

REPLACE HEAT PUMPS BW ROBINSON STATE SCHOOL ROLLA, MISSOURI

MECH / ELEC ENGINEER:



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2018019632



Wayne A. Strobe

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SHEET INDEX

G-001	COVER SHEET
M-101	HVAC DEMOLITION / RENOVATION FLOOR PLANS
M-601	MECHANICAL SCHEDULES
E-101	POWER DEMOLITION / RENOVATION FLOOR PLANS

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MIKE KEHOE, GOVERNOR
DEPARTMENT OF
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1 OF 4 SHEETS
JULY 24, 2025



ISSUED FOR
CONSTRUCTION



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BW ROBINSON STATE SCHOOL

300 LANNING LANE
ROLLA, MISSOURI

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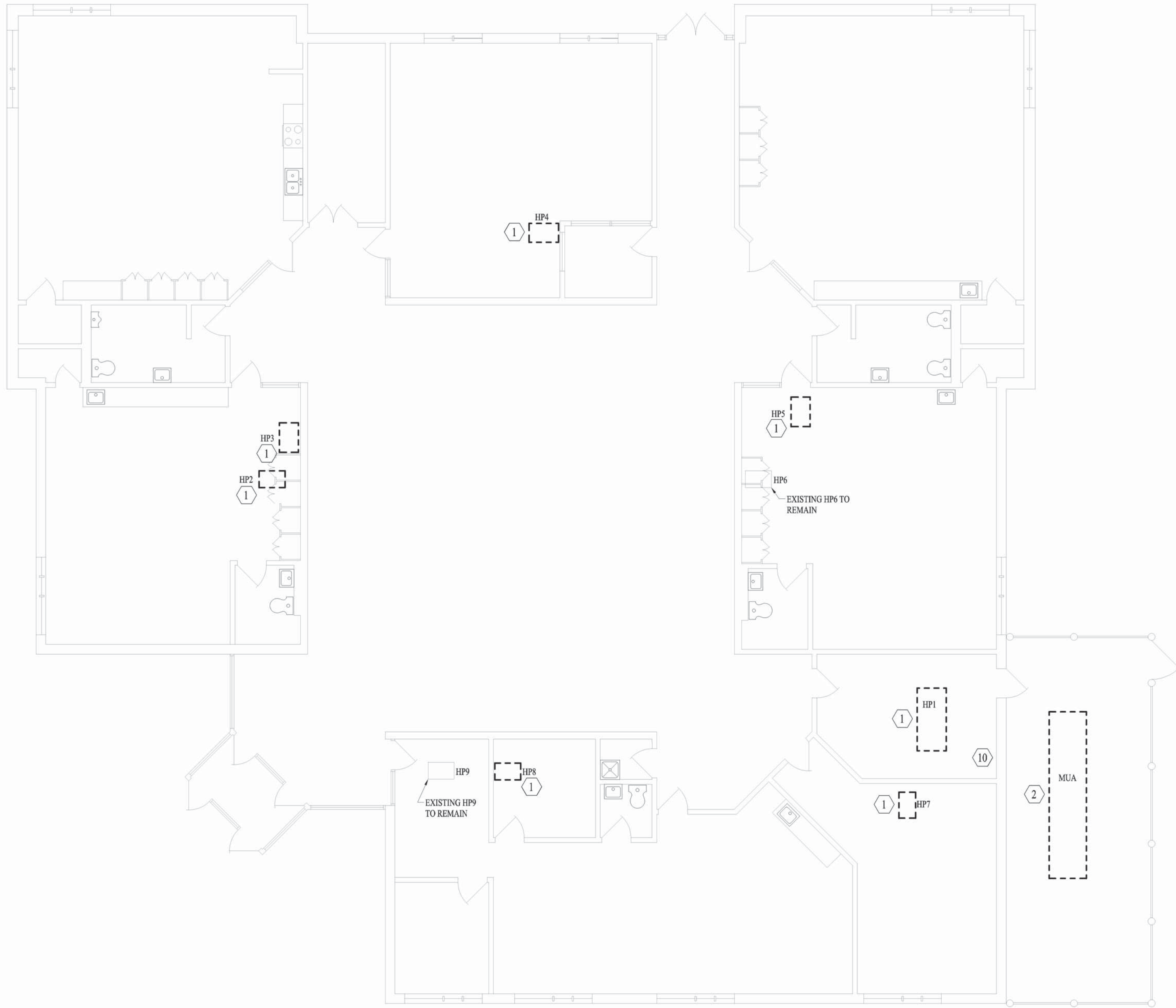
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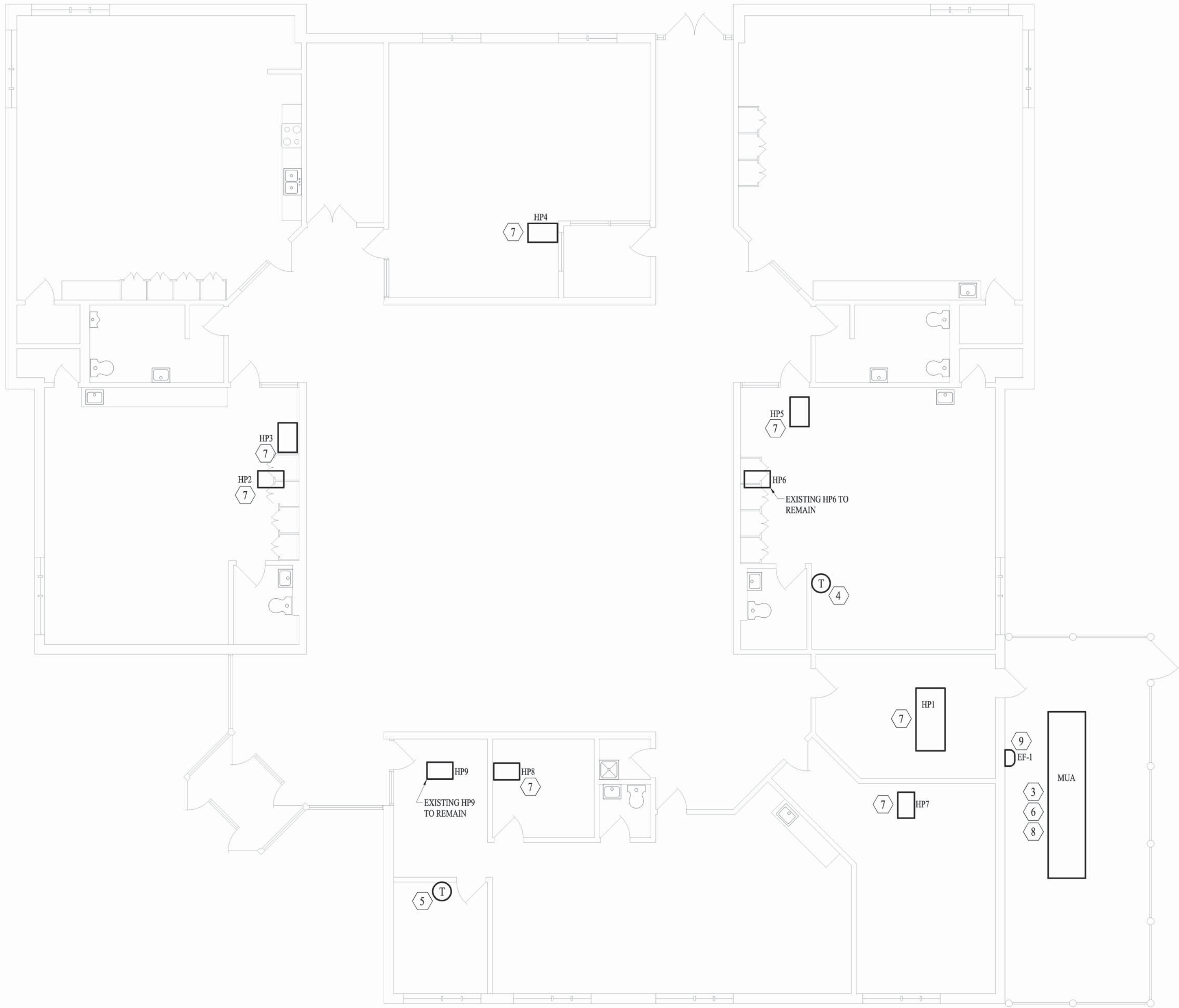
M-101

SHEET 2 OF 4
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01 HVAC DEMOLITION FLOOR PLAN
SCALE: 1/8"=1'-0"



02 HVAC RENOVATION FLOOR PLAN
SCALE: 1/8"=1'-0"

GENERAL NOTES:

- DRAWINGS (PLANS, DETAILS AND SCHEMATICS ARE DIAGRAMMATIC IN NATURE AND INDICATE GENERAL LOCATION AND ARRANGEMENT OF NEW AND EXISTING MAJOR EQUIPMENT AND PIPING SYSTEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS AND DIMENSIONS OF ALL EQUIPMENT, PIPING AND PIPING COMPONENTS. CONTRACTOR IS ALSO RESPONSIBLE FOR FINAL TIE-IN POINT LOCATIONS BETWEEN NEW AND EXISTING PIPING SYSTEMS EQUIPMENT AND UTILITIES.
- UNLESS OTHERWISE NOTED EXISTING SHOWN IN FADE-AWAY PEN. NEW, RELOCATED OR DEMOLITION ITEMS SHOWN IN DARK HEAVY PEN.
- MATERIAL EXPOSED WITHIN THE RETURN AIR PLENUM SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE DEVELOPMENT INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84.
- THE EXISTING ALERTON CONTROLS BAS SYSTEM SHALL REMAIN AND ALL NEW EQUIPMENT SHALL BE CONNECTED TO THE EXISTING BAS.

NOTES:

- REMOVE EXISTING HEAT PUMP ABOVE CEILING. EXISTING DUCTWORK, PIPING, AND CONTROLS TO REMAIN FOR REUSE.
- REMOVE EXISTING MUA UNIT. EXISTING DUCTWORK, AND CONTROLS TO REMAIN FOR REUSE. CAP CONDENSER WATER PIPING IN MECHANICAL ROOM.
- CONNECT BACK TO EXISTING RETAINED 16x12 OA DUCT, AND CONTROLS.
- NEW CONTROLS FOR EXISTING HP-6 CONNECTED TO EXISTING ALERTON BAS.
- NEW CONTROLS FOR EXISTING HP-9 CONNECTED TO EXISTING ALERTON BAS.
- EXTERIOR DUCTWORK SHALL BE INSULATED WITH 2" THICK, 3.0 PCF FIBERGLASS INSULATION AND WRAPPED WITH A 0.016" ALUMINUM JACKETING.
- CONNECT NEW HEATPUMP TO EXISTING SA DUCT, RA DUCT, CONDENSER WATER PIPING, AND CONTROLS.
- MODIFY EXISTING EQUIPMENT PAD AS REQUIRED FOR NEW MUA UNIT.
- CONNECT NEW EXHAUST FAN TO EXISTING 14x10 EA DUCT AT WALL PENETRATION.
- CAP 14"Ø EA DUCT OPENING IN MECHANICAL ROOM.



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

SEQUENCE OF OPERATION

WATER TO AIR HEAT PUMP OPERATION

THE WATER TO AIR HEAT PUMP UNITS SHALL OPERATE BASED ON A LOCAL COMMUNICATING ALERTON THERMOSTAT AND BACNET CONTROLS IN THE HEAT PUMP TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. THE HEAT PUMP UNIT FAN SHALL RUN WHEN THE UNIT CALLS FOR HEATING, COOLING, OR DEHUMIDIFICATION. THE CONTROLS SHALL MODULATE THE REVERSING VALVE TO HEATING OR COOLING AS REQUIRED. UNIT OCCUPIED/UNOCCUPIED MODE SHALL BE DETERMINED BY THE EXISTING ALERTON BAS. IN UNOCCUPIED MODE THE UNIT SHALL BE SET BACK A MAXIMUM OF TWO DEGREES FROM SETPOINT FOR HEATING AND COOLING.

MAKE-UP AIR UNIT

THE NEW MAKE-UP AIR UNIT MUA-1 SHALL RUN TO PROVIDE VENTILATION AIR AND PRESSURIZATION TO THE SPACES. THE AIR COOLED HEAT-PUMP SHALL CYCLE FROM HEATING/COOLING TO MAINTAIN A DISCHARGE AIR SETPOINT OF 70 DEG F (ADJUSTABLE), WHEN OUTSIDE AIR CONDITIONS LIMIT THE EFFECTIVENESS OF THE AIR COOLED HEAT PUMP IN HEATING MODE THE SCR CONTROLLER FOR THE AUXILIARY ELECTRIC HEATER SHALL MODULATE THE ELECTRIC HEATING CAPACITY TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. IN OCCUPIED MODE THE UNIT SHALL RUN AT FULL CAPACITY TO BRING 1200 CFM OF OUTSIDE AIR INTO THE SPACE. IN UNOCCUPIED MODE THE UNIT SHALL RUN AT HALF SPEED TO BRING 600 CFM OF OA INTO THE SPACE. THE BACNET CONTROLLER IN MUA-1 SHALL CONNECT TO THE EXISTING ALERTON BAS SYSTEM. UNIT OCCUPIED/UNOCCUPIED MODE SHALL BE DETERMINED BY THE EXISTING ALERTON BAS.

EXHAUST FAN

THE NEW EXHAUST FAN EF-1 SHALL OPERATE TO PROVIDE TOILET EXHAUST FOR THE BUILDING. EF-1 SHALL BE CONNECTED TO THE EXISTING ALERTON BAS SYSTEM. EF-1 SHALL RUN IN OCCUPIED MODE AND SHALL BE SHUT OFF IN UNOCCUPIED MODE. UNIT OCCUPIED/UNOCCUPIED MODE SHALL BE DETERMINED BY THE EXISTING ALERTON BAS.

HEAT PUMP SCHEDULE																					
MARK	MANUFACTURER	MODEL NUMBER	CONFIGURATION POS. / ORIN.	S.A. (CFM)	ESP (IN W.C.)	COOLING			HEATING			WATER FLOW (GPM)	H.P. WPD (FT)	FILTER		ELECTRICAL				NOTES	
						CAPACITY (MBH)		EWT (° F)	EER	CAP. TOTAL (BTH)	EWT (°F)			COP	QTY	SIZE MERV 8	VOLTS	Ø	MCA (AMPS)		MAX FUSE
						TOTAL	SENSIBLE														
HP-1	DAIKIN	WCCW2096	HORIZONTAL	2900	0.8	86.3	59.9	90	12.8	77.1	55	3.6	21.0	5.0	1	16X20X2	208	3	35.8	45	1,2,3,4
HP-2	DAIKIN	WSSH019	HORIZONTAL	675	0.2	19.1	13.7	90	15.8	19.3	55	4.6	4.5	4.4	1	18X24X2	208	1	11.8	15	1,2,3,4
HP-3	DAIKIN	WSSH024	HORIZONTAL	800	0.2	22.5	15.8	90	14.2	23.2	55	4.5	6.0	7.9	1	18X34X2	208	3	9.0	15	1,2,3,4
HP-4	DAIKIN	WSSH024	HORIZONTAL	800	0.2	22.5	15.8	90	14.2	23.2	55	4.5	6.0	7.9	1	18X34X2	208	3	9.0	15	1,2,3,4
HP-5	DAIKIN	WSSH024	HORIZONTAL	800	0.2	22.5	15.8	90	14.2	23.2	55	4.5	6.0	7.9	1	18X34X2	208	3	9.0	15	1,2,3,4
HP-7	DAIKIN	WSSH019	HORIZONTAL	675	0.2	19.1	13.7	90	15.8	19.3	55	4.6	4.5	4.4	1	18X24X2	208	1	11.8	15	1,2,3,4
HP-8	DAIKIN	WSSH019	HORIZONTAL	675	0.2	19.1	13.7	90	15.8	19.3	55	4.6	4.5	4.4	1	18X24X2	208	1	11.8	15	1,2,3,4
	DAIKIN																				

NOTES:

- RATINGS ARE BASED ON (COOLING) 80/67; (HEATING) 68.
- PROVIDE WITH MERV 8 FILTERS.
- PROVIDE WITH ECM MOTORS ON FANS.
- PROVIDE WITH NEW FLEX HOSES, SHUT-OFF VALVES, AND CIRCUIT SETTERS.

MAKE-UP UNIT SCHEDULE																						
MARK	MANUFACTURER	MODEL NUMBER	SUPPLY FAN			COOLING				HEATING			AUX ELECT HEATING			MIN OA CFM	ELECTRICAL				NOTES	
			CFM	ESP "H2O	HP	CAPACITY(MBH)		EAT(°F) DB/WB	LAT(°F) DB/WB	CAPACITY MBH	EAT DEG F	LAT DEG F	CAPACITY KW	STAGES	EAT DEG F		LAT DEG F	VOLTS	Ø	MCA AMPS		MOCP AMPS
						TOTAL	SENS.															
MUA-1	DAIKIN	DPSH07B	1,200	0.50	1.2	91.1	48.3	95/78	54.8/54.8	81.7	37.0	96	36	SCR	0	95	NOTE 4	208	3	172.4	175.0	1,2,3,5

NOTES:

- PROVIDE WITH SOLID BOTTOM ROOF CURB, FACTORY INSTALLED WEATHERPOOF GFCI OUTLET, FACTORY INSTALLED DISCONNECT SWITCH, VARIABLE SPEED HEAT PUMP COMPRESSOR, HOT GAS REHEAT, A 12KW AUXILIARY ELECTRIC HEATER, 2" MERV 8 FILTERS, A BACNET CONTROL CARD, AND A DISCHARGE AIR TEMPERATURE CONTROLLER.
- UNITS CONFIGURED FOR HORIZONTAL EA AND OA DUCT CONNECTIONS.
- COMPRESSOR CAPACITY BASED ON 95 DEG F AMBIENT TEMPERATURE FOR COOLING AND 5 DEG F AMBIENT TEMPERATURE FOR HEATING.
- UNIT SHALL BE SET UP FOR TWO SPEED OPERATION. PROVIDE 1200 CFM OA IN OCCUPIED MODE AND 600 CFM OA IN UNOCCUPIED MODE.
- UNIT TO BE CONNECTED TO EXISTING ALERTON BAS.

EXHAUST FAN SCHEDULE									
MARK	MANUFACTURER	MODEL	CFM	E.S.P. "H2O	MOTOR HP	ELECTRICAL			REMARKS
						VOLTS	Ø	MCA AMPS	
EF-1	LOREN COOK	100W15DH	525	0.40	1/8	120	1	5.50	

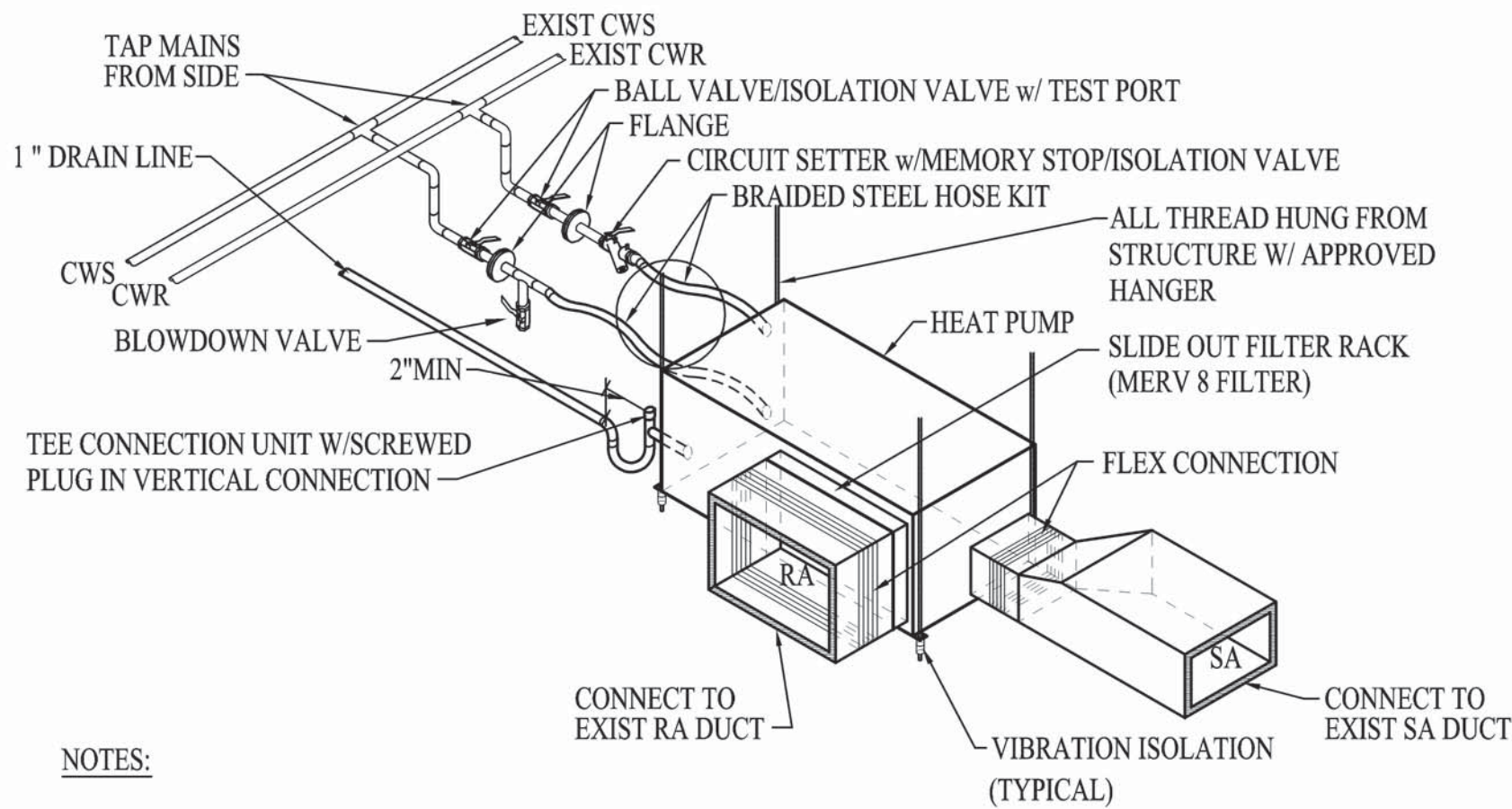
NOTES:

- WALL MOUNT DIRECT DRIVE EXHAUST FAN WITH SPEED CONTROL ADJUSTMENT FOR BALANCING AIRFLOW.
- PROVIDE WITH FACTORY INSTALLED DISCONNECT SWITCH.

EXHAUST FAN SPECIFICATION

MODEL: ACWD-HP

MANUFACTURER:	LOREN COOK IS BASIS OF DESIGN. EQUIVALENT FANS BY TWIN CITY OR GREENHECK ARE ACCEPTABLE.
DESCRIPTION:	FAN SHALL BE A SPUN ALUMINUM, WALL MOUNTED, DIRECT DRIVEN, HORIZONTAL HIGH PRESSURE CENTRIFUGAL EXHAUST VENTILATOR.
CERTIFICATIONS:	FAN SHALL BE MANUFACTURED AT AN ISO 9001 CERTIFIED FACILITY. FAN SHALL BE LISTED BY UNDERWRITERS LABORATORIES (UL 705) AND UL LISTED FOR CANADA (CUL 705). FAN SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE.
CONSTRUCTION:	FAN SHALL BE OF BOLTED AND WELDED CONSTRUCTION UTILIZING CORROSION RESISTANT FASTENERS. THE SPUN ALUMINUM STRUCTURAL COMPONENTS SHALL BE CONSTRUCTED OF MINIMUM 16 GAUGE MARINE ALLOY ALUMINUM, BOLTED TO A RIGID ALUMINUM SUPPORT STRUCTURE. THE SPUN ALUMINUM WALL FLANGE SHALL HAVE PREPUNCHED KEYSLOT HOLES AND A MOUNTING TEMPLATE WITH WALL OPENING LOCATION FOR EASE OF INSTALLATION. THE WINDBAND SHALL HAVE A ROLLED BEAD FOR ADDED STRENGTH. AN INTEGRAL CONDUIT CHASE SHALL BE PROVIDED INTO THE MOTOR COMPARTMENT TO FACILITATE WIRING CONNECTIONS. THE MOTOR SHALL BE ENCLOSED IN A WEATHER-TIGHT COMPARTMENT, SEPARATED FROM THE EXHAUST AIRSTREAM. UNIT SHALL BEAR AN ENGRAVED ALUMINUM NAMEPLATE. NAMEPLATE SHALL INDICATE DESIGN CFM AND STATIC PRESSURE. UNIT SHALL BE SHIPPED IN ISTA CERTIFIED TRANSIT TESTED PACKAGING.
WHEEL:	WHEEL SHALL BE CENTRIFUGAL BACKWARD INCLINED, CONSTRUCTED OF 100% ALUMINUM, INCLUDING A PRECISION MACHINED CAST ALUMINUM HUB. AN AERODYNAMIC ALUMINUM INLET CONE SHALL BE PROVIDED FOR MAXIMUM PERFORMANCE AND EFFICIENCY. WHEEL SHALL BE BALANCED IN ACCORDANCE WITH AMCA STANDARD 204-05, <i>BALANCE QUALITY AND VIBRATION LEVELS FOR FANS</i> .
MOTOR (ACWD):	MOTOR SHALL BE NEMA DESIGN B WITH A MINIMUM OF CLASS B INSULATION RATED FOR CONTINUOUS DUTY AND FURNISHED AT THE SPECIFIED VOLTAGE, PHASE AND ENCLOSURE.
MOTOR (ACWD-EC):	MOTOR SHALL BE AN ELECTRONICALLY COMMUTATED MOTOR RATED FOR CONTINUOUS DUTY AND FURNISHED EITHER WITH INTERNALLY MOUNTED POTENTIOMETER SPEED CONTROLLER OR WITH LEADS FOR CONNECTION TO 0-10 VDC EXTERNAL CONTROLLER.
PRODUCT:	FAN SHALL BE MODEL ACWD-HP AS MANUFACTURED BY LOREN COOK COMPANY OF SPRINGFIELD, MISSOURI.



NOTES:

- ALL PVC TO METAL CONNECTIONS TO BE FLANGED.
- BALANCE CIRCUIT SETTER TO WATER FLOW INDICATED IN SCHEDULE .

01 HEAT PUMP CONNECTION DETAIL
NO SCALE



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

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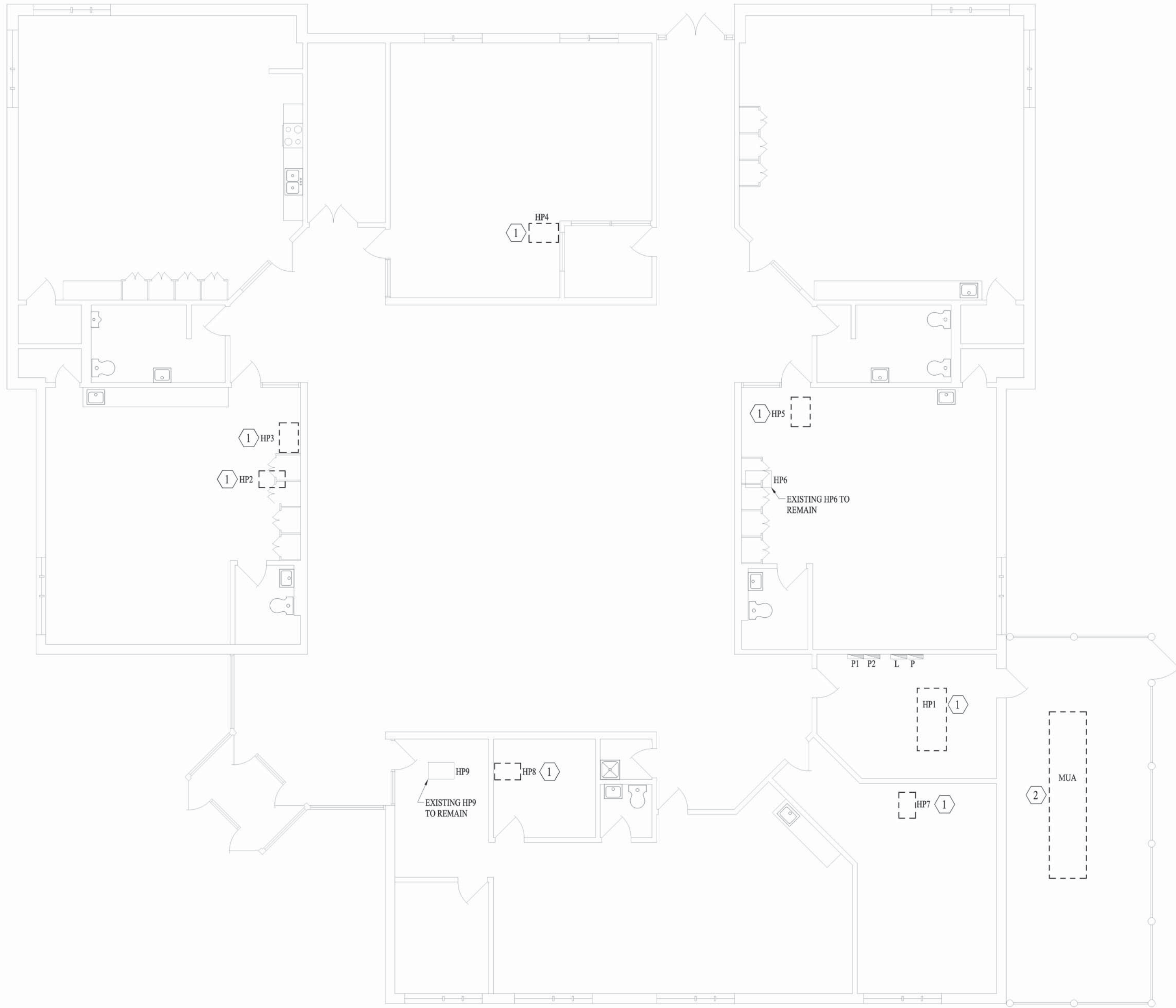
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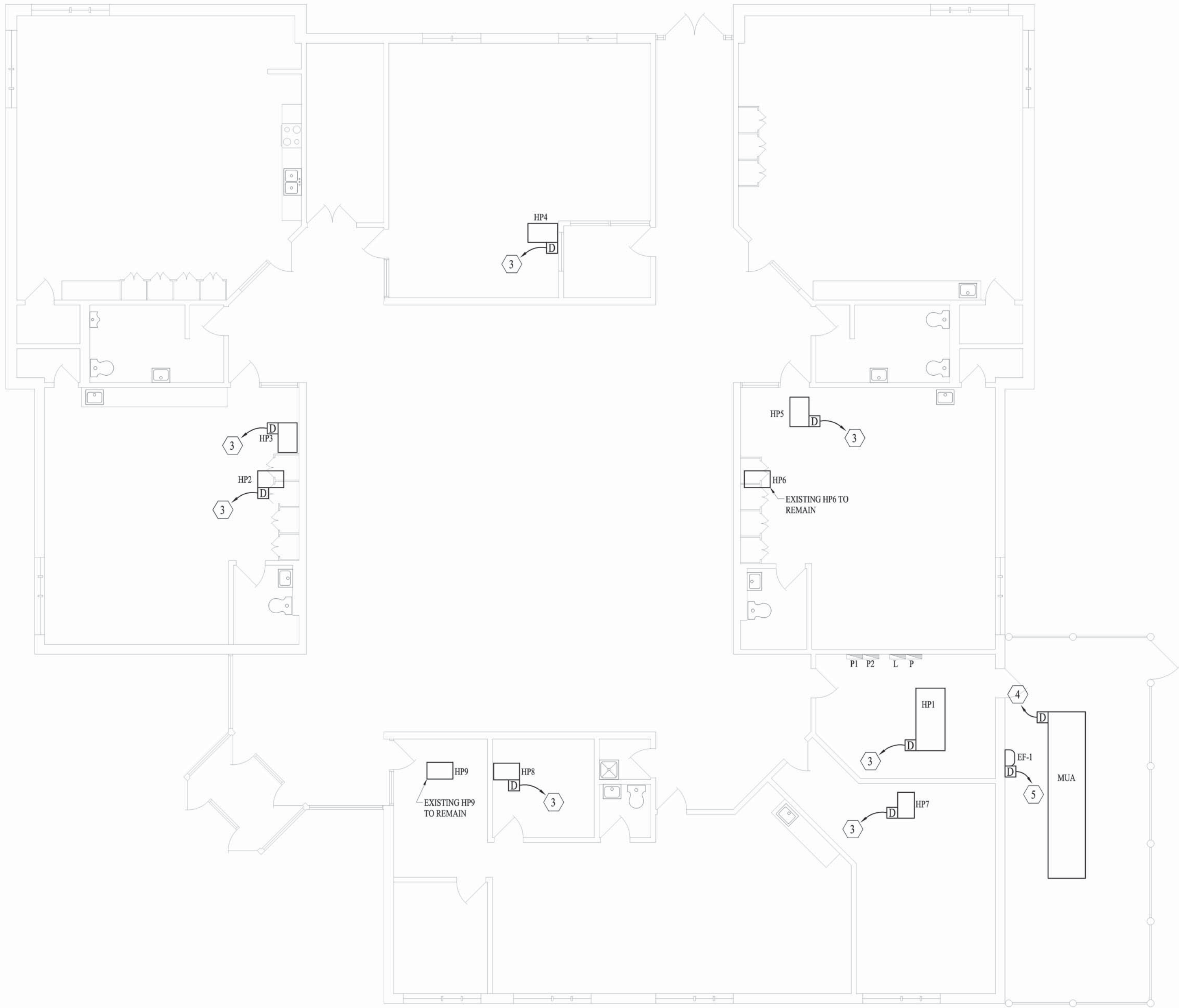
E-101

SHEET 4 OF 4
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01 POWER DEMOLITION FLOOR PLAN

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02 POWER RENOVATION FLOOR PLAN

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- THE EXISTING ALERTON CONTROLS BAS SYSTEM SHALL REMAIN AND ALL NEW EQUIPMENT SHALL BE CONNECTED TO THE EXISTING BAS.

NOTES

- DISCONNECT EXISTING HEAT PUMP POWER TO ALLOW FOR REMOVAL OF HEAT PUMP. THE EXISTING POWER SUPPLY TO REMAIN FOR REUSE.
- DISCONNECT EXISTING MUA UNIT POWER SUPPLY TO ALLOW FOR REMOVAL OF MUA UNIT. REMOVE CONDUITS AND CONDUCTORS BACK TO EXISTING PANEL.
- CONNECT TO THE EXISTING RETAINED POWER SUPPLY.
- 3 #20 THWN, #6 CU GRD, 2" C BACK TO A NEW 175A, 3P BRKR. IN EXISTING PANEL "P1"
- 2 #12 THHN, #12 CU GRD, 3/4" C BACK TO A NEW 15A, 2P BRKR. IN EXISTING PANEL "P1"



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