1. GENERAL PROVISIONS

A. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE 2021 VIRGINIA MECHANICAL CODE INCLUDING REFERENCED CODES AND STANDARDS AND IN ACCORDANCE WITH MANDATES OF THE LOCAL BUILDING OFFICIALS.

B. THE GENERAL ARRANGEMENT AND LOCATIONS OF DUCTWORK, PIPING, FIXTURES, ETC. ARE INDICATED BY THE DRAWINGS AND SHALL BE INSTALLED IN ACCORDANCE THEREWITH; WITH THE EXCEPTION OF SUCH CHANGES AS MAY BE REQUIRED ON ACCOUNT OF OTHER TRADES. CONTRACTOR SHALL COORDINATE WORK WITH INSTALLATION OF OTHER SUBCONTRACTORS.

C. MECHANICAL WORK SHALL BE COORDINATED WITH THE CONTRACTOR AS TO SCHEDULING, DIMENSIONING AND LOCATION OF EQUIPMENT.

D. MAJOR ITEMS ARE SHOWN ON THE PROJECT PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INCIDENTAL ITEMS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.

E. TRADE NAMES AND CATALOG NUMBERS SHALL BE INTERPRETED AS ESTABLISHING A GENERAL DESIGN AND STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. UNLESS STATED OTHERWISE, THE CONTRACTOR MAY USE ANY ARTICLE WHICH, IN HIS JUDGEMENT, AND WITH WRITTEN COMMENT FROM THE ARCHITECT/ENGINEER INDICATING NO OBJECTION, IS EQUAL OR SUPERIOR TO THAT SPECIFIED. DRAWINGS SHOWING CHANGES OR REVISIONS REQUIRED BY THE SUBSTITUTION FOR SPECIFIED ITEMS SHALL BE SUBMITTED WITH THE SHOP DRAWING DATA, AND THE COSTS OF ALL SUCH CHANGES SHALL BE BORNE BY THE CONTRACTOR.

F. SIMILAR ITEMS SHALL BE PROVIDED BY A SINGLE MANUFACTURER.

G. ALL REQUIRED WALL OR FLOOR OPENINGS SHALL BE COORDINATED WITH THE CONTRACTOR.

H. ALL PIPING SHALL BE ABOVE CEILING UNLESS INDICATED OTHERWISE.

I. DO NOT INSTALL PVC PIPING OR ANY COMBUSTIBLE MATERIAL IN ANY AIR PLENUM.

J. ALL EQUIPMENT SHALL BE WIPED CLEAN, REMOVING ALL TRACES OF OIL, DIRT, OR PAINT SPOTS.

K. PROVIDE SUPPORTS TO RIGIDLY ATTACH ALL EQUIPMENT, APPURTENANCES AND PIPE AS REQUIRED FOR SUPPORT. PRIOR TO INSTALLATION OF HANGERS AND INSERTS, THE CONTRACTOR SHALL COORDINATE LOCATIONS AND REQUIREMENTS TO MINIMIZE CONFLICTS WITH OTHER BUILDING SYSTEMS. INSTALLATION OF PIPE HANGERS AND SUPPORTS SHALL BE IN STRICT ACCORDANCE WITH MSS SP-58, 69 AND 89.

L. CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL EQUIPMENT INDICATED TO BE FURNISHED BY OTHERS.

M. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD, WITHOUT ADDITIONAL COST TO THE OWNER, ANY DEFECT WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE OWNER.

2. SUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND PROJECT INFORMATION

A. SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS:
   (1) MECHANICAL SLEEVE SEALS
   (2) FIRE BARRIER PENETRATION SEALS
   (3) INSULATION
   (4) ALL MECHANICAL EQUIPMENT

B. IDENTIFY ALL MECHANICAL SHOP DRAWINGS, PRODUCT DATA AND SAMPLES WITH THE NAME OF THE PROJECT. CLEARLY MARK THE SPECIFIC ITEMS INTENDED FOR USE. SUBMIT ALL RELATED ITEMS AT ONE TIME.

C. PRIOR TO SUBSTANTIAL COMPLETION OF THE PROJECT, SUBMIT THE FOLLOWING INFORMATION FOR REVIEW AND APPROVAL.
   (1) OPERATING AND MAINTENANCE INSTRUCTIONS.
   (2) "AS BUILT" DRAWINGS.

3. GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD, WITHOUT ADDITIONAL COST TO THE OWNER, ANY DEFECTS WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE OWNER.

4. "AS BUILT" DRAWINGS: CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF THE LOCATION OF ALL CONCEALED DUCTWORK, PIPING, VALVES, CONTROLS, ETC., BOTH INTERIOR AND EXTERIOR. ON COMPLETION OF THE WORK, ONE PRINT EACH OF THE CONTRACT DRAWINGS WHICH ARE APPLICABLE SHALL BE NEATLY AND CLEARLY MARKED IN COLOR TO SHOW ALL VARIATIONS BETWEEN THE WORK ACTUALLY PROVIDED AND THAT INDICATED ON THE CONTRACT DRAWINGS.

5. OPERATING AND MAINTENANCE MANUALS

A. GENERAL: PRIOR TO COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TWO HARDBACKED LOOSELEAF RING TYPE BINDERS, IDENTIFIED WITH THE NAME OF THE PROJECT. CONTRACTOR SHALL DELIVER THESE BINDERS TO THE ENGINEER FOR REVIEW AND TRANSMITTAL TO THE OWNER.

B. THE FOLLOWING ITEMS AND OTHER ADDITIONAL PERTINENT DATA FOR EACH ITEM OF EQUIPMENT SHALL BE INCLUDED:
   (1) NAME OF MANUFACTURER.
   (2) NAME, ADDRESS AND TELEPHONE NUMBER OF NEAREST MANUFACTURER'S REPRESENTATIVE.
   (3) COPY OF LATEST APPROVED SHOP DRAWING.
   (4) MANUFACTURER'S OPERATING AND MAINTENANCE MANUAL INCLUDING LUBRICATION DATA.
   (5) PARTS NUMBERS FOR ALL REPLACEABLE ITEMS.
   (6) SERIAL NUMBERS OF ALL PRINCIPAL ITEMS OF EQUIPMENT.
   (7) CONTROL DIAGRAMS AND SEQUENCE OF OPERATION.
   (8) MANUFACTURER'S WRITTEN GUARANTEES THAT EXTEND BEYOND THE CONTRACTOR'S ONE YEAR GUARANTEE.

C. THE OPERATING AND MAINTENANCE MANUALS SHALL BE CONSIDERED A PART OF THE FINAL INSPECTION AND THEY SHALL BE SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS PRIOR TO REQUEST FOR FINAL INSPECTION.

6. ACCESS DOORS: ACCESS DOORS SHALL BE PROVIDED FOR ALL CONCEALED VALVES, CONTROLS, AND ANY OTHER EQUIPMENT OR MATERIALS REQUIRING INSPECTION OR MAINTENANCE. ACCESS DOORS SHALL BE FURNISHED FOR FLOORS, WALLS AND CEILINGS, OF ADEQUATE SIZE SO THAT CONCEALED ITEMS WILL BE READILY ACCESSIBLE FOR SERVICING OR FOR REMOVAL AND REPLACEMENT IF NECESSARY.

7. PAINTING

A. SCOPE OF WORK: MECHANICAL EQUIPMENT, MATERIALS, AND RELATED PIPING DO NOT REQUIRE PAINTING EXCEPT AS INDICATED BELOW.

B. EQUIPMENT WITH A FACTORY APPLIED FINISH WILL NOT REQUIRE ADDITIONAL PAINTING EXCEPT TOUCH-UP WITH MATCHING FINISH WHERE IT IS DAMAGED.

C. PIPING, FABRICATED SUPPORTS, OR OTHER UNFINISHED AND UNPROTECTED MATERIALS LOCATED OUTDOORS SHALL BE PAINTED WITH A SUITABLE PRIMER AND COMPATIBLE FINISH PAINT. COLOR SHALL BE AS DIRECTED BY ENGINEER.

D. PAINT INSIDE OF DUCTWORK WITH MATTE BLACK PAINT WHERE VISIBLE BEHIND AIR INLETS AND OUTLETS.

E. PROTECTION OF WORK: PAINTING SHALL BE DONE WITH ALL POSSIBLE CARE TO PROTECT THIS WORK AND WORK OF OTHER TRADES. ALL DAMAGE TO THIS AND OTHER WORK CAUSED BY THE PAINTING OPERATIONS SHALL BE CORRECTED, CLEANED OR REPAIRED AS REQUIRED. HARDWARE, SPECIAL CONTROL ITEMS, GAUGES, THERMOMETERS, NAMEPLATES, INSTRUMENT GLASS AND OTHER SIMILAR ITEMS SHALL BE REMOVED OR PROPERLY PROTECTED DURING THE PAINTING OPERATIONS TO INSURE THAT THESE ITEMS ARE NOT COVERED OR SPLATTERED WITH PAINT.

8. IDENTIFICATION

A. SUBMITTALS
   (1) SUBMIT LIST OF WORDING, SYMBOLS, LETTER SIZE, AND COLOR CODING FOR MECHANICAL IDENTIFICATION.
   (2) SUBMIT VALVE CHART AND SCHEDULE, INCLUDING VALVE TAG NUMBER, LOCATION, FUNCTION, AND VALVE MANUFACTURER'S NAME AND MODEL NUMBER.
   (3) PRODUCT DATA: PROVIDE MANUFACTURERS CATALOG LITERATURE FOR EACH PRODUCT REQUIRED.

B. NAMEPLATES
   (1) DESCRIPTION: LAMINATED THREE-LAYER PLASTIC WITH ENGRAVED LETTERS ON LIGHT CONTRASTING BACKGROUND COLOR.

C. TAGS
   (1) METAL TAGS: BRASS WITH STAMPED LETTERS; TAG SIZE MINIMUM 1-1/2 INCHES (40 MM) DIAMETER.
   (2) CHART: TYPEWRITTEN LETTER SIZE LIST IN ANODIZED ALUMINUM FRAME.

D. STENCILS
   (1) STENCILS: WITH CLEAN CUT SYMBOLS AND LETTERS OF FOLLOWING SIZE:
      (A) 3/4 TO 1-1/4 INCHES (20-30 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 8 INCHES (200 MM) LONG COLOR FIELD, 1/2 INCHES (15 MM) HIGH LETTERS.
      (B) 1-1/2 TO 2 INCHES (40-50 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 8 INCHES (200 MM) LONG COLOR FIELD, 3/4 INCH (20 MM) HIGH LETTERS.
      (C) 2-1/2 TO 6 INCHES (65-150 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 12 INCHES (300 MM) LONG COLOR FIELD, 1-1/4 INCHES (30 MM) HIGH LETTERS.
      (D) 8 TO 10 INCHES (200-250 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 24 INCHES (600 MM) LONG COLOR FIELD, 2-1/2 INCHES (65 MM) HIGH LETTERS.
      (E) OVER 10 INCHES (250 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 32 INCHES (800 MM) LONG COLOR FIELD, 3-1/2 INCHES (90 MM) HIGH LETTERS.
      (F) DUCTWORK AND EQUIPMENT: 2-1/2 INCHES (65 MM) HIGH LETTERS.
   (2) STENCIL PAINT: AS SPECIFIED IN SECTION 09900, SEMI-GLOSS ENAMEL, COLORS CONFORMING TO ASME A13.1.

E. PIPE MARKERS
   (1) COLOR: CONFORM TO ASME A13.1.
   (2) PLASTIC PIPE MARKERS: FACTORY FABRICATED, FLEXIBLE, SEMI- RIGID PLASTIC, PREFORMED TO FIT AROUND PIPE OR PIPE COVERING; MINIMUM INFORMATION INDICATING FLOW DIRECTION ARROW AND IDENTIFICATION OF FLUID BEING CONVEYED.

F. CEILING TACKS
   (1) DESCRIPTION: STEEL WITH 3/4 INCH (20 MM) DIAMETER COLOR CODED HEAD.
   (2) COLOR CODE AS FOLLOWS:
      (A) YELLOW - HVAC EQUIPMENT
      (B) RED - FIRE DAMPERS/SMOKE DAMPERS
      (C) GREEN - PLUMBING VALVES
      (D) BLUE - HEATING/COOLING VALVES

G. INSTALLATION
   (1) DEGREASE AND CLEAN SURFACES TO RECEIVE ADHESIVE FOR IDENTIFICATION MATERIALS.
   (2) INSTALL PLASTIC NAMEPLATES WITH CORROSIVE-RESISTANT MECHANICAL FASTENERS, OR ADHESIVE. APPLY WITH SUFFICIENT ADHESIVE TO ENSURE PERMANENT ADHESION AND SEAL WITH CLEAR LACQUER.
   (3) INSTALL TAGS WITH CORROSION RESISTANT CHAIN.
   (4) INSTALL PLASTIC PIPE MARKERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
   (5) IDENTIFY AIR CONDITIONING UNITS AND FANS WITH PLASTIC NAMEPLATES OR STENCIL PAINTING.
   (6) IDENTIFY CONTROL PANELS AND MAJOR CONTROL COMPONENTS OUTSIDE PANELS WITH PLASTIC NAMEPLATES.
   (7) IDENTIFY DUCTWORK WITH PLASTIC NAMEPLATES OR STENCILLED PAINTING. IDENTIFY WITH AIR HANDLING UNIT OR FAN AND AREA BEING SERVED.
   (8) TAG AUTOMATIC CONTROLS, INSTRUMENTS, AND RELAYS. KEY TO CONTROL SCHEMATIC.
   (9) IDENTIFY PIPING, CONCEALED OR EXPOSED, WITH PLASTIC PIPE MARKERS OR STENCILLED PAINTING. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. LOCATE IDENTIFICATION NOT TO EXCEED 20 FEET (6 M) ON STRAIGHT RUNS INCLUDING RISERS AND DROPS, ADJACENT TO EACH VALVE AND TEE, AT EACH SIDE OF PENETRATION OF STRUCTURE OR ENCLOSURE, AND AT EACH OBSTRUCTION.
   (10) PROVIDE CEILING TACKS TO LOCATE VALVES ABOVE T-BAR TYPE PANEL CEILINGS. LOCATE IN CORNER OF PANEL CLOSEST TO EQUIPMENT.

9. CONCRETE EQUIPMENT PADS

A. UNLESS OTHERWISE NOTED, CONCRETE PADS NOT LESS THAN 10 INCHES HIGH AND WHICH PROJECT NOT LESS THAN 4 INCHES BEYOND THE EQUIPMENT ON ALL SIDES SHALL BE PROVIDED ALL FLOOR-MOUNTED EQUIPMENT. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS, 3% TO 8% AIR ENTRAINMENT, 6 INCHES SLUMP MAXIMUM UPON PLACEMENT. CONCRETE SHALL NOT BE PLACED WHEN TEMPERATURE WILL FALL BELOW 32 DEGREES F DURING PLACEMENT OR DURING A PERIOD OF THREE DAYS AFTER PLACEMENT. ANCHOR BOLTS SHALL BE SET PRIOR TO POURING OF THE SLABS.

10. INSULATION

A. FLAME/SMOKE RATINGS: PROVIDE COMPOSITE PLUMBING INSULATION (INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES) WITH FLAME-SPREAD RATING OF 25 OR LESS, AND SMOKE-DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ANSI/ASTM E84 (NFPA 255) METHOD. INSULATION SHALL BE LABELED BY THE MANUFACTURER. THE LABEL SHALL INDICATE THE INSULATING VALUE, FLAME SPREAD AND SMOKE-DEVELOPED RATING.

B. SUBMITTALS: SUBMIT MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF PLUMBING INSULATION. SUBMIT SCHEDULE SHOWING MANUFACTURER'S PRODUCT NUMBER, THICKNESS, AND FURNISHED ACCESSORIES FOR EACH PLUMBING SYSTEM REQUIRING INSULATION.

C. INSTALLATION: INSULATION SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS USING ONLY ADHESIVES, MASTICS AND PLUMBING FASTENERS APPROVED BY THE INSULATION MANUFACTURER. INSULATION SHALL NOT BE APPLIED UNTIL AFTER THE EQUIPMENT HAS BEEN TESTED WITH RESULTS ACCEPTABLE TO THE ARCHITECT/ENGINEER. INSULATION WITH A VAPOR BARRIER JACKET SHALL BE APPLIED WITH A CONTINUOUS, UNBROKEN VAPOR SEAL AND ALL JOINTS SHALL BE SEALED WITH A VAPOR BARRIER ADHESIVE UNLESS OTHERWISE INDICATED. STAPLES, STICK CLIPS AND HANGERS SHALL BE VAPOR SEALED WHERE THEY PUNCTURE VAPOR BARRIER JACKETS.

D. MATERIALS:
   (1) RIGID DUCT INSULATION: ASTM C612, RIGID NONCOMBUSTIBLE, WITH MAXIMUM SERVICE TEMPERATURE OF 450°F. THERMAL CONDUCTIVITY "K"=0.23 AT 75°F, DENSITY=3.0 LB/CU. FT. F AT 75 DEGREES F. FACTORY APPLIED JACKET (ASJ) SHALL CONSIST OF WHITE KRAFT PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH GLASS FIBER YARN. EQUAL TO OWENS-CORNING ASJ.
   (2) FLEXIBLE DUCT INSULATION: ASTM C1290, MINERAL FIBER BLANKET, WITH OPERATING TEMPERATURE OF 250°F. THERMAL CONDUCTIVITY "K"=0.30 AT 75°F, DENSITY=0.75 LB/CU. FT. F AT 75 DEGREES F. FACTORY APPLIED JACKET (ASJ) SHALL CONSIST OF WHITE KRAFT PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH GLASS FIBER YARN.
   (3) ELASTOMERIC CELLULAR FOAM PIPE INSULATION: ASTM C534, TYPE 1 TUBULAR FORM, UNSLIT TUBING OR PRE-SLIT TUBULAR WITH FACTORY APPLIED PRESSURE SENSITIVE ADHESIVE. "K"=0.27 AT 75 DEGREES F, SERVICE TEMPERATURE OF 0°F TO 200°F. NO JACKET REQUIRED.

E. DUCT INSULATION
   (1) DUCT INSULATION: INSULATE ALL SUPPLY AIR, OUTDOOR AIR DUCTS AND RETURN DUCTS.
   (2) PROVIDE INSULATION WITH VAPOR RETARDER JACKETS. PIPING SYSTEM WITH EQUIVALENT THICKNESS AND COMPOSITION OF INSULATION AS APPLIED TO ADJOINING PIPE RUN.
   (3) EXTEND DUCT INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS AND SIMILAR PIPING PENETRATIONS, EXCEPT WHERE OTHERWISE INDICATED.
   (4) INSTALL PROTECTIVE METAL SHIELDS AND INSULATED INSERTS WHEREVER NEEDED TO PREVENT COMPRESSION OF INSULATION.
   (5) SUPPLY, RETURN AND OUTSIDE AIR DUCTS: INSULATE WITH 2" THICK FLEXIBLE DUCTWORK INSULATION.

F. PIPE INSULATION
   (1) REFRIGERANT SUCTION AND HOT GAS PIPING: INSULATE 1-1/2" AND SMALLER PIPES WITH 1-1/2" THICK ELASTOMERIC CELLULAR FOAM INSULATION. INSULATE LARGER THAN 1-1/2" PIPES WITH 2" THICK ELASTOMERIC CELLULAR FOAM.

11. DUCTWORK

A. GALVANIZED STEEL DUCTS: ASTM A653/A653M GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, HAVING G60 ZINC COATING IN CONFORMANCE WITH ASTM A90/90M. EXPOSED ROUND DUCTWORK TO BE PAINTABLE SPIRAL. COLOR TO BE SELECTED BY ARCHITECT/OWNER.

B. FLEXIBLE DUCTS: UL LABELED, BLACK POLYMER FILM SUPPORTED BY HELICAL WOUND SPRING STEEL WIRE. THE PRESSURE RATING SHALL BE 4" WG POSITIVE AND 0.5" WG NEGATIVE. THE MAXIMUM VELOCITY SHALL BE 4000 FPM AND THE TEMPERATURE RANGE SHALL BE -20°F TO 175°F.

C. FABRIC DUCTS: DUCTSOX SKELECORE FTS SYSTEM OR APPROVED EQUAL. FABRIC TO BE EQUIPPED WITH ORIFICES FOR AIR SUPPLY. COLOR TO BE SELECTED BY ARCHITECT/OWNER.

D. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.

E. WHERE RECTANGULAR ELBOWS ARE USED, FURNISH TURNING VANES.

F. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15° DIVERGENCE WHEREVER POSSIBLE; MAXIMUM 30° DIVERGENCE UPSTREAM OF EQUIPMENT AND 45° CEONVERGENCE DOWNSTREAM.

G. FLEXIBLE DUCT CONNECTIONS SHALL BE FABRICATED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.

H. VOLUME CONTROL DAMPERS SHALL BE RUSKIN MODEL MD-35 AND SHALL BE FABRICATED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.

12. DIFFUSERS, REGISTERS AND GRILLES

A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE THE TYPE, MATERIAL, AIR PATTERN AND FINISH INDICATED ON THE DRAWINGS.

B. INSTALL AIR OUTLETS AND INLETS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. INSTALL DIFFUSERS, REGISTERS AND GRILLES TO DUCTWORK WITH AIRTIGHT CONNECTION.

13. CLEANING AND TESTING

A. CLEAN EQUIPMENT AND FIXTURES TO A SANITARY CONDITION WITH CLEANING MATERIALS APPROPRIATE TO THE SURFACE AND MATERIAL BEING CLEANED. CLEAN DUCT SYSTEMS AND FORCE AIR AT HIGH VELOCITY THROUGH DUCT TO REMOVE ACCUMULATED DUST.

B. REPLACE FILTERS OF OPERATING EQUIPMENT.

C. HEATING AND COOLING SYSTEMS AND EXHAUST SYSTEMS SHALL BE TESTED, ADJUSTED AND BALANCED (TAB). AIR HANDLING SYSTEMS SHALL BE ADJUSTED TO WITHIN +/- 10% OF DESIGN. THE TOTAL OF AIR OUTLETS AND INLETS SHALL BE ADJUSTED TO WITHIN PLUS 10% AND MINUS 5% OF DESIGN TO SPACE. ADJUST OUTLETS AND INLETS IN SPACE TO WITHIN +/- 10% OF DESIGN.

D. THE TAB CONTRACTOR SHALL NOT BE AFFILIATED IN ANY WAY BE WITH THE INSTALLING CONTRACTOR OR EQUIPMENT SUPPLIERS. PROVIDE TAB REPORT.

END OF SPECIFICATIONS

COMM. NO.
2024-A-817
DESIGNED BY
TAD
DRAWN BY
TAD
DATE
7-5-2024

REVISIONS

NO.	DATE	BY

MECHANICAL SPECIFICATIONS

ADDITION TO
NEW HOPE CHURCH
3050 LEE HIGHWAY N.
PULASKI , VIRGINIA

COMMONWEALTH OF VIRGINIA
MELINDA D. RUBLE
Lic. No.028163
05.26.2025
PROFESSIONAL ENGINEER

THOMAS A. DOUTHAT , JR.
ARCHITECT
159 FOURTH STREET,NW
PULASKI VIRGINIA
(540)980-2429

SHEET
M-1
OF 6

PACKAGED UNIT SCHEDULE

DESIG.	AREA SERVED	EER AT ARI	MIN. O.A. CFM	SUPPLY FAN			COOLING CAPACITY				HEATING CAPACITY			ELECTRICAL			APPROX WEIGHT LBS.	BASIS OF DESIGN: TRANE	NOTES
				CFM	ESP IN W.G.	HP	TOTAL MBH	SENS. MBH	EAT DB/WB °F	AMBIENT °F	INPUT MBH	OUTPUT MBH	EAT °F	V/PH	UNIT MCA	UNIT MOCP			
PAC-1	ENTRANCE	10.8	840	6000	1.0	3.0	177.1	134.4	77.4/64.7	92/74	320.0	259.2	62.6	480/3	41	50	2075	YSJ180A3	ALL
PAC-2	GYM	10.8	2065	6000	1.0	3.0	183.4	139.6	80.8/67.0	92/74	320.0	259.2	52.0	480/3	41	50	2075	YSJ180A3	ALL
PAC-3	GYM	10.8	2065	6000	1.0	3.0	183.4	139.6	80.8/67.0	92/74	320.0	259.2	52.0	480/3	41	50	2075	YSJ180A3	ALL
PAC-4	1ST FLOOR	10.8	2100	6000	1.0	3.0	184.0	139.5	81.0/67.2	92/74	320.0	259.2	51.5	480/3	41	50	2075	YSJ180A3	ALL
PAC-5	2ND FLOOR	10.8	2400	6000	1.0	3.0	185.3	140.9	81.8/67.7	92/74	320.0	259.2	48.8	480/3	41	50	2075	YSJ180A3	ALL

NOTES:
1. HORIZONTAL DISCHARGE
2. CONDENSER COIL GUARD
3. CLOGGED FILTER SWITCH
4. LOW AMBIENT CONTROL
5. 100% O.A. COMPARATIVE ENTHALPY ECONOMIZER WITH POWER EXHAUST
6. MERV 13 FILTERS
7. POWER CONVENIENCE OUTLET
8. POWER EXHAUST KIT.
9. RETURN AIR SMOKE DETECTOR
10. HOT GAS REHEAT
11. SINGLE ZONE VAV
12. SPACE TEMPERATURE & HUMIDITY SENSORS
13. LP GAS CONVERSION KIT
14. HUMIDITY CONTROL

FAN SCHEDULE

UNIT	CFM	S.P.	RPM	MOTOR			SELECTION BASED ON GREENHECK	CONTROL	NOTES
				WATTS	VOLTS	PH			
EF-1	300	0.25	1350	80	120	1	CSP-A390	CONTINUOUS DURING OCCUPIED TIMES	1
EF-2	300	0.25	1350	80	120	1	CSP-A390	CONTINUOUS DURING OCCUPIED TIMES	1
EF-3	300	0.25	1350	80	120	1	CSP-A390	CONTINUOUS DURING OCCUPIED TIMES	1
EF-4	50	0.25	656	19	120	1	SP-A200	WALL SWITCH	2

SCHEDULE NOTES:
1. PROVIDE WITH ELECTRICAL DISCONNECT, BACKDRAFT DAMPER, WALL CAP, SPEED CONTROLLER CONTROL AS INDICATED IN SCHEDULE.
2. PROVIDE WITH ELECTRICAL DISCONNECT, BACKDRAFT DAMPER, ROOF CAP, SPEED CONTROLLER. CONTROL AS INDICATED IN SCHEDULE.

ELECTRIC UNIT HEATER SCHEDULE

MARK	MANUFACTURER & MODEL NO.	MBH	CFM	KW	VOLT/PH
UH-1	MARKEL PJPUHE05	17.1	400	5.0	480/3

NOTES:
• PROVIDE WITH DISCONNECT SWITCH & WALL MOUNTED LINE VOLTAGE THERMOSTAT.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

MARK	MANUFACTURER & MODEL NO.	DESCRIPTION	MATERIAL	FINISH	ACCESSORIES & FEATURES
SUPPLY DIFFUSERS					
CD-1	METALAIRE 5700-6	24"X24" CEILING DIFFUSER WITH 6"ø NECK FOR LAY-IN CEILING	STEEL	WHITE	MODEL BDS DAMPER
CD-2	METALAIRE 5700-6	24"X24" CEILING DIFFUSER WITH 8"ø NECK FOR LAY-IN CEILING	STEEL	WHITE	MODEL BDS DAMPER
CD-3	METALAIRE 5700-6	24"X24" CEILING DIFFUSER WITH 10"ø NECK FOR LAY-IN CEILING	STEEL	WHITE	MODEL BDS DAMPER
GRILLES & REGISTERS					
TG-1	METALAIRE SRH-1	10"X6" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-2	METALAIRE SRH-1	14"X14" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-3	METALAIRE SRH-1	28"X28" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-4	METALAIRE SRH-1	48"X24" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-5	METALAIRE SRH-1	24"X22" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-6	METALAIRE SRH-1	18"X14" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
TG-7	METALAIRE SRH-1	36"X48" FIXED BLADE SIDEWALL RETURN/TRANSFER GRILLE	STEEL	NOTE 1	--
BG-1	METALAIRE SRH-1	36"X48" FIXED BLADE SIDEWALL LOW RETURN GRILLE	STEEL	NOTE 1	--
CG-1	METALAIRE 7500R-6	24"X24" CEILING GRILLE WITH 10"ø FOR LAY-IN CEILING	STEEL	NOTE 1	--
CG-2	METALAIRE 7500R-6	24"X24" CEILING GRILLE WITH 14"ø FOR LAY-IN CEILING	STEEL	WHITE	--
CG-3	METALAIRE 7500R-6	24"X24" CEILING GRILLE WITH 18"ø FOR LAY-IN CEILING	STEEL	WHITE	--
CR-1	METALAIRE 7500R-6	24"X24" CEILING REGISTER WITH 8"ø FOR LAY-IN CEILING	STEEL	WHITE	OPPOSED BLADE DAMPER
TR-1	METALAIRE V4004-1	10"X6" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	NOTE 1	OPPOSED BLADE DAMPER
TR-2	METALAIRE V4004-1	6"X6" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	NOTE 1	OPPOSED BLADE DAMPER
TR-3	METALAIRE V4004-1	10"X8" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	NOTE 1	OPPOSED BLADE DAMPER
TR-4	METALAIRE V4004-1	12"X8" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	NOTE 1	OPPOSED BLADE DAMPER

NOTE 1: COORDINATE FINISH WITH ARCHITECT/OWNER.

GENERAL MECHANICAL NOTES

1. ALL PIPING AND DUCTWORK SHALL BE ABOVE CEILING UNLESS OTHERWISE INDICATED.
2. INSTALL THERMOSTATS, HUMIDISTATS AND TEMPERATURE AND HUMIDITY SENSORS WITH OPERABLE BUTTONS AT 48" MAX ABOVE FLOOR. WHERE THERMOSTATS AND SNAP SWITCHES (SEE ELECTRICAL DRAWINGS) ARE INDICATED IN CLOSE PROXIMITY ON THE SAME WALL, THE LOCATIONS SHALL BE COORDINATED SO THAT THE THERMOSTAT IS CENTERED DIRECTLY OVER THE SNAP SWITCH OR GROUP OF SNAP SWITCHES.
3. DUCT DIMENSIONS INDICATED ARE SHEET METAL DIMENSIONS.
4. COORDINATE LOCATIONS OF CEILING MOUNTED DIFFUSERS, REGISTERS AND GRILLES WITH LIGHT FIXTURES AND CEILING GRID. REFER TO ELECTRICAL DRAWINGS.
5. FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF SIDE SHOWN OR INDICATED.
6. ACCESS SHALL BE MAINTAINED TO ALL CONTROL DEVICES. ACCESS PANEL SIZES AND LOCATIONS SHALL BE DETERMINED PRIOR TO BIDDING AND SHALL BE INCLUDED IN THE BID PRICE FOR CONTRACT WORK. ACCESS PANELS SHALL BE INSTALLED WHERE REQUIRED AND SHALL BE FIRE RATED WHEN USED IN FIRE RESISTIVE CONSTRUCTION.
7. PIPING AND DUCTWORK SHALL BE SUPPORTED FROM, OR ANCHORED TO, THE BUILDING STRUCTURE; CEILING CONSTRUCTION SHALL NOT BE USED FOR SUPPORT OR ANCHORING OF WORK.
8. TEMPERATURE CONTROL WIRING WIRING LESS THAN 100 VOLTS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR. WIRING 100 VOLTS AND GREATER SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR.
9. MAINTAIN ACCESS BELOW EQUIPMENT INSTALLED ABOVE CEILINGS. DO NOT OBSTRUCT ACCESS WITH PIPING OR DUCTWORK.
10. PROVIDE MANUAL VOLUME DAMPERS AS REQUIRED TO PROPERLY BALANCE THE SYSTEM.
11. CONTRACTOR SHALL CLOSELY COORDINATE LOCATIONS OF ALL PANELBOARDS WITH LOCATIONS OF ALL DUCTWORK AND PLUMBING PIPING. DUCTWORK AND PLUMBING PIPING SHALL NOT BE INSTALLED OVER TOP OF ANY PANELBOARD. DUCTWORK AND PLUMBING PIPING SHALL NOT BE INSTALLED OVER ANY OF THE CODE REQUIRED CLEAR SPACES AT ANY PANELBOARD LOCATION.

HVAC CONTROLS

1. PROVIDE DOCUMENTATION AND TRAINING TO OWNER ALONG WITH ONE YEAR WARRANTY. LABEL ALL CONTROLS AND EQUIPMENT THE SAME AS IDENTIFIED ON THE DRAWINGS AND SUBMITTALS. SUBMIT SHOP DRAWINGS AND DETAILED SEQUENCE OF OPERATION OF CONTROL SYSTEM PRIOR TO INSTALLATION.
2. CONTROLS SHALL INCLUDE ALL THERMOSTATS, SENSORS, VALVES, DAMPERS, TRANSFORMERS, STARTERS, RELAYS, WIRING, INTERLOCKS AND OTHER DEVICES TO ENABLE THE SEQUENCE OF OPERATION. CONTROLS SHALL BE COORDINATED WITH THE EQUIPMENT PROVIDED.
3. PROVIDE START-UP AND VERIFICATION OF CONTROL SYSTEM & SEQUENCE OF OPERATION. COORDINATE WITH TEST & BALANCE CONTRACTOR TO OPERATE EQUIPMENT IN ALL MODES AND DEVICE POSITIONS.
4. ROOM SENSOR SHALL HAVE DIGITAL DISPLAY AND TIMED OVERRIDE BUTTON. ALL SENSORS SHALL HAVE THE CAPABILITY TO ADJUST ROOM TEMPERATURE SETPOINT OR TO HAVE THIS FUNCTION LOCKED OUT.
5. PACKAGED UNITS: IN OCCUPIED MODE, THE SUPPLY FAN SHALL RUN CONTINUOUSLY, THE OUTSIDE AIR DAMPER SHALL OPEN AND THE UNIT CONTROLLER WILL MAINTAIN ROOM SETPOINT BY CYCLING THE COOLING/HEATING. IN UNOCCUPIED MODE, THE UNITS SHALL BE DE-ENERGIZED UNTIL A CALL FOR SETBACK HEATING OR COOLING BY THE UNIT CONTROLLER. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AT ALL TIMES DURING UNOCCUPIED MODE. OVERRIDE BUTTON ON WALL SENSOR SHALL PLACE THE UNIT IN OCCUPIED MODE FOR TWO HOURS (ADJUSTABLE). CONTROLS SHALL INCLUDE CONTROLLER AND START/STOP.

LEGEND

R	REFRIGERANT
12 x 6	RECTANGULAR DUCT
	FLEXIBLE CONNECTION
VD	VOLUME DAMPER
D	DROP IN DIRECTION OF AIRFLOW
R	RISE IN DIRECTION OF AIRFLOW
	SUPPLY DUCT UP (OR FROM ABOVE)
	SUPPLY DUCT DOWN (OR FROM BELOW)
	RETURN OR EXHAUST DUCT UP
	RETURN OR EXHAUST DUCT DOWN
	FLEXIBLE DUCT
MOD	MOTOR OPERATED DAMPER
	REDUCER
SDR	SMOKE DETECTOR, DUCT MOUNTED
T	THERMOSTAT OR TEMPERATURE SENSOR

ABBREVIATIONS

BTU	BRITISH THERMAL UNIT
CD	CEILING DIFFUSER
CFD	CEILING FIRE DAMPER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
COP	COEFFICIENT OF PERFORMANCE
CR	CEILING REGISTER
DB	DRY BULB TEMPERATURE
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EFF	EFFICIENCY
EXT	EXTERNAL
F	DEGREES FAHRENHEIT
FPM	FEET PER MINUTE
FT	FEET
HP	HORSEPOWER
IN	INCH, INCHES
LAT	LEAVING AIR TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
VD	VOLUME DAMPER
MH	MOUNTING HEIGHT
MIN	MINIMUM
MOD	MOTOR OPERATED DAMPER
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OA	OUTSIDE AIR
PD	PRESSURE DROP
PS	PRESSURE SENSOR
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAGE
RA	RETURN AIR
SP	STATIC PRESSURE
TEMP	TEMPERATURE
TG	TOP GRILLE
TR	TOP REGISTER
TYP	TYPICAL
WB	WET BULB TEMPERATURE
WC, WG	WATER COLUMN
AFF	ABOVE FINISHED FLOOR
ABV	ABOVE
AD	ACCESS DOOR
BEL	BELOW
BET	BETWEEN
CLG	CEILING
CONN	CONNECT, CONNECTION
CONT	CONTINUED
DN	DOWN
EA	EACH
FL	FLOOR
FLEX	FLEXIBLE
FR	FROM
GALV	GALVANIZED
REQD	REQUIRED
SH	SHEET
SDR	DUCT MOUNTED SMOKE DETECTOR

COMM. NO. 2024-A-817
DESIGNED BY TAD
DRAWN BY TAD
DATE 7-5-2024

REVISIONS

NO.	DATE	BY

MECHANICAL SCHEDULES & NOTES

ADDITION TO
NEW HOPE CHURCH
3050 LEE HIGHWAY N.
PULASKI , VIRGINIA

COMMONWEALTH OF VIRGINIA
MELINDA D. RUBLE
Lic. No.028163
05.26.2025
PROFESSIONAL ENGINEER

THOMAS A. DOUTHAT , JR.
ARCHITECT
159 FOURTH STREET,NW
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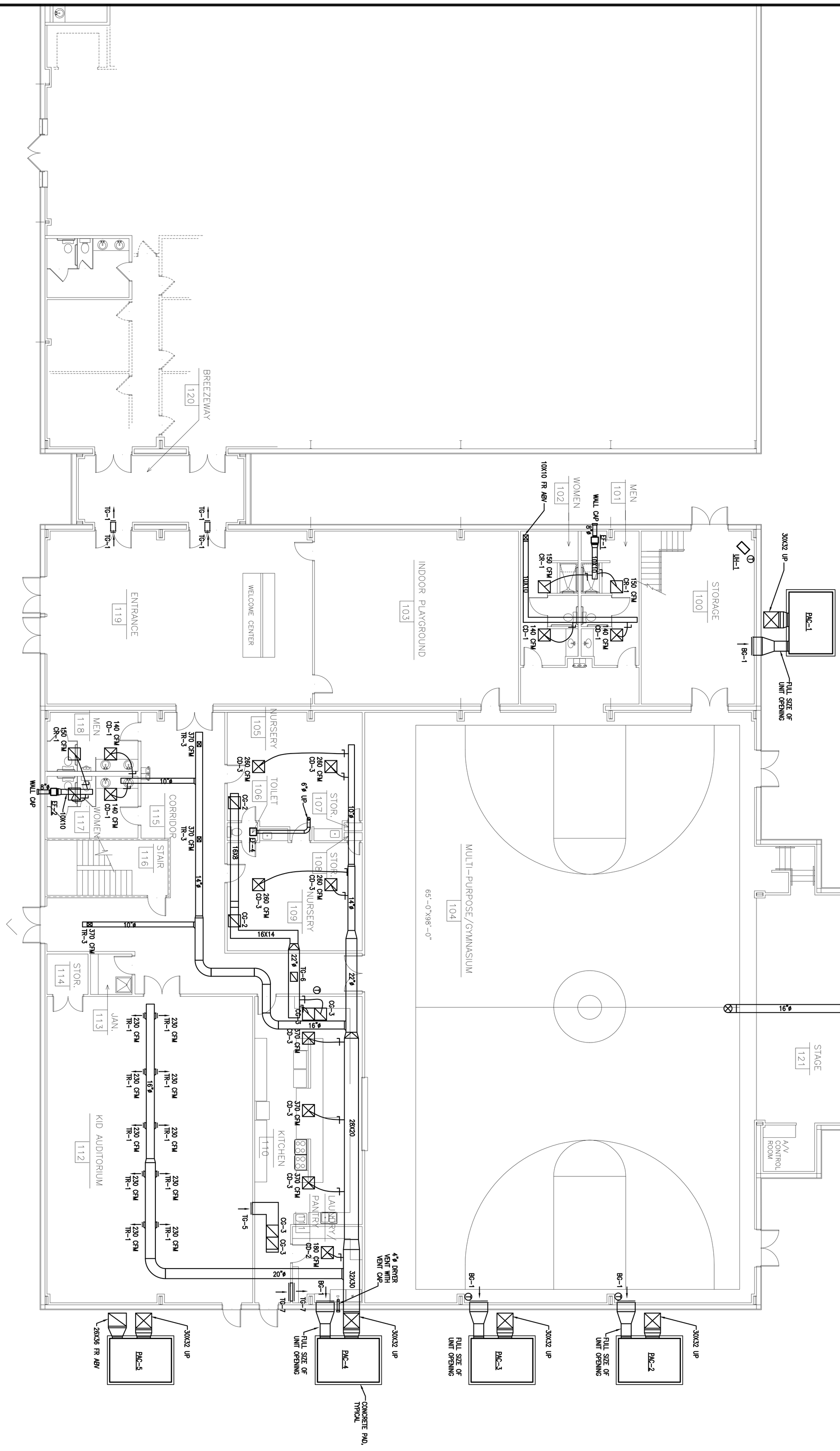
(540)980-2429

SHEET M-2
OF 6



FIRST FLOOR PLAN – MECHANICAL

SCALE : 1/8" = 1'-0"

THOMAS A. DOUTHAT , JR.

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COMMONWEALTH OF VIRGINIA
MELINDA D. RUBLE
Lic. No.028163
05.26.2025
PROFESSIONAL ENGINEER

FIRST FLOOR PLAN – MECHANICAL

ADDITION TO

NEW HOPE CHURCH

3050 LEE HIGHWAY N.

PULASKI , VIRGINIA

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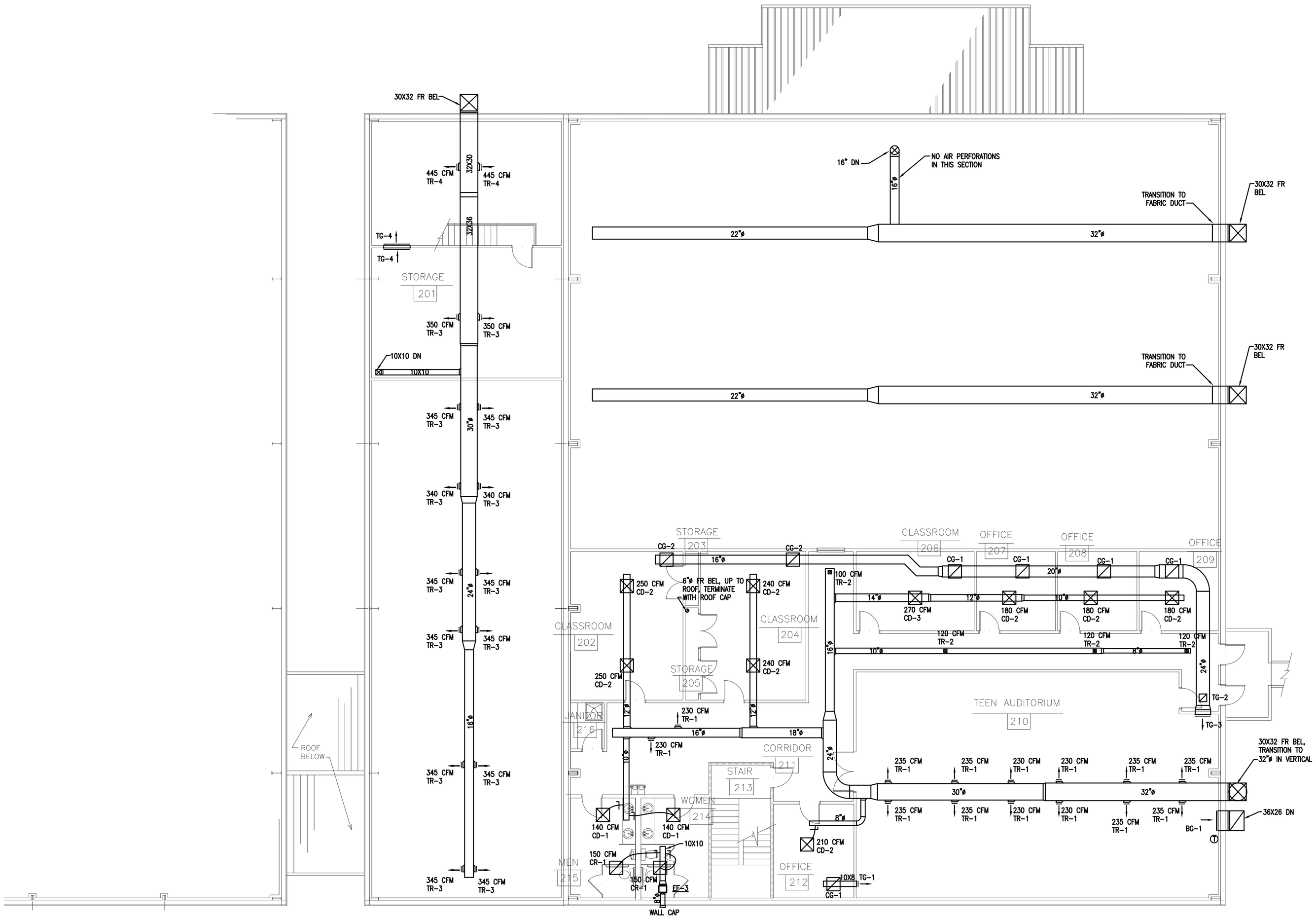
OF 6



SECOND FLOOR PLAN – MECHANICAL

SCALE : 1/8" = 1'-0"

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SECOND FLOOR PLAN – MECHANICAL

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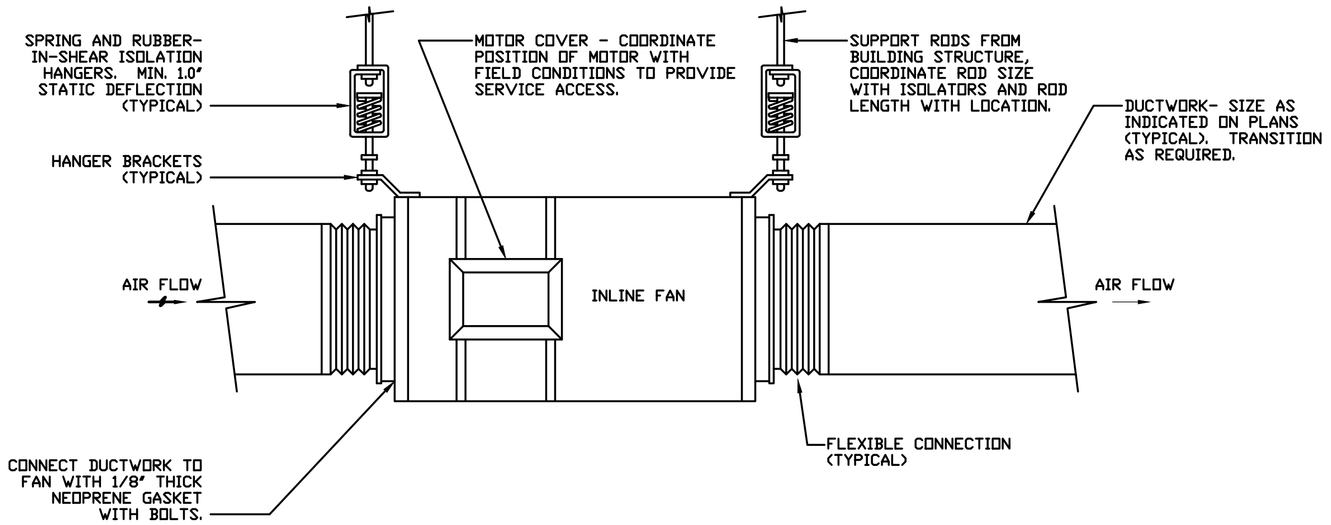
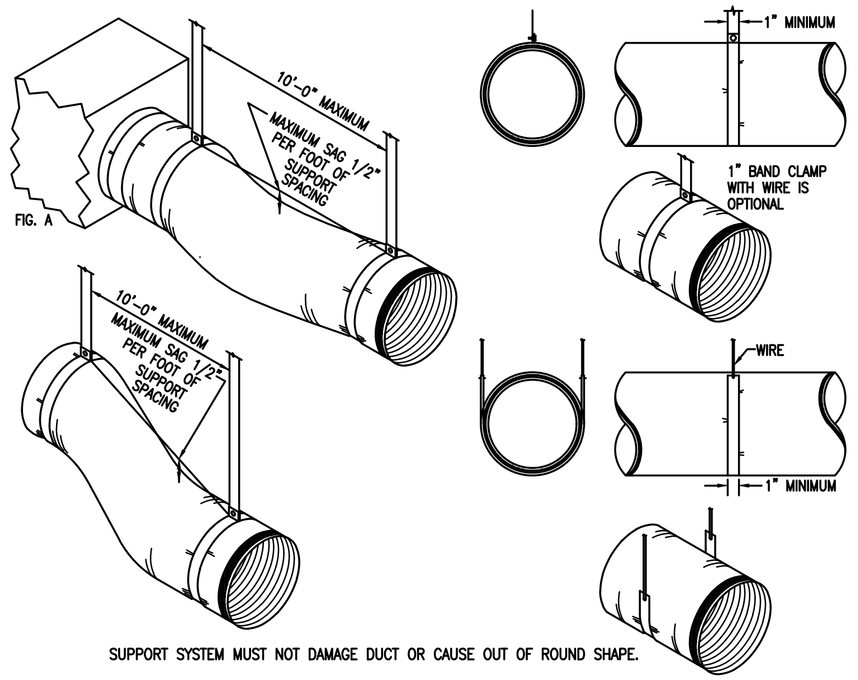


INLINE FAN DETAIL

NO SCALE

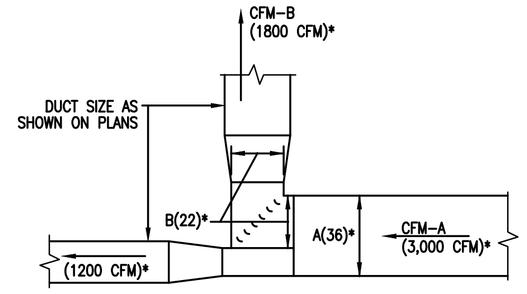
NOTE: ALL PIPE HANGER AND SUPPORT DESIGN IS DELEGATE TO THE CONTRACTOR



SUPPORT SYSTEM MUST NOT DAMAGE DUCT OR CAUSE OUT OF ROUND SHAPE.

DETAIL - FLEXIBLE DUCT SUPPORTS

NO SCALE



A - WIDTH OF DUCT MAIN BEFORE TAKEOFF.
B - WIDTH OF TAKEOFF CONNECTION.
CFM-A - TOTAL AIR QUANTITY PASSING THRU DUCT AT A INCLUDING QUANTITY REMOVED AT TAKEOFF B.
CFM-B - AIR QUANTITY REMOVED THRU TAKEOFF B

$B = \frac{CFM-B}{CFM-A} \times A$

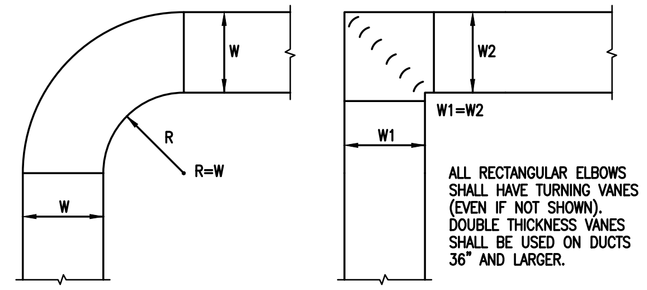
* EXAMPLE: CFM-A = 3000 CFM, CFM-B = 1800 CFM, A = 36"

$B = \frac{1800\ CFM}{3000\ CFM} \times 36" = 21.6"$

SAY B = 22" (ROUND OFF TO NEAREST INCH)

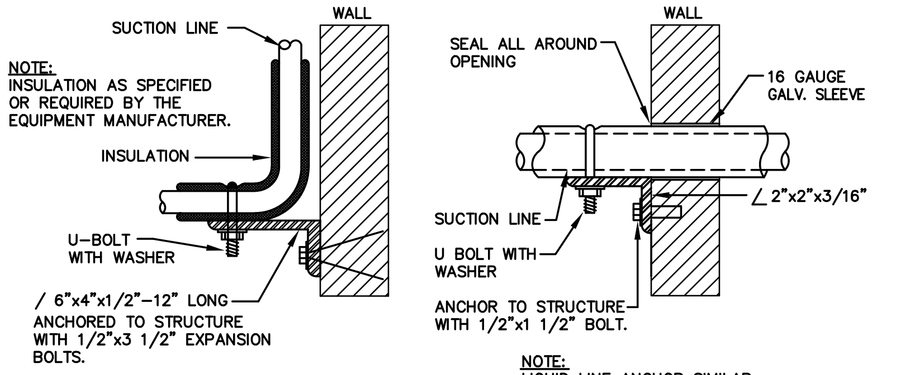
DETAIL - BRANCH DUCT CONNECTION

NO SCALE



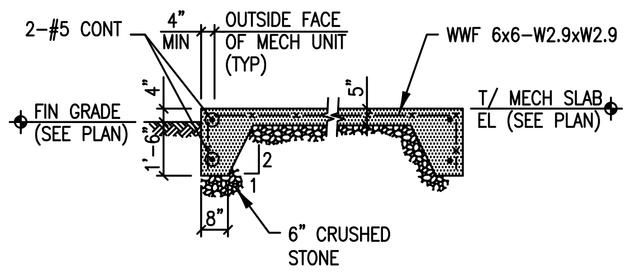
DETAIL - DUCT ELBOWS

NO SCALE



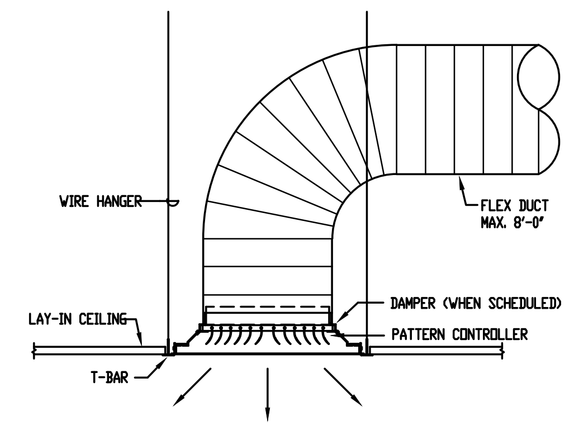
REFRIGERANT PIPE SUPPORTS AT WALL

NO SCALE



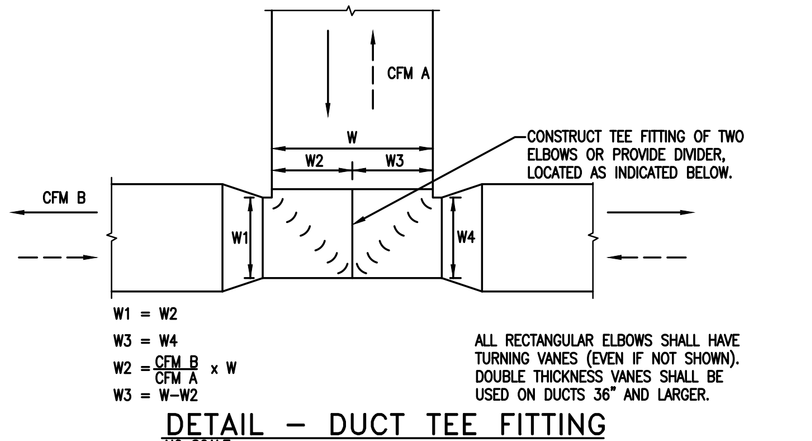
OUTDOOR EQUIPMENT PAD DETAIL

NO SCALE



LAY-IN CEILING DIFFUSER DETAIL

NOT TO SCALE



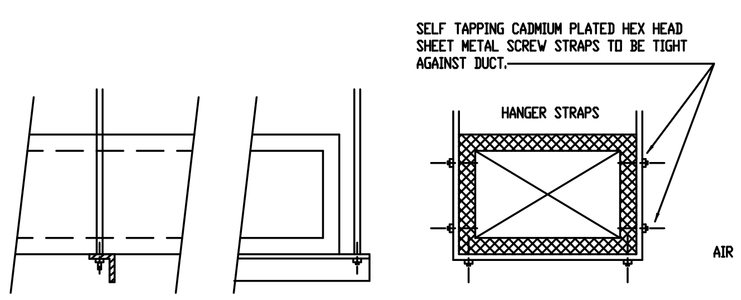
DETAIL - DUCT TEE FITTING

NO SCALE

HANGER SIZES FOR RECTANGULAR DUCT			
MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1"X18" GAGE STRAP	NONE REQUIRED	10'-0"

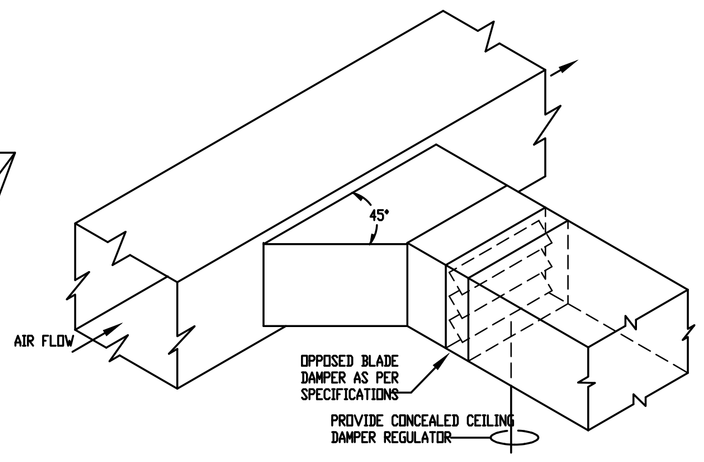
NOTE:
ALL SUPPLY AIR DUCT SHALL BE WRAPPED EXTERNALLY AS PER SPECIFICATIONS

NO POP RIVETS ALLOWED



DUCT STRAP HANGER DETAIL

NOT TO SCALE



BRANCH DUCT TAKE-OFF @ SUPPLY MAIN

NOT TO SCALE

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MECHANICAL DETAILS

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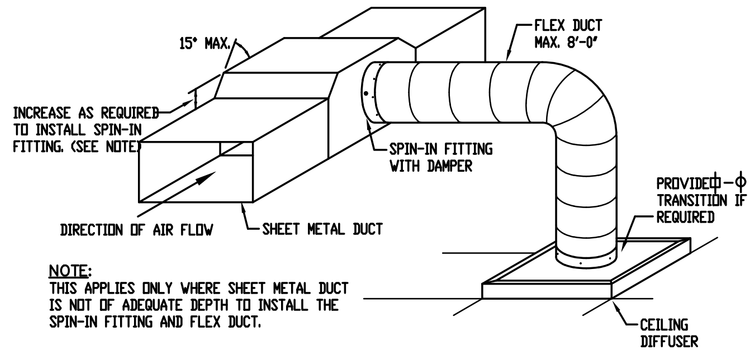
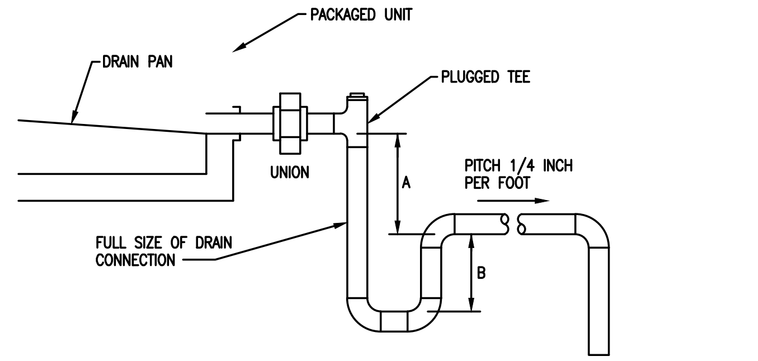
OF 6



FLEX DUCT TAKE-OFF @ SHEET METAL DUCT DETAIL

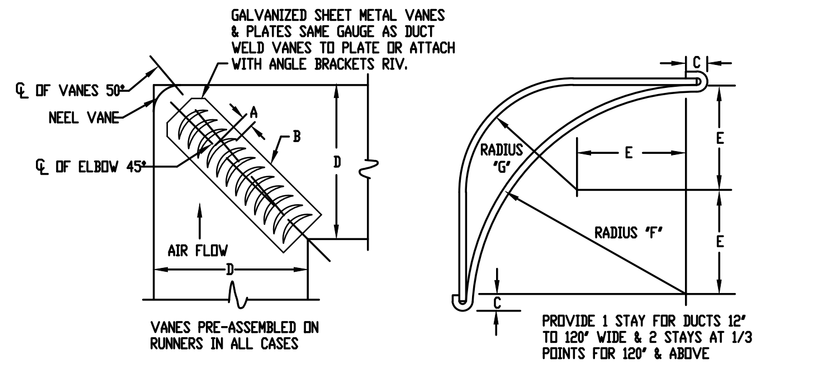
NOT TO SCALE



DRAW THROUGH UNITS (NEGATIVE CASING PRESSURE)	BLOW THROUGH UNITS (POSITIVE CASING PRESSURE)
A = 1 INCH PLUS MAXIMUM CASING STATIC PRESSURE	A = 1 INCH MINIMUM
B = A/2	B = 1 INCH PLUS MAXIMUM CASING STATIC PRESSURE

DETAIL – CONDENSATE DRAIN

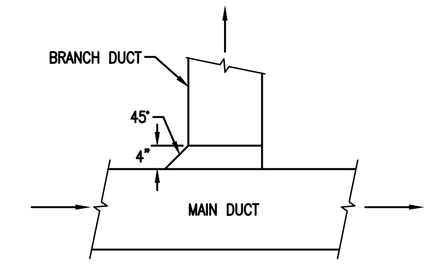
NO SCALE



D & D UP TO 24"	A = 1-1/2"	B = 5"	TYPE "B" VANES
D & D OVER 24"	A = 3-1/4"	B = 9"	TYPE "A" VANES
TYPE "A" VANES	C = 1/2"	E = 2-1/4"	RADIUS "F" = 4-1/2" RADIUS "G" = 2-1/4"
TYPE "B" VANES	C = 1/4"	E = 1"	RADIUS "F" = 2" RADIUS "G" = 1"

SQUARE ELBOW DETAIL

NOT TO SCALE



DETAIL – BRANCH DUCT CONNECTION

NO SCALE

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MECHANICAL DETAILS

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PLUMBING SPECIFICATIONS

1. GENERAL PROVISIONS

   A. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE INCLUDING REFERENCED CODES AND STANDARDS AND IN ACCORDANCE WITH MANDATES OF THE LOCAL BUILDING OFFICIALS.

   B. THE GENERAL ARRANGEMENT AND LOCATIONS OF PIPING, FIXTURES, ETC. ARE INDICATED BY THE DRAWINGS AND SHALL BE INSTALLED IN ACCORDANCE THEREWITH; WITH THE EXCEPTION OF SUCH CHANGES AS MAY BE REQUIRED ON ACCOUNT OF OTHER TRADES. CONTRACTOR SHALL COORDINATE WORK WITH INSTALLATION OF OTHER SUBCONTRACTORS.

   C. PLUMBING WORK SHALL BE COORDINATED WITH THE CONTRACTOR AS TO SCHEDULING, DIMENSIONING AND LOCATION OF EQUIPMENT.

   D. MAJOR ITEMS ARE SHOWN ON THE PROJECT PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INCIDENTAL ITEMS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.

   E. ALL PIPING SYSTEMS SHALL TERMINATE 5 FEET BEYOND THE BUILDING LINE UNLESS INDICATED OTHERWISE. EXTENSION OF THESE LINES SHALL BE PROVIDED BY THE SITE CONTRACTOR.

   F. TRADE NAMES AND CATALOG NUMBERS SHALL BE INTERPRETED AS ESTABLISHING A GENERAL DESIGN AND STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. UNLESS STATED OTHERWISE, THE CONTRACTOR MAY USE ANY ARTICLE WHICH, IN HIS JUDGEMENT, AND WITH WRITTEN COMMENT FROM THE ARCHITECT/ENGINEER INDICATING NO OBJECTION, IS EQUAL OR SUPERIOR TO THAT SPECIFIED. DRAWINGS SHOWING CHANGES OR REVISIONS REQUIRED BY THE SUBSTITUTION FOR SPECIFIED ITEMS SHALL BE SUBMITTED WITH THE SHOP DRAWING DATA, AND THE COSTS OF ALL SUCH CHANGES SHALL BE BORNE BY THE CONTRACTOR.

   G. SIMILAR ITEMS SHALL BE PROVIDED BY A SINGLE MANUFACTURER.

   H. ALL REQUIRED WALL OR FLOOR OPENINGS SHALL BE COORDINATED WITH THE CONTRACTOR.

   I. ALL PIPING SHALL BE ABOVE CEILING UNLESS INDICATED OTHERWISE.

   J. DO NOT INSTALL PVC PIPING OR ANY COMBUSTIBLE MATERIAL IN ANY AIR PLENUM.

   K. ALL EQUIPMENT SHALL BE WIPED CLEAN, REMOVING ALL TRACES OF OIL, DIRT, OR PAINT SPOTS.

   L. PROVIDE SUPPORTS TO RIGIDLY ATTACH ALL EQUIPMENT, APPURTENANCES AND PIPE AS REQUIRED FOR SUPPORT. PRIOR TO INSTALLATION OF HANGERS AND INSERTS, THE CONTRACTOR SHALL COORDINATE LOCATIONS AND REQUIREMENTS TO MINIMIZE CONFLICTS WITH OTHER BUILDING SYSTEMS. INSTALLATION OF PIPE HANGERS AND SUPPORTS SHALL BE IN STRICT ACCORDANCE WITH MSS SP-58, 69 AND 89.

   M. CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL EQUIPMENT INDICATED TO BE FURNISHED BY OTHERS.

2. SUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND PROJECT INFORMATION

   A. SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS:
      (1) STRAINERS
      (2) INSULATION
      (3) GAS COCKS
      (4) CLEANOUTS
      (5) FLOOR DRAINS
      (6) GATE VALVES
      (7) CHECK VALVES
      (8) BACKFLOW PREVENTERS
      (9) ALL SCHEDULED EQUIPMENT INDICATED ON SHEET P-2

   B. IDENTIFY ALL PLUMBING SHOP DRAWINGS, PRODUCT DATA AND SAMPLES WITH THE NAME OF THE PROJECT. CLEARLY MARK THE SPECIFIC ITEMS INTENDED FOR USE. SUBMIT ALL RELATED ITEMS AT ONE TIME.

   C. PRIOR TO SUBSTANTIAL COMPLETION OF THE PROJECT, SUBMIT THE FOLLOWING INFORMATION FOR REVIEW AND APPROVAL.

      (1) OPERATING AND MAINTENANCE INSTRUCTIONS.
      (2) "AS BUILT" DRAWINGS.

3. GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD, WITHOUT ADDITIONAL COST TO THE OWNER, ANY DEFECTS WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE OWNER.

4. "AS BUILT" DRAWINGS: CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF THE LOCATION OF ALL CONCEALED PIPING, VALVES, CONTROLS, ETC., BOTH INTERIOR AND EXTERIOR. ON COMPLETION OF THE WORK, ONE PRINT EACH OF THE CONTRACT DRAWINGS WHICH ARE APPLICABLE SHALL BE NEATLY AND CLEARLY MARKED IN COLOR TO SHOW ALL VARIATIONS BETWEEN THE WORK ACTUALLY PROVIDED AND THAT INDICATED ON THE CONTRACT DRAWINGS.

5. OPERATING AND MAINTENANCE MANUALS

   A. GENERAL: PRIOR TO COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TWO HARDBACKED LOOSELEAF RING TYPE BINDERS, IDENTIFIED WITH THE NAME OF THE PROJECT. CONTRACTOR SHALL DELIVER THESE BINDERS TO THE ENGINEER FOR REVIEW AND TRANSMITTAL TO THE OWNER.

   B. THE FOLLOWING ITEMS AND OTHER ADDITIONAL PERTINENT DATA FOR EACH ITEM OF EQUIPMENT SHALL BE INCLUDED:

   C. THE OPERATING AND MAINTENANCE MANUALS SHALL BE CONSIDERED A PART OF THE FINAL INSPECTION AND THEY SHALL BE SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS PRIOR TO REQUEST FOR FINAL INSPECTION.

6. ACCESS DOORS: ACCESS DOORS SHALL BE PROVIDED FOR ALL CONCEALED VALVES, CONTROLS, AND ANY OTHER EQUIPMENT OR MATERIALS REQUIRING INSPECTION OR MAINTENANCE. ACCESS DOORS SHALL BE FURNISHED FOR FLOORS, WALLS AND CEILINGS, OF ADEQUATE SIZE SO THAT CONCEALED ITEMS WILL BE READILY ACCESSIBLE FOR SERVICING OR FOR REMOVAL AND REPLACEMENT IF NECESSARY.

7 . IDENTIFICATION

   A. SUBMITTALS
      (1) SUBMIT LIST OF WORDING, SYMBOLS, LETTER SIZE, AND COLOR CODING FOR MECHANICAL IDENTIFICATION.
      (2) SUBMIT VALVE CHART AND SCHEDULE, INCLUDING VALVE TAG NUMBER, LOCATION, FUNCTION, AND VALVE MANUFACTURER'S NAME AND MODEL NUMBER.
      (3) PRODUCT DATA: PROVIDE MANUFACTURERS CATALOG LITERATURE FOR EACH PRODUCT REQUIRED.

   B. NAMEPLATES
      (1) DESCRIPTION: LAMINATED THREE-LAYER PLASTIC WITH ENGRAVED LETTERS ON LIGHT CONTRASTING BACKGROUND COLOR.

   C. TAGS
      (1) METAL TAGS: BRASS WITH STAMPED LETTERS; TAG SIZE MINIMUM 1-1/2 INCHES (40 MM) DIAMETER.
      (2) CHART: TYPEWRITTEN LETTER SIZE LIST IN ANODIZED ALUMINUM FRAME.

   D. INSTALLATION
      (1) DEGREASE AND CLEAN SURFACES TO RECEIVE ADHESIVE FOR IDENTIFICATION MATERIALS.
      (2) INSTALL PLASTIC NAMEPLATES WITH CORROSIVE-RESISTANT MECHANICAL FASTENERS, OR ADHESIVE. APPLY WITH SUFFICIENT ADHESIVE TO ENSURE PERMANENT ADHESION AND SEAL WITH CLEAR LACQUER.
      (3) INSTALL TAGS WITH CORROSION RESISTANT CHAIN.
      (4) INSTALL PLASTIC PIPE MARKERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
      (5) IDENTIFY CONTROL PANELS AND MAJOR CONTROL COMPONENTS OUTSIDE PANELS WITH PLASTIC NAMEPLATES.
      (6) IDENTIFY VALVES IN MAIN AND BRANCH PIPING WITH TAGS.
      (7) IDENTIFY PIPING, CONCEALED OR EXPOSED, WITH PLASTIC PIPE MARKERS OR STENCILLED PAINTING. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. LOCATE IDENTIFICATION NOT TO EXCEED 20 FEET (6 M) ON STRAIGHT RUNS INCLUDING RISERS AND DROPS, ADJACENT TO EACH VALVE AND TEE, AT EACH SIDE OF PENETRATION OF STRUCTURE OR ENCLOSURE, AND AT EACH OBSTRUCTION.
      (8) PROVIDE CEILING TACKS TO LOCATE VALVES ABOVE T-BAR TYPE PANEL CEILINGS. LOCATE IN CORNER OF PANEL CLOSEST TO EQUIPMENT.

8. PIPING SPECIALTIES

   A. PIPE ESCUTCHEONS: INSTALL PIPE ESCUTCHEONS ON EACH PIPE PENETRATION THRU FLOORS, WALLS PARTITIONS, AND CEILINGS WHERE PENETRATION IS EXPOSED TO VIEW AND ON EXTERIOR OF BUILDING. SECURE ESCUTCHEON TO PIPE OR INSULATION SO ESCUTCHEON COVERS PENETRATION HOLE, AND IS FLUSH WITH ADJOINING SURFACE. PROVIDE SHEET STEEL ESCUTCHEONS, SOLID OR SPLIT HINGED. FOR AREAS WHERE WATER AND CONDENSATION CAN BE EXPECTED TO ACCUMULATE, PROVIDE CAST BRASS OR SHEET BRASS ESCUTCHEONS, SOLID OR SPLIT HINGED.

   B. PIPE SLEEVES: INSTALL PIPE SLEEVES WHERE PIPING PASSES THROUGH WALLS, FLOORS, CEILINGS, AND ROOFS. DO NOT INSTALL SLEEVES THROUGH STRUCTURAL MEMBERS OF WORK, EXCEPT AS DETAILED ON DRAWINGS, OR AS REVIEWED BY ARCHITECT/ENGINEER. SIZE SLEEVES SO THAT PIPING AND INSULATION (IF ANY) WILL HAVE FREE MOVEMENT IN SLEEVE, INCLUDING ALLOWANCE FOR THERMAL EXPANSION.

   C. FIRE BARRIER PENETRATION SEALS: PROVIDE SEALS FOR ANY OPENING THROUGH FIRE-RATED WALLS, FLOORS, OR CEILINGS USED AS PASSAGE FOR PLUMBING COMPONENTS SUCH AS PIPING. INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER. SEALS SHALL BE EQUAL TO ONE OF THE FOLLOWING:

      (1) DOW-CORNING FIRESTOP SYSTEM PENETRATION SEALS INCLUDING FIRE STOP SEALANT AND FIRE STOP FOAM.

      (2) 3M BRAND "FIRE BARRIER WRAP/STRIP" NO. FS-195, FIRE BARRIER CAULK, CP-25 AND PUTTY NO. 303 SHALL BE USED WHERE PVC, POLYPROPYLENE OR OTHER NON-METALLIC PIPES PASS THROUGH FLOORS AND FIRE RATED WALLS.

9. INSULATION

   A. FLAME/SMOKE RATINGS: PROVIDE COMPOSITE PLUMBING INSULATION (INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES) WITH FLAME-SPREAD RATING OF 25 OR LESS, AND SMOKE-DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ANSI/ASTM E84 (NFPA 255) METHOD. INSULATION SHALL BE LABELED BY THE MANUFACTURER. THE LABEL SHALL INDICATE THE INSULATING VALUE, FLAME SPREAD AND SMOKE-DEVELOPED RATING.

   B. SUBMITTALS: SUBMIT MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF PLUMBING INSULATION. SUBMIT SCHEDULE SHOWING MANUFACTURER'S PRODUCT NUMBER, THICKNESS, AND FURNISHED ACCESSORIES FOR EACH PLUMBING SYSTEM REQUIRING INSULATION.

   C. INSTALLATION: INSULATION SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS USING ONLY ADHESIVES, MASTICS AND PLUMBING FASTENERS APPROVED BY THE INSULATION MANUFACTURER. INSULATION SHALL NOT BE APPLIED UNTIL AFTER THE EQUIPMENT HAS BEEN TESTED WITH RESULTS ACCEPTABLE TO THE ARCHITECT/ENGINEER.

   D. MATERIALS:

      (1) CELLULAR FOAM PIPE INSULATION: TUBULAR, FLEXIBLE, FIRE RESISTANT INSULATION WITH OPERATING TEMPERATURE RANGE OF -40 DEGREES F TO 220 DEGREES F, THERMAL CONDUCTIVITY "K"=0.27 BTU-IN/HOUR-SF-DEG F AT 75 DEGREES F. NO JACKET REQUIRED. EQUAL TO ARMSTRONG ARMAFLEX AP.

   E. PIPE INSULATION

      (1) INSULATION OMITTED: OMIT INSULATION ON EXPOSED PLUMBING FIXTURE RUNOUTS FROM FACES OF WALL OR FLOOR TO FIXTURE; ON UNIONS, FLANGES, STRAINERS, FLEXIBLE CONNECTIONS, AND EXPANSION JOINTS.

      (2) COVER VALVES, FITTINGS AND SIMILAR ITEMS IN EACH PIPING SYSTEM WITH EQUIVALENT THICKNESS AND COMPOSITION OF INSULATION AS APPLIED TO ADJOINING PIPE RUN.

      (3) EXTEND PIPING INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS AND SIMILAR PIPING PENETRATIONS, EXCEPT WHERE OTHERWISE INDICATED.

      (4) INSTALL PROTECTIVE METAL SHIELDS AND INSULATED INSERTS WHEREVER NEEDED TO PREVENT COMPRESSION OF INSULATION.

      (5) DOMESTIC COLD WATER PIPING, ABOVE GROUND: PIPING SHALL BE INSULATED WITH 1/2 INCH THICK GLASS FIBER, CELLULAR FOAM, OR POLYETHYLENE PIPE INSULATION.

      (6) DOMESTIC HOT WATER PIPING (INCLUDING HOT WATER RECIRCULATING): PIPING SHALL BE INSULATED WITH 1 INCH THICK GLASS FIBER, CELLULAR FOAM, OR POLYETHYLENE PIPE INSULATION. VAPOR SEAL IS NOT REQUIRED.

10. PLUMBING PIPING

   A. DOMESTIC WATER PIPING ABOVE GROUND

      PIPE: TYPE L HARD DRAWN COPPER OR CPVC
      FITTINGS: CAST BRONZE OR WROUGHT COPPER OR CPVC
      JOINTS: SOLDERED USING TIN-ANTIMONY (95-5) SOLDER

   B. DOMESTIC WATER PIPING UNDERGROUND

      PIPE: TYPE K SEAMLESS ROLL STOCK
      FITTINGS: CAST BRONZE OR WROUGHT COPPER
      JOINTS: SOLDERED USING TIN-ANTIMONY (95-5) SOLDER

   C. SOIL, WASTE AND VENT PIPING BELOW GRADE AND STORM SEWER BELOW GRADE

      SIZE: 4 INCHES AND SMALLER
      PIPE: SERVICE WEIGHT CAST IRON ASTM A-74 OR SCH. 40 PVC-DWV ASTM D-2665
      FITTINGS: SERVICE WEIGHT CAST IRON OR PVC SOCKET FITTINGS (DWV)
      JOINTS: HUB & SPIGOT CAULKED OR COMPRESSION GASKETS FOR CAST IRON OR SOLVENT CEMENT JOINTS FOR PVC

   D. SOIL, WASTE AND VENT PIPING ABOVE GRADE AND STORM DRAINS & ROOF LEADERS

      SIZE: 3 INCHES AND LARGER
      PIPE: SERVICE WEIGHT CAST IRON ASTM A-74 OR HUBLESS ASTM C-564 OR SCH. 40 PVC-DWV ASTM D-2665
      FITTINGS: SERVICE WEIGHT OR HUBLESS CAST IRON OR PVC SOCKET FITTINGS (DWV)
      JOINTS: HUB & SPIGOT CAULKED, COMPRESSION GASKETS OR NEOPRENE SLEEVES AND STAINLESS STEEL BANDS FOR CAST IRON OR SOLVENT CEMENT JOINTS FOR PVC

      SIZE: 2-1/2 INCHES AND SMALLER: SAME AS 3 INCHES AND LARGER EXCEPT VENTS MAY BE SCH. 40 GALVANIZED STEEL ASTM A120/A53 WITH GALVANIZED CAST IRON OR MALLEABLE IRON FITTINGS.

   E. ALL PIPE OF THE SAME SIZE SHALL BE THE SAME MATERIAL.

   F. SLOPE ALL DRAIN LINES 1/4 INCH PER FOOT MINIMUM FOR SIZES LESS THAN 4 INCHES; SLOPE 1/8 INCH PER FOOT FOR SIZES 4 INCHES AND LARGER.

   G. SOIL, WASTE AND VENT PIPING LOCATED BELOW GRADE SHALL BE MINIMUM 2 INCHES SIZE.

   H. VENTS SHALL EXTEND 12 INCHES ABOVE THE ROOF. ROOF FLASHING SHALL BE COORDINATED WITH BY THE CONTRACTOR.

   I. DOMESTIC HOT AND COLD WATER PIPING SHALL BE 1/2 INCHES SIZE UNLESS INDICATED OTHERWISE.

11. PROPANE GAS SYSTEMS

   A. GAS SERVICE PIPING:

      (1) ALL SIZES: SCHEDULE 40 BLACK STEEL PIPE, ASTM A120/A53-CW OR ASTM/A53 GRADE B (WELDED OR SEAMLESS); WROUGHT STEEL BUTTWELDING FITTINGS.

      (2) WRAPPING FOR EXPOSED PIPING: MACHINE WRAP PIPE USING 50% OVERLAP WRAP, WITH POLYVINYL CHLORIDE TAPE. HAND WRAP FITTINGS USING 100% OVERLAP WRAP EXTENDING 6 INCHES BEYOND FITTING ONTO WRAPPED PIPE. COMPLY WITH TAPE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

   B. BUILDING DISTRIBUTION PIPING AND VENT PIPING:

      (1) ALL SIZES: SCHEDULE 40 BLACK STEEL PIPE, ASTM A120/A53-CW OR ASTM/A53 GRADE B (WELDED OR SEAMLESS); MALLEABLE IRON THREADED FITTINGS (EXPOSED PIPING ONLY); WROUGHT STEEL BUTTWELDING FITTINGS (CONCEALED AND EXPOSED PIPING).

   C. GAS COCKS:

      (1) GAS COCKS 2 INCHES AND SMALLER: 150 PSI NON-SHOCK WOG, BRONZE STRAIGHTWAY COCK, FLAT OR SQUARE HEAD, THREADED ENDS.

      (2) GAS COCKS 2-1/2 INCHES AND LARGER: 125 PSI NON-SHOCK WOG, IRON BODY BRONZE MOUNTED, STRAIGHTWAY COCK, SQUARE HEAD, FLANGED ENDS.

   D. ALL GAS PIPING EQUIPMENT CONNECTIONS SHALL BE PROVIDED WITH A 6 INCHES DIRT TRAP, UNION AND GAS COCK SHUT OFF.

   E. ALL JOINTS SHALL BE SEALED WITH CHEMICALLY RESISTANT SEALER APPLIED TO MALE THREADS OF PIPE CONNECTION.

   F. GAS PIPING SHALL BE INSTALLED WITH A 1/64 INCH PER FOOT DOWNWARD SLOPE IN DIRECTION OF FLOW.

12. CLEANOUTS

   A. CLEANOUTS SHALL BE THE SAME SIZE AS LINE SERVED, BUT NOT LARGER THAN 4 INCHES, AND SHALL BE PROVIDED AT THE BASE OF EACH SOIL AND WASTE STACK, AT ALL POINTS WHERE DIRECTION CHANGE IS MORE THAN 45 DEGREES, AT MINIMUM INTERVALS OF 50 FEET FOR 4 INCHES AND SMALLER PIPING, AT MINIMUM INTERVALS OF 100 FEET FOR PIPING LARGER THAN 4 INCHES, AS REQUIRED BY CODE AND AS INDICATED ON THE DRAWINGS. COVERS SHALL BE SET FLUSH WITH FLOOR OR WALL.

13. FLOOR DRAINS

   A. PROVIDE FLOOR DRAINS OF SIZE AND TYPE AS INDICATED ON DRAWINGS. ALL DRAINS CONNECTING TO SANITARY SEWER SYSTEM SHALL BE FURNISHED WITH P-TRAP. DRAINS SHALL HAVE OUTLET COMPATIBLE WITH PIPING SYSTEM TO WHICH IT IS CONNECTED.

   B. INSTALL FLOOR DRAINS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PROVIDE FLOOR DRAINS WHERE INDICATED ON DRAWINGS AND AT LOW POINTS OF SURFACE AREAS TO BE DRAINED.

14. PLUMBING VALVES

   A. PROVIDE SHUT-OFF VALVE AND UNION OR EQUIVALENT AT EACH HOT AND COLD WATER EQUIPMENT CONNECTION. PROVIDE SHUT-OFF VALVE ON EACH BRANCH OR RISER THAT SERVES TWO OR MORE PLUMBING FIXTURES.

   B. GATE VALVES 2-1/2 INCHES AND SMALLER: ALL BRONZE, RISING STEM, SOLID WEDGE DISC. STOCKHAM B-100 OR B-108.

   C. CHECK VALVES IN HORIZONTAL PIPES:

      (1) 2 INCHES AND SMALLER: ALL BRONZE, REGRINDING BRONZE DISC, HORIZONTAL SWING, Y-PATTERN. STOCKHAM B-319OR B-309.

   D. CHECK VALVES IN VERTICAL PIPES AND PUMP DISCHARGE: SILENT CHECK VALVE WITH SEMI-STEEL BODY, BRONZE TRIM AND STAINLESS STEEL SPRING. METRAFLEX 700 SERIES.

   E. BALL VALVES MAY BE USED IN LIEU OF GATE VALVES 2 INCHES AND SMALLER. BALL VALVES SHALL HAVE BRONZE BODY, BRONZE BALL AND TFE SEATS AND SEALS. STOCKHAM S-216BRRT OR S-216BRRS.

15. WATER HEATERS

   A. UL AND NEMA COMPLIANCE: PROVIDE ELECTRIC MOTORS AND ELECTRICAL COMPONENTS REQUIRED AS PART OF PLUMBING EQUIPMENT, WHICH HAVE BEEN LISTED AND LABELED BY UNDERWRITERS LABORATORIES AND COMPLY WITH NEMA STANDARDS.

   B. NEC COMPLIANCE: COMPLY WITH NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AS APPLICABLE TO INSTALLATION AND ELECTRICAL CONNECTIONS OF ANCILLARY ELECTRICAL COMPONENTS OF PLUMBING EQUIPMENT.

   C. WATER HEATERS SHALL BE FURNISHED WITH ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE WITH TEST LEVER.

16. PLUMBING FIXTURES

   A. CODES AND STANDARDS: COMPLY WITH APPLICABLE PORTIONS OF NATIONAL STANDARD PLUMBING CODE PERTAINING TO MATERIALS AND INSTALLATION OF PLUMBING FIXTURES.

      (1) ANSI STANDARDS: COMPLY WITH APPLICABLE ANSI STANDARDS PERTAINING TO PLUMBING FIXTURES AND SYSTEMS.

      (2) PDI COMPLIANCE: COMPLY WITH STANDARDS ESTABLISHED BY PDI PERTAINING TO PLUMBING FIXTURE SUPPORTS.

      (3) UL COMPLIANCE: CONSTRUCT WATER COOLERS IN ACCORDANCE WITH UL STANDARD 399 "DRINKING-WATER COOLERS", AND PROVIDE UL-LISTING AND LABEL.

      (4) ANSI COMPLIANCE: CONSTRUCT AND INSTALL BARRIER FREE PLUMBING FIXTURES IN ACCORDANCE WITH ANSI STANDARD A117.1 "SPECIFICATIONS FOR MAKING BUILDINGS AND FACILITIES ACCESSIBLE TO AND USABLE BY PHYSICALLY HANDICAPPED PEOPLE".

   B. ALL EXPOSED FIXTURE SUPPLIES AND WASTE LINES SHALL BE CHROME PLATED.

   C. PLUMBING FIXTURES SHALL BE POSITIVELY VENTED AND TRAPPED IN ACCORDANCE WITH THE BOCA PLUMBING CODE, LATEST EDITION. WET VENTING IS ALLOWED IF WASTE PIPING IS OVERSIZED AND IN ACCORDANCE WITH CODE PROVISIONS. LOCATION OF VENT SHALL NOT EXCEED MAXIMUM DISTANCES TO THE TRAP AS ESTABLISHED WITHIN THE BOCA PLUMBING CODE.

17. FIRE SUPPRESSION SYSTEM

   A. ALL AREAS SHALL BE PROTECTED BY A FIRE SUPPRESSION SYSTEM DESIGNED AND INSTALLED IN STRICT ACCORDANCE WITH NFPA-13 AND THE STATE BUILDING CODE.

   B. CONTRACTOR TO PROVIDE FULL SHOP DRAWINGS TO INCLUDE ALL DESIGN CALCULATIONS, DETAILED CATALOG CUT SHEETS AND LAYOUT DRAWINGS INDICATING THE PROPOSED SYSTEM. DRAWINGS AND CALCULATIONS SHALL BE PREPARED AND STAMPED BY A NICET CERTIFIED DESIGN PROFESSIONAL.

   C. ALL FIRE PROTECTION PIPE SIZES SHALL BE HYDRAULICALLY CALCULATED IN ACCORDANCE WITH NFPA-13.

   D. ALL SPRINKLER HEADS SHALL BE QUICK RESPONSE SPRINKLER RECESSED HEADS WITH CAPS.

18. CLEANING AND TESTING

   A. ALL WATER PIPING, VALVES, ETC. SHALL BE THOROUGHLY FLUSHED OF FOREIGN MATTER AND TESTED FOR LEAKS IN ACCORDANCE WITH SECTION 312.5 OF THE VIRGINIA PLUMBING CODE. ANY LEAKAGE SHALL BE REPAIRED. DISINFECT DOMESTIC WATER PIPING INCLUDING WATER SERVICE PIPING IN ACCORDANCE WITH AWWA C601.

   B. ALL DRAIN, WASTE AND VENT PIPING SHALL BE TESTED FOR LEAKS BY FILLING PIPING SYSTEM TO OVERFLOW AND ALLOWING TO STAND FOR 24 HOURS. NO VISIBLE DROP IN WATER LEVEL WILL BE ACCEPTABLE.

END OF SPECIFICATIONS

COMM. NO.
2024-A-817
DESIGNED BY
TAD
DRAWN BY
TAD
DATE
7-5-2024

REVISIONS

NO.	DATE	BY

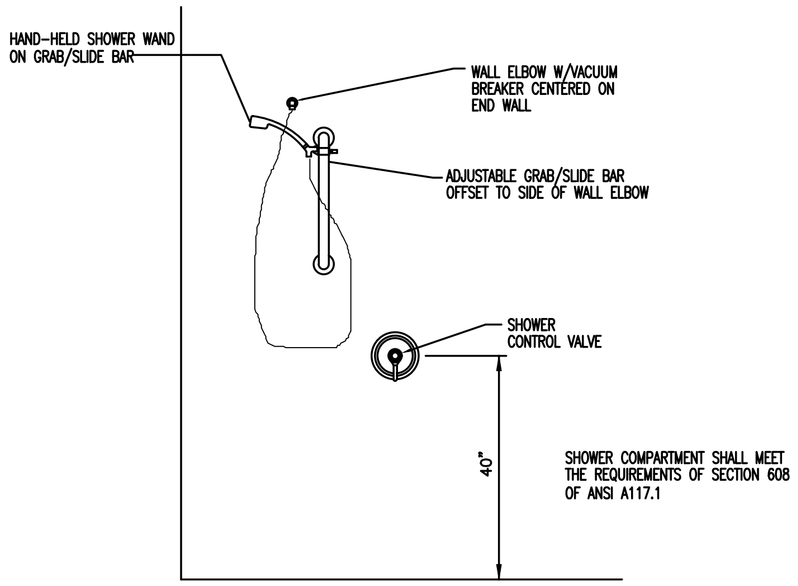
PLUMBING SPECIFICATIONS

ADDITION TO
NEW HOPE CHURCH
3050 LEE HIGHWAY N.
PULASKI , VIRGINIA

COMMONWEALTH OF VIRGINIA
MELINDA D. RUBLE
Lic. No.028163
05.26.2025
PROFESSIONAL ENGINEER

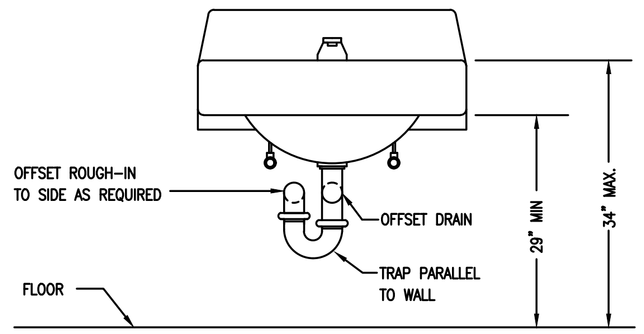
THOMAS A. DOUTHAT , JR.
ARCHITECT
159 FOURTH STREET,NW
PULASKI VIRGINIA
(540)980-2429

SHEET
P — 1
OF 6



SHOWER SH–1 WET WALL

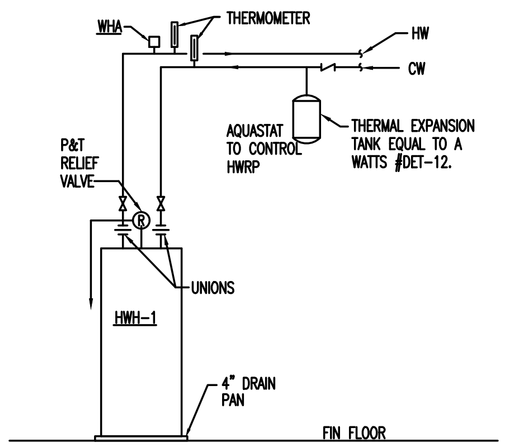
NO SCALE



DETAIL – LAVATORY L–2

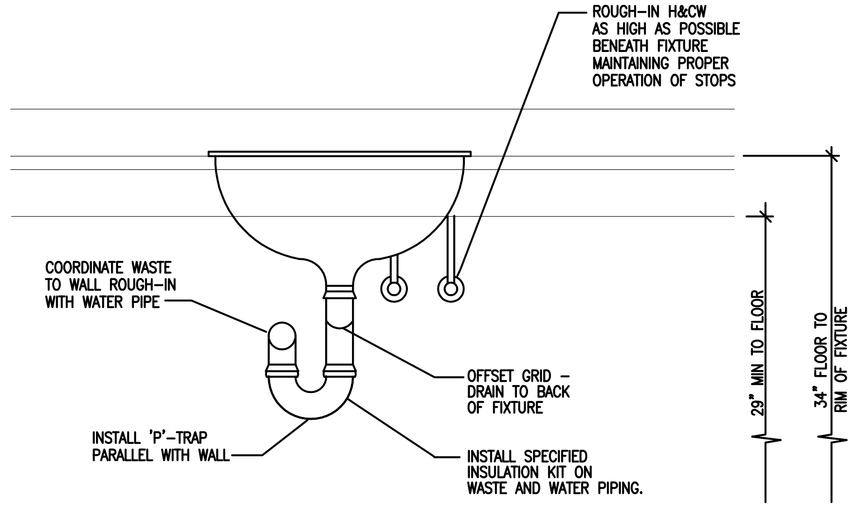
NO SCALE

NOTE: INSULATE TRAP & SUPPLIES AS SPECIFIED.



DETAIL – WATER HEATER

NO SCALE



DETAIL – H.C. LAV FIXTURE L–1

NO SCALE

PLUMBING FIXTURE INSTALLATION SCHEDULE

FIXTURE	MARK	MH	CW	HW	VENT	WASTE
WATER CLOSET	WC–1	17"	1"	--	2"	4"
WATER CLOSET	WC–2	15"	1"	--	2"	4"
URINAL	U–1	17"	3/4"	--	1–1/2"	2"
LAVATORY	L–1	COUNTER	1/2"	1/2"	1–1/2"	2"
LAVATORY	L–2	34"	1/2"	1/2"	1–1/2"	2"
SINK	S–1	COUNTER	1/2"	1/2"	1–1/2"	2"
SINK	S–2	COUNTER	1/2"	1/2"	1–1/2"	2"
JANITOR SINK	JS–1	FLOOR	1/2"	1/2"	1–1/2"	2"
SHOWER	SH–1	72"(A)	1/2"	1/2"	–	–
ELECTRIC WATER COOLER	EWC–1	36"(B)	1/2"	--	1–1/2"	2"

NOTES

1. SIZE GIVEN ARE FOR FIXTURE ONLY. EXCEPTIONS, IF ANY, ARE SHOWN ON PLANS.
2. MOUNTING HEIGHT DIMENSIONS ARE TO FLOOD LEVEL RIM OF FIXTURE, UNLESS NOTED OTHERWISE.
   (A) MOUNTING HEIGHT TO SHOWER HEAD
   (B) MOUNTING HEIGHT TO LOWER SPOUT OUTLET.

PLUMBING EQUIPMENT SCHEDULE

WC–1 KOHLER K–3611 HIGHLINE ELONGATED VITREOUS CHINA WATER CLOSET (HANDICAPPED, TANK TYPE, FLOOR MTD., 1.6 GAL/FLUSH CLASS FIVE FLUSHING TECHNOLOGY; KOHLER K–4650 ELONGATED SEAT; BOLT CAPS.

WC–2 KOHLER K–3978 WELLWORTH ELONGATED VITREOUS CHINA WATER CLOSET (TANK TYPE, FLOOR MTD., 1.6 GAL/FLUSH) CLASS FIVE FLUSHING TECHNOLOGY; KOHLER K–4650 ELONGATED SEAT; BOLT CAPS.

U–1 AMERICAN STANDARD #6541.132 ALLBROOK VITREOUS CHINA URINAL (HANDICAP FLUSH VALVE–3/4" TOP SPUD, WALL MTD., 1.0 GAL./FLUSH) SIPHON JET; SLOAN G2–8186 CHROME SENSOR FLUSH VALVE, WALL HANGER OR JOSAM #17800 SERIES CARRIER.

L–1 KOHLER K–2699–1 BRYANT LAVATORY, VITREOUS CHINE, DROP–IN; DELTA FAUCET MODEL B501LF FAUCET; WHEELCHAIR OFFSET GRID DRAIN STRAINER, AND ANGLE SUPPLIES WITH LOOSE KEY STOPS. PROVIDE TRUBRO #102W PRE–MOLDED INSULATION KIT INSULATING BOTH SUPPLIES AND DRAIN AND LAWLER #516 WATER MIXER.

L–2 KOHLER K–2205 CAXTON LAVATORY, VITREOUS CHINA, UNDERMOUNT; AMERICAN STANDARD FAUCET MODEL NO. 7075104, BRUSHED NICKEL FAUCET; WHEELCHAIR OFFSET GRID DRAIN STRAINER, AND ANGLE SUPPLIES WITH LOOSE KEY STOPS. PROVIDE TRUBRO #102W PRE–MOLDED INSULATION KIT INSULATING BOTH SUPPLIES AND DRAIN AND LAWLER #516 WATER MIXER.

S–1 ELKAY LR1918 LUSTERSTONE STAINLESS STEEL SINGLE BOWL SINK, 18 GA., TYPE 304 STAINLESS SELF–RIM, 7" DEEP FOR TOP MOUNT INSTALLATION; ELKAY FAUCET LK2477CR; CHROME P–TRAP AND SUPPLIES.

S–2 ELKAY #LRAD3319650PD STAINLESS STEEL DOUBLE BOWL HANDICAP SINK 18 GA., TYPE 304 STAINLESS SELF RIM, 3–HOLE, 6.5" DEEP; #420 DELTA FAUCET WITH 8" SPOUT, SINGLE LEVER CONTROL AND SPRAY ATTACHMENT, CHROME P–TRAP AND SUPPLIES, #LK35 STRAINERS.

JS–1 FIAT #MSB–2424 MOLDED STONE MOP SERVICE BASIN, 24"x24"x10"; #830–AA WALL MTD FAUCET W/VACUUM BREAKER & BUCKET HOOK; #832–AA HOSE & BRACKET, #E–77–AA VINYL BUMPER GUARD. #889–CC MOP HANGER & #ODC–3–2 QUICK DRAIN CONNECTOR, #MSG2424 STAINLESS STEEL WALL GUARDS.

EWC–1 ELKAY #LZSTL8WSLP TWO STATION ELECTRIC WATER COOLER WITH BOTTLE FILLER, GRANITE GRAY FINISH, FRONT AND SIDE PRESS BARS, LEAD FREE WORKING COMPONENTS; 8.0 GPH CAPACITY AND 5.0 AMPS.

SH–1 AKER OPS–6036 ROLL–IN SHOWER COMPLETE PACKAGE TO INCLUDE L–SHAPED GRAB BARS AND SEAT, CURTAIN ROD, RECESSED SOAP DISH; SPEAKMAN #VS–1985–AF–M–SCS PRESSURE BALANCED MIXING VALVE WITH INTEGRAL SPRING CHECK STOPS, SLIDE BAR, 60" STAINLESS BRAIDED HOSE, COLOR TO BE WHITE

WH–1 JOSAM #71050–74–72 WALL HYDRANT, NON FREEZE, CAST BRONZE W/ INTEGRAL VACUUM BREAKER; UNION ELBOW ASSEMBLY AND WALL CLAMP. NOTE: ALL SUPPLY PIPING SHALL BE CONCEALED IN AN APPROVED MANNER.

WMB ABS BOXES, ONE BOX WITH CENTER DRAIN AND ONE BOX WITH TWO WATER VALVES & WATER HAMMER ARRESTORS. PROVIDE FLANGED BOXES SUITABLE FOR DRYWALL INSTALLATION.

FD–1 JOSAM #30000–5A–2–17 FLOOR DRAIN, SATIN FINISH BRONZE TOP, NON–CLOG STRAINER, SECURED GRATE; 4"DEEP SEAL TRAP; PROSET TRAP GUARD. SET RIM FLUSH WITH FINISH FLOOR.

CO JOSAM CLEANOUT
FLOOR ROUND, SATIN BRONZE TOP, RECESSED PLUG.
WALL CHROME FLUSH WALL PLATE, RECESSED PLUG.

RPZ WATTS #909 REDUCED PRESSURE ZONE BACKFLOW PREVENTOR, BRONZE CONSTRUCTION, EPOXY COATED CAST IRON CHECK VALVE BODY WITH BRONZE SEATS, FDA APPROVED EPOXY COATED CAST IRON RELIEF VALVE WITH TRIM. ASSEMBLY TO BE SUITABLE FOR VERTICAL INSTALLATION.

PRV WATTS 25AUB WATER PRESSURE REDUCING VALVE, BRONZE CONSTRUCTION, WITH INTEGRAL STRAINER AND BUILT–IN BYPASS.

HWH–1 STATE CSB–52–12–SFE ELECTRIC WATER HEATER, THREE ELEMENTS, 50 GAL. CAPACITY TANK, 50 GAL/HR RECOVERY AT 40 DEG. F. AND 100 DEG.F. RISE, 12 KW; 230/1; T&P RELIEF VALVE.

HWRP–1 BELL & GOSSET #100 CIRCULATING PUMP, 1/12 HP., 120 VOLT, 15 GPM AT 7 FT. HEAD, BRONZE TOP.

LEGEND

- BRANCH CONNECTION – BOTTOM OF MAIN
- BRANCH CONNECTION – SIDE OF MAIN
- BRANCH CONNECTION – TOP OF MAIN
- PIPE DOWN OR PIPE FROM BELOW
- PIPE UP OR PIPE FROM ABOVE
- DIRECTION OF FLOW
- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- SPRINKLER HEAD
- SANITARY SEWER OR DRAIN
- SANITARY VENT
- RL — RAIN LEADER ABOVE LOWEST FLOOR
- SD — STORM SEWER OR DRAIN
- CO — CLEANOUT FLUSH WITH FLOOR
- CO — CLEANOUT BELOW FLOOR
- HOSE BIBBS (PLAN & ELEVATION)
- GATE VALVE
- BALL VALVE
- THERMOMETER
- PRESSURE REDUCING VALVE (PRV)
- R — RELIEF VALVE
- BACKFLOW PREVENTER (BFP)

ABBREVIATIONS

ABV	ABOVE
BTU	BRITISH THERMAL UNIT
BEL	BELOW
BET	BETWEEN
CLG	CEILING
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECT, CONNECTION
CW	COLD WATER
CONT	CONTINUED
DN	DOWN
EA	EACH
EWC	ELECTRIC WATER COOLER
F	DEGREES FARENHEIT
FD	FLOOR DRAIN
FL	FLOOR
FR	FROM
FT	FEET
GPM	GALLONS PER MINUTE
GV	GATE VALVE
HB	HOSE BIBB
HW	HOT WATER
IN	INCH, INCHES
MAX	MAXIMUM
MIN	MINUMUM
RD	ROOF DRAIN
REQD	REQUIRED
RL	ROOF LEADER
SH	SHEET
TEMP	TEMPERATURE
TYP	TYPICAL
V	SANITARY VENT
VTR	VENT THRU ROOF
W	SANITARY WASTE
WH	WALL HYDRANT

COMM. NO. 2024–A–817
DESIGNED BY TAD
DRAWN BY TAD
DATE 7–5–2024

REVISIONS

NO.	DATE	BY

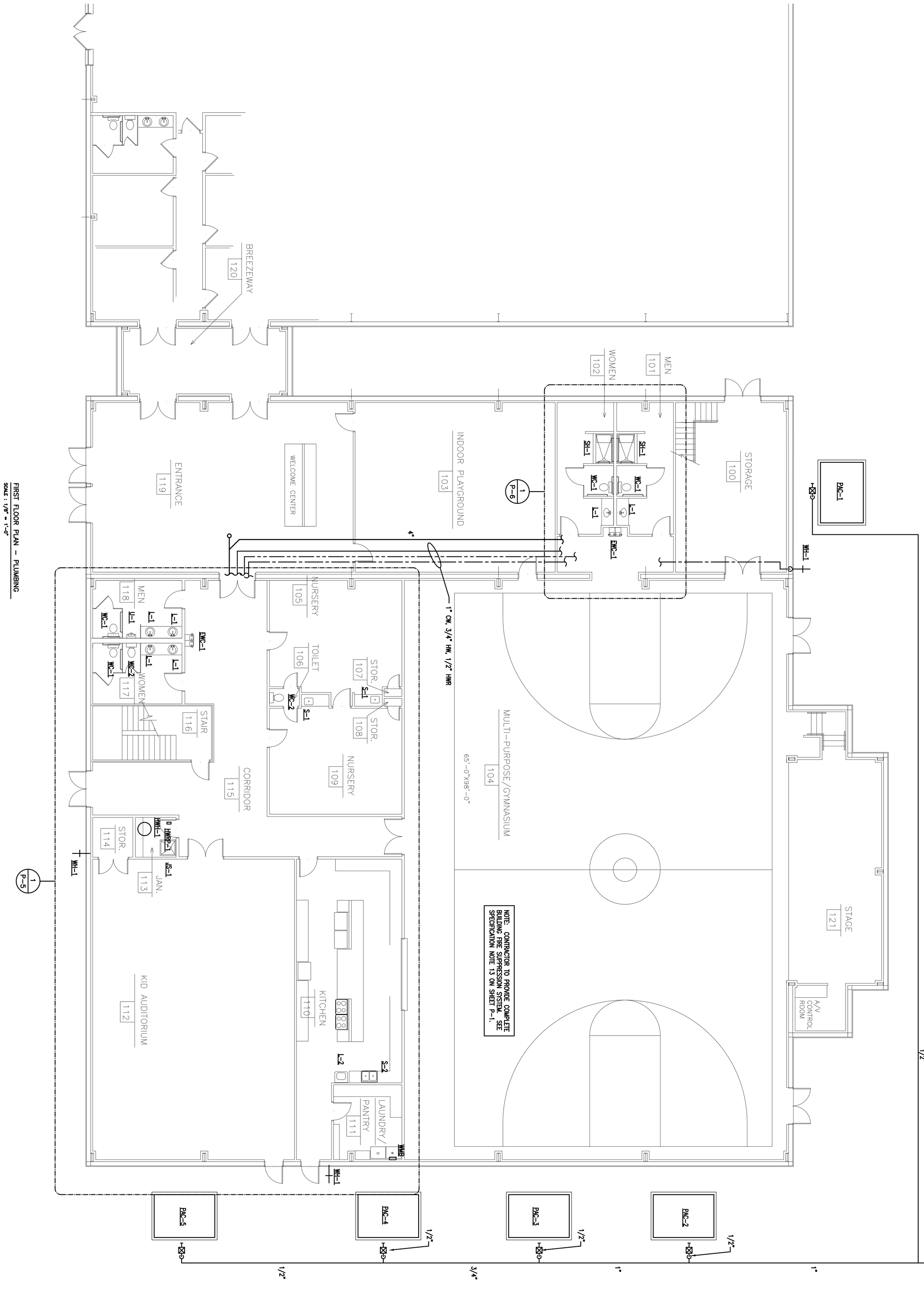
PLUMBING SCHEDULES, DETAILS

ADDITION TO
NEW HOPE CHURCH
3050 LEE HIGHWAY N.
PULASKI , VIRGINIA

COMMONWEALTH OF VIRGINIA
MELINDA D. RUBLE
Lic. No.028163
05.26.2025
PROFESSIONAL ENGINEER

THOMAS A. DOUTHAT , JR.
ARCHITECT
159 FOURTH STREET,NW
PULASKI VIRGINIA
(540)980–2429

SHEET P–2
OF 6



FIRST FLOOR PLAN – PLUMBING

SCALE : 1/8" = 1'-0"

1/2"

COMM. NO.	2024-A-817
DESIGNED BY	TAD
DRAWN BY	TAD
DATE	7-5-2024

REVISIONS		
NO.	DATE	BY

FIRST FLOOR PLAN – PLUMBING

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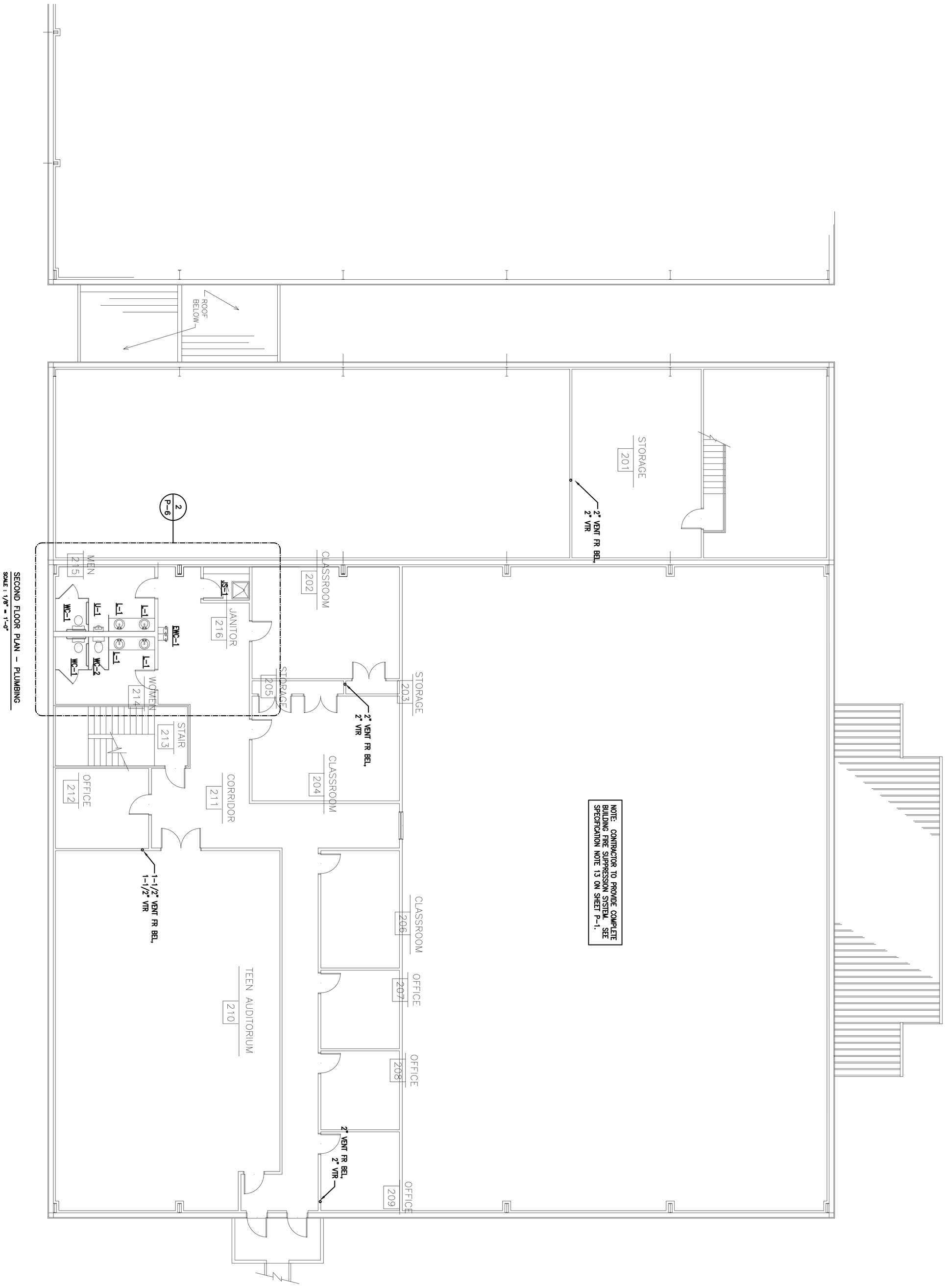
SHEET P-3 OF 6



SECOND FLOOR PLAN – PLUMBING
SCALE : 1/8" = 1'-0"

SHEET P—4 OF 6

THOMAS A. DOUTHAT , JR.
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SECOND FLOOR PLAN – PLUMBING

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PULASKI , VIRGINIA

REVISIONS		
NO.	DATE	BY

COMM. NO. 2024-A-817
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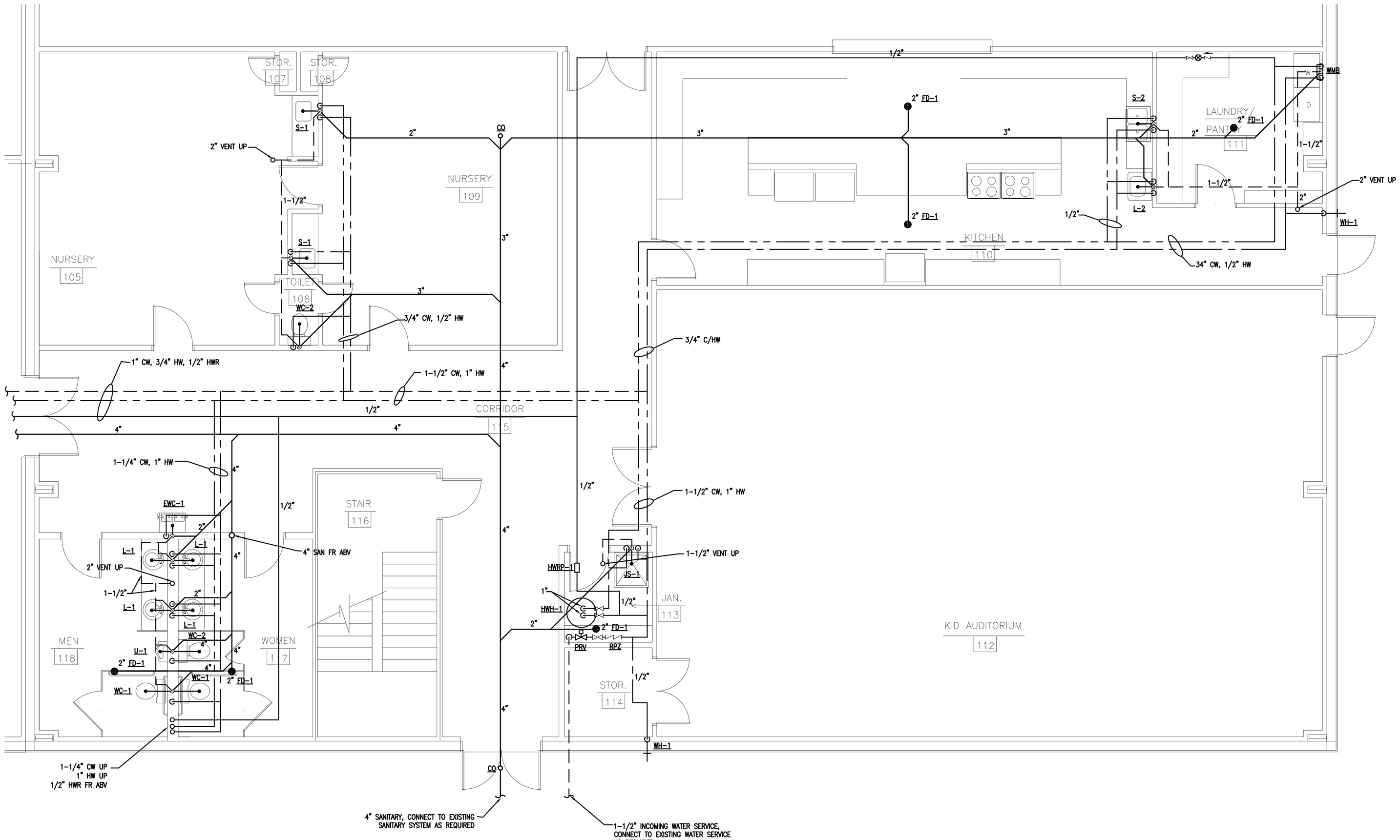
DATE 7-5-2024



1
P-5

ENLARGED PLAN – PLUMBING

SCALE : 1/8" = 1'-0"

COMM. NO.
2024-A-817
DESIGNED BY
TAD
DRAWN BY
TAD
DATE
7-5-2024

REVISIONS

NO.	DATE	BY

ENLARGED PLANS – PLUMBING

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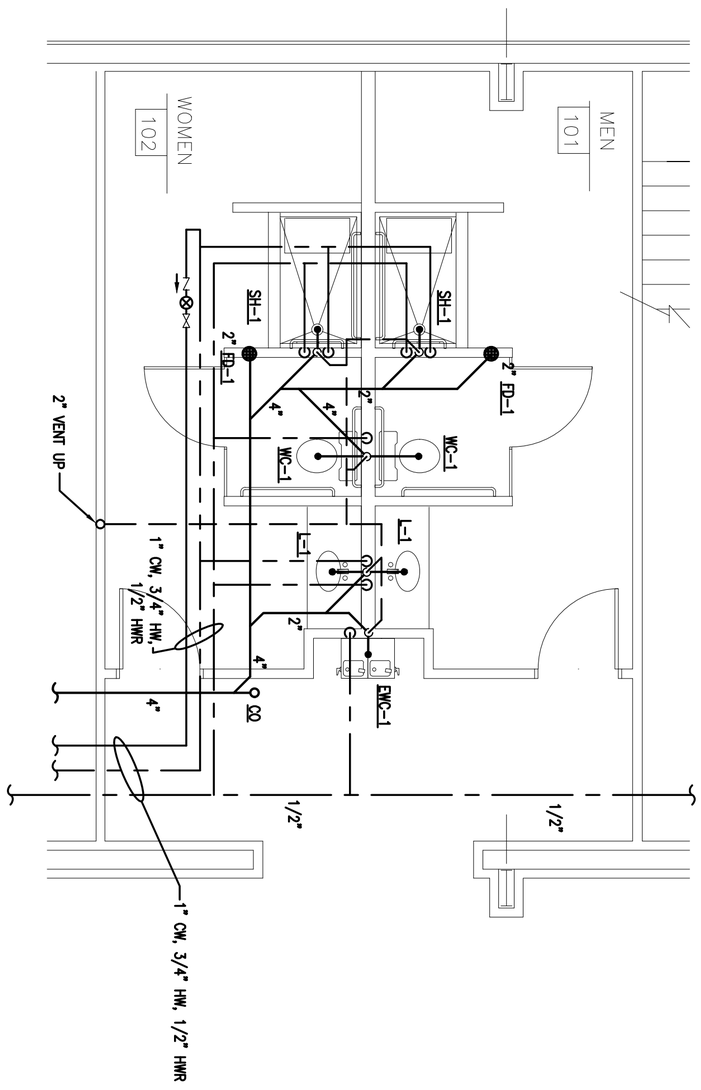
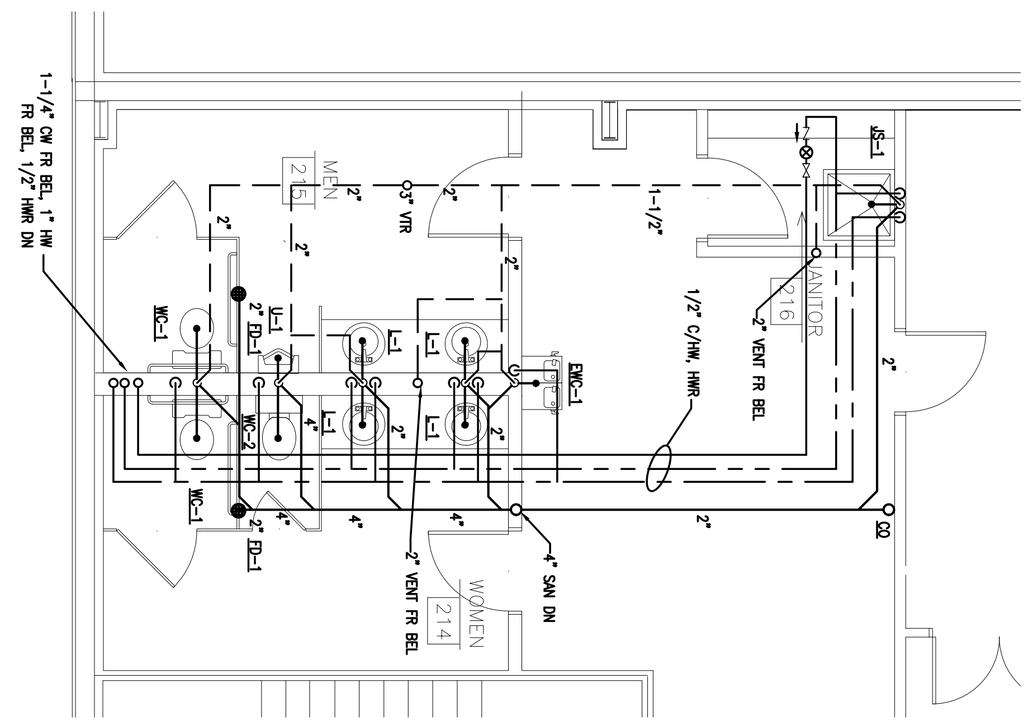
SHEET
P – 5
OF 6



1 / P-6

ENLARGED PLAN – PLUMBING

SCALE : 1/8" = 1'-0"



2 / P-6

ENLARGED PLAN – PLUMBING

SCALE : 1/8" = 1'-0"

SHEET P-6 OF 6

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ENLARGED PLANS – PLUMBING

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