

MECHANICAL NOTES

- ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE LATEST EDITIONS OF THE N.J. STATE UNIFORM CONSTRUCTION CODE (UCC), 2021 INTERNATIONAL BUILDING CODE, 2021 INTERNATIONAL MECHANICAL CODE, 2020 NATIONAL ELECTRICAL CODE (NEC), 2021 NATIONAL STANDARD PLUMBING CODE (NSPC), 2021 INTERNATIONAL FUEL GAS CODE, ASHRAE, SMACNA, OSHA, NFPA, AND LOCAL INSPECTORS HAVING JURISDICTION.
- THE CONTRACTOR(S) SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK. CONTRACTOR(S) SHALL BE TOTALLY RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO SUBMITTING BID. ANY DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT/ENGINEER.
- THESE DRAWINGS ARE SCHEMATIC IN NATURE. EXACT ROUTING OF PIPING AND DUCTWORK, INSTALLATION OF VALVES, ACCESS DOORS, HANGERS, SPECIALTIES, ETC. SHALL BE COORDINATED IN FIELD AS DICTATED BY THE CONDITIONS ENCOUNTERED.
- PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, TOOLS, AND ALL ACCESSORIES REQUIRED FOR THE INSTALLATION OF A COMPLETE HEATING, COOLING, AND VENTILATING SYSTEM AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
- DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS. SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
- THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL REQUIRED PERMITS AND INSPECTIONS AND PAY ALL COSTS FOR THE SAME.
- CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST CONSTRUCTION SKILLS AND ATTENTION. CONTRACTOR SHALL BE TOTALLY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THIS CONTRACT AND COORDINATION WITH OTHER WORK BEING INSTALLED BY OTHERS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA. ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE EFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS.
- CONTRACTOR SHALL COORDINATE HIS WORK WITH THE BUILDING OWNER AND/OR GENERAL CONTRACTOR AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE OWNER AND/OR GENERAL CONTRACTOR.
- ALL EQUIPMENT SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER. ALIGN, LEVEL AND ADJUST FOR SATISFACTORY OPERATION. INSTALL SO THAT THAT CONNECTION AND DISCONNECTION OF PIPING AND ACCESSORIES CAN BE EASILY MADE AND SO THAT ALL PARTS ARE EASILY ACCESSIBLE FOR INSPECTION, MAINTENANCE AND REPAIR.
- ALL PIPING, DUCTWORK AND EQUIPMENT SHALL BE SUPPORTED AND BRACED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST BOCA BUILDING CODE IN REFERENCE TO SEISMIC REQUIREMENTS. ENGAGE THE SERVICES OF A PROFESSIONAL MANUFACTURER OF SEISMIC RESTRAINTS AND BRACING TO BE RESPONSIBLE FOR THE DESIGN AND PERFORMANCE OF ALL SUCH DEVICES. ALL SUCH DEVICES SHALL BE BY A SINGLE MANUFACTURER WHEREVER POSSIBLE. THE STRUCTURAL DESIGN AND APPLICATION OF SEISMIC RESTRAINTS SHALL MEET THE FOLLOWING CRITERIA:  
  

USE GROUP:	B
SEISMIC HAZARD GROUP:	B
EFFECTIVE PEAK VELOCITY:	I
SEISMIC PERFORMANCE CATEGORY:	0.05 ≤ Av ≤ 0.10

ALL HVAC SYSTEM COMPONENTS ARE EXEMPT FROM SEISMIC RESTRAINTS REQUIREMENT AS PER 2021 IBC PARAGRAPH 1610.6
- THE CONTRACTOR SHALL REVIEW A COMPLETE SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT TO MAKE HIMSELF AWARE OF THE WORK OF ALL OTHER TRADES WHICH MAY REQUIRE COORDINATION.
- ALL CONNECTIONS TO SERVICES PROVIDED BY OTHERS SHALL BE COORDINATED WITH THE G.C., OWNER AND OTHER ASSOCIATED CONTRACTORS AS REQUIRED. IN BUILDINGS TO BE MAINTAINED ACTIVE. THESE CONNECTIONS MAY REQUIRE PREMIUM TIME WORK AS DIRECTED BY THE OWNER AND/OR THE G.C.
- ALL PENETRATIONS THROUGH FLOOR ASSEMBLIES, CORRIDOR WALLS AND OTHER SIMILAR FIRE RATED PARTITIONS OR ASSEMBLIES SHALL BE FILLED COMPLETELY WITH A FIRE RETARDANT MATERIAL TO MAINTAIN ITS FIRE RATING.
- ALL EQUIPMENT SHALL BEAR THE LABEL OF AN APPROVED TESTING AGENCY AND SHALL BE INSTALLED IN ACCORDANCE WITH ALL MANUFACTURER'S PUBLISHED RECOMMENDATIONS.
- ALL WORK SHALL OPERATE WITHOUT OBJECTIONABLE NOISE OR VIBRATION. IF, IN THE OPINION OF THE ENGINEER, ARCHITECT, OR OWNER, THE SYSTEM IS FOUND TO BE NOISY, THIS CONTRACTOR SHALL AT HIS OWN EXPENSE MAKE REPAIRS OR CHANGES NECESSARY TO ELIMINATE THE OBJECTIONABLE NOISE.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK SHALL BE RIGID GALVANIZED CONSTRUCTION IN ACCORDANCE WITH ACCEPTED METHODS OF ASHRAE AND SMACNA.
- ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK 10'-0" UPSTREAM AND DOWNSTREAM OF AIR HANDLING EQUIPMENT SHALL BE INTERNALLY LINED WITH 1" THICK DUCT LINER SIMILAR TO "JOHNS MANVILLE PERMACOTE LINACOUSTIC" AND TREATED WITH BIOKID. EDGES SHALL BE COATED. MECHANICAL FASTENERS SHALL BE SPACED IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" AND METAL NOSING SHALL BE INSTALLED AT FAN DISCHARGE. COMPLETELY PURGE THE DUCT SYSTEM TO REMOVE ANY LOOSE FIBERS. DOES NOT APPLY TO BATHROOM, DRYER.
- ALL NON-LINED SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE EXTERNALLY WRAPPED WITH FOILFACED 1 1/2" THICK, WITH CONDUCTIVITY OF 0.29 OR LESS. DUCT WRAP SIMILAR TO "JOHNS MANVILLE MICROLITE". DOES NOT APPLY TO BATHROOM, DRYER AND TRASH ROOM EXHAUST SYSTEMS
- ALL BRANCH TAKE-OFFS SHALL BE FURNISHED AND INSTALLED WITH VOLUME DAMPERS OR VOLUME EXTRACTORS.
- FLEXIBLE DUCTS SHALL BE ZINC COATED SPRING HELIX, BONDED TO DUCT CORE. INSULATION SHALL BE NOMINAL 1", 1.0 P.C.F. DENSITY FIBERGLASS SHIELDED FROM AIR STREAM WITH FULL INTERIOR LINER. VAPOR BARRIER JACKET SHALL BE SEAMLESS COPOLYMER JACKET. FLEXIBLE DUCTWORK SHALL BE LIMITED IN LENGTH TO A MAXIMUM OF 8 FEET.
- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL CONTROL DEVICES AND CONTROL WIRING. CONTROL WIRING SHALL INCLUDE ALL LOW AND LINE VOLTAGE WIRING REQUIRED FOR CONTROL DEVICES SUCH AS DAMPER AND VALVE ACTUATORS, THERMOSTATS AND CONTROL PANELS. COORDINATE ALL LINE VOLTAGE CONTROL POWER REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
- THE MECHANICAL CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROVIDING MOTOR STARTERS AND DISCONNECT SWITCHES REQUIRED FOR HVAC EQUIPMENT.
- ALL SUPPLY, RETURN, OUTSIDE AIR AND EXHAUST AIR SYSTEMS SHALL BE TESTED, BALANCED, AND ADJUSTED TO DELIVER AIR QUANTITIES TO ACCOMPLISH THE DESIGN CRITERIA. SUBMIT A TEST AND BALANCE REPORT FROM A LICENSED PROFESSIONAL ENGINEER OR AABC OR NEBB CERTIFIED PROFESSIONAL. THE BALANCING CONTRACTOR SHALL BE INDEPENDENT OF CONTRACTOR FOR MECHANICAL WORK.
- ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTATION SHALL BE NEATLY ORGANIZED IN A 3 RING BINDER AND SUBMITTED TO THE OWNER/G.C. AT THE COMPLETION OF THE WORK.
- THIS CONTRACTOR SHALL GUARANTEE THE COMPLETE JOB FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF ACCEPTANCE BY THE OWNER. ANY WORK, MATERIALS, OR EQUIPMENT FOUND TO BE DEFECTIVE DURING THAT PERIOD SHALL BE CORRECTED IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER.
- ALL EXPOSED DUCTWORK, EQUIPMENT, ETC. SHALL BE PRIMED BY THE CONTRACTOR. FINAL PAINTING SHALL BE BY THE GENERAL CONTRACTOR. WHERE APPLICABLE, EXPOSED EQUIPMENT SHALL BE FACTORY PAINTED BY THE EQUIPMENT MANUFACTURER. COLOR PER ARCHITECT.
- ALL DUCTWORK SHALL BE RUN AS HIGH AS POSSIBLE, TIGHT TO THE UNDERSIDE OF THE STRUCTURE ABOVE. WHERE DUCTS CROSS, THE MECHANICAL CONTRACTOR SHALL COORDINATE IN THE FIELD SUCH THAT ONE DUCT IS OFFSET UP BETWEEN FRAMING MEMBERS AS REQUIRED.
- THE MECHANICAL CONTRACTOR SHALL CLOSELY COORDINATE THE LOCATION AND REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT WITH THE ELECTRICAL AND PLUMBING CONTRACTORS AND THE BUILDING STRUCTURE.
- THE MECHANICAL CONTRACTOR SHALL PROVIDE TRAINING FOR THE OWNER AND THE OWNER'S STAFF FOR OPERATING AND MAINTAINING ALL SYSTEMS.
- PROVIDE FIRE OR SMOKE DAMPERS AT ALL FIRE OR SMOKE RATED PARTITIONS AS REQUIRED, WHETHER SHOWN OR NOT. PROVIDE DUCT ACCESS DOOR TO ENABLE RESETTING OF DAMPER. COORDINATE WITH ARCHITECTURAL DRAWINGS AND ALL APPLICABLE CODES FOR REQUIRED LOCATIONS.
- AT CONNECTIONS TO PREVIOUSLY INSTALLED SYSTEMS, REPAIR OR REPLACE SHEET METAL, PIPING, INSULATION, ETC., AS REQUIRED TO MATCH EXISTING ADJACENT SURFACES.
- THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING ASSOCIATED WITH THE MECHANICAL WORK, AND FIRE STOPPING OF ALL PENETRATIONS OF FIRE RATED PARTITIONS ASSOCIATED WITH THE MECHANICAL WORK.

- THE MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS DOORS AT ALL LOCATIONS WHICH MAY REQUIRE ACCESS FOR MECHANICAL SYSTEM INSPECTION OR MAINTENANCE. WHERE ACCESS THROUGH GYP. BD. CEILINGS OR WALLS WILL ALSO BE REQUIRED, THE MECHANICAL CONTRACTOR MUST COORDINATE ACCESS REQUIREMENTS WITH GENERAL CONTRACTOR.
- COORDINATE GAS PIPING INSTALLATION WITH PLUMBING CONTRACTOR PRIOR TO INSTALLATION OF UNITS. COORDINATE POWER AND CONTROL WIRING WITH ELECTRICAL CONTRACTOR PRIOR TO INSTALLATION OF UNITS.
- PROVIDE CONDENSATE DRAIN PIPING FROM MECHANICAL ROOM TO OUTSIDE.
- PROVIDE REFRIGERANT TUBING BETWEEN INDOOR UNITS AND OUTDOOR UNITS. RUN TUBING CONCEALED IN WALL AND FLOOR CONSTRUCTION. INSULATE AS REQUIRED.
- ALL PENETRATIONS THROUGH FLOOR ASSEMBLIES, CORRIDOR WALLS AND OTHER SIMILAR FIRE-RATED PARTITIONS SHALL RECEIVE CODE COMPLIANT FIRESTOPPING TO MAINTAIN THE FIRE-RATING OF THE ASSEMBLY PENETRATED. PENETRATIONS OF 2" DIA. OR GREATER SHALL BE INSTALLED WITH FIRESTOP COLLARS.

ENERGY CODE COMPLIANCE NOTES

- OUTDOOR SUPPLY AND RETURN AIR DUCTWORK SHALL BE INSULATED WITH MINIMUM OF R-8 RIGID INSULATION. IN ACCORDANCE WITH ASHRAE 90.1 (2019) TABLES 6.8.2-1 AND 6.8.2-2.
- SUPPLY AND RETURN DUCTWORK LOCATED IN UNCONDITIONED SPACE SHALL BE INSULATED WITH R-6 BATT INSULATION. IN ACCORDANCE WITH ASHRAE 90.1 (2013) TABLES 6.8.2-1 AND 6.8.2-2.
- SUPPLY AND RETURN DUCTWORK LOCATED IN CONDITIONED SPACE SHALL BE INSULATED WITH R-4 BATT INSULATION.
- ALL JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS, AND CONNECTIONS IN DUCTWORK, SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS, (ADHESIVES), MASTIC-PLUS-EMBEDDED FABRIC SYSTEMS OR TAPES. TAPES AND MASTICS USED TO SEAL DUCTWORK SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL181B. DUCT CONNECTIONS TO FLANGES OF AIR DISTRIBUTION SYSTEM EQUIPMENT SHALL BE SEALED AND MECHANICALLY FASTENED. UNLISTED DUCT TAPE IS NOT PERMITTED AS A SEALANT ON ANY METAL DUCTS.
- THE DUCTWORK IS CLASSIFIED AS LOW PRESSURE AND TO BE CONSTRUCTED IN ACCORDANCE WITH MECHANICAL CODE, SMACNA STANDARDS, AND IN ACCORDANCE WITH ICC SECTION C403.2.9.1. ALL LONGITUDINAL AND TRANSVERSE JOINTS, SEAMS AND CONNECTIONS OF SUPPLY AND RETURN DUCTS SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES), MASTIC-PLUS-EMBEDDED-FABRIC SYSTEMS OR TAPES INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- FOR REFRIGERANT SYSTEMS PROVIDE 1" PIPE INSULATION FOR PIPES LESS THAN 1½". PROVIDE 1½" INSULATION FOR PIPES 1½" OR GREATER IN ACCORDANCE WITH ASHRAE 90.1 (2019) TABLES 6.8.3-1 AND 6.8.3-2.
- OPERATING AND MAINTENANCE MANUAL IS TO BE PROVIDED TO THE BUILDING OWNER BY THE MECHANICAL CONTRACTOR.
- DOORS LEADING TO THE OUTDOORS ARE AUTOMATIC/SELF CLOSING. THEREFORE, AS PER ASHRAE 90.1 (2019) SECTION 6.5.10 EXCEPTION #1, DOOR SWITCHES TO DISABLE MECHANICAL COOLING/HEATING WHEN DOORS ARE OPEN ARE NOT REQUIRED.

- \* ALL MOTORIZED DAMPERS SHALL BE CLASS I RATED FOR AIR LEAKAGE.
- \* ALL EQUIPMENT MUST BE UL/REFERENCE STANDARD APPROVED

PROFESSIONAL STATEMENT :

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THIS APPLICATION IS IN COMPLIANCE WITH ASHRAE 90.1-2019.

SYMBOLS & LEGEND KEY

	NEW DUCTWORK (SINGLE LINE)
	NEW DUCTWORK
	1.5" ACOUSTICAL LINING
	2HR FIRE RATED ENCLOSURE
	VOLUME DAMPER
	CLEANOUT
	FLEXIBLE CONNECTION
	FIRE DAMPER AND ACCESS DOOR
	FIRE/SMOKE DAMPER AND ACCESS DOOR
	C&S AIR PRODUCTS MODEL RD-521 CEILING RADIATION DAMPER
	CEILING REGISTER
	1.5" ACOUSTICAL LINING. SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS
	DRAIN
	WIREMESH SCREEN
	MOTORIZED DAMPER
	OPEN ENDED DUCT
	MOTORIZED DAMPER
	THERMOSTAT
	TOP REGISTER
	CEILING GRILLE

GENERAL NOTES

- COORDINATE ALL WORK WITH THE ARCHITECTURAL DRAWINGS. VERIFY LOCATION OF ALL VISIBLE DEVICES WITH ARCHITECT PRIOR TO INSTALLATION, INCLUDING THERMOSTATS, DIFFUSERS, GRILLES, REGISTERS, SENSOR ETC. APPEARANCE OF ALL VISIBLE DEVICES SHALL MATCH APPEARANCE OF EXISTING DEVICES FOR FINISH, COLOR AND MOUNTING FRAME. RECEIVE APPROVAL FROM THE ARCHITECT FOR ALL DEVICES PRIOR TO PURCHASE.
- ALL SHEETMETAL SIZES INDICATED ARE CLEAR INSIDE DIMENSIONS.
- CONTRACTOR SHALL FOLLOW BUILDING RULES & REGULATIONS AND THEIR DESIGN GUIDELINES.
- BALANCE DIFFUSERS TO CFM SHOWN ON DRAWING.
- DRAWINGS ARE INTENDED TO SHOW THE PROPER SIZE AND GENERAL LOCATION OF THE EQUIPMENT, PIPING, DUCTWORK, ETC. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONNECTIONS. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENTS OF SYSTEMS AND WORK INCLUDED IN CONTRACT. DEVIATION FROM LAYOUT SHOWN MUST BE APPROVED BY THE ARCHITECT/ENGINEER.
- ALL DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR DROPS, RISES AND TRANSITIONS.
- THE SHEET METAL SHOP DRAWINGS SHALL INDICATE ALL HUNG CEILING STARTING POINTS, ELEVATIONS AND BREAK LINES. WHERE PIPING, LIGHTS AND DUCTWORK CONFLICTS, DUCTWORK SHALL BE SET UP OR DOWN.
- ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LINE VOLTAGE CONDUIT AND WIRE. MAKE ALL LINE VOLTAGE FINAL WIRING CONNECTIONS. FURNISH AND INSTALL DISCONNECT SWITCHES UNLESS FURNISHED AS PART OF PACKAGE EQUIPMENT.
- PROVIDE MANUAL DAMPERS IN EACH SPLIT OR TAP CONNECTION TO TRUNK DUCTS FOR BALANCING PURPOSES, EACH DAMPER PROVIDED WITH OPERATOR AND LOCKING DEVICE.
- CONTRACTOR SHALL SUPPLY "AS BUILT DRAWINGS" AT THE CONCLUSION OF THE JOB.
- CONTRACTOR TO BE RESPONSIBLE FOR DIFFUSER FRAME TYPE. MUST APPROVED BY ARCHITECT.
- ALL HVAC SYSTEMS SHALL CONFORM WITH NEW JERSEY STATE BUILDING CODE, NEW JERSEY STATE ENERGY CONSERVATION CODE AND ALL APPLICABLE JURISDICTIONAL BODIES. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND APPROVALS, FEES AND CLOSEOUTS.
- ALL DUCTWORK SHALL BE AND TESTED SEALED, BALANCED TO AN ALLOWABLE LEAKAGE OF 5%. SUBMIT BALANCE REPORT FOR APPROVAL TO DESIGN TEAM (ENGINEER/ARCHITECT)
- CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR THE PERIOD OF ONE (1) YEAR.
- CONTRACTOR SHALL BE RESPONSIBLE FOR BALANCING OF AIR QUANTITIES AT ALL AIR CONDITIONING OUTLETS AND RETURNS AS SHOWN ON THE PLANS.
- ALL HVAC DUCTWORK SHALL BE SUPPORTED FROM FLOOR BEAMS EITHER DIRECTLY OR INDIRECTLY BY MEANS OF STEEL FRAMEWORK. ALL EQUIPMENT SUSPENSION MUST BE APPROVED BY THE BUILDING STRUCTURAL ENGINEER. METHOD FOR HANGING EQUIPMENT WILL BE DETAILED ON THE SHEET METAL SHOP DRAWINGS.
- SHOP DRAWINGS SHALL BE PREPARED WITH COMPLETE DIMENSIONAL INFORMATION, INCLUDING COORDINATES TO BRANCH DUCT AND DIFFUSERS STUBS. ELEVATIONS TO THE UNDERSIDE OF EXISTING LOW PRESSURE DUCTS AND NEW DUCTS, SHALL BE CLEARLY INDICATED ON THE DRAWING SUBMITTED AND SHALL BE CAREFULLY CHECKED FOR CONFORMANCE WITH CEILING HEIGHT REQUIREMENTS. ALL CONFLICTS MUST BE FLAGGED ON THE SHOP DRAWINGS. SHOP DWG SHALL INCLUDE A LIST OF REFERENCE DRAWINGS USED.
- THIS CONTRACTOR IS RESPONSIBLE TO COORDINATE AND INCLUDE IN HIS BID THE RELOCATION OF ALL PIPING, HANGERS, CONDUITS, ETC. REQUIRED TO INSTALL DUCTWORK.
- SUPPORT, PROTECT, MAINTAIN AND REPAIR ANY DAMAGED DUCTWORK, PIPING AND INSULATION AFFECTED BY THE WORK OF THIS PROJECT.
- FURNISH ALL LABOR AND MATERIALS, TOOLS, EQUIPMENT AND SERVICES TO PERFORM THE ALTERATION AS INDICATED.
- WHERE PIPING, LIGHTS AND DUCTWORK CONFLICT, DUCTWORK SHALL SET UP AND DOWN.
- PROVIDE FITTINGS FOR CHANGE IN PIPE SIZES FOR FINAL CONNECTION AS REQUIRED.
- PROVIDE UNION OR FLANGED CONNECTIONS AT EACH PIECE OF EQUIPMENT AND ON BOTH SIDES OF CONTROL VALVES.
- DRAINAGE PIPING PITCH NOT LESS THAN 1/8" PER FOOT.
- PROVIDE ACCESS DOORS IN DUCTWORK WHERE INDICATED OR REQUIRED FOR ACCESS TO SYSTEM COMPONENTS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:  
A. REHEAT COILS  
B. VOLUME DAMPERS  
C. VALVES
- PROVIDE FIRE/SMOKE DAMPERS (WITH ACCESS DOORS) AT THE FOLLOWING POINTS.  
A. POINT OF PASSING THROUGH SHAFT WALLS TO CONNECT TO VERTICAL RISERS.  
B. WHERE PASSING THROUGH FLOOR OR ROOF CONSTRUCTION.  
C. WHERE PASSING THROUGH FIRE RATED PARTITIONS (REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION OF FIRE RATED PARTITIONS).  
D. WHERE INDICATED OR REQUIRED BY CODE.
- FOR PIPE CONNECTION DETAILS FOR EQUIPMENT, SEE DETAILS ON DRAWINGS.
- FOR AREAS WITH INACCESSIBLE CEILINGS, VOLUME DAMPERS SHALL BE PROVIDED WITH METAL FLEXIBLE CABLE OPERATORS FOR REMOTE OPERATION OF DAMPERS THROUGH FACE OF DIFFUSERS, GRILLES OR REGISTERS.
- ALL DUCTWORK IS TO BE KEPT AS HIGH AS POSSIBLE SO AS TO MAINTAIN CEILING HEIGHTS SHOWN ON ARCHITECTURAL DRAWINGS.
- PROVIDE DRAIN VALVES AT ALL LOW POINTS OF ALL WATER SYSTEM.
- PROVIDE CONDENSATE PUMP FOR EACH AC UNIT, FAN COIL UNIT, ETC. IF GRAVITY CONDENSATE REMOVAL IS NOT POSSIBLE.



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OWNER / APPLICANT :

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917.855.5050 - 646.643.8104

PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

DRAWING NAME :  
MECHANICAL COVER SHEET

BLDG DEPT REF. # SCALE:  
AS NOTED

SIGNATURE & SEAL  
ALEXEY WAPILIS  
ENGINEER  
N.J. LIC. No. GE56570  
DATE:  
12/10/2021

DRAWING #  
M-001

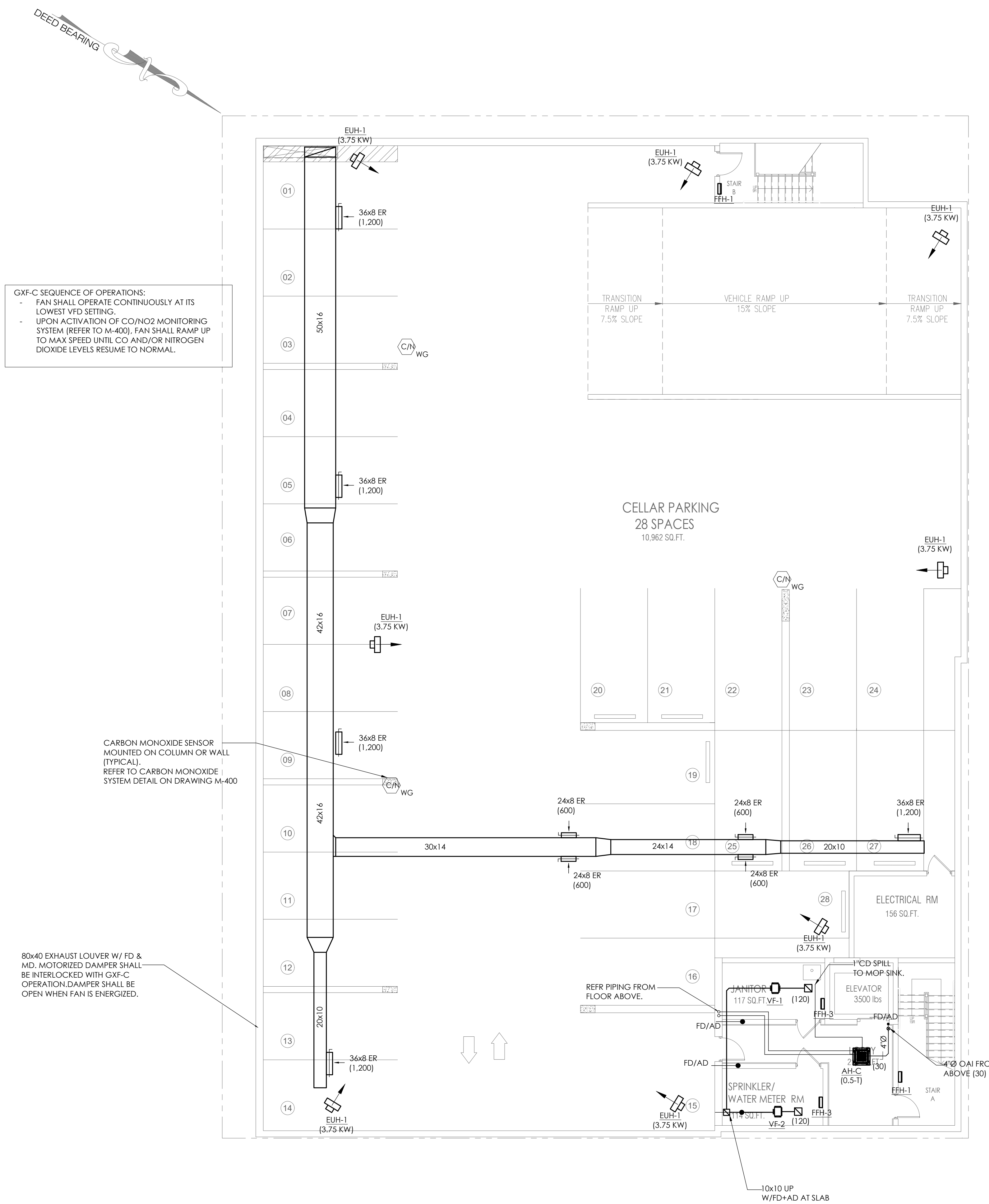
PROJECT # : 2021.09.02



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GXF-C SEQUENCE OF OPERATIONS:  
- FAN SHALL OPERATE CONTINUOUSLY AT ITS LOWEST VFD SETTING.  
- UPON ACTIVATION OF CO/NO2 MONITORING SYSTEM (REFER TO M-400), FAN SHALL RAMP UP TO MAX SPEED UNTIL CO AND/OR NITROGEN DIOXIDE LEVELS RESUME TO NORMAL.

CARBON MONOXIDE SENSOR MOUNTED ON COLUMN OR WALL (TYPICAL). REFER TO CARBON MONOXIDE SYSTEM DETAIL ON DRAWING M-400

80x40 EXHAUST LOUVER W/ FD & MD. MOTORIZED DAMPER SHALL BE INTERLOCKED WITH GXF-C OPERATION. DAMPER SHALL BE OPEN WHEN FAN IS ENERGIZED.

① MECHANICAL FLOOR PLAN - CELLAR FLOOR  
1/8" = 1'-0"

PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

DRAWING NAME:  
MECHANICAL CELLAR PLAN

BLDG DEPT REF.# SCALE:  
AS NOTED

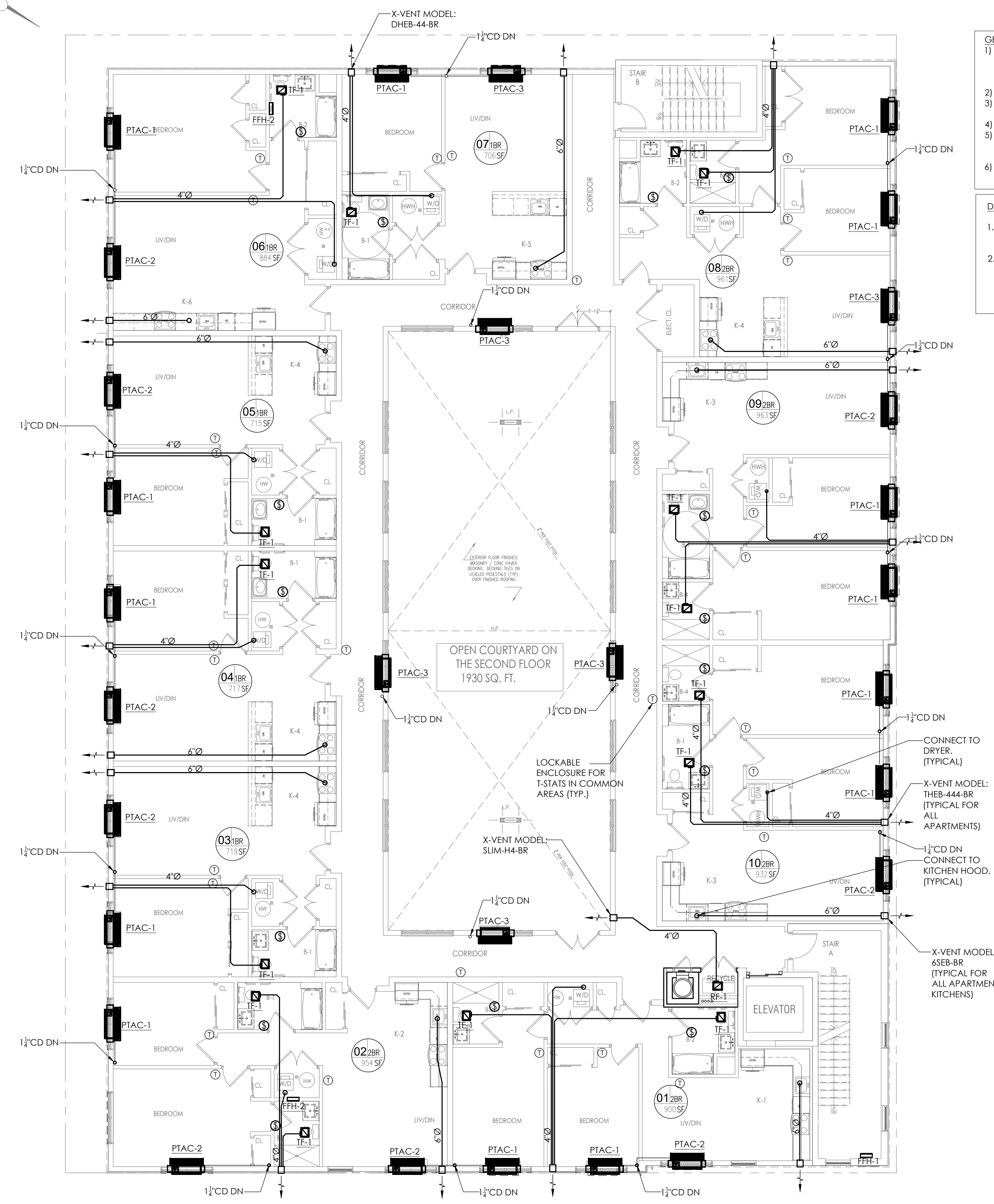
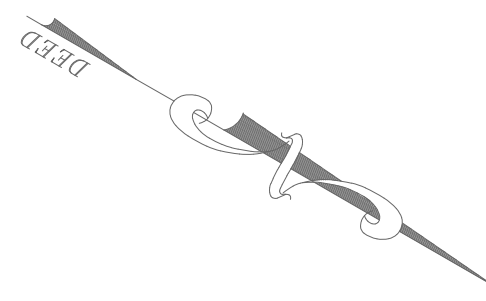
SIGNATURE & SEAL  
ALEXEY MARSH  
ENGINEER  
N.J. LIC. No. GE56570

DATE:  
12/10/2021

DRAWING #  
M-100

PROJECT #: 2021.09.02





- GENERAL NOTES:**
- 1) IT IS THE DESIGN INTENT TO TERMINATE ALL SIDE WALL EXHAUSTS A MINIMUM OF 3 FEET FROM ANY OPERABLE WINDOW. CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO INSTALLATION IF ANY EXHAUSTS DUCT DOES NOT MEET THIS REQUIREMENT.
  - 2) REFER TO PLUMBING PLANS FOR HOT WATER HEATER SPECIFICATIONS.
  - 3) MECHANICAL CONTRACTOR SHALL INSTALL ALL KITCHEN HOOD DUCTWORK AND VENTS.
  - 4) ALL EXHAUST DUCTWORK SHALL BE AT LEAST 26 GAGE STEEL.
  - 5) ALL PENETRATIONS THROUGH CEILING SHALL BE FIREPROOFED USING HILT FIRESTOP SEALANT WHICH HAVE BEEN TESTED IN ACCORDANCE WITH ASTM E814 OR UL 1479
  - 6) PROVIDE THERMOSTATS WITH LOCKABLE COVERS FOR ALL COMMON SPACES.

- DUCTWORK NOTES:**
1. ANY DUCT PENETRATION THROUGH A RATED CEILING ASSEMBLY WITHIN APARTMENTS SHALL BE PROTECTED WITH A RADIATION DAMPER.
  2. ANY DUCT PENETRATION THROUGH A RATED CEILING ASSEMBLY IN PUBLIC CORRIDORS SHALL BE PROTECTED WITH A CORRIDOR DAMPER (RUSKIN MODEL: FSD36C)

1 MECHANICAL FLOOR PLAN - 2ND - 3RD TYPICAL FLOOR  
1/8" = 1'-0"



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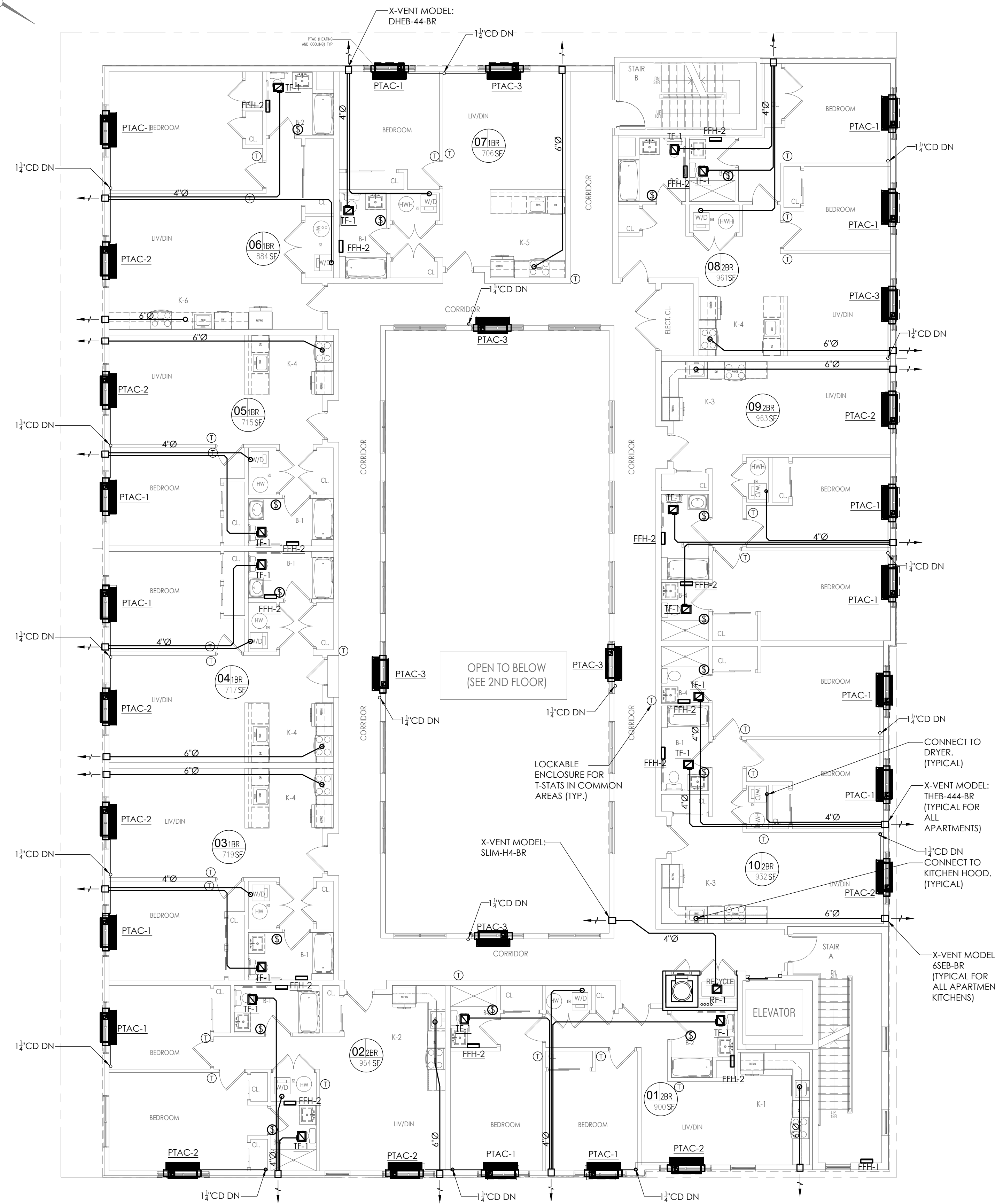
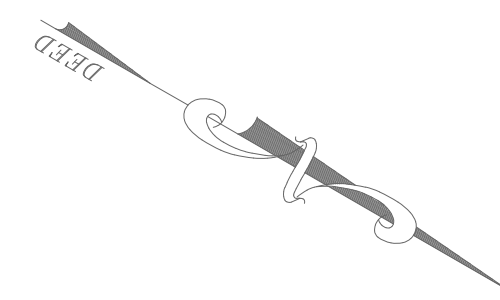
DRAWING NAME:  
MECHANICAL 2ND-3RD TYPICAL FLOOR PLAN

BLDG DEPT REF.# SCALE:  
AS NOTED

SIGNATURE & SEAL DATE:  
ALEXEY MAHLIS ENGINEER 12/10/2021  
N.J. LIC. No. GE56570

DRAWING #  
**M-102**

PROJECT #: 2021.09.02



- GENERAL NOTES:**
- 1) IT IS THE DESIGN INTENT TO TERMINATE ALL SIDE WALL EXHAUSTS A MINIMUM OF 3 FEET FROM ANY OPERABLE WINDOW. CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO INSTALLATION IF ANY EXHAUSTS DUCT DOES NOT MEET THIS REQUIREMENT.
  - 2) REFER TO PLUMBING PLANS FOR HOT WATER HEATER SPECIFICATIONS.
  - 3) MECHANICAL CONTRACTOR SHALL INSTALL ALL KITCHEN HOOD DUCTWORK AND VENTS.
  - 4) ALL EXHAUST DUCTWORK SHALL BE AT LEAST 26 GAGE STEEL.
  - 5) ALL PENETRATIONS THROUGH CEILING SHALL BE FIREPROOFED USING HILTI FIRESTOP SEALANT WHICH HAVE BEEN TESTED IN ACCORDANCE WITH ASTM E814 OR UL 1479
  - 6) PROVIDE THERMOSTATS WITH LOCKABLE COVERS FOR ALL COMMON SPACES.

- DUCTWORK NOTES:**
1. ANY DUCT PENETRATION THROUGH A RATED CEILING ASSEMBLY WITHIN APARTMENTS SHALL BE PROTECTED WITH A RADIATION DAMPER.
  2. ANY DUCT PENETRATION THROUGH A RATED CEILING ASSEMBLY IN PUBLIC CORRIDORS SHALL BE PROTECTED WITH A CORRIDOR DAMPER (RUSKIN MODEL: FSD36C)

1 MECHANICAL FLOOR PLAN - 4TH FLOOR  
1/8" = 1'-0"



ARCHITECT:  
AK ARCHITECTURE  
151 WEST PASSAIC STREET  
ROCHELLE PARK NJ  
07662  
TEL: 201-906-6359  
AK@AKARCHUSA.COM

OWNER / APPLICANT :

MEP ENGINEER:  
MAE Engineering, PLLC  
81 Serrell Ave  
Staten Island, NY 10312  
917.855.5050 - 646.643.8104

PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

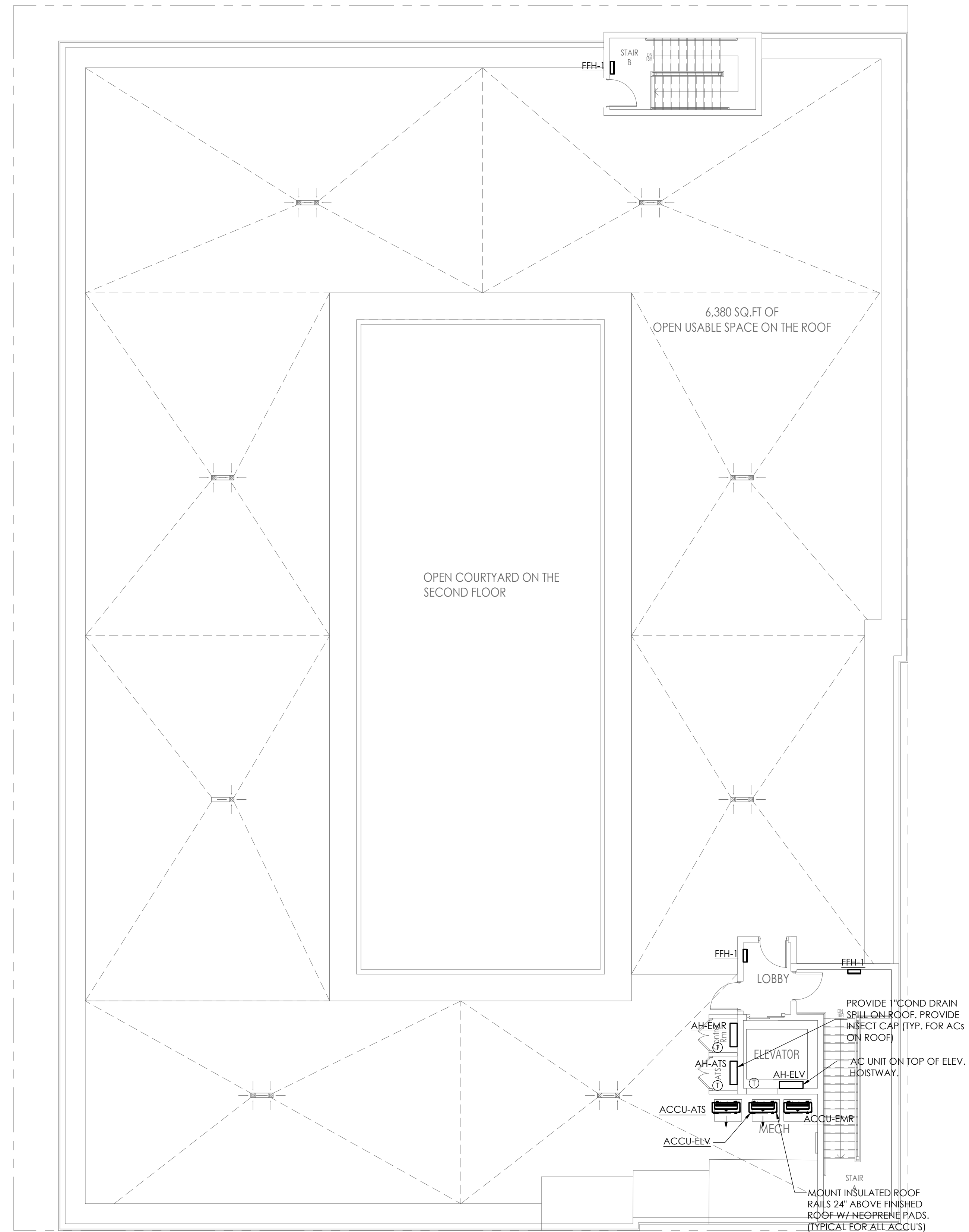
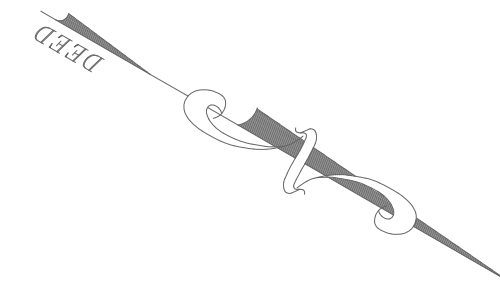
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MECHANICAL 4TH  
FLOOR PLAN

BLDG DEPT REF.# SCALE:  
AS NOTED

SIGNATURE & SEAL  
ALEXEY WAPILIS  
ENGINEER  
N.J. LIC. No. GE56570 DATE:  
12/10/2021

DRAWING #  
**M-103**

PROJECT #: 2021.09.02



① MECHANICAL FLOOR PLAN - ROOF  
1/8" = 1'-0"



ARCHITECT:  
AK ARCHITECTURE  
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OWNER / APPLICANT :

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PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

DRAWING NAME:  
MECHANICAL ROOF PLAN

BLDG DEPT REF. # SCALE:  
AS NOTED

SIGNATURE & SEAL  
ALEXEY MARULIS  
ENGINEER  
N.J. LIC. No. GE56570

DATE:  
12/10/2021

DRAWING #

**M-104**

PROJECT #: 2021.09.02



ARCHITECT:  
AK ARCHITECTURE  
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OWNER / APPLICANT :

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### SQUARE NECK OUTLET SCHEDULE (FOR RATED CEILING ASSEMBLIES W/ WOOD TRUSSES)

SYMBOL	NECK SIZE	MODULE SIZE	CFM RANGE	NOISE CRITERIA (Nc)	Tuttle & Bailey MODEL No	CEILING RADIATION DAMPER ASSEMBLY MANUFACTURER / MODEL No
SR	9x9	Duct + 5-9/16	101-250	<20	M-SF (4way)	C&S AIR PRODUCTS / RD-521
SR	12X12	Duct + 5-9/16	251-500	21	M-SF (4way)	C&S AIR PRODUCTS / RD-521
SR	15X15	Duct + 5-9/16	501-750	21	M-SF (4way)	C&S AIR PRODUCTS / RD-521
SR	18X18	Duct + 5-9/16	751-900	20	M-SF (4way)	C&S AIR PRODUCTS / RD-521
RG	6x6	Duct+1-13/16	0-100	28	A70D	C&S AIR PRODUCTS / RD-521
RG	9x9	Duct+1-13/16	101-250	38	A70D	C&S AIR PRODUCTS / RD-521
RG	12X12	Duct+1-13/16	251-500	38	A70D	C&S AIR PRODUCTS / RD-521
RG	14x14	Duct+1-13/16	501-750	41	A70D	C&S AIR PRODUCTS / RD-521
RG	18X18	Duct+1-13/16	751-900	35	A70D	C&S AIR PRODUCTS / RD-521

NOTES:  
1) MECHANICAL CONTRACTOR TO COORDINATE BORDER TYPES WITH CLG. CONSTRUCTION. SEE ARCHITECTURAL REFLECTED CLG. DRAWINGS.  
2) TUTTLE & BAILEY MODEL M-SF FOR SURFACE MOUNTED AND GYB BOARD CEILINGS.  
3) DIFFUSERS LOCATED IN GYP. BOARD SHALL BE FURNISHED WITH CABLE DAMPERS YOUNG REGULATOR MODEL #800AW.  
4) DIFFUSERS TO BE CONSTRUCTED OF ALUMINUM WITH WHITE FINISH.  
5) PROVIDE C&S AIR PRODUCTS MODEL RD-521 CEILING RADIATION DAMPER FOR ALL AIR OUTLETS IN RATED CEILING MEMBRANES.  
6) PROVIDE RUSKIN FSD36C CORRIDOR DAMPER FOR ALL PENETRATIONS OF RATED CORRIDOR CEILING MEMBRANES.

### AIR COOLED CONDENSING UNIT SCHEDULE

UNIT NO.	SERVICE	LOCATION	NOMINAL COOLING CAPACITY,TON	COOLING DATA		HEATING DATA		ELECTRICAL DATA			MANUFACTURER AND MODEL No.	REMARKS	WEIGHT LBS.	EFFICIENCY
				CAP/BTU	SEER2	CAP/BTU	HSPF2	MCA/MFS	VOLTS	PH				
ACCU-EMR	AH-EMR	ROOF	1.5 TONS	18,000	21.600	19	30	208	1	LG KJUSAB181A	HEAT PUMP PROVIDE LOW AMBIENT KIT	140	SEER2: 23 HSPF2: 10.0	
ACCU-ELV	AH-ELV	ROOF	1.5 TONS	18,000	21.600	19	30	208	1	LG KJUSAB181A	HEAT PUMP PROVIDE LOW AMBIENT KIT	140	SEER2: 23 HSPF2: 10.0	
ACCU-ATS	AH-ATS	ROOF	0.8 TONS	9,000	10,900	12	15	208	1	LG KJUSAB091A	HEAT PUMP PROVIDE LOW AMBIENT KIT	140	SEER2: 23.8 HSPF2: 10.9	
ACCU-1	AH-1.C	GROUND FL.	2 TON	24,000	27,000	26.4	30	208	1	LG ZRUN024GSS0	HEAT PUMP PROVIDE LOW AMBIENT KIT	140	SEER2: 20.05 HSPF2: 10.2	

NOTES:  
1. INSULATE ALL LINES. 1" INSULATION FOR INDOOR PIPING LESS THAN 1.5". ALL OTHER SIZES, AND OUTDOOR PIPING SHALL HAVE 1.5" INSULATION.  
2. ACCU TO BE MOUNTED ON A INSULATED CURB 18"-24" IN HEIGHT.  
3. CONTACT KLIMA NEW YORK, LLC @ 212-678-5100

### AIR HANDLING UNIT SCHEDULE

UNIT No.	SERVICE	CFM	NOMINAL COOLING CAPACITY,TON	COOLING DATA		HEATING DATA		ELECTRICAL DATA			MANUFACTURER AND MODEL No	REMARKS
				CAP/BTU	SEER2	CAP/BTU	HSPF2	VOLTS	PH	MCA/MFS		
AH-EMR	EMR	706	1.5	18,000	21,600	POWERED BY ACCU			LG KNUJAB181A	WALL MOUNTED		
AH-ELV	ELEV. HOISTWAY	706	1.5	18,000	21,600	POWERED BY ACCU			LG KNUJAB181A	WALL MOUNTED		
AH-ATS	ATS	459	0.8	9,000	10,900	POWERED BY ACCU			LG KNUJAB091A	WALL MOUNTED		
AH-1	1ST FL LOBBY	335	1.0	12,000	13,800	208	1	0.25 AMPS	LG KNUJDB121A	4-WAY CASS.		
AH-C	CELLAR	265	0.5	7,000	8,100	208	1	0.25 AMPS	LG KNUJDB071A	4-WAY CASS.		

### DIFFUSER AND REGISTER SCHEDULE (FOR USE IN NON RATED CEILING ASSEMBLIES)

SYMBOL	MANUFACTURER	MODEL	CFM RANGE	SERVICE	NK SIZE	PANEL SIZE	ACCESSORIES	TYPE	REMARKS
CD	ANEMOSTAT	EPL-D	0-125	SUPPLY	6" DIA.	24x24	-	LAY-IN	SEE NOTES
CD	ANEMOSTAT	EPL-D	126-275	SUPPLY	8" DIA.	24x24	-	LAY-IN	SEE NOTES
CR	ANEMOSTAT	SAC3LD	0-500	RETURN	23x11	24x12	OBD	LAY-IN	DUCTED RETURN REGISTER. SEE NOTES
CR	ANEMOSTAT	SAC3LD	501-1000	RETURN	23x23	24x24	OBD	LAY-IN	DUCTED RETURN REGISTER. SEE NOTES
CR	ANEMOSTAT	S30HD	0-375	RETURN	12x12	-	OBD	SURFACE	DUCTED RETURN REGISTER. SEE NOTES
CG	ANEMOSTAT	SAC3LD	0-500	RETURN	23x11	24x12	-	LAY-IN	NON-DUCTED RETURN GRILLES. SEE NOTES
CG	ANEMOSTAT	SAC3LD	501-1000	RETURN	23x23	24x24	-	LAY-IN	NON-DUCTED RETURN GRILLES. SEE NOTES
CG	ANEMOSTAT	S30HD	0-250	RETURN	12x12	-	-	SURFACE	NON-DUCTED RETURN GRILLES. SEE NOTES
ER	ANEMOSTAT	HD35	0-600	GARAGE EXHAUST	12x12	-	-	SURFACE	EXHAUST GRILLE IN GARAGE SEE NOTES

NOTES:  
1) MECHANICAL CONTRACTOR TO COORDINATE BORDER TYPES WITH CLG. CONSTRUCTION.  
2) FURNISH PLASTER FRAMES FOR SHEETROCK AREAS. ANEMOSTAT MODEL "1BF".  
3) DIFFUSERS LOCATED IN GYP. BOARD SHALL BE FURNISHED WITH CABLE DAMPERS YOUNG REGULATOR MODEL #800AW.  
4) ALL BALANCING TO BE PERFORMED THRU BRANCH DAMPERS.  
5) ALL EPL-D DIFFUSERS FURNISHED WITH DIRECTIONAL ADJUSTABLE DEFLECTORS.  
6) CFM SHALL BE INDICATED ON DRAWINGS

### ELECTRIC HEATER SCHEDULE

UNIT ID	SERVICE	LOCATION	SUPPLY CFM	CAPACITY MBH	ELECTRICAL DATA				MANUFACTURER	MODEL #	REMARKS	
					POWER WATTS	MCA	MOP	VOLTS				PH
FFH-1	VARIABLES	WALL	300	13.65	4,000	19.2	25	208	1	QMARK	AWH4408F	WALL SURFACE MOUNTED
FFH-2	BATHROOM	WALL	-	2.56	750	6.3	15	120	1	BERKO	GFR1500T2F	WALL RECESS MOUNTED W/ BUILT-IN THERMOSTAT
FFH-3	VARIABLES	WALL	-	2.56	750	6.3	15	120	1	BERKO	GFR1500T2F	WALL RECESS MOUNTED W/ BUILT-IN THERMOSTAT
EUH-1	VARIABLES	CEILING PLENUM	375	12.8	3,750	10.4		208	3	INDEECO	P-961U5000K-T	WALL MOUNT SWIVEL BRACKET KIT W/ BUILT-IN THERMOSTAT

NOTES:  
1. PROVIDE LOW VOLTAGE RELAY SECTION AND TRANSFORMER.  
2. COLOR SELECTED BY ARCHITECT PROVIDE HEATERS WITH DISCONNECT SWITCH, SINGLE-POLE THERMOSTAT (BUILT-IN) AND SINGLE-POLE LOW VOLTAGE RELAY WITH BUILT-IN TRANSFORMER (24 VAC CONTROL).

### DUCTWORK INSULATION

DUCTWORK IN CONDITIONED SPACES	PROVIDE MINIMUM R-4 INSULATION
DUCTWORK IN UNCONDITIONED SPACES	PROVIDE MINIMUM R-6 INSULATION
OUTDOOR DUCTWORK	PROVIDE MINIMUM R-8 RIGID INSULATION

### PIPING INSULATION

CONDENSATE DRAIN PIPING	PROVIDE 1/2" PIPE INSULATION FOR COPPER PIPING. NO INSULATION REQUIRED IF PVC PIPE IS USED.
REFRIGERANT PIPING	INDOOR PIPING: 1" ARMAFLEX INSULATION FOR PIPING LESS THAN 1 1/2" IN DIAMETER. 1 1/2" ARMAFLEX INSULATION FOR ALL OTHER PIPE SIZES. OUTDOOR PIPING: 1 1/2" ARMAFLEX INSULATION

### PACKAGED TERMINAL AIR CONDITIONER

UNIT No.	SERVICE	COOLING CAPACITY BTU/HR	HEATING CAPACITY BTU/HR	ELECTRIC HEATER			CFM	ELECTRICAL DATA				EER	COP	MANUFACTURER	MODEL #	
				HEATING BTU/HR	HEATING WATTS	MODEL		AMPS	VOLTS	PH	MCA					MOCP
PTAC-1	APARTMENTS	9,200	10,300	N/A	N/A	N/A	380	3.5	208	1	7.9	15	12.1	4.1	ICE AIR	RSXC09
PTAC-2	APARTMENTS	12,500	13,700	N/A	N/A	N/A	400	5.2	208	1	9.9	15	11.3	3.7	ICE AIR	RSXC13
PTAC-3	APARTMENTS & CORRIDORS	16,300	17,900	N/A	N/A	N/A	480	8.4	208	1	12.9	20	11.3	3.23	ICE AIR	RSXC18

NOTES:  
1. PROVIDE REMOTE, WALL MOUNTED SMART THERMOSTAT (SMART PHONE CONTROL CAPABLE). MODEL TO BE APPROVED BY OWNERSHIP.  
2. REFRIGERANT R-32.  
3. PROVIDE BUILT-IN MAKEUP AIR DAMPER FOR EACH PTAC.

### FAN SCHEDULE

UNIT ID	SERVICE	LOCATION	CFM	ESP (IN. W.C.)	FRPM	ELECTRICAL DATA				MANUFACTURER	MODEL #	NOTES
						HP	BHP	VOLTS	PH			
TF-1	TOILETS	CEILING	50	0.38	1,374	-	-	120	1	PANASONIC	FV-0511VF1	1 - 3, 6, 14
RF-1	RECYCLE RM	CEILING	50	0.38	1,374	-	-	120	1	PANASONIC	FV-0511VF1	1 - 3, 6, 14
VX-1,VF-1,2	COMPACTOR RM	GROUND FL	120	0.6"	2,750	30 WATTS	-	115	1	GREENHECK	CSP-A390-VG	1, 3, 4
OAF-1	LOBBY	GROUND FL	50	0.5"	1,114	30 WATTS	1.5 FLA	115	1	GREENHECK	CSP-A390-VG	1, 3, 4
GXF-1	GARAGE	GROUND FL.	8,400	1.0"	1,114	5	2.72	208	3	GREENHECK	SQ-20-M2-VG	1, 3, 5, 9, 10
GXF-C	GARAGE	CELLAR	8,400	1.0"	1,114	5	2.72	208	3	GREENHECK	SQ-20-M2-VG	1, 3, 5, 9, 10

NOTES:  
1. PROVIDE FLEXIBLE DUCT CONNECTIONS  
2. PROVIDE BACKDRAFT DAMPER  
3. PROVIDE DISCONNECT SWITCH.  
4. FAN SHALL RUN 24/7.  
5. HANGING VIBRATION ISOLATORS.  
6. FAN SHALL BE CONTROLLED BY LIGHT SWITCH.  
7. PROVIDE ROOF CURB.  
8. PROVIDE WITH VARIGREEN CONSTANT PRESSURE CONTROL, CONSTANT PRESSURE INTEGRAL TRANSDUCER, TRANSFORMER, DIAL.  
9. PROVIDE W/ VFD.  
10. FAN SHALL BE CONTROLLED BY CO/NO2 DETECTION SYSTEM.  
11. PROVIDE PANASONIC CEILING RADIATION DAMPER, MODEL PC-RD05C5 WHEN FAN IS INSTALLED IN A RATED CEILING MEMBRANE AND APARTMENT UNITS.

PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

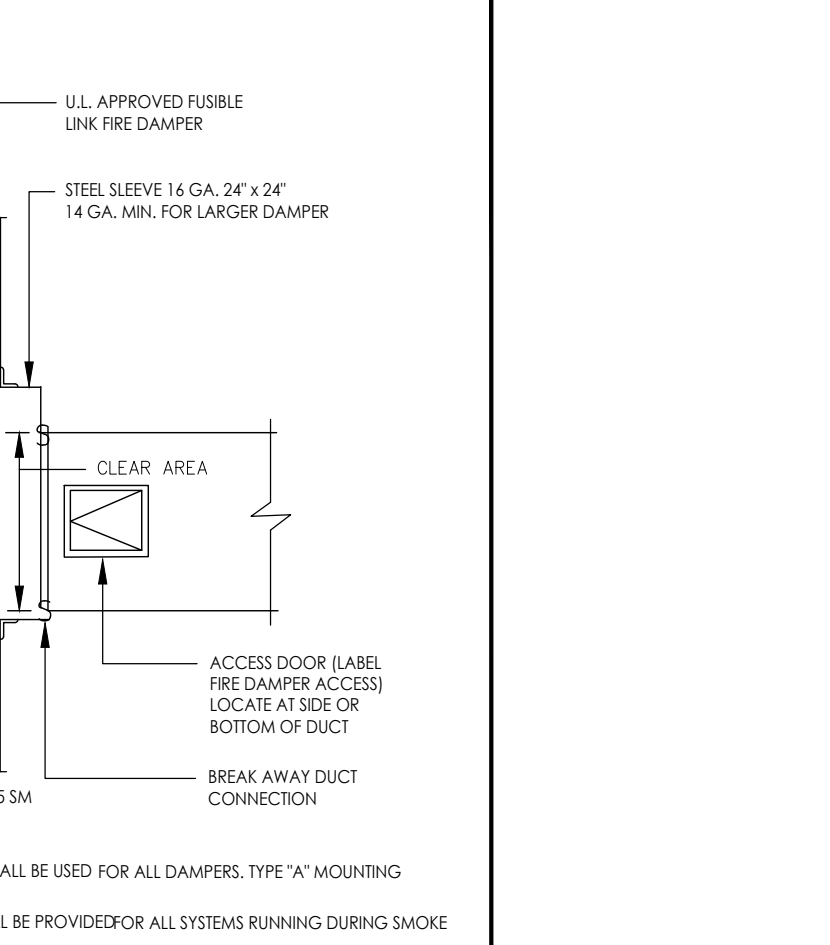
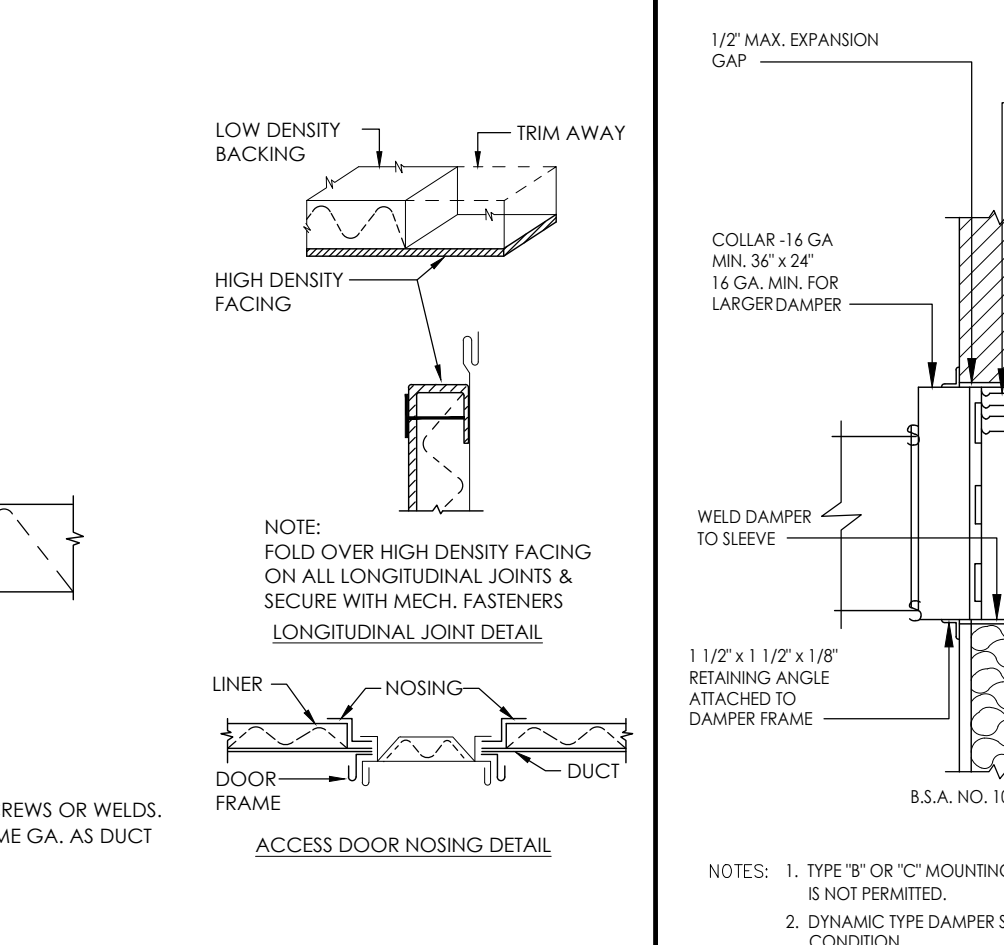
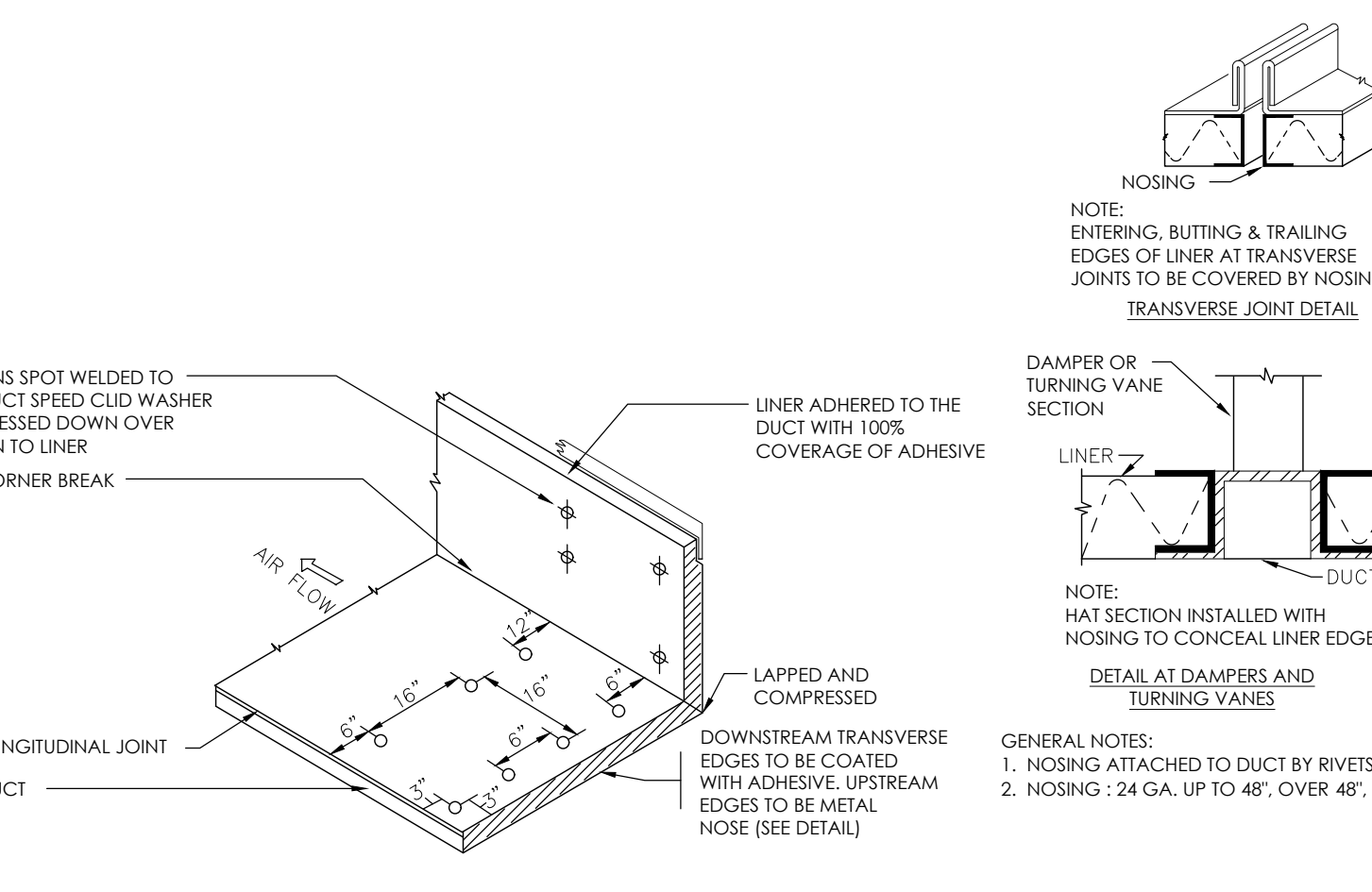
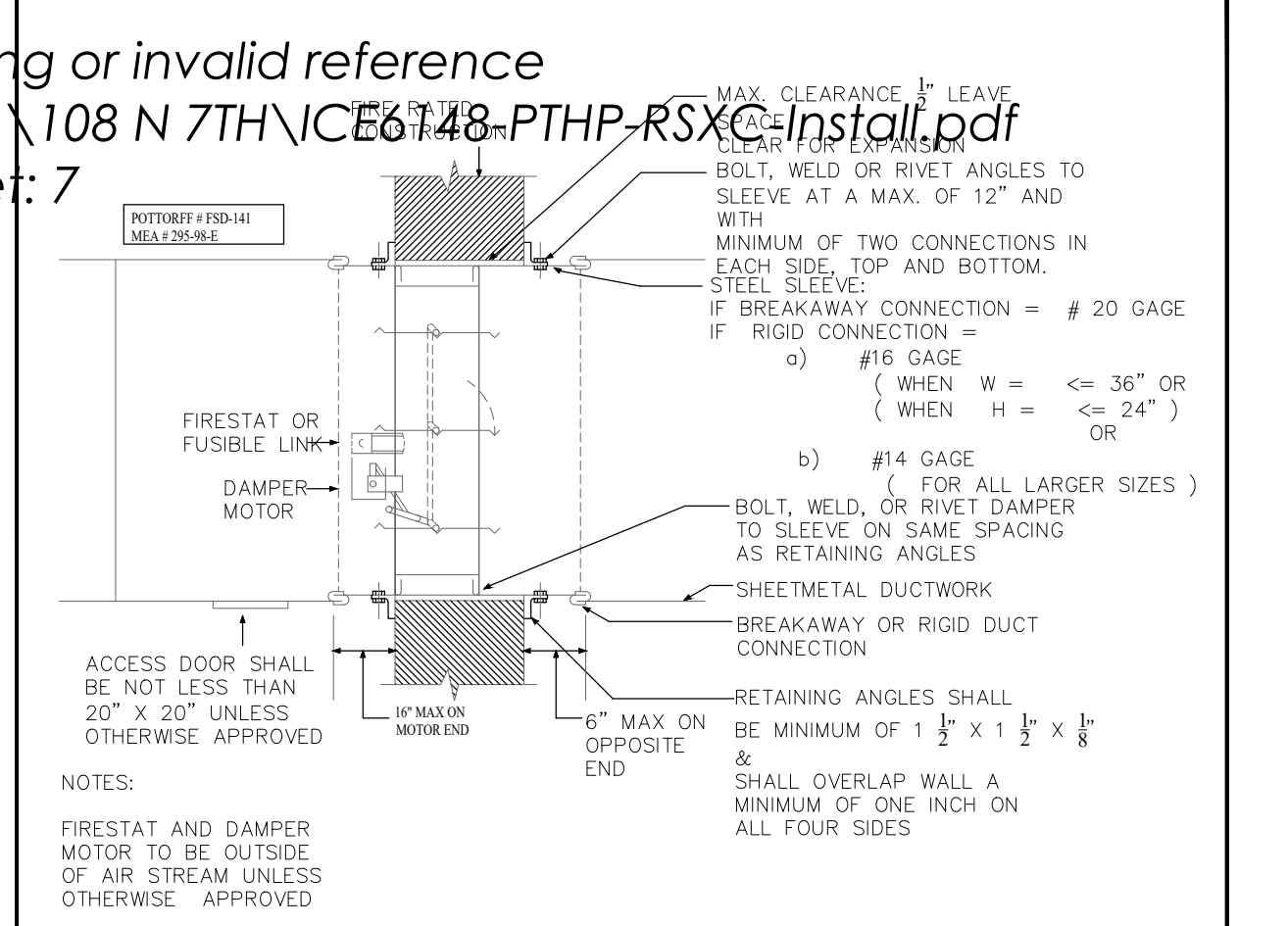
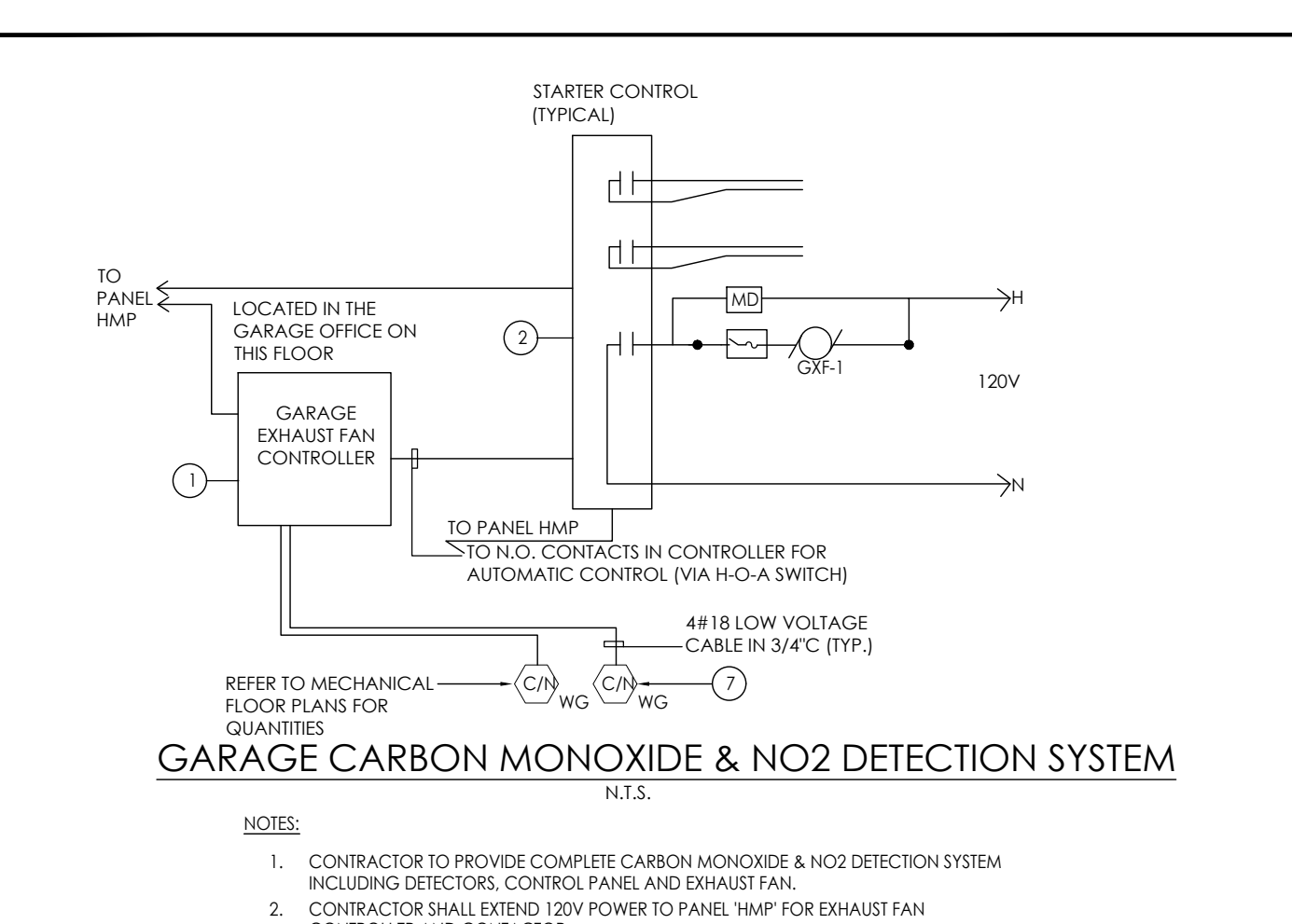
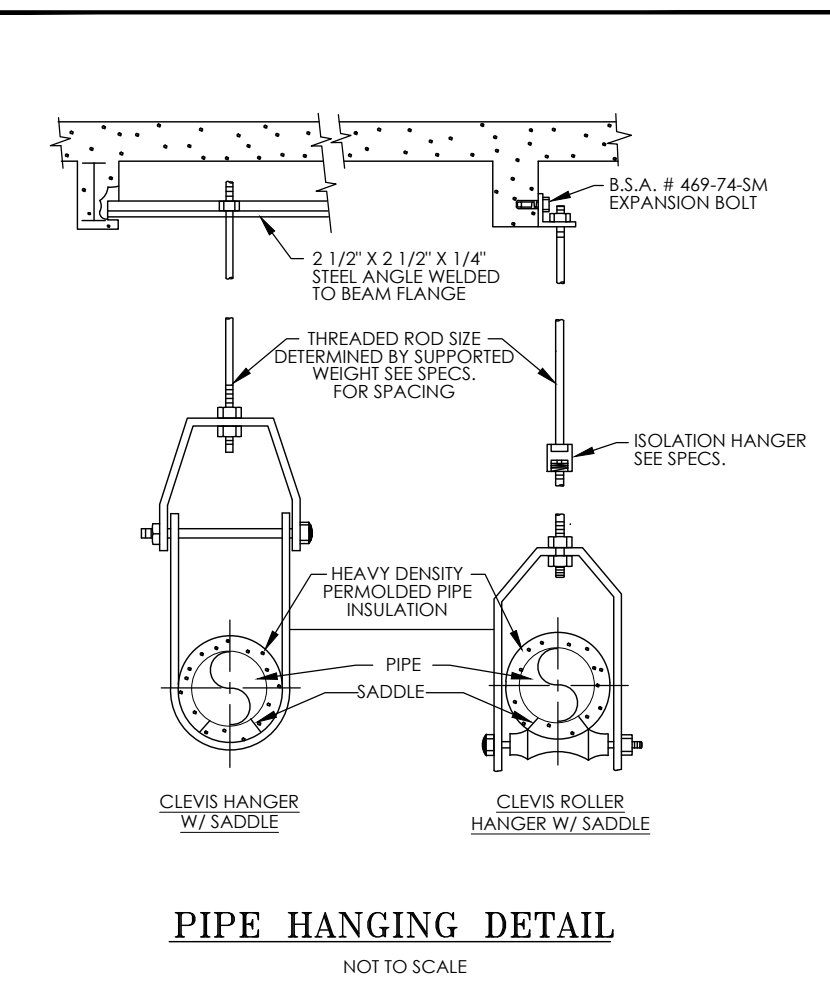
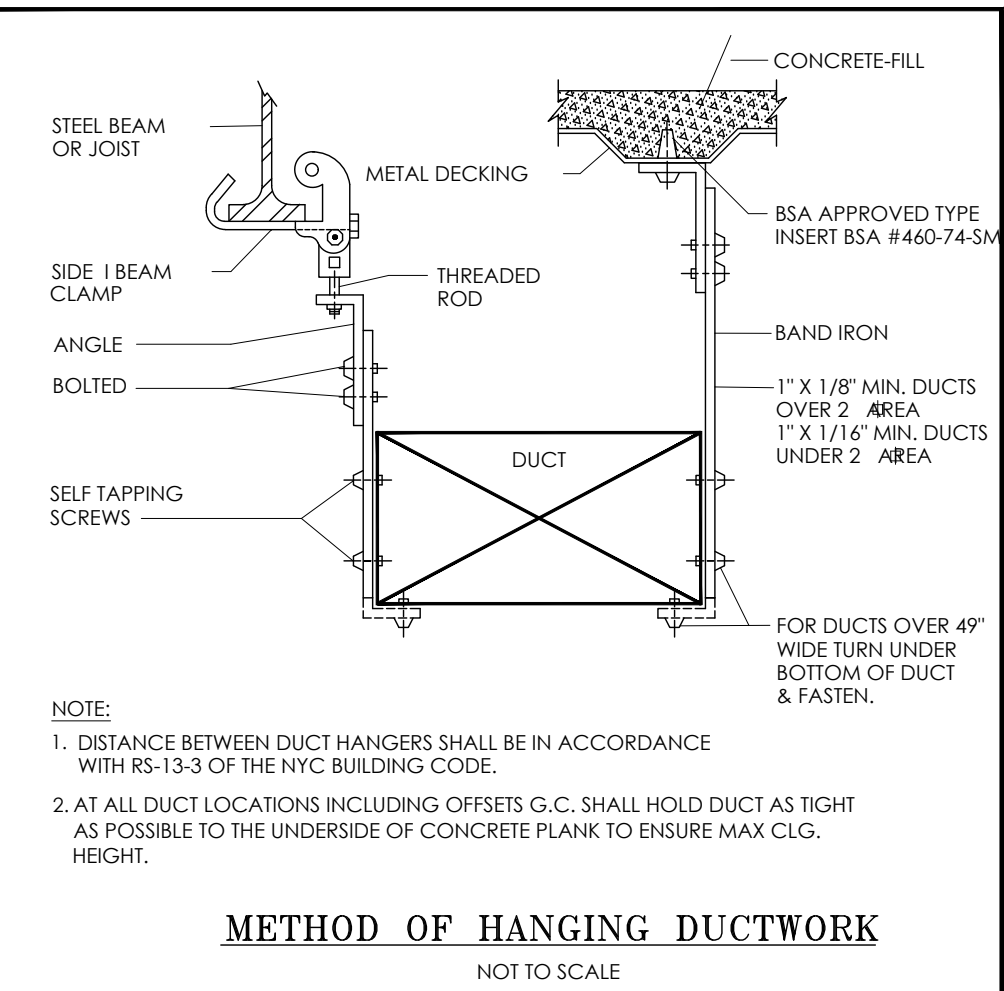
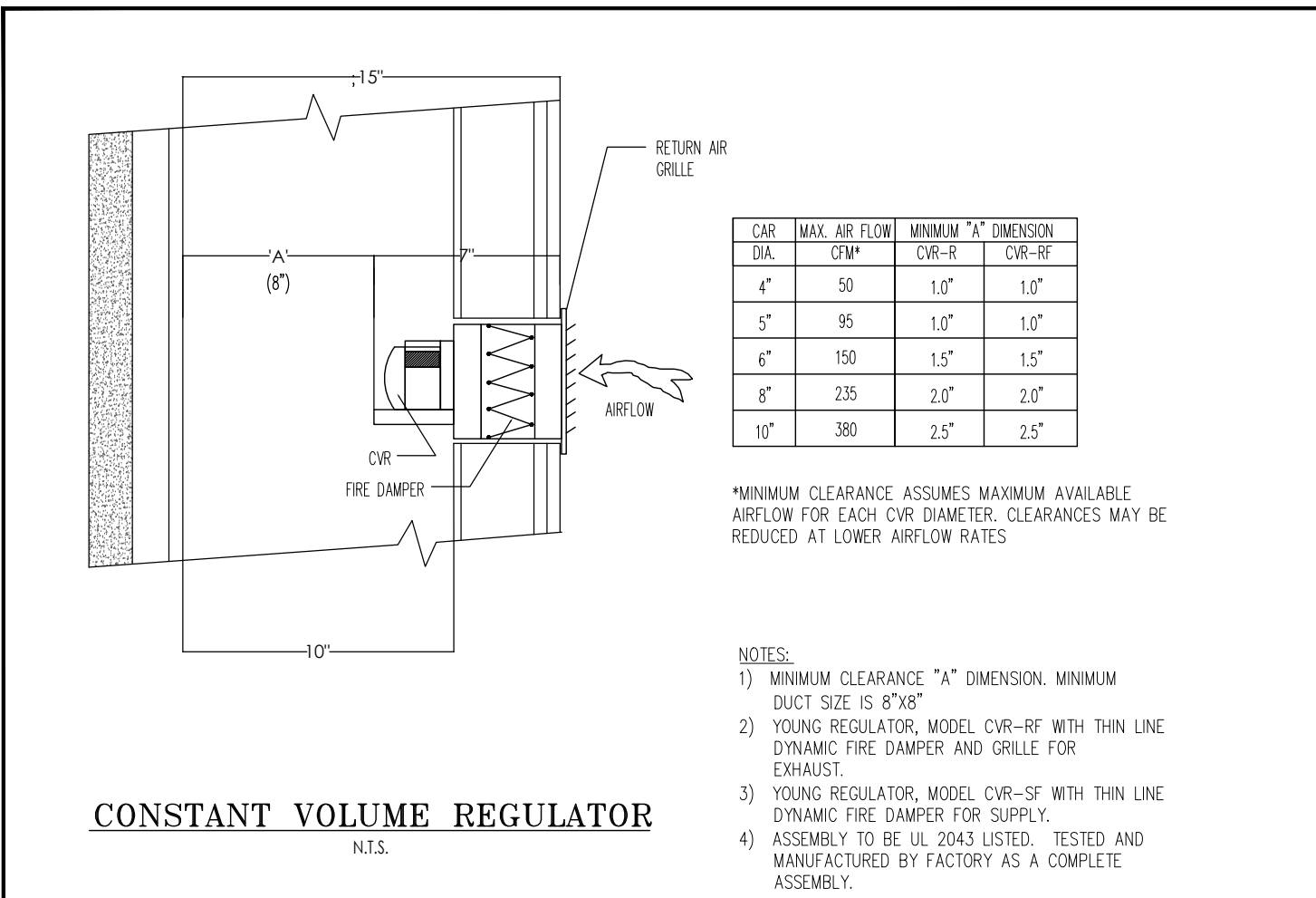
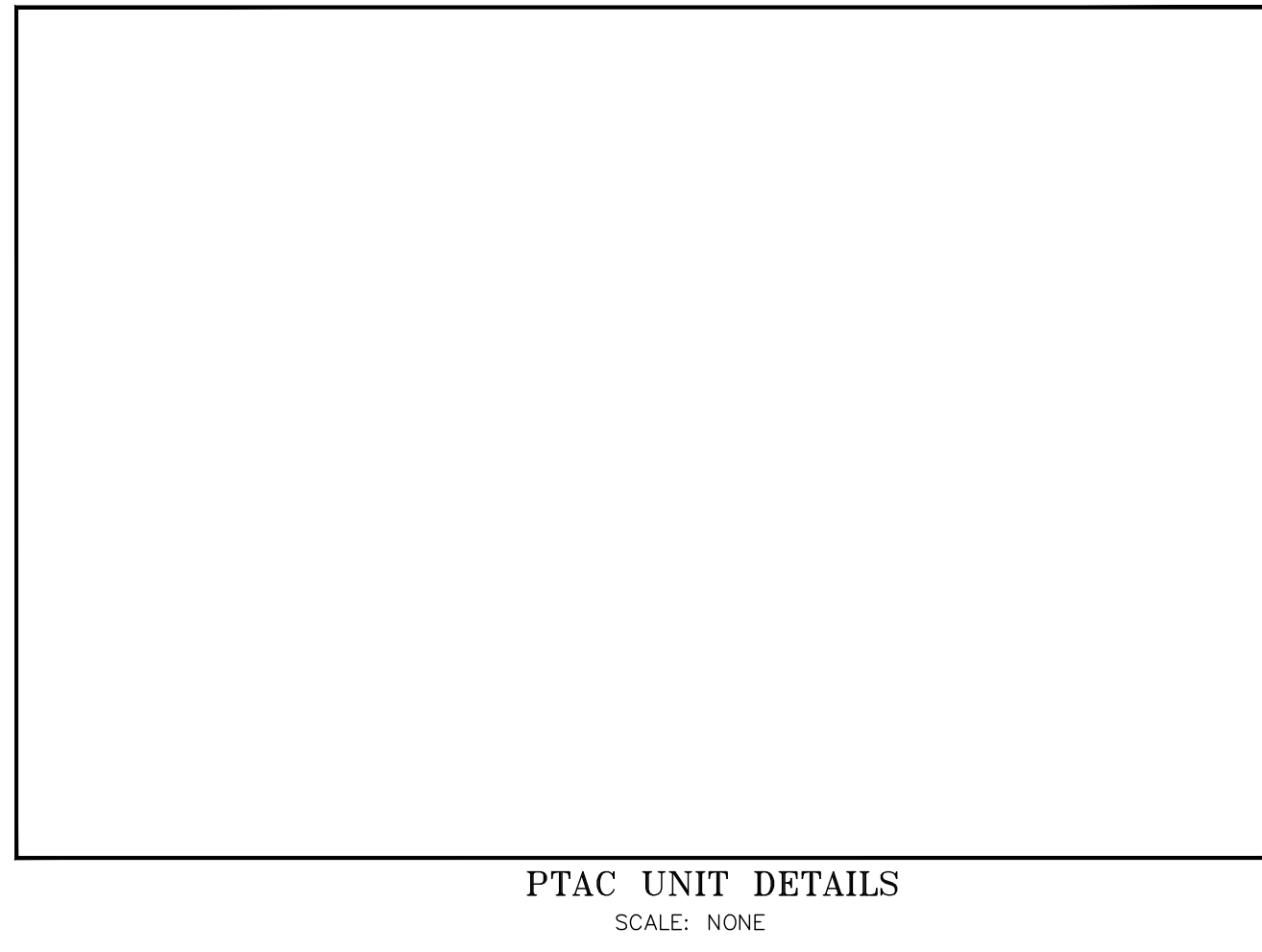
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MECHANICAL SCHEDULES

BLDG DEPT REF. # SCALE:  
AS NOTED

SIGNATURE & SEAL  
ALEXEY MAHILUS  
ENGINEER  
N.J. LIC. No. GE56570  
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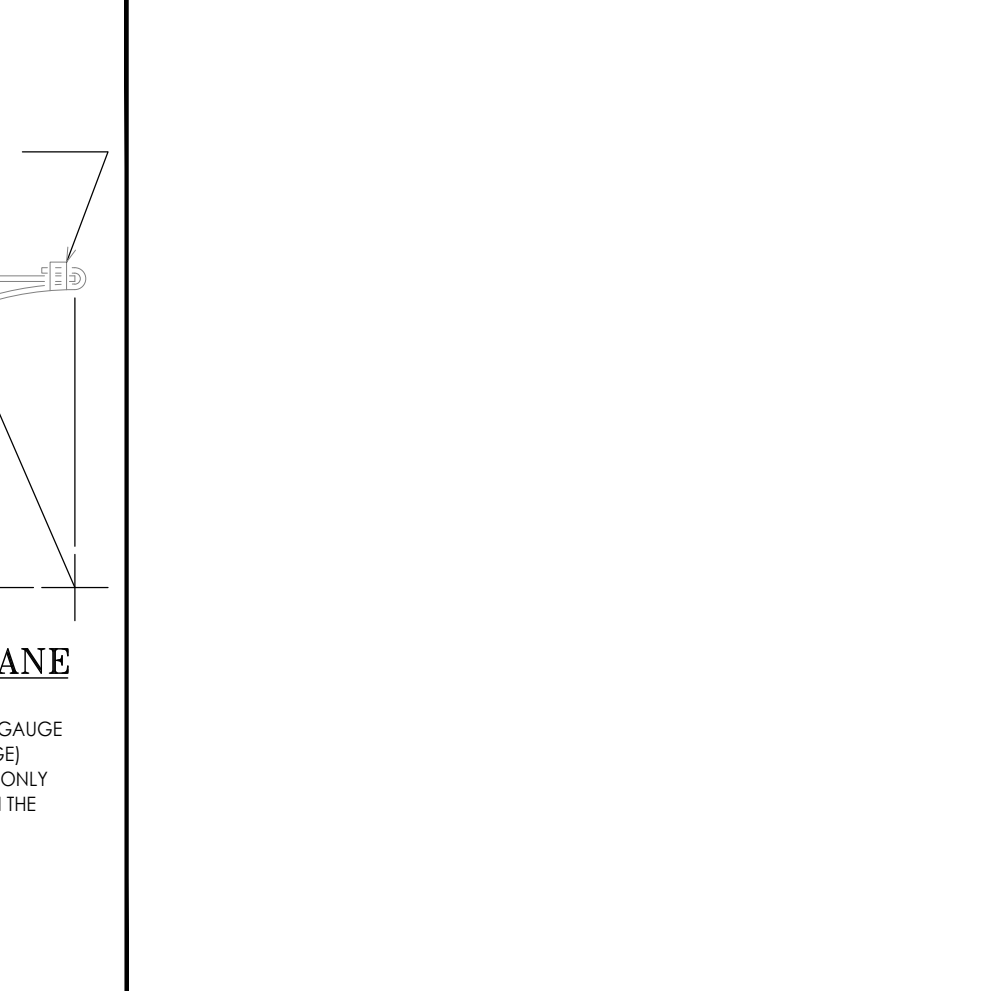
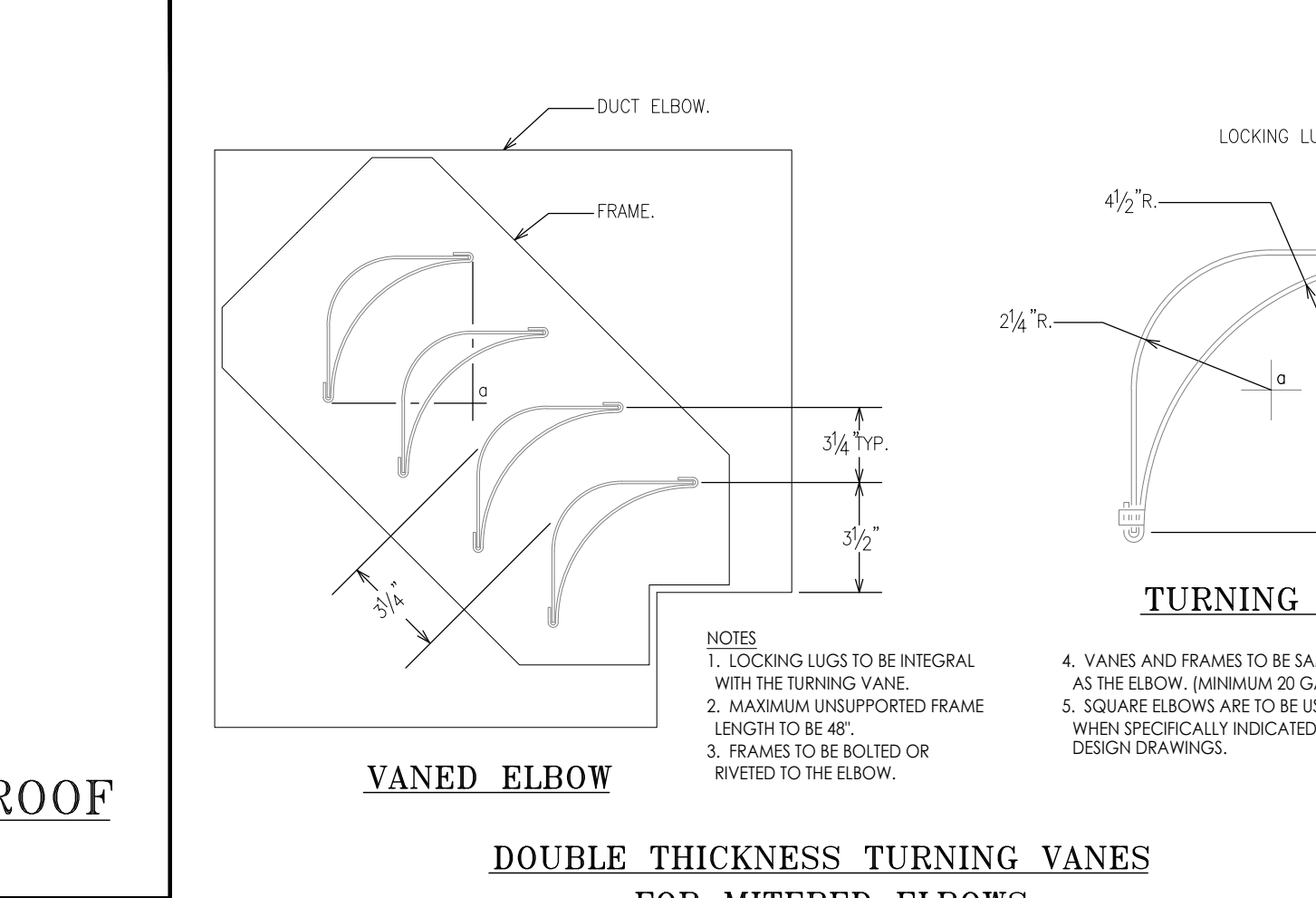
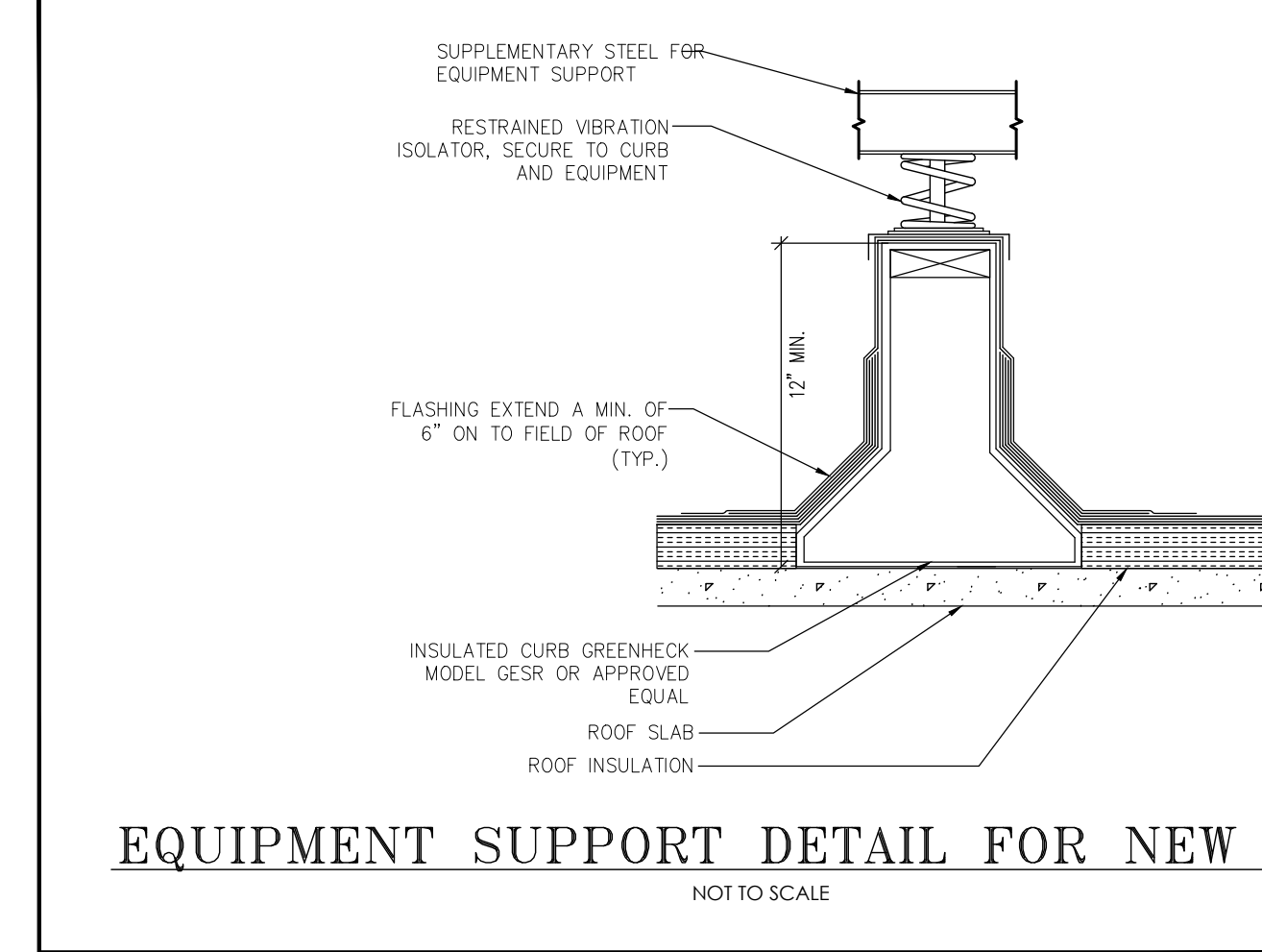
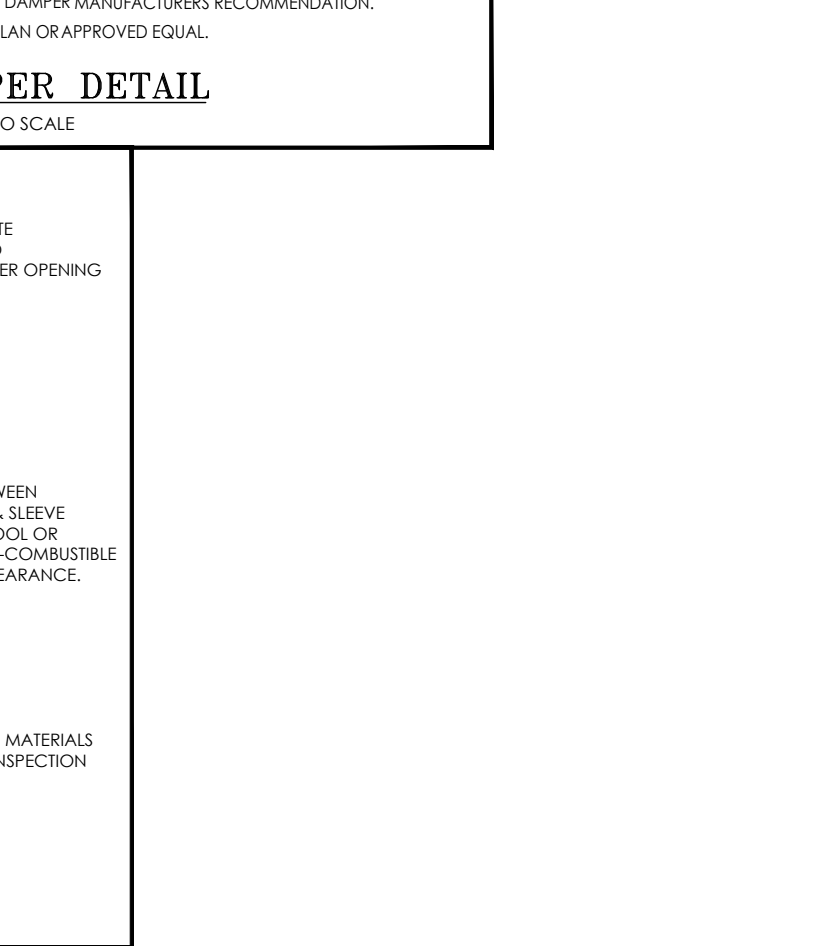
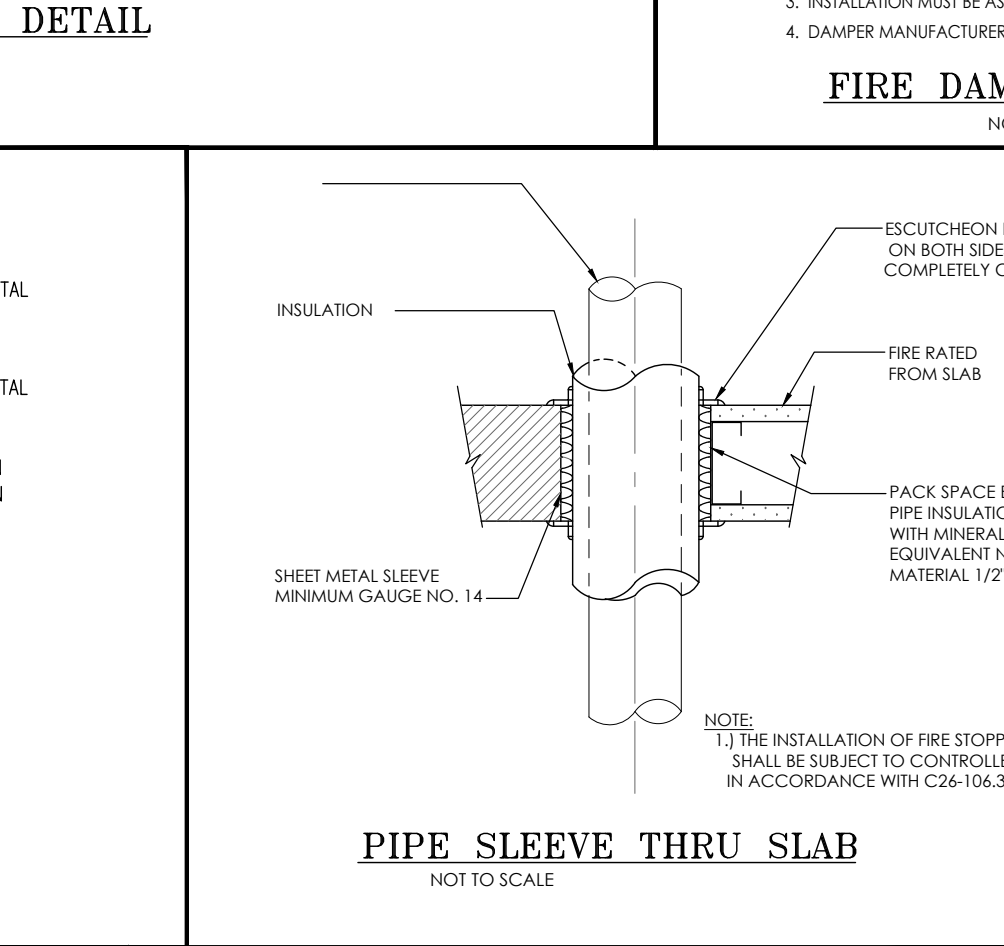
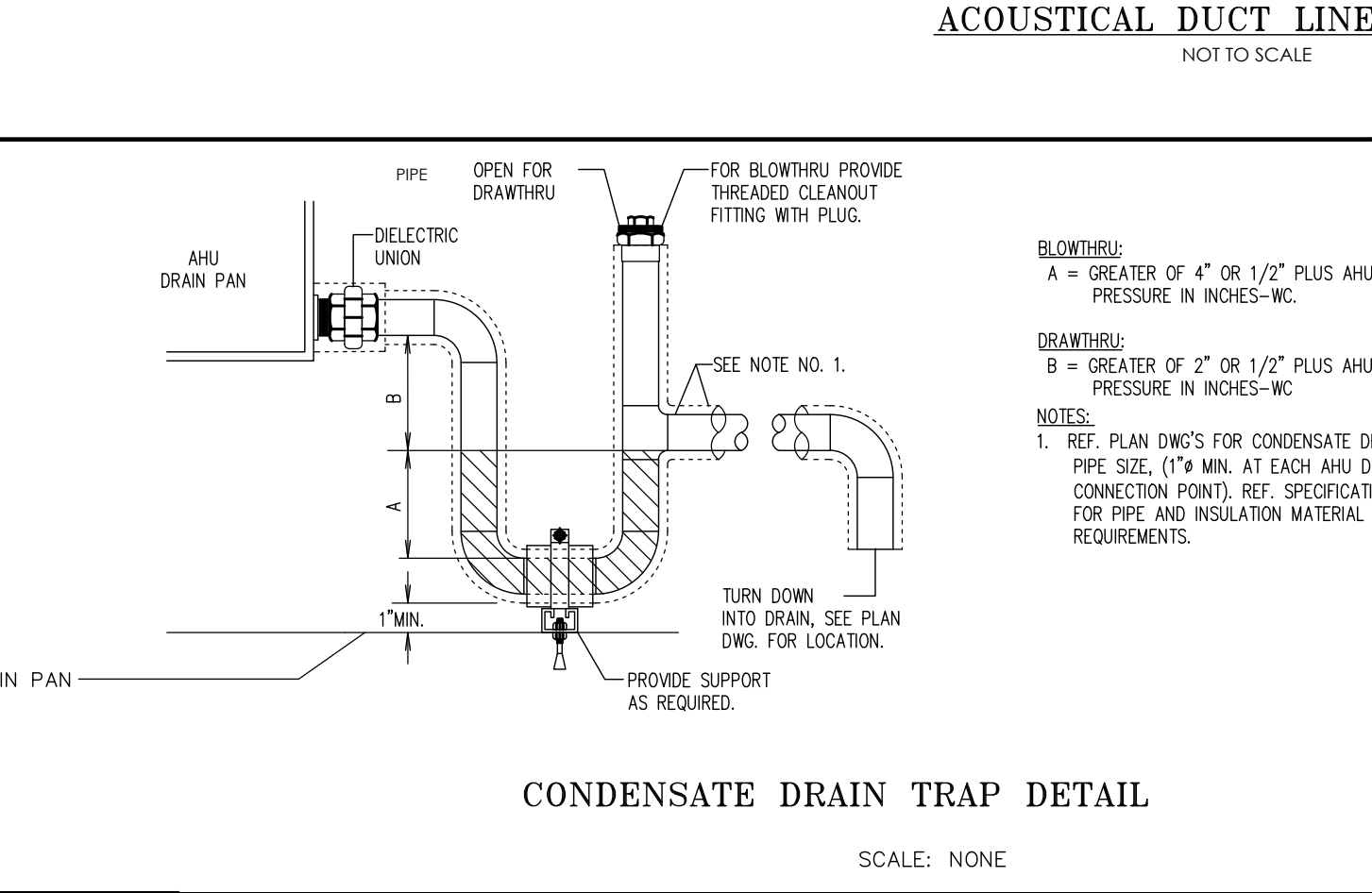
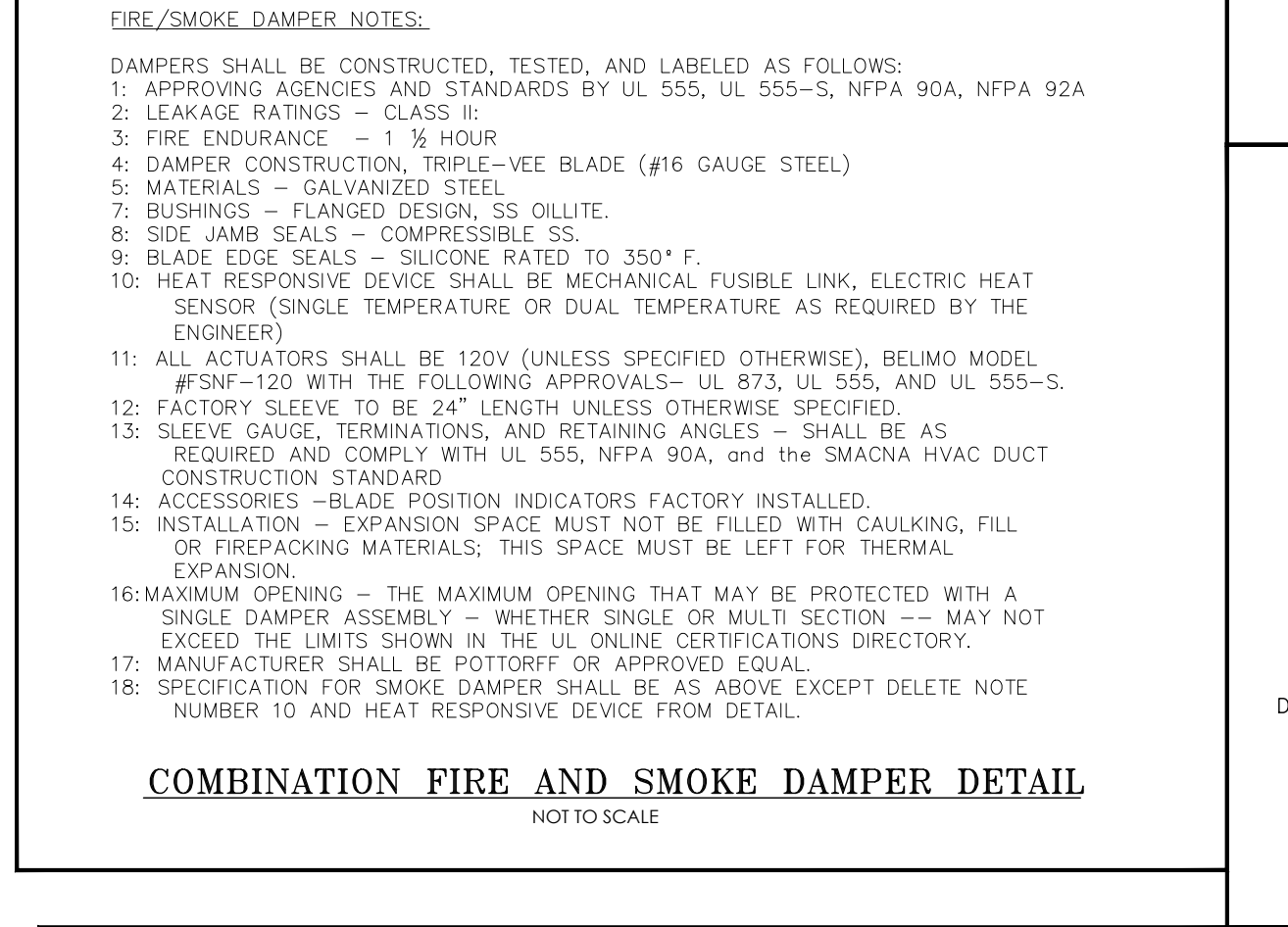
DRAWING #  
**M-300**

PROJECT # : 2021.09.02



**KEYNOTES**

DESIGNATION	DESCRIPTION
1	DP120V AUTOMATIC EXHAUST FAN CONTROLLER FOR CO DETECTION SYSTEM WITH 12 OUTPUT POINTS. THE PANEL SHALL HAVE 3 LEVELS OF FAN & ALARMS RELAYS, LED INDICATOR, DRIVER CKTS. FOR HORN/STROBE SIGNAL, PROVIDE MANUAL OVERRIDE BY PASS SWITCHES ON PANEL TO CONTROL FAN. CONTROLLER SHALL BE MANUFACTURED BY MACURCO INC. 3946 MARIPOSA STREET, ENGLEWOOD COLORADO 80110. TELEPHONE# (303) 781-4062.
2	6-POLE EXHAUST FAN CONTACTOR ELECTRICALLY OPERATED, ELECTRICALLY HELD IN NEMA 12 ENCLOSURE FOR CONTROL OF FAN MOTOR CIRCUIT. COORDINATE SIZE WITH ACTUAL FAN MOTOR(S) IN FIELD.
3	COMBINATION STARTER/DISCONNECT UNLESS OTHERWISE INDICATED FOR FANS ON THE PLANS OR THIS SHEET. PROVIDE ALL CONTROL WIRING AND MOUNTING AS REQUIRED. PROVIDE 120V TO STARTER COIL (TYPICAL FOR ALL GARAGE EXHAUST FANS).
4	EXHAUST FAN. REFER TO HVAC FLOOR PLANS FOR APPROXIMATE LOCATION.
5	JUNCTION BOX. PROVIDE NUMBER AND SIZE AS REQUIRED FOR COMPLETE FIELD INSTALLATION. PROVIDE ALL CONDUITS AS REQUIRED. ALL BOXES SHALL BE RATED NEMA 12.
6	REFER TO HVAC FLOOR PLANS FOR EXACT LOCATIONS AND QUANTITIES.
7	CK-12 CARBON MONOXIDE & NITROGEN DIOXIDE SENSOR MOUNTED ON COLUMN OR WALL AS INDICATED ON FLOOR PLANS. PROVIDE MANUAL PROOF WIRE GUARD OVER SENSOR TO AVOID DAMAGE. DETECTOR SHALL BE MANUFACTURED BY MACURCO INC. 3946 MARIPOSA STREET, ENGLEWOOD COLORADO 80110. TELEPHONE# (303) 781-4062.



**BID & SCOPE NOTES:**

- CONTRACTOR(S) SHALL BE RESPONSIBLE TO REVIEW ALL CONTRACT DOCUMENTS, INCLUDING SPECIFICATIONS. ALL BIDS SHALL INCLUDE THE SCOPE OF WORK INDICATED ON THE CONTRACT DOCUMENTS. THE DRAWINGS ARE DIAGRAMMATIC. WORK NOT EXPRESSLY SHOWN BUT REASONABLY IMPLIED TO ACHIEVE A FULLY FUNCTIONING SYSTEM SHALL BE INCLUDED. ANY EXCEPTIONS, DEVIATIONS, EXCLUSIONS FROM THE SCOPE OF WORK INDICATED ON THE CONTRACT DOCUMENTS SHALL BE SUBMITTED IN WRITING TO ROCK BROOK FOR APPROVAL. IN THE ABSENCE OF ANY SUCH APPROVALS, ALL BIDS SHALL BE INCLUSIVE OF THE SCOPE OF WORK INDICATED ON THE CONTRACT DOCUMENTS.
- DISCREPANCIES FOUND ON THE CONTRACT DOCUMENTS, IF ANY, SHALL BE BROUGHT TO THE ATTENTION OF BOTH THE ARCHITECT AND ENGINEER IN WRITING FOR CONSULTANT DESIGN DIRECTION.
- BASIS OF DESIGN PRODUCTS/MANUFACTURERS, WHERE INDICATED ON THE CONTRACT DOCUMENTS, SHALL BE PROVIDED AND INCLUDED AS PART OF THE BID. SUBSTITUTIONS SHALL NOT BE ALLOWED UNLESS A FORMAL SUBSTITUTION REQUEST FORM IS SUBMITTED TO THE ARCHITECT AND ENGINEER IN WRITING AND AN APPROVAL FROM THE ARCHITECT/ENGINEER IS SUBMITTED BACK TO THE CONTRACTOR(S). IN THE ABSENCE OF ANY SUCH APPROVALS, ALL BIDS SHALL BE INCLUSIVE OF THE SCOPE OF WORK INDICATED ON THE CONTRACT DOCUMENTS. THE CONTRACTOR PROPOSING A SUBSTITUTION BEARS THE BURDEN OF FULLY COORDINATING THE SUBSTITUTED PRODUCT WITH OTHER TRADES AND DELIVERING A SYSTEM THAT MEETS THE DESIGN INTENT.
- AT THE OWNER'S SOLE DISCRETION AND DIRECTION, NON-COMPLIANT PRODUCTS SELECTED AND INSTALLED BY THE CONTRACTOR(S) AS PART OF THIS CONTRACT SHALL BE IMMEDIATELY REMOVED AND REPLACED BY THE CONTRACTOR(S) AT THE CONTRACTOR'S EXPENSE. ALL COSTS FOR REMOVAL, REPLACEMENT, ETC. SHALL BE BORNE SOLELY BY THE CONTRACTOR(S).

**GENERAL NOTES:**

- ALL DRAWINGS INDICATE GENERAL ARRANGEMENTS, APPROXIMATE SIZES, AND RELATIVE LOCATIONS OF PRINCIPAL ELEMENTS. DO NOT SCALE DRAWINGS FOR DIMENSIONS.
- PRIOR TO START OF DEMOLITION, CONTRACTOR SHALL EMPLOY THE SERVICES OF A CERTIFIED BALANCER TO TAKE PRE-CONSTRUCTION AIRFLOW AND HYDRONIC READINGS OF ALL SPACES SERVED BY SYSTEMS IMPACTED BY THE SCOPE OF THIS PROJECT, INCLUDING SPACES OUTSIDE THE SCOPE OF THE PROJECT, BUT SERVED BY SYSTEMS IMPACTED BY THIS PROJECT. ALL READINGS SHALL BE RECORDED AND A PRE-DEMOLITION BALANCING REPORT SHALL BE SUBMITTED TO THE ENGINEER.
- PRIOR TO START OF WORK, CONTRACTOR SHALL NOTIFY ENGINEER, IN WRITING, OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND CONTRACT DOCUMENTS.
- PRIOR TO THE START OF DEMOLITION, RECOVER REFRIGERANTS FROM EQUIPMENT SHOWN TO BE REMOVED, WHERE APPLICABLE.
- AT THE START OF CONSTRUCTION, IF EXISTING PIPE OR DUCTWORK IS MISSING INSULATION, OR EXISTING EQUIPMENT TO REMAIN IS DAMAGED OR NON-FUNCTIONAL, NOTIFY ENGINEER FOR RESOLUTION.
- ALL BASE BUILDING MECHANICAL EQUIPMENT TO REMAIN SHALL BE PROTECTED WITH PRE-FILTERS, AND ALL RETURN AIR OPENINGS TO REMAIN SHALL BE PROTECTED WITH HIGH EFFICIENCY FILTER FABRIC PRIOR TO START OF WORK. PROTECTION SHALL BE REMOVED, EQUIPMENT SHALL BE VACUUMED AND WIPED DOWN, AND NEW FILTERS SHALL BE INSTALLED AT COMPLETION OF CONSTRUCTION AND PRIOR TO EQUIPMENT START-UP.
- WHERE AREAS SERVED BY EXISTING SYSTEMS BEING REMOVED REQUIRE CONTINUOUS OPERATION, INSTALL AND MAKE NEW OR TEMPORARY SYSTEMS OPERATIONAL PRIOR TO REMOVAL OF EXISTING SYSTEMS.
- CONTRACTOR SHALL EXERCISE SPECIAL CARE NOT TO DAMAGE ANY OF THE OWNER'S FACILITIES OR EQUIPMENT WHILE PERFORMING CONSTRUCTION WORK. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE THAT OCCURS.
- ANY EXISTING OR NEW CONSTRUCTION THAT IS DAMAGED DURING THE COURSE OF THE MECHANICAL WORK SHALL BE RESTORED TO ITS ORIGINAL CONDITION BY THE MECHANICAL CONTRACTOR.
- REFER TO ARCHITECTURAL SECTIONS "CUTTING AND PATCHING" AND "SELECTIVE DEMOLITION" FOR GENERAL DEMOLITION REQUIREMENTS AND PROCEDURES.
- WHERE PIPING IS INDICATED TO BE REMOVED, ISOLATE AND DRAIN SYSTEM AS REQUIRED TO ALLOW REMOVAL OF PIPING INDICATED, AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL AND REPAIR OR REPLACE INSULATION AS REQUIRED.
- WHERE DUCTWORK IS INDICATED TO BE REMOVED, REMOVE PORTION OF DUCTWORK INDICATED AND CAP REMAINING DUCTWORK WITH SAME OR COMPATIBLE DUCTWORK MATERIAL, SEAL PATCHED OR CAPPED SECTIONS TO BE AIRTIGHT AND REPAIR OR REPLACE INSULATION AS REQUIRED.
- WHERE EQUIPMENT IS INDICATED TO BE REMOVED, DISCONNECT AND CAP ALL SERVICES WHERE NECESSARY, AND REMOVE EQUIPMENT.
- WHERE EQUIPMENT IS INDICATED TO BE REMOVED AND RELOCATED, DISCONNECT AND CAP ALL SERVICES WHERE NECESSARY, REMOVE, CLEAN, AND STORE EQUIPMENT, WHEN APPROPRIATE, REINSTALL, RECONNECT, AND MAKE EQUIPMENT OPERATIONAL IN NEW LOCATION.
- IF PIPE OR DUCT INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED DURING CONSTRUCTION, REPLACE WITH NEW PRODUCTS AS PER SPECIFICATIONS.
- MINIMUM CLEARANCE IN FINISHED SPACES WITHOUT CEILINGS SHALL BE 8'-0" ABOVE FINISHED FLOOR, UNLESS OTHERWISE ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED. ALL DUCTWORK, PIPING, AND EQUIPMENT SHALL BE INSTALLED TO CLEAR WINDOW AND DOOR OPENINGS. MINIMUM CLEARANCE IN MECHANICAL ROOMS SHALL BE 7'-0".
- DO NOT INSTALL EQUIPMENT, PIPING, OR DUCTWORK OVER ELECTRIC PANELS AND SWITCH BOARDS. FOLLOW THE ELECTRICAL CODE AS ADOPTED BY THE LOCAL JURISDICTION.
- DO NOT INSTALL PIPING OVER, AROUND, IN FRONT OF, BEHIND, OR BELOW ELECTRICAL CONTROLS, PANELS, SWITCHES, TERMINAL BOXES, OR SIMILAR ELECTRICAL EQUIPMENT. DRIP PANS ARE NOT PERMITTED.
- DO NOT ALLOW EQUIPMENT, PIPING, OR DUCTWORK TO INFRINGE UPON WORKING CLEARANCES AS REQUIRED BY THE ELECTRICAL CODE AS ADOPTED BY THE LOCAL JURISDICTION.
- DO NOT INSTALL PIPING, DUCTWORK OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT ROOMS, OR TELECOMMUNICATION CLOSETS IN OR ABOVE THESE SPACES.
- DO NOT INSTALL PIPING, DUCTWORK, OR EQUIPMENT IN ELEVATOR MACHINE ROOMS. LOCATE EQUIPMENT TO SERVE THESE SPACES OUTSIDE THE ROOM AND DUCT INTO THE SPACE USING SIDEWALL REGISTERS IN THE WALLS.
- POSITION ALL MECHANICAL WORK FOR EASY, UNOBSTRUCTED ACCESS FOR MAINTENANCE AND OPERATION.
- IN GENERAL, ARRANGE WORK SO ACCESS DOORS ARE NOT REQUIRED. WHERE MECHANICAL DEVICES REQUIRING ACCESS MUST BE CONCEALED IN FINISHED CONSTRUCTION, COORDINATE WITH OTHER TRADES TO DETERMINE THE REQUIRED PANEL SIZE, AND COORDINATE LOCATION WITH THE GENERAL CONTRACTOR.
- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL TRADES AFFECTED.
- UNLESS OTHERWISE NOTED, FURNISH AND INSTALL ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION OF DUCTWORK, PIPING, AND EQUIPMENT.
- ALL ROOF-MOUNTED EQUIPMENT CURBS SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION.
- UNLESS FACTORY INSTALLED AS PART OF A SMOKE DAMPER OR PIECE OF EQUIPMENT, SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR, AND MOUNTED IN DUCTWORK BY THE MECHANICAL CONTRACTOR, AS SHOWN ON THE DRAWINGS. INSTALL PER MANUFACTURER'S PRINTED INSTRUCTIONS. DETECTORS THAT ARE FURNISHED AS PART OF A SMOKE DAMPER OR PIECE OF EQUIPMENT SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.
- MECHANICAL CONTRACTOR IS RESPONSIBLE TO FURNISH DISCONNECTS FOR INSTALLATION BY ELECTRICAL CONTRACTOR. SOURCING MECHANICAL CONTRACTOR IS RESPONSIBLE TO FURNISH DISCONNECTS FOR INSTALLATION BY ELECTRICAL CONTRACTOR. SOURCING THROUGH THE EQUIPMENT MANUFACTURER IS PREFERRED WHEN AVAILABLE. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL CHARACTERISTICS AND INSTALLATION.
- PROVIDE DUCT TRANSITION OR PIPE REDUCER AS REQUIRED TO CONNECT TO EQUIPMENT. DUCT TRANSITIONS SHALL NOT EXCEED 30 DEGREES.
- ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
- IF DUCT SIZE IS NOT INDICATED UPSTREAM OF A DIFFUSER, DUCT SIZE SHALL MATCH THE NECK SIZE OF THE DIFFUSER.
- PROVIDE A LOCKING QUADRANT VOLUME DAMPER AT THE TAKEOFF TO EACH DIFFUSER FOR BALANCING PURPOSES, UNLESS OTHERWISE INDICATED.
- FLEXIBLE DUCTS, WHERE PERMITTED, SHALL NOT EXCEED 6 FEET IN LENGTH AND SHALL NOT BE RUN THROUGH WALLS.
- DURING CONSTRUCTION, CONTRACTOR SHALL COVER THE OPEN ENDS OF ALL NEW DUCTS AND MAINTAIN COVERS DURING THE COURSE OF CONSTRUCTION TO KEEP CONSTRUCTION DEBRIS FROM ENTERING DUCTWORK.
- COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS. MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- UNLESS OTHERWISE NOTED, ALL BRANCH PIPING SERVING EQUIPMENT SHALL BE 3/4-INCH.
- REMOVAL AND/OR RELOCATION OF EXISTING EQUIPMENT SHALL REQUIRE THE BAS GRAPHICS AND DATABASE TO BE UPDATED, AS REQUIRED, BY THE CONTROLS CONTRACTOR.
- AT THE COMPLETION OF CONSTRUCTION, REBALANCE SPACES OUTSIDE THE SCOPE OF THE PROJECT, BUT SERVED BY SYSTEMS IMPACTED BY THE SCOPE OF THIS PROJECT, TO PRE-DEMOLITION BALANCING READINGS.
- WHERE PHASING APPLIES, CONTRACTOR SHALL REFERENCE ARCHITECTURAL PLANS FOR CONSTRUCTION PHASING DIAGRAM AND SUPPLEMENTAL CONDITIONS.
- ALL MECHANICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEW JERSEY UNIFORM CONSTRUCTION CODE AND ADOPTED VERSIONS OF THE INTERNATIONAL MECHANICAL CODE (IMC), NEW JERSEY EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), ENERGY CODE (ASHRAE 90.1), APPLICABLE SECTIONS OF THE NATIONAL STANDARD PLUMBING CODE AND NATIONAL ELECTRIC CODE (NEC), LOCAL ORDINANCES, AUTHORITY HAVING JURISDICTION, AND ALL SUBSEQUENT AMENDMENTS TO THE ABOVE CODES IN EFFECT AT THE TIME THESE DRAWINGS WERE SIGNED AND SEALED.

**MECHANICAL SPECIFICATIONS**

**PART 1 - GENERAL**

**1.01 DEFINITIONS**

- A. THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND DELIVER TO THE JOB SITE.
- B. THE TERM "INSTALL" SHALL MEAN TO UNPACK, STORE, ASSEMBLE, FIX IN POSITION, AND CONNECT FOR USE.
- C. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL.
- D. THE TERM "CONTRACTOR" SHALL MEAN THE MECHANICAL CONTRACTOR OR ANY MECHANICAL SUBCONTRACTOR.

**1.02 REFERENCES**

- A. UNLESS THE CONTRACT DOCUMENTS INCLUDE MORE STRINGENT REQUIREMENTS, APPLICABLE CONSTRUCTION INDUSTRY STANDARDS HAVE THE SAME FORCE AND EFFECT AS IF COPIED DIRECTLY INTO THE CONTRACT DOCUMENTS TO THE EXTENT REFERENCED. SUCH STANDARDS ARE MADE PART OF THE CONTRACT DOCUMENTS BY REFERENCE.
- B. THE CONTRACTOR SHALL BE FAMILIAR WITH INDUSTRY STANDARDS APPLICABLE TO ITS CONSTRUCTION ACTIVITY. WHERE COPIES OF STANDARDS ARE NEEDED TO PERFORM A REQUIRED CONSTRUCTION ACTIVITY, OBTAIN COPIES DIRECTLY FROM PUBLICATION SOURCE.
- C. THE CONTRACTOR SHALL COMPLY WITH ALL LAWS, ORDINANCES, STATUTES, AND LAWFUL ORDERS ISSUED BY AUTHORITIES HAVING JURISDICTION AND RULES, CONVENTIONS, AND AGREEMENTS WITHIN THE CONSTRUCTION INDUSTRY THAT CONTROL THE PERFORMANCE OF THE WORK.

**1.03 SCOPE OF WORK**

- A. THE WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
  - PROVIDE NEW DUCTWORK, DAMPERS, AND ACCESSORIES AS INDICATED.
  - PROVIDE NEW PIPING, VALVES, AND ACCESSORIES AS INDICATED.
  - PROVIDE NEW EQUIPMENT WHERE INDICATED.
  - PROVIDE NEW CONTROLS AS NECESSARY TO PERFORM SEQUENCES OF OPERATIONS.
  - PROVIDE THE SERVICES OF AN INDEPENDENT TESTING AND BALANCING CONTRACTOR TO TEST, ADJUST, BALANCE AND RECORD SYSTEM FLOWS.
- B. EACH CONTRACTOR SHALL HAVE LIMITED USE OF PREMISES FOR CONSTRUCTION OPERATIONS AS INDICATED ON DRAWINGS BY AREAS SHOWN.
- C. MAINTAIN EXISTING BUILDING IN A WEATHERTIGHT CONDITION THROUGHOUT CONSTRUCTION PERIOD. ALL WORK NOT SPECIFICALLY CALLED FOR, BUT REASONABLY IMPLIED, INCLUDING CUTTING, PATCHING AND REPAIR OF DAMAGE CAUSED BY CONSTRUCTION OPERATIONS SHALL BE PROVIDED BY THE CONTRACTOR.
- D. THE CONTRACTOR SHALL ENSURE THAT ALL RULES AND REGULATIONS, INCLUDING THOSE WHICH MAY BE ISSUED BY THE OWNER, ARE BEING OBSERVED. THE CONTRACTOR SHALL INSTALL SIGNAGE, BARRIERS AND OTHER MEANS TO PROVIDE WARNINGS AND RESTRICT ACCESS TO CONSTRUCTION AREAS.
- E. DO NOT INSTALL ALUMINUM OR COPPER PRODUCTS WHERE THEY WILL BE ENCASED IN CONCRETE.

**1.04 COORDINATION**

- A. EACH CONTRACTOR SHALL COORDINATE ITS OPERATIONS WITH THE WORK OF OTHER TRADES TO ENSURE THE PROPER INSTALLATION, CONNECTION AND OPERATION OF SYSTEMS.
- B. CONTRACTOR SHALL BE RESPONSIBLE TO TAKE FIELD MEASUREMENTS AS REQUIRED TO ENSURE THE WORK WILL FIT BASED ON FIELD CONDITIONS.
- C. CONTRACTOR SHALL WORK WITH OTHER TRADES TO PREPARE PROJECT SPECIFIC ELECTRONIC COORDINATION DRAWINGS ACCURATELY TO SCALE. DO NOT BASE COORDINATION DRAWINGS ON REPRODUCTIONS OF THE CONTRACT DOCUMENTS OR STANDARD PRINTED DATA. INDICATE FUNCTIONAL AND SPATIAL RELATIONSHIPS OF COMPONENTS OF ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL AND ELECTRICAL SYSTEMS. INDICATE DIMENSIONS AND MAKE SPECIFIC NOTE OF DIMENSIONS THAT APPEAR TO BE IN CONFLICT WITH SUBMITTED EQUIPMENT AND MINIMUM CLEARANCE REQUIREMENTS. PROVIDE ALTERNATE SKETCHES FOR RESOLUTION OF SUCH CONFLICTS.
- D. CONTRACTOR SHALL NOTIFY BUILDING OWNER IN WRITING AT LEAST 3 DAYS PRIOR TO SHUTDOWN OF ANY BUILDING SYSTEM. CONTRACTOR SHALL INCLUDE COORDINATION WITH OWNER FOR ANY WORK DURING AN EXTENDED SHUTDOWN THAT MAY BE NECESSARY TO PERFORM OUTSIDE OF NORMAL BUSINESS HOURS.

**1.05 PRODUCT REQUIREMENTS**

- A. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE PROVIDED.
- B. THE PRODUCTS SHOWN ON THE DRAWINGS ARE BASED ON A SPECIFIC MANUFACTURER, MAKE, AND MODEL. THESE PRODUCTS ESTABLISH SIGNIFICANT QUALITIES RELATED TO TYPE, FUNCTION, DIMENSION, IN-SERVICE PERFORMANCE, PHYSICAL PROPERTIES, APPEARANCE, AND OTHER CHARACTERISTICS FOR PURPOSES OF EVALUATING PRODUCTS OF OTHER NAMED MANUFACTURERS.
- C. THE ENGINEER SHALL CONSIDER REQUESTS FOR SUBSTITUTION WHEN THE FOLLOWING CONDITIONS ARE SATISFIED: REQUESTED SUBSTITUTION OFFERS OWNER A SUBSTANTIAL ADVANTAGE IN COST, TIME, OR ENERGY CONSERVATION AFTER DEDUCTING ADDITIONAL RESPONSIBILITIES THE SUBSTITUTION MAY PRESENT TO THE OWNER, INCLUDING COMPENSATION TO ENGINEER FOR REDESIGN AND EVALUATION SERVICES AND INCREASED CONSTRUCTION COSTS OF RELATED WORK. DOES NOT REQUIRE EXTENSIVE REVISIONS TO THE CONTRACT DOCUMENTS; IS CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL PRODUCE THE INDICATED RESULTS; IS FULLY DOCUMENTED AND PROPERLY SUBMITTED; SHALL NOT ADVERSELY AFFECT THE CONTRACTOR'S CONSTRUCTION SCHEDULE; AND HAS BEEN COORDINATED WITH OTHER RELATED WORK.
- D. THE CONTRACTOR SHALL DELIVER, STORE, AND HANDLE PRODUCTS USING MEANS AND METHODS THAT SHALL PREVENT DAMAGE, DETERIORATION, AND LOSS. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. THE CONTRACTOR SHALL STORE MATERIALS IN A MANNER THAT SHALL NOT ENDANGER PROJECT STRUCTURE.
- E. THE CONTRACTOR SHALL PROVIDE THE MANUFACTURER'S STANDARD WRITTEN PRODUCT WARRANTY TO THE OWNER. WHERE SPECIAL WARRANTIES ARE INDICATED, THE CONTRACTOR SHALL PROVIDE THE WRITTEN WARRANTY FOR THE GIVEN TIME PERIOD TO THE OWNER. WARRANTIES SPECIFIED IN OTHER SECTIONS SHALL BE IN ADDITION TO, AND RUN CONCURRENT WITH, OTHER WARRANTIES REQUIRED BY THE CONTRACT DOCUMENTS. MANUFACTURER'S DISCLAIMERS AND LIMITATIONS ON PRODUCT WARRANTIES DO NOT RELIEVE THE CONTRACTOR OF OBLIGATIONS UNDER THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

**1.06 SUBMITTAL PROCEDURES**

- A. CONTRACTOR SHALL PREPARE AND SUBMIT ELECTRONIC SUBMITTALS FOR WORK AND ITEMS INDICATED. SUBMITTALS OR SUBMITTAL DOWNLOAD NOTIFICATIONS SHALL BE SENT VIA EMAIL. PROVIDE SUBMITTALS FOR THE FOLLOWING: PERFORMANCE DATA AND MATERIAL SPECIFICATIONS FOR ALL EQUIPMENT LISTED IN SCHEDULES, DIMENSIONED SHEET METAL DRAWINGS, MATERIAL SPECIFICATIONS FOR ITEMS LISTED IN PRODUCTS SECTION, SEQUENCE OF OPERATIONS AND MATERIAL SPECIFICATIONS FOR AUTOMATIC TEMPERATURE CONTROLS, AND TESTING, ADJUSTING, AND BALANCING REPORT.
- 1. SHEET METAL SHOP DRAWINGS SHALL INCLUDE: DUCT LAYOUT INDICATING DUCT SIZES, CONFIGURATION, LINED DUCT SECTIONS, DUCT STATIC PRESSURE CLASSES, BOTTOM OF DUCT ELEVATIONS, DIMENSIONS OF MAIN DUCT RUNS FROM BUILDING GRID LINES, LOCATIONS OF DAMPERS, AND DUCT ACCESS DOORS.
- B. CONTRACTOR SHALL ALLOW SUFFICIENT PROCESSING OF SUBMITTALS FOR REVIEW PRIOR TO START DATES OF FABRICATION, PURCHASING, TESTING, AND DELIVERY NECESSARY TO MEET PROJECT SCHEDULE. ALLOW 12 DAYS FOR THE REVIEW AND TRANSMISSION OF EACH SUBMITTAL.
- C. ALL SUBMITTALS SHALL INCLUDE THE FOLLOWING INFORMATION: ROCK BROOK'S PROJECT NAME AND LOCATION, DATE, NAME AND ADDRESS OF ENGINEER, NAME AND ADDRESS OF CONTRACTOR AND/OR SUBCONTRACTOR, NAME AND ADDRESS OF SUPPLIER, NAME OF MANUFACTURER, SUBMITTAL NUMBER, AND A DESCRIPTION OF THE WORK OR ITEM SUBMITTED. IDENTIFY ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS ON THE SUBMITTALS. INDICATE PARTIAL SUBMITTALS AS SUCH.
- D. TRANSMIT EACH SUBMITTAL WITH AN ELECTRONIC TRANSMITTAL FORM IDENTIFYING EACH SUBMITTAL AND INCLUDING SPECIFICATION NUMBER, AS APPLICABLE.
- E. RESUBMITTALS SHALL FOLLOW THE SAME PROCEDURES AS FOR SUBMITTALS. IDENTIFY RESUBMITTALS AS SUCH.
  - NOTE DATE AND CONTENT OF PREVIOUS SUBMITTAL.
  - NOTE DATE AND CONTENT REVISION IN LABEL OR TITLE BLOCK AND CLEARLY INDICATE EXTENT OF REVISION.
    - RESUBMITTALS THAT DO NOT CLEARLY IDENTIFY WHAT HAS BEEN CHANGED, MAY BE RETURNED WITHOUT REVIEW UNTIL CHANGES ARE IDENTIFIED.
    - RESUBMIT SUBMITTALS UNTIL THEY ARE MARKED "APPROVED" OR "APPROVED AS NOTED". APPROVED" OR "APPROVED AS NOTED", OR "APPROVED AS NOTED". APPROVED AS NOTED".
  - SUBMITTALS AND RESUBMITTALS MARKED "APPROVED AS NOTED" DO NOT REQUIRE RESUBMISSION FOR APPROVED AS NOTED" DO NOT REQUIRE RESUBMISSION FOR DO NOT REQUIRE RESUBMISSION FOR RECORD.
- G. ENGINEER SHALL REVIEW EACH SUBMITTAL, MAKE MARKS TO INDICATE CORRECTIONS OR MODIFICATIONS AND STAMP EACH SUBMITTAL WITH ACTION STAMP INDICATING ACTION TO BE TAKEN. APPROVAL OF SUBMITTAL SHALL NEITHER RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR COMPLIANCE WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS, NOR ACCURACY OF MEASUREMENTS.

**1.07 CUTTING AND PATCHING**

- A. THE CONTRACTOR SHALL REMOVE, REPLACE, PATCH, AND REPAIR MATERIALS AND SURFACES CUT OR DAMAGED DURING CONSTRUCTION BY METHODS AND WITH MATERIALS SO AS NOT TO VOID EXISTING WARRANTIES.
- B. CUT-IN-PLACE CONSTRUCTION USING METHODS LEAST LIKELY TO DAMAGE ELEMENTS RETAINED OR ADJOINING CONSTRUCTION. COMPLY WITH ORIGINAL INSTALLER'S WRITTEN RECOMMENDATIONS. CAP, VALVE, OR PLUG AND SEAL REMAINING PORTION OF PIPE OR CONDUIT CUT.
- C. PATCH CONSTRUCTION BY FILLING, REPAIRING, REFINISHING, AND SIMILAR OPERATIONS FOLLOWING PERFORMANCE OF OTHER WORK. PATCH WITH DURABLE SEAMS THAT ARE AS INVISIBLE AS POSSIBLE. PROVIDE MATERIALS AND COMPLY WITH INSTALLATION REQUIREMENTS SPECIFIED BY OTHER SECTIONS.
- D. CONTRACTOR SHALL REPAIR OR REPLACE FIRE PROOFING AND FIRE STOPPING DISTURBED DURING CONSTRUCTION.

**1.08 WASTE MANAGEMENT**

- A. THE CONTRACTOR SHALL PERFORM THE FOLLOWING FOR ITEMS SALVAGED FOR REUSE DURING THE WORK: CLEAN SALVAGED ITEMS, PROTECT AND STORE SALVAGED ITEMS UNTIL RE-INSTALLATION, AND INSTALL SALVAGED ITEMS TO COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT.
- B. CONTRACTOR SHALL PERFORM THE FOLLOWING FOR ITEMS SALVAGED FOR OWNER'S USE: CLEAN SALVAGED ITEMS, PROTECT AND STORE ITEMS UNTIL DELIVERY, TRANSPORT SALVAGED ITEMS TO OWNER'S STORAGE AREA.
- C. THE CONTRACTOR SHALL FOLLOW THE LOCAL ORDINANCES FOR RECYCLED MATERIALS.
- D. THE CONTRACTOR SHALL DISPOSE OF ALL DEMOLITION AND CONSTRUCTION WASTE FROM THE PROJECT SITE IN A LANDFILL OR INCINERATOR ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

**1.09 PROJECT CLOSEOUT**

- A. THE CONTRACTOR SHALL COMPLETE OR CORRECT ALL WORK IDENTIFIED AS NOT CONFORMING TO THE CONTRACT DOCUMENTS.
- B. THE CONTRACTOR SHALL PREPARE ELECTRONIC RECORD DRAWINGS IN AUTOCAD FORMAT TO SHOW ACTUAL AS-BUILT INSTALLATION CONDITIONS.
- C. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF OPERATION AND MAINTENANCE DATA INDICATING OPERATION AND MAINTENANCE OF EACH SYSTEM, SUBSYSTEM, AND PIECE OF EQUIPMENT.
- D. THE CONTRACTOR SHALL PROVIDE SOURCE INFORMATION, MANUFACTURER'S MAINTENANCE DOCUMENTATION, MAINTENANCE PROCEDURES, MAINTENANCE AND SERVICE SCHEDULES, SPARE PARTS LIST AND SOURCE INFORMATION, MAINTENANCE SERVICE CONTRACTS, AND WARRANTY AND BOND INFORMATION FOR EACH SYSTEM, SUBSYSTEM, AND PIECE OF EQUIPMENT.
- E. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF EMERGENCY INFORMATION INDICATING PROCEDURES FOR USE BY EMERGENCY PERSONNEL AND BY OWNER'S OPERATING PERSONNEL FOR TYPES OF EMERGENCIES INDICATED.
- F. UNLESS OTHERWISE SPECIFIED IN OTHER SECTIONS, THE CONTRACTOR SHALL DEVELOP AN INSTRUCTION PROGRAM TO TRAIN THE OWNER'S PERSONNEL IN THE OPERATION, EMERGENCY PROCEDURES, ADJUSTMENT, TROUBLESHOOTING, MAINTENANCE, AND REPAIR OF EACH SYSTEM, SUBSYSTEM, AND PIECE OF EQUIPMENT.

**PART 2 - PRODUCTS**

**2.01 WIRING AND MOTOR CONTROLLERS**

- A. ALL LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY THIS CONTRACTOR. PROVIDE TRANSFORMERS AS REQUIRED.
- B. UNLESS OTHERWISE INDICATED PROVIDE ALL ELECTRICAL DISCONNECT SWITCHES FOR ALL NEW OR RELOCATED EQUIPMENT WHETHER UNIT MOUNTED OR REMOTE MOUNTED.
- C. UNLESS OTHERWISE INDICATED PROVIDE ALL MOTOR CONTROLLERS, STARTERS AND VARIABLE FREQUENCY DRIVES FOR ALL NEW OR RELOCATED EQUIPMENT WHETHER UNIT MOUNTED OR REMOTE MOUNTED.
- D. POWER WIRING REQUIREMENTS TO ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. COORDINATE POWER REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
- E. WIRING SHALL MEET THE REQUIREMENTS OF ELECTRICAL SPECIFICATIONS. ALL WIRING WITHIN MECHANICAL ROOMS, EXPOSED TO VIEW IN FINISHED SPACES, OR INSTALLED ABOVE INACCESSIBLE CEILINGS SHALL BE RUN WITHIN EMT CONDUIT AS SPECIFIED IN ELECTRICAL SPECIFICATIONS. WIRING ABOVE ACCESSIBLE CEILINGS MAY BE INSTALLED USING J-HOOKS OR CABLE TRAY.

**2.02 MOTORS**

- A. MOTORS 1/2 HP AND LARGER SHALL BE THREE-PHASE. MOTORS SMALLER THAN 1/2 HP SHALL BE SINGLE PHASE. ALL MOTORS SHALL HAVE THE FOLLOWING CHARACTERISTICS:
  - FREQUENCY RATING OF 60 HERTZ.
  - NEMA STANDARD VOLTAGE SELECTED TO OPERATE ON NOMINAL CIRCUIT VOLTAGE TO WHICH THE MOTOR IS CONNECTED.
  - SERVICE FACTOR OF 1.15 FOR OPEN DRIP-PROOF TYPE AND 1.0 FOR TOTALLY ENCLOSED TYPE.
  - RATED FOR CONTINUOUS DUTY AT AMBIENT TEMPERATURE OF 105 DEG F AND AT ALTITUDE OF 3300 FEET ABOVE SEA LEVEL.
  - CAPACITY AND TORQUE CHARACTERISTICS SUFFICIENT TO START, ACCELERATE, AND OPERATE CONNECTED LOADS AT DESIGNATED SPEEDS, AT INSTALLED ALTITUDE AND ENVIRONMENT, WITH INDICATED OPERATING SEQUENCE AND WITHOUT EXCEEDING NAMEPLATE RATINGS OR CONSIDERING SERVICE FACTOR.
  - MOTORS SHALL MEET THE EFFICIENCY REQUIREMENTS OF ASHRAE 90.1.
  - POLYPHASE MOTORS SHALL BE NEMA MG 1, DESIGN B, MEDIUM INDUCTION MOTOR, PREMIUM EFFICIENCY. MOTOR STATOR SHALL HAVE COPPER WINDINGS. MOTOR ROTOR SHALL BE SQUIRREL CAGE TYPE. MOTOR BEARINGS SHALL BE DOUBLE SHIELDED, PRE-LUBRICATED BALL BEARINGS SUITABLE FOR RADIAL THRUST LOADING. MOTOR INSULATION SHALL BE CLASS F WITH TEMPERATURE RISE SELECTED TO MATCH RATING. MOTOR ENCLOSURE SHALL BE CAST IRON. MOTOR SHALL HAVE RATING, CHARACTERISTICS, AND FEATURES COORDINATED WITH THE USE OF THE VARIABLE FREQUENCY CONTROLLER SPECIFIED. MOTOR SHALL BE DESIGNED WITH CRITICAL VIBRATION FREQUENCIES OUTSIDE OPERATING RANGE OF CONTROLLER OUTPUT. MOTOR INSULATION SHALL BE CLASS H WITH TEMPERATURE RISE SELECTED TO MATCH CLASS B RATING. COMPLY WITH NEMA MG1 FOR THERMAL PROTECTION REQUIREMENTS.

**2.03 VIBRATION ISOLATION AND SUPPORTS**

- A. PROVIDE VIBRATION ISOLATION SYSTEM TO PREVENT THE TRANSMISSION OF EQUIPMENT VIBRATION EITHER THROUGH THE BUILDING STRUCTURE OR CONNECTED DUCTWORK AND PIPING.
- B. PROVIDE SPRING HANGERS FOR ALL ROTATING EQUIPMENT SUSPENDED FROM THE BUILDING STRUCTURE.
- C. PROVIDE SPRING ISOLATORS FOR ALL ROTATING EQUIPMENT MOUNTED THAT IS FLOOR OR ROOF-MOUNTED.
- D. PIPING CONNECTED TO MOTOR DRIVEN PUMPS: ISOLATE PIPING 1-1/2 INCH AND LARGER FOR A DISTANCE OF 50 FEET FROM EQUIPMENT.
- E. VIBRATION ISOLATION EQUIPMENT SHALL BE AS MANUFACTURED BY MASON INDUSTRIES OR APPROVED EQUAL.
- F. PACKAGED EQUIPMENT THAT IS INTERNALLY ISOLATED BY THE MANUFACTURER DOES NOT REQUIRE VIBRATION ISOLATION.

**2.04 FIRESTOPPING**

- A. PROVIDE PENETRATION FIRESTOPPING THAT IS PRODUCED AND INSTALLED TO RESIST SPREAD OF FIRE, RESIST PASSAGE OF SMOKE AND OTHER GASES, AND MAINTAIN ORIGINAL FIRE-RESISTANCE RATING OF CONSTRUCTION PENETRATED. PROVIDE PENETRATION FIRESTOPPING WITH RATINGS DETERMINED PER ASTM E 814 OR UL 1479.

**2.05 IDENTIFICATION**

- A. EQUIPMENT IDENTIFICATION
  - PROVIDE PERMANENTLY INSTALLED LABELS ON EACH PIECE OF MAJOR EQUIPMENT. LABELS SHALL BE VISIBLE AND ACCESSIBLE.
    - MULTI-LAYER, MULTI-COLOR, PLASTIC LABELS FOR MECHANICAL ENGRAVING, 1/8-INCH-THICK, WITH PRE-DRILLED HOLES FOR ATTACHMENT HARDWARE.
    - RED BACKGROUND WITH WHITE LETTERING.
    - ABLE TO WITHSTAND TEMPERATURES UP TO 160 DEGREES F.
    - LENGTH AND WIDTH VARY FOR REQUIRED LABEL CONTENT, BUT NO SMALLER THAN 2-1/2 BY 3/4 INCH.
    - FASTENERS: STAINLESS STEEL RIVETS OR SELF-TAPPING SCREWS.
    - LABEL CONTENT: INCLUDE EQUIPMENT'S UNIQUE EQUIPMENT NUMBER.

**2.06 INSULATION**

- A. GENERAL
  - INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE OR OWENS CORNING. INSTALL INSULATION, MASTICS, ADHESIVES, COATINGS, COVERS, WEATHER-PROTECTION AND OTHER WORK EXACTLY AS REQUIRED BY THE MANUFACTURER'S RECOMMENDATIONS. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVES AND SEALANTS COUNCIL STANDARDS AND SMACNA.
  - APPLY INSULATION AFTER SYSTEMS HAVE BEEN TESTED, PROVED TIGHT AND APPROVED BY THE ENGINEER. REMOVE DIRT, SCALE, OIL, RUST, AND OTHER FOREIGN MATTER PRIOR TO INSTALLATION OF INSULATION.
  - LEAKS IN THE VAPOR BARRIER OR VOIDS IN THE INSULATION SHALL NOT BE ACCEPTABLE.
  - ASTM E-84 MINIMUM FIRE HAZARD RATINGS SHALL BE 25 FLAME SPREAD, 50 FUEL CONTRIBUTED, AND 50 SMOKE DEVELOPED.
  - WHERE DUCTS ARE INSULATED, FLEXIBLE CONNECTIONS TO DUCTS SHALL BE INSULATED.
  - INSULATE STANDING SEAMS WITH SAME MATERIAL AND THICKNESS AS DUCT.
  - INSULATION SHALL BE CONTINUOUS THROUGH WALL AND CEILING AND IN SLEEVES.
  - TRANSMISSION RATES OF VAPOR BARRIER SHALL NOT EXCEED 0.02 PERMS
- B. DUCT INSULATION
  - IF INSULATION DOES NOT HAVE PRECUT LAP MAKE LAPPED BUTT JOINTS BY CUTTING 2 INCH STRIP OF INSULATION AWAY FROM VAPOR BARRIER. APPLY 6 INCH STRIPS OF APPROVED ADHESIVE ON 16 INCH CENTERS AND WRAP DUCT WITH INSULATION. STAPLE LAPPED JOINT WITH OUTWARD CLINCHING STAPLES. SEAL STAPLED JOINTS AIRTIGHT WITH APPROVED VAPOR BARRIER MASTIC OR PRESSURE-SENSITIVE TAPE.
  - COVER BREAKS IN VAPOR MATERIAL WITH PATCHES OF SAME MATERIAL, SECURED WITH ADHESIVE AND STAPLES. SEAL WITH APPROVED BARRIER COATING.
  - FILL VOIDS IN INSULATION AT JACKET PENETRATIONS AND SEAL WITH VAPOR BARRIER COATING.
  - SEAL AND FLASH TERMINATION AND PUNCTURES WITH FIBROUS GLASS CLOTH BETWEEN TWO COATS OF VAPOR BARRIER COATING.
  - TERMINATE VAPOR BARRIER AND EXTEND INSULATION AT STANDOFF BRACKETS.
  - DUCTWORK EXPOSED TO WEATHER OR OUTSIDE CONDITIONS:
    - RECTANGULAR DUCTWORK:
      - INNER LAYER OF 3-INCH THICK JOHNS MANVILLE 800 SERIES SPIN-GLAS (FACED FIBER GLASS BOARD PRODUCT) OR APPROVED EQUAL. INSULATION SHALL PROVIDE A MINIMUM R-VALUE OF R-12.
      - FINAL LAYER OF VENTURE CLAD 1577 CW WEATHER BARRIER OR APPROVED EQUAL, SHALL BE INSTALLED OVER FOIL FACED URETHANE INSULATION.
      - SEAMS ON BENDS, ELBOWS, AND SIMILAR FITTINGS SHALL BE SEALED WITH VENTURE CLAD SMOOTH FOIL, 3-PLY LAMINATE, 3-INCH WIDE ADHESIVE VENTURE CLAD 1578 TAPE OR APPROVED EQUAL.
      - ROUND DUCTWORK INSULATION SHALL BE MITERED OR FORMED.
- C. EQUIPMENT INSULATION
  - DO NOT INSULATE FACTORY INSULATED EQUIPMENT.

**2.07 METAL DUCTS**

- A. GENERAL
  - MATERIAL AND INSTALLATION, IN ADDITION TO MEETING CODE REQUIREMENTS, SHALL MEET THE REQUIREMENTS OF THE FOLLOWING REFERENCE STANDARDS, EXCEPT FOR MORE STRINGENT REQUIREMENTS SPECIFIED OR SHOWN ON THE DRAWINGS: SMACNA HVAC DUCT CONSTRUCTION HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL.
  - DUCT SYSTEM LAYOUT, AS INDICATED, HAS BEEN USED AS THE BASIS FOR SIZING AND FOR SELECTING THE TYPE OF AIR MOVING AND DISTRIBUTION EQUIPMENT AND OTHER AIR SYSTEM COMPONENTS. CHANGES TO DUCT SYSTEM LAYOUT OR CONFIGURATION OF DUCTS SHALL BE SUBMITTED TO ENGINEER. LAYOUT MODIFICATIONS SHALL BE ACCOMPANIED WITH CALCULATIONS SHOWING THAT PROPOSED LAYOUT SHALL PROVIDE ORIGINAL DESIGN RESULTS WITHOUT INCREASING SYSTEM TOTAL PRESSURE.
  - SHEET METAL MATERIALS:
    - GALVANIZED SHEET STEEL: ASTM A 653/A 653 M; G90 COATING DESIGNATION; MILL PHOSPHATIZED FINISH FOR SURFACES EXPOSED TO WEAV.
  - SUPPLY, RETURN, AND GENERAL EXHAUST DUCTS.
  - REINFORCEMENT SHAPES, PLATES, AND TIE RODS SHALL BE OF THE SAME MATERIAL USED FOR THE ASSOCIATED DUCTWORK.
  - TIE RODS SHALL BE, 1/4-INCH MINIMUM DIAMETER FOR LENGTHS 36 INCHES OR LESS; 3/8-INCH MINIMUM DIAMETER FOR LENGTHS LONGER THAN 36 INCHES.
- B. ELBOW CONFIGURATION:
  - RECTANGULAR DUCT: COMPLY WITH FITTINGS BELOW AS DEFINED BY SMACNA'S "HVAC DUCT HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"
    - RADIUS: TYPE RE 1 WITH MINIMUM 1.5 RADIUS TO DIAMETER RATIO.
  - MITERED:
    - FOR DUCTS SMALLER THAN 8 INCHES: TYPE RE 4.
    - FOR DUCTS 8 INCHES AND LARGER: TYPE RE 2 WITH DOUBLE THICKNESS TURNING VANES.
  - ROUND DUCT: COMPLY WITH FITTINGS BELOW AS DEFINED BY SMACNA'S "HVAC DUCT HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"
    - MINIMUM RADIUS-TO-DIAMETER RATIO: 1.5
    - ROUND ELBOWS, 12 INCHES AND SMALLER IN DIAMETER: STAMPED OR STANDING SEAM.
    - ROUND ELBOWS, 14 INCHES AND LARGER IN DIAMETER: STANDING SEAM.
    - STANDING SEAM ELBOWS SHALL EACH HAVE THE FOLLOWING NUMBER OF SEGMENTS:
      - 15 OR 30 DEGREE: 2 SEGMENTS.
      - 45 DEGREE ELBOW: 3 SEGMENTS.
      - 60 DEGREE ELBOW: 4 SEGMENTS.
      - 90 DEGREE ELBOW: 5 SEGMENTS.
    - BRANCH CONFIGURATION:
      - RECTANGULAR DUCT:
        - RECTANGULAR MAIN TO RECTANGULAR BRANCH: 45 DEGREE ENTRY
        - RECTANGULAR MAIN TO ROUND BRANCH: BELLMOUTH
      - ROUND DUCT:
        - VELOCITY 1000 FPM OR LOWER: 90-DEGREE TAP.
        - VELOCITY 1000 TO 1500 FPM: CONICAL TAP.
        - VELOCITY 1500 FPM OR HIGHER: 45 DEGREE LATERAL.
  - C. SEALANT MATERIALS
    - JOINT AND SEAM TAPE SHALL BE 2-INCHES WIDE; GLASS-FIBER REINFORCED FABRIC.
    - TAPE SEALING SYSTEM SHALL BE WOVEN-FIBER TAPE IMPREGNATED WITH GYPSUM MINERAL COMPOUND AND MODIFIED ACRYLIC/SILICONE ACTIVATOR TO REACT EXOTHERMICALLY WITH TAPE TO FORM HARD, DURABLE AIRTIGHT SEAL.
    - WATER-BASED JOINT AND SEAM SEALANT SHALL BE FLEXIBLE, ADHESIVE SEALANT, RESISTANT TO UV LIGHT WHEN CURED, UL 723 LISTED, AND COMPLYING WITH NFPA REQUIREMENTS FOR CLASS 1 DUCTS.
    - SOLVENT BASED JOINT AND SEAM SEALANT SHALL BE ONE PART, NON-SAG, SOLVENT-RELEASE-CURING, POLYMERIZED BUTYL SEALANT FORMULATED WITH A MINIMUM 75 PERCENT SOLIDS.
    - FLANGED JOINT MASTIC SHALL BE ONE-PART, ACID-CURING, SILICONE, ELASTOMERIC JOINT SEALANT COMPLYING WITH ASTM C 920, TYPE S, GRADE NS, CLASS 25, USE O.
    - FLANGE GASKETS SHALL BE BUTYL RUBBER OR EPDM POLYMER WITH POLYISOBUTYLENE PLASTICIZER.
    - ROUND DUCT JOINT O-RING SEALS:
      - SEAL SHALL PROVIDE MAXIMUM 3 CFM/100 SQ. FT. AT 1-INCH WG AND SHALL BE RATED FOR 10-INCH WG STATIC-PRESSURE CLASS, POSITIVE OR NEGATIVE.
      - EPDM O-RING TO SEAL IN CONCAVE BEAD IN COUPLING OR FITTING SPIGOT.



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PROJECT ADDRESS:  
108-114 NORTH 7TH STREET  
PATERSON, NJ  
BLOCK: 414 LOTS: 1 & 21

DRAWING NAME :

**MECHANICAL SPECIFICATIONS**

BLDG DEPT REF. # SCALE:  
AS NOTED

SIGNATURE & SEAL  
ALEXEY VAHUIS  
ENGINEER  
N.J. LIC. No. GE56570

DATE:  
12/10/2021

DRAWING #  
**M-500**

PROJECT # : 2021.09.02



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- c. DOUBLE-LIPPED, EPDM O-RING SEAL, MECHANICALLY FASTENED TO FACTORY FABRICATED COUPLINGS AND FITTING SPIGOTS.
C. HANGERS AND SUPPORTS
1. BUILDING ATTACHMENTS SHALL BE CONCRETE INSERTS, POWDER ACTUATED FASTENERS, OR STRUCTURAL STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED.
2. HANGER MATERIALS SHALL BE GALVANIZED SHEET STEEL OR THREADED STEEL ROD COMPLYING WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE.
3. DUCT ATTACHMENTS SHALL BE SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH DUCT MATERIALS.
4. TRAPEZE AND RISER SUPPORTS SHALL BE GALVANIZED STEEL SHAPES COMPLYING WITH ASTM A 36.
5. DUCT SLEEVES, AND SEALING COLLARS
1. ROUND DUCT SLEEVES: MINIMUM 20 GAUGE GALVANIZED STEEL.
2. SQUARE AND RECTANGULAR DUCT COLLARS: MINIMUM 1-1/2 INCH X 26 GAUGE GALVANIZED STEEL FLANGE.
3. FLEXIBLE SLEEVES: VENTFABRICS INC.; METALEDGE VENGAS OR EQUAL. 9-INCH WIDE, 20 OUNCE/SQ. YD GLASS FABRIC, DOUBLE COATED WITH NEOPRENE, 24 GAUGE GALVANIZED. SECURE WITH 1 INCH WIDE GALVANIZED STEEL BANDS AND 1/8 INCH STOVE BOLTS, 5 INCHES ON CENTER.
E. SINGLE-WALL RECTANGULAR DUCT FABRICATION
1. SUPPLY, AND EXHAUST DUCTWORK SHALL MEET THE FOLLOWING PRESSURE CLASS UNLESS OTHERWISE NOTED: 1-INCH W.G. POSITIVE OR NEGATIVE PRESSURE APPLICATION, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4, 2500 FEET PER MINUTE OR LESS VELOCITY.
2. TRANSVERSE JOINTS:
a. FOR DUCTS WITH LONGEST SIDE LESS THAN 36 INCHES, SELECT JOINT TYPE IN ACCORDANCE WITH FIGURE 2-1. JOINTS AND COMPONENTS SHALL BE CONSTRUCTED USING MANUFACTURER'S GUIDELINES FOR MATERIAL THICKNESS, REINFORCEMENT SIZE AND SPACING, AND JOINT REINFORCEMENT.
b. FOR DUCTS WITH LONGEST SIDE 36 INCHES OR GREATER, USE SMACNA FLANGED JOINT CONNECTOR TYPE T-22, T-24, T-24A, T-25A, OR T-25B. FACTORY FABRICATED FLANGED DUCT CONNECTION SYSTEM MAY BE USED IF SUBMITTED AND APPROVED BY ENGINEER.
3. LONGITUDINAL SEAMS SHALL BE PITTSBURGH LOCK SEALED WITH NON-CURING POLYMER SEALANT.
4. CROSS BREAK OR CROSS BEAD DUCT SIDES 19-INCHES AND LARGER AND 20 GAUGE OR LESS, WITH MORE THAN 10 SQUARE FEET OF NON-BRACED PANEL AREA.
F. SINGLE-WALL ROUND DUCT FABRICATION
1. SUPPLY, AND EXHAUST DUCTWORK SHALL MEET THE FOLLOWING PRESSURE CLASS UNLESS OTHERWISE NOTED: 1-INCH W.G. POSITIVE OR NEGATIVE PRESSURE APPLICATION, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 2, 2500 FEET PER MINUTE OR LESS VELOCITY.
2. TRANSVERSE JOINTS:
a. DUCTS UP TO 20 INCHES IN DIAMETER: SMACNA TYPE RT-1 (BEADED SLEEVE), RT-5 (CRIMP JOINT), OR RT-6 (SWEDGE) JOINTS SEALED BEFORE AND AFTER FASTENING.
b. DUCTS 20 INCHES AND LARGER SHALL BE THREE-PIECE GASKETED, FLANGED JOINT CONSISTING OF TWO INTERNAL FLANGES WITH SEALANT AND ONE EXTERNAL CLOSURE BAND WITH GASKET.
3. LONGITUDINAL JOINTS:
a. FABRICATE ROUND DUCTS LARGER THAN 90 INCHES WITH BUTT-WELDED LONGITUDINAL SEAMS.
b. FABRICATE FLAT-OVAL DUCTS LARGER THAN 72 INCHES IN WIDTH (MAJOR DIMENSION) WITH BUTT-WELDED LONGITUDINAL SEAMS.
4. ROUND DUCTS MAY USE A PREFABRICATED CONNECTION SYSTEM CONSISTING OF DOUBLE-LIPPED, EPDM RUBBER GASKET. MANUFACTURE DUCTS ACCORDING TO CONNECTION SYSTEM MANUFACTURER'S TOLERANCES.

2.08 DUCT ACCESSORIES

- A. VOLUME DAMPERS
1. PROVIDE MANUAL ADJUSTABLE VOLUME DAMPERS WITH EXTENDED MOUNT INDICATING AND LOCKING QUADRANTS.
5. DAMPERS SHALL BE A MINIMUM OF 1/2 INCH SMALLER IN BOTH DIMENSIONS, OR 1 INCH SMALLER IN DIAMETER THAN SIZE OF DUCT IN WHICH THEY ARE INSTALLED.
6. DAMPERS LARGER THAN 12 INCHES IN HEIGHT SHALL BE OPPOSED MULTI-BLADE.
7. DAMPER BLADES SHALL BE TWO GAUGES HEAVIER THAN THE ADJOINING DUCTWORK AND SHALL BE RIVETED TO SUPPORTING RODS. HEM OVER EDGES PARALLEL TO THE ROD.
8. BRACKETS SHALL BE GALVANIZED METAL. SECURED TO DUCTWORK WITH SHEET METAL SCREWS WITH LOCKING QUADRANT ARMS. PROVIDE 2 INCH HANDLE EXTENSION FOR ALL DAMPERS ON EXTERNALLY INSULATED DUCTWORK.
9. PROVIDE REMOTE DAMPER OPERATORS FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. REMOTE OPERATORS SHALL BE CABLE OPERATED AND CAPABLE OF BEING LOCATED UP TO 50 FEET FROM THE DAMPER THEY CONTROL. PROVIDE MOUNTING BRACKET FOR REMOTE OPERATOR. YOUNG REGULATOR, MODEL 270-275, OR EQUAL.
B. FLEXIBLE CONNECTIONS
1. PROVIDE NEOPRENE-COATED FLAMEPROOF FABRIC CRIMPED INTO DUCT FLANGES FOR ATTACHMENT TO DUCT AND EQUIPMENT. PROVIDE FLEXIBLE CONNECTIONS WHERE DUCTWORK CONNECTS TO EQUIPMENT OR WHERE DUCTWORK CROSSES A BUILDING EXPANSION JOINT. PROVIDE ADEQUATE JOINT FLEXIBILITY TO ALLOW FOR THERMAL, AXIAL, TRANSVERSE, TORSIONAL MOVEMENT, AND CAPABLE OF ABSORBING VIBRATION. MAKE JOINT AIRTIGHT.
C. FIRE DAMPERS
1. ACCEPTABLE MANUFACTURERS: RUSKIN COMPANY, AIR BALANCE INC., GREENHECK, OR APPROVED EQUAL.
2. FIRE DAMPERS SHALL BE LABELED ACCORDING TO UL FIRE RATING.
3. TYPE-A CURTAIN TYPE: FRAME WITH BLADES IN AIRSTREAM FABRICATED WITH ROLL-FORMED 0.034-INCH THICK GALVANIZED STEEL WITH MITERED AND INTERLOCKING CORNERS.
4. FACTORY OR FIELD-INSTALLED GALVANIZED SHEET STEEL MOUNTING SLEEVE, WITH 0.052 MINIMUM THICKNESS AND OF LENGTH TO SUIT APPLICATION.
5. MOUNT VERTICALLY OR HORIZONTALLY AS INDICATED.
6. FUSIBLE LINKS: REPLACEABLE, 165 DEG. F. PROVIDE DUCT ACCESS DOOR FOR REPLACEMENT OF FUSIBLE LINK.
7. FIRE RATING: 1-1/2 HOURS.
D. DUCT ACCESS DOORS
1. DUCT ACCESS DOORS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE DUCT IN WHICH THEY ARE INSTALLED AND SHALL BE THE SAME OR GREATER GAUGE AS THE DUCTWORK SERVED. INSULATED DOORS SHALL BE INSTALLED IN INSULATED DUCTWORK. FLUSH FRAMES SHALL BE PROVIDED FOR UNINSULATED DUCTWORK. EXTERNAL FRAMES SHALL BE PROVIDED FOR EXTERNALLY INSULATED DUCTS. ONE SIDE OF DOOR SHALL BE HINGED AND THE AND THE OTHER SIDE SHALL BE PROVIDED WITH MINIMUM ONE LEVER LATCH.
2. AT A MINIMUM ACCESS DOORS SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF DUCT COILS, UPSTREAM OF DUCT FILTERS, DOWNSTREAM OF CONTROL DAMPERS, ADJACENT TO DUCT MOUNTED FIRE AND SMOKE DAMPERS TO ALLOW RESET OR REINSTALL OF FUSIBLE LINKS, AND AT ALL CONTROL DEVICES REQUIRING INSPECTION.
3. ACCEPTABLE MANUFACTURERS: AIR BALANCE, INC., RUSKIN COMPANY, VENTFABRICS, INC., OR APPROVED EQUAL.
E. INSTALLATION OF DUCT ACCESSORIES
1. DUCT ACCESSORIES SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. APPLICABLE DETAILS OF CONSTRUCTION SHALL BE AS SHOWN IN SMACNA STANDARDS AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES.

2.09 AIR DEVICES

- A. ACCEPTABLE MANUFACTURERS ARE ANEMOSTAT, TITUS, KRUEGER, PRICE INDUSTRIES.
B. CEILING DIFFUSERS, AND SUPPLY, RETURN AND EXHAUST AIR REGISTERS: EXCEPT AS OTHERWISE INDICATED, PROVIDE CEILING DIFFUSERS, AND SUPPLY, RETURN AND EXHAUST AIR REGISTERS OR GRILLES WHERE SHOWN, OF TYPE, SIZE, SHAPE, PERFORMANCE AND FINISHES, AS INDICATED ON THE DRAWINGS.
C. PROVIDE DIFFUSERS, AND SUPPLY, RETURN, AND EXHAUST REGISTERS OR GRILLES WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT WALL OR CEILING CONSTRUCTION.
D. THE CONTRACTOR SHALL PROVIDE PUBLISHED PERFORMANCE DATA FOR THE DIFFUSERS, REGISTERS, AND GRILLES. PERFORMANCE DATA SHALL INCLUDE: STATIC PRESSURE DROP, THROW, AND NOISE RATING AT PUBLISHED AIRFLOW RATES.
E. ALL AIR OUTLETS AND INLETS SHALL BE TESTED IN ACCORDANCE WITH ANSI/ASHRAE STANDARD 70 - METHOD OF TESTING FOR RATING THE PERFORMANCE OF AIR OUTLETS AND INLETS."

2.10 ROOF CURBS

- A. MANUFACTURER: THE PATE COMPANY, OR EQUAL.
B. ROOF EQUIPMENT SUPPORTS:
1. FOR USE WITH EQUIPMENT NOT PROVIDED WITH ROOF SUPPORT BY THE MANUFACTURER.
2. FOR EQUIPMENT NOT EXCEEDING 36 INCHES IN WIDTH; INTEGRAL BASEPLATE AND COUNTERFLASHING. PATE COMPANY MODEL ES.
3. FOR EQUIPMENT EXCEEDING 36 INCHES IN WIDTH; PATE COMPANY MODEL ES SUPPORTS IN HEIGHT TO PROVIDE MINIMUM 24 INCHES CLEARANCE BETWEEN UNDERSIDE OF EQUIPMENT AND FINISHED ROOF SURFACE.

2.11 GRAVITY ROOF VENTILATOR - RELIEF

- A. ACCEPTABLE MANUFACTURERS ARE GREENHECK, PENN BARRY, AND COOK FANS.
B. HOOD AND BASE: ALL GALVANIZED EXTERIOR WITH WINDBAND AND REMOVABLE CURB CAP. MINIMUM STANDARD BASE HEIGHT OF 5 INCHES.
C. CURB CAP: SIZED SIX INCHES LARGER THAN THROAT SIZE. PRE-PUNCHED WITH MOUNTING HOLES FOR INSTALLATION ON CURB.
D. BIRDSCREEN: 1/2-INCH GALVANIZED MESH MOUNTED HORIZONTALLY ACROSS THE RELIEF AREA OF THE HOOD.
E. ACCESSORIES:
1. EXTENDED BASE: TO PROVIDE OVERALL BASE HEIGHT OF 12 INCHES.
2. CURB SEAL: RUBBER SEAL BETWEEN GRAVITY VENTILATOR AND ROOF CURB.
3. ROOF CURB: 12-INCH ALUMINUM, 1-1/2 INCH INSULATION.
4. DAMPER: MOTORIZED OR GRAVITY AS SCHEDULED. GALVANIZED FRAME WITH PRE-PUNCHED MOUNTING HOLES.
5. INSECT SCREEN: FINE MESH ALUMINUM FITTED TO TOP OF THROAT.
6. TIE-DOWN POINTS: FOUR BRACKETS LOCATED ON HOOD SUPPORTS TO SECURE FAN IN HEAVY WIND APPLICATIONS.

2.12 ELECTRIC UNIT HEATER

- A. ACCEPTABLE MANUFACTURERS: INDEECO, QMARK, MARKEL, MARLEY ENGINEERED PRODUCTS OR APPROVED EQUAL.
B. UNIT HEATER SHALL BE ELECTRIC HEAT TYPE, WITH MINIMUM 20 GAGE POWDER COATED GALVANIZED STEEL CABINET.
C. OUTLET GRILLE: INDIVIDUALLY ADJUSTABLE LOUVERS TO DIRECT AIRFLOW.
D. FAN: TOTALLY ENCLOSED, DIRECT DRIVE, RESILIENTLY MOUNTED, BLOWER WITH FACTORY-LUBRICATED BALL BEARINGS. BLOW-THROUGH DESIGN.
E. CONTROLS: AUTOMATIC RESET THERMAL CUTOFF
F. HEATER SHALL BE PROVIDED WITH DISCONNECT SWITCH MOUNTED ON UNIT CABINET.

2.13 TRANSFER FAN (IN-LINE)

- A. ACCEPTABLE MANUFACTURERS ARE COOK, GREENHECK, PENN VENTILATION.
B. HOUSING: INSULATED, GALVANIZED STEEL.
C. FAN: FORWARD-CURVED CENTRIFUGAL TYPE, DIRECT DRIVE, DYNAMICALLY BALANCED WITH PERMANENTLY LUBRICATED MOTOR AND BUILT IN THERMAL OVERLOAD PROTECTION.
D. ACCESSORIES:
1. POWER DISCONNECT
2. SPEED CONTROLLER
3. VIBRATION ISOLATOR KIT.
E. PROVIDE FLEXIBLE CONNECTION BETWEEN FAN AND DUCTWORK.

2.14 AUTOMATIC TEMPERATURE CONTROLS

- A. PROVIDE ALL CONTROLLERS, POWER SUPPLIES, SENSORS, TRANSMITTERS, TRANSDUCERS, TRANSFORMERS, SWITCHES, RELAYS, DAMPERS, ACTUATORS, AND WIRING NECESSARY TO PERFORM SEQUENCES AS DESCRIBED.

- 1. RELAYS SHALL BE UL LISTED PLUG-IN TYPE WITH DUST COVER AND LED ENERGIZED INDICATOR.
2. AC VOLTAGE TRANSFORMERS SHALL BE UL LISTED, 600 VAC-RATED, COMPLETE WITH BUILT-IN FUSE PROTECTION. TRANSFORMERS SHALL BE SUITABLE FOR AMBIENT TEMPERATURES OF 40-130 DEG F AND SHALL PROVIDE PLUS OR MINUS 0.5 PERCENT ACCURACY AT 24 VAC AND A 5 VA LOAD. WINDINGS SHALL BE COMPLETELY ENCLOSED WITH METAL OR PLASTIC MATERIAL.
3. UNLESS SPECIFIED BY ARCHITECT, MOUNT WALL DEVICES AT HEIGHTS LISTED BY ADA REQUIREMENTS.
C. APPLICATION SPECIFIC CONTROLLERS SHALL OPERATE AS A STAND-ALONE CONTROLLER CAPABLE OF PERFORMING ITS SPECIFIED CONTROL RESPONSIBILITIES INDEPENDENTLY OF OTHER CONTROLLERS. THE CONTROLLERS SHALL BE A MICROPROCESSOR BASED, MULTI-TASKING, REAL-TIME DIGITAL CONTROL PROCESSOR. CONTROLLERS SHALL INCLUDE ALL POINT INPUTS AND OUTPUTS NECESSARY TO PERFORM THE SPECIFIED CONTROL SEQUENCES. ANALOG OUTPUTS SHALL BE INDUSTRY STANDARD SIGNALS SUCH AS 24 VOLT FLOATING CONTROL, 0-10 VOLT, PROVIDING AN INTERFACE TO A VARIETY OF MODULATING ACTUATORS. ALL CONTROLLER SEQUENCES AND OPERATION SHALL PROVIDE CLOSED LOOP CONTROL OF THE INTENDED APPLICATIONS.
D. ELECTRONIC TEMPERATURE SENSORS:
1. FOR OFFICES, MECHANICAL/ELECTRICAL ROOMS, AND MISCELLANEOUS NON-CRITICAL APPLICATIONS: PROVIDE THERMISTOR-TYPE ROOM TEMPERATURE SENSOR WITH ADJUSTABLE SET-POINT CAPABILITY (RANGE PROGRAMMABLE VIA SOFTWARE) AND TEMPERATURE INDICATION. OFFICE SENSORS SHALL BE EQUIPPED WITH UNOCCUPIED OVERRIDE BUTTON.
E. PROVIDE AN INSULATED BASEPLATE FOR ALL THERMOSTATS/TEMPERATURE SENSORS LOCATED ON EXTERIOR WALLS.

2.15 ROOF-MOUNTED FANS DOWNBLAST

- A. ACCEPTABLE MANUFACTURERS ARE TWIN CITY, GREENHECK, PENN BARRY, AND COOK FANS.
B. ROOF MOUNTED EXHAUST FANS SHALL BE OF THE CENTRIFUGAL, DIRECT DRIVE TYPE.
C. HOUSING: REMOVABLE, SPUN ALUMINUM TOP WITH A SQUARE ONE-PIECE ALUMINUM BASE AND VENTURI INLET CONE.
D. FAN WHEEL: ALUMINUM HUB AND WHEEL WITH BACKWARD INCLINED BLADES.
E. ACCESSORIES:
1. FACTORY-MOUNTED DISCONNECT SWITCH WITH THERMAL OVERLOAD PROTECTION.
2. BIRD SCREEN.
3. [MOTOR-OPERATED DAMPER, ACTUATOR VOLTAGE TO MATCH FAN.]
4. ROOF CURB.
F. WHEEL, MOTOR, AND DRIVE ASSEMBLY SHALL BE COMPLETELY ISOLATED FROM THE FAN SUPPORTS BY RUBBER ISOLATORS TO REDUCE TRANSMISSION OF NOISE AND VIBRATION.

PART 3 - EXECUTION

3.01 EXECUTION REQUIREMENTS

- A. THE EXISTENCE AND LOCATION OF SITE IMPROVEMENTS, UTILITIES AND OTHER CONSTRUCTION INDICATED AS EXISTING ARE NOT GUARANTEED. BEFORE BIDDING, INVESTIGATE AND VERIFY THE EXISTENCE AND LOCATION OF MECHANICAL AND ELECTRICAL SYSTEMS AND OTHER CONSTRUCTION AFFECTING THE WORK.
B. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AS REQUIRED TO FIT THE WORK PROPERLY. WHERE PORTIONS OF THE WORK ARE INDICATED TO FIT TO OTHER CONSTRUCTION, VERIFY DIMENSIONS OF OTHER CONSTRUCTION BY FIELD MEASUREMENTS BEFORE FABRICATION.
C. THE CONTRACTOR SHALL VERIFY SPACE REQUIREMENTS OF ITEMS SHOWN DIAGRAMMATICALLY ON DRAWINGS. IMMEDIATELY ON DISCOVERY OF THE NEED FOR CLARIFICATION OF THE CONTRACT DOCUMENTS, SUBMIT A REQUEST FOR INFORMATION TO THE ENGINEER. INCLUDE A DETAILED DESCRIPTION OF THE PROBLEM ENCOUNTERED, TOGETHER WITH RECOMMENDATIONS FOR CHANGING THE CONTRACT DOCUMENTS.
D. THE CONTRACTOR SHALL INSTALL VERTICAL WORK PLUMB AND HORIZONTAL WORK LEVEL UNLESS OTHERWISE INDICATED. WHERE SPACE IS LIMITED, INSTALL COMPONENTS TO MAXIMIZE SPACE AVAILABLE FOR MAINTENANCE AND EASE OF REMOVAL FOR REPLACEMENT. CONCEAL PIPES, DUCTS, WIRING, ETC., IN FINISHED AREAS UNLESS OTHERWISE INDICATED.
E. THE CONTRACTOR SHALL COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS FOR INSTALLING PRODUCTS IN APPLICATIONS INDICATED.
F. THE CONTRACTOR SHALL PROVIDE ANCHORS AND FASTENERS AS REQUIRED TO ANCHOR EACH COMPONENT SECURELY IN PLACE, LOCATED AND ALIGNED WITH OTHER PORTIONS OF THE WORK. ALLOW FOR BUILDING MOVEMENT, INCLUDING THERMAL EXPANSION AND CONTRACTION. COORDINATE INSTALLATION OF ANCHORAGES THAT ARE EMBEDDED IN CONCRETE OR MASONRY.
G. THE CONTRACTOR SHALL MAINTAIN WORK AREA FREE OF WASTE MATERIALS AND DEBRIS. REMOVE DEBRIS FROM CONCEALED SPACES BEFORE THE SPACE IS ENCLOSED.
H. THE CONTRACTOR SHALL START EQUIPMENT AND OPERATING COMPONENTS TO CONFIRM PROPER OPERATION. REMOVE MALFUNCTIONING UNITS, REPLACE WITH NEW UNITS, AND RETEST.
I. THE CONTRACTOR SHALL ADJUST OPERATING COMPONENTS FOR PROPER OPERATION WITHOUT BINDING. ADJUST EQUIPMENT FOR PROPER OPERATION.
J. TEST EACH PIECE OF EQUIPMENT TO VERIFY PROPER OPERATION. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

3.02 TESTING, ADJUSTING AND BALANCING (TAB)

- A. PROVIDE TAB SERVICES BY AN INDEPENDENT TAB CONTRACTOR NEBB OR AABC CERTIFIED. TESTING AND BALANCING OF SYSTEMS SHALL NOT BEGIN UNTIL INSTALLER HAS CERTIFIED THAT THE JOB IS COMPLETE.
B. THE INDEPENDENT TESTING CONTRACTOR SHALL PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS, AND SERVICES FOR STARTUP, TESTING, AND BALANCING OF MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN ON PLANS AND SCHEDULES, AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS, AND AUTHORITIES HAVING JURISDICTION, INCLUDING CITY, TOWN, OR COUNTY INSPECTORS. ENSURE THAT ALL CONTRACTORS ARE AVAILABLE ONSITE DURING THE ENTIRE TIME THESE PROCEDURES TAKE PLACE. ENSURE THAT ANY LISTED ORDERS OF PRECEDENCE OR PROCEDURES ARE FOLLOWED.
C. NOTIFY THE ENGINEER AND AUTHORITIES INVOLVED AT LEAST TWO WEEKS BEFORE STARTUP, TESTING AND BALANCING BEGINS.
D. DESCRIPTION OF WORK
1. COORDINATE WITH ALL OF THE TRADES TO ASSURE THAT ALL WORK IS COMPLETED AND OPERATIONAL PRIOR TO STARTING TAB.
2. TEST AND BALANCE AIR SYSTEMS WITH MAXIMUM ATTAINABLE INTERNAL LOAD (LIGHTS AND EQUIPMENT).
3. USE ONLY DIRECT FLOW MEASUREMENT UNLESS OTHERWISE SPECIFIED. DO NOT USE INDIRECT CALCULATIONS.
4. EXCEPT FOR AIR OUTLETS AND INLETS, WHERE ACTUAL MEASUREMENTS FOR FINAL BALANCE SHOW DEVIATION OF MORE THAN 5 PERCENT FROM DESIGN, AND DEVIATION CANNOT BE CORRECTED BY BALANCING WITH INSTALLED LAYOUT AND ELEMENTS, REPORT THESE CONDITIONS WITH RECOMMENDATIONS FOR CORRECTIVE ACTION.
5. ON FAN SYSTEMS CONTROLLED BY STATIC PRESSURE, ENSURE BY TESTING AND RECORDING, THAT DEVICES ARE CALIBRATED TO PERFORM AS SPECIFIED. PROVIDE DESIGN STATIC PRESSURE AT THE MOST DEMANDING LOCATION AND VERIFY THAT STATIC PRESSURE SETPOINT IS AT MINIMUM REQUIREMENTS FOR SYSTEM OPERATION. COORDINATE STATIC PRESSURE SETPOINT OF CONTROLS WITH INSTALLER.
6. VERIFY THAT THERMOSTATS AND DEVICES THEY CONTROL, OPERATE AS INTENDED AND IN SEQUENCE SPECIFIED.
7. WHERE, IN THE OPINION OF BALANCING AGENCY, EXCESSIVE VIBRATION, MOVEMENT OR NOISE FROM ANY PIECE OF EQUIPMENT, DUCTWORK, OR PIPING REMAINS, REPORT THESE CONDITIONS WITH RECOMMENDATIONS FOR CORRECTIVE ACTION.
8. ESTABLISH OPTIMAL FAN RPM AND ADVISE INSTALLER OF REQUIRED REPLACEMENT DRIVE SIZE. CHECK AND VERIFY FAN RPM FOLLOWING DRIVE REPLACEMENT.
9. PROVIDE FINAL BALANCING REPORT TO THE ENGINEER FOR REVIEW.
E. BALANCING TOLERANCES
1. ADJUST AIR SYSTEMS TO PLUS OR MINUS 5 PERCENT, MAXIMUMS AND MINIMUMS, FROM FIGURES INDICATED.
F. ADJUSTING
1. PERMANENTLY MARK SETTINGS OF VALVES, DAMPERS AND OTHER ADJUSTMENT DEVICES TO ALLOW SETTINGS TO BE RESTORED. SET AND LOCK MEMORY STOPS.
2. AFTER ADJUSTMENTS, TAKE MEASUREMENTS TO VERIFY BALANCE HAS NOT BEEN DISRUPTED.
3. REPLACE ALL BELT GUARDS, CLOSE ACCESS DOORS, CLOSE DOORS TO ELECTRICAL SWITCH BOXES AND RESTORE THERMOSTAT TO SPECIFIED SETTINGS.
G. AIR SYSTEMS
1. MAKE AIR QUANTITY MEASUREMENTS IN DUCTS BY PITOT TUBE TRAVERSES OF THE ENTIRE CROSS-SECTIONAL AREA OF THE DUCT. MEASURE THE PEAK AIRFLOW AT THE SUPPLY DUCT MAIN.
2. ADJUST DISTRIBUTION SYSTEM TO OBTAIN UNIFORM SPACE TEMPERATURES FREE FROM OBJECTIONABLE DRAFTS AND NOISE.

END OF MECHANICAL SPECIFICATIONS

Table with 2 columns and 4 rows, mostly empty cells.

PROJECT ADDRESS:
108-114 NORTH 7TH STREET
PATERSON, NJ
BLOCK: 414 LOTS: 1 & 21

DRAWING NAME :

MECHANICAL SPECIFICATIONS

BLDG DEPT REF.# SCALE: AS NOTED

SIGNATURE & SEAL
ALEXEY VIKHILIS
ENGINEER
N.J. LIC. No. GE56570
DATE: 12/10/2021

DRAWING # M-501

PROJECT #: 2021.09.02