

ARCHITECTURE

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ADMINISTRATION BUILDING UPRADES
PLYMOUTH-CANTON COMMUNITY SCHOOLS

PLYMOUTH, MI 48170
PROJECT NUMBER 13089E
BIDS

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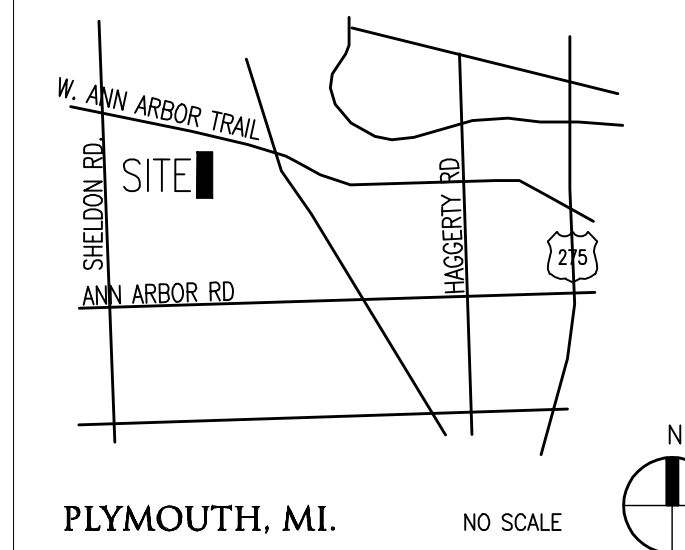
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PROJECT DATA:
LOCATION MAP



PLYMOUTH, MI. NO SCALE
ADDRESS: ADMINISTRATION BUILDING
454 S. HARVERY ST.
PLYMOUTH, MI 48170

BUILDING:
BUILDING AREA(S) = 7,619 SQ. FT. (EXISTING)

CODE:
GOVERNING CODES:
- 2012 MICHIGAN BUILDING CODE
- 2012 MICHIGAN PLUMBING CODE
- 2012 MICHIGAN MECHANICAL CODE
- 2009 MICHIGAN UNIFORM ENERGY CODE (ANSI/ASHRAE/IESNA Standard 90.1-2007)
- 2011 MICHIGAN ELECTRICAL RULES (2011 NEC, plus Part 8 Rules)
- 2010 MICHIGAN ELEVATOR RULES (ASME A17.1-2010, ASME A18.1-2011)
- MICHIGAN BARRIER FREE CODE
(Michigan Building Code 2012 and ICC A117.1-2009)
- 2013 MICHIGAN BOILER CODE RULES (ASME Boiler and Pressure Vessel Code, 2010 edition, plus 2011a addenda)
(National Board Inspection Code [NBIC], 2011 edition)

CONSTRUCTION CLASSIFICATION:
USE GROUP CLASSIFICATION:

DATE ISSUED FOR:
01-19-17 BIDS
01-13-17 95% REVIEW

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PROJECT TITLE
Administration Building
PROJECT NO.
13089E
DRAWING NO.
TS.1



**ROOF PLAN LEGEND**

REMOVE EXISTING SHINGLES, ALL UNDERLAYS AND EXISTING STEP FLASHINGS DOWN TO EXISTING PLYWOOD DECK. INSTALL NEW ASPHALT SHINGLES ON FELT UNDERLAYMENT ON SELF-ADHERING SHEET UNDERLAYMENT ON EXISTING 3/4" PLYWOOD SHEATHING, TYP.



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REGISTRATION SEAL

CONSULTANT

PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**Composite Roof Plan And Details**

ISSUE DATES

DATE	ISSUED FOR:
01-19-17	BIDS
01-13-17	95% REVIEW

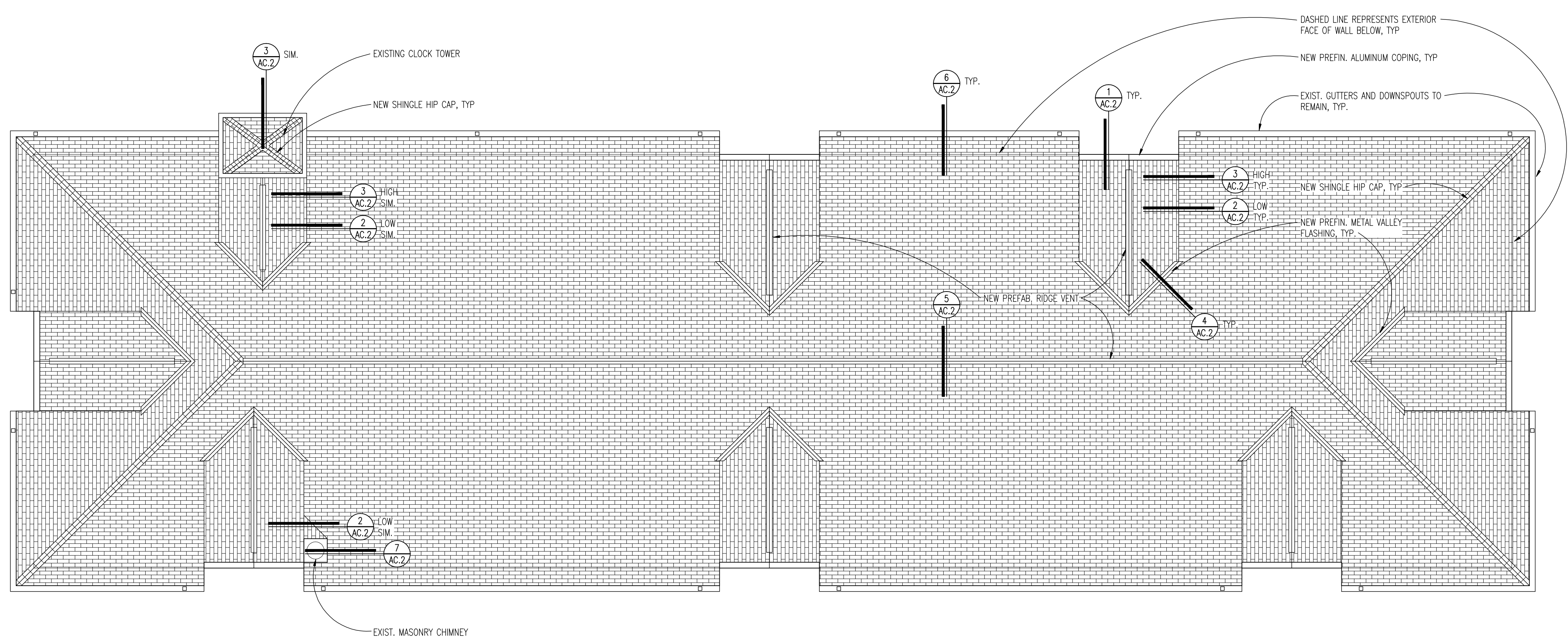
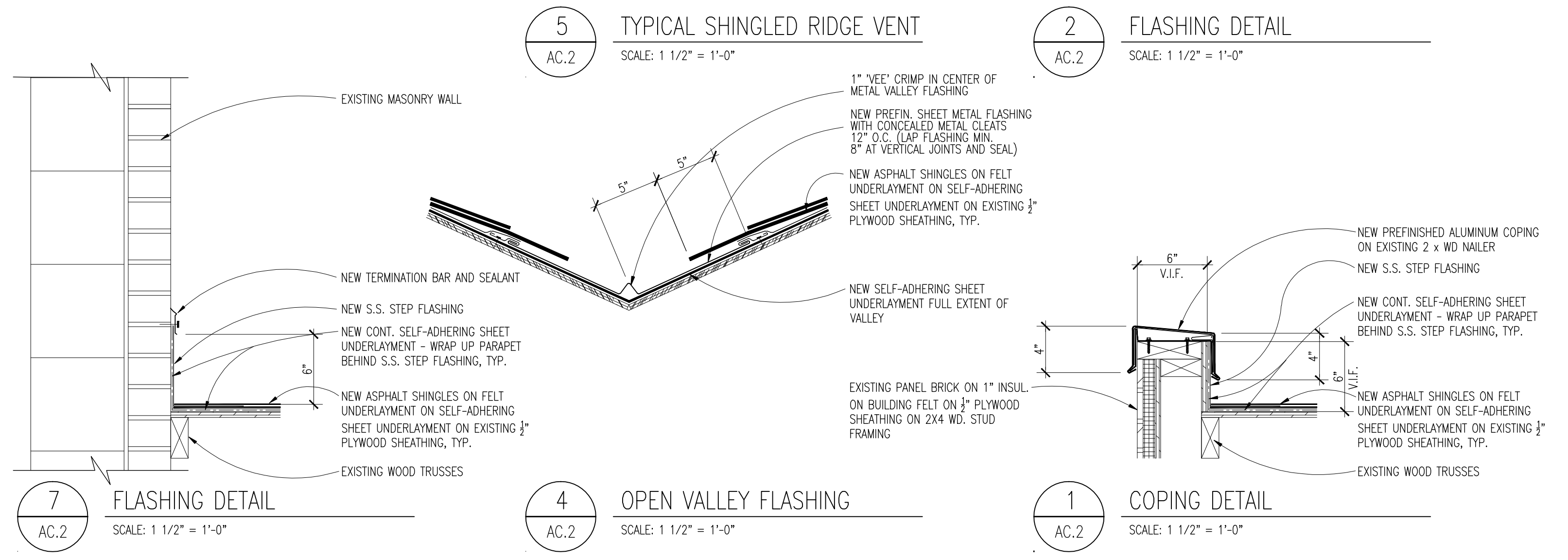
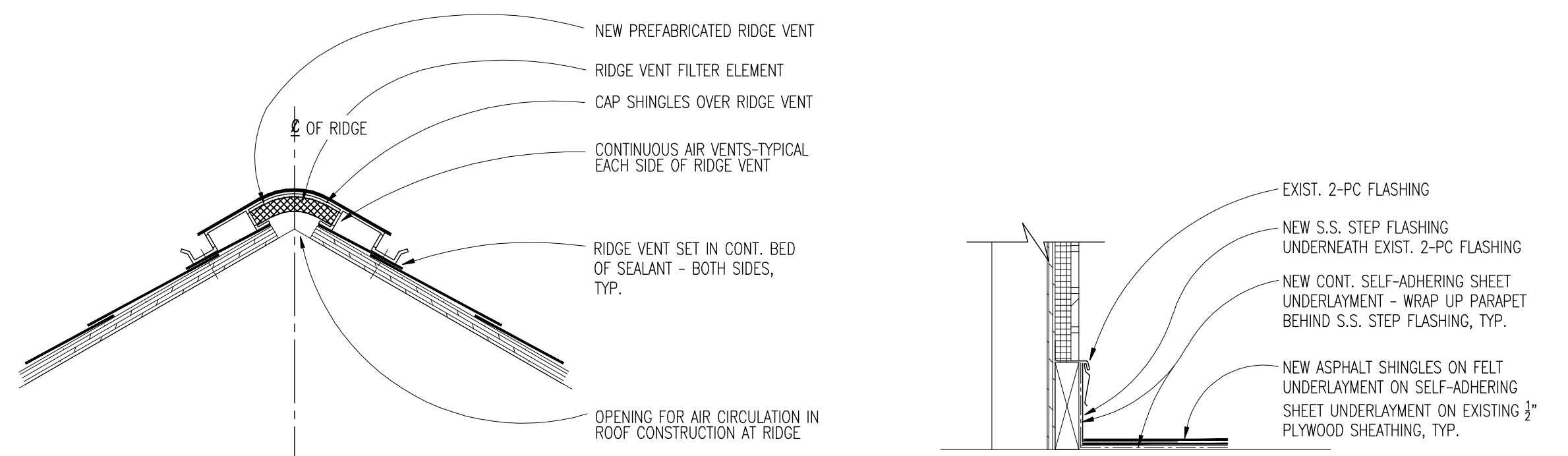
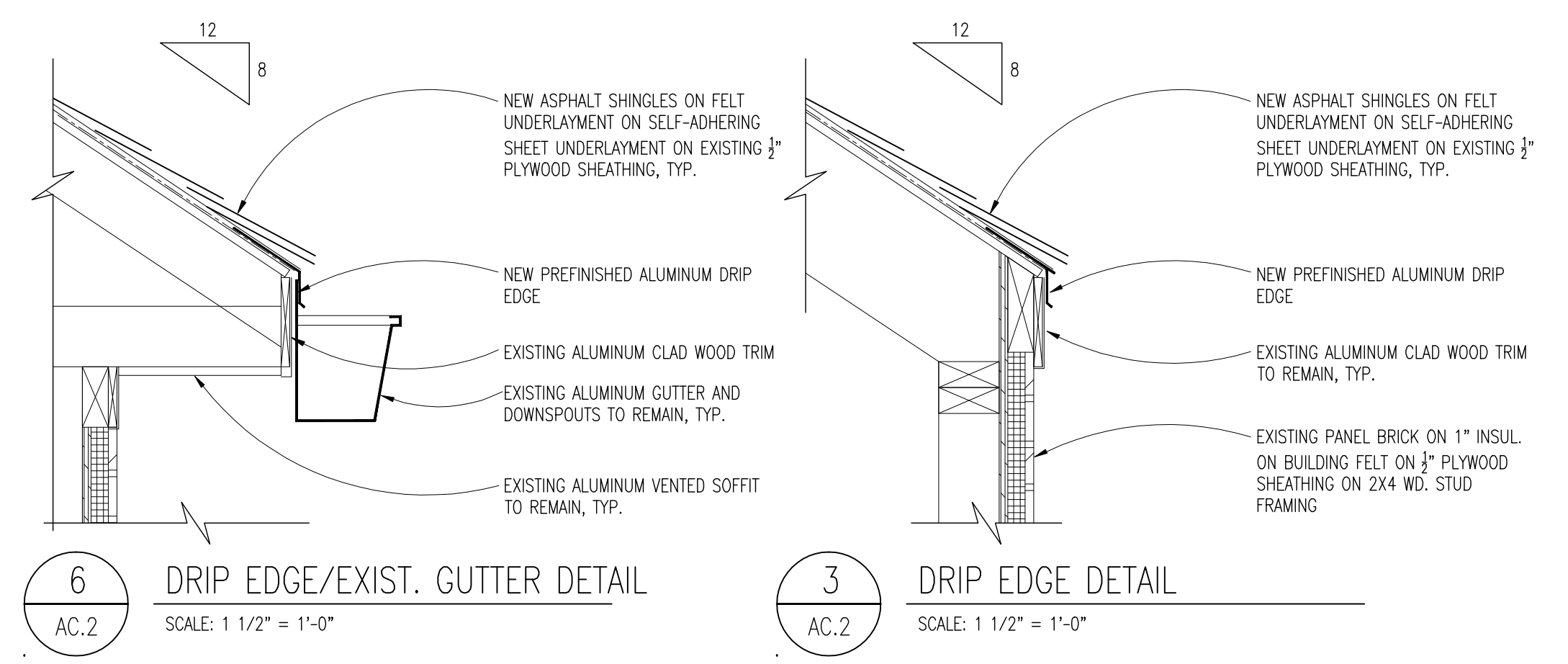
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PROJECT NO.

**13089E**

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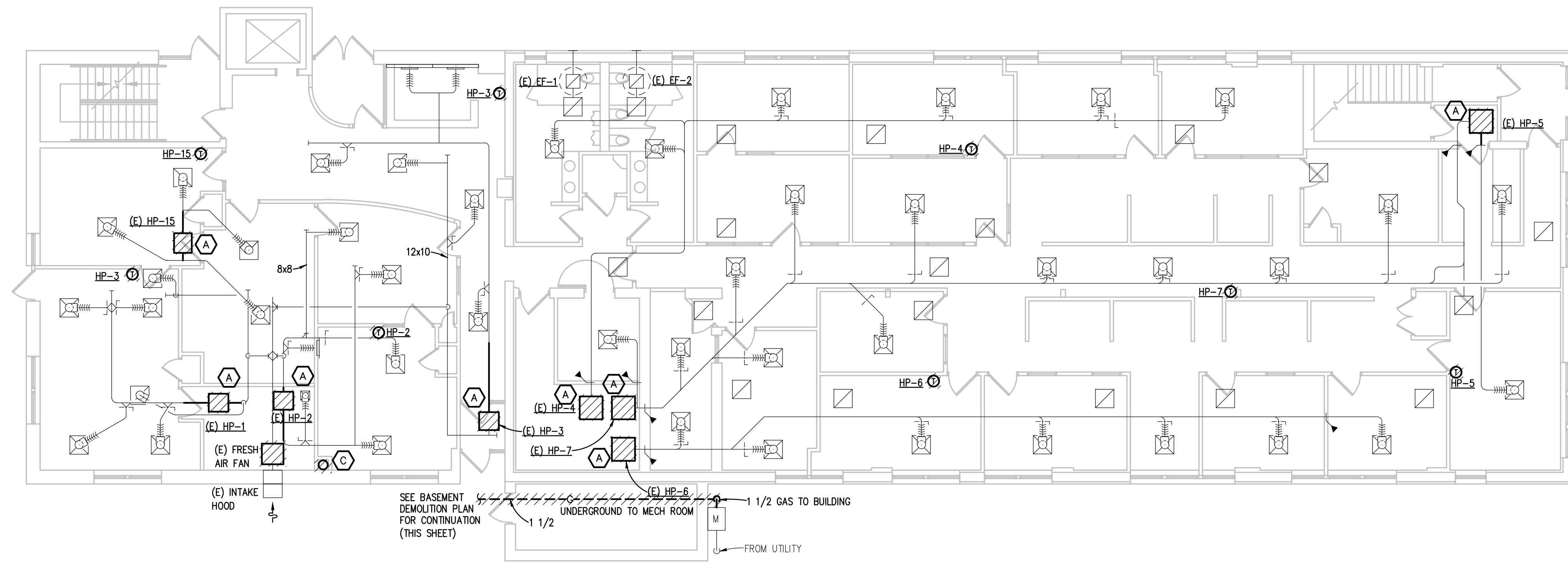
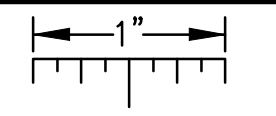
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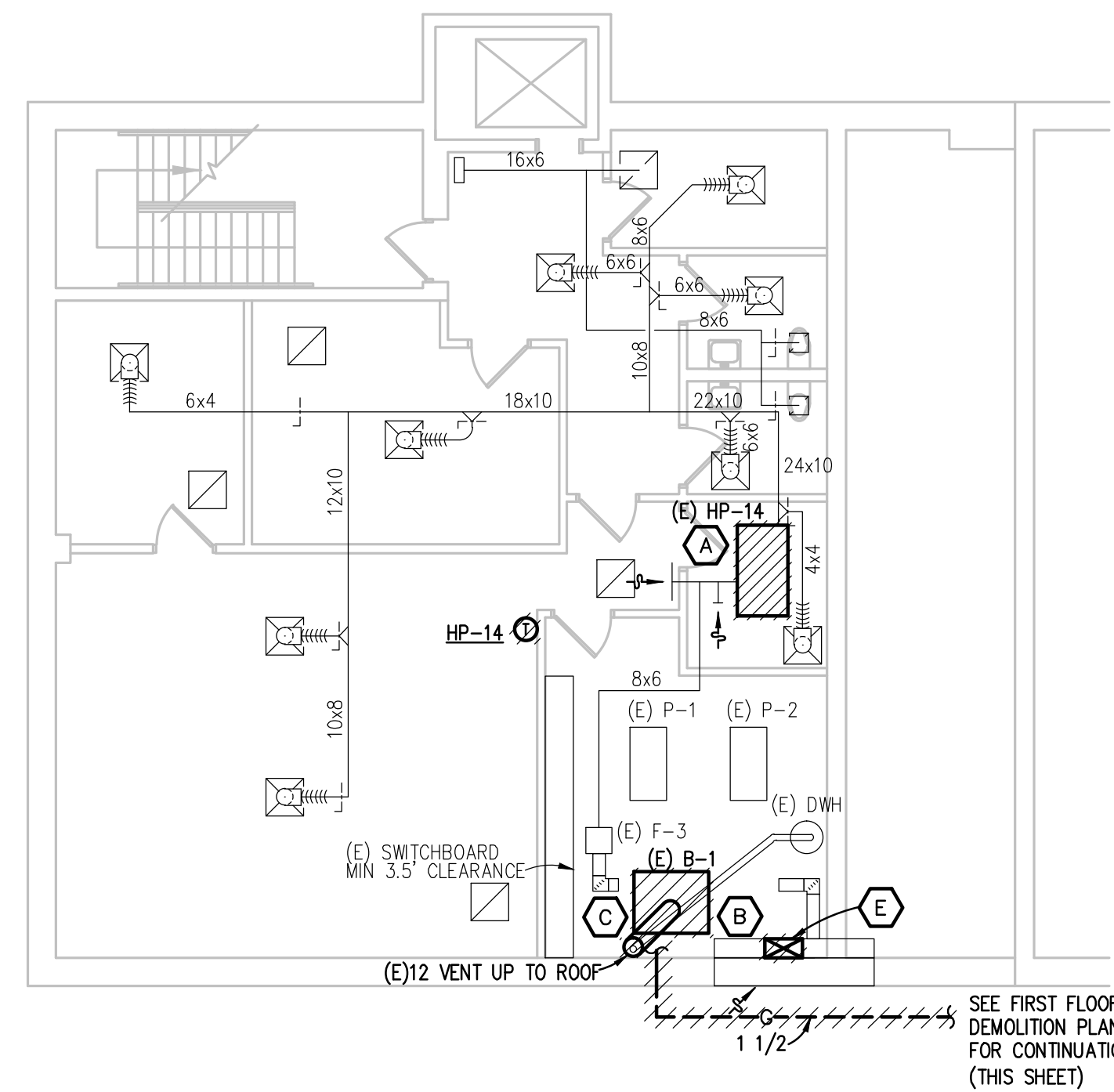
**COMPOSITE ROOF PLAN**  
 SCALE: 1/8" = 1'-0"



THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



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



**LOWER LEVEL MECHANICAL DEMOLITION PLAN**  
SCALE: 1/8" = 1'-0"

**MECHANICAL GENERAL DEMOLITION NOTES:**

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO THE ENGINEER.
3. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

**DEMOLITION KEY NOTES:**

- A. REMOVE EXISTING HEAT PUMP AND PIPING CONNECTIONS IN ORDER TO BE REPLACED. SHEET METAL TO REMAIN. PREPARE PIPING AND SHEET METAL FOR NEW CONNECTIONS.
- B. REMOVE EXISTING BOILER, ACCESSORIES, AND CONTROLS IN ORDER TO BE REPLACED.
- C. REMOVE EXISTING BOILER FLUE AND VENT TO ROOF.
- D. REMOVE EXISTING INLINE FAN AND DUCTWORK AS INDICATED. PREPARE REMAINING DUCTWORK FOR NEW CONNECTION TO NEW FAN.
- E. REMOVE EXISTING COMBUSTION AIR DUCT AND DAMPER FROM EXISTING LOUVER AND BLANK OFF OPENING.

**PRIOR TO DEMOLITION**  
THE TESTING AND BALANCING CONTRACTOR SHALL PROVIDE FLOW MEASUREMENTS FOR HEATING SYSTEM AND RECORD HEAD PRESSURES FOR THE EXISTING CIRCULATION PUMP(S). HEATING SYSTEM MUST BE PLACED IN A SIMULATED FULL LOAD, WHEN TAKING THE WATER FLOW MEASUREMENTS.

PROVIDE AIRFLOW READINGS FOR ALL DIFFUSERS/GRILLES, HEAT PUMPS AND FANS.

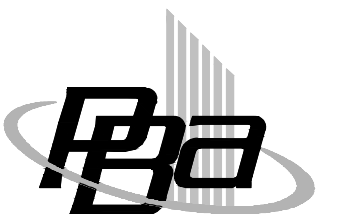
DEMOLITION WORK MUST NOT BEGIN, UNTIL THE TESTING AND BALANCING CONTRACTOR IS COMPLETE WITH RECORDING PRE-CONSTRUCTION WATER AND AIR FLOWS INDICATED ABOVE.



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PBA Project No: 2016.0441

PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**LOWER LEVEL AND FIRST FLOOR MECHANICAL DEMOLITION PLANS**

ISSUE DATES


01-19-2017 BIDS

DATE: ISSUED FOR:

DRAWN ZAV

CHECKED GRN

APPROVED RNR

PROJECT NO.

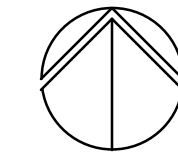
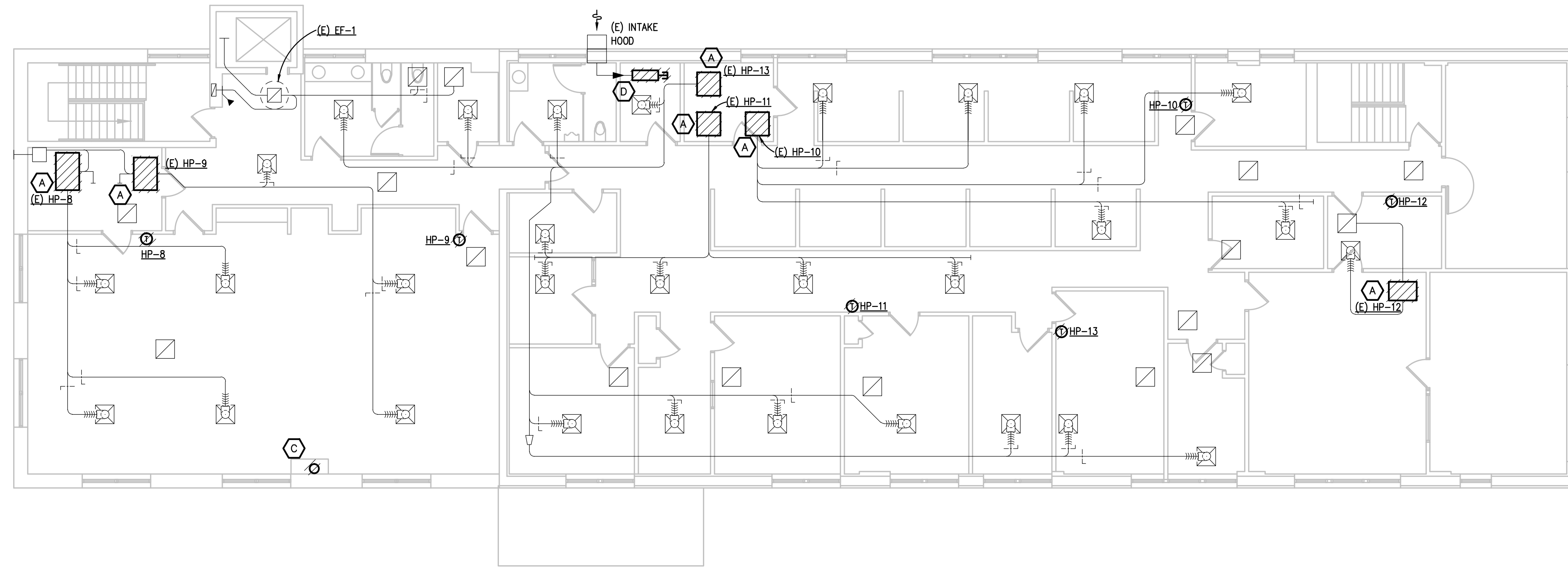
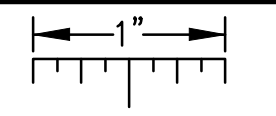
**13089E**

DRAWING NO.

**MD1.1**

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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



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

**MECHANICAL GENERAL DEMOLITION NOTES:**

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO THE ENGINEER.
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4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

**DEMOLITION KEY NOTES:**

- A. REMOVE EXISTING HEAT PUMP AND PIPING CONNECTIONS IN ORDER TO BE REPLACED. SHEET METAL TO REMAIN. PREPARE PIPING AND SHEET METAL FOR NEW CONNECTIONS.
- B. REMOVE EXISTING BOILER, ACCESSORIES, AND CONTROLS IN ORDER TO BE REPLACED.
- C. REMOVE EXISTING BOILER FLUE AND VENT TO ROOF.
- D. REMOVE EXISTING INLINE FAN AND DUCTWORK AS INDICATED. PREPARE REMAINING DUCTWORK FOR NEW CONNECTION TO NEW FAN.
- E. REMOVE EXISTING COMBUSTION AIR DUCT AND DAMPER FROM EXISTING LOUVER AND BLANK OFF OPENING.

**PRIOR TO DEMOLITION**  
THE TESTING AND BALANCING CONTRACTOR SHALL PROVIDE FLOW MEASUREMENTS FOR HEATING SYSTEM AND RECORD HEAD PRESSURES FOR THE EXISTING CIRCULATION PUMPS(S). HEATING SYSTEM MUST BE PLACED IN A SIMULATED FULL LOAD, WHEN TAKING THE WATER FLOW MEASUREMENTS.  
  
PROVIDE AIRFLOW READINGS FOR ALL DIFFUSERS/GRILLES, HEAT PUMPS AND FANS.  
  
DEMOLITION WORK MUST NOT BEGIN, UNTIL THE TESTING AND BALANCING CONTRACTOR IS COMPLETE WITH RECORDING PRE-CONSTRUCTION WATER AND AIR FLOWS INDICATED ABOVE.



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PBA Project No: 2016.0441

PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**SECOND FLOOR MECHANICAL DEMOLITION PLAN**

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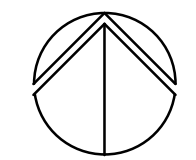
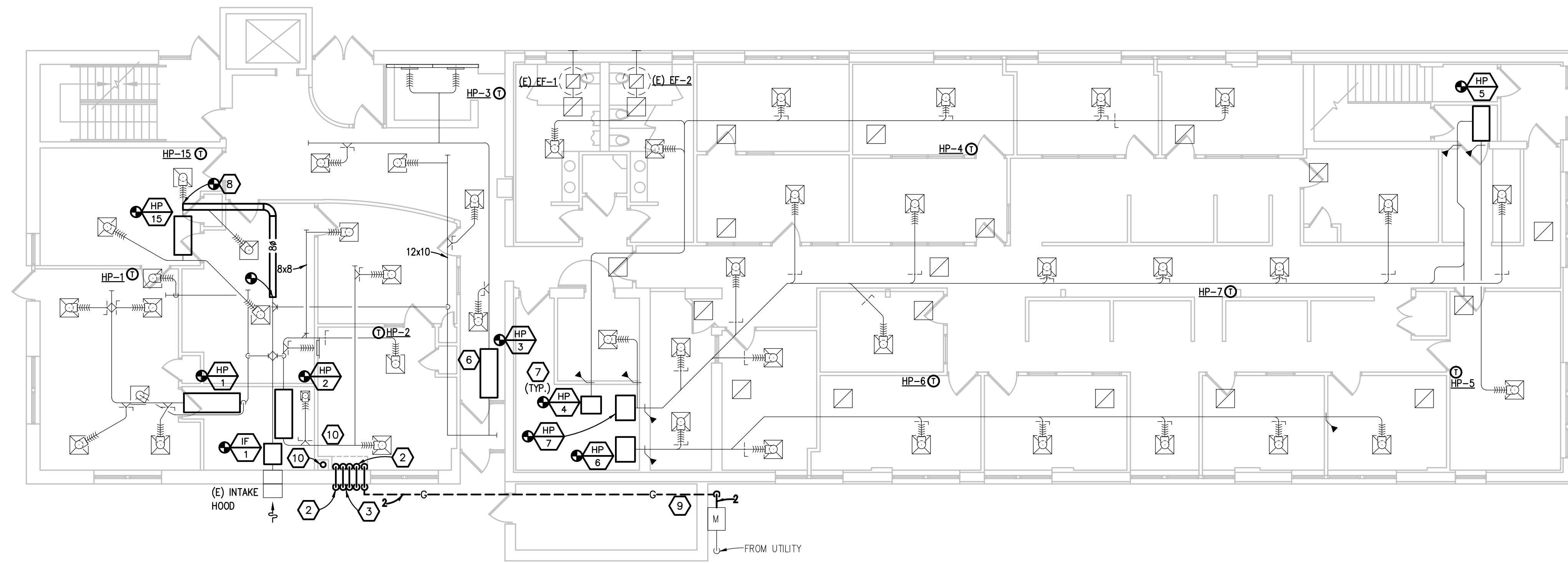
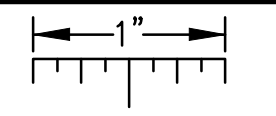
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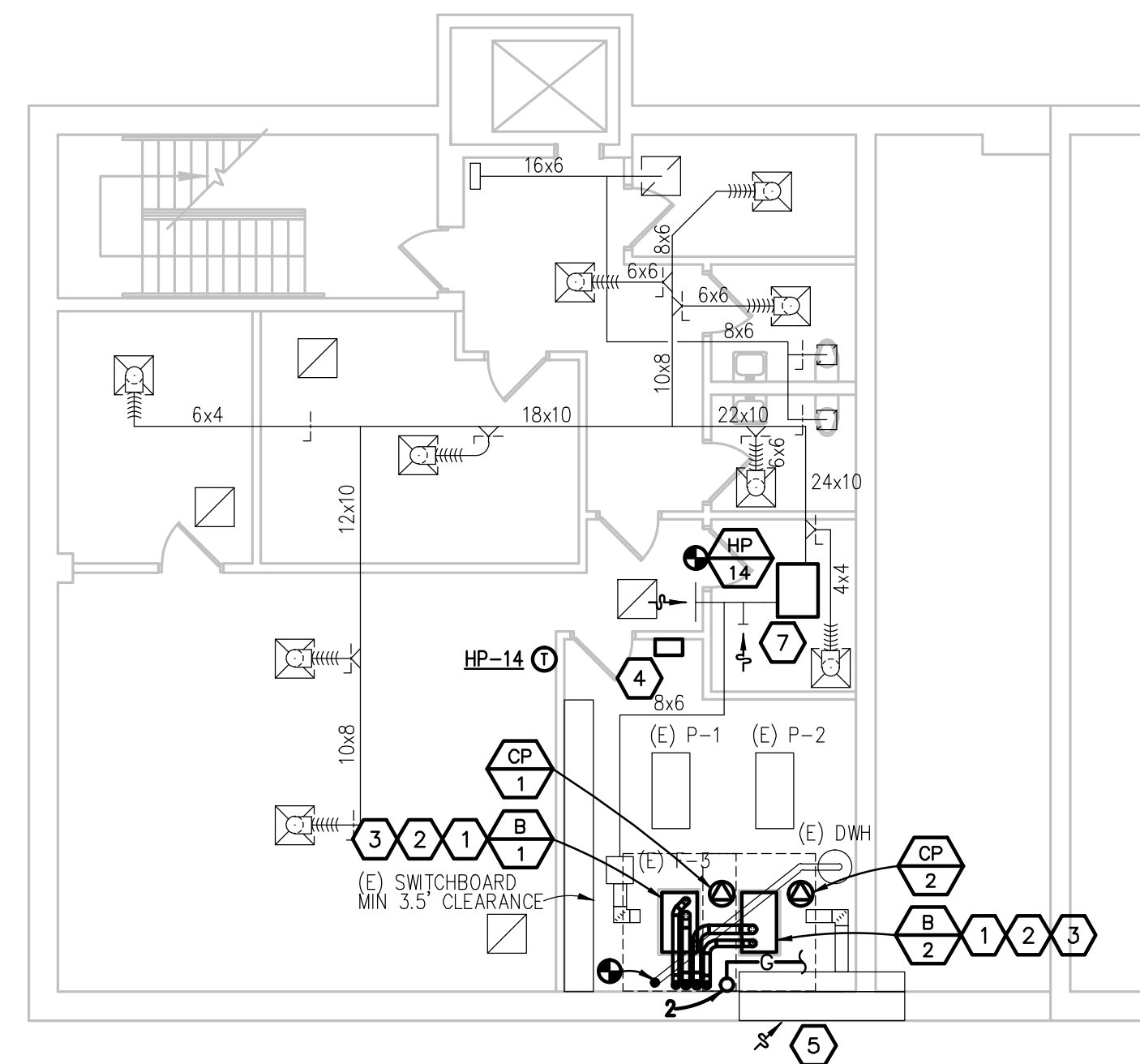
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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



**FIRST FLOOR MECHANICAL NEW WORK PLAN**  
SCALE: 1/8" = 1'-0"



**LOWER LEVEL MECHANICAL NEW WORK PLAN**  
SCALE: 1/8" = 1'-0"

**7 CONSTRUCTION KEY NOTES:**

- NEW CONDENSING BOILER. PROVIDE AND INSTALL FLUE SIDE CONDENSATE NEUTRALIZER AS SPECIFIED. RE-USE OR EXTEND EXISTING PAD AS REQUIRED TO ACCOMMODATE NEW BOILER(S).
- 4" DIAMETER (AL294C STAINLESS STEEL, FOR CATEGORY IV BOILERS) FLUE STACK UP TO FIRST FLOOR AND THROUGH WALL IN ARCHITECTURAL ENCLOSURE. REFER TO DETAILS AND PROVIDE MANUFACTURER'S RECOMMENDED TERMINATION CAP. COORDINATE ROUTING WITH EXISTING CONDITIONS AND KEEP WALL PENETRATIONS AT LEAST 12" APART.
- INSULATED 5" DIAMETER (STAINLESS STEEL) COMBUSTION AIR INTAKE PIPE UP TO FIRST FLOOR AND THROUGH WALL IN ARCHITECTURAL ENCLOSURE. ROUTE COMBUSTION AIR INTAKE AND EXHAUST FLUE PER 2008 INTERNATIONAL FUEL GAS CODE AND PER MANUFACTURER'S RECOMMENDATIONS. LOCATE COMBUSTION AIR TERMINATION MIN 3 FT UNDER THE FLUE VENT TERMINATION. KEEP WALL PENETRATIONS AT LEAST 12" APART.
- EMERGENCY SHUT OFF SWITCH FOR BOILERS.
- CLOSE UNUSED PORTIONS OF EXISTING LOUVER. SEE DETAILS FOR SPECIFIED METHOD OF BLANK OFF.
- NEW HORIZONTAL HEAT PUMP. PLACE NEW UNIT AS CLOSE AS POSSIBLE TO LOCATION OF EXISTING UNIT. PROVIDE NEW UNIT CONTROLS. LOCATE ROOM TEMPERATURE SENSOR IN SAME LOCATION AS EXISTING REMOVED SENSOR. PROVIDE NEW PIPING AND DUCTWORK AS REQUIRED TO RECONNECT UNIT. PROVIDE NEW UNIT HANDERS. WHEN BALANCING NEW UNIT DISTRIBUTE DIFFERENCE OF AIRFLOW BETWEEN NEW AND OLD HEAT PUMP EVENLY THROUGHOUT ASSOCIATED DIFFUSERS. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REINSTALLING ALL CEILING REQUIRED FOR THEIR WORK. MECHANICAL CONTRACTOR SHALL REPLACE ALL DAMAGED TILES.
- NEW VERTICAL HEAT PUMP. PLACE NEW UNIT AS CLOSE AS POSSIBLE TO LOCATION OF EXISTING UNIT. PROVIDE NEW EQUIPMENT PAD OR EXTEND EXISTING EQUIPMENT PAD WHERE NECESSARY. PROVIDE NEW UNIT CONTROLS. LOCATE ROOM TEMPERATURE SENSOR IN SAME LOCATION AS EXISTING REMOVED SENSOR. PROVIDE NEW PIPING AND DUCTWORK AS REQUIRED TO RECONNECT UNIT. WHEN BALANCING NEW UNIT DISTRIBUTE DIFFERENCE OF AIRFLOW BETWEEN NEW AND OLD HEAT PUMP EVENLY THROUGHOUT ASSOCIATED DIFFUSERS.
- NEW OA DUCT. CONNECT TO HEAT PUMP RETURN AIR AS INDICATED.
- NEW 2 GAS PIPE FROM METER UNDERGROUND TO MECHANICAL ROOM. PENETRATE EXTERIOR WALL ABOVE GRADE AND DROP TO MECHANICAL ROOM THROUGH MECHANICAL CHASE. REFER TO GAS PIPING DIAGRAM FOR EXTENT OF PIPING WORK AND TO FIND REQUIRED PIPING ACCESSORIES.
- EXTEND NEW 4" DWH FLUE VENT TO ROOF. CONTRACTOR TO COORDINATE SIZE WITH EXISTING DWH.

**PLUMBING GENERAL NOTES:**

- THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- REFER TO ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF PLUMBING FIXTURES.
- HOT AND COLD WATER PIPING RUN-OUTS TO LAVATORIES AND SINKS SHALL BE 1/2" UNLESS OTHERWISE NOTED.
- PLUMBING VENT PIPING THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10'-0" FROM ANY FRESH AIR INTAKE LOCATION AND A MINIMUM OF 18" CLEAR FROM THE INSIDE FACE OF PARAPET.
- PROVIDE CODE REQUIRED CLEARANCE FOR ALL CLEANOUTS INSTALLED IN SANITARY WASTE AND VENT PIPING.
- MINIMUM UNDERGROUND PIPE SIZE SHALL BE 3".
- WATER SERVICE ENTRANCE PIPING SHALL BE BURIED WITH DEPTH OF COVER OVER TOP OF PIPE OF AT LEAST 1' OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.

**HVAC PIPING GENERAL NOTES:**

- THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- SUBMIT PROPOSED METHODS OF ANCHORING AND GUIDING PIPING SYSTEMS TO STRUCTURAL ENGINEER FOR APPROVAL.
- COORDINATE LOCATION OF DUCT-MOUNTED HYDRONIC DEVICES WITH SHEET METAL TRADES.
- BRANCH PIPING SERVING TERMINAL UNIT HEATING COILS OR RADIANT CEILING PANELS SHALL BE 3/4" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING MORE THAN ONE TERMINAL UNIT HEATING COIL SHALL BE 1" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING HOT WATER UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE 1" UNLESS OTHERWISE NOTED.
- MOUNT THERMOSTATS 48" A.F.F., UNLESS OTHERWISE NOTED. LOCATE AS CLOSE AS POSSIBLE TO DOOR WHEN INDICATED NEAR DOOR. COORDINATE EXACT LOCATION WITH ALL OTHER TRADES.

**SHEET METAL GENERAL NOTES:**

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- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.



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PBA Project No. 20160441

PROJECT TITLE  
**Administration  
Building Upgrades**

Plymouth-Canton  
Community Schools

DRAWING TITLE  
**LOWER LEVEL AND FIRST  
FLOOR MECHANICAL  
PLANS**

ISSUE DATES

01-19-2017 BIDS

DATE: ISSUED FOR:

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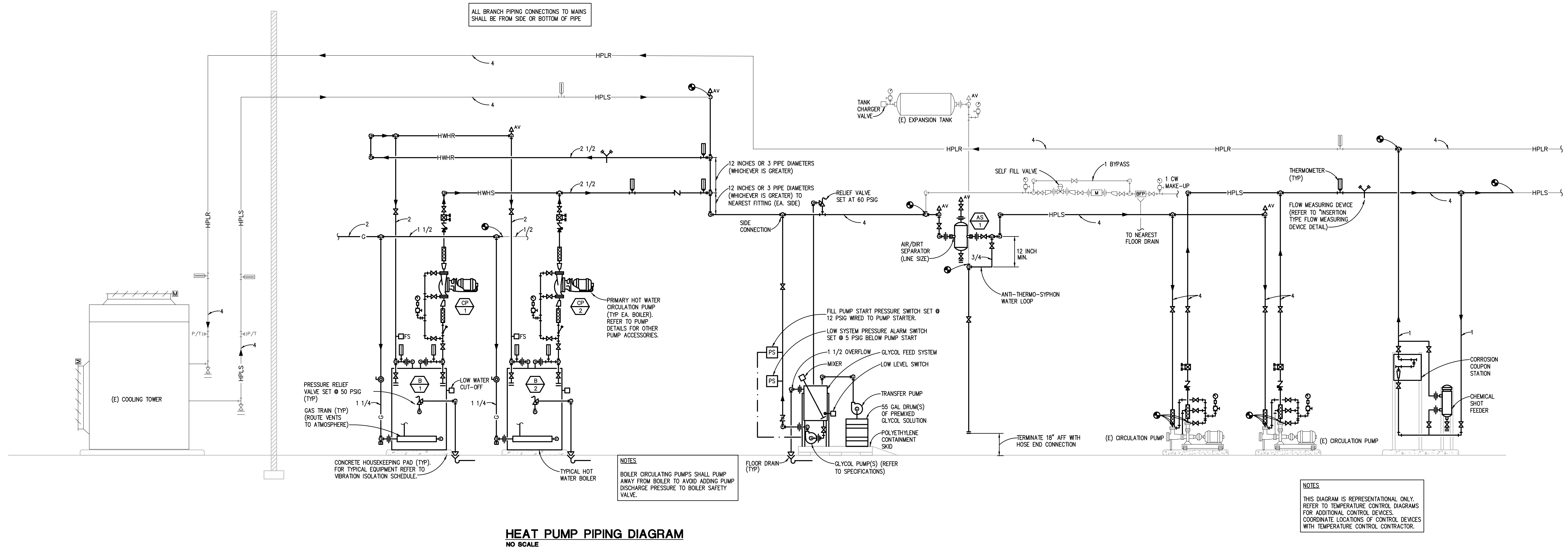
**13089E**

DRAWING NO.

**M2.1**







**GAS LOAD SCHEDULE**

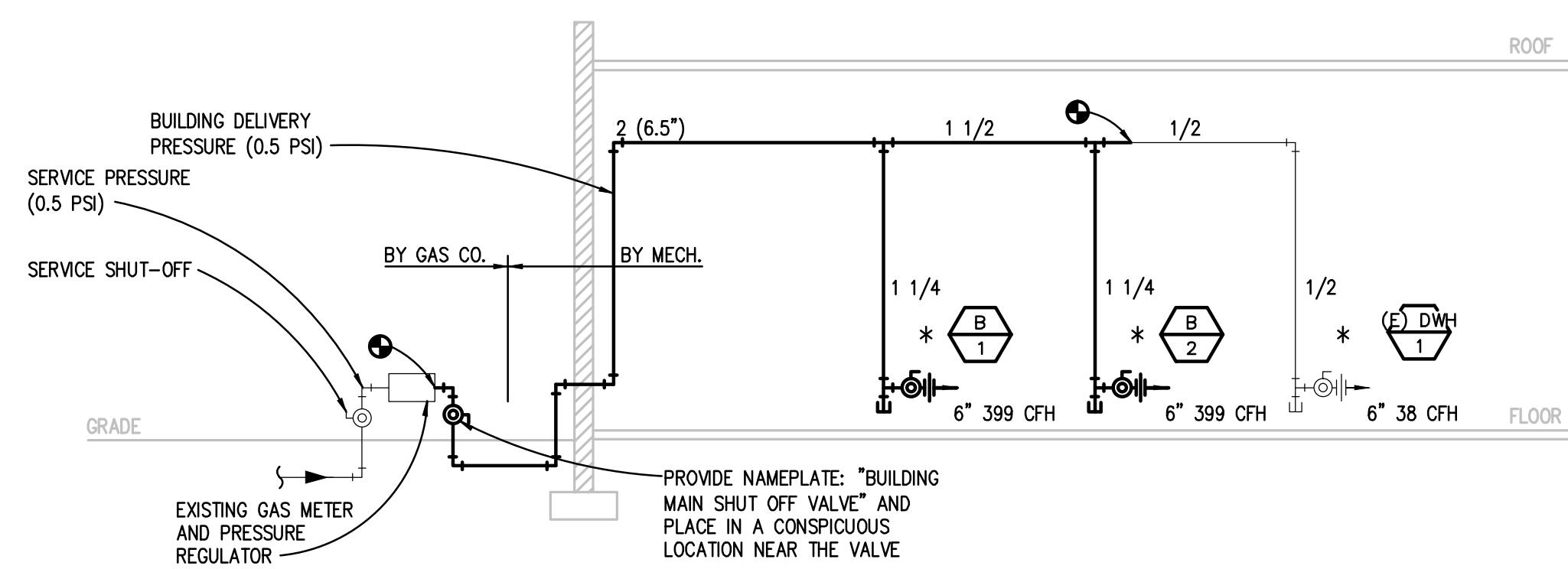
ITEM	TOTAL CFH
BOILER B-1	399
BOILER B-2	399
(E) WATER HEATER	38
CONNECTED GAS LOAD =	836 @ 7"

\* GAS TRAIN PROVIDED BY EQUIPMENT MANUFACTURER - SEE SPECIFICATIONS

\*\* GAS PRESSURE REGULATOR PROVIDED BY FOOD SERVICE MANUFACTURER

\*\*\* THE GAS SERVICE COMPONENTS SHALL BE RATED IN ACCORDANCE WITH THE FOLLOWING CHART

METER OUTLET PRESSURE (psig)	MINIMUM SYSTEM PRESSURE RATING (psig)
0.4	0.5
1 OR 2	10
3 OR 30	DELIVERY +10
31 TO 100	DELIVERY +20
101 TO 200	DELIVERY +30









# TEMPERATURE CONTROL - SYMBOLS LIST

## SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
AO	AQUASTAT, STRAP ON BULB
CS	CURRENT SWITCH
///	DAMPER - OPPOSED BLADE
///	DAMPER - PARALLEL BLADE
M	DAMPER MOTOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DPS	DIFFERENTIAL PRESSURE SWITCH
CM	FIRE ALARM SYSTEM, ADDRESSABLE CONTROL MODULE
FZ	FREEZE/STAT
[ ]	GUARD FOR STAT OR SENSOR
H	HUMIDITY SENSOR, DUCT MOUNTED
—	LINE - ELECTRIC
—	LINE - PNEUMATIC
M/S	MOTOR STARTER
OS	OCCUPANCY SENSOR
R	RELAY, ELECTRIC
AI	SIGNAL - DDC/BAS, ANALOG INPUT
AO	SIGNAL - DDC/BAS, ANALOG OUTPUT
DI	SIGNAL - DDC/BAS, DIGITAL INPUT
DO	SIGNAL - DDC/BAS, DIGITAL OUTPUT
△	SIGNAL - PACKAGED EQUIPMENT, ANALOG INPUT
△	SIGNAL - PACKAGED EQUIPMENT, ANALOG OUTPUT
△	SIGNAL - PACKAGED EQUIPMENT, DIGITAL INPUT
△	SIGNAL - PACKAGED EQUIPMENT, DIGITAL OUTPUT

## SCHEMATIC SYMBOLS (CONT.)

SYMBOL	DESCRIPTION
DD	SMOKE DETECTOR - DUCT MOUNTED
SD	SMOKE DETECTOR - SPACE MOUNTED
S/S	START/STOP RELAY
SPT	STATIC PRESSURE TRANSMITTER
SP	STATIC PRESSURE SENSOR OR PROBE
SW	SWITCH
T	TEMPERATURE SENSOR - RIGID ELEMENT IN WELL
T	TEMPERATURE SENSOR - DUCT MOUNTED AVG ELEMENT
T	TEMPERATURE SENSOR - DUCT MOUNTED RIGID ELEMENT
T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)
XF	TRANSFORMER
2	VALVE - 2 WAY CONTROL VALVE
3	VALVE - 3 WAY CONTROL VALVE
VFC	VARIABLE FREQUENCY CONTROLLER

## WIRING SYMBOLS

SYMBOL	DESCRIPTION
—	COIL - MOTOR STARTER CONTACTOR
—	COIL - EP OR SOLENOID VALVE
—	CONTACT - INSTANT OPERATING, NO
—	CONTACT - INSTANT OPERATING, NC
—	GROUND
—	MOTOR, SINGLE PHASE

## WIRING SYMBOLS (CONT.)

SYMBOL	DESCRIPTION
—	SWITCH - 3 POSITION SELECTOR HAND/OFF/AUTO
—	SWITCH - MANUAL SPST, NO
—	SWITCH - MANUAL SPST, NC
—	SWITCH - MANUAL SPDT
—	SWITCH - PRESSURE & VACUUM, NO
—	SWITCH - PRESSURE & VACUUM, NC
—	SWITCH - TEMPERATURE ACTUATED, NO
—	SWITCH - TEMPERATURE ACTUATED, NC
—	THERMAL OVERLOAD, SINGLE PHASE
—	THERMAL OVERLOAD CONTACTS - 3 PHASE
—	TRANSFORMER
—	WIRE TERMINATION AT DEVICE
—	WIRE TO WIRE TERMINATION
—	WIRING NOT CONNECTED

## WIRING TERMS

ABBREVIATION	DESCRIPTION
SPST	SINGLE POLE SINGLE THROW
SPDT	SINGLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW
NO	NORMALLY OPEN
NC	NORMALLY CLOSED

NOTE: SOME SYMBOLS & ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

NOTE: REFER TO MECHANICAL STANDARDS ON DRAWING M0.1 FOR ADDITIONAL SYMBOLS & ABBREVIATIONS THAT MAY BE USED ON TEMPERATURE CONTROL DRAWINGS.

## ABBREVIATION LIST

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AAV	AUTOMATIC AIR VENT	EROP	ELECTRIC RADIANT CEILING PANEL	NC	NORMALLY CLOSED
ACC	AIR COOLED CONDENSER	ERU	ENERGY RECOVERY UNIT	NC/C	NORMALLY CLOSED TIMED CLOSED
ACCU	AIR COOLED CONDENSING UNIT	EUH	ELECTRIC UNIT HEATER	NC/O	NORMALLY CLOSED TIMED OPEN
AD	ACCESS DOOR	EWB	ENTERING WET BULB	NIC	NOT IN CONTRACT
AFF	ABOVE FINISHED FLOOR	EWT	ENTERING WATER TEMPERATURE	NFPA	NATIONAL FIRE PROTECTION AGENCY
AHU	AIR HANDLING UNIT	EXH	EXHAUST	NO	NORMALLY OPEN
ALT	ALTERNATE	F	DEGREES FAHRENHEIT	NC/C	NORMALLY OPEN TIMED CLOSED
AMP	AMPERE	F&B	FACE AND BYPASS DAMPER	NO/O	NORMALLY OPEN TIMED OPEN
ASRAE	AIR PRESSURE DROP	FAS	FIRE ALARM SYSTEM	NSB	NIGHT SETBACK
AUX	AUXILIARY	FCU	FAN COIL UNIT	OA	OUTSIDE AIR
BAS	BUILDING AUTOMATION SYSTEM	FLR	FLOOR	OAT	OUTSIDE AIR TEMPERATURE
C	COMMON	FM	FLOW MEASURING DEVICE	PACU	PACKAGED AIR CONDITIONING UNIT
CFM	CUBIC FEET PER MINUTE	FT	FEET	PD	PRESSURE DROP (FEET OF WATER)
CH	CHILLER	FTR	FINNED TUBE RADIATION	PHR	PERFORMER HEAT RETURN
CHWP	CHILLED WATER PUMP	GPM	GALLONS PER MINUTE	RHS	ROOM HEAT SUPPLY
CHWR	CHILLED WATER RETURN	GRH	GRAVITY RELIEF HOOD	PNL	PANEL
CHWS	CHILLED WATER SUPPLY	HOA	HAND/OFF/AUTO	PPM	PARTS PER MILLION
CLC	COOLING	HP	HEAT PUMP	PRV	PRESSURE REDUCING VALVE
CLP	COMPUTER LOOP PUMP	HPLP	HORSEPOWER	PSI	POUNDS PER SQUARE INCH
CLR	COMPUTER LOOP RETURN	HPLR	HEAT PUMP LOOP PUMP	R	RETURN
CLS	COMPUTER LOOP SUPPLY	HPLR	HEAT PUMP LOOP RETURN	RA	RETURN AIR
CO2	CARBON DIOXIDE	HPLS	HEAT PUMP LOOP SUPPLY	RAT	RETURN AIR TEMPERATURE
COND	CONDENSATE	HR	HOUR	RCP	RADIANT CEILING PANEL
CONT	CONTINUATION OR CONTINUED	HTG	HEATING	RELA	RELIEF AIR
CONTR	CONTRACTOR	HV	HEATING VENTILATING	REQD	REQUIRED
CONV	CONVECTOR	HVAC	HEATING, VENTILATING, AIR CONDITIONING	RF	RETURN FAN
CONT	CENTRAL OPERATOR STATION	HWH	HOT WATER HEATING	RH	RELATIVE HUMIDITY
CP	CIRCULATING PUMP	HWS	HOT WATER HEATING SUPPLY	RTU	ROOF TOP UNIT
CT	COOLING TOWER	HW	HOT WATER	SA	SUPPLY AIR
CUH	CABINET UNIT HEATER	HWR	HOT WATER RETURN	SF	SUPPLY FAN
CW	COLD WATER	HX	HEAT EXCHANGER	SP	STATIC PRESSURE
CWP	CONDENSER WATER PUMP	IAQ	INDOOR AIR QUALITY	S/S	START/STOP
CWR	CONDENSER WATER RETURN	IN	INCHES	STD	STANDARD
CWS	CONDENSER WATER SUPPLY	JC	JANITOR'S CLOSET	STM	STEAM
DA	DISCHARGE AIR	KW	KILOWATT	SZ	SINGLE-ZONE
DAT	DISCHARGE AIR TEMPERATURE	KWH	KILOWATT-HOUR	S/W	SUMMER/WINTER
DB	DRY BULB TEMPERATURE	LC	LOGarithmic CURVE	SW	SWITCH
DDC	DIRECT DIGITAL CONTROL	LBS/HR	POUNDS PER HOUR	TC	TEMPERATURE CONTROL
DEG	DEGREES	MA	MIXED AIR	TEMP	TEMPERATURE
DMPR	DAMPER	MAT	MIXED AIR TEMPERATURE	THP	TERMINAL HEATING RETURN
D/N	DAY/NIGHT	MAU	MAKE-UP AIR UNIT	THS	TERMINAL HEATING SUPPLY
DN	DOWN	MAX	MAXIMUM	TSP	TOTAL STATIC PRESSURE
DPR	DAMPEN	MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR	TU	(AIR) TERMINAL UNIT
DWG	DRAWING	MCC	MOTOR CONTROL CENTER	TYP	TYPICAL
DWH	DOMESTIC WATER HEATER	MECH	MECHANICAL	UH	UNIT HEATER
DX	DIRECT EXPANSION	MEZZ	MEZZANINE	UL	UNDERWRITER'S LABORATORY
(E)	EXISTING	MFR	MANUFACTURER	UV	UNIT VENTILATOR
EA	EXHAUST AIR	MIN	MINIMUM	VAV	VARIABLE AIR VOLUME
EAT	ENTERING AIR TEMPERATURE	MISC	MISCELLANEOUS	VFC	VARIABLE FREQUENCY CONTROLLER
ECUH	ELECTRIC CABINET UNIT HEATER	MBSH	MILLION BRITISH THERMAL UNITS PER HOUR	VUV	VERTICAL UNIT VENTILATOR
EDB	ENTERING DRY BULB	M/S	MOTOR STARTER	WC	WATER COLUMN
EF	EXHAUST FAN	M/TD	MOUNTED	XFMR	TRANSFORMER
EFF	EFFICIENCY	MTR	MOTOR		
EHC	ELECTRIC HEATING COIL	MV	MANUAL AIR VENT		
ELEC	ELECTRICAL	MZ	MULTI-ZONE		

# GENERAL NOTES

- THESE GENERAL NOTES SHALL BE APPLICABLE FOR ALL TC DRAWINGS.
- "PROVIDE" IS DEFINED AS "FURNISH AND INSTALL".
- TC CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.
- FOR TEMPERATURE CONTROL DRAWINGS ONLY: ALL DETAILED INFORMATION IDENTIFIED WITH HEAVY LINE WEIGHT SHALL BE PROVIDED BY TC CONTRACTOR. ALL OTHER INFORMATION IDENTIFIED WITH LIGHT LINE WEIGHT SHALL BE PROVIDED BY OTHER TRADES.
- ALL CONTROL SCHEMATICS AND WIRING DIAGRAMS ARE FOR THE CLARIFICATION OF EQUIPMENT INTERLOCKING FUNCTIONS AND THE INTERFACE OF VARIOUS CONTRACTORS' WORK AND SHALL NOT BE MISTAKEN AS SHOP DRAWINGS FOR ACTUAL INSTALLATION.
- TC CONTRACTOR SHALL PROVIDE DDC CONTROLLERS AS REQUIRED TO MEET INTENT OF DESIGN DOCUMENTS. REFER TO THE PLANS FOR THE DDC FUNCTIONS THAT APPLY TO EACH MECHANICAL SYSTEM.
- ALL TO PROVIDED COMPONENTS AND ALL TO CONTRACTOR INSTALLED WIRING SHALL BE LABELED PER SPECIFICATIONS.
- ALL WIRING AND SYSTEM CONTROL VOLTAGES SHALL BE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATION AND THE ELECTRICAL SPECIFICATIONS.
- VARIABLE FREQUENCY CONTROLLER, FAN AND PUMP MOTOR STARTERS, STARTER WIRING, CONTROL VOLTAGE TRANSFORMERS AND ASSOCIATED POWER WIRING SHALL BE PROVIDED BY OTHER TRADES.
- DUCT SMOKE DETECTORS SHALL BE FURNISHED, INSTALLED AND WIRING TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. ELECTRICAL SHALL PROVIDE FIRE ALARM SYSTEM CONTROL MODULES FOR REQUIRED SAFETIES TO MOTOR STARTERS OR VFCs AS INDICATED. CONTROL MODULES SHALL BE LOCATED NEAR RESPECTIVE MOTOR STARTERS OR VFCs. TC CONTRACTOR SHALL PROVIDE INTERLOCK WIRING FROM CONTROL MODULES TO MOTOR STARTERS OR VFCs.
- ALL DDC AND CONTROL INTERLOCK WIRING SHALL BE BY TC CONTRACTOR UNLESS OTHERWISE NOTED. TC CONTRACTOR SHALL COORDINATE WITH VFC AND MOTOR STARTER SUPPLIERS TO DETERMINE EXACT WIRING REQUIREMENTS AND TERMINATION POINTS.
- ALL DDC AND CONTROL INTERLOCK WIRING BETWEEN COMPONENTS SHALL BE INSTALLED WITHOUT INTERMEDIATE STOPS. WIRE SPLICING AT INTERMEDIATE TERMINAL STRIPS IS NOT ACCEPTABLE.
- ALL ELECTRICAL WIRING AND RACEWAY SYSTEMS SHALL COMPLY WITH ELECTRICAL SPECIFICATION REQUIREMENTS. WHERE RACEWAY IS REQUIRED, TWO SEPARATE ELECTRICAL RACEWAY SYSTEMS SHALL BE PROVIDED: ONE FOR 120V WIRING AND THE OTHER FOR 24V WIRING.
- TC CONTRACTOR SHALL COORDINATE ALL GRAPHICS PROVIDED AT THE BAS FRONT-END SYSTEM WITH THE OWNER FOR POINT NAMING AND COLOR CONVENTIONS.
- TC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER SUPPLIES REQUIRED FOR TC SYSTEM UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PANEL SCHEDULES FOR SPARE CIRCUITS OR CIRCUITS DEDICATED TO TEMPERATURE CONTROLS. COORDINATE CIRCUIT USE WITH ELECTRICAL CONTRACTOR.
- TC CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL FIELD MOUNTED COMPONENTS.
- THERMOSTATS AND SPACE TEMPERATURE SENSORS SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. PROVIDE GUARDS FOR SPACE TEMP SENSORS LOCATED IN PUBLIC AREA.
- TC CONTRACTOR SHALL PROVIDE AUXILIARY PANELS FOR REQUIRED PANEL MOUNTED EQUIPMENT SUCH AS RELAYS, TRANSDUCERS, CONTROL TRANSFORMERS, ETC. AUXILIARY PANELS SHALL BE LOCATED NEXT TO ASSOCIATED DDC PANEL.
- REMOTELY MOUNTED FIELD DEVICES SUCH AS RELAYS, CONTROL TRANSFORMERS, ETC., SHALL BE HOUSED IN AN ENCLOSURE PROVIDED BY THE TC CONTRACTOR.
- CONTROL TRANSFORMERS WHEN REQUIRED SHALL BE SIZED FOR 150% OF ACTUAL LOAD.
- FREEZE/STATS SHALL BE MOUNTED ON UPSTREAM FACE OF COOLING COILS. FREEZE/STAT QUANTITY SHALL BE ONE PER 20 SQ. FT. OF CROSS SECTIONAL AREA.
- CURRENT SWITCHES USED FOR OPERATIONAL STATUS SHALL HAVE CURRENT THRESHOLD SETPOINT ADJUSTED TO INDICATE BELT OR DRIVE FAILURE.
- ALL CONTROL VALVES, CONTROL DAMPERS AND ASSOCIATED CONTROL ACTUATORS IDENTIFIED ON TC DRAWINGS SHALL BE FURNISHED BY TC CONTRACTOR UNLESS OTHERWISE NOTED. DAMPER SIZE AND LOCATIONS ARE INDICATED ON MECHANICAL FLOOR PLAN DRAWINGS.
- ALL CONTROL VALVES AND DAMPERS FURNISHED BY THE TC CONTRACTOR SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR. ALL PIPE PENETRATIONS AND BASIC FITTINGS REQUIRED FOR SENSOR INSTALLATIONS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR.
- DAMPER ACTUATORS SHALL BE INSTALLED BY TC CONTRACTOR UNLESS OTHERWISE INDICATED.
- ALL INSTRUMENTATION TUBING REQUIRED FOR DPS AND DPT COMPONENT INSTALLATIONS SHALL BE PROVIDED BY TC CONTRACTOR.
- TC CONTRACTOR SHALL FIELD MOUNT ALL REQUIRED PACKAGED CONTROL COMPONENTS FURNISHED BY EQUIPMENT SUPPLIERS WHERE INDICATED. ALL REQUIRED 24V AND 120V FIELD WIRING SHALL BE PROVIDED BY TC CONTRACTOR UNLESS NOTED OTHERWISE. TC CONTRACTOR SHALL COORDINATE SPECIFIC SYSTEM WIRING REQUIREMENTS WITH PACKAGED EQUIPMENT SUPPLIERS.



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 PSA Project No. 2016.041

PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**TEMPERATURE CONTROL STANDARDS AND GENERAL NOTES**

ISSUE DATES

01-19-2017	BIDS
DATE:	ISSUED FOR:
DRAWN: BG	CHECKED: SC
APPROVED: GJZ	

PROJECT NO.  
**13089E**  
 DRAWING NO.  
**M8.1**

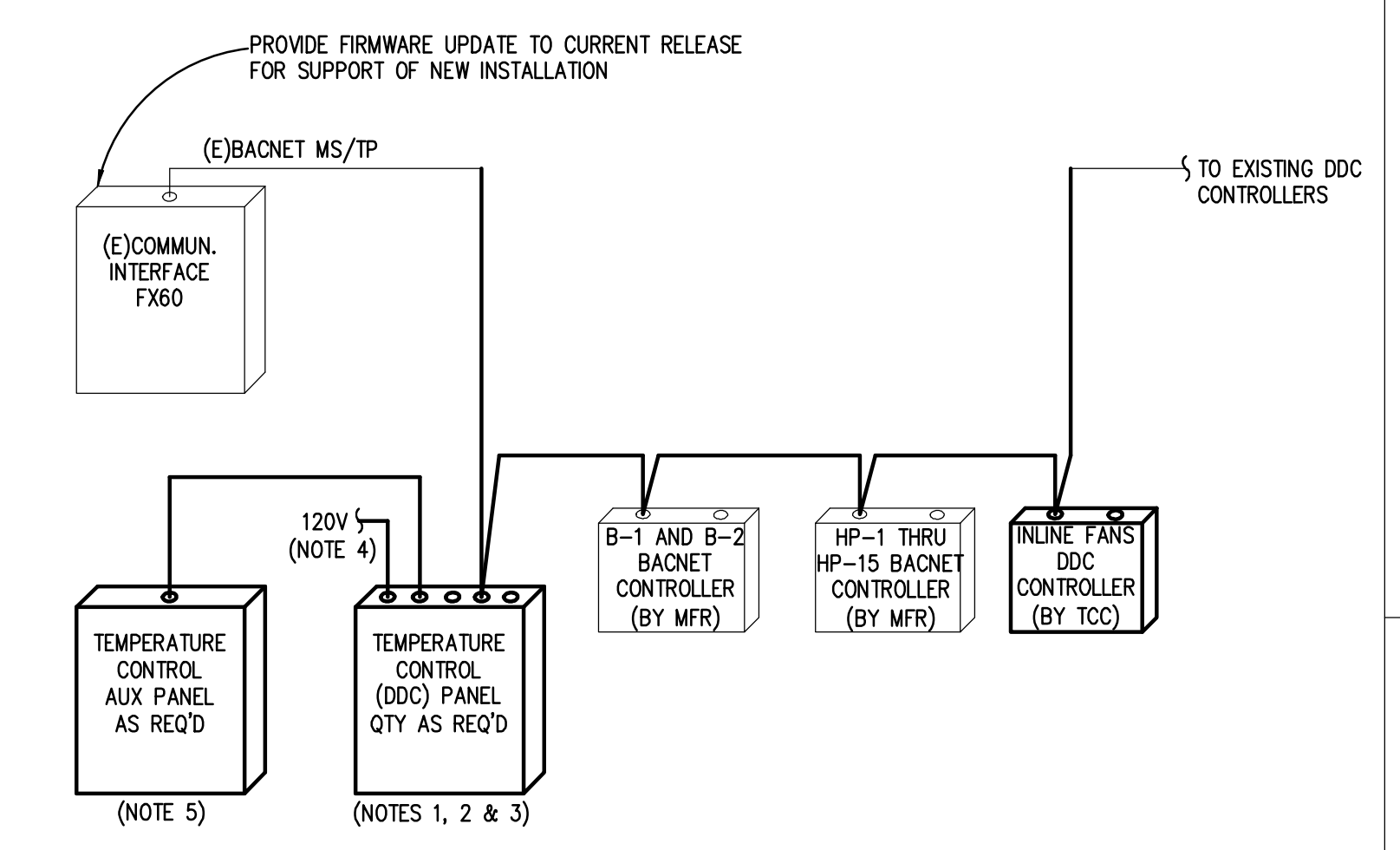
**ALL NEW ROOM TEMPERATURE SENSORS SHALL BE PROVIDED WITH AN EXTRA LARGE STAINLESS STEEL TRIM RING, IF REQUIRED, TO PREVENT PATCHING/PAINTING OF WALL. RE-USE THE EXISTING SENSOR LOCATION FOR NEW SENSOR.**

**ALL DDC SENSOR WIRING MUST BE CONCEALED WITHIN THE WALLS. ALL DDC WIRING ABOVE CEILINGS MUST BE SUPPORTED IN BRIDLE RINGS.**

**ANY USE OF EXPOSED WIRING WHETHER IN RACEWAY OR WIREMOLD IS PROHIBITED WITHOUT THE CONSENT OF THE ARCHITECT.**

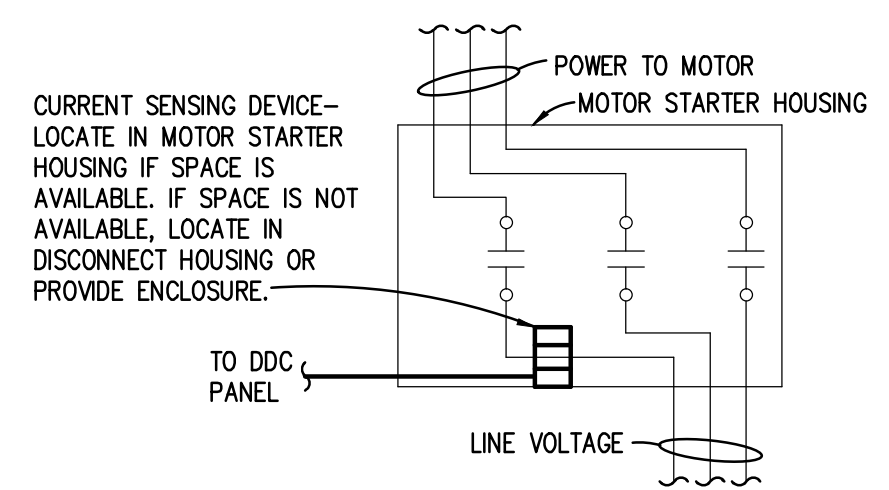
**ANY TEMPERATURE SENSOR LOCATION NOT RE-USED SHALL BE PROVIDED WITH A BLANK, STAINLESS STEEL COVER. PROVIDE AN EXTRA LARGE STAINLESS STEEL TRIM RING, IF REQUIRED, TO PREVENT PATCHING/PAINTING.**

**ALL WIRING SHALL BE UL PLENUM RATED.**



## DDC SYSTEM ARCHITECTURE

- TYPICAL - NO SCALE
- NOTES:
- EXISTING BUILDING AUTOMATION SYSTEM IS JCI METASYS SYSTEM. NEW DDC SYSTEM COMPONENTS SHALL BE CONNECTED TO NEW NETWORK COMMUNICATIONS. TC CONTRACTOR SHALL UPGRADE THE EXISTING FRONT-END BAS HARDWARE/SOFTWARE AS NECESSARY TO ACCOMMODATE NEW WORK AND PROVIDE GRAPHICS PER SPECIFICATION FOR NEW EQUIPMENT.
  - REFER TO TEMPERATURE CONTROL SCHEMATICS FOR THE REQUIRED POINTS ASSOCIATED FOR EACH SYSTEM.
  - TC CONTRACTOR SHALL DETERMINE DDC PANEL QUANTITY AND LOCATIONS BASED ON POINT DENSITIES AND AVAILABLE MOUNTING SPACE. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND COORDINATE WITH OTHER TRADES.
  - TC CONTRACTOR SHALL PROVIDE REQUIRED POWER SUPPLIES FOR TEMPERATURE CONTROL SYSTEM COMPONENTS.
  - AUXILIARY PANEL FOR GAUGES, TRANSMITTERS, RELAYS, POWER TRANSFORMERS, ETC.
  - SEE MECHANICAL PLANS AND SCHEDULES FOR LOCATIONS AND QUANTITIES.

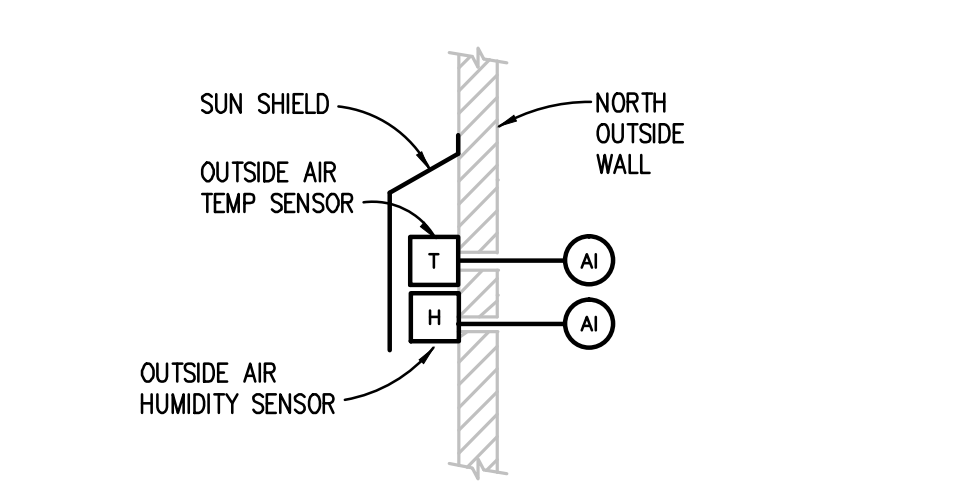


## CURRENT SWITCH INSTALLATION DETAIL

- NOTES:
- FAN AND PUMP STATUS SHALL BE PROVEN BY CURRENT SWITCHES INDICATION BY DDC TO THE BAS.
  - INSTALL CURRENT SWITCH ON MOTOR LEADS. CURRENT SWITCH SHALL BE ADJUSTED TO MEET THE CURRENT DRAW REQUIRED TO DETECT FAN BELT OR VFC LOSS OR PUMP COUPLING DETACHMENT OR VFC LOSS.

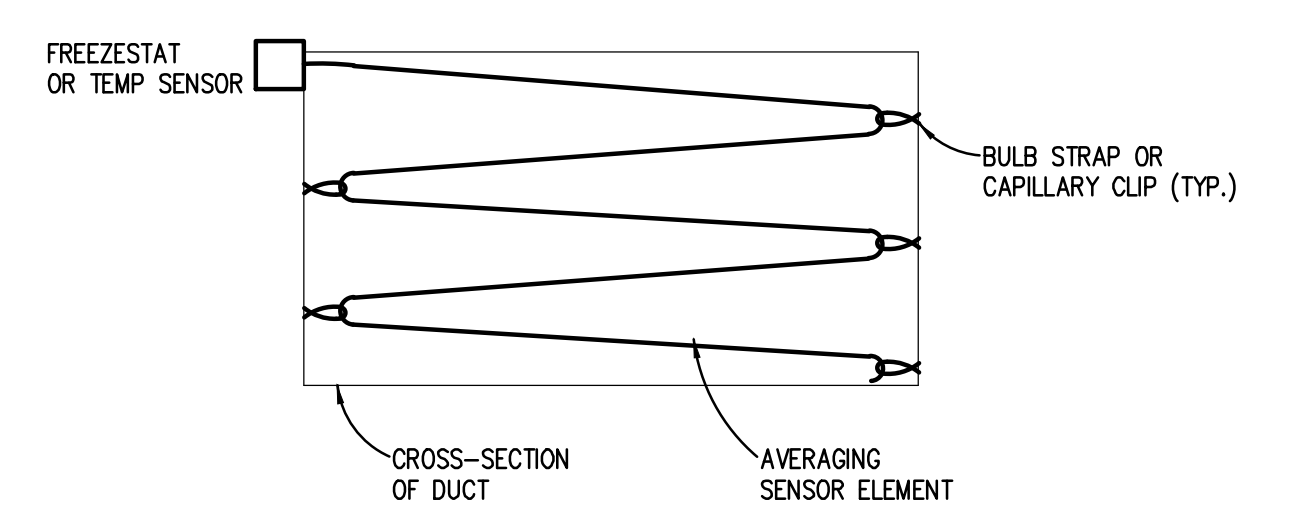
## SEQUENCE OF OPERATION

- ALL DELAY TIMERS DESCRIBED IN THE SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS).
- UPON FAN OR PUMP MOTOR START AND AFTER 120 SECOND (ADJUSTABLE) DELAY BY DDC, IF THE CURRENT DRAW IS NOT APPROPRIATE, DDC SHALL ALARM THE MOTOR STATUS POINT. WHEN MOTOR IS ON AND NOT IN ALARM, DDC SHALL TOTALIZE RUN TIME HOURS FOR BAS USE.
- UPON FAN OR PUMP MOTOR STOP AND AFTER 120 SECOND (ADJUSTABLE) DELAY BY DDC, IF THE CURRENT DRAW IS NOT ZERO, DDC SHALL ALARM THE MOTOR STATUS POINT.



## OA SENSOR INSTALLATION DETAIL

NO SCALE



## AVERAGING ELEMENT INSTALLATION DETAIL

TYPICAL



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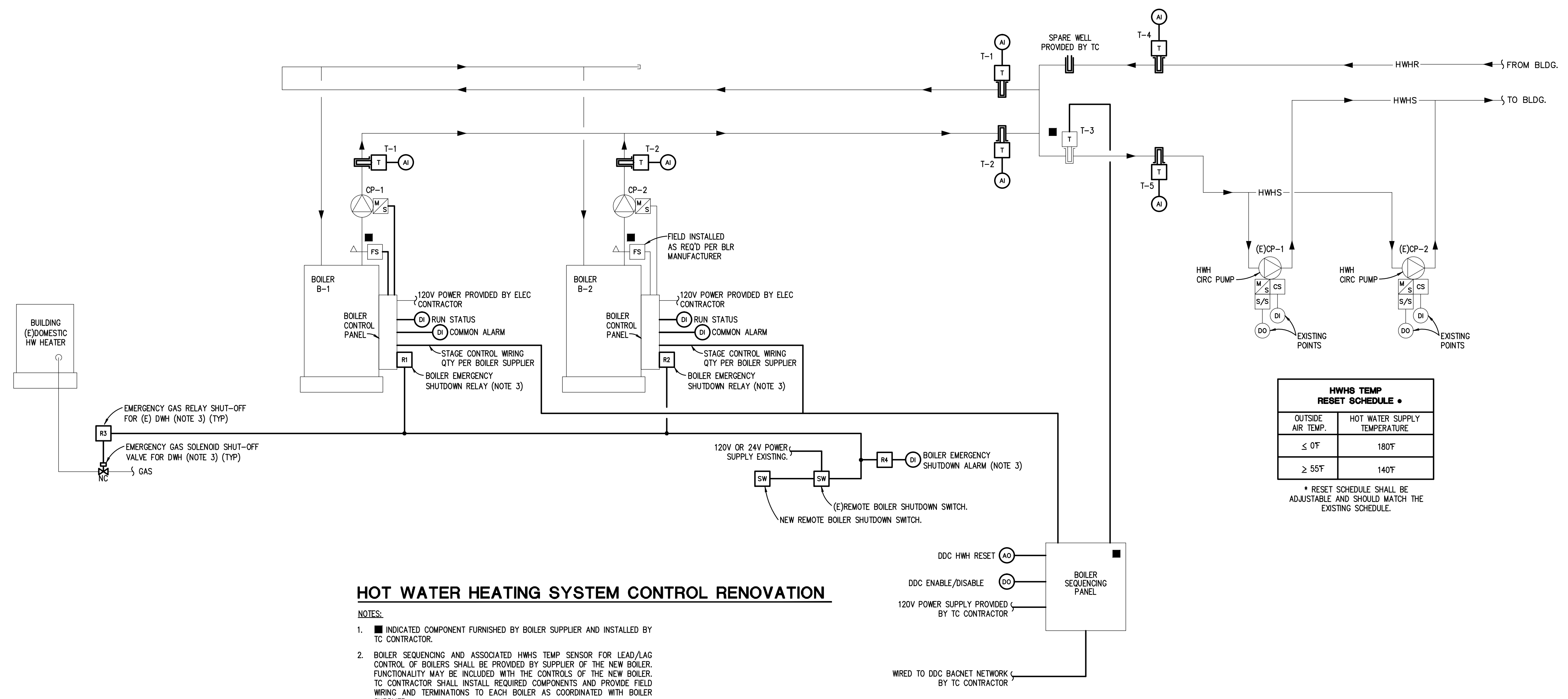
Plymouth-Canton Community Schools

DRAWING TITLE  
**TEMPERATURE CONTROLS**

ISSUE DATES

01-19-2017	BIDS
DATE:	ISSUED FOR:
DRAWN: BG	CHECKED: SC
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PROJECT NO.  
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**M8.2**

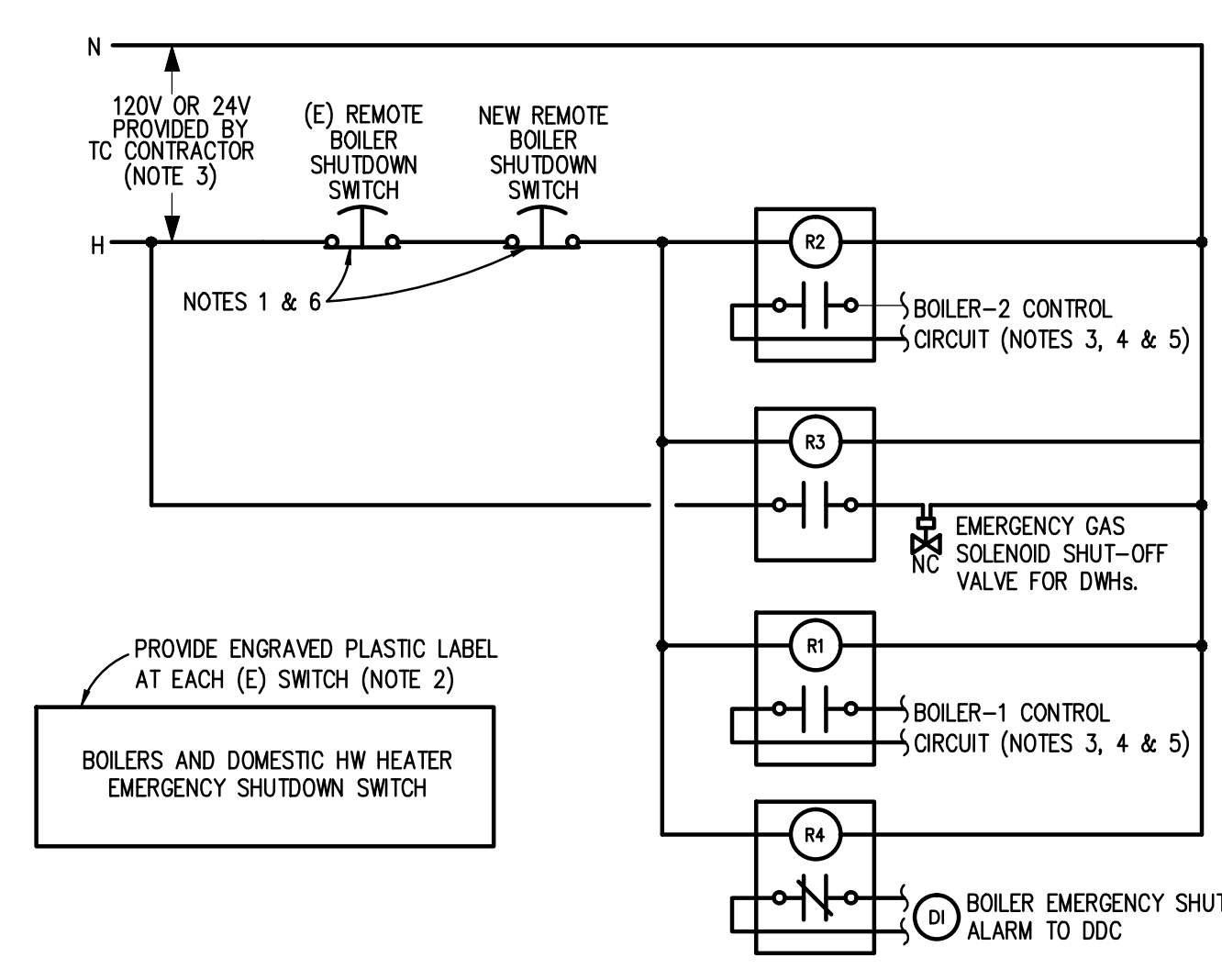
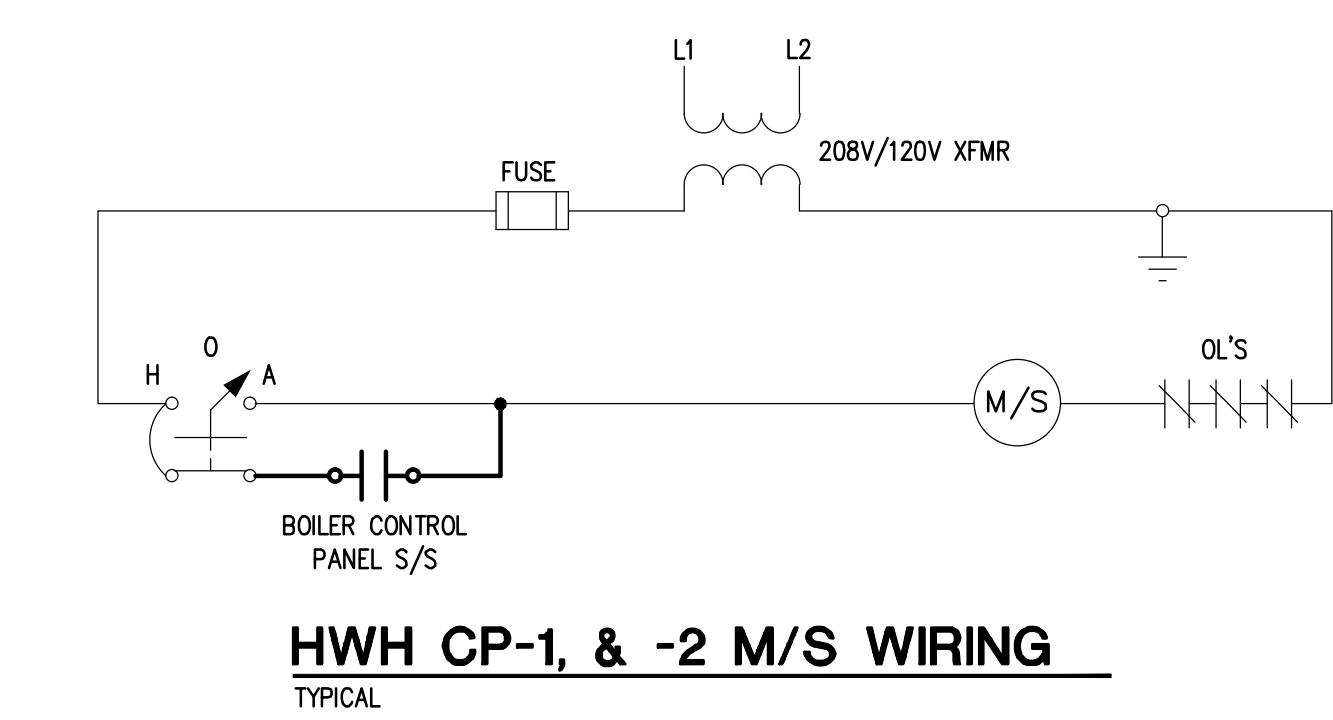
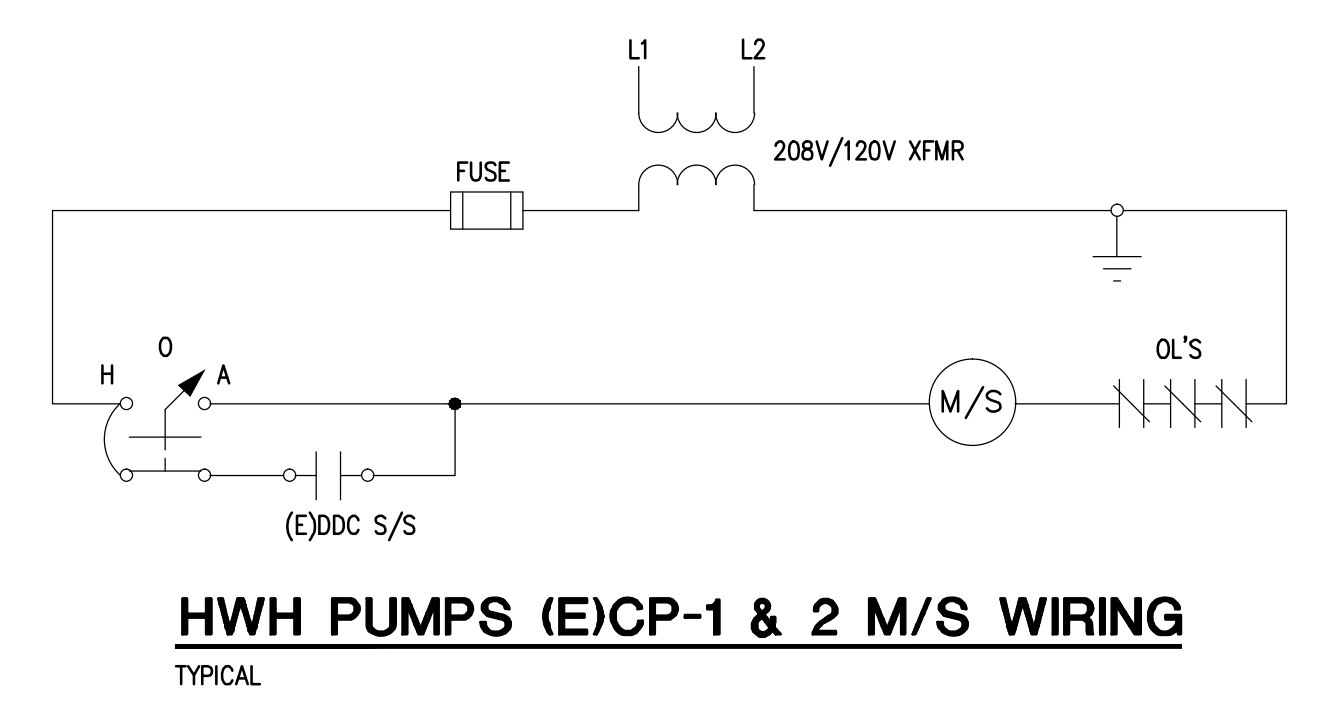


**HOT WATER HEATING SYSTEM CONTROL RENOVATION**

- NOTES:**
- INDICATED COMPONENT FURNISHED BY BOILER SUPPLIER AND INSTALLED BY TC CONTRACTOR
  - BOILER SEQUENCING AND ASSOCIATED HWHS TEMP SENSOR FOR LEAD/LAG CONTROL OF BOILERS SHALL BE PROVIDED BY SUPPLIER OF THE NEW BOILER. FUNCTIONALITY MAY BE INCLUDED WITH THE CONTROLS OF THE NEW BOILER. TC CONTRACTOR SHALL INSTALL REQUIRED COMPONENTS AND PROVIDE FIELD WIRING AND TERMINATIONS TO EACH BOILER AS COORDINATED WITH BOILER SUPPLIER.
  - TC CONTRACTOR SHALL PROVIDE BOILER EMERGENCY SHUTDOWN COMPONENTS AND WIRING. REFER TO REMOTE BOILER SHUTDOWN WIRING DIAGRAM.
  - TC CONTRACTOR SHALL MODIFY ANY EXISTING RELATED DDC CONTROLS TO ACCOMMODATE CONTROLS RETROFIT AS INDICATED.

**SEQUENCE OF OPERATION**

- HOT WATER HEATING SYSTEM:**
- ALL SETPOINTS, RESET SCHEDULE SETPOINTS, DEADBANDS, AND TIME INTERVALS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS. ALL MOTOR CONTROL SWITCHES SHALL BE IN "AUTO" POSITION.
  - HOT WATER HEATING SYSTEM SHALL BE ACTIVATED FOR CONTINUOUS OPERATION DURING BUILDING OCCUPANCY OR WHEN OUTDOOR AIR TEMPERATURE IS BELOW 50°F FOR BUILDING UNOCCUPANCY.
  - SECONDARY HWH CIRC PUMPS CP-1 & CP-2 SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. ONE OF THE TWO PUMPS SHALL BE ACTIVATED BY DDC TO OPERATE CONTINUOUSLY. THE OTHER WILL SERVE AS STANDBY. DDC SHALL ALTERNATE PUMP OPERATION BASED ON RUNTIME HOURS OR EVERY TWO WEEKS - OPERATOR SELECTABLE.
  - DDC SHALL MONITOR OPERATING STATUS OF EACH PUMP. UPON PUMP FAILURE, DDC SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP. DDC SHALL TOTALIZE RUN TIME HOURS OF OPERATION FOR EACH PUMP.
  - REMOTE CONTROL SHALL BE THRU BOILER SEQUENCING PANEL FURNISHED BY BOILER SUPPLIER. DDC SYSTEM SHALL ENABLE BOILER SEQUENCING PANEL CONTROL WHEN SECONDARY HWH CIRC PUMP CP-1 OR CP-2 IS ACTIVATED. THE BOILER SEQUENCING PANEL SHALL ACTIVATE OR DEACTIVATE BOILERS AND CONTROL BOILER STAGES AS REQUIRED TO MAINTAIN HWH SUPPLY TEMP (T-5) SETPOINT BASED ON OUTSIDE AIR RESET SCHEDULE.
  - DDC SHALL RESET THE HWH SUPPLY SETPOINT BASED ON DDC OUTSIDE AIR TEMPERATURE SENSOR.
  - THE BOILER SEQUENCING PANEL SHALL INCLUDE OPERATOR SELECTABLE BOILER LEAD/LAG OPERATION OR FIRST ON/FIRST OFF OPERATION.
  - WHENEVER A BOILER CIRCUIT IS ACTIVATED, ITS RESPECTIVE PRIMARY CIRC PUMP SHALL BE ACTIVATED BY FACTORY WIRED PUMP RELAY. BOILER SHALL NOT FIRE UNTIL FLOW IS PROVEN BY FLOW SWITCH.
  - WHENEVER A BOILER IS DEACTIVATED, A BOILER SYSTEM CONTROLLED TIME DELAY SHALL KEEP PUMP RUNNING FOR A FEW MINUTES (TIME BASED ON BOILER MANUFACTURER RECOMMENDATION) TO DISSIPATE HEAT FROM THE DEACTIVATED BOILER.
  - IF REMOTE CONTROL IS LOST, LOCAL BURNER MODULATING CONTROL AT EACH BOILER SHALL BE SET TO MAINTAIN 180°F LEAVING WATER TEMPERATURE.
  - EACH BOILER SAFETY CONTROLS SHALL INCLUDE AN AUTO-RESET HI-LIMIT (BOILER OPERATOR) WITH SETPOINT OF 190°F AND A MANUAL-RESET HI-LIMIT WITH SETPOINT OF 200°F.
  - DDC SHALL MONITOR BOILER RUN STATUS AND COMMON ALARM FOR EACH BOILER THROUGH DRY CONTACTS AVAILABLE IN RESPECTIVE BOILER CONTROL PANEL.
  - DDC SHALL MONITOR BOILER PRIMARY TEMPERATURES (T-1 & T-2) AND HWH SECONDARY TEMPERATURES (T-4 & T-5) FOR DIAGNOSTIC PURPOSES. WHEN HWH SYSTEM IS ACTIVATED, AND AFTER A 20 MINUTE DELAY, IF HWH SUPPLY TEMP (T-4) DROPS BELOW 140°F, DDC SHALL ACTIVATE ALARM.
  - WHEN ONE OF THE REMOTE BOILER SHUTDOWN SWITCHES IS PUSHED, BURNER CONTROLS FOR ALL BOILERS SHALL BE DE-ENERGIZED THRU HARDWIRE INTERLOCK. DDC SHALL MONITOR SWITCH CIRCUIT AND ACTIVATE ALARM WHEN REMOTE BOILER SHUTDOWN CONDITION OCCURS.



**REMOTE BOILERS/DWH EMERGENCY SHUTDOWN WIRING**

- NOTES:**
- REFER TO FLOOR PLANS FOR EXISTING AND NEW SWITCHES. INTERLOCK NEW BOILER'S SHUTDOWN RELAY AND (E)DWH GAS SHUTOFF SOLENOID VALVE WITH THE EXISTING DEVICES/WIRING.
  - TC CONTRACTOR SHALL PROVIDE SIGN (NAME PLATE) TO BE PLACED DIRECTLY ABOVE OR BELOW EACH EXISTING PUSHBUTTON SWITCH THAT READS: "BOILERS AND DOMESTIC HW HEATER EMERGENCY SHUTDOWN". FIELD VERIFY EXISTING SWITCH QUANTITY.
  - TC CONTRACTOR SHALL SUPPLY POWER TO NEW CONTROL RELAYS FROM EXISTING POWER CIRCUIT. COORDINATE WITH ELECTRICAL CONTRACTOR AS NECESSARY.
  - TC CONTRACTOR SHALL WIRE NEW BOILER'S CONTROL CIRCUIT (POWER FROM SECONDARY SIDE OF CONTROL TRANSFORMERS) AND (E)DWH GAS SHUTOFF SOLENOID VALVE THRU NORMALLY OPEN RELAY CONTACTS. TO CONTRACTOR SHALL COORDINATE EXACT WIRING AND TERMINATION REQUIREMENTS WITH EQUIPMENT MANUFACTURERS.
  - TC CONTRACTOR SHALL MOUNT SHUTDOWN CONTROL RELAY AT RESPECTIVE BOILER CONTROL PANEL. SHUTDOWN AND GAS VALVE RELAYS SHALL BE MOUNTED IN DDC AUXILIARY PANEL.
  - TC CONTRACTOR SHALL RE-USE EXISTING EMERGENCY PUSHBUTTON SWITCH AS SHOWN ON PLANS.

- SEQUENCE OF OPERATION:**
- UNDER NORMAL OPERATING CONDITIONS THE CIRCUIT SHALL BE ENERGIZED AND THE RELAYS' NORMALLY OPEN (NO) CONTACTS SHALL BE CLOSED. WHEN A SWITCH IS PUSHED (LATCHED) THE RELAY CONTACTS SHALL OPEN AND INTERRUPT EACH BOILER'S CONTROL CIRCUIT AND CLOSE (E)DWH GAS SHUTOFF SOLENOID VALVE. WHEN THE SWITCH IS RELEASED, THE RELAYS SHALL BE ENERGIZED AND THE NORMALLY OPEN CONTACTS SHALL CLOSE, ENERGIZING EACH BOILER'S CONTROL CIRCUIT AND OPEN THE (E)DWH GAS SHUTOFF SOLENOID VALVE. (PILOT LIGHT MAY NEED TO BE MANUALLY IGNITED).
  - DDC SHALL ACTIVATE AN ALARM WHEN A REMOTE PUSHBUTTON SWITCH HAS BEEN PUSHED.

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PROJECT TITLE  
**Administration  
 Building Upgrades**

Plymouth-Canton  
 Community Schools

DRAWING TITLE  
**TEMPERATURE  
 CONTROLS**

ISSUE DATES

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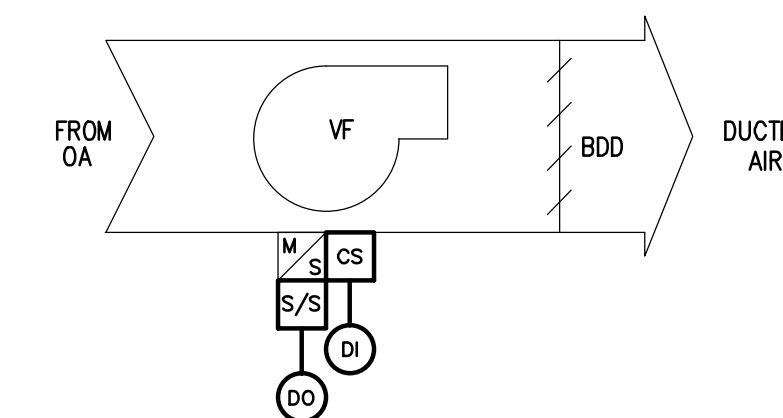
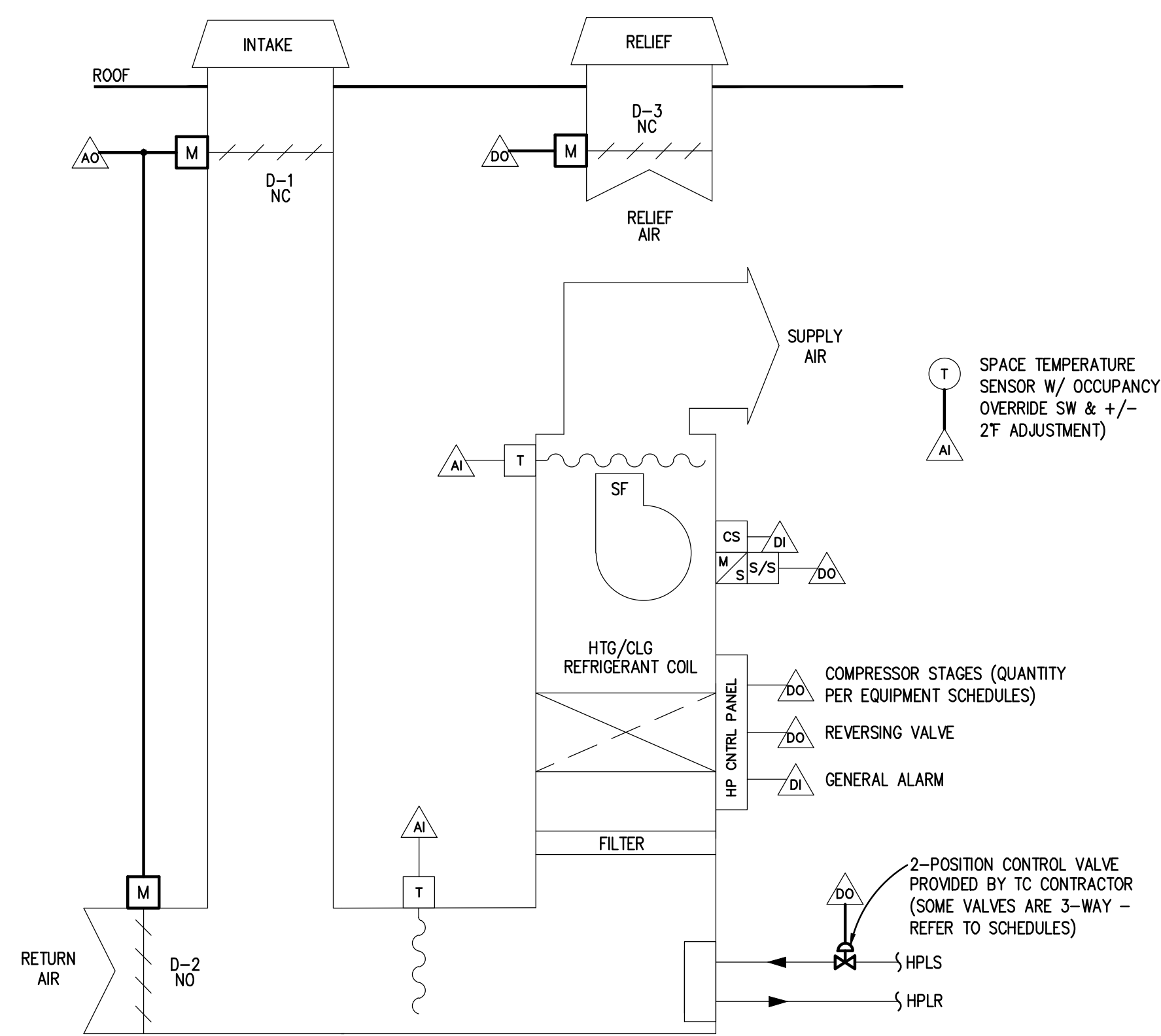
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**M8.3**



**VENTILATION FAN CONTROL**

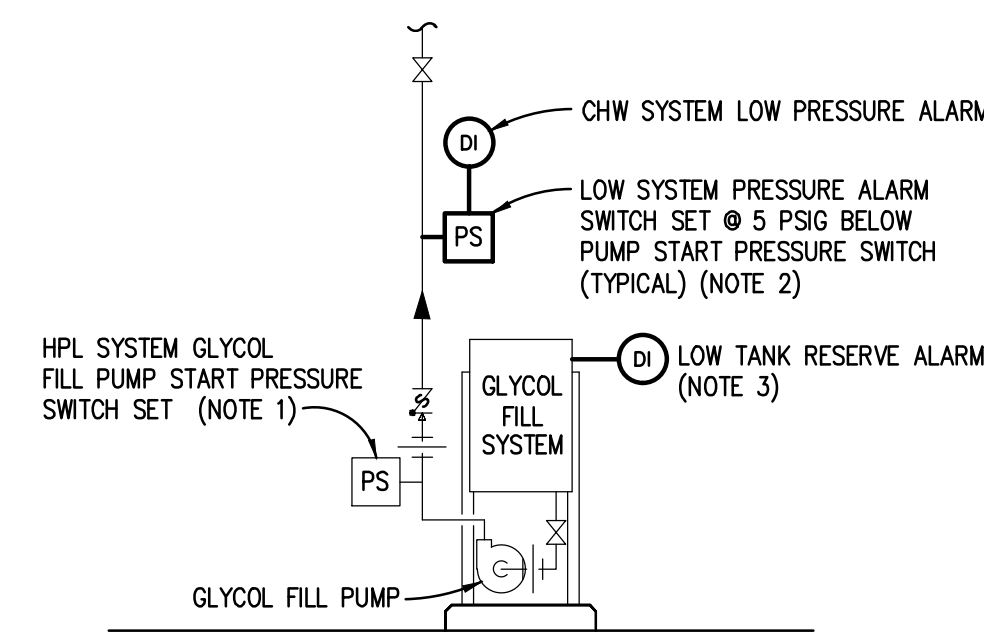
TYPICAL  
 SEQUENCE OF OPERATION:  
 1. VENTILATION FAN WILL BE ACTIVATED BY BAS/DDC TIME OF DAY SCHEDULE FOR THE BUILDING.

**WATER SOURCE HEAT PUMP CONTROL**

- NOTE:
- COORDINATE WIRING, TERMINATION, CONTROL AND I/O REQUIREMENTS WITH EQUIPMENT MANUFACTURER. SPECIFIC CONTROL REQUIREMENTS MAY DIFFER SLIGHTLY DEPENDING ON EQUIPMENT MANUFACTURER.
  - MANUFACTURER SHALL PROVIDE BACNET, OPEN SOURCE, HEAT PUMP CONTROLLER, SENSORS, CONTROL DEVICES, INTERNAL WIRING, ETC., FOR A COMPLETE DDC SYSTEM. TO CONTRACTOR SHALL PROVIDE FIELD WIRING OF DEVICES AND SENSORS THAT ARE SHIPPED LOOSE.

**SEQUENCE OF OPERATION**

- VUV - WATER SOURCE HEAT PUMP CONTROL:
- THE MANUFACTURER'S HEAT PUMP CONTROLLER SEQUENCE OF OPERATION MAY NOT EXACTLY MATCH THE SEQUENCE SHOWN BELOW. WHERE VARIANCES OCCUR, THE MANUFACTURER SHALL DOCUMENT IN THE EQUIPMENT SUBMITTALS.
  - ALL SETPOINTS, DEADBANDS, DELAY TIMERS, ETC., INCLUDING TIME-OF-DAY HOURS OF OPERATION AND SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS. APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS. ALL MOTOR CONTROL SWITCHES SHALL BE IN THE "AUTO" POSITION.
  - VUV-HEAT PUMP UNIT SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. VUV-HEAT PUMP SHALL OPERATE BASED ON TIME SCHEDULED OCCUPIED MODE COMPENSATED BY OPTIMUM START/STOP, TEMPORARY OCCUPIED MODE (SET FOR 2 HOURS) ENABLED FROM OVERRIDE SWITCH ON TEMPERATURE SENSORS) AND UNOCCUPIED CYCLE MODE.
  - VUV-HEAT PUMP SHALL NOT BE ACTIVATED UNTIL HEAT PUMP LOOP FLOW IS PROVEN BY DDC FOR A PERIOD OF 2 MINUTES.
  - DURING BUILDING OCCUPANCY: SUPPLY FAN SHALL OPERATE CONTINUOUSLY, ASSOCIATED MIXED AIR DAMPERS SHALL BE CONTROLLED AS DESCRIBED HEREIN.
  - DURING BUILDING UNOCCUPANCY: SUPPLY FAN SHALL BE CYCLED ON & OFF TO MAINTAIN UNOCCUPIED MODE SPACE TEMPERATURE SETPOINTS. MIXED AIR DAMPERS AND RELIEF DAMPER SHALL CLOSE TO OUTSIDE AIR.
  - SUPPLY FAN STATUS SHALL BE MONITORED BY DDC THRU RESPECTIVE CURRENT SWITCH. ABNORMAL STATUS CONDITION FOR ANY OF THESE DEVICES SHALL ACTIVATE ALARM. DDC SHALL TOTALIZE RUN TIME HOURS OF OPERATION.
  - WHEN SPACE TEMP RISES ABOVE COOLING SETPOINT, THE HEAT PUMP UNIT CONTROLLER SHALL SWITCH REVERSING VALVE TO COOLING MODE POSITION, OPEN HEAT PUMP LOOP ISOLATION VALVE, AND ACTIVATE COMPRESSOR (2-STAGES WHERE APPLICABLE) TO ACHIEVE SETPOINT.
  - WHEN SPACE TEMP FALLS BELOW HEATING SETPOINT, THE HEAT PUMP UNIT CONTROLLER SHALL SWITCH REVERSING VALVE TO HEATING MODE POSITION, OPEN HEAT PUMP LOOP ISOLATION VALVE, AND ACTIVATE COMPRESSOR (2-STAGES WHERE APPLICABLE) TO ACHIEVE SETPOINT.
  - ZONE SPACE TEMPERATURE SETPOINTS SHALL BE AS FOLLOWS:  
 HEATING UNOCCUPIED SETPOINT = 62°F  
 HEATING OCCUPIED SETPOINT = 72°F  
 COOLING OCCUPIED SETPOINT = 75°F  
 COOLING UNOCCUPIED SETPOINT = 85°F
  - DDC SHALL OVERRIDE COMPRESSOR AS REQUIRED TO PREVENT DISCHARGE AIR TEMPERATURE FROM DROPPING BELOW LOW LIMIT SETPOINT OF 50°F WHEN COOLING AND RISING ABOVE 90°F WHEN HEATING.
  - HEAT PUMP LOOP ISOLATION VALVE SHALL BE CLOSED WHEN ALL COMPRESSOR STAGES ARE DEACTIVATED.
  - DDC SHALL MONITOR GENERAL ALARM FROM HEAT PUMP CONTROL.
  - IF BOTH HEAT PUMP LOOP DISTRIBUTION PUMPS FAIL, HEAT PUMP UNIT COMPRESSOR CONTROL SHALL BE DEACTIVATED BY DDC TO PREVENT LOCAL SAFETY CUTOFF FROM OCCURRING AT RESPECTIVE HEAT PUMP CONTROLLER. IF HEAT PUMP IS OPERATING IN THE HEATING MODE, THE ENTIRE UNIT SHALL BE DEACTIVATED. HEAT PUMP OPERATION AND COMPRESSOR CONTROL SHALL AUTOMATICALLY RESTART WHEN RESPECTIVE FAILURE ALARM IS CLEARED.



**GLYCOL FILL STATION MONITORING**

GLYCOL FILL STATION SERVES HPL SYSTEM

NOTE:

- PUMP CONTROL PRESSURE SWITCH AND ASSOCIATED CONTROL WIRING ARE PROVIDED WITH GLYCOL FILL STATION.
- PRESSURE SWITCH FOR ALARM MONITORING SHALL BE FURNISHED BY TC CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.
- DRY CONTACTS FOR REMOTE MONITORING OF LOW TANK RESERVE ALARM PROVIDED WITH GLYCOL FILL STATION.





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FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE						
COPPER CONDUCTORS						
OVERCURRENT DEVICE RATING (AMPERES)	WIRE SIZE (AWG OR KCMIL)		CONDUIT SIZE			
	PHASE & NEUTRAL	GROUND	SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G)	SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	THREE PHASE 3 WIRE+G (3PH, 1G)	THREE PHASE & NEUTRAL 4 WIRE+G (3PH, 1N, 1G)
15-20	12	12	3/4"	3/4"	3/4"	3/4"
25-30	10	10	3/4"	3/4"	3/4"	3/4"
35-40	8	10	3/4"	3/4"	3/4"	3/4"
45-50	8 (6)	10	3/4"	3/4"	3/4"	3/4"
60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")	1" (1 1/4")
70	4	8	1"	1 1/4"	1 1/4"	1 1/4"
80	4 (3)	8	1"	1 1/4"	1 1/4"	1 1/4"
90-100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"	1 1/4"
110	2 (1)	6	-	1 1/4"	1 1/4"	1 1/4" (1 1/2")
125	1 (1/0)	6	-	1 1/4" (1 1/2")	1 1/4" (1 1/2")	1 1/2"
150	1/0	6	-	1 1/2"	1 1/2"	1 1/2"
175	2/0	6	-	2"	2"	2"
200	3/0	6	-	2"	2"	2 1/2"
225	4/0	4	-	2"	2"	2 1/2"
250	4	4	-	2 1/2"	2 1/2"	2 1/2"
300	350	4	-	2 1/2"	2 1/2"	3"
350	500	3	-	3"	3"	3"
400	500	3	-	3"	3"	3"
450	2-4/0	2-2	-	2-2"	2-2"	2-2 1/2"
500	2-250	2-2	-	2-2 1/2"	2-2 1/2"	2-2 1/2"
600	2-350	2-1	-	2-2 1/2"	2-2 1/2"	2-3"
700	2-500	2-1/0	-	2-3"	2-3"	2-3"
800	2-500	2-1/0	-	2-3"	2-3"	2-3 1/2"
1000	3-400	3-2/0	-	3-3"	3-3"	3-3"
1200	3-600	3-3/0	-	3-3 1/2"	3-3 1/2"	3-3 1/2"
1600	4-600	4-4/0	-	4-3 1/2"	4-3 1/2"	4-3 1/2"
2000	5-600	5-250	-	5-3 1/2"	5-3 1/2"	5-3 1/2"

\* = SEE NOTE 4

NOTES:

- CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
- CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
- CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
- CONDUCTORS ARE BASED ON 90°C INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C FOR TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES.
- CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
- ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LOG SIZES.
- SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
- OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY.
- SPEC FROM ALUMINUM TO COPPER PRIOR TO ENTERING EQUIPMENT LISTED FOR USE WITH COPPER CONDUCTORS ONLY OR USE COPPER CONDUCTORS FOR THE ENTIRE LENGTH OF FEEDER.

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS						
BRANCH CIRCUIT RATING (A)	WIRE SIZE (AWG)	MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)				
		120V	208V	240V	277V	480V
20A	12	83	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
30A	10	85	148	170	197	341
	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

NOTES:

- THE ABOVE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR OF 0.85 PER NEC CHAPTER 9, TABLE 9.
- PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.
- CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 3% CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
- LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOADING OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP TO COMPLY WITH ASHRAE 90.1 AND THE NEC. FOR CIRCUITS LOADED GREATER THAN 64% OF BRANCH BREAKER RATING, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

RACEWAY APPLICATION SCHEDULE													
RACEWAY	AC/NC CABLE	ALUMINUM RIGID CONDUIT	ELECTRICAL METALLIC TUBING (EMT)	SURFACE RACEWAY	ELECTRICAL NONMETALLIC TUBING (ENT)	FIBROSE METAL CONDUIT (FMC)	RIGID POLYESTER OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY	INTERMEDIATE METAL CONDUIT (IMC)	LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)	LIQUIDTIGHT FLEXIBLE NONMETAL CONDUIT (LFNC)	FIBROTYPE OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY	RIGID STEEL CONDUIT	KEYED NOTES
OUTDOOR	EXPOSED											X	
OUTDOOR	CONCEALED (ABOVE GROUND)											X	
OUTDOOR	UNDERGROUND											X	X X X X
OUTDOOR	CONNECTED TO VIBRATING EQUIPMENT								X				EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENT
INDOOR	EXPOSED												
INDOOR	NOT SUBJECT TO PHYSICAL DAMAGE - UNFINISHED SPACES	X											
INDOOR	EXPOSED			X									
INDOOR	NOT SUBJECT TO PHYSICAL DAMAGE - FINISHED SPACES												
INDOOR	EXPOSED											X	
INDOOR	SUBJECT TO SEVERE PHYSICAL DAMAGE											X	RIGID STEEL CONDUIT UP TO 10'-0" AFF. LOCATIONS INCLUDE: LOADING DOCKS, CORRIDORS USED FOR TRAFFIC OF MECHANIZED CARTS AND PALLET HANDLING UNITS, MECHANICAL ROOMS
INDOOR	CONCEALED IN CEILINGS, INTERIOR WALL AND PARTITIONS	X	X										NOT TO EXCEED 6'-0" IN CEILING SPACE
INDOOR	CONNECTED TO VIBRATING EQUIPMENT								X				EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENT USE LFMC IN DAMP/WET LOCATIONS
INDOOR	DAMP AND WET LOCATIONS								X			X	
INDOOR	BELOW SLAB IN GRADE											X	X
INDOOR	EMBEDDED IN CONCRETE ABOVE GRADE											X	X
INDOOR	OPTICAL FIBER OR COMMUNICATIONS CABLE IN SPACES USED FOR ENVIRONMENTAL AIR			X						X			
INDOOR	CONCEALED GENERAL PURPOSE DISTRIBUTION OF OPTICAL FIBER OR COMMUNICATION CABLE			X						X		X	
SPECIAL APPLICATIONS	MRI		X										
SPECIAL APPLICATIONS	NATATORIUMS/FOUNTAINS		X										USE COMPRESSION FITTINGS, PAINTED WITH CORROSION RESISTANT PAINT BY PAINTING CONTRACTOR.

GENERAL NOTES

- "X" INDICATES ACCEPTABLE SELECTION.
- REFER TO "CONDUCTORS AND CABLES" SPECIFICATION FOR APPLICATION LIMITATIONS OF AC/NC CABLE.

MOTOR CIRCUIT SIZING SCHEDULE (208V, 3 PHASE)				
MOTOR HP	SWITCH/FUSE	CIRCUIT BREAKER	STARTER SIZE/TYPE	MOTOR DISCONNECT (NOTE 3)
1/2	30/6A	15A	1	30A
3/4	30/6A	15A	1	30A
1	30/10A	15A	1	30A
1 1/2	30/10A	15A	1	30A
2	30/10A	15A	1	30A
3	30/20A	20A	1	30A
5	30/25A	25A	1	30A
7 1/2	60/40A	50A	1	60A
10	60/50A	60A	2	60A
15	60/60A	90A	3	60A
20	100/90A	100A	3	100A
25	100/100A	110A	3	100A
30	200/125A	125A	4	200A
40	200/175A	175A	4	200A
50	200/200A	200A	5	200A
60	400/250A	250A	5	400A
75	400/300A	300A	5	400A
100	400/400A	400A	6	400A
125	600/500A	600A	6	600A
150	600/600A	600A	6	600A

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.



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PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**ELECTRICAL STANDARD SCHEDULES**

ISSUE DATES

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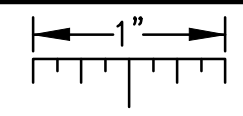
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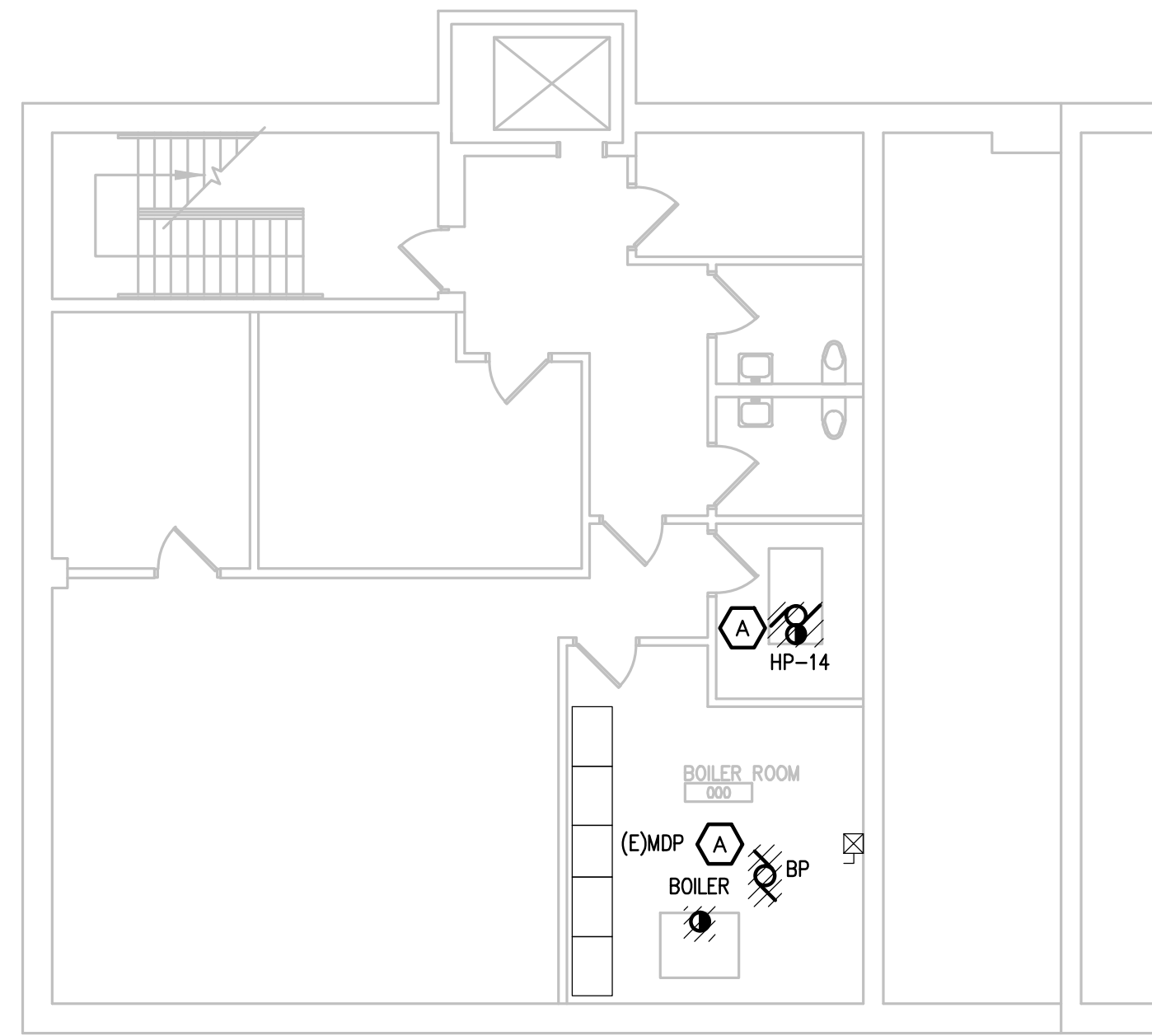
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**E0.2**

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



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



**LOWER LEVEL ELECTRICAL DEMOLITION PLAN**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES:**

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
3. REMOVE LIGHTING FIXTURES AND ELECTRICAL DEVICES AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE DEVICES SHOWN.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TOLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

**# DEMOLITION NOTES:**

- A. DISCONNECT AND REMOVE POWER FOR MECHANICAL EQUIPMENT. EXISTING CIRCUITING SHALL REMAIN FOR REUSE.



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**LOWER AND FIRST FLOOR ELECTRICAL DEMOLITION PLANS**

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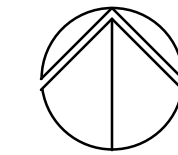
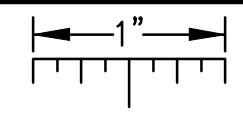
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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



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

**GENERAL NOTES:**

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
3. REMOVE LIGHTING FIXTURES AND ELECTRICAL DEVICES AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE DEVICES SHOWN.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TOLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

**DEMOLITION NOTES:**

- A. DISCONNECT AND REMOVE POWER FOR MECHANICAL EQUIPMENT. EXISTING CIRCUITING SHALL REMAIN FOR REUSE.



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PBA Project No: 2016.0441

PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**SECOND FLOOR ELECTRICAL DEMOLITION PLAN**

ISSUE DATES


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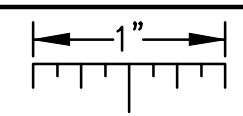
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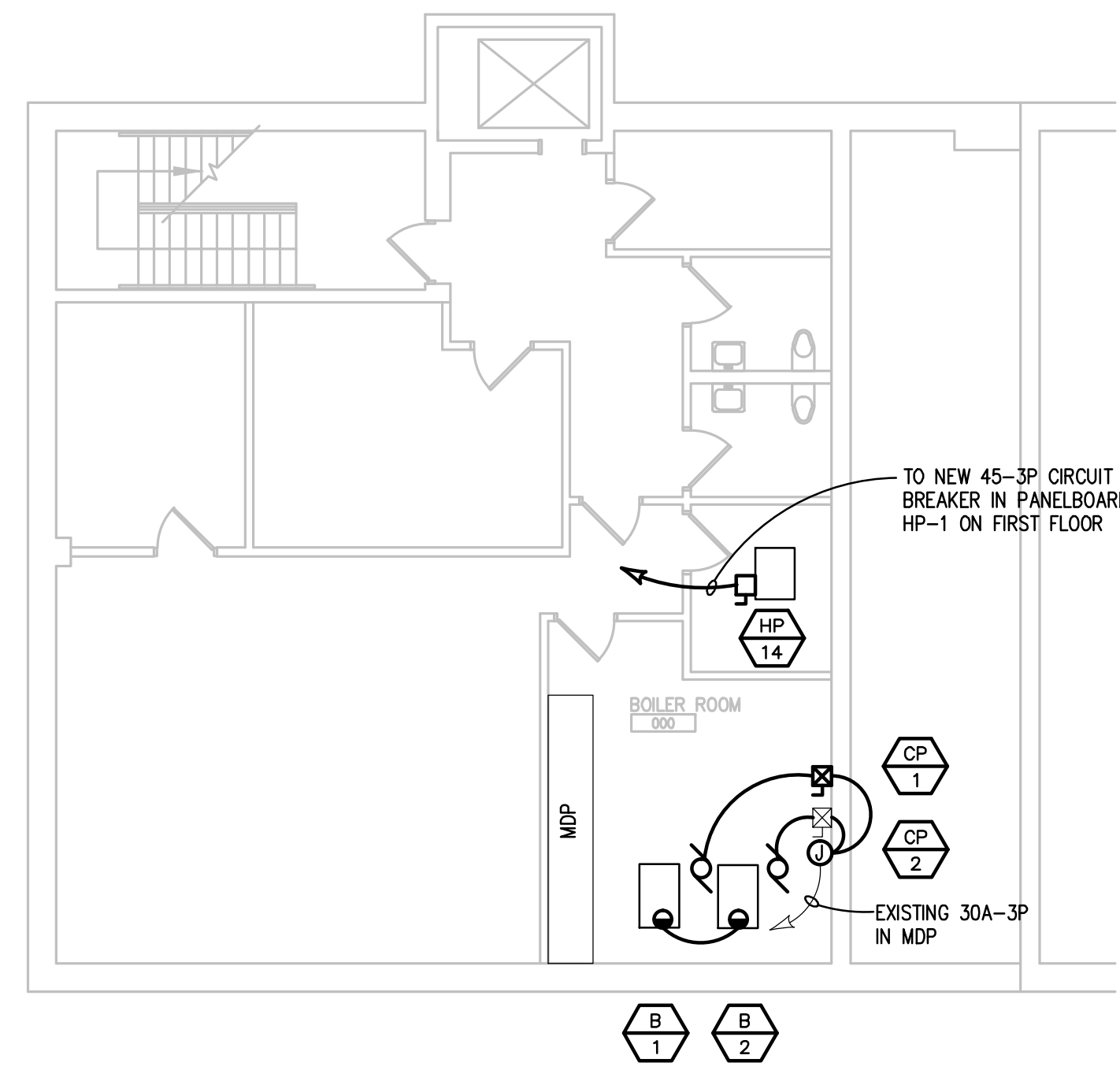
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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



**FIRST FLOOR ELECTRICAL NEW WORK PLAN**  
SCALE: 1/8" = 1'-0"



**LOWER LEVEL ELECTRICAL NEW WORK PLAN**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES:**

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
5. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
6. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
7. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT, PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.

**CONSTRUCTION KEY NOTES:**

1. CONNECT TO NEAREST AVAILABLE 120V CIRCUIT.
2. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
3. PROVIDE NEW 15A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
4. PROVIDE NEW 20A-3P CIRCUIT BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
5. PROVIDE NEW 25A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
6. PROVIDE NEW 35A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.



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PROJECT TITLE  
**Administration Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE  
**LOWER LEVEL AND FIRST FLOOR ELECTRICAL NEW WORK PLANS**

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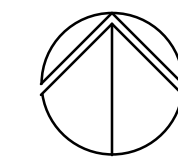
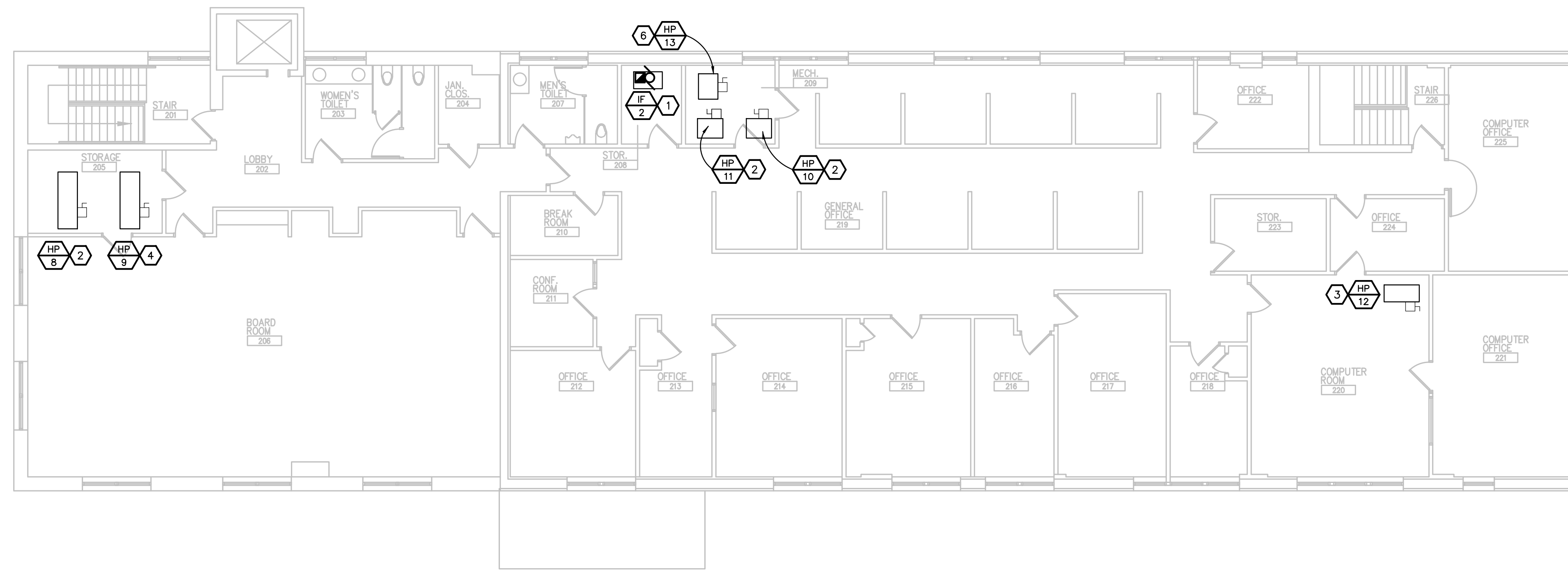
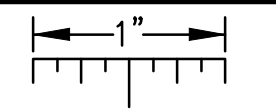
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DRAWING NO.

**E2.1**

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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



**SECOND FLOOR ELECTRICAL NEW WORK PLANS**  
SCALE: 1/8" = 1' - 0"

**GENERAL NOTES:**

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