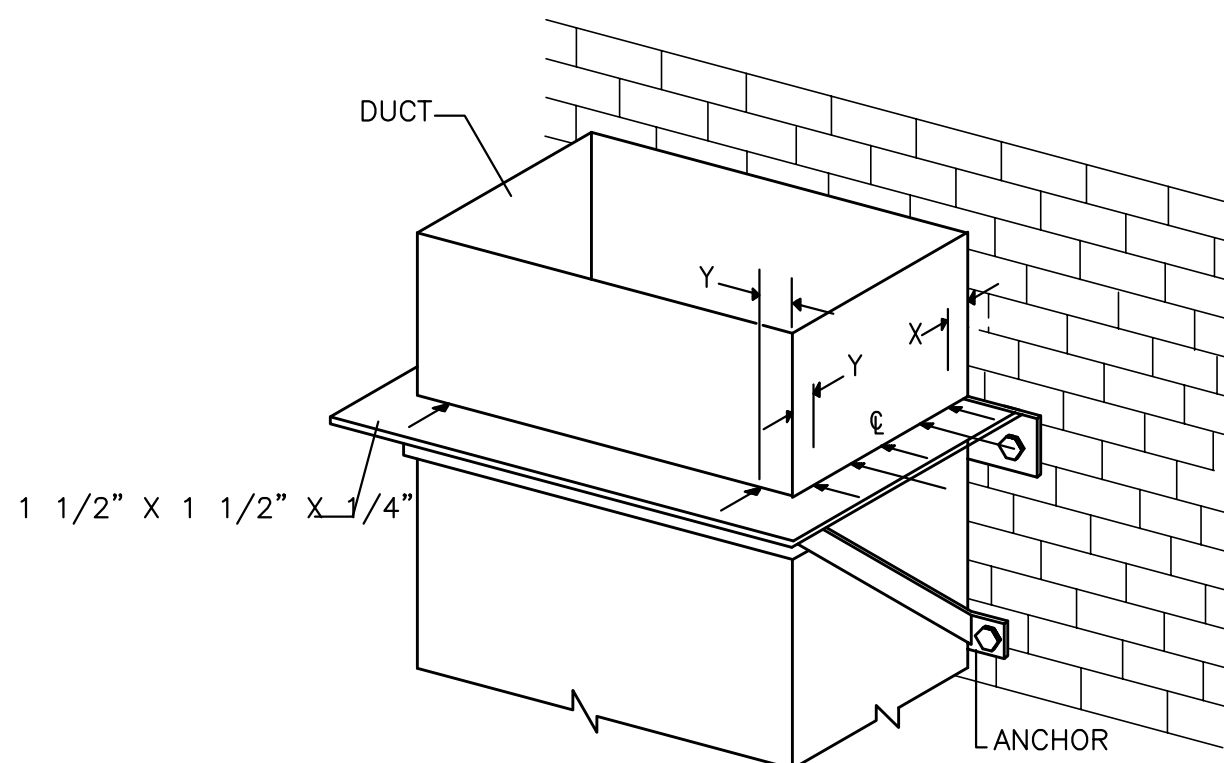
NOT TO SCALE



NOTE: IF REFRIGERANT LINES ARE REQUIRED TO PENETRATE THE EXTERIOR WALL HIGHER THAT 24" ABOVE GRADE  
THE MECHANICAL CONTRACTOR SHALL ROUTE PIPING UP EXTERIOR WALL AND SHALL PROVIDE AND INSTALL AN  
EASILY REMOVABLE GALVANIZED STEEL COVER OVER PIPING AS REQUIRED. COVER SHALL BE PAINT GRIP GRADE.  
COVER SHALL BE PAINTED TO MATCH EXTERIOR WALL COLOR. ANCHOR COVER TO BOLT/FASTEN HEAT PUMP TO  
CONCRETE PAD WITH ALL GALVANIZED HARDWARE.

### HEAT PUMP ON GRADE MOUNTING DETAIL

NOT TO SCALE



DUCT GAGE	ALLOWABLE LOAD PER FASTENER
25, 22, 20	35 lb
18, 16	50 lb

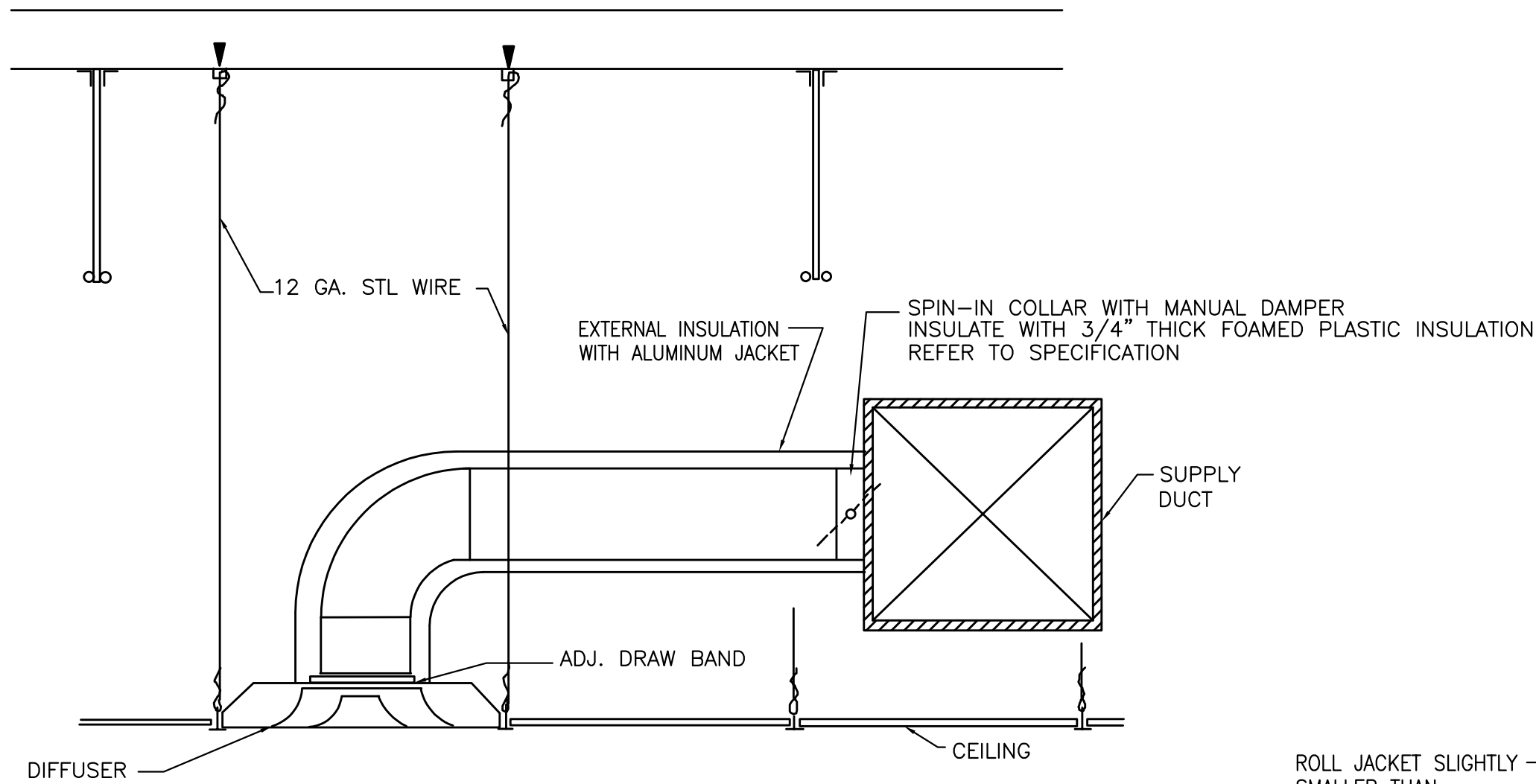
WELD, BOLT OR NO. 8 SCREW (MIN.). DEVIATION PERMITTED BY OTHER  
ANALYSIS. X = 1", Y = 2", ADD OTHERS TO ACCOMMODATE LOAD. MINIMUM  
OF 3 ON 24" WIDTH AND UP. ADD ALONG SIDES NEAREST ANCHORS.

NOTES:

- BRACKETS ARE SIZED FOR 12 FEET OF DUCT, MAXIMUM.
- LOCATE DUCTS AGAINST WALL OR MAXIMUM OF 2" AWAY FROM WALL.
- EACH WALL ANCHOR SHALL SATISFY THE FOLLOWING CRITERIA UNLESS  
OTHER ANALYSIS IS MADE:  
A. TENSILE LOAD =  $\frac{3}{8}$  X DUCT WEIGHT; SAFTY FACTOR OF 4.  
B. SHEAR LOAD X  $\frac{1}{2}$  X DUCT WEIGHT; SAFETY FACTOR OF 4.

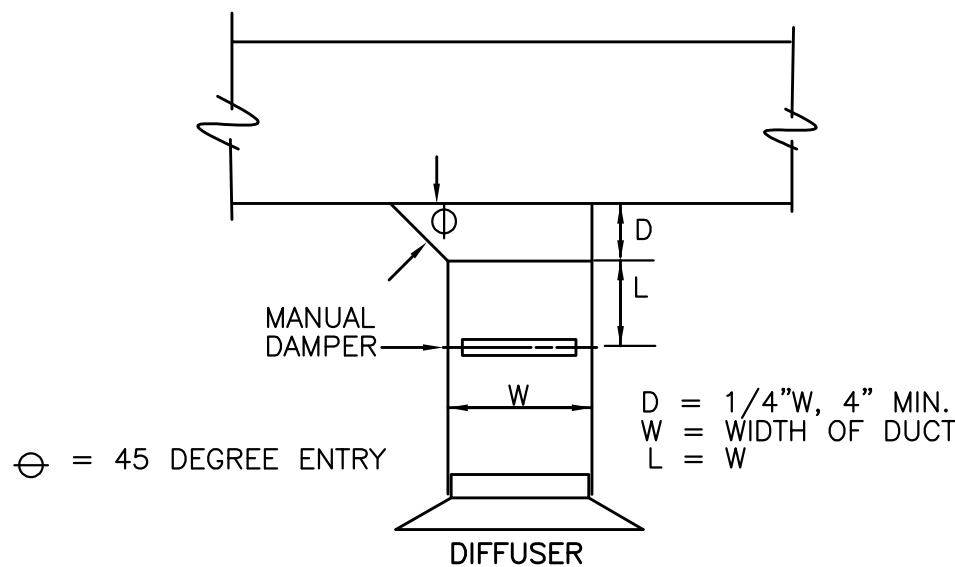
### DUCT SUPPORT FROM WALL

NO SCALE



### TYPICAL CEILING DIFFUSER DETAIL

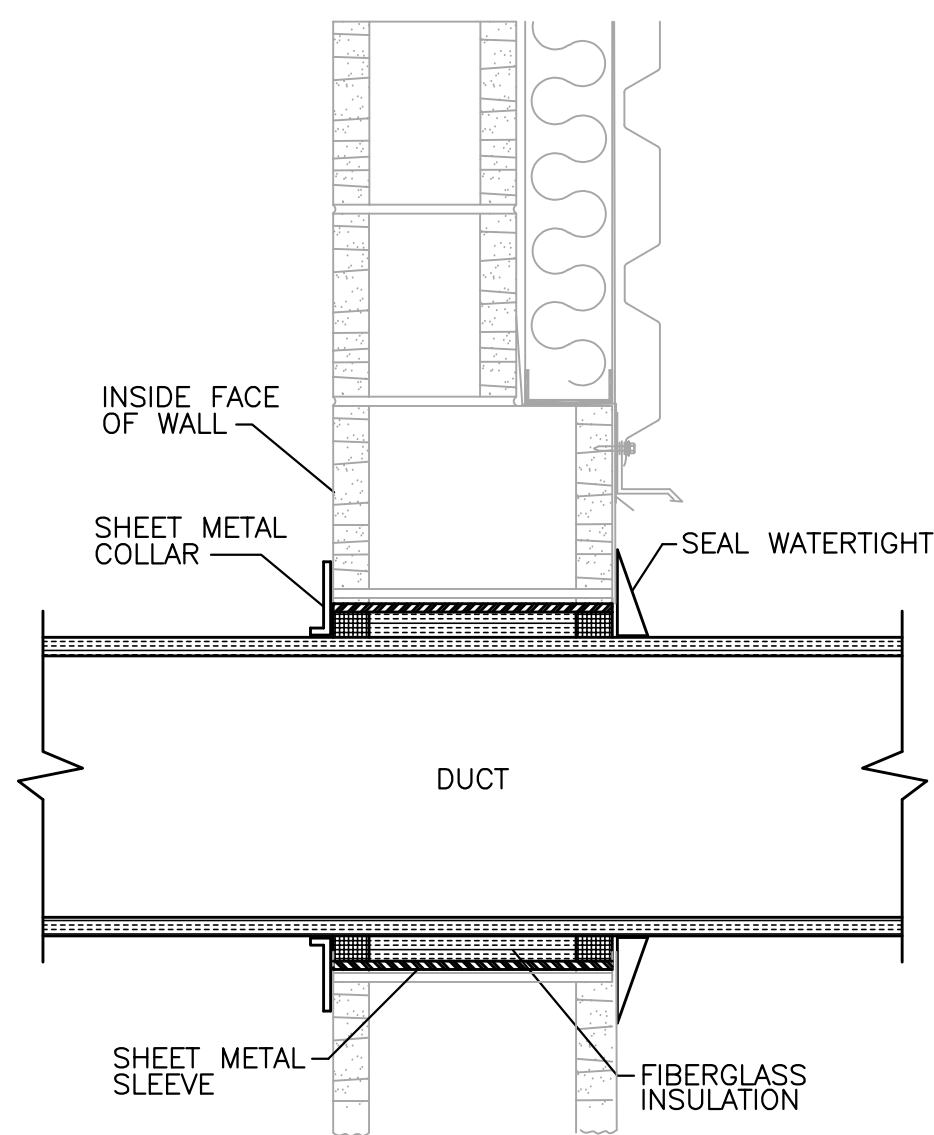
NO FLEX. EXTERNAL INSULATION WITH ALUMINUM JACKET  
NO SCALE



NOTE:  
USE THIS DETAIL FOR ALL REGISTERS AND DIFFUSERS WITH RECTANGULAR DUCT  
CONNECTIONS AND SUFFICIENT SPACE FOR INSTALLATION OF THE 45 DEGREE TAP  
AND MANUAL DAMPER AS SHOWN. OTHERWISE SEE "DUCT CONN. AT SUPPLY REGISTER".

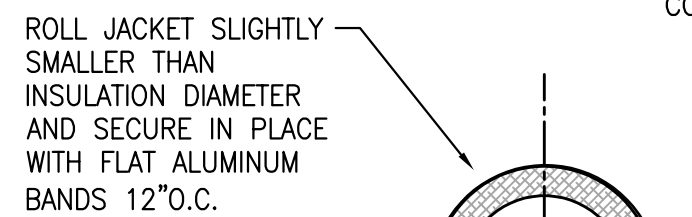
### REGISTER, GRILLE, OR DIFFUSER DUCT CONNECTION

NO SCALE



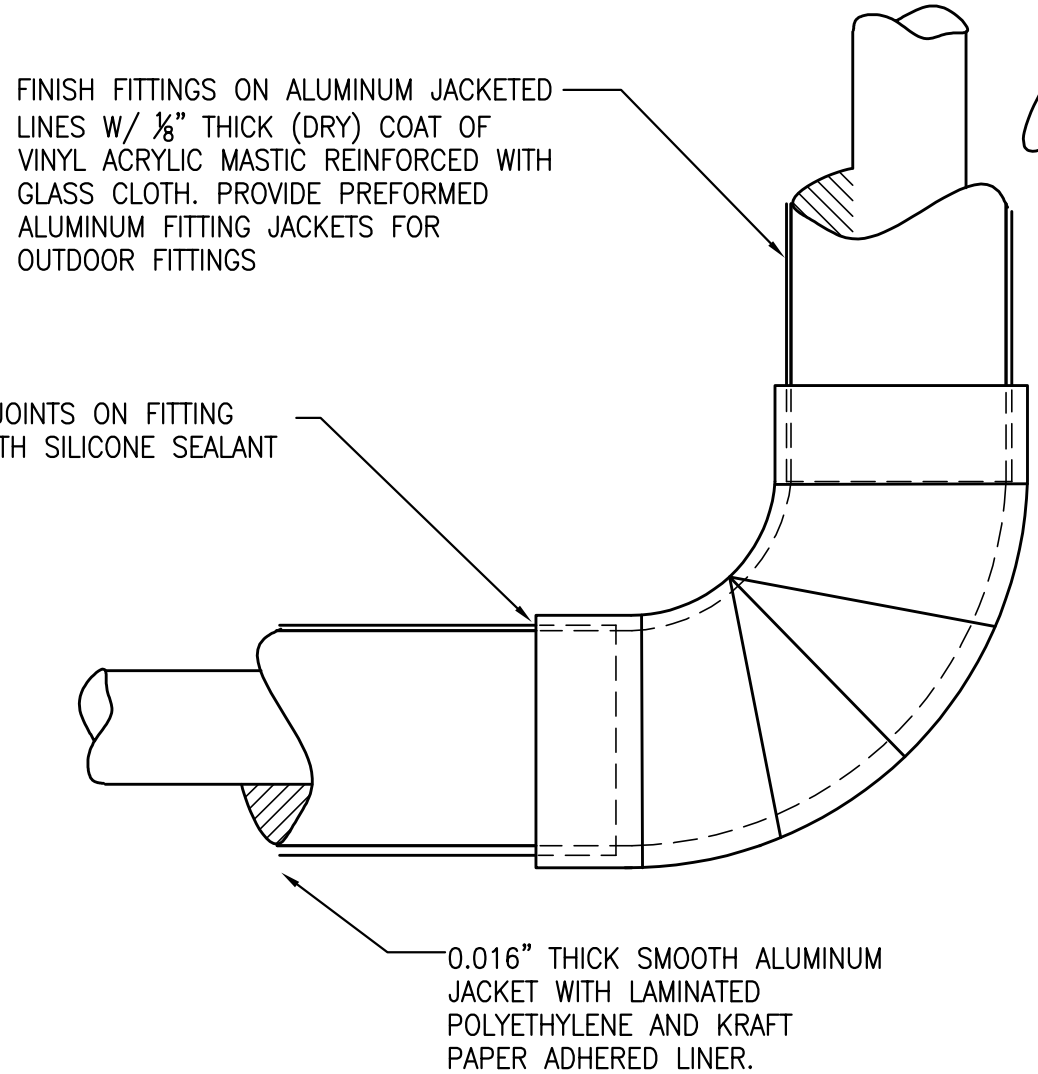
### DUCT SLEEVE FOR OUTSIDE WALL PENETRATION

NO SCALE



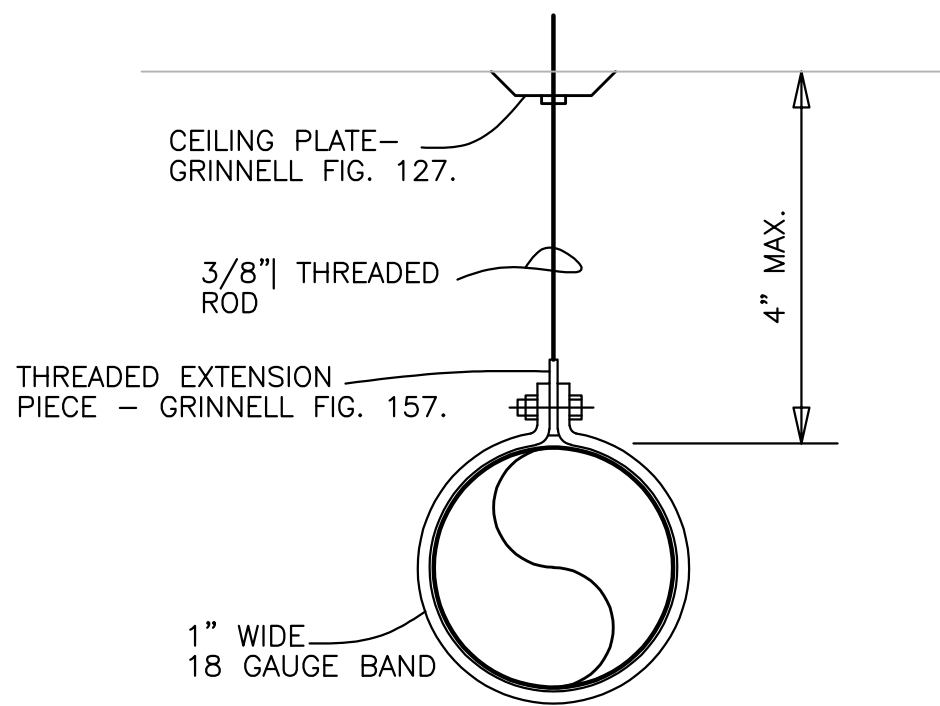
LAP JACKET MINIMUM  
2" AND PLACE  
OVERLAP AT  $\pm 120^\circ$   
ARRANGED TO SHED  
WATER.

SEAL ALL JOINTS ON FITTING  
COVERS WITH SILICONE SEALANT



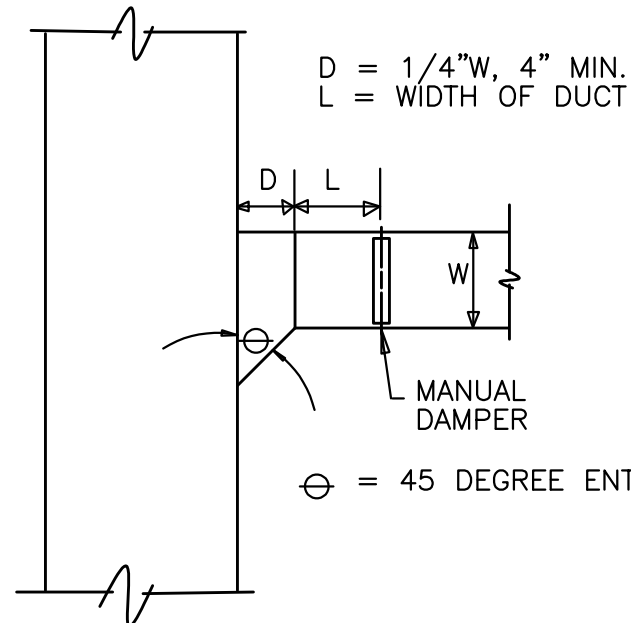
### REFRIGERANT PIPING ALUMINUM JACKET DETAIL

NOT TO SCALE



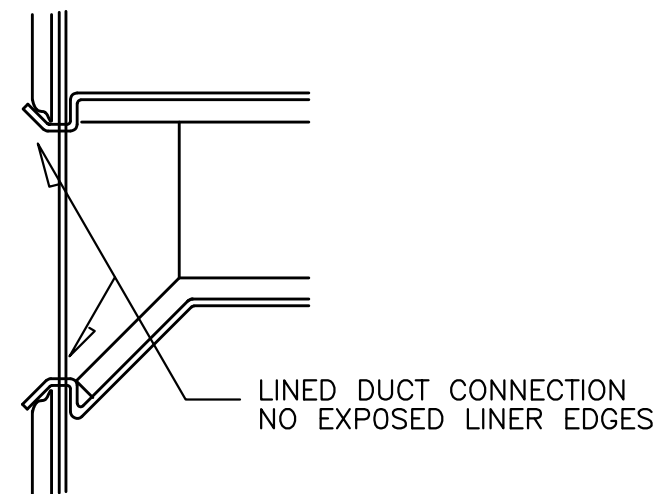
### DUCT HANGERS

NO SCALE

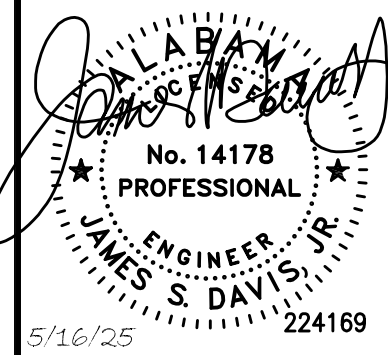


### DUCT BRANCH CONNECTION

NO SCALE



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BY	DESCRIPTION
#	DATE

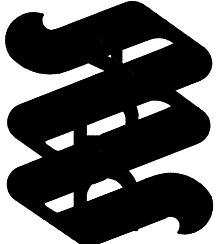


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224169

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MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

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Fax (205) 251-8506



SHEET TITLE  
HVAC  
DETAILS

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DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M7	8 OF 19



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Mark: ERU-1  
Model: VXC-212-FH-17.5I-J-C2

#### Factory Controller Sequence of Operation

**FACTORY CONTROLLER:** Controller shall be provided with required sensors and programming for rooftop unit. Controller shall be factory programmed, mounted and tested. Controller shall have a LCD readout for changing set points and monitoring unit operation.

#### UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G):

- Factory mounted and wired outdoor air damper actuator is powered
- Exhaust fan starts after a (adj.) delay.
- Supply fan starts after a (adj.) delay.
- Tempering options and energy core option to function as described below.

#### UNIT STOP COMMAND (OR DE-ENERGIZED):

- Supply fan, exhaust fan and tempering options de-energized.
- Outdoor air damper actuator is spring return close.

**OCCUPIED/UNOCCUPIED MODES:** Shall be based on a 7-day time clock internal to the controller. The schedule shall be set by the end user. When a user initiates an override input, the controller will switch from unoccupied to occupied mode. The controller will return to the scheduled occupied/unoccupied mode after the override time has expired. If internal time clock is disabled, a remote contact or a BMS can control the occupied/unoccupied mode.

#### Occupied Mode:

- Damper control per below.
- Exhaust fan ON.
- Supply fan ON.
- Heating per below.
- Cooling per below.

#### Unoccupied Mode (Unit Off):

- Unit remains off when in unoccupied mode.
- Supply fan OFF
- Exhaust fan OFF
- Tempering OFF
- Outdoor air damper closed.

**MORNING WARMUP/COOL DOWN:** Prior to occupancy, the unit will run using the warmup or cool down sequence until the occupied set point is achieved. The heating or cooling mode must not be locked out and the space temperature is below or above set point by the unoccupied hysteresis (adj.) (This Sequence must be field configured.)

**SUPPLY BLOWER SEQUENCE:** The supply blower is provided with a factory mounted variable frequency drive. The supply blower speed will be controlled with the following sequence. Minimum supply fan turndown is 50% of the design maximum operation.

**BMS Control:** The supply blower is modulated based upon a command from the Building Management System. (This Sequence must be field configured.)

**EXHAUST BLOWER SEQUENCE:** The exhaust blower will operate at a constant speed set point (adj.) during operation.

**BMS Control:** The exhaust blower is modulated based upon a command from the Building Management System. (This sequence must be field configured.)

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Mark: ERU-1  
Model: VXC-212-FH-17.5I-J-C2

**COOLING SEQUENCE:** The cooling is controlled to maintain the supply temperature set point. The mechanical cooling will be locked out when the outside air is < 55 F (adj.).

**Packaged DX Cooling (Inverter Scroll):** The controller will provide a modulating signal for cooling. From 0-100%, the inverter scroll will be controlled to maintain discharge temperature. The electronic expansion valve will modulate to maintain 8 of superheat.

**Modulating Hot Gas Reheat Sequence:** During dehumidification the modulating HGRH is controlled to maintain the supply temperature set point.

**Modulating Head Pressure Control:** Lead condenser fan will have an EC motor and will modulate to maintain a head pressure set point.

**REHEAT SEQUENCE:** While the unit is in dehumidification mode the outdoor air will be reheated via Modulating Hot Gas Reheat for space neutral applications.

**Modulating Hot Gas Reheat:** The controller will modulate the hot gas reheat reheat valve with a 0-10 V signal to maintain the supply temperature set point (adj.).

**HEATING SEQUENCE:** The heating is controlled to maintain the supply temperature set point. The heating will be locked out when the outside air is > 80 F (adj.).

**Indirect Gas Furnace:** The controller will modulate the indirect gas furnace to maintain the supply temperature set point (adj.).

**TEMPERATURE CONTROL SEQUENCE:** The unit will maintain the supply air discharge setpoint per the following. Adjustable locally or by BMS.

**Supply Discharge Temperature Control:** The supply setpoint will be a constant temperature setpoint from the controller (adj.). Adjustable locally or by BMS.

**BUILDING FREEZE PROTECTION:** If the supply air temperature drops below 35 F (adj.) for 300s (adj.), the controller will de-energize the unit and activate the alarm output.

**TEMPERATURE PROTECTION:** The controller will enable the supply fan to modulate down to help the unit keep up with heating demand in the event of wheel failure or the unit operating outside design conditions. (This can be enabled under the manufacturer menu in the controller)

**UNIT LEAK DETECTION AND MITIGATION:** The unit will be equipped with refrigerant leak detection sensors. These sensors along with the following sequence of operation are required per UL60335-2-40.

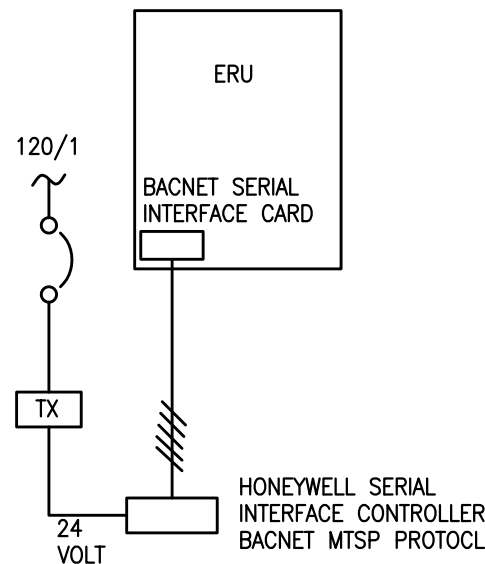
**Refrigerant Leak Detected In Air Tunnel:** If a refrigerant leak is detected in the air tunnel, the supply fan will operate at minimum airflow requirement, the outside air damper will open, powered exhaust fan will operate based on configured sequence, and compressors are disabled to reduce leakage rate. This operation is required in order to move stagnant refrigerant from within the unit, duct, and space ensuring proper dilution of the refrigerant. This operation is required even if the unit is called to be off. After leak detection is cleared, the unit will go back to normal operation. Exception to this operation is when the unit is receiving an active fire alarm signal at the unit controller. If unit controller is receiving a fire alarm input, the unit will not operate the leak mitigation supply fan sequence.

Dry alarm contacts available to allow the building (by others) to perform external mitigation actions when necessary. These by other external actions include opening of zone dampers in the ductwork, disabling duct

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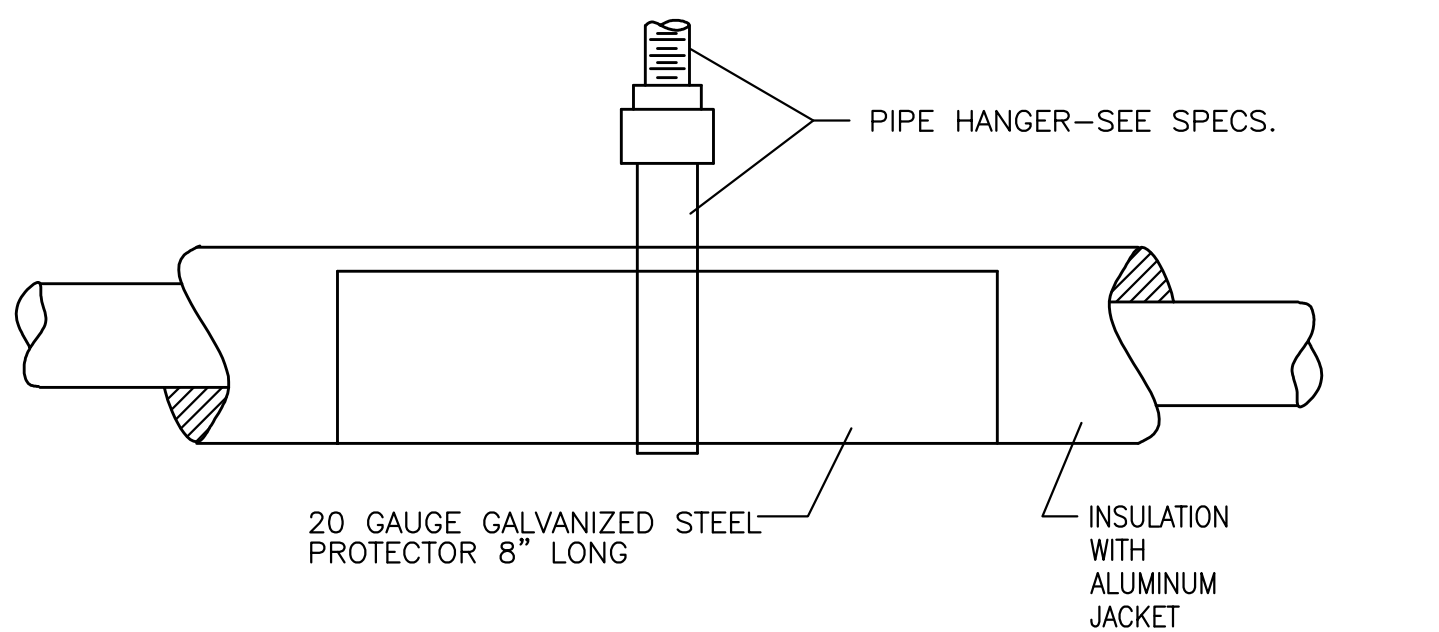


#### MINIMUM POINTS:

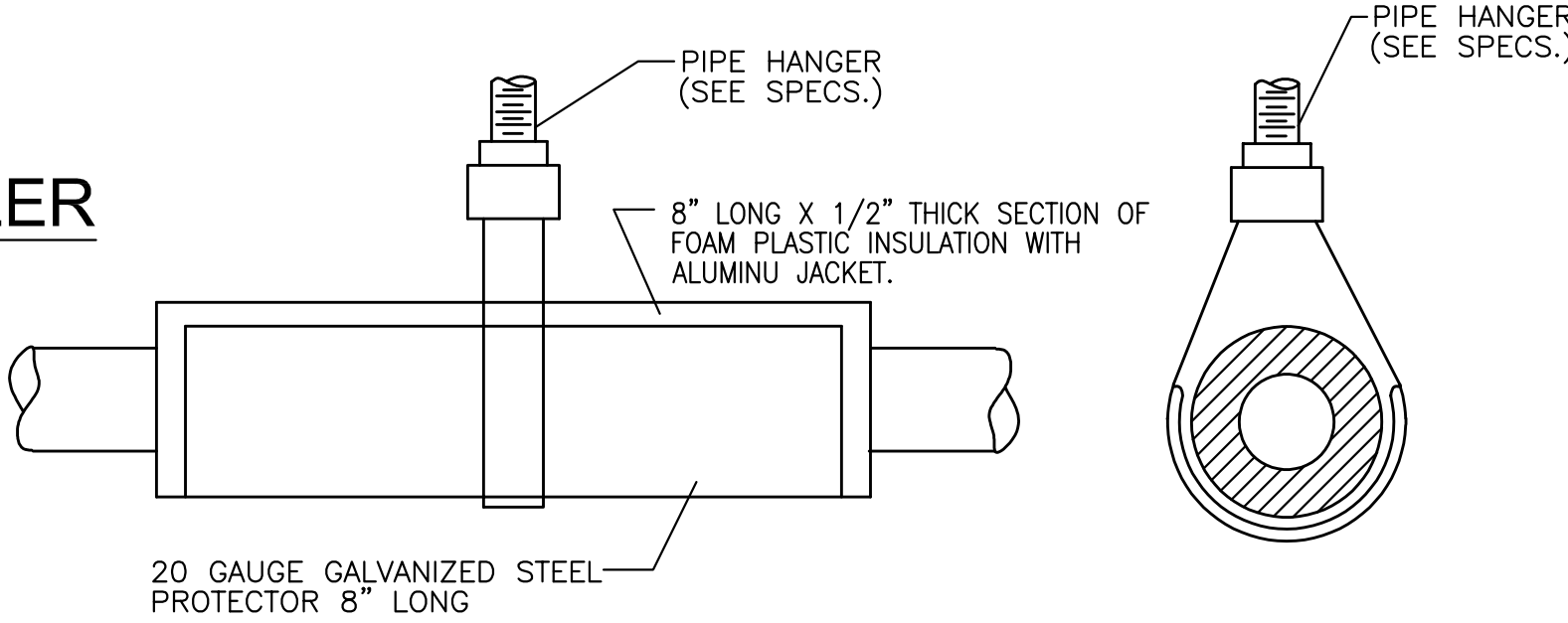
START/STOP (SAF/RLF) FANS  
SUPPLY TEMPERATURE  
RETURN TEMPERATURE  
OUTSIDE AIR TEMPERATURE  
FILTER STATUS  
RETURN HUMIDITY  
ROOM TEMPERATURE  
ROOM TEMPERATURE

## ERU-1 HONEYWELL CONTROLLER

NO SCALE



### INSULATED LINES

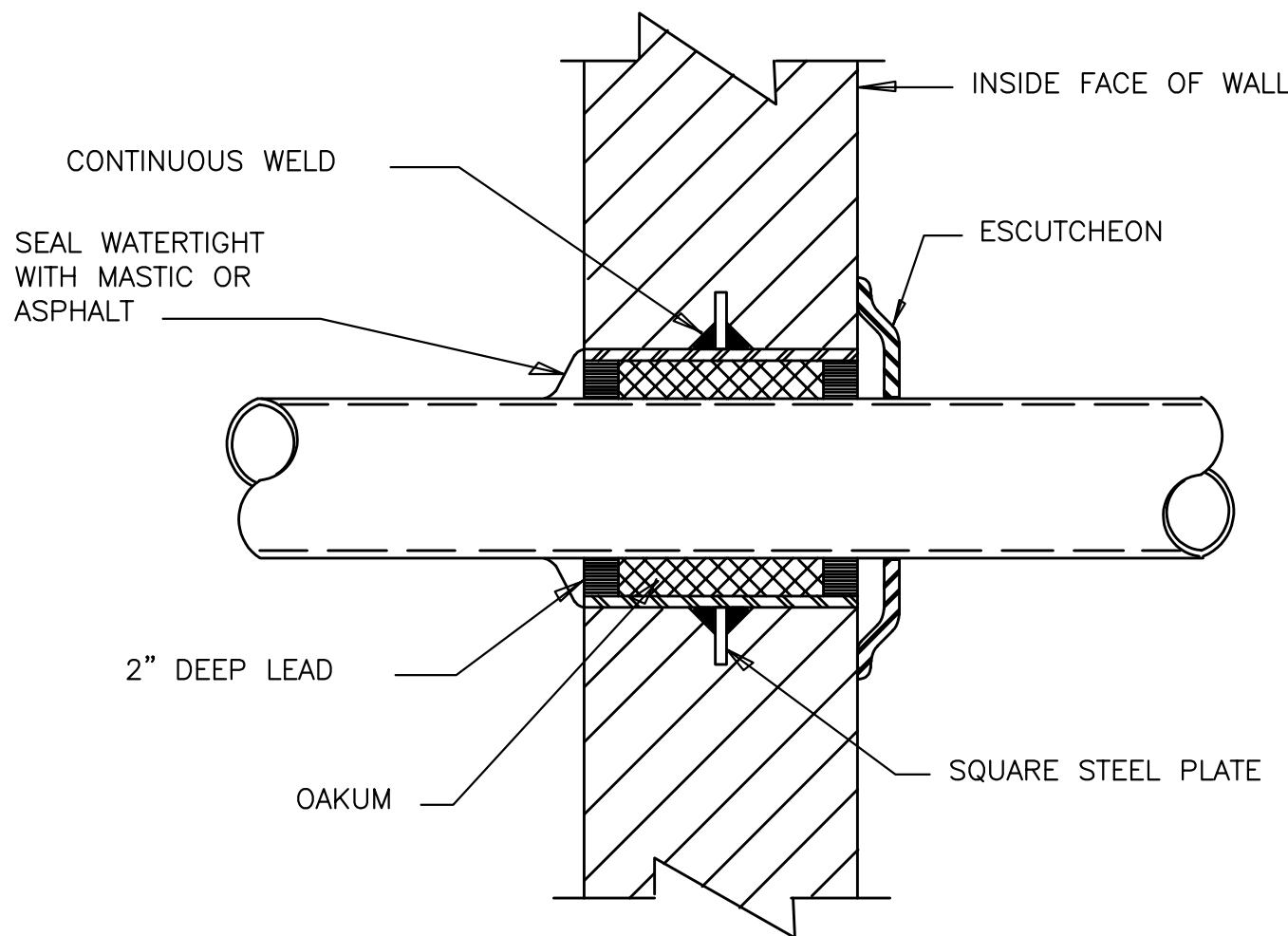


### UNINSULATED LINES

### SECTION

## REFRIGERANT LINES HANGERS

ALL REFRIGERANT PIPING TO HAVE ALUMINUM JACKET OVER INSULATION  
NO SCALE



## PIPE SLEEVE FOR OUTSIDE WALL ABOVE OR BELOW GRADE

NO SCALE



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Model: VXC-212-FH-17.5I-J-C2

mounted electric resistance heaters, and/or enabling additional mechanical ventilation if required per ASHRAE 15.

**Refrigerant Leak Detected In Compressor Compartment:** If a refrigerant leak is detected in the compressor compartment and the unit is configured with an indirect gas furnace, the furnace will be disabled while leak detection is active. After leak detection is cleared, the unit will go back to normal operation.

**ALARMS INDICATION:** The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

**Building Management System:** The controller will send all alarms to the BMS.

**Supply and Exhaust Air Alarm:** The controller monitors the proving switch on each blower and sends an alarm in the case of either blower proving switch not engaging.

**DX Alarm:** The controller monitors the refrigerant pressure. In the case of low refrigerant pressure the compressors will shut down until refrigerant pressure returns to normal values and the controller will send an alarm. In the case of high refrigerant pressure the compressors will shut down, requiring a manual reset and the controller will send a alarm.

**Temperature Sensor Alarm:** The controller sends an alarm in the case of a failed air temperature sensor.

**ACCESSORIES:** The following accessories will be included with the unit to expand the functionality or usability of the controller.

**BMS Interfacing:** A BMS port or BACNET mstp serial card is provided with the controller for field interfacing with a building management system. Each card is sent out with the default parameters, and the controls contractor must change the appropriate addresses to match the BMS settings.

**Phase and Brownout Protection:** Factory mounted and wired component which monitors the main power coming into the unit. If a phase drops out, or if the incoming voltage exceeds the acceptable range, the component will turn off the unit to help protect the electrical systems.

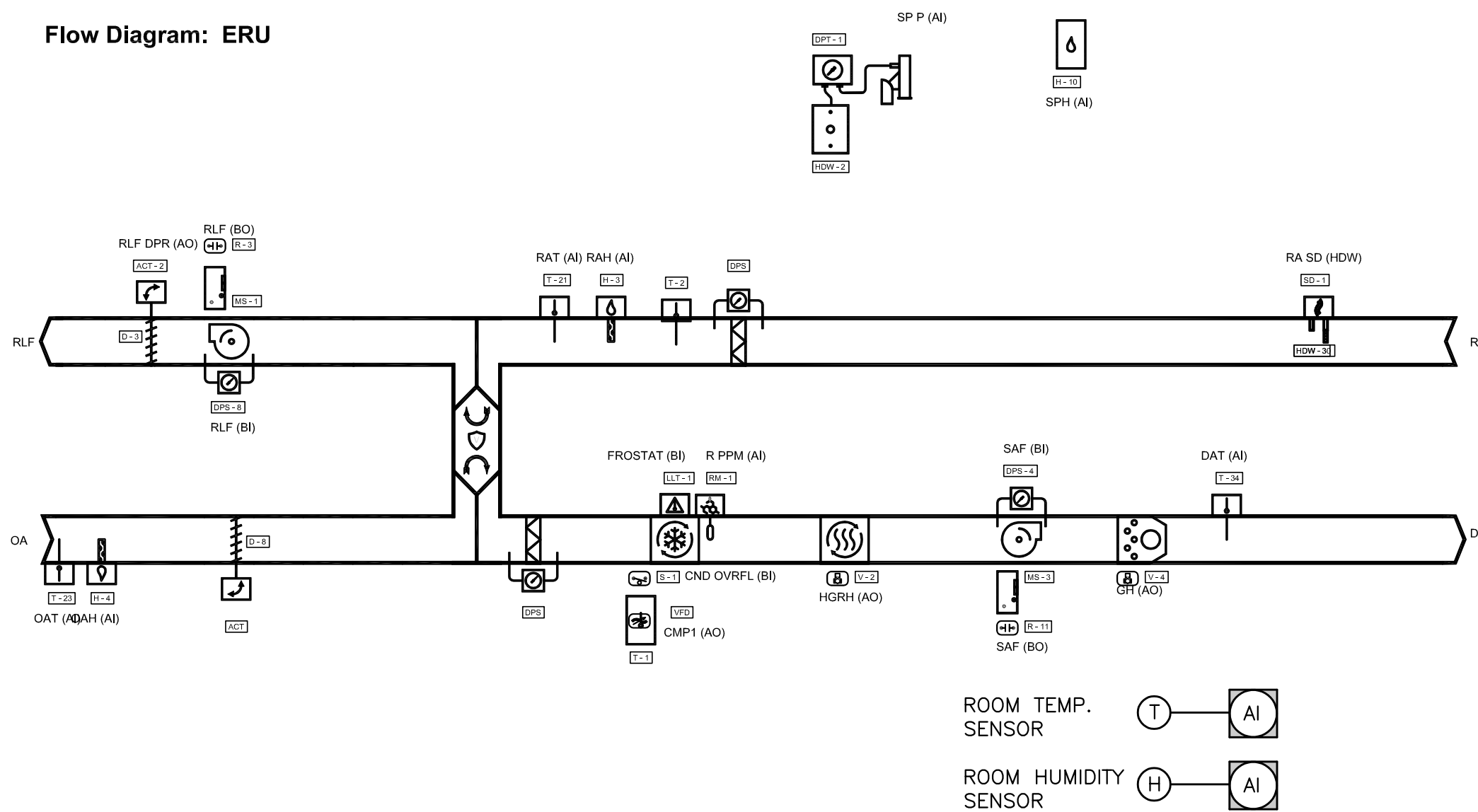
**Damper End Switch:** Damper end switched will be provided to ensure the supply and exhaust fans do not enable until the dampers are proven open.

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#### Flow Diagram: ERU

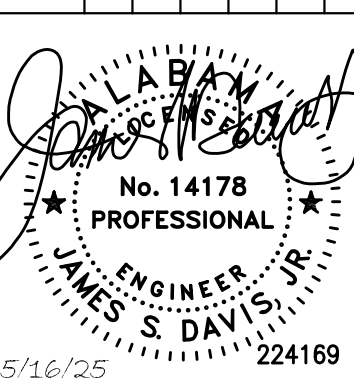


## ERU-1 FACTORY CONTROL SEQUENCE OF OPERATIONS

NO SCALE

#### REVISIONS

BY	DESCRIPTION	DATE

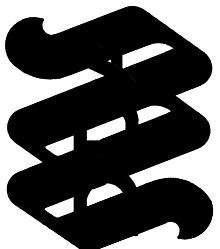


5/16/25

224169

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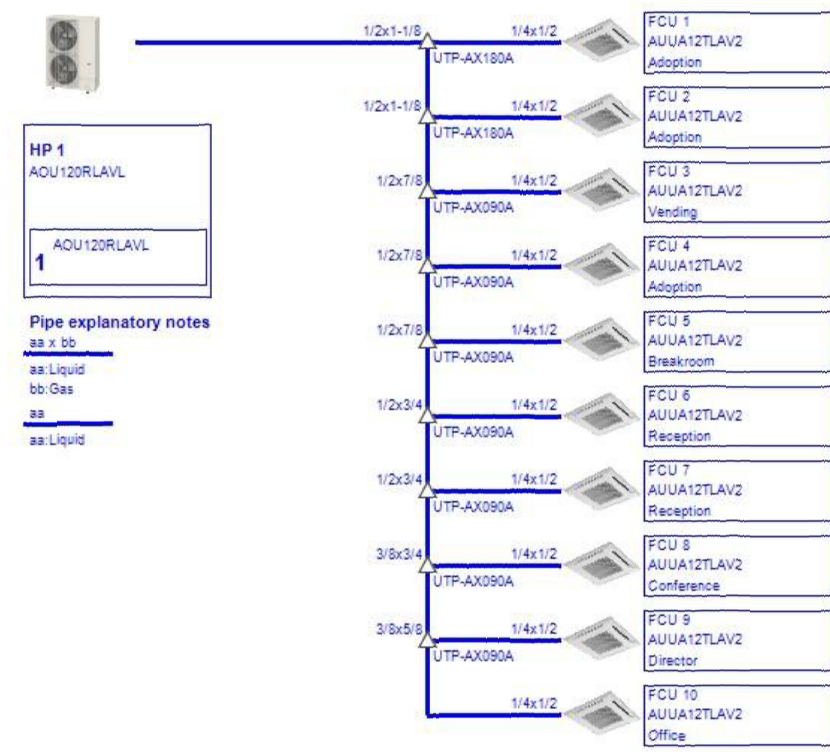
SHEET TITLE  
HVAC  
DETAILS

DRAWN BY JAG	CHECKED BY JSD
DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M8	9 OF 19



AIRSTAGE

4.Piping Diagrams  
4.1.Piping HP 1 (VRF system)

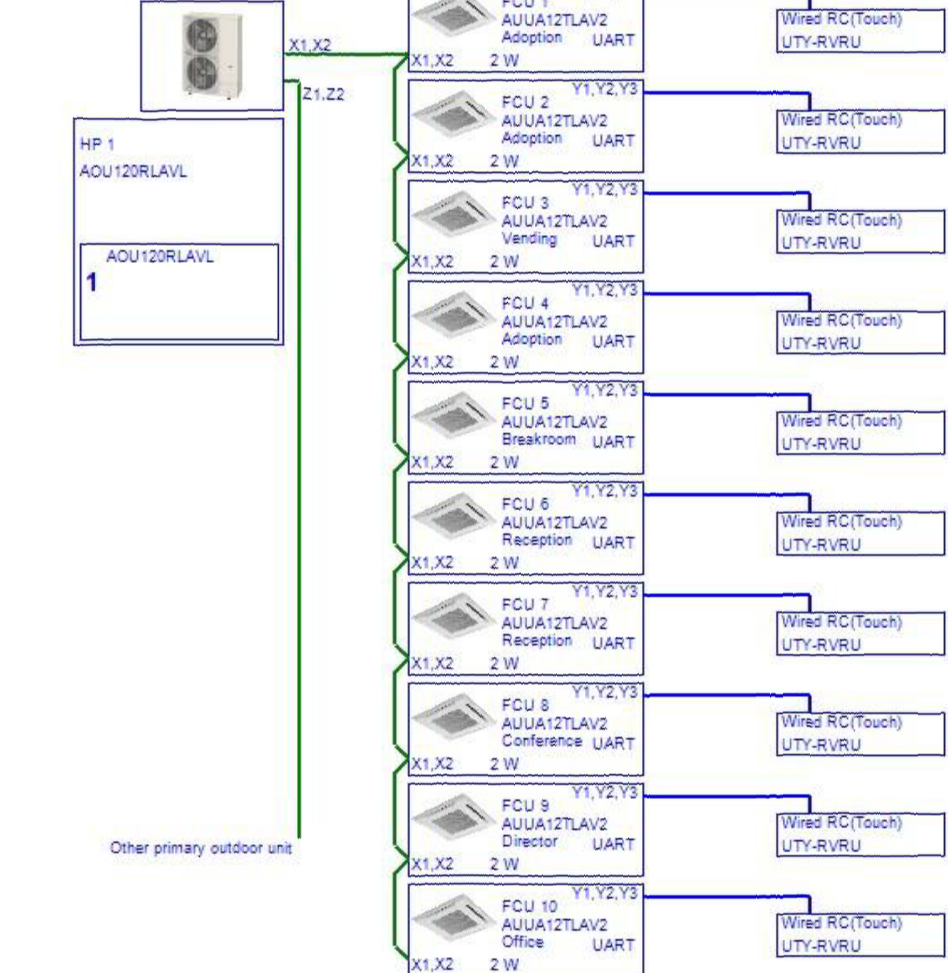


Refrig in OU (factory) R410A(lbs)	24.3	Add Refrig (extra OU) R410A(lbs)	0.0	Add Refrig (piping) R410A(lbs)	0.0	Total Refrig R410A(lbs)	24.3
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\*System refrigerant piping lengths required to confirm additional refrigerant charge. Please refer to Design & Technical and Installation manual for calculation method or input all pipe lengths in the piping design within Design Simulator.

AIRSTAGE

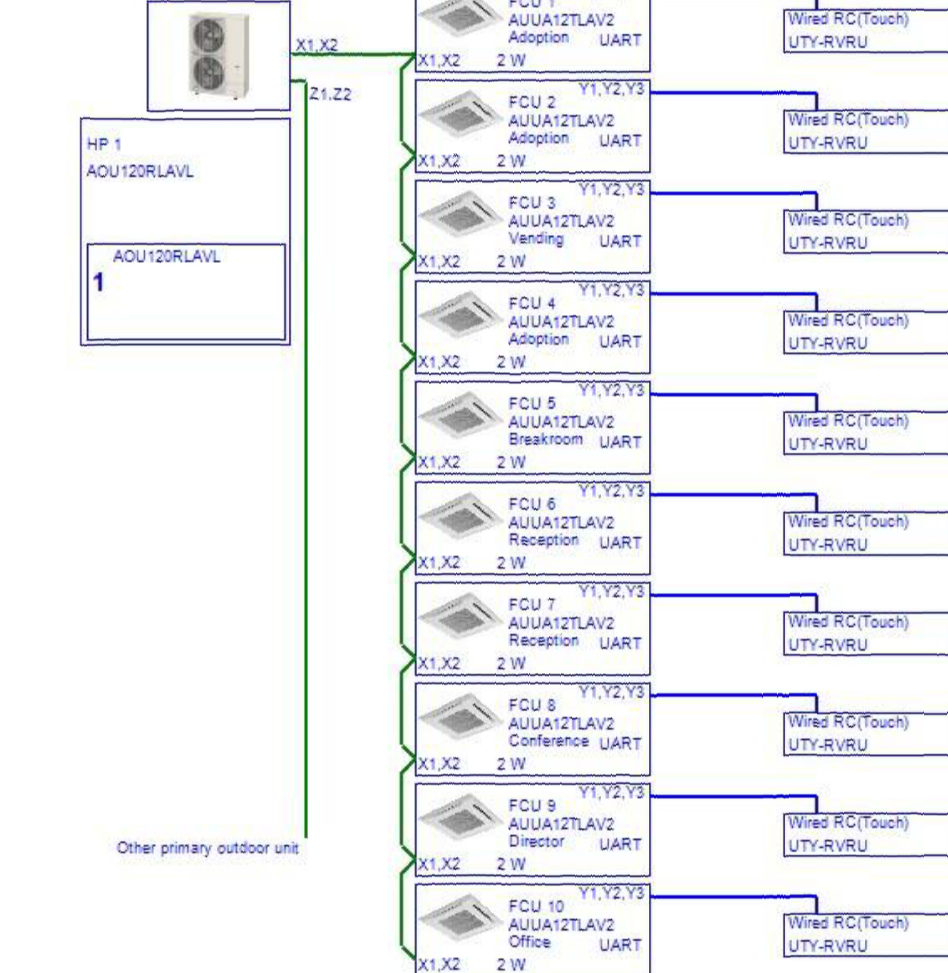
5.Wiring Diagrams  
5.1.Wiring HP 1 (VRF system)



Transmission line  
Size: 0.35mm²(22AWG)  
Wire type: LEVEL 4 (R410A) non-polar 2-core twisted pair solid core diameter 0.65mm  
Remarks: LONWORKS compatible cable  
Remote controller line  
Size: 0.33-1.25mm²(22-16AWG)

AIRSTAGE

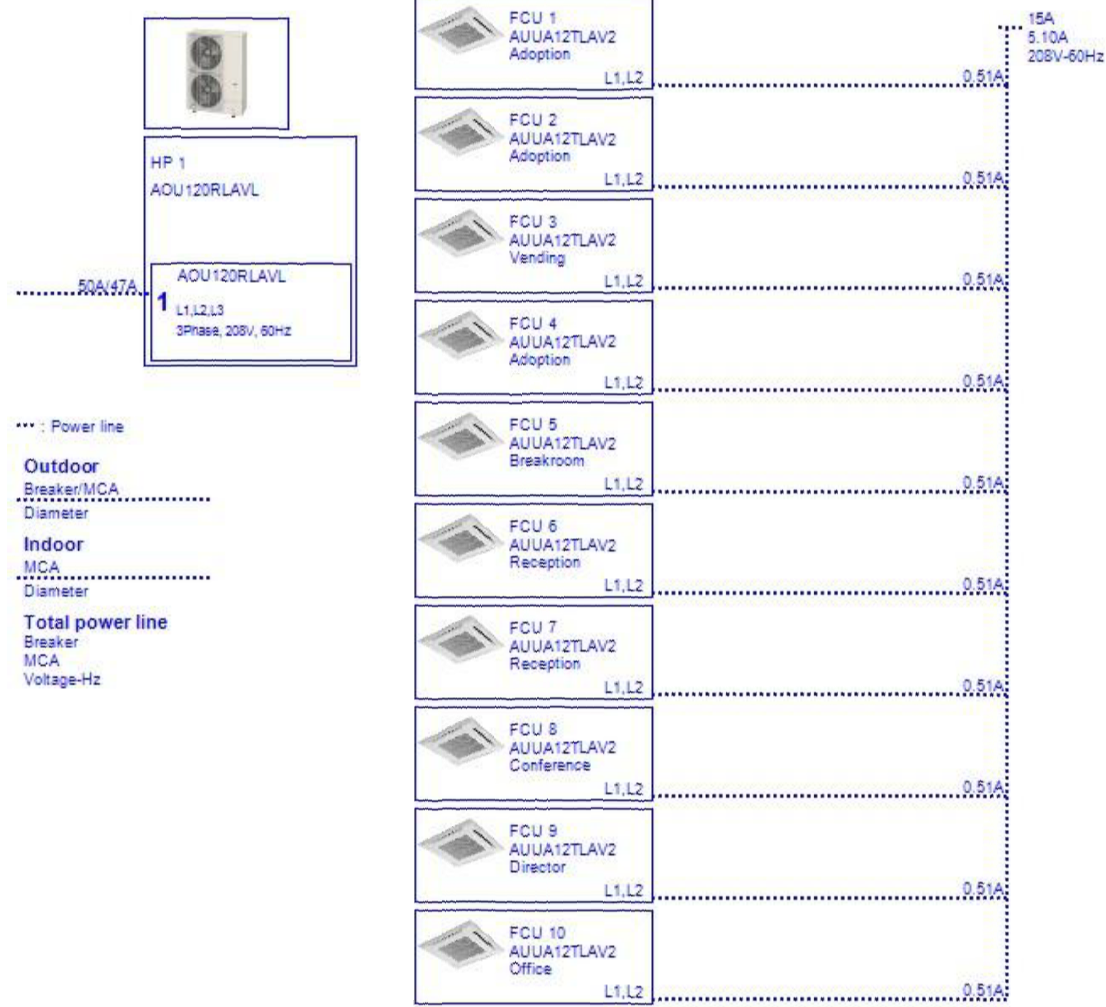
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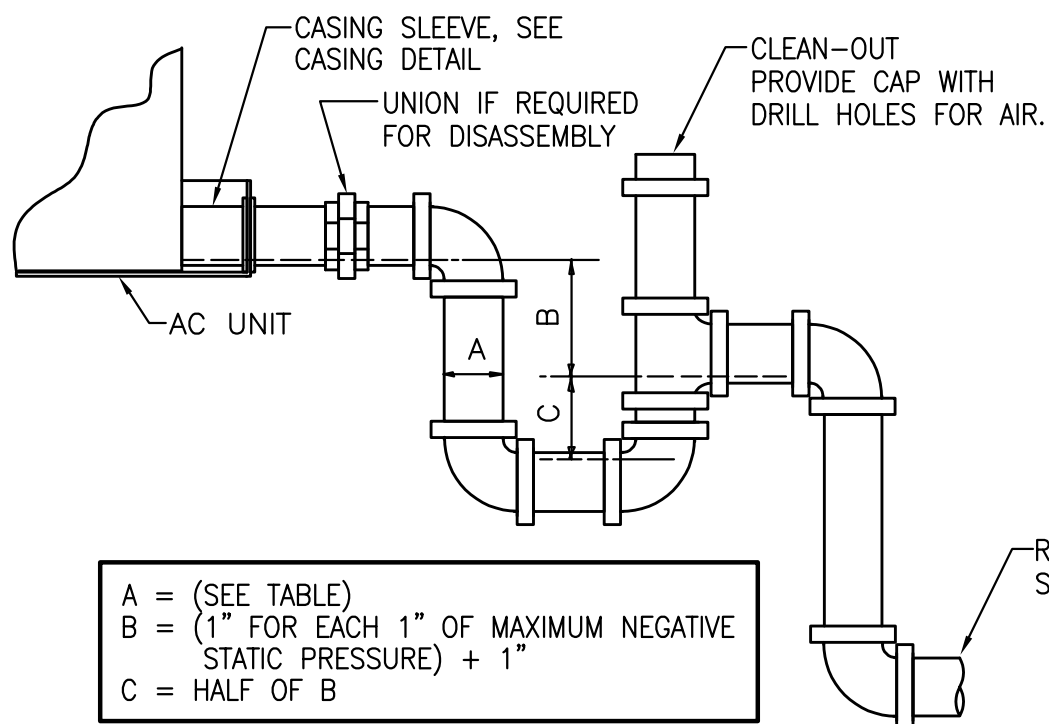
5.2.Wiring HP 1 (VRF system)



Regulation of wire size and circuit breaker differs from each locality, please refer to local rules.

VRF PIPING AND WIRING DIAGRAMS

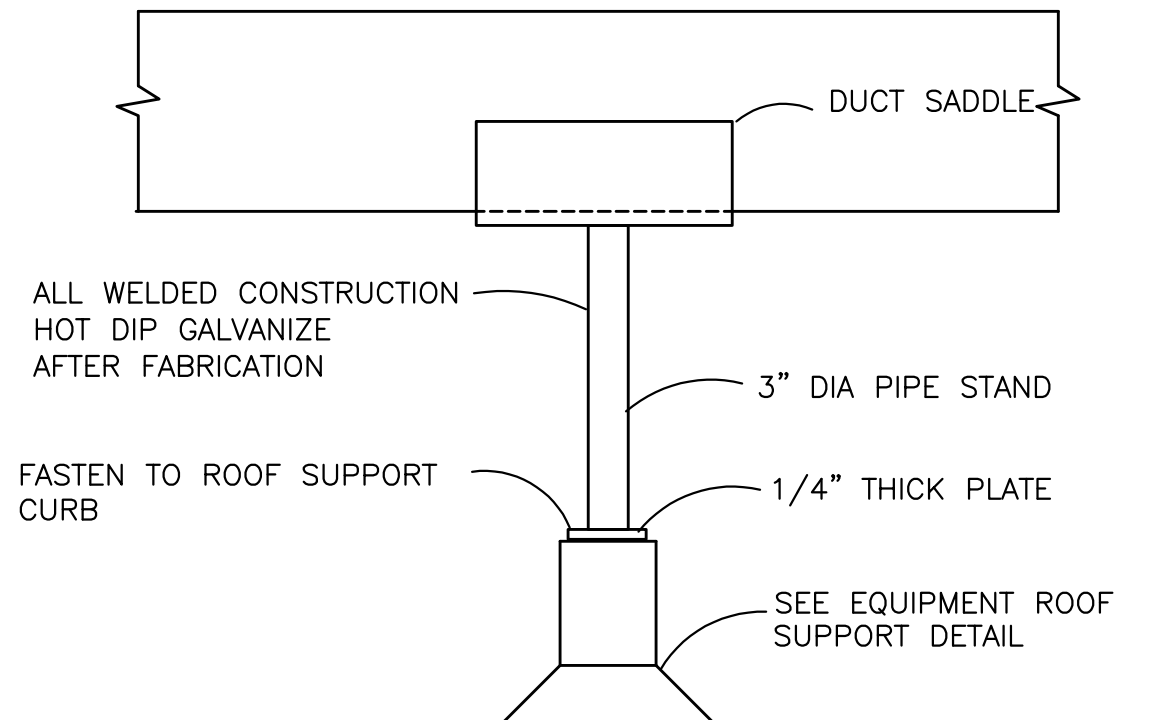
NO SCALE



AC UNIT DRAIN TRAP

NOT TO SCALE

AC TONS	MIN. DRAIN SIZE
0 TO 20	1"
21 TO 40	1-1/4"
41 TO 60	1-1/2"
61 TO 100	2"
101 TO 250	3"
251 & LARGER	4"

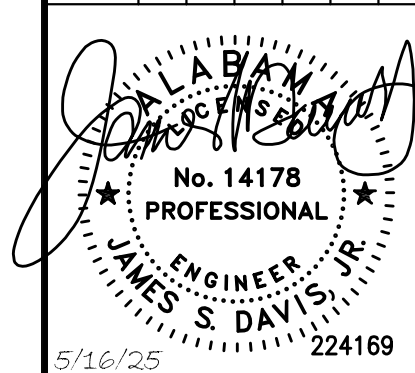


GROUND DUCT SUPPORT DETAIL

NO SCALE

REVISIONS

BY	DESCRIPTION	DATE

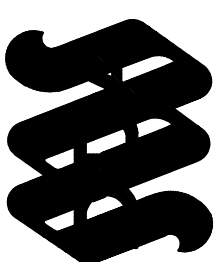


5/16/25

224169

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

MW / Davis Dumas & Assoc., Inc.  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Birmingham, AL 35244  
Phone (205) 252-0246  
Fax (205) 251-8506



SHEET TITLE  
HVAC  
DETAILS

DRAWN BY	CHECKED BY
JAG	JSD
DATE	MAY 16, 2025
JOB NUMBER	224169
SHEET NUMBER	10
M9	OF 19



SECTION 230500 - GENERAL PROVISIONS - HVAC

PART 1 - GENERAL

1. SCOPE:

- A. PROVISIONS OF THIS SECTION APPLY TO ALL HEATING, VENTILATING, AND AIR CONDITIONING (HVAC), CONTROLS, AND TEST AND BALANCE WORK.
- B. INCLUDE THE PROVISIONS OF GENERAL CONDITIONS AS PART OF THIS SECTION.
- C. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICES NECESSARY FOR THE COMPLETION OF ALL HVAC WORK SHOWN OR SPECIFIED, COMPLETE AND READY FOR OPERATION, CONSISTING IN GENERAL OF THE FOLLOWING:

1. REMOVAL OF EXISTING HVAC SYSTEM.
2. NEW HVAC SYSTEM.
- a. VRF HEAT PUMP SYSTEM.
- b. ENERGY RECOVERY AND VENTILATION SYSTEM.

D. GIVE REQUIRED NOTICES, FILE DRAWINGS, OBTAIN AND PAY FOR PERMITS, DEPOSITS AND FEES NECESSARY FOR THE INSTALLATION OF THE HVAC WORK. OBTAIN AND PAY FOR INSPECTIONS REQUIRED BY LAWS, ORDINANCES, RULES, REGULATIONS OR PUBLIC AUTHORITY HAVING JURISDICTION, OBTAIN AND PAY FOR CERTIFICATES OF SUCH INSPECTIONS, AND FILE SUCH CERTIFICATES WITH OWNER.

E. "PROVIDE" MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR OPERATION.

1.2 USE OF BUILDING SYSTEMS FOR TEMPORARY HEAT/AIR CONDITIONING DURING CONSTRUCTION:

A. BUILDING HVAC SYSTEMS SHALL NOT BE USED DURING CONSTRUCTION UNLESS THE FOLLOWING CONDITIONS ARE MET:

1. EQUIPMENT SPECIFIED HEREINAFTER TO HAVE FACTORY SUPERVISED START-UP SHALL HAVE HAD SUCH START-UP.
2. ALL RETURN AIR AND OUTSIDE AIR OPENINGS SHALL HAVE TEMPORARY FILTER MEDIA INSTALLED OVER INLET SIDE OF OPENINGS AND SECURED AIR TIGHT THERE-TO.
3. AIR FILTERS OF QUALITY SPECIFIED FOR ULTIMATE USE SHALL BE INSTALLED IN THE AIR HANDLING UNITS.
4. MOTORS SHALL HAVE CORRECT OVERLOAD ELEMENTS INSTALLED IN THE STARTERS.
5. ALL SAFETY CONTROLS SHALL BE IN OPERATION.
- B. CONTRACTOR SHALL TURN SYSTEM OVER TO OWNER IN CONDITION EQUAL TO THAT WHICH WOULD HAVE OCCURRED IF THE SYSTEMS HAD NOT BEEN USED DURING CONSTRUCTION.

1.3 DRAWINGS:

- A. HVAC DRAWINGS ARE DIAGRAMMATIC AND SUBJECT TO REQUIREMENTS OF ARCHITECTURAL DRAWINGS AND CONDITIONS EXISTING IN THE FIELD. HVAC DRAWINGS INDICATE GENERALLY THE LOCATION OF COMPONENTS AND ARE NOT INTENDED TO SHOW ALL FITTINGS OR ALL DETAILS OF THE WORK.
- B. FOLLOW THE DRAWINGS CLOSELY. COORDINATE DIMENSIONS WITH ARCHITECTURAL DRAWINGS AND FIELD CONDITIONS. DO NOT SCALE HVAC DRAWINGS FOR LOCATION OF SYSTEM COMPONENTS.
- C. MAKE NO CHANGES WITHOUT ARCHITECT'S WRITTEN PERMISSION. IN CASE OF DOUBT, OBTAIN ARCHITECT'S DECISION BEFORE PROCEEDING WITH WORK. FAILURE TO FOLLOW THIS INSTRUCTION SHALL MAKE THE CONTRACTOR LIABLE FOR DAMAGE TO OTHER WORK AND RESPONSIBLE FOR REMOVING AND REPAIRING DEFECTIVE OR MISS-LOCATED WORK IN PROPER MANNER.
- D. DO NOT SCALE DRAWINGS TO LOCATE CEILING DIFFUSERS. COORDINATE WITH LIGHTING AND CEILING GRIDS. CONTRACTOR FOR HVAC WORK IS RESPONSIBLE FOR COORDINATING WITH ALL TRADES.
- E. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY. WORK SHOWN OR SPECIFIED IN ONE IS BINDING AS IF SHOWN OR SPECIFIED IN BOTH. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT FOR CLARIFICATION DURING THE BIDDING PERIOD. NO ALLOWANCE SHALL BE SUBSEQUENTLY MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE BROUGHT SAID DISCREPANCIES TO THE ATTENTION OF THE CONSULTANT DURING THE BIDDING PERIOD OR BY REASON OF ANY ERROR ON THE CONTRACTOR'S PART.
- F. NO ATTEMPT HAS BEEN MADE TO ESTABLISH THE REQUIRED SECTIONS OR SPLITS OF EQUIPMENT RELATIVE TO THE SIZE OF ACCESS INTO THE SPACE, BUILDING, ETC. CONTRACTOR SHALL ESTABLISH ALL SAID SPLITS, SECTIONS, ETC. NECESSARY TO INSTALL EQUIPMENT COMPLETE WITHOUT UNDUE DISASSEMBLY OF EQUIPMENT OR DEMOLITION OF BUILDING PARTS AT SITE OF WORK.

1.4 APPLICABLE CODES AND STANDARDS:

A. COMPLY WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AND STANDARDS:

1. ANSIB31.9 - CODE FOR BUILDING SERVICES PIPING
2. ANSIASHRAE 15 - SAFETY CODE FOR MECHANICAL REFRIGERATION
3. ASHRAE 62.1 - VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY
4. ASHRAE 90.1 - ENERGY COMPLIANCE
5. NFPA 30 - FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE
6. NFPA 54 - NATIONAL FUEL GAS CODE
7. NFPA 70 - NATIONAL ELECTRICAL CODE
8. NFPA 90A - INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS
9. NFPA 101 - SAFETY TO LIFE FROM FIRE IN BUILDINGS AND STRUCTURES
10. OTHER STANDARDS AS REFERENCED IN OTHER SECTIONS OF DIVISION 23
11. 2021 INTERNATIONAL BUILDING CODE
12. 2021 INTERNATIONAL PLUMBING CODE
13. 2021 INTERNATIONAL FUEL GAS CODE
14. 2021 INTERNATIONAL MECHANICAL CODE
15. 2021 INTERNATIONAL ENERGY CONSERVATION CODE

1.5 QUALIFICATIONS OF SUBCONTRACTOR:

A. THE HVAC SUBCONTRACTOR SHALL MEET THE FOLLOWING QUALIFICATIONS:

1. HE SHALL HAVE BEEN IN BUSINESS AS A HVAC CONTRACTOR FOR AT LEAST 3 YEARS PRIOR TO THE DATE OF OPENING BIDS, AND SHALL HAVE HELD A LICENSE FROM THE **ALABAMA** STATE LICENSING BOARD FOR GENERAL CONTRACTORS FOR AT LEAST 3 YEARS.
2. HE SHALL HAVE A SATISFACTORY EXPERIENCE RECORD WITH HVAC INSTALLATIONS OF CHARACTER AND SCOPE COMPARABLE WITH THIS PROJECT, AND FOR AT LEAST 3 YEARS PRIOR TO THE DATE OF OPENING BIDS SHALL HAVE HAD AN ESTABLISHED SERVICE DEPARTMENT CAPABLE OF PROVIDING SERVICE INSPECTION OR FULL MAINTENANCE CONTRACTS.
3. IF THE HVAC SUBCONTRACTOR, WITH THE ENGINEER'S APPROVAL, USES A SUB-SUBCONTRACTOR TO PROVIDE ANOTHER DISCIPLINE THAT THE SUBCONTRACTOR DOES NOT NORMALLY FURNISH, THAT SUB-SUBCONTRACTOR SHALL MEET THE SAME QUALIFICATIONS AS THE SUBCONTRACTOR.

1.6 CONFLICTS AND INTERFERENCES:

A. IF SYSTEMS INTERFERE OR CONFLICT, THE ARCHITECT SHALL DECIDE WHICH EQUIPMENT TO RELOCATE REGARDLESS OF WHICH WAS FIRST INSTALLED.

1.7 WORKMANSHIP:

A. DO ALL WORK IN A NEAT AND FIRST-CLASS MANNER. REMOVE AND REPLACE WORK NOT DONE IN SUCH MANNER AS DIRECTED BY THE ARCHITECT.

1.8 COOPERATION:

A. COOPERATE WITH ALL OTHER CRAFTS. PERFORM WORK IN A TIMELY MANNER. DO NOT DELAY THE EXECUTION OF OTHER WORK.

1.9 VISITING SITE:

A. VISIT SITE AND BECOME FAMILIAR WITH LOCATION AND VARIOUS CONDITIONS AFFECTING WORK PRIOR TO BID. NO ADDITIONAL ALLOWANCE WILL BE GRANTED BECAUSE OF LACK OF KNOWLEDGE OF SUCH CONDITIONS. NO CONSIDERATION SHALL BE GIVEN TO FUTURE CLAIMS DUE TO EXISTING CONDITIONS. ANY DISCREPANCIES OR INTERFERENCES SHALL BE REPORTED IMMEDIATELY TO THE ARCHITECT/CONSULTANT.

1.10 MATERIALS:

- A. UNLESS OTHERWISE NOTED, PROVIDE NEW, STANDARD, FIRST-GRADE MATERIALS THROUGHOUT. **UNLESS OTHERWISE NOTED, ALL PIPE, FITTINGS AND VALVES SHALL BE MADE IN THE UNITED STATES OF AMERICA.**
- B. WHERE MATERIALS OR PRODUCTS ARE SPECIFIED BY MANUFACTURER'S NAME, BRAND, TRADE NAME, OR CATALOG REFERENCE, SUCH NAMED MATERIALS OR PRODUCTS SHALL BE THE BASIS OF THE ESTIMATE, WITHOUT SUBSTITUTION, AND SHALL BE FURNISHED UNDER THE CONTRACT UNLESS REQUESTS FOR EQUIVALENTS ARE APPROVED AS NOTED BELOW. WHERE TWO OR MORE BRANDS ARE NAMED THE CHOICE OF THESE SHALL BE OPTIONAL WITH THE CONTRACTOR.
- C. EQUIVALENTS WILL BE CONSIDERED ONLY IF WRITTEN REQUEST FOR APPROVAL HAS BEEN RECEIVED BY THE ARCHITECT (FROM A GENERAL CONTRACT BIDDER) 10 DAYS PRIOR TO THE DATE ESTABLISHED FOR RECEIPT OF PROPOSALS. EACH REQUEST SHALL INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH AN EQUIVALENT IS PROPOSED AND A COMPLETE DESCRIPTION OF THE PROPOSED EQUIVALENT INCLUDING DRAWINGS, CUTS, PERFORMANCE AND TEST DATA, AND DEVIATION FROM THE SPECIFICATION AND ANY OTHER INFORMATION NECESSARY FOR EVALUATION. A STATEMENT SETTING FORTH ANY CHANGES IN OTHER MATERIALS, EQUIPMENT OR OTHER WORK THAT INCORPORATION OF THE EQUIVALENT MAY REQUIRE SHALL BE INCLUDED. THE BURDEN OF PROOF OF THE MERIT OF THE PROPOSED EQUIVALENT IS UPON THE PROPOSER. THE ARCHITECT'S DECISION OF APPROVAL OR DISAPPROVAL OF A PROPOSED EQUIVALENT IS FINAL.
- D. IF THE ARCHITECT APPROVES ANY PROPOSED EQUIVALENT PRIOR TO RECEIPT OF PROPOSALS, APPROVAL WILL BE SET FORTH IN AN ADDENDUM. **DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.**
- E. NO PROPOSED EQUIVALENT WILL BE CONSIDERED AFTER THE CONTRACT HAS BEEN EXECUTED, EXCEPT AS DESCRIBED IN THE GENERAL CONDITIONS.
- F. WITHIN 45 DAYS OF EXECUTION OF CONTRACT AND BEFORE ORDERING MATERIALS OR EQUIPMENT, SUBMIT TO ARCHITECT AND OBTAIN HIS APPROVAL OF A DETAILED LIST SHOWING EACH ITEM WHICH IS TO BE FURNISHED BY MAKE, TRADE NAME, CATALOG NUMBER, OR THE LIKE, TOGETHER WITH MANUFACTURER'S SPECIFICATIONS, CERTIFIED PRINTS, AND OTHER DATA SUFFICIENT FOR MAKING COMPARISONS WITH ITEMS SPECIFIED. WHEN APPROVED, SUCH SCHEDULE SHALL BE OF EQUAL FORCE WITH THESE SPECIFICATIONS IN THAT NO VARIATION THERE FROM SHALL BE ALLOWED EXCEPT WITH ARCHITECT'S WRITTEN APPROVAL. SUBMIT PDF FORMAT FILES FOR APPROVAL. PROVIDE PDF FILES OF APPROVED DATA FOR PROJECT CLOSE-OUT.
- G. SIMILAR ITEMS OF EQUIPMENT SHALL BE THE PRODUCT OF THE SAME MANUFACTURER.

1.11 SHOP DRAWINGS:

A. BEFORE STARTING WORK, SUBMIT AND OBTAIN APPROVAL OF DETAILED DRAWINGS OF THE FOLLOWINGS, FULLY DIMENSIONED (INCLUDING ELEVATIONS OF DUCTWORK AND PIPING) AND DRAWN TO 1/4" TO 1/2" SCALE.

SUBMIT A MINIMUM OF 2 SETS OF BOND SHOP DRAWINGS OR PDF FORMAT DIGITAL FILES OF SHOP DRAWINGS. PIPING SHOP DRAWINGS SHALL INCLUDE DRAIN AND VENT LOCATIONS, PIPE SLOPES DOWN TO DRAINS AND UP TO VENTS, PIPING ELEVATIONS, PIPING CONNECTION DETAILS, AND A LIST OF PIPING MATERIALS. DUCTWORK SHOP DRAWINGS SHALL INCLUDE ELEVATIONS, CONSTRUCTION METHODS, RE-INFORCEMENTS, GAUGES, AND ACCESS DOOR LOCATIONS AND SIZES. PROVIDE SECTION DRAWINGS OF LOCATIONS WHERE DUCTS CROSS OR DEMONSTRATE WITH ELEVATIONS THAT DUCTS WILL FIT. ALL SHOP DRAWINGS SHALL BE PRODUCED USING AUTOCAD AND A COPY OF THE SHOP DRAWING FILES SHALL BE PROVIDED IN PDF FORMAT FOR SHOP DRAWING REVIEW. A THUMB-DRIVE WITH A COPY OF ALL APPROVED SHOP DRAWINGS IN CAD AND PDF FORMAT SHALL BE PROVIDED FOR PROJECT CLOSEOUT. SHOP DRAWINGS SHALL BE RECEIVED WITHIN 60 DAYS OF THE EXECUTION OF THE CONTRACT AND BEFORE CONSIDERATION OF A REQUEST FOR PAYMENT.

1. DUCTWORK (DO NOT SCALE FOR DIFFUSER LOCATIONS, BUT COORDINATE WITH CEILING GRIDS AND LIGHTING LAYOUT). SEE SECTION "AIR DISTRIBUTION". SHOP DRAWINGS SHALL INCLUDE MATERIAL TYPE (STAINLESS STEEL, GALVANIZED), FINISH (PAINT GRIP, ETC.), ACTUAL SIZES INCREASED TO ALLOW FOR INTERNAL INSULATION AND GAUGES ALONG WITH FABRICATION SECTION NOTES FOR INDIVIDUAL SECTIONS. IN ADDITION, INCLUDE ELEVATIONS OF BOTTOM OF DUCT ABOVE FINISHED FLOOR LEVEL. SHOW BUILDING SECTIONS THROUGH CONGESTED AREAS FOR COORDINATION WITH STRUCTURE AND OTHER DISCIPLINES. PROVIDE JOINT DETAILS, DUCT SEAL METHODS, INSULATION TYPE, ETC.
2. COMPLETE MECHANICAL EQUIPMENT AND FAN ROOM PLANS SHOWING LOCATION OF EQUIPMENT, CONDUIT STUBS FOR MOTORS, FLOOR DRAINS, AND EQUIPMENT PADS AND FOUNDATIONS.
3. EQUIPMENT PIPING.

- B. SUBMIT COMPLETE CONTROL AND POWER WIRING DIAGRAMS FOR APPROVAL BEFORE INSTALLING CONTROLS. SEE CONTROLS SECTION.
- C. ENGINEERS' CADELECTRONIC DRAWINGS FILES WILL BE AVAILABLE UPON REQUEST FOR THE CONVENIENCE OF THE CONTRACTOR AND FOR USE IN PREPARATION OF SHOP DRAWINGS. A SERVICE FEE OF \$100.00 PER DRAWING SHEET FILE SHALL BE REMITTED TO THE ENGINEER PRIOR TO DELIVERY OF CADELECTRONIC DRAWING FILES ALONG WITH A SIGNED AGREEMENT BETWEEN THE ENGINEER AND CONTRACTOR.

1.12 RECORD DRAWINGS:

A. WHEN WORK STARTS THE ARCHITECT WILL FURNISH TWO COMPLETE SETS OF WHITE PRINTS OF THE HVAC DRAWINGS. ALL CORRECTIONS, VARIATIONS, AND DEVIATIONS, INCLUDING THOSE REQUIRED BY CHANGE ORDERS, IF ANY, MUST BE RECORDED IN COLORED INK OR COLORED PENCIL AT THE END OF EACH WORKING DAY ON THESE DRAWINGS. THE MARKED PRINTS SHALL BE AVAILABLE AT ALL TIMES FOR THE ARCHITECT'S INSPECTION.

B. PRIOR TO EXAMINING THE REQUEST FOR FINAL PAYMENT OR MAKING ANY RESPONSE THERETO, THE ARCHITECT SHALL RECEIVE FROM THE CONTRACTOR ONE COMPLETE SET OF THE WHITE PRINTS, MARKED AS STATED ABOVE, INDICATING THE ACTUAL COMPLETED INSTALLATION OF THE WORK INCLUDED UNDER THIS CONTRACT.

1. ACCURATELY SHOW LOCATION, SIZE AND ELEVATION OF NEW EXTERIOR UTILITY WORK AND ITS RELATIONSHIP TO ANY EXISTING UTILITIES, OBSTRUCTIONS, ETC., CONTIGUOUS TO THE AREA OF WORK.

2. BLOCK OUT AREAS MODIFIED BY CHANGE\_ORDER & IDENTIFY THEM BY CHANGE\_ORDER NUMBER.

3. THE ARCHITECT WILL FORWARD THE MARKED WHITE PRINTS TO THE CONSULTING ENGINEERS FOR REVIEW. THEY WILL THEN BE RETURNED BY THE ARCHITECT TO THE CONTRACTOR FOR USE IN PREPARING RECORD DRAWINGS.

C. WHEN WORK IS COMPLETED, THE ENGINEERS' CADELECTRONIC DRAWING FILES WILL BE MADE AVAILABLE UPON REQUEST FOR THE CONVENIENCE TO THE CONTRACTOR FOR A SERVICE FEE OF \$100.00 PER CADELECTRONIC DRAWING SHEET FILE AND FOR USE IN PREPARING RECORD DRAWINGS. CONTRACTOR SHALL TRANSFER THE INFORMATION FROM THE MARKED WHITE PRINTS TO THE CAD FILES, REMOVING ALL SUPERSEDED DATA IN ORDER TO SHOW THE ACTUAL COMPLETED CONDITIONS. INCLUDE WITH THE RECORD DRAWINGS EQUIPMENT SCHEDULES, DETAILS, SECTIONS, AND CONTROLS EDITED TO SHOW ACTUAL COMPLETED CONDITIONS. WHEN RECORD DRAWINGS ARE COMPLETE, PROVIDE ONE SET OF MYLAR REPRODUCIBLES, 2 SETS OF BOND PRINTS, AND ONE COMPLETE SET OF AUTOCAD DRAWING FILES (AUTOCAD 2016 FORMAT) AND ONE SET OF PDF DRAWING FILES ON CD-ROM DISKS.

D. DUCTWORK AND CONTROL DRAWINGS SHALL BE A SET OF CAD SHOP DRAWINGS, UP-DATED TO SHOW ACTUAL CONDITIONS AT COMPLETION OF WORK. INCLUDE THE CONTRACT DRAWINGS EQUIPMENT SCHEDULES AND DETAILS EDITED TO SHOW ACTUAL COMPLETED CONDITIONS.

E. HVAC PIPING DRAWINGS MAY BE PREPARED AS NOTED ABOVE, OR HVAC PIPING MAY BE ADDED TO THE DUCTWORK SHOP DRAWINGS NOTED ABOVE.

1.13 PROTECTION OF ROTATING PARTS:

- A. FOR THIS PARAGRAPH ONLY, "EXPOSED" SHALL MEAN LOCATED IN A CASING OR ROOM OR PLENUM WITH DOOR LARGE ENOUGH TO ADMIT A MAN.
- B. EQUIP EXPOSED BELT DRIVES WITH BELT GUARDS WITH HOLES FOR MEASURING SPEEDS OF DRIVEN SHAFTS.

1.14 PROTECTION OF EQUIPMENT:

- A. DURING CONSTRUCTION, PROTECT HVAC EQUIPMENT AND DUCTWORK FROM DAMAGE OR DETERIORATION AND PREVENT WATER, DUST, ETC. FROM ENTERING THE EQUIPMENT OR DUCTWORK. COVER ENDS OF DUCTWORK BEFORE DELIVERY TO SITE WITH DURO-DYNE DYN-Q-WRAP. COVER ALL OPENINGS IN EQUIPMENT WITH DYN-Q-WRAP UNTIL DUCTWORK IS ATTACHED.
- B. DURING CONSTRUCTION, KEEP ALL STORED DUCTWORK SECURELY COVERED FOR PROTECTION FROM WATER AND DUST. DO NOT STORE DIRECTLY ON THE FLOOR. IMMEDIATELY REMOVE ALL DUCTWORK THAT IS WET OR DIRTY FROM THE JOB SITE.
- C. DURING CONSTRUCTION, SEAL JOINTS AND SEAMS IN DUCTWORK AS IT IS INSTALLED.
- D. WHEN INSTALLATION IS COMPLETE, CLEAN EQUIPMENT AND MAKE READY FOR PAINTING.

1.15 INSTALLATION OF EQUIPMENT:

- A. INSTALL EQUIPMENT TO PROVIDE NORMAL SERVICE ACCESS TO ALL COMPONENTS.
- B. WHERE DRAWINGS SHOW SUFFICIENT SPACE FOR REMOVING COMPONENTS, INSTALL EQUIPMENT TO PROVIDE SUCH CLEARANCE. PROVIDE SPACE AT ALL EQUIPMENT POWER AND CONTROL PANELS AS REQUIRED BY LOCAL CODES.
- C. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. IF MANUFACTURER'S INSTRUCTIONS CONFLICT WITH CONTRACT DOCUMENTS, OBTAIN ARCHITECT'S DECISION BEFORE PROCEEDING.
- D. ALL EQUIPMENT SHALL BE FIRMLY FASTENED IN PLACE:

1. ROOF CURBS SHALL BE SECURED TO DECK AND STRUCTURE AND CURB MOUNTED ITEMS SHALL BE SECURED TO CURBS.
2. PAD MOUNTED EQUIPMENT SHALL BE SECURED TO PADS USING POURED IN PLACE ANCHOR BOLTS OR CINCH ANCHORS.
3. VIBRATION ISOLATORS SHALL BE SECURED TO FLOORS OR PADS AND EQUIPMENT SHALL BE BOLTED TO THE ISOLATORS.
4. AIR DEVICES CONNECTED BY FLEXIBLE DUCT SHALL BE SECURED INDEPENDENTLY OF ALL OTHER BUILDING SYSTEMS TO PREVENT FALLING IF GRID SHIFTS.

1.16 EQUIPMENT SUPPORTS:

- A. PROVIDE SUPPORTS FOR DUCTWORK, PIPING AND EQUIPMENT. HOT DIP GALVANIZE AFTER FABRICATION ALL GRILLAGE, SUPPORTS, ETC., LOCATED OUTDOORS. PRIME COAT AND PAINT ALL GRILLAGE, SUPPORTS, ETC. LOCATED INDOORS. WHERE NOTED PROVIDE 304 STAINLESS STEEL SUPPORTS. AT THE CONTRACTOR'S OPTION, ALL GRILLAGE, SUPPORTS, ETC. LOCATED OUTDOORS MAY BE 304 STAINLESS STEEL INSTEAD OF HOT DIP GALVANIZED.
- B. PROVIDE FACTORY FABRICATED EQUIPMENT ROOF SUPPORTS WITH TOPS 16" ABOVE ROOF LINE FOR ROOF MOUNTED ITEMS AS SHOWN. CURBS SHALL MATCH ROOF SLOPE AS REQUIRED SO UNITS ARE INSTALLED LEVEL. SUPPORTS SHALL HAVE INTEGRAL CANTS. PRESSURE-TREATED WOOD NAILERS AND COUNTER FLASHING. SUPPORTS SHALL BE GALVANIZED STEEL, GAUGE AS REQUIRED FOR LOADS. 18 GAUGE MINIMUM.

1.17 CUTTING AND PATCHING AND INCIDENTAL WORK:

- A. SET SLEEVES AND INSERTS AND LAY OUT AND FORM OPENINGS IN WALLS, BEAMS, GIRDERS AND STRUCTURAL FLOORS IN THIS SECTION.
- B. CUT, PATCH AND REPAIR AS REQUIRED TO ACCOMPLISH HVAC WORK AND FINISH TO MATCH ADJACENT WORK. ARCHITECT'S APPROVAL REQUIRED BEFORE CUTTING ANY PART WHERE STRENGTH OR APPEARANCE OF FINISHED WORK IS INVOLVED.
- C. PROVIDE ALL MOTORS INCIDENTAL TO THE HVAC SYSTEMS. WIRING OF MOTORS, SWITCHES AND STARTERS IS INCLUDED IN "ELECTRICAL SECTIONS".
- D. DO ALL CONTROL WIRING REQUIRED FOR HVAC WORK AND ALL POWER WIRING REQUIRED BY CONTROL PANELS, CONTROL SYSTEM, AND CONTROL DEVICES.
- E. FURNISH MOTOR STARTERS AS SPECIFIED BELOW.
- F. FINAL WATER CONNECTIONS TO SERVICES ARE INCLUDED IN THIS SECTION.
- G. PERMANENT DRAIN CONNECTIONS FROM AC UNITS, ETC., AND AUTO AIR VENTS TO NEAREST FLOOR DRAIN ARE INCLUDED IN THIS SECTION.
- H. DOOR LOUVERS ARE NOT INCLUDED IN THIS SECTION.

1.18 FLASHING:

- A. GENERAL: FURNISH ALL FAN CURBS, PITCH CURBS, METAL BASE FLASHING AND COUNTER FLASHING REQUIRED FOR HVAC WORK. INSTALLATION OF ABOVE ITEMS IS SPECIFIED IN ROOFING SECTION.
- B. FAN CURBS FOR POWER ROOF VENTILATORS ARE SPECIFIED WITH THE FANS.
- C. PITCH CURBS: 20 GAUGE GALVANIZED STEEL, AT LEAST 8" DEEP. BASES MITERED AND SOLDERED AND EXTENDING AT LEAST 4" HORIZONTALLY.
- D. METAL BASE FLASHING: GALVANIZED STEEL FOR FERROUS ITEMS, AND STAINLESS STEEL FOR STAINLESS STEEL DUCT ITEMS. MINIMUM THICKNESS 22 GAUGE (0.034") GALVANIZED STEEL, 20 GAUGE (0.038") STAINLESS STEEL, 0.032" ALUMINUM. BASES MITERED AND SOLDERED. EXTENDING OUT AT LEAST 4" HORIZONTALLY AND 8" VERTICALLY.
- E. METAL COUNTER FLASHING: OF MATERIAL AND GAUGES SPECIFIED FOR BASE FLASHING, LAPPING BASE FLASHING AT LEAST 3".

1.19 EXCAVATION & BACKFILLING:

- A. INCLUDE ALL EXCAVATION AND BACKFILLING REQUIRED TO BRING THE WORK TO LINE AND GRADE SHOWN, INCLUDING EXCAVATION OF ROCK AND ALL OTHER MATERIALS WHICH MAY BE ENCOUNTERED.
- B. EXCAVATE TRENCHES WIDE ENOUGH FOR PROPER INSTALLATION OF WORK. GRADE TRENCH BOTTOMS EVENLY. PROVIDE BELL HOLES AS NECESSARY TO INSURE UNIFORM BEARING FOR PIPES. EXCAVATE MINIMUM 6" BELOW PIPE. REFILL CUTS BELOW REQUIRED PIPE GRADE WITH SAND OR COMPACTED GRAVEL. SUPPORT PIPE CONTINUOUSLY ALONG ITS ENTIRE LENGTH. (DO NOT USE PIERS TO SUPPORT PIPING.)
- C. BACKFILL AFTER INSPECTION BY ARCHITECT AND AUTHORITIES HAVING JURISDICTION. BACKFILL COMPACTED AREAS (ENGINEERED FILL) WITH SAND OR FINE GRAVEL (89/10) IN ACCORDANCE WITH REQUIREMENTS OF "SITEWORK" NO LESS THAN 95% COMPACTANCY. BACKFILL PAVED AREAS WITH SAND OR FINE GRAVEL (89/10) COMPACTED TO MEET REQUIREMENTS OF PAVING SECTION. BACKFILL SHALL BE FREE OF ROCK, WOOD, STEEL, BRICK, ETC. DO NOT DISTURB PIPE. RESTORE OR REPAIR PAVEMENTS AND THE LIKE AFTER BACKFILLING, MATCHING ADJACENT WORK.
- D. RESOD GRASSSED AREAS AND REPLACE BUSHES, ETC.

1.20 REMOVAL OF EXISTING WORK:

A. DISMANTLE THE FOLLOWING ITEMS AND REMOVE THEM FROM THE PREMISES. UPON REMOVAL THEY SHALL BECOME THE CONTRACTOR'S PROPERTY:

1. DUCTWORK, PIPING, CONDUITS, ETC.
- B. DISMANTLE THE FOLLOWING ITEMS AND STORE THEM ON THE PREMISES AS DIRECTED:
1. ALL AIR HANDLING EQUIPMENT.
2. ALL CONDENSING UNITS.
3. PACKAGE HVAC UNIT.

1.21 CONNECTIONS TO EXISTING SYSTEMS:

- A. MAKE CONNECTIONS TO EXISTING SYSTEMS ONLY AT TIME AUTHORIZED. IN WRITING, BY OWNER.
- B. TAKE EXISTING SYSTEMS AND/OR EQUIPMENT OUT OF SERVICE ONLY AT TIMES AUTHORIZED IN WRITING BY OWNER.
- C. DRAIN EXISTING SYSTEMS AND FILL, VENT, TEST, BALANCE AND PUT EXISTING SYSTEMS INTO OPERATION AFTER CONNECTIONS HAVE BEEN MADE.
- D. REPAIR EXISTING INSULATION AT POINTS OF CONNECTION TO EXISTING WORK.

1.22 MOTORS, STARTERS & ELECTRICAL EQUIPMENT:

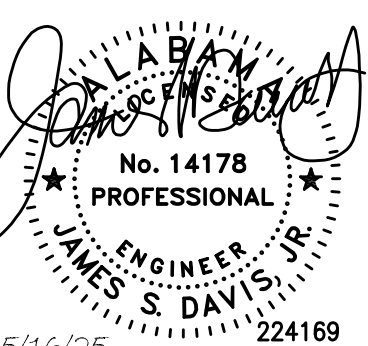
- A. PROVIDE ELECTRICAL EQUIPMENT COMPATIBLE WITH THE CURRENT SHOWN ON ELECTRICAL DRAWINGS. VERIFY CURRENT CHARACTERISTICS BEFORE ORDERING EQUIPMENT.
- B. SHOULD THE CONTRACTOR WITH THE ARCHITECT'S APPROVAL, MAKE CHANGES IN ELECTRICAL EQUIPMENT FROM THAT SHOWN ON THE ELECTRICAL DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REQUIRED CHANGES.
- C. PROVIDE FACTORY INSTALLED FUSES IN ALL EQUIPMENT REQUIRING FUSING FOR BRANCH CIRCUIT PROTECTION.
- D. MOTORS: 1750 RPM OPEN DRIP, PROOF CONSTRUCTION UNLESS OTHERWISE SHOWN OR SPECIFIED. INTEGRAL HORSEPOWER MOTORS SHALL MEET NEMA PREMIUM EFFICIENCY LEVELS AS STATED IN THE LATEST VERSION OF NEMA MG-1. ALLIS-CHALMERS, GENERAL ELECTRIC, GOULDS, LOUIS ALLIS, WESTINGHOUSE.
- E. WHERE MOTORS ARE SHOWN OR SCHEDULED TO BE CONNECTED TO A VARIABLE FREQUENCY DRIVE, THIS MOTOR SHALL BE AN INVERTER DUTY RATED BY THE MOTOR MANUFACTURER AND SHALL COMPLY WITH NEMA MG1, ARTICLE 31.
- F. WHERE SHOWN ON ELECTRICAL DRAWINGS, FURNISH INCREMENT WOUND MOTORS FOR 2-STEP STARTING.
- G. DO NOT RUN MOTORS UNTIL CORRECT OVERLOAD ELEMENTS ARE INSTALLED IN STARTERS. TRADING OVERLOAD ELEMENTS FOR ELEMENTS OF CORRECT SIZE FOR MOTORS ACTUALLY FURNISHED SHALL BE INCLUDED IN THIS SECTION.
- H. FURNISHING ALL STARTERS IS INCLUDED IN THIS SECTION. STARTER INSTALLATION IS SPECIFIED UNDER "ELECTRICAL SECTION". STARTERS SHALL BE EQUIPPED WITH MELTING ALLOY THERMAL OVERLOAD AND PHASE LOSS PROTECTION. IN ALL 3 PHASES.
- I. UNLESS OTHERWISE SHOWN OR SPECIFIED FOR SINGLE PHASE MOTORS PROVIDE MANUAL STARTERS EQUAL TO SQUARE D CLASS 2510. WHEN INSTALLED IN EQUIPMENT ROOMS PROVIDE SURFACE MOUNTED ENCLOSURE. AND WHEN INSTALLED IN FINISHED WALLS OUTSIDE EQUIPMENT ROOMS PROVIDE FLUSH MOUNTED ENCLOSURE, KEY OPERATED.
- J. PROVIDE H, O, A SWITCHES, FUSED CONTROL CIRCUIT TRANSFORMERS, AUXILIARY CONTACTS, ETC., AS SHOWN ON CONTROL DIAGRAMS OR REQUIRED BY CONTROL SEQUENCES.
- K. ALL STARTERS SHALL BE THE PRODUCT OF THE SAME MANUFACTURER.
- L. ALL CONTROL PANELS, ELECTRICAL ASSEMBLIES, ETC. MUST BEAR A LABEL FROM A RECOGNIZED TESTING LABORATORY AS AN ASSEMBLY, NOT AS INDIVIDUAL COMPONENTS.

1.23 SLEEVES:

- A. FOR PIPE THROUGH FLOORS INSIDE FIRE RATED CHASES OR THROUGH NON-FIRE RATED WALLS: 20 GAUGE GALVANIZED STEEL, 1" LARGER THAN PIPE OR PIPE COVERING.
- B. FOR PIPE THROUGH CONCRETE BEAMS: SCHEDULE 40 BLACK STEEL PIPE, 1" LARGER THAN PIPE OR PIPE COVERING.
- C. FOR PIPE PASSING THROUGH FLOORS OUTSIDE FIRE RATED CHASES AND FIRE RATED WALLS AND PARTITIONS, PROVIDE 20 GAUGE STEEL SLEEVE LEAVING THE ANNULAR SPACE BETWEEN PIPE OR PIPE COVERING AS REQUIRED BY US SYSTEMS. WHERE PIPE IS INSULATED, INSULATION SHALL BE CONTINUOUS THRU SLEEVE. REFER TO THROUGH-PENETRATION FIRESTOP SYSTEMS WHERE INCLUDED IN THE CONTRACT DOCUMENTS. OTHERWISE, SEAL PIPE WITH 3M BRAND FIRE BARRIER CP 2208 CAULK, FLAMESTOP V, SPECIFIED TECHNOLOGIES, INC., "SPEC SEAL SEALANT", RECTORSOAL CORP. METACALK 950 OR HILTI FSONE BEARING UL LISTING FOR ACTUAL CONDITIONS OF INSTALLATION, THICKNESS AND APPLICATION IN STRICT ACCORD WITH UL REFERENCE.

REVISIONS

BY	DESCRIPTION	DATE	#					

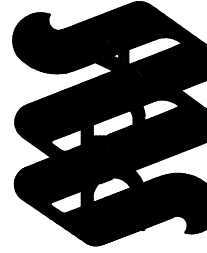


5/16/25

224169

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

MW / Davis Dumas & Assoc., Inc.  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Birmingham, AL 35244  
Phone (205) 252-0246  
Fax (205) 251-8506



SHEET TITLE  
HVAC SPECS

DRAWN BY  
JAG

CHECKED BY  
JSD

DATE  
MAY 16, 2025

JOB NUMBER  
224169

SHEET NUMBER  
M10

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OF  
19

FOR EACH TYPE INSTALLATION, ANY EQUIVALENTS MUST MEET THE 10 DAY PRIOR APPROVAL PROVISION AND MUST SHOW UL APPROVAL FOR ALL CONDITIONS, BARE PIPE, INSULATED PIPE, ETC. FOR PLASTIC PIPING MATERIAL SUBMITTAL MUST SHOW UL APPROVAL FOR EACH APPLICATION AND IF CAULK COMES IN DIRECT CONTACT WITH PIPE, IT MUST BE COMPATIBLE AND NOT INJURIOUS TO THE PIPE.

- D. SET SLEEVES BEFORE CONCRETE IS POURED OR MASONRY IS ERECTED. IN EXISTING CONSTRUCTION, GROUT SLEEVES FIRMLY IN PLACE.
- E. SLEEVES FOR DUCTS: SEE FIRE DAMPERS (SECTION: AIR DISTRIBUTION).
- F. EXTEND FLOOR SLEEVES 1 1/2" ABOVE FINISH FLOOR IN AREAS WHERE FLOOR IS SUBJECT TO BEING WET DURING NORMAL USAGE (MECHANICAL ROOMS, TOILETS, ETC.).
- G. WHERE EXPOSED DUCTS PASS THROUGH WALLS AND PARTITIONS, PROVIDE 4" WIDE 20 GAUGE GALVANIZED STEEL CLOSURE PLATES EXCEPT AT GRILLES AND REGISTERS. FIT CLOSURE PLATES SNUGLY TO DUCT AND SECURE TO WALL. GROUT AROUND DUCTS AND SOUND ABSORBERS AT EQUIPMENT ROOM WALLS.
- H. WHERE EXPOSED PIPES PASS THROUGH WALLS AND PARTITIONS IN FINISHED SPACES, PROVIDE CHROME PLATED F & C PLATES OR ESCUTCHEONS.

1.24 PAINTING:

- A. REFINISH EQUIPMENT DAMAGED DURING CONSTRUCTION TO NEW CONDITION.
- B. PAINT ALL NON\_POTABLE WATER PIPE AND INSULATION YELLOW IN ACCORDANCE WITH PLUMBING CODE USING PAINT OF TYPE SPECIFIED IN PAINTING SECTION.
- C. PAINT UNINSULATED DUCT SURFACES VISIBLE THROUGH GRILLES AND REGISTERS FLAT BLACK.
- D. PRIME AND PAINT ALL BARE, EXPOSED, EXTERIOR PIPING USING TYPE SPECIFIED IN PAINTING SECTION.
- E. PRIME AND PAINT ALL GRILLAGE, SUPPORTS, ETC. LOCATED INDOORS EXCEPT WHERE NOTED TO BE GALVANIZED.
- F. OTHER PAINTING IS SPECIFIED IN PAINTING SECTION, FINISHES DIVISION.

1.25 PIPE IDENTIFICATION:

- A. IDENTIFY ALL PIPING EXPOSED TO VIEW OR ACCESSIBLE THROUGH REMOVABLE CEILINGS OR ACCESS PANELS WITH PLASTIC SNAP \_ON PIPE LINE MARKERS. COLOR CODE MARKERS IN ACCORDANCE WITH ANSI A13.1. SHOW PIPE CONTENTS AND DIRECTION OF FLOW. (MARKERS ON LINES 8" OD AND SMALLER SHALL BE TAPED IN PLACE. ON LINES OVER 8" OD SECURE WITH SPRING CLIPS.) MARKERS SHALL BE EQUAL TO CRAFTMARK, BRADY, SETON OR BRIMAR.
- B. PROTECT ALL FACTORY IDENTIFICATION TAGS, NAMEPLATES, MODEL AND SERIAL NUMBERS, STENCILING, ETC., DURING CONSTRUCTION AND REPLACE IF DAMAGED.
- C. LABEL SPACING AND EXTENT:
- ON STRAIGHT RUN OF PIPES: ABOVE SUSPENDED CEILINGS SPACE LABELS APPROXIMATELY 10 FEET ON CENTER; ELSEWHERE, 20 FEET ON CENTER.
  - WHEREVER A PIPE ENTERS OR LEAVES A ROOM OR BUILDING.
  - AT CHANGE OF DIRECTION.
  - AT MAIN VALVES AND CONTROL VALVES (NOT EQUIPMENT VALVES).
  - AT MANIFOLDS.
  - ON RISERS, JUST ABOVE AND BELOW FLOORS.
- D. THE REFRIGERANT PIPING IDENTIFICATION SHALL INDICATE THE REFRIGERANT DESIGNATION AND SAFETY GROUP CLASSIFICATION OF REFRIGERANT USED IN THE PIPING SYSTEM. FOR GROUP A2L AND B2L REFRIGERANTS, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT "WARNING-RISK OF FIRE. FLAMMABLE REFRIGERANT." FOR GROUP A2, A3, B2 AND B3 REFRIGERANTS, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT: "DANGER-RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT." FOR ANY GROUP B REFRIGERANT, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT: "DANGER-TOXIC REFRIGERANT."

1.26 VALVE TAGS:

- A. 2" X 3" LAMINATED PLASTIC WITH 1/2" NUMBERS ENGRAVED AT TOP, LEAVING SPACE FOR FURTHER ENGRAVING BY OTHERS. SECURE TAGS WITH CHAINS TO VALVE YOKE OR STEM, NOT HANDLES.
- B. VALVE TAG COLORS:
- HVAC: WHITE TAGS WITH BLACK NUMBERS.
- C. VALVE TAG LOCATIONS: AT ALL VALVES ON MAINS, RISERS AND BRANCHES (NOT EQUIPMENT SERVICE VALVES).
- D. VALVE TAG NUMBERS: STARTING WITH NUMBER 1, NUMBER TAGS IN SEQUENCE FROM THE LOWEST POINT TO THE HIGHEST POINT IN THE BUILDING. IN EXISTING BUILDINGS EXTEND EXISTING SEQUENCES.

1.27 VALVE CHARTS:

- A. IN ALL MECHANICAL ROOMS, PROVIDE CHARTS SHOWING NUMBER AND LOCATIONS OF ALL LABELED VALVES, TYPE OF SERVICE, ETC. LAMINATE IN HEAVY PLASTIC AND PROVIDE BRASS GROMMETS FOR ATTACHING TO WALL. ATTACH TO WALL WITH ANCHORS AND BRASS SCREWS.
- B. IN EXISTING BUILDINGS INCLUDE EXISTING VALVES IN THE CHARTS OF NEW VALVES.
- 1.28 EQUIPMENT IDENTIFICATION:
- A. PROVIDE 2" X 3" OR LARGER LAMINATED PLASTIC NAMEPLATES WITH 1/2" NUMBERS AND LETTERS IN COLORS SPECIFIED BELOW. SCREW TAGS TO EQUIPMENT IN OBVIOUS LOCATIONS. ENGRAVE EQUIPMENT DESIGNATION AND NUMBERS AS SHOWN ON PLANS AND DRAWINGS ON UPPER HALF OF TAG, LEAVING LOWER HALF OF TAG FOR FUTURE ENGRAVING BY OWNER.
- B. PROVIDE SIMILAR NAMEPLATES FOR MOTOR STARTERS FURNISHED UNDER DIVISION 23.
- C. SECURE NAMEPLATES WITH ACORN HEAD SCREWS.
- D. COLORS:
- EQUIPMENT CONNECTED TO UTILITY POWER ONLY \_ BLACK LETTERS ON WHITE NAMEPLATES.
  - EQUIPMENT CONNECTED TO EMERGENCY POWER \_ RED LETTERS ON WHITE NAMEPLATES.
- E. IN EXISTING BUILDING REPLACE ALL EXISTING NAMEPLATES WHICH DO NOT COMPLY WITH ABOVE COLORS.

1.29 EXHAUST FAN IDENTIFICATION:

- A. 2" X 3" OR LARGER LAMINATED PLASTIC NAMEPLATES WITH RED LETTERS AND NUMBERS ON WHITE BACKGROUND, IDENTIFYING TYPE OF FAN, NUMBER ACCORDING TO PLANS, AND ROOMS SERVED. ENGRAVE ON UPPER HALF OF TAG, LEAVING LOWER HALF FOR ENGRAVING BY OWNER. FASTEN WITH ACORN HEAD SCREWS.
- 1.30 ACCESS DOORS:
- A. FURNISH AND INSTALL ACCESS DOORS FOR VALVES, FIRE DAMPERS, DAMPERS, CONTROLS, AIR VENTS, AND OTHER ITEMS LOCATED ABOVE NON\_LIFTOUT CEILINGS OR BEHIND PARTITIONS OR WALLS. DOORS IN NON\_FIRE RATED WALLS AND CEILINGS: 16 GAUGE STEEL WITH HINGES AND SCREWDRIVER LATCHES. DOORS IN FIRE RATED WALLS AND CEILINGS: UL LABELED WITH FIRE RATING EQUAL TO FIRE RATING OF WALL OR CEILING. DOORS IN SECURITY CEILINGS TO BE 10 GA. STEEL PANELS, WHITE POWDER COAT, 2" X 2" X 3/16" STEEL ANGLE FRAME HEAVY DUTY BUTT HINGES WITH SECURITY SCREWS. PROVIDE DOOR STYLES COMPATIBLE WITH ADJOINING SURFACES AS SELECTED BY ARCHITECT. SIZE DOORS TO PERMIT REMOVAL OF EQUIPMENT AND/OR MAINTENANCE. DOORS: B&B\_CO, NYSTROM, WILLIAMS BROS., OR EQUAL.
- B. MARK LAY\_IN CEILINGS WITH COLORED VINYL SELF ADHERING DISC STUCK ON GRID ADJACENT TO MAINTENANCE ACCESS POINTS.

1.31 TESTS, CLEANING & ADJUSTMENTS:

- A. GENERAL:
- ALL TESTS SHALL BE WITNESSED BY THE ARCHITECT IN ADDITION TO THE AUTHORITIES HAVING JURISDICTION. A MINIMUM OF 72 HOURS NOTICE IS REQUIRED PRIOR TO PERFORMANCE OF TESTS.
  - ALL AIR DUCT PRESSURE TESTS ARE SPECIFIED IN SECTION AIR DISTRIBUTION.
  - ALL HVAC AIR BALANCE WORK AND HVAC EQUIPMENT TESTS (OTHER THAN HYDROSTATIC TESTS) ARE SPECIFIED IN SECTION 23 7000, "HVAC TESTING & BALANCING". NOTIFY THE TESTING AND BALANCING AGENCY WHEN SYSTEMS ARE READY FOR BALANCING - SEE SECTION 23 7000, "HVAC TESTING & BALANCING".
  - TESTING AND BALANCING OTHER THAN THAT NOTED ABOVE IS SPECIFIED IN SECTION "HVAC TESTING & BALANCING".
  - ALL INSTRUMENTS USED FOR TESTING AND BALANCING WORK SHALL HAVE BEEN CALIBRATED WITHIN 6 MONTHS AND CHECKED FOR ACCURACY PRIOR TO START OF WORK.
  - COOPERATE IN THE EXECUTION OF WORK SPECIFIED IN SECTION 237000 HVAC TESTING AND BALANCING AND PROVIDE ASSISTANCE AS NOTED IN SECTION 237000.
  - PERFORM ALL TESTS AS REQUIRED BY LOCAL CODES. CONTRACTOR SHALL FURNISH TESTING EQUIPMENT.
  - IF LOCAL CODES ARE MORE STRINGENT THAN THE FOLLOWING, LOCAL CODES SHALL GOVERN.
- B. REFRIGERATION SYSTEM: WHEN SYSTEM IS COMPLETE, BUT BEFORE THE PIPE COVERING HAS BEEN INSTALLED, TEST COMPONENTS WITH DRY NITROGEN AND MAKE TIGHT AT EQUIPMENT MANUFACTURER'S RECOMMENDED TEST PRESSURES. THEN EVACUATE THE SYSTEM TO 26"HG. VACUUM WHICH THE SYSTEM SHALL HOLD FOR 24 HOURS. AFTER PASSING THE ABOVE TESTS, CHARGE AND LEAK TEST UNDER OPERATING CONDITIONS USING ELECTRONIC LEAK DETECTOR.
- C. AIR SYSTEM:
- DUCT CLEANING:
    - CLEAN NEW DUCT SYSTEM(S) AND EXISTING DUCT SYSTEMS TO BE REUSED BEFORE TESTING, ADJUSTING, AND BALANCING.
    - USE SERVICE OPENINGS FOR ENTRY AND INSPECTION.
      - CREATE NEW OPENINGS AND INSTALL ACCESS PANELS APPROPRIATE FOR DUCT STATIC-PRESSURE CLASS IF REQUIRED FOR CLEANING ACCESS. PROVIDE INSULATED PANELS FOR INSULATED OR LINED DUCT. PATCH INSULATION AS RECOMMENDED BY INSULATION MANUFACTURER. COMPLY WITH SECTION 236000 "AIR DISTRIBUTION" FOR ACCESS PANELS AND DOORS.
      - DISCONNECT AND RECONNECT FLEXIBLE DUCTS AS NEEDED FOR CLEANING AND INSPECTION.
      - REMOVE AND REINSTALL CEILING TO GAIN ACCESS DURING THE CLEANING PROCESS.
    - PARTICULATE COLLECTION AND ODOR CONTROL:
      - WHEN VENTING VACUUMING SYSTEM INSIDE THE BUILDING, USE HEPA FILTRATION WITH 99.97 PERCENT COLLECTION EFFICIENCY FOR 0.3-MICRON-SIZE (OR LARGER) PARTICLES.
      - WHEN VENTING VACUUMING SYSTEM TO OUTDOORS, USE FILTER TO COLLECT DEBRIS REMOVED FROM HVAC SYSTEM, AND LOCATE EXHAUST DOWNWIND AND AWAY FROM AIR INTAKES AND OTHER POINTS OF ENTRY INTO BUILDING.
    - CLEAN THE FOLLOWING COMPONENTS BY REMOVING SURFACE CONTAMINANTS AND DEPOSITS:
      - AIR OUTLETS AND INLETS (REGISTERS, GRILLES, AND DIFFUSERS).
      - SUPPLY, RETURN, AND EXHAUST FANS INCLUDING FAN HOUSINGS, PLENUMS (EXCEPT CEILING SUPPLY AND RETURN PLENUMS), SCROLLS, BLADES OR VANES, SHAFTS, BAFFLES, DAMPERS, AND DRIVE ASSEMBLIES.
      - AIR-HANDLING UNIT INTERNAL SURFACES AND COMPONENTS INCLUDING MIXING BOX, COIL SECTION, AIR WASH SYSTEMS, SPRAY ELIMINATORS, CONDENSATE DRAIN PANS, HUMIDIFIERS AND DEHUMIDIFIERS, FILTERS AND FILTER SECTIONS, AND CONDENSATE COLLECTORS AND DRAINS.
      - COILS AND RELATED COMPONENTS.
      - RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES EXCEPT IN CEILING PLENUMS AND MECHANICAL EQUIPMENT ROOMS.
      - SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
      - DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.
    - MECHANICAL CLEANING METHODOLOGY:
      - CLEAN METAL DUCT SYSTEMS USING MECHANICAL CLEANING METHODS THAT EXTRACT CONTAMINANTS FROM WITHIN DUCT SYSTEMS AND REMOVE CONTAMINANTS FROM BUILDING.

- USE VACUUM-COLLECTION DEVICES THAT ARE OPERATED CONTINUOUSLY DURING CLEANING. CONNECT VACUUM DEVICE TO DOWNSTREAM END OF DUCT SECTIONS SO AREAS BEING CLEANED ARE UNDER NEGATIVE PRESSURE.
  - USE MECHANICAL AGITATION TO DISLODGE DEBRIS ADHERED TO INTERIOR DUCT SURFACES WITHOUT DAMAGING INTEGRITY OF METAL DUCTS, DUCT LINER, OR DUCT ACCESSORIES.
  - CLEAN FIBROUS-GLASS DUCT LINER WITH HEPA VACUUMING EQUIPMENT; DO NOT PERMIT DUCT LINER TO GET WET. REPLACE FIBROUS-GLASS DUCT LINER THAT IS DAMAGED, DETERIORATED, OR DELAMINATED OR THAT HAS FRIABLE MATERIAL, MOLD, OR FUNGUS GROWTH.
  - CLEAN COILS AND COIL DRAIN PANS ACCORDING TO NADCA 1992. KEEP DRAIN PAN OPERATIONAL. RINSE COILS WITH CLEAN WATER TO REMOVE LATENT RESIDUES AND CLEANING MATERIALS; COMB AND STRAIGHTEN FINS.
  - PROVIDE DRAINAGE AND CLEANUP FOR WASH-DOWN PROCEDURES.
  - ANTIMICROBIAL AGENTS AND COATINGS: APPLY EPA-REGISTERED ANTIMICROBIAL AGENTS IF FUNGUS IS PRESENT. APPLY ANTIMICROBIAL AGENTS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AFTER REMOVAL OF SURFACE DEPOSITS AND DEBRIS.
2. WHEN SYSTEM HAS BEEN COMPLETED, REMOVE ALL TRASH AND DIRT, LEAVE ALL BALANCING DAMPERS OPEN AND INSTALL SPECIFIED FILTERS IN ALL EQUIPMENT. CHECK ALL FAN MOTORS FOR ROTATION. PROVIDE ALL ITEMS AS REQUIRED FOR WORK SPECIFIED IN SECTION 23 7000 "HVAC TESTING & BALANCING".
- D. AT THE BEGINNING OF THE FIRST HEATING SEASON, ADJUST AND BALANCE OPERATING PHASES AND REPEAT AT THE BEGINNING OF THE FIRST COOLING SEASON OR VICE\_VERSA, AS THE CASE MAY BE, ALL WITHOUT CHARGE.
- E. START-UP AND SERVICE:

- THE CONTRACTOR AND FACTORY AUTHORIZED SERVICE REPRESENTATIVE FOR THE ENERGY RECOVERY UNIT (ERU) SHALL PLACE EACH ITEM OF SUCH EQUIPMENT INTO SATISFACTORY OPERATION WITH ALL AUTOMATIC AND SAFETY DEVICES. FURTHER, ALL ADJUSTMENT SERVICE REQUIRED SHALL BE PERFORMED DURING THE WARRANTY PERIOD. ADJUSTMENT SERVICES DO NOT INCLUDE LUBRICATING FANS OR MOTORS AND DOES NOT INCLUDE CHANGING FILTERS OR ADJUSTING BELTS.
- IN ADDITION, SUBMIT EQUIPMENT MANUFACTURERS' START-UP REPORTS FOR ITEMS LISTED ABOVE. SEE PARAGRAPH "PROJECT CLOSE\_OUT", BELOW.
- STARTING SYSTEMS:
  - COORDINATE SCHEDULE FOR START-UP OF VARIOUS EQUIPMENT AND SYSTEMS.
  - NOTIFY OWNER SEVEN DAYS PRIOR TO START-UP OF EACH ITEM AND PROVIDE ONE COPY OF MANUFACTURER'S OPERATION AND MAINTENANCE INSTRUCTIONS.
  - VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE, OR OTHER CONDITIONS WHICH MAY CAUSE DAMAGE.
  - VERIFY THAT TESTS, METER READINGS, AND SPECIFIED ELECTRICAL CHARACTERISTICS AGREE WITH THOSE REQUIRED BY THE EQUIPMENT OR SYSTEM MANUFACTURER.
  - VERIFY WIRING AND SUPPORT COMPONENTS FOR EQUIPMENT ARE COMPLETE AND TESTED.
  - EXECUTE START-UP UNDER SUPERVISION OF RESPONSIBLE MANUFACTURER'S REPRESENTATIVE & CONTRACTORS' PERSONNEL IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTION.
  - WHEN SPECIFIED IN INDIVIDUAL SPECIFICATION SECTIONS, REQUIRE MANUFACTURER TO PROVIDE AUTHORIZED REPRESENTATIVE TO BE PRESENT AT SITE TO INSPECT, CHECK AND APPROVE EQUIPMENT OR SYSTEM INSTALLATION PRIOR TO START-UP, AND TO SUPERVISE PLACING EQUIPMENT OR SYSTEM IN OPERATION.
  - SUBMIT A WRITTEN REPORT IN ACCORDANCE WITH SECTION THAT EQUIPMENT OR SYSTEM HAS BEEN PROPERLY INSTALLED AND IS FUNCTIONING CORRECTLY.

1.32 WARRANTY & INSTRUCTIONS:

- A. SEE GENERAL CONDITIONS. ONE\_YEAR WARRANTY.
- B. CONTRACTOR SHALL AND HEREBY DOES WARRANT ALL MATERIALS, WORKMANSHIP AND EQUIPMENT FURNISHED AND INSTALLED BY HIM TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE YEAR AFTER DATE OF SUBSTANTIAL COMPLETION OF THE CONTRACT. SHOULD ANY DEFECTS IN MATERIAL, WORKMANSHIP, OR EQUIPMENT BE MADE KNOWN TO CONTRACTOR WITHIN THE ONE\_YEAR WARRANTY PERIOD, CONTRACTOR SHALL REPLACE SUCH MATERIALS, WORKMANSHIP, OR EQUIPMENT WITHOUT CHARGE.
- C. ALL RECIPROCATING AND SCROLL REFRIGERATION COMPRESSORS SHALL BEAR 5-YEAR NON-PRO-RATED PARTS WARRANTY.
- D. ALL GAS FIRED AIR FURNACES SHALL BEAR 10 YEAR PRORATED HEAT EXCHANGER WARRANTIES.
- E. AFTER COMPLETION OF THE WORK, CONTRACTOR SHALL OPERATE THE EQUIPMENT WHICH HE INSTALLS FOR A PERIOD OF (10) WORKING DAYS, AS A TEST OF SATISFACTORY OPERATING CONDITIONS. DURING THIS TIME, CONTRACTOR SHALL INSTRUCT THE OWNER'S OPERATING PERSONNEL IN THE CORRECT OPERATION OF THE EQUIPMENT.
- F. PROVIDE PDF OF MANUFACTURER'S OPERATING AND MAINTENANCE MANUALS AND PARTS LISTS FOR ALL EQUIPMENT AND MATERIALS FURNISHED. PROVIDE A MAINTENANCE SCHEDULE LISTING ROUTINE MAINTENANCE OPERATIONS AND SUGGESTED FREQUENCY THEREOF. INCLUDE ALL WARRANTY DATES ON EQUIPMENT AND GUARANTEES.
- G. ANY WORK PERFORMED ON NEW OR EXISTING AIR CONDITIONING/REFRIGERATION EQUIPMENT, WHETHER INSIDE OR OUT, THAT REQUIRES REMOVING THE REFRIGERANT FROM THE SYSTEM WILL REQUIRE THE USE OF A RECOVERY/RECYCLING UNIT. INTENTIONAL RELEASE OF THE REFRIGERANT, REGARDLESS OF TYPE, WILL NOT BE ALLOWED.
- H. ANY REFRIGERANT REMOVED FROM A SYSTEM THAT HAS BEEN PROPERLY RECYCLED AND HAS NOT BEEN EXPOSED TO "BURN OUT" CAN AND SHOULD BE REUSED IN THE SYSTEM. REFRIGERANT THAT HAS BEEN CONTAMINATED AND CANNOT BE REUSED AFTER BEING PROPERLY RECYCLED SHALL BE RECLAIMED BY THE CONTRACTOR AND RETURNED TO THE PROPER COMPANY REPRESENTATIVE.
- I. DURING THE PERIOD OF TESTS, ADJUST ALL CONTROLS, REGULATORS, ETC., TO COMPLY WITH THESE SPECIFICATIONS.
- J. SUPPLY INITIAL CHARGES OF REFRIGERANT, REFRIGERATION LUBRICATING OIL AND ANTI\_FREEZE NECESSARY FOR THE CORRECT OPERATION OF THE EQUIPMENT. MAINTAIN THESE CHARGES DURING THE GUARANTEE PERIOD, WITH NO ADDITIONAL COST TO THE OWNER, UNLESS LOSS OF CHARGE IS THE FAULT OF THE OWNER.
- K. MAKE AVAILABLE TO THE OWNER, WITHOUT ADDITIONAL COST, WARRANTY SERVICE AND ADJUSTMENT OF THE EQUIPMENT FOR THE GUARANTEE PERIOD. DUE TO CRITICAL TEMPERATURE GUIDELINES CONTRACTOR SHALL RESPOND TO OWNER'S CALL FOR SERVICE WITHIN A 6 HOUR TIME PERIOD.

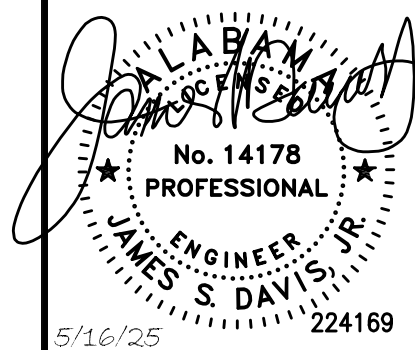
1.33 PROJECT CLOSE\_OUT:

- A. PRIOR TO THE ISSUANCE OF A CERTIFICATE FOR FINAL PAYMENT, SUBMIT TO ARCHITECT AND OBTAIN HIS APPROVAL OF THE FOLLOWING:
- A LETTER SIGNED BY THE SUBCONTRACTORS FOR HVAC, ELECTRICAL, TEMPERATURE CONTROL WORK STATING THAT THEY HAVE JOINTLY CHECKED EACH POWER CIRCUIT AND CONTROL CIRCUIT AND MUTUALLY AGREE THAT EACH ITEM IS PROPERLY WIRED AND THAT CONTROLS AND POWER CIRCUITS WILL FUNCTION PROPERLY.
  - RECORD DRAWINGS \_ SHEET METAL WORK: PDF FILES AND CAD FILES.
  - RECORD DRAWINGS - PIPING: PDF FILES AND CAD FILES.
  - RECORD DRAWINGS \_ CONTROL SYSTEMS: PDF FILES AND CAD FILES.
  - AIR BALANCE REPORT PDF FILES. (SEE SECTION 237000 "HVAC TESTING & BALANCING").
  - EQUIPMENT SUBMITTAL DATA PDF FILES.
  - EQUIPMENT OPERATING AND MAINTENANCE MANUALS PDF FILES.
  - MAINTENANCE SCHEDULE.
  - EQUIPMENT WARRANTY DATES AND GUARANTEES.
  - LIST OF OWNER'S PERSONNEL WHO HAVE RECEIVED MAINTENANCE INSTRUCTIONS.
  - INSTALL VALVE CHARTS IN MECHANICAL ROOMS.
  - LETTER CERTIFYING AND SIGNED BY OWNER OR HIS REPRESENTATIVE THAT THE OWNER OR HIS REPRESENTATIVE HAS RECEIVED THE SPARE FILTERS AND PUMP SEALS SPECIFIED FOR EACH HVAC SYSTEM.
  - SUBMIT FACTORY START-UP REPORTS FOR:
    - ENERGY RECOVERY UNIT.
  - INCLUDE WITH INSULATION MATERIAL SUBMITTAL LETTERS FROM THE INSULATION MATERIAL MANUFACTURER CERTIFYING THAT THE INSULATION MATERIAL DOES NOT CONTAIN ASBESTOS IN ANY SHAPE, FORM OR QUANTITY.

1.34 TRAINING OF OWNER PERSONNEL:

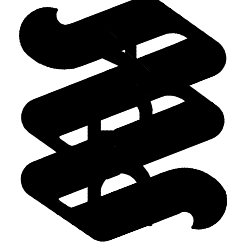
- A. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR TRAINING COORDINATION AND SCHEDULING AND ULTIMATELY TO ENSURE THAT TRAINING IS COMPLETED.
- B. THE ENGINEER SHALL BE RESPONSIBLE FOR OVERSEEING AND APPROVING THE CONTENT AND ADEQUACY OF THE TRAINING OF OWNER PERSONNEL FOR COMMISSIONED EQUIPMENT.
- THE HVAC ENGINEER SHALL DETERMINE THE SPECIAL NEEDS AND AREAS WHERE TRAINING WILL BE MOST VALUABLE. THE OWNER AND ENGINEER SHALL DECIDE HOW RIGOROUS THE TRAINING SHOULD BE FOR EACH PIECE OF COMMISSIONED EQUIPMENT. THE HVAC ENGINEER SHALL COMMUNICATE THE RESULTS TO THE SUBS AND VENDORS WHO HAVE TRAINING RESPONSIBILITIES.
  - EACH SUB AND VENDOR RESPONSIBLE FOR TRAINING SHALL SUBMIT A WRITTEN TRAINING PLAN TO THE HVAC ENGINEER FOR REVIEW AND APPROVAL PRIOR TO TRAINING. THE PLAN WILL COVER THE FOLLOWING ELEMENTS:
    - EQUIPMENT (INCLUDED IN TRAINING)
    - INTENDED AUDIENCE
    - LOCATION OF TRAINING
    - OBJECTIVES
    - SUBJECTS COVERED (DESCRIPTION, DURATION OF DISCUSSION, SPECIAL METHODS, ETC.)
    - DURATION OF TRAINING ON EACH SUBJECT
    - INSTRUCTOR FOR EACH SUBJECT
    - METHODS (CLASSROOM LECTURE, VIDEO, SITE WALK-THROUGH, ACTUAL OPERATIONAL DEMONSTRATIONS, WRITTEN HANDOUTS, ETC.)
    - INSTRUCTOR AND QUALIFICATIONS
  - FOR THE PRIMARY HVAC EQUIPMENT, THE CONTROLS CONTRACTOR SHALL PROVIDE A SHORT DISCUSSION OF THE CONTROL OF THE EQUIPMENT DURING THE HVAC OR ELECTRICAL TRAINING CONDUCTED BY OTHERS.
  - THE GENERAL CONTRACTOR SHALL DEVELOP AN OVERALL TRAINING PLAN AND SCHEDULE, WITH THE SUBCONTRACTORS AND OTHER CONSULTANTS, THE OVERALL TRAINING FOR THE COMMISSIONED SYSTEMS. THE ENGINEER WILL RECOMMEND APPROVAL OF THE TRAINING TO THE OWNER UPON SATISFACTORY COMPLETION USING A STANDARD APPROVAL FORM. THE OWNER AND CONTRACTORS SIGN THE APPROVAL FORM.
  - VIDEO TAPING OF THE TRAINING SESSIONS WILL BE PROVIDED AT THE OWNERS REQUEST.
- C. HVAC CONTRACTOR, THE HVAC CONTRACTOR SHALL HAVE THE FOLLOWING TRAINING RESPONSIBILITIES:
- PROVIDE THE HVAC ENGINEER AND OWNER WITH A TRAINING PLAN TWO WEEKS BEFORE THE PLANNED TRAINING.
  - PROVIDE DESIGNATED OWNER PERSONNEL WITH COMPREHENSIVE ORIENTATION AND TRAINING IN THE UNDERSTANDING OF THE SYSTEMS AND THE OPERATION AND MAINTENANCE OF EACH PIECE OF HVAC EQUIPMENT INCLUDING, BUT NOT LIMITED TO, PUMPS, BOILERS, FURNACES, CHILLERS, HEAT REJECTION EQUIPMENT, AIR CONDITIONING UNITS, AIR HANDLING UNITS, FANS, TERMINAL UNITS, CONTROLS AND WATER TREATMENT SYSTEMS, ETC.
  - TRAINING SHALL NORMALLY START WITH CLASSROOM SESSIONS FOLLOWED BY HANDS-ON TRAINING ON EACH PIECE OF EQUIPMENT, WHICH SHALL ILLUSTRATE THE VARIOUS MODES OF OPERATION, INCLUDING STARTUP, SHUTDOWN, FIRE/SMOKE ALARM, POWER FAILURE, ETC.
  - DURING ANY DEMONSTRATION, SHOULD THE SYSTEM FAIL TO PERFORM IN ACCORDANCE WITH THE REQUIREMENTS OF THE O&M MANUAL OR SEQUENCE OF OPERATIONS, THE SYSTEM WILL BE REPAIRED OR ADJUSTED AS NECESSARY AND THE DEMONSTRATION REPEATED.

REVISIONS				
BY	DESCRIPTION	DATE	#	



5/16/25

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA



**MW / Davis Dumas & Assoc., Inc.**  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Southlake, TX 76086  
Phone (205) 252-0746  
Fax (205) 251-8506

SHEET TITLE	
HVAC SPECS	
DRAWN BY	CHECKED BY
JAG	JSD
DATE	
MAY 16, 2025	
JOB NUMBER	
224169	
SHEET NUMBER	12
M11	OF 19



FOR EACH TYPE INSTALLATION, ANY EQUIVALENTS MUST MEET THE 10 DAY PRIOR APPROVAL PROVISION AND MUST SHOW UL APPROVAL FOR ALL CONDITIONS, BARE PIPE, INSULATED PIPE, ETC. FOR PLASTIC PIPING MATERIAL SUBMITTAL MUST SHOW UL APPROVAL FOR EACH APPLICATION AND IF CAULK COMES IN DIRECT CONTACT WITH PIPE, IT MUST BE COMPATIBLE AND NOT INJURIOUS TO THE PIPE.

- D. SET SLEEVES BEFORE CONCRETE IS POURED OR MASONRY IS ERECTED. IN EXISTING CONSTRUCTION, GROUT SLEEVES FIRMLY IN PLACE.
- E. SLEEVES FOR DUCTS: SEE FIRE DAMPERS (SECTION: AIR DISTRIBUTION).
- F. EXTEND FLOOR SLEEVES 1 1/2" ABOVE FINISH FLOOR IN AREAS WHERE FLOOR IS SUBJECT TO BEING WET DURING NORMAL USAGE (MECHANICAL ROOMS, TOILETS, ETC.).
- G. WHERE EXPOSED DUCTS PASS THROUGH WALLS AND PARTITIONS, PROVIDE 4" WIDE 20 GAUGE GALVANIZED STEEL CLOSURE PLATES EXCEPT AT GRILLES AND REGISTERS. FIT CLOSURE PLATES SNUGLY TO DUCT AND SECURE TO WALL. GROUT AROUND DUCTS AND SOUND ABSORBERS AT EQUIPMENT ROOM WALLS.
- H. WHERE EXPOSED PIPES PASS THROUGH WALLS AND PARTITIONS IN FINISHED SPACES, PROVIDE CHROME PLATED F & C PLATES OR ESCUTCHEONS.

1.24 PAINTING:

- A. REFINISH EQUIPMENT DAMAGED DURING CONSTRUCTION TO NEW CONDITION.
- B. PAINT ALL NON\_POTABLE WATER PIPE AND INSULATION YELLOW IN ACCORDANCE WITH PLUMBING CODE USING PAINT OF TYPE SPECIFIED IN PAINTING SECTION.
- C. PAINT UNINSULATED DUCT SURFACES VISIBLE THROUGH GRILLES AND REGISTERS FLAT BLACK.
- D. PRIME AND PAINT ALL BARE, EXPOSED, EXTERIOR PIPING USING TYPE SPECIFIED IN PAINTING SECTION.
- E. PRIME AND PAINT ALL GRILLAGE, SUPPORTS, ETC. LOCATED INDOORS EXCEPT WHERE NOTED TO BE GALVANIZED.
- F. OTHER PAINTING IS SPECIFIED IN PAINTING SECTION, FINISHES DIVISION.

1.25 PIPE IDENTIFICATION:

- A. IDENTIFY ALL PIPING EXPOSED TO VIEW OR ACCESSIBLE THROUGH REMOVABLE CEILINGS OR ACCESS PANELS WITH PLASTIC SNAP \_ON PIPE LINE MARKERS. COLOR CODE MARKERS IN ACCORDANCE WITH ANSI A13.1. SHOW PIPE CONTENTS AND DIRECTION OF FLOW. (MARKERS ON LINES 8" OD AND SMALLER SHALL BE TAPED IN PLACE. ON LINES OVER 8" OD SECURE WITH SPRING CLIPS.) MARKERS SHALL BE EQUAL TO CRAFTMARK, BRADY, SETON OR BRIMAR.
- B. PROTECT ALL FACTORY IDENTIFICATION TAGS, NAMEPLATES, MODEL AND SERIAL NUMBERS, STENCILING, ETC., DURING CONSTRUCTION AND REPLACE IF DAMAGED.
- C. LABEL SPACING AND EXTENT:
- ON STRAIGHT RUN OF PIPES: ABOVE SUSPENDED CEILINGS SPACE LABELS APPROXIMATELY 10 FEET ON CENTER; ELSEWHERE, 20 FEET ON CENTER.
  - WHEREVER A PIPE ENTERS OR LEAVES A ROOM OR BUILDING.
  - AT CHANGE OF DIRECTION.
  - AT MAIN VALVES AND CONTROL VALVES (NOT EQUIPMENT VALVES).
  - AT MANIFOLDS.
  - ON RISERS, JUST ABOVE AND BELOW FLOORS.
- D. THE REFRIGERANT PIPING IDENTIFICATION SHALL INDICATE THE REFRIGERANT DESIGNATION AND SAFETY GROUP CLASSIFICATION OF REFRIGERANT USED IN THE PIPING SYSTEM. FOR GROUP A2L AND B2L REFRIGERANTS, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT "WARNING-RISK OF FIRE. FLAMMABLE REFRIGERANT." FOR GROUP A2, A3, B2 AND B3 REFRIGERANTS, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT: "DANGER-RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT." FOR ANY GROUP B REFRIGERANT, THE IDENTIFICATION SHALL ALSO INCLUDE THE FOLLOWING STATEMENT: "DANGER-TOXIC REFRIGERANT."

1.26 VALVE TAGS:

- A. 2" X 3" LAMINATED PLASTIC WITH 1/2" NUMBERS ENGRAVED AT TOP, LEAVING SPACE FOR FURTHER ENGRAVING BY OTHERS. SECURE TAGS WITH CHAINS TO VALVE YOKE OR STEM, NOT HANDLES.
- B. VALVE TAG COLORS:
- HVAC: WHITE TAGS WITH BLACK NUMBERS.
- C. VALVE TAG LOCATIONS: AT ALL VALVES ON MAINS, RISERS AND BRANCHES (NOT EQUIPMENT SERVICE VALVES).
- D. VALVE TAG NUMBERS: STARTING WITH NUMBER 1, NUMBER TAGS IN SEQUENCE FROM THE LOWEST POINT TO THE HIGHEST POINT IN THE BUILDING. IN EXISTING BUILDINGS EXTEND EXISTING SEQUENCES.

1.27 VALVE CHARTS:

- A. IN ALL MECHANICAL ROOMS, PROVIDE CHARTS SHOWING NUMBER AND LOCATIONS OF ALL LABELED VALVES, TYPE OF SERVICE, ETC. LAMINATE IN HEAVY PLASTIC AND PROVIDE BRASS GROMMETS FOR ATTACHING TO WALL. ATTACH TO WALL WITH ANCHORS AND BRASS SCREWS.
- B. IN EXISTING BUILDINGS INCLUDE EXISTING VALVES IN THE CHARTS OF NEW VALVES.

1.28 EQUIPMENT IDENTIFICATION:

- A. PROVIDE 2" X 3" OR LARGER LAMINATED PLASTIC NAMEPLATES WITH 1/2" NUMBERS AND LETTERS IN COLORS SPECIFIED BELOW. SCREW TAGS TO EQUIPMENT IN OBVIOUS LOCATIONS. ENGRAVE EQUIPMENT DESIGNATION AND NUMBERS AS SHOWN ON PLANS AND DRAWINGS ON UPPER HALF OF TAG, LEAVING LOWER HALF OF TAG FOR FUTURE ENGRAVING BY OWNER.
- B. PROVIDE SIMILAR NAMEPLATES FOR MOTOR STARTERS FURNISHED UNDER DIVISION 23.
- C. SECURE NAMEPLATES WITH ACORN HEAD SCREWS.
- D. COLORS:
- EQUIPMENT CONNECTED TO UTILITY POWER ONLY \_ BLACK LETTERS ON WHITE NAMEPLATES.
  - EQUIPMENT CONNECTED TO EMERGENCY POWER \_ RED LETTERS ON WHITE NAMEPLATES.
- E. IN EXISTING BUILDING REPLACE ALL EXISTING NAMEPLATES WHICH DO NOT COMPLY WITH ABOVE COLORS.

1.29 EXHAUST FAN IDENTIFICATION:

- A. 2" X 3" OR LARGER LAMINATED PLASTIC NAMEPLATES WITH RED LETTERS AND NUMBERS ON WHITE BACKGROUND, IDENTIFYING TYPE OF FAN, NUMBER ACCORDING TO PLANS, AND ROOMS SERVED. ENGRAVE ON UPPER HALF OF TAG, LEAVING LOWER HALF FOR ENGRAVING BY OWNER. FASTEN WITH ACORN HEAD SCREWS.

1.30 ACCESS DOORS:

- A. FURNISH AND INSTALL ACCESS DOORS FOR VALVES, FIRE DAMPERS, DAMPERS, CONTROLS, AIR VENTS, AND OTHER ITEMS LOCATED ABOVE NON\_LIFTOUT CEILINGS OR BEHIND PARTITIONS OR WALLS. DOORS IN NON\_FIRE RATED WALLS AND CEILINGS: 16 GAUGE STEEL WITH HINGES AND SCREWDRIVER LATCHES. DOORS IN FIRE RATED WALLS AND CEILINGS: UL LABELED WITH FIRE RATING EQUAL TO FIRE RATING OF WALL OR CEILING. DOORS IN SECURITY CEILINGS TO BE 10 GA. STEEL PANELS, WHITE POWDER COAT, 2" X 2" X 3/16" STEEL ANGLE FRAME HEAVY DUTY BUTT HINGES WITH SECURITY SCREWS. PROVIDE DOOR STYLES COMPATIBLE WITH ADJOINING SURFACES AS SELECTED BY ARCHITECT. SIZE DOORS TO PERMIT REMOVAL OF EQUIPMENT AND/OR MAINTENANCE. DOORS: BAR\_CO, NYSTROM, WILLIAMS BROS. OR EQUAL.
- B. MARK LAY\_IN CEILINGS WITH COLORED VINYL SELF ADHERING DISC STUCK ON GRID ADJACENT TO MAINTENANCE ACCESS POINTS.

1.31 TESTS, CLEANING & ADJUSTMENTS:

- A. GENERAL:
- ALL TESTS SHALL BE WITNESSED BY THE ARCHITECT IN ADDITION TO THE AUTHORITIES HAVING JURISDICTION. A MINIMUM OF 72 HOURS NOTICE IS REQUIRED PRIOR TO PERFORMANCE OF TESTS.
  - ALL AIR DUCT PRESSURE TESTS ARE SPECIFIED IN SECTION AIR DISTRIBUTION.
  - ALL HVAC AIR BALANCE WORK AND HVAC EQUIPMENT TESTS (OTHER THAN HYDROSTATIC TESTS) ARE SPECIFIED IN SECTION 23 7000, "HVAC TESTING & BALANCING". NOTIFY THE TESTING AND BALANCING AGENCY WHEN SYSTEMS ARE READY FOR BALANCING - SEE SECTION 23 7000, "HVAC TESTING & BALANCING".
  - TESTING AND BALANCING OTHER THAN THAT NOTED ABOVE IS SPECIFIED IN SECTION "HVAC TESTING & BALANCING".
  - ALL INSTRUMENTS USED FOR TESTING AND BALANCING WORK SHALL HAVE BEEN CALIBRATED WITHIN 6 MONTHS AND CHECKED FOR ACCURACY PRIOR TO START OF WORK.
  - COOPERATE IN THE EXECUTION OF WORK SPECIFIED IN SECTION 237000 HVAC TESTING AND BALANCING AND PROVIDE ASSISTANCE AS NOTED IN SECTION 237000.
  - PERFORM ALL TESTS AS REQUIRED BY LOCAL CODES. CONTRACTOR SHALL FURNISH TESTING EQUIPMENT.
  - IF LOCAL CODES ARE MORE STRINGENT THAN THE FOLLOWING, LOCAL CODES SHALL GOVERN.
- B. REFRIGERATION SYSTEM: WHEN SYSTEM IS COMPLETE, BUT BEFORE THE PIPE COVERING HAS BEEN INSTALLED, TEST COMPONENTS WITH DRY NITROGEN AND MAKE TIGHT AT EQUIPMENT MANUFACTURER'S RECOMMENDED TEST PRESSURES. THEN EVACUATE THE SYSTEM TO 26"HG. VACUUM WHICH THE SYSTEM SHALL HOLD FOR 24 HOURS. AFTER PASSING THE ABOVE TESTS, CHARGE AND LEAK TEST UNDER OPERATING CONDITIONS USING ELECTRONIC LEAK DETECTOR.
- C. AIR SYSTEM:
- DUCT CLEANING:
    - CLEAN NEW DUCT SYSTEM(S) AND EXISTING DUCT SYSTEMS TO BE REUSED BEFORE TESTING, ADJUSTING, AND BALANCING.
    - USE SERVICE OPENINGS FOR ENTRY AND INSPECTION.
      - CREATE NEW OPENINGS AND INSTALL ACCESS PANELS APPROPRIATE FOR DUCT STATIC-PRESSURE CLASS IF REQUIRED FOR CLEANING ACCESS. PROVIDE INSULATED PANELS FOR INSULATED OR LINED DUCT. PATCH INSULATION AS RECOMMENDED BY INSULATION MANUFACTURER. COMPLY WITH SECTION 236000 "AIR DISTRIBUTION" FOR ACCESS PANELS AND DOORS.
      - DISCONNECT AND RECONNECT FLEXIBLE DUCTS AS NEEDED FOR CLEANING AND INSPECTION.
      - REMOVE AND REINSTALL CEILING TO GAIN ACCESS DURING THE CLEANING PROCESS.
    - PARTICULATE COLLECTION AND ODOR CONTROL:
      - WHEN VENTING VACUUMING SYSTEM INSIDE THE BUILDING, USE HEPA FILTRATION WITH 99.97 PERCENT COLLECTION EFFICIENCY FOR 0.3-MICRON-SIZE (OR LARGER) PARTICLES.
      - WHEN VENTING VACUUMING SYSTEM TO OUTDOORS, USE FILTER TO COLLECT DEBRIS REMOVED FROM HVAC SYSTEM, AND LOCATE EXHAUST DOWNWIND AND AWAY FROM AIR INTAKES AND OTHER POINTS OF ENTRY INTO BUILDING.
    - CLEAN THE FOLLOWING COMPONENTS BY REMOVING SURFACE CONTAMINANTS AND DEPOSITS:
      - AIR OUTLETS AND INLETS (REGISTERS, GRILLES, AND DIFFUSERS).
      - SUPPLY, RETURN, AND EXHAUST FANS INCLUDING FAN HOUSINGS, PLENUMS (EXCEPT CEILING SUPPLY AND RETURN PLENUMS), SCROLLS, BLADES OR VANES, SHAFTS, BAFFLES, DAMPERS, AND DRIVE ASSEMBLIES.
      - AIR-HANDLING UNIT INTERNAL SURFACES AND COMPONENTS INCLUDING MIXING BOX, COIL SECTION, AIR WASH SYSTEMS, SPRAY ELIMINATORS, CONDENSATE DRAIN PANS, HUMIDIFIERS AND DEHUMIDIFIERS, FILTERS AND FILTER SECTIONS, AND CONDENSATE COLLECTORS AND DRAINS.
      - COILS AND RELATED COMPONENTS.
      - RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES EXCEPT IN CEILING PLENUMS AND MECHANICAL EQUIPMENT ROOMS.
      - SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
      - DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.
    - MECHANICAL CLEANING METHODOLOGY:
      - CLEAN METAL DUCT SYSTEMS USING MECHANICAL CLEANING METHODS THAT EXTRACT CONTAMINANTS FROM WITHIN DUCT SYSTEMS AND REMOVE CONTAMINANTS FROM BUILDING.

- USE VACUUM-COLLECTION DEVICES THAT ARE OPERATED CONTINUOUSLY DURING CLEANING. CONNECT VACUUM DEVICE TO DOWNSTREAM END OF DUCT SECTIONS SO AREAS BEING CLEANED ARE UNDER NEGATIVE PRESSURE.
  - USE MECHANICAL AGITATION TO DISLODGE DEBRIS ADHERED TO INTERIOR DUCT SURFACES WITHOUT DAMAGING INTEGRITY OF METAL DUCTS, DUCT LINER, OR DUCT ACCESSORIES.
  - CLEAN FIBROUS-GLASS DUCT LINER WITH HEPA VACUUMING EQUIPMENT; DO NOT PERMIT DUCT LINER TO GET WET. REPLACE FIBROUS-GLASS DUCT LINER THAT IS DAMAGED, DETERIORATED, OR DELAMINATED OR THAT HAS FRIABLE MATERIAL, MOLD, OR FUNGUS GROWTH.
  - CLEAN COILS AND COIL DRAIN PANS ACCORDING TO NADCA 1992. KEEP DRAIN PAN OPERATIONAL. RINSE COILS WITH CLEAN WATER TO REMOVE LATENT RESIDUES AND CLEANING MATERIALS; COMB AND STRAIGHTEN FINS.
  - PROVIDE DRAINAGE AND CLEANUP FOR WASH-DOWN PROCEDURES.
  - ANTIMICROBIAL AGENTS AND COATINGS: APPLY EPA-REGISTERED ANTIMICROBIAL AGENTS IF FUNGUS IS PRESENT. APPLY ANTIMICROBIAL AGENTS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AFTER REMOVAL OF SURFACE DEPOSITS AND DEBRIS.
2. WHEN SYSTEM HAS BEEN COMPLETED, REMOVE ALL TRASH AND DIRT, LEAVE ALL BALANCING DAMPERS OPEN AND INSTALL SPECIFIED FILTERS IN ALL EQUIPMENT. CHECK ALL FAN MOTORS FOR ROTATION. PROVIDE ALL ITEMS AS REQUIRED FOR WORK SPECIFIED IN SECTION 23 7000 "HVAC TESTING & BALANCING".
- D. AT THE BEGINNING OF THE FIRST HEATING SEASON, ADJUST AND BALANCE OPERATING PHASES AND REPEAT AT THE BEGINNING OF THE FIRST COOLING SEASON OR VICE\_VERSA, AS THE CASE MAY BE, ALL WITHOUT CHARGE.
- E. START-UP AND SERVICE:

- THE CONTRACTOR AND FACTORY AUTHORIZED SERVICE REPRESENTATIVE FOR THE ENERGY RECOVERY UNIT (ERU) SHALL PLACE EACH ITEM OF SUCH EQUIPMENT INTO SATISFACTORY OPERATION WITH ALL AUTOMATIC AND SAFETY DEVICES. FURTHER, ALL ADJUSTMENT SERVICE REQUIRED SHALL BE PERFORMED DURING THE WARRANTY PERIOD. ADJUSTMENT SERVICES DO NOT INCLUDE LUBRICATING FANS OR MOTORS AND DOES NOT INCLUDE CHANGING FILTERS OR ADJUSTING BELTS.
- IN ADDITION, SUBMIT EQUIPMENT MANUFACTURERS' START-UP REPORTS FOR ITEMS LISTED ABOVE. SEE PARAGRAPH "PROJECT CLOSE\_OUT", BELOW.
- STARTING SYSTEMS:
  - COORDINATE SCHEDULE FOR START-UP OF VARIOUS EQUIPMENT AND SYSTEMS.
  - NOTIFY OWNER SEVEN DAYS PRIOR TO START-UP OF EACH ITEM AND PROVIDE ONE COPY OF MANUFACTURER'S OPERATION AND MAINTENANCE INSTRUCTIONS.
  - VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE, OR OTHER CONDITIONS WHICH MAY CAUSE DAMAGE.
  - VERIFY THAT TESTS, METER READINGS, AND SPECIFIED ELECTRICAL CHARACTERISTICS AGREE WITH THOSE REQUIRED BY THE EQUIPMENT OR SYSTEM MANUFACTURER.
  - VERIFY WIRING AND SUPPORT COMPONENTS FOR EQUIPMENT ARE COMPLETE AND TESTED.
  - EXECUTE START-UP UNDER SUPERVISION OF RESPONSIBLE MANUFACTURER'S REPRESENTATIVE & CONTRACTORS' PERSONNEL IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTION.
  - WHEN SPECIFIED IN INDIVIDUAL SPECIFICATION SECTIONS, REQUIRE MANUFACTURER TO PROVIDE AUTHORIZED REPRESENTATIVE TO BE PRESENT AT SITE TO INSPECT, CHECK AND APPROVE EQUIPMENT OR SYSTEM INSTALLATION PRIOR TO START-UP, AND TO SUPERVISE PLACING EQUIPMENT OR SYSTEM IN OPERATION.
  - SUBMIT A WRITTEN REPORT IN ACCORDANCE WITH SECTION THAT EQUIPMENT OR SYSTEM HAS BEEN PROPERLY INSTALLED AND IS FUNCTIONING CORRECTLY.

1.32 WARRANTY & INSTRUCTIONS:

- A. SEE GENERAL CONDITIONS, ONE\_YEAR WARRANTY.
- B. CONTRACTOR SHALL AND HEREBY DOES WARRANT ALL MATERIALS, WORKMANSHIP AND EQUIPMENT FURNISHED AND INSTALLED BY HIM TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE YEAR AFTER DATE OF SUBSTANTIAL COMPLETION OF THE CONTRACT. SHOULD ANY DEFECTS IN MATERIAL, WORKMANSHIP, OR EQUIPMENT BE MADE KNOWN TO CONTRACTOR WITHIN THE ONE\_YEAR WARRANTY PERIOD, CONTRACTOR SHALL REPLACE SUCH MATERIALS, WORKMANSHIP, OR EQUIPMENT WITHOUT CHARGE.
- C. ALL RECIPROCATING AND SCROLL REFRIGERATION COMPRESSORS SHALL BEAR 5-YEAR NON-PRO-RATED PARTS WARRANTY.
- D. ALL GAS FIRED AIR FURNACES SHALL BEAR 10 YEAR PRORATED HEAT EXCHANGER WARRANTIES.
- E. AFTER COMPLETION OF THE WORK, CONTRACTOR SHALL OPERATE THE EQUIPMENT WHICH HE INSTALLS FOR A PERIOD OF (10) WORKING DAYS, AS A TEST OF SATISFACTORY OPERATING CONDITIONS. DURING THIS TIME, CONTRACTOR SHALL INSTRUCT THE OWNER'S OPERATING PERSONNEL IN THE CORRECT OPERATION OF THE EQUIPMENT.
- F. PROVIDE PDF OF MANUFACTURER'S OPERATING AND MAINTENANCE MANUALS AND PARTS LISTS FOR ALL EQUIPMENT AND MATERIALS FURNISHED. PROVIDE A MAINTENANCE SCHEDULE LISTING ROUTINE MAINTENANCE OPERATIONS AND SUGGESTED FREQUENCY THEREOF. INCLUDE ALL WARRANTY DATES ON EQUIPMENT AND GUARANTEES.
- G. ANY WORK PERFORMED ON NEW OR EXISTING AIR CONDITIONING/REFRIGERATION EQUIPMENT, WHETHER INSIDE OR OUT, THAT REQUIRES REMOVING THE REFRIGERANT FROM THE SYSTEM WILL REQUIRE THE USE OF A RECOVERY/RECYCLING UNIT. INTENTIONAL RELEASE OF THE REFRIGERANT, REGARDLESS OF TYPE, WILL NOT BE ALLOWED.
- H. ANY REFRIGERANT REMOVED FROM A SYSTEM THAT HAS BEEN PROPERLY RECYCLED AND HAS NOT BEEN EXPOSED TO "BURN OUT" CAN AND SHOULD BE REUSED IN THE SYSTEM. REFRIGERANT THAT HAS BEEN CONTAMINATED AND CANNOT BE REUSED AFTER BEING PROPERLY RECYCLED SHALL BE RECLAIMED BY THE CONTRACTOR AND RETURNED TO THE PROPER COMPANY REPRESENTATIVE.
- I. DURING THE PERIOD OF TESTS, ADJUST ALL CONTROLS, REGULATORS, ETC., TO COMPLY WITH THESE SPECIFICATIONS.
- J. SUPPLY INITIAL CHARGES OF REFRIGERANT, REFRIGERATION LUBRICATING OIL AND ANTI\_FREEZE NECESSARY FOR THE CORRECT OPERATION OF THE EQUIPMENT. MAINTAIN THESE CHARGES DURING THE GUARANTEE PERIOD, WITH NO ADDITIONAL COST TO THE OWNER, UNLESS LOSS OF CHARGE IS THE FAULT OF THE OWNER.
- K. MAKE AVAILABLE TO THE OWNER, WITHOUT ADDITIONAL COST, WARRANTY SERVICE AND ADJUSTMENT OF THE EQUIPMENT FOR THE GUARANTEE PERIOD. DUE TO CRITICAL TEMPERATURE GUIDELINES CONTRACTOR SHALL RESPOND TO OWNER'S CALL FOR SERVICE WITHIN A 6 HOUR TIME PERIOD.

1.33 PROJECT CLOSE\_OUT:

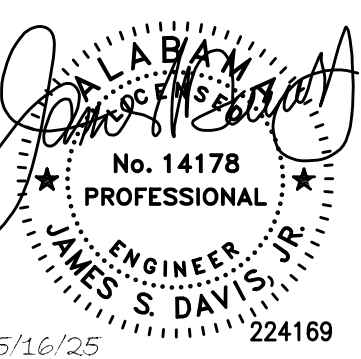
- A. PRIOR TO THE ISSUANCE OF A CERTIFICATE FOR FINAL PAYMENT, SUBMIT TO ARCHITECT AND OBTAIN HIS APPROVAL OF THE FOLLOWING:
- A LETTER SIGNED BY THE SUBCONTRACTORS FOR HVAC, ELECTRICAL, TEMPERATURE CONTROL WORK STATING THAT THEY HAVE JOINTLY CHECKED EACH POWER CIRCUIT AND CONTROL CIRCUIT AND MUTUALLY AGREE THAT EACH ITEM IS PROPERLY WIRED AND THAT CONTROLS AND POWER CIRCUITS WILL FUNCTION PROPERLY.
  - RECORD DRAWINGS \_ SHEET METAL WORK: PDF FILES AND CAD FILES.
  - RECORD DRAWINGS - PIPING: PDF FILES AND CAD FILES.
  - RECORD DRAWINGS \_ CONTROL SYSTEMS: PDF FILES AND CAD FILES.
  - AIR BALANCE REPORT PDF FILES. (SEE SECTION 237000 "HVAC TESTING & BALANCING").
  - EQUIPMENT SUBMITTAL DATA PDF FILES.
  - EQUIPMENT OPERATING AND MAINTENANCE MANUALS PDF FILES.
  - MAINTENANCE SCHEDULE.
  - EQUIPMENT WARRANTY DATES AND GUARANTEES.
  - LIST OF OWNER'S PERSONNEL WHO HAVE RECEIVED MAINTENANCE INSTRUCTIONS.
  - INSTALL VALVE CHARTS IN MECHANICAL ROOMS.
  - LETTER CERTIFYING AND SIGNED BY OWNER OR HIS REPRESENTATIVE THAT THE OWNER OR HIS REPRESENTATIVE HAS RECEIVED THE SPARE FILTERS AND PUMP SEALS SPECIFIED FOR EACH HVAC SYSTEM.
  - SUBMIT FACTORY START-UP REPORTS FOR:
    - ENERGY RECOVERY UNIT.
  - INCLUDE WITH INSULATION MATERIAL SUBMITTAL LETTERS FROM THE INSULATION MATERIAL MANUFACTURER CERTIFYING THAT THE INSULATION MATERIAL DOES NOT CONTAIN ASBESTOS IN ANY SHAPE, FORM OR QUANTITY.

1.34 TRAINING OF OWNER PERSONNEL:

- A. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR TRAINING COORDINATION AND SCHEDULING AND ULTIMATELY TO ENSURE THAT TRAINING IS COMPLETED.
- B. THE ENGINEER SHALL BE RESPONSIBLE FOR OVERSEEING AND APPROVING THE CONTENT AND ADEQUACY OF THE TRAINING OF OWNER PERSONNEL FOR COMMISSIONED EQUIPMENT.
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  - THE GENERAL CONTRACTOR SHALL DEVELOP AN OVERALL TRAINING PLAN AND SCHEDULE, WITH THE SUBCONTRACTORS AND OTHER CONSULTANTS, THE OVERALL TRAINING FOR THE COMMISSIONED SYSTEMS. THE ENGINEER WILL RECOMMEND APPROVAL OF THE TRAINING TO THE OWNER UPON SATISFACTORY COMPLETION USING A STANDARD APPROVAL FORM. THE OWNER AND CONTRACTORS SIGN THE APPROVAL FORM.
  - VIDEO TAPING OF THE TRAINING SESSIONS WILL BE PROVIDED AT THE OWNERS REQUEST.
- C. HVAC CONTRACTOR, THE HVAC CONTRACTOR SHALL HAVE THE FOLLOWING TRAINING RESPONSIBILITIES:
- PROVIDE THE HVAC ENGINEER AND OWNER WITH A TRAINING PLAN TWO WEEKS BEFORE THE PLANNED TRAINING.
  - PROVIDE DESIGNATED OWNER PERSONNEL WITH COMPREHENSIVE ORIENTATION AND TRAINING IN THE UNDERSTANDING OF THE SYSTEMS AND THE OPERATION AND MAINTENANCE OF EACH PIECE OF HVAC EQUIPMENT INCLUDING, BUT NOT LIMITED TO, PUMPS, BOILERS, FURNACES, CHILLERS, HEAT REJECTION EQUIPMENT, AIR CONDITIONING UNITS, AIR HANDLING UNITS, FANS, TERMINAL UNITS, CONTROLS AND WATER TREATMENT SYSTEMS, ETC.
  - TRAINING SHALL NORMALLY START WITH CLASSROOM SESSIONS FOLLOWED BY HANDS-ON TRAINING ON EACH PIECE OF EQUIPMENT, WHICH SHALL ILLUSTRATE THE VARIOUS MODES OF OPERATION, INCLUDING STARTUP, SHUTDOWN, FIRE/SMOKE ALARM, POWER FAILURE, ETC.
  - DURING ANY DEMONSTRATION, SHOULD THE SYSTEM FAIL TO PERFORM IN ACCORDANCE WITH THE REQUIREMENTS OF THE O&M MANUAL OR SEQUENCE OF OPERATIONS, THE SYSTEM WILL BE REPAIRED OR ADJUSTED AS NECESSARY AND THE DEMONSTRATION REPEATED.

REVISIONS

BY	DESCRIPTION	DATE	#						



5/16/25

224169

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA



SHEET TITLE  
HVAC SPECS

DRAWN BY JAG	CHECKED BY JSD
DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M12	13 OF 19

1. DURING ANY DEMONSTRATION, SHOULD THE SYSTEM FAIL TO PERFORM IN ACCORDANCE WITH THE REQUIREMENTS OF THE O&M MANUAL OR SEQUENCE OF OPERATIONS, THE SYSTEM WILL BE REPAIRED OR ADJUSTED AS NECESSARY AND THE DEMONSTRATION REPEATED.
2. THE APPROPRIATE TRADE OR MANUFACTURER'S REPRESENTATIVE SHALL PROVIDE THE INSTRUCTIONS ON EACH MAJOR PIECE OF EQUIPMENT. THIS PERSON MAY BE THE START-UP TECHNICIAN FOR THE PIECE OF EQUIPMENT. THE INSTALLING CONTRACTOR OR MANUFACTURER'S REPRESENTATIVE, PRACTICAL BUILDING OPERATING EXPERTISE AS WELL AS IN-DEPTH KNOWLEDGE OF ALL MODES OF OPERATION OF THE SPECIFIC PIECE OF EQUIPMENT ARE REQUIRED. MORE THAN ONE PARTY MAY BE REQUIRED TO EXECUTE THE TRAINING.
3. THE CONTROLS CONTRACTOR SHALL ATTEND SESSIONS OTHER THAN THE CONTROLS TRAINING, AS REQUESTED, TO DISCUSS THE INTERACTION OF THE CONTROLS SYSTEM AS IT RELATES TO THE EQUIPMENT BEING DISCUSSED.
4. THE TRAINING SESSIONS SHALL FOLLOW THE OUTLINE IN THE TABLE OF CONTENTS OF THE OPERATION AND MAINTENANCE MANUAL AND ILLUSTRATE WHENEVER POSSIBLE THE USE OF THE O&M MANUALS FOR REFERENCE.
5. TRAINING SHALL INCLUDE:
- a. USE OF THE PRINTED INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTION MATERIAL INCLUDED IN THE O&M MANUALS.
- b. A REVIEW OF THE WRITTEN O&M INSTRUCTIONS EMPHASIZING SAFE AND PROPER OPERATING REQUIREMENTS, PREVENTATIVE MAINTENANCE, SPECIAL TOOLS NEEDED AND SPARE PARTS INVENTORY SUGGESTIONS. THE TRAINING SHALL INCLUDE START-UP, OPERATION IN ALL MODES POSSIBLE, SHUT-DOWN, SEASONAL CHANGEOVER AND ANY EMERGENCY PROCEDURES.
- c. DISCUSSION OF RELEVANT HEALTH AND SAFETY ISSUES AND CONCERNS.
- d. DISCUSSION OF WARRANTIES AND GUARANTEES.
- e. COMMON TROUBLESHOOTING PROBLEMS AND SOLUTIONS.
- f. EXPLANATORY INFORMATION INCLUDED IN THE O&M MANUALS AND THE LOCATION OF ALL PLANS AND MANUALS IN THE FACILITY.
- g. DISCUSSION OF ANY PECULIARITIES OF EQUIPMENT INSTALLATION OR OPERATION.
- h. THE FORMAT AND TRAINING AGENDA IN THE COMMISSIONING PROCESS, ASHRAE GUIDELINE 0-2005.
- i. CLASSROOM SESSIONS SHALL INCLUDE THE USE OF OVERHEAD PROJECTIONS, SLIDES, VIDEO/AUDIO-TAPED MATERIAL AS MIGHT BE APPROPRIATE.
9. HANDS-ON TRAINING SHALL INCLUDE START-UP, OPERATION IN ALL MODES POSSIBLE, INCLUDING MANUAL, START-UP SHUT-DOWN AND ANY EMERGENCY PROCEDURES AND PREVENTATIVE MAINTENANCE FOR ALL PIECES OF EQUIPMENT.
10. STARTING SYSTEMS:
- a. COORDINATE SCHEDULE FOR START-UP OF VARIOUS EQUIPMENT AND SYSTEMS.
- b. NOTIFY OWNER SEVEN DAYS PRIOR TO START-UP OF EACH ITEM AND PROVIDE ONE COPY OF MANUFACTURER'S OPERATION AND MAINTENANCE INSTRUCTIONS.
- c. VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE, OR OTHER CONDITIONS WHICH MAY CAUSE DAMAGE.
- d. VERIFY THAT TESTS, METER READINGS, AND SPECIFIED ELECTRICAL CHARACTERISTICS AGREE WITH THOSE REQUIRED BY THE EQUIPMENT OR SYSTEM MANUFACTURER.
- e. VERIFY WIRING AND SUPPORT COMPONENTS FOR EQUIPMENT ARE COMPLETE AND TESTED.
- f. EXECUTE START-UP UNDER SUPERVISION OF RESPONSIBLE MANUFACTURER'S REPRESENTATIVE & CONTRACTORS' PERSONNEL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTION.
- g. WHEN SPECIFIED IN INDIVIDUAL SPECIFICATION SECTIONS, REQUIRE MANUFACTURER TO PROVIDE AUTHORIZED REPRESENTATIVE TO BE PRESENT AT SITE TO INSPECT, CHECK AND APPROVE EQUIPMENT OR SYSTEM INSTALLATION PRIOR TO START-UP, AND TO SUPERVISE PLACING EQUIPMENT OR SYSTEM IN OPERATION.
- h. SUBMIT A WRITTEN REPORT IN ACCORDANCE WITH SECTION THAT EQUIPMENT OR SYSTEM HAS BEEN PROPERLY INSTALLED AND IS FUNCTIONING CORRECTLY.
11. THE HVAC CONTRACTOR SHALL FULLY EXPLAIN AND DEMONSTRATE THE OPERATION, FUNCTION AND OVERRIDES OF ANY LOCAL PACKAGED CONTROLS, NOT CONTROLLED BY THE CENTRAL CONTROL SYSTEM.
12. TRAINING SHALL OCCUR AFTER FUNCTIONAL TESTING IS COMPLETE, UNLESS APPROVED OTHERWISE BY THE OWNER.

END OF SECTION

SECTION 231000 - MATERIALS AND METHODS - HVAC

PART 1 - GENERAL

1.1 SCOPE:

- A. SECTION 230500 - "GENERAL PROVISIONS - HVAC" SHALL APPLY TO AND BECOME PART OF THIS SECTION.

PART 2 - MATERIALS: (ALL PIPE, FITTINGS AND VALVES SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA)

2.1 HVAC DRAIN PIPING:

- A. STANDARD WEIGHT GALVANIZED STEEL PIPE ASTM A106 WITH GALVANIZED MALLEABLE IRON FITTINGS, OR TYPE L HARD COPPER WITH WROUGHT COPPER SWEAT FITTINGS, AT CONTRACTOR'S OPTION.
- B. PROVIDE DRAIN TRAPS FOR AC UNIT DRAIN PANS. SIZE TRAPS AS REQUIRED TO DRAIN UNDER OPERATING CONDITIONS. SEE TRAP DETAIL ON DRAWINGS.

2.2 REFRIGERATION PIPING:

- A. TYPE L HARD DRAWN COPPER TUBING WITH WROUGHT COPPER SWEAT FITTINGS. JOINTS: SILFOSSSED WITH CONTINUOUS FLOW OF DRY NITROGEN THROUGH LINES.
- B. SIZE ALL LINES PER MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS BASED ON ACTUAL LINE LENGTHS, DISTANCES, AND ELEVATIONS. SO AS TO ENSURE OIL RETURN AT MINIMUM LOADING.
- C. SMALL LINES 5/8" OD AND SMALLER MAY BE SOFT COPPER WITH FLARE FITTINGS, PROVIDED THAT ALL JOINTS ARE EXPOSED FOR VISUAL INSPECTION.
- D. REFRIGERANT PIPING SHALL NOT BE LEFT OPEN FOR A PERIOD LONGER THAN NECESSARY TO ASSEMBLE THE PIPING. PROVIDE NITROGEN FLOW, AND SOLDER. IN NO CASE SHALL ANY PIPING ASSEMBLED OR STORED BE LEFT OPEN AT THE END OF THE DAY. PIPE THAT IS ASSEMBLED BUT NOT SOLDERED IS OPEN. PIPING THAT IS STORED SHALL NOT BE USED IF IT HAS LOST THE MANUFACTURER'S NITROGEN CHARGE.
- E. REFRIGERANT PIPING SHALL BE PROTECTED AGAINST PHYSICAL DAMAGE. REFRIGERANT PIPING INSTALLED IN STUDS, JOISTS, RAFTERS OR SIMILAR MEMBER SPACES, AND LOCATED LESS THAN 1-1/4 INCHES (32 MM) FROM THE NEAREST EDGE OF THE MEMBER, SHALL BE CONTINUOUSLY PROTECTED BY SHIELD PLATES. PROTECTIVE STEEL SHIELD PLATES SHALL COVER THE AREA OF THE TUBE PLUS THE AREA EXTENDING NOT LESS THAN 2 INCHES (51 MM) BEYOND BOTH SIDES OF THE TUBE. SHIELD PLATES SHALL BE OF STEEL MATERIAL HAVING A THICKNESS OF NOT LESS THAN 0.0575 INCH (1.46 MM) (NO. 16 GAGE).

2.3 PIPE HANGERS:

- A. GENERAL: PIPE HANGERS, ANVIL, PHD, MICHIGAN HANGER, B-LINE OR ELCCN. ANVIL FIGURE NUMBERS ARE GIVEN FOR REFERENCE. PROVIDE COPPER CLAD OR PLASTIC COATED HANGERS ON BARE COPPER LINES.
- B. EQUIP PIPE HANGERS WITH VIBRATION ISOLATORS AS SPECIFIED UNDER VIBRATION ISOLATORS.
- C. PIPE HANGERS FOR LINES 3" AND SMALLER: ADJUSTABLE WROUGHT RING HANGERS, ANVIL FIG. 97 OR 69 OR WROUGHT CLEVIS HANGERS.
- D. PIPE HANGERS FOR PIPING 4" AND LARGER: ADJUSTABLE WROUGHT CLEVIS HANGERS.
- E. PARALLEL PIPING GRADED IN SAME DIRECTION MAY BE GROUPED ON TRAPEZES, TRAPEZES FOR LINE 4" AND SMALLER, UNISTRUT P2000 CHANNEL, OR EQUAL, WITH RODS SIZED AS SPECIFIED BELOW FOR LARGEST PIPE ON TRAPEZE. GUIDE LINES ON (BUT NOT ANCHOR TO) TRAPEZES USING UNISTRUT SERIES P1100 CLAMPS. TRAPEZES SHALL NOT EXCEED 3' IN LENGTH. SPACE LINES TO ALLOW AT LEAST 3" CLEAR BETWEEN ADJACENT PIPE OR PIPE COVERING AND BETWEEN PIPES OR PIPE COVERING AND RODS. SPACE TRAPEZES AS SPECIFIED FOR PIPE HANGERS BASED UPON SMALLEST SIZE OF PIPE ON TRAPEZE.
- F. PROVIDE RISER CLAMPS ON PIPE RISERS ON EACH FLOOR. CLAMPS IN CONTACT WITH COPPER OR PLASTIC PIPE, PLASTIC COATED.
- G. BEAM CLAMPS: ANVIL FIG. 228.
- H. INSERTS FOR HANGERS IN CONCRETE STRUCTURES: UNDERWRITER'S LISTED CAST IRON INSERTS. ANVIL FIG. 282.
- I. SIZE RODS FOR PIPE HANGERS NOT SMALLER THAN THE FOLLOWING: 3/8" RODS FOR PIPE UP TO 2", 1/2" FOR 2\_1/2" AND 3" PIPE, 5/8" RODS FOR 4" AND 5" PIPE, 3/4" RODS FOR 6" PIPE, AND 7/8" RODS FOR 8", 10" AND 12" PIPE. 1" RODS FOR 14" AND 16" PIPE AND 1\_1/8" RODS FOR 18" PIPE.
- J. SPACE PIPE HANGERS AT MAXIMUM: PIPE HANGER SPACING FOR SCREWED, SOLDER JOINT AND WELDED PIPING: 1/2" AND 3/4"; 6 FT.; 1" TO 1\_1/4"; 8 FT.; 1\_1/2" TO 2\_1/2", 10 FT.; 3" AND OVER, 12 FT. INSTALL ADDITIONAL HANGERS AT CHANGE OF DIRECTION, VALVE CLUSTERS, AND AT ALL DUCT AND UNIT MOUNTED COILS.
- K. INSTALL PIPE HANGERS ON INSULATED PIPE OVER PIPE COVERING. PROVIDE FACTORY FABRICATED INSULATED PIPE SHIELDS EQUAL TO PIPE SHIELDS, INC. "THERMAL HANGER SHIELDS" OR TRU-BALANCE INSULATED SADDLES AT HANGERS. PROVIDE SHIELD INSULATION OF RIGID CALCIUM SILICATE INDOORS OR RIGID PERLITE SILICATE OUTDOORS. THE SAME THICKNESS AS ADJACENT PIPE COVERING. (AT CONTRACTOR'S OPTION, PIPE SHIELDS MAY BE FIELD FABRICATED USING RIGID CALCIUM SILICATE OR FOAMGLASS INSULATION WITH ASJ AND 20 GAUGE GALVANIZED STEEL PROTECTOR, SHIELD LENGTH: 1.5 TIMES NOMINAL PIPE SIZE BUT NOT LESS THAN 4".)
- L. WRAP BARE COPPER REFRIGERANT LINES WITH SHEET LEAD OR MOLDED PLASTIC SLEEVE AT HANGERS.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION:

- A. CUT PIPE SQUARE AND REAM FULL SIZE AFTER CUTTING. CLEAN PIPE. MAKE THREADED JOINTS WITH TEFLON TAPE. DO NOT SPRING PIPE INTO PLACE.
- B. PROVIDE WELDING MATERIAL AND LABOR IN ACCORDANCE WITH THE WELDING PROCEDURES OF THE HEATING, PIPING, AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION OR OTHER APPROVED PROCEDURE CONFORMING TO THE REQUIREMENTS OF ANSI B31.9 "BUILDING SERVICE PIPING". EMPLOY ONLY WELDERS FULLY QUALIFIED IN THE ABOVE SPECIFIED PROCEDURE AND CURRENTLY CERTIFIED BY RECOGNIZED TESTING AUTHORITY. USE EITHER ELECTRIC ARC OR OXYACETYLENE WELDING. PROVIDE FULL PERIMETER WELDS AT BOTH FACE END AND COLLAR END OF EACH SLIP, ON FLANGE.
- C. INSTALL PIPING TO ALLOW FOR EXPANSION. MAKE CONNECTIONS TO ALL EQUIPMENT TO ELIMINATE UNDUE STRAINS IN PIPING AND EQUIPMENT. FURNISH NECESSARY FITTINGS AND BENDS TO AVOID SPRINGING OF PIPES DURING ASSEMBLY.
- D. PITCH AIR CONDITIONING UNIT DRAIN LINES DOWN IN DIRECTION OF FLOW 1/8" PER FOOT OF HORIZONTAL RUN. GRADE CHILLED AND HOT AND CONDENSER WATER SUPPLY AND RETURN LINES DOWN TO DRAINS AND UP TO AIR VENTS.
- E. INSTALL CHROME PLATED FLOOR AND CEILING PLATES ON PIPE PASSING THROUGH FINISHED SURFACES IN FINISHED SPACES.
- F. MAKE CONNECTIONS TO EQUIPMENT USING SCREWED UNIONS IN SIZES 2" AND SMALLER AND FLANGED UNIONS IN SIZES 2\_1/2" AND LARGER. INSTALL UNIONS IN ALL PIPING CONNECTIONS TO EACH PIECE OF EQUIPMENT. PROVIDE UNIONS ON ALL SIDES OF CONTROL VALVES.
- G. WHEREVER FERROUS PIPES OR TANKS AND COPPER TUBING CONNECT, PROVIDE DIELECTRIC INSULATING UNIONS OR COUPLINGS, EQUAL TO VICTAULIC STYLE 47, "V-LINE" INSULATING COUPLINGS AS MANUFACTURED BY LOCHINVAR, THREAD TO THREAD OR CTS FABRICATION FLANGE ADAPTORS FOR FLANGE CONNECTIONS.
- H. NEAR HEATING AND AIR CONDITIONING EQUIPMENT REQUIRING WATER PROVIDE VALVED AND CAPPED WATER OUTLETS OF SIZES SHOWN FOR CONNECTION TO EQUIPMENT, INCLUDING REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTERS. MAKE FINAL CONNECTIONS UNDER HVAC WORK. NOTE THAT ALL PIPING AND INSULATION DOWNSTREAM FROM BACKFLOW PREVENTER MUST BE PAINTED YELLOW.
- I. RUN PIPING CONCEALED, EXCEPT WHERE SPECIFICALLY SHOWN OR SPECIFIED TO BE EXPOSED. PLUMB ALL VERTICAL LINES AND RUN MAINS PARALLEL TO BUILDING WALLS UNLESS SPECIFICALLY SHOWN OTHERWISE.
- J. LAY UNDERGROUND PRESSURE PIPING SO TOP OF PIPE IS AT LEAST 18" BELOW FINISHED GRADE. SUPPORT ALL UNDERGROUND PIPING SOLIDLY ALONG BODY OF PIPE. STRONGLY SUSPEND OTHER PIPING FROM BUILDING CONSTRUCTION.
- K. PIPE SHALL BE BRACED AT FLEXIBLE CONNECTIONS TO PREVENT BLOWOUTS UNDER OPERATING CONDITIONS.
- L. RUN NO PIPING OR TUBING IN DIRECT CONTACT WITH SLAG FILL, WHERE NECESSARY TO PASS THROUGH SLAG, PROTECT PIPING WITH NOT LESS THAN TWO WRAPPINGS OF POLYVINYL CHLORIDE TAPE OR EQUIVALENT PROTECTION APPROVED BY ARCHITECT.

END OF SECTION

SECTION 231000 - MATERIALS AND METHODS - HVAC

PART 1 - GENERAL

1.1 SCOPE:

- A. SECTION 230500 - "GENERAL PROVISIONS - HVAC" SHALL APPLY TO AND BECOME PART OF THIS SECTION.

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PART 3 - EXECUTION

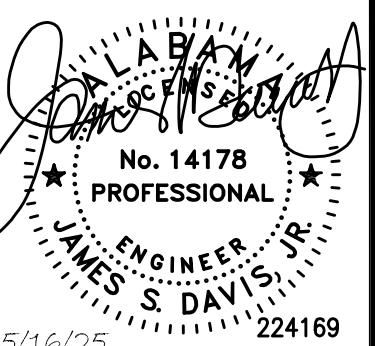
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- E. INSTALL CHROME PLATED FLOOR AND CEILING PLATES ON PIPE PASSING THROUGH FINISHED SURFACES IN FINISHED SPACES.
- F. MAKE CONNECTIONS TO EQUIPMENT USING SCREWED UNIONS IN SIZES 2" AND SMALLER AND FLANGED UNIONS IN SIZES 2\_1/2" AND LARGER. INSTALL UNIONS IN ALL PIPING CONNECTIONS TO EACH PIECE OF EQUIPMENT. PROVIDE UNIONS ON ALL SIDES OF CONTROL VALVES.
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- I. RUN PIPING CONCEALED, EXCEPT WHERE SPECIFICALLY SHOWN OR SPECIFIED TO BE EXPOSED. PLUMB ALL VERTICAL LINES AND RUN MAINS PARALLEL TO BUILDING WALLS UNLESS SPECIFICALLY SHOWN OTHERWISE.
- J. LAY UNDERGROUND PRESSURE PIPING SO TOP OF PIPE IS AT LEAST 18" BELOW FINISHED GRADE. SUPPORT ALL UNDERGROUND PIPING SOLIDLY ALONG BODY OF PIPE. STRONGLY SUSPEND OTHER PIPING FROM BUILDING CONSTRUCTION.
- K. PIPE SHALL BE BRACED AT FLEXIBLE CONNECTIONS TO PREVENT BLOWOUTS UNDER OPERATING CONDITIONS.
- L. RUN NO PIPING OR TUBING IN DIRECT CONTACT WITH SLAG FILL, WHERE NECESSARY TO PASS THROUGH SLAG, PROTECT PIPING WITH NOT LESS THAN TWO WRAPPINGS OF POLYVINYL CHLORIDE TAPE OR EQUIVALENT PROTECTION APPROVED BY ARCHITECT.

END OF SECTION

REVISIONS

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5/16/25

224169

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD -  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA



SHEET TITLE  
HVAC SPECS

DRAWN BY JAG	CHECKED BY JSD
DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M13	14 OF 19



SECTION 235000 - HEATING AND AIR CONDITIONING EQUIPMENT AND SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE:

A. SECTION 230500 - "GENERAL PROVISIONS - HVAC" SHALL APPLY TO AND BECOME PART OF THIS SECTION.

PART 2 - EQUIPMENT AND SPECIALTIES

2.1 DEHUMIDIFIERS

- A. U.L. LABELED REFRIGERATED DEHUMIDIFIERS CONSISTING IN GENERAL OF AN EVAPORATOR COIL, CONDENSER COIL, FAN MOTOR AND FANS, REFRIGERATION COMPRESSOR, DRAIN PAN, AND CONTROLS ALL ENCLOSED IN A HEAVY GAUGE STEEL CABINET WITH BAKED ENAMEL FINISH.
- B. SANTA FE OR APPROVED EQUAL.

2.2 SPLIT SYSTEM HEAT PUMP - VRF:

- A. SPLIT SYSTEM AIR CONDITIONERS SHALL CONSIST OF A WALL OR CEILING MOUNTED INDOOR SECTION, OUTDOOR HEAT PUMP UNIT, CONNECTING REFRIGERANT PIPING, AND ELECTRONIC CONTROLS. SYSTEM SHALL BE UL RATED.
- B. INDOOR UNIT SHALL CONSIST OF CENTRIFUGAL EVAPORATOR FAN(S), EVAPORATOR COIL, DRAIN PAN WITH CONDENSATE PUMP AND SAFETY SWITCH, ALL ENCLOSED IN A PLASTIC CASING EQUIPPED WITH ADJUSTABLE SUPPLY GRILLE AND RETURN AIR GRILLE. PROVIDE 3 POLE DISCONNECT SWITCH.
- C. OUTDOOR UNIT SHALL CONSIST OF COMPRESSOR, CONDENSER COIL, CONDENSER FAN, AND CONTROLS, ALL ENCLOSED IN A METAL GRILLED CABINET SUITABLE FOR ROOF OR PAD MOUNTING. PROVIDE REFRIGERANT PIPING KIT, PRE-INSULATED, PROPERLY SIZED FOR CAPACITY SHOWN. (SEE DRAWINGS TO DETERMINE LENGTH).
- D. CONTROLS SHALL CONSIST OF A WALL MOUNTED REMOTE CONTROLLER UTILIZING A MICROPROCESSOR. FUNCTIONS SHALL INCLUDE:

1. COMPUTERIZED DEHUMIDIFICATION.
2. OPERATION MODE SETTING.
3. SELF-DIAGNOSTIC DISPLAY.
4. ROOM TEMPERATURE DISPLAY.
5. TWENTY-FOUR HOUR ON-OFF TIMER.
6. FAN SPEED INDICATOR.
7. MEMORY.

E. SPLIT SYSTEM HEAT PUMP - VRF SHALL BE FUJITSU.

2.3 VARIABLE REFRIGERANT FLOW SIMULTANEOUS HEATING AND COOLING SYSTEM

- A. GENERAL: THE VARIABLE REFRIGERANT FLOW HEATING AND COOLING SYSTEM IS DESIGNED AND SPECIFIED FOR HEAT RECOVERY SIMULTANEOUSLY HEATING AND COOLING. VARIABLE REFRIGERANT FLOW SYSTEMS MANUFACTURED BY FUJITSU.
- B. SUBMITTAL REQUIRED: IN ADDITION TO DETAILED EQUIPMENT SUBMITTAL NOTED ABOVE, SUCCESSFUL BIDDER SHALL SUBMIT A DETAILED, DIMENSIONED REFRIGERANT PIPING PLAN SHOWING LINE LENGTHS AND SIZES. REFRIGERANT PIPING SHALL BE AS APPROVED BY THE EQUIPMENT MANUFACTURER.
- C. SYSTEM DESCRIPTION

1. THE VARIABLE CAPACITY HEAT PUMP AND AIR CONDITIONING SYSTEM SHALL BE A VARIABLE REFRIGERANT FLOW SERIES HEAT/COOL SPLIT SYSTEM USING SIMULTANEOUS HEAT/COOL OPERATION. THE SYSTEM SHALL CONSIST OF MULTIPLE INDOOR UNITS AND ONE OR MORE OUTDOOR UNITS MANUFACTURED FOR COMBINED CAPACITY REQUIREMENTS. THE OUTDOOR UNIT SHALL BE DIRECT EXPANSION TYPE AIR COOLED HEAT PUMP WITH VARIABLE SPEED DRIVEN ROTARY COMPRESSOR UTILIZING ADVANCED INVERTER CONTROL.
2. BY VARYING THE ROTATIONAL SPEED OF THE COMPRESSOR, THE INVERTER CONTROL IS MATCHING THE AMOUNT OF REFRIGERANT BEING DELIVERED TO THE NEEDS OF EACH ZONE DURING FULL AND PARTIAL-LOAD CONDITIONS. INDOOR UNITS SHALL BE SUPPLIED AS PER SCHEDULE. EACH INDOOR UNIT IS CAPABLE OF OPERATING SEPARATELY WITH INDIVIDUAL TEMPERATURE CONTROL. THE INDOOR UNITS SHALL BE CONNECTED TO THE SYSTEM UTILIZING SOLENOID VALVE KITS MATCHING THE SIZE OF THE INDOOR UNIT.
3. THE SYSTEM SHALL BE PIPED WITH REFRIGERANT LINES USING FACTORY SUPPLIED CONNECTORS ON ALL BRANCHING LINES. ALL REFRIGERANT PIPING SHALL BE INSULATED AS SPECIFIED. THE SYSTEM SHALL BE CHARGED WITH R410A REFRIGERANT ACCORDING TO MANUFACTURER'S GUIDELINES.

D. QUALITY ASSURANCE:

1. THE UNITS SHALL BE LISTED BY UNDERWRITERS LABORATORY OR THE CANADIAN STANDARD ASSOCIATION (CSA / CSA-US) AND BEAR THE UL OR CSA LABEL.
2. ALL FACTORY WIRING SHALL BE IN ACCORDANCE WITH NATIONAL OR STATE ELECTRIC CODES.
3. THE SYSTEM SHALL BE MANUFACTURED IN A FACILITY BEARING ISO 9001 AND/OR ISO 14001 CERTIFICATION WHICH IS A SET OF STANDARDS APPLYING TO ENVIRONMENTAL PROTECTION SET BY THE INTERNATIONAL STANDARD ORGANIZATION (ISO). THE SYSTEM SHALL BE FACTORY TESTED.

E. HANDLING AND STORAGE: THE UNITS SHALL BE HANDLED AND STORED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. EACH UNIT SHALL BE SUPPLIED WITH INITIAL CHARGE OF R410A.

F. WARRANTY: THE UNIT SHALL HAVE A MANUFACTURER'S WARRANTY (PARTS AND LABOR) FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF INSTALLATION. THERE SHALL BE A SIX (6) YEAR COMPRESSOR (PARTS) WARRANTY FROM THE DATE OF INSTALLATION.

G. INSTALLATION AND START UP: THE SYSTEM INCLUDING REFRIGERANT PIPING AND CHARGE MUST BE INSTALLED AND COMMISSIONED BY A FACTORY TRAINED TECHNICIAN.

OPERATING RANGE (OUTDOOR AMBIENT)

COOLING: 14°F DB TO 109°F DB

HEATING: -4°F WB TO 59°F WB

H. OUTDOOR UNIT:

1. GENERAL: THE OUTDOOR UNIT SHALL BE DESIGNED SPECIFICALLY FOR USE WITH VRF INVERTER TECHNOLOGY COMPONENTS.
2. THE UNIT SHALL BE FACTORY ASSEMBLED AND WIRED WITH ALL REFRIGERANT AND ELECTRONIC CONTROLS.
3. THE REFRIGERANT CIRCUIT SHALL CONSIST OF A DC INVERTER TYPE ROTARY COMPRESSOR, MOTORS, FANS, CONDENSER COIL, ELECTRONIC EXPANSION VALVE, OIL SEPARATORS, SERVICE PORTS, LIQUID RECEIVERS AND ACCUMULATORS, CAPILLARY TUBE, 4-WAY VALVES, SOLENOID VALVES, AND STRAINER.
4. ALL REFRIGERANT PIPING (SUCTION, LIQUID AND DISCHARGE) MUST BE INDIVIDUALLY INSULATED BETWEEN THE OUTDOOR AND INDOOR UNITS.
5. CONNECTABILITY: UP TO 16 INDOOR UNITS ON A SINGLE OUTDOOR UNIT AND UP TO 40 INDOOR UNITS ON COMBINATION UNITS. DIVERSITY RATIO 50 - 130%.
6. THE SOUND POWER LEVEL SHALL NOT EXCEED 65 DB(A) AT 3.3 FEET IN FRONT AT HEIGHT OF 4.9 FEET DURING STANDARD HEAT OR COOL MODE. AT THE "QUIET" MODE THIS VALUE SHALL DROP TO 62 DB(A).
7. THE SYSTEM WILL AUTOMATICALLY RESTART OPERATION AFTER A POWER FAILURE LOST SETTING. (NO REPROGRAMMING).
8. THE FOLLOWING SAFETY DEVICES SHALL BE INCLUDED: HIGH PRESSURE SWITCH, LOW PRESSURE SWITCH, CONTROL CIRCUIT FUSES, CRANKCASE HEATER, OVERCURRENT (CT METHOD), INVERTER PROTECTION, ANTI-CYCLE TIMER.
9. REVERSE-CYCLE DEFROST FOR OUTDOOR UNIT CYCLE DEFROST.
10. THE OUTDOOR UNIT SHALL BE COMPLETELY WEATHERPROOF AND CORROSION RESISTANT. UNIT PANELS SHALL BE PAINTED WITH BAKED ENAMEL FINISH.
11. CONDENSER FAN
  - a. CONDENSING UNIT SHALL CONSIST OF ONE PROPELLER TYPE FAN DIRECT DRIVE 0.7 KW MOTOR WITH VARIABLE SPEED DC INVERTER WITH HIGH PRESSURE SWITCH AND OVERCURRENT (CT METHOD) CONNECTION.
  - b. THE FAN SHALL BE VERTICAL TYPE DISCHARGE AIR CONFIGURATION.
  - c. THE FAN SHALL BE PROTECTED WITH FAN GUARD TO PREVENT CONTACT WITH MOVING PARTS.

12. OUTDOOR COIL:

- a. THE CONDENSER COIL SHALL BE MADE OF COPPER TUBES AND ALUMINUM FINS MECHANICALLY BONDED.
- b. THE CONDENSER FINNED AREA SHALL ACCOMMODATE FOR SYSTEM SUBCOOLING CAPACITY IN COOLING MODE.
- c. THE CONDENSER FINNED AREA SHALL ACCOMMODATE FOR SYSTEM SUPERHEAT CAPACITY IN HEATING MODE.

13. COMPRESSORS:

- a. INVERTER COMPRESSOR: THE COMPRESSOR SHALL BE A DC INVERTER TYPE SCROLL HERMETIC COMPRESSOR WITH VARIABLE REFRIGERANT FLOW CAPABILITY.
- b. OIL SEPARATOR SHALL BE PART OF THE DISCHARGE (HOT GAS) LINE.
- c. PROVIDE SUCTION LINE ACCUMULATORS
- d. COMPRESSOR MOTOR SHALL BE TYPE IPMSM (INTERIOR PERMANENT MAGNET SYNCHRONOUS MOTOR).

14. ELECTRICAL:

- a. THE POWER SUPPLY TO THE OUTDOOR UNIT SHALL BE 208/230 VOLTS, 3 PHASE, 60 HERTZ
- b. THE CONTROL VOLTAGE BETWEEN THE OUTDOOR UNITS AND INDOOR AND INDOOR UNITS SHALL BE 12 VDC IN 18 AWG STRANDED, SHIELDED CABLE. THE SHIELDING MUST BE GROUNDED ON ONE SIDE.

I. INDOOR UNITS:

1. 4-WAY CEILING MOUNTED SEMI-RECESSED INDOOR FAN COIL UNITS AND HORIZONTAL FAN COIL UNITS DUCTED:

a. GENERAL : UNIT SIZING AND CABINET:

- 1) SEMI-RECESSED CEILING UNITS SHALL BE CONSTRUCTED FOR INSTALLATION IN A 24" BY 24" CEILING GRID SYSTEM WITHOUT MODIFICATION TO THE CEILING SYSTEM. THE INDOOR UNIT SHALL BE FACTORY ASSEMBLED, WIRED AND RUN TESTED, CONTAINED WITHIN THE UNIT SHALL BE ALL FACTORY WIRING, PIPING, ELECTRONIC MODULATING LINEAR EXPANSION DEVICE, CONTROL CIRCUIT BOARD AND FAN MOTOR. THE UNIT SHALL HAVE A SELF-DIAGNOSTIC FUNCTION, 3-MINUTE TIME DELAY MECHANISM, AN AUTO RESTART FUNCTION, AND A TEST RUN SWITCH. INDOOR UNIT AND REFRIGERANT PIPES SHALL BE CHARGED WITH DEHYDRATED AIR OR NITROGEN BEFORE SHIPMENT FROM THE FACTORY.
- 2) FOUR-WAY GRILLE SHALL BE FIXED TO THE BOTTOM OF THE CABINET ALLOWING TWO, THREE OR FOUR-WAY AIRFLOW.

b. FAN

- 1) THE INDOOR UNIT FAN SHALL BE A TURBO FAN ASSEMBLY DRIVEN BY A SINGLE MOTOR.
- 2) THE INDOOR UNIT FAN SHALL BE STATICALLY AND DYNAMICALLY BALANCED TO RUN ON A MOTOR WITH PERMANENTLY LUBRICATED BEARINGS.
- 3) THE INDOOR UNIT FAN SHALL CONSIST OF THREE SPEEDS, LOW, MID, AND HIGH.
- 4) THE INDOOR UNIT SHALL HAVE AN ADJUSTABLE AIR OUTLET SYSTEM OFFERING 4-WAY AIRFLOW, 3-WAY AIRFLOW, OR 2-WAY AIRFLOW
- 5) THE AUTO AIR SWING VANES.

c. CASSETTE FILTER: RETURN AIR SHALL BE FILTERED BY MEANS OF AN EASILY REMOVABLE, WASHABLE FILTER.

d. FAN COIL: RETURN AIR PLENUM FILTER BOX 1" THICK PLEATED FILTER, MERV 8.

e. COIL:

- 1) THE INDOOR UNIT SHALL BE OF NON-FERROUS CONSTRUCTION WITH SMOOTH PLATE FINS ON COPPER TUBING.
- 2) THE TUBING SHALL HAVE INNER GROOVES FOR HIGH EFFICIENCY HEAT EXCHANGE.
- 3) ALL TUBE JOINTS SHALL BE BRAZED WITH SILVER ALLOY.
- 4) THE COILS SHALL BE PRESSURE TESTED AT THE FACTORY.
- 5) A CONDENSATE PAN AND DRAIN SHALL BE PROVIDED UNDER THE COIL.
- 6) REFRIGERANT LINES TO THE INDOOR UNITS SHALL BE INDIVIDUALLY INSULATED WITH 3/4" CLOSED CELL FOAM INSULATION.
- 7) THIS MODEL HAS A FACTORY INSTALLED CONDENSATE LIFT PUMP.
- 8) CAPACITY: SEE THE SCHEDULE ON THE DRAWINGS FOR THE CAPACITY REQUIREMENT IN EACH ZONE.
- 9) POWER REQUIREMENTS: POWER REQUIREMENT SHALL BE 208 TO 230 VOLTS SINGLE PHASE POWER

J. WALL MOUNT INDOOR FAN COIL UNIT:

1. SPLIT SYSTEM AIR CONDITIONERS SHALL CONSIST OF A WALL MOUNTED INDOOR SECTION, CONNECTING REFRIGERANT PIPING, AND ELECTRONIC CONTROLS. SYSTEM SHALL BE UL RATED.
2. INDOOR UNIT SHALL CONSIST OF CENTRIFUGAL EVAPORATOR FAN(S), EVAPORATOR COIL, DRAIN PAN WITH CONDENSATE PUMP AND SAFETY SWITCH, ALL ENCLOSED IN A PLASTIC CASING EQUIPPED WITH ADJUSTABLE SUPPLY GRILLE AND RETURN AIR GRILLE. PROVIDE 3 POLE DISCONNECT SWITCH.
3. CONTROLS SHALL CONSIST OF A WALL MOUNTED REMOTE CONTROLLER UTILIZING A MICROPROCESSOR. FUNCTIONS SHALL INCLUDE:

- a. COMPUTERIZED DEHUMIDIFICATION.
- b. OPERATION MODE SETTING.
- c. SELF-DIAGNOSTIC DISPLAY.
- d. ROOM TEMPERATURE DISPLAY.
- e. TWENTY-FOUR HOUR ON-OFF TIMER.
- f. FAN SPEED INDICATOR.
- g. MEMORY.
- h. LOW AMBIENT OPERATION.

K. HEAT PUMP VERTICAL INDOOR UNITS:

1. INDOOR UNITS: SUPPLY FANS, COILS, FILTERS, AND DRIP PANS, VERTICAL AS SHOWN.
2. CASINGS: GALVANIZED STEEL NOT LIGHTER THAN (22) GAUGE, REINFORCED WITH ANGLES OR FORMED SHAPES WITH BAKED ENAMEL FINISH OVER BONDORIZING. CASING PANELS: REMOVABLE FOR ACCESS TO FANS, MOTORS, COILS, AND BEARINGS. PROVIDE KNOCKOUTS FOR PIPING AND ELECTRICAL CONNECTIONS. CASING SHALL BE INSULATED WITH 1" THICK FOIL-FACED DUCT LINER MEETING THE REQUIREMENTS OF NFPA 90A.
3. PROVIDE STATICALLY AND DYNAMICALLY BALANCED DIRECT DRIVEN CENTRIFUGAL FANS WITH SELF ALIGNING BALL BEARINGS, ADJUSTABLE SPEED MOTOR (3 SPEED), FAN MOTOR AND DRIVE SHALL BE LOCATED INSIDE UNIT CABINET. PROVIDE FAN STARTING RELAY FOR EACH UNIT.
4. COILS: INCLUDE REFRIGERANT COILS AND ELECTRIC HEATING COILS. REFRIGERANT COILS SHALL CONSIST OF NONFERROUS FINS SECURELY BONDED TO SEAMLESS COPPER TUBES, AND SHALL BEAR AHRI APPROVED RATINGS.
5. DRAIN PANS: PROVIDE CORROSION RESISTANT COATING AND INSULATING CORROSION-RESISTANT FILL.
6. FILTERS: 1" THICK THROWAWAY FILTERS, MERV 8. TURN EQUIPMENT OVER TO OWNER WITH CLEAN FILTERS. PROVIDE ONE SET OF SPARE FILTERS.
7. ELECTRIC HEATERS:
  - a. ALL HEATERS SHALL BE LISTED IN THE UNDERWRITERS LABORATORIES, INC. ELECTRICAL APPLIANCE & UTILIZATION EQUIPMENT LIST.
  - b. HEATERS SHALL HAVE CERAMIC SUPPORTED NICHROME WIRE ELEMENTS, FLANGED MOUNTING PLATE, NEMA 1 CONTROL BOX CONTAINING CONTACTORS FOR HEATERS, FACTORY WIRED TO TERMINAL STRIPS AND 1/2" INSULATION BETWEEN MOUNTING PLATE AND CONTROL BOX, ALL SHEET METAL PARTS IN AIR STREAM ALUMINIZED OR GALVANIZED STEEL. PROVIDE SPACES AT TERMINAL END OF HEATER SO THAT INTERNAL DUCT INSULATION WILL NOT CAUSE HOT SPOTS.
  - c. EQUIP HEATERS WITH FACTORY WIRED AUTOMATIC HIGH LIMIT CONTROL AND A SUPPLEMENTARY INDEPENDENT THERMAL DEVICE TO DISCONNECT ALL POWER CIRCUITS IN CASE AUTOMATIC HIGH LIMIT FAILS. EQUIP HEATERS SHALL BE SUPPLIED WITH CONTROL CIRCUITS SUITABLE FOR 24 VOLT CONTROL. FACTORY WIRED TO TERMINAL BLOCKS IN CONTROL BOX.
  - d. PROVIDE STAGING AS REQUIRED BY CODE, BUT NOT FEWER STAGES THAN THOSE SHOWN.
8. INDOOR UNITS: OF SAME MANUFACTURER AS OUTDOOR UNITS.
9. PROVIDE INSULATED PLENUM BASES AS SHOWN.

L. CONTROLS:

1. ZONE CONTROL:
  - a. CONTROL OF THE ZONE (INDOOR) UNITS SHALL BE ACCOMPLISHED WITH A WIRED ZONE CONTROLLER.
  - b. ZONE CONTROLLER MODELS AVAILABLE SHALL BE AS FOLLOWS:
    - 1) STANDARD WIRED ZONE CONTROLLER WITH DIAGNOSTIC CAPABILITY
2. INTELLIGENT CONTROLLER:
  - a. THIS CONTROLLER SHALL CONNECT TO THE SYSTEM COMMUNICATION TRUNK AND PROVIDE THE CAPABILITY OF PROGRAMMED CONTROL ON ALL OF THE ZONE UNITS CONNECTED TO THE TRUNK.
  - b. THIS CONTROLLER SHALL PROVIDE WEB ACCESS TO THE SYSTEM.
  - c. THIS CONTROLLER SHALL HAVE A USER INTERFACE WITH A TOUCH SCREEN.
  - d. THIS CONTROLLER SHALL HAVE BACNET SERIAL INTERFACE WITH BAS.

24. CENTRIFUGAL ROOF EXHAUSTERS:

- A. CENTRIFUGAL POWER ROOF VENTILATORS WITH AMCA CERTIFIED AIR AND SOUND RATINGS, BELT OR DIRECT DRIVEN AS SHOWN, PROVIDE PERMANENTLY OILED BEARINGS, STATICALLY AND DYNAMICALLY BALANCED BACKWARD CURVED BLADE WHEELS AND SPUN ALUMINUM HOUSING WITH CURB CAP, DISCONNECT SWITCHES, BACK DRAFT DAMPER AND OUTLET BIRD SCREEN. FOR BELT DRIVEN FANS PROVIDE V-BELT DRIVE SIZED FOR 50% OVERLOAD, ADJUSTABLE PITCH MOTOR PULLEY AND ADJUSTABLE MOTOR BASE. FOR EACH FAN FURNISH AN 18 GAUGE GALVANIZED STEEL INSULATED PREFABRICATED CURB WITH INTEGRAL CANT. FURNISH BAFFLED SOUND ABSORBING CURBS WHERE REQUIRED TO OBTAIN NOISE LEVELS SPECIFIED. STATIC PRESSURES SCHEDULED ARE EXTERNAL TO SOUND CURBS.
- B. FANS SHALL BE GREENHECK, ACME, CARNES, PENN OR LOREN COOK.

25. CENTRIFUGAL WALL EXHAUSTERS:

- A. FANS: AMCA CERTIFIED AIR AND SOUND RATINGS, BELT OR DIRECT DRIVEN AS SHOWN WITH PERMANENTLY OILED BEARINGS, STATICALLY AND DYNAMICALLY BALANCED BACKWARD CURVED BLADE WHEELS AND SPUN ALUMINUM HOUSING WITH DISCONNECT SWITCHES, BACK DRAFT DAMPER AND OUTLET BIRD SCREEN. FOR BELT DRIVEN FANS PROVIDE V-BELT DRIVE SIZED FOR 50% OVERLOAD, ADJUSTABLE PITCH MOTOR PULLEY AND ADJUSTABLE MOTOR BASE.
- B. FANS: GREENHECK, ACME, PENN OR LOREN COOK.

26. IN-LINE CENTRIFUGAL FANS:

- A. AMCA APPROVED AIR AND SOUND RATED DIRECT OR BELT DRIVEN FANS AS SCHEDULED. COMPLETE WITH V-BELT DRIVES SIZED FOR 50% OVERLOAD, SELF ALIGNING GREASE LUBRICATED BALL BEARINGS, ADJUSTABLE PITCH MOTOR PULLEYS, ADJUSTABLE MOTOR BASES AND STATICALLY AND DYNAMICALLY BALANCED BACKWARD CURVED BLADE WHEELS, ALL ENCLOSED IN A GALVANIZED STEEL HOUSING WITH INLET BELL AND OUTLET DUCT COLLARS. (FAN WHEEL AND MOTOR ASSEMBLY SHALL BE HINGED FOR ACCESS.)
- B. FANS SHALL BE GREENHECK TYPE SQ, CARNES, PEERLESS, ACME, PENN OR LOREN COOK.

27. CEILING EXHAUST FANS:

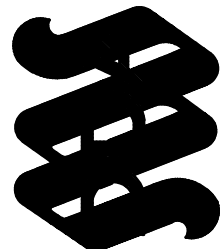
REVISIONS

#	DATE	DESCRIPTION	BY



SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA

MW / Davis Dumas & Assoc., Inc.  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Southlake, TX 76090  
Phone (205) 252-0246  
Fax (205) 251-8506



SHEET TITLE  
HVAC SPECS

DRAWN BY JAG	CHECKED BY JSD
DATE MAY 16, 2025	
JOB NUMBER 224169	
SHEET NUMBER M14	15 OF 19



A circular professional seal for the State of Alabama. The outer ring contains the text "ALABAMA" at the top and "JAMES S. DAVIS, JR." at the bottom. Inside the ring, the words "REGISTERED" and "PROFESSIONAL" are separated by two stars. The center of the seal features the text "No. 14178" and "ENGINEER". The seal is signed with a cursive signature across the top and has the date "5/16/25" written in the bottom left corner. The number "224169" is written in the bottom right corner.

224169

SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA

M15	OF
	19

3. TEMPERATURE CONTROL:

- a. THE CONTROLLER SHALL ENABLE THE TEMPERATURE CONTROL SEQUENCE WHEN ANY OF THE FOLLOWING CONDITIONS ARE MET.
  - 1) OCCUPANCY MODE.
  - 2) NIGHT SETBACK MODE ENABLED.
- b. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE DETERMINED BY THE FOLLOWING INPUTS. SPACE TEMPERATURE AND HUMIDITY CONTROL WITH SUPPLY AIR RESET OR PID LOOP DRIVEN BY USER-DEFINED SPACE TEMPERATURE SETPOINT WITHIN THE SUPPLY MINIMUM AND MAXIMUM SET POINTS.
- c. THE CONTROLLER SHALL ENABLE THE FOLLOWING MODES OF OPERATION IN ORDER TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT.
  - 1) HEATING.
  - 2) ENERGY RECOVERY.
  - 3) COOLING.
- d. HEATING:
  - 1) THE CONTROLLER SHALL ENABLE HEATING UNDER THE FOLLOWING CONDITION. TEMPERATURE CONTROL PID LOOP DETERMINES HEATING REQUIRED DUE TO THE DIFFERENCE BETWEEN THE SUPPLY AIR TEMPERATURE AND SUPPLY AIR TEMPERATURE SETPOINT.
- e. COOLING:
  - 1) THE CONTROLLER SHALL ENABLE COOLING UNDER THE FOLLOWING CONDITIONS. (A). TEMPERATURE CONTROL PID LOOP DETERMINES COOLING REQUIRED DUE TO THE DIFFERENCE BETWEEN THE SUPPLY AIR TEMPERATURE AND SUPPLY AIR TEMPERATURE SETPOINT.

1. INSTALL SOLENOID VALVE IN EACH LIQUID AND HOT GAS BYPASS LINE. HOT GAS SOLENOID VALVE SHALL BE EQUIPPED WITH A HIGH TEMPERATURE COIL. SOLENOID VALVES FOR HEAT PUMP UNITS SHALL BE BI-DIRECTIONAL FLOW.

END OF SECTION

SECTION 236000 - AIR DISTRIBUTION

PART 1 - GENERAL

1.1 SCOPE:

A. SECTION 230500 - "GENERAL PROVISIONS - HVAC" SHALL APPLY TO AND BECOME PART OF THIS SECTION.

1.2 SHOP DRAWINGS:

A. SEE SECTION 230500 - "GENERAL PROVISIONS - HVAC".

B. DUCTWORK SHOP DRAWINGS SHALL INCLUDE DETAILS OF DUCT CONSTRUCTION: SEAMS, JOINTS, GAUGES, REINFORCING, ELEVATIONS, AND HANGER DETAILS FOR EACH PRESSURE CLASS AND SIZE RANGE TOGETHER WITH DETAILS OF TURNING VANES, BRANCH CONNECTIONS, DAMPERS AND ACCESS DOORS. INCLUDE ACCESS DOOR LOCATIONS AND SIZES. IDENTIFY ON THE SHOP DRAWINGS DUCT SECTIONS AS THEY WILL BE IDENTIFIED FOR FABRICATION AND INSTALLATION. PROVIDE SECTION DRAWINGS OF LOCATIONS WHERE DUCTS CROSS OR DEMONSTRATE WITH ELEVATIONS THAT DUCTS WILL FIT.

PART 2 - PRODUCTS

2.1 GRILLES, REGISTERS AND DIFFUSERS:

A. GENERAL: AIR DEVICES MAY BE PRICE, TITUS, KRUEGER, NAILOR, OR APPROVED EQUAL. TITUS PART NUMBERS ARE GIVEN FOR REFERENCE. COORDINATE BORDER AND FRAME TYPES FOR AIR DEVICES WITH CEILING TYPES AS SHOWN ON ARCHITECTURAL REFLECTED CEILING PLAN.

B. RECTANGULAR PERFORATED FACE DIFFUSERS ONE, TWO, THREE, FOUR, WAY OR CORNER THROW: ADJUSTABLE PATTERN PERFORATED FACE DIFFUSERS, WITH ADJUSTABLE CURVED BLADE PATTERN ADJUSTER, WHITE ENAMEL FINISH, FACE PLATE REMOVABLE THROUGH GRID, OPPOSED BLADE DAMPERS, #PDS, **"IN FIRE RATED CEILINGS USE PAS-FR"**

C. RECTANGULAR LOUVER FACE DIFFUSERS ONE, TWO, THREE, FOUR, WAY OR CORNER THROW (LD OR CD): FIXED PATTERN LOUVER FACE DIFFUSERS, ALL ALUMINUM WITH WHITE ENAMEL FINISH, REMOVABLE CORES LATCHED IN PLACE, OPPOSED BLADE DAMPERS, ADJUSTABLE MULTIBLADE SCOOPS, #TDC, JA, **"IN FIRE RATED CEILINGS USE TDC-FR"**

D. CURVED BLADE DIFFUSERS, ONE, TWO, THREE, FOUR, WAY THROW (CBD, L, \_2, \_3, \_4): ALL ALUMINUM ADJUSTABLE CURVED BLADE DIFFUSERS WITH PLASTER FRAMES, OPPOSED BLADE DAMPERS AND MULTIBLADE SCOOPS, WHITE ENAMEL FINISH #250, JA.

E. RECTANGULAR PLAQUE FACE DIFFUSERS, FOUR-WAY THROW (ALD): FIXED PATTERN PLAQUE FACE DIFFUSER, ALL ALUMINUM WITH WHITE ENAMEL FINISH, ROUND NECK AND OPPOSED BLADE DAMPER, #OWN.

F. LINEAR DIFFUSER/BOOT: FIXED PATTERN EXTRUDED ALUMINUM 2-WAY THROW DIFFUSER DESIGNED FOR VARIABLE VOLUME USE, MOUNTED ON OUTLET OF GALVANIZED STEEL BOOT WITH 1/2" INTERNAL INSULATION, AND ROUND SIDE INLET COLLAR WITH DAMPER. DIFFUSER/BOOT SHALL BE DESIGNED TO LAY INTO CEILING GRID AND BE SUPPORTED BY GRID. PROVIDE ALL NECESSARY MOUNTING CLIPS AND ACCESSORIES. BOOT INSULATION SHALL COMPLY WITH THE REQUIREMENTS FOR DUCT INSULATION. INTERNAL DIFFUSER FINISH: OFF WHITE ENAMEL, #MLF, **"IN FIRE RATED CEILINGS USE TBD-FR"**

G. SUPPLY REGISTERS (SR): ADJUSTABLE VERTICAL FACE BARS, ADJUSTABLE HORIZONTAL REAR BARS, OPPOSED BLADE DAMPERS, PLASTER FRAMES, ADJUSTABLE MULTIBLADE SCOOPS, ALL ALUMINUM WITH PRIME COAT FINISH, #E2Z.

H. WALL RETURN REGISTERS (WRR): ALL ALUMINUM, ALUMINUM LACQUER FINISH, HORIZONTAL BARS FIXED AT ABOUT 35° ANGLE, PLASTER FRAMES, OPPOSED BLADE DAMPER #350. (WALL RETURN GRILLES (WRG) DELETE OPPOSED BLADE DAMPER).

I. WALL EXHAUST REGISTERS (WER): SAME AS WALL RETURN REGISTERS.

J. CEILING RETURN REGISTERS (R): ALL ALUMINUM, 12" X 12" X 1/2" CUBE CORE, PLASTER FRAME, OPPOSED BLADE DAMPERS, WHITE ENAMEL FINISH #50F. OMIT DAMPERS FOR REGISTERS NOT ATTACHED TO RETURN DUCTWORK.

K. CEILING EXHAUST REGISTERS (E) AND CEILING TRANSFER REGISTERS (T): SAME AS CEILING RETURN REGISTERS.

2.2 SHEET METAL SPECIALTIES:

A. MAKE RECTANGULAR TAKE-OFFS IN LOW PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTS USING 45° ENTRY TAP (SMACNA DUCT CONSTRUCTION STANDARDS "BRANCH CONNECTIONS" FIGURE #2.5) WITH MANUAL DAMPER WITH END BEARINGS AND LOCKING QUADRANT IN BRANCH. SAW-MARK ENDS OF DAMPER RODS PARALLEL TO BLADES. END BEARINGS AND QUADRANTS SHALL HAVE AIR-TIGHT DUCT CONNECTIONS AND SHAFT SEALS. DURO\_DYNE OR EQUAL.

B. MANUAL BALANCING DAMPERS: COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, FIGURE 2\_12 AND 2\_13. EQUIP ALL DAMPERS WITH LOCKING QUADRANTS AND END BEARINGS. SAW-MARK ENDS OF DAMPER RODS PARALLEL TO BLADES. END BEARINGS AND QUADRANTS SHALL HAVE AIR-TIGHT DUCT CONNECTIONS AND SHAFT SEALS. DURO\_DYNE OR EQUAL.

C. WHEN DAMPER QUADRANTS ARE LOCATED OTHER THAN ABOVE LAY-IN CEILINGS.

1. SUBSTITUTE YOUNG NUMBER 315 OR 270-896C ADJUSTABLE COVER CONCEALED REGULATORS OR VENT-LOCK #677 REGULATORS AND AN ADDITIONAL END BEARING FOR THE QUADRANT (REGULATOR COVER SHALL BE WHITE). PROVIDE ALL CABLE, GEARS, JOINTS, RODS, ETC. AS REQUIRED TO PLACE THE REGULATOR IN THE CEILING WITHIN 6 FEET HORIZONTAL OF THE DAMPER, AS DIRECTED BY THE ARCHITECT.

2. PROVIDE AN ACCESS DOOR FOR ACCESS TO THE QUADRANT (SEE "ACCESS DOORS", HEREINAFTER).

D. PROVIDE "STAND-OFFS" (HAT SECTIONS) FOR DAMPER QUADRANTS, CONTROLS, ETC., ON EXTERNALLY INSULATED DUCTS. "STAND-OFFS" ARE REQUIRED AT QUADRANTS ON SPIN-IN DAMPERS.

E. BRANCH DUCT CONNECTIONS FOR CONNECTING ROUND LOW PRESSURE BRANCHES TO RECTANGULAR LOW PRESSURE TRUNKS: GALVANIZED STEEL SPIN-IN OR SIDE TAKEOFF FITTINGS WITH INTEGRAL DAMPERS, COLLARS, SIMILAR AND EQUAL TO FLEXMASTER, SERIES FLD OR STD FOR SHEET METAL TRUNKS AND SERIES C80 FOR FIBROUS TRUNKS WITH STAND-OFFS. PROVIDE INTEGRAL DAMPERS WITH 2" INSULATION BUILD-OUT, SHAFT, U-BOLT, NYLON BUSHINGS, LOCKING QUADRANT AND HANDLE. GAUGES: AS REQUIRED FOR PRESSURE CLASS (26 GAUGE MINIMUM.)

F. BRANCH DUCT CONNECTIONS FOR CONNECTING ROUND MEDIUM PRESSURE DUCT TO RECTANGULAR MEDIUM PRESSURE DUCT: GALVANIZED STEEL BELLMOUTH FITTING WITH NEOPRENE GASKET AND PRE-DRILLED MOUNTING HOLES EQUAL TO BUCKLEY AIR-TITE. GAUGES AS REQUIRED FOR PRESSURE CLASS (24 GAUGE MINIMUM). FLEXMASTER STD OR APPROVED EQUAL MAY BE SUBSTITUTED AT CONTRACTOR'S OPTION (24 GAUGE MINIMUM). BRANCH DUCT CONNECTIONS FOR CONNECTING ROUND MEDIUM PRESSURE DUCT TO ROUND OR FLAT OVAL MEDIUM PRESSURE DUCT: GALVANIZED STEEL CONICAL SADDLE OR FLANGED FITTING EQUAL TO UNITED. GAUGES AS REQUIRED FOR PRESSURE CLASS (22 GAUGE MINIMUM.)

2.3 FLEXIBLE DUCT CONNECTIONS:

A. INSTALL NEOPRENE COATED GLASS CLOTH FLEXIBLE CONNECTIONS AT ALL DUCT CONNECTIONS TO ALL FANS, ALL AC UNITS AND ALL POWERED INDUCTION UNITS.

B. INSTALL FLEXIBLE CONNECTIONS IN ALL DUCTS AT BUILDING EXPANSION JOINTS.

2.4 ELECTRICAL GROUNDINGS:

A. GROUND SUPPLY FANS.

B. INSTALL BRAIDED COPPER JUMPERS AROUND ALL FLEXIBLE CONNECTIONS, TAKING CARE THAT JUMPERS DO NOT BEND FLEXES.

2.5 DUCTWORK - GENERAL:

A. UNLESS OTHERWISE SHOWN OR SPECIFIED CONSTRUCT DUCTS OF GALVANIZED STEEL SHEET METAL USING GAUGES AND RECOMMENDED DETAILS AS CONTAINED IN THE CURRENT EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS. DUCTWORK SHALL INCLUDE SUPPLY AIR, EXHAUST AIR, RETURN AIR, AND OUTDOOR AIR DUCTS, TOGETHER WITH ALL NECESSARY FITTINGS, SPLITTERS, DAMPERS, QUADRANTS, FLEXIBLE CONNECTIONS, SLEEVES, HANGERS, SUPPORT, BRACES, ETC. HANG AND INSTALL DUCTS IN A NEAT AND WORKMANSHIP MANNER WITH ADEQUATE BRACING AND CROSS BRACING TO PREVENT BREATHING, RATTLING, AND VIBRATION. **DO NOT USE SNAP-LOCK SEAMS.**

B. INSTALL DURO\_DYNE LOCKING QUADRANTS AND DURO\_DYNE END BEARINGS ON ALL SPLITTERS AND MANUAL VOLUME DAMPERS LOCATED ABOVE ACCESSIBLE CEILING AND YOUNG #315 REGULATOR, AND DURO\_DYNE END BEARINGS ELSEWHERE. PROVIDE STAND-OFFS FOR QUADRANTS ON EXTERNALLY INSULATED DUCTS. (REFER ALSO TO "SHEET METAL SPECIALTIES".)

C. DUCT DIMENSIONS ARE **NET DIMENSIONS INSIDE INSULATION**. DETERMINE GAUGES BY ACTUAL DUCT SIZE.

D. ALL DUCT TURNS (EXCEPT AS NOTED BELOW FOR 90 DEGREE TURNS) SHALL BE RADIUSED WITH A CENTERLINE RADIUS OF 1.5 TIMES THE DUCT WIDTH IN THE PLANE OF THE TURN. AT THE CONTRACTOR'S OPTION, 90 DEGREE TURNS MAY BE SQUARE THROAT ELBOWS VANED TO PROVIDE A DYNAMIC LOSS COEFFICIENT (C) NOT GREATER THAN 0.2 OR SHALL BE RADIUSED. DO NOT USE "PUSH ON" VANE RUNNERS. DUCT TURNS LESS THAN 20 DEGREES MAY BE INTERED. DO NOT USE OFF-SETS THAT REDUCE THE CROSS-SECTIONAL AREA OF THE DUCT.

E. DUCT SEALING: SEAL DUCT SEAMS AND JOINTS AFTER ASSEMBLY AS NOTED BELOW. SEAL ENTIRE CIRCUMFERENCE OF ALL BRANCH DUCT CONNECTIONS, TAPPING COLLARS AND SPIN-INS. SEAL DUCTS USING MASTIC SEALANT EQUAL TO SOLVENT BASED UNITED DUCT SEALER.

1. CLASS A SEAL: SEAL ALL JOINTS AND SEAMS AND LEAK TEST AT PRESSURE SPECIFIED. LEAKAGE CFM PER 100 SQ. FT. DUCT SURFACE AREA SHALL NOT EXCEED 8 TIMES THE SQUARE ROOT OF THE TEST PRESSURE IN INCHES OF WATER AND NO LEAKS SHALL BE AUDIBLE.

2. CLASS B SEAL: SEAL ENTIRE CIRCUMFERENCE OF ALL TRANSVERSE JOINTS. SEAL ALL LONGITUDINAL JOINTS.

3. CLASS C SEAL: SEAL ENTIRE CIRCUMFERENCE OF ALL TRANSVERSE JOINTS.

4. CLASS D SEAL: SEAL CORNERS OF TRANSVERSE JOINTS.

2.6 DUCTWORK - LOW PRESSURE:

A. DUCTWORK, LOW PRESSURE, SHALL INCLUDE: ALL NEW DUCTWORK.

B. CONSTRUCT DUCTS IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS FOR PRESSURE AND SEAL CLASSES NOTED BELOW. DO NOT USE SNAP-LOCK SEAM.

C. PRESSURE AND SEAL CLASSES: 1" PRESSURE CLASS, SEAL CLASS "C".

D. SEAL ALL EXISTING SUPPLY, RETURN AND EXHAUST DUCTS WHICH ARE AN INTEGRAL PART OF NEW OR MODIFIED SYSTEMS (BUT WHICH ARE NOT EXTERNALLY INSULATED) AS SPECIFIED ABOVE FOR NEW WORK OF THE SAME TYPE.

E. HANG DUCTS USING 1"X12-GUAGE GALVANIZED STRAPS AT TRANSVERSE JOINTS BUT NOT GREATER THAN 8 FT. APART.

F. ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH "PAINT GRIP" FINISH TO ACCEPT EPOXY PAINT FINISH. NO ADHESIVE LABELS SHALL BE PLACED ON THE EXPOSED SURFACE OF EXPOSED DUCTWORK.

G. PROVIDE GALVANIZED SHEET STEEL METAL DUCTS OF SIZES SHOWN ON PLANS. CONSTRUCT, HANG, SUPPORT AND REINFORCE IN ACCORDANCE WITH 2" PRESSURE CLASS AS CONTAINED IN THE CURRENT EDITION OF THE SMACNA DUCT CONSTRUCTION STANDARDS. USE REINFORCEMENT NOTED FOR THE LONGEST SIDE ON ALL SIDES OF THE DUCT AND BOLT TOGETHER AT CORNERS WITH MINIMUM 5/16" DIAMETER BOLTS. DO NOT PENETRATE DUCT AT REINFORCEMENT WITH SCREWS. **DO NOT USE SNAP-LOCK SEAMS.**

2.7 DUCTWORK LOW PRESSURE ROUND:

- A. LOW PRESSURE ROUND DUCTWORK INCLUDES ALL ROUND SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK EXCEPT AS SPECIFIED MEDIUM PRESSURE ROUND DUCTWORK.
- B. DUCTWORK: FACTORY FABRICATED SINGLE-WALL GALVANIZED STEEL ROUND SPIRAL LOCK SEAM DUCTS OF 26 GAUGE FOR DUCTS UP TO 14" IN DIAMETER, 26 GAUGE FOR DUCTS FROM 15" TO 26" IN DIAMETER, 24 GAUGE FOR DUCTS 27" TO 36" IN DIAMETER, AND 22 GAUGE FOR DUCTS OVER 36" IN DIAMETER.
- C. FABRICATE FITTINGS BY CONTINUOUS BRAZING OR ELECTRIC WELDING. THICKNESS OF METAL FOR ROUND FITTINGS: 26 GAUGE FOR FITTINGS UP TO 14" IN DIAMETER, 24 GAUGE FOR FITTINGS 15" TO 26" IN DIAMETER, 22 GAUGE FOR ALL FITTINGS OVER 26" IN DIAMETER. ELBOWS SHALL HAVE A CENTER-LINE RADIUS OF 1.5 DIAMETERS, 5 PIECE CONSTRUCTION. TAKE-OFFS SHALL BE 45 DEGREE LATERALS. SPLITTERS (TEES) SHALL BE REDUCING Y-BRANCH WITH DAMPERS.
- D. MAKE TRANSVERSE JOINTS USING BEADED SLIP COUPLINGS, SEALING COMPOUND EQUAL TO SOLVENT BASED UNITED DUCT SEAL AND SHEET METAL SCREWS.
- E. PROVIDE HANGER STRAPS PER SMACNA TABLE NO MORE THAN 8 FT. APART. STRAPS SHALL ENCIRCLE DUCT. DO NOT PENETRATE DUCTWORK AT HANGERS.
- F. NO ADHESIVE LABELS SHALL BE PLACED ON THE EXPOSED SURFACE OF EXPOSED DUCTWORK.
- G. DUCTWORK AND FITTINGS SHALL BE UNITED MCGILL AIRFLOW, SEMCO, SPIRAL SYSTEMS, SPIRAL PIPE OF TEXAS OR EASTERN SHEET METAL ROUND DUCT AND FITTINGS, 2" WG STANDARD.

2.8 FLEXIBLE DUCTS:

- A. FLEXIBLE DUCT CONNECTORS: 2 ELEMENT SPIRAL CONSTRUCTION COMPOSED OF GALVANIZED STEEL SUPPORTING SPIRAL AND COATED WOVEN TEXTILE FABRIC WITH METAL OR MINERAL BASE. UL LISTED AS CLASS I AIR DUCT AND CONNECTOR (UL 161).
- B. FLEXIBLE CONNECTORS SHALL NOT EXCEED 5 FEET IN LENGTH AND TURNS SHALL NOT EXCEED 20 DEGREES WITH MAXIMUM OF TWO TURNS.
- C. MAKE CONNECTIONS BETWEEN FLEXIBLE DUCTS AND OTHER EQUIPMENT USING GALVANIZED STEEL DRAW BANDS WITH PLATED SCREWS AND BUCKLES AND UNITED DUCT SEAL FOR HIGH AND MEDIUM PRESSURE DUCTS AND NYLON DRAW BANDS FOR LOW PRESSURE DUCTS.
- D. FACTORY INSULATE COLD FLEXIBLE DUCTS USING INSULATION EQUIVALENT TO THAT SPECIFIED FOR COLD DUCTS MINIMUM R5 RATINGS AND PROVIDE CONTINUOUS VAPOR BARRIER AT CONNECTIONS TO OTHER DUCTS AND EQUIPMENT.
- E. HANG DUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- F. FLEXIBLE DUCTS: THERMAFLEX M\_KG, EVERCLEAN, OR FLEXMASTER TYPE 4M.

2.9 DUCTWORK LOCATED OUTDOORS:

A. CONSTRUCT OUTDOOR DUCTS AS SPECIFIED FOR THE RESPECTIVE DUCTS, ABOVE. SEAL ALL JOINTS AND SEAMS WEATHER TIGHT USING GLASS CLOTH TAPE AND CARBOLASTIC OR UNITED DUCT SEALER.

2.10 WEATHER LOUVERS:

A. LOUVERS SHALL BE AMCA CERTIFIED 6" THICK EXTRUDED ALUMINUM DRAINABLE STATIONARY LOUVERS WITH MINIMUM 0.08" THICK BLADES AND FRAME AND MINIMUM 50% FREE AREA. NOMINAL EQUIP WITH 1/2" MESH ALUMINUM BROSSCREEN ON INSIDE OF LOUVER. COLOR TO BE SELECTED BY ARCHITECT. FINISH TO BE MANUFACTURER'S KYNAR 500 FLUOROPOLYMER COATING CONFORMING TO AAMA 605.2. PROVIDE SAMPLES OF COLOR AND FINISH TO ARCHITECT FOR APPROVAL. AIR PRESSURE DROP SHALL NOT EXCEED 0.15" WG AT MAXIMUM AIR VELOCITY OF 850 FPM THROUGH FREE AREA. WATER PENETRATION SHALL NOT EXCEED 0.01 OUNCES PER SF OF FREE AREA.

B. LOUVERS SHALL BE RUSKIN ELF6375DX OR EQUIVALENT BY GREENHECK, OR APPROVED EQUAL.

2.11 AUTOMATIC DAMPERS:

- A. PROVIDE AND INSTALL AUTOMATIC DAMPERS AS SHOWN ON PLANS, SCHEDULED, OR AS REQUIRED. COORDINATE SIZE, QUANTITY AND LOCATIONS OF AUTOMATIC DAMPERS WITH AUTOMATIC CONTROL WORK AS REQUIRED. DAMPERS SHALL BE FACTORY FABRICATED WITH EXTRUDED ALUMINUM BLADES AND FRAMES.
- B. DAMPER FRAMES SHALL BE 5" X 1" X .125" (MINIMUM THICKNESS) EXTRUDED ALUMINUM HAT CHANNEL WITH HAT SHAPED MOUNTING FLANGES ON BOTH SIDES OF THE FRAME. EACH CORNER SHALL BE REINFORCED WITH TWO DIE FORMED INTERNAL BRACES AND MACHINE STAKED FOR MAXIMUM RIGIDITY OR INTEGRAL OVERLAPPING GUSSET REINFORCEMENTS IN EACH CORNER TO ASSURE SQUARE CORNERS AND PROVIDE MAXIMUM RESISTANCE TO RACKING.
- C. DAMPER BLADES SHALL BE AIRFOIL TYPE EXTRUDED ALUMINUM WITH METAL BLADE TO METAL BLADE OVERLAP. EACH BLADE SHALL BE MAXIMUM 6" DEPTH WITH INTEGRAL STRUCTURAL REINFORCING TUBE RUNNING FULL LENGTH. MINIMUM THICKNESS OF BLADE SHALL BE 0.070". EACH BLADE SHALL BE SYMMETRICAL RELATIVE TO ITS AXLE PIVOT POINT, PRESENTING IDENTICAL PERFORMANCE CHARACTERISTICS WITH AIR FLOWING IN EITHER DIRECTION THROUGH THE DAMPER. PROVIDE SYMMETRICAL BLADES OF VARYING SIZE AS REQUIRED TO COMPLETELY FILL THE DAMPER OPENING. BLADE ORIENTATION IS HORIZONTAL. BLADE OPERATION IS PARALLEL OR OPPOSED. BLADES SHALL BE CONTAINED WITHIN THE DAMPER FRAME.
- D. BLADE EDGE SEALS SHALL BE FLEXIBLE AND SUITABLE FOR -72°F TO +275°F MECHANICALLY LOCKED IN EXTRUDED BLADE SLOTS YET EASILY REPLACEABLE IN FIELD. JAMB SEALS SHALL BE FLEXIBLE STAINLESS STEEL, COMPRESSION TYPE TO PREVENT LEAKAGE BETWEEN THE END OF THE BLADE AND THE DAMPER FRAME. USE OF BLADE END TO OVERLAP THE FRAME FOR JAMB SEAL IS NOT ACCEPTABLE. ADHESIVE OR CLIP-ON TYPE BLADE OR JAMB SEALS ARE NOT ACCEPTABLE.
- E. BEARINGS SHALL BE NON-CORROSIVE MOLDED SYNTHETIC. AXLES SHALL BE 1/2" PLATED STEEL HEXAGONAL SHAPED AND TO PROVIDE POSITIVE LOCKING CONNECTION TO BLADE. LINKAGE SHALL BE CONCEALED OUT OF AIRSTREAM, WITHIN FRAME TO REDUCE PRESSURE DROP, NOISE AND MAINTENANCE.
- F. PROVIDE AND INSTALL ELECTRIC, 24 OR 120V AC, SPRING RETURN, 2-POSITION OR MODULATING DAMPER ACTUATOR(S) AS SPECIFIED IN CONTROLS SPECIFICATION SECTIONS OR AS INDICATED ON DRAWINGS. ACTUATOR(S) SHALL BE SIZED AS REQUIRED TO SUFFICIENTLY OPEN/CLOSE DAMPERS UNDER OPERATING CONDITIONS. MULTIPLE ACTUATORS SHALL BE PROVIDED AS REQUIRED.
- G. INSTALL DAMPERS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND REQUIREMENTS. INSTALL DAMPERS SQUARE AND FREE FROM RACKING.
- H. DAMPERS MUST BE ACCESSIBLE TO ALLOW INSPECTION, ADJUSTMENT, AND REPLACEMENT OF COMPONENTS. PROVIDE AND INSTALL ACCESS DOORS AS SPECIFIED AND REQUIRED.
- I. PROVIDE AND INSTALL BRACING FOR MULTIPLE SECTION ASSEMBLIES TO SUPPORT ASSEMBLY WEIGHT AND TO HOLD AGAINST SYSTEM PRESSURE. ATTACH MULTIPLE DAMPER SECTION ASSEMBLIES TOGETHER IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. INSTALL SUPPORT MULLIONS AS REINFORCEMENT BETWEEN ASSEMBLIES AS REQUIRED.
- J. SUBMITTAL SHALL INCLUDE LEAKAGE, MAXIMUM AIRFLOW AND MAXIMUM PRESSURE RATINGS BASED ON AMCA PUBLICATION 500. DAMPER SHALL BE TESTED AND LICENSED IN ACCORDANCE WITH AMCA 511 FOR AIR PERFORMANCE AND AIR LEAKAGE. DAMPER SHALL MEET THE LEAKAGE REQUIREMENTS OF THE INTERNATIONAL ENERGY CONSERVATION CODE BY LEAKING LESS THAN 3 CFM/SQ. FT. AT 1" OF STATIC PRESSURE AND SHALL BE AMCA LICENSED AS CLASS 1A.
- K. SAW-MARK ENDS OF DAMPER RODS PARALLEL TO BLADES.
- L. RECTANGULAR DAMPERS SHALL BE RUSKIN MODEL CD50, GREENHECK VCD-43, OR PREAPPROVED EQUIVALENT.
- M. ROUND DAMPERS SHALL BE RUSKIN MODEL CDRS25, GREENHECK VCDR-53, OR PREAPPROVED EQUIVALENT.

2.12 FIRE DAMPERS:

- A. PROVIDE AND INSTALL UL LABELED 1-1/2 HOUR FIRE DAMPERS, WHEREVER SHEET METAL DUCTS PASS THROUGH CHASE WALLS, FLOORS OUTSIDE FIRE CHASES, AND ELSEWHERE AS SHOWN OR REQUIRED BY LOCAL CODE. VERIFY FIRE RATINGS OF WALLS. ALL FIRE DAMPERS REQUIRED MAY NOT BE SHOWN ON MECHANICAL PLANS.
1. FIRE DAMPERS SHALL BE "VENETIAN BLIND" DAMPERS, UNLESS OTHERWISE SHOWN FOLDED BLADES AND FRAMES SHALL NOT OBSTRUCT AIR STREAM. PROVIDE TYPE C FIRE DAMPER IN ALL MEDIUM AND HIGH PRESSURE SUPPLY DUCTS. DAMPERS IN FLOORS SHALL BE SPRING LOADED.
- B. INSTALL CEILING FIRE DAMPERS AS SHOWN IN DETAIL "A". PLATE #5 OF SMACNA "FIRE DAMPER GUIDE" AT CEILING PENETRATIONS WHERE REQUIRED BY LOCAL CODE.
- C. INSTALL ACCESS DOOR IN LOW PRESSURE DUCTS AT EACH FIRE DAMPER, INSTALL WALL OR CEILING ACCESS DOOR FOR ACCESS TO FIRE DAMPERS NOT ACCESSIBLE THROUGH LIFT\_OUT CEILINGS. SEE ACCESS DOORS, BELOW.

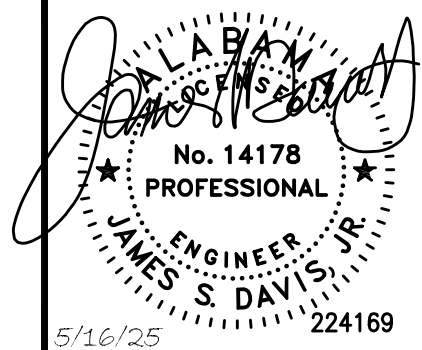
2.13 ACCESS DOORS:

- A. ACCESS DOORS IN LOW PRESSURE DUCTS: GALVANIZED STEEL FRAME FLANGE MOUNTED PERMANENTLY SECURED TO DUCT WITH A HINGED GASKETED ACCESS PORT HELD IN PLACE WITH THUMB OPERATED LATCHES. DOORS IN INSULATED DUCTS: DOUBLE THICKNESS WITH INSULATION. DOORS IN NON-INSULATED DUCTS: A SINGLE THICKNESS. SIZE DOORS TO PERMIT REMOVAL OF EQUIPMENT OR MAINTENANCE. MINIMUM 18" X 18" IN DUCTS 20" OR GREATER, MINIMUM 12" X 12" IN DUCTS 14" TO 18" AND MINIMUM 8" X 12" IN DUCTS 10" TO 12". IF DUCT IS LESS THAN 16", ENLARGE DUCT AT ACCESS DOOR (AND FIRE DAMPER, IF APPLICABLE) TO ALLOW MINIMUM 8" X 12" ACCESS DOOR. KEES "FH" SERIES STANDARD PRESSURE FLANGED MOUNT. INSTALL FOR FLUSH INTERIOR OR DOUBLE WALL DOORS.
- B. MARK ACCESS POINTS IN LIFT\_OUT CEILINGS WITH COLORED VINYL STICK-ON DISCS. LOCATE DISCS ON GRID ADJACENT TO POINT OF ACCESS AND COORDINATE LOCATION OF ACCESS DOORS IN NON-ACCESSIBLE CEILING WITH GENERAL CONTRACTOR.

END OF SECTION

REVISIONS

BY	DESCRIPTION	DATE	#						

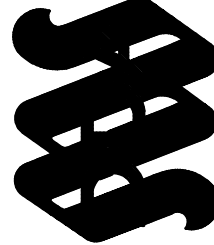


5/16/25

224169

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

MW / Davis Dumas & Assoc., Inc.  
CONSULTING ENGINEERS  
4500 Southlake Parkway, Suite 200  
Birmingham, AL 35244  
Phone (205) 252-0246  
Fax (205) 251-8506



SHEET TITLE  
HVAC SPECS

DRAWN BY CHECKED BY

JAG JSD

DATE

MAY 16, 2025

JOB NUMBER

224169

SHEET NUMBER

M16

17

OF 19



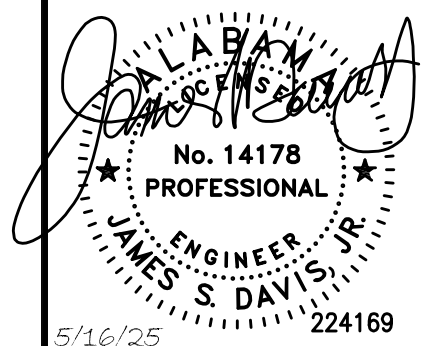


PART 1 - GENERAL

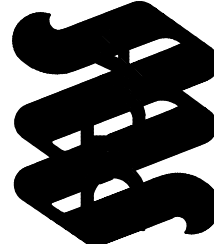
- SCOPE:
- A. SECTION 230500 - "GENERAL PROVISIONS," HVAC SHALL APPLY TO AND BECOME PART OF THIS SECTION.
- 1.2. CONTROL SYSTEMS:
- A. FURNISH AND INSTALL COMPLETE AND READY FOR OPERATION.
- B. PRODUCTS OF A MANUFACTURER MAINTAINING COMPLETE SERVICE AND PARTS FACILITIES IN ALABAMA CONTINUOUSLY FOR THE LAST THREE YEARS.
- C. CONTROL EQUIPMENT, EXCEPT FOR ITEMS COMPRISING AN INTEGRAL PART OF THE WATER OR REFRIGERATION PIPING, SHALL BE INSTALLED BY TRAINED MECHANICS EMPLOYED BY THE CONTROL MANUFACTURER.
- D. INCLUDE THE SERVICES OF A FULL TIME CONTROL TECHNICIAN FOR CALIBRATING AND ADJUSTING CONTROLS FOR THE FIRST WORKING DAY AFTER OWNER HAS OCCUPIED BUILDING.
- E. BEFORE INSTALLATION, SUBMIT FOR APPROVAL, 5 COPIES OF COMPLETE POWER AND CONTROL WIRING AND PIPING DIAGRAMS AND LIST OF CONTROL PANEL LOCATIONS BY ROOM NAME AND NUMBER, HANG A PHOTOSTATIC COPY OF THE "AS BUILT" DIAGRAM, FRAMED BEHIND GLASS, IN EACH EQUIPMENT ROOM. PROVIDE ONE SET OF REPRODUCIBLE SEPARS OF "AS BUILT" CONTROL DIAGRAMS AT COMPLETION OF PROJECT FOR THE OWNERS USE.
- F. PROVIDE PERMANENT NAMEPLATES FOR CONTROL SWITCHES AND MOTOR STARTERS. NAMEPLATES, ENGRAVED LAMINATED PLASTIC WITH LETTERS LEGIBLE UNDER NORMAL OPERATING CONDITIONS. (BLACK ON WHITE).
- G. PERMANENTLY IDENTIFY CONTROL DEVICES AND ROOM THERMOSTATS. SO THEY MAY BE IDENTIFIED ON CONTROL DIAGRAMS. PROVIDE ENGRAVED PLASTIC NAMEPLATES FOR ITEMS MOUNTED OUTSIDE OF OR ON FACES OF PANELS, MARK OTHER INSTRUMENTS WITH INDELIBLE INK.
- 1.3. CONTROL WIRING:
- A. INCLUDE ALL CONTROL AND INTERLOCK WIRING AND POWER WIRING FOR CONTROL PANEL IN THIS SECTION. INSTALL ALL CONTROL AND INTERLOCK WIRING IN EMT, EXIT AND EMT FITTINGS SHALL COMPLY WITH THE PROVISIONS OF ELECTRICAL WORK. **PLENUM-RATED COMMUNICATION WIRING SHALL BE ALLOWED IN LIEU OF CONDUIT ONLY WHEN INSTALLED CONCEALED ABOVE ACCESSIBLE CEILING SURFACES (SUCH AS ABOVE LAY IN CEILING) AND SHALL BE SUPPORTED BY CABLE TAY OR J-HOOKS ON INTERVALS NOT TO EXCEED 5'-0" ON CENTER IN ACCORDANCE WITH DIVISION 26 SPECIFICATIONS.**
- B. WATERPROOF AND FIRESTOP ALL UNFINISHED FLOOR PENETRATIONS. FIRESTOP CONDUIT PENETRATIONS OF FIRE RATED WALLS AND PARTITIONS.
- C. WIRE ALL DEVICES INDIVIDUALLY TO TERMINAL STRIPS IN CONTROL PANELS.
- D. FURNISH NECESSARY RELAYS AND AUXILIARY CONTACTORS AND OTHER ACCESSORIES REQUIRED. PROVIDE INTERLOCK RELAYS PER N.E.C. COORDINATE START, STOP STATIONS, AUXILIARY CONTACTS, ETC., WITH SUPPLIER OF STARTERS AND MOTOR CONTROL DEVICES SPECIFIED IN ELECTRICAL WORK.
- 1.4. CONTROL DEVICES:
- A. ROOM THERMOSTATS: 7-DAY PROGRAMMABLE THERMOSTAT WITH LCD TOUCH SCREEN DISPLAY,  $\pm 1.4^{\circ}\text{F}$  TEMPERATURE ACCURACY FROM 50 F TO 90 F,  $\pm 3\%$  RH HUMIDITY ACCURACY FROM 20% RH TO 90% RH. THERMOSTATS COVERES HIGH IMPACT PLASTIC MOUNT AT 4'-0" ABOVE FINISHED FLOOR IN ACCORDANCE WITH ADA.
- B. REMOTE BULB THERMOSTATS AND THERMOSTAT TRANSMITTERS: UNLESS OTHERWISE SHOWN USE AVERAGING ELEMENTS NOT LESS THAN 8 FEET LONG FOR FLOOR OR CIRCUMFERRING CROSS SECTIONS UP TO 24 SQUARE FEET FACE AREA AND ELEMENTS NOT LESS THAN 17 FEET LONG FOR SECTIONS OVER 24 SQUARE FEET FACE AREA.
- C. THERMISTOMERS: PIPE LINE THERMOMETERS ARE SPECIFIED IN ANOTHER SECTION. INSTALL DIAL THERMOMETERS IN DUCTS WHERE SHOWN ON CONTROL DIAGRAMS. PROVIDING AVERAGING BULBS WHERE SHOWN.
- D. FIRESTATS: SINGLE POLE DOUBLE THROW, ELECTRIC, MANUAL RESET, PNEUMATIC NOT PERMITTED. FIRESTATS SHOWN TO BE CONNECTED TO THE FIRE ALARM SYSTEM: COMPATIBLE WITH FIRE ALARM SYSTEM. FURNISHED AND INSTALLED UNDER ELECTRICAL WORK, WIRED UNDER ELECTRICAL WORK.
- E. SMOKE DETECTORS SHALL BE IONIZATION DETECTORS WHICH DETECT PRODUCTS OF COMBUSTION. FURNISH, WIRE, AND INSTALL SMOKE DETECTORS UNDER THIS SECTION. PROVIDE SMOKE DETECTORS COMPATIBLE WITH FIRE ALARM SYSTEM SPECIFIED UNDER ELECTRICAL WORK AND EQUIP THEM WITH CONTACTS FOR CONNECTION TO FIRE ALARM SYSTEM.
- F. FLOW SWITCHES: VAPORPROOF ENCLOSURES, McDONNELL & MILLER, PNEUMATIC NOT PERMITTED.
- G. PROGRAM CLOCKS: 24 ELECTRONIC, AUTOMATICALLY RECHARGED BATTERY OPERATED QUARTZ CLOCK WITH NUMBER OF CHANNELS REQUIRED FOR CONTROL SEQUENCE. EACH CHANNEL INDIVIDUALLY PROGRAMMABLE. PROVIDE HAND-OFF AUTO SWITCH FOR EACH CHANNEL. (MULTIPLE CLOCKS MAY BE USED TO OBTAIN REQUIRED NUMBER OF CHANNELS.) ALL CLOCKS MOUNTED IN A FLUSH CONTROL PANEL, AS SPECIFIED. TORK OR EQUAL.
- H. DAMPER OPERATORS: OF SUFFICIENT POWER TO CLOSE/OPEN VALVES & DAMPERS UNDER OPERATING CONDITIONS, ELECTRIC VALVE & DAMPER MOTORS SHALL HAVE OIL IMMERSED GEAR TRAINS & SPRING RETURN TO NORMAL POSITION.
- I. CAPILLARY SUPPORTS: SECURELY SUPPORT ALL DUCT, MOUNTED AND CASING, MOUNTED THERMOSTAT CAPILLARIES USING FACTORY FABRICATED COPPER BULB SUPPORTS.
- J. PROVIDE STAND-OFFS FOR CONTROL DEVICES MOUNTED ON EXTERNALLY INSULATED DUCTS AND EQUIPMENT.
- K. ANCHOR ALL ITEMS MOUNTED ON GYPSUM BOARD (DRY WALL) USING TOGGLE BOLTS OR MOLY BOLTS, NOT EXPANSION SHIELDS.
- L. PROVIDE RADUSED COPPER CAPILLARY SUPPORTS FOR FREEZEZAT AND CONTROL CAPILLARIES.
- M. AUTOMATIC DAMPERS:
1. AUTOMATIC DAMPERS ARE SPECIFIED IN SECTION "AIR DISTRIBUTION".
- N. STATIC PRESSURE MEASURING STATIONS:
1. STATIC PRESSURE MEASURING STATIONS ARE SPECIFIED IN SECTION "AIR DISTRIBUTION".
- 1.5. CONTROL PANELS:
- A. LOCAL CONTROL PANELS: CONSTRUCT OF GALVANIZED STEEL WITH BAKED ENAMEL FINISH OR ALUMINUM, PLYWOOD, ALUMINUM FRONTS AND BACKS AND EXTRUDED TOPS, BOTTOMS, AND ENDS. ALL PANELS SHALL HAVE PANO HINGES AND KEY LOCKING LATCHES (KEY PANELS ALRGE). PERMANENTLY LABEL INSTRUMENTS LOCATED IN PANELS CONSISTENT WITH LABELING ON CONTROL DIAGRAM. GEMENT PHOTOSTATIC OF APPROVED DIAGRAM INSIDE EACH PANEL COVER. (INCLUDE LOCAL, REMOTE SWITCHING FOR CONTROL POINT ADJUSTERS ON FACE OF EACH PANEL.)
- B. BOTTOM OF CONTROL PANELS SHALL BE LOCATED NOT LESS THAN 2'-1/2 FEET ABOVE FLOOR AND TOP NOT MORE THAN 6 FEET ABOVE THE FLOOR.
- 1.6. INTERFACES WITH FIRE ALARM SYSTEM (FAS):
- A. RELAYS ACTUATED BY FAS WILL BE MOUNTED IN FAS PANELS LOCATED IN FAN ROOMS, EQUIPMENT ROOMS, ETC.
- B. WIRING FROM LOCAL PANELS TO FAS PANELS IS INCLUDED IN THIS SECTION.

## REVISIONS

#	DATE



SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD  
SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA



**MW / Davis Dumas & Assoc., Inc.**  
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SHEET TITLE  
HVAC SPECS

DRAWN BY <b>JAG</b>		CHECKED BY <b>JSD</b>	
DATE <b>MAY 16, 2025</b>			
JOB NUMBER <b>224169</b>			
SHEET NUMBER <b>M18</b>		19	
		OF 19	



G:\2024\24038\00\1\E1 ELECTRICAL LEGEND NOTES AND SLD \_24038.DWG  
SAVED: 6/09/2025 - 4:09PM  
PLOTTED: 6/09/2025 - 4:33PM BY CYNTHIA

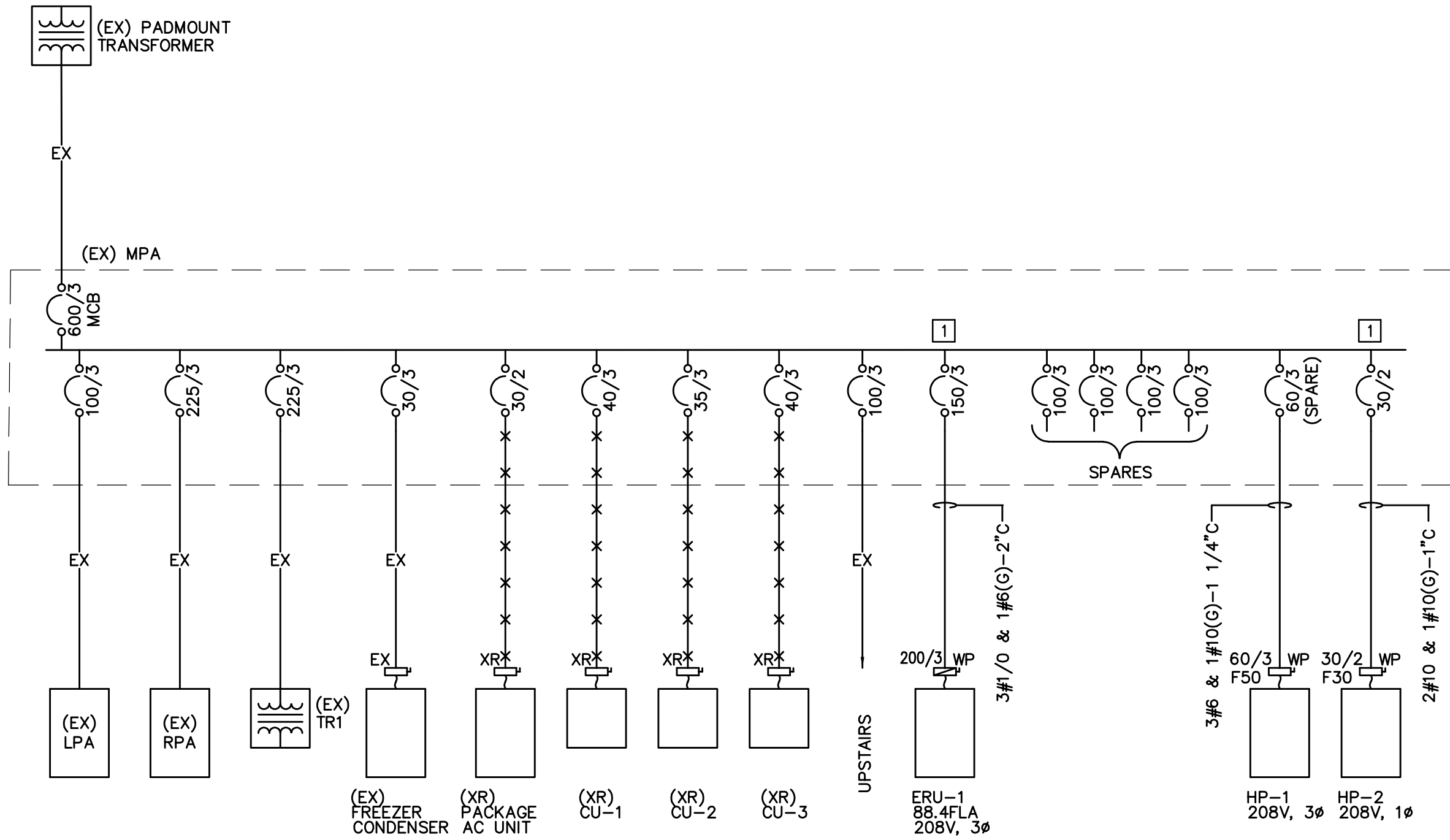
FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER	LED LAMPS			TYPE MOUNTING	MOUNTING HEIGHT	RECESSED DEPTH	NOTES / REMARKS
			COLOR	WATTS	LUMENS				
A	RAB	EZPANFA/2X4/D10	4000K	30	3,627	LI	C	2"	
B	RAB	EZPANFA/2X4/D10	4000K	40	4,849	LI	C	2"	
C	RAB	EZPANFA/2X4/D10	4000K	50	5,630	LI	C	2"	
D	RAB	EZPANFA/2X2/D10	4000K	25	3,276	LI	C	2"	
E	RAB	GUS17-4	4000K	30	3,734	W	76"		
F	RAB	CS4	4000K	18	2,781	S	C		

ABBREVIATIONS: S-SURFACE W-WALL LI-LAY-IN C-CEILING R-RECESSED

FIXTURE NOTES

- CATALOG NUMBERS SHOWN IDENTIFY BASIC FIXTURE TYPE AND ESTABLISH THE STANDARD OF QUALITY. DESIGNATIONS FOR TYPE AND NUMBER OF LAMPS, ACCESSORIES SPECIFIED ELSEWHERE AND HARDWARE REQUIRED FOR A COMPLETE, FINISHED, INSTALLATION ARE NOT REPEATED.
- EACH LIGHT FIXTURE SHALL BE EQUIPPED WITH LED LAMPS. FURNISH AND INSTALL LAMPS AS SHOWN IN SCHEDULE AND IN SPECIFICATIONS.
- ALL DRIVERS SHALL BE 120/277 VOLTS UNLESS SHOWN OTHERWISE.
- EACH DRIVER SHALL BE PROTECTED WITH A DUAL ELEMENT FUSE.
- EACH LUMINAIRE SHALL BE EQUIPPED WITH A LINE SIDE DISCONNECTING MEANS IN COMPLIANCE WITH NEC ARTICLE 410.130, PARAGRAPH G.
- EACH RECESSED FIXTURE SHALL BE WIRED WITH FLEX WITH A SEPARATE GREEN GROUND WIRE BONDED TO OUTLET BOX AND FIXTURE BODY WITH BONDING SCREWS OR CLIPS.
- STEM MOUNTED FIXTURE SHALL BE WIRED THROUGH STEMS EQUIPPED WITH A SEPARATE GREEN GROUND WIRE BONDED TO OUTLET BOX AND FIXTURE BODY WITH BONDING SCREWS.
- SURFACE MOUNTED FIXTURES SHALL BE COMPLETE WITH JOINING PLATES, ENDCAPS, ETC.
- FURNISH TRIM RINGS FOR ALL RECESSED FIXTURES. PLASTER RINGS SHALL BE FURNISHED WHERE REQUIRED FOR PROPER INSTALLATION IN CEILING CONSTRUCTION.
- EXIT LIGHTS SHALL BE EQUIPPED WITH LED LAMPS, AND A STANDBY BATTERY PACK CAPABLE OF 90 MINUTES OF OPERATION UPON NORMAL POWER INTERRUPTION COLOR AND SIZE OF LETTERS AND FACE CHARACTERISTICS SHALL BE IN ACCORDANCE WITH LOCAL REQUIREMENTS; DIRECTIONAL ARROWS SHALL BE AS SHOWN ON DRAWINGS.
- FIXTURES NOTED BY "NL" SHALL BE EQUIPPED WITH A STANDBY BATTERY PACK, AND SHALL BE UNSWITCHED.
- FIXTURES NOTED BY "EM" SHALL BE EQUIPPED WITH A STANDBY BATTERY PACK WITH UNSWITCHED CIRCUIT TO BATTERY CHARGER. DRIVER SWITCHED AS SHOWN ON PLANS.
- TROFFER DOORS SHALL BE REGRESSED ALUMINUM CONSTRUCTION WITH BAKED WITH ENAMEL FINISH, AND SHALL BE EQUIPPED WITH SPRING LOADED LATCHES. FLUORESCENT TROFFER LENS SHALL BE ACRYLIC 0.125 INCHES THICK, MINIMUM.
- ALL FIXTURES SHALL BE PAINTED AFTER FABRICATION.
- RECESSED FIXTURES SHALL BE EQUIPPED WITH PRE-WIRED JUNCTION BOXES AND MOUNTING HARDWARE AS REQUIRED.
- RECESSED FIXTURES SHALL BE RATED FOR TYPE CEILING INSTALLED. UNITS INSTALLED IN INSULATED OR LAY-IN CEILING SHALL BE EITHER INSULATED CEILING (IC) RATED OR SHALL BE THERMALLY PROTECTED (TP).
- FIXTURE OUTLET BOX LOCATIONS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC AND APPROXIMATE IN LOCATION. EXACT POSITION OF THE OUTLET BOX SHALL DEPEND ON THE FIXTURE AND THE MOUNTING DETAIL.
- MOUNTING AND SUPPORT DETAILS FOR LIGHTING FIXTURES SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER BEFORE THE FIXTURES ARE INSTALLED. NO COMBUSTIBLE MATERIALS SHALL BE USED.



SINGLE LINE DIAGRAM

NO SCALE

NOTES:

- 1 REMOVE EXISTING SPARE CIRCUIT BREAKER, AND INSTALL NEW, AS INDICATED.

FIRE ALARM SYSTEM

- ☐ FIRE ALARM SYSTEM – MANUAL PULL STATION, MOUNT 48". NUMBER DENOTES ZONE.
- ☐ FIRE ALARM SYSTEM – LOCAL ALARM AND SUPERVISORY CONTROL PANEL.
- ☐ FIRE ALARM SYSTEM – ANNUNCIATOR.
- ☐ FIRE ALARM SYSTEM – SMOKE DETECTOR, PHOTOELECTRIC.
- ☐ FIRE ALARM SYSTEM – AUTOMATIC FIRE DETECTOR, THERMAL.
- ☐ FIRE ALARM SYSTEM – DUCT SMOKE DETECTOR.
- ☐ FIRE ALARM SYSTEM – HORN AND ALARM SIGNAL LIGHT. ("H" DENOTES HIGH OUTPUT, "L" DENOTES LOW OUTPUT).
- ☐ FIRE ALARM SYSTEM – HORN.
- ☐ FIRE ALARM SYSTEM – ALARM SIGNAL LIGHT.
- ☐ FIRE ALARM SYSTEM – AIR HANDLING UNIT SHUTDOWN RELAY, 2 SETS OF FORM "C" CONTACTS RATED 120 VOLTS, 10 AMPERES.

FIRE ALARM NOTE:

ALL DEVICES SHALL BE FLUSH MOUNTED UNLESS NOTED BY "S" IN WHICH CASE THE DEVICES SHALL BE MOUNTED ON A SURFACE BOX, FURNISHED BY THE FIRE ALARM EQUIPMENT SUPPLIER, FINISHED TO MATCH THE ALARM SYSTEM EQUIPMENT.

GENERAL NOTES

- VERIFY ALL DOOR SWINGS WITH ARCHITECTURAL BEFORE ROUGHING IN LIGHT SWITCHES TO ENSURE PROPER SWITCH LOCATION. VERIFY ALL CASEWORK DETAILS TO ENSURE THAT ALL OUTLETS ABOVE CASEWORK ARE AT THE PROPER HEIGHT.
- SERVICE TO BUILDING IS EXISTING 120/208 VOLTS, 3 PHASE, 4 WIRE.
- ALL CONDUIT SHALL BE RUN CONCEALED UNLESS SPECIFICALLY SHOWN EXPOSED.
- MULTI-WIRE LIGHTING BRANCH CIRCUITS, PROPERLY PHASED AS REQUIRED TO SHARE THE SYSTEM NEUTRAL, SHALL BE UTILIZED AS INDICATED ON THE DRAWINGS. NO MORE THAN THREE (3) BRANCH CIRCUITS MAY BE INSTALLED IN A CONDUIT RACEWAY UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS.
- CONDUCTORS IN 120 VOLT, BRANCH CIRCUIT HOMERUNS WHICH EXCEED 75 FEET IN LENGTH FROM THE PANELBOARD TO THE FIRST OUTLET SHALL BE INCREASED AT LEAST ONE AWG SIZE TO COMPENSATE FOR VOLTAGE DROP.
- THE ELECTRICAL CONTRACTOR SHALL WORK CLOSELY WITH THE GENERAL CONTRACTOR AND VERIFY EXACT TYPE OF EQUIPMENT TO BE INSTALLED AND THE DIMENSIONS WHICH MAY AFFECT THE EXACT PLACEMENT OF ELECTRICAL WORK.
- VERIFY THE EXACT LOCATION OF ALL MOTORS AND EQUIPMENT BEFORE ROUGHING-IN. LIKEWISE APPRAISE ALL TRADES OF THE LOCATIONS OF ELECTRICAL WORK THAT EFFECTS WALL THICKNESS, PLUMBING, MECHANICAL, ETC.
- WHERE REQUIRED BY THE NEC OR LOCAL CODES, EACH MOTOR OR ITEM OR EQUIPMENT REQUIRED TO HAVE A DISCONNECTING MEANS WITHIN SIGHT OF THE MOTOR OR EQUIPMENT SHALL BE SO EQUIPPED.
- WHERE REQUIRED BY THE NEC OR LOCAL CODES, EACH ITEM OF HVAC EQUIPMENT REQUIRED TO HAVE A 20 AMPERE, 120 VOLT, RECEPTACLE WITHIN SIGHT OF THE MOTOR OR EQUIPMENT SHALL BE SO EQUIPPED.
- ALL WORK IN NEW OR REMODELED AREAS SHALL BE MADE TO TIE INTO EXISTING IN A UNIFORM MANNER. SIMILAR ITEMS IN NEW AREAS SHALL BE CHECKED AGAINST EXISTING AREAS AS FOR TYPE MOUNTING, MOUNTING HEIGHTS, ETC. ANY ITEMS SHOWN IN NEW AREAS AT VARIANCE FROM ABOVE SHALL BE REFERRED TO ARCHITECT FOR DECISION PRIOR TO ROUGHING IN.
- NOTE THAT THIS IS AN OPERATING FACILITY AND THUS ANY WORK THAT MAY CAUSE A DISTURBANCE OR INTERRUPTION IN THE NORMAL OPERATION OF THE FACILITY MUST BE CAREFULLY COORDINATED WITH THE ARCHITECT AND OWNER AND SPECIAL STEPS SHALL BE TAKEN TO MINIMIZE SUCH OCCURRENCES. ALL DISTURBANCES OR INTERRUPTIONS SHALL BE APPROVED BY THE OWNER PRIOR TO THE OCCURRENCE.
- ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE AN INSULATED EQUIPMENT GROUNDING CONDUCTOR PULLED IN THE CONDUIT WITH CURRENT CONDUCTORS UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE SIZED ACCORDING TO TABLE 250-122 OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE UNLESS INDICATED TO BE LARGER IN THE SPECIFICATIONS OR PLANS.
- INSTALL ARC FLASH WARNING LABELS, IN ACCORDANCE WITH NEC 110.16, ON ALL NEW AND/OR OLD MODIFIED ELECTRICAL MOTOR.

GRAPHICAL ELECTRICAL SYMBOLS

- ☐ CEILING OUTLET – FIXTURE TYPE "A" CIRCUIT #1.
- ☐ CEILING OUTLET – EXISTING.
- ☐ CEILING OUTLET – LED FIXTURE – SINGLE OR CONTINUOUS, LENGTHS AS SHOWN.
- ☐ CEILING OUTLET – LED STRIP.
- ☐ CEILING OUTLET – JUNCTION.
- ☐ WALL OUTLET – DUPLEX RECEPTACLE, 20A, 125V, 3 WIRE, NEMA 5-20R.
- ☐ WALL OUTLET – DOUBLE DUPLEX RECEPTACLE, 20A, 125V, 3 WIRE, NEMA 5-20R, SINGLE PLATE.
- ☐ WALL OUTLET – DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTING, 20A, 125V, 3 WIRE, NEMA 5-20R, SINGLE PLATE.
- ☐ WALL OUTLET – DOUBLE DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTING, 20A, 125V, 3 WIRE, NEMA 5-20R, SINGLE PLATE.
- ☐ WALL OUTLET – EXISTING.
- ☐ WALL OUTLET – JUNCTION BOX.
- ☐ WALL OUTLET – JUNCTION BOX WITH FLEXIBLE CONNECTION TO EQUIPMENT.

OUTLET NOTES:

- "A" – ABOVE COUNTER, VERIFY EXACT HEIGHT AND MOUNTING DETAILS PRIOR TO ROUGH-IN.
- "BC" – MOUNT BELOW COUNTER, VERIFY EXACT LOCATION PRIOR TO ROUGH-IN.

- ☐ SWITCH OUTLET – AC TYPE, SINGLE POLE, 20A, 125/277V.
- ☐ SWITCH OUTLET – AC TYPE, 3-WAY, 20A, 125/277V.
- ☐ SWITCH OUTLET – AC TYPE, 4-WAY, 20A, 125/277V.
- ☐ SWITCH OUTLET – LINE VOLTAGE SWITCH WITH VACANCY SENSOR (MANUAL ON, AUTO OFF), SINGLE POLE/3-WAY, DUAL TECHNOLOGY.
- VOICE/DATA BACKBOARD – 3/4" PLYWOOD PAINTED 2 COATS FIRE RETARDANT PAINT, 48" x 96" HIGH, UNLESS SHOWN OTHERWISE.
- ☐ BRANCH CIRCUIT – HOMERUN TO PANELBOARD OR DEVICE NOTED.
- ☐ BRANCH CIRCUIT – CONCEALED IN CEILING OR WALL.
- ☐ BRANCH CIRCUIT – CONCEALED IN FLOOR.
- ☐ BRANCH CIRCUIT – EXISTING CONDUIT. BARS DENOTE NEW CONDUCTORS.
- ☐ BRANCH CIRCUIT – EXISTING TO BE REMOVED OR ABANDONDED IF IN SLAB.
- ☐ BRANCH CIRCUIT – EXPOSED.

BRANCH CIRCUIT NOTES:

- ☐ CIRCUIT WITHOUT FURTHER DESIGNATION-2#12 & 1#12(G)-1/2"C.
- ☐ HASH MARKS REPRESENT NUMBER OF #12 PHASE AND NEUTRAL CONDUCTORS, IF MORE THAN 2, IN CONDUIT SIZED PER N.E.C.
- ☐ NUMBER IN CONDUIT REPRESENTS CONDUCTOR SIZE IF OTHER THAN #12 (#16,14,10,8,6, ETC.). HASH MARKS REPRESENT NUMBER OF PHASE & NEUTRAL CONDUCTORS, IF MORE THAN 2, IN CONDUIT SIZED PER N.E.C.
- ☐ MOTOR – SHOWN 2 HP (TYPICAL) OR ☐ 45 AMPS (TYPICAL).
- ☐ AIR CONDITIONING UNIT.
- ☐ STRIP HEATER.
- ☐ CEILING EXHAUST FAN – FRACTIONAL.
- ☐ MAGNETIC MOTOR STARTER.
- ☐ MANUAL MOTOR STARTER WITH THERMAL PROTECTION.
- ☐ SAFETY SWITCH, NON-FUSED, HEAVY DUTY 30/3, UNLESS NOTED OTHERWISE.
- ☐ SAFETY SWITCH, FUSED, HEAVY DUTY 30/3, UNLESS NOTED OTHERWISE.
- ☐ LIGHTING PANEL AND/OR RECEPTACLE PANEL.
- ☐ POWER PANEL.
- ☐ TRANSFORMER.

ABBREVIATIONS – GENERAL:

- WP – WEATHERPROOF – NEMA 3R.
- EC – EMPTY CONDUIT.
- A – MOUNT ABOVE COUNTER.
- BC – MOUNT BELOW COUNTER.
- AF – ABOVE FINISHED FLOOR.
- F – FLUSH MOUNT.
- SLD – SEE SINGLE LINE DIAGRAM.
- GFI – GROUND FAULT INTERRUPTING.
- EX – EXISTING.
- XR – EXISTING, REMOVE.
- XRL – EXISTING, REMOVED AND RELOCATED.
- XRQ – EXISTING, REMOVE DEVICE, EXTEND CIRCUIT CONDUCTORS AS REQUIRED AND INSTALL FINISHED BLANK COVER.
- XRP – EXISTING, REMOVE AND REPLACE WITH NEW.

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SHEET TITLE  
LEGEND,  
NOTES AND  
SINGLE LINE  
DIAGRAM

DRAWN BY	CHECKED BY
CFB	DMH
DATE	06/11/25
JOB NUMBER	224169
SHEET NUMBER	E1
OF	

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD-  
SHELBY COUNTY COMMISSION  
COLUMBIANA, ALABAMA

REVISIONS

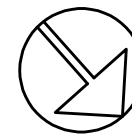
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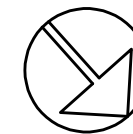
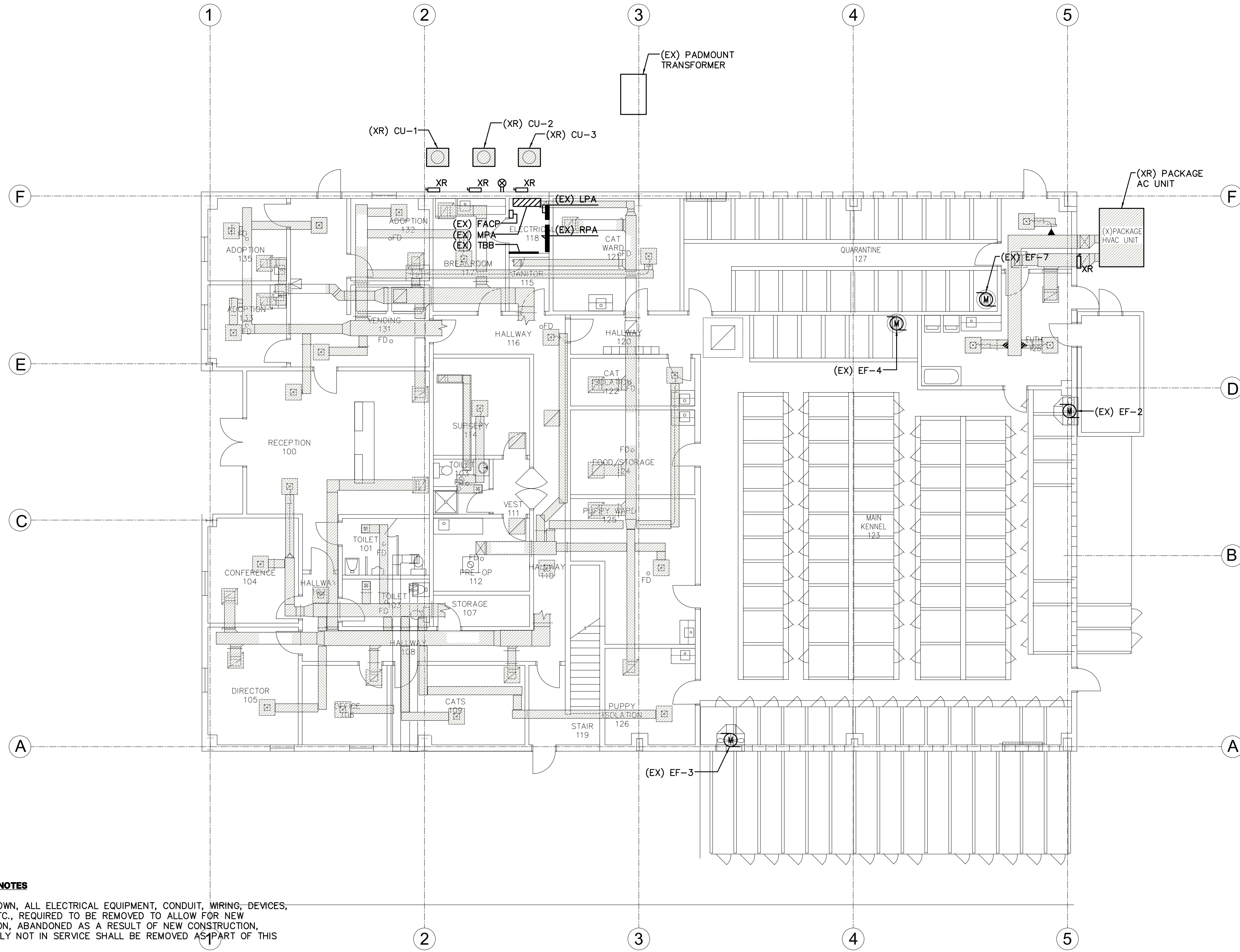
#### DEMOLITION NOTES

1. IN AREA SHOWN, ALL ELECTRICAL EQUIPMENT, CONDUIT, WIRING, DEVICES, FIXTURES, ETC., REQUIRED TO BE REMOVED TO ALLOW FOR NEW CONSTRUCTION, ABANDONED AS A RESULT OF NEW CONSTRUCTION, OR CURRENTLY NOT IN SERVICE SHALL BE REMOVED AS PART OF THIS CONTRACT.
2. EXPOSED CONDUITS AND CONDUITS IN ACCESSIBLE AREAS SHALL BE REMOVED COMPLETELY; CONDUITS CONCEALED IN FLOORS, WALLS AND ABOVE NON-ACCESSIBLE CEILINGS MAY BE CAPPED AND ABANDONED AFTER REMOVAL OF ALL CONDUCTORS.
3. EXISTING ELECTRICAL EQUIPMENT AND CIRCUITRY NOT BEING REMOVED OR REWORKED UNDER THIS CONTRACT, BUT LOCATED SO AS TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT, SHALL REMAIN IN SERVICE. SUCH CIRCUITS, EQUIPMENT, ETC., SHALL BE EXTENDED, RELOCATED OR REMOVED AND REINSTALLED AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION.
4. REMOVE ALL EXISTING CIRCUITS SERVING EQUIPMENT SHOWN TO BE REMOVED UNDER THIS CONTRACT. CIRCUIT BREAKERS IN EXISTING PANELBOARDS ABANDONED AS A RESULT OF DEMOLITION SHALL BE REUSED WHERE AVAILABLE, AND SIZED AS SHOWN ON NEW WORK PLANS, TO SERVE NEW EQUIPMENT.



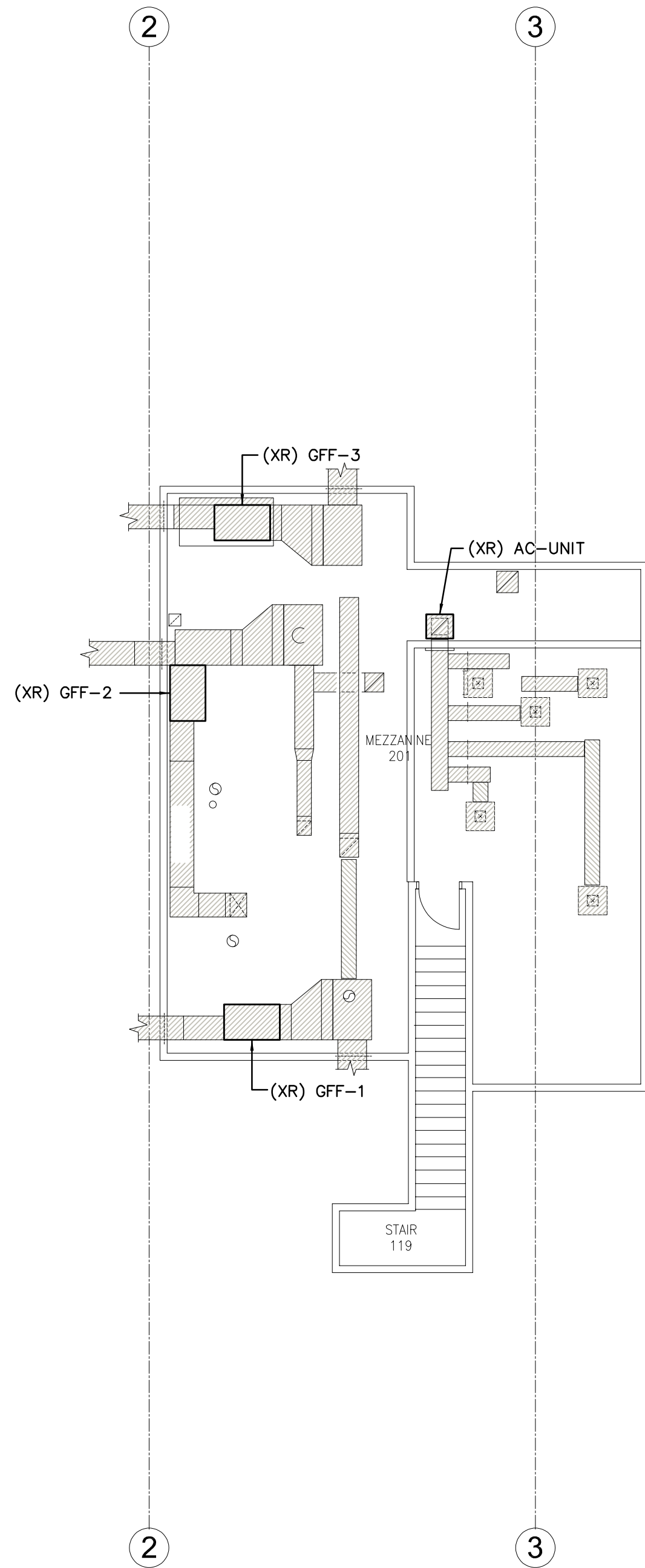
#### FIRST FLOOR - DEMOLITION - ELECTRICAL

SCALE: 1/8" = 1'-0"



#### SECOND FLOOR - DEMOLITION

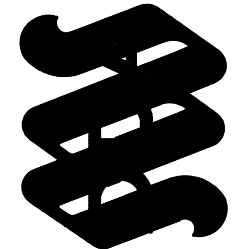
SCALE: 1/8" = 1'-0"



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SHEET TITLE  
1ST & 2ND  
FLOOR  
DEMOLITION  
ELECTRICAL

DRAWN BY	CFB	CHECKED BY	DMH
DATE	06/11/25		
JOB NUMBER	224169		
SHEET NUMBER	E2	OF	

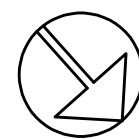
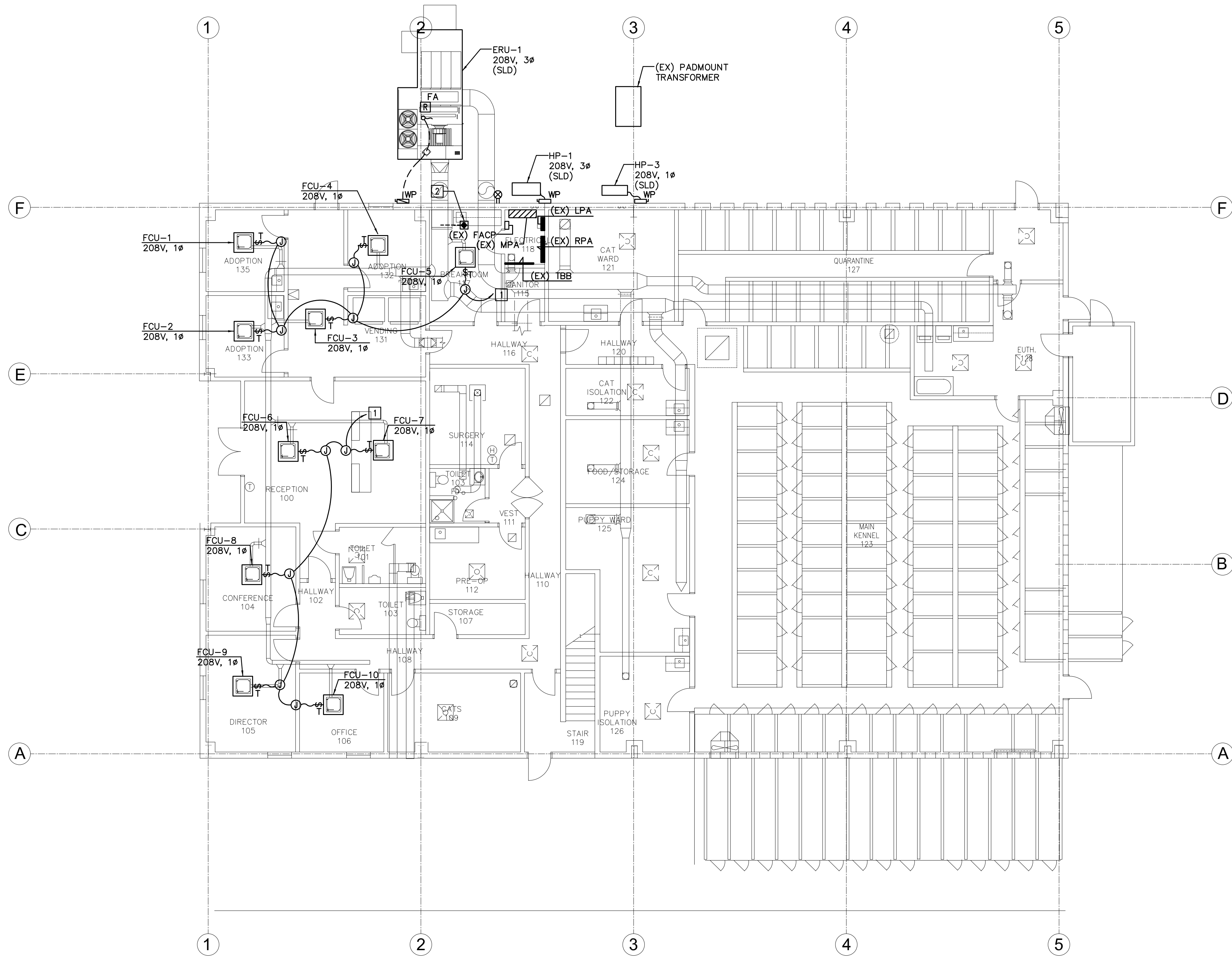
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MCDOW ROAD  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

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G:\2024\24038\DD\E3 FLOOR PLAN - NEW WORK\_24038.DWG  
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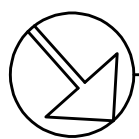
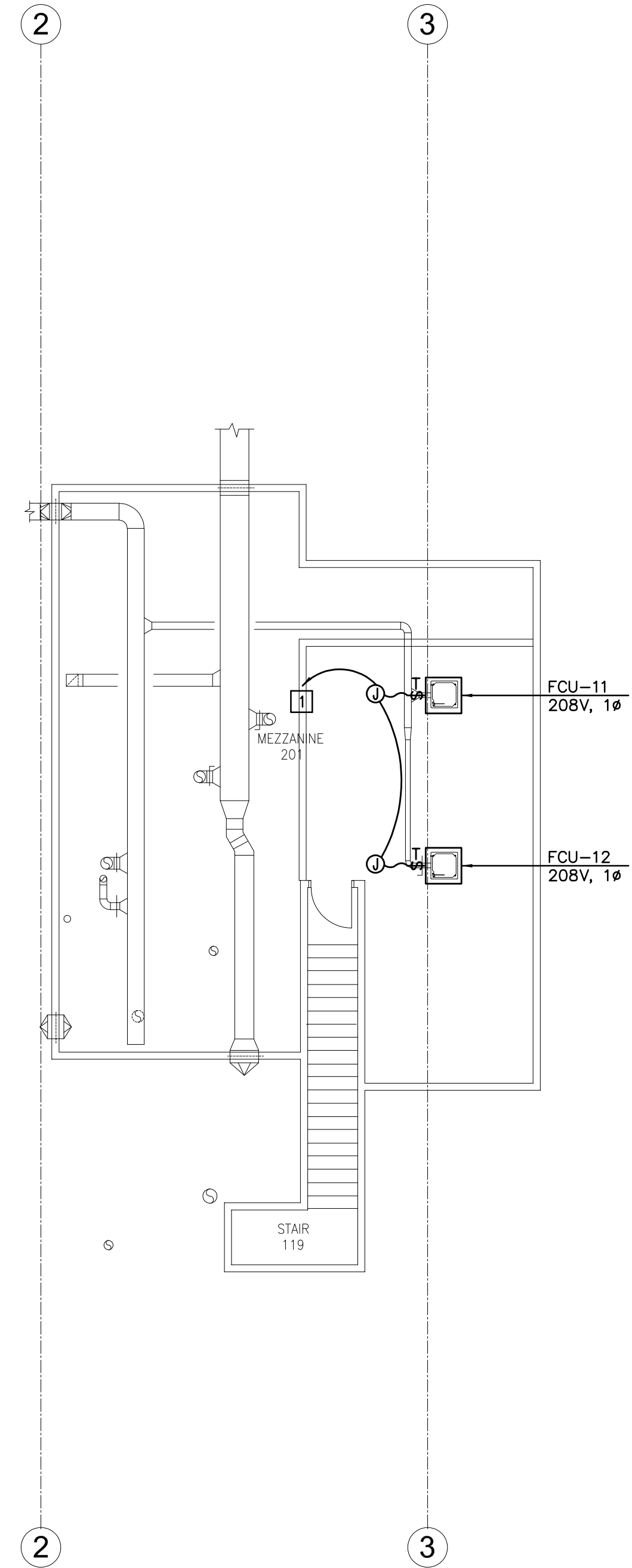


FIRST FLOOR PLAN - NEW WORK - POWER & AUXILIARY

SCALE: 1/8" = 1'-0"

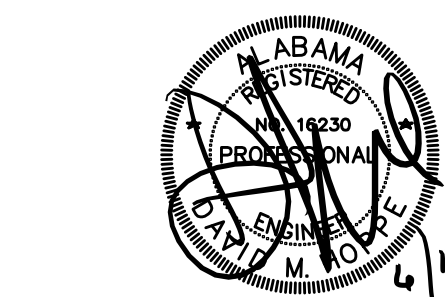
NOTES:

- TO NEW 15/2 CIRCUIT BREAKER INSTALLED IN AVAILABLE SPACE IN EXISTING PANEL RPA.
- SUPPLY AIR DUCT DETECTOR, IN SUPPLY DUCT, WITH UNIT SHUT-DOWN. COORDINATE WITH MECHANICAL.



SECOND FLOOR PLAN - NEW WORK - POWER & AUXILIARY

SCALE: 1/8" = 1'-0"



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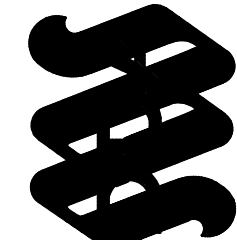
PROJECT 24038 ENGINEER DMH

REVISIONS

#	DATE	DESCRIPTION	BY

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COLUMBIANA, ALABAMA

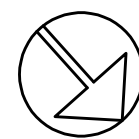
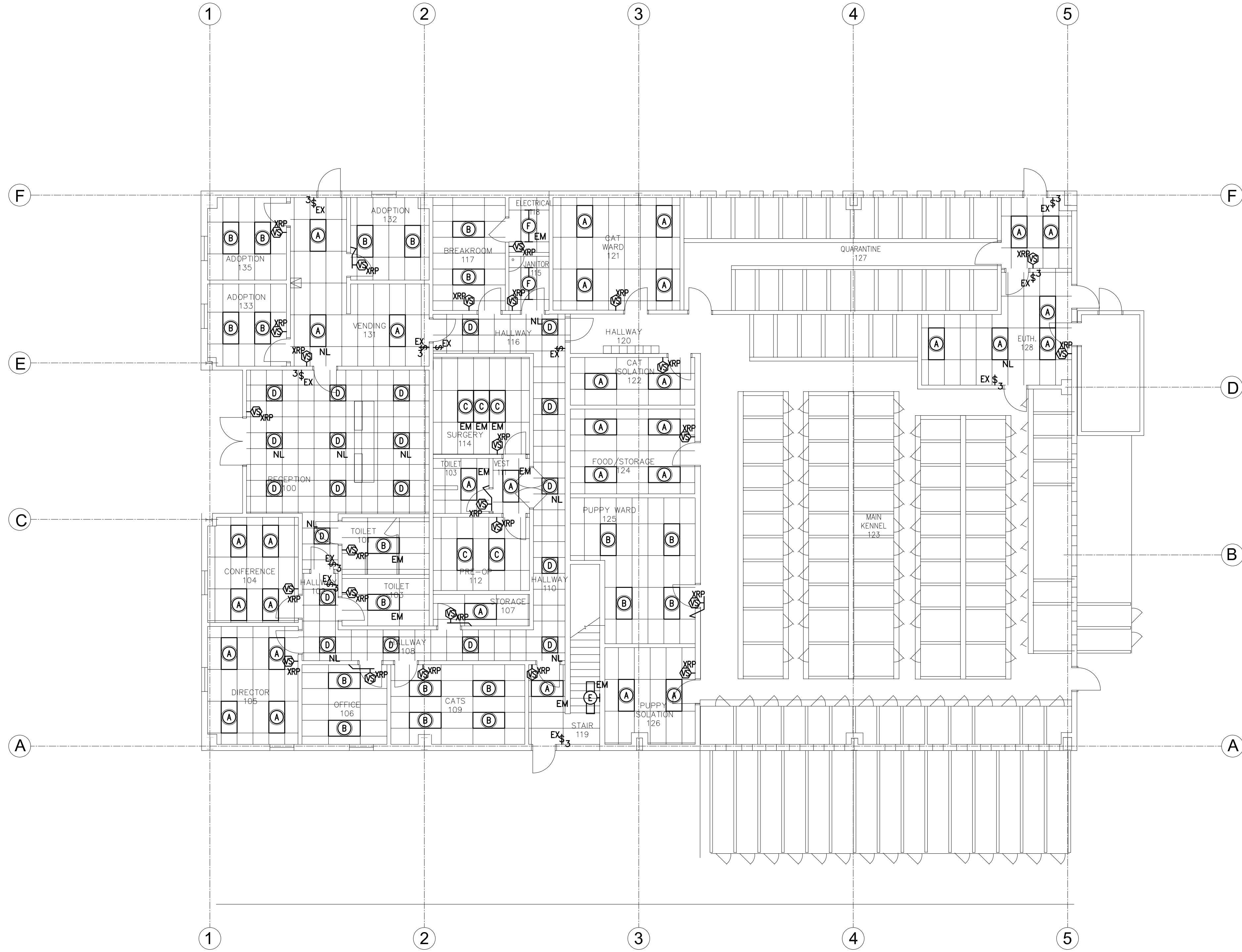
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SHEET TITLE  
1ST & 2ND  
FLOOR PLAN  
NEW WORK-  
ELECTRICAL

DRAWN BY CFB	CHECKED BY DMH
DATE 06/11/25	JOB NUMBER 224169
SHEET NUMBER E3	OF

G:\2024\24038\DD\E4 FLOOR PLAN - LIGHTING - NEW WORK\_24038.DWG  
SAVED: 6/09/2025 - 4:14PM  
PLOTTED: 6/09/2025 - 4:32PM BY CYNTHIA

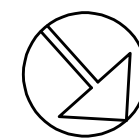
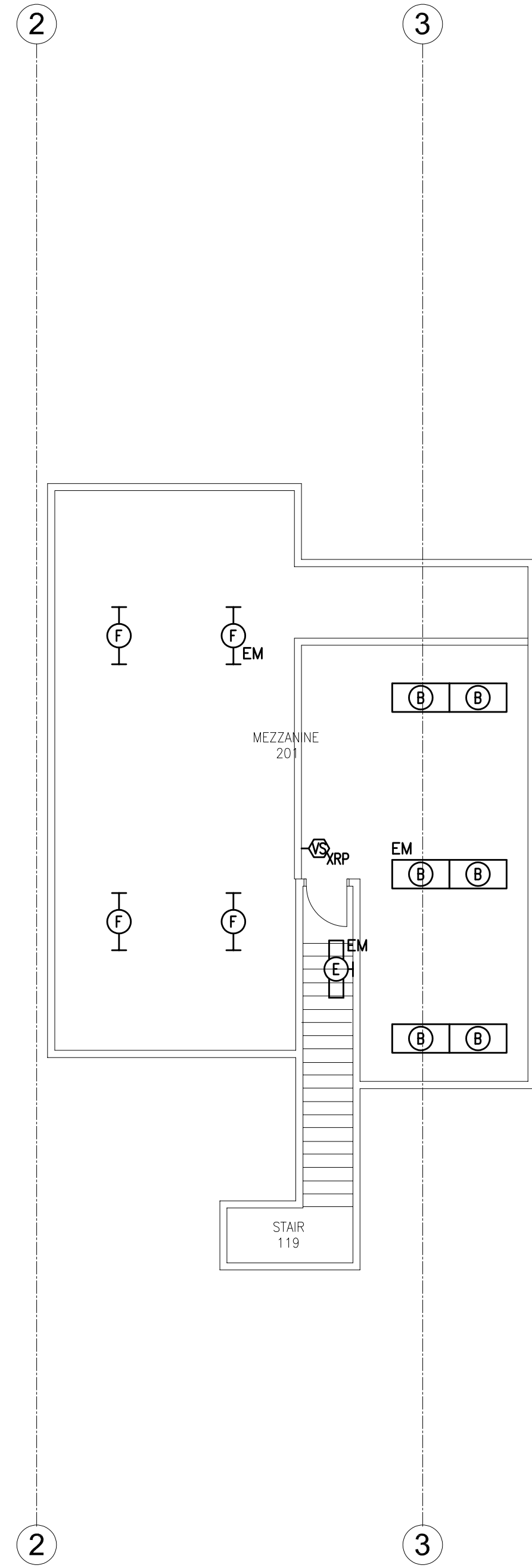


FIRST FLOOR PLAN - NEW WORK - LIGHTING

SCALE: 1/8" = 1'-0"

**LIGHTING NOTES:**

- ALL LIGHTING FIXTURES SHOWN ARE NEW, AND SHALL REPLACE EXISTING FIXTURES. VERIFY EXISTING CONDITIONS, AND MODIFY CEILINGS AS REQUIRED TO INSTALL NEW FIXTURES. CONNECT NEW FIXTURES TO EXISTING CIRCUIT.
- EXISTING EXIT SIGNS SHALL REMAIN. REMOVE AND REINSTALL AS REQUIRED FOR CEILING REPLACEMENT.
- WHERE ROOM SWITCHES ARE REPLACED WITH VACANCY SENSORS, REWORK EXISTING CIRCUIT AS REQUIRED TO ACCOMMODATE SWITCHING.



SECOND FLOOR PLAN - NEW WORK - LIGHTING

SCALE: 1/8" = 1'-0"

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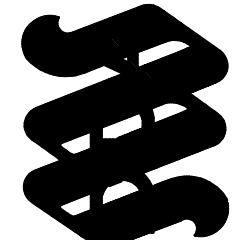
PROJECT **24038** ENGINEER **DMH**

**REVISIONS**

#	DATE	DESCRIPTION	BY

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COLUMBIANA, ALABAMA

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SHEET TITLE  
**1ST & 2ND  
FLOOR PLAN  
NEW WORK-  
LIGHTING**

DRAWN BY CFB	CHECKED BY DMH
DATE 06/11/25	JOB NUMBER 224169
SHEET NUMBER <b>E4</b>	OF

G:\2024\24038\DD\ES ELECTRICAL SPECIFICATIONS \_24038.DWG  
SAVED: 5/19/2025 - 1:35PM  
PLOTTED: 6/09/2025 - 4:23PM BY CYNTHIA

ELECTRICAL SPECIFICATIONS

1. WIRE AND CABLE 600 VOLT
- A. CONDUCTORS SHALL HAVE CURRENT CARRYING CAPACITIES AS PER NEC, #12 MINIMUM EXCEPT FOR CONTROLS, AND FIXTURE WIRE.

B. CONDUCTORS FOR GENERAL USE, SIZED #10 AND SMALLER, SHALL BE SOLID COPPER. CONDUCTORS #8 AND LARGER, AND ANY SIZE TO MOTORS OR VIBRATING EQUIPMENT SHALL BE STRANDED COPPER.

C. ALL CONDUCTOR INSULATION SHALL BE 600–VOLT.

D. INSULATION FOR BRANCH CIRCUITS IN DRY LOCATIONS ONLY, SIZED #10 AND SMALLER, SHALL BE COLOR CODED, NYLON JACKETED, PVC, TYPE THHN–THWN.

E. INSULATION FOR FEEDERS, #8 AND LARGER, AND FOR CIRCUITS RUN IN WET LOCATIONS AND BELOW GRADE SHALL BE CROSS–LINKED POLYETHYLENE INSULATION TYPE RHH–RHW/USE OR TYPE XHHW.
2. WIRE CONNECTIONS
- A. WIRE CONNECTIONS, #10 AND SMALLER CONNECTIONS SHALL BE MADE WITH INSULATED WIRE CONNECTORS WITH STEEL SPRING CONNECTOR THREADS. WIRE CONNECTORS SHALL BE "TWISTER" WIRE–NUT SERIES AS MANUFACTURED BY IDEAL INDUSTRIES, INC.

B. ON WIRE LARGER THAN #10, SHALL BE MADE WITH APPROVED SOLDERLESS CONNECTORS AND COVERED WITH SCOTCH #33 ELECTRICAL TAPE SO THAT THE INSULATION IS EQUAL TO CONDUCTOR INSULATION.
3. EQUIPMENT GROUNDING
- A. AN EQUIPMENT GROUNDING CONDUCTOR (SIZED IN ACCORDANCE WITH TABLE 250–122 OF THE NEC UNLESS SHOWN OR SPECIFIED ELSEWHERE TO BE LARGER) SHALL BE INSTALLED IN THE SAME RACEWAY WITH ALL CIRCUIT CONDUCTORS.

B. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT EACH ENCLOSURE. WHERE AN EQUIPMENT GROUNDING BUS, BONDED TO THE EQUIPMENT ENCLOSURE, IS PROVIDED, ALL EQUIPMENT GROUNDING CONDUCTORS SHALL BE CONNECTED THERETO. WHERE AN EQUIPMENT GROUNDING BUS IS NOT PROVIDED, GROUNDING BUSHINGS SHALL BE UTILIZED ON ENCLOSURE TERMINATIONS OF CONDUITS.
4. CONDUIT, TYPE OF INSTALLATION
- A. EMT MAY BE UTILIZED FOR BRANCH CIRCUITS AND AUXILIARY SYSTEMS WHERE CONCEALED IN CEILING OR WALLS AND EXPOSED WHERE THERE IS NO DANGER OF MECHANICAL INJURY IN ACCORDANCE WITH BELOW.

B. UNLESS SHOWN OR SPECIFIED OTHERWISE, RIGID OR IMC CONDUIT SHALL BE USED AS FOLLOWS:

(a) FOR EXTERIOR USE OR OTHER AREAS EXPOSED TO MOISTURE,

(b) WHERE DANGER OF MECHANICAL INJURY EXISTS, AND

(c) WHERE EMT OR NON–METALLIC CONDUIT IS NOT SPECIFICALLY PERMITTED.

C. RIGID CONDUIT SHALL BE USED IN HAZARDOUS AREAS.
5. INSTALLATION OF CONDUIT EMT, IMC, RIGID
- A. CONDUITS SHALL BE SIZED IN ACCORDANCE WITH THE LATEST NATIONAL ELECTRICAL CODE EXCEPT WHERE SHOWN TO BE LARGER ON THE DRAWINGS OR WHEN REQUIRED BY LOCAL CODE. MINIMUM CONDUIT SIZE 3/4".

B. FOLLOW METHODS WHICH ARE APPROPRIATE AND APPROVED FOR THE LOCATION AND CONDITIONS INVOLVED. WHERE NOT OTHERWISE SHOWN, SPECIFIED, OR APPROVED IN A PARTICULAR CASE, RUN ALL WIRING CONCEALED.

C. WHERE RIGID AND/OR IMC CONDUITS ENTER BOXES, THEY SHALL BE SECURED IN PLACE BY APPROVED LOCKNUTS AND BUSHING.

D. WHERE EMT ENTERS BOXES, THEY SHALL BE SECURED IN PLACE WITH APPROVED INSULATING FITTINGS.

E. EXPOSED CONDUIT RUNS SHALL BE RUN PARALLEL AND/OR RIGHT ANGLES TO BUILDING WALLS AND/OR PARTITIONS.

F. FASTEN CONDUIT SECURELY IN PLACE BY MEANS OF APPROVED CONDUIT CLAMPS, HANGERS, SUPPORTS AND FASTENINGS. ARRANGEMENT AND METHODS OF FASTENING ALL CONDUITS SHALL BE SUBJECT TO ARCHITECT/ENGINEER'S DIRECTION AND APPROVAL. USE ONLY APPROVED CLAMPS, GALVANIZED WIRE MAY NOT BE USED IN ANY INSTANCE.

G. JUNCTION OR OUTLET BOXES IN OR ABOVE CEILINGS SHALL BE SUPPORTED INDEPENDENTLY FROM CONDUITS OR CEILING SUPPORT BY ALL THREAD ROD SECURED TO ROOF OR FLOOR STRUCTURE ABOVE

H. ALL CONDUITS SHALL BE SUPPORTED WITHIN 3 FEET OF EACH COUPLING, FITTING, OUTLET BOX, JUNCTION BOX, CABINET OR EQUIPMENT ENCLOSURE CONDUIT SUPPORTS SHALL BE INDEPENDENT OF DUCTS, PLUMBING PIPING, CEILING SUPPORTS, ETC. CONDUITS SHALL NOT BE SUPPORTED BY JUNCTION BOXES, PULL BOXES, FIXTURES, ETC.
6. CEILING AND WALL OUTLET BOXES
- A. OUTLET BOXES SHALL BE STANDARD TYPE, WITH KNOCKOUTS, MADE OF HOT DIPPED GALVANIZED STEEL, STEEL CITY, RACO, APPLETON, OR BOWERS.

B. SINGLE WALL OUTLET BOXES SHALL BE TWO GANG WITH SINGLE GANG TRIM RINGS.

C. WALL OUTLET BOXES INSTALLED IN 4" OR GREATER WALLS SHALL BE 3–1/2" DEEP. WALL OUTLET BOXES INSTALLED WALLS LESS THAN 4" SHALL BE MAXIMUM DEPTH PERMITTED WALL CONSTRUCTION.

D. CEILING OUTLET BOXES SHALL BE 4" OCTAGON 2–1/8" DEEP OR LARGER AS REQUIRED DUE TO NUMBER OF WIRES.

E. BOXES SHALL BE PROVIDED WITH APPROVED 3/8" FIXTURE STUDS WHEN REQUIRED TO SUPPORT STEM MOUNTED LIGHT FIXTURES.

F. EXCEPT WHEN LOCATED IN EXPOSED CONCRETE BLOCK, SWITCH AND RECEPTACLE BOXES SHALL BE 4" SQUARE WITH TRIM RING FOR SINGLE GANG INSTALLATION. APPROPRIATE GANG BOXES SHALL BE USED FOR MOUNTING GANGED SWITCHES.

G. WHEN INSTALLED IN EXPOSED CONCRETE BLOCK, SWITCH AND RECEPTACLE BOXES SHALL BE SQUARE TYPE DESIGNED FOR EXPOSED BLOCK INSTALLATION.
7. CIRCUIT BREAKERS
- A. NEW CIRCUIT BREAKERS INSTALLED IN EXISTING PANELBOARDS SHALL BE BY THE SAME MANUFACTURER AS THE PANELBOARD OR EXISTING CIRCUIT BREAKERS AND SHALL BE MECHANICALLY AND ELECTRICALLY IDENTICAL TO EXISTING CIRCUIT BREAKERS.

B. CIRCUIT BREAKERS SHALL BE QUICK–MAKE, QUICK–BREAK, THERMAL MAGNETIC, TRIP INDICATING, MOLDED CASE TYPE, ALTERNATING CURRENT. BREAKERS SHALL TRIP FREE OF THE HANDLE AND TRIPPING SHALL BE INDICATED BY THE HANDLE ASSUMING A POSITION BETWEEN "OFF" AND "ON". MULTIPLE POLE BREAKERS SHALL HAVE INTERNAL COMMON TRIP WITH SINGLE OPERATING HANDLE; EXTERNAL HANDLE TIES ARE NOT ACCEPTABLE.

C. SINGLE POLE BREAKERS SHALL BE UL LISTED AS "SWITCHING BREAKERS" AND SHALL CARRY THE "SWD" MARKING.

D. BREAKERS SHALL BE BOLT–ON OR PLUG–ON TYPE AS REQUIRED TO MATCH EXISTING.

E. FURNISH AND INSTALL ALL NECESSARY BUS ALTERATIONS, ADDITIONS AND/OR HARDWARE AS REQUIRED TO INSTALL NEW CIRCUIT BREAKERS.

F. BUS BARS SHALL BE SILVER PLATED COPPER OR TIN–PLATED ALUMINUM AS REQUIRED TO MATCH EXISTING. ALL CONNECTORS SHALL BE PLATED.

G. AMPACITY OF NEW BUSSING SHALL BE NOT LESS THAN EXISTING.

H. A NEW GROUND BUS SHALL BE INSTALLED IN ANY PANEL, NOT SO EQUIPPED, TO WHICH A NEW CIRCUIT IS RUN CONTAINING A SEPARATE EQUIPMENT GROUNDING CONDUCTOR.

I. WIRING IN PANELBOARD GUTTERS SHALL BE DONE IN A NEAT AND WORKMAN–LIKE MANNER. WIRING SHALL BE GROUPED INTO NEAT BUNDLES AND SECURED WITH NON–METALLIC TIE WRAPS.

J. PANELBOARD SHALL BE TYPEWRITTEN AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR TO ENSURE ACCURACY. DIRECTORIES SHALL INCLUDE ADEQUATE DESCRIPTIONS TO ALLOW ACCURATE IDENTIFICATION OF THE LOAD AND LOCATION SERVED.
8. WIRING DEVICES
- A. SWITCHES AND RECEPTACLES SHALL BE SPECIFICATION GRADE, TAMPER PROOF, AC TYPE AS MANUFACTURED BY ARROW HART, HUBBELL, LEVITON OR P & S. RECEPTACLES IN EXAM ROOMS AND OTHER PATIENT CARE AREAS SHALL BE HOSPITAL GRADE.

B. SWITCHES SHALL BE SILENT OPERATION TOGGLE RATED 20 AMPERES, 120/277 VOLTS AC. ALL SWITCHES SHALL BE EQUIPPED WITH SCREW TERMINALS FOR BONDING GROUNDING ELECTRODE CONDUCTORS. SWITCHES SHALL BE HUBBELL CSB120 SERIES OR EQUAL.

C. RECEPTACLES SHALL BE BACK AND SIDE WIRED, SPECIFICATION GRADE, IN NEMA CONFIGURATION AS SHOWN ON DRAWINGS. UNLESS OTHERWISE NOTED, GENERAL USE OUTLETS SHALL BE 20 AMPERE, 120 VOLT DUPLEX RECEPTACLES, HUBBELL CATALOG #5362 OR EQUAL.

- D. WHERE NOTED ON THE DRAWINGS, AND/OR REQUIRED BY CODE, RECEPTACLES SHALL BE EQUIPPED WITH INTEGRAL CLASS A GROUND FAULT PROTECTION (5 MILLIAMPERE SENSITIVITY), UNLESS NOTED OTHERWISE ALL "GFI" RECEPTACLES SHALL BE DUPLEX, RATED 20 AMPERES, 120 VOLTS WITH "TEST" AND "RESET" BUTTONS AND FEED THROUGH FEATURE FOR GROUND FAULT PROTECTION OF ALL DEVICES ON THE LOAD SIDE OF THE UNIT. "GFI" RECEPTACLES SHALL BE HUBBELL CATALOG #GF–83001 OR EQUAL.
- E. SWITCHES AND RECEPTACLES SHALL BE GREY, WITH STAINLESS STEEL PLATES.
9. FIRE ALARM SYSTEM
- A. EXISTING FIRE ALARM SYSTEM IS MANUFACTURED BY SIMPLEX. ALL NEW DEVICES SHALL BE AS MANUFACTURED BY, AND COMPATIBLE WITH, EXISTING SYSTEM.

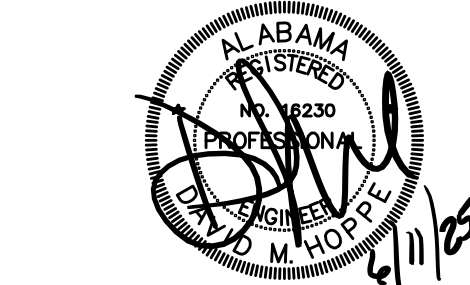
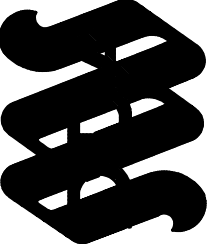
B. PROVIDE FULL FIRE ALARM SHOP DRAWING COMPLETE WITH POINT TO POINT WRING, COMPONENT CUT SHEETS AND BATTERY CALCULATIONS FOR REVIEW AND APPROVAL AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

C. PROVIDE ALL LABOR AND MATERIAL REQUIRED TO MODIFY THE EXISTING INSTALLATION AS SHOWN.

D. THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO PROVIDE A FULLY FUNCTIONAL FIRE DETECTION AND NOTIFICATION SYSTEM COMPLIANT WITH ALL APPLICABLE SECTIONS OF NFPA 72.

SHELBY COUNTY ANIMAL SERVICE BUILDING  
MCDOW ROAD–  
SHELBY COUNTY COMMISSION  
COLUMBIA, ALABAMA

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PROJECT 24038 ENGINEER DMH

SHEET TITLE  
ELECTRICAL  
SPECIFICATION

DRAWN BY CFB CHECKED BY DMH

DATE 06/11/25

JOB NUMBER 224169

SHEET NUMBER E5 OF