

MECHANICAL SYMBOLS LIST		
	AC-1	TXF-1
EQUIPMENT SYMBOL		
AIR DEVICES		
		CEILING DIFFUSER SUPPLY
		CEILING DIFFUSER RETURN
		CEILING DIFFUSER EXHAUST
		SIDEWALL/DUCT MOUNTED GRILLE-SUPPLY
		SIDEWALL/DUCT MOUNTED GRILLE-RETURN
DUCT ACCESSORIES		
		VOLUME DAMPER W/ ACCESS DOOR
		FIRE DAMPER W/ ACCESS DOOR
		MOTORIZED DAMPER W/ ACCESS DOOR
CONTROLS & SENSORS		
		CEILING DIFFUSER SUPPLY
		MANUAL ON/OFF SWITCH
		DUCT SMOKE DETECTOR
		CO2 DETECTOR
		TEMPERATURE SENSOR
DUCTWORK		
		AIR DUCT W/ 1.5" ACOUSTICAL LINING
		FLEXIBLE DUCT
		FLEXIBLE CONNECTION
		RECTANGULAR DUCT (WIDTH X DEPTH)
		ROUND DUCT (DIAMETER)
		ROUND DUCT CROSS SECTION
		SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
		RETURN AIR RECTANGULAR DUCT CROSS SECTION

MECHANICAL ABBREVIATIONS	
AL	ACOUSTIC LINING
CDS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
COD	CORD OPERATED DAMPER
DN	DOWN
EA	EXHAUST AIR
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
FD/AD	FIRE DAMPER W/ACCESS DOOR
EG	EXHAUST GRILLE
MD	MOTORIZED DAMPER
RTU	ROOF TOP UNIT
RG	RETURN GRILLE
RA	RETURN AIR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SG	SUPPLY GRILL
SA	SUPPLY AIR
VD	VOLUME DAMPER
TEF	TOILET EXHAUST FAN
WMS	WIRE MESH SCREEN
EUH	ELECTRIC UNIT HEATER
MAU	MAKE-UP AIR UNIT
KEF	KITCHEN EXHAUST FAN
OAF	OUTSIDE AIR FAN
AC	AIR CURTAIN

MECHANICAL DRAWING LIST	
MO.1	MECHANICAL GENERAL NOTES, ABBREVIATIONS & SYMBOLS LIST
MO.2	MECHANICAL SPECIFICATIONS
M1.0	MECHANICAL FIRST FLOOR PLAN
M1.1	MECHANICAL ROOF PLAN
M3.0	MECHANICAL HOOD INFORMATION
M4.0	HOOD DATA
M4.1	HOOD DATA
M4.2	HOOD DATA
M5.0	MECHANICAL DETAILS (1 OF 2)
M5.1	MECHANICAL DETAILS (2 OF 2)
M6.0	MECHANICAL SCHEDULES

ENERGY CODE COMPLIANCE STATEMENT	
TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND JUDGEMENT, THESE PLANS AND SPECIFICATION ARE IN COMPLIANCE WITH IECC 2009.	

INDIANA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2014 INDIANA BUILDING CODE (IMC-2012) AND RULES AND REGULATIONS OF THE INDIANA DEPARTMENT OF BUILDINGS TO DATE.

- THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS, THE TESTS WILL SHOW COMPLIANCE WITH 2014 INTERNATIONAL BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
 - STANDARDS OF HEATING – 2012 IMC 309.1
 - DUCT CONSTRUCTION AND INSTALLATION– 2012 IMC 603
 - AIR INTAKES, EXHAUSTS AND RELIEFS – 2012 IMC 401.5
 - AIR FILTERS – 2012 IMC 605
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH 2012 IMC 401.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2012 IMC 403.3
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- MECHANICAL SYSTEM SHALL BE COMMISSIONED PER ASHRAE 90.1-2007 SECTION 6.7.2.4. FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY PER ASHRAE 90.1-2007 SECTION 6.7.2.1 & 6.7.2.2.
- A COMMISSIONING PLAN SHALL BE DEVELOPED BY A LICENSED DESIGN PROFESSIONAL, MECHANICAL ENGINEER OR APPROVED AGENCY.
- A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE LICENSED DESIGN PROFESSIONAL, ELECTRICAL ENGINEER, MECHANICAL ENGINEER OR APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT AS PER ASHRAE 90.1 2007.
- A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND MEASUREMENTS COMPLETED IN ACCORDANCE WITH THE SECTION ASHRAE 90.1-2007 SECTION 6.7.2.1 & 6.7.2.2.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- SMOKE DETECTOR SHALL MEET UL268A.

GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO THIS WORK SHALL BE OBSERVED AND FULLY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR REGULATIONS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFOR SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED, THE CONTRACTOR SHALL BE RESPONSIBLE TO SEAL THE SAME TO MAINTAIN THE RATED INTEGRITY.
- CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
- PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING TEMPORARY. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL SLOTTED TYPE AND FACTORY PAINTED. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.

MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.

- PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR ACCESS TILE IDENTIFICATION: PROVIDE, BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIAL IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- EVIDENCE THAT A PROPOSAL SHALL BE CONSTRUED AS TESTIMONY THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND THAT HE WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

NOTE TO CONTRACTOR

- THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETION AND READY FOR SERVICE OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE PROVISION ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL HVAC NOTES

GENERAL:

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, CONCEALED ACCESS PANELS, MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- ALL CONDENSATE DRAIN LINES FROM EACH ROOF TOP UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

- TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

HVAC DUCTWORK – SHEET METAL

- CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- SUPPLY AND RETURN DUCTWORK 10' FROM ALL HVAC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
- IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
- ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL AND REFLECTED CEILING PLANS. LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDES OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
- PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

THERMOSTATIC CONTROLS

6.4.3.1 ZONE THERMOSTATIC CONTROLS
6.4.3.1.1 GENERAL. THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE INDIVIDUALLY CONTROLLED BY THERMOSTATIC CONTROLS RESPONDING TO TEMPERATURE WITHIN THE ZONE. FOR THE PURPOSES OF SECTION 6.4.3.1, A DWELLING UNIT SHALL BE PERMITTED TO BE CONSIDERED A SINGLE ZONE.

EXCEPTIONS: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE LOADS SHALL BE PERMITTED TO SERVE ONE OR MORE ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED:

- THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION FOR 50 CONTIGUOUS FEET OR MORE AND
- THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY A THERMOSTATIC CONTROL(S) LOCATED WITHIN THE ZONE(S) SERVED BY THE SYSTEM. EXTERIOR WALLS ARE CONSIDERED TO HAVE DIFFERENT ORIENTATIONS IF THE DIRECTIONS THEY FACE DIFFER BY MORE THAN 45 DEGREES.

6.4.3.1.2 DEAD BAND. WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEAD BAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

- THERMOSTATS THAT REQUIRE MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
- SPECIAL OCCUPANCY OR SPECIAL APPLICATIONS WHERE WIDE TEMPERATURE RANGES ARE NOT ACCEPTABLE (SUCH AS RETIREMENT HOMES, PROCESS APPLICATIONS, MUSEUMS, SOME AREAS OF HOSPITALS) AND ARE APPROVED BY THE AUTHORITY HAVING JURISDICTION.

6.4.3.2 SET POINT OVERLAP RESTRICTION. WHERE HEATING AND COOLING TO A ZONE ARE CONTROLLED BY SEPARATE ZONE THERMOSTATIC CONTROLS LOCATED WITHIN THE ZONE, MEANS (SUCH AS LIMIT SWITCHES, MECHANICAL STOPS, OR, FOR DDC SYSTEMS, SOFTWARE PROGRAMMING) SHALL BE PROVIDED TO PREVENT THE HEATING SET POINT FROM EXCEEDING THE COOLING SET POINT MINUS ANY APPLICABLE PROPORTIONAL BAND.

6.4.3.3 OFF-HOUR CONTROLS. HVAC SYSTEMS SHALL HAVE THE OFF-HOUR CONTROLS REQUIRED BY SECTIONS 6.4.3.3.1 THROUGH 6.4.3.3.4.
EXCEPTIONS:

- HVAC SYSTEMS INTENDED TO OPERATE CONTINUOUSLY.
- HVAC SYSTEMS HAVING A DESIGN HEATING CAPACITY AND COOLING CAPACITY LESS THAN 15,000 BTU/H THAT ARE EQUIPPED WITH READILY ACCESSIBLE MANUAL ON/ OFF CONTROLS.

6.4.3.3.1 AUTOMATIC SHUTDOWN. HVAC SYSTEMS SHALL BE EQUIPPED WITH AT LEAST ONE OF THE FOLLOWING:

- CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY-TYPES PER WEEK, ARE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST TEN HOURS, AND INCLUDE AN ACCESSIBLE MANUAL OVERRIDE, OR EQUIVALENT FUNCTION, THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.
- AN OCCUPANT SENSOR THAT IS CAPABLE OF SHUTTING THE SYSTEM OFF WHEN NO OCCUPANT IS SENSED FOR A PERIOD OF UP TO 30 MINUTES.
- A MANUALLY OPERATED TIMER CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO TWO HOURS.
- AN INTERLOCK TO A SECURITY SYSTEM THAT SHUTS THE SYSTEM OFF WHEN THE SECURITY SYSTEM IS ACTIVATED.

EXCEPTION: RESIDENTIAL OCCUPANCIES MAY USE CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER TWO DIFFERENT TIME SCHEDULES PER WEEK.

6.4.3.3.2 SETBACK CONTROLS. HEATING SYSTEMS LOCATED IN CLIMATE ZONES 2-8 SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES ABOVE A HEATING SET POINT ADJUSTABLE DOWN TO 55°F OR LOWER. COOLING SYSTEMS LOCATED IN CLIMATE ZONES 1B, 2B, AND 3B SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES BELOW A COOLING SET POINT ADJUSTABLE UP TO 90°F OR HIGHER OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.

EXCEPTION: RADIANT FLOOR AND CEILING HEATING SYSTEMS.

DOS BROS

MECHANICAL GENERAL NOTES, ABBREVIATIONS & SYMBOLS LIST

MO.1

SECTION 0101 – QUALITY OF WORK

- 1.1 WORKMANSHIP
- A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

- 1.2 CODE COMPLIANCE
- A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

SECTION 0102 –REQUIRED DOCUMENTS

- 1.1 SHOP DRAWINGS
- A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.
- 1.2 SUBMITTALS
- A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.
- 1.3 RECORD DRAWINGS
- A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.
- 1.4 EQUIPMENT OPERATING INSTRUCTIONS
- A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTNANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE-RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 078413–PENETRATION FIRE–STOPPING

- 1.1 QUALITY ASSURANCE
- A. INSTALLER QUALIFICATIONS: AN FM GLOBAL–APPROVED FIRE–STOP CONTRACTOR OR A UL–QUALIFIED FIRE–STOP CONTRACTOR.
- B. FIRE–TEST–RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL
- 1.2 PENETRATION FIRESTOPPING
- A. PENETRATIONS IN FIRE–RESISTANCE–RATED WALLS: F–RATINGS PER ASTM E 814 OR UL 1479.
- B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F– AND T–RATINGS PER ASTM E 814 OR UL 1479:
- C. PENETRATIONS IN SMOKE BARRIERS: L–RATINGS PER UL 1479.
- D. W–RATINGS: PER UL 1479.
- 1.3 INSTALLATION
- A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.
- 1.4 FIELD QUALITY CONTROL
- A. INSPECTION OF INSTALLED FIRE–STOPPING: BY OWNER–ENGAGED AGENCY ACCORDING TO ASTM E 2174.
- 1.5 THROUGH–PENETRATION FIRESTOP SYSTEM SCHEDULE

WHERE UL–CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL’S “FIRE RESISTANCE DIRECTORY” UNDER PRODUCT CATEGORY XHEZ.

- FOR THE FOLLOWING SYSTEMS:
- METALLIC AND NON–METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:
- a. LATEX SEALANT
- b. SILICONE SEALANT
- c. INTUMESCENT PUTTY
- d. MORTAR
- e. SILICONE FOAM
- f. PILLOWS/BAGS
- g. INTUMESCENT WRAP STRIPS
- h. INTUMESCENT COMPOSITE SHEET

- 1.6 MANUFACTURERS
1. HILTI CONSTRUCTION CHEMICAL, INC
2. TREMCO INC.
3. 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413

SECTION 230517 – SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

- 1.1 SLEEVE–SEAL SYSTEMS
- A. FIELD–ASSEMBLED, MODULAR SEALING–ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.
1. SEALING ELEMENTS: EPDM RUBBER OR NBR.
2. PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.
3. CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION–RESISTANT COATING, STAINLESS STEEL.
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. ADVANCE PRODUCTS & SYSTEMS, INC.
2. CALPICO, INC.
3. METRAFLEX COMPANY (THE).
4. PIPELINE SEAL AND INSULATOR, INC.

- 1.2 SLEEVE–SEAL FITTINGS
- A. MANUFACTURED PLASTIC, SLEEVE–TYPE, PLASTIC OR RUBBER WATER–STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.
- 1.3 GROUT
- A. NON–SHRINK, FACTORY PACKAGED.
- 1.4 SLEEVE AND SLEEVE–SEAL SCHEDULE
- A. USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING–PENETRATION APPLICATIONS:
1. INTERIOR PARTITIONS:
- a. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED–STEEL–PIPE SLEEVES, PVC–PIPE SLEEVES.
- b. PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED–STEEL–SHEET SLEEVES.

END OF SECTION 230517

SECTION 230518 – ESCUTCHEONS FOR HVAC PIPING

- PART 2 – PRODUCTS
- 2.1 ESCUTCHEONS
- A. ONE–PIECE, CAST–BRASS TYPE: WITH POLISHED, CHROME–PLATED AND ROUGH–BRASS FINISH AND SETSCREW FASTENER.
- 2.2 FLOOR PLATES
- A. ONE–PIECE FLOOR PLATES: CAST–IRON FLANGE WITH HOLES FOR FASTENERS.
- PART 3 – EXECUTION
- 3.1 INSTALLATION
- A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILING, AND FINISHED FLOORS.
- B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.
1. ESCUTCHEONS FOR NEW PIPING:
- a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE–PIECE, DEEP–PATTERN TYPE.
- b. INSULATED PIPING: ONE–PIECE, STAMPED–STEEL TYPE.
- c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.
- d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED, CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.

- 3.2 FIELD QUALITY CONTROL
- A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

SECTION 230529 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

- 1.1 PERFORMANCE REQUIREMENTS
- A. DELEGATED DESIGN: DESIGN TRAPPIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.
- DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND 3.DESIGN SEISMIC–RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.
- 1.2 SUBMITTALS
- A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER
- 1.3 QUALITY ASSURANCE
- A. AWS D11.1/D1.1M, “STRUCTURAL WELDING CODE – STEEL.”
- 1.4 COMPONENTS
- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
- B. FIBERGLASS PIPE HANGERS: –CLEVIS, CENTURY COMPOSITES, COOPER B–LINE
- D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER
- E. FIBERGLASS STRUT SYSTEMS: COOPER B–LINE
- F. THERMAL–HANGER SHIELD INSERTS:
- G. FASTENER SYSTEMS: POWER–ACTUATED FASTENERS OR MECHANICAL–EXPANSION ANCHORS
- H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB–MOUNTED TYPE
- I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

SECTION 230548 – VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

- PART 1 – GENERAL
- 1.1 COMPONENTS
- A. VIBRATION ISOLATORS:
1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS
2. MOUNTS: DOUBLE–DEFLECTION TYPE.
3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST–DUCTILE–IRON HOUSING.
4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN–SPRING TYPE.
5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN–SPRING TYPE WITH SEISMIC RESTRAINT.
6. HOUSED SPRING MOUNTS: DUCTILE–IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
7. ELASTOMERIC HANGERS: DOUBLE–DEFLECTION TYPE.
8. SPRING HANGERS: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
9. SPRING HANGERS WITH VERTICAL–LIMIT STOP: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL–LIMIT STOP.
10. PIPE RISER RESILIENT SUPPORT.
- ALL–DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.
11. RESILIENT PIPE GUIDES.

B. AIR–MOUNTING SYSTEMS:

1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED–AIR BELLOW.
2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED–AIR BELLOW.
- C. RESTRAINED VIBRATION ISOLATION ROOF–CURB RAILS: FACTORY–ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR–AND WATERTIGHT–CURB RAIL WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.
- D. VIBRATION ISOLATION EQUIPMENT BASES:
1. STEEL BASE: FACTORY–FABRICATED, WELDED, STRUCTURAL–STEEL BASES AND RAILS READY FOR FIELD–APPLIED, CAST–IN–PLACE CONCRETE

1.2 FIELD QUALITY CONTROL

- A. TESTING: BY EITHER: OWNER–ENGAGED AGENCY, CONTRACTOR–ENGAGED AGENCY, OR CONTRACTOR.

PART–2 PRODUCTS

- 1.1 VIBRATION ISOLATORS & SEISMIC–RESTRAINT DEVICES
- A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. JOHNS–MANVILLE
2. OWENS–CORNING
- 1.6 ACOUSTICAL TREATMENT
1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5” THICK R–6 AS MANUFACTURED BY DUCTMATE. 1–1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE, FIBERGLASS DUCT LINER, LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.
- 1.7 SEALANT MATERIALS
1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.

END OF SECTION 230548

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

- 1.1 SUMMARY
- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
1. AIR SYSTEMS: CONSTANT AND VARIABLE VOLUME SYSTEMS.
2. MOTORS.

- 1.2 QUALITY ASSURANCE
- A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

- 1.3 EXECUTION
- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER’S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
- I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
- J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230713 – DUCT INSULATION

- 1.1 QUALITY ASSURANCE
1. SURFACE–BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME–SPREAD INDEX OF 25, AND SMOKE–DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE–DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTM E4.
- 1.2 FIELD QUALITY CONTROL
- A. FIELD INSPECTIONS: BY OWNER–ENGAGED AGENCY.
- 1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE:
- A. CONCEALED, RECTANGULAR, ROUND AND FLAT–OVAL, SUPPLY–RETURN, OUTDOOR–AND EXHAUST–AIR DUCT AND AIR PLENUM INSULATION:

- B. FLEXIBLE ELASTOMERIC, MINERAL–FIBER BLANKET, MINERAL–FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:
- UNCONDITIONED SPACES WITHIN BUILDING: R–5
- WITHIN BUILDING ENVELOPE ASSEMBLY: R–8
- OUTSIDE OF BUILDING: R–8
- 1.4 ITEMS NOT INSULATED:
1. FIBROUS–GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1.
3. FACTORY–INSULATED FLEXIBLE DUCTS.
4. FACTORY–INSULATED PLENUMS AND CASINGS.
5. FLEXIBLE CONNECTORS.
6. VIBRATION–CONTROL DEVICES.
7. FACTORY–INSULATED ACCESS PANELS AND DOORS.
8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

- 1.5 PRODUCTS
- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
1. JOHNS–MANVILLE
2. OWENS–CORNING

- 1.6 ACOUSTICAL TREATMENT
1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5” THICK R–6 AS MANUFACTURED BY DUCTMATE. 1–1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE, FIBERGLASS DUCT LINER, LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.
- 1.7 SEALANT MATERIALS
1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.

KITCHEN EXHAUST DUCT:

A MINIMUM INSULATION COVERING OF 2 INCHES (51 MM) OF MAGNESIUM OR CALCIUM SILICATE BLOCK, WITH STAGGERED JOINTS, ATTACHED WITH GALVANIZED STEEL WIRE OR MATERIAL ASSEMBLY EQUIVALENT IN INSULATING AND FIRE–RESISTANT QUALITIES WHICH CANNOT BE PENETRATED BY GREASE SHALL BE APPLIED TO ALL KITCHEN EXHAUST DUCTS INSIDE THE BUILDING.

- A. NON–INSULATED DUCTWORK:
- 1) WHERE SOUND LINING IS OF MINIMUM THICKNESS SPECIFIED FOR INSULATION.
- 2) KITCHEN EXHAUST DUCT RUNNING OUTDOOR SHALL BE PROTECTED BY PAINT OR OTHER WEATHERPROOF PROTECTIVE COATING. STAINLESS STEEL DUCTS SHALL NOT REQUIRE PAINT OR WEATHERPROOF PROTECTIVE COATING.

END OF SECTION 230713

SECTION 233113 – METAL DUCTS

- 1.1 CONSTRUCTION
- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2–1/2 INCH DUCT PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2” WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
1. DUCTWORK SHALL BE TRANSVERSELY JOINED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1–1/2”X1–1/2”X1/8” GALVANIZED ANGLES. TACK–WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8” THICK REINFORCED GASKET, OVERLAPPED AT CORNERS. GASKET SIMILAR TO 3M–1202 OR APPROVED EQUAL.
2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 18 GAUGE ALL WELDED CONSTRUCTION.
3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6’ CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.
4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30–03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30–02 AND COVERED WITH APPROVED SEALING TAPE.
5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWS A5.2.
6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.
- C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:
- USG MAX. SIDE INCHES TRANSVERSE JOINTS AND BRACING
- 22 UP TO 12 8 SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS
- 22 13 TO 24 1”X1”X1/8” ANGLES ON 4 FOOT CENTERS
- 20 25 TO 35 1”X1”X1/8” ANGLES ON 2 FOOT CENTERS
- D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:
1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.
- E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU OF RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3–6 AND AS

SHOWN IN FIG. 3–1 AND 3–2 FOR ROUND DUCTWORK.

- F. ALL DUCTWORK SHALL BE SEALED TO CLASS “A” AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.

- 1.2 MATERIALS
- A. SINGLE–WALL RECTANGULAR DUCTS AND FITTINGS.
- B. SINGLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.
- C. SHEET METAL MATERIALS:
1. GALVANIZED SHEET STEEL.
2. STAINLESS–STEEL SHEETS.
3. ALUMINUM SHEETS.
4. FACTORY–APPLIED ANTI–MICROBIAL COATING.
- D. DUCT LINER:
1. FIBROUS GLASS, TYPE I, FLEXIBLE.
- a. WITH ANTI–MICROBIAL EROSION–RESISTANT COATING.
2. FLEXIBLE ELASTOMERIC.
3. NATURAL FIBER.

- E. SEALANT MATERIALS:
1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.
6. ROUND DUCT JOINT O–RING SEALS.

- 1.3 DUCT CLEANING
- A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.
- B. CLEAN THE FOLLOWING ITEMS:
1. AIR OUTLETS AND INLETS.
2. SUPPLY, RETURN, AND EXHAUST FANS.
3. AIR–HANDLING UNITS.
4. COILS AND RELATED COMPONENTS.
5. RETURN–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
6. SUPPLY–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.
- 1.4 DUCT SCHEDULE
- A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:
8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

KITCHEN EXHAUST DUCTWORK:

- A. ALL HORIZONTAL AND VERTICAL KITCHEN EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF 16 GAUGE MINIMUM BLACK IRON OR PREFABRICATED DOUBLE WALL GREASE DUCTWORK APPROVED FOR KITCHEN EXHAUST APPLICATION WITH ETL LISTED TO UL 1978 AND UL 2221 SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER INSTALLATION INSTRUCTIONS AND LOCAL CODES. ALL SEAMS AND JOINTS SHALL HAVE A LIQUID TIGHT CONTINUOUS EXTERNAL WELD AS PER NFPA 96 FOR BLACK IRON DUCTWORK. THE EXTERIOR OF ALL KITCHEN RANGE BLACK IRON EXHAUST DUCTS SHALL HAVE 1–1/2” X 1–1/2” X 1/8” WELDED ANGLES, PUNCHED FOR SECURING BLOCK INSULATION. WHERE KITCHEN RANGE BLACK IRON EXHAUST DUCT RISER PASSED VERTICALLY THROUGH FLOORS OF THE BUILDING, PROVIDE ANGLE CLIPS WELDED TO THE DUCT OF REQUIRED SIZES TO SUPPORT THE WEIGHT OF THE RISER SECTIONS ON THE BUILDING STRUCTURE AT EACH OF THE FLOOR LEVELS. PROVIDE AND INSTALL ALL SUPPLEMENTARY STRUCTURAL STEEL IN SHAFTS TO PROPERLY SUPPORT EXHAUST DUCTWORK FROM BUILDING CONSTRUCTION. PROVIDE MINIMUM 12”X12” ACCESS DOOR ON SIDE OF HORIZONTAL DUCTS AT 12’ SPACING. ACCESS DOORS SHALL BE SIMILAR TO DESCRIPTION IN “ACCESS DOORS IN SHEET METAL WORK WORK” EXCEPT THAT DOOR GAUGE SHALL BE THE SAME AS DUCT GAUGE. ALL HORIZONTAL DUCTS SHALL BE PITCHED BACK TO HOODS 1/4 ” PER FOOT OR MAXIMUM PITCH ATTAINABLE. THIS TRADE SHALL DRILL OR CUT ALL REQUIRED OPENING AS REQUIRED BY THE DUCTS EXTINGUISHING SYSTEM AND AS COORDINATED WITH THE TRADE SUPPLYING THE EXTINGUISHING SPRAY HEADS. MAINTAIN 6” CLEARANCE BETWEEN SHEET METAL DUCT AND ANY SURFACE SUCH AS SLAB , BEAM OR SHAFT ENCLOSURE.
- B. ALL HORIZONTAL AND VERTICAL KITCHEN RANGE BLACK IRON EXHAUST DUCTWORK GAUGES SHALL BE AS FOLLOWS.

SIZE	GAUGE	BLACK IRON
LESS THEN 155 SQIN	16	
155–200 SQIN	14	
201–255 SQIN	12	

- C. ALL EXHAUST DUCT WORK FROM DISHWASHERS, POT SINKS, OVENS, OR OTHER KITCHEN APPARATUS EMITTING HEAT OR VAPOR (OTHER THEN RANGE HOOD EXHAUST) SHALL BE CONSTRUCTED OF ALUMINUM WITH WELDED JOINTS (USING SMACNA STANDARDS) AND MADE WATERTIGHT. THIS INCLUDES ALL DUCTWORK FROM THE EQUIPMENTS TO THE EXHAUST FAN AND FROM THE EXHAUST FAN TO THE DISCHARGE AIR LOUVERS. THE DUCTS SHALL PITCH BACK TO THE DISHWASHER FROM THE VERTICAL RISER OR WHERE THE RUN OF DUCT IS TOO LONG SHALL CHANGE PITCH TO DRAIN TO THE BOTTOM OF THE RISER. WHERE DUCTS LEAVE SHAFT TO ENTER THE EXHAUST FAN THEY SHALL ALSO BE PITCHED TO A LOW POINT AWAY FROM THE RISER. WELD 3/4 ” DRAINS AT ALL LOW POINTS AND RUN TO THE NEAREST DRAIN. THIS TRADE SHALL BE HELD RESPONSIBLE TO PROVIDE A WATERTIGHT AND DRAINED SYSTEM. REGARDLESS OF THE QUANTITY OF STEAM OR WATER VAPOR LEAVING THE EQUIPMENTS.

END OF SECTION 233113

SECTION 233713 – DIFFUSERS, REGISTERS, AND GRILLES

- 1.1 PRODUCTS
- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS

INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.

B. MANUFACTURERS: TITUS

1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- a. CARNES.
- b. HART & COOLEY INC.
- c. KRUEGER.
- d. METALAIR, INC.
- e. NALOR INDUSTRIES INC.
- f. RUSKIN
- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.
- D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713

SEQUENCE OF OPERATIONS

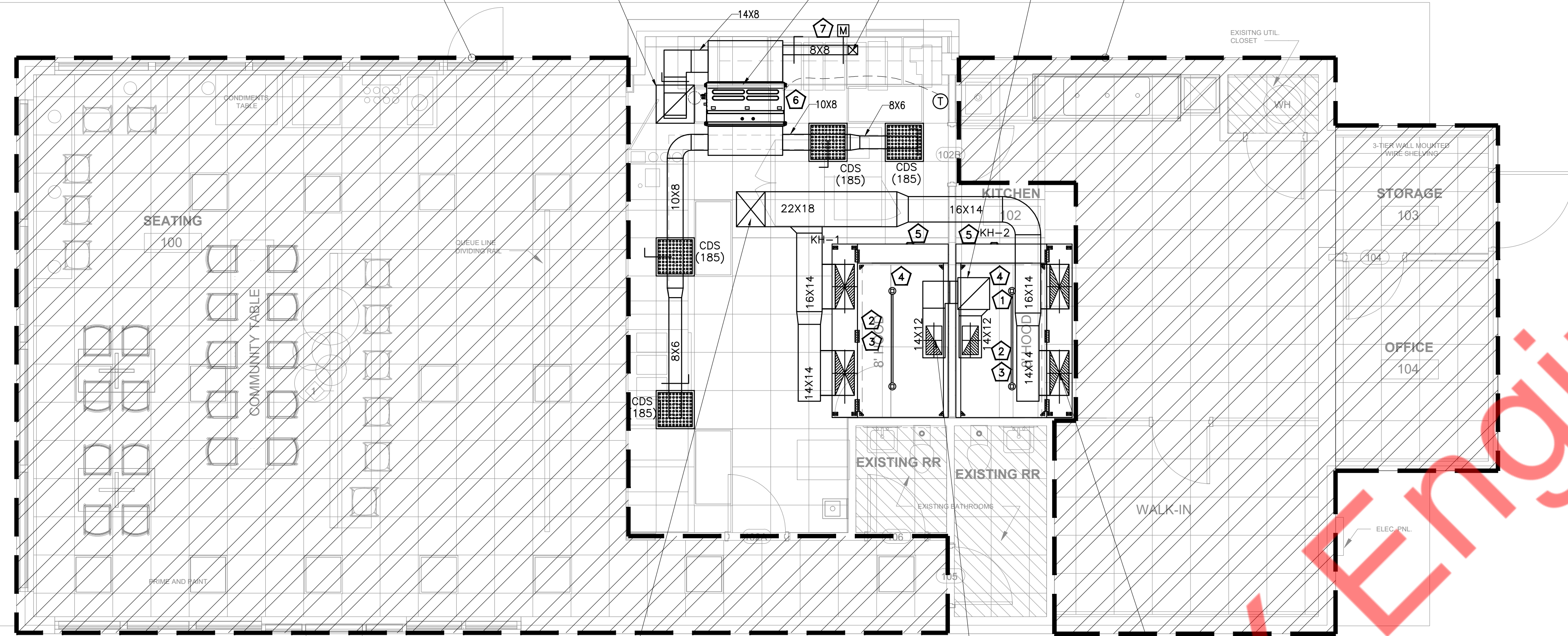
- 1) FIRE AND SMOKE DAMPER
- a) SMOKE DETECTION/TEST/POWER FAILURE OPERATION
- WHEN SMOKE IS DETECTED (VIA A SMOKE DETECTOR), DURING TESTING OR IF POWER FAILURE OCCURS, THE DAMPER WILL CLOSE AND REMAIN CLOSED. WHEN THE SMOKE SIGNAL CEASES (SMOKE DETECTOR RESET), THE TEST IS COMPLETED OR POWER IS RESTORED THE DAMPER WILL AUTOMATICALLY RESET TO THE OPEN POSITION. THE DAMPER AUTOMATICALLY RESETS IF NUISANCE ALARMS OCCUR AND THE SYSTEM IS RESET.
- b) FIRE OPERATION
- WHEN TEMPERATURES IN EXCESS OF 165F/74C (212F/100C, 250F/121C OR 350F/177C OPTIONAL) ARE DETECTED, THE DAMPER WILL CLOSE AND LOCK. AT NO TIME SHALL THE DAMPER BE DISENGAGED FROM THE ACTUATOR. UPON CESSATION OF THE FIRE CONDITIONS, THE DAMPER CAN BE REOPENED BY PRESSING THE RESET BUTTON LOCATED ON THE DAMPER ASSEMBLY.
- 2) AC UNITS:
- UNIT SHALL BE STARTED AND STOPPED BY WALL MOUNTED PROGRAMMABLE THERMOSTAT. DURING “ON” MODE UNIT THERMOSTAT SHALL ENERGIZE COMPRESSOR(S) AND SUPPLY FAN TO MAINTAIN ROOM SET POINT OF 75°F ADJUSTABLE; WHEN ROOM TEMPERATURE DROPS BELOW SET POINT COMPRESSOR(S) SHALL DE–ENERGIZE AND FAN SHALL REMAIN ON.

COMBINATION FIRE SMOKE DAMPER–INSTALLATION MATRIX			
TASK	MECHANICAL CONTRACTOR	ELECTRICAL CONTRACTOR	FIRE ALARM VENDOR
FURNISH & INSTALL DAMPER	X		
FURNISH & INSTALL DUCT/SMOKE DETECTOR	X		
INSTALL LINE VOLTAGE WIRING AND CONDUITS		X	
INSTALL FIRE ALARM CABLEING			X
PROGRAMMING FIRE ALARM DEVICES			X
TESTING OF FIRE SMOKE DAMPER ASSEMBLY	X	X	X
NOTES: 1. THIS CHART IS PROVIDED AS A GUIDELINE. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COORDINATE AMONG THE SUB CONTRACTORS TO ENSURE COMPLETE UNDERSTANDING OF THE SYSTEMS, INCLUDING HOW AND BY WHOM THEY SHALL BE INSTALLED.			

DOS BROS

MECHANICAL SPECIFICATIONS

M0.2



1 MECHANICAL FIRST FLOOR PLAN
1/4" = 1'-0"

CDR-1
24"X24"
[600]
W/NECK
14"x14"

ALL EXISTING DUCTWORK WITH AIR DIFFUSERS, THERMOSTATS AND SENSORS TO REMAIN AND TO BE REUSED. CONTRACTOR TO CHECK FOR ANY OBSTRUCTION IN THE DUCT SYSTEM AND CLEAN AS NEEDED. RE-INSULATE THE TEMPERED/DAMAGED DUCT INSULATIONS. INSULATION R-VALUE SHALL BE MINIMUM PER THE LOCAL CODE. CONTRACTOR TO REPORT THE DESIGN ENGINEER INCASE IF ANY DISCREPANCY FOUND.

22X18
(3200)
UP

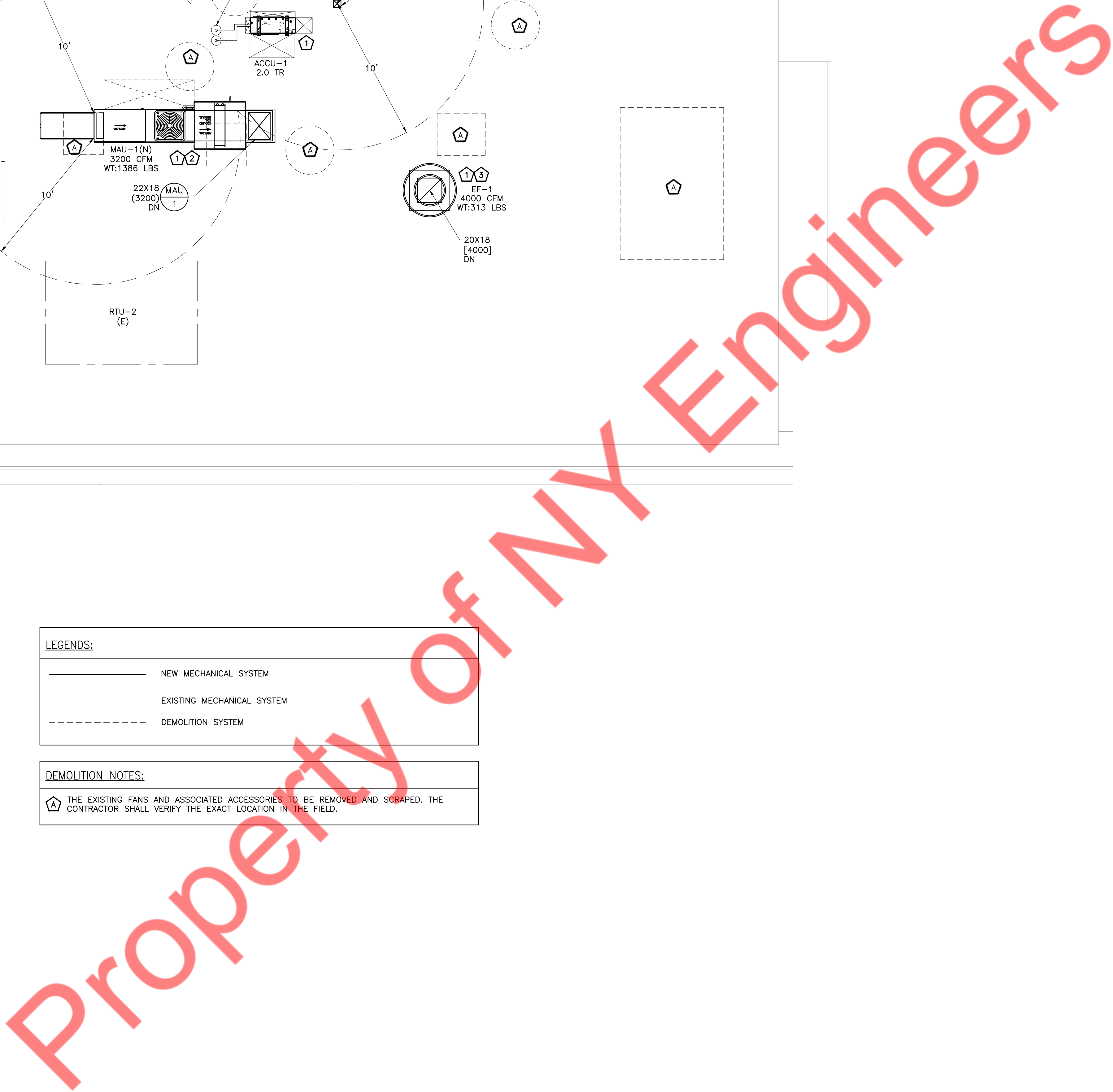
CONNECT TO HOOD
EXHAUST COLLAR.
(TYP 2)

CONNECT TO MAKE-UP
AIR SUPPLY PLENUM
(TYP 4)

- 1 EXHAUST FOR KITCHEN HOOD IS REQUIRED AT THE COOKING STATION. RUN SHEET METAL DUCT FROM CONNECTION ON HOOD TO EXHAUST FAN. OFFSET AND TRANSITION AT CONNECTIONS AS NEEDED. VERIFY DIMENSIONS PRIOR TO FABRICATION OR INSTALLATION. USE FACTORY-MANUFACTURED PIPE AND FITTINGS ONLY. VERIFY LOCATION ON SITE WITH MOST RECENT KITCHEN PLANS.
- 2 INSTALL KITCHEN HOOD(KH-1&2). SUPPORT HOOD AS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL HOOD ACCORDING TO THE REQUIREMENTS OF ITS LISTING, IN COMPLIANCE WITH NFPA 96, THE BUILDING CODE, AND AUTHORITIES HAVING JURISDICTION. HOOD SHALL HAVE AN INTEGRAL DUCT COLLAR. TEMPERATURE SENSOR TO AUTOMATICALLY ENERGIZE THE EXHAUST AND MAKEUP AIR FANS IF COOKING TEMPERATURES ARE DETECTED. EXHAUST DUCT SYSTEM TO BE WELDED OR FACTORY-MANUFACTURED WATER AND AIR TIGHT.
- 3 INSTALL REMOTE TEMPERATURE SENSOR FOR HOOD KH--1&2 AT THIS LOCATION 60" AFF. COORDINATE LOCATION WITH EQUIPMENT & ARCHITECT. PROVIDE (2) #18 G. THERMISTOR CABLE FROM TEMPERATURE SENSOR TO HOOD CONTROL PANEL. INCLUDE HOOD CONTROLLER WITH CONTROL PANEL FOR CONTROL OF HOOD WITH CONNECTED KITCHEN EXHAUST FAN AND MAKE-UP AIR UNIT. EXHAUST AIR FLOW AND MAKE-UP AIR SUPPLY TO HOOD SHALL VARY AS PER REQUIREMENT.
- 4 MAU DUCT OF RUN TO BE COORDINATED WITH HOOD SUPPORTS.
- 5 HOOD(KH-1&2) TO BE PROVIDED WITH DRY CONTACT PROVISION FOR FIRE SUPPRESSION SYSTEM CONNECTION. REMOTE TYPE HOOD ANSUL FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION SCOPE, SHALL BY OTHERS.
- 6 1" CO W/ CONDENSATE DRAIN PUMP TO LAVATORY WASTE W/ AIR GAP FITTING. COORDINATE W/ PLUMBING CONTRACTOR.
- 7 MOTORIZED DAMPER TO BE INTERLOCKED WITH AC-1.

1. ALL WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.
2. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS.
3. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.
4. THESE DRAWINGS, AS PREPARED, ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS CONSTRUCTION OF THE PROJECT AND THE WORK OF THE TRADES WILL PERMIT. EQUIPMENT LOCATIONS INDICATED ARE APPROXIMATE. COORDINATE EXACT LOCATIONS AND REQUIRED CLEARANCES WITH EQUIPMENT SUPPLIER AND ALL TRADES PRIOR TO INSTALLATION.
5. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL THE EQUIPMENT INDICATED WITHIN THE MECHANICAL DRAWINGS UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE UL LISTED. VERIFY LOCATION AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND / OR INSTALLATION.
6. DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
7. ALL METAL DUCT AND AIR DISTRIBUTION DEVICES SHALL BE INSULATED WITH R-8, 75 DENSITY FOIL-BACKED INSULATION WITH FIRE AND SMOKE RATING 25-50.
8. ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, SEALED, AND INSULATED PER THE LATEST ISSUE OF SMACNA LOW-VELOCITY DUCT MANUAL.
9. THE CONTRACTOR SHALL COORDINATE DIFFUSER LOCATIONS ON SITE WITH THE MOST RECENT REFLECTED CEILING PLAN.
10. THE CONTRACTOR IS TO MAKE ALL LOW-VOLTAGE WIRING CONNECTIONS FOR ALL HVAC EQUIPMENT INCLUDING TEMPERATURE CONTROLS, ROOF TOP UNITS, SMOKE DETECTORS AND CONTRACTOR PANEL.
11. THE ENTIRE INSTALLATION SHALL BE GUARANTEED FREE OF DEFECTS AND CONTRACTOR SHALL REPAIR AND / OR REPLACE ANY DEFECTIVE MATERIALS OR EQUIPMENT AT NO COST TO THE OWNER FOR A MINIMUM PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY ARCHITECT OR ENGINEER.
12. ALL WORK SHALL BE SUBJECT TO THE ACCEPTANCE AND APPROVAL OF THE ARCHITECT AND OWNER. THE ARCHITECT SHALL BE NOTIFIED OF ANY AND ALL DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. FAILURE OF PROPER NOTIFICATION DOES NOT RELIEVE THE CONTRACTOR. THE CONTRACTOR SHALL CORRECT ANY AND ALL WORK ARISING FROM SUCH FAILURE TO COORDINATE DISCREPANCIES TO THE SATISFACTION OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.
13. THE CONTRACTOR SHALL, UPON COMPLETION OF PROJECT, PERFORM A COMPLETE TEST AND BALANCE OF ALL EQUIPMENT. PROVIDE A WRITTEN REPORT TO THE ARCHITECT. ALL CAPACITIES MUST BE SET TO WITHIN $\pm 10\%$ OF AMOUNTS INDICATED ON THE FLOOR PLAN AND SCHEDULES.
14. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF TRUSSES AND MODIFY DUCTWORK ACCORDINGLY.
15. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/ BARRIERS AS PER LOCAL CODE. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
16. PROVIDE VOLUME DAMPER AT EACH SUPPLY, RETURN AND EXHAUST DUCTWORK BRANCH.

1. PROVIDE CLEAN OUT AT ALL ELBOWS AND BOTTOM OF RISER TYPE-I KITCHEN EXHAUST DUCT. CLEAN-OUT OPENINGS SHALL BE PROVIDED AT EVERY CHANGE IN DIRECTION. TIGHT-FITTING DOORS CONSTRUCTED OF STEEL HAVING A THICKNESS NOT LESS THAN THAT REQUIRED FOR THE DUCT. OPENING DOOR ASSEMBLIES SHALL HAVE A GASKET OR SEALANT THAT IS NONCOMBUSTIBLE AND LIQUID TIGHT, AND SHALL NOT HAVE FASTENERS THAT PENETRATE THE DUCT. THE OPENING DIMENSIONS SHALL BE 12X12 INCHES ON ACCESSIBLE SIDE OF DUCT. SPACING BETWEEN CLEAN OUT OPENING SHALL NOT BE MORE THAN 12 FEET. THE CLEANOUTS SHALL BE LOCATED ON THE SIDE OF THE DUCT WITH THE OPENING NOT LESS THAN 1.5 INCHES (38 MM) ABOVE THE BOTTOM OF THE DUCT, AND NOT LESS THAN 1 INCH (25 MM) BELOW THE TOP OF THE DUCT. WHERE THE DIMENSIONS OF THE SIDE OF THE DUCT PROHIBIT THE CLEAN-OUT INSTALLATION PRESCRIBED HEREIN, THE OPENINGS SHALL BE ON THE TOP OF THE DUCT OR THE BOTTOM OF THE DUCT WHERE LOCATED ON THE TOP OF THE DUCT, THE OPENING EDGES SHALL BE A MINIMUM OF 1/2 INCH (25 MM) FROM THE EDGES OF THE DUCT. WHERE LOCATED IN THE BOTTOM OF THE DUCT, CLEAN-OUT OPENINGS SHALL BE DESIGNED TO PROVIDE INTERNAL DAMMING AROUND THE OPENING, SHALL BE PROVIDED WITH GASKETING TO PRECLUDE GREASE LEAKAGE, SHALL PROVIDE FOR DRAINAGE OF GREASE DOWN THE DUCT AROUND THE DAM, AND SHALL BE APPROVED FOR THE APPLICATION.
2. COMMERCIAL KITCHEN GREASE DUCTS SHALL BE DESIGNED FOR THE TYPE OF COOKING APPLIANCE AND HOOD SERVED.
3. JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE IN THE EXTERNAL SURFACE IF THE DUCT SYSTEMS.
4. DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET AND OUTLET OF THE FAN FOR INLINE FANS. APPROVED FLEXIBLE CONNECTIONS MAY BE PROVIDED.
5. A VIBRATION ISOLATION CONNECTOR FOR CONNECTING A DUCT TO A FAN SHALL CONSIST OF NON-COMBUSTIBLE PACKING IN A METAL SLEEVE JOINT OF APPROVED DESIGN OR SHALL BE A COATED-FABRIC FLEXIBLE DUCT CONNECTOR LISTED AND LABELED FOR THE APPLICATION. VIBRATION ISOLATION CONNECTORS SHALL BE INSTALLED ONLY AT THE CONNECTION OF A DUCT TO A FAN INLET OR OUTLET.
6. PRIOR TO THE USE OR CONCEALMENT OF ANY PORTION OF A GREASE DUCT SYSTEM, A LEAKAGE TEST SHALL BE PERFORMED. DUCT SHALL BE CONSIDERED TO BE CONCEALED WHERE INSTALLED IN SHAFTS OR COVERED BY COATINGS OR WRAPS THAT PREVENT THE DUCTWORK FROM VISUALLY INSPECTED ON ALL SIDE. THE DUCT INSTALLER SHALL BE RESPONSIBLE FOR PROVIDING THE NECESSARY EQUIPMENT AND PERFORMING THE GREASE DUCT LEAKAGE TEST. THE DUCT LEAKAGE TEST SHALL BE PERFORMED FOR ALL THE DUCT SYSTEMS, INCLUDING THE DUCT-TO-DUCT CONNECTION. THE DUCTWORK SHALL BE PERMITTED TO BE TESTED IN SECTIONS, PROVIDED THAT EVERY JOINT IS TESTED (IF TEST IS FAILED, CONTRACTOR TO PROVIDE NEW KITCHEN EXHAUST DUCT).
7. PROVIDE SMOKE TEST TO PROOF TIGHTNESS OF THE GREASE DUCT.
8. GREASE DUCT BRACING AND SUPPORTS SHALL BE OF NON-COMBUSTIBLE MATERIAL SECURELY ATTACHED TO THE STRUCTURE AND DESIGNED TO CARRY GRAVITY AND SEISMIC LOADS WITHIN THE STREET LIMITATIONS OF THE NEW YORK CITY BUILDING CODE. BOLTS, SCREWS, RIVETS AND OTHER MECHANICAL FASTENERS SHALL NOT PENETRATE DUCT WALLS.
9. A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER WITH PROVISION FOR CLEANOUT IN ACCORDANCE WITH NFPA 96.
10. CLEANOUT OPENINGS SHALL BE PROVIDED AT EVERY CHANGE IN DIRECTION, WITHIN 3 FEET OF THE EXHAUST FAN.
11. A GREASE DUCT SERVING THE TYPE-1 HOOD THAT PENETRATED A CEILING, WALL OR FLOOR SHALL BE ENCLOSED FROM THE FIRE POINT OF PENETRATION TO THE OUTLET TERMINAL. DUCT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT OF THE FIRE-RESISTANCE RATED ASSEMBLY PENETRATED BUT NEED NOT EXCEED 2 HOURS.
12. KITCHEN-EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS BUILDINGS, ADJACENT BUILDINGS AND ADJACENT PROPERTY LINE. THIS EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM AND NOT LESS THAN 3 FEET ABOVE AIR INTAKE OPENINGS INTO ANY BUILDING.



1 MECHANICAL ROOF PLAN
1/4" = 1'-0"

ROOF PLAN KEY NOTES:

- | | |
|---|---|
| 1 | COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS. |
| 2 | CONTRACTOR TO RUN CONDENSATE DRAIN FROM MAU TO NEAREST ROOF DRAIN OR DOWN SPOUT. COORDINATE IN FIELD. |
| 3 | KITCHEN EXHAUST TERMINATION SHALL BE MINIMUM 10 FEET FROM PROPERTY, 40" ABOVE THE ROOF SURFACE, 3 FEET AWAY FROM OPENING INTO BUILDING AND 10 FEET AWAY FROM ANY OUTSIDE AIR INTAKES. |

GENERAL FLOOR PLAN NOTES:

1. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND WITH A STRUCTURAL ENGINEER.
2. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING, ETC.
3. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
4. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
5. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C. AND OWNER.
6. COORDINATE ALL EQUIPMENT WITH STRUCTURAL.
7. MAINTAIN ALL CODE AND MANUFACTURERS RECOMMENDED CLEARANCE AROUND ALL ROOF EQUIPMENT.
8. PROVIDE 1" CONDENSATE DRAIN FOR MAKE-UP AIR UNITS.
9. PROVIDE WEATHER PROOF COATING FOR ALL EXTERIOR DUCTING.

LEGENDS:

- _____ NEW MECHANICAL SYSTEM
 - - - - - EXISTING MECHANICAL SYSTEM
 - - - - - DEMOLITION SYSTEM

DEMOLITION NOTES:

- A** THE EXISTING FANS AND ASSOCIATED ACCESSORIES TO BE REMOVED AND SCRAPPED. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION IN THE FIELD.

DOS BROS

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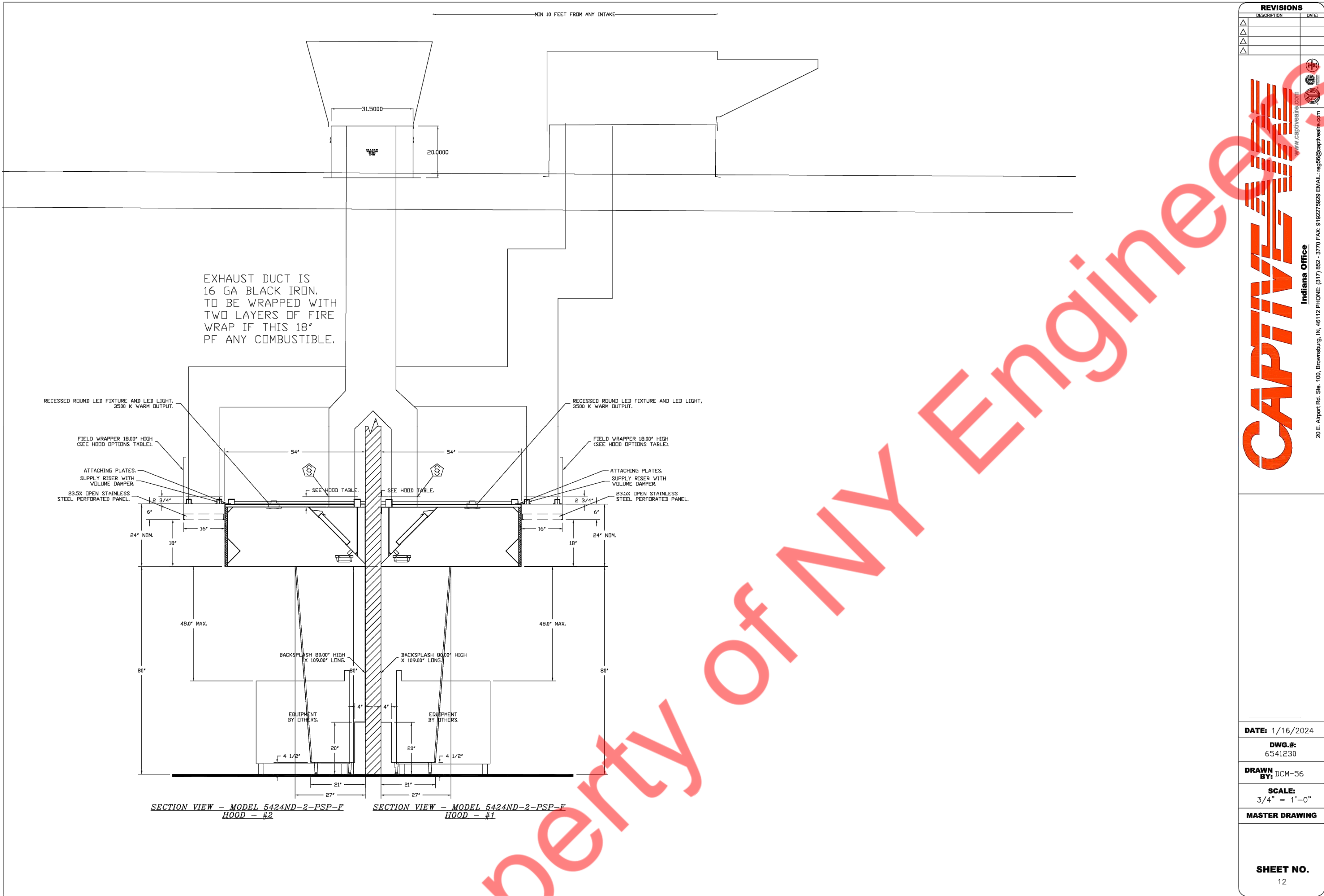
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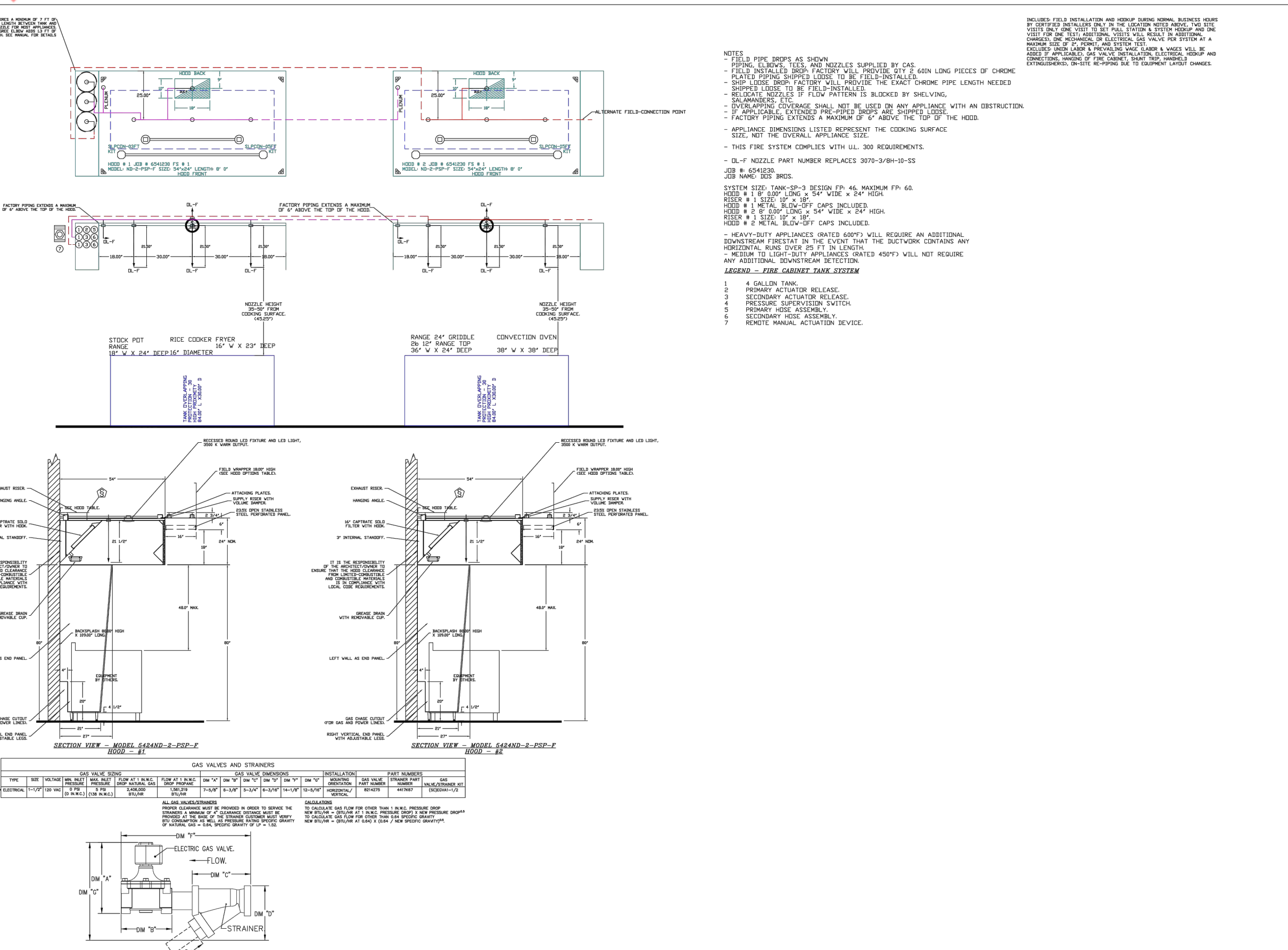
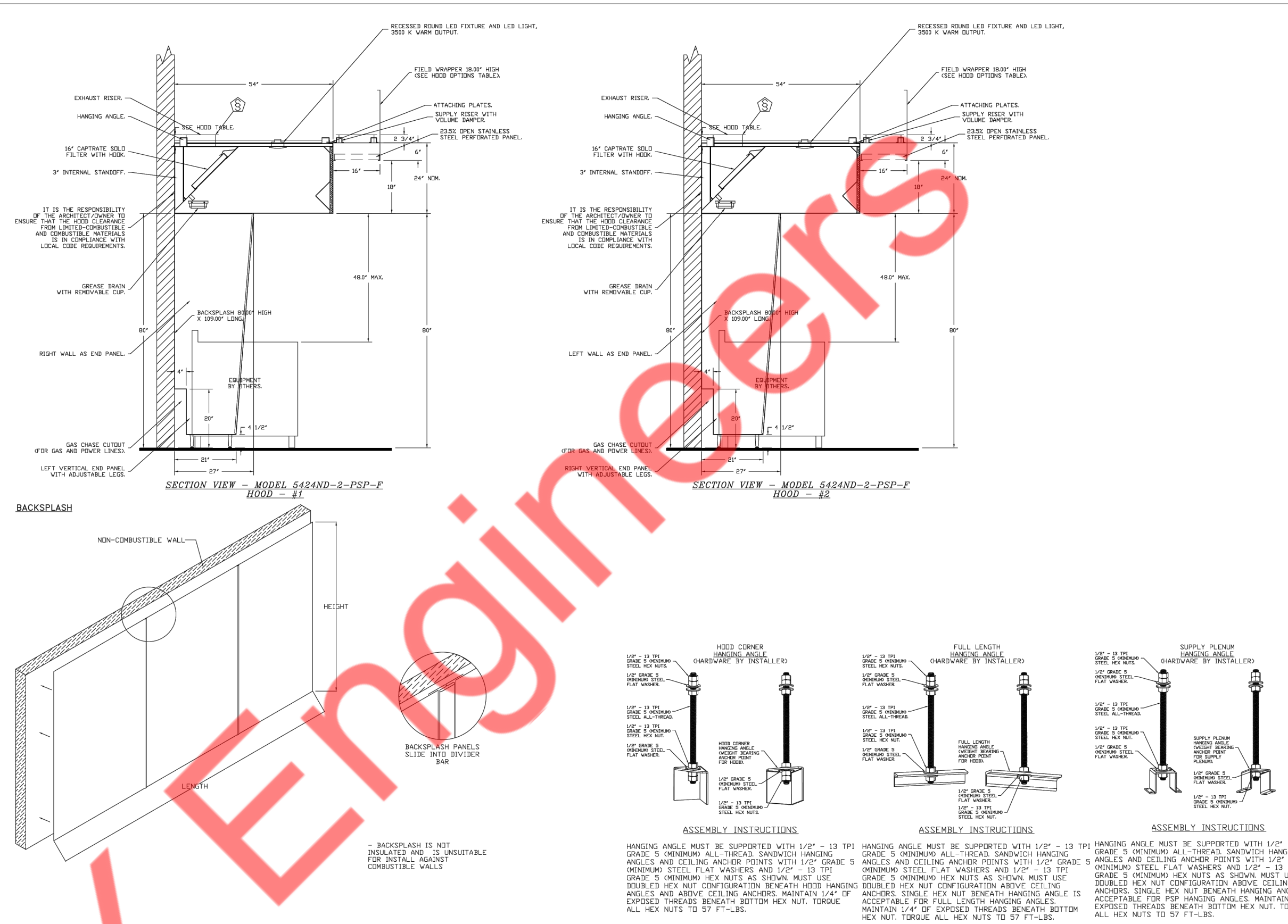
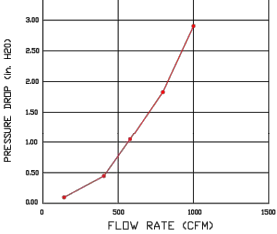
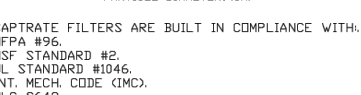
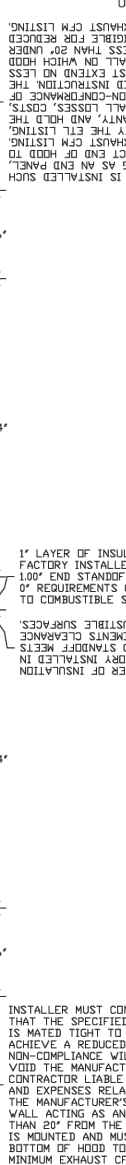
MECHANICAL
ROOF PLAN

M1.1



GENERAL NOTES

- A. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTOR.
- B. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTOR.
- C. ALL ASSOCIATED HANGER MATERIALS BY INSTALLING CONTRACTOR.
- D. ANY LIGHTS SHOWN INSTALLED BY THE MANUFACTURER, AND FACTORY PREWIRED PER THE PLANS. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTOR.
- E. SEISMIC RESTRAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
- F. INSTALLING CONTRACTOR ASSUMES ALL RELATED RESPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.
- G. SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.
- H. NOMINAL HOOD DIMENSIONS AS SHOWN ON DRAWINGS.
- I. THE HOODS INDICATED SHALL BE CAPTIVE-AIRE MODEL ND-2-PSP-F OR APPROVED EQUAL. THE HOOD SHALL BE SINGLE WALL TYPE HOOD WITH BUILT-IN MAKE-UP AIR CAPABILITIES. THE HOOD COMPONENTS SHALL BE FABRICATED OF TYPE 430 STAINLESS STEEL ON ALL EXPOSED SURFACES. THE HOOD SHALL BE PROVIDED WITH HANGING ANGLES ON EACH END OF THE HOOD. NOMINAL HOOD DIMENSIONS SHALL BE AS SHOWN ON DRAWINGS.

[illegible][illegible]

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DEMAND CONTROL VENTILATION HOOD CONTROL PANEL SPECIFICATIONS

CONTROLS SHALL BE LISTED BY ETL, UL, CSA AND SHALL COMPLY WITH DEMAND VENTILATION SYSTEM TURNDOWN REQUIREMENTS OUTLINED IN ICC 403.7.5 (2021).

- THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.
- TEMPERATURE PROBES LOCATED IN THE EXHAUST DUCT RISER/DISK SHALL BE CONSTRUCTED OF STAINLESS STEEL.
- A DIGITAL CONTROLLER SHALL BE PROVIDED TO ACTIVATE THE HOOD EXHAUST FAN DYNAMICALLY BASED ON A FIXED DIFFERENTIAL BETWEEN THE AMBIENT AND DUCT TEMPERATURES SENSORS. THIS FUNCTION SHALL MEET THE REQUIREMENTS OF IMC 501.1.
- A DIGITAL CONTROLLER SHALL PROVIDE ADJUSTABLE HYSTERESIS SETTINGS TO PREVENT CYCLING OF THE FAN AFTER THE COOKING APPLIANCE HAVE BEEN TURNED OFF AND/OR THE HEAT IN THE EXHAUST SYSTEM IS REDUCED.
- A DIGITAL CONTROLLER SHALL PROVIDE AN ADJUSTABLE MINIMUM FAN RUN-TIME SETTING TO PREVENT FAN CYCLING.
- VARIABLE FREQUENCY DRIVES (VFDs) SHALL BE PROVIDED FOR FANS AS REQUIRED. THE DIGITAL CONTROLLER SHALL BE CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY GIVEN TIME:
 - 1. AUTOMATIC: THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR. FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD. DEPENDING ON THE GAS CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC. THESE TERMS REFER TO WHETHER A VARIABLE SPEED MOTOR SUCH AS A LE MOTOR OR VFD DRIVEN MOTOR MODULATE WITH TEMPERATURE. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS "DYNAMIC", THESE VILS MODULATE WITH A USER-DEFINED RANGE BASED ON THE TEMPERATURE DIFFERENTIAL. PANELS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS "STATIC", FANS WILL RUN AT A SET SPEED CALCULATED FOR THE ABOVE DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN ICC 403.7.5 (2021).
 - 2. MANUAL: THE SYSTEM OPERATES BASED ON MANUAL INPUT FROM AN HMI.
 - 3. SCHEDULE: A WEEKLY SCHEDULE CAN BE SET TO RUN FANS FOR A SPECIFIC PERIOD THROUGHOUT THE DAY. THERE ARE THREE OCCURRED TIMES PER DAY TO ALLOW FOR THE USER TO SET UP A TIME THAT IS SUITABLE TO THEIR NEEDS. ANY TIME THAT IS WITHIN THE DEFINED OCCURRED TIME, THE SYSTEM WILL RUN AT MODULATE MODE AND FOLLOW THE FAN SCHEDULE ALGORITHM BASED ON TEMPERATURE DURING THIS TIME. DURING UNOCCURRED TIME, THE SYSTEM SHALL HAVE AN EXHAUST OFFSET TO PREVENT UNWANTED ACTIVATION WHILE BEING IN THE MODULATE MODE. THE SYSTEM SHALL NOT BE REQUIRED TO RUN.
 - 4. STATION: THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (OCC, HWS OR HARD-WIRED INTERLOCK).
 - 5. JUMP: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO RUN. THE HOOD MAKEUP AIR VILS, THROUGHOUT, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE EXHAUST SYSTEM PROVIDED BY THE ELECTRICAL TOOL. GAS WILL SHUT OFF VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.

TYPICAL HOOD CONTROL PANEL INSTALLATION

SEQUENCE OF OPERATIONS:

THE HOOD CONTROL PANEL IS CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY GIVEN TIME:

- 1. AUTOMATIC: THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR. FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD. DEPENDING ON THE GAS CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC. THESE TERMS REFER TO WHETHER A VARIABLE SPEED MOTOR SUCH AS A LE MOTOR OR VFD DRIVEN MOTOR MODULATE WITH TEMPERATURE. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS "DYNAMIC", THESE VILS MODULATE WITH A USER-DEFINED RANGE BASED ON THE TEMPERATURE DIFFERENTIAL. PANELS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS "STATIC", FANS WILL RUN AT A SET SPEED CALCULATED FOR THE ABOVE DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN ICC 403.7.5 (2021).
- 2. MANUAL: THE SYSTEM OPERATES BASED ON MANUAL INPUT FROM AN HMI.
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- 4. STATION: THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (OCC, HWS OR HARD-WIRED INTERLOCK).
- 5. JUMP: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO RUN. THE HOOD MAKEUP AIR VILS, THROUGHOUT, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE EXHAUST SYSTEM PROVIDED BY THE ELECTRICAL TOOL. GAS WILL SHUT OFF VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.

AN LED INTERFACE SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

- SWIFT HIGH BUTTON FN & LIGHT SWITCH ACTIVATION.
- INTEGRATED GAS VALVE RESET FOR ELECTRICAL GAS VALVES AND RESET RELAY REQUIRED.
- VFD PAUSE/RESUME/STOP/RESTART, A VISUAL ALARM NOTIFICATION.
- MECHANICAL GAS VALVE STATUS, A VISUAL ALARM NOTIFICATION.
- MEASURED DUCT TEMPERATURE SENSORS WITH ALARMS & VISUAL ALARM NOTIFICATION.
- A SINGLE LOW VOLTAGE STATUS FLAG WORKING CONDITION.
- AN ENERGY SAVING INDICATOR THAT UTILIZES MEASURED KWH FROM THE VFDs.

DATE: 1/16/2024

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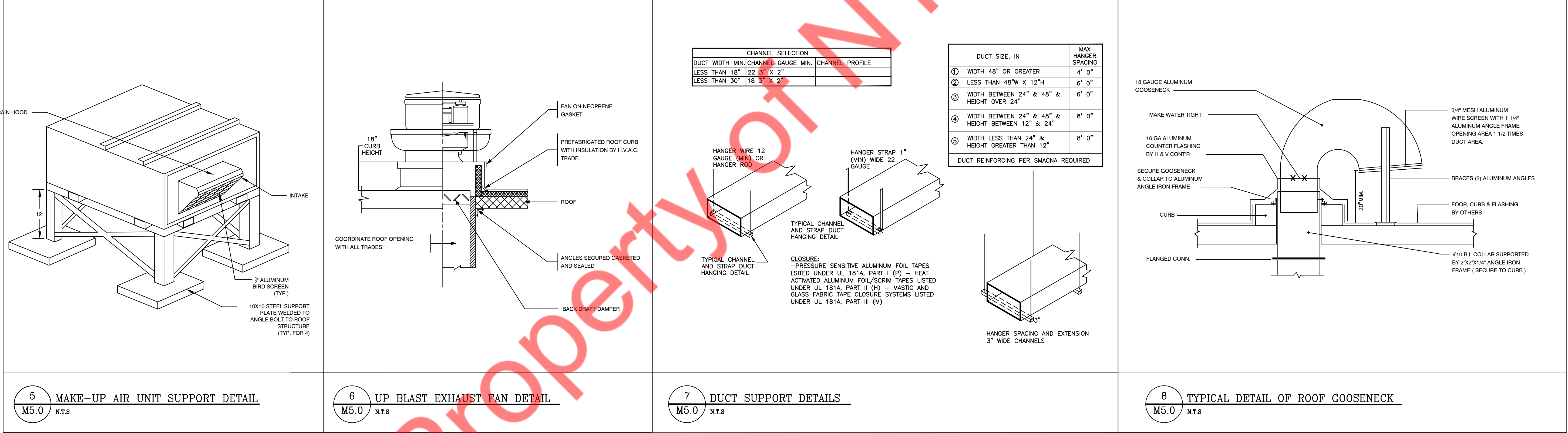
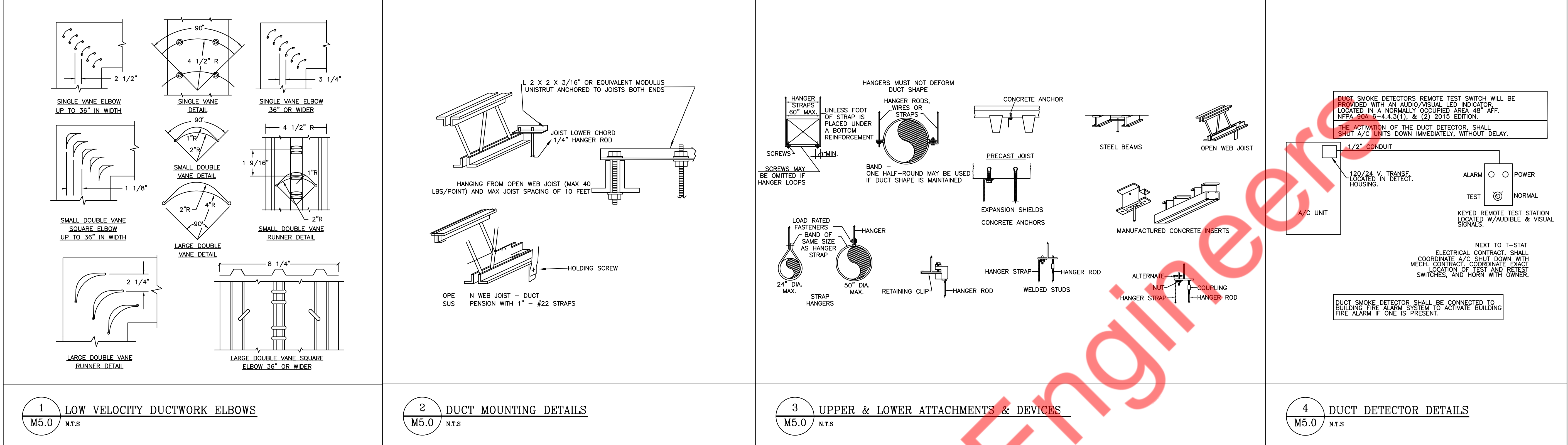
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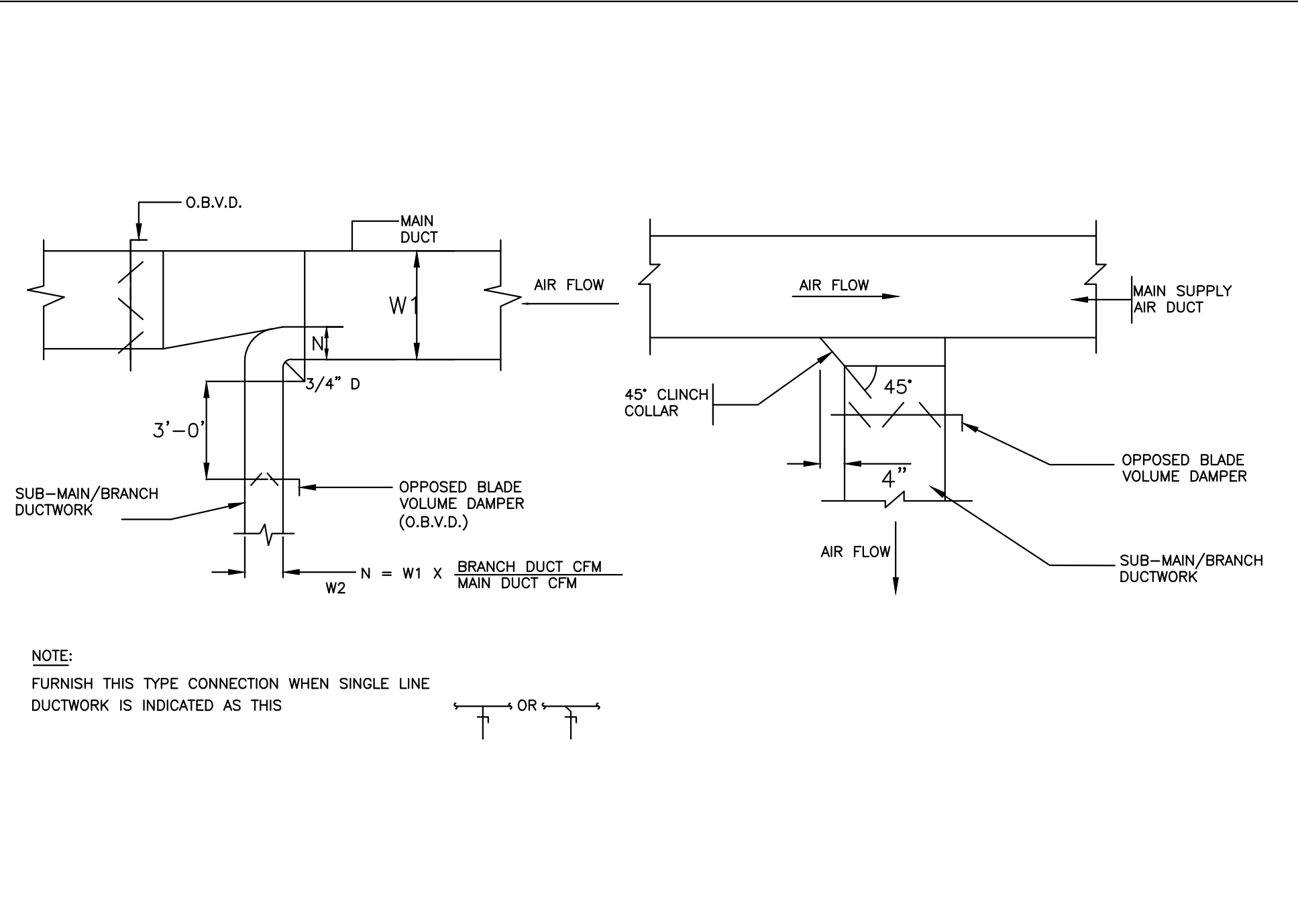
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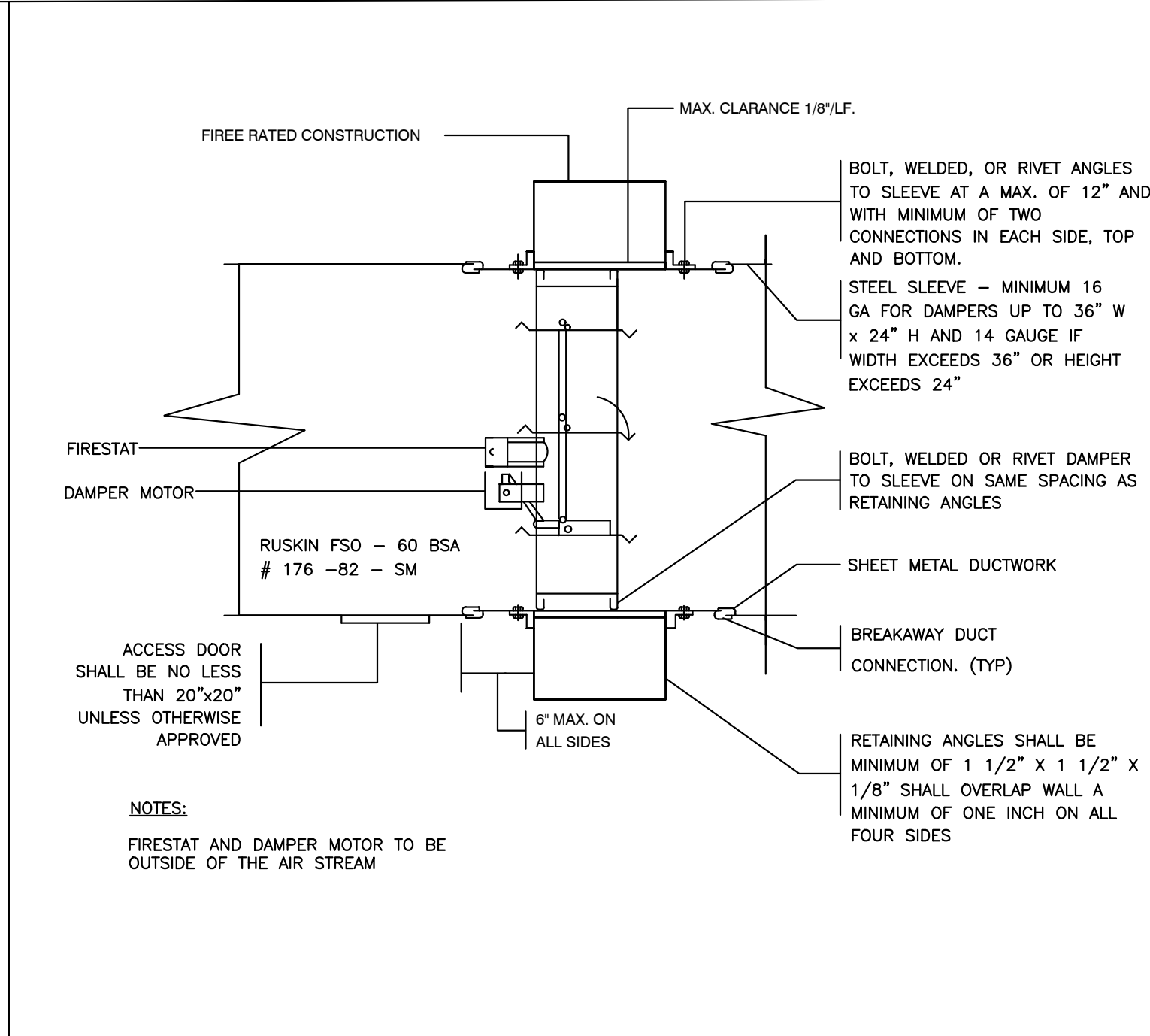
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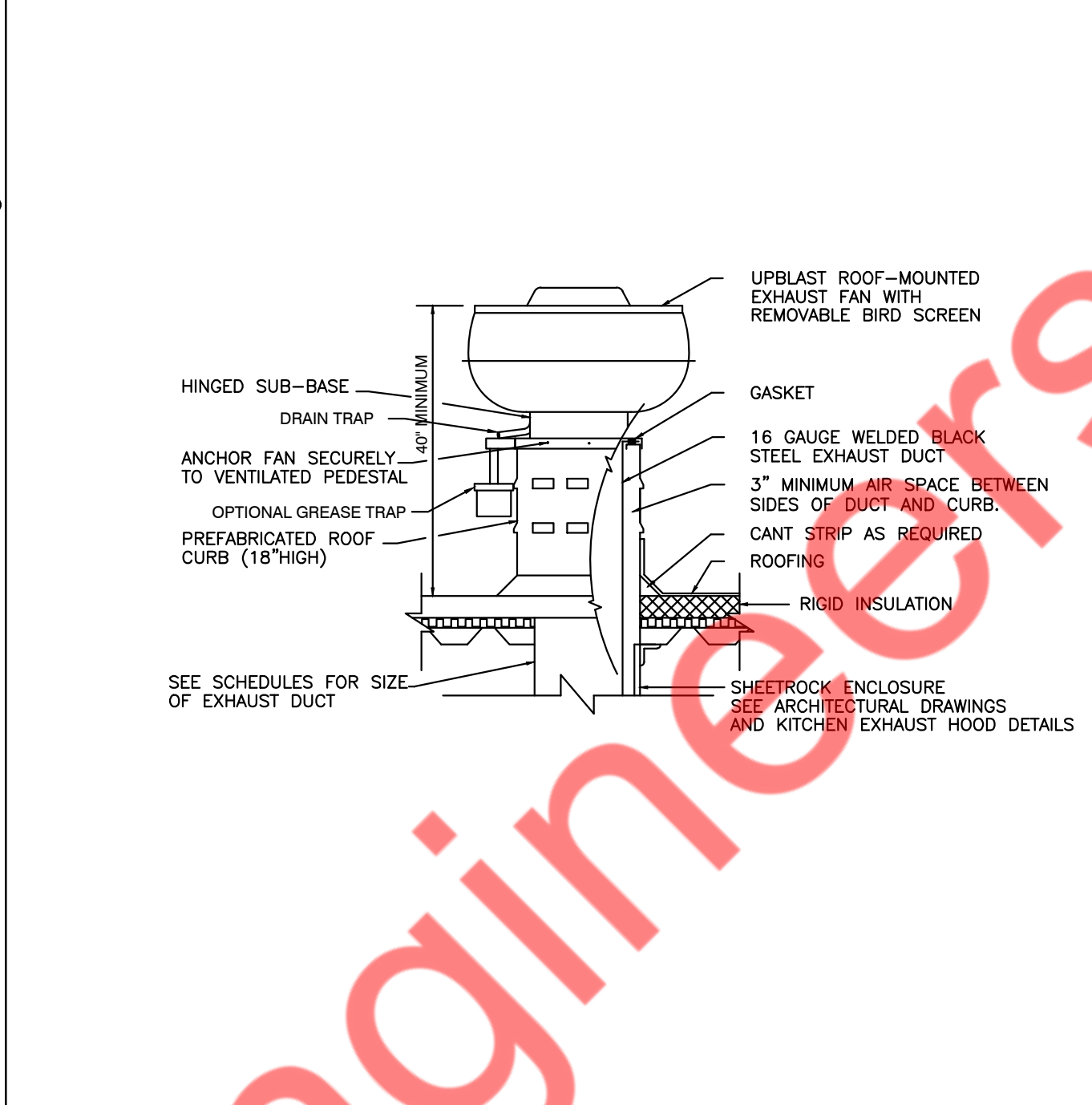
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Date:FEB-28-2024 CHECK SET



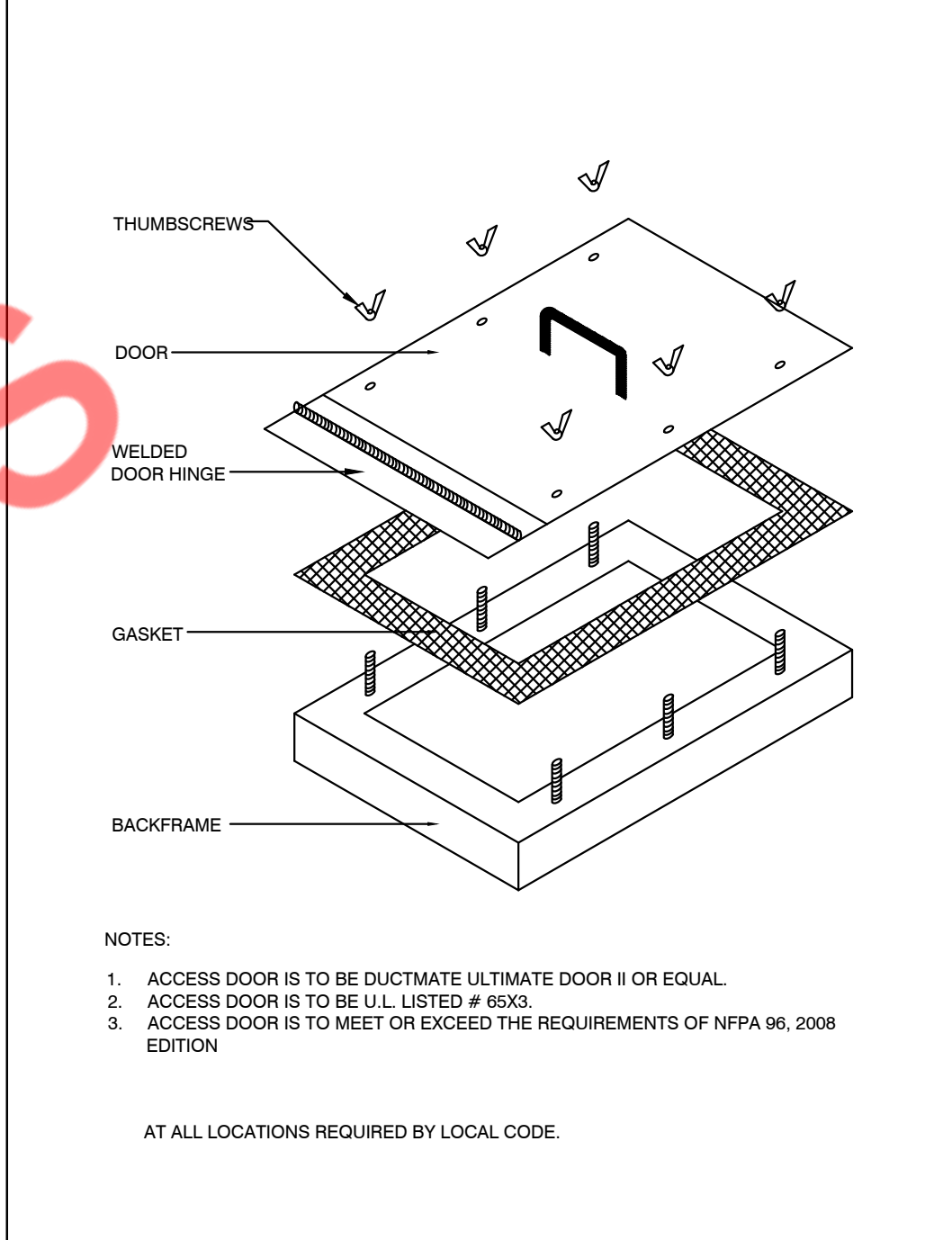
1 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
M5.1 N.T.S



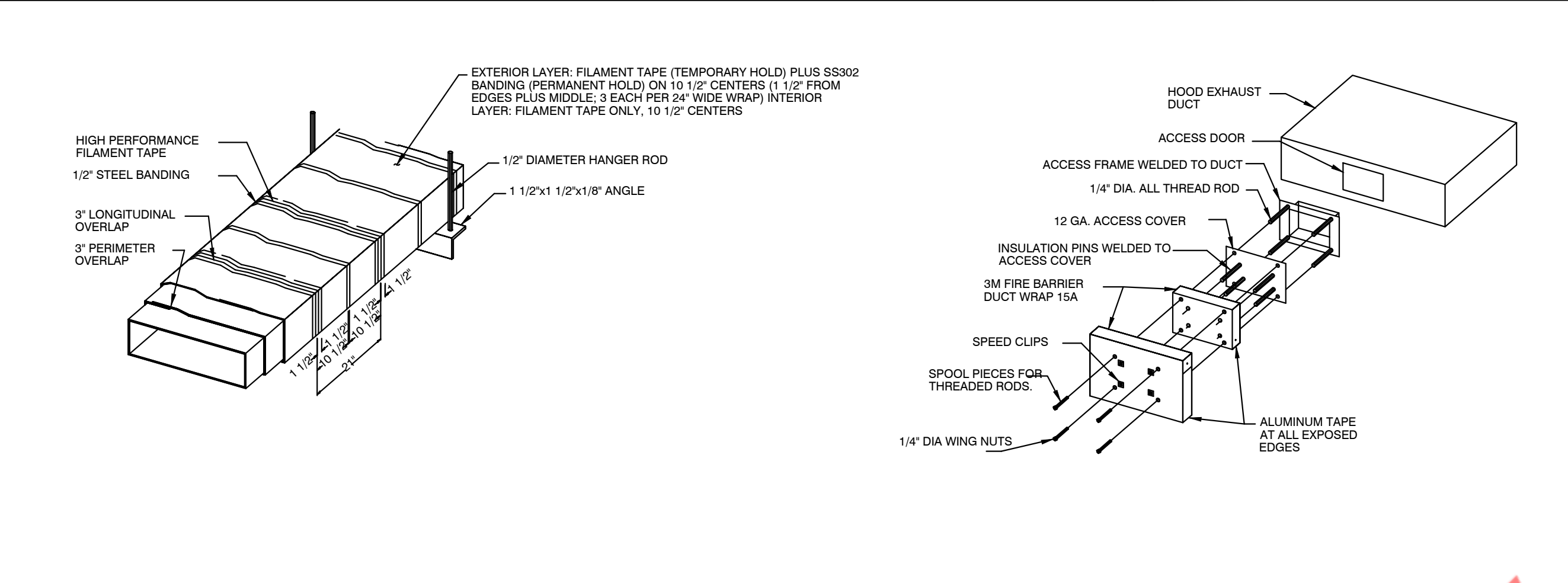
2 COMBINATION FIRE AND SMOKE DAMPER DETAIL
M5.1 N.T.S



3 KITCHEN ROOF EXHAUST FAN DETAIL
M-5.1 N.T.S



4 GREASE DUCT ACCESS DOOR DETAIL
M-5.1 N.T.S



5 GREASE DUCT WRAP DETAIL
M-5.1 N.T.S

MAU SCHEDULE																											
MAKE UP AIR UNIT (FAN) SCHEDULE														MAKE UP AIR UNIT (CONDENSER) SCHEDULE													
UNIT TAG	MUA CFM	ESP (IN W.G.)	TOTAL COOLING CAPACITY (MBH)	HP	ELECT (V/PH)	FLA	MCA	MOCp	MANUF. AND MODEL NO.	WEIGHT (LBS)	SONES	QTY	REMARKS	UNIT TAG	MUA CFM	TONNAGE	SEER	ELECT (V/PH)	RLA	MCA	QTY	INPUT (MBH)	OUTPUT (MBH)	TEMP RISE (DEG F)	INPUT GAS PRESSURE (IN W.C.)	GAS TYPE	BURNER EFFICIENCY (%)
MAU-1(N)	3200	0.575	60	2	208/3	8.3	10.4	15	CAPTIVEAIRE A2-D.500-20D-MPU	1386	12.7	1	END DISCHARGE	MAU-1(N)	3200	5TR	14	208-230/3	17.4	21.4	1	204.3	188.03	55	7-14	NATURAL	92
NOTES:																											
1) UNIT TO BE PROVIDED WITH CLASS 1A LOW LEAKAGE MOTORIZED DAMPER, NEMA 3R DISCONNECT, FAN WITH VFD, VIBRATION ISOLATION SPRING SUPPORTED BLOWER, INTAKE HOOD, SCREEN INTAKE, AND MERV -8 FILTER																											
2) DOUBLE WALL CONSTRUCTION WITH WEATHER PROOF COATING WITH 1 INCH FIBERGLASS INSULATION ALL AROUND THE UNIT																											
3) ALL MISC. ITEMS, MECHANICAL WIRING, CONNECTIONS, SUPPORTS ETC. TO BE PROVIDED BY GC WHICH ARE REQUIRED FOR INSTALLATION.																											
4) INTEGRATION AND CONTROL OF HOODS, KITCHEN EXHAUST FANS AND MAU SHALL BE UNDER KITCHEN VENDOR SCOPE. ALSO SUPPLY AND INSTALLATION OF FIRE SYSTEM SHALL BE DONE BY KITCHEN VENDOR.																											

FAN SCHEDULE																
UNIT ID	MANUFACTURER	HOOD LENGTH	MODEL	CFM	TYPE	DRIVE	FAN RPM	WEIGHT (LBS)	E.S.P. (IN. W.G.)	MOTOR HP	VOLTS	PHASE	FLA	SERVICE	INTERLOCKED WITH	NOTES / ACCESSORIES
EF-1 (N)	CAPTIVEAIRE	16'-0"	DU240HFA	4000	ROOF	DIRECT	941	361	1.75	5	208	3	15.8	KITCHEN	HOOD CONTROL	1,2,3,4,5
NOTES / ACCESSORIES:																
1. REFER HOOD DATA FOR FURTHER DETAILS. 5. AMCA SEAL & UL CERTIFIED																
2. WEATHER PROOF DISCONNECT SWITCH, VARIABLE SPEED CONTROL																
3. SPEED CONTROL SWITCH																
4. THERMAL OVERLOAD PROTECTION																

TYPE I, HOODS										
UNIT ID	MANUFACTURER	LENGTH	MODEL	SERVICE	COOKING	EXHAUST			CONSTRUCTION	WEIGHT
		(FEET-INCH)			TEMPERATURE (DEG F)	AIR (CFM)	PLENUM W X L X H	E.S.P (IN. W.G.)		(LBS)
HOOD-1	CAPTIVEAIRE	8'-0"	5427 ND-2-PSP-F	KITCHEN	600	2000	10" X 18" X 4"	0.968	430 STAINLESS STEEL	900
HOOD-2	CAPTIVEAIRE	8'-0"	5427 ND-2-PSP-F	KITCHEN	600	2000	10" X 18" X 4"	0.968	430 STAINLESS STEEL	900
NOTES / ACCESSORIES:										
1. PROVIDE MANUFACTURER RECOMMENDED ACCESSORIES & INSTALL AS PER MANUFACTURER'S RECOMMENDATION.										
2. REFER HOOD DATA FURTHER DETAILS.										

INDOOR AIR CONDITIONER SCHEDULE															BASIS OF DESIGN: MITSUBISHI			
UNIT TAG	AREA SERVED	TYPE	CAP. (TON)	COOLING MBH	HEATING MBH	TOTAL CFM (MAX.)	MAX. ESP. (IN. WG)	MAX. SOUND PRESS.(DBA)	ELECTRICAL DATA				UNIT DIMENSIONS IN. W x D x H	PIPE SIZE			WEIGHT (LBS.)	MODEL NO.
									PH/VOLT/HZ	MCA (A)	FLA (A)	POWER SUPPLY		LIQ.	SUCTION	DRAIN (ID)		
AC-1	SEE PLAN	DUCTED (MID STATIC)	2.0	24.0	28.0	741	0.28	36	1/208-230/60	2.28	1.82	Indoor unit is powered by the outdoor unit	43-5/16" x 28-7/8" x 9-7/8"	3/8"	5/8"	1-1/4"	67	TPEADA0241AA80A
NOTES:																		
1) SUPPLY AIR CFM BASED ON HIGH SPEED.																		
2) REFRIGERANT R410A SHALL BE PROVIDED.																		
3) PROVIDE MOUNTING BRACKETS AND ALL ASSOCIATED ACCESSORIES.																		
4) PROVIDE FILTER ON ALL RETURNS TO UNIT.																		
5) INDOOR UNIT ACCESS PANEL FIELD-PROVIDED.																		

OUTDOOR CONDENSING UNITS															MAKE: MITSUBISHI		
UNIT TAG	LOCATION	INDOOR UNITS SERVED	CAP.TR	COOLING MBH	HEATING MBH	UNIT DIMENSIONS IN. W x D x H	WEIGHT (LBS)	PIPING DIMENSION		ELECTRICAL			SOUND LEVEL (Dba)	(DUCTED/NON-DUCTED)		MODEL NO.	
								LIQUID-HI PRESSURE	GAS LOW-PRESSURE	(V/Hz/Ph)	MCA	MOP		EER	SEER		HSPF
ACCU-1	ROOF	AC-1	2.0	24.0	28.0	33-1/16" x 13" x 34-5/8"	129	3/8"	5/8"	208-230/60/1	17.0	31	55	12.5	18.0	11.2	NTXSKS24A112AA
NOTES: OUTDOOR UNITS																	
1. UNIT SHALL HAVE TEN YEAR EXTENDED WARRANTY FOR COMPRESSORS/PARTS.																	
2. PROVIDE COMPRESSOR CYCLE PROTECTOR.																	

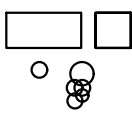


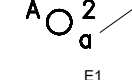
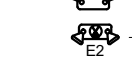
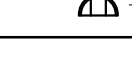
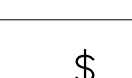





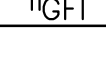






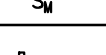
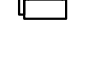



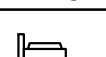
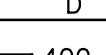
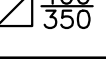

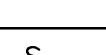
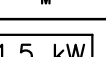
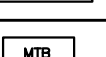
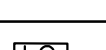
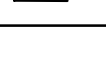

AIR TERMINALS SCHEDULE								
UNIT ID	MANUFACTURER	MODEL	SIZE	DESCRIPTION	CONSTRUCTION	FINISH	QTY (NOS)	REMARKS
CDS	TITUS	PAS	24x24	PERFORATED FACE CEILING DIFFUSER	ALUMINIUM	WHITE	4	1,2,3,4
CDR	TITUS	50FL	24x24	SQUARE FACE CEILING DIFFUSER FOR RETURN	ALUMINIUM	WHITE	1	1,2,3,4,5
NOTES:							NECK SIZES:	
1. MAXIMUM NOISE CRITERION RATING < 35 DBA.							Up To 100 Cfm	- 6" DIA
2. BAKED ENAMEL FINISH, COLOR TO BE SELECTED BY ARCHITECT.							101 To 225 Cfm	- 8" DIA
3. MOUNTING FRAME TYPE SHALL BE COORD. WITH CEILING / WALL CONSTRUCTION TYPE.							226 To 375 Cfm	- 10" DIA
4. NECK SIZE SHALL BE AS SCHEDULED.							376 To 600 Cfm	- 12" DIA
5. DIFFUSERS SHALL BE 4-WAY BLOW UNLESS OTHERWISE INDICATED ON PLANS.							601 To 900 Cfm	- 14" DIA
							901 To 1100 Cfm	- 15" DIA

DOS BROS

MECHANICAL SCHEDULES

M6.0

ELECTRICAL SYMBOLS LIST

LIGHTING		POWER AND TELECOMMUNICATION		ELECTRICAL ABBREVIATIONS				GENERAL NOTES	
      	LIGHTING FIXTURE AND OUTLET BOX. "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.		CEILING MOUNTED JUNCTION BOX	A	AMPERES	EA	EACH	<div>1. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE INDIANA ELECTRICAL CODE 2009 (NFPA 70-2008) WITH ALL LOCAL GOVERNING CODES, LAWS, AND REGULATIONS.</div> <div>2. CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.</div> <div>3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.</div> <div>4. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.</div> <div>5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD), OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED, WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RIGIDLY AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.</div> <div>6. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.</div> <div>7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH MPD DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.</div> <div>8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.</div> <div>9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.</div> <div>10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.</div> <div>11. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.</div> <div>12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.</div> <div>13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CONCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.</div> <div>14. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.</div> <div>15. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.</div> <div>16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.</div> <div>17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECTURE PRIOR TO INSTALLATION.</div> <div>18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.</div> <div>19. ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.</div> <div>20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.</div> <div>21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.</div> <div>22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.</div> <div>23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.</div> <div>24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.</div> <div>25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.</div> <div>26. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.</div> <div>27. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.</div>	
	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.		DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	A/C, AC	AIR CONDITIONING UNIT	EM	EMERGENCY		
	CIRCUIT NUMBER : INDICATED BY NUMBER		DUPLEX FLOOR MOUNTED RECEPTACLE	AF	AMPERE FRAME/AMP FUSE	EMT	ELECTRICAL METALLIC TUBING		
	SWITCHING INDICATED BY LOWER CASE LETTERS.		DUPLEX CEILING MOUNTED RECEPTACLE	AFF	ABOVE FINISHED FLOOR	EQUIP	EQUIPMENT		
	EMERGENCY WALL PACK LIGHT FIXTURE WITH 90 MINUTES BATTERY BACKUP		DUPLEX GFI RECEPTACLE	AS	AMP SWITCH	ER	EXISTING TO BE RELOCATED		
	EMERGENCY WALL PACK LIGHT FIXTURE AND EXIT SIGN WITH 90 MINUTES BATTERY BACKUP		DOUBLE DUPLEX RECEPTACLE	AIC	AMPS INTERRUPTING CAPACITY	FA	FIRE ALARM		
	EXTERIOR EMERGENCY WALL SCONCE WITH INBUILT PHOTOCELL & BATTERY		DUPLEX DEDICATED RECEPTACLE	AT	AMP TRIP	E	EXISTING		
SWITCHES AND CONTROLS			TELEPHONE/DATA OUTLET	ATS	AUTOMATIC TRANSFER SWITCH	FL	FLOOR		
\$	20A SPST TOGGLE SWITCH U.O.N."o" DENOTES LIGHTING FIXTURE/SWITCHED RECEPTACLE CONTROLLED.		DATA OUTLET	AUTO	AUTOMATIC	G	GROUND		
\$o	DIMMER SWITCH.	MOTORS AND CONTROLS		AWG	AMERICAN WIRE GAUGE	GFI	GROUND FAULT INTERRUPTER		
TC	TIME CLOCK.		AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.	C	CONDUIT	GP	GENERAL PURPOSE		
-PC	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.	C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER		
			30A/240V NON FUSED DISCONNECT SWITCH	CKT	CIRCUIT	HHW	HOT WATER HEATER		
			60A/240V NON FUSED DISCONNECT SWITCH	CLG	CEILING	HZ	HERTZ		
			100A/240V NON FUSED DISCONNECT SWITCH	COMM	COMMUNICATION	IC	INTERRUPTING CAPACITY		
			200A/240V NON FUSED DISCONNECT SWITCH	CT	CURRENT TRANSFORMER	PP	POWER PANEL		
			FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.	CU	COPPER	PWR	POWER		
			THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS PER MOTOR RATING.	DIA	DIAMETER	R	REMOVE		
			MANUAL MOTOR SWITCH	DISC	DISCONNECT	RE	RELOCATED EXISTING		
			ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	DN	DOWN	REC	RECEPTACLE		
			METER TERMINAL BOX	DP	DISTRIBUTION PANEL	RGS	RIGID GALVANIZED STEEL		
LC	LIGHTING CONTACTOR	DWG	DRAWING	RR	REMOVE & RELOCATE				
			LIGHTING CONTACTOR	JB	JUNCTION BOX	SECT	SECTION		
			KEYED NOTE REFERENCE	KCMIL	ONE THOUSAND CIRCULAR MILS	SPDT	SINGLE POLE DOUBLE THROW		
		+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	KV	KILOVOLT	SPST	SINGLE POLE SINGLE THROW		
			DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM	KVA	KILOVOLT--AMPERES	SPEC	SPECIFICATION		
		ANNOTATION		KW	KILOWATTS	SW	SWITCH		
			KEYED NOTE REFERENCE	LTC	LIGHTING	SWBD	SWITCHBOARD		
		+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	MAX	MAXIMUM	SYM	SYMMETRICAL		
			DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM	MC	MOTOR CONTROLLER	SYS	SYSTEMS		
		POWER DISTRIBUTION		MCB	MAIN CIRCUIT BREAKER	TELE	TELEPHONE		
			DISTRIBUTION PANELBOARD, 208V/120V--SURFACE OR FLUSH MOUNTED.	MLO	MAIN LUGS ONLY	TEMP	TEMPERATURE		
			MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND AMPERAGE AS NOTED.	MTD	MOUNTED	TXF	TOILET EXHAUST FAN		
				MTS	MANUAL TRANSFER SWITCH	TYP	TYPICAL		
				N	NEUTRAL	UON	UNLESS OTHERWISE NOTED		
				NIC	NOT IN CONTRACT	V	VOLT/VOLTAGE		
				NTS	NOT TO SCALE	VA	VOLT AMPERE		
				PNL	PANEL	WP	WEATHER PROOF		
				W	WATT	ø	PHASE		
				ELECTRICAL DRAWING LIST					
				E0.1	ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES				
				E0.2	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2				
				E0.3	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2				
				E1.0	FIRST FLOOR ELECTRICAL LIGHTING PLAN				
				E2.0	FIRST FLOOR ELECTRICAL POWER PLAN				
				E2.1	ELECTRICAL ROOF POWER PLAN				
				E3.0	ELECTRICAL RISER DIAGRAM				
				E3.1	ELECTRICAL PANEL SCHEDULES				
				E4.0	ELECTRICAL SITE PLAN				

DOS BROS

ELECTRICAL
SYMBOL LIST.
ABBREVIATIONS
& GENERAL
NOTES

E0.1

Date: FEB 2024

Revision:

Date:FEB-28-2024 CHECK SET

ELECTRICAL SPECIFICATIONS

1. GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- E. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- F. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- G. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- H. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- I. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- J. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- K. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- L. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.

2. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. DEFINITIONS:

- 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE, AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

C. QUALITY ASSURANCE

- 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.

3) CURRENT CHARACTERISTICS:

- a. SERVICE: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
- b. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

4) HEIGHTS OF OUTLETS:

- a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
- RECEPTACLES AND TELEPHONES: 1 FT–6 IN.
 - WALL SWITCHES: 4 FT–0 IN.

- WALL SWITCHES: 4 FT–0 IN.
- WALL FIXTURES: 7 FT–0 IN.
- MOTOR CONTROLLERS: 5 FT–0 IN.
- CLOCKS: 7 FT 6 IN

- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

D. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.

- 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

E. MATERIALS

- 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.

- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS:

- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
- MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.

- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.

- c. GROUPED LINES AND SERVICES: TRAPEZIE HANGERS OF BOLTED ANGLES OR CHANNELS.

- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRIED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECTURE.

- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECTURE PRIOR TO INSTALLATION.

3. SCOPE OF WORK:

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE INDIANA ELECTRICAL CODE (2009 (NFPA 70–2008)) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.

- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.

- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY A THORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE FLORIDA BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

- F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.

4. SHOP DRAWINGS

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

- 1) PROJECT NAME AND LOCATION
- 2) NAME OF ARCHITECT AND ENGINEER
- 3) ITEM IDENTIFICATION
- 4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

- 1) SAFETY/DISCONNECT SWITCHES
- 2) FUSES
- 3) CIRCUIT BREAKERS
- 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
- 5) RACEWAYS
- 6) WIRE AND CABLE
- 7) WALL SWITCHES
- 8) INSERTION RECEPTACLES
- 9) MOMENTARY CONTACT SWITCHES
- 10) TIME SWITCHES
- 11) LIGHTING FIXTURES.

- E. ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE. CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWINGS. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.

5. AS–BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8–1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

- D. REPRODUCIBLE "AS–BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS–BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

6. LOW–VOLTAGE DISTRIBUTION EQUIPMENT:

- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.

- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED. LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO–POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE–POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE–BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK–MAKE– QUICK–BREAK, UL CLASS R UP TO 600 AMP, MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

7. FUSES:

- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW–PEAK DUAL–ELEMENT TIME–DELAY LPN–RK (AMP)SP (250V) /LPS–RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

- B. MOTOR CIRCUITS – ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW–PEAK DUAL–ELEMENT TIME–DELAY LPN–RK (AMP)SP (250V) /LPS–RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.

- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL–MAGNETIC, QUICK–MAKE–QUICK–BREAK, BOLT–ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP–FREE HANDLE. MULTI–POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT–TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

- 1) 120 VOLTS, 100–AMP FRAME: 10,000* AMPS, 1 POLE.

- 2) 120/240 VOLTS, 225–AMP FRAME: 22,000* AMPS MINIMUM AIC RATING SHALL BE COORDINATED WITH UTILITY COMPANY. BASE BID ACCORDINGLY.

8. DISTRIBUTION PANELBOARDS, CIRCUIT BREAKER TYPE:

- A. THREE PHASE, 4 OR 5 WIRE, COPPER BUS BARS, WITH 2, 3, OR 4 WIRE BRANCHES, AS NOTED. CAPACITY OF PANEL AND CIRCUITS, AS NOTED BELOW. PANELBOARD TO HAVE GROUND BUS SAME SIZE AS PHASE BUSES.

- B. CABINETS: CODE GAUGE GALVANIZED SHEET STEEL PRIMED AND PAINTED WITH TRIM AND DOOR, TYPE AS NOTED, LAP AND RIVET CORNERS OR FORM AS APPROVED.

- C. TRIM: ONE PIECE FULL FINISH PRIMED AND PAINTED SHEET STEEL. TRIM SHALL BE MOUNTED WITH A CONTINUOUS PIANO HINGE CONFIGURED IN SUCH A MANNER THAT IT SHALL BE POSSIBLE TO GAIN FULL ACCESS TO CIRCUIT BREAKERS AND WIRING GUTTERS WITHOUT REMOVING THE TRIM. PROVIDE A MULTI–PIN CYLINDER LOCK (YALE, CORBIN OR EQUAL) TO LATCH THE TRIM. KEYS SHALL BE MILLED.

- D. HARDWARE: MULTI–PIN, CYLINDER LOCKS WITH MILLED KEYS. ALL PANELS SHALL BE KEYED ALIKE. DOOR OVER 48” HIGH SHALL BE EQUIPPED WITH A CHROME PLATED VAULT HANDLE, BUILT–IN LOCK AND 3–POINT CATCH FASTENING DOOR AT TOP, BOTTOM AND CENTER.

- E. HINGES: CONCEALED, CONTINUOUS PIANO HINGE AS DESCRIBED ABOVE.

- F. DIRECTORY HOLDER: MEAL FRAME WITH NONBREAKABLE, TRANSPARENT COVER AND DIRECTORY CARD. ENTRIES TO BE TYPEWRITTEN BY ELECTRICAL CONTRACTOR. PROVIDE AN ENGRAVED LAMINATED NAMEPLATE ADJACENT TO EACH BRANCH BREAKER. MOUNT WITH SELF TAPPING MACHINE SCREWS.

- G. FURNISH MULTI–CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING NOT PERMITTED. SECURE LUGS TO BUS BY STUD BOLTS.

- H. PANELBOARD CONSTRUCTION FOR BOLTED TYPE BREAKERS. MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, RMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. INDIVIDUAL CIRCUIT BREAKERS SHALL HAVE MINIMUM 100A FRAME, TRIPS SIZED AS SHOW ON THE PLANS.

- I. MINIMUM GUTTER SPACES: PANELS WITH 225 AMPERE MAINS, 5–¼” MINIMUM, 400 AMPERES AND OVER, MINIMUM GUTTERS 8”. FOR PANELS WITH THROUGH FEEDERS, INCREASE GUTTER WIDTH BY 2” MINIMUM AND PROVIDE A SHEET STEEL BARRIER BETWEEN THE PANEL GUTTER AND THE THROUGH FEEDER PORTION OF THE BACK BOX. BRANCH CIRCUIT BREAKERS SHALL BE MECHANICALLY INTERLOCKED WHEN SHOWN ON DRAWINGS.

- J. DISTRIBUTION AND SUB–DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30” WIDE AND 10” DEEP.

- K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.

- L. PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).

9. DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:

- A. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
- B. NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD–LOCKABLE.

- C. PANELBOARD SHALL BE CONSTRUCTED OF CODE–CAUSE STEEL, GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.

- D. ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORE).

- E. DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.

F. DISCONNECTS

- 1) DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.

- 2) SWITCHING MECHANISM SHALL BE QUICK–MAKE, QUICK–BREAK, SINGLE THROW WITH EXTERNAL OPERATING MECHANICALLY INTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO INTERIOR WHEN DISCONNECT IS IN OFF POSITION ONLY. PROVIDE MEANS TO LOCK OPERATING HANDLE IN THE OPEN AND CLOSED POSITION. DESIGNATE ON THE ENCLOSURE THE OPEN AND CLOSED POSITION OF THE OPERATING HANDLE.

- 3) SWITCHES SHALL BE OF THE DOUBLE STATIONARY CONTACT TYPE.

- 4) SWITCHES SHALL BE EQUIPPED WITH REJECTION TYPE FUSE HOLDERS, FUSIBLE AS SHOWN ON THE DRAWINGS; PROVIDE COMPLETE WITH FUSES AS SCHEDULED.

G. INSTALLATION

- 1) DISTRIBUTION PANELBOARD SHALL BE MOUNTED TO STRUCTURAL STEEL CHANNEL (KINDORF) WHICH SHALL BE BOLTED TO THE WALL USING EXPANSION ANCHORS FOR LARGE PANELS.

DOS BROS

ELECTRICAL
SPECIFICATIONS
1 OF 2

E0.2

ELECTRICAL SPECIFICATIONS (CONT.)

H. IDENTIFICATION

- 1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.
- 2) NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF ¼" HIGH WHITE LETTERING.

I. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.

J. POWER PANELBOARDS SHALL BE SIMILAR TO GENERAL ELECTRIC TYPE "OMR", AS MANUFACTURED BY ATLAS SWITCH COMPANY, ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.

K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.

L. PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).

M. MATERIALS

1) RACEWAYS:

- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
- b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
- d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

2) FITTINGS AND ACCESSORIES:

- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
- d. BUSHINGS: METALLIC INSULATED TYPE.

3) BOXES:

- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED, WITHOUT FIXTURE OR DEVICE. FURNISH BLANK COVER, OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED, RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

N. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK, NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL

WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

O. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

P. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

Q. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

R. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.

S. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

10. WIRE AND CABLE:

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).

E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.

F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM:
BLACK FOR A PHASE
RED FOR B PHASE
BLUE FOR C PHASE

1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING.

COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

11. WIRING DEVICES:

A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).

C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION, GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.

1) SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).

2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT,

D. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.

E. COLORS: COORDINATE COLORS WITH ARCHITECT.

F. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

12. LIGHTING FIXTURES:

A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

C. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.

D. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.

E. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED. AC POWERED WITH BATTERY OF 90 MINUTES RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

DOS BROS

ELECTRICAL
SPECIFICATIONS
2 OF 2

E0.3

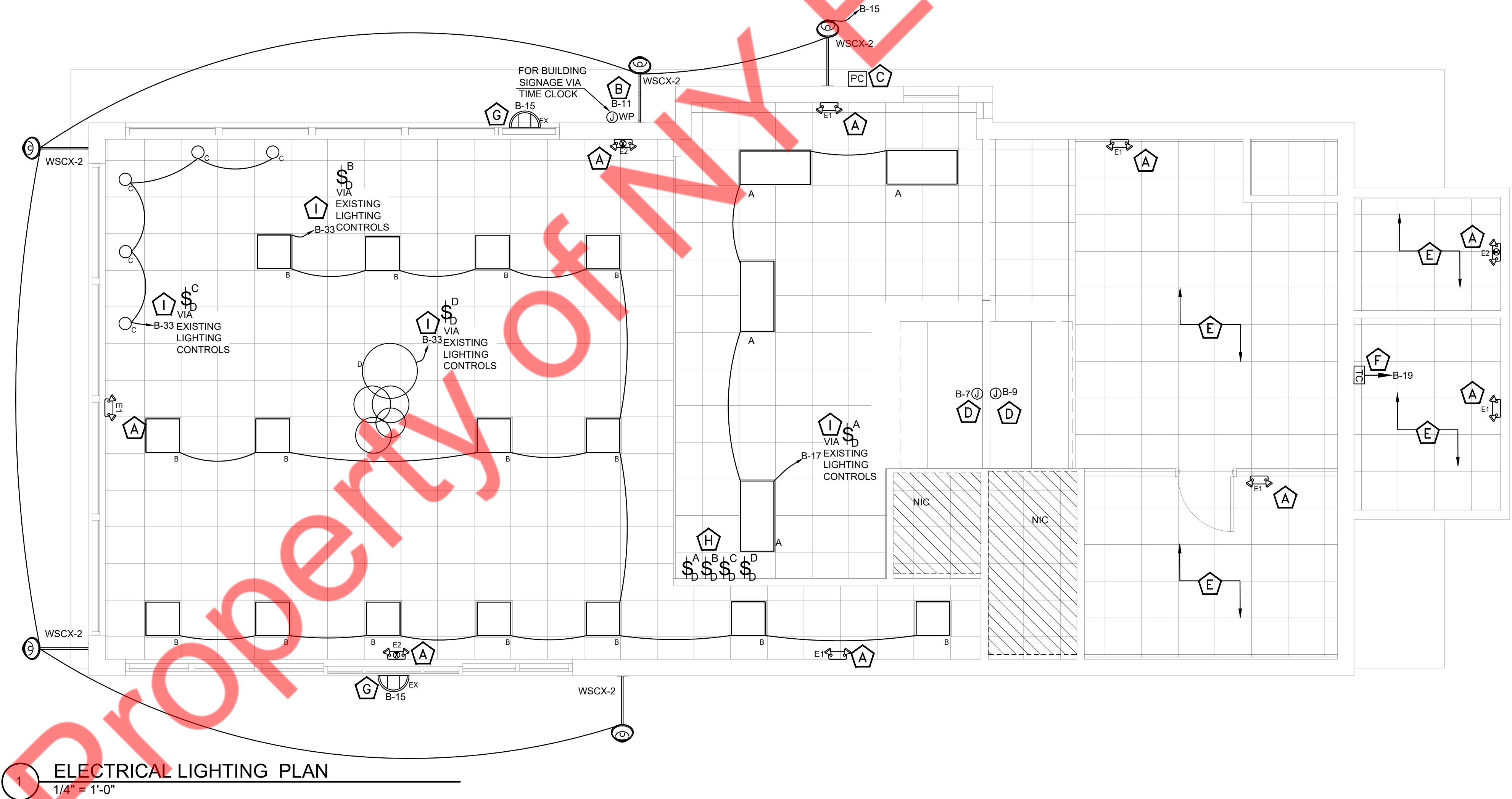
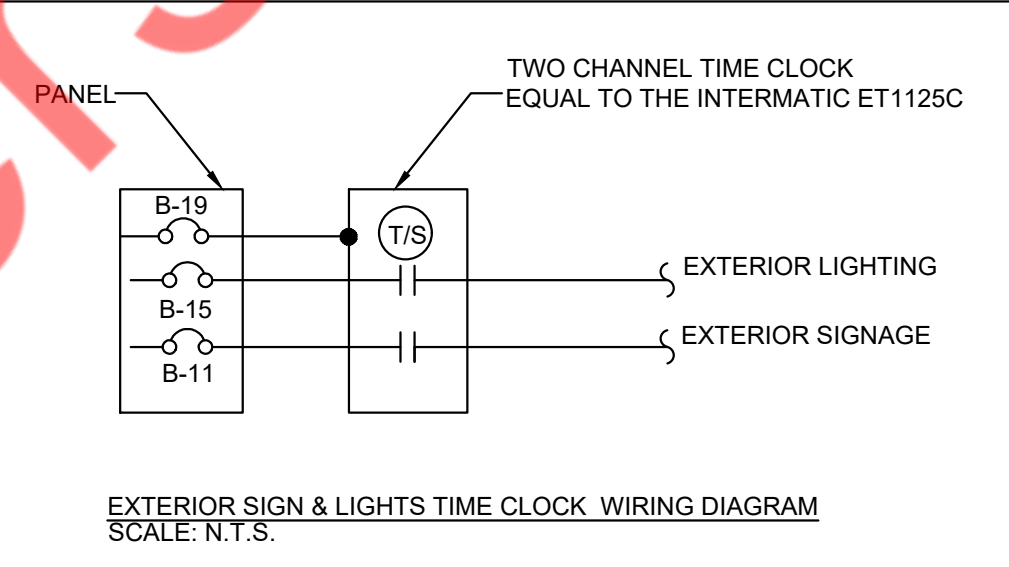
LIGHTING FIXTURE SCHEDULE						
SR.NO.	SYMBOL	LABEL	DESCRIPTION	MANUFACTURER	CATALOGUE NUMBER	WATTS
1		A	2X4 LED TROFFER, LENGTH 48", 4000K, DIMMABLE VIA 0-10V	COOPER	24AC-LD3-48-UNV-L840-CD1-U	48
2		B	2X2 LED TROFFER, LENGTH 48", 4000K, DIMMABLE VIA 0-10V	COOPER	24AC-LD3-34-UNV-L840-CD1-U	39
3		C	MILCA MINI PENDANT	LIGHTOLOGY	KZC813283	7
4		D	SATURN II 4 LIGHT PENDANT	LIGHTOLOGY	ET2503913	83
5		E1	WALL MOUNTED EMERGENCY LIGHT	TBD	TBD	TBD
6		E2	WALL MOUNTED EMERGENCY LIGHT WITH EXIT SIGN	TBD	TBD	TBD
7		EX	EMERGENCY WALL SCONCE	LITHONIA	WDGE3 LED E20WC PE	18
8		WSCX-2	EXTERIOR LIGHT FIXTURE	HI-LITE MFG INC.	H-HDMR16/18-1-119/MR15AD1C293010T-10-S1	10

ELECTRICAL LIGHTING PLAN GENERAL NOTES

- REFER TO DWG. E-0.1 FOR ELECTRICAL PLAN NOTES & SYMBOL LIST.
- ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATION AND MOUNTING HEIGHTS OF FIXTURES WITH ARCHITECT.
- LIGHTING FIXTURES LAYOUT TO BE COORDINATED AS PER ARCHITECTURAL DRAWINGS.

ELECTRICAL LIGHTING PLAN KEYED WORK NOTES

- A** CONNECT ALL EMERGENCY EGRESS LIGHTING FIXTURES TO THE NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
- B** E.C. TO COORDINATE THE BUILDING SIGNAGE CONNECTION REQUIREMENTS WITH SIGN VENDOR. BASE BID ACCORDINGLY. PROVIDE POWER TO WEATHER PROOF JUNCTION BOX AND TOGGLE SWITCH FOR TENANT SIGN VIA TIMECLOCK/PHOTOCELL. COORDINATE EXACT MOUNTING LOCATION WITH SIGN VENDOR PRIOR TO ROUGH-IN. BASE BID ACCORDINGLY.
- C** E.C. SHALL CONNECT THE EXTERIOR LIGHTING CIRCUIT VIA TIMECLOCK/PHOTOCELL. COORDINATE EXACT LOCATION OF PHOTOCELL WITH ARCHITECT/OWNER.
- D** ELECTRICAL CONTRACTOR SHALL PROVIDE POWER CONNECTIONS TO THE HOOD LIGHTING. BASE BID ACCORDINGLY.
- E** EXISTING LIGHT FIXTURES AND THEIR LIGHTING CONTROLS IN THIS AREA TO REMAIN CONNECTED TO THE RESPECTIVE EXISTING PANEL ALONGWITH THEIR CONTROLS. E.C. TO FIELD VERIFY THE OPERABLE CONDITION OF EXISTING CONTROLS, BRANCH CIRCUITS. PROVIDE NEW IF FOUND INOPERABLE.
- F** ELECTRICAL CONTRACTOR SHALL PROVIDE TIME CLOCK. ALL THE EXTERIOR LIGHT FIXTURES SHALL BE CONTROLLED VIA PHOTOCELL/TIMER. COORDINATE EXACT CONTROL REQUIREMENTS WITH LIGHTING VENDOR AND PROVIDE AUTOMATIC LIGHTING CONTROLS. BASE BID ACCORDINGLY. COORDINATE EXACT LOCATION OF TIMECLOCK WITH OWNER ON FIELD.
- G** ELECTRICAL CONTRACTOR SHALL CONNECT THE EMERGENCY EXTERIOR LIGHT TO THE NEAREST EXTERIOR LIGHTING CIRCUIT. COORDINATE EXACT LOCATION OF LIGHT FIXTURE WITH THE ARCHITECT/OWNER.
- H** ELECTRICAL CONTRACTOR SHALL COORDINATE AND PROVIDE EXACT TYPE AND MODEL AS PER THE SITE CONDITION. ALSO COORDINATE WITH ARCHITECT/OWNER FOR FINAL LOCATION. BASE BID ACCORDINGLY.
- I** CONTRACTOR SHALL VERIFY THE EXISTING TIMER LIGHTING CONTROLS AND PROVIDE NEW CONTROLS IF EXISTING CONTROLS ARE INOPERABLE. NEW CONTROLS SHALL BE IN LINE WITH THE EXISTING CONTROLS TYPE AVAILABLE IN THE TENANT SPACE. BASE BID ACCORDINGLY.



Date: FEB 2024
Revision:
Date:FEB-28-2024 CHECK SET

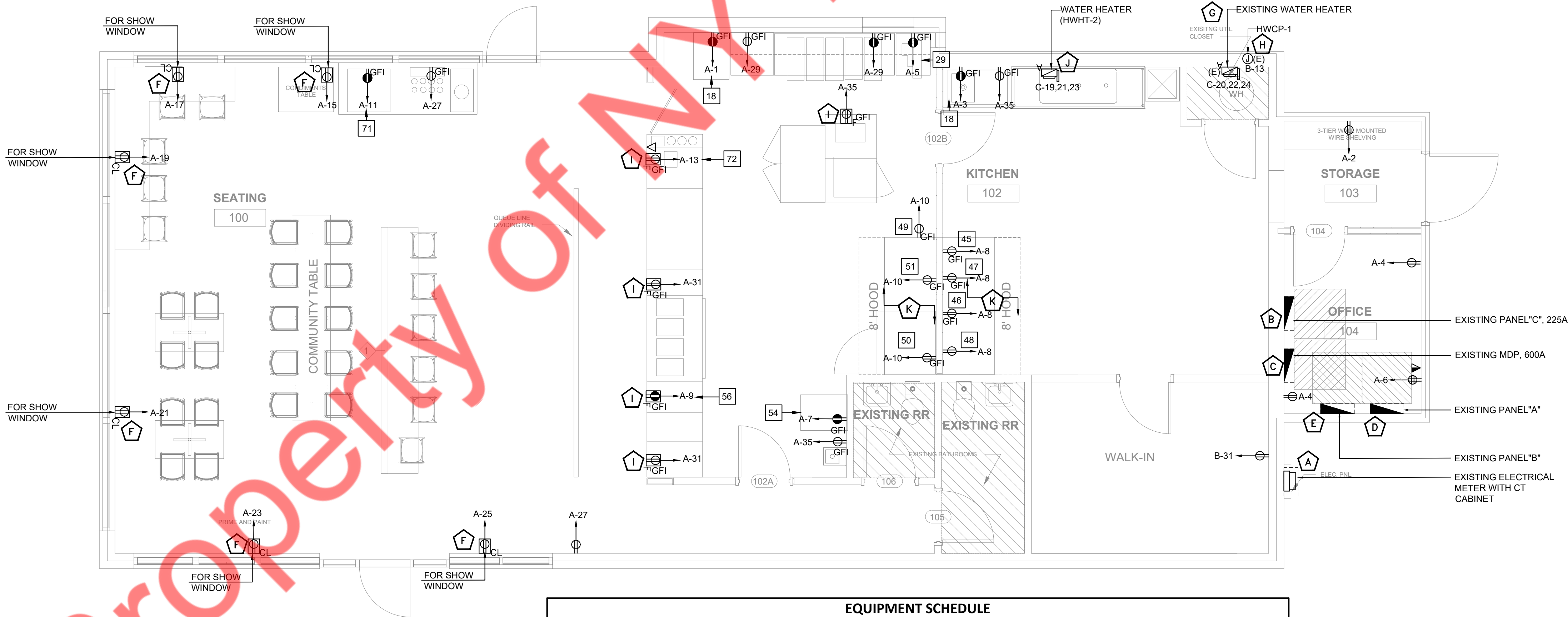
FIRST FLOOR
ELECTRICAL
LIGHTING PLAN

POWER PLAN GENERAL NOTES:

1. REFER TO SHEET E-0.1 FOR ELECTRICAL PLAN NOTES & SYMBOL LIST.
2. E.C. SHALL COORDINATE WITH OTHER TRADE CONTRACTORS FOR EXACT LOCATION AND POWER REQUIREMENT OF THE EQUIPMENT FROM OTHER TRADES. PROVIDE WIRING AND CONTROLS AS REQUIRED (IF NOT PROVIDED BY THEM), PRIOR TO BID. BASE BID ACCORDINGLY.
3. ELECTRICAL CONTRACTOR SHALL VERIFY EXACT POWER AND CONNECTION REQUIREMENT WITH THE MANUFACTURER PRIOR TO ROUGH IN. BASE BID ACCORDINGLY.
4. ALL THE CIRCUITS SUPPLYING KITCHEN EQUIPMENT AND SHOWN "GFI" ON POWER PLAN SHALL BE PROTECTED EITHER AT A PANEL WITH GFI RATED BREAKER OR RECEPTACLE WITH GFI AS PER NEC 210.8. IF GFI RECEPTACLES ARE USED, CONTRACTOR SHALL LOCATE THE GFI RECEPTACLES SUCH THAT THESE ARE READILY ACCESSIBLE PER CODE.
5. ALL THE RECEPTACLES SHALL BE RATED PER CIRCUIT. E.C. SHALL VERIFY AND MAKE FINAL CONNECTIONS ACCORDINGLY.
6. ELECTRICAL CONTRACTOR SHALL PROVIDE GFCI PROTECTION FOR ALL THE FLOOR OUTLETS AS PER NEC ARTICLE.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE TYPED PANEL DIRECTORY FOR ALL THE ELECTRICAL PANELS AS PER NEC 408.4(A)
8. REFER TO SHEET E-3.0 FOR ELECTRICAL RISER DIAGRAM AND SHEET E-3.1 FOR ELECTRICAL PANEL SCHEDULE.

POWER PLAN KEYED WORK NOTES:

- A** EXISTING 600A 120/208V, 3-PHASE, 4-WIRE ELECTRICAL METER AND CT CABINET TO REMAIN. E.C. SHALL COORDINATE WITH LANDLORD/OWNER/UTILITY COMPANY FOR EXACT LOCATION IN FIELD. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING METER IN FIELD. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES.
- B** EXISTING 600A, 120/208V, 3-PHASE, 4-WIRE PANEL "MDP" TO REMAIN. E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL "MDP" AND REPLACE OR RECTIFY THE BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
- C** EXISTING 225A, 120/208V, 3-PHASE, 4-WIRE PANEL "C" TO REMAIN. E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL "C" AND REPLACE OR RECTIFY THE BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
- D** EXISTING 225A, 120/208V, 3-PHASE, 4-WIRE PANEL "A" TO REMAIN. E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL "A" AND REPLACE OR RECTIFY THE BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
- E** EXISTING 225A, 120/208V, 3-PHASE, 4-WIRE PANEL "B" TO REMAIN. E.C. SHALL COORDINATE WITH LANDLORD/OWNER FOR EXACT LOCATION. E.C. TO VERIFY THE OPERABLE CONDITION OF THE EXISTING PANEL "B" AND REPLACE OR RECTIFY THE BREAKERS AS SHOWN PER PANEL SCHEDULE. BASE BID ACCORDINGLY.
- F** PROVIDE SHOW WINDOW RECEPTACLE AS PER NEC 210.62. VERIFY EXACT LOCATION WITH ARCHITECT/OWNER.
- G** EXISTING ELECTRICAL SUPPLY FOR THE WATER HEATER (WH-1) SHALL REMAIN. VERIFY THE CONDITION OF EXISTING DISCONNECT. PROVIDE NEW DISCONNECT IF INOPERABLE. E.C. SHALL COORDINATE WITH PLUMBING CONTRACTOR FOR THE EXACT POWER REQUIREMENTS. BASE BID ACCORDINGLY.
- H** EXISTING ELECTRICAL SUPPLY FOR RECIRCULATION PUMP (HWCP-1) SHALL REMAIN. PROVIDE NEW CONNECTION IF EXISTING IS IN OPERABLE. E.C. SHALL COORDINATE WITH THE PLUMBING CONTRACTOR FOR THE EXACT POWER REQUIREMENTS. BASE BID ACCORDINGLY.
- I** E.C. SHALL PROVIDE NECESSARY SUPPLY REQUIREMENT FOR RECEPTACLES OR PROVIDE POWER CONNECTION AS REQUIRED PER SITE. ALL THE CONDUITS SHALL RUN UNDER GROUND FROM THE NEAREST WALL. BASE BID ACCORDINGLY.
- J** ELECTRICAL SUPPLY FOR THE WATER HEATER (HWHT-2). E.C. SHALL COORDINATE WITH PLUMBING CONTRACTOR FOR THE EXACT POWER REQUIREMENTS. BASE BID ACCORDINGLY.
- K** ELECTRICAL CONTRACTOR SHALL COORDINATE ELECTRICAL CONNECTION FOR IGNITION POWER REQUIREMENTS WITH EQUIPMENT MANUFACTURER. BASE BID ACCORDINGLY.



1 FIRST FLOOR ELECTRICAL POWER PLAN
1/4" = 1'-0"

EQUIPMENT SCHEDULE								
SR.NO.	ITEM NO.	DESCRIPTION	Manufacturer	MODEL	VOLTAGE	PHASE	AMPS	KW
1	18	Heated Holding Cabinet	Alto-Shaam	1200-UP	120	1	8	0.96
2	23	Immersion Hand Mixer	Robot Goupe	MP800	120	1	7.5	0.9
3	29	Cutter Mixers	Robot Goupe	R702VV	120	1	5.8	0.7
4	45	Range, Stock Pot, Gas	Southbend	SPR-2J-FB	-	-	-	-
5	46	Rice/Grain Cooker	Town	RM-55N-R	-	-	-	-
6	48	Gas Floor Fryer	Imperial	IFS-50G	-	-	-	-
7	49	Hotplate, Countertop, Gas	Star	602HF	-	-	-	-
8	50	Combi Oven Gas	Alto-Shaam	CTP7 20G	-	-	-	-
9	51	Griddle, Gas, Countertop	Star	624TF	-	-	-	-
10	54	Reach in Refrigerator	True-Mfg-General Foodservice	T-49G-HC-FGD01	115	1	5.4	0.621
11	56	Sandwich/Panini Grill	Star	PST14T	120	1	15	1.8
12	71	Soda Dispenser	Cornelius	Enduro 250	115	1	3.5	0.4
13	72	POS		TENANT SUPPLIED	120	1	1.5	0.18

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- ELECTRICAL ROOF POWER PLAN GENERAL NOTES:**

 - REFER TO SHEET E-0.1 FOR ELECTRICAL PLAN NOTES & SYMBOL LIST.
 - REFER TO SHEET E-3.0 FOR ELECTRICAL RISER DIAGRAM AND E-3.1 FOR ELECTRICAL PANEL SCHEDULES.
 - ELECTRICAL CONTRACTOR SHALL PROVIDE WEATHER PROOF GFI RECEPTACLE NEED MECHANICAL UNITS AS PER NEC 210.63
 - COORDINATE EXACT LOCATION OF EXHAUST FANS WITH MECHANICAL CONTRACTOR.
 - ALL THE EXISTING BRANCH FEEDERS FROM THE EXISTING MDP TO THE RTUS SHALL BE REUSED IN COORDINATION WITH THE OWNER. VERIFY WHETHER THE FEEDERS ARE OPERABLE. PROVIDE NEW BRANCH FEEDERS IN PLACE OF EXISTING AS REQUIRED. BASE BID ACCORDINGLY.
 - ELECTRICAL CONTRACTOR SHALL PROVIDE NECESSARY POWER CONNECTIONS TO INTERLOCK EXHAUST FANS WITH RTUS IN COORDINATION WITH THE MECHANICAL CONTRACTOR. BASE BID ACCORDINGLY.
- ELECTRICAL ROOF POWER PLAN KEYED WORK NOTES:**

A

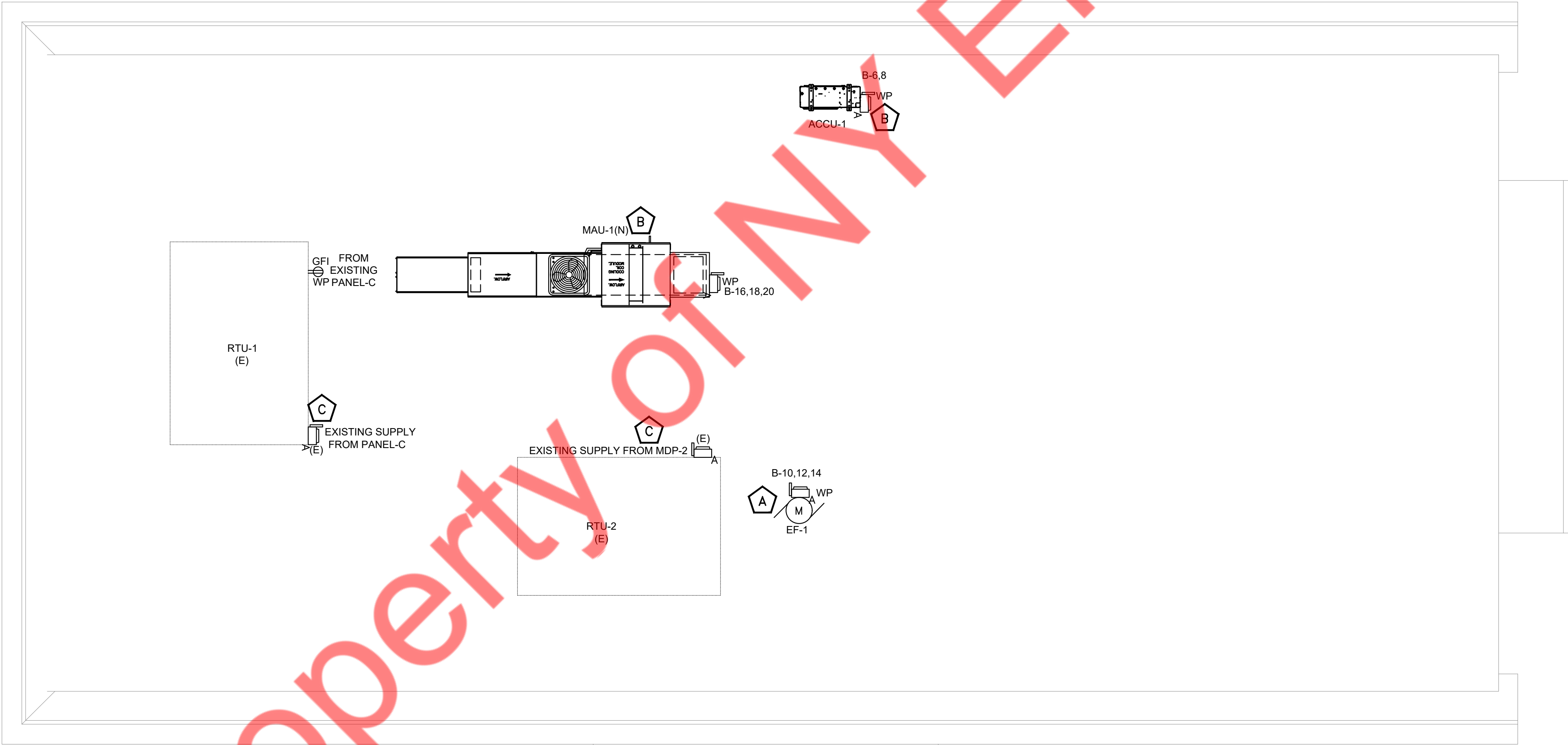
EXHAUST FANS FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE POWER, DISCONNECT/SWITCHING CONTROLS ALONG WITH NECESSARY WIRING AS REQUIRED FOR COMPLETE OPERATION OF EXHAUST FANS. BASE BID ACCORDINGLY.

B

ELECTRICAL CONTRACTOR SHALL COORDINATE DISCONNECT AND FUSE REQUIREMENT FOR MECHANICAL UNIT WITH MECHANICAL CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED.

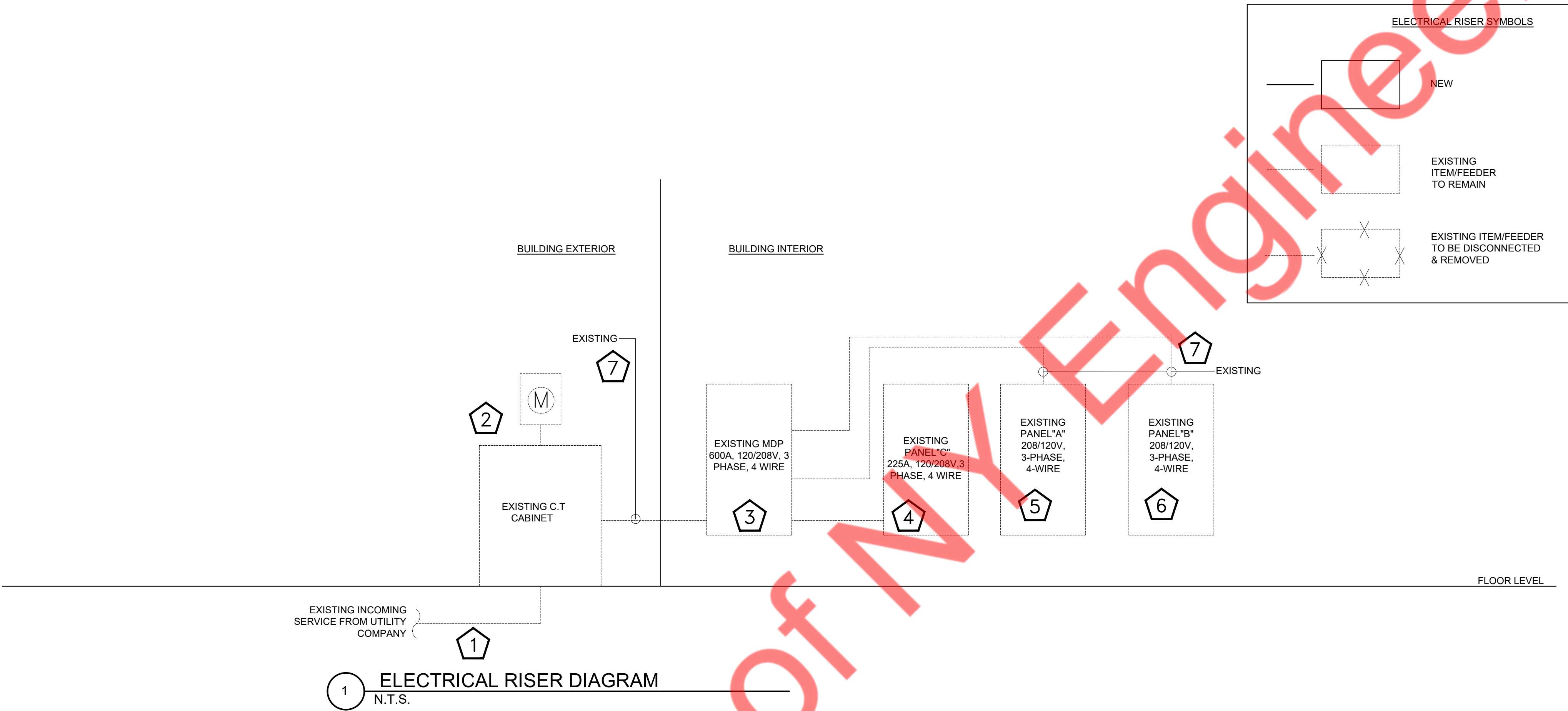
C

EXISTING ELECTRICAL DISCONNECT TO RTU SHALL REMAIN. E.C. SHALL VERIFY THE OPERABLE CONDITION OF EXISTING FEEDER AND DISCONNECT. REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.REPORT IF ANY DISCREPANCIES OBSERVED BEFORE COMMENCING ANY WORK.



1 ELECTRICAL ROOF POWER PLAN
1/8" = 1'-0"

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ELECTRICAL
RISER
DIAGRAM

PANEL: MDP (E)										MOUNTING: EXISTING						
208Y/120		VOLTS,		3	PHASE,		4	WIRE		PANEL LOCATION: OFFICE						
MAIN CB:		600A		MLO: NA		BUS:		600A		MIN,		FED FROM: EXISTING METER CABINET				
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL)																
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.		
						A	B	C								
1	125/3P	SPARE				0.00						SPARE	100/3P	2		
3							0.00							4		
5								0.00						6		
7						EX				5.88	O			PANEL-A (E)	100/3P	8
9	SPARE				6.78	O	10									
11							5.66	O	12							
13					7.38			7.38	O	PANEL-B (E)	150/3P	14				
15					125/3P	SPARE						6.03	O	16		
17			7.59	O								18				
19	225/3P	PANEL-C	O	11.32								EXISTING	11.32		20	
21			O	11.32						11.32			SPARE	50/3P	22	
23			O	11.32		11.32	24									
TOTAL CONNECTED LOAD (KVA)						18.70	24.13	24.57								

PANEL: C (E)										MOUNTING: AS EXISTING													
208Y/120		VOLTS,		3		PHASE,		4		WIRE		PANEL LOCATION: OFFICE											
MAIN CB:		225A		MLO: NA		BUS:		225A		MIN,		FED FROM: MDP											
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL)																							
CKT NO.		TRIP AMPS	DESCRIPTION OF LOAD			LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD		TRIP AMPS	CKT NO.					
1			SPARE						A	B	C					SPARE		2					
3									EX	EX	4												
5											EX							6					
7									0.00									8					
9			SPARE							0.00						SPARE		10					
11											0.00							12					
13									0.00		0.00							14					
15										0.00								16					
17		50/3P	SPARE								0.00					SPARE		18					
19																		20					
21									O	4.66								11.32	11.32		6.66	O	22
23									O	4.66										11.32		6.66	O
TOTAL CONNECTED LOAD (KVA)										11.32	11.32	11.32											

PANEL: A (E)										MOUNTING: EXISTING					
208Y/120		VOLTS,		3	PHASE,		4	WIRE			PANEL LOCATION: OFFICE				
MAIN CB:		100A		MLO: 100A		BUS:		125A		MIN,		FED FROM: MDP			
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL),E:KITCHEN/EQUIPMENTS															
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	HEATED HOLDING CABINET (EQ-18)	E	0.96	2#12, #12G, 3/4"C	1.14			2#12, #12G, 3/4"C	0.18	R	STORAGE AREA RECEPTACLE	20	2	
3	20	HEATED HOLDING CABINET (EQ-18)	E	0.96	2#12, #12G, 3/4"C		1.32		2#12, #12G, 3/4"C	0.36	H	OFFICE AREA RECEPTACLE	20	4	
5	20	CUTTER MIXER (EQ-29)	E	0.70	2#12, #12G, 3/4"C			0.88	2#12, #12G, 3/4"C	0.18	H	OFFICE POS RECEPTACLE	20	6	
7	20	REACH IN REFRIGERATOR (EQ-54)	E	0.70	2#12, #12G, 3/4"C	1.42			2#12, #12G, 3/4"C	0.72	E	GAS COUNTER TOP RECEPTACLE CKT-1	20	8	
9	20	SABDWICH/PANNINI GRILL (EQ-56)	E	1.80	2#12, #12G, 3/4"C		2.34		2#12, #12G, 3/4"C	0.54	E	GAS COUNTER TOP RECEPTACLE CKT-2	20	10	
11	20	SODA DISPENSER (EQ-71)	E	0.40	2#12, #12G, 3/4"C			0.40				SPARE	20	12	
13	20	POS RECEPTACLE (EQ-72)	R	0.18	2#12, #12G, 3/4"C	0.18						SPARE	20	14	
15	20	SHOW WINDOW RECEPTACLE-1	R	1.00	2#12, #12G, 3/4"C		1.00					SPARE	20	16	
17	20	SHOW WINDOW RECEPTACLE-2	R	1.00	2#12, #12G, 3/4"C			1.00				SPARE	20	18	
19	20	SHOW WINDOW RECEPTACLE-3	R	1.80	2#12, #12G, 3/4"C	1.80						SPARE	20	20	
21	20	SHOW WINDOW RECEPTACLE-4	R	1.80	2#12, #12G, 3/4"C		1.80					SPARE	20	22	
23	20	SHOW WINDOW RECEPTACLE-5	R	1.80	2#12, #12G, 3/4"C			1.80				SPARE	20	24	
25	20	SHOW WINDOW RECEPTACLE-6	R	1.20	2#12, #12G, 3/4"C	1.20						SPARE	20	26	
27	20	SEATING AREA CONVENIENCE RECEPTACLE	R	0.36	2#12, #12G, 3/4"C		0.36					SPARE	20	28	
29	20	SERVICE STATION-1 CONVENIENCE RECEPTACLE	R	0.36	2#12, #12G, 3/4"C			0.36				SPARE	20	30	
31	20	SERVICE STATION-2 CONVENIENCE RECEPTACLE	R	0.36	2#12, #12G, 3/4"C	0.36						SPARE	20	32	
33	20	AS EXISTING	L	0.50	EXISTING		0.50					SPARE	20	34	
35	20	SERVICE STATION-3 CONVENIENCE RECEPTACLE	R	0.72	2#12, #12G, 3/4"C			0.72				SPARE	20	36	
37	20	AS EXISTING	L	0.50	EXISTING	0.50						SPARE	20	38	
39	20	SPARE					0.00					SPARE	20	40	
41	20	AS EXISTING	L	0.50	EXISTING			0.50				SPARE	20	42	
TOTAL CONNECTED LOAD (KVA)						6.60	7.32	5.66							

PANEL: B (E)												MOUNTING: EXISTING		
208Y/120	VOLTS,	3	PHASE,	4	WIRE	PANEL LOCATION: OFFICE								
MAIN CB: 150A		MLO: 150A		BUS: 150A		MIN,				FED FROM: MDP				
NOTE:NOTE: L : LIGHTING, H : HVAC LOAD, M : MOTOR LOAD, R : RECEPTACLES, O : OTHER/MISC. (TYPICAL)														
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
						A	B	C						
1	20	AS EXISTING	L	0.50	EXISTING	0.70			2#12, #12G, 3/4"C	0.20	H	AC-1	20/2P	2
3	20	AS EXISTING	L	0.50	EXISTING		0.70			0.20	H			4
5	20	AS EXISTING	L	0.50	EXISTING			2.27	2#10, #10G, 3/4"C	1.77	H	ACCU-1	30/2P	6
7	20	HOOD LIGHTING-1	L	0.50	2#12, #12G, 3/4"C	2.27				1.77	H			8
9	20	HOOD LIGHTING-2	L	0.50	2#12, #12G, 3/4"C		2.40			1.90	M			10
11	20	BUILDING SIGNAGE	L	1.00	2#12, #12G, 3/4"C			2.90	2#12, #12G, 3/4"C	1.90	M	EF-1(N)	30/3P	12
13	20	HWCP-1	O	0.08	2#12, #12G, 3/4"C	1.98				1.90	M			14
15	20	EXTERIOIR LIGHTING	L	0.50	2#12, #12G, 3/4"C		1.75			1.25	H			16
17	20	INTERIOIR LIGHTING	L	0.50	2#12, #12G, 3/4"C			1.75	2#12, #12G, 3/4"C	1.25	H	MAU-1(N)	15/2P	18
19	20	TIMECLOCK	O	0.50	2#12, #12G, 3/4"C	1.75				1.25	H			20
21	20	ROOF RECEPTACLE-1	R	0.18	2#12, #12G, 3/4"C		0.18					SPARE	20	22
23	20	ROOF RECEPTACLE-2	R	0.18	2#12, #12G, 3/4"C			0.18				SPARE	20	24
25	20	EXTERIOR POLE LIGHTING	L	0.50	2#10, #10G, 3/4"C	0.50						SPARE	20	26
27	20	EXISTING PYLON SIGN	L	1.00	2#10, #10G, 3/4"C		1.00					SPARE	20	28
29	20	SPARE						0.00				SPARE	20	30
31	20	WALK-IN AREA RECEPTACLE	R	0.18	2#12, #12G, 3/4"C	0.18						SPARE	20	32
33	20	SEATING AREA LIGHTING	L	0.80	2#12, #12G, 3/4"C		0.80					SPARE	20	34
35	20	SPARE						0.00				SPARE	20	36
37	20	SPARE				0.00						SPARE	20	38
39	20	SPARE					0.00					SPARE	20	40
41	20	AS EXISTING	L	0.50	EXISTING			0.50				SPARE	20	42

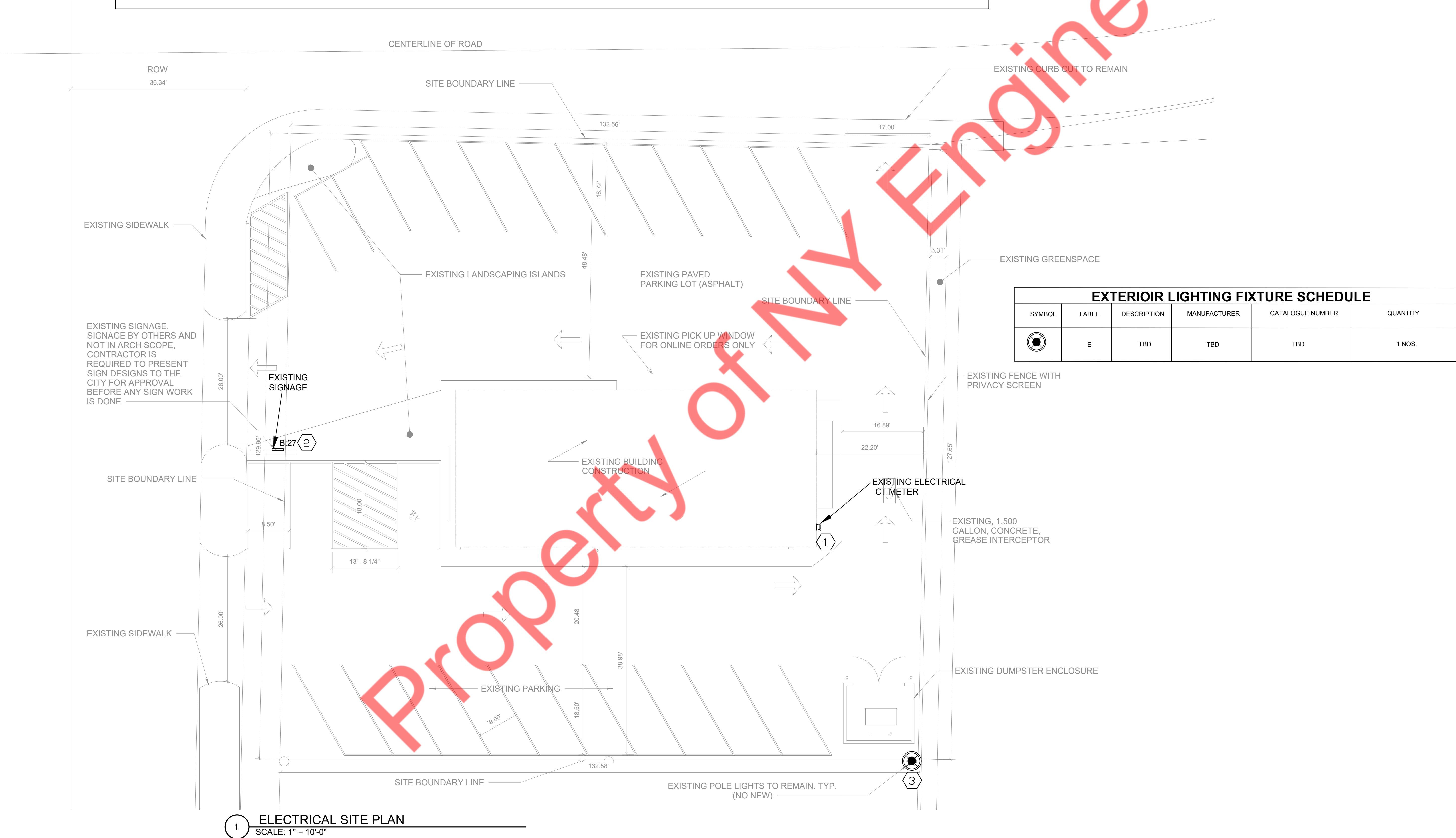
PANEL SCHEDULE GENERAL NOTES
A. VERIFY THE EXACT PANEL SIZE, BREAKER RATING, CABLE SIZE AND QU


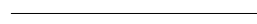
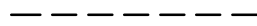




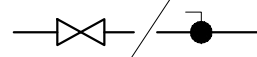

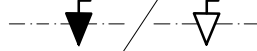

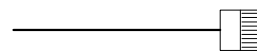
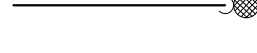

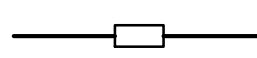
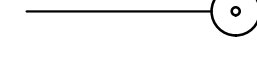



SITE PLAN GENERAL NOTES:

- 1. ALL UNDERGROUND CONDUIT SHALL BE PVC IF PROVIDED NEW. PROVIDE GALVANIZED STEEL SLEEVE WHEN PASSING THROUGH THE FOUNDATION WALL CONCRETE FLOOR. EXTEND CONDUIT 6" ABOVE THE FINISHED FLOOR AND PROVIDE WITH PROTECTIVE GROMMET.
- 2. ALL CONDUIT SHALL BURIED AT LEAST 18" BELOW FINISHED GRADE.
- 3. ALL INSTALLED CONDUIT SHALL BE PROVIDED WITH A PULL STRING.
- 4. CONTRACTOR SHALL PROVIDE UNDER GROUND PVC CONDUITS BUT THE AREAS WHERE TRANSITION OCCURS SHALL BE PROVIDED WITH RIGID STEEL CONDUIT ATLEAST FROM 1 FEET BELOW GRADE TO ABOVE AND DEPTH REQUIREMENTS SHALL BE FOLLOWED AS PER NEC 300.5.
- 5. EXISTING EXTERIOR SITE LIGHT FIXTURES SHALL REMAIN.
- 6. CIRCUIT NUMBERS ARE INDICATED FOR REFERENCE ONLY. E.C. TO VERIFY SITE LIGHT FIXTURE DETAILS AND PROVIDE ELECTRICAL SUPPLY ACCORDINGLY. INFORM ENGINEER OF ANY DISCREPANCY.
- 7. ALL THE SIGN AND OUTLINE LINE LIGHTING SHALL BE AS PER NEC ARTICLE 600.

SITE PLAN KEYED NOTES:

- 1. REUSE EXISTING ELECTRICAL METER AND CT CABINET, REPORT IF ANY DISCREPANCIES OBSERVED.
- 2. E.C. SHALL VERIFY THE OPERABLE CONDITION OF EXISTING SIGNS AND REUSE THE EXISTING CIRCUIT. PROVIDE THE NEW FEEDER OR CONDUIT AS REQUIRED IF IN OPERABLE. BASE BID ACCORDINGLY.
- 3. ALL EXTERIOR LIGHTING SHALL REMAIN. E.C. SHALL VERIFY THE OPERABLE CONDITION AND REPORT IF ANY DISCREPANCIES OBSERVED.



SYMBOL	DESCRIPTION
	GREASE SANITARY SEWER (UNDERGROUND)
	EXISTING SANITARY SEWER (UNDERGROUND)
	VENT PIPING
	FILTERED WATER
	COLD WATER
	HOT WATER
	RECIRCULATING HOT WATER
	SHUTOFF VALVE
	BALANCING VALVE
	GAS PLUG VALVE
	PRESSURE REDUCING VALVE
	FLOOR SINK WITH HALF GRATE
	FLOOR DRAIN
	PIPE UP OR DOWN
	PIPE UP
	WATER HAMMER ARRESTOR
	CLEAN OUT DECK PLATE
	HOT WATER RECIRCULATION PUMP
	POINT OF NEW CONNECTION

PLUMBING ABBREVIATIONS	
CO	CLEANOUT
CODP	CLEAN OUT DECK PLATE
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
GSAN	GREASE SANITARY
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
EXIST.	EXISTING
G	GAS
FD	FLOOR DRAIN
LAV	LAVATORY
BFP	BACK FLOW PREVENTER
FS	FLOOR SINK
MS	MOP SINK
PS	PREP SINK
AFF	ABOVE FINISH FLOOR
VTR	VENT THROUGH ROOF

<u>PLUMBING DRAWING LIST</u>	
P0.1	PLUMBING NOTES, ABBREVIATIONS, SYMBOLS & SPECIFICATIONS
P0.2	PLUMBING SPECIFICATIONS
P1.1	PLUMBING SANITARY, WATER SUPPLY AND GAS PLAN
P1.2	PLUMBING ROOF PLAN
P5.1	PLUMBING DETAILS (1 OF 2)
P5.2	PLUMBING DETAILS (2 OF 2)
P6.1	PLUMBING SCHEDULES AND RISERS

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- a. INDIANA BUILDING CODE 2014 (2012 INTERNATIONAL BUILDING CODE).
- b. INDIANA MECHANICAL CODE 2014 (2012 INTERNATIONAL MECHANICAL CODE).
- c. INDIANA PLUMBING CODE 2012 (2006 INTERNATIONAL PLUMBING CODE).
- d. 2009 INTERNATIONAL ENERGY CONSERVATION CODE.
- e. INDIANA FUEL GAS CODE 2014 EDITION (2012 INTERNATIONAL FUEL GAS CODE)

BUILDING DEPARTMENT PLUMBING NOTES

1. ALL PLUMBING SYSTEM (SANITARY, WASTE, GAS, VENT & WATER DISTRIBUTION PIPING SYSTEMS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2006 INTERNATIONAL PLUMBING CODE.
2. INSTALLATION OF UNDERGROUND SANITARY DRAINAGE AND VENT PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION IN PC 702.2
3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION IN PC 305.
4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION IN PC 306.
5. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308.
6. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF PC CHAPTER 6.
7. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF PC CHAPTER 7 SECTIONS PC 701 THROUGH PC 712.
8. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 TO PC 917.

PLUMBING SPECIFICATIONS:

1. BASIC PLUMBING REQUIREMENTS, MATERIALS, AND METHODS
- 1.01 SCOPE
- A. PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
 - B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
 - C. OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
 - D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
 - E. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
 - F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FROST PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
 - G. ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.
 - H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
 - I. MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
 - J. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
 - K. THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING, ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.02 SUBMITTALS

- A. SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.
1. PIPE AND FITTINGS
 2. VALVES
 3. HANGERS AND SUPPORTS
 4. PLUMBING PIPING LAYOUT
 5. TESTS
 6. PLUMBING FIXTURES
 7. WATER HEATERS & ACCESSORIES
 8. FLOOR DRAINS
 9. MIXING VALVES
 10. ALL SCHEDULED PLUMBING EQUIPMENT
- B. SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
- C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT OBLIGATE THE CONTRACTOR TO CONFORM WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
- D. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
- E. SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.
- F. FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.
- G. RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.

1.03 SUBSTITUTIONS

- ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
- B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.
- 1.04 DEFINITIONS
- A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
- B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
- C. PROVIDE: TO FURNISH AND INSTALL.
- D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.
- E. REFER TO THE INDIANA PLUMBING CODE, 2012 EDITION (ADOPTS THE IPC 2006) FOR ADDITIONAL DEFINITIONS.
- 1.05 DRAWINGS
- A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
- B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
- C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
- D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.
- E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS OF INFORMATION FURNISHED BY THE OWNER.
- F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.
- 1.06 PRODUCTS
- A. SANITARY AND VENT PIPING:
1. ABOVE GRADE/ UNDERGROUND PIPING SHALL BE CAST IRON PIPE WHICH SHOULD COMPLY WITH ASTM A 74 STANDARD/CISPI 301.
 2. SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.
 3. PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.
 4. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.
- B. DOMESTIC WATER PIPING:
1. ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE AS PER TABLE 605.4 2006 INTERNATIONAL PLUMBING CODE
 2. FITTINGS IN DOMESTIC WATER PIPING SHALL BE COPPER OR COPPER ALLOY AS PER TABLE 605.5, 2006 INTERNATIONAL PLUMBING CODE.
 3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
 4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
 5. COMPLY WITH NSF 61 FOR MATERIALS, FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
 6. AS PER 2009 IECC, AUTOMATIC-CIRCULATING HOT WATER SYSTEMS, PIPING SHALL BE INSULATED WITH 1 INCH (25 MM) OF INSULATION HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 BTU PER INCH/H X FTX2 °F (1.53 W PER 25 MM/M2X K). THE FIRST 8 FEET (2438 MM) OF PIPING IN NONCIRCULATING SYSTEMS SERVED BY EQUIPMENT WITHOUT INTEGRAL HEAT TRAPS SHALL BE INSULATED WITH 0.5 INCH (12.7 MM) OF MATERIAL HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 BTU PER INCH/H X FTX2 °F (1.53 W PER 25 MM/M2X K).
 7. AS PER 2009 IPC 501.8 ALL HOT WATER SUPPLY BE EQUIPPED WITH AUTOMATIC TEMPERATURE CONTROLS CAPABLE OF ADJUSTMENTS FROM THE LOWEST TO THE HIGHEST ACCEPTABLE TEMPERATURE SETTINGS FOR THE INTENDED TEMPERATURE OPERATING RANGE.
 8. AS PER 2009 IECC 504.3, TEMPERATURE CONTROLLING MEANS SHALL BE PROVIDED TO LIMIT THE MAXIMUM TEMPERATURE OF WATER DELIVERED FROM LAVATORY FAUCETS IN PUBLIC FACILITY RESTROOMS TO 110°F.
- C. MIXING VALVES
1. VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.
 2. TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM, AND/OR HOT WATER. MAXIMUM TEMPERATURE LIMIT SHALL BE SET FIXTURE TYPE. IF ONE SUPPLY SHOULD FAIL, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5GPM @ 45 PSIG DIFFERENTIAL.
 3. TYPES OF VALVES: TYPE A- THERMOSTATICALLY OPERATED BY MEANS OF BI-METALLIC STRIP, OR EXPANSION BELLOW; TYPE B- SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C- PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D- BALANCED PRESSURE OPERATION, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.

D. HOT WATER RE-CIRCULATING PUMP

1. IN-LINE PUMP, SINGLE STAGE VOLUTE TYPE PUMP SHALL BE MADE OF CAST IRON OR FORGED LEAD-FREE BRONZE IMPELLER.
2. THE PUMP SHALL HAVE A GROUND AND POLISHED STEEL SHAFT WITH A HARDENED INTEGRAL THRUST COLLAR. THE SHAFT SHALL BE SUPPORTED BY TWO HORIZONTAL SLEEVE BEARINGS DESIGNED TO CIRCULATE OIL. THE PUMPS ARE TO BE EQUIPPED WITH A MECHANICAL SEAL WITH CARBON SEAL FACE ROTATING AGAINST CERAMIC SEAT. THE MOTOR SHALL BE NON-OVERLOADING AT ANY POINT ON MOTOR CURVE.
3. DIRECT CONNECT PUMP TO ELECTRIC MOTOR WITH FLEXIBLE COUPLING. THE MOTOR SHALL BE OF THE DRIP-PROOF, SUCTION BEARING, QUIET OPERATING, RUBBER-MOUNTED CONSTRUCTION. EQUIPMENT MOTOR WITH BUILT-IN THERMAL OVERLOAD PROTECTION.
4. INSTALL IN-LINE CIRCULATING PUMPS BETWEEN PIPE FLANGES IN PIPING SYSTEMS. INSTALL OVERHEAD PIPE SUPPORTS, BOTH SIDES OF IN-LINE PUMPS, INSTALLED IN HORIZONTAL PIPING RUNS.
5. PROVIDE DRAIN VALVE ON HOT WATER RETURN LINE AFTER RE-CIRCULATION PUMP TO BLEED AIR.

E. GAS PIPING:

1. GAS PIPING SHALL BE SIZED IN ACCORDANCE WITH INDIANA FUEL GAS CODE 2014, PIPE SIZING TABLES OR SIZING EQUATIONS IN ACCORDANCE WITH SECTION 402.4.
2. METALLIC PIPE SHALL COMPLY WITH SECTIONS 403.4.1 THROUGH 403.4.4.
3. PIPING SYSTEM INSTALLATION SHALL COMPLY WITH REQUIREMENTS OF INDIANA FUEL GAS CODE 2014 SECTION 404.
4. SHUTOFF VALVES SHALL BE LOCATED IN PLACES SO AS TO PROVIDE ACCESS FOR OPERATION AND SHALL BE INSTALLED SO AS TO BE PROTECTED FROM DAMAGE.
5. FITTINGS SHALL BE MALLEABLE IRON.
6. PIPING UNDERGROUND BENEATH BUILDING SHALL COMPLY WITH INDIANA FUEL GAS CODE 2014.

D. HANGERS AND SUPPORTS:

1. HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS..
4. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

E. VALVES:

1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4". PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
2. ALL FIXTURES WITH THE EXCEPTION OF FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
4. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.

F. SLEEVES AND ESCUTCHEONS:

1. SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GA GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USSG THERMAFIBER SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.
2. PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GA STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.

G. ELECTRIC WATER HEATER

1. EXISTING ELECTRIC STORAGE TYPE WATER HEATER TO REMAIN AS EXISTING.
2. NEW ELECTRIC TANKLESS WATER HEATER PROPOSED WITH 14KW OF POWER (REFER P6.1 FOR SCHEDULE).

H. DRAINAGE ACCESSORIES

1. GENERAL:
 - a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
 - b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL-RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.
2. DEVICES:
 - a. CLEANOUT & CLEANOUT PLUG
 - THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS-TIGHT CLEANOUT PLUG
 - PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.
 - LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.

b. CLEANOUT WALL PLATE

- IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRONZE COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER TO SECURE TO CLEANOUT PLUG.
- c. CLEANOUT DECK PLATE
- IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY; ROUND, POLISHED NICKEL BRONZE SCORATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER; THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.
- d. HOUSE TRAP
- SERVICE WEIGHT CAST IRON SOIL PIPE RUNNING TRAP WITH BELL AND SPIGOT ENDS AND TWO CLEANOUT HUBS.

e. FRESH AIR INTAKE

- PIPE MATERIAL SHOULD BE SAME AS DRAINAGE SYSTEM AT POINT OF CONNECTION
 - GRILLE FREE AREA SHOULD BE AT LEAST EQUAL TO CROSS-SECTION AREA OF PIPE TO WHICH CONNECTION MADE AND MADE OF POLISHED NICKEL BRONZE, WITH REMOVABLE GRATE, EITHER PERFORATED OR BAR TYPE. GRATE ATTACHED TO GRILLE BODY WITH VANDAL RESISTANT FASTENER.
- INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.
- VERIFY EXACT LOCATIONS OF ALL EXISTING UTILITIES.
- INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND

- REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE
REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE
ELBOWED FITTINGS AT THE BASE OF RISERS.

WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE

- PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
- PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
- NO PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M RAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY
FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM,
REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC.,
REQUIRED TO ACCOMPLISH THE FLUSHING.

- PRESSURE REQUIREMENTS. PROVIDE GAS PRESSURE REGULATORS
 ENTED TO THE BUILDING EXTERIOR ON GAS SUPPLY TO ALL
 EQUIPMENT REQUIRING LOWER THAN LINE GAS PRESSURE.
- ALL PIPING INSTALLED ON THE ROOF SHALL BE SUPPORTED BY
 "BELLOW BLOCK" PIPE STANDS AS MANUFACTURED BY MIRO
 INDUSTRIES, OR APPROVED EQUAL. WOOD PIPE SUPPORTS SHALL
 NOT BE ACCEPTABLE. PROVIDE TRAFFIC/WALK PADS BELOW ALL
 PIPE STANDS.

INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

- PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL
LUSHOMETER VALVES AND QUICK-CLOSING VALVES.
- UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR
RAINS SHALL BE MAINTAINED BY AN APPROVED TRAP
PRIMING DEVICE.
- MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR
ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.

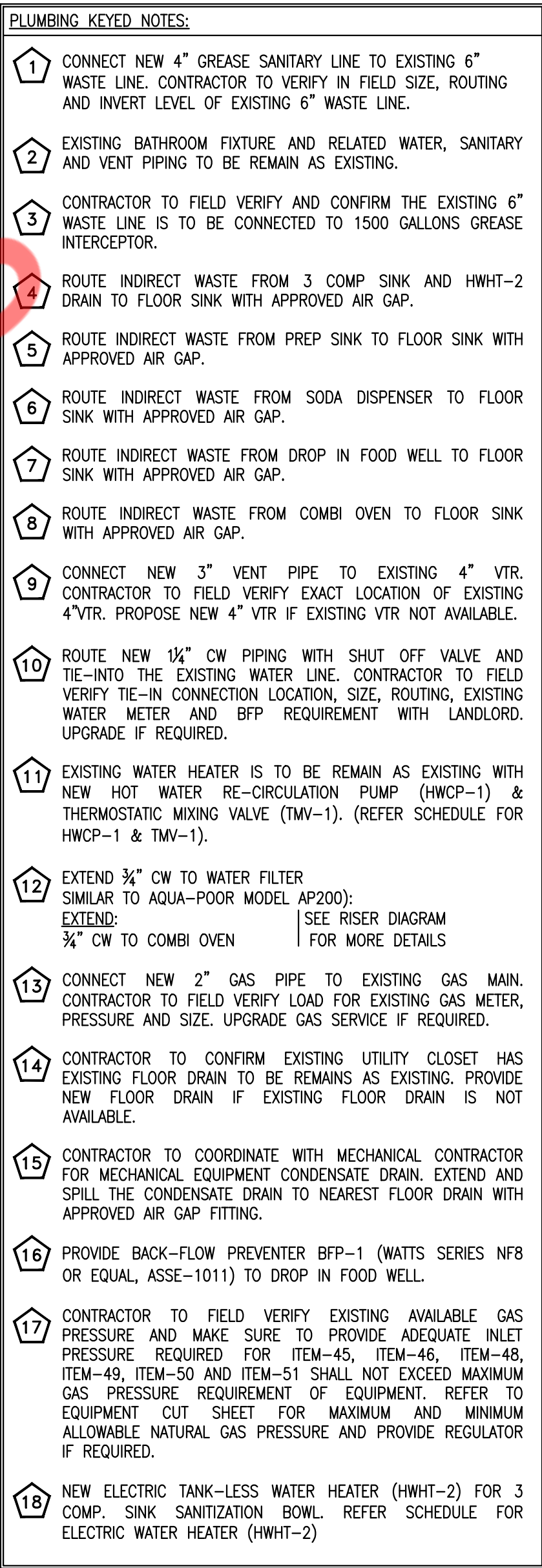
MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL LUMBERING V.T.R.S. AND ALL OUTDOOR AIR INTAKES. OFFSET ENT STACKS AND STACK VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.

STALLATION

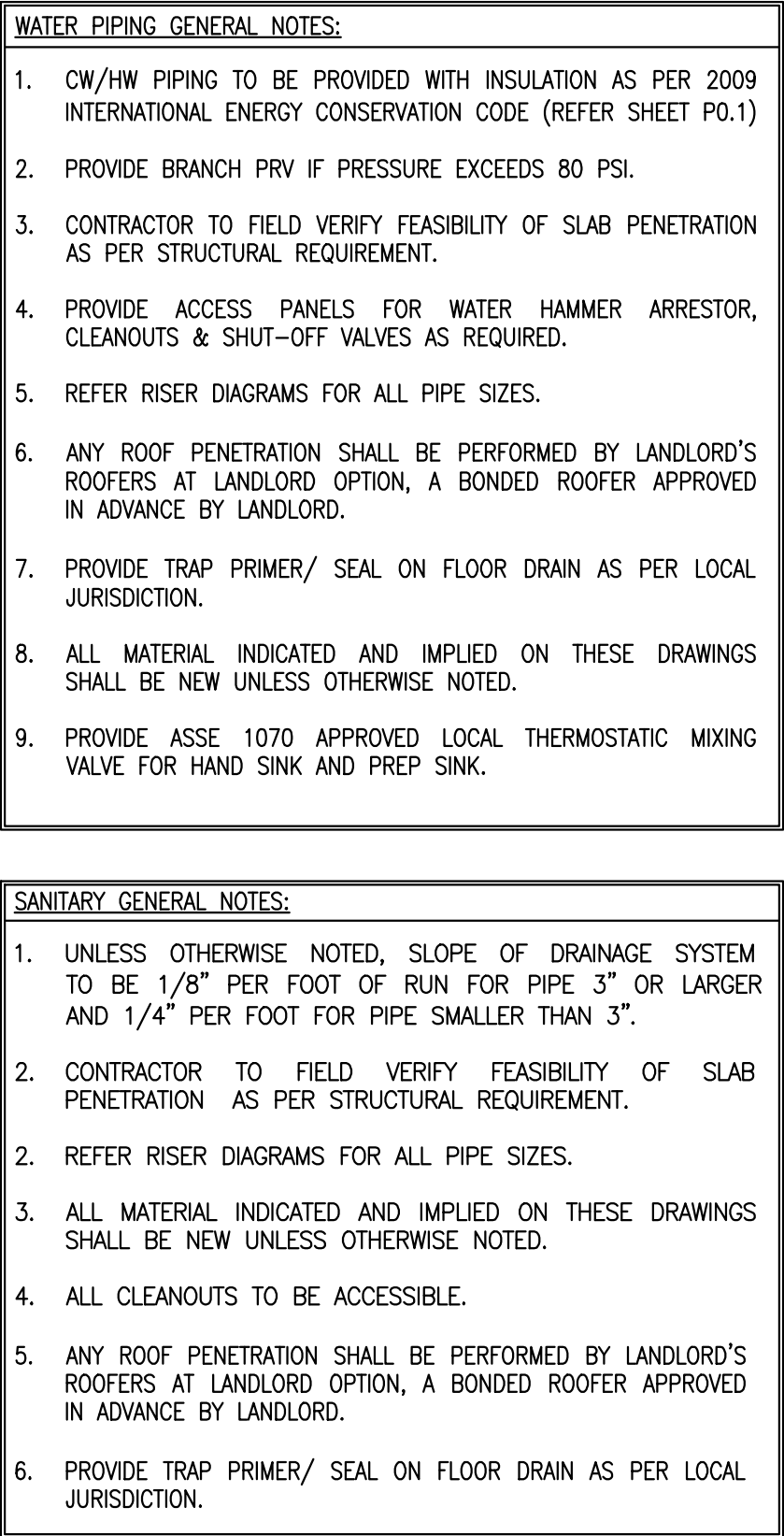
- GENERAL
- ALL WORK RELATED TO ROOF DISRUPTION SHALL BE DONE BY GC. PLUMBER TO COORDINATE WITH GC.
- EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- COORDINATE THE PLUMBING WORK WITH ALL OTHER TREAD WORK AND THE CONSTRUCTION SCHEDULE.
- REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.

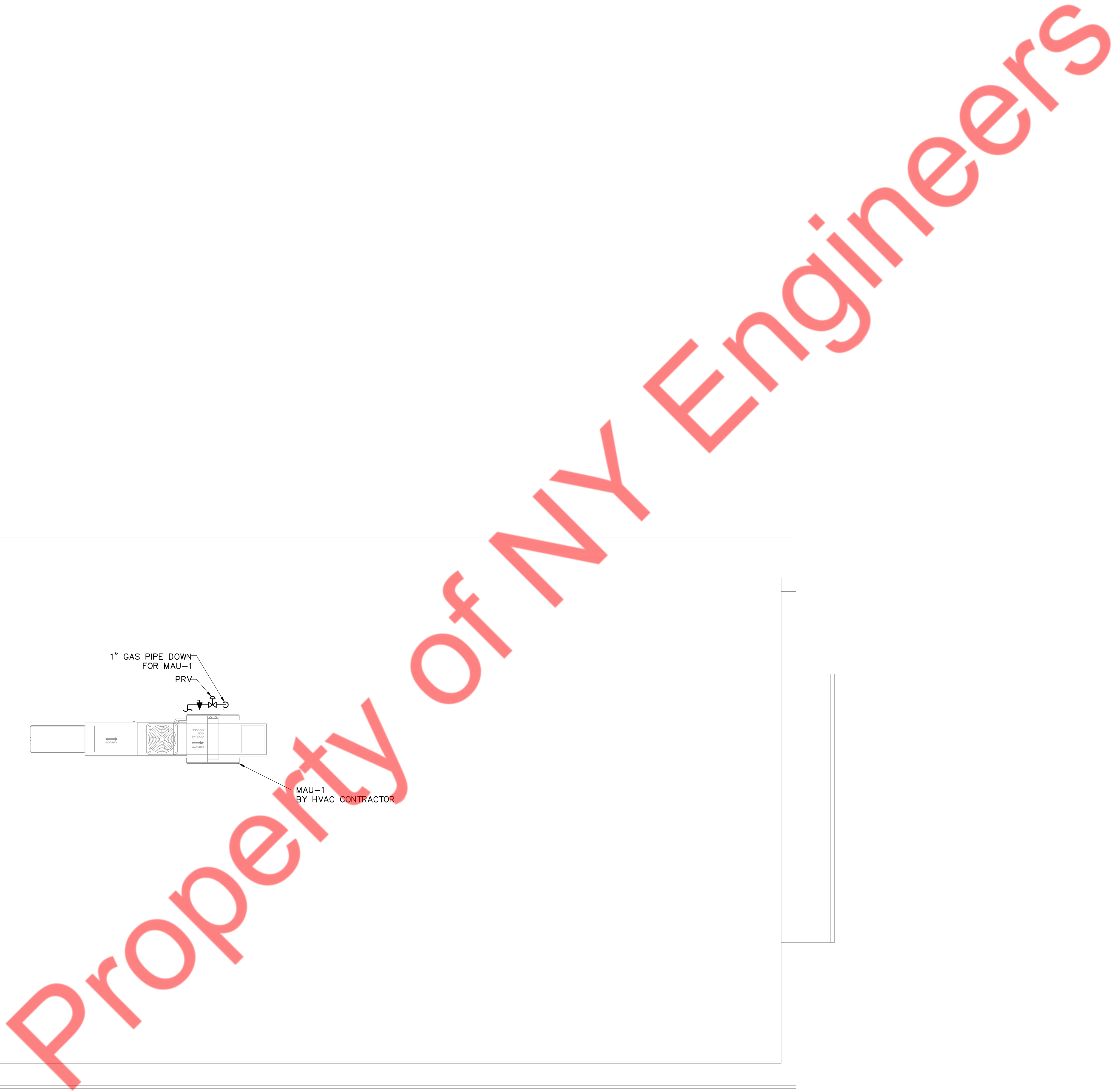
DOS BROS

PLUMBING NOTES, ABBREVIATIONS, SYMBOLS & SPECIFICATIONS P0.1



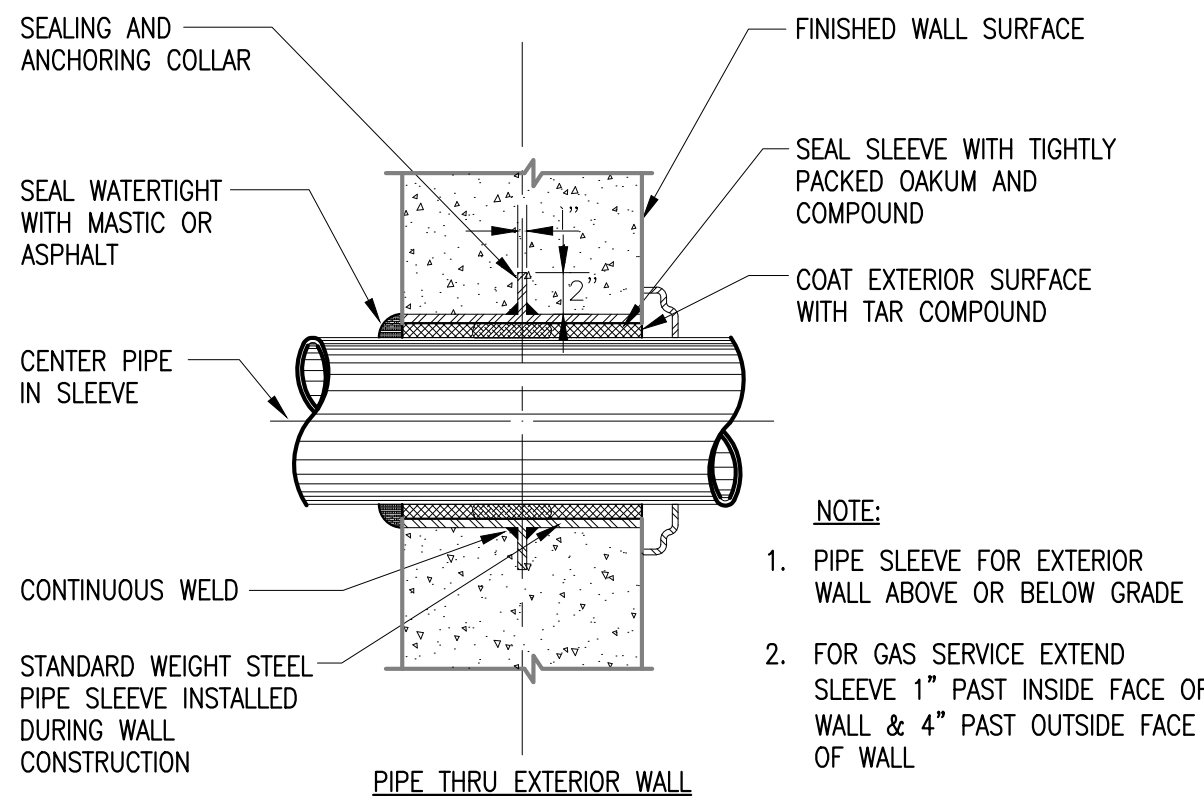
2 PLUMBING WATER SUPPLY AND GAS PLAN
1/4" = 1'-0"



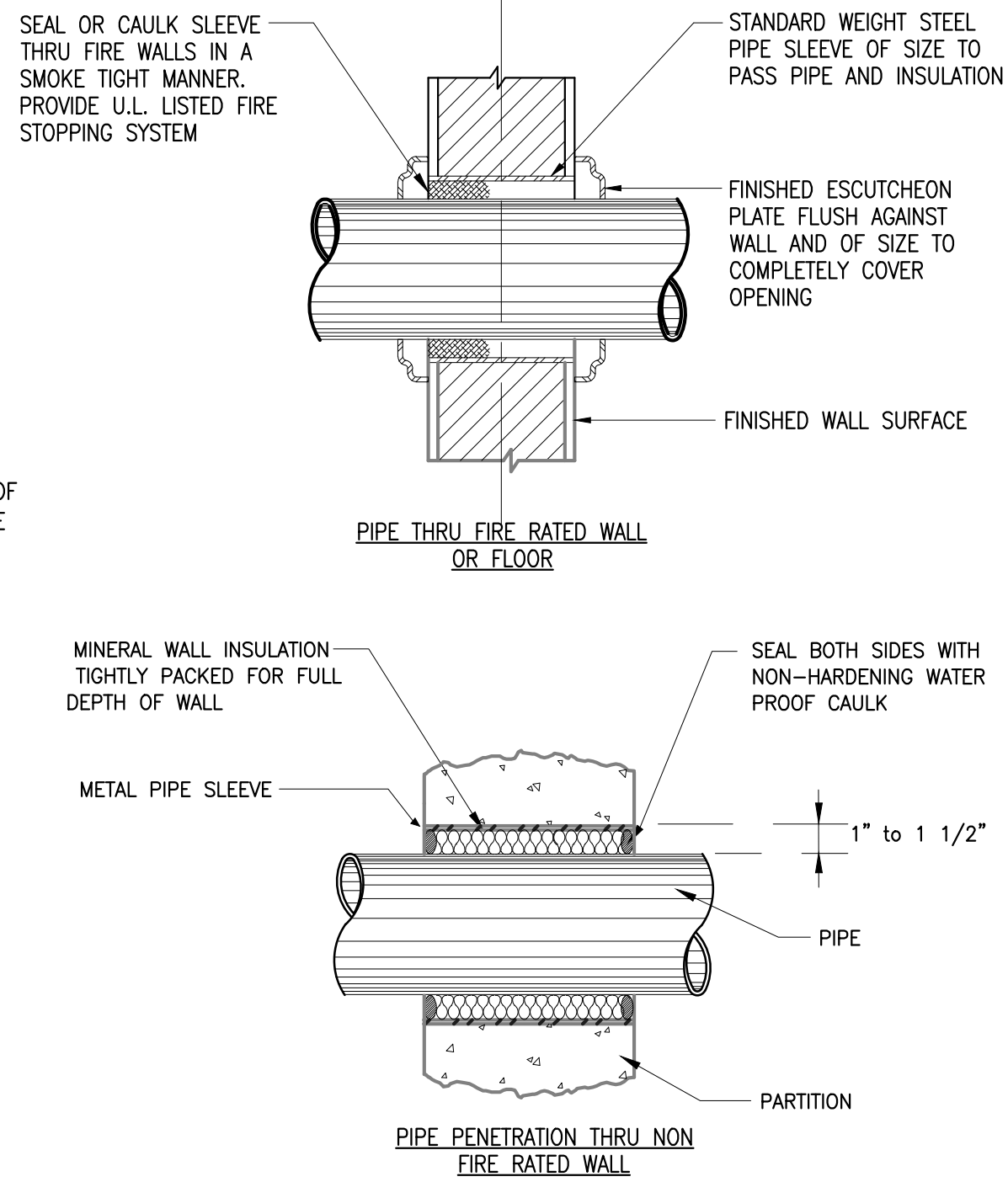


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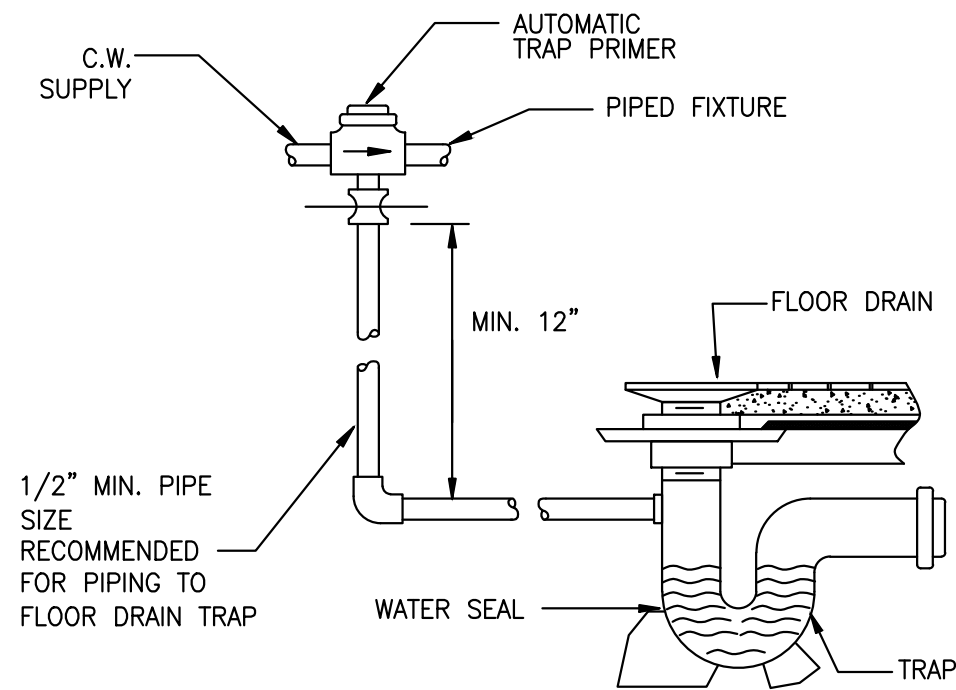
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Revision:
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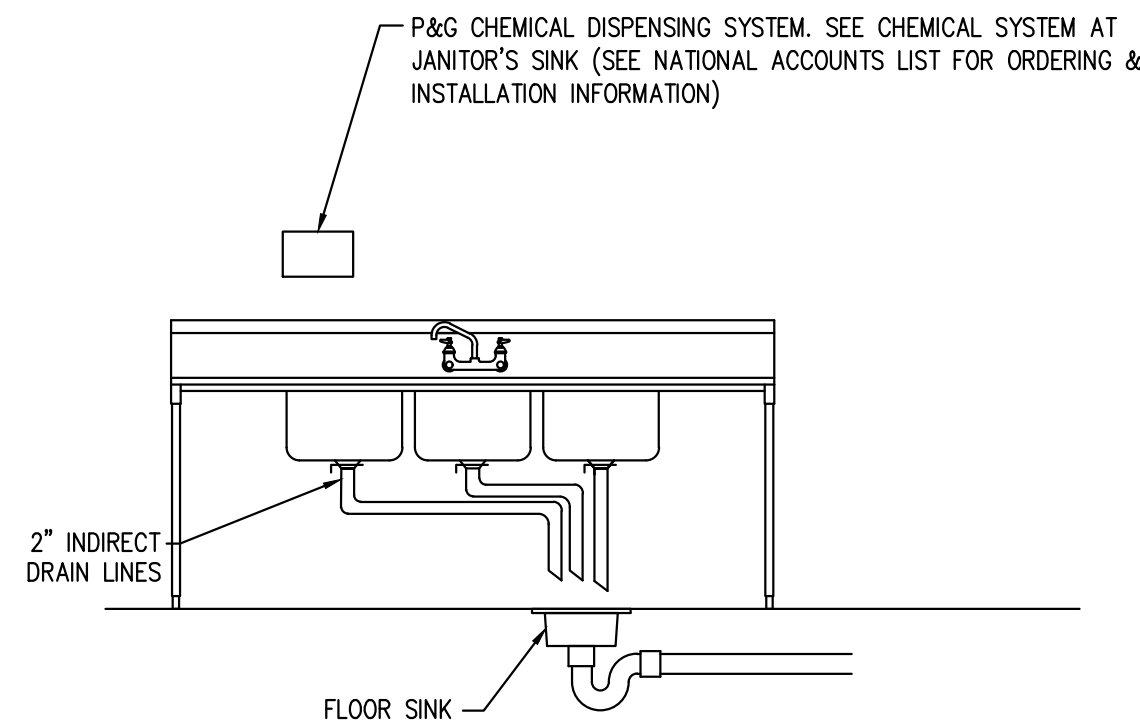
1
P5.1
PIPE SLEEVE THRU WALL SECTION
N.T.S



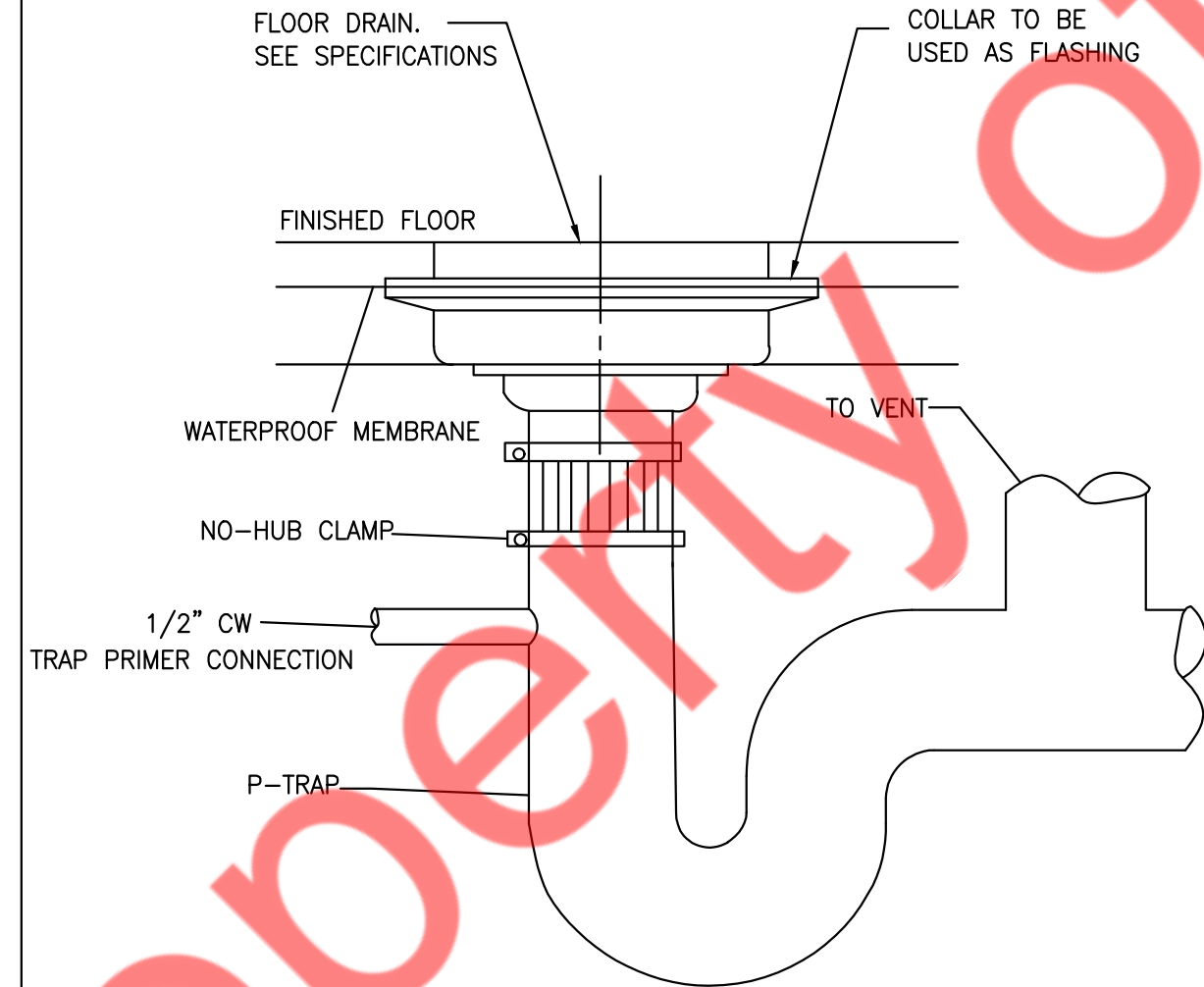
2
P5.1
BALANCING VALVE PIPING DETAIL
N.T.S



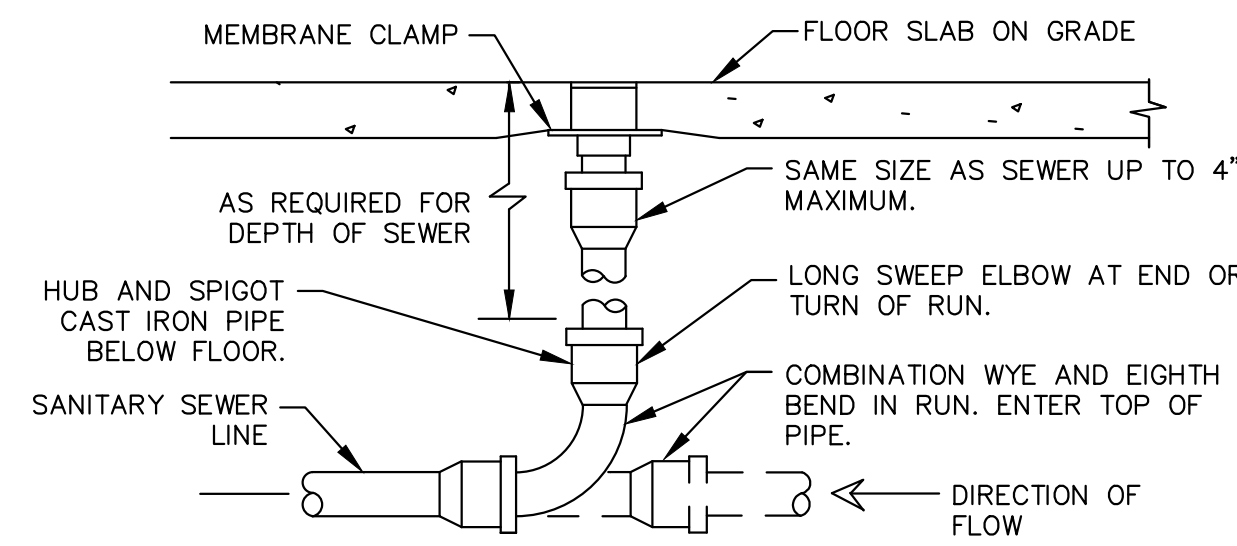
3
P5.1
FLOW CONTROLLED TRAP PRIMER DETAIL
N.T.S



4
P5.1
3 COMPARTMENT SINK DETAILS
N.T.S

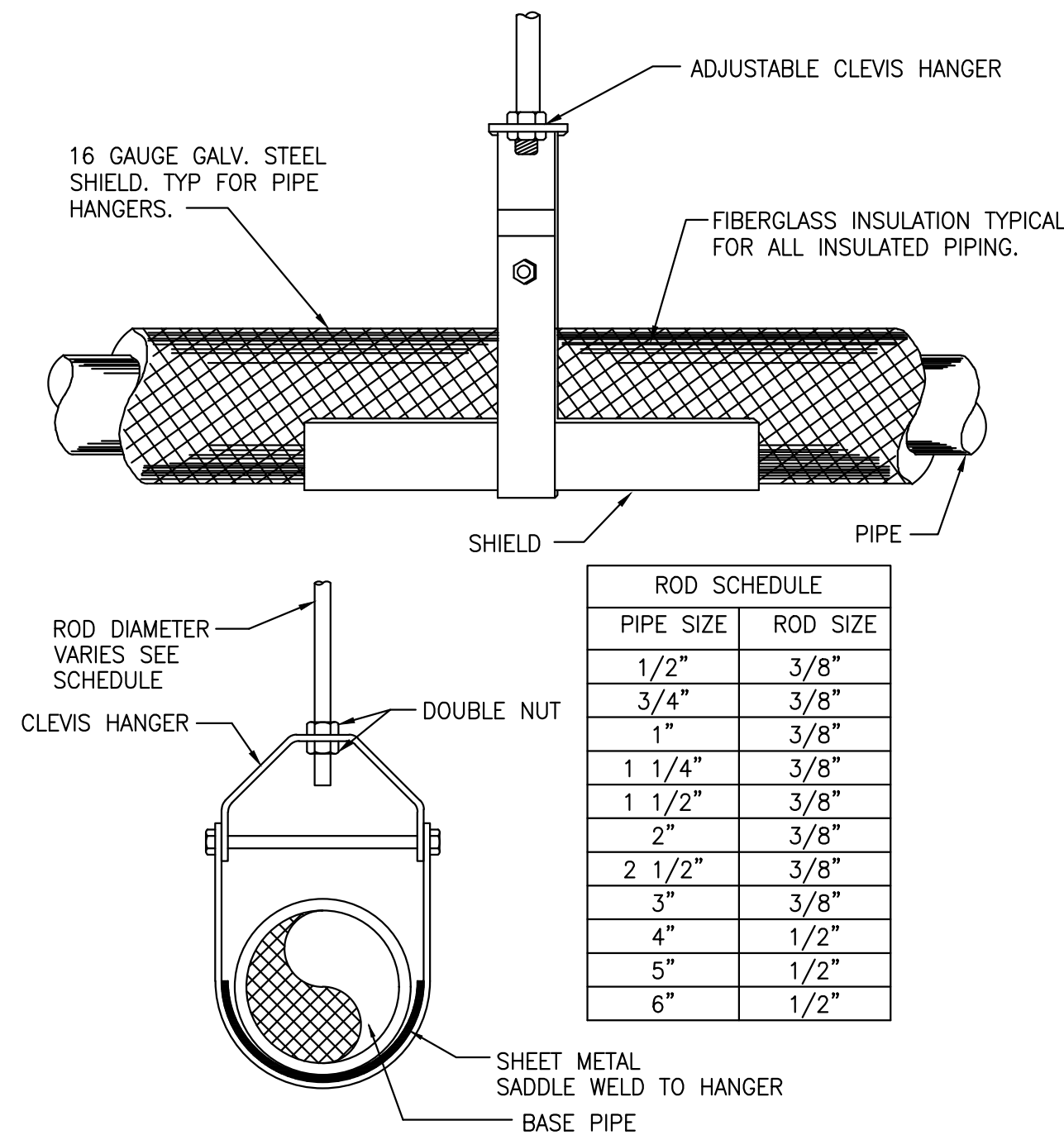


5
P5.1
FLOOR DRAIN DETAIL
N.T.S

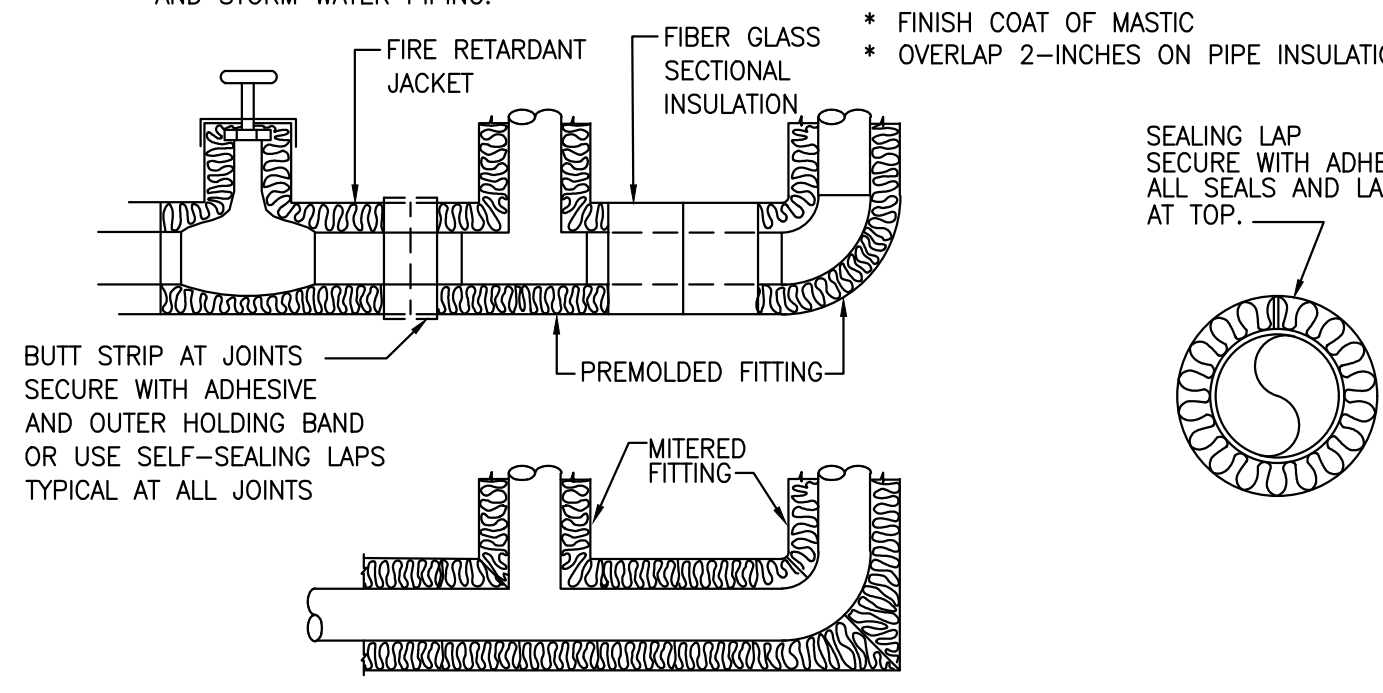
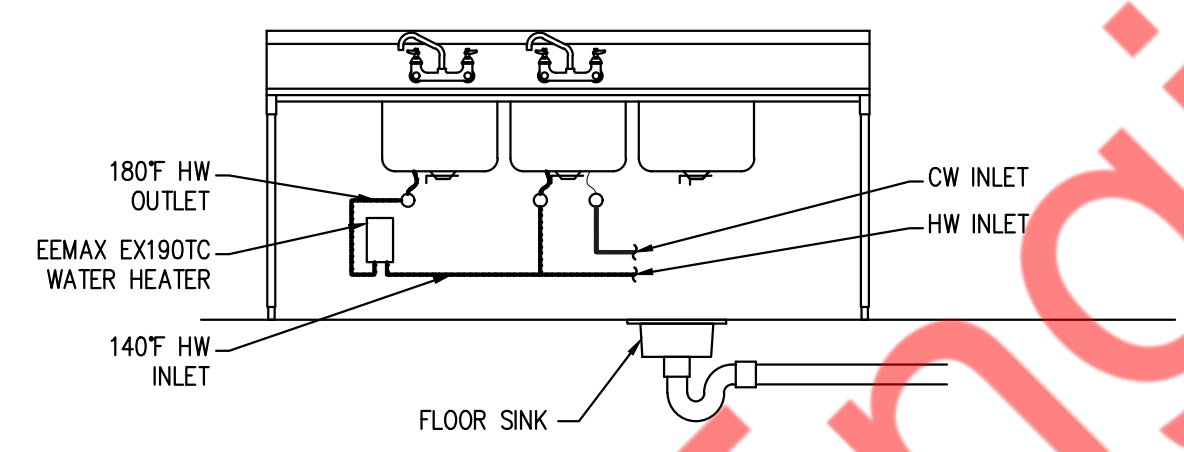
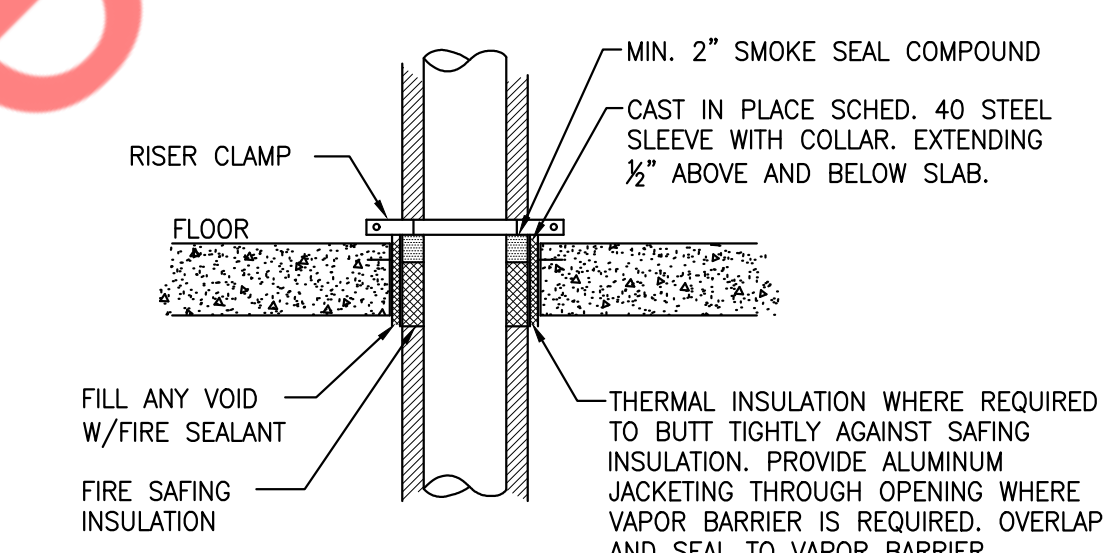
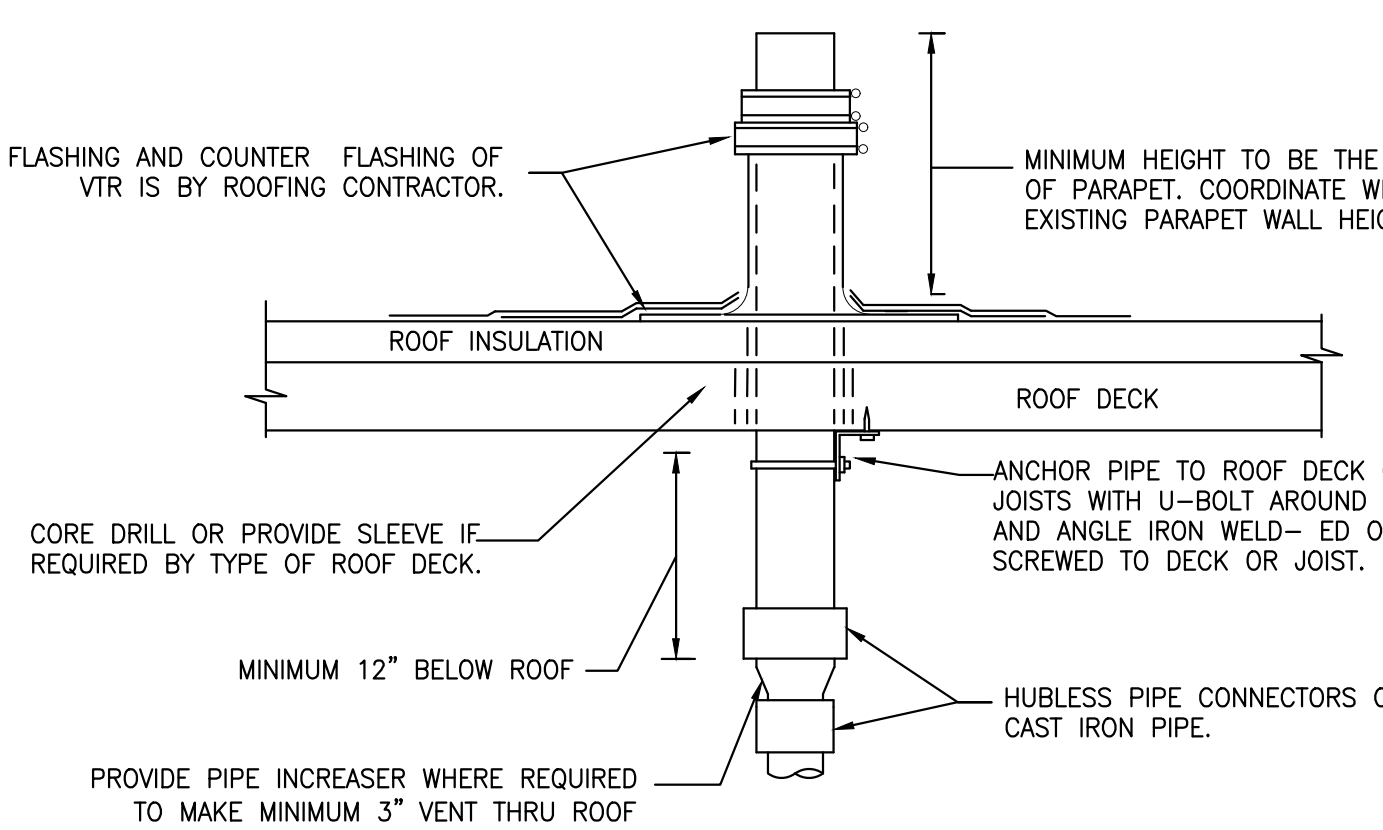
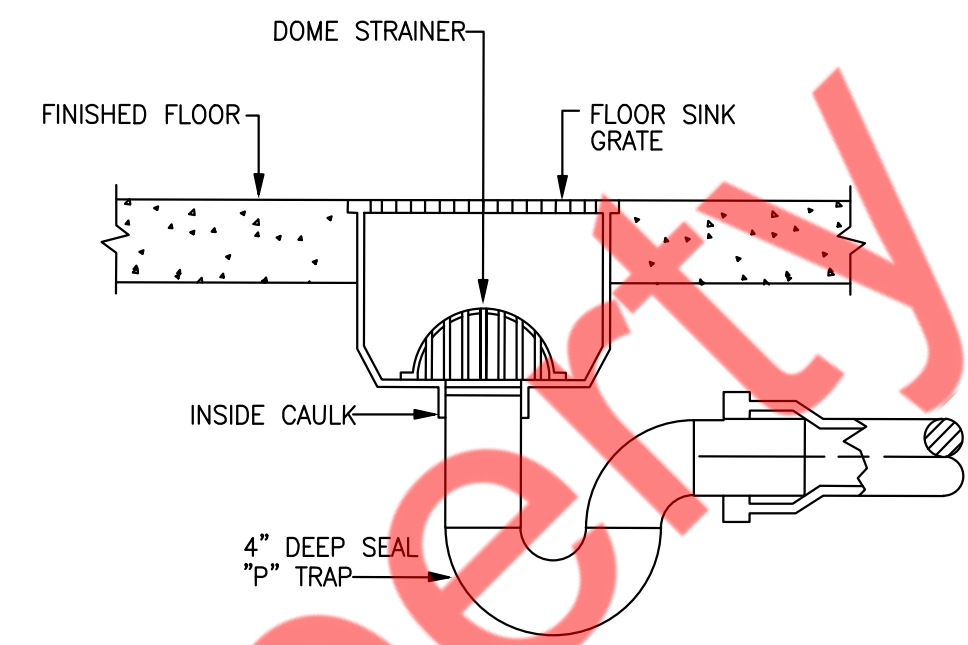
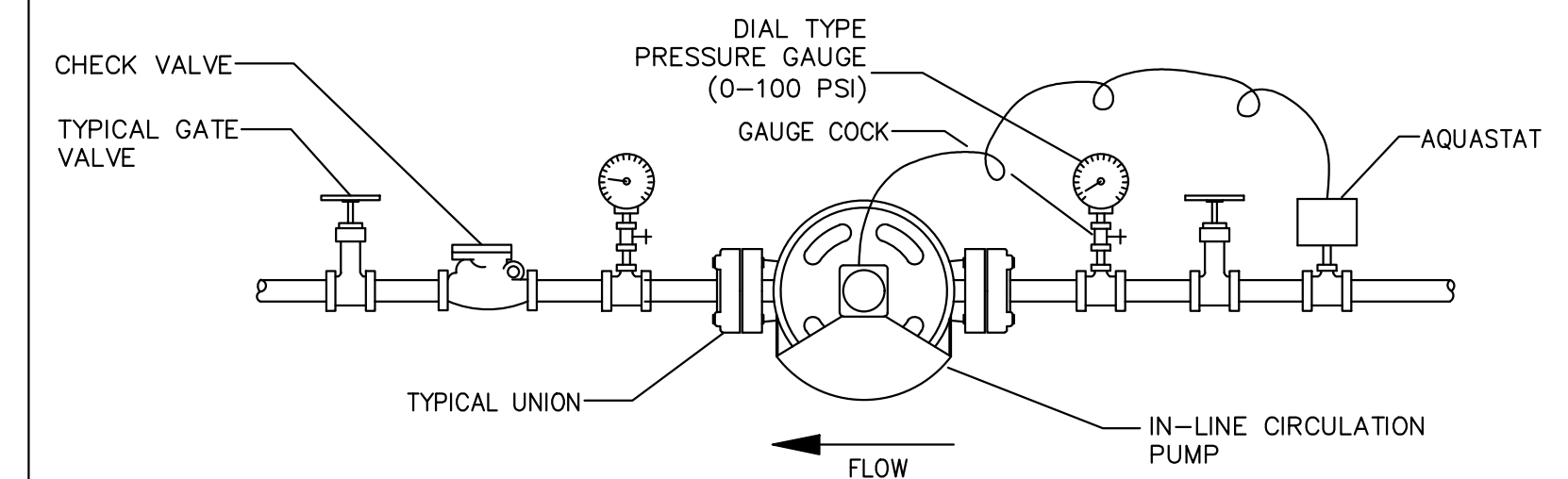
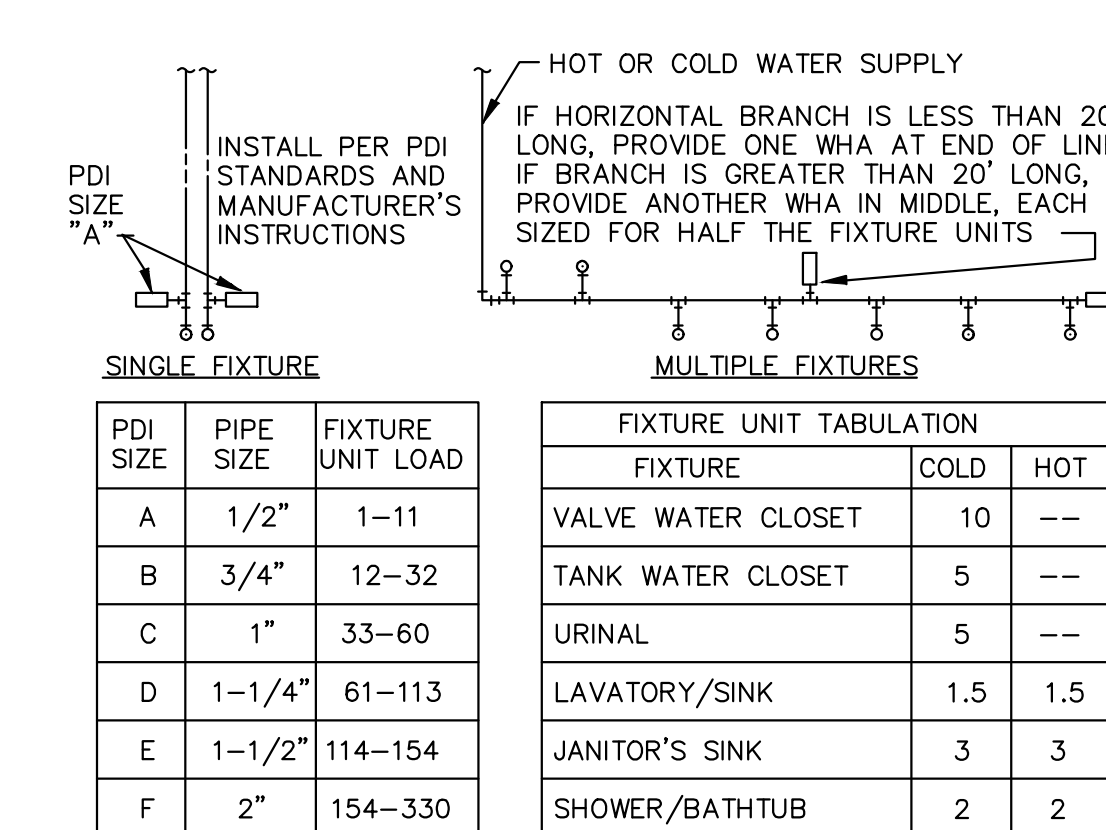


COMMENTS:
1. LOCATE AT BUILDING EXIT, AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT 50' INTERVALS ON STRAIGHT RUNS, AND/OR WHERE SHOWN ON PLANS. PROVIDE BACKFILL PER ARCHITECTURAL SPECIFICATIONS. LOCATE CLEANOUTS WHERE THERE IS 18" CLEAR AROUND. CONSULT LOCAL CODES FOR OTHER FCO REQUIREMENTS.
2. ROUND SECURED GASKETED NICKEL BRONZE ADJUSTABLE TOP WITH "CO" CAST IN COVER. PROVIDE CLEANOUT TOP WITH VARIATIONS SUITABLE FOR FLOOR COVERING (CARPET MARKER, RECESSED FOR TILE, SCORATED FOR UNFINISHED FLOORS). PROVIDE GASKETED PLUG IN CAST IRON BODY. USE TEFLON JOINT COMPOUND ON PLUG THREADS. CLEAN THE TOP OF EXPOSED FCO AFTER INSTALLATION.

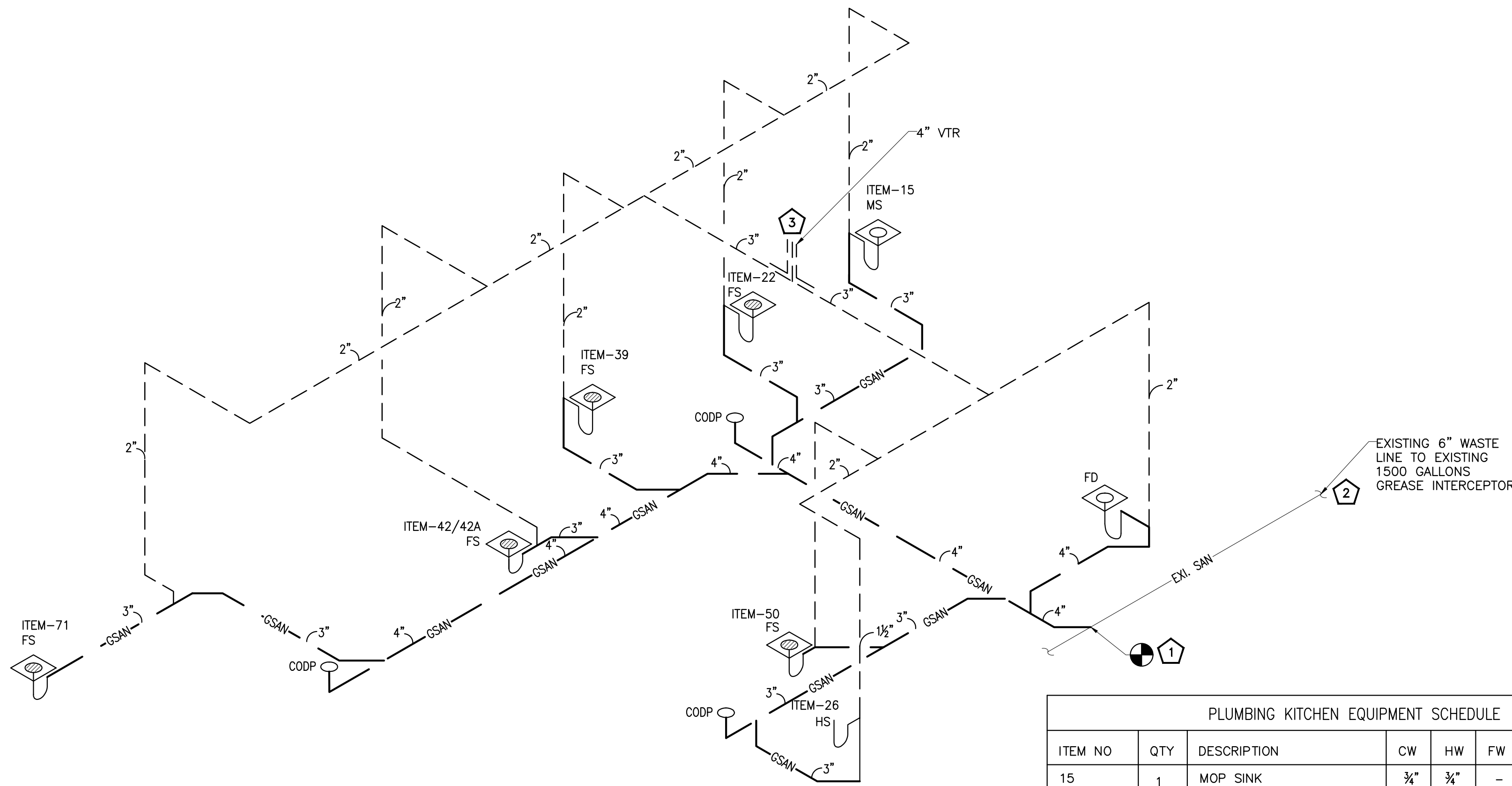
6
P5.1
FLOOR CLEANOUT DETAIL
N.T.S



7
P5.1
HANGER DETAIL
N.T.S

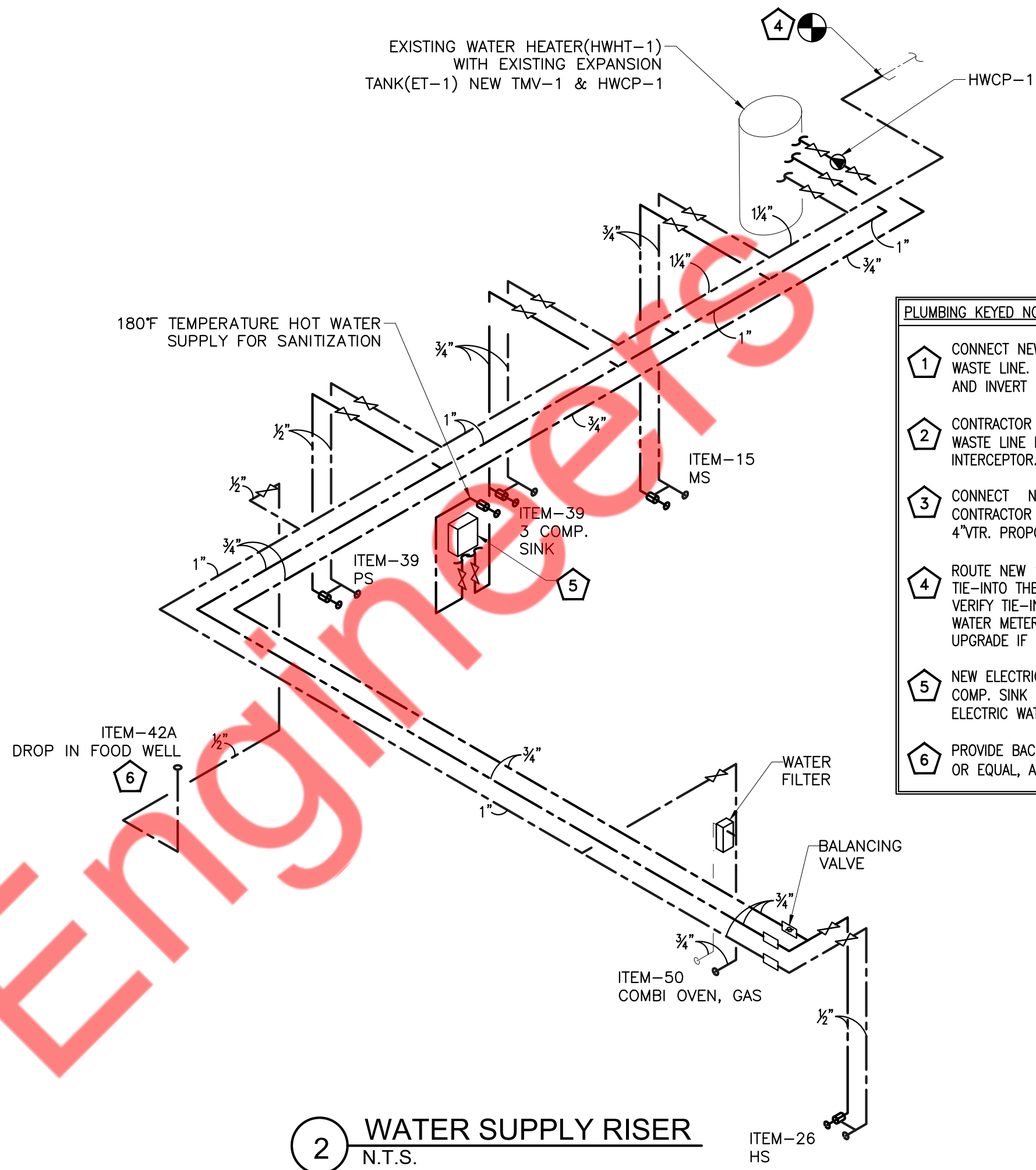
<div><p>CONCEALED VALVES AND FITTINGS</p><ul style="list-style-type: none">• WRAP WITH 1-INCH THICK, 1-POUND DENSITY TO REQUIRED PIPE INSULATION THICKNESS• SECURE WITH WIRE OR TAPE.• VAPOR SEAL COLD WATER, CHILLED WATER AND STORM WATER PIPING.</div> <div></div> <div><p>CONCEALED VALVES AND FITTINGS</p><ul style="list-style-type: none">• PREMOLDED FIBER GLASS OR RADIAL MITERED PIPE INSULATION• SKIM COAT OF INSULATION CEMENT• COAT OF MASTIC• WRAP WITH FIBER GLASS REINFORCING CLOTH.• FINISH COAT OF MASTIC• OVERLAP 2-INCHES ON PIPE INSULATION.<p>SEALING LAP SECURE WITH ADHESIVE ALL SEALS AND LAPS AT TOP.</p></div>	<div><p>PROVIDE CLEANOUTS IN TURNS/ENDS OF PIPE. USE DWV FITTINGS IF SIZE IS LARGER THAN 1".</p><p>DISCHARGE INTO RECEPTOR WITH AIR GAP SUFFICIENT TO REMOVE GRATE AND STRAINER. MAKE AIR GAP TWICE PIPE DIAMETER OR MINIMUM OF 2".</p><p>SLOPE PIPE AS MUCH AS POSSIBLE TOWARD DISCHARGE</p><p>MAKE CONNECTION TO EQUIPMENT AS REQUIRED.</p><p>VERIFY WITH LOCAL CODES— IF WHEN TRAP AND/OR VENT ARE REQUIRED FOR THE LENGTH OF DRAIN PIPE INSTALLED</p><p>MAKE PIPE MINIMUM ONE SIZE LARGER THAN EQUIPMENT CONNECTION, MINIMUM 3/4". USE "M" OR "L" HARD COPPER UP TO 1" AND TYPE DWV FOR LARGER</p><p>ROUTE PIPE INCONSPICUOUSLY AND UNOBTUSIVELY, SECURED BY MEANS OF CLAMPS OR BRACKETS TO THEIR OWN EQUIPMENT UNITS AND ROUTED TO THEIR SPECIFIC FLOOR SINKS. THERE SHALL NOT BE ANY LOOSE OR DANGLING WASTE LINES, NOR WASTE LINES LYING ON THE FLOOR. DO NOT INSULATE INDIRECT DRAIN PIPE WHEN INSTALLED EXPOSED IN FOOD SERVICE FACILITY. REFER TO LOCAL CODES FOR FURTHER INFORMATION.</p></div>	<div></div> <div><p>NOTE:</p><p>1. HEATER TO BE INSTALL BELOW THE LEVEL OF ALL HOT WATER OUTLET SERVICED BY THE HEATER.</p></div>	<div></div> <div><p>NOTES:</p><p>1. SLEEVES TO BE SIZED AS REQUIRED FOR OVERALL PIPE DIAMETER. (INCLUDING INSULATION, WHERE APPLICABLE)</p><p>2. PIPE CLAMPS FOR COPPER PIPING SHALL BE COPPER PLATED.</p></div>
<div><p>1 P5.2 N.T.S</p><p>INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS</p></div>	<div><p>2 P5.2 N.T.S</p><p>INDIRECT/CONDENSATE DRAIN</p></div>	<div><p>3 P5.2 N.T.S</p><p>UNDER SINK WATER HEATER INSTALLATION DETAILS</p></div>	<div><p>4 P5.2 N.T.S</p><p>FLOOR PENETRATION DETAIL</p></div>
<div></div>	<div></div>	<div></div>	<div></div> <div><p>PC TO PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUIVALENT WITH PISTON AND O-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL IN LINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE THE UNITS AS SHOWN ON THE DRAWINGS AND/OR PER THE TABLES SHOWN ABOVE.</p></div>
<div><p>5 P5.2 N.T.S</p><p>VENT THROUGH ROOF (VTR) DETAILS</p></div>	<div><p>6 P5.2 N.T.S</p><p>FLOOR SINK DETAILS</p></div>	<div><p>7 P5.2 N.T.S</p><p>INLINE RECIRCULATING PUMP DETAIL</p></div>	<div><p>8 P5.2 N.T.S</p><p>WATER HAMMER ARRESTORS</p></div>

Date: FEB 2024
Revision:
Date:FEB-28-2024 CHECK SET



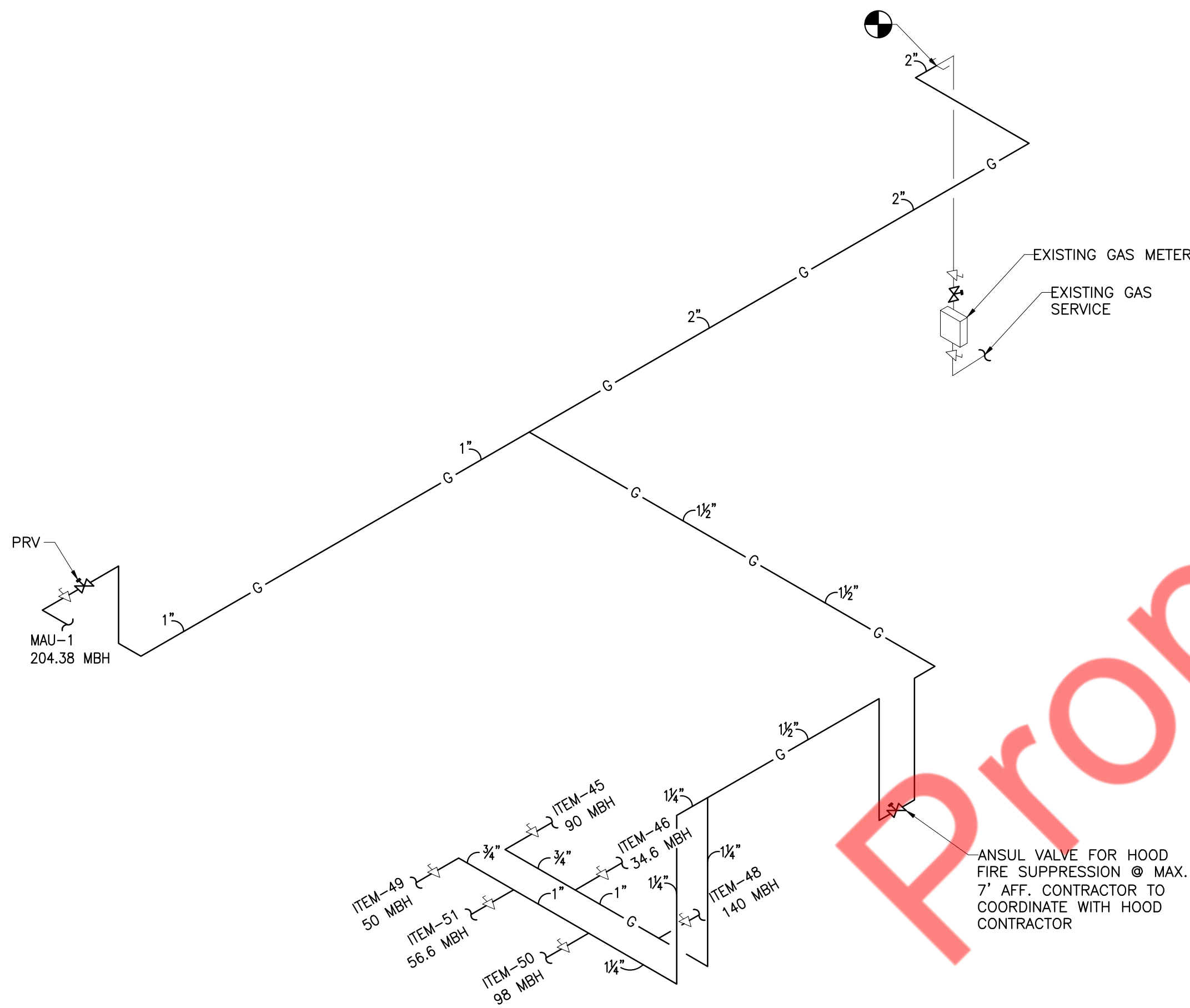
1 SANITARY RISER
N.T.S.

PLUMBING KITCHEN EQUIPMENT SCHEDULE							
ITEM NO	QTY	DESCRIPTION	CW	HW	FW	DRAINAGE	
						DIRECT	INDIRECT
15	1	MOP SINK	¾"	¾"	–	3"	–
22	1	3 COMPARTMENT SINK	¾"	¾"	–	–	2"
26	1	HAND SINK	½"	½"	–	1½"	–
39	1	PREP SINK	½"	½"	–	–	2"
42A	1	DROP IN FOOD WELL	½"	–	–	–	¾"
71	1	SODA DISPENSER	–	–	–	–	1"
50	1	COMBI OVEN, GAS	¾"	–	¾"	–	1½"



2 WATER SUPPLY RISER
N.T.S.

- PLUMBING KEYED NOTES:
- CONNECT NEW 4" GREASE SANITARY LINE TO EXISTING 6" WASTE LINE. CONTRACTOR TO VERIFY IN FIELD SIZE, ROUTING AND INVERT LEVEL OF EXISTING 6" WASTE LINE.
 - CONTRACTOR TO FIELD VERIFY AND CONFIRM THE EXISTING 6" WASTE LINE IS TO BE CONNECTED TO 1500 GALLONS GREASE INTERCEPTOR.
 - CONNECT NEW 3" VENT PIPE TO EXISTING 4" VTR. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF EXISTING 4"VTR. PROPOSE NEW 4" VTR IF EXISTING VTR NOT AVAILABLE.
 - ROUTE NEW 1 1/2" CW PIPING WITH SHUT OFF VALVE AND TIE-INTO THE EXISTING WATER LINE. CONTRACTOR TO FIELD VERIFY TIE-IN CONNECTION LOCATION, SIZE, ROUTING, EXISTING WATER METER AND BFP REQUIREMENT WITH LANDLORD. UPGRADE IF REQUIRED.
 - NEW ELECTRIC TANKLESS WATER HEATER (HWHT-2) FOR 3 COMP. SINK SANITIZATION BOWL. REFER SCHEDULE FOR ELECTRIC WATER HEATER (HWHT-2)
 - PROVIDE BACK-FLOW PREVENTER BFP-1 (WATTS SERIES NF8 OR EQUAL, ASSE-1011) TO DROP IN FOOD WELL.



3 NATURAL GAS RISER
N.T.S.

GAS EQUIPMENT SCHEDULE					
ITEM NO.	QTY.	DESCRIPTION	MANUFACTURER	MODEL	BTU/HR.
45	1	RANGE, STOCK POT, GAS	SOUTHBEND	SPR-2J-FB	90,000
46	1	RICE/GRAIN COOKER	TOWN	RM-55N-R	34,600
48	1	GAS FLOOR FRYER	IMPERIAL	IFS-50	140,000
49	1	HOTPLATE, COUNTERTOP, GAS	STAR MFG	602HF	50,000
50	1	COMBI OVEN, GAS	ALTO-SHAM	CTP7-20G	98,000
51	1	GRIDDLE, GAS, COUNTERTOP	STAR MFG	624TF	56,600
MAU-1	1	MAKE UP AIR UNIT	-	-	204,378
TOTAL LOAD					673,578

- NEW GAS PIPING - LOW PRESSURE SYSTEM
INLET PRESSURE < 2.0PSI
PRESSURE DROP- 0.5 IN W.C
LONGEST LENGTH- APPROX. 85'
GAS PIPE SIZING PER TABLE 402.4(2), INDIANA
FUEL GAS CODE, 2014. REQUIRED GAS PIPE SIZE IS - 2"
GAS NOTES:
- CONTRACTOR TO FIELD VERIFY EXISTING AVAILABLE GAS PRESSURE AND MAKE SURE TO PROVIDE ADEQUATE INLET PRESSURE REQUIRED FOR MECHANICAL AND KITCHEN EQUIPMENTS.
 - PROVIDE SHUT-OFF VALVE AN ACCESSIBLE LOCATION.
 - CONTRACTOR SHALL VERIFY ACTUAL GAS PRESSURE AND LONGEST LENGTH OF RUN FROM METER TO FARTHEST APPLIANCE PRIOR TO INSTALLATION AND NOTIFY ENGINEER IF CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLAN.

PUMP SCHEDULE											
TAG	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA				SELECTION BASED ON		REMARKS/OPTIONS
			GPM	HEAD (FT.)	HP	V	PH	HZ	MANUFACTURER	MODEL NUMBER	
HWCP-1	HOT WATER RECIRC. PUMP	IN-LINE	2.0	9	1/12	120	1	60	BELL & GOSSETT	PL-30-B	NOTE 1,2
OPTIONS (ALL RCP UNITS) • AQUA-STAT & NIGHT TIMER • BALANCING VALVE & CHECK VALVE • FLANGED PUMP • MAINTENANCE BALL VALVES ON BOTH SIDES OF PUMP											
NOTES: 1. SET AQUA-STAT WITH SET POINT 10 DEGREES BELOW SYSTEM SUPPLY TEMP. 2. INSTALL RECIRCULATION PUMP PER MANUFACTURERS REQUIREMENTS.											

MIXING VALVE SCHEDULE						
TAG	DESCRIPTION	MAXIMUM GPM	MINIMUM GPM	PRESSURE LOSS	SELECTION BASED ON	
					MANUFACTURER	MODEL NUMBER
TMV-1	THERMOSTATIC MIXING VALVE	30	0.1	5	ACORN	MV17-3
NOTES: 1. INSTALL MIXING VALVE PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL PIPING AND VALVES PER O&M MANUAL.						

HOT WATER HEATER SCHEDULE										
TAG	LOCATION	SERVING	QUANTITY	FLOW RATE GPM @ RISE	TYPE	ELECTRICAL				REMARK
						VOLTS	PHASE	HERTZ	INPUT KW	
HWHT-2	BELOW 3 COMP. SINK	NEAR 3 COMP. SINK	1	2.5 @ 38°F	ELECTRIC POINT OF USE WATER HEATER	208	3	60	14	EEMAX EX190TC DIMENSIONS 10.12"(H) X 10.68"(W) X 4.32"(THICKNESS)

DRAIN ACCESSORIES & SCHEDULE																																							
BODY																STRAINER														REMARKS									
DESIGNATION	REQUIRED	SERIES NO.					CAST IRON	GALVANIZED	ALL BRONZE	HIGH DENSITY POLYETHYLENE	SECONDARY CLAMP	CLAMPING DEVICE	DECK CLAMP	BACK WATER VALVE	SUMP RECEIVER	FLASHING COLLAR	CAST IRON	GALVANIZED	ALL BRONZE	NICKEL BRONZE (ADJUSTABLE)	CHROME PLATED	SEDIMENT BUCKET	SECONDARY STRAINER	POLISHED FINISH	SATIN FINISH	TRACTOR GRATE	ST. STEEL	FUNNEL TOP	FLAT TOP	DOME	RAISED LIP	EXTENSION(WHERE REQUIRED)	LESS GRATE	BRONZE TOP	IRON GRATE	POLYETHYLENE	SOLID HINGED COVER	LOCATION	
		ZURN	WADE	SMITH	JOSAM																																		
FD	•	ZURN-Z505					•														•																		REFER PLANS

- NOTES:
- ALL FLOOR DRAINS IN FINISHED AREAS AND ALL ROOF DRAINS SHALL BE LOCATED AS PER THE ARCHITECTURAL DRAWINGS.
 - THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS.
 - THE TOP OF ALL FLOOR DRAINS SHALL BE FLUSH WITH THE ADJACENT FINISHED FLOOR.
 - PROVIDE ELECTRONIC TRAP PRIMER FOR MECHANICAL/TRASH ROOM FLOOR DRAINS & FUNNEL DRAIN. PROVIDE FLOW CONTROL TRAP PRIMER FOR ALL OTHER ROOM FLOOR DRAINS.