

HVAC ABBREVIATIONS

* BELOW IS A GENERAL ABBREVIATIONS LIST USED ON ALL PROJECTS. ABBREVIATIONS MAY OR MAY NOT BE USED ON THIS PROJECT.

<p>AT AMPS AABC ASSOCIATED AIR BALANCE COUNCIL ABV ABOVE ACU AIR CONDITIONING UNIT ACCU AIR-COOLED COMPRESSOR CONDENSING UNIT ACH AIR CHANGE PER HOUR ADA AMERICANS WITH DISABILITIES ACT AFF ABOVE FINISHED FLOOR AG ABOVE GRADE AGA AMERICAN GAS ASSOCIATION AHAP AS HIGH AS POSSIBLE AHU AIR HANDLING UNIT AIA AMERICAN INSTITUTE OF ARCHITECTS AISC ALUMINUM INSTITUTE OF STEEL CONSTRUCTION ANSI AMERICAN NATIONAL STANDARDS INSTITUTE APD AIR PRESSURE DROP APPROX APPROXIMATELY ARCH ARCHITECTURAL ARI AMERICAN REFRIGERATION INSTITUTE ASHRAE AMERICAN SOCIETY OF HVAC&R ENGINEERS ASME AMERICAN SOCIETY OF MECHANICAL ENGINEERS ASTM AMERICAN SOCIETY FOR TESTING MATERIALS ATC AUTOMATIC TEMPERATURE CONTROLS ATS AUTOMATIC TRANSFER SWITCH AWG AMERICAN WIRE GAUGE BF BELOW FLOOR BFG BELOW FINISHED GRADE BHP BRAKE HORSEPOWER BKR BREAKER BLDG BUILDING BLW BELOW BTW BETWEEN C CELSIUS (DEGREES) CAP CAPACITY CATV CABLE TELEVISION CB CATCH BASIN CFM CUBIC FEET PER MINUTE CHW CHILLED WATER CKT CIRCUIT CLG CEILING CONC CONCRETE COND CONDENSATE CONN CONNECT OR CONNECTION CONT CONTINUATION CONTR. CONTRACTOR CUH CABINET UNIT HEATER CW COLD WATER DB DRY BULB DEMO DEMOLITION DISC DISCONNECT DN DOWN DOM DOMESTIC DS DOWN SPOUT DTL DETAIL DWG(S) DRAWING(S) EAT ENTERING AIR TEMPERATURE EA EXHAUST AIR EA/ EACH E.C. ELECTRICAL (SUB)CONTRACTOR EDH ELECTRIC DUCT HEATER EER ENERGY EFFICIENCY RATIO EF EXHAUST FAN ELEC ELECTRIC ENT ENTERING EP EXPLOSION PROOF ESP EXTERNAL STATIC PRESSURE ETC ETCETERA ETR EXISTING TO REMAIN EXH EXHAUST EX EXISTING EXP EXPANSION F&T FLOAT AND THERMOSTATIC F FAHRENHEIT (DEGREES) FA FRESH AIR FACP FIRE ALARM CONTROL PANEL F.A.T. FINAL AIR TEMPERATURE F.C. FLEXIBLE CONNECTION FD FIRE DAMPER FG FINISHED GRADE FH FIRE HYDRANT F.L.A. FULL LOAD AMPS FLR FLOOR FPM FEET PER MINUTE FR FROM FT. HD. FEET OF HEAD FU FUSED G.C. GENERAL CONTRACTOR GFI GROUND FAULT INTERRUPTER GPM GALLONS PER MINUTE H.C. HVAC (SUB) CONTRACTOR HB HOSE BIBB HOA HAND/OFF/AUTO HP HORSEPOWER HPS HIGH PRESSURE STEAM HTR HEATER HUH HORIZONTAL UNIT HEATER HVAC HEATING, VENTILATING AND AIR CONDITIONING HWR HOT WATER RETURN HWS HOT WATER SUPPLY</p>	<p>IBC INTERNATIONAL BUILDING CODE ICC INTERNATIONAL CODE COUNCIL IFC INTERNATIONAL FIRE CODE IMC INTERNATIONAL MECHANICAL CODE IPC INTERNATIONAL PLUMBING CODE IN INCHES INSUL INSULATION/INSULATE INV INVERT ISP INTERNAL STATIC PRESSURE JB JUNCTION BOX KV KILOVOLT KVA KILOVOLT AMPS KW KILOWATT L&I PA LABOR AND INDUSTRY L.A.T. LEAVING AIR TEMPERATURE LAV LAVATORY LOD LIMIT OF DEMOLITION LTG LIGHTING LVG LEAVING MAX MAXIMUM MBH MILLION BTU'S PER HOUR M.C. MECHANICAL (SUB)CONTRACTOR M.C.A. MINIMUM CIRCUIT AMPS MECH MECHANICAL MED MEDIUM MFR MANUFACTURER MIN MINIMUM M.O.C.P. MAXIMUM OVERCURRENT PROTECTION MOD MOTOR OPERATED DAMPER MV MEDIUM VOLTAGE N NORMAL N.G. NATURAL GAS NBS NATIONAL BUREAU OF STANDARDS NC NEW CONNECTION NEC NATIONAL ELECTRIC CODE NEMA NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION NFPA NATIONAL FIRE PROTECTION ASSOCIATION NOT IN CONTRACT No. NUMBER NTS NOT TO SCALE O.A. OUTSIDE AIR OC ON CENTER OSHA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION P.C. PLUMBING (SUB)CONTRACTOR PD PRESSURE DROP PH PHASE PLB PLUMBING PNL PANEL PRESS PRESSURE PSIA POUNDS PER SQUARE FOOT (ABSOLUTE) PSIG POUNDS PER SQUARE FOOT (GAUGE) R RECESSED R.A. RETURN AIR RAR RETURN AIR REGISTER RCPT RECEPTACLE REF. REFRIGERANT/REFRIGERATION REQ'D REQUIRED REQ'MTS REQUIREMENTS RH RELATIVE HUMIDITY RM ROOM RPM REVOLUTIONS PER MINUTE RWC RAIN WATER CONDUCTOR S.A. SUPPLY AIR SAN SANITARY SCALE SCALE SD SLOT DIFFUSER SMACNA SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION S.P. STATIC PRESSURE (IN. W.C.) SQ SQUARE SQ. FT. SQUARE FEET STL STEEL TEL TELEPHONE TEMP TEMPERATURE THRU THROUGH TSP TOTAL STATIC PRESSURE TYP TYPICAL UL UNDERWRITERS LABORATORIES UST UNDERGROUND STORAGE TANK V VOLTS VAV VARIABLE AIR VOLUME VCD VOLUME CONTROL DAMPER VEL VELOCITY VTR VENT THROUGH ROOF W/ WITH WB WET BULB WC WATER CLOSET WG WATER GAUGE WP WATER PROOF WTR WATER</p>
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LEGEND & SYMBOLS

* BELOW IS A GENERAL LEGEND AND SYMBOLS LIST USED ON ALL PROJECTS. SYMBOLS MAY OR MAY NOT BE USED ON THIS PROJECT.

<p>XX SPECIFIC NOTES (ON DRAWING)</p> <p>M MOTORIZED DAMPER</p> <p>⊕ THERMOSTAT</p> <p>← AIR FLOW ARROW</p> <p>□ CEILING DIFFUSER OR AIR DEVICE</p> <p>S-#-X"Ø AIRFLOW (CFM)</p> <p>□ CEILING MOUNTED RETURN OR EXHAUST GRILLE / REGISTER</p> <p>R-#-X"Ø OR X"X" RETURN AIR DIFFUSER TAG</p> <p>18"x12" INTERIOR CLEAR DUCTWORK DIMENSIONS; WIDTHxHEIGHT</p> <p>□ SUPPLY DUCT TOWARD VIEWER</p> <p>□ SUPPLY DUCT AWAY FROM VIEWER</p> <p>□ RETURN OR EXHAUST DUCT TOWARD VIEWER</p> <p>□ RETURN OR EXHAUST DUCT AWAY FROM VIEWER</p> <p>□ OUTSIDE AIR DUCT AWAY FROM VIEWER</p> <p>□ FLEXIBLE DUCT</p> <p>□ MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR EACH MECHANICAL APPLIANCE SHALL BE MADE AVAILABLE TO THE LOCAL FIELD INSPECTOR ON THE JOB SITE AT THE TIME OF INSPECTION.</p> <p>□ COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH THE EXISTING BUILDING, SYSTEMS AND ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.</p> <p>□ MOTORIZED CONTROL DAMPER</p> <p>□ TRANSITION; SYMMETRIC</p> <p>□ TRANSITION; ASYMMETRIC</p> <p>□ TRANSITION; RECTANGULAR TO ROUND</p> <p>90 DEG RADIUS ELBOW (R/W = 1.5)</p> <p>□ MITERED ELBOW WITH TURNING VANES</p> <p>□ TEE, BOOT ENTRY BRANCH</p> <p>□ TEE, ROUND BRANCH</p> <p>□ TEE, CONICAL ROUND BRANCH</p> <p>□ TEE, ROUND TO ROUND BRANCH</p>	<p>1. THIS SET OF DRAWINGS IS PART OF A COMPLETE SET OF MECHANICAL AND ELECTRICAL DRAWINGS PREPARED FOR THE PURPOSES OF CONSTRUCTING THIS PROJECT. NO CONTRACTOR, FOR THE PURPOSES OF BIDDING, CONSTRUCTION, ETC. IS TO BE GIVEN A PARTIAL SET OF DRAWINGS WITHOUT HAVING BEEN GIVEN THE CHANCE TO REVIEW THE ENTIRE SET FIRST TO DETERMINE IF THEIR SCOPE OF WORK EXTENDS BEYOND THE CONTENTS WITH IN THIS SET.</p> <p>2. THIS CONTRACTOR IS TO BE FAMILIAR WITH THE SPECIFICATIONS AND THE REQUIREMENTS OF THE SPECIFICATIONS AND APPLY THOSE REQUIREMENTS TO THE CONSTRUCTION OF THIS PROJECT. A COPY OF THE SPECIFICATION ON DRAWINGS IS TO BE PRESENT AT THE JOBSITE AT ALL TIMES.</p> <p>3. INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH 2018 INTERNATIONAL BUILDING CODE AND ALL LOCAL APPLICABLE CODES.</p> <p>4. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.</p> <p>5. THE DRAWINGS ARE INTENDED TO COVER SYSTEMS WHICH WILL FIT THE AVAILABLE SPACE AND WHICH WILL NOT INTERFERE WITH THE GENERAL STRUCTURAL DESIGN. THE CONTRACTOR IS TO CAREFULLY EXAMINE THE DRAWINGS FOR ALL BRANCHES OF WORK AND SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL AND APPARATUS INTO THE BUILDING. COORDINATE THE EXACT LOCATION OF EQUIPMENT AND EQUIPMENT CONNECTIONS WITH THE ENGINEER AND EQUIPMENT SUPPLIERS.</p> <p>6. DRAWINGS ARE DIAGRAMMATIC FOR PIPING, CONDUITS AND DUCTWORK THAT IS NOT SHOWN IN DETAIL. SIZES OF PIPING, CONDUITS AND DUCTWORK AND THEIR LOCATIONS ARE INDICATED, BUT IT IS NOT INTENDED TO SHOW EVERY OFFSET, FITTING OR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED DURING INSTALLATION OF THE WORK. THE ALIGNMENT OF PIPING, CONDUIT, OR DUCTWORK SHALL BE VERIFIED FROM THAT INDICATED ON THE DRAWINGS WITHOUT EXTRA EXPENSE TO THE OWNER WHERE NECESSARY TO AVOID STRUCTURAL OR MECHANICAL INTERFERENCES, OR TO AVOID THE WORK OF ANY OTHER TRADES.</p> <p>7. CHECK AND VERIFY ALL DIMENSIONS, SITE CONDITIONS, DRAWINGS AND SPECIFICATIONS. REPORT ANY AND ALL DISCREPANCIES OR DEFICIENCIES TO THE ARCHITECT AT ONCE.</p> <p>8. PERFORM LABOR IN A THOROUGH AND COMPLETE WORKMAN LIKE MANNER AND WITH ALL REASONABLE RAPIDITY TO THE SATISFACTION OF THE ENGINEER & OWNER.</p> <p>9. ALL MECHANICAL EQUIPMENT SHALL BEAR THE LABEL OF AN APPROVED TESTING AGENCY.</p> <p>10. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. SHOULD ANY VARIANCE BETWEEN PLANS AND SPECIFICATIONS OCCUR WITH THESE INSTRUCTIONS, THE ENGINEER SHOULD BE CONTACTED IMMEDIATELY SO THAT ANY VARIATIONS IN INSTALLATION CAN BE KNOWN BY ALL PARTIES CONCERNED.</p> <p>11. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.</p> <p>12. MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR EACH MECHANICAL APPLIANCE SHALL BE MADE AVAILABLE TO THE LOCAL FIELD INSPECTOR ON THE JOB SITE AT THE TIME OF INSPECTION.</p> <p>13. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH THE EXISTING BUILDING, SYSTEMS AND ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.</p> <p>14. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.</p> <p>15. THESE DRAWINGS DO NOT INDICATE EVERY CHANGE OF DUCT OR PIPE SIZE (I.E. WHERE A DUCT OR PIPE IS TO CONNECT TO A PIECE OF EQUIPMENT, ETC.). WHERE DUCT OR A PIPE OF A DIFFERENT SIZE THAN THAT OF THE INLET OF SUCH EQUIPMENT CONNECTIONS, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AN APPROPRIATE TRANSITION AS REQUIRED.</p> <p>16. ALL TRADES ARE RESPONSIBLE FOR THEIR OWN CUTTING AND PATCHING TO INSTALL WORK INDICATED. M.C. IS TO COORDINATE WITH THE G.C. OPENINGS REQUIRED IN WALLS AND FLOORS SO THAT THEY CAN BE PROPERLY FRAMED IN PRIOR TO CONSTRUCTION. NO CUTTING IS TO BE DONE WHICH WILL EFFECT THE STRUCTURAL INTEGRITY OF THE BUILDING. ALL ROUND MASONRY OPENINGS THROUGH MASONRY ARE TO BE SAW CUT CORED. PROVIDE APPROPRIATE STEEL LINTELS WHERE REQUIRED - CONSULT WITH A STRUCTURAL ENGINEER FOR REQUIREMENTS.</p> <p>17. ALL OPENINGS IN FIRE WALLS DUE TO PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.</p> <p>18. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.</p> <p>19. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.</p> <p>20. ALL EQUIPMENT, PIPING, DUCTWORK, ETC. SHALL BE SUPPORTED AS DETAILED, SPECIFIED, AND REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.</p> <p>21. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.</p> <p>22. ALL DUCTWORK, PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE AS NOTED OR DETAILED ON THE DRAWINGS. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS.</p> <p>23. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.</p> <p>24. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.</p> <p>25. FURNISH AND INSTALL ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, STRAINERS, UNIONS, TRAPS, FLANGES, OTHER APPURTENANCES REQUIRING ACCESS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS DOORS ARE NOT TO REDUCE THE FIRE RATING OF THE WALL IN WHICH THEY ARE INSTALLED.</p> <p>26. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.</p>
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GENERAL NOTES

- INSTALL THE TOP OF ALL THERMOSTAT BOXES APPROXIMATELY 48" A.F.F., PER THE OWNER'S REQUEST, AND TO CONFORM WITH ANY AND ALL APPLICABLE CODES AND REQUIREMENTS (I.E. ADA, ETC.)
- CONTRACTOR IS TO MAINTAIN A COMPLETE SET OF AS-BUILT DRAWINGS, UPDATED DAILY WHICH INDICATE AS-BUILT (TO INCLUDE BUT NOT LIMITED TO REVISED ROUTING CONFIGURATIONS, EQUIPMENT LAYOUTS, ETC. - SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION) CONDITIONS. AT A MINIMUM THE CONTRACTOR IS TO UPDATE THE G.C.'S AS BUILT SET EACH WEEK. A COMPLETE SET OF AS-BUILT DRAWINGS IS TO BE PROVIDED PRIOR TO ISSUING OF SUBSTANTIAL COMPLETION.
- PROVIDE THREE (3) SPARE FILTERS FOR EVERY PIECE OF EQUIPMENT FURNISHED UNDER THIS CONTRACT WHICH IS FURNISHED WITH DISPOSABLE FILTERS.
- A COMPLETE SET OF DRAWINGS OUTLINING THE EXISTING HVAC SYSTEMS WERE NOT AVAILABLE FOR USE DURING DESIGN. EXISTING CONDITIONS ARE SHOWN USING INACCURATE ORIGINAL DESIGN DRAWINGS AND LIMITED SITE SURVEY. THE CONTRACTOR IS TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS, CONSTRAINTS, LIMITATIONS AND AVAILABLE SPACE AND INCLUDE ALL REQUIRED TRANSITIONS, OFFSETS AND RELOCATIONS OF EXISTING EQUIPMENT, PIPING OR DUCTWORK AS IS NECESSARY FOR A COMPLETE INSTALLATION AS SHOWN ON THE DRAWINGS.
- BIDDERS ARE REQUIRED TO VISIT THE SITE TO DETERMINE THE SCOPE OF WORK AND EXTENT OF DEMOLITION AND NEW WORK, EXISTING CONSTRUCTION TO REMAIN, POTENTIAL CONFLICTS, OBSTRUCTIONS AND SITE RELATED CHALLENGES PRIOR TO SUBMITTING BIDS.
- THE LOCATION OF EXISTING DUCTWORK, PIPING, ETC IS SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING SYSTEMS BEFORE COMMENCING WORK.
- NO DUCTWORK, PIPING OR EQUIPMENT IS TO BE ABANDONED IN PLACE. ALL EXISTING DUCTWORK, PIPING AND EQUIPMENT NOT BEING REUSED IS TO BE REMOVED AND PROPERLY DISPOSED OF BELOW NOTES.
- THE CONTRACTOR IS RESPONSIBLE FOR VISITING THE SITE TO DETERMINE EXACTLY HOW THE EQUIPMENT IS TO BE BROUGHT INTO THE BUILDING. I.E. LIMITATIONS DUE TO PATHWAYS TO MECHANICAL ROOMS, RIGGING REQUIREMENTS, OR DUE TO EXISTING SITE CONDITIONS, UTILITY LOCATIONS, ETC. EQUIPMENT MAY NEED TO BE SHIPPED TO THE SITE KNOCKED DOWN OR DISASSEMBLED TO MINIMIZE REQUIRED ENTRANCE OPENING SIZE. COORDINATE ALL LOGISTICS WITH OWNER.
- AT LOCATIONS WHERE NEW PIPING/DUCTWORK CONNECTS TO EXISTING, DETERMINE EXACT LOCATION, SIZE AND ELEVATION OF EXISTING EQUIPMENT AT SITE BEFORE INSTALLING NEW PIPING/DUCTWORK.
- EXISTING EQUIPMENT, PIPING AND DUCTWORK BEING REMOVED AND NOT BEING REUSED IS TO BE PROPERLY DISPOSED OF IN COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, INCLUDING RECLAIM OF REFRIGERANT.
- VERIFY EXACT BUILDING STRUCTURE CONSTRUCTION IN FIELD AND ADJUST DUCT SIZE OR LOCATIONS TO AVOID TRUSS LOCATIONS AND CROSS MEMBERS. DUCT DIMENSIONS INDICATED MAY BE ADJUSTED PROVIDING THAT THE TOTAL FREE AREA OF THE NEW DUCT BE NO LESS THAN THE FREE AREA OF THE DUCT INDICATED ON THIS DRAWING.
- ALL DUCTWORK PENETRATIONS OF A FIRE RATED PARTITION, WALL OR BARRIER ARE TO BE FITTED WITH AN APPROPRIATE FIRE DAMPER AS REQUIRED BY CODE.
- DUCT DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR, INSIDE DIMENSIONS.
- ALL 90° ELBOWS IN SUPPLY AND EXHAUST DUCTWORK ARE TO HAVE TURNING VANES.
- CLEAN AND VACUUM ALL DUCTWORK PRIOR TO FINAL CONNECTION TO EQUIPMENT AND DEVICES.
- ALL PRESSURE TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT, DUCTWORK OR PIPING INSULATION IS APPLIED.
- TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.
- THE CONTRACTOR IS TO PERFORM ALL TESTS (INCLUDING ALL TESTING AND FORMS REQUIRED FOR THE INSTALLATION OF THE NEW EQUIPMENT) AND INSPECTIONS, SUBMIT ALL REPORTS, AND WHERE REQUIRED BY STATE LAW, ARRANGE FOR AND PAY ALL ASSOCIATED FEES FOR AN ON-SITE INSPECTION BY CERTIFIED INSPECTORS. ALL NECESSARY REPORTS ARE TO BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION WITH COPIES FORWARDED TO THE ENGINEER. DISPLAY OF REQUIRED CERTIFICATES IS TO BE IN GLASS ENCLOSED FRAMES TO BE HUNG IN THE MECHANICAL ROOM WHERE THE EQUIPMENT IS INSTALLED BY THE CONTRACTOR.
- CONTRACTOR IS TO SUBMIT FINAL BALANCE REPORT TO CODE OFFICIAL, G.C., ENGINEER, ARCHITECT AND OWNER FOR REVIEW PRIOR TO RECEIVING BUILDING OCCUPANCY PERMIT. CONTRACTOR TO FOLLOW REQUIREMENTS OF SPECIFICATION PERTAINING TO BALANCE REPORTS.
- THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING DRAWINGS, SPECIFICATIONS AND FORMS REQUIRED TO INSTALL NEW EQUIPMENT (AS REQUIRED) TO THE AUTHORITIES HAVING JURISDICTION, INCLUDING ALL REQUIRED FEES. THE CONTRACTOR MAY SUBMIT COPIES OF CONTRACT DRAWINGS AND SPECIFICATIONS, IF THE INSTALLATION IS REFLECTED ACCURATELY BY THESE DOCUMENTS.
- CONTRACTOR SHALL, IN THE PRESENCE OF THE ENGINEER OF RECORD, DEMONSTRATE EQUIPMENT OPERATIONS, SYSTEM TO SYSTEM INTERFACING RELATIONSHIPS, AND DEMONSTRATE CONTROL OPERATIONS.
- PROVIDE AN OPERATING AND MAINTENANCE MANUAL TO THE G.C. AND OWNER AT THE TIME OF SYSTEM INSTALLATION COMPLETION. REFER TO SPECIFICATION FOR MORE REQUIREMENTS.
- ALL DUCTWORK IS TO BE CLASS II (MEDIUM DUTY) CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS FOR - 15" WATER GAGE. NOTE: DUCTWORK IS TO BE WELDED OR GASKETED FLANGE TYPE - SPIRAL DUCTWORK IS NOT PERMITTED. SUPPORT PER SMACNA GUIDELINES AND AT EVERY JOINT/TRANSITION.
- PRIOR TO CONSTRUCTION OF THE DUCT SYSTEM, THE CONTRACTOR IS TO SUBMIT A DETAILED SHOP DRAWING ILLUSTRATING ENTIRE DUCT SYSTEM INCLUDING DIMENSIONS, FITTINGS, SIZES, HANGER LOCATIONS, ETC. ALL FIELD VERIFIED.
- GROUND WELD FUME COLLECTOR AND EXHAUST FANS PER NFPA 91 AND THE MANUFACTURERS INSTALLATION REQUIREMENTS TO PREVENT ACCUMULATION OF STATIC ELECTRICITY IN THE SYSTEM.



NOTES, LEGEND & ABBREVIATIONS - HVAC

WELD FUME EXTRACTION
WELDING ROOM
FOR
ALLEGANY COLLEGE, LAVALLE BUILDING
37 LANE AVENUE, LAVALLE, MARYLAND 211502



BRETT N. YONISH, P.E.
CHRISTOPHER G. ALBRIGHT, P.E.

541 MAIN STREET
WINDBER, PA 15963
(814) 467-6877

EQUIPMENT MANUFACTURER
BASIS OF DESIGN:
EQUIPMENT INDICATED ON THIS SET OF DRAWINGS IS REPRESENTED LOCALLY BY PITTSBURGH AIR SYSTEMS. CONTACT JIM REED: 412-539-1234
PRE-APPROVED EQUIVALENT:
EQUIVALENTLY PERFORMING EQUIPMENT MANUFACTURED BY DONALDSON FILTRATION SOLUTIONS AND SUPPLIED BY JOOS EQUIPMENT COMPANY WILL BE CONSIDERED FOR APPROVAL WHERE IT MEETS ALL REQUIREMENTS INDICATED HERE-IN. CONTACT THOMAS LAMARE: 610-513-1235

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 00989, EXPIRATION DATE: 06-12-2026
BRETT N. YONISH
DATE 02-04-2025

REVISIONS		
MARK	BY	DATE

DATE: 02/04/2025
DRAWN BY: K.E.K./S.M.M.
CHECKED BY: C.G.A.
PROJECT NO. EHEA 24141
DRAWING NO. M-1



Angle θ Degrees	Loss Fraction of VP in Branch
10	0.06
15	0.09
20	0.12
25	0.15
30	0.18
35	0.21
40	0.25
45	0.28
50	0.32
60	0.44
90	1.00

Note: Branch entry loss assumed to occur in branch and is so calculated.
Do not include a regain calculation for branch entry enlargements.

BRANCH ENTRY LOSSES

TITLE: BRANCH ENTRY AND WEATHER CAP LOSSES
FIGURE: 9-f
DATE: 1-12

WELD FUME EXTRACTION DUCT SCHEDULE

DUCT SECTION	SIZE	AIRFLOW	VELOCITY	VELOCITY PRESSURE	APPROX. LENGTH
(WF1)	7"Ø	750	2,650 fpm	0.44	21 FT
(DC2)	11"Ø	1,500	2,300 fpm	0.33	6 FT
(DC3)	14"Ø	2,250	2,150 fpm	0.29	14 FT
(DC4)	16"Ø	3,000	2,200 fpm	0.30	6 FT
(DC5)	16"Ø	3,750	2,700 fpm	0.45	4 FT
(DC6)	18"Ø	4,500	2,600 fpm	0.42	8 FT
(DC7)	24"Ø	9,000	2,900 fpm	0.52	14 FT
(DC8)	7"Ø	750	2,650 fpm	0.44	9 FT
(DC9)	11"Ø	1,500	2,300 fpm	0.33	30 FT

NOTES:
1. DUCT TRANSPARENT VELOCITY 2,000-2,500 FPM PER ACGIH INDUSTRIAL VENTILATION 28TH EDITION, TABLE 5-1.
2. SCHEDULED DUCT LENGTHS ARE CENTER LINE LENGTHS.
3. VELOCITY PRESSURE PER CONVERSIONS TABLE 9-3 FOR STANDARD AIR IN CHAPTER 9 OF ACGIH

WELDING FUME EXHAUST COLLECTOR SCHEDULE

TAG	SERVES	FAN CFM	S.P.	B.H.P.	R.P.M.	D.B.A.	# CARTRIDGES	FILTER S.F. EA	FILTER INITIAL PRESSURE DROP	FILTER FINAL PRESSURE DROP	FEI	FULL LOAD AMPS (FLA)	LOCKED ROTOR AMPS (LRA)	ELECT. CHAR.	CONTROL	APPROX. WEIGHT	BASIS OF DESIGN*
WFEC-1	WELDING BOOTHS	9,000	13.0"	30.0	3,431	77.0	12	254.0	0.5" WG	5.0" WG	1.17	33.2	218.0	3Ø-460V-60HZ	NOTE 1	2,300 lbs.	VENTAIRE DCC-3-12

NOTES:
1. FUME COLLECTOR IS TO OPERATE ON/OFF VIA WALL MOUNTED CONTROLLER.
2. FURNISH FUME COLLECTOR WITH THE FOLLOWING OPTIONS AND ACCESSORIES:
A. MERV 15 FILTER MEDIA
B. REVERSE PULSE FILTER CLEANING SYSTEM
C. CONTROL PANEL WITH VFD/DISCONNECT/PULSE CONTROL TIMER BOARD WITH BUILT-IN DIGITAL PRESSURE GAGE - NEMA 4X.
D. EASY ACCESS FILTER DOORS
E. FAN OUTLET SILENCER
F. DRUM LID WITH LATCH KIT & 55 GALLON COLLECTION DRUM
G. FAN INLET SPARK ARRESTOR - 24"Ø
H. SOLENOID HEATER KIT
3. PROVIDE OUTDOOR WEATHERPROOF FUSED DISCONNECT SWITCH.
*OR APPROVED EQUIVALENT.

FUME ARM SCHEDULE

TAG	QUANTITY	AIR FLOW	ARM REACH	PIVOT POINTS	ARM Ø	STATIC PRESSURE DROP (IN WG)	BASIS OF DESIGN*	
						STRAIGHT	BENT	
FA-1	14	750 CFM	10'-0"	3	6.0	1.5"	2.5"	VENTAIRE SIFA6100

NOTES:
1. RIGID TUBE CONSTRUCTION - POWDER COATED CARBON STEEL.
2. FLEXIBLE TUBE CONSTRUCTION - NEOPRENE
3. PROVIDE POWDER COATED ALUMINUM INLET HOOD WITH ALUMINUM DISK 1/4 TURN VOLUME DAMPER AT EACH FUME ARM.
4. PROVIDE PAINTED STEEL WALL BRACKET FOR EACH FUME ARM.
5. PROVIDE MANUALLY ADJUSTABLE PIVOT POINT EXTERNAL SUPPORTS AT EACH PIVOT POINT AND UPPER ARM BALANCING ROD.
6. REFER TO DETAIL ON DRAWING M-4.
*OR APPROVED EQUIVALENT.

UTILITY EXHAUST FAN SCHEDULE

TAG	SERVES	FAN CFM	S.P.	B.H.P.	R.P.M.	FULL LOAD AMPS (FLA)	LOCKED ROTOR AMPS (LRA)	ELECT. CHAR.	CONTROL	BASIS OF DESIGN*
UEF-1	STAINLESS STEEL WELDING BOOTHS	1,500	4.5"	2.0	3,600	2.7	23.9	3Ø-460V-60HZ	NOTE 1	VENTAIRE UVS122-2-3

NOTES:
1. FAN IS TO BE CONTROLLED VIA WALL MOUNTED RUN/START/STOP/RESET MOTOR STARTER - VENTAIRE MODEL EFC2-460-3-2. STARTER IS TO BE NEMA 4X RATED AND HAVE INTEGRAL PILOT LIGHT.
2. FURNISH UTILITY EXHAUST FAN WITH THE FOLLOWING OPTIONS AND ACCESSORIES:
A. VFD FOR BALANCING AIRFLOW
B. CCW/THD ROTATION/DISCHARGE - VERIFY IN FIELD
C. RIS VIBRATION ISOLATORS
D. WEATHER/DRIVE COVER
E. 3/4" NPT DRAIN
F. SINGLE THICKNESS BACKWARD INCLINE OR RADIAL BLADE FAN
G. OPPOSED BLADE DISCHARGE DAMPER
3. PROVIDE OUTDOOR WEATHERPROOF FUSED DISCONNECT SWITCH.
*OR APPROVED EQUIVALENT.

EXPANSIONS AND CONTRACTIONS

Taper angle degrees	1.25:1	1.5:1	1.75:1	2:1	2.5:1
3 1/2	0.92	0.88	0.84	0.81	0.75
5	0.88	0.84	0.80	0.76	0.68
10	0.85	0.76	0.70	0.63	0.53
15	0.83	0.70	0.62	0.55	0.43
20	0.81	0.67	0.57	0.48	0.43
25	0.80	0.65	0.53	0.44	0.28
30	0.79	0.63	0.51	0.41	0.23
Abrupt 90	0.77	0.62	0.50	0.40	0.25

Where: $SP_2 = SP_1 + R(VP_1 - VP_2)$
* When $SP_2 = 0$ (atmosphere) SP_1 will be (-)

The regain (R) will only be 70% of value shown above when expansion follows a disturbance or elbow (including a fan) by less than 5 duct diameters.

TITLE: EXPANSIONS AND CONTRACTIONS
FIGURE: 9-d
DATE: 1-12

DUCT DESIGN DATA ELBOW LOSSES

	R/D				
	0.75	1.00	1.50	2.00	2.50
Stamped	0.33	0.22	0.15	0.13	0.12
5-piece	0.46	0.33	0.24	0.19	0.17*
4-piece	0.50	0.37	0.27	0.24	0.23*
3-piece	0.54	0.42	0.34	0.33	0.33*

* extrapolated from published data

OTHER ELBOW LOSS COEFFICIENTS:
Mitered, no vanes: 1.2
Mitered, turning vanes: 0.6
Flatback (R/D=2.5): 0.05 (see Chapter 5, Figure 5-16)

NOTE: Loss factors are assumed to be for elbows of "zero length." Friction losses should be included to the intersection of centerlines.

ROUND ELBOW LOSS COEFFICIENTS

TITLE: DUCT DESIGN DATA ELBOW LOSSES
FIGURE: 9-c
DATE: 1-12

1. FAN MOTOR STARTER
2. TIMERBOARD ENCLOSURE

POWER SUPPLY DISCONNECT

AIR SUPPLY
CONDENSATE VALVE
EXHAUST VALVE
AIR FILTER
AIR REGULATOR

1" NPT Female Coupling
Plastic Tubing
Air Manifold (Header)
Diaphragm Valve
Solenoid Valves
1" NPT Female Coupling

Set your compressed air regulator to **90 PSI** for optimum pulse clean performance

COMPRESSED AIR FOR PULSING FILTER

NOT TO SCALE

Compressed Air

The supplied compressed air must be clean, dry, and oil-free. Set the compressed air pressure levels to 90-100 psi. Do NOT exceed 100 psi as damage may occur to the components.

Prior to installation, purge the compressed air lines of any dirt or buildup.

1. Install the compressed air pipe line to the air manifold to either the top or bottom 1" NPT cou-

pling. Use thread sealant tape or compound on all connections.
2. A drip tee or ball valve installed on the bottom of the manifold is recommended to allow for the draining of any water buildup.
3. It is also recommended to install a shut-off valve, pressure regulator, safety exhaust valve, and filter close to the collector.

AIR COMPRESSOR SCHEDULE

TAG	LOCATION	SERVICE	TYPE	PRESSURE PSIG (MAX)	CFM	RECEIVER SIZE				MOTOR			BASIS OF DESIGN		
						GALLONS	BASE LENGTH	BASE WIDTH	TANK HEIGHT	HP	RPM	VOLTS-PHASE-HERTZ	OPERATING WEIGHT (LBS)	MANUFACTURER	MODEL
AC-1	MECH. RM. 110B	WELDING FUME COLLECTOR	TWO-STAGE PISTON	175	14	80.0	28"	37"	69"	5.0	3,450	230V-60HZ-1Ø	505	INGERSOLL RAND	2340N

NOTES:
1. AIR COMPRESSOR IS TO BE SUPPLIED WITH "ALL-SEASON LUBRICANT START-UP KIT", #32305880. M.C. IS TO INSTALL KIT ACCORDING TO FACTORY INSTALLATION INSTRUCTIONS TO OBTAIN EXTENDED WARRANTY FROM FACTORY.
2. PROVIDE AND INSTALL PACE AIR SYSTEM PRESSURE CONTROLLER, INLINE FILTER AND AIR DRIER ON AIR COMPRESSOR FOR A FULLY FUNCTIONING COMPRESSED AIR PIPING SYSTEM.
* CONTACT MATT MATESEVAC, TOTAL EQUIPMENT CO. - 412.509.4485 FOR EQUIPMENT PRICING. OR APPROVED EQUIVALENT.

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 80989, EXPIRATION DATE: 05-12-2026

Christopher G. Albright
CHRISTOPHER G. ALBRIGHT DATE: 02-04-2025

SCHEDULES - HVAC

WELD FUME EXTRACTION WELDING ROOM FOR ALLEGANY COLLEGE, LAVALLE BUILDING 37 LANE AVENUE, LAVALLE, MARYLAND 21502

East Hills Engineering Associates
A LIMITED LIABILITY COMPANY

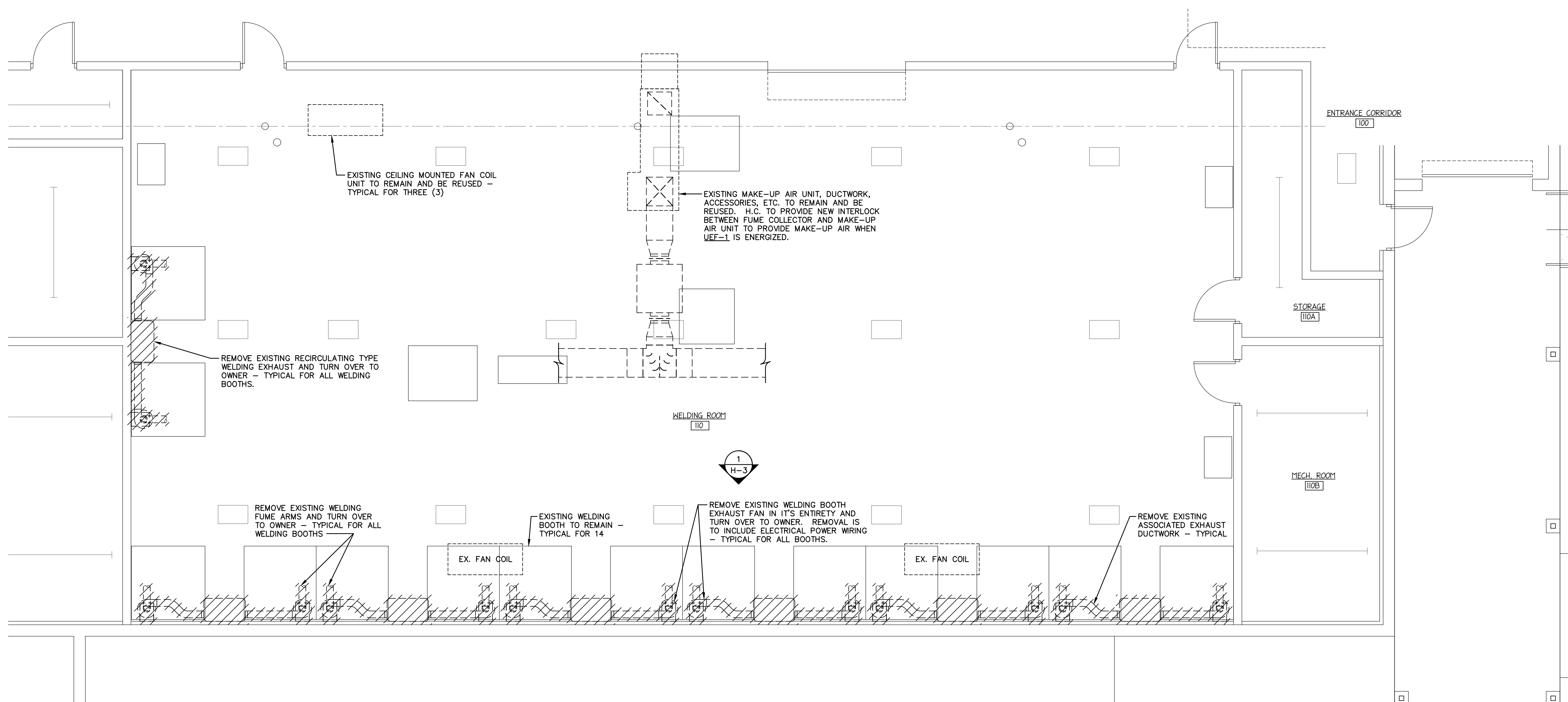
BRETT N. YONISH, P.E.
CHRISTOPHER G. ALBRIGHT, P.E.

541 MAIN STREET
WINDBER, PA 15963
(814) 467-6877

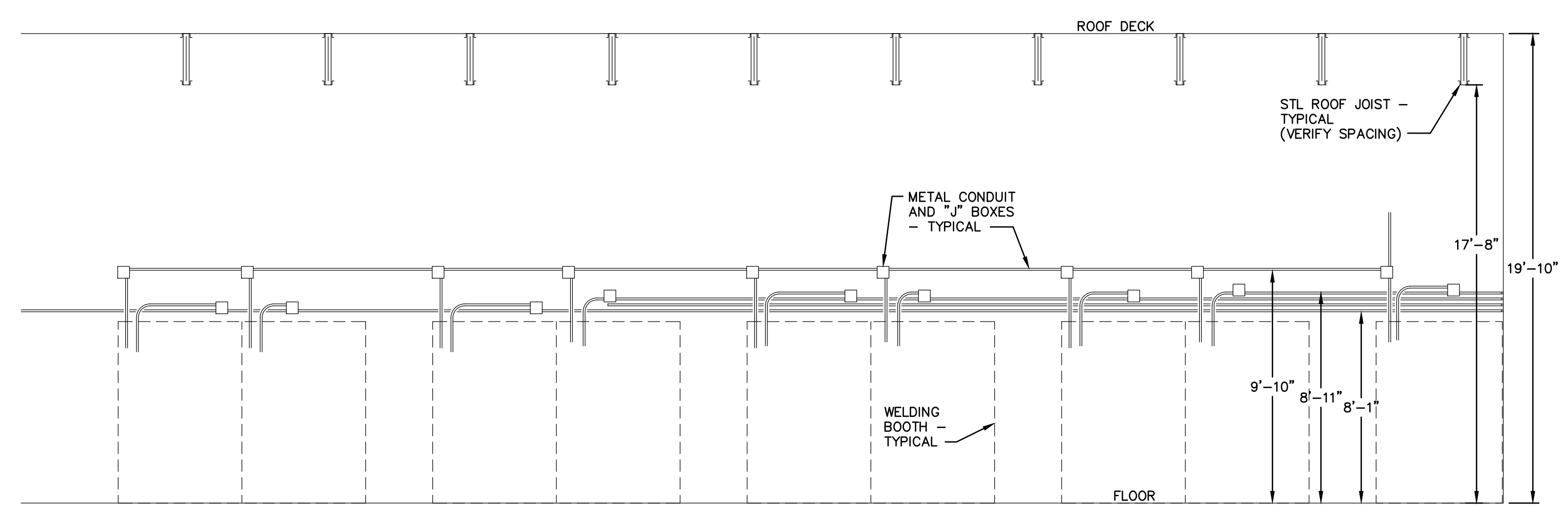
REVISIONS		
MARK	BY	DATE

DATE: 02/04/2025
DRAWN BY: C.G.A./S.M.M.
CHECKED BY: C.G.A.
PROJECT NO. EHEA 24141

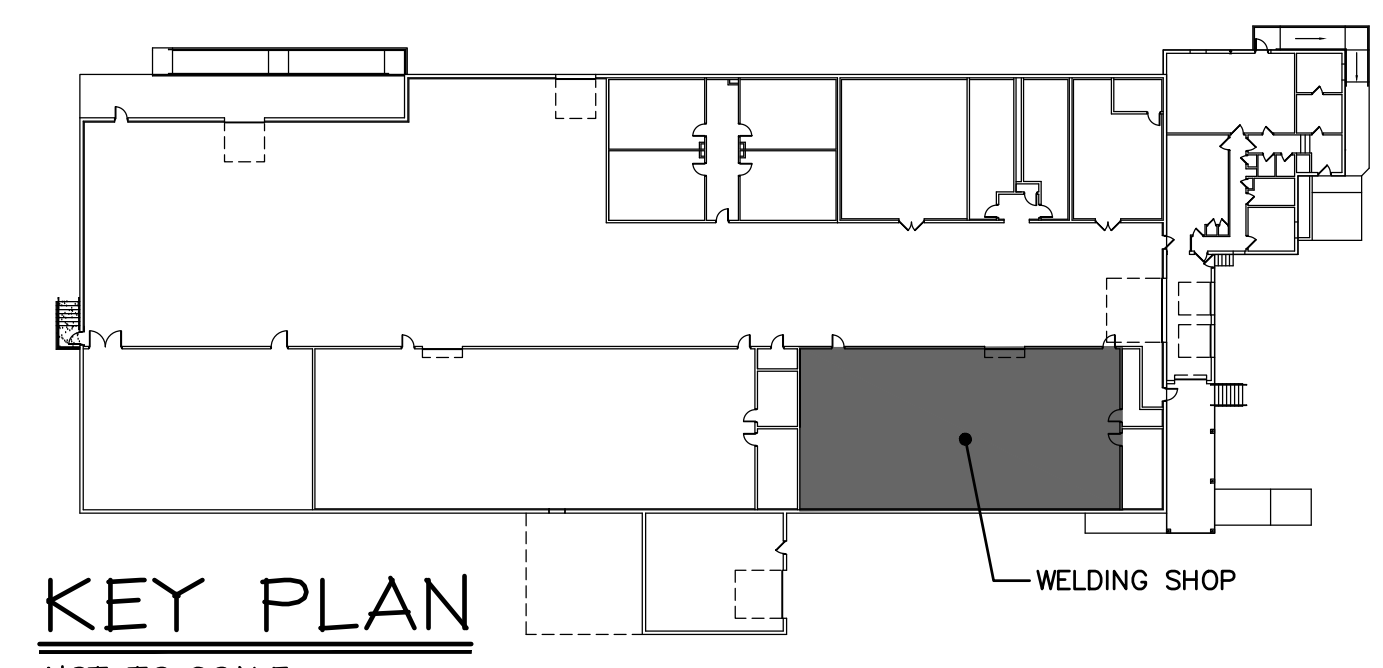
DRAWING NO. **M-2**



PARTIAL FLOOR PLAN - WELDING SHOP - HVAC DEMOLITION
SCALE: 1/4" = 1'-0"



ELEVATION
NOT TO SCALE



KEY PLAN
NOT TO SCALE

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 40289, EXPIRATION DATE: 05-12-2026
Christopher G. Albright
CHRISTOPHER G. ALBRIGHT DATE 02-04-2025

PARTIAL FLOOR PLAN - WELDING - HVAC DEMO

WELD FUME EXTRACTION
WELDING ROOM
FOR
ALLEGANY COLLEGE, LAVALLE BUILDING
37 LANE AVENUE, LAVALLE, MARYLAND 211502

East Hills Engineering Associates
A LIMITED LIABILITY COMPANY

BRETT N. YONISH, P.E.
CHRISTOPHER G. ALBRIGHT, P.E.
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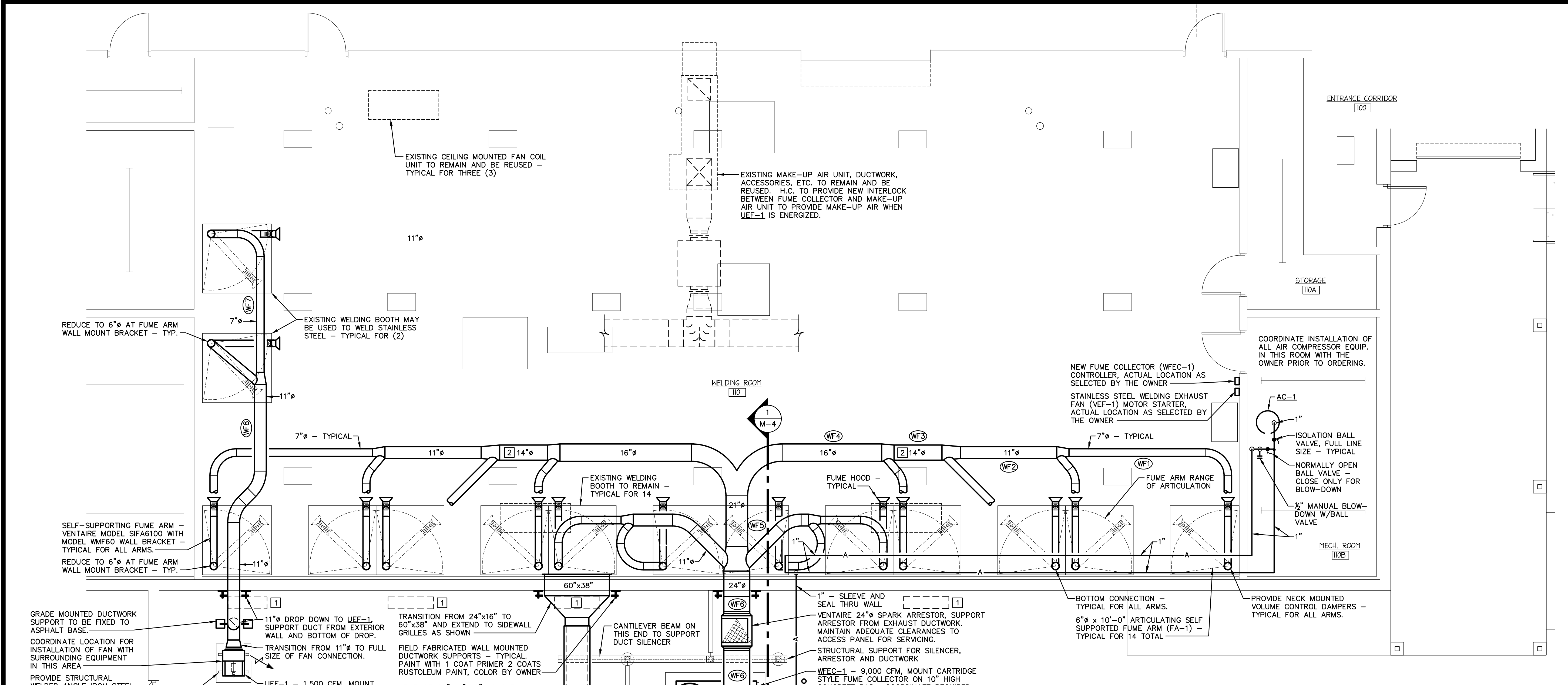
REVISIONS		
MARK	BY	DATE

DATE: 02/04/2025	DRAWING NO. M-3
DRAWN BY: K.E.K./S.M.M.	
CHECKED BY: C.G.A.	
PROJECT NO. EHEA 24141	



PARTIAL FLOOR PLAN - WELDING - HVAC

WELD FUME EXTRACTION
WELDING ROOM
FOR
ALLEGANY COLLEGE, LAVALLE BUILDING
37 LANE AVENUE, LAVALLE, MARYLAND 211502

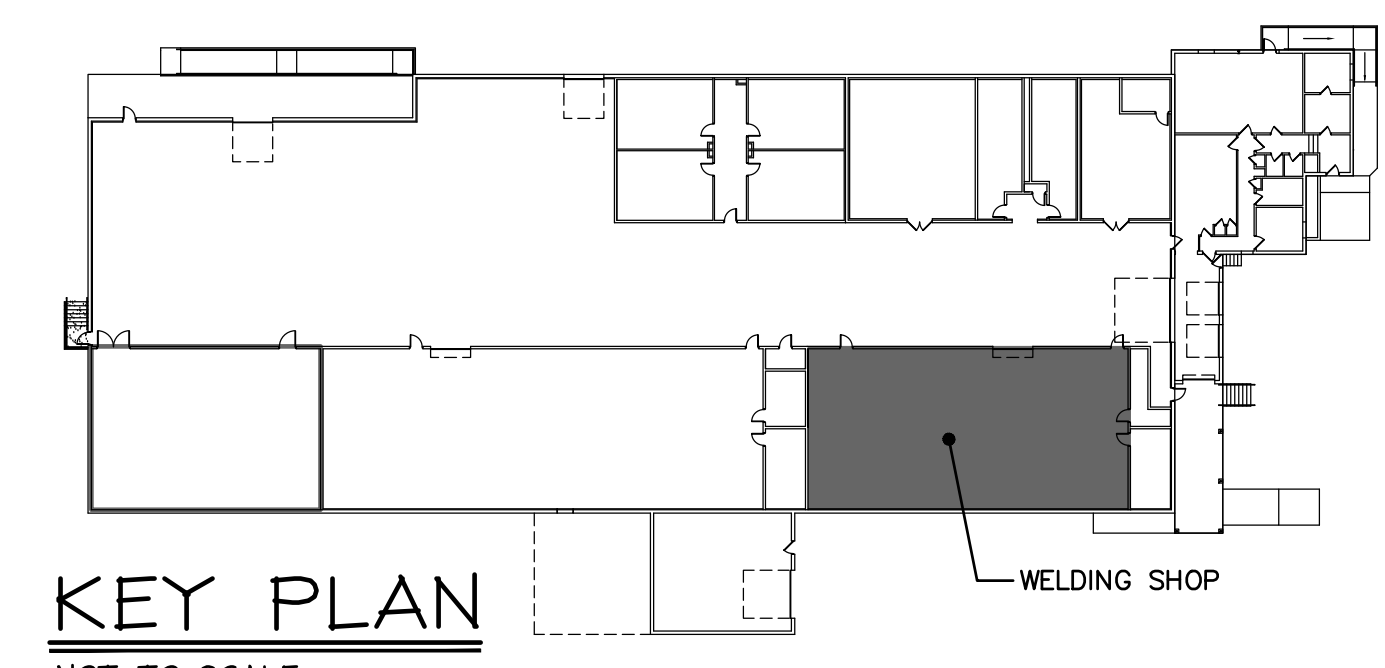


PARTIAL FLOOR PLAN - WELDING SHOP - HVAC
SCALE: 1/4" = 1'-0"

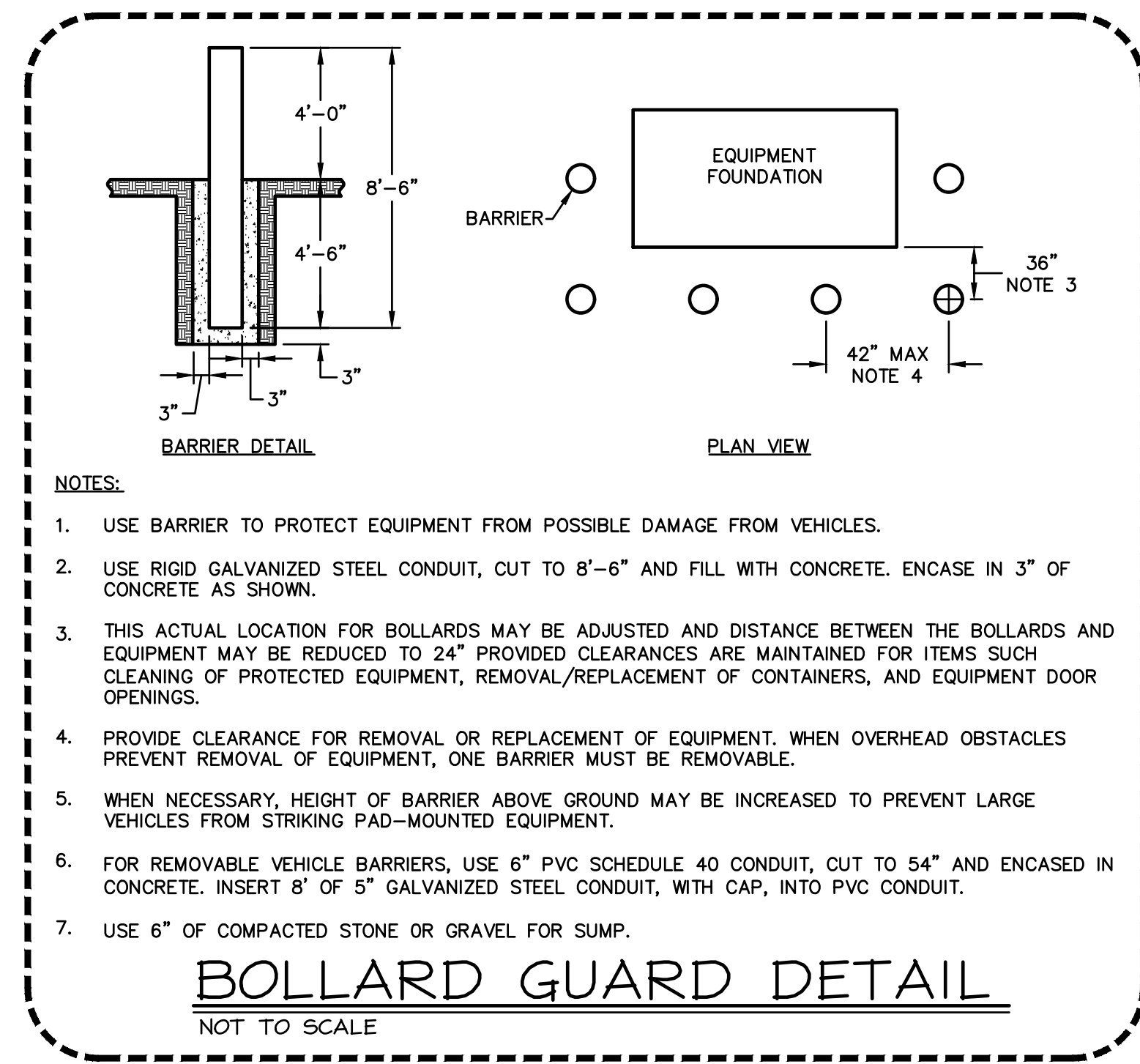
- IMPORTANT NOTES**
1. ALL ELBOWS ARE TO BE LONG RADIUS ELBOWS (R/D = 2.0) UNLESS OTHERWISE NOTED ON THE DRAWINGS.
 2. MAINTAIN 12" CLEARANCE BETWEEN ALL DUCTWORK AND COMBUSTIBLE MATERIALS.

SPECIFIC NOTES - HVAC (APPLY TO THIS DRAWING ONLY)

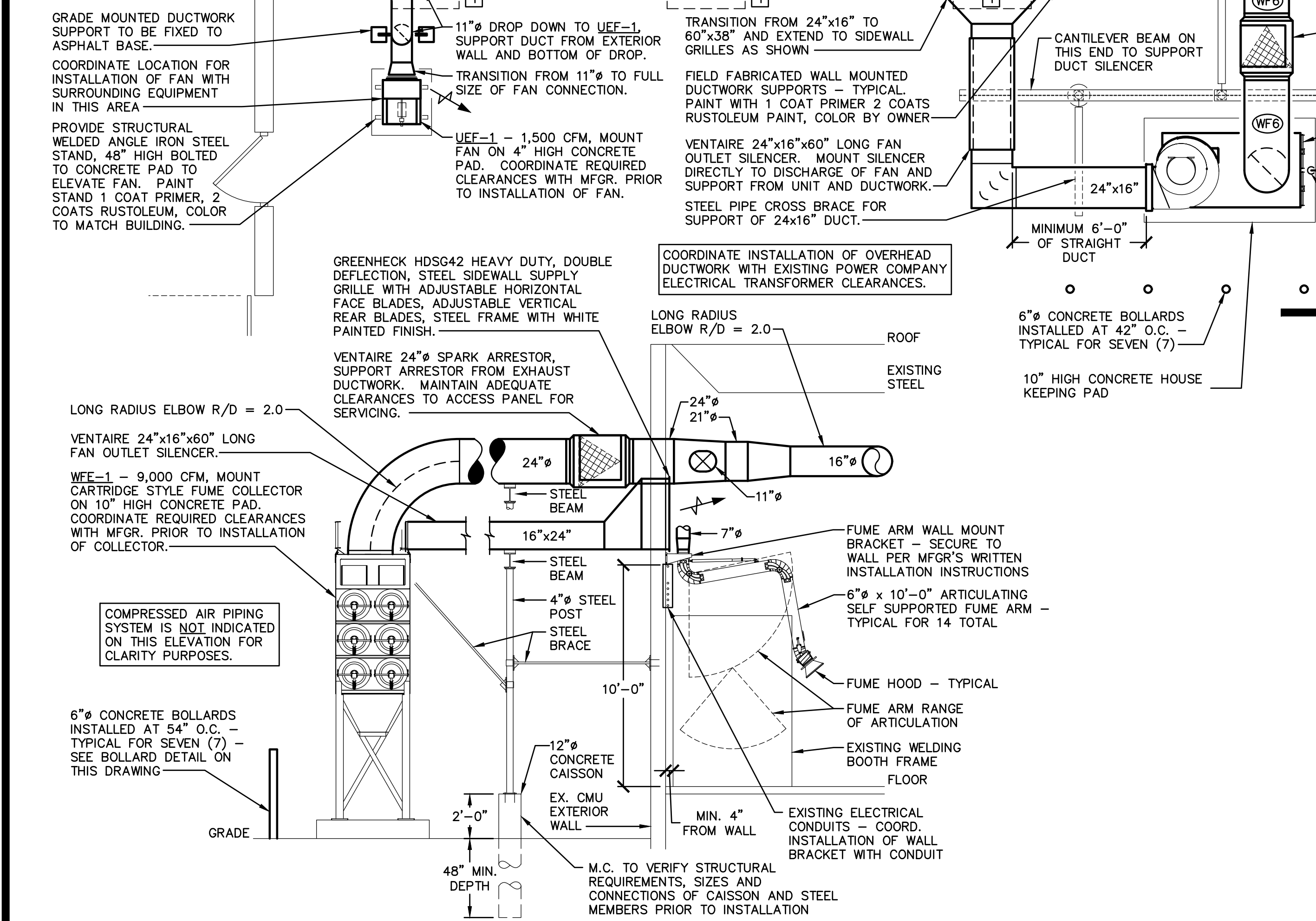
1. EXISTING WALL MOUNTED SPLIT SYSTEM OUTDOOR UNITS TO REMAIN. M.C. IS TO MODIFY EXISTING REFRIGERANT PIPING, POWER/CONTROL WIRING AS REQUIRED FOR INSTALLATION OF NEW WELDING FUME COLLECTOR SYSTEM. VERIFY EXTENT OF MODIFICATIONS IN FIELD PRIOR TO BIDDING.
2. INSTALL DUCT AS CLOSE TO EXTERIOR WALL AS POSSIBLE - SHOWN PULLED AWAY FROM WALL FOR CLARITY.



KEY PLAN
NOT TO SCALE



BOLLARD GUARD DETAIL
NOT TO SCALE



ELEVATION AT EQUIPMENT
SCALE: 1/4" = 1'-0"

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 80989, EXPIRATION DATE: 05-12-2026
Christopher G. Albright
CHRISTOPHER G. ALBRIGHT DATE: 02-04-2025

REVISIONS		
MARK	BY	DATE

DATE: 02/04/2025
DRAWN BY: C.G.A./S.M.M.
CHECKED BY: C.G.A.
PROJECT NO. EHEA 24141
DRAWING NO. M-4

SECTION 23 05 00 - BASIC MECHANICAL REQUIREMENTS - SPEC ON DRAWINGS

SCOPE

- 1.1 IT IS THE INTENT OF THIS SPECIFICATION AND ACCOMPANYING DRAWINGS TO DESCRIBE AND INDICATE THE MANUFACTURE, ERECTION AND INSTALLATION OF THE EQUIPMENT AND CONNECTION TO THE SAME SPECIFIED HEREIN AND SHOWN ON THE DRAWINGS. IT IS NOT INTENDED THAT THE SPECIFICATIONS AND DRAWINGS DESCRIBE AND INDICATE EACH PIECE OF EQUIPMENT REQUIRED FOR INSTALLATION, FOR WHERE ITEMS ARE INTENDED OR REQUIRED FOR A SATISFACTORY INSTALLATION AND ARE THE ACCEPTED PRACTICE OF THE TRADE, THEY SHALL BE CONSIDERED TO BE BOTH SPECIFIED AND INDICATED.
1.2 THIS SPECIFICATION AND THE CONTRACT DRAWINGS ARE INTENDED TO BE UTILIZED BY THE HVAC CONTRACTOR TO INSTALL CERTAIN HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT, BUT ARE NOT TO BE INTERPRETED TO CONTAIN CERTAIN BASIC SYSTEM INSTALLATION KNOWLEDGE ESSENTIAL FOR A COMPLETE AND QUALITY INSTALLATION. BY PROVIDING A BID TO THE PRIME GENERAL CONTRACTOR, THIS HVAC CONTRACTOR IS CERTIFYING THAT HE/SHE HAS EXPERIENCE IN INSTALLATIONS OF HVAC SYSTEMS OF COMPARABLE SIZE AND POSSESSES KNOWLEDGE AND EMPLOYS KNOWLEDGEABLE PERSONNEL TO ENSURE THE HVAC INSTALLATION IS COMPLETE IN ALL RESPECTS.
1.3 THE CONTRACTOR IS TO FURNISH LABOR, MATERIALS AND EQUIPMENT REQUIRED TO COMPLETELY INSTALL EACH SYSTEM INDICATED ON THE PLANS AND AS HERE WITHIN SPECIFIED.
1.4 THE CONTRACTOR SHALL SCHEDULE AND COORDINATE ALL WORK IN CLOSE COOPERATION WITH ALL TRADES WORKING ON THIS PROJECT.
1.5 WORK AND MATERIALS ARE TO BE INSTALLED SUBJECT TO THE APPROVAL OF THE ENGINEER AND THE OWNER.
1.6 THE CONTRACTOR IS TO CAREFULLY EXAMINE THE SITE, PLANS AND SPECIFICATIONS AND INCLUDE LABOR AND EQUIPMENT NECESSARY TO PERFORM, BUT NOT NECESSARILY LIMITED TO THE BELOW SPECIFIED WORK AND THE WORK INDICATED ON THE DRAWINGS.
1.7 NOTE: "FURNISH AND INSTALL" MEANS THE FURNISHING OF EQUIPMENT, MATERIALS AND LABOR REQUIRED FOR COMPLETE OPERATING SYSTEMS.

WORK NOT INCLUDED

- 2.1 ELECTRICAL CONSTRUCTION WHICH INCLUDES BUT IS NOT LIMITED TO THE DISCONNECTION OF THE EXISTING ELECTRICALLY POWERED EQUIPMENT, REMOVAL OF ALL CIRCUITS RENDERED DEAD INCLUDING THE POWER WIRING, CONDUITS, HANGERS, ETC., INSTALLATION OF NEW CIRCUITS TO POWER EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR. REFER TO THE ELECTRICAL DRAWINGS FOR MORE INFORMATION.

GENERAL

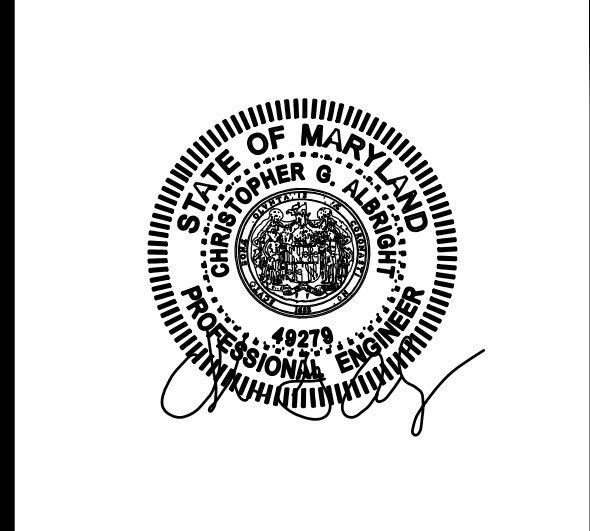
- 3.1 THE TERMS "M.C.", "H.C.", "THE CONTRACTOR", "THIS CONTRACTOR" OR "MECHANICAL/HVAC CONTRACTOR" MENTIONED IN THESE SPECIFICATIONS REFERS TO THE MECHANICAL PRIME CONTRACTOR RESPONSIBLE FOR THE WORK AND EQUIPMENT INCLUDED IN THESE DRAWINGS AND SPECIFICATIONS.
3.2 THE CONTRACTOR IS TO FURNISH EQUIPMENT, LABOR, MATERIALS, TOOLS, SERVICES AND FACILITIES NECESSARY FOR INSTALLATION OF THE PROJECT, IN GENERAL, AS NOTED UNDER "SCOPE" AND MORE FULLY SPECIFIED HEREIN. THE CONTRACTOR IS TO CAREFULLY EXAMINE THE SITE, EXISTING CONDITIONS, PLANS AND SPECIFICATIONS BEFORE SUBMITTING HIS PROPOSAL AS HE WILL BE HELD RESPONSIBLE FOR THE COMPLETE INSTALLATION IN EVERY DETAIL.
3.3 WHERE THE WORD "ARCHITECT" OR "ENGINEER" APPEARS IN THIS SPECIFICATION, IT MEANS ENGINEER, AND OWNER.
3.4 APPLICABLE REQUIREMENTS OF THE "GENERAL CONDITIONS" AND "GENERAL REQUIREMENTS" APPLY TO THIS ENTIRE SPECIFICATION AND ARE TO HAVE THE SAME FORCE AND EFFECT AS IF PRINTED HERewith IN FULL. THE GENERAL CONDITIONS ARE TO BE AS PROVIDED BY THE COLLEGE.
3.5 WORK AND MATERIALS ARE TO BE INSTALLED SUBJECT TO THE APPROVAL OF THE ENGINEER AND THE OWNER'S REPRESENTATIVE. WHERE THE WORD "ENGINEER" APPEARS IN THIS SPECIFICATION, IT MEANS ENGINEER, ARCHITECT, AND/OR THE OWNER'S REPRESENTATIVE.
3.6 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR WORK, MATERIAL, AND EQUIPMENT FURNISHED FOR THE CONTRACT, INCLUDING THOSE OF HIS SUB-CONTRACTORS, UNTIL COMPLETION OF THE PROJECT AND FINAL ACCEPTANCE. DAMAGED WORK OR MATERIALS ARE TO BE REPLACED. THE CONTRACTOR IS TO PROVIDE NECESSARY STORAGE SHEDS FOR THE PROTECTION OF THE MATERIAL AND EQUIPMENT FOR THE CONTRACT.
3.7 THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE HEALTH AND SAFETY OF ALL WORKERS, VISITORS, BYSTANDERS OR ANY PERSONS EXPOSED TO THIS JOBSITE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SAFETY TRAINING, CONSTRUCTION TECHNIQUES, PROPER USE OF EQUIPMENT, ETC. THAT MAY POSE A RISK. NOTHING SHOWN ON THE DRAWINGS OR SPECIFICATIONS IS TO BE CONSTRUED AS RELIEVING THE CONTRACTOR FROM THIS RESPONSIBILITY.
3.8 THE DRAWINGS ARE INDICATIVE OF THE CHARACTER AND SCOPE OF THE WORK AND ARE DIAGRAMMATIC AND NOT INTENDED TO SHOW ALL DETAILS. THE CONTRACTOR IS TO REPORT AMBIGUITIES OR DISCREPANCIES TO THE ENGINEER FOR WRITTEN CLARIFICATION BEFORE SUBMITTING A BID. IMPORTANT: THE DRAWINGS ARE DIAGRAMMATIC AND ARE FOR BIDDING PURPOSES ONLY. THE CONTRACTOR IS NOT TO FABRICATE PIPING OR DUCTWORK FROM THESE DRAWINGS. THE CONTRACTOR IS TO REVIEW THE GENERAL AND STRUCTURAL DRAWINGS TO DETERMINE THE SPACE AVAILABLE PRIOR TO FABRICATING PIPING AND DUCTWORK.
3.9 DUE TO THE SMALL SCALE OF THE DRAWINGS, ALL REQUIRED OFFSETS AND FITTINGS MAY NOT BE SHOWN BUT SHALL BE PROVIDED AT NO CHANGE IN THE CONTRACT PRICE.
3.10 AS MANY OF THE LINES AS COULD PRACTICALLY BE SHOWN ON THE DRAWINGS HAVE BEEN IDENTIFIED, BUT SOME HAVE BEEN OMITTED FOR CLARITY. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SUCH PIPING AND/OR DUCTWORK THAT MAY BE REQUIRED OR DIRECTED TO EFFECT PROPER CONNECTIONS TO ALL APPARATUS, EQUIPMENT, AND FIXTURES IN ACCORDANCE WITH THE MANUFACTURER'S DETAILED DRAWINGS AND INSTRUCTIONS.
3.11 CONSTRUCTION IS TO BE EXECUTED WITH THE MAXIMUM SPEED CONSISTENT WITH GOOD WORKMANSHIP.
3.12 BEFORE COMMENCING WORK, THE CONTRACTOR IS TO CAREFULLY EXAMINE THE EXISTING ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AS WELL AS ALL DRAWINGS PROVIDED WITH THIS SET. IF ANY DISCREPANCIES OCCUR BETWEEN THE DRAWINGS, OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, HE IS TO REPORT SUCH DISCREPANCIES TO THE ENGINEER IN WRITING AND OBTAIN WRITTEN INSTRUCTION AS TO THE MANNER IN WHICH TO PROCEED. NO DEPARTURES FROM THE CONTRACT DRAWINGS ARE TO BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER.
3.13 DURING THE COURSE OF CONSTRUCTION, CONFLICTS AND DISCREPANCIES WHICH THE CONTRACTOR FAILED TO NOTIFY THE ENGINEER OF ARE TO BE INTERPRETED BY THE

- ENGINEER SO AS TO OBTAIN A CONSISTENT AND WORKMANLIKE INSTALLATION. THE CONTRACTOR IS BOUND BY THE ENGINEER'S DECISION AND IS TO CARRY OUT THE WORK AT NO ADDITIONAL COST TO THE OWNER.
3.14 MATERIAL AND EQUIPMENT TO BE FURNISHED UNDER THE CONTRACT IS TO BE NEW AND CONFORM TO THE GRADE, QUALITY, STYLE, SIZE AND STANDARDS AS SPECIFIED HEREIN. EQUIPMENT IS TO BE THE LATEST STANDARD PRODUCT AS ADVERTISED IN PRINTED CATALOGS BY REPUTABLE MANUFACTURERS FOR THE PURPOSE INTENDED AND HAVE REPLACEMENT PARTS AVAILABLE.
3.15 THE CONTRACTOR IS TO ASSUME SOLE RESPONSIBILITY FOR STRUCTURAL, MECHANICAL, AND ELECTRICAL CHANGES REQUIRED TO ACCOMMODATE SUBSTITUTED MATERIAL OR EQUIPMENT.
3.16 EQUIPMENT, MATERIAL OR APPARATUS OF ANY ONE SYSTEM IS TO BE THE PRODUCT OF ONE MANUFACTURER, OR EQUIVALENT PRODUCTS OF A NUMBER OF MANUFACTURERS WHICH ARE SUITABLE FOR USE AS INDICATED IN THE VARIOUS SYSTEMS. SIMILAR EQUIPMENT, MATERIAL OR APPARATUS OF THE SAME OR SIMILAR TYPE ARE TO BE AS MANUFACTURED BY THE SAME MANUFACTURER.
3.17 EQUIPMENT IS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS FOR TYPE AND CAPACITY OF EACH PIECE OF EQUIPMENT. THE CONTRACTOR IS TO OBTAIN THESE INSTRUCTIONS FROM THE MANUFACTURER AND INCLUDE SAME WITH THE SUBMISSION OF THE EQUIPMENT. THE TYPE, CAPACITY, AND APPLICATION OF EQUIPMENT ARE TO BE SUITABLE AND CAPABLE OF SATISFACTORY OPERATION FOR THE PURPOSE INTENDED.
3.18 THE CONTRACTOR IS TO GIVE REQUISITES, NOTICES, OBTAIN AND PAY FOR PERMITS, AND PAY DEPOSITS AND FEES NECESSARY FOR THE INSTALLATION AND TESTS AND INSPECTION OF WORK PROVIDED UNDER THIS SPECIFICATION. THESE TESTS ARE TO BE CONDUCTED AS REQUIRED BY THE REGULATIONS OF THE LOCAL AND/OR STATE AUTHORITIES.
PROJECT MANAGEMENT
4.1 MANAGEMENT OF THE PROJECT IS TO BE PROVIDED. IT IS ESSENTIAL THAT SUCH MANAGEMENT IS PROVIDED, FOR WITHOUT IT, POOR QUALITY, WASTE, SHORTCUTS AND DELAYS WILL RESULT. IT IS IMPORTANT THE WORK OF THIS PROJECT BE COMPLETED DURING THE PERIOD SPECIFIED.
PROJECT RECORD DOCUMENTS
5.1 DURING THE PROGRESS OF THE WORK, THE MECHANICAL CONTRACTOR, ASSIGNED AND MAJOR SUB-CONTRACTORS EMPLOYED BY THEM, ARE TO MAINTAIN A CURRENT (DAILY) RECORD SET OF CONTRACT DRAWINGS (PRINTS) AND SPECIFICATIONS, INDICATING THEREON WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS, INCLUDING WORK COVERED BY SUPPLEMENTAL CONTRACTS, ADDENDA, CHANGE ORDERS OR OTHER BONA FIDE SOURCES.
5.2 AT THE COMPLETION OF THE CONSTRUCTION WORK AND PRIOR TO ACCEPTANCE OF THE PROJECT, THE CONTRACTOR IS TO FURNISH THE OWNER A COMPLETE SET OF "AS-BUILT" RED-LINED PRINTS INDICATED THEREON CHANGES AND REVISIONS FROM THE ORIGINAL CONTRACT DOCUMENTS AND SUCH ADDITIONAL DETAILS AS TO PROVIDE A COMPLETE REFERENCE DOCUMENT FOR USE BY OWNER. IF VARIATIONS AND DETAILS CANNOT BE SHOWN CLEARLY THEREON, THEN THE CONTRACTOR IS TO PREPARE SUPPLEMENTAL DRAWINGS ADEQUATE TO IMPART THE INFORMATION.
5.3 INDICATIONS ON "RECORD" DRAWINGS ARE TO BE EXECUTED IN A LEGIBLE MANNER BY THE CONTRACTOR.
COMPLIANCE WITH CODES LAWS AND REGULATIONS
6.1 WORK IS TO CONFORM TO APPLICABLE CODES INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
A. THE INTERNATIONAL MECHANICAL CODE/2021 (OR MOST RECENT EDITION ADOPTED BY THE AUTHORITY HAVING JURISDICTION).
B. INTERNATIONAL ENERGY CONSERVATION CODE/2021 (OR EDITION MOST RECENTLY ADOPTED BY THE AUTHORITY HAVING JURISDICTION).
C. THE NATIONAL ELECTRIC CODE (EDITION MOST RECENTLY ADOPTED BY THE AUTHORITY HAVING JURISDICTION) OF THE NATIONAL FIRE PROTECTION ASSOCIATION.
D. THE NATIONAL FIRE CODES (EDITION MOST RECENTLY ADOPTED BY THE AUTHORITY HAVING JURISDICTION) OF THE NATIONAL FIRE PROTECTION ASSOCIATION.
E. APPLICABLE SECTIONS OF THE NATIONAL FIRE PROTECTION AGENCY (NFPA) 2012 VERSION, INCLUDING NFPA-96 & 101.
F. ALL OTHER APPLICABLE LOCAL, STATE AND NATIONAL CODES.
6.2 IF AN ABOVE-NAMED CODE HAS BEEN REPLACED BY AN UPDATED VERSION AND HAS BEEN ADOPTED BY THE AUTHORITY HAVING JURISDICTION, THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR COMPLYING WITH THE SAME.
6.3 MATERIALS AND EQUIPMENT UNDER THE CONTRACT ARE TO BE NEW AND BEAR THE UNDERWRITER'S LABORATORIES LABEL WHEREVER A STANDARD HAS BEEN ESTABLISHED BY THAT AGENCY.
CUTTING AND PATCHING
7.1 EXTERIOR WALL OPENINGS FOR PENETRATION OF DUCTWORK, ARE TO BE FRAMED AND REINFORCED BY THE HVAC CONTRACTOR.
7.2 NO CUTTING IS TO BE DONE WHICH MAY IN ANY WAY AFFECT THE BUILDING STRUCTURALLY.
7.3 PATCHING (IF REQUIRED) IS TO MATCH ADJACENT SURFACES, AND IS TO BE FINISHED WITH THE SAME MATERIAL, PAINT, ETC., AS ADJACENT SURFACES.
COORDINATION
8.1 THE CONTRACTOR IS TO COORDINATE WITH OTHER CONTRACTORS AND ARRANGE THE WORK TO ELIMINATE CONFLICTS WITH THE CONDUIT, PIPING AND EQUIPMENT OF OTHER CONTRACTS.
8.2 THE CONTRACTOR IS TO REVIEW EXISTING CONDITIONS AND THE INTENT OF THE WORK INDICATED ON THESE DRAWINGS AND ARRANGE SUCH WORK TO AVOID EXISTING INTERFERENCES INCLUDING INTERFERENCES WITH EXISTING PIPING, STRUCTURE, DUCTWORK, ETC.
8.3 ALTHOUGH THE DRAWINGS ARE TO BE INDICATIVE OF GENERAL ROUTINGS, THE ACTUAL LOCATION OF PIPES, DUCTWORK AND EQUIPMENT ARE TO BE DETERMINED AT THE SITE. THE CONTRACTOR IS TO CONFER WITH THE VARIOUS OTHER CONTRACTORS ON THE PROJECT AS TO THE LOCATIONS OF DIFFERENT LINES OF PIPES, DUCTS, AND EQUIPMENT INSTALLED UNDER OTHER CONTRACTS BEFORE FABRICATION OF DUCTWORK OR ERECTING ANY WORK IN ORDER TO AVOID INTERFERENCE. THE CONTRACTOR IS TO INSURE PROPER SECURING AND ANCHORING OF WORK.

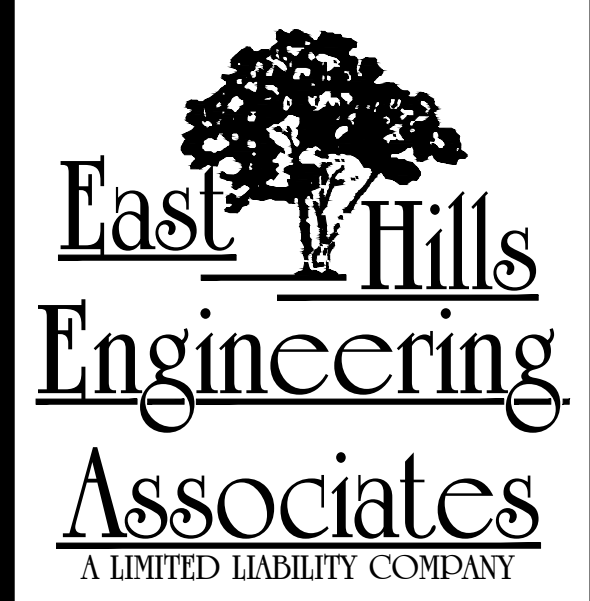
- 8.4 CHANGES NECESSARY DUE TO LACK OF COORDINATION OR BECAUSE OF POOR WORKMANSHIP ARE TO BE MADE AT NO ADDITIONAL COST TO THE OWNER, I.E., SHOULD ANY CONTRACTOR PROCEED WITH THE INSTALLATION OF EQUIPMENT, PIPE, ETC., PRIOR TO COORDINATING WITH THE OTHER CONTRACTORS AND THAT EQUIPMENT, PIPE, ETC., PREVENTS PROPER INSTALLATION OF WORK OF OTHER TRADES, THE OFFENDING CONTRACTOR IS TO REMOVE AND REPLACE HIS WORK AT HIS OWN COST.
8.5 WHERE THE MECHANICAL CONTRACTOR IS INSTALLING NEW ELECTRICALLY OPERATED EQUIPMENT HE IS TO FURNISH TO THE ELECTRICAL SUB-CONTRACTOR PERTINENT INFORMATION REGARDING ELECTRICAL REQUIREMENTS OF THE MOTOR OPERATED AND ELECTRICAL CONTROL EQUIPMENT TO BE FURNISHED UNDER THE MECHANICAL CONTRACT. INFORMATION IS TO INCLUDE ELECTRICAL CHARACTERISTICS, EXACT ROUGH-IN DIMENSIONS, INFORMATION ON REMOTE CONTROL EQUIPMENT, SPECIAL INSTRUCTIONS OF THE MANUFACTURER AND WIRING DIAGRAMS IF REQUIRED.
8.6 CONNECTIONS TO MECHANICAL EQUIPMENT IS TO BE MADE IN A NEAT AND WORKMANLIKE MANNER, PLACING THE EQUIPMENT IN PROPER OPERATING CONDITION, WITH SUITABLE PROVISIONS FOR MAINTENANCE OR REPLACEMENT, WHEN AVAILABLE, THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS ARE TO BE FOLLOWED IN MAKING FINAL DECISIONS.
SITE SPECIFIC REQUIREMENTS
9.1 WORK IN THE EXISTING EDUCATIONAL FACILITY WILL REQUIRE SPECIAL CLEARANCES THAT ARE INDICATED WITHIN THE GENERAL CONDITIONS OF THE CONTRACT. THE CONTRACTOR AND ALL SUB-CONTRACTORS AND THEIR EMPLOYEES WORKING ON SITE AT THIS PROJECT ARE REQUIRED TO ADHERE TO THE GENERAL CONDITIONS AND THE REQUIREMENTS THEREIN.
9.2 WORK IN THE EXISTING EDUCATIONAL FACILITY WILL REQUIRE THAT THE CONTRACTOR COORDINATE ALL WORK WITH THE STAFF AND FACILITY DIRECTORS OF THE COLLEGE TO IMPLEMENT THE WORK AS SHOWN WITHOUT CAUSING A DISRUPTION TO THE ADJACENT SPACES AND THE OCCUPIED BUILDING AND OPERATIONS.
WORK IN THE EXISTING BUILDING
10.1 UNLESS OTHERWISE NOTED, ALL MATERIALS AND EQUIPMENT REMOVED BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OFF-SITE.
10.2 A COMPLETE SET OF AS-BUILT DRAWINGS OUTLINING THE EXISTING HVAC SYSTEMS WERE NOT AVAILABLE FOR USE DURING DESIGN. EXISTING CONDITIONS ARE SHOWN USING INACCURATE ORIGINAL DRAWINGS AND LIMITED SITE SURVEY. THE CONTRACTOR IS TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS, CONSTRAINTS, LIMITATIONS AND AVAILABLE SPACE AND INCLUDE ALL REQUIRED TRANSITIONS, OFFSETS AND RELOCATIONS OF EXISTING EQUIPMENT, PIPING OR DUCTWORK AS IS NECESSARY FOR A COMPLETE INSTALLATION AS SHOWN ON THE DRAWINGS.
10.3 CONTRACTOR IS TO TAKE ALL NECESSARY PRE-CAUTIONS AND PROVIDE ALL NECESSARY ITEMS TO PROTECT THE BUILDING AND EQUIPMENT IN CLOSE PROXIMITY TO THE AREA BEING DISTURBED TO PROTECT IF FROM DAMAGE. ANY DAMAGE CAUSED DURING THE COURSE OF CONSTRUCTION BECOMES THE CONTRACTORS RESPONSIBILITY TO REPAIR OR REPLACE.
SUBMISSIONS
11.1 GENERAL: PROVIDE SUBMITTALS IN ACCORDANCE WITH THE GENERAL CONDITIONS OF THE CONTRACT AND THIS SECTION.
11.2 APPROVAL: IS TO BE OBTAINED FOR ALL EQUIPMENT AND MATERIAL BEFORE DELIVERY TO THE JOB SITE. DELIVERY, STORAGE OR INSTALLATION OF EQUIPMENT OR MATERIAL WHICH HAS NOT HAD PRIOR APPROVAL WILL NOT BE PERMITTED AT THE JOB SITE.
11.3 ALL MATERIALS, APPLIANCES, MACHINES AND FIXTURES ARE TO SATISFY COMPLETELY ALL THE SPECIFICATION REQUIREMENTS IN EACH CASE AND ARE TO BE OF THE BEST AVAILABLE QUALITY AND GRADE. EQUIPMENT OF EQUAL QUALITY WITH A SATISFACTORY RECORD OF PERFORMANCE WILL BE CONSIDERED FOR REVIEW.
11.4 MARK SUBMITTALS WITH APPLICABLE PROJECT NAME, SPECIFICATION SECTION # (AND PARAGRAPH IF APPLICABLE) AND DRAWING REFERENCE/TAG. SUBMISSIONS ARE TO BE COORDINATED WITH THE CONTRACT DRAWINGS AND BE MARKED AND CLEARLY LABELED USING TAG DESCRIPTIONS AS INDICATED THERE ON. WHERE MULTIPLE MODELS ARE INDICATED ON THE SUBMISSION, THE SUBMISSION IS TO BE MARKED UP BY THE CONTRACTOR TO INDICATE WHICH MODEL IS BEING PROPOSED. UNMARKED, UNLABELED SUBMISSIONS WILL BE REJECTED.
11.5 THE SUBMITTALS ARE TO BE COMPLETE WITH NECESSARY CONSTRUCTION AND FUNCTIONAL DETAILS REQUISITE FOR A THOROUGH EVALUATION. SUCH ITEMS AS ARE REJECTED ARE TO BE PROMPTLY RESUBMITTED IN CONFORMITY WITH THE SPECIFICATION REQUIREMENTS. CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS DURING THIS REVIEW WILL NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS TO BE RESPONSIBLE FOR: CONFIRMING AND CORRELATING QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF OTHER TRADES AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.
11.6 SUBMITTALS FOR INDIVIDUAL SYSTEMS AND EQUIPMENT ASSEMBLIES, WHICH CONSIST OF MORE THAN ONE ITEM OR COMPONENTS ARE TO BE MADE FOR THE SYSTEM OR ASSEMBLY AS A WHOLE. PARTIAL SUBMITTALS WILL NOT BE CONSIDERED FOR APPROVAL.
11.7 ELECTRONIC SUBMISSIONS WILL BE ACCEPTED IF THE SUBMISSION CONTAIN LESS THAN 10 PRINTED PAGES. IF THE SUBMISSION IS LARGER THAN 10 PAGES, ONE HARD COPY IS TO BE SENT DIRECTLY TO THE ENGINEER IN ADDITION TO THE STANDARD ELECTRONIC DELIVERY.
11.8 DELIVER ELECTRONIC SUBMISSIONS TO THE COLLEGE CONTRACT REPRESENTATIVE WHO WILL FORWARD THEM TO REBECCA BERKEY AT REBECCAB@EASTHILLS.ENG.COM AND ALL HARD COPY SUBMISSIONS TO EAST HILLS ENGINEERING ASSOCIATES LLC, 541 MAIN STREET, WINDBER, PA 15963.
11.9 SHOP DRAWINGS INFORMATION AND DATA ARE TO BE SUBMITTED FOR THE FOLLOWING ITEMS PRIOR TO INSTALLATION:
A. AIR BALANCE REPORT
B. AIR COMPRESSOR
C. COPIES OF WARRANTY CARDS
D. DUCT CONSTRUCTION METHODS AND MATERIALS
E. DUCT SUPPORTS AND SHOP DRAWINGS OF STEEL FRAMES FO
F. DUCTWORK AND FITTINGS
G. EQUIPMENT START-UP FORMS
H. FILTERS
I. GRILLES, REGISTERS AND DIFFUSERS

- J. LETTER OF CERTIFICATION THAT INSTRUCTIONS HAVE BEEN GIVEN
K. LOUVERS
L. OPERATION AND MAINTENANCE MANUALS
M. RECORD DRAWINGS
N. SHOP DRAWINGS OF THE DUCT SYSTEM
O. SOUND ATTENUATORS
P. UTILITY EXHAUST FANS
Q. VFD
R. WELD FUME ARMS
S. WELD FUME EXHAUST COLLECTOR
11.10 IN THE EVENT OF A DISPUTE AS TO WHETHER OR NOT A PARTICULAR ITEM OF EQUIPMENT OR MATERIAL MEETS THE SPECIFICATION REQUIREMENTS, THE DECISION OF THE ENGINEER IS FINAL. REFER TO SUBSTITUTIONS AS HEREINAFTER SPECIFIED.
11.11 THE HVAC CONTRACTOR IS TO FURNISH SHOP DRAWINGS FOR ELECTRICALLY OPERATED EQUIPMENT THAT HAS BEEN CLEARED WITH THE ENGINEER TO THE ELECTRICAL CONTRACTOR INDICATING ELECTRICAL CHARACTERISTICS AND INCLUDING NECESSARY WIRING DIAGRAMS.
11.12 CLOSEOUT SUBMITTALS:
A. OPERATION AND MAINTENANCE DATA: PROVIDE OPERATION AND MAINTENANCE DATA IN ACCORDANCE WITH THE GENERAL CONDITIONS OF THE CONTRACT, SECTION 01-78-00 - CLOSE OUT SUBMITTALS AND PER PART 3 OF THIS SECTION - OPERATIONS AND MAINTENANCE MANUALS.
B. WARRANTIES AND BONDS: PROVIDE WARRANTIES AND BONDS IN ACCORDANCE WITH THE GENERAL CONDITIONS OF THE CONTRACT, PER PART 3 OF THIS SECTION - WARRANTIES AND BONDS.
C. AS-BUILT DRAWINGS: PROVIDE RECORD DOCUMENTATION (AS-BUILT DRAWINGS) IN ACCORDANCE WITH THE GENERAL CONDITIONS OF THE CONTRACT.
1. AT THE COMPLETION OF THE CONSTRUCTION WORK AND AS A CONDITION OF ITS ACCEPTANCE, FURNISH TO THE ARCHITECT THESE MARKED-UP DOCUMENTS TO BE USED BY THE OWNER AS A RECORD OF EXACT LOCATIONS OF INSTALLED SYSTEMS. THE MARKED-UP DRAWINGS MAY BE UTILIZED BY THE ARCHITECT TO PREPARE "AS-CONSTRUCTED" AUTOCAD DRAWINGS.
SUBSTITUTIONS
12.1 THE VARIOUS MATERIALS AND PRODUCTS SPECIFIED IN THE SPECIFICATIONS BY NAME OR DESCRIPTION ARE GIVEN TO ESTABLISH A STANDARD OF QUALITY AND OF COST FOR BID PURPOSES. IT IS NOT THE INTENT TO LIMIT THE ACCEPTANCE TO ANY ONE MATERIAL OR PRODUCT SPECIFIED BUT RATHER TO NAME OR DESCRIBE A MATERIAL OR PRODUCT AS THE ABSOLUTE MINIMUM STANDARD THAT IS DESIRED AND ACCEPTABLE. A MATERIAL OR PRODUCT OF THE LESSER QUALITY WOULD NOT BE ACCEPTABLE.
12.2 IMPORTANT: WHERE A PRODUCT IS NAMED BY MANUFACTURER AND MODEL NUMBER AND OTHER MANUFACTURER'S NAMES ARE LISTED (IN PARENTHESES), THOSE NAMES IN PARENTHESES ARE CONSIDERED TO BE SUBSTITUTE MANUFACTURERS WHOSE EQUIPMENT MAY BE ACCEPTABLE, PROVIDED THAT THEY MEET THE INTENT OF THE SPECIFICATION, AND MEET OR EXCEED REQUIRED CAPACITIES.
12.3 EQUIPMENT IS TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DATA AND RECOMMENDATIONS.
12.4 WHERE EQUIPMENT IS NOT SPECIFIED, IT IS INTENDED THAT ONLY FIRST GRADE MATERIAL BE USED. ONLY NEW EQUIPMENT IN GOOD CONDITION WILL BE ACCEPTED. EQUIPMENT IS SUBJECT TO INSPECTION AND APPROVAL OF THE ENGINEER. ITEMS INSTALLED PRIOR TO APPROVAL BY THE ENGINEER ARE AT THE CONTRACTOR'S RISK. THE ENGINEER MAY REQUIRE NON-APPROVED ITEMS TO BE REMOVED AND REPLACED WITH SPECIFIED ITEMS.
12.5 EXTREMELY IMPORTANT: RESUBMISSION OF ITEMS REJECTED OR MARKED "REVISE AND RESUBMIT" WILL BE REVIEWED ONE TIME BY THE ENGINEER AT NO COST TO THE CONTRACTOR. SHOULD THE RESUBMITTAL BE REJECTED OR MARKED "REVISE AND RESUBMIT", THE CONTRACTOR WILL BE INVOICED FOR ANY ADDITIONAL TIME SPENT BY THE ENGINEER AT HIS CURRENT BILLING RATE.
12.6 THE CONTRACTOR IS TO ASSUME SOLE RESPONSIBILITY FOR STRUCTURAL, MECHANICAL, AND ELECTRICAL CHANGES REQUIRED TO ACCOMMODATE SUBSTITUTED MATERIAL OR EQUIPMENT.
12.7 SHOULD IT BE SHOWN BY PRINTED DATA THAT ANY SUBSTITUTED PIECE OF EQUIPMENT USES MORE ENERGY (NATURAL GAS, ELECTRICITY, ETC.) THEN THE PIECE OF EQUIPMENT UPON WHICH DESIGN WAS BASED, THE SUBSTITUTED PIECE OF EQUIPMENT WILL BE REJECTED.
RECEIPT OF EQUIPMENT
13.1 NEW EQUIPMENT BEING USED ON THIS PROJECT, WHETHER DELIVERED TO JOBSITE OR TO THE CONTRACTOR'S PLACE OF BUSINESS IS TO BE EXAMINED (TO DETERMINE IF THE EQUIPMENT WAS DAMAGED) PRIOR TO SIGNATURE OF RECEIPT BY THE CONTRACTOR'S REPRESENTATIVE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FILE DAMAGE CLAIMS WITH THE MOVER (TRUCK, RAILROAD, ETC.) AT TIME OF RECEIPT OF DAMAGED EQUIPMENT.
STORAGE OF MATERIAL
14.1 THE CONTRACTOR IS TO ERECT AND MAINTAIN PROPER FACILITIES FOR PROTECTING MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT DURING EACH PHASE OF CONSTRUCTION UNTIL ACCEPTANCE BY THE ENGINEER. ANY DAMAGED MATERIALS OR EQUIPMENT IS TO BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE TO THE SATISFACTION OF THE ENGINEER AND THE OWNER'S REPRESENTATIVE.
14.2 PROTECTION IS TO INCLUDE SHEDS OR OTHER BUILDINGS AS REQUIRED FOR PROTECTION OF MATERIALS AND EQUIPMENT. IN THE EVENT THE AVAILABLE AREAS ON THE SITE ARE INADEQUATE, THE CONTRACTOR IS TO, AT HIS OWN EXPENSE, PROVIDE SUITABLE STORAGE UNDER ROOF AT OTHER LOCATIONS.
PROTECTION OF EQUIPMENT
15.1 IT IS TO BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT EQUIPMENT, PIPING, INSULATION, CONTROLS AND SIMILAR ITEMS OF EQUIPMENT FROM DIRT, GRIME, PLASTER AND WATER DURING EACH PHASE OF CONSTRUCTION. THIS PROTECTION IS TO BE PROVIDED BY COVERING WITH TRANSPARENT PLASTIC SHEETING, CAPS OR AS REQUIRED TO THE SATISFACTION OF THE ENGINEER.
ELECTRICAL REQUIREMENTS FOR EQUIPMENT INSTALLATION
16.1 UNLESS SPECIFIED AS BEING FURNISHED BY THE MANUFACTURER, THE MECHANICAL ACCESSORY WITH THE EQUIPMENT, THE MECHANICAL CONTRACTOR IS TO VERIFY ALL EXISTING CONDITIONS AND ALL DIMENSIONS BEFORE BEGINNING ANY WORK. EACH CONTRACTOR IS TO FULLY COORDINATE THEIR WORK WITH THAT OF OTHERS. REFER TO THE CONTRACT AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 0279. EXPIRATION DATE: 05-12-2028
Christopher G. Albright
DATE 02-04-2025



HVAC SPECIFICATION
WELD FUME EXTRACTION
WELDING ROOM
FOR
ALLEGANY COLLEGE, LAVALLE BUILDING
37 LANE AVENUE, LAVALLE, MARYLAND 211502



BRETT N. YONISH, P.E.
CHRISTOPHER G. ALBRIGHT, P.E.

541 MAIN STREET
WINDBER, PA 15963
(814) 467-6877

Table with 3 columns: MARK, BY, DATE. Header row: REVISIONS. Below are several empty rows for recording revisions.

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 0279. EXPIRATION DATE: 10-13-2026
Brett Nicholas Yonish
DATE 02-04-2025

DATE: 02/04/2025
DRAWN BY: C.G.A.
CHECKED BY: C.G.A.
PROJECT NO. EHEA 24141
DRAWING NO. M-5

DISCONNECT SWITCHES FOR EACH ELECTRICALLY OPERATED PIECE OF EQUIPMENT SPECIFIED UNDER THIS CONTRACT. DISCONNECT SWITCHES ARE TO BE FUSED OR NON-FUSED AS NOTED ON THE PLANS OR AS REQUIRED BY THE NATIONAL ELECTRIC CODE.

16.2 WHERE DISCONNECT SWITCHES ARE NOT FACTORY INSTALLED, THEY ARE TO BE UNIT MOUNTED OR WALL MOUNTED BY THE MECHANICAL CONTRACTOR. LOCATIONS FOR DISCONNECT SWITCHES AND OTHER CONTROL DEVICES MAY NOT BE INDICATED ON THE PLANS. COORDINATE LOCATIONS WITH THE OWNER AND ELECTRICAL SUB-CONTRACTOR.

16.3 THE MECHANICAL CONTRACTOR IS TO WALL (OR UNIT) MOUNT DISCONNECT SWITCHES, START-STOP SWITCHES, ETC., IN THE CLOSE VICINITY OF THE EQUIPMENT BEING CONTROLLED. THE ELECTRICAL CONTRACTOR IS TO POWER WIRE TO (AND THROUGH WHERE REQUIRED) THESE DEVICES AND IS TO FINAL CONNECT POWER WIRING TO ELECTRICALLY OPERATED EQUIPMENT BEING INSTALLED BY THE MECHANICAL CONTRACTOR. THE MECHANICAL CONTRACTOR IS TO FURNISH SHOP DRAWINGS OF APPROVED ELECTRICALLY OPERATED EQUIPMENT TO THE ELECTRICAL SUB-CONTRACTOR FOR HIS USE. ANY CHANGES REQUIRED TO ACCOMMODATE APPROVED SUBSTITUTE EQUIPMENT SUCH AS LARGER WIRE, CONDUIT, BREAKERS, ETC., ARE TO BE THE FINANCIAL RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

16.4 TEMPERATURE CONTROL COMPONENT SUCH AS THERMOSTATS, SENSORS, INTERLOCKING RELAYS, AND OTHER TEMPERATURE REGULATING CONTROLS AS WELL AS CONTROL WIRING, INCIDENTAL POWER WIRING, CONDUIT, ETC., AS REQUIRED BY THIS SPECIFICATION, ARE TO BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR (OR HIS/HER ATC SUB-CONTRACTOR).

16.5 ELECTRICAL EQUIPMENT, COMPONENTS AND WIRING FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR ARE TO CONFORM TO THE FOLLOWING ELECTRICAL REQUIREMENTS, CODES AND REGULATIONS:

A. UNDERWRITER'S LABELS: WHERE APPLICABLE, MATERIALS AND EQUIPMENT ARE TO BEAR THE LABEL AS LISTED BY THE NATIONAL BOARD OF FIRE UNDERWRITER'S LABORATORY.

B. REGULATIONS: ELECTRICAL INSTALLATION IS TO MEET THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE OF NATIONAL BOARD OF FIRE UNDERWRITERS AMENDED TO DATE. IN ADDITION, ANY STATE, MUNICIPAL OR OTHER AUTHORITY'S LAWS, REGULATIONS OR RULES APPLICABLE TO THE WORK ARE TO BE FOLLOWED.

C. ANY CONTACTOR OR STARTER TO WHICH LINE VOLTAGE EXCEEDS 120 VOLTS AND WHICH IS PROVIDED FOR EQUIPMENT WHICH WILL BE CONTROLLED BY AUTOMATIC TEMPERATURE CONTROL SYSTEM IS TO BE PROVIDED WITH 120 VOLT CONTROL TRANSFORMER WIRED TO LINE SIDE OF CONTACTOR OR STARTER.

DIRT NOISE AND CLEAN UP

17.1 CONSTRUCT BARRIERS AROUND THE AREA OF CONSTRUCTION TO THE SATISFACTION OF THE OWNER TO PREVENT CONSTRUCTION DIRT AND DEBRIS FROM CONTAMINATING ADJACENT FINISHED, OCCUPIED, UNAFFECTED AREAS.

17.2 BARRIERS ARE TO CONSIST OF PLASTIC SHEETING OR OTHER BARRIER MATERIAL WITH ZIP OPEN ENTRYWAYS AND PLASTIC ADHESIVE CARPET PROTECTION AROUND EACH ENTRY/EXIT SO DIRT AND DEBRIS IS NOT TRACKED FROM THE CONSTRUCTION ZONE INTO THE UNAFFECTED AREAS. LIMIT ENTRY AND EXIT TO OPENINGS AS DIRECTED BY THE OWNER.

17.3 THE CONTRACTOR IS TO DO CUTTING AND PATCHING IN A MANNER TO CAUSE THE LEAST DUST, DIRT AND NOISE.

17.4 THE CONTRACTOR IS TO KEEP THE BUILDING FREE OF RUBBISH AND MATERIAL DURING THE COURSE OF CONSTRUCTION INsofar AS HIS WORK IS CONCERNED.

17.5 THE EXTERIOR AND INTERIOR PREMISES OF THE BUILDING ARE TO BE KEPT AS CLEAN AS POSSIBLE DURING THE ENTIRE CONSTRUCTION. WEEKLY CLEAN-UP WILL BE MANDATORY.

17.6 WHEN, IN THE OPINION OF THE ENGINEER, ANY ACCUMULATION OF MATERIAL IS OBSTRUCTING CONSTRUCTION PROGRESS, THE CONTRACTOR IS TO IMMEDIATELY REMOVE SUCH MATERIAL.

17.7 UPON COMPLETION OF THE PROJECT, THE CONTRACTOR IS TO REMOVE RUBBISH, SURPLUS EQUIPMENT, ETC., AND HAVE EACH AREA CLEANED SPOTLESS TO A STANDARD AS APPROVED BY THE OWNER AND ENGINEER.

17.8 THE CONTRACTOR IS TO THOROUGHLY CLEAN EQUIPMENT, LEAVING SAME IN FIRST-CLASS WORKING CONDITION, CLEAN PERMANENT FILTERS AND INSTALL CLEAN, THROW-AWAY FILTERS INTO EACH PIECE OF EQUIPMENT.

INSPECTION

18.1 THE FOLLOWING OPERATIONS ARE TO BE PERFORMED IN PREPARATION FOR FINAL INSPECTION. THIS CONTRACTOR IS TO DEMONSTRATE TO THE OWNER AND THE ENGINEER THAT ALL NEW EQUIPMENT IS OPERATING IN COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS.

18.2 MACHINERY: MACHINERY IS TO BE INITIALLY SERVICED. MACHINERY IS TO BE TEST OPERATED AND NECESSARY ADJUSTMENTS MADE TO MAKE IT PERFORM IN COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS.

18.3 CONTROLS: ALL CONTROLS WILL BE TESTED AND ADJUSTED BY THE HVAC SUB-CONTRACTOR (OR HIS/HER AUTOMATIC TEMPERATURE CONTROL SUB-CONTRACTOR) TO ACHIEVE THE INTENT OF THESE SPECIFICATIONS. CONTROLS ARE TO BE ADJUSTED WHILE THE SYSTEM IS OPERATING UNDER FULL LOAD CONDITIONS.

GUARANTEE AND WARRANTIES

19.1 THE CONTRACTOR IS TO GUARANTEE FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE THAT MATERIAL AND WORKMANSHIP FURNISHED UNDER THE CONTRACT ARE FREE FROM DEFECTS. THE CONTRACTOR IS TO REPLACE ANY EQUIPMENT OR MATERIAL FOUND DEFECTIVE WITHIN THE GUARANTEE PERIOD AT NO COST TO THE OWNER.

19.2 THE CONTRACTOR IS TO ALSO, DURING THE ONE YEAR GUARANTEE PERIOD, BE RESPONSIBLE FOR THE PROPER ADJUSTMENTS OF SYSTEMS, EQUIPMENT AND APPARATUS INSTALLED BY HIM AND DO WORK NECESSARY TO INSURE EFFICIENT AND PROPER FUNCTIONING OF THE SYSTEM AND EQUIPMENT.

19.3 PROVIDE COPIES OF COMPLETED WARRANTY CARDS THAT ARE TO BE SENT BACK TO EQUIPMENT MANUFACTURERS FOR ALL EQUIPMENT WITH EXTENDED WARRANTIES.

INSTRUCTIONS AND MAINTENANCE MANUALS

20.1 THE CONTRACTOR IS TO FURNISH THE SERVICES OF COMPETENT PERSONNEL TO INSTRUCT EMPLOYEES DESIGNATED BY THE OWNER IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT AND SYSTEMS INSTALLED UNDER THE CONTRACT. THE CONTRACTOR IS TO ALLOT A MINIMUM OF FOUR (4) HOURS BY THEIR PROJECT FOREMAN TO COMMISSION AND GIVE OWNER INSTRUCTIONS ON THIS PROJECT.

20.2 A LETTER OF CERTIFICATION ITEMIZING THE EQUIPMENT, SYSTEM, INSTRUCTOR AND BEARING SIGNATURES OF THE EMPLOYEES INSTRUCTED IS TO BE DELIVERED TO THE OWNER UPON COMPLETION OF THE PROJECT. THE LETTER OF CERTIFICATION IS TO NOTE THE

NUMBER OF HOURS SPENT IN EXPLANATION AND ACTUAL OPERATION OF SYSTEM WITH MAINTENANCE PERSONNEL. (TEMPLATE COPY OF AN ACCEPTABLE LETTER FORMAT IS AVAILABLE UPON REQUEST).

20.3 THE CONTRACTOR IS TO FURNISH THE OWNER WITH TWO (2) COPIES OF A BOUND "MAINTENANCE MANUAL" CONTAINING COMPLETE OPERATING INSTRUCTIONS, MANUFACTURER'S CATALOG NUMBERS AND COMPLETE DESCRIPTION AND PARTS LIST OF EACH PIECE OF EQUIPMENT FURNISHED UNDER THE CONTRACT.

SECTION 23 31 00 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ducts.
- B. Ducts for laboratory and industrial-grade applications.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2021.
- D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2021.
- E. NFPA 91 - Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids; 2020.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2021.
- G. SMACNA (ROUND) - Round Industrial Duct Construction Standards; 2013.
- H. UL 2518 - Standard for Safety Air Dispersion Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and layout/configuration with dimensions.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Duct Shape and Material in accordance with Allowed Static Pressure Range:
 - 1. Round exhaust: Minus 15 in-wc (3735 Pa) of galvanized steel.
 - 2. Rectangular: Plus 1 in-wc (250 Pa) of galvanized steel.
- B. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Return/Recirculated Air: 1 in-wc (250 Pa) pressure class, galvanized steel.
 - b. Weld Fume Exhaust Air: -15 in-wc (-3735 Pa) pressure class, galvanized steel.
- C. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
 - 4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 - 5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 - 6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
 - 7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

- A. Material Requirements:
 - 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
 - 2. Aluminum: ASTM B209/B209M, aluminum sheet, alloy 3003-H14.
- 2.3 WELD FUME EXHAUST DUCTS FOR INDUSTRIAL-GRADE APPLICATIONS

A. Duct Class:

- 1. Class 3: Average dry dust in moderate concentrations with high abrasion at a minimum conveying velocity of 3,500 to 4,000 fpm (18 to 20 m/s).

B. Sectional Shape and Material Requirements:

- 1. Round Metal Duct:
 - a. Pressure Class: Minus 15 in-wc (3.75 kPa).
 - b. Maximum Air Service Temperature:
 - 1) 400 degrees F (205 degrees C): Galvanized steel.
 - c. Minimum Duct Thickness: Duct Class 3; 16 gauge, 0.064 inch (1.6 mm).
 - d. Compliance: Provide ductwork, fittings, supports, hangers, and appurtenances:
 - 1) Round: SMACNA (ROUND) construction standard.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).

- B. Install products following the manufacturer's instructions.
- C. Comply with safety standards NFPA 90A and NFPA 90B.
- D. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E. Duct sizes indicated are precise inside dimensions.
- F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

END OF SECTION

PART 1 GENERAL CODE RELATED NOTES AND REFERENCES

1.1 INTERNATIONAL MECHANICAL CODE - 2021

A. Chapter 1 - Scope and Administration

- 1. Maintain proper operating condition in accordance with this design, manufacturer's requirements and the provisions of the edition of the code under which they were installed. The Contractor is responsible to install, start up and test the systems for proper operation and make necessary adjustments within the specified warranty period. The Owner or Owners' authorized agent is responsible for proper maintenance of the system there-after. Inspection for maintenance of HVAC systems is to be performed in accordance with ASHRAE/ACCA/ANSI Standard 180 (2021 - 102.3 Maintenance) and NFPA 91.

- 2. By reference, the codes and standards listed within Chapter 15 of the International Mechanical Code are to be considered part of the requirements of this installation to the prescribed extent of each such reference. (2021 - 102.8 Referenced Codes and Standards)

- 3. The duties and powers of the Code Official includes but may not be limited to the following: Enforcing the provisions of the code, render interpretations of the code and adopt policies and procedures to clarify the application of the provisions therein, receive applications, review construction documents and issue permits for the installation and alteration of mechanical systems, inspect the premises for which such permits have been issued, and enforce compliance within the provisions of the Code. (2021 - 104.2 & 104.3 Applications, Permits, and Inspections)

- 4. The Code Official may request access to the building for inspection with or without notice. The Contractor is to provide such access as is reasonably possible. (2021 - 104.4 Right of Entry)

- 5. Perform all tests required to substantiate compliance with the provisions of the Code as part of this Contract. Tests are to be performed as specified within the Code or by other recognized test standards performed by approved testing agencies. Provide reports for the retention of the Code Official. (2021 - 105.3 Required Testing)

- 6. The Contractor is to make application for the permit and pay the required fee as part of this contract. It is the Contractors responsibility to contact the local Authority Having Jurisdiction to obtain copies of the required permit application and fee structure so these fees are included within the bid. (2021 - 106.3 Application for Permit)

- 7. One (1) set of approved construction documents is to be kept on site at all times during the course of construction. (2021 - 106.4.6 Retention of Construction Documents)

- 8. A copy of the construction permit is to be kept on the site of the work until the completion of the project. (2021 - 106.4.8 Posting of a Permit)

B. Chapter 3 - General Regulations

- 1. Each length of pipe and tubing and each fitting utilized in the mechanical HVAC systems is to bear the identification of the manufacturer. (2021 - 301.3 Identification)
- 2. Where floors, walls, ceiling or any other portion of the building or structure are required to be altered or

replaced in the process of installation or repairing any system, the building or structure is to be left in a safe structural condition in accordance with the International Building Code. Cutting any portion of the building may not in anyway reduce the structural integrity of the buildings structural systems. (2021 - 302.1 Structural Safety)

- 3. Appliances are not to be installed in locations where they would be subject to mechanical damage unless protected by approved barriers. (2021 - 303.4 Protection from Damage)

- 4. Maintain required clearance to combustible construction as specified in the listing and manufacturers written instructions for all installed heat producing equipment and appliances. Reduction of clearance is only permitted by methods approved by section 308 of the IMC. (2021 - 304.9 Clearances to Combustible Construction)

- 5. Install equipment and appliances on flat and level concrete slab surfaces a minimum of 3" above grade or suspend above exposed earth no less than 6" above grade. Support in accordance with the manufacturer's written instructions. (2021 - 304.10 Clearances from Grade)

- 6. Provide access for inspection, service, repair and replacement of appliances, control devices, heat exchangers and other HVAC system components without removing permanent construction of non-related systems. Provide a level 30"x30" (minimum) working space in front of the control side of all appliances. (2021 - 306.1 Access)

C. Chapter 6 - Duct Systems

- 1. Plenum enclosure construction material exposed to the airflow of a building's HVAC system are to comply with the requirements of section 703.5 of the International Building Code. Materials are to be listed and labeled to have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E84 or UL 723. (2021 - 602.2 Plenums)

- 2. Construct ductwork to allow an even distribution of air over the entire filter. (2021 - 605.3 Airflow Over the Filter)

- 3. Space around duct penetrating a nonfire-resistance-rated floor assembly shall comply with code from the International Building Code (2021 - 607.1.2.1 Ducts that Penetrate Nonfire-Resistance-Rated Assemblies)

1.2 NFPA 91

- A. Comply with all applicable sections of this Standard
- B. Exhaust ducts are not to pass through fire rated construction.

- C. Construct duct systems per:
 - 1. Accepted industry practice for industrial duct construction
 - 2. round and rectangular industrial duct construction standards

- D. Support ducts from systems designed to support the weight of the duct and any duct installed components.

- E. Laps in duct construction are to be in the direction of airflow.

- F. Provide access to duct systems where required to ensure the proper operation of the industrial ventilation system.

- G. Building components are not to be used as parts of the industrial ventilation duct system.



HVAC SPECIFICATION

**WELD FUME EXTRACTION
WELDING ROOM**
FOR
ALLEGANY COLLEGE, LAVALLE BUILDING
37 LANE AVENUE, LAVALLE, MARYLAND 21502



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REVISIONS

MARK	BY	DATE

DATE: 02/04/2025

DRAWN BY: C.G.A.

CHECKED BY: C.G.A.

PROJECT NO.: EHEA 24141

DRAWING NO.

M-6

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 49273, EXPIRATION DATE: 05-12-2026
Brett N. Yonish
BRETT N. YONISH, P.E. DATE 02-04-2025