MECHANICAL SYMBOLS LIST

			DOLC AND CENCODE				
—(AC−1)(TXF−1)	EQUIPMENT SYMBOL	CONTROLS AND SENSORS					
•	POINT OF NEW CONNECTION TO EXISTING	T	THERMOSTAT				
		\bigcirc_{S}	TEMPERATURE SENSOR				
AIR DEVICES			DUCTWORK				
\boxtimes	CEILING DIFFUSER SUPPLY	======	AIR DUCT W/ 1.5" ACOUSTICAL LINING				
	CEILING DIFFUSER RETURN	- ~~-	FLEXIBLE DUCT				
	ICT ACCESSORIES	FC FC	FLEXIBLE CONNECTION				
	T	24X12	RECTANGULAR DUCT (WIDTH X DEPTH)				
BD	BACKDRAFT DAMPER		SUPPLY AIR RECTANGULAR DUCT CROSS SECTION				
			RETURN AIR RECTANGULAR DUCT CROSS SECTION				
	VOLUME DAMPER W/ ACCESS DOOR						
•		1					

MECHANICAL ABBREVIATIONS

FIRE DAMPER W/ ACCESS DOOR

14120117 (14	HONE ADDITENATIONS						
AL	ACOUSTIC LINING						
CDS	CEILING DIFFUSER SUPPLY						
CDR	CEILING DIFFUSER RETURN						
CFM	CUBIC FEET OF AIR PER MINUTE						
COP	COEFFICIENT OF PERFORMANCE						
EER	ENERGY EFFICIENCY RATIO						
EN	ENERGY ANALYSIS						
FC	FLEXIBLE CONNECTION						
Hene	HEATING SEASONAL						
HSPF	PERFORMANCE FACTOR						
EF	EXHAUST FAN						
CEED	SEASONAL ENERGY						
SEER	EFFICIENCY RATIO						
TEF	TOILET EXHAUST FAN						
VD	VOLUME DAMPER						
VFD	VARIABLE FREQUENCY DRIVE						
FD	FIRE DAMPER						
MD	MOTORIZED DAMPER						
OA	OUTSIDE AIR						
RTU	ROOF TOP UNIT						
RG	RETURN AIR GRILLE						

	MECHANICAL DRAWING LIST
M0.1	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M0.2	MECHANICAL SPECIFICATIONS (1 OF 2)
мо.3	MECHANICAL SPECIFICATIONS (2 OF 2)
M1.1	MECHANICAL FLOOR & ROOF PLANS
M5.1	MECHANICAL DETAILS (1 OF 3)
M5.2	MECHANICAL DETAILS (2 OF 3)
M5.3	MECHANICAL DETAILS (3 OF 3)
M6.1	MECHANICAL SCHEDULES
M7.1	HOOD DATA
M8.1	HEAT LOAD CALCULATIONS REPORT (1 OF 2)
M8.2	HEAT LOAD CALCULATIONS REPORT (2 OF 2)

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. 2020 FLORIDA BUILDING CODE, BUILDING 7TH EDITION
- b. 2020 FLORIDA BUILDING CODE, MECHANICAL 7TH EDITION
- c. 2020 FLORIDA BUILDING CODE , PLUMBING 7TH EDITION
- d. 2020 FLORIDA BUILDING CODE, ENERGY CONSERVATION 7TH EDITION
- e. 2020 FLORIDA BUILDING CODE, FUEL GAS 7TH EDITION

FLORIDA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2020 FLORIDA BUILDING CODE; BASE CODE IBC 2018, AND ALL RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- 1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2020 FLORIDA MECHANICAL CODE,
- 3. AS PER C408.2.5 OF FLORIDA BUILDING CODE; BASE CODE FECC 2020, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER.
- 4. AS PER C408.3.2 OF FLORIDA BUILDING CODE; BASE CODE FECC 2020, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTAINED MANUAL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED 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 FLORIDA BUILDING CODE; BASE CODE FBC 2020, REQUIREMENTS AS OUTLINES IN SECTION.
- 6. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF FLORIDA BUILDING CODE; BASE CODE FMC 2020 CHAPTER 4 AND CHAPTER 5: A. MECHANICAL VENTILATION - SECTION 403.
- 8. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
- A. STANDARDS OF HEATING FLORIDA BUILDING CODE; BASE CODE FMC 2020.
- B. DUCT CONSTRUCTION AND INSTALLATION-SECTION 603 OF FLORIDA BUILDING CODE; BASE CODE FMC 2020.
- BASE CODE FMC 2020. D. AIR FILTERS -SECTION 605 OF FLORIDA BUILDING CODE; BASE CODE FMC 2020. . MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION

C. AIR INTAKES, EXHAUSTS AND RELIEF-SECTION 401 OF FLORIDA BUILDING CODE;

- SYSTEMS -SECTION 513 OF FLORIDA BUILDING CODE; BASE CODE FMC 2020. 9. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING
- SEASON: 68 DEG. FAHRENHEIT. 10. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE
- WALL CONSTRUCTION AND LOCATION.
- 11. 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.

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.
- 2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY 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 MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE
- 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 THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- 6. 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.
- 7. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- 8. 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.
- 9. 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 PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.

- 10. 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. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. 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.
- 11. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING 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.
- 12. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- 13. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- 14. 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 APPROVA
- 15. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE C403.2.4.1 GENERAL (MANDATORY): THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- 16. 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 EXCEPTION: IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- 17. 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.
- AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- 19. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 20. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY b. C403.2.4.1.2 DEADBAND (MANDATORY) PERIOD BEGINS UPON PROJECT ACCEPTANCE
- 21. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 22. 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 EXCEPTIONS: ADDITIONAL COST TO THE OWNER.
- 23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY 2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- 24. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- 25. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 26. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE d. C403.2.4.2 OFF-HOUR CONTROLS (MANDATORY) ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT 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 EXCEPTIONS: EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- 27. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- 28. 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.
- 29. 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.
- 30. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR
- WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED. "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

SCOPE OF WORK

SCOPE OF WORK

- 1.THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION 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.
- 2.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 WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY LY TO THIS WORK.
- THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES NCURRED 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 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.

THERMOSTATIC CONTROLS:

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

- INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:
- THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM).
- 18. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING 2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.
 - a. C403.2.4.1.1 HEAT PUMP SUPPLEMENTARY HEAT (MANDATORY)
 - HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT, EXCEPT DURING DEFROST, PREVENT SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE THE HEATING LOAD.

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

- 1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
- TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.
- c. C403.2.4.1.3 SETPOINT OVERLAP RESTRICTION (MANDATORY)
- WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH. MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.4.1.2.
- EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

- . ZONES THAT WILL BE OPERATED CONTINUOUSLY.
- 2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH LOCATED WITH READY
- e. C403.2.4.2.1 THERMOSTATIC SETBACK (MANDATORY)
- THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).
- f. C403.2.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN (MANDATORY)
- AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.
- g. C403.2.4.2.3 AUTOMATIC START (MANDATORY)
- AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.

GENERAL HVAC NOTES

GENERAL:

- 1. 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.
- 2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- 3. 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.
- 4. 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.
- 5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- 6. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- 7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- 8. 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.
- 9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- 10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- 11. 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.
- 12. 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.
- 13. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- 14. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED 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.
- 15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- 16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION—FREE INSTALLATION.
- 17. 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.
- 18. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES
- 19. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- 20. 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.
- 21. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- 22. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
- 23. 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

- 1. 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.
- 2. 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 ASHRAF.
- 3. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- 4. SUPPLY AND RETURN DUCTWORK 20' FROM ALL HVAC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- 5. RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- 6. 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.
- 7. 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.
- 8. 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.
- 9. ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- 10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- 11. 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.
- 12. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- 13. ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- 14. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- 15. 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.
- 16. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- 17. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- 18. 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.
- 19. 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.
- 20. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- 21. 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.
- 22. 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.
- 23. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

SPECIFICATIONS

SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

- A. THE BIDDER BY MAKING A BID REPRESENTS THAT:
- THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.
- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

- A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON—TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.
- C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

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.
- 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 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. 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.

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 PUTTYd. MORTAR
- h. SILICONE FOAM
- i. PILLOWS/BAGS
- j. INTUMESCENT WRAP STRIPSk. INTUMESCENT COMPOSITE SHEET

1.6 MANUFACTURERS

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

END OF SECTION 078413

SECTION 230529 — HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PERFORMANCE REQUIREMENTS

- DELEGATED DESIGN: DESIGN TRAPEZE PIPE 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.
- 1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS,
- SYSTEM CONTENTS, AND TEST WATER.

 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.

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- 1.2 SUBMITTALS

 A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER
- 1.3 QUALITY ASSURANCE
- A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE STEEL."
- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
- B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL
- C. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE
- D. METAL FRAMING SYSTEMS: MFMA MANUFACTURERE. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE
- F. THERMAL—HANGER SHIELD INSERTS:
- G. FASTENER SYSTEMS: POWDER—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:

 ACOUSTICAL PIPE ANCHOR.

 ALL—DIRECTIONAL,
- 1.RESILIENT PIPE GUIDES.
- AIR-MOUNTING SYSTEMS:
- 1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED—AIR BELLOWS.
- 2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED—AIR BELLOWS.
- 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.
 - 2. INERTIA BASE: FACTORY—FABRICATED, WELDED, STRUCTURAL—STEEL BASES AND RAILS READY FOR

. 1.2 FIELD QUALITY CONTROL

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

FIELD-APPLIED, CAST-IN-PLACE CONCRETE

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:
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. ACE MOUNTINGS CO., INC.
- 2. AMBER/BOOTH COMPANY, INC.

CALIFORNIA DYNAMICS CORPORATION.

- 4. HILTI, INC.
- 5. ISOLATION TECHNOLOGY, INC.6. KINETICS NOISE CONTROL.
- 7. LOOS & CO.; CABLEWARE DIVISION.

8. MASON INDUSTRIES.

9. TOLCO INCORPORATED; A BRAND OF NIBCO INC.

10. UNISTRUT; TYCO INTERNATIONAL, LTD.

END OF SECTION 230548

END OF SECTION 0102

SECTION 230593 — TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
 - 1. AIR SYSTEMS: CONSTANT VOLUME.
- 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 SJECTION 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

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 ASTME 84.

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-6 R-4.2 WITHIN BUILDING ENVELOPE ASSEMBLY: R-6 R-4.2 OUTSIDE OF BUILDING: R-6 R-4.2

1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS.
- 2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/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.

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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,

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 1 INCH WG PRESSURE, SEAL CLASS "A".
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
- 1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH. USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
- 2. SHEET STEEL SHALL COMPLY WITH ASTMA653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY—COATED (GALVANINEALED) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METALLIC—COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
- 3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT—RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
- 4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33
- 5. PROVIDE EXPANDED TAKE-OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90-DEGREE TAKE-OFF FITTINGS OR TRAIGHT TAPS WILL NOT BE ACCEPTED.
- 6. BUTTON PUNCH SNAP-LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.
- 7. ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR DUCTS IF SIZED IN ACCORDANCE WITH ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY WRITTEN PERMISSION OF THE ENGINEER.

- 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
- 22 UP TO 12 S 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 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.
- 7 ALLINANIINA CLIEFTO
- 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.
- FLEXIBLE ELASTOMERIC.
 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
- COILS AND RELATED COMPONENTS.
 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.

END OF SECTION 233113

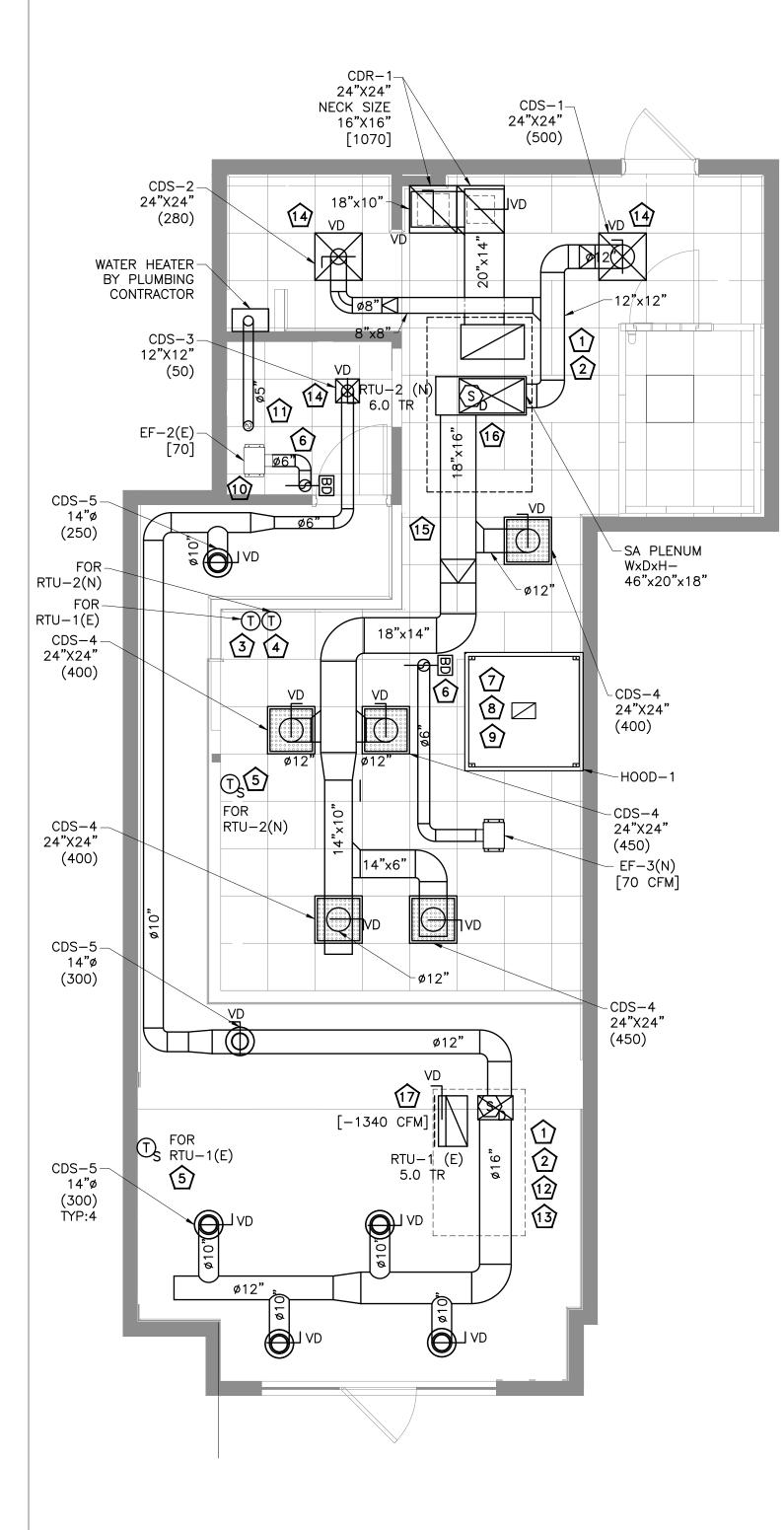
SECTION 233713 — DIFFUSERS, REGISTERS, AND GRILLES

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.

- 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



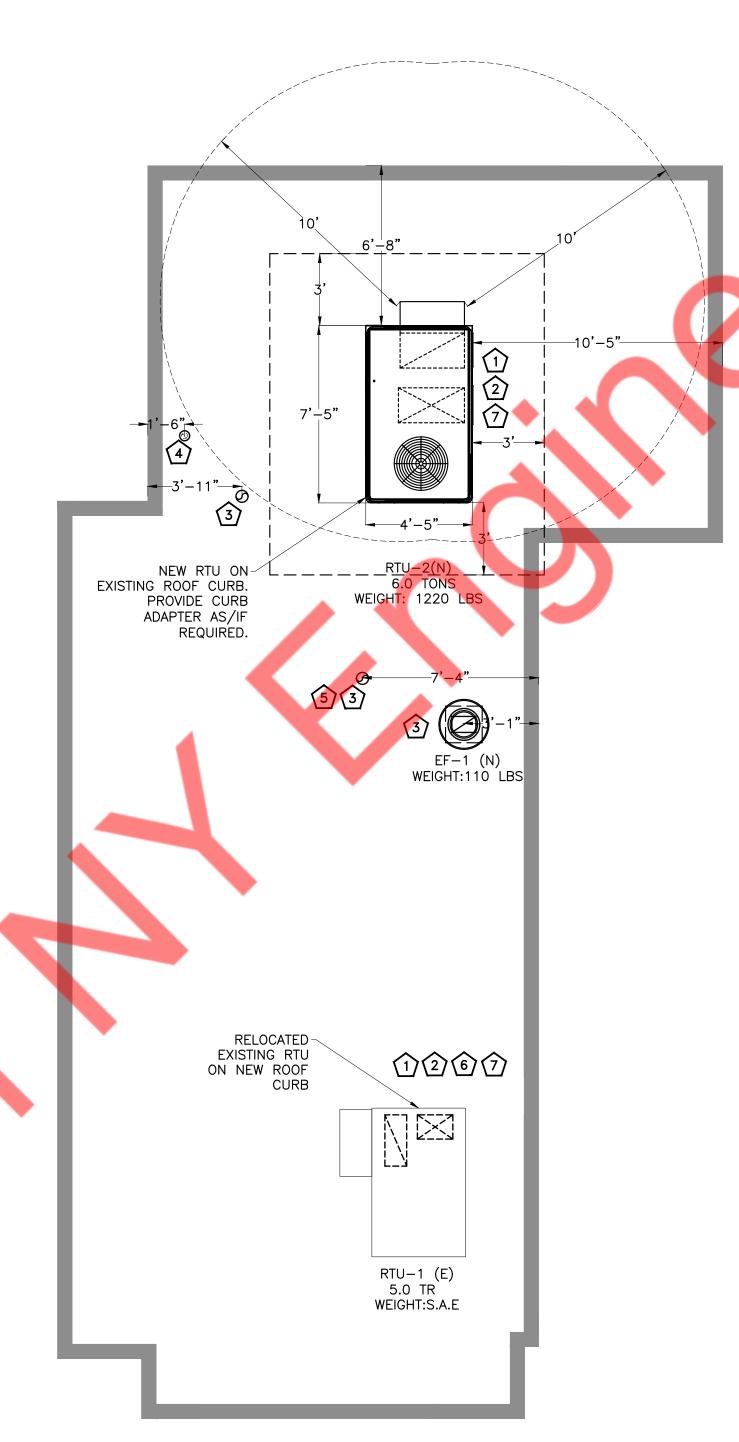
MECHANICAL GENERAL NOTES

- A. CONTRACTOR SHALL BALANCE EACH AIR DIFFUSER WITH THE CFM SHOWN ON PLANS.
 B. DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR DUCTWORK ROUTING. OFFEST AND RUN DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
- C. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
- D. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
 E. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC
- BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
 F. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON
- ACTUAL EQUIPMENT SELECTED.

 G. ALL EXPOSED DUCTWORK SHALL BE AS SHOWN, DOUBLE WALL, INSULATED METAL, PRIMED FOR PAINTING. ALL CONCEALED DUCTWORK SHALL BE INSULATED METAL RECTANGULAR UNLESS OTHERWISE ALLOWED IN WRITING BY THE ENGINEER OF RECORD. COORDINATE FINAL FINISH WITH ARCHITECT.
- H. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.
- I. FOR EXPOSED DUCTWORK, PROVIDE INTERNAL INSULATION. FOR CONCEALED DUCTWORK PROVIDE EXTERNAL INSULATION.
- J. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.

MECHANICAL FLOOR PLANKEY NOTES:

- 1) COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL REQUIREMENT.
- EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM ROOFTOP UNITS TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE. THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
- RELOCATE AND REUSE EXISTING THERMOSTAT. IF EXISTING THERMOSTAT IS NOT PRESENT, THEN INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- 5 TEMPERATURE SENSOR FOR THERMOSTAT SERVING DESIGNATED RTU.
- ROUTE 6"Ø EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND VENT CAP. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES AND TERMINATES.
- 1 INSTALL EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. TRANSITION FROM HOOD CONNECTION TO WELDED KITCHEN EXHAUST DUCT SIZES SHOWN.
- DUCT TO BE PROVIDED WITH KITCHEN EQUIPMENT AND INSTALLED BY MECHANICAL CONTRACTOR. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 9 12"x8" GREASE EXHAUST DUCT FROM HOOD UP THRU ROOF TO EF-1(N).
- 10 CEILING MOUNTED EXHAUST FAN INTERLOCKED WITH RTU-2(N).
- Ø3"/Ø5" CONCENTRIC VENT FROM HOT WATER HEATERS. TERMINATE VENT AT LEAST 36" ABOVE ROOF. INSTALL AS PER MANUFACTURES RECOMMENDATIONS.
- EXISTING EQUIPMENT TO REMAIN SAME AND TO BE REUSED WITH ALL ITS EXISTING ACCESSORIES. CONTRACTOR TO FIELD VERIFY LOCATION OF THE EQUIPMENT ON SITE & INFORM TO ARCHITECT IF ANY ACCESSORIES NOT WORKING OR NOT IN GOOD CONDITION.
- RELOCATE AND REUSE EXISTING SMOKE DETECTOR, IF IT IS NOT PRESENT THEN, PROVIDE NEW ONE. SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N E C SMOKE DETECTOR SHALL BE SYSTEM SENSOR MODEL DH100ACDCLP OR EQUAL.
- (14) EXISTING DIFFUSER TO BE RELOCATED AND REUSED.
- CONTRACTOR TO FIELD VERIFY EXISTING DUCTWORK, ASSOCIATED ACCESSORIES, REUSE EXISTING DUCTWORK AS MUCH AS POSSIBLE. IF DAMAGED REPLACE WITH SIMILAR KIND OR AS PER DRAWING.
- SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N E C.
- 17 FULL SIZE RETURN AIR DUCT WITH W.M.S



MECHANICAL GENERAL NOTES

- A. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
- B. ALL ITEMS TO BE RE-USED OR RELOCATED SHALL BE CLEANED, REPAIRED, AND RESTORED TO LIKE NEW CONDITION PRIOR TO RE-USE.

 C. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED
- WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.

 D. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC
- BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.

 E. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- F. COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM SPACES.
 G. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST

MECHANICAL ROOF PLAN KEYNOTES:

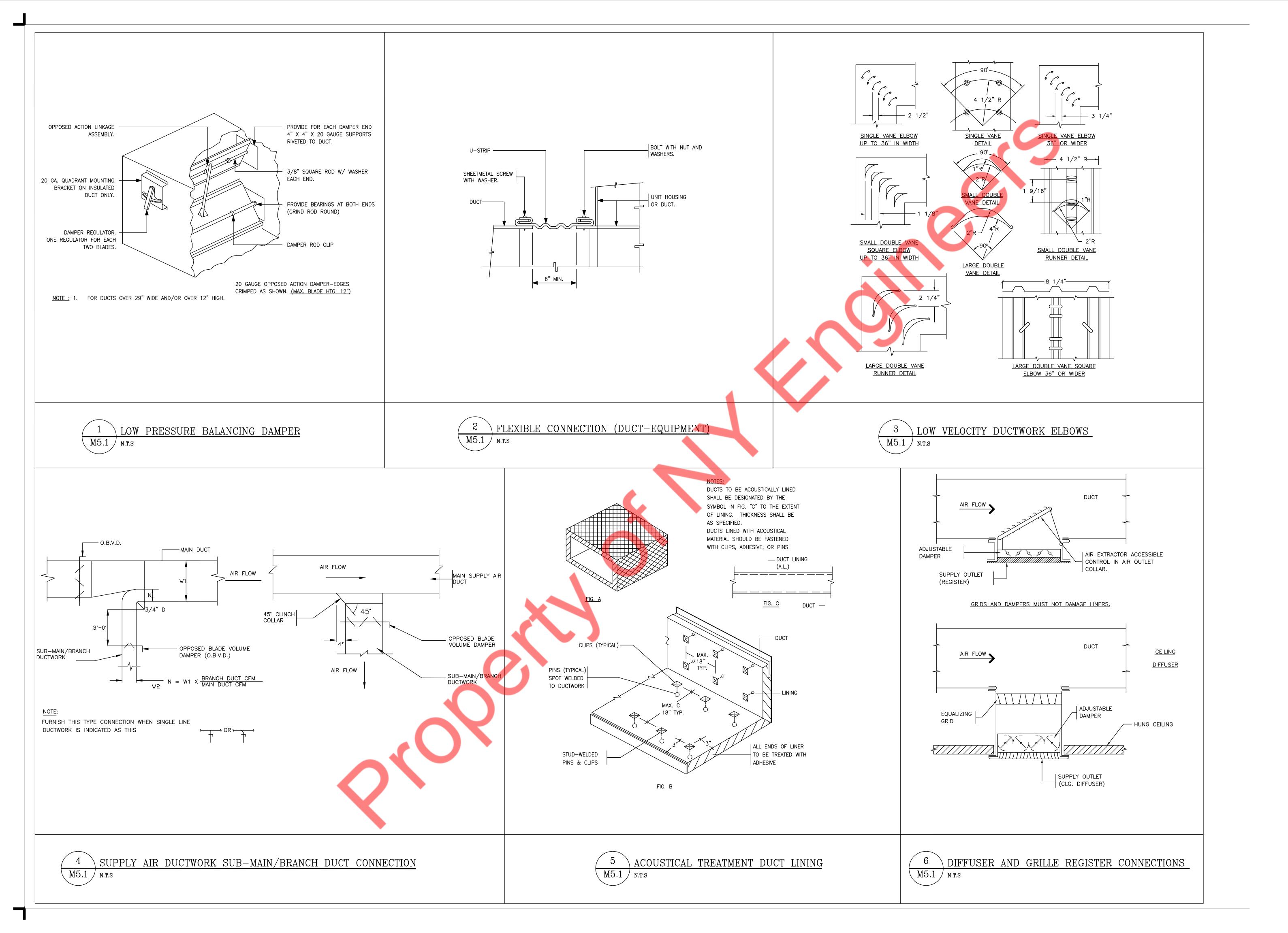
DUCT LENGTH AS NEEDED.

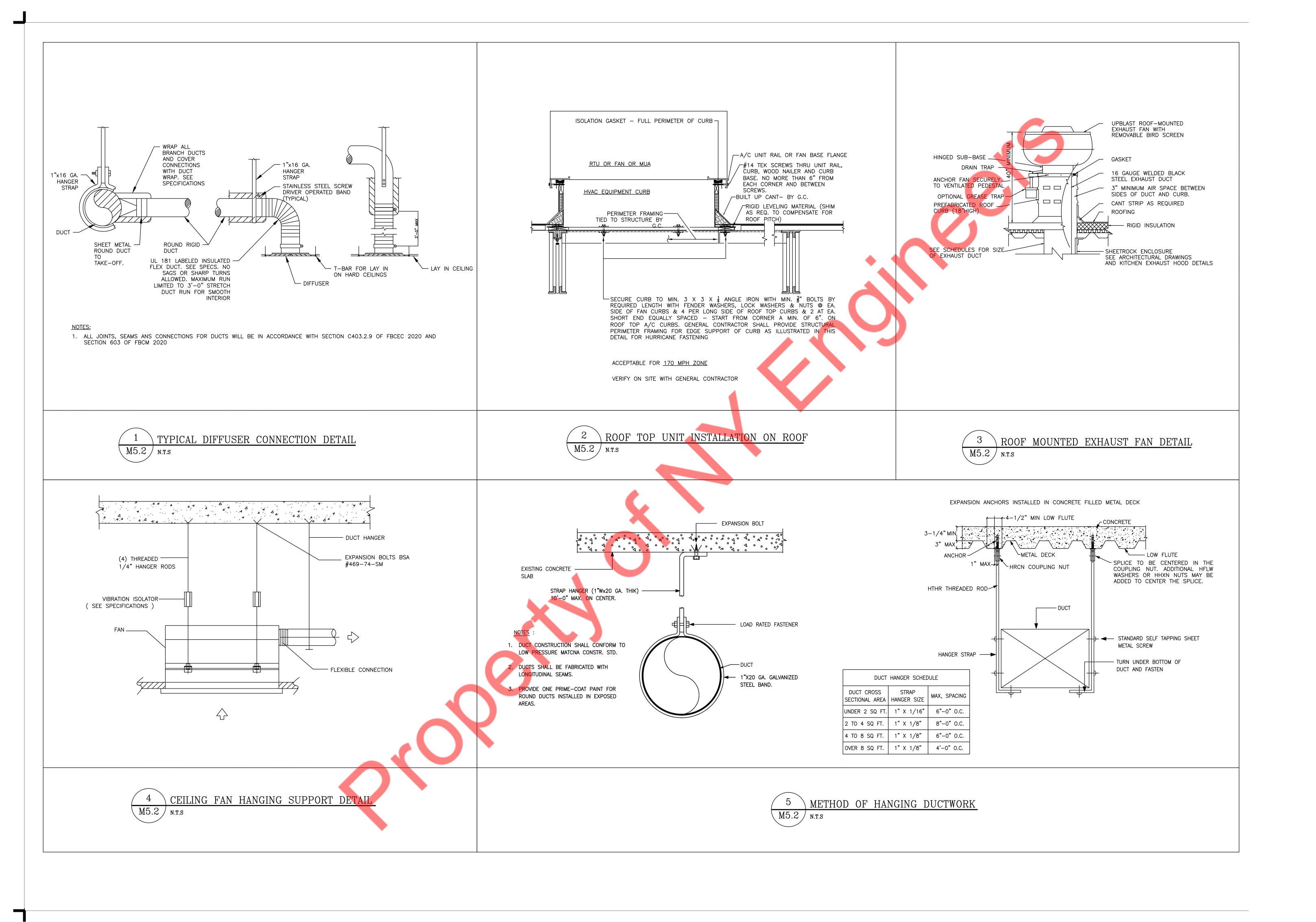
- COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS/ENGINEER OR LANDLORD/CLIENT.
- CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE RTU-2(N) & RTU-1(E).
- CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY INTAKE SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE EXHAUST DUCT TERMINATING ON ROOF.
- ø3"/ø5" CONCENTRIC VENT FROM HOT WATER HEATERS. TERMINATE VENT AT LEAST 36" ABOVE ROOF. INSTALL AS PER MANUFACTURES RECOMMENDATIONS.
- Ø6" EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND VENT CAP. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- EXISTING EQUIPMENT TO REMAIN SAME AND TO BE REUSED WITH ALL ITS EXISTING ACCESSORIES. CONTRACTOR TO FIELD VERIFY LOCATION OF THE EQUIPMENT ON SITE & INFORM TO ARCHITECT IF ANY ACCESSORIES NOT WORKING OR NOT IN GOOD CONDITION.
- CONTRACTOR TO RUN CONDENSATE DRAIN FROM RTU'S TO SINK TAIL PIECE CONNECTION OR NEAREST ROOF DRAIN.

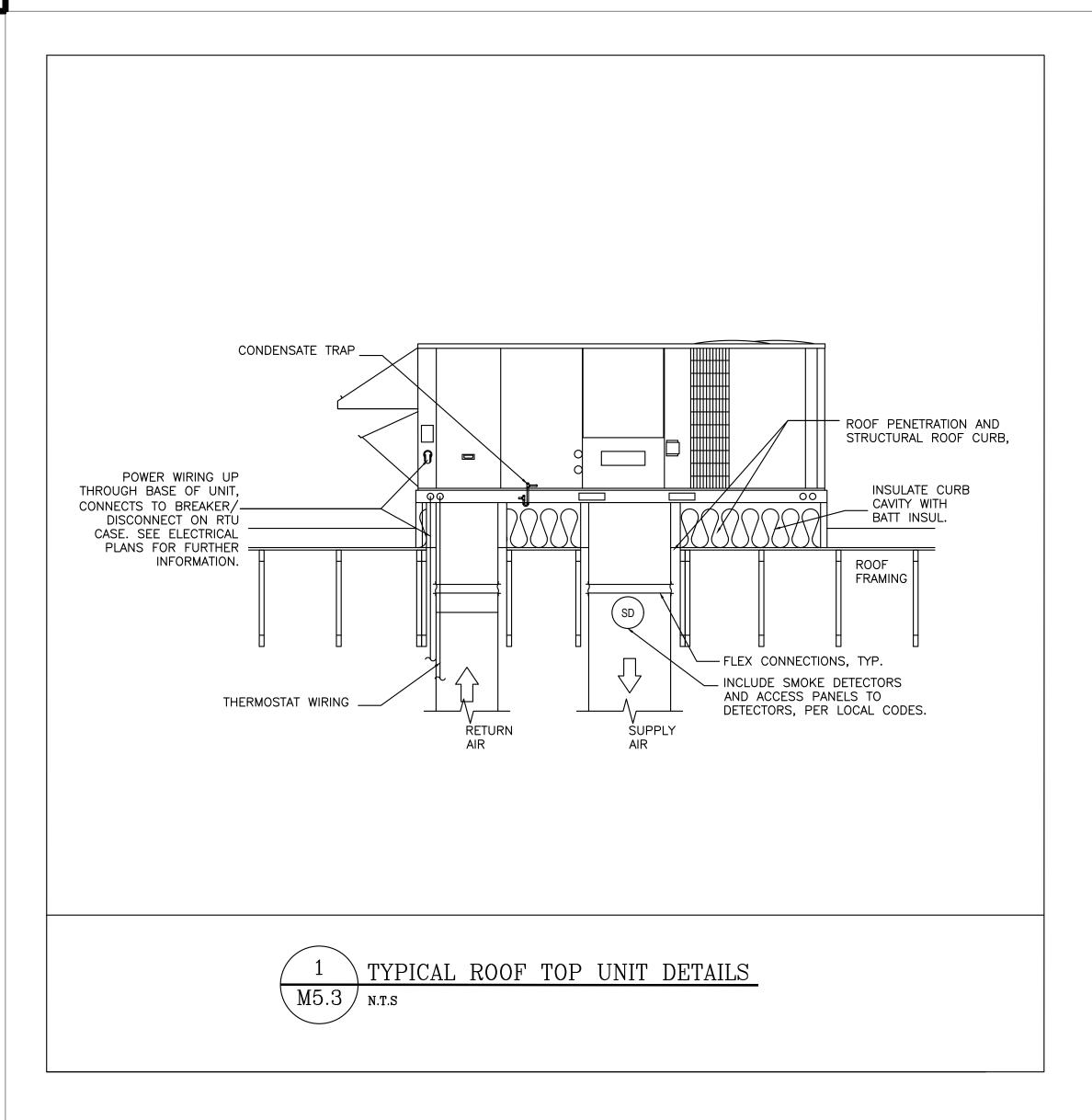
1 MECHANICAL FLOOR PLAN
1/4"=1'-0"

2 MECHANICAL ROOF PLAN

1/4"=1'-0"







								ROOF TOP	UNIT S	CHEDULE											
			AREA	NOMINAL		SUPPLY FAN	l	HEATING CAPACITY			COOLING CAPACIT	TY								OPERATING	1
UNITID	MANUFACTURER	MODEL	SERVED	TONS	SUPPLY AIR	OUTSIDE AIR	MAX. ESP	IN HEAT PUMP MODE	TOTAL	SENSIBL	E AMBIENT TEMP.	ENTERING TEMP.	VOLTS	PH	HZ	Ν/CΛ (Λ)	MOCP (A)	COP	SEER	WEIGHT (LBS.)	REMARK
			SERVED	TONS	CFM	CFM	(IN. OF W.G.)	(MBH)	MBH	MBH	DB (°F)	DB / WB (°F)	VOLIS	РП	П	IVICA (A)	WOCP (A)			WEIGHT (LBS.)	<u> </u>
RTU-1 (E)	S.A.E	S.A.E	SEE PLAN	5.0	1800	460	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	208(VIF)	3(VIF)	60(VIF)	43(VIF)	45(VIF)	S.A.E	S.A.E	S.A.E	15 to 19
RTU-2 (N)	TRANE	WHC074H3 (OR EQUIVALENT)	SEE PLAN	6.0	2880	740	0.5	65	81.48	66.31	95	80/67	208	3	60	42	50	3.5	15.5	1220	1 to 14
NOTES:																					
1	ALL EQUIPMENT M	IUST BE MEETING OR EXCEEDIN	G THE BRA	NDS MININ	1UM REQUIRE	MENTS.															
7	ELECTRICAL CONN	ECTION TO BE SINGLE POINT A	ND TO BE T	HROUGH T	HE BOTTOM O	E THE LINIT															

2 ELECTRICAL CONNECTION TO BE SINGLE POINT AND TO BE THROUGH THE BOTTOM OF THE UNIT.

3 PROVIDE DISCONNECT SWITCH AND AN UNPOWERED GFIC RECEPTACLE. 4 14" ROOF CURB - CONTRACTOR SHALL FIELD INSULATE. SHIP ASAP AHEAD OF THE UNIT.

5 CONDENSATE DRAIN WITH 2" DEEP VENTED TRAP DISCHARGE TO NEAREST DRAIN OR GUTTER OR DOWN SPOUT.

6 CABINET WITH 1/2" FIBERGLASS INSULATION. 7 PROVIDE 8-WIRE, 24 VAC, AUTOMATIC CHANGEOVER, 2-STAGE HEAT / COOL, REMOTELY PROGRAMMABLE THERMOSTAT.

8 REMOTE SENSORS SHALL BE PROVIDED IN SPACE WIRED BACK TO PROGRAMMABLE, 24 HOUR, 7 DAY, THERMOSTATS.

9 ANTI SHORT CYCLE TIMER.

10 THROWAWAY 2" FILTERS (MERV 8).

11 WHERE REQUIRED, PROVIDE LOW AMBIENT COOLING CAPABILITY DOWN TO 0 DEGREES F.

12 DRY BULB & ENTHALPY ECONOMIZER WITH BAROMETRIC RELIEF / 25% MANUAL OUTSIDE AIR DAMPER ASSEMBLY WITH HOOD (ZONE 'E' ONLY). PROVIDE ECONOMIZER WITH FDD.

13 PROVIDE ALL COMPRESSORS WITH 5 YEAR WARRANTY.

14 SUPPLY AIR SMOKE DETECTOR - UNIT MOUNTED

15 S.A.E - SAME AS EXISTING , V.I.F - VERIFY IN FIELD

16 EXISTING RTU WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.

17 CONTRACTOR TO CONFIRM IF EXISTING RTU IS WORKING AT ITS 100% RATED CAPACITY.

18 CONTRACTOR TO FIELD VARIFY EXACT LOCATION AND CONFIGURATION OF RTU ON SITE.

19 CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING RTU TO MATCH VALUES MENTIONED IN ABOVE TABLE..

					EX	HAUST FAN	SCHEDULE					
		FLOW RATE	EXTERNAL	SPEED	I	ELECTRIC DA	TA	MAXIMUM	BASIS OF	DESIGN	WEIGHTS	
TAG	QUANTITY	FLOW RATE	STATIC PRESSURE	SPEED	\//pu/uz	MOTOR HD	FLA (AMPS)	LOUDNESS	DASIS OF	DESIGN	(LBS)	REMARK
		CFM	IN W.G.	RPM	V/F11/11Z	INIOTORTIF	FLA (AIVIF3)	DBA	MANUFACTURER	MODEL	(LD3)	
EF-1(N)	1	1050	0.9	1725	115/1/60	0.25	5.8	-	ACCUREX	XCUE-100-VG	110	1,2
EF-2 (E)	1	70	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	3,4,5
EF-3 (N)	1	70	0.5	900	115/1/60	0.6(MCA)	0.46	48	GREENHECK	SP-A200	30	6,7
NOTES:				•		-		•	_		•	•

1) PROVIDE ALL

2) PROVIDE RO

3) S.A.E :- SAMI

4) EXISTING FA

5) MAXIMUM NOISE CRITERION RATING < 35 DBA. FOR ROUND NECK DIFFUSERS: NECK SIZES SHALL BE:-

15" DIA: 901-1100 CFM 14" DIA: 601-900 CFM 12" DIA: 376-600 CFM 10" DIA: 226-375 CFM 8" DIA: 101-225 CFM 6" DIA: 0-100 CFM

6) DISCONNECT SWITCH, AMCA SEAL & UL CERTIFIED, THERMAL OVERLOAD PROTECTION.

7) INTERLOCK WITH OVEN.

	CFM	IN W.G.	RPM	V/111/112			DBA	MANUFACTURER	MODEL	(LDS)	
1	1050	0.9	1725	115/1/60	0.25	5.8	-	ACCUREX	XCUE-100-VG	110	1,2
1	70	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	3,4
1	70	0.5	900	115/1/60	0.6(MCA)	0.46	48	GREENHECK	SP-A200	30	6,
ALL NECES	SARY ACCESS	SORIES AS PER MAN	IUFACTU	RER'S RECO	MMENDATIO	ONS.					
ROOF CUR	B, WEATHER	PROOF DISCONNE	CT SWITC	H, AMCA SE	AL & UL CER	TIFIED, THERI	MAL OVERLO	OAD PROTECTION.			
ME AS EXI	STING.										
FAN WITH	WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.										
TOR TO FII	ELD VERIFY E	XACT LOCATION AN	ID CONFI	GURATION	OF FANS ON	I SITE.					
CT SWITC	Η ΔΙΜΟΔ SEA	1 & UI CERTIFIED	ΤΗΕΒΙΛΙΔΙ	ΟΛΕΒΙΟΦΕ	PROTECTIO	NI	_			·	

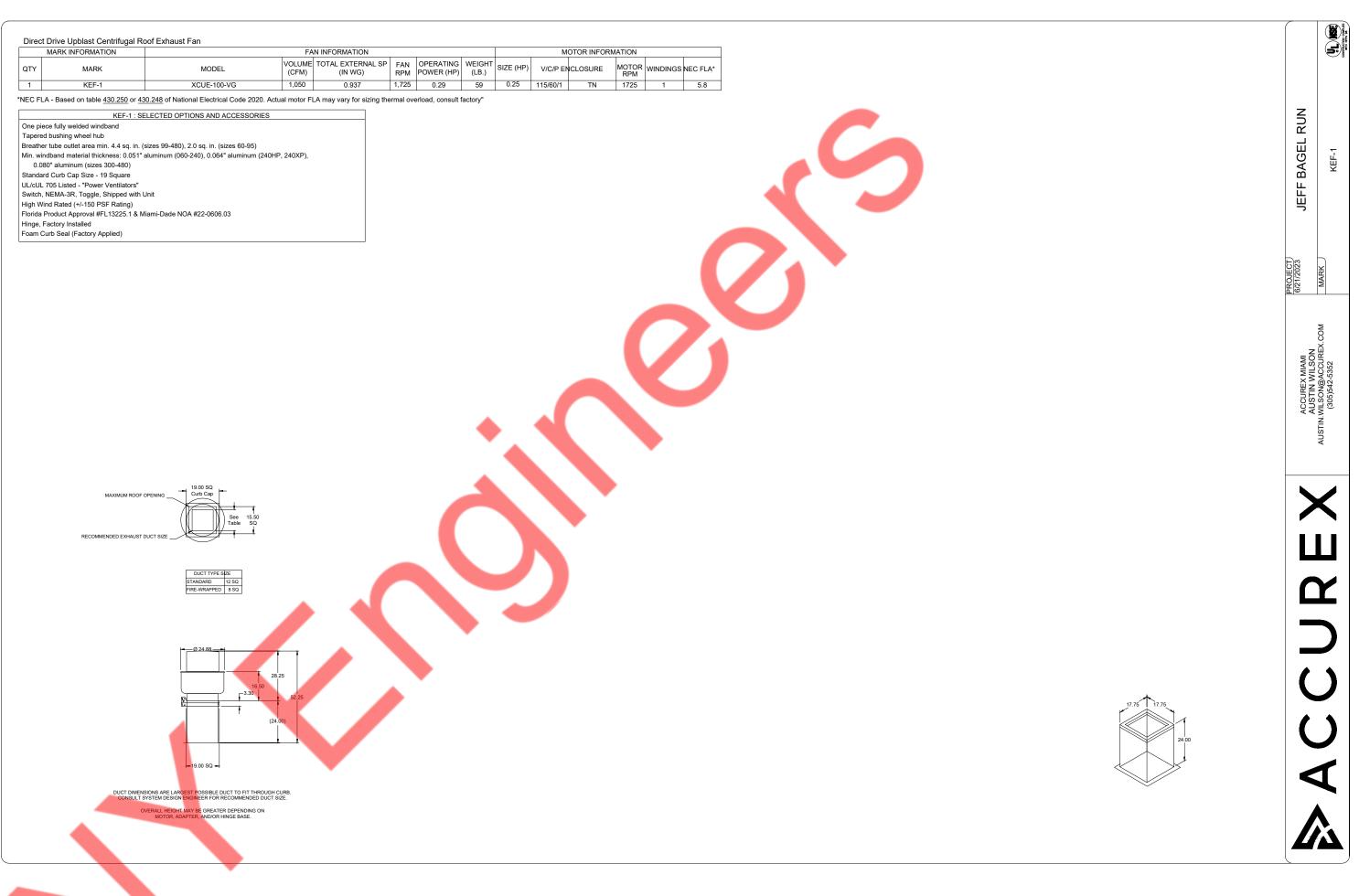
		AIR	TERMINAL DEVIC	ES SCHED	ULE							
TAG	SIZE (IN.)	DESCRIPTION	CONSTRUCTION	FINISH	NECK SIZE (IN.)	BASIS OF D	ESIGN	NOTES				
IAG	SIZE (IIV.)	DESCRIPTION	CONSTRUCTION	ГІМІЗП	NECK SIZE (IIV.)	MANUFACTURER	MODEL	NOTES				
CDS-1	24X24	SUPPLY AIR DIFFUSER	ALUMINUM	WHITE	12	TITUS	OMNI-AA	ALL				
CDS-2	S-2 24X24 SUPPLY AIR DIFFUSER ALUMINUM WHITE 8 TITUS OMNI-AA ALL											
CDS-3	12X12	SUPPLY AIR DIFFUSER	ALUMINUM	WHITE	6	TITUS	OMNI-AA	ALL				
CDS-4	24X24	PERFORATED SUPPLY AIR DIFFUSER	ALUMINUM	WHITE	12	TITUS	PAR	ALL				
CDS-5	Ø14	ROUND CEILING DIFFUSERS	ALUMINUM	WHITE	10	TITUS	TMRA-AA	ALL				
CDR-1	24X24	EGGCRATE GRILLE	ALUMINUM	WHITE	16X16	TITUS	50F	ALL				
NOTES:-												
1) PROVID	1) PROVIDE FRAME FOR MOUNTING AIR DEVICE IN LAY-IN GRID CEILING UNLESS REFLECTED CEILING PLAN INDICATES HARD CEILING. IN AREAS											
WITH HARD CEILINGS, PROVIDE FRAMES FOR SURFACE MOUNTING.												
2) UNLESS) UNLESS OTHERWISE NOTED, BRANCH DUCTS SERVING AIR DEVICES SHALL BE SAME SIZE AS NECK OF AIR DEVICE.											
3) COORE	DINATE FINA	AL COLOR/FINISH WITH ARCHITECT/C	WNER.									
4) AIR DE'	VICE SHALL	BE OF GALVANIZED FINISH WHEN IN	STALLED ON EXPO	SED DUCT	WORK.							

				VENTILATIO	N CALCULA	TIONS					
2001411415	4.054	NUMBER OF	NUMBER OF PEOPLE	FINAL	CFM AS PI	ER FMC 2020	CALCULATED	PROVIDED.	EXHAUS	тсғм	PROVIDE
ROOM NAME	AREA	PEOPLE/1000sq.ft AS PER FMC 2020	FMC 2020	PEOPLE NO.	CFM/PERS ON	CFM/SQ.FT	VENT CFM	OAI	CFM/SQFT/FIXTURE	CALCULATED CFM	
											CFM
KITCHEN	526	20	11	4	7.5	0.12	95		0.7	368	1120
SCULLERY	48	0	0	1	0	0.12	10		-	-	-
DINING	206	70	14	11	7.5	0.18	120	1200	-	-	0
CORRIDOR	128	0	0	0	0	0.06	10		-	-	-
TOILET	46	0	0	0	0	0	0		70	0	70
ΤΩΤΔΙ	954	-	-	16	_	_	235	1200	_	_	1190

AIR BALANCE									
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR				
RTU-1 (E)	SEE PLAN	1800 CFM	460 CFM	1340 CFM	-				
RTU-2(N)	SEE PLAN	2880 CFM	740 CFM	2140 CFM	-				
EF-1(N)	KITCHEN	-	1	-	1050 CFM				
EF-2 (E)	RESTROOM	-	1	-	70 CFM				
EF-3 (N)	OVEN	-	1	-	70 CFM				
	TOTAL:	4680 CFM	1200 CFM	3480 CFM	1190 CFM				
BUILDING PRESSURE: 10 CFM POSITIVE									
) CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON RTUS TO									
ATCH VALUES MENTIONED IN A BOVE TABLE									

|MATCH VALUES MENTIONED IN ABOVE TABLE.





System Checksums By Trial

RTU-1 (E)

		Single Zone
PEAK	TEME	PERATURES
g Design		Cooling Heating
-	SADB	59.5 76.9
	Ra Plenum	76.1 71.7
Coil Peak Percent	Return	76.0 71.7
Tot Sens Of Total	Ret/OA	82.0 57.6
Btu/h (%)	Fn MtrTD	0.0 0.0
	Fn BldTD	0.0 0.0
0.00	Fn Frict	0.0 0.0
0 0.00		

											•
	COOLING C	OIL PEAK			CLG SPACE	PEAK		HEATING	COIL PEAK		TEM
	ed at Time: Outside Air:		/Hr: 8 / 17 HR: 90 / 78 / 1	129	Mo/Hr: OADB:	Sum of Peaks		Mo/Hr: OADB:	Heating Design 38		SADB Ra Plenum
	Space	Plenum	Net	Percent	Space	Percent	I	Space Peak			Return
	Sens. + Lat.	Sens. + Lat	Total	Of Total	Sensible			Space Sens		Of Total	Ret/OA
	Btu/h	Btu/h	Btu/h	(%)	Btu/h	(%)		Btu/h	Btu/h	(%)	Fn MtrTD
Envelope Loads	•	0	•	•		•	Envelope Loads	•	2		Fn BldTD
Skylite Solar	0	0	0	0	0	0		0	0		Fn Frict
Skylite Cond	0	1 000	1 000	0	0	0		0	0	0.00	
Roof Cond	0	1,233	1,233	3	7.004	0		0	-493	2.12	
Glass Solar	4,209	0	4,209	9	7,021	38	Glass Solar	4.700	0	0.00	A
Glass/Door Cond	915	0	915	2	419	2		-1,798	-1,798	7.72	
Wall Cond	1,296	13	1,309	3	1,739	9		-729	-736	3.16	Diffuser
Partition/Door	0		0	0	0	0		100	100	0.00	
Floor	0	0.00	0	0	0.00	0		-460		1.98	Terminal Main Fan
Adjacent Floor	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	
Infiltration	4,642		4,642	10	624	3	Infiltration	-2,835		12.18	Sec Fan
Sub Total ==>	11,063	1,245	12,308	26	9,803	52	Sub Total ==>	-5,822	-6,322	27.15	Nom Vent
Internal Loads				1			Internal Loads				AHU Vent Infil
Lights	934	233	1,167	2	934	5	Lights	0	0	0.00	MinStop/Rh
People	1,936	0	1,936	4	1,180	6		0	0	0.00	Return
Misc	1,167	0	1,167	2	1,167	6	Misc	0	0	0.00	Exhaust
Sub Total ==>	4,037	233	4,271	9	3,281	18	Sub Total ==>	0	0	0.00	Rm Exh Auxiliary
Ceiling Load	126	-126	0	0	107	1	Ceiling Load	-43	0	0.00	Leakage Dwn
Ventilation Load	0	0	25,407	54	0	0	Ventilation Load	0	-17,171	73.75	Leakage Ups
Adj Air Trans Heat	0	_	0	0	0		Adj Air Trans Heat	0	0	0	
Dehumid. Ov Sizing			0	0			Ov/Undr Sizing	0	0	0.00	
Ov/Undr Sizing	5,499		5,499	12	5,499	29	Exhaust Heat		211	-0.91	ENGI
Exhaust Heat	-,	-623	-623	-1	-,		OA Preheat Diff.		0	0.00	
Sup. Fan Heat			0	0			RA Preheat Diff.		0	0.00	
Ret. Fan Heat		0	0	0		A	Additional Reheat		0	0.00	% OA
Duct Heat Pkup		0	0	0			1				cfm/ft²
Underfir Sup Ht Pku	u p		0	0			Underfir Sup Ht Pkup		0	0.00	cfm/ton
Supply Air Leakage		0	0	0			Supply Air Leakage		0	0.00	ft²/ton
				1 1							Btu/hr·ft²
Grand Total ==>	20,725	730	46,862	100.00	18,690	100.00	Grand Total ==>	-5,864	-23,282	100.00	No. People

AIRF	LOWS	
	Cooling	Heating
Diffuser	1,087	1,087
Terminal Main Fan	1,087 1,087	1,087 1,087
Sec Fan	0	0
Nom Vent	460	460
AHU Vent	460	460
Infil	76	76
MinStop/Rh	0	0
Return	1,163	1,163
Exhaust	536	536
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

Cooling 42.3

2.85

278.29

97.56

123.00

11

Heating 42.3

2.85

-76.38

			COOLING	G COIL SEL	ECTIC	N 🖊							
	Total (Capacity	Sens Cap.	Coil Airflow	Ent	er DB/W	B/HR	Lea	Leave DB/WE				
	ton	MBh	MBh	cfm	°F	°F	gr/lb	°F	°F	gr/lb			
Main Clg	3.9	46.9	25.4	1,087	82.0	70.0	91.5	59.5	57.1	66.1			
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0			
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0			
Total	3.9	46.9				•							

	AREA	S	
Gro	ss Total	Glas	
		ft²	(%)
Floor	381		
Part	0		
Int Door	0		
ExFlr	19		
Roof	380	0	0
Wall	253	108	43
Ext Door	0	0	0

HEA	ATING COIL	SELECTIO	ON	
	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg Aux Htg	-29.1 0.0	1,087 0	57.6 0.0	76.9 0.0
Preheat	0.0	1,087	57.6	59.5
Humidif Opt Vent	0.0 0.0	0	0.0	0.0
Total	-29.1		- 3 -	

Project Name: Celebration, FL

CELEBRATION FL COPY.TRC Dataset Name:

System Checksums By Trial

RTU-2 (N)

Single Zone

	COOLING C	OIL PEAK			CLG SPACE	PEAK		HEATING CO	IL PEAK		TEMP	ERATURES	S
Peaked	d at Time:	Mo/H	łr: 8 / 16		Mo/Hr:	Sum of		Mo/Hr: He	ating Design			Cooling	Heating
Οι	utside Air:	OADB/WB/HI	R: 91 / 78 / 1	27	OADB:	Peaks		OADB: 38			SADB Ra Plenum	58.7 76.1	75.6 71.5
	Space Sens. + Lat.	Plenum Sens. + Lat	Net	I	Space	Percent		Space Peak	Coil Peak		Return Ret/OA	76.1 82.3	71.5 58.1
	Btu/h	Btu/h	Total	Of Total	Sensible Ptu/b	Of Total		Space Sens	Tot Sens		Fn MtrTD	0.0	0.0
Envelope Loads	Dtu/II	Dlu/II	Btu/h	(%)	Btu/h	(%)	Envelope Loads	Btu/h	Btu/h	(%)	Fn BldTD	0.0	0.0
Skylite Solar	0	0	0	0	0	0	Skylite Solar	0	0	0.00	Fn Frict	0.0	0.0
Skylite Cond	0	0	0	0	0	0	Skylite Cond	0	0	0.00	1111100		
Roof Cond	0	1,799	1,799	2	0	0	Roof Cond	0	-74 6	2.10			
Glass Solar	0	0	0	0	0	0	Glass Solar	0	0	0.00	AIF	RFLOWS	
Glass/Door Cond	327	0	327	0	339	1	Glass/Door Cond	-625	- <mark>6</mark> 25	1.76			
Wall Cond	1,385	452	1,838	2	1,693	5	Wall Cond	-1,443	-1,926	5,42		Cooling	_
Partition/Door	0		0	0	0	0	Partition/Door	0	0	0.00	Diffuser	1,828	1,828
Floor	0		0	0	0.00	0	Floor	-558	-558	1.57	Terminal	1,828	1,828
Adjacent Floor	0.00	0.00	0.00	0.00	0.00	0.00	Adjacent Floor	0.00	0.00	0.00	Main Fan	1,828	1,828
Infiltration	6,494		6,494	8	2,436	7	Infiltration	-4,522	-4,522	12.74	Sec Fan	0	0
Sub Total ==>	8,207	2,251	10,458	13	4,468	13	Sub Total ==>	-7,148	-8,376	23.60	Nom Vent	740	740
				 							AHU Vent	740	740
Internal Loads				1			Internal Loads				Infil	121	121
Lights	1,415	354	1,769	2	1,415	4	Lights	0	0	0.00	MinStop/Rh	0	0
People	1,138	0	1,138	1	1,045	3	People	0	0	0.00	Return	1,949	1,949
Misc	15,499	0	15,499	20	15,499	47	Misc	0	0	0.00	Exhaust	861	861
Sub Total ==>	18,052	354	18,406	24	17,959	54	Sub Total ==>	0	0	0.00	Rm Exh	0	0
											Auxiliary	0	0
Ceiling Load	201	-201	0	0	189	1	Ceiling Load	-96	0	0.00	Leakage Dwn	0	0
Ventilation Load	0	0	39,641	51	0	0	Ventilation Load	0	-27,623	77.81	Leakage Ups	0	0
Adj Air Trans Heat	0		0	0	0	0	Adj Air Trans Heat	0	0	0			
Dehumid. Ov Sizing			0	0			Ov/Undr Sizing	0	0	0.00			
Ov/Undr Sizing	10,498		10,498	13	10,498	32	Exhaust Heat		501	-1.41	ENGIN	EERING CH	(S
Exhaust Heat		-1,063	-1,063	-1			OA Preheat Diff.		0	0.00			
Sup. Fan Heat			0	0	ı I		RA Preheat Diff.		0	0.00	0, 04	Cooling	Heating
Ret. Fan Heat		0	0	0		A	Additional Reheat		0	0.00	% OA	40.5	40.5
Duct Heat Pkup		0	0	0	I				-		cfm/ft²	3.16	3.16
Underfir Sup Ht Pku	p	_	0	0			Underfir Sup Ht Pkup		0	0.00	cfm/ton	281.37	
Supply Air Leakage		0	0	0			Supply Air Leakage		0	0.00	ft²/ton	89.15	
							 		<u> </u>	100.00	Btu/hr·ft²	134.61	-76.64
Grand Total ==>	36,958	1,341	77,940	100.00	33,114	100.00	Grand Total ==>	-7,244	-35,498	100.00	No. People	5	

			COOLING	COIL SEL	ECTIC)N				
		Capacity	Sens Cap.	Coil Airflow	Ent	er DB/W	ave DB/WB/HR			
	ton	MBh	MBh	cfm		°F	gr /lb	°F	°F	gr/lb
Main Clg	6.5	77.9	46.1	1,828	82.3	70.4	93.3	58.7	57.7	70.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	6.5	77.9								

Gro	AREAS	Glas	s (%)					
Floor	579							
Part	0							
Int Door	0							
ExFIr	23							
Roof	578	0	0					
Wall	381	0	0					
Ext Door	23	0	0					

HEA	TING COIL	SELECTIO	ON	
	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg Aux Htg	-44.4 0.0	1,828 0	58.1 0.0	75.6 0.0
Preheat	0.0	1,828	58.1	58.7
Humidif Opt Vent	0.0 0.0	0	0.0	0.0
 Total	-44.4	O	0.0	0.0

Project Name: Celebration, FL

Dataset Name: CELEBRATION FL COPY.TRC

		[ELECTRICAL SYMBOLS LIST					GENERAL NOTES (APPLY TO ALL "E" DRAWINGS)
	SWITCHES AND CONTROLS		POWER AND TELECOMMUNICATION		ELECTRICAL AB	BBREVIA	TIONS	ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT
\$a	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED.	J	JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.	А	AMPERES	EA	EACH	VERSION OF THE NATIONAL ELECTRIC CODE(NEC) WITH AMENDMENTS, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
\$ ³	20A 3-WAY TOGGLE SWITCH U.N.O. "a" DENOTES LIGHTING FIXTURE CONTROLLED	<u> </u>	JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTE, +18" AFF OR AS NOTED.	A/C, AC	AIR CONDITIONING UNIT	EC	EMPTY CONDUIT/ ELECTRICAL CONTRACTOR	2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING
\$ ⁴	20A 4-WAY TOGGLE SWITCH U.N.O. "a" DENOTES LIGHTING FIXTURE CONTROLLED		JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED	AF	AMPERE FRAME/AMP FUSE	EF	EXHAUST FAN	CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
ΦD	WALL BOX INCANDESCENT DIMMER SWITCH, LUTHRON MAESTRO SERIES. "a"		DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AFF	ABOVE FINISHED FLOOR	ЕМ	EMERGENCY	3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
\$6	DENOTES LIGHTING FIXTURE CONTROLLED.	—	DUPLEX DEDICATED RECEPTACLE, +18" AFF OR AS NOTED.	AS	AMP SWITCH	EMT	ELECTRICAL METALLIC TUBING	4. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE
_(OS)	WALL OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	Т	DUPLEX CONVENIENCE RECEPTACLE - 20A-1P, 125V, NEMA 5-20R MOUNTED	AIC	AMPS INTERRUPTING CAPACITY	EQUIP	EQUIPMENT	APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
\$°S	WALL MOUNTED VACANCY SENSOR SWITCH, WATTSTOPPER CS-50PIR SERIES.	→ ⇔ ^{CL}	FLUSH IN CELING.	AT	AMP TRIP	ER 	EXISTING TO BE RELOCATED	5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND
4/2	WALL MOONTED VACANCT SENSON SWITCH, WAITSTOTT EN GS SOTTIN SENIES.	$ \mathbb{P}_{GFI}$	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	ATS	AUTOMATIC TRANSFER SWITCH	ETR	EXISTING TO REMAIN ELECTRIFIED WORKSTATION	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
\$0	WALL MOUNTED SPRING WOUND TIME SWITCH TORK	₩ _{GFI}	DUPLEX DEDICATED GFI RECEPTACLE, +18" AFF OR AS NOTED.	AUTO	AUTOMATIC AMERICAN WIRE GAUGE	EWF	FURNITURE ELECTRIC WATER HEATER	BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR
\$	DIMMER SWITCH	•	ELECTRICAL FLOOR BOX	AWG	CONDUIT	FA	FIRE ALARM	LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
\$ _{os}	OCCUPANCY SENSOR SWITCH	(A)	RECEPTACLE FOR DRYER	C/B,CB	CIRCUIT BREAKER	FBO	FURNISHED BY OTHERS, INSTALLE	6. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH
\$ _{os}	COMBINATION OF DIMMER AND OCCUPANCY SENSOR SWITCH	[NID]	NETWORK INTERFACE DEVICE. NID IS 'ONT' BOX WHICH INCLUDES BOTH	CKT	CIRCUIT	FDR	& WIRED BY EC FEEDER	FISH WIRE.
+05	ASCO CONTACTOR C-25 TORK TIMER T-25 STACKED.		'ONT' AND ITS SISTER BOX AS PER VERIZON STANDARDS.	CLG	CEILING	FIBO	FURNISHED & INSTALLED BY OTHERS, WIRED BY EC	7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES,
		#	QUAD RECEPTACLE TELEPHONE (DATA OUTLET, A"COMARE OUTLET, BOX WITH SINGLE CANO COMAR	СОММ	COMMUNICATION	FIXT	FIXTURE	DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND
<u>-D</u>	DOOR SWITCH	-	TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND	СТ	CURRENT TRANSFORMER	FL	FLOOR	THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
PC	PHOTOCELL IN NAMA 3R ENCLOSURE.		TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.	CU	COPPER	FLUOR	FLUORESCENT	8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL
-PC	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.		TELEPHONE OUTLET, WALL-MOUNTED +48" AFF UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE	°C	DEGREE CELSIUS	G	GROUND	ACCEPTANCE.
BP	BELL PUSH	_	REE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4"DIAMETER GROMMETED OPENING.	•F	DEGREE FAHRENHEIT	GFI	GROUND FAULT INTERRUPTER	9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
(OS) _A	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.		DATA OUTLET — (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE	DIA	DIAMETER	GP	GENERAL PURPOSE	10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR
_(os)	WALL OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY		PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH	DISC	DISCONNECT	НС	HUNG CEILING	BETTER.
	SENSOR SCHEDULE.		1 1/4" DIAMETER GROMMETED OPENING.	DN	DOWN	НР	HORSEPOWER	11. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE
–(vs)	WALL VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	\neg	CABLE TV OUTLET, WALL-MOUNTED AT 18" AFF UNO.	DP	DISTRIBUTION PANEL	HWH	HOW WATER HEATER	AND CONDUIT CAP FOR ALL EMPTY CONDUITS. 12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE
VS	CEILING VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	*	MOTORS AND CONTROLS	DWH	DOMESTIC WATER HEATER	HZ	HERTZ	CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
(DS)	CEILING MOUNTED DAYLIGHT SENSOR.		AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION	DWG	DRAWING	IC	INTERRUPTING CAPACITY	13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE
	WIRING SYSTEMS	M S _M	WITH JUNCTION BOX AND MOTOR SWITCH.	JB	JUNCTION BOX	PP	POWER PANEL	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
			AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT	KCMIL	ONE THOUSAND CIRCULAR MILS	PVC	POLYVINYL CHLORIDE	APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS
3	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF	L X WP	SWITCH WITH WEATHER PROOF.	KV	KILOVOLT	PWR	POWER	AND INSTALLED CONCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
UP-	1#12 ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION,		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.	KVA	KILOVOLT-AMPERES	R	REMOVE	14. SUPPORT PANEL, JUNCTION AND PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
3 5	NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF		30A NON FUSED DISCONNECT SWITCH	KW	KILOWATTS	RE	RELOCATED EXISTING	15. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND
- OF -	2#12 ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION,		60A NON FUSED DISCONNECT SWITCH	LP	LIGHTING PANEL	REC	RECEPTACLE	SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
3 5 7 UP-	NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.		100A NON FUSED DISCONNECT SWITCH	LTG	LIGHTING	RGS	RIGID GALVANIZED STEEL	16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY
	CONDUIT TURNING UP, SEE FLOOR PLANS FOR CONDITIONS.	п	200A NON FUSED DISCONNECT SWITCH	MAX	MAXIMUM	RR	REMOVE & RELOCATE	GASKET FOR A COMPLETE RAIN TIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN
	CONDUIT TURNING OP, SEE FLOOR PLANS FOR CONDITIONS. CONDUIT TURNING DOWN, SEE FLOOR PLANS FOR CONDITION.		COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH, FURNISHED BY	МС	MOTOR CONTROLLER	SECT	SECTION	WEATHERPROOF ENCLOSURE.
	CONDOIT TOIRNING DOWN, SEE FLOOR PLANS FOR CONDITION.		HVAC/CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.	мсв	MAIN CIRCUIT BREAKER	SPDT	SINGLE POLE DOUBLE THROW	17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
	CONDUIT AND WIRE TO BUILDING GROUND.	400 350	FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP	MER	MECHANICAL EQUIPMENT ROOM	SPST	SINGLE POLE SINGLE THROW	18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED
			NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.	MIN	MINIMUM	SPEC	SPECIFICATION	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
	CABLE TRAY, WIDTH AND MOUNTING AS NOTED.	48	COMBINATION SOLID—STATE MOTOR STARTER.	MLO	MAIN LUGS ONLY	SW	SWITCH	FOR THIS PROJECT.
		MD	MOTORIZED DAMPER.	MTD	MOUNTED	SWBD	SWITCHBOARD	19. ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR
	UNDERGROUND	FSD	FIRE SMOKE DAMPER	MTS	MANUAL TRANSFER SWITCH	SYM	SYMMETRICAL	SLAB. 20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE
	EXISTING	M/M/	DUPLEX PUMP. NUMBER INDICATES HP RATING OF PUMP.	N	NEUTRAL	SYS	SYSTEMS	APPROVED FOR THAT APPLICATION.
	NEW	C L	THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS	NE	NEW DEVICE TO REPLACE EXISTING	TELE	TELEPHONE	21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE—RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN
<u>(S)</u>	CEILING MOUNTED SMOKE DETECTOR.	^y	PER MOTOR RATING.	NIC	NOT IN CONTRACT	TEMP	TEMPERATURE	24 INCHES, UNLESS FIRE—RATED BOXES OR PUTTY PADS ARE UTILIZED. 22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND
\$/co	COMBINATION OF SMOKE AND CO DETECTOR.	S _M	MANUAL MOTOR SWITCH	NL	NIGHT LIGHT	TXF	TOILET EXHAUST FAN	ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.
<u> </u>		1.5 kW	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	NTS	NOT TO SCALE	TYP	TYPICAL	23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS,
	ELECTRICAL DRAWING LIST		ANNOTATION	OC	ON CENTER	UON	UNLESS OTHERWISE NOTED	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
E1.0	ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	Р	POLES	V	VOLT/VOLTAGE	DETAILS.
E1.1	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2	$\overline{\langle \chi \rangle}$	KEYED NOTE REFERENCE	PB	PULLBOX	VA	VOLT AMPERE	24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
E1.2	ELECTRICAL LIGHTING AND POWER PLAN		DETAIL DEFEDENCE. DETAIL AUGUSES INDICATES ON	PC	PERSONAL COMPUTER	VAV	VARIABLE AIR VOLUME	25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
E2.0 E3.0	ELECTRICAL LIGHTING AND POWER PLAN ELECTRICAL DETAILS	E/2-1	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM	ø	PHASE	VFD	VARIABLE FREQUENCY DRIVE	26. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED
E4.0	ELECTRICAL DETAILS ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULE			PNL	PANEL	VP	VAPORPROOF	WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
			POWER DISTRIBUTION	w	WATT	WP	WEATHER PROOF	27. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANEL BOARD. PROVIDE WIRE AND CONDUIT TO
			MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND	W	WIRE	XFMR	TRANSFORMER	INDICATES CIRCUIT NUMBERS IN PANEL BOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANEL BOARD.
								The second secon
			AMPERAGE AS NOTED.	WH	WALL HEATER	ZRT	ZONE REGISTER TERMINALS	
			BRANCH PANELBOARD, 208Y/120V—SURFACE OR FLUSH MOUNTED TRANSFORMER, SIZE AS NOTED.	WH E	WALL HEATER EXISTING	ZRT IG	ZONE REGISTER TERMINALS ISOLATED GROUND	

DISTRIBUTION PANELBOARD, 208Y/120V-SURFACE OR FLUSH MOUNTED.

ELECTRICAL SPECIFICATIONS

GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT, 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
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
- F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
- G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- H. 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.
- SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- 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.
- K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR
- 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.
- M. 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.
- N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- P. 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
- 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 OWNER. 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 FIXTURES: 7 FT-0 IN.
- MOTOR CONTROLLERS: 5 FT-0 IN.

- WALL SWITCHES: 4 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

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 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
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- 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 MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- 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
- F. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH
- G. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT 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 NATIONAL ELECTRICAL CODE (NEC), AND ALL OTHER APPLICABLE INDUSTI 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 HERE
- 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
- CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION. RK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL RANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE ORK 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.
- CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE 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
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

4) APPROVAL STAMP OF PRIME CONTRACTOR

1) PROJECT NAME AND LOCATION

2) NAME OF ARCHITECT AND ENGINEER

3) ITEM IDENTIFICATION

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)

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

TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

- D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
- 1) SAFETY/DISCONNECT SWITCHES
- FUSES
- 3) CIRCUIT BREAKERS
- 4) PANEL BOARDS/LOAD CENTER (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.
- 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 DRAWING. 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
 - 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.
 - 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.
 - REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED NDICATING 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:
 - PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES,
- CIRCUIT BREAKERS, PANELS AND TRANSFORMERS. B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE
- 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:

SYMMETRICAL.

- 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
- 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 LISTED BY UL (600V) (UL CLASS RK1 OR CLASS J), AND BE WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS
- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
- 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 A ND 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

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.
- CABINETS: CODE GAUGE GALVANIZED SHEET STEEL PRIMED AND PAINTED WITH TRIM AND DOOR, TYPE AS NOTED, LAP AND RIVET CORNERS OR FORM AS APPROVED.
- 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
- HARDWARE: MULTI-PIN, CYLINDER LOCKS WITH MILLED KEYS. PANELS SHALL BE KEYED ALIKE. DOOR OVER 48" HIGH SHALL 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 DESCRIBE
- 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
- 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.
- MINIMUM GUTTER SPACES: PANELS WITH 225 AMPERE MAINS, 5-34" 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.
- DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- 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.
- 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:
 - THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
 - NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
 - PANELBOARD SHALL BE CONSTRUCTED OF CODE-GAUGE 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 HANDLE MECHANCIALLY 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.
- H. IDENTIFICATION
 - 1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD
 - 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 1/4" HIGH WHITE LETTERING.
- I. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A
- MINIMUM OF 30" WIDE AND 10" DEEP. 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.

PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID

NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED

- (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).
- B. MATERIALS 1) RACEWAYS:

THREAD LESS.

- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
- b. ELECTRO-METALIC TUBING (EMT): THIN WALL PIPE, GALVANIZED,
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP,

BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

- GALVANIZED. d. WIRE-WAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE
- 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:

INSULATED THROAT.

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

ELECTRICAL SPECIFICATIONS (CONT.)

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 70 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.
- C. 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.

D. 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 MANUFACTIURED 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).

A. 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.

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

9. 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.
- 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.

WIRING DEVICES:

- 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.
- 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).

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.

11. 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. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24—INCH LAMPS AND RAPID START FOR 48—INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.
- D. 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.
- E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.
- F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.
- G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.
- H. 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 PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

12. TELEPHONE CONDUIT SYSTEM:

- PROVIDE COMPLETE SYSTEM OF RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.
- B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.
- C. OUTLETS SHALL BE:1) WALL; 4 IN. SQUARE WITH BUSHED COVER PLATE.
- D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.
- E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.
- FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

13. GROUNDING AND BONDING:

- PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (NATIONAL ELECTRICAL CODE), AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.
- B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.
- C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.
- D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.
- E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

 1) CIRCUITS SERVING ANY WALL BOX DIMMER.
 - 2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES.
 TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING
 CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE, OR
 AS OTHER WISE NOTED ON DRAWINGS.
 - 3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES
- 4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

14. PANEL BOARDS:

- A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.
- B. CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.
- C. LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.

- D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.
- E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR—IN—DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.
- F. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.
- H. FURNISH ALL PANELBOARDS WITH FEED—THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- I. ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.
- J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
- K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.
 - ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.
- SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM AND 14,000 AMPERES R.M.S. SYMMETRICAL FOR 480Y/277 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.
- N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.

14. LOAD CENTERS

- A. LOAD CENTERS SHALL COMPLY WITH UL67 AND MEET FEDERAL SPECIFICATION W-P-115c.
- B. CIRCUIT BREAKERS SHALL BE OF THE PLUG-IN, THERMAL MAGNETIC, MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. TANDEM OR DUPLEX TYPE CIRCUIT BREAKERS SHALL NOT BE PERMITTED. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS.
- C. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.
- D. ENCLOSURES MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR FLUSH MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED. ALL LOAD CENTERS SHALL BE 14 %" WIDE AND 3 %"
- E. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
- F. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 22,000/10,000 AMPERES R.M.S. SYMMETRICAL SERIES RATING FOR 208Y/120 VOLT. SERIES RATED LOAD CENTERS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

16. SMOKE ALARMS:

- A. PROVIDE SOLID STATE, PHOTOELECTRIC TYPE, HARD-WIRED SMOKE ALARM WITH 9V BATTERY BACKUP AND INTEGRAL TEMPORAL PATTER EVACUATION HORN. EDWARDS 517 SERIES OR APPROVED EQUAL.
- B. THREE POSITION TEST FEATURE THAT SIMULATES ACTUAL SMOKE CONDITIONS. SHALL CONTAIN MAINTENANCE INDICATOR.
- C. PROVIDE WITH INTEGRAL 135 DEGREE F ISOLATED HEAT DETECTION OR INTEGRAL RELAY RATED 0.6A AT 125V AC., AS INDICATED ON THE PLANS AND DRAWINGS.
- D. DEVICE SHALL BE RATED TO OPERATE AT A RANGE OF 40°f TO
- E. UL LISTED TO UL217 AND APPROVED.

17. INTERCOM CONDUIT SYSTEM:

- A. PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.
- B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF INTERCOM MANUFACTURER.
- C OUTLETS SHALL
- C. OUTLETS SHALL BE:1)WALL: 4 IN. SQUARE WITH SINGLE GANG COVER PLATE.
- D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.
- E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM EACH APARTMENT TO MAIN INTERCOM CONTROLLER AT ENTRANCE.

POWER PLAN GENERAL NOTES:

- A. EXACT LOCATION OF MECHANICAL, PLUMBING, KITCHEN, FURNITURE SYSTEMS, OWNER FURNISHED EQUIPMENT ETC. THAT REQUIRE ELECTRICAL CONNECTIONS ARE SHOWN ON THE MECHANICAL, PLUMBING, AND/OR ARCHITECTURAL DRAWINGS. E.C. TO COORDINATE EXACT LOCATIONS WITH RESPECTIVE CONTRACTORS AND/OR VENDORS PRIOR TO ANY ROUGH—INS.
- B. REVIEW AND COORDINATE WITH ALL TRADES CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR EQUIPMENT WITH ELECTRICAL CONNECTIONS. COORDINATE EXACT MOUNTING LOCATIONS WITH THE SPECIFIC TRADE AND ARCHITECT.
- C. MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOME-RUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANEL BOARD. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANEL BOARD.
- D. ALL WIRING SHALL BE IDENTIFIED BY PANEL BOARD AND CIRCUIT NUMBERS IN ALL CABINETS, JUNCTION BOXES, WIRING TROUGHS, ENCLOSURES, SPLICE OR TERMINATION POINTS ETC.
- E. ALL 120V, 15A AND 20A RECEPTACLES IN KITCHEN AREA SHALL BE "GFCI" IN ACCORDANCE WITH NEC ARTICLE 210.8(B).
- F. GFI SHOWN WITH THE RECEPTACLE INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE GFI BREAKER ON THE CIRCUIT SHOWN ON PLAN. IF RECEPTACLE IS NOT AVAILABLE OR IT IS NOT ACCESSIBLE.
- G. ELECTRICAL CONDUCTORS FOR FEEDERS AND BRANCH CIRCUITS
 COMBINED SHALL BE SIZED FOR A MAXIMUM OF 5 PERCENT VOLTAGE
- H. EXISTING CIRCUIT CONNECTIONS FOR EXISTING MECHANICAL UNIT SHALL REMAIN. E.C. TO VERIFY OPERABLE CONDITIONS OF CIRCUIT CONNECTION AND BREAKER IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

POWER PLAN KEYED NOTES: (#)

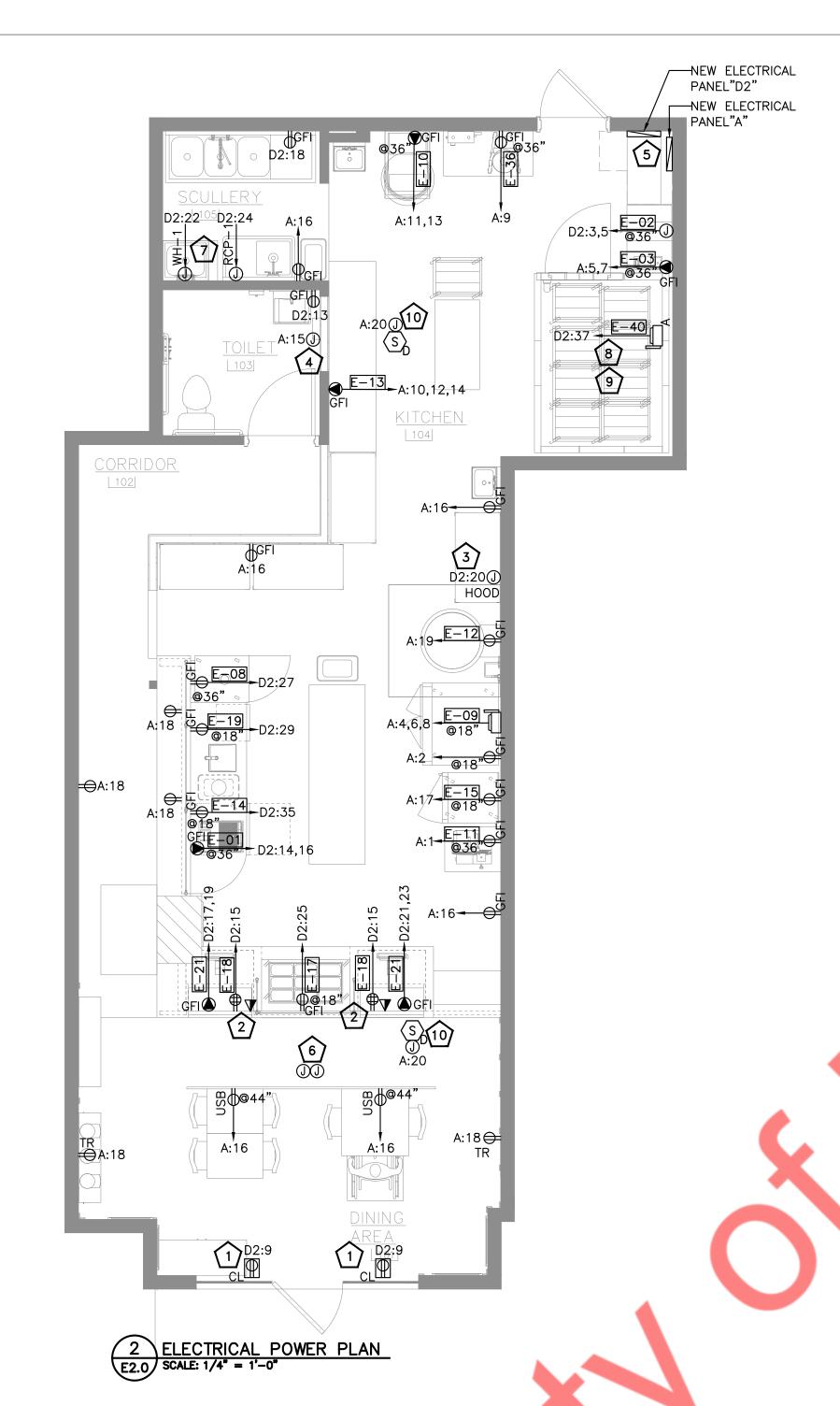
- 1. PROVIDE CEILING MOUNTED RECEPTACLE FOR SHOW WINDOW AS REQUIRED BY CODE. VERIFY WITH LOCAL ENERGY AGENCY. VERIFY EXACT LOCATION WITH ARCHITECT.
- 2. ELECTRICAL CONTRACTOR TO VERIFY THE MOUNTING HEIGHT, LOCATION & DETAILS FOR POS RECEPTACLES WITH ARCHITECT/OWNER PRIOR TO ROUGH IN.
- 3. ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATION & DETAILS OF KITCHEN HOOD CONTROL PANEL WITH KITCHEN HOOD MANUFACTURER.
- 4. ELECTRICAL CONTRACTOR TO PROVIDE JUNCTION BOX FOR HAND DRYER AT LOCATION SPECIFIED BY OWNER'S REPRESENTATIVE.
- 5. E.C.ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF PANELS IN THE FIELD. 3' CLEAR SPACE SHALL BE PROVIDED IN FRONT OF THE PANEL AS PER CODE.
- 6. ELECTRICAL CONTRACTOR SHALL PROVIDE BACK BOX AND CONDUIT WITH PULL STRING FOR MECHANICAL UNIT. CONFIRM FINAL LOCATION WITH MECHANICAL DRAWING PRIOR TO ROUGH—IN.
- 7. PROVIDE JUNCTION BOX FOR WH-1 AND RCP-1. E.C. TO COORDINATE EXACT REQUIREMENT WITH PLUMBING CONTRACTOR & MAKE POWER PROVISION ACCORDINGLY.
- 8. ELECTRICAL CONTRACTOR TO COORDINATE EXACT POWER REQUIREMENT WITH WALK IN BOX MANUFACTURER AND MAKE POWER PROVISION ACCORDINGLY.
- 9. ELECTRICAL CONTRACTOR TO FIELD VERIFY LOCATION OF CONDENSING UNIT AND PROVIDE POWER CONNECTION WITH NECESSARY ELECTRICAL FIXTURES/ DISCONNECTS AS PER MANUFACTURER REQUIREMENTS.
- 10. JUNCTION BOX FOR SMOKE DETECTOR. E.C. TO FIELD VERIFY EXACT LOCATION OF SMOKE DETECTOR WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH—IN.

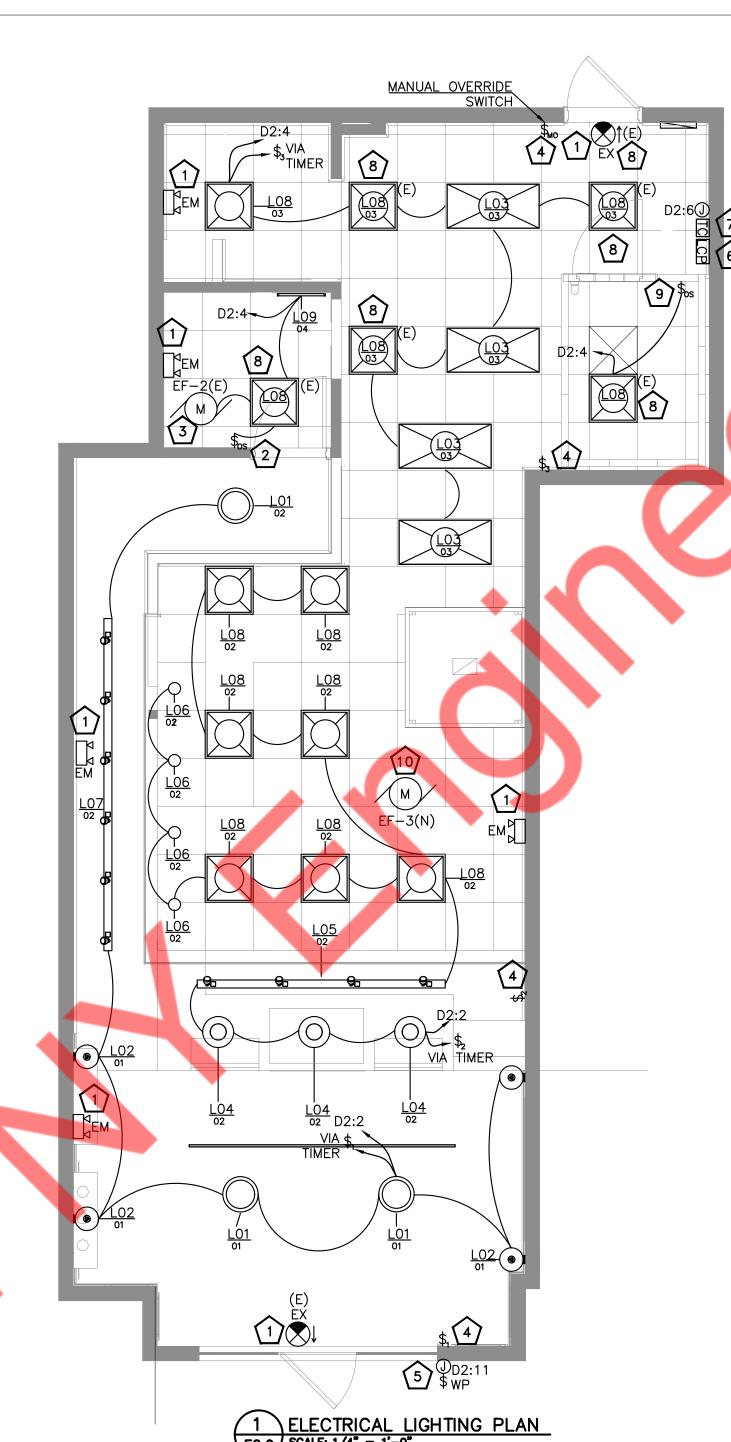
		KITCHEN EQI	JIPMENT SC	HEDULE				
ITEM NO.	QTY	DESCRIPTION	VOLTAGE	PHASE	AMPS	kW	CONN. TYPE	NEMA
E01	01	ESPRESSO MACHINE	208	1	14	2.91	CORD & PLUG	6-30
E02	01	HOT COFFEE BREWER	208	1	25.5	5.30	TERMINAL BOX	-
E03	01	ESPRESSO GRINDER	208	1	2.11	0.44	CORD & PLUG	6-30
E08	01	DUAL TEMPERATURE WINE DISPENSER	115	1	4.4	0.51	CORD & PLUG	5-15
E09	01	MINI ROTATING RACK CONVECTION OVEN -ELECTRIC	208	3	50	17.99	DISCONNECT	-
E10	01	40 QT. TWO-SPEED SPIRAL DOUGH MIXER	208	1	14.5	3.02	CORD & PLUG	6-20
E11	01	BAGEL AND BUN SLICER	120	1	3.75	0.45	CORD & PLUG	5-20
E12	01	BAGGLE KETTLE	115	1	4	0.46	CORD & PLUG	5-15
E13	01	SINGLE BAGEL DIVIDER FORMER	208	3	4.7	1.69	CORD & PLUG	6-20
E14	01	UNDERCOUNTER REFRIGERATOR	115	1	6.6	0.76	CORD & PLUG	5-15
E15	01	FULL SIZE INSULATED HEATED CABINET WITH CLEAR DOOR	120	1	12	1.44	CORD & PLUG	5-20
E17	01	BUFFET DISPLAY TABLE	115	1	3.8	0.44	CORD & PLUG	5-15
E18	02	POS	115	1	1.6	0.18	CORD & PLUG	5-20
E19	01	ICE MACHINE U.C.	115	1	5	0.58	CORD & PLUG	5-15
E21	02	REFRIGERATED COUNTER CASE, SELF-SERVE	208	1	1.12	0.23	CORD & PLUG	6-20
E36	01	PLANETARY MIXER STAINLESS STEEL 20 QT.	120	1	9	1.08	CORD & PLUG	5-20
E40	01	12'x10' FOOD WALK-IN	120	1	8.5	1.02	CORD & PLUG	5-20

NOTE: E.C. TO COORDINATE WITH ARCHITECT / KITCHEN EQUIPMENT SPECIALIST FOR CONNECTION TYPE AND HEIGHT PRIOR TO ROUGH IN.

BIDDING/ROUGH-IN.

A. E.C.TO VERIFY EXACT VOLTAGE, NUMBER OF WIRES, BREAKER & RECEPTACLE RATING AND POWER CONNECTION REQUIREMENT OF THE EQUIPMENT WITH KITCHEN EQUIPMENT SPECIALIST. ANY DISCREPANCIES SHALL BE COMMUNICATED WITH ENGINEER ON RECORD PRIOR TO





ELECTRICAL LIGHTING PLAN GENERAL NOTES:

- A. COORDINATE FINAL FIXTURE MAKE AND MODEL WITH ARCHITECT.
- B. COORDINATE FINAL REQUIREMENT / MODEL / QUANTITY OF DIMMER WITH ARCHITECT/OWNER.
- C. CONTRACTOR TO PROVIDE MANUAL SWITCHING AS PER FBC 2020, C405.2.5 AND LIGHTING CONTROL PER C405.2.2.
- D. VERIFY ALL EXISTING EXTERIOR LIGHTS ON BUILDING, WALKWAYS AND IN PARKING AREAS ARE WOKING PROPERLY. REPLACE IF FOUND INOPERABLE BASE BID ACCORDINGLY.

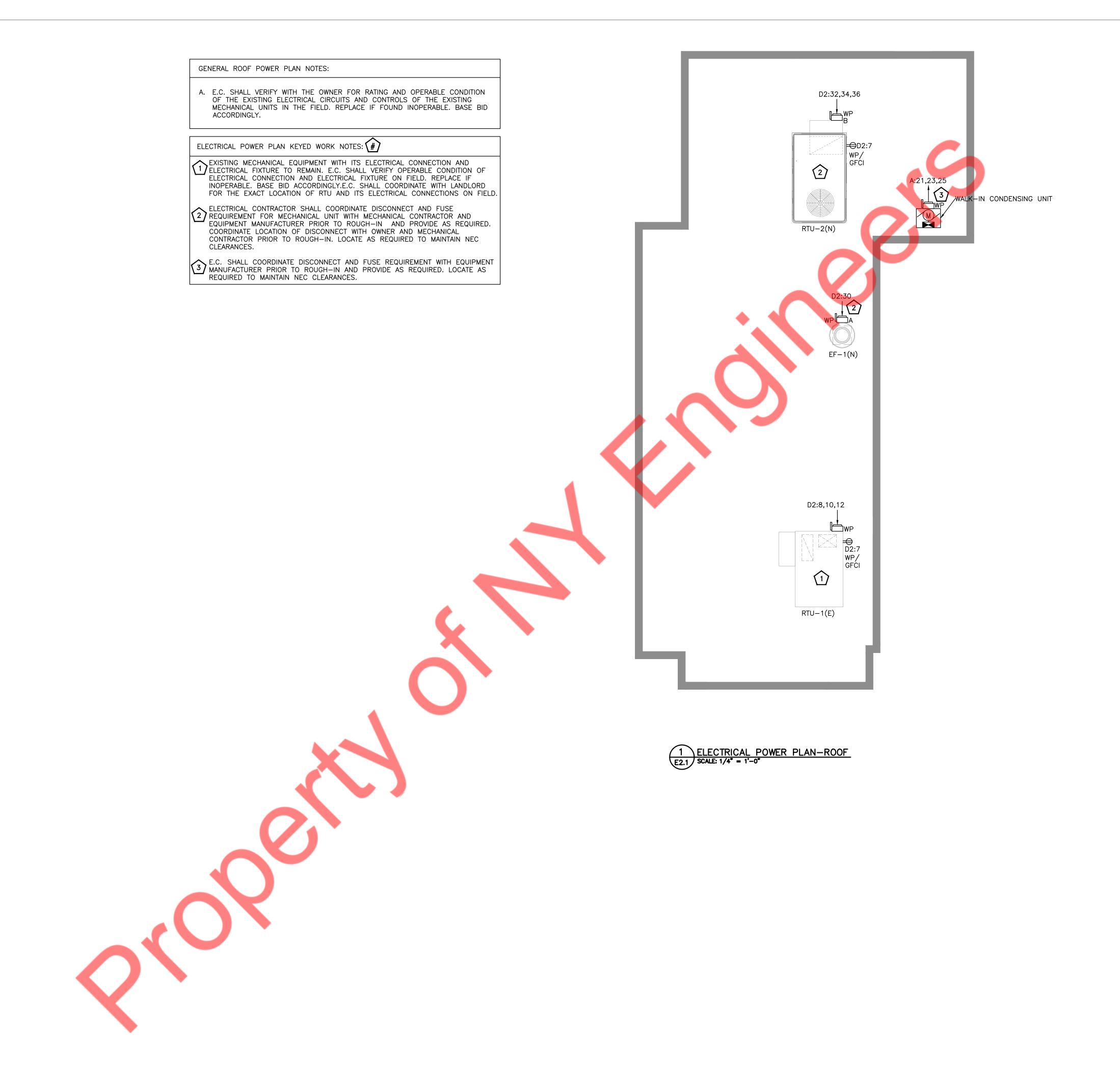
ELECTRICAL LIGHTING PLAN KEYED NOTES: (#)

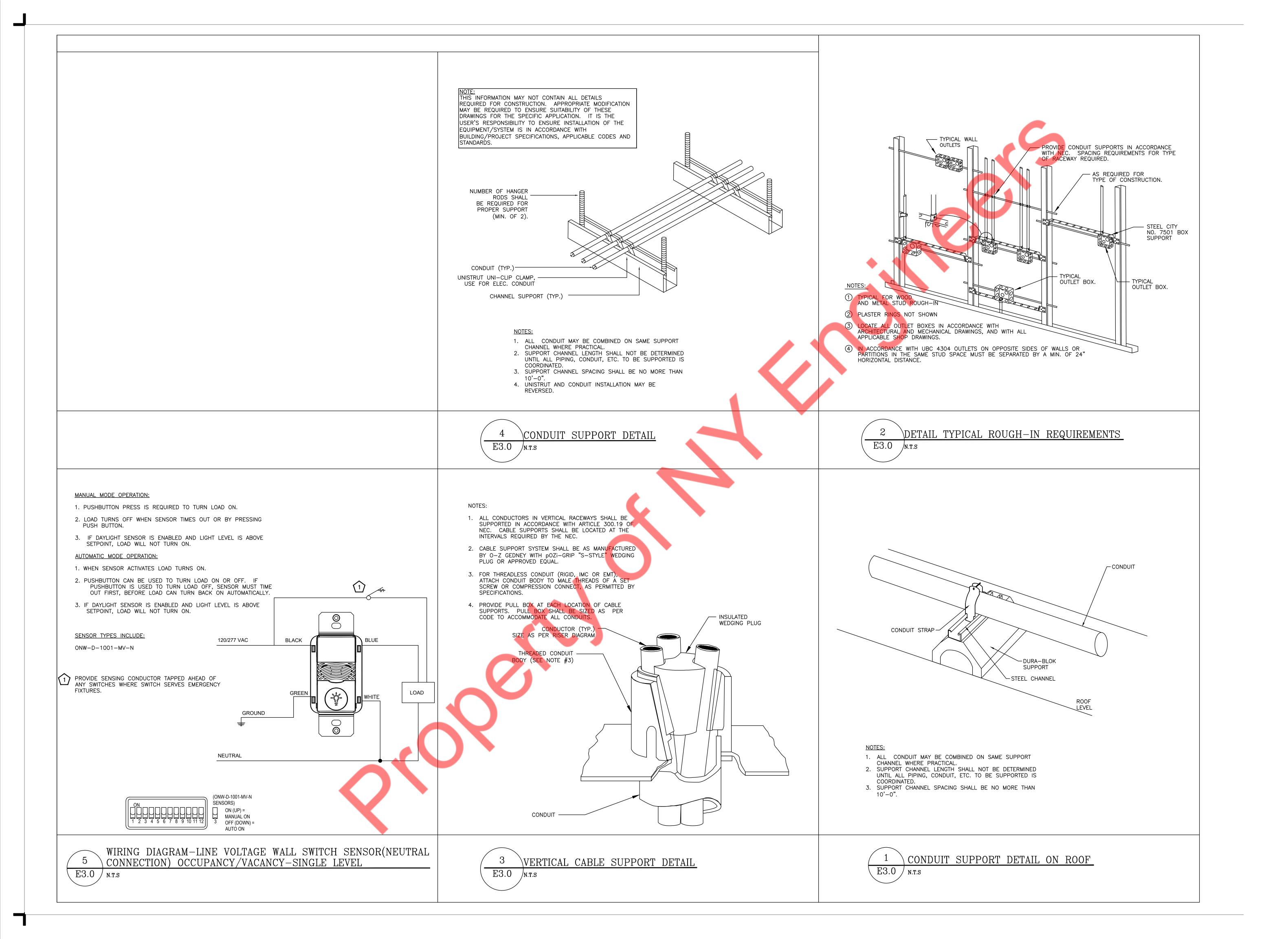
- CONNECT ALL EMERGENCY EGRESS LIGHTING AND EXIT SIGN FIXTURES TO NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES. EXIT SIGNS SHALL NOT EXCEED 5 WATTS PER FACE.
- 2. WALL MOUNTED OCCUPANCY SENSOR. E.C. TO COORDINATE EXACT LOCATION IN FIELD.
- 3. EXHAUST FAN SHALL BE CIRCUITED & CONTROLLED ALONG WITH THE LIGHT FIXTURES IN THE SAME ROOM.
- 4. SWITCHES FOR LIGHTING CONTROL. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
- 5. JUNCTION BOX FOR EXTERIOR SIGNAGE CONTROLLED WITH TIMECLOCK. ALSO COORDINATE EXACT LOCATION WITH SIGNAGE PROVIDER.
- 6. E.C. CO-ORDINATE LOCATION OF LIGHTING CONTACTOR PANEL 'LCP' WITH ARCHITECT/OWNER. SEE SCHEDULE ON THIS DRAWING FOR ADDITIONAL INFORMATION.
- 7. CO-ORDINATE LOCATION OF ET1125C SERIES 24-HOUR ELECTRONIC TIME SWITCH (3.1"X5.3"X8") WITH ARCHITECT/OWNER. SEE SCHEDULE ON THIS DRAWING FOR ADDITIONAL INFORMATION.
- 8. EXISTING LIGHTING FIXTURES TO REMAIN. CONNECT EXISTING LIGHTING FIXTURES TO NEW CONTROLS AS SHOWN.
- 9. INSTALL SWITCH HEIGHT MOUNTED OCCUPANCY SENSOR SUITABLE FOR WALK-IN COOLER/FREEZER ROOM. E.C. TO COORDINATE WITH WALK-IN COOLER/FREEZER MANUFACTURER
- 10. EXHAUST FAN SHALL BE INTERLOCKED WITH THE OVEN, CIRCUIT TO BE EXISTING.
- 11. NOT IN USED.

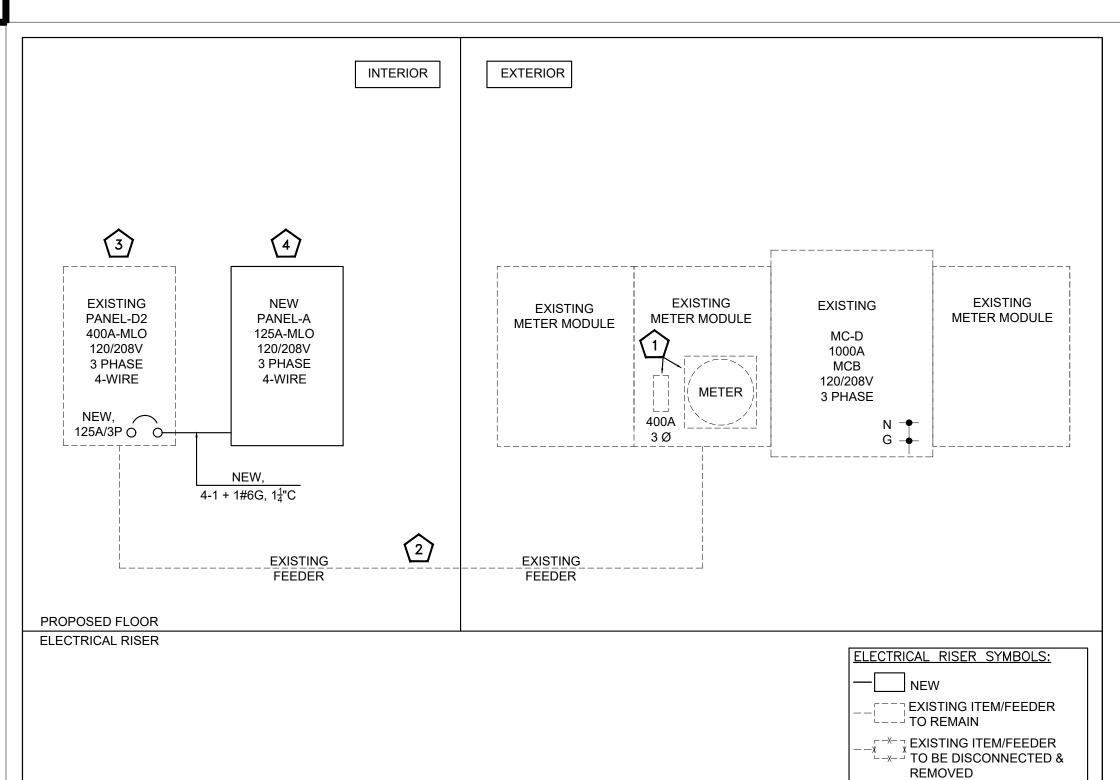
	LIGHT FIXTURE SCHEDULE											
No.	DESCRIPTION	MANUFACTURER	MODEL	QUANTITY	WATTAGE							
L01	LENS LARGE PENDANT LIGHT	ZERO	LED 973LM BLACK HFF	3	21W							
L02	MARLIN WALL LAMP	FARO BARCELONA	65133	4	15W							
L03	24" x 48" TROFFER	LITHONIA	EPANL-24-48L-35K	4	45W							
L04	HALF DOME PENDANT LIGHT	BASELITE	HD14/38/LBLC	3	35W							
L05	LED TRACK LIGHTING (4 LAMPS)	JUNO	R605-35K-80CRI-WFL-BL	4	11W/L							
L06	6" CAN LIGHT	LITHONIA	LDN6-L06-WR-LD-MVOLT-D1	4	45W							
L07	LED TRACK LIGHTING (6 LAMPS)	JUNO	R605-35K-80CRI-WFL-BL	6	11W/L							
L08	24" x 24" TROFFER	LITHONIA	EPANL-24-24L-35K	13	45W							
L09	VANITY SCONCE	LITHONIA	FMVCSLS-24IN-MVOLT-35K-90CRI-BN-M6	1	TBD							
L10	CHICAGO EDGE LIT EXIT SIGN	BIG BEAM	ERCXL-EDGE 2WRWCS	02	5W							
EX	EXIT SIGN	_	_	_	5W							

LIGHT FIXTURE SCHEDULE GENERAL NOTE:

- A. VERIFY FINAL SELECTION WITH ARCHITECT/OWNER PRIOR TO BID.
- B. ALL THE FIXTURE SHALL BE LED TYPE.
- C. FIXTURES SELECTED SHALL BE OPERABLE AT 120V.







RISER DIAGRAM GENERAL NOTE:

- A. E.C. SHALL COORDINATE WITH UTILITY FOR THE AVAILABLE FAULT CURRENT AND VERIFY AIC RATING OF THE EXISTING DEVICES IN FIELD ACCORDINGLY.
- B. E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
- C. E.C. SHALL VERIFY THE EXISTING POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER FOR ANY DISCREPANCY BEFORE COMMENCING ANY WORK.

ELECTRICAL RISER KEYED WORK NOTES:

- 1. EXISTING 400A, 120/208V, 3PH, 4W ELECTRICAL METER AND BREAKER FOR THE PROJECT SPACE SHALL REMAIN. E.C TO VERIFY EXACT LOCATION, RATING AND OPERABLE CONDITION OF THE EXISTING METER & BREAKER IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- 2. EXISTING 400A, 120/208V, 3PH, 4W FEEDER SHALL REMAIN. E.C. SHALL VERIFY THE EXACT RATING AND OPERABLE CONDITION OF THE FEEDER IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- 3. EXISTING 400A, 120/208V 3PH, 4W ELECTRICAL PANEL "D2" FOR THE PROJECT SPACE SHALL REMAIN. E.C. SHALL VERIFY EXACT LOCATION, RATING & OPERABLE CONDITION OF THE PANEL IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- 4. NEW 125A, 120/208V 3PH, 4W ELECTRICAL PANEL"A". E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.

PANEL SCHEDULE ABBREVIATIONS:

- L = LIGHTING R = RECEPTAC
- R = RECEPTACLEH = HVAC
- M = MOTOR E = KITCHEN EQUIPMENT
- O = OTHER

 * GEGL CIRCLUIT BREAKER
- * GFCI CIRCUIT BREAKER.** NEW CIRCUIT BREAKER IN EXISTING PANEL.

PANEL SCHEDULE GENERAL NOTE:

- A. ALL CIRCUITING SHOWN IN THE EXISTING PANEL IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY CIRCUITING OF THE EXISTING DEVICES IN FIELD AND INFORM ENGINEER FOR DISCREPANCIES.
- B. ELECTRICAL CONTRACTOR TO VERIFY THE EXACT PANEL SIZES AND INCOMING FEEDER SIZE IN FIELD. INFORM ENGINEER FOR ANY DISCREPANCY BEFORE BID.
- C. E.C. SHALL REPLACE OR PROVIDE NEW CIRCUIT BREAKERS IN PLACE OF EXISTING CIRCUIT BREAKERS WHEREVER NECESSARY TO BE IN LINE WITH THE PANEL SCHEDULE.
- D. E.C. SHALL VERIFY OPERABLE CONDITION OF EXISTING PANEL, CABLE, FEEDERS,CIRCUIT BREAKER ETC. IN FIELD. REPLACE IN FOUND INOPERABLE.

PANEL:	D2 (EXISTI	NG)										MOUNTING:	SURFACE	
120/208	VOLTS,	3 PHASE,			4	WIRE						PANEL LOCATION:	вон	
		MLO: 400 A		BUS:	400A	MIN,						FED FROM:	EXISTING METER CENTER	
NOTE:	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH	PER	PHASE (R	(VA)	MINIMUM BRANCH	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF	LOAD TRIP AMPS	CKT NO.
				, ,	CIRCUIT	Α	В	С	CIRCUIT					
1	20	SPARE				0.90			2#12, #12G, 3/4"C	0.90	L	LIGHTING FOH	20	2
3	30/2P	E02_HOT COFFEE BREWER	E	2.65	3#10, #10G, 3/4"C		3.55		2#12, #12G, 3/4"C	0.90	L	LIGHTING FOH	20	4
5	30/27	LOZ_HOT COFFEE BREWER	E	2.65	3#10, #10G, 3/4 C			3.15	2#12, #12G, 3/4"C	0.50	0	TIME CLOCK	20	6
7	20	ROOF RECEPTACLE	R	0.36	2#12, #12G, 3/4"C	5.46				5.10	Н			8
9	20	REC SHOW WINDOW	R	0.36	2#12, #12G, 3/4"C		5.46		3#8, #10G, 3/4"C	5.10	Н	RTU-1 (E)	45/3P	10
11	20	SIGNAGE POWER	L	1.20	2#12, #12G, 3/4"C			6.30		5.10	Н			12
13	20	RESTROOM GFCI	R	0.36	2#12, #12G, 3/4"C	1.82			2#10, #10G, 3/4"C	1.46	Е	E01_ESPRESSO MACHINE	30/2P	14
15	20	E18_POS RECEPTACLES	R	0.90	2#12, #12G, 3/4"C		2.36		2#10, #10G, 3/4 C	1.46	Е	LOT_ESPICESSO MACHINE	30/2F	16
17	20/2P	E21_REFRIGERATED COUNTER CASE,	E	0.15	2#12, #12G, 3/4"C			1.15	2#12, #12G, 3/4"C	1.00	R	REC_SECURITY	20	18
19		SELF-SERVE	E	0.15		0.65			2#12, #12G, 3/4"C	0.50	0	JUNCTION BOX FOR HOOD	20	20
21	20/2P	E21_REFRIGERATED COUNTER CASE,	E	0.15	2#12, #12G, 3/4"C		0.25		2#12, #12G, 3/4"C	0.10	0	WH-1	20	22
23		SELF-SERVE	E	0.15				0.65	2#12, #12G, 3/4"C	0.50	0	RCP-1	20	24
25	20	E17_ICE CREAM DIPPING CABINET	E	0.53	2#12, #12G, 3/4"C	0.53						SPARE	20	26
27	20	E08_PORTABLE COFFEE DISPENSER	E	0.16	2#12, #12G, 3/4"C		0.16					SPARE	20	28
29	20	E19_U.C.REFRIGERATOR	E	0.58	2#12, #12G, 3/4"C			1.28	2#12, #12G, 3/4"C	0.70	Ŧ	EF-1(N)	20	30
31	20	SPARE				4.04				4.04	Н			32
33	20	SPARE					4.04		3#6, #10 G, 3/4"C	4.04	Н	RTU-2 (N)	50/3P	34
35	20	E14_U.C.REFRIGERATOR	E	0.76	2#12, #12G, 3/4"C			4.80		4.04	Н			36
37	20	E40_FOOD WALK-IN	Н	1.00	2#12, #12G, 3/4"C	8.81				7.81	0			38
39	40/2P	SPARE					7.81		4#1, #6G, 1 1/4"C	7.81	0	TO PANEL "A"	125/3P	40
41	70/21	JI FILE						7.81		7.81	0			42
				TOI	TAL CONNECTED LOAD (KVA)	22.20	23.62	25.13						

PANEL:	A (NEW)												MOUNTING: SURFACE		
120/208	VOLTS,	3 PH	HASE,			4	WIRE	1					PANEL LOCATION: BOH		
		MLO: 12	25 A		BUS:	125 A	MIN,						FED FROM: EXISTING PAN	EL "D2"	
NOTE:	•														
CKT NO.	TRIP AMPS	DESCRIPTION OF	LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER A	PHASE (I	KVA)	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20	E11_12" MANUAL GRAVITY FEEI	D MEAT SLICER	Е	0.45	2#12, #12G, 3/4"C	1.65			2#12, #12G, 3/4"C	1.20	E	CONVECTION OVEN CONTROLS (E09)	20	2
3	20	E15_FULL SIZE INSULATED HEAT	TED CABINET	Е	1.44	2#12, #12G, 3/4"C		7.44			6.00	E			4
5	30/2P	E03 ESPRESSO GRINDER		E	0.22	2#10, #10G, 3/4"C			6.22	3#6, #10G, 3/4"C	6.00	E	E09_CONVECTION OVEN-ELECTRIC	60/3P	6
7	30/2P	LUS_LSFRLSSO GRINDLR		E	0.22	2#10, #10G, 3/4 C	6.22				6.00	E			8
9	20	E36_PLANETARY MIXER STAINLE	ESS STEEL 20 QT.	E 🚄	1.08	2#12, #12G, 3/4"C		1.65			0.57	E			10
11	20/2P	E10_40 QT. TWO-SPEED SPIRAL	DOLIGH MIXER	Е	1.51	2#12, #12G, 3/4"C			2.08	3#12, #12G, 3/4"C	0.57	Е	E13_SINGLE BAGEL DIVIDER FORMER	20/3P	12
13	20/21	1210_40 Q1: 1WO 31 22D 31 IIIAE	DOOGIT WIIXER	Е	1.51	2#12, #120, 3/4 C	2.08				0.57	E			14
15	20	HAND DRYER		М	1.00	2#12, #12G, 3/4"C		1.90		2#12, #12G, 3/4"C	0.90	R	KITCHEN GENERAL RECEPTACLE	20	16
17	20	E15_HEATED ACABINET		Е	1.44	2#12, #12G, 3/4"C			2.34	2#12, #12G, 3/4"C	0.90	R	GENERAL RECEPTACLE	20	18
19	20	E12_BAGGLE KETTLE		E	0.50	2#12, #12G, 3/4"C	0.60			2#12, #12G, 3/4"C	0.10	R	SMOKE DETECTOR	20	20
21				I	0.50			0.50					SPARE	20	22
23	20/3P	WALK-IN CONDENSING UNIT		Н	0.50	2#12, #12G, 3/4"C			0.50				SPARE	20	24
25				Н	0.50		0.50						SPARE	20	26
27	20	SPARE			•			0.00					SPARE	20	28
29	20	SPARE							0.00				SPARE	20	30
31	20	SPARE					0.00						SPARE	20	32
33	20	SPARE						0.00					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	SPARE (0.00				SPARE	20	42
	_				тот	AL CONNECTED LOAD (KVA) 11.05	11.49	11.14			_			

PLUMBING SYMBOLS LIST

SANITARY SEWER (UNDERFLOOR) GREASE SANITARY SEWER (UNDERFLOOR) EXISTING GREASE SANITARY SEWER (UNDERFLOOR) — EX.GSAN —— EX.SAN — EXISTING SANITARY SEWER (UNDERFLOOR) GAS PIPING — G — VENT PIPING _____

COLD WATER PIPING ____ HOT WATER PIPING

HOT WATER RETURN PIPING ____

EXISTING COLD WATER PIPING PIPE UP PIPE DROP CLEANOUT **─**(•)─

PLUGGED OUTLET/CLEANOUT POINT OF CONNECTION

PLUMBING ABBREVIATIONS

CO CLEANOUT CW COLD WATER HOT WATER HOT WATER RETURN **SANITARY** VENT WASTE LAVATORY WATER CLOSET TYP. **TYPICAL** DOWN ABOVE FINISH FLOOR FLOOR DRAIN SQ. FT. SQUARE FEET BACK FLOW PREVENTER WATER HEATER NOT IN SCOPE

PLUMBING DRAWING LIST

PLUMBING NOTES, SYMBOLS, ABBREVIATIONS & SPECIFICATIONS

FUNNEL DRAIN

EXPANSION TANK

P1.1 PLUMBING FLOOR PLANS

P2.1 PLUMBING DETAILS

P3.1 PLUMBING RISERS & SCHEDULES

BUILDING DEPARTMENT PLUMBING NOTES

- 1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER, STORM) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE FDITION.
- 2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.2
- 3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
- 4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC
- 5. RODENT PROOFING AS PER PC 304
- 6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902,PC 1102.
- 7. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
- 8. DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
- 9. DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
- 10. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
- 11. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
- 12. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF 1.03 SUBSTITUTIONS CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708,
- 13. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH
- 14. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 107.

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 FREEZE 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 THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED
- 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
- . VALVES HANGERS AND SUPPORTS
- 4. PLUMBING PIPING LAYOUT
- 5. TESTS
- PLUMBING FIXTURES WATER HEATERS & ACCESSORIES
- 8. MIXING VALVES
- 9. 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.
- REQUIREMENTS OF 2020 FLORIDA PLUMBING CODE, 7th C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
 - D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.
 - E. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE
 - F. 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.
 - G. 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.
 - H. 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.

- A. 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.

1.05 DEFINITIONS

- A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER. COMPLETE WITH RELATED ACCESSORIES.
- B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
- . 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.

- A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF 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.
- . REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
-). 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 AND INFORMATION FURNISHED BY THE OWNER.
- F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

- A. SANITARY AND VENT PIPING:
- 1. ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER COUPLING.
- 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
- 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.
- A.1 DOMESTIC WATER PIPING:
- 1. ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN OPPER TUBE. OR CPVC AS PER ASTM D2846, ASTM F441, ASTM F442 AND CSA B137.6 STANDARDS.
- 2. FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.OR CPVC AS PER ASSE 1061. ASTM D2846, ASTM F437, ASTM F438, ASTM F439, CSA B137.6 STANDARDS.
- 3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER
- 4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
- COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
- 6. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH 2020 FLORIDA ENERGY CONSERVATION CODE, 7TH EDITION SECTION C403.2.10 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS NOMINAL PIPE OR TUBE FLUID **NSULATION CONDUCTIVITY** SIZE (INCHES) OPERATING TEMPERATI CONDUCTIVITY | MEAN RATING RANGE AND to 11% to 4 to BTU?IN./ | TEMPERATURE, | < 1 $< 1\frac{1}{2}|< 4 |< 8|^{2}$ USAGE (°F) (H?FT2?*F) 141-200 | 0.25-0.29 1.5 | 1.5 | 2 | 2 | 2 125 105-140 0.21-0.28 100

- 0.5 0.5 1.0 1.0 1.0 0.21 - 0.2775 0-60 WATER DISTRIBUTION SYSTEM AS PER FLORIDA ENERGY CONSERVATION CODE 2020, 7TH EDITION, C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER ROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
- a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE. b. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).
- 8. AS PER FLORIDA ENERGY CONSERVATION CODE 2020, 7TH EDITION, C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

- SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION. 10. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION. B. 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
- 2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
- 3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
- 4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
- 5. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

C. 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 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 SHUT-OFF VALVES ON SUPPLY LINES.
- 4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- 5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- 6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

D. GAS PIPING:

- 1. GAS PIPING SHALL BE SIZED IN ACCORDANCE WITH PIPE SIZING TABLES OR SIZING EQUATIONS IN ACCORDANCE WITH 2020 FLORIDA BUILDING CODE-FUEL GAS, 7TH EDITION SECTION 402.4.
- INDIVIDUAL OUTLETS TO GAS RANGES SHALL NOT BE ESS THAN ¾ INCHES NPS.
- METALLIC PIPE SHALL COMPLY WITH 2020 FLORIDA BUILDING CODE- FUEL GAS, 7TH EDITION SECTIONS 403.4.1 THROUGH 403.4.4.
- PIPING SYSTEM INSTALLATION SHALL COMPLY WITH REQUIREMENTS OF 2020 FLORIDA BUILDING CODE-FUEL GAS, 7TH EDITION, SECTION 404.
- 5. AS PER 2020 FLORIDA BUILDING CODE- FUEL GAS 7TH EDITION SECTION 404.6; UNDERGROUND PIPING, WHERE INSTALLED BELOW GRADE THROUGH THE OUTER FOUNDATION OR BASEMENT WALL OF A BUILDING, SHALL BE ENCASED IN A PROTECTIVE PIPE SLEEVE. THE ANNULAR SPACE BETWEEN THE GAS PIPING AND THE SLEEVE SHALL BE SEALED.
- 6. PIPING INSTALLED UNDERGROUND BENEATH BUILDINGS IS PROHIBITED EXCEPT WHERE THE PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE DESIGNED TO WITHSTAND THE SUPERIMPOSED LOADS. THE CONDUIT SHALL BE PROTECTED FROM CORROSION IN ACCORDANCE WITH SECTION 404.11 AND SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 404.11.1 OR 404.11.2 OF 2020 FLORIDA BUILDING CODE- FUEL GAS, 7TH EDITION.
- 7. AS PER FLORIDA FUEL GAS CODE 2020, 7TH EDITION SECTION 404.12: UNDERGROUND PIPING SYSTEMS SHALL BE INSTALLED A MINIMUM DEPTH OF 12 INCHES BELOW GRADE.
- 8. THE GAS PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE TO WITH STAND THE SUPERIMPOSED LOADS.
- 9. SHUTOFF VALVES SHALL BE LOCATED IN PLACES SO AS TO PROVIDE ACCESS FOR OPERATION AND SHALL BE INSTALLED SO AS TO BE PROTECTED FROM
- E. 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.
- F. 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.
- G. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- H. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

- J. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- K. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
- L. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
- M. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
- N. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
- O. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
- P. 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
- . AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- 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.
 - 2. INSTALLATION

BUILDING CONDITIONS.

MANAGER IS REQUIRED.

2.01 GENERAL

- T. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
- U. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- V. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- W. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- X. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- OUTSIDE, BEFORE ASSEMBLY. Z. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH

Y. REMOVE SCALE AND FOREIGN MATERIAL. FROM INSIDE AND

- FLANGES AND UNIONS. AA. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL
- AB. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN
- UNHEATED SPACES. AC. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS. THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY
- AD. THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING
- AE. WHEN CONNECTING TO EXISTING STACKS AND RISERS. PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY

AND VENT STACKS. 2.02 ABOVE GRADE

SYSTEMS.

- A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.
- B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.
- C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING, LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

3. TESTING

- A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
- B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
- C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
- D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
- E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
- F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.
- G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN

SUBSTANCES AND SHALL BE LEFT CLEAN.

- H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.
- J. ALL EQUIPMENT WILL BE FACTORY TESTED.
- I. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
- K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.
- L. TESTING REQUIREMENTS
- a. DOMESTIC WATER PIPING SHALL BE TESTED AND PROVED TIGHT UNDER A WATER PRESSURE NOT LESS THAN THE WORKING PRESSURE OF THE
- b. THIS WORKING PRESSURE SHALL BE HELD FOR NOT LESS THAN 15 MINUTES.

c. THE REQUIRED TESTS SHALL BE PERFORMED IN

ACCORDANCE WITH THIS SECTION AND SECTION M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET

STANDARDS OF THE DEPARTMENT OF HEALTH,

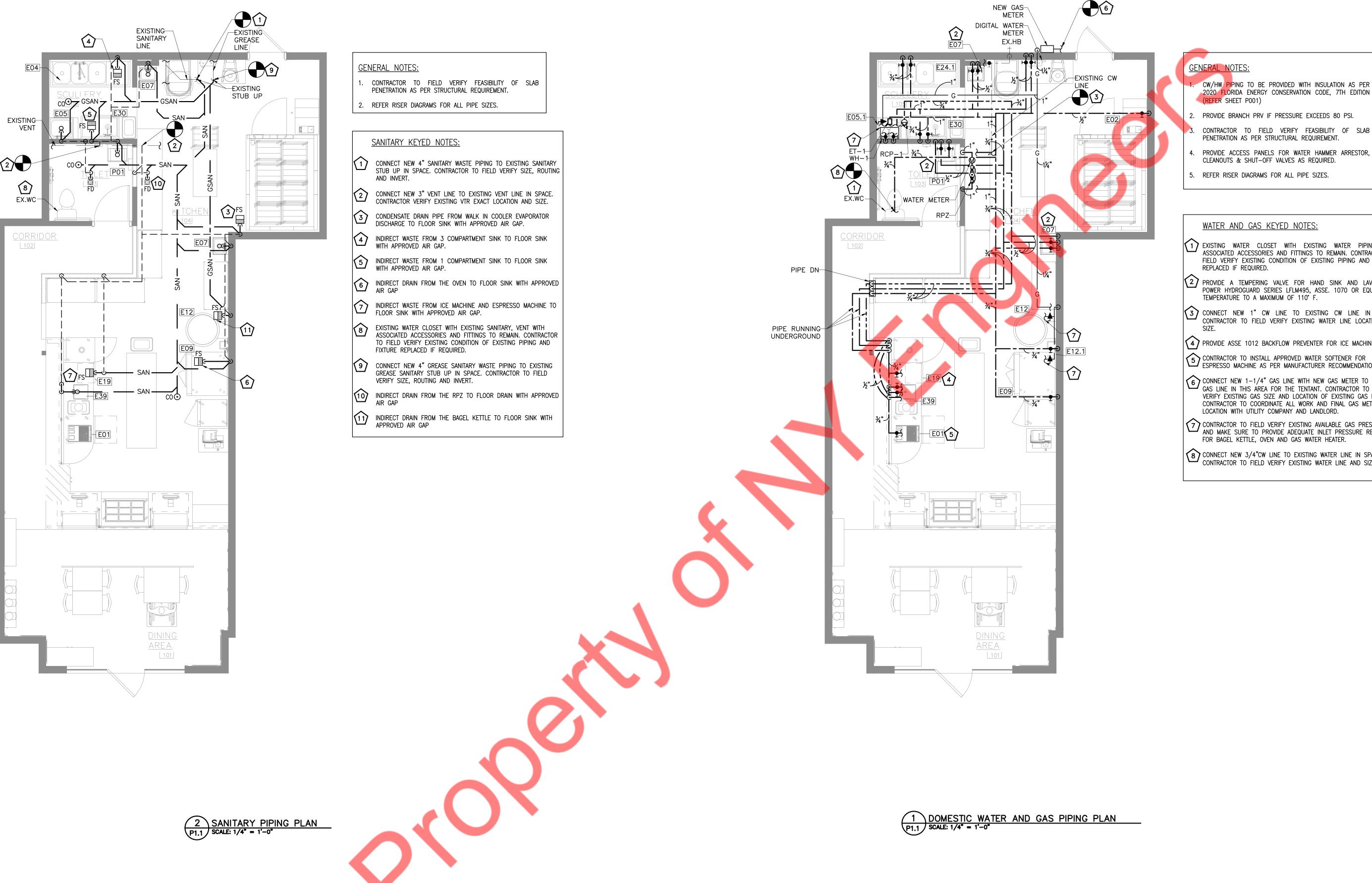
AND FOR A PERIOD OF RETENTION AS

STIPULATED. N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL

4. WARRANTY

ACCEPTANCE.

A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.



CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER 2020 FLORIDA ENERGY CONSERVATION CODE, 7TH EDITION

PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.

CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.

1) EXISTING WATER CLOSET WITH EXISTING WATER PIPING WITH ASSOCIATED ACCESSORIES AND FITTINGS TO REMAIN. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION OF EXISTING PIPING AND FIXTURE

PROVIDE A TEMPERING VALVE FOR HAND SINK AND LAVATORIES. POWER HYDROGUARD SERIES LFLM495, ASSE. 1070 OR EQUAL. SET

CONNECT NEW 1" CW LINE TO EXISTING CW LINE IN SPACE.
CONTRACTOR TO FIELD VERIFY EXISTING WATER LINE LOCATION AND

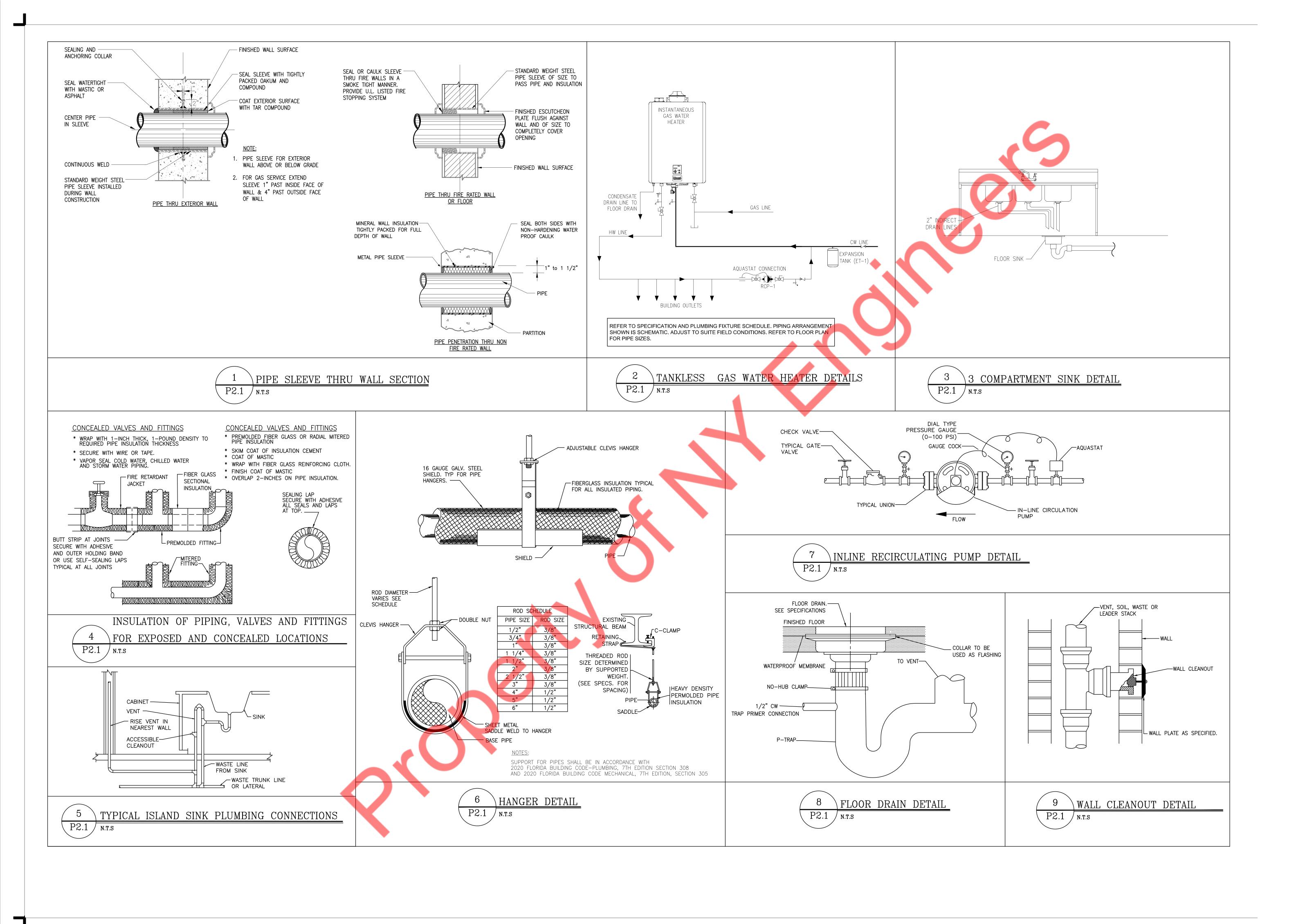
PROVIDE ASSE 1012 BACKFLOW PREVENTER FOR ICE MACHINE.

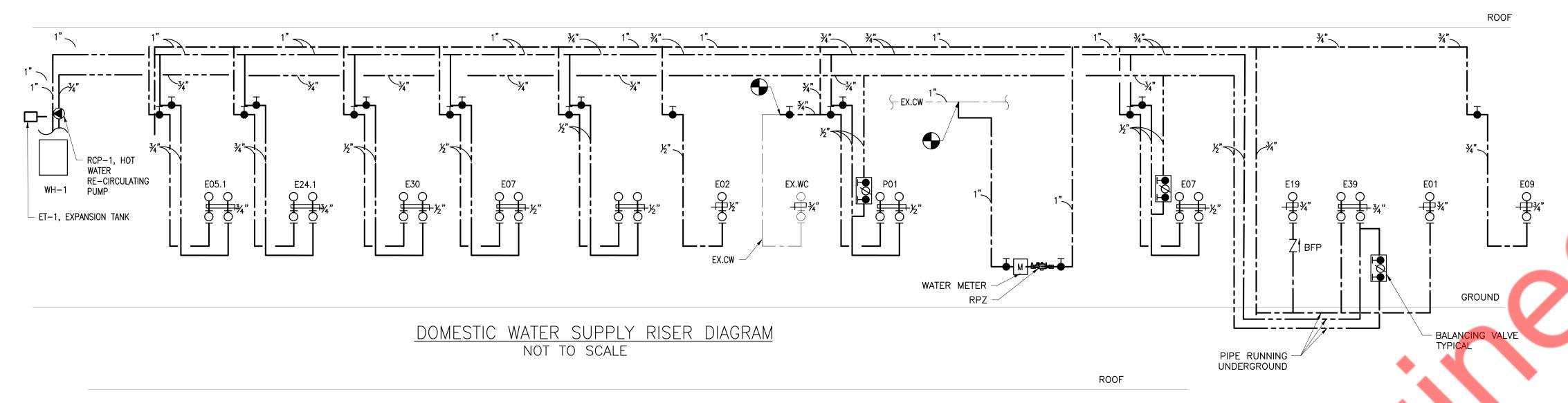
CONTRACTOR TO INSTALL APPROVED WATER SOFTENER FOR ESPRESSO MACHINE AS PER MANUFACTURER RECOMMENDATION.

6 CONNECT NEW 1-1/4" GAS LINE WITH NEW GAS METER TO EXISTING GAS LINE IN THIS AREA FOR THE TENTANT. CONTRACTOR TO FIELD VERIFY EXISTING GAS SIZE AND LOCATION OF EXISTING GAS MAIN. CONTRACTOR TO COORDINATE ALL WORK AND FINAL GAS METER LOCATION WITH UTILITY COMPANY AND LANDLORD.

CONTRACTOR TO FIELD VERIFY EXISTING AVAILABLE GAS PRESSURE AND MAKE SURE TO PROVIDE ADEQUATE INLET PRESSURE REQUIRED FOR BAGEL KETTLE, OVEN AND GAS WATER HEATER.

8 CONNECT NEW 3/4"CW LINE TO EXISTING WATER LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING WATER LINE AND SIZE.





NEW 3" VENT LINE CONNECT TO EXISTING VENT LINE (VERIFY IN E04 | E12 | FS | FS | GROUND

SANITARY RISER DIAGRAM NOT TO SCALE

	EQUIPMENT				SAN			
IXTURE CATEGORY		MANUFACTURER	MODEL	DIRECT INDIREC		VENT	CW	HW
EX.WC	WC WATER CLOSET E		Е	Е	-	E	Е	-
P01	LAVATORY	AMERICAN STANDARD	9024901EC.020	2"	-	1-1/2"	1/2"	1/2"
E05	MOP SINK	SERVE-WARE	BKMS2-1620-6-KIT	3"	-	2"	-	_
E05.1	MOP SINK FAUCET	SERV-WARE	SF1000	-	-	-	3/4"	3/4"
E01	ESPRESSO MACHINE	EVERSYS	C'2-M-TEMPEST	-	1-1/4"	-	3/4"	-
E02	HOT COFFEE BREWER	GROUND CONTROL	CYCLOPS	-	1"	-	1/2"	-
E04	3 COMP SINK	EAGLE GROUP	314-16-3-24R	-	2"	-	-	-
E24.1	PRE-RINSE FAUSET	T&S BRASS	B-0133-12-CR-B	-	-	-	3/4"	3/4"
E07	HAND SINK	REGENCY	600HS17SP	2"	-	1-1/2"	1/2"	1/2"
E09	OVEN	LBC	LMO-G8-N-P	-	1/2"	-	3/4"	-
E12	BAGEL KETTLE	DAVRIK	BK40	-	1-1/2"	-	-	-
E12.1	POT FILLER	KROWNE METAL	20-203L	-	-	-	1/2"	
E19	ICE MACHINE	AVANTCO	UC-F-120-A 19"	-	1"	-	3/4"	
E30	1-COMP SINK	ADVANCE TABCO	FC-1-1818-18R	-	2"	-	3/4"	3/4"
E39	UNDER COUNTER BASIN	KADO	LUX	2"	-	1-1/2"	1/2"	1/2"
	DIGITAL WATER METER	DOMIX	DOMIX 45A	-	-	-	1/2"	1/2"
FS	FLOOR SINK	-	-	3"	-	2"		-
FD	FLOOR DRAIN	-	-	_	4"	2"		_

			R SCHEDULE					
HEATER TAG	LOCATION	FLOW RATE @75° F	FUEL TYPE	INPUT BTU/HR	ТҮРЕ	M	ANUFACTURER & MODEL NO.	REMARKS
WH-1	SCULLERY 105	5	NATURAL GAS	199,000	TANKLESS WATER HEATER		RINNAI CU199i	-DIMENSION 18.5" W X 31.3" H

RECIRCULATING PUMP SCHEDULE										
ITEM	QUANTITY	GPM	TOTAL HEAD(FT)	MOTOR HP	MANUFACTURER & MODEL NO					
RCP-1	1	2	10	0.115	GRUNDFOS UP 15-18					

	EXPANSION TANK SCHEDULE										
TAG	LOCATION	SERVICE	CAPACITY (GALLONS)	MANUFACTURER & MODEL	DIMENSION (DIA X HEIGHT)	WEIGHT (LBS)	NO. OF EXPANSION TANK				
ET-1	REFER FLOOR PLANS	HW	2	THERM-X-TROL ST-5	8" X 13"	5	1				

FIXTURE UNIT CALCULATION											
	UNITS PER FIXTURE TOTAL										
FIXTURE	QT	Υ	EQUIPMENT CATEGORY	CW	HW	TOTAL	CW	HW	TOTAL		
EX.WC	1		WATER CLOSET	5	0	5	5	0	5		
P01	1		LAVATORY	1.5	1.5	2	1.5	1.5	2		
E05	1		MOP SINK	2.25	2.25	3	2.25	2.25	3		
E30	1		1-COMP SINK		3	4	3	3	4		
E07	2		HAND SINK	0.5	0.5	0.7	1	1	1.4		
E39	1		UNDER COUNTER BASIN	0.5	0.5	0.7	0.5	0.5	0.7		
E24.1	1		3 COMP SINK	3	3	4	3	3	4		
E19	1		ICE MACHINE	0.25	0	0.25	0.25	0	0.25		
E02	1		HOT COFFEE BREWER	0.25	0	0.25	0.25	0	0.25		
E01	1		ESPRESSO MACHINE	0.25	0	0.25	0.25	0	0.25		
E09	1	. OVEN		0.25	0	0.25	0.25	0	0.25		
					TOTAL FIX	TURE UNITS	17.25	11.25	21.1		
						TOT	AL FIXTURE	UNITS 21.1	= 21.5 GPM		
WSFU VALUE	S AS PER F	LORIDA	A PLUMBING CODE 2020 TA	BLE E103.3	(2)						

PER FLORIDA PLUMBING CODE 2020 TABLE E103.3(3) FOR 21.5 GPM CALCULATED PIPE SIZE IS 1"

EANOUTS SHALL BE PROVIDED FOR DRAINAGE PIPING IN ACCORDANCE WITH CTION 708, 2020 FLORIDA BUILDING CODE— PLUMBING, 7TH EDITION.

1. AS PER SECTION 604.9, 2020 FLORIDA BUILDING CODE— PLUMBING WATER HAMMER ARRESTOR SHALL BE INSTALLED WHERE REQUIRED IN

2. VALVES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 606.1

ARRESTORS SHALL CONFORM TO ASSE 1010.

2020 FLORIDA BUILDING CODE- PLUMBING

ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. WATER HAMMER

WATER TEMPERATURE LIMITING DEVICE SHALL BE INSTALLED WHERE REQUIRED IN ACCORDANCE WITH SECTION 607 OF 2020 FLORIDA BUILDING JMBING. TO LIMIT TEMPERED WATER TO A MAXIMUM OF 110° F PREVENTER APPLICATIONS SHALL BE INSTALLED AS PER TABLE 608.1 OF RIDA BUILDING CODE— PLUMBING, 7TH EDITION.

ROOF E12 NEW GAS LINE -BAGEL KETTLE NEW GAS METER -

NOTES:

GAS RISER DIAGRAM NOT TO SCALE

GAS PIPE SIZING PER TABLE 402.4(2), FLORIDA FUEL GAS CODE, 2020. GAS INLET PRESSURE- LESS THAN 2 PSI. PRESSURE DROP- 0.5" WC

TOTAL EQUIVALENT LENGTH OF PIPE =67FEET

GAS NOTE:

PROVIDE SHUT-OFF VALVE AN ACCESSIBLE LOCATION. PROVIDE GAS PRESSURE REGULATOR FOR ALL GAS EQUIPMENT IF REQUIRED.

CONTRACTOR SHALL VERIFY ACTUAL GAS PRESSURE AND LONGEST LENGTH OF RUN TO FARTHEST APPLIANCE PRIOR TO INSTALLATION AND NOTIFY ENGINEER IF CONDITION DIFFER THAN SHOWN ON THIS PLAN.

GAS LOAD SUMMERY										
ITEM NO.	QTY.	DESCRIPTION	MANUFACTURER	MODEL	SIZE	BTU/HR.				
WH-1	1	WATER HEATER	RINNAI	CU199I	1"	199,000				
E12	1	BAGEL KETTLE	DAVRIK	BK40	1"	180,000				
E09	1	OVEN	LBC	LMO-G8-N-P	3/4"	90,000				
					TOTAL LOAD	469,000				

1		BAGEL KETTLE			DAVRIK BK40		1"	180,000
1	I	OVE	N		LBC	LMO-G8-N-P	3/4"	90,000
							TOTAL LOAD	469,000
			GREASE IN	NTERCEPTO	OR CALCULA	TION		
S	GS	HR	LF =	GALLONS				
40	25	11	0.75	690				
RE	QUIRE	D CAPACI	TY (GAL) = 6	90				
BASE E	QUAT	ION: (S) x ((GS) x (HR/1	2) x (LF) = E	ffective capac	city of grease interceptor in gallor	ns	
				LEGEND				
	S		NUMBER	OF MEALS I	PER SEAT(4)	(10)		
	GS					•		STAURANTS;
HR NUMBER OF HOUF				OF HOURS E	STABLISHME	ENT IS OPEN		
	LF			•				
EXISTI	NG GF	REASE INTI	ERCEPTOR	CAPACITY I	IS 1250 GALL	ONS		
	S 40 RE BASE E	40 25 REQUIRE BASE EQUAT S GS HR LF	S GS HR 40 25 11 REQUIRED CAPACI BASE EQUATION: (S) x G S GS HR LF	GREASE IN S GS HR LF = 40 25 11 0.75 REQUIRED CAPACITY (GAL) = 6 BASE EQUATION: (S) x (GS) x (HR/1) S NUMBER GALLONS USE 10 G HR NUMBER LOADING RECREAT	GREASE INTERCEPTOR S GS HR LF = GALLONS 40 25 11 0.75 690 REQUIRED CAPACITY (GAL) = 690 BASE EQUATION: (S) x (GS) x (HR/12) x (LF) = E LEGEND S NUMBER OF MEALS GS GALLONS OF WASTE USE 10 GALLONS FOR HR NUMBER OF HOURS E LF LOADING FACTOR (2.18)	GREASE INTERCEPTOR CALCULA LEGEND GREATION AND CALCULA LEGEND GREATION AND CALCULA GREATION AND CALCULA LEGEND GREATION AND CALCULA LEGEND	GREASE INTERCEPTOR CALCULATION S GS HR LF = GALLONS 40 25 11 0.75 690 REQUIRED CAPACITY (GAL) = 690 BASE EQUATION: (S) x (GS) x (HR/12) x (LF) = Effective capacity of grease interceptor in gallor LEGEND S NUMBER OF MEALS PER SEAT (4X10) GS GALLONS OF WASTEWATER PER SEAT (USE 25 GALLONS FOR USE 10 GALLONS FOR SINGLE SERVICE ARTICLE RESTAURAN HR NUMBER OF HOURS ESTABLISHMENT IS OPEN LOADING FACTOR (2.0 INTERSTATE HIGHWAYS, 1.5 OTHER FREEN	GREASE INTERCEPTOR CALCULATION GREASE INTERCEPTOR CALCULATION GREASE INTERCEPTOR CALCULATION S GS HR LF = GALLONS 40 25 11 0.75 690 REQUIRED CAPACITY (GAL) = 690 BASE EQUATION: (S) x (GS) x (HR/12) x (LF) = Effective capacity of grease interceptor in gallons LEGEND S NUMBER OF MEALS PER SEAT(4X10) GS GALLONS OF WASTEWATER PER SEAT (USE 25 GALLONS FOR ORDINARY RE USE 10 GALLONS FOR SINGLE SERVICE ARTICLE RESTAURANTS.) HR NUMBER OF HOURS ESTABLISHMENT IS OPEN LOADING FACTOR (2.0 INTERSTATE HIGHWAYS, 1.5 OTHER FREEWAYS, 1.25 RECREATIONAL USE AREAS, 1.0 MAIN HIGHWAYS, 0.75 OTHER HIGHWAYS)