HVAC GENERAL NOTES

1. THESE GENERAL NOTES APPLY TO ALL MECHANICAL DRAWINGS. IN THE EVENT THAT ANY GENERAL NOTES CONFLICTS WITH THE WRITTEN CONSTRUCTION SPECIFICATIONS, THE MOST STRINGENT OF THE TWO SHALL RULE.
2. CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO INSTALL A COMPLETE AND OPERABLE MECHANICAL SYSTEM AS INDICATED ON THE DRAWINGS, SPECIFICATIONS AND IN ACCORDANCE WITH CODES.
3. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. THE CONTRACTOR SHALL PROVIDE ALL HANGERS AND SUPPORTS (IN COMPLIANCE WITH SEISMIC CATEGORY "C" REQUIRED FOR A COMPLETE INSTALLATION.
4. THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. DO NOT SCALE DRAWINGS.
5. COORDINATE ALL MECHANICAL WORK WITH OTHER TRADES TO INSURE PROPER CLEARANCE AND SPATIAL RELATIONSHIPS TO OTHER EQUIPMENT AND STRUCTURAL COMPONENTS.
6. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPE TRANSITIONS REQUIRED FOR FINAL CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY ALL DUCT AND PIPE DIMENSIONS PRIOR TO FABRICATION.
7. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MECHANICAL EQUIPMENT.
8. ALL CONTROL WIRING AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE. ALL CONTROL WIRING IN RETURE PLENUMS SHALL BE PLENUM RATED. CONTROL WIRING LOCATED IN MECHANICAL ROOMS SHALL BE ROUTED IN RIGID CONDUIT.
9. CONTRACTOR IS RESPONSIBLE FOR THE RESTART OF ANY SYSTEMS DE-ENERGIZED TO ACCOMMODATE THIS WORK.
10. INSTALL SMOKE DETECTORS (PROVIDED BY ELECTRICAL) AT EACH A/C UNIT HANDLING OVER 2000 CFM, MOUNTED IN SA DUCT (NFPA 90A, 4-4.2), AND IN RA DUCT PRIOR TO EXHAUST OR MIXING (SMC 406.1). ALSO INSTALL SMOKE DETECTORS AT EACH A/C UNIT SERVING BUILDING EGRESS (REGARDLESS OF SIZE), MOUNTED IN SA DUCT. DETECTOR(S) TO STOP UNIT FAN IF SMOKE IS DETECTED. INTERLOCK WITH FIRE ALARM SYSTEM IF APPLICABLE.
11. PROVIDE AND INSTALL ACCESS PANELS/DOORS IN WALLS, CEILINGS AND DUCTWORK AS REQUIRED TO ACCESS/SERVICE VALVES, DUCT DETECTORS, CONTROL COMPONENTS, FIRE DAMPERS AND OTHER CONCEALED MECHANICAL DEVICES.
12. ALL DUCT DIMENSIONS ARE INSIDE CLEAR UNLESS OTHERWISE NOTED. ALL DUCT DIMENSIONS SHALL BE MODIFIED AS REQUIRED TO ACCOUNT FOR DUCT INSULATION.
13. LOCATE ALL MECHANICAL EQUIPMENT TO FACILITATE UNOBSTRUCTED AIR/WATER FLOW AND ACCESS TO UNIT SERVICE PANELS, CONTROLS AND VALVES AS REQUIRED BY THE MANUFACTURER AND APPLICABLE CODES.
14. ALL AIR/HYDRONIC LEAK TESTING AND INSPECTIONS SHALL BE COMPLETED PRIOR TO THE APPLICATION OF INSULATION MATERIALS. FAILURE TO COMPLY WITH THIS REQUIREMENT MAY RESULT IN THE REMOVAL AND REAPPLICATION OF THE INSULATION AT THE CONTRACTORS EXPENSE.
15. LOCATE ALL TEMERATURE, PRESSURE, FLOW MEASURING DEVICES AND COMPONENTS IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTIONS OF PIPE/DUCTWORK UP AND DOWN STREAM OF DEVICE AS OUTLINED BY THE EQUIPMENT MANUFACTURER.
16. TESTING, ADJUSTING AND BALANCING CONTRACTOR SHALL BE A CURRENT AND RECOGNIZED MEMBER OF THE AABC OR NEBB AS OUTLINED IN THE CONSTRUCTION SPECIFICATIONS.
17. ALL DUCTWORK, PIPING OR EQUIPMENT SUPPORTED FROM THE STRUCTURE SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. CONTRACTOR RESPONSIBLE FOR THE REPAIR/REPLACEMENT OR ANY FIREPROOFING REMOVED TO ACCOMMADATE HANGER ATTACHMENT.
18. ALL NEW/MODIFIED SUPPLY DUCTWORK SHALL BE EXTERNAL INSULATED IN ACCORDANCE WITH THE CONSTRUCTION SPECIFICATION.
19. CONFIRM LOCATIONS OF FIRE RATED CEILINGS, WALLS, AND FLOORS. FIRE SEAL ALL PENETRATIONS WITH FIRE STOP SEALANT. DUCTWORK THAT PENETRATES FIRE PARTITIONS SHALL BE EQUIPPED WITH FIRE DAMPERS.
20. OFFSET DUCTWORK AS REQUIRED TO ACCOMMODATE THE ARCHITECTURAL REFLECTIVE CEILING PLAN.
21. NO SUPPLY DIFFUSER SHALL BE LOCATED WITHIN 36" OF ANY SMOKE DETECTOR OR AUTOMATIC SPRINKLER HEAD/DEVICE.
22. ALL 45 DEGREE OR GREATER ELBOWS (INCLUDING THOSE AT DIFFUSER CONNECTIONS) SHALL BE CONSTRUCTED OF RIGID DUCTWORK.
23. ALL WORK SHALL BE PREFORMED IN ACCORDANCE WITH SITE CONSTRUCTION AND SAFETY REQUIREMENTS. NO WORK SHALL BE PERFORMED WITHOUT VALID JOB SCHEDULE AND FIRE ALARM PERMITS (WHERE REQUIRED). ALL WORKERS MUST REGISTER WITH THE LOCAL MAINTENANCE CONTRACTOR PRIOR TO PERFORMING ANY WORK.
24. ALL WASTE OR DISCARDED MATERIALS SHALL BE RECYCLED IN ACCORDANCE WITH SITE CONSTRUCTION POLICIES. REPORT ALL RECYCLED MATERIAL QUANTITIES TO PROJECT ENGINEER. WRITTEN REPORT SHALL INCLUDE MATERIAL TYPE, QUANTITIES, AND DISPOSITION OF THE MATERIALS.
25. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING A COMPLETE SET OF AS-BUILT DRAWINGS DETAILING ALL FIELD MODIFICATIONS TO THE DESIGN DRAWINGS. DRAWINGS SHALL INCLUDE LOCATION AND ELEVATION REFERENCED FROM FINISHED FLOORS.
26. EACH BRANCH DUCT SERVING A DIFFUSER SHALL HAVE A MANUAL BALANCING DAMPER INSTALLED AT MAIN DUCT TAKE-OFF REGARDLESS OF DRAWING OMISSION.

DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES

RECTANGULAR DUCTS

MAXIMUM SIZE (INCHES)	STEEL (MINIMUM THICKNESS, NOMINAL)	ALUMINUM (MINIMUM THICKNESS, NOMINAL)
THROUGH 12	0.022 INCH (26 GAGE, GALV.)	0.020 INCH (NO. 24 B&S GAGE)
13 THROUGH 30	0.028 INCH (24 GAGE, GALV.)	0.025 INCH (NO. 22 B&S GAGE)
31 THROUGH 54	0.034 INCH (22 GAGE, GALV.)	0.032 INCH (NO. 20 B&S GAGE)
55 THROUGH 84	0.040 INCH (20 GAGE, GALV.)	0.040 INCH (NO. 18 B&S GAGE)
OVER 84	0.052 INCH (18 GAGE, GALV.)	0.051 INCH (NO. 16 B&S GAGE)

ROUND DUCTS

MAXIMUM SIZE (INCHES)	SPIRAL SEAM DUCT STEEL (MINIMUM THICKNESS, NOMINAL)	LONGITUDINAL SEAM DUCT STEEL (MINIMUM THICKNESS, NOMINAL)	FITTINGS STEEL (MINIMUM THICKNESS, NOMINAL)
THROUGH 12	0.019 INCH (28 GAGE, GALV.)	0.022 INCH (26 GAGE, GALV.)	0.022 INCH (26 GAGE, GALV.)
13 THROUGH 18	0.022 INCH (26 GAGE, GALV.)	0.028 INCH (24 GAGE, GALV.)	0.028 INCH (24 GAGE, GALV.)
19 THROUGH 28	0.028 INCH (24 GAGE, GALV.)	0.034 INCH (22 GAGE, GALV.)	0.034 INCH (22 GAGE, GALV.)
29 THROUGH 36	0.034 INCH (22 GAGE, GALV.)	0.040 INCH (20 GAGE, GALV.)	0.040 INCH (20 GAGE, GALV.)
37 THROUGH 52	0.040 INCH (20 GAGE, GALV.)	0.052 INCH (18 GAGE, GALV.)	0.052 INCH (18 GAGE, GALV.)

DUCT SIZING CRITERIA

MEDIUM PRESSURE SUPPLY———— MAX. 1900 FPM OR .20"/100'

LOW PRESSURE SUPPLY———— MAX. 1000 FPM OR .07"- 1.0"/100'; WHICH EVER IS LOWER

LOW PRESSURE RETURN/EXHAUST—— MAX 800 FPM .05" - .08"/100'; WHICH EVER IS LOWER

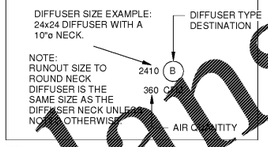
DUCT CONSTRUCTION CLASSIFICATION

DUCT SECTION	PRESSURE CLASS/SEAL CLASS
SUPPLY- UNIT DISCHARGE TO TERMINAL	+6", SEAL CLASS A
SUPPLY-TERMINAL UNIT TO DIFFUSER	+1", SEAL CLASS A
RETURN - ALL	-2", SEAL CLASS A
EXHAUST - ALL	-2, SEAL CLASS A

PIPE SIZE CRITERIA

PIPE SIZE	FLOW PRESSURE (GPM)	PRESSURE DROP RANGE (ft/100)	VELOCITY (ft/sec)
3/4"	0 - 3	0.00 - 2.91	0.00 - 1.97
1"	4 - 7	1.34 - 3.58	1.56 - 2.74
1-1/4"	8 - 13	1.66 - 3.91	2.05 - 3.33
1-1/2"	14 - 21	1.95 - 4.00	2.54 - 3.80
2"	22 - 44	1.17 - 4.00	2.30 - 4.60
2-1/2"	45 - 73	1.59 - 3.91	3.01 - 4.89
3"	74 - 131	1.37 - 3.97	3.21 - 5.69
4"	132 - 270	1.04 - 4.00	3.33 - 6.80
5"	271 - 491	1.30 - 4.00	4.34 - 7.87
6"	492 - 796	1.60 - 4.00	5.46 - 8.84
8"	797 - 1558	1.01 - 3.63	5.11 - 10.0
10"	1559 - 2460	1.15 - 2.76	6.34 - 10.0
12"	2461 - 3488	1.15 - 2.24	7.06 - 10.0
14"	3489 - 4216	1.39 - 1.99	8.27 - 10.0
16"	4217 - 5508	1.02 - 1.70	7.66 - 10.0
18"	5509 - 6972	0.94 - 1.48	7.90 - 10.0
20"	6973 - 8670	0.85 - 1.30	8.05 - 10.0
24"	8671 - 12530	0.51 - 1.04	6.92 - 10.0

HVAC-AIR DISTRIBUTION TAG



HVAC LEGEND

DUCTWORK - AIR TERMINALS

- SUPPLY AIR DIFFUSER; SUPPLY DUCT AND MVD IN SECTION
- RETURN AIR GRILLE; RETURN DUCT AND MVD IN SECTION
- EXHAUST AIR GRILLE; EXHAUST DUCT AND MVD IN SECTION
- 24"ø — SIDEWALL GRILLE TAP WITH MANUAL VOLUME DAMPER, RND
- 24x24 — SIDEWALL GRILLE TAP WITH MANUAL VOLUME DAMPER, SQ

DUCTWORK - EQUIPMENT

- MVD; MANUAL BALANCING/VOLUME DAMPER
- M — MOTORIZED DAMPER
- BDD — BACK DRAFT DAMPER WITH AIR FLOW INDICATION
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- FSD — COMBINATION FIRE & SMOKE DAMPER
- SDT — SMOKE DETECTOR
- EDH-x — ELECTRIC DUCT HEATER, WITH TAG

DUCTWORK - EQUIPMENT

- CU, HP-x — CONDENSING UNIT ON CONCRETE HOUSE KEEPING PAD WITH TAG
- CU, HP-x — CONDENSING UNIT ON EQUIPMENT RAILS WITH TAG
- EF-x — CEILING MOUNTED EXHAUST FAN WITH TAG, DUCT SHOWN
- EF-x — INLINE SUSPENDED MOUNT EXHAUST FAN WITH TAG, DUCT SHOWN
- EF-x — ROOF/CURB MOUNTED EXHAUST FAN WITH TAG, DUCT SHOWN
- GF, WSHP, A/C-x — INDOOR VERTICAL AIR HANDLING EQUIP, DUCT NOT SHOWN
- GF, WSHP, A/C-x — INDOOR HORIZONTAL AIR HANDLING EQUIP, DUCT SHOWN
- ROOF/CURB MOUNTED AIR HANDLING UNIT, DUCT NOT SHOWN
- VARIABLE AIR VOLUME BOX W/ TAG, DUCT SHOWN
- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE DEMOLISHED
- NEW RIGID DUCTWORK
- SQUARE DUCT TAKE OFF, BOTTOM
- SQUARE DUCT TAKE OFF, TOP
- NEW FLEXIBLE DUCTWORK
- N E — EXISTING DUCTWORK TO NEW DUCTWORK CONNECTION
- NEW DUCTWORK WITH LINER
- 24x12 — DUCTWORK DIMENSION LABEL (24" WIDTH x 12" HEIGHT
- 24x12 — SQUARE ELBOW WITH DOUBLE THICKNESS THRNING VANES
- 24x12 — SQUARE ELBOW, NO TURNING VANES
- 24x24 — SQ ELBOW 45°, MITERED
- 24x24 — SQ ELBOW 45°, RADIUS
- 24x12 — SQ DUCT ELEVATION CHANGE 90° DOWN
- 24x12 — SQ DUCT ELEVATION CHANGE, 90° UP
- 24x12 — SQUARE DUCT TAKE OFF, SIDE
- SQUARE DUCT TAKE OFF, BOTTOM
- SQ TO RND CONCENTRIC TRANSITION
- SQ TO RND ECCENTRIC TRANSITION
- SQUARE DUCT TAKE OFF, TOP
- 24"ø — DUCTWORK DIMENSION LABEL (24" DIAMETER)
- 24"ø — RND ELBOW 90°, RADIUS
- 24"ø — RND ELBOW 90°, MITERED
- 24"ø — RND ELBOW 45°, RADIUS
- 24"ø — RND ELBOW 90°, RADIUS
- RND DUCT ELEVATION CHANGE, DOWN
- RND DUCT ELEVATION CHANGE, UP
- 24x12 — ROUND DUCT TAKE OFF
- SQ TO SQ CONCENTRIC TRANSITION
- SQ TO SQ ECCENTRIC TRANSITION
- 24x12 — SQ TO RND CONCETRIC TRANSITION IN RISE
- 24x12 — SQ TO RND CONCENTRIC TRANSITION IN DROP

ABBREVIATIONS

AC	AIR CONDITIONING UNIT	DC	DRY COOLER	GALV	GALVANIZED	N/A	NOT APPLICABLE
AD	ACCESS DOOR	DDC	DIRECT DIGITAL CONTROL	GPM	GALLONS PER MINUTE	NC	NOISE CRITERIA
AFF	ABOVE FINISH FLOOR	DIA	DIAMETER	HP	HORSEPOWER	NOM	NOMINAL
AHU	AIR HANDLING UNIT	DP	DIFFERENTIAL PRESSURE	HT	HEIGHT	NTS	NOT TO SCALE
AS	AIRSTREAM	DX	DIRECT EXPANSION	HX	HEAT EXCHANGER	OA	OUTSIDE AIR
ATM	ATMOSPHERE	EA	EACH OR EXHAUST AIR	Hz	FREQUENCY	OD	OUTSIDE DIAMETER
BD	BALANCING DAMPER	EAT	ENTERING AIR TEMPERATURE	ID	INSIDE DIAMETER	P	PUMP
BDD	BACK DRAFT DAMPER	EF	EXHAUST FAN	kW	KILOWATT	PH	PHASE (ELECTRICAL)
BHP	BRAKE HORSEPOWER	EWT	ENTERING WATER TEMPERATURE	kWh	KILOWATT HOUR	PLBG	PLUMBING
BOD	BOTTOM OF DUCT	EXP	EXPANSION	L	LENGTH	PPM	PARTS PER MILLION
BTUH	BRITISH THERMAL UNIT	F	FAHRENHEIT	LAT	LEAVING AIR TEMPERATURE	PSFG	POUNDS PER SQUARE FOOT
BTUH	BTU PER HOUR	FA	FACE AREA	LF	LINEAR FEET	PSIG	POUNDS PER SQUARE INCH
CC	COOLING COIL	FD	FIRE DAMPER	LH	LATENT HEAT	QTY	QUANTITY
CF	CUBIC FEET	FP	FAN POWERED	LRA	LOCKED ROTOR AMPS	R	RADIUS
CFM	CUBIC FEET PER MINUTE	FPM	FEET PER MINUTE	LVR	LOUVER	RA	RETURN AIR
CLG	CEILING	FPS	FEET PER SECOND	LWT	LEAVING WATER TEMPERATURE	REQ'D	REQUIRED
COL	COLUMN CONC CONCRETE	FS	FLOW SWITCH	MBU	THOUSAND BTUH	RF	RETURN FAN
CRAC	COMPUTER ROOM UNIT	FSD	COMB SMOKE FIRE DAMPER	MFR	MANUFACTURER	RH	HUMIDITY, RELATIVE
CU	CONDENSING UNIT	G	GAS	MIN	MINIMUM	RLA	RUNNING LOAD AMPS
DB	DRY BULB	GAL	GALLONS	MOD	MOTOR OPERATED DAMPER	SA	SUPPLY AIR
						SD	SMOKE DAMPER
						SF	SUPPLY FAN
						SG	SPECIFIC GRAVITY
						SH	SENSIBLE HEAT
						SHR	SENSIBLE HEAT RATIO
						SP	STATIC PRESSURE
						SPEC	SPECIFICATIONS
						TOD	TOP OF DUCT
						TYP	TYPICAL
						U	HEAT TRANSFER COEFFICIENT
						UCD	UNDERCUT DOOR
						UH	UNIT HEATER
						V	VOLTS
						VAV	VARIABLE AIR VOLUME
						VFD	VARIABLE FREQUENCY DRIVE
						VOL	VOLUME
						W	WATT
						WB	WET BULB
						WC	WATER COLUMN
						WPD	WATER PRESSURE DROP

Mechanical Sheet Index

Sheet Number	Sheet Name	Issuance 10.02.18 100% DD	Issuance 11.26.18 100% CD
M001	COVER SHEET	X	X
M002	SPEC SHEET	X	X
MD101	DEMO PLAN	X	X
M101	HVAC PLAN - GYM ADDITION	X	X
M102	HVAC PLAN - SPIRIT SHOP	X	X
M400	SCHEDULES	X	X
M500	DETAILS		X
M600	CONTROLS		X

franklin|architects
142 Market Street P.O. Box 4048
Chattanooga . TN . 37405
v: 423.266.1207 f: 423.266.1216

In association with:
Project No. 150-18

AEED, inc.
Advanced Energy Engineering & Design, Inc.
408 McCallie Ave
Chattanooga, TN 37402
www.aeedinc.com
(423) 752-3438

CCS Gym Expansion + Spirit Store

for

Chattanooga Christian School

3354 Charger Dr.
Chattanooga, TN 37409

CONSTRUCTION DOCUMENTS

Revisions

No.	Issue	Date

Sheet Information

Date	11.26.2018
Job No.	6774.3 / 6774.4

Title

MECHANICAL

COVER SHEET

Sheet

M001

Last Plotted: 11/26/2018 4:16:53 PM