HVAC GENERAL NOTES

1. ALL MECHANICAL EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF THE 2012 INTERNATIONAL MECHANICAL CODE, THE 2012 INTERNATIONAL BUILDING CODE, THE 2009 INTERNATIONAL ENERGY CONSERVATION CODE, STATE AND LOCAL AMENDMENTS, NFPA 90A, 101, UNDERWRITERS LABORATORIES (OR ETL) AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
2. THIS PROJECT HAS BEEN DESIGNED TO COMPLY WITH THE 2009 INTERNATIONAL ENERGY CODE COMPLIANCE PATH. THE OWNER/ARCHITECT/CONTRACTOR SHALL REFER TO THE APPLICABLE PROJECT DOCUMENTATION (SCORECARD/ CHECKLIST/ CODE) PRIOR TO PRESENTING VALUE ENGINEERING ALTERNATIVES OR OWNER/ARCHITECT REQUESTED REVISIONS THAT MAY IMPACT COMPLIANCE WITH THE APPLICABLE GREEN BUILDING PROGRAM OR ENERGY CODE.
3. THE LOCATIONS, ARRANGEMENT AND EXTENT OF EQUIPMENT, PIPING, SUPPORTS, DEVICES, CONDUIT, AND OTHER APPURTENANCES RELATED TO THE INSTALLATION OF THE MECHANICAL AND ELECTRICAL WORK SHOWN ARE APPROXIMATE. THE DRAWINGS ARE DIAGRAMMATIC. DO NOT SCALE THE DRAWINGS, BUT REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS OF BUILDING COMPONENTS. SHOULD A CONFLICT EXIST BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS REGARDING DIMENSIONS, SCALE, ETC., NOTIFY THE ARCHITECT IMMEDIATELY.
4. MATERIALS, EQUIPMENT OR LABOR NOT INDICATED, BUT WHICH CAN BE REASONABLY INFERRED TO BE NECESSARY FOR A COMPLETE INSTALLATION SHALL BE PROVIDED. THE DRAWINGS AND SPECIFICATIONS DO NOT UNDERTAKE TO INDICATE EVERY ITEM OF MATERIAL, EQUIPMENT OR LABOR REQUIRED TO PRODUCE A SAFE, COMPLETE AND PROPERLY OPERATING SYSTEM.
5. PRIOR TO PURCHASING ANY MATERIALS OR STARTING ANY WORK, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, DUCTWORK SIZES AND LOCATIONS, EQUIPMENT, ETC. SHOWN ON THE DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE ARCHITECT.
6. SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ARCHITECT/ENGINEER PRIOR TO ORDERING, PURCHASING, OR FABRICATING ANY MECHANICAL EQUIPMENT. SHOP DRAWINGS SHALL INCLUDE: ALL EQUIPMENT SCHEDULED OR SPECIFIED ON THE DRAWINGS; DUCTWORK DRAWN TO 1/4" SCALE OR THE SCALE SHOWN ON THE DRAWINGS.
7. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTALLATION INSTRUCTIONS.
8. ALL MECHANICAL EQUIPMENT AND SYSTEMS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE BY OWNER.
9. ALL HVAC COMPRESSORS SHALL HAVE EXTENDED 4-YEAR MANUFACTURER'S WARRANTY FOR A 5-YEAR TOTAL WARRANTY.
10. FOR EXACT LOCATION OF OUTDOOR AIR CONDITIONING UNITS, SEE ARCHITECTURAL DRAWINGS.
11. INSTALL GRADE MOUNTED OUTDOOR AIR CONDITIONING EQUIPMENT LEVEL ON 4" THICK REINFORCED CONCRETE PADS [2" (MIN.) THICK POLYPROPYLENE EQUIPMENT PAD 4" LARGER THAN OUTDOOR UNIT FOOTPRINT; DIVERSITECH "E LITE" PAD OR APPROVED EQUAL] EXTENDING 4" BEYOND UNIT PERIMETER.
12. PORTIONS OF DUCTWORK AND PIPE INSULATION VISIBLE THROUGH AIR DISTRIBUTION DEVICES IN FINISHED AREAS SHALL BE PAINTED FLAT BLACK.
13. MOUNT TOP OF THERMOSTAT SENSORS 46" AFF UNLESS NOTED OTHERWISE. COORDINATE THERMOSTAT LOCATIONS WITH OTHER TRADES.
14. CAREFULLY COORDINATE ALL PENETRATIONS THROUGH EXTERIOR WALLS WITH ARCHITECTURAL DRAWINGS AND FINISHES. THE PENETRATIONS SHALL NOT BE LOCATED WHERE THEY WILL CONFLICT WITH ARCHITECTURAL FEATURES, TRANSITIONS IN MATERIALS, OR COLOR CHANGES IN MATERIALS. HORIZONTALLY ALIGN PENETRATIONS WHEREVER POSSIBLE UNLESS NOTED OTHERWISE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO ANY WORK BEING DONE.
15. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL MECHANICAL EQUIPMENT, DUCTWORK, PIPING, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR OTHERWISE ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT.
16. ALL PIPE AND DUCT PENETRATIONS OF FIRE AND/OR SMOKE-RATED ASSEMBLIES SHALL BE FIRE-STOPPED AS REQUIRED TO RESTORE THE ASSEMBLY TO ITS ORIGINAL INTEGRITY. FIRE BARRIER PRODUCTS SHALL BE AS MANUFACTURED BY TREMCO, HILTI, 3M, STI, NELSON OR APPROVED EQUAL.
17. ACCESS PANELS IN NON-ACCESSIBLE CEILINGS AND IN WALLS TO ALLOW ADEQUATE ROOM FOR MAINTENANCE OF EQUIPMENT AND BALANCING OF SYSTEMS SHALL BE INSTALLED UNDER THE ARCHITECTURAL DIVISION. ACCESS PANELS IN CEILING AND WALLS SHALL BE PROVIDED WHERE SHOWN ON THE DRAWINGS OR WHERE NECESSARY TO ACCESS DAMPERS, VALVES, ETC. COORDINATE EXACT LOCATION OF ALL ACCESS PANELS WITH THE ARCHITECT DURING THE SHOP DRAWING PROCESS.
18. ACCESS DOORS SHALL BE INSTALLED AT ALL FIRE DAMPERS, COMBINATION FIRE/SMOKE DAMPERS, SMOKE DAMPERS AND WHERE INDICATED FOR CEILING RADIATION DAMPERS TO FACILITATE INSPECTION AND MAINTENANCE. PERMANENTLY IDENTIFY THE ACCESS DOOR BY A DIE-CUT LABEL WITH ½" HIGH RED BLOCK LETTERS ON A WHITE BACKGROUND. LABEL SHALL READ "FIRE DAMPER", "COMBINATION FIRE/SMOKE DAMPER", "SMOKE DAMPER" OR "CEILING RADIATION DAMPER".
19. ALL MECHANICAL EQUIPMENT SHALL BE LABELED WITH A 2" HIGH SEMI-RIGID PLASTIC LAMINATE NAMEPLATE WITH 1" HIGH WHITE LETTERS ON A BLACK BACKGROUND SECURELY AFFIXED TO THE EQUIPMENT. THE NAMEPLATE SHALL SHOW THE EQUIPMENT TAG USED ON THESE DRAWINGS.
20. REFER TO ARCHITECTURAL PLANS FOR FLOOR AND CEILING ASSEMBLY UL RATINGS AND DETAILS.
21. ALL MATERIALS EXPOSED WITHIN HVAC PLENUMS SHALL HAVE A FLAME-SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED RATING INDEX OF NOT MORE THAN 50 UNLESS OTHERWISE ALLOWED BY CODE.
22. THE FIRE SPRINKLER CONTRACTOR SHALL INSTALL AND LOCATE ALL FIRE SPRINKLER PIPING TO PREVENT PIPING FROM THE POTENTIAL OF FREEZING. THE FIRE SPRINKLER CONTRACTOR IS REQUIRED TO NOTIFY THE ARCHITECT AND COORDINATE WITH THE MECHANICAL AND ELECTRICAL CONTRACTORS IF HEATING IS REQUIRED.

TESTING, ADJUSTING AND BALANCING (COMMERCIAL PROJECTS)

1. AFTER CONSTRUCTION, THE ENTIRE HVAC SYSTEM SHALL BE TESTED, ADJUSTED, AND BALANCED TO DELIVER THE AIR QUANTITIES SHOWN ON THE DRAWINGS. SUBMIT THE CERTIFIED (AABC OR NEBB) TEST AND BALANCE REPORT TO THE ARCHITECT FOR APPROVAL.
2. VENTILATION AIR DISTRIBUTION SYSTEMS (OUTDOOR AIR AND EXHAUST AIR) SHALL BE BALANCED TO ACHIEVE THE AIRFLOW RATES INDICATED ON THE DRAWINGS. THESE AIRFLOW RATES SHALL BE CONSIDERED MINIMUM RATES. THE MEASURED AIR BALANCE TOLERANCE FOR BOTH OUTDOOR AIR AND EXHAUST AIR RATES SHALL BE 0% TO +10%.

MECHANICAL/ELECTRICAL COORDINATION:

1. CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT OR SUBMITTING SHOP DRAWINGS, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN. SHOP DRAWING SUBMITTALS SHALL CLEARLY STATE THAT THE ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT HAS BEEN COORDINATED WITH THE ELECTRICAL CONTRACT DOCUMENTS AND THE ELECTRICAL CONTRACTOR.
2. ALL MECHANICAL EQUIPMENT REQUIRING ELECTRICAL POWER SHALL BE INSTALLED WITH A DISCONNECT SWITCH AT EACH PIECE OF EQUIPMENT. COORDINATE SWITCH TYPE (FUSED OR NON-FUSED) WITH EQUIPMENT CHARACTERISTICS, MANUFACTURER'S RECOMMENDATIONS AND THE ELECTRICAL DRAWINGS. DISCONNECT SWITCH SHALL BE FURNISHED BY MECHANICAL FOR INSTALLATION BY ELECTRICAL. DISCONNECT SWITCHES SHALL NOT BE MOUNTED ON THE EQUIPMENT IT SERVES UNLESS INTEGRAL TO THE UNIT.
3. PROVIDE ALL SYSTEM CONTROLS AND ASSOCIATED CONTROL AND INTERLOCK WIRING FOR COMPLETE AND OPERABLE SYSTEMS. 120 VOLT AND HIGHER WIRING SHALL BE MC CABLE OR IN CONDUIT IN ACCORDANCE WITH LOCAL CODES AND THE MATERIALS AND INSTALLATION REQUIREMENTS OF DIVISION 26 - ELECTRICAL.
4. COORDINATE POWER AND FIRE ALARM REQUIREMENTS OF ALL COMBINATION FIRE/SMOKE DAMPERS AND SMOKE DAMPERS WITH THE ELECTRICAL CONTRACTOR.
5. ALL REQUIRED CONTROL WIRING (INCLUDING POWER WIRING REQUIRED FOR CONTROL PANELS, DEVICES, ETC.) NOT INDICATED ON THE ELECTRICAL DRAWINGS SHALL BE INCLUDED AS PART OF THE MECHANICAL WORK. WIRING IN HVAC PLENUM SPACES SHALL BE INSTALLED ACCORDING TO CODE REQUIREMENTS.
6. UNLESS NOTED OTHERWISE, TRANSFORMERS, CONTROLS AND CONTROL WIRING REQUIRED FOR ALL MECHANICAL SYSTEMS SHALL BE FURNISHED WITH THE EQUIPMENT IT SERVES AND INSTALLED BY THE MECHANICAL CONTRACTOR. MOTOR STARTERS FOR HVAC EQUIPMENT SHALL BE FURNISHED WITH THE MOTOR OR APPARATUS WHICH IT OPERATES. MOTOR STARTER INSTALLATION SHALL BE BY THE DIVISION 26 CONTRACTOR.
7. CLEARANCES FOR ELECTRIC DUCT HEATERS AND LOW VOLTAGE CONTROL PANELS LOCATED ABOVE CEILINGS: THE CONTRACTOR SHALL COORDINATE AND PLAN THE WORK TO ALLOW FOR A CLEAR SPACE IN FRONT OF ALL ELECTRIC DUCT HEATER CONTROL PANELS (INCLUDING, BUT NOT LIMITED TO AHUS, FCUS, VAVs, PIUs, UHs, ETC.) OF 42" X 30" WIDE (OR THE WIDTH OF THE PANEL WHICHEVER IS GREATER). THE CONTROL PANEL DOOR SHALL BE ALLOWED TO OPEN AT LEAST 90 DEGREES. EQUIPMENT WITHOUT DUCT HEATERS THAT HAVE LOW VOLTAGE CONTROL PANELS SHALL HAVE A MINIMUM CLEAR SPACE IN FRONT OF THE PANEL OF 24" X 24" WIDE (OR THE WIDTH OF THE PANEL WHICHEVER IS GREATER).
8. ROUTING OF PIPING AND DUCTWORK SHALL BE COORDINATED WITH THE ELECTRICAL CONTRACTOR AND ALL OTHER TRADES DURING THE SUBMITTAL AND LAYOUT PHASE. PIPING AND DUCTWORK SHALL NOT BE ROUTED THROUGH THE DEDICATED ELECTRICAL SPACE ABOVE EACH LOAD CENTER.

DUCT SMOKE DETECTORS:

1. ALL FANS SUPPLYING MORE THAN 2000 CFM OF AIR TO ANY SPACE SHALL BE INSTALLED WITH A SMOKE DETECTOR IN THE RETURN DUCTWORK. DUCT SMOKE DETECTORS SHALL BE INSTALLED IN THE RETURN AIR PATH OF AIR DISTRIBUTION SYSTEMS UTILIZING A COMMON SUPPLY AND/OR RETURN AIR PLENUM WITH A COMBINED DESIGN CAPACITY GREATER THAN 2000 CFM.
2. THE SMOKE DETECTOR SHALL BE WIRED TO STOP THE FAN UPON DETECTION OF SMOKE, AND SIGNAL THE BUILDING FIRE ALARM CONTROL PANEL. THE SMOKE DETECTOR SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR, MOUNTED IN THE DUCT BY THE MECHANICAL CONTRACTOR, AND WIRED BY THE ELECTRICAL CONTRACTOR.

AIR DISTRIBUTION:

1. SUPPLY, RETURN AND O.A. DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEETMETAL IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE, LATEST EDITION.
   a. SNAP-LOCK LONGITUDINAL SEAMS ARE NOT ALLOWED UNLESS SECURED WITH SHEET METAL FASTENING SCREWS AS RECOMMENDED BY SMACNA.
2. ALL JOINTS AND SEAMS IN ALL SHEETMETAL DUCTWORK SHALL BE SEALED WITH DUCT SEALER.
3. TAPES, SEALANTS AND MASTICS USED TO SEAL METALLIC AND FLEXIBLE AIR DUCTS AND FLEXIBLE AIR CONNECTORS SHALL COMPLY WITH UL 181B AND SHALL BE MARKED "181 B-FX" FOR PRESSURE-SENSITIVE TAPE OR "181 B-M" FOR MASTIC/SEALANT.
4. MECHANICAL FASTENERS FOR USE WITH FLEXIBLE NONMETALLIC AIR DUCTS SHALL COMPLY WITH UL 181B AND SHALL BE MARKED "181 B-C".
   a. SEAL, INSPECT AND TEST SHEETMETAL DUCTWORK PRIOR TO INSULATING OR CONCEALING. SEAL ALL DUCTWORK AND PLENUMS TO MEET SMACNA SEAL CLASS A.
   b. SEAL ALL TRANSVERSE JOINT, LONGITUDINAL SEAMS, AND DUCT WALL PENETRATIONS.
   c. PRESSURE-SENSITIVE TAPE SHALL NOT BE USED AS THE PRIMARY SEALANT, UNLESS IT HAS BEEN CERTIFIED TO COMPLY WITH UL-181A OR UL-181B BY AN INDEPENDENT TESTING LABORATORY AND THE TAPE IS USED IN ACCORDANCE WITH THAT CERTIFICATION.
   d. ALL CONNECTIONS SHALL BE SEALED, INCLUDING BUT NOT LIMITED TO SPIN-IN FITTINGS, TAPS, OTHER BRANCH CONNECTIONS, ACCESS DOORS, AND DUCT CONNECTIONS TO EQUIPMENT.
   e. SEALING THAT WOULD VOID PRODUCT LISTINGS IS NOT REQUIRED.
   f. SPIRAL LOCK SEAMS NEED NOT BE SEALED.
5. EXTERIOR SUPPLY AND RETURN DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEETMETAL (G 90 MINIMUM) WITH ALL SEAMS CAULKED AND SEALED WEATHERTIGHT AND COATED WITH A RUST PREVENTIVE COATING OVER THE ENTIRE DUCT SURFACE. RUST PREVENTATIVE COATING SHALL BE "RUST DESTROYER" BY ADVANCE PROTECTIVE PRODUCTS, INC., OR APPROVED EQUAL. SLOPE OR CROWN DUCTWORK AT 1/4" PER FOOT TRANSVERSELY TO PREVENT STANDING WATER ON TOP OF DUCTWORK. ALSO, REFER TO INSULATION NOTE 1e BELOW FOR INSULATION REQUIREMENTS AND PREFABRICATED ALTERNATE DUCT SYSTEM.
6. ALL OPEN-ENDED DUCTS AND FAN OUTLETS SHALL HAVE ½" X ½" HARDWARE CLOTH AFFIXED TO THE OPENING.
7. EXHAUST DUCTWORK SHALL BE GALVANIZED SHEET METAL (G 90 MINIMUM) CONSTRUCTED TO SMACNA STANDARDS AND SHALL NOT BE INSULATED UNLESS NOTED OTHERWISE.
8. ALL DUCTWORK SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING TILES OR CEILING STRUCTURE. DUCT SUPPORTS AND ATTACHMENT TO STRUCTURE SHALL BE PER SMACNA STANDARDS.
9. FLEXIBLE DUCTWORK SHALL BE THERMAFLEX M-KE (U.L. 181 LISTED, CLASS 1 FLEXIBLE AIR DUCT) OR EQUAL. PROVIDE MINIMUM INSULATION VALUE OF R-6; R-8 WHEN LOCATED OUTSIDE THE THERMAL ENVELOPE OF THE BUILDING, OR GREATER WHERE REQUIRED BY APPLICABLE ENERGY CODE. AIR CONNECTORS ARE NOT ACCEPTABLE. FLEX DUCT DIAMETER SHALL MATCH DEVICE NECK DIAMETER. PROVIDE ROUND GALVANIZED STEEL DUCT RUNOUTS TO MAINTAIN A MAXIMUM FLEXIBLE DUCT LENGTH OF 5'-0". FLEXIBLE DUCTWORK SHALL BE INSTALLED AS STRAIGHT AS POSSIBLE AND SHALL BE ROUTED AND SUPPORTED WITHOUT FORMING CRIMPS OR OTHER AIR FLOW RESTRICTIONS. PROVIDE SQUARE TO ROUND ADAPTERS OR BOOTS TO CONNECT TO AIR DEVICE NECK WHEN REQUIRED.
10. ROUND AND FLEXIBLE SUPPLY AIR DUCTWORK SHALL BE CONNECTED TO MAIN DUCTS WITH A CONICAL TYPE SPIN-IN FITTING WITH MANUAL VOLUME DAMPER (EXCEPT WHERE INSTALLED ABOVE INACCESSIBLE CEILINGS, THE DAMPER SHALL BE OMITTED AND PROVIDED IN THE AIR DEVICE NECK).
11. TAPE, BED AND SEAL AIR TIGHT ALL PENETRATIONS FROM RETURN AIR PLENUMS TO NON-RETURN AIR PLENUMS THAT ARE REQUIRED DUE TO DUCTWORK, PIPING OR OTHER ITEMS.
12. DUCTWORK DIMENSIONS SHOWN ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
13. EXTERNAL STATIC PRESSURE (ESP) DOES NOT INCLUDE COIL, CASING OR FILTER PRESSURE DROP.
14. INSTALL FIRE DAMPERS IN ALL RATED WALLS AND FLOOR PENETRATIONS. FIRE DAMPERS SHALL BE THE DYNAMIC TYPE WITH BLADES OUT OF THE AIRSTREAM WHERE POSSIBLE. ALL FIRE DAMPERS SHALL COMPLY WITH THE REQUIREMENTS OF U.L. 555. REFER TO THE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RATED ASSEMBLIES.
15. INSTALL SMOKE DAMPERS IN ALL DUCT PENETRATIONS THROUGH SMOKE RATED WALLS. WHERE DUCTS PENETRATE WALLS THAT CARRY BOTH FIRE AND SMOKE RATINGS OR ARCHITECTURAL SHAFTS, THE DAMPERS INSTALLED SHALL BE COMBINATION FIRE AND SMOKE DAMPERS. ALL SMOKE DAMPERS SHALL COMPLY WITH THE REQUIREMENTS OF U.L. 555S. ALL COMBINATION FIRE AND SMOKE DAMPERS SHALL COMPLY WITH THE REQUIREMENTS OF U.L. 555 AND U.L. 555S.
16. DUCT ACCESS DOORS: PROVIDE ACCESS DOORS IN DUCTWORK AT EACH FIRE, COMBINATION FIRE/SMOKE AND SMOKE DAMPER LOCATION.
17. PROVIDE ALL OUTDOOR AIR INTAKES AND EXHAUST OPENINGS WITH MOTORIZED OR GRAVITY DAMPERS IN ACCORDANCE WITH THE LOCAL ENERGY CODE. DAMPERS SHALL CLOSE WHEN THE VENTILATION SYSTEM IS NOT OPERATING.
18. LOCATIONS OF GRILLES, REGISTERS, AND DIFFUSERS SHOWN ON THE DRAWINGS ARE APPROXIMATE. COORDINATE EXACT LOCATIONS WITH LIGHTS, CEILING GRID, ETC. AND ARCHITECTURAL REFLECTED CEILING PLAN.
19. WHERE BALANCING DAMPERS CANNOT BE ACCESSED FROM BELOW THE CEILING, PROVIDE A REMOTE OPERATED DAMPER; YOUNG REGULATOR OR EQUAL.
20. FLEXIBLE DUCT CONNECTORS SHALL BE USED TO CONNECT DUCTWORK AND PLENUMS TO FAN-ROTATING EQUIPMENT; PROFLEX BY DUCTMATE OR APPROVED EQUAL. INDOOR FLEXIBLE CONNECTORS SHALL BE 26 OZ/SQ. YD. GLASS FABRIC DOUBLE COATED WITH NEOPRENE. OUTDOOR FLEXIBLE CONNECTORS SHALL BE 24 OZ/SQ. YD. GLASS FABRIC DOUBLE COATED WITH WEATHERPROOF SYNTHETIC RUBBER RESISTANT TO UV RAYS AND OZONE. FABRICS, COATINGS AND ADHESIVES SHALL BE TESTED IN ACCORDANCE WITH UL 701 AND HAVE A FLAME SPREAD/ SMOKE DEVELOPED RATING OF 25/50. FLEXIBLE DUCT CONNECTORS SHALL ALSO BE PROVIDED WHERE DUCTWORK CROSSES BUILDING EXPANSION JOINTS.
21. EXPOSED INTERIOR DUCTWORK TO BE PAINTED SHALL HAVE ALL EXPOSED SURFACES (INCLUDING HANGER STRAPS) COATED WITH A "PAINT GRIP" FINISH FOR FIELD PAINTING. AS AN OPTION, MILL PHOSPHATIZED STEEL DUCTWORK MAY BE USED. LINE OR INSULATE PER HVAC GENERAL NOTES OR SPEC SECTION 23 07 00.
22. EXPOSED DOUBLE-WALL, INSULATED ROUND OR FLAT OVAL DUCT AND FITTINGS SHALL BE BY McGILL AIRFLOW LLC (OR EQUAL BY LINX INDUSTIES OR SEMCO, INC.). DUCT SYSTEM SHALL HAVE SPIRAL LOCKSEAM (OR WELDED) GALVANIZED SHEET METAL OUTER SHELL, 1" THICK COATED ACOUSTICAL LINER, AND A PERFORATED SHEET METAL INNER LINER.
23. PROTECT DUCTS EXPOSED IN FINISHED SPACES FROM BEING DENTED, SCRATCHED, OR DAMAGED. TRIM DUCT SEALANTS FLUSH WITH METAL TO CREATE A SMOOTH AND UNIFORM EXPOSED BEAD. TWO-PART TAPE SEALING SYSTEMS ARE NOT ALLOWED. REPAIR OR REPLACE DAMAGED DUCTWORK AND FINISH WORK THAT DOES NOT COMPLY WITH THESE REQUIREMENTS.

INSULATION:

1. DUCT INSULATION:
   a. DUCT WRAP SHALL BE UL LISTED FIBERGLASS BLANKET INSULATION WITH FOIL VAPOR BARRIER, JOHNS MANVILLE MICROLITE EQ FSK OR APPROVED EQUAL. PUNCTURES AND TEARS IN THE FOIL JACKET SHALL BE PATCHED WITH FOIL TAPE TO MAINTAIN THE INTEGRITY OF THE VAPOR BARRIER. INSULATE SHEET METAL DUCTWORK IN THE THICKNESSES AND DENSITIES LISTED BELOW:
      i. SHEET METAL SUPPLY AND OUTSIDE AIR DUCTWORK: 2" THICK, 1 LB/FT³ DENSITY, R-6 MINIMUM INSTALLED.
      ii. SHEET METAL RETURN DUCTWORK IN NON-AIR-CONDITIONED AREAS (SUCH AS INTERSTITIAL SPACES AND FLOOR/CEILING ASSEMBLIES): 2" THICK, 1 LB/FT³ DENSITY, R-6 MINIMUM INSTALLED.
      iii. ALL SHEET METAL DUCTWORK LOCATED OUTSIDE OF THE THERMAL ENVELOPE OF THE BUILDING (INCLUDING CRAWL SPACES AND ATTIC SPACES): 3" THICK, ¾" LB/FT³ DENSITY, R-8 MINIMUM INSTALLED.
   b. INDOOR EXPOSED RECTANGULAR SHEET METAL SUPPLY AND RETURN AIR DUCTWORK SHALL BE LINED WITH 1" THICK DUCT LINER (MINIMUM R-4) JOHNS MANVILLE LINACOUSTIC RC OR EQUAL.
   c. INDOOR EXPOSED ROUND, SPIRAL AND OVAL SUPPLY AND RETURN AIR DUCT SHALL BE LINED WITH 1" THICK ROUND DUCT LINER (MINIMUM R-4), JOHNS MANVILLE SPIRACOUSTIC PLUS OR EQUAL.
   d. INDOOR EXPOSED ROUND AND SPIRAL OUTSIDE AIR DUCT SHALL BE INSULATED WITH 1" THICK PREFORMED FIBROUS GLASS PIPE INSULATION WITH VAPOR BARRIER JACKET [K-Value: 0.23 BTU·in/hr·ft²·°F (0.033 W/m K), when tested in accordance with ASTM C 335 at 75 °F (24 °C)]; JOHNS MANVILLE MICRO-LOK OR APPROVED EQUAL.
   e. EXTERIOR DUCTWORK SHALL BE LINED WITH 2" THICK DUCT LINER BOARD (MINIMUM R-8). JOHNS MANVILLE PERMACOTEâ LINACOUSTIC R-300 OR EQUAL. COAT THE EXTERIOR OF THE ENTIRE DUCT SURFACE WITH A RUST INHIBITIVE PAINT. PAINTING BY MECHANICAL. SUBMIT COLOR CHART TO THE ARCHITECT DURING THE SUBMITTAL PHASE. AS AN ALTERNATIVE, THERMADUCT OUTDOOR DUCT SYSTEM HAVING A MINIMUM R-VALUE OF 8 MAY BE USED. THE SYSTEM SHALL UTILIZE NON-FIBROUS CLOSED CELL KINGSPAN KOOLDUCT FORTIFIED INNER LINER COMPLIANT TO UL (C-UL) 181, STANDARD FOR SAFETY LISTED, CLASS 1 SYSTEM AND SMACNA CLASS 1 LEAKAGE, OR LESS. SUBMIT PRODUCT DATA AND LAYOUT DRAWINGS DURING THE SUBMITTAL PHASE. FOR PROJECTS LOCATED WITHIN 2 MILES OF THE SEACOAST, FLANGES AND HARDWARE SHALL BE ALUMINUM (ALLOY 3003 - H14 TEMPER PER ASTM B209). CROWN OR SLOPE DUCTWORK AT 1/4" PER FOOT TRANSVERSELY TO PREVENT STANDING WATER ON TOP OF DUCTWORK.
   f. DUCT LINER FOR ACOUSTICS: LINE ALL SHEETMETAL DUCTWORK A MINIMUM OF 15'-0" (OR AS INDICATED) UPSTREAM AND DOWNSTREAM OF ALL AIR HANDLING UNITS, ROOFTOP UNITS, FAN COIL UNITS AND TERMINAL UNITS. DUCT LINER FOR RECTANGULAR DUCTS SHALL BE 1" THICK, (MINIMUM R-6 OR GREATER WHERE REQUIRED BY APPLICABLE ENERGY CODE) JOHNS MANVILLE LINACOUSTIC RC OR EQUAL. THE LEADING EDGE OF THE DUCT LINER SHALL HAVE A SHEETMETAL NOSING. LINED DUCTWORK DOES NOT REQUIRE ADDITIONAL EXTERIOR INSULATION WHERE LINER MEETS REQUIRED R-VALUES. RETURN AIR TRANSFER DUCTS, ELBOWS AND SOUND BOOTS SHALL BE LINED WITH 1" THICK LINER UNLESS OTHERWISE NOTED.
   g. REFER TO ARCHITECTURAL DRAWINGS AND/OR SPECIFICATIONS FOR PAINTING OF DUCTWORK, INSULATION, ETC. IN EXPOSED INTERIOR AREAS.
   h. DUCTWORK PENETRATING SMOKEPROOF ENCLOSURES SHALL BE WRAPPED USING A U.L. LISTED AND APPROVED 2-HOUR RATED FIRE WRAP INSULATING SYSTEM OR ENCLOSED IN AN APPROVED FIRE RATED ASSEMBLY.

2. PIPE INSULATION:
   a. CONVENTIONAL SPLIT SYSTEMS - PIPING INSULATION SHALL BE FLEXIBLE ELASTOMERIC TUBING, ARMAFLEX PIPE INSULATION WITH REINFORCED LAP SEAL; BLACK LAPSEAL AS MANUFACTURED BY ARMACELL OR EQUAL BY K-FLEX OR AEROFLEX. INSULATION THICKNESS SHALL BE PER SPECIFICATION SECTION 23 23 00. ALL JOINTS AND SEAMS SHALL BE SEALED WEATHER-TIGHT WITH ARMAFLEX BLACK LAPSEAL TAPE OR THE INSULATION MANUFACTURER'S APPROVED EQUAL. BLACK LAPSEAL TAPE SHALL BE USED TO SECURE THERMOSTAT CABLE TO PIPING PRIOR TO APPLYING THE FINISH COAT. THE FINISH COAT FOR FLEXIBLE ELASTOMERIC INSULATION INSTALLED OUTDOORS SHALL BE A WATER-BASED LATEX ENAMEL DESIGNED FOR USE OVER ALL FORMS OF FLEXIBLE ELASTOMERIC INSULATION. FINISH COAT SHALL PROVIDE A PROTECTIVE FINISH SUITABLE TO BOTH INDOOR AND OUTDOOR APPLICATIONS, FORMULATED FOR COLD WEATHER FLEXIBILITY TO RESIST CRACKING AND WEATHER-RESISTANT TO ULTRAVIOLET (UV) AND OZONE. COATING SHALL BE ARMAFLEX WB FINISH OR THE INSULATION MANUFACTURER'S RECOMMENDED COATING. K-FLEX TITAN INSULATION DOES NOT REQUIRE A FIELD APPLIED COATING.
   b. INSULATE ALL CONDENSATE DRAIN PIPING AND FITTINGS WITHIN THE BUILDING'S THERMAL ENVELOPE WITH SECTIONAL PREFORMED FIBERGLASS PIPE INSULATION WITH VAPOR BARRIER JACKET; JOHNS MANVILLE MICRO-LOK OR APPROVED EQUAL. ACCEPTABLE ALTERNATE: CLOSED CELL ELASTOMERIC; ARMAFLEX WITH LAPSEAL. THICKNESS SHALL BE MANUFACTURER'S RECOMMENDED THICKNESS TO PREVENT CONDENSATION ON THE EXTERIOR OF THE JACKET. MINIMUM THICKNESS SHALL BE ½" FOR PIPE SIZES UP TO 1¼" AND 1" THICKNESS FOR PIPE SIZES 1½" AND LARGER. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

GAS FLUES (U.L. LISTED)

1. GAS FLUE MATERIAL SHALL BE AS RECOMMENDED BY THE HEATING APPLIANCE MANUFACTURER EXCEPT THAT WHERE POLYVINYL CHLORIDE (PVC) IS ALLOWABLE FOR CATEGORY II AND IV APPLIANCES, PROVIDE A UL TESTED AND LISTED POLYPROPYLENE (PP) GAS VENTING SYSTEM; POLYFLUE, POLYPRO, INNOFLUE OR APPROVED EQUAL. PVC IS ACCEPTABLE FOR COMBUSTION AIR PIPING. CERTAIN APPLIANCES MAY REQUIRE AL29-4C VENTING MATERIAL IN CONFORMANCE WITH UL 1738.
2. SIZING AND ROUTING RESTRICTIONS SHALL BE PER MANUFACTURER'S REQUIREMENTS.
3. TERMINATE ALL GAS FLUE PIPING TO THE OUTDOORS THROUGH ROOF OR EXTERIOR WALL. TERMINATION SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND FLASHED AND SEALED WEATHERTIGHT.

PIPING

1. REFRIGERANT PIPING SHALL BE TYPE L OR ACR (AIR CONDITIONING AND REFRIGERATION FIELD SERVICE) COPPER TUBING WITH BRAZED JOINTS.
2. REFRIGERANT CIRCUIT ACCESS PORTS LOCATED OUTDOORS SHALL BE FITTED WITH LOCKING-TYPE TAMPER-RESISTANT CAPS.
3. REFRIGERANT PIPING CARRYING OTHER THAN SAFETY GROUP A1 OR B1 REFRIGERANTS AND INTERCONNECTING SEPARATE PIECES OF EQUIPMENT (SPLIT HVAC SYSTEMS) AND PASSI

DESIGN CONDITIONS

SITE LOCATION: MABLETON, GEORGIA
COBB COUNTY
33.80 N LAT., 84.58 W LONG.
1,075 FEET ELEVATION
ASHRAE 90.1-2007 CLIMATE ZONE 3A

DESIGN CONDITIONS: 21.2°F WINTER DESIGN DRY BULB (ASHRAE 99.6%)
91.9°F DRY BULB AND 74.0°F MEAN COINCIDENT WET BULB SUMMER DESIGN (ASHRAE 1%)

CALCULATIONS BASED ON ASHRAE DESIGN CRITERIA AND CALCULATION METHODOLOGY.

NO CAPACITY HAS BEEN INCLUDED IN THIS DESIGN FOR FUTURE ADDITIONS.

MECH/ELEC COORDINATION

THE MECHANICAL CONTRACTOR SHALL COORDINATE THE ELECTRICAL CHARACTERISTICS OF ALL HVAC EQUIPMENT (VOLTAGE, PHASE, MCA, MOCP, ETC.) WITH THE ELECTRICAL CONTRACTOR AND THE ELECTRICAL PLANS PRIOR TO SUBMITTING OR ORDERING ANY MECHANICAL EQUIPMENT. ANY SUBSEQUENT MISMATCH BETWEEN THE MECHANICAL EQUIPMENT ELECTRICAL REQUIREMENTS AND THE ELECTRICAL SERVICE, AS DESIGNED AND PROVIDED, SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR WITH NO ADDITIONS TO THE CONTRACT.

MECHANICAL/ELECTRICAL COORDINATION STATEMENTS REQUIRED BY HVAC GENERAL NOTES [AND SPECIFICATION SECTION 23 00 00, PARAGRAPH 1.06.E] SHALL BE INCLUDED WITH HVAC EQUIPMENT SUBMITTALS/SHOP DRAWINGS.

HVAC ABBREVIATION LEGEND

DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION
1000 BTU/HR	MBH	EXHAUST FAN	EF	POOL EQUIPMENT ROOM	PER
ABOVE CEILING	A/C	EXTERNAL STATIC PRESSURE	ESP	PRESSURE DROP	PD
ABOVE FINISHED FLOOR	AFF	FIRE FIGHTERS SMOKE CONTROL PANEL	FSCP	REFRIGERANT LIQUID	RL
ABOVE FINISHED GRADE	AFG	FREE AREA	FA	REFRIGERANT SUCTION	RS
ACCESS DOOR	AD	FURNACE	F	RELIEF HOOD	RH
ACCESS PANEL (REFER TO ARCHITECTURAL DWGS.)	AP	GARAGE EXHAUST FAN	GEF	REGISTER (AIR DIVICE WITH FACE OPERATED BALANCING DAMPER)	REG
AIR CONDITIONER	AC	GRILLE (AIR DIVICE WITHOUT A BALANCING DAMPER)	GR	RETURN AIR	RA
AIR COOLED CONDENSING UNIT	CU	HEAT PUMP	HP	ROOF TOP UNIT	RTU
AIR HANDLER	AH	HEATING SEASONAL PERFORMANCE FACTOR	HSPF	SEASONAL ENERGY EFFICIENCY RATIO	SEER
ALUMINUM	ALUM	HEIGHT	HT	SENSIBLE	SENS
AUTHORITY HAVING JURISDICTION	AHJ	HIGH SIDEWALL	HSW	SQUARE FEET	SF
BYPASS DAMPER	BPD	INCHES OF WATER COLUMN	IN WC	STATIC PRESSURE (IN WC)	SP
CABINET UNIT HEATER	CUH	INSIDE DIAMETER	ID	SUPPLY AIR	SA
CEILING HEATER	CEH	INTAKE HOOD	IH	SUPPLY GRILLE	SG
CEILING RADIATION DAMPER	CRD	INTEGRATED ENERGY EFFICIENCY RATIO	IEER	SUPPLY REGISTER	SR
CIRCULATION FAN	CF	KILOWATT	kW	TRANSFER	TXR
CLEAN OUT	CO	LEAVING AIR TEMPERATURE	LAT	TRANSFER DUCT	TD
COEFFICIENT OF PERFORMANCE	COP	LEAVING WATER TEMPERATURE	LWT	TYPICAL	TYP
CONDENSATE DRAIN	C D	LOW SIDEWALL (12" AFF)	LSW	UNDER CUT DOOR	UCD
DOWN	DN	MOUNT	MT	UNLESS NOTED OTHERWISE	UNO
DUCT ACCESS DOOR	AD	NOT APPLICABLE	N/A	VARIABLE REFRIGERANT VOLUME/VARIABLE REFRIGERANT FLOW	VRV/VRF
DRY BULB	DB	ON CENTER	OC	WALL LOUVER	WL
ELECTRIC UNIT HEATER	EUH	OPEN ENDED DUCT	OED	WATER COLUMN OR WATER GAUGE	WC OR WG
ELECTRIC WALL HEATER	EWH	OPENING	OPG	WET BULB	WB
ENTERING AIR TEMPERATURE	EAT	OPPOSED BLADE DAMPER	OBD	ZONE DAMPER	ZD
ENTERING WATER TEMPERATURE	EWT	OUTSIDE AIR	OA		
EXHAUST AIR (ENVIRONMENTAL AIR)	EA	OUTSIDE AIR UNIT	OAU		

HVAC SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A 100/6"ø	AIR DEVICE TAG, TYPE "A", BALANCE FOR 100 CFM, 6"ø NECK	M	MOTORIZED DAMPER
BDD	BACK DRAFT DAMPER		RETURN/ EXHAUST AIR DUCT TURNED DOWN
CO/NO2	CARBON MONOXIDE/ NITROGEN DIOXIDE (CO/NO2) SENSOR		RETURN / EXHAUST AIR DUCT TURNED UP
A	CO/NO2 GAS DETECTION SYSTEM ALARM		RETURN / EXHAUST AIR CEILING GRILLE (CEILING)
FSD	COMBINATION FIRE/SMOKE DAMPER (HORIZONTAL)		ROUND CEILING DIFFUSER
FSD	COMBINATION FIRE/SMOKE DAMPER (VERTICAL)		SIDEWALL SUPPLY REGISTER OR GRILLE
D	DUCT DROP		SIDE WALL RETURN AIR REGISTER OR GRILLE
R	DUCT RISE		SLOT DIFFUSER
12x10	DUCT SIZE - RECTANGULAR (OR 12/10)		SPIN IN FITTING W/ DAMPER & FLEX DUCTWORK
8"ø	DUCT SIZE - ROUND		SQUARE CEILING DIFFUSER
	DUCT SMOKE DETECTOR		SUPPLY AIR DUCT TURNED DOWN
	DUCT TRANSITION		SUPPLY AIR DUCT TURNED UP
	DRYER VENT BOX	T S	THERMOSTAT / TEMPERATURE SENSOR
AH	EQUIPMENT DESIGNATION		TURNING VANES
	FIRE DAMPER (HORIZONTAL)	UCD	UNDER CUT DOOR
	FIRE DAMPER (VERTICAL)		WALL CAP (EA OR OA)
	FLEXIBLE DUCT		WALL LOUVER (INTAKE)
	FLEXIBLE DUCT CONNECTOR		WALL LOUVER (EXHAUST)
	LINED DUCT		MECHANICAL EQUIPMENT WITH SERVICE AND AIRFLOW CLEARANCES (AS REQUIRED BY THE MANUFACTURER)
	MANUAL VOLUME DAMPER (RECTANGULAR DUCT)		
	MANUAL VOLUME DAMPER (ROUND DUCT)		

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GEORGIA REGISTERED No. 17742 PROFESSIONAL ENGINEER DONALD SHEFFIELD
11-4-19

ISSUANCES		
No.	Drawing Issue Description	Date
	ISSUED FOR BID	11/04/19

PEBBLEBROOK HS B007 - FIELDHOUSE

DOE Facility Code 4066
FTE = 2787
IU = 143

991 OLD ALABAMA ROAD
MABLETON, GA 30126

COBB COUNTY SCHOOL DISTRICT

GENERAL NOTES AND LEGEND - MECHANICAL

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Project Number: 1810370 Drawn By: JAM Checked By: DWG

DS	20190224.01
Principal-in-Charge	Project No.
DWG	10/01/19
Project Manager	Date
DWG	
Project Architect	
JAM	
Staff Architect	

MF0.01
Drawing No.

ISSUED FOR CONSTRUCTION

PROJECT NUMBER: 20190224.01 PROJECT NAME: PEBBLEBROOK HS B007 - FIELDHOUSE
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