	MECHANIC	CAL SYME	BOLS LIST
AC-1 (TXF-1)	EQUIPMENT SYMBOL	CONTI	ROLS AND SENSORS
	AIR DEVICES	Ū	THERMOSTAT
$\boxtimes$	CEILING DIFFUSER SUPPLY	S	MANUAL ON/OFF SWITCH
		<u>(S)</u>	DUCT SMOKE DETECTOR
	CEILING DIFFUSER RETURN	① <sub>S</sub>	TEMPERATURE SENSOR
	SIDEWALL/DUCT MOUNTED GRILLE—SUPPLY		DUCTWORK
		=====	AIR DUCT W/ 1.5" ACOUSTICAL LINING
Į		<b>-</b> ~~~	FLEXIBLE DUCT
<u> </u>	SIDEWALL/DUCT MOUNTED GRILLE-RETURN	FC FC	FLEXIBLE CONNECTION
	ICT ACCESSORIES	24X12	RECTANGULAR DUCT (WIDTH X DEPTH)
	T ACCESSONIES	<u>ø12</u>	ROUND DUCT (DIAMETER)
	VOLUME DAMPER W/ ACCESS DOOR	<b>S</b>	ROUND DUCT CROSS SECTION
			SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
<del>}   }</del>	FIRE DAMPER W/ ACCESS DOOR		RETURN AIR RECTANGULAR DUCT CROSS SECTION
M	MOTORIZED DAMPER W/ ACCESS DOOR		•
BD	BACKDRAFT DAMPER		

MECHA	ANICAL ABBREVIATIONS
AFF	ABOVE FINISHED FLOOR
AL	ACOUSTIC LINING
BOD	BOTTOM OF DUCT
BOE	BOTTOM OF EQUIPMENT
CDS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
DN	DOWN
EG	EXHAUST GRILLE
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
MD	MOTORIZED DAMPER
CU	CONDENSING UNIT
RG	RETURN GRILLE
RA	RETURN AIR
CEED	SEASONAL ENERGY
SEER	EFFICIENCY RATIO
SG	SUPPLY GRILLE
SA	SUPPLY AIR
VD	VOLUME DAMPER
TEF	TOILET EXHAUST FAN
EF	EXHAUST FAN
AHU	AIR HANDLING UNIT
MAU	MAKE AIR UNIT
KEF	KITCHEN EXHAUST FAN
LV	LOUVER
COP	COEFFICIENT OF PERFORMANCE
PCU	POLLUTION CONTROL UNIT

## SUMMARY OF DESIGN CONDITIONS

## CLIMATE:

- 1. CLIMATE ZONE 1A.
- 2. COOLING OUTDOOR DESIGN TEMPERATURE (DB): 92.1° F (FLORIDA, 0.4% ASHRAE 2017 CLIMATE DATA).
- 3. HEATING OUTDOOR DESIGN TEMPERATURE (DB): 45.6° F (FLORIDA, 99.6%, ASHRAE 2017 CLIMATE DATA).
- 4. COOLING INDOOR DESIGN TEMPERATURE (DB): 75° F.
- 5. HEATING INDOOR DESIGN TEMPERATURE (DB): 72° F.
- 6. INDOOR RELATIVE HUMIDITY: 30% (HEATING), 50% (COOLING).

	MECHANICAL DRAWING LIST
M001	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M002	MECHANICAL SPECIFICATIONS
M100	MECHANICAL FLOOR PLAN
M101	MECHANICAL ROOF PLAN
м500	MECHANICAL DETAILS (1 OF 2)
M501	MECHANICAL DETAILS (2 OF 2)
м600	MECHANICAL SCHEDULES
H100	HOOD & MAU DETAILS (1 OF 5)
H101	HOOD & MAU DETAILS (2 OF 5)
H102	HOOD & MAU DETAILS (3 OF 5)
H103	HOOD & MAU DETAILS (4 OF 5)
H104	HOOD & MAU DETAILS (5 OF 5)

# FLORIDA ENERGY CONSERVATION CODE-2020 COMPLIANCE

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND JUDGEMENT, THESE PLANS AND SPECIFICATION ARE IN COMPLIANCE WITH THE FLORIDA ENERGY CONSERVATION CODE—2020.

### FLORIDA BUILDING DEPARTMENT NOTES

- ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF FLORIDA BUILDING CODE; BASE CODE IBC 2020, AND ALL RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2020 FLORIDA MECHANICAL CODE, CHAPTER 4.
- 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.
- 5. 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.
- 7. 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.
- CODE FMC 2020.

  B. DUCT CONSTRUCTION AND INSTALLATION—SECTION 603 OF FLORIDA BUILDING CODE; BASE CODE FMC 2020.
- FLORIDA BUILDING CODE; BASE CODE FMC 2020.

  D. AIR FILTERS —SECTION 605 OF FLORIDA BUILDING CODE;
  BASE CODE FMC 2020.

C. AIR INTAKES, EXHAUSTS AND RELIEF-SECTION 401 OF

- E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION 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. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY FLORIDA BUILDING CODE; BASE CODE FMC 2020 CHAPTER 4 SECTION 403.3. HVAC SYSTEM SHALL BE BALANCED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS AS REQUIRED BY FLORIDA BUILDING CODE; BASE CODE FECC 2020 SECTION 408.2.2.
- 11. SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION 606 FLORIDA BUILDING CODE; BASE CODE FMC 2020, TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.
- 12. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE—RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- 13. 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.
- 14. A COMMISSIONING PLAN SHALL DEVELOPED BY A LICENSED DESIGN PROFESSIONAL, MECHANICAL ENGINEER OR APPROVED
- 15. A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES
  AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE
  LICENSED DESIGN PROFESSIONAL, ELECTRICAL ENGINEER,
  MECHANICAL ENGINEER OR APPROVED AGENCY AND PROVIDED
  TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT AS
  PER FLORIDA BUILDING CODE; BASE CODE FECC 2020,
- 16. MECHANICAL SYSTEMS SHALL BE COMMISSIONED PER FLORIDA BUILDING CODE; BASE CODE FECC 2020 C403.2.11, C408.2.1, C408.2.5 FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.

## GENERAL NOTES

- 1. 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 CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF—DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- 5. 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. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.

- 10. 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
- 11. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER
- 12. 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.
- 13. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- 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 APPROVAL.
- 15. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- 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 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.
- 18. UNLESS OTHERWISE SPECIFICALLY 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.
- 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 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 ADDITIONAL COST TO THE OWNER.
- OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

  24. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE

23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE

- 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 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 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.

## EFINITIONS:

- 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.
- 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.

## 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 THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- 3.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 PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

#### GENERAL HVAC NOTES

#### **GENERAL:**

- 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.
- . 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.
- 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.)
- 15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT
- 16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION—FREE INSTALLATION.

BE SUPPORTED FROM A METAL DECK.

- 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

- 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 ASHRAE.
- 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.
- . 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
- 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
- 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.

INSTRUCTIONS.

- 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
- 23. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

### SECTION 0101 - QUALITY OF WORK

#### 1.1 WORKMANSHIP

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

#### 1.2 CODE COMPLIANCE

A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

### END OF SECTION 0101

## SECTION 0102 - REQUIRED DOCUMENTS

### 1.1 SHOP DRAWINGS

A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

#### 1.2 SUBMITTALS

A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

#### 1.3 RECORD DRAWINGS

A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.

#### 1.4 EQUIPMENT OPERATING INSTRUCTIONS

- A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH 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.

#### END OF SECTION 0102

#### SECTION 078413-PENETRATION FIRE-STOPPING 1.1 QUALITY ASSURANCE

- A. INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR
- B. FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL

## 1.2 PENETRATION FIRESTOPPING

- A. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479. B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND
- T-RATINGS PER ASTM E 814 OR UL 1479:
- C. PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.

## D. W-RATINGS: PER UL 1479.

## 1.3 INSTALLATION

- A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.
- 1.4 FIELD QUALITY CONTROL A. INSPECTION OF INSTALLED FIRE—STOPPING:

UNDER PRODUCT CATEGORY XHEZ.

- 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"

## FOR THE FOLLOWING SYSTEMS:

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

## 1.6 MANUFACTURERS

## 1. HILTI CONSTRUCTION CHEMICAL, INC

2. TREMCO INC.

#### 3. 3M FIRE PROTECTION PRODUCTS END OF SECTION 078413

### SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

## 1.1 SLEEVE—SEAL SYSTEMS

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

1.2 SLEEVE-SEAL FITTINGS A. MANUFACTURED PLASTIC. SLEEVE-TYPE, PLASTIC OR RUBBER WATER-STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.

#### 1.3 GROUT A. NON-SHRINK, FACTORY PACKAGED.

- 1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE A. USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING-PENETRATION APPLICATIONS:
  - 1. INTERIOR PARTITIONS:
  - a. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE

#### b. PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED-STEEL-SHÈET SLEÉVES.

ESCUTCHEONS FOR HVAC

# PART 2 - PRODUCTS

END OF SECTION 230517

SECTION 230518

2.1 ESCUTCHEONS A. ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED. CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.

#### 2.2 FLOOR PLATES

A. ONE-PIECE FLOOR PLATES: CAST-IRON FLANGE WITH HOLES FOR FASTENERS.

### PART 3 - EXECUTION

- 3.1 INSTALLATION A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS,
- CEILINGS, AND FINISHED FLOORS. B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT

## COMPLETELY COVERS OPENING.

- 1. ESCUTCHEONS FOR NEW PIPING: a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE-PIECE, DEEP-PATTERN TYPE.
- b. INSULATED PIPING: ONE-PIECE, STAMPED-STEEL c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN
- FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OF STAMPED-STEEL TYPE. d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH

#### CHROME-PLATED FINISH **POLISHED** STAMPED-STEEL TYPE.

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

## END OF SECTION 230518

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

- 1.1 PERFORMANCE REQUIREMENTS A. DELEGATED DESIGN: DESIGN 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.

## 1.2 SUBMITTALS

BY

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. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE
- D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER
- E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE
- F. THERMAL-HANGER SHIELD INSERTS:
- G. FASTENER SYSTEMS: 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 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: WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.
- 4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN—SPRING TYPE. 5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL,
- OPEN-SPRING TYPE WITH SEISMIC RESTRAINT. 6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE
- SEISMIC SNUBBERS. 7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE. 8. SPRING HANGERS: COMBINATION COIL—SPRING AND
- ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION. 9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL—SPRING AND ELASTOMERIC—INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION
- AND WITH VERTICAL-LIMIT STOP. 10.PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.

11.RESILIENT PIPE GUIDES.

- B. AIR-MOUNTING SYSTEMS:
  - 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:
- FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.
- FACTORY-FABRICATED, WELDED, INFRTIA BASE: STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

## 1.2 FIELD QUALITY CONTROL

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

MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE

- PART-2 PRODUCTS VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT
- 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

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

- 1.1 SUMMARY A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
- AIR SYSTEMS: CONSTANT SYSTEMS.

#### 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.

- 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 DIAG 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 REQU<mark>IRED</mark> 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. INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN
- GOOD WORKING CONDITION AND ACCURATELY CALIBRATED. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN
- SPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING

ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF

#### COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS. 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;

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:

A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL,

UNCONDITIONED SPACES WITHIN BUILDING: R-6 WITHIN BUILDING ENVELOPE ASSEMBLY: R-12

## R-12

#### 1.4 ITEMS NOT INSULATED:

- FIBROUS-GLASS DUCTS.
- ANDASHRAE/IESNA 90.1.
- 2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE

- 3. FACTORY-INSULATED FLEXIBLE DUCTS.
- 4. FACTORY-INSULATED PLENUMS AND CASINGS.
- FLEXIBLE CONNECTORS. 6. VIBRATION—CONTROL DEVICES.
- 7. FACTORY-INSULATED ACCESS PANELS AND DOORS. 8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

## 1.5 PRODUCTS

OUTSIDE OF BUILDING:

- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
- 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, FLÉXIBLE 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

## END OF SECTION 230713

## SECTION 233113 - METAL DUCTS

DIMENSIONS REQUIRED,

# 1.1 CONSTRUCTION

- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2-1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
- 1. DUCTWORK SHALL BE TRANSVERSELY JOINTED CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1-1/2"X1-1/2"X1/8" GALVANIZED ANGLES, TACK-WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMO<mark>OTH. JOINTS S</mark>HALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS, GASKET SIMILAR
- 3M−1202 OR APPROVED EQUAL. 2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
- 3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE

4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK

- HALL BE PITTSBURGH LOCK SEAMS WITH SEALING MPOUND, EQUAL TO BENJAMIN FOSTER NO. 30-03 INS<mark>ERTED</mark> INTO SEAM. ALL <mark>SE</mark>AMS SHALL BE BRUSHED ▲ 30−02 AND COVERED WITH APPROVED SEALING 5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER,
- FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2. 6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE O. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.

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

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

F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND

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

- 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.

CLASS 3 FOR ROUND DUCTS.

2. STAINLESS-STEEL SHEETS. 3. ALUMINUM SHEETS.

FLEXIBLE ELASTOMERIC.

NATURAL FIBER.

4. FACTORY-APPLIED ANTI-MICROBIAL COATING.

1. FIBROUS GLASS, TYPE I, FLEXIBLE. a. WITH ANTI-MICROBIAL EROSION-RESISTANT COATING.

## E. SEALANT MATERIALS:

- 1. TWO-PART TAPE SEALING SYSTEM.
- WATER-BASED JOINT AND SEAM SEALANT. 3. SOLVENT-BASED JOINT AND SEAM SEALANT.
- 4. FLANGED JOINT SEALANT.

- FLANGE GASKETS.
- 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.

AND MAKEUP AIR SYSTEMS.

- 2. SUPPLY, RETURN, AND EXHAUST FANS.
- 3. AIR-HANDLING UNITS.
- 4. COILS AND RELATED COMPONENTS.
- 5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
- 6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.

7. DEDICATED EXHAUST AND VENTILATION COMPONENTS

- 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, AN 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

- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- HART &
- KRUEGER.
- NAILOR INDUSTRIES INC.
- ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED. D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED
- THERMOSTATIC CONTROLS: A. C403.4.2.1 THERMOSTATIC CONTROLS (MANDATORY)

BLADE DAMPER UNLESS OTHERWISE NOTED.

#### OF RESPONDING TO TEMPERATURE WITHIN THE ZONE, WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED. NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE

END OF SECTION 233713

PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM. INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES. GAINS OF

BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE

CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE

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

2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS

BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE

FOLLOWING CONDITIONS ARE MET:

#### CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

MINIMUM.

**EXCEPTIONS:** 

B. C403.4.1.2 DEADBAND (MANDATORY)

FEET (15 240 MM).

TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ÈNERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE

THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A

1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES. 2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN

INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE

SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK

CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC

#### 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

C. C403.4.1.3 SETPOINT OVERLAP RESTRICTION (MANDATORY)

TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.4.1.2. D. C403.4.2 OFF—HOUR CONTROLS (MANDATORY)

TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

- ZONES THAT WILL BE OPERATED CONTINUOUSLY.
- LOCATED WITH READY ACCESS. E. C403.4.2.1 THERMOSTATIC SETBACK (MANDATORY) THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO

SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN

2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800

BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH

ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F

F. C403.4.2.2 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. C403.4.2.3 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.

#### PIPING INSULATION

EXTERIOR WALL)

#### A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE

<u>INSULATION</u>	INSULATION SCHEDULE - PIPING									
SIZE	THICKNESS	MATERIAL FINISH								
PING	1.5"	P-6								
IN PIPING	1.0"	P-6								
	SIZE	SIZE THICKNESS  PING 1.5"								

- PIPING, VALVES AND FITTINGS TO BE INSULATED:
- ) LOW TEMPERATURE PIPING SYSTEMS 0 TO 55 DEG F INCLUDING: a.CHILLED WATER SUPPLY AND RETURN. b.CONDENSER WATER SUPPLY AND RETURN.
- c.CONDENSATE DRAIN PIPING. 2) LOW TEMPERATURE PIPING SYSTEMS - 0 TO 55 DEG F INCLUDING:
- a.GLYCOL WATER SUPPLY AND RETURN. 3) LOW TEMPERATURE HOT PIPING SYSTEMS - 100 TO 200 DEG F INCLUDING: a.LOW TEMPERATURE HOT WATER SUPPLY AND
- 4)PROTECTIVE COVERINGS SHALL BE INSTALLED ON INSULATION THAT ARE EXPOSED TO WEATHER OR SUBJECT TO

b.PUMPED CONDENSATE DISCHARGE.

- a.ARMA-CHEK SILVER" MULTI-LAYER LAMINATE OF ALUMINUM, COATED WITH A UV PROTECTIVE FILM BACKED WITH A FLEXIBLE PVO FILM. THE MATERIAL SHOULD BE ADHERED WITH ARMAFLEX 520 ADHESIVE OR EQUIVALENT AND ALL JOINS AND SEAMS SECURED WITH
- RECOMMENDATIONS. b.HIGH DENSITY RUBBER CLADDING OF THE "ARMA-CHECK R" TYPE BONDED USING AN CONTACT ADHESIVE APPROPRIATE FULL WITH A MINIMUM 50 MM OVERLAP AT ALL BUTT JOINTS AND LONGITUDINAL SEAMS. WEATHER-PROOF MASTIC SEALANT SHALL BE APPLIED OVER ALL SEAMS AND JOINTS. ALL MATERIAL SHALL BE OVERLAPPED ANI STAGGERED IN SUCH A WAY AS TO ENSURE A WATERSHED IS ALWAYS PROVIDED. INSTALLATION MANUFACTURER'S RECOMMENDATIONS. ALL EXCESS ADHESIVE VISIBLE ON THE SURFACE OF THE COMPLETED ASSEMBLY SHALL BE REMOVED
- METAL, WITH ALL EXTERNAL JOINTS AND FIXING MADE WEATHER-PROOF WITH SILICONE SEALANT.
- FIBERGLASS, MAXIMUM 0.24 K-FACTOR AT 75 DEG

USING AN APPROPRIATE CLEANING MATERIAL.

c.METAL CLADDING, COMPRISED OF COATED SHEET

# HI-LO TEMP INSULATION INSERTS.

SIMILAR TO ARMSTRONG ARMAFLEX II.

1) TYPE F-1: FITTING COVER, MOLDED WHITE PVC

JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05

PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEG F

MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE.

2) TYPE F-2: WHITE VAPOR BARRIER COATING WITH 10X10 OR 20X20 MESH WHITE GLASS, POLYESTER

SIMILAR TO MANVILLE ZESTRON.

- 3) TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.
- LEAK TESTS SHALL BE COMPLETED AND APPROVED. 4) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR
- 5) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS, PROVIDE SADDLES OR SHIELDS FOR PROTECTION AT ALL
- AND REPLACEABLE WITHOUT DAMAGE.

- MECHANICAL DAMAGE. THE PROTECTIVE COVERING
- "ARMA-CHEK SILVER TAPE". INSTALLATION SHALL BE IN ALL CASES TO THE MANUFACTURER'S

- C. MATERIAL: 1) TYPE P-1: MINIMUM 4 LB DENSITY MOLDED MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL

SERVICE JACKET. SIMILAR TO OWENS—CORNING

2) TYPE P-3: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS FITTING, MAXIMUM 0.23 K-FACTOR AT 75 DEG F MEAN TEMPERATURE SIMILAR TO EPOLUX HAMFAB MOLDED FITTINGS.

3) TYPE P-4: MINIMUM 1 LB DENSITY FIBERGLASS

FITTING INSERTS, MAXIMUM 0.27 K-FACTOR AT 75

DEG F MEAN TEMPERATURE SIMILAR TO MANVILLE

- 4) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED
- D. FINISH:
- OR NYLON CLOTH REINFORCING MEMBRANE MINIMUM 31 MIL DRY FILM THICKNESS, SIMILAR TO FOSTER TITE-FIT, UL LABEL.
- 4) TYPE F-6: WHITE FINISHING AND INSULATING CEMENT APPLIED OVER HEXAGONAL WIRE MESH.
- E. INSTALLATION: 3) BEFORE APPLYING INSULATION ALL PRESSURE AND

CEMENT SIMILAR TO KEENE SUPERSLICK.

- BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE STAPLES NOT PERMITTED REQUIRED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.
- 6) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE

CONTRACTORS AND SUB-CONTRACTORS SHALL CAREFULLY REVIEW THE CONSTRUCTION DOCUMENTS. INFORMATION REGARDING THE COMPLETE WORK IS DISPERSED THROUGHOUT THE DOCUMENT SET AND CANNOT BE ACCURATELY DETERMINED WITHOUT REFERENCE TO THE COMPLETE DOCUMENT SET.

COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE. PROVIDE DUCT RISES AND DROPS AS REQUIRED FOR FIELD INSTALLATION AND TRADE COORDINATION. NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE STARTING WORK.

DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENT. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. REFER TO MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, ACCESSORIES, OFFSETS, AND MATERIALS NECESSARY FOR A COMPLETE

ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE GOVERNING CITY. PURCHASE ALL PERMITS ASSOCIATED WITH THE WORK. OBTAIN ALL INSPECTIONS REQUIRED BY CODE.

SUPPORT NEW MECHANICAL SYSTEMS WITH SEISMIC RESTRAINTS IN ACCORDANCE WITH SEISMIC HAZARD LEVEL 'A' OF THE SEISMIC RESTRAINT MANUAL, AS PUBLISHED BY SMACNA, AND IN ACCORDANCE WITH THE FLORIDA BUILDING CODE, LATEST EDITION.

CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON PLAN.

NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR PIPING AND DUCTWORK ROUTING. OFFEST AND RUN PIPING, DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA PIPING, DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.

COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.

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

DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM

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

CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.

M. COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM SPACES.

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.

MOUNT DUCTWORK AS HIGH AS POSSIBLE.

TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND

MECHANICAL CONTRACTOR TO COORDINATE INSTALLATION OF WATER HEATER EXHAUST FLUE WITH PLUMBING CONTRACTOR.

ALL EXPOSED ROUND DUCTWORK SHALL BE INTERNALLY LINED. ALL DUCTWORK DIMENSIONS ARE INSIDE CLEAR.

NEW DUCTWORK IN CONCEALED AREAS MAY BE RECTANGULAR WITH EQUIVALENT CROSS SECTIONAL FLOW AREA.

KITCHEN EXHUAST SYSTEM NOTES

PROVIDE CLEAN OUT AT ALL ELBOWS AND EVERY 15 FEET HORIZONTAL KITCHEN EXHAUST DUCT. COMMERCIAL KITCHEN GREASE DUCTS SHALL BE DESIGNED FOR THE TYPE OF COOKING APPLIANCE AND HOOD SERVED.

JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE IN THE EXTERNAL SURFACE IF THE DUCT SYSTEMS.

DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET AND OUTLET OF THE FAN FOR INLINE FANS. APPROVED FLEXIBLE CONNECTIONS MAY BE PROVIDED.

A VIBRATION ISOLATION CONNECTOR FOR CONNECTING A DUCT TO A FAN SHALL CONSIST OF NON-COMBUSTIBLE PACKING IN A METAL SLEEVE JOINT OF APPROVED DESIGN OR SHALL BE A COATED—FABRIC FLEXIBLE DUCT CONNECTOR LISTED AND LABELED FOR THE APPLICATION. VIBRATION ISOLATION CONNECTORS SHALL BE INSTALLED ONLY AT THE CONNECTION OF A DUCT TO A FAN INLET OR OUTLET.

PRIOR TO THE USE OR CONCEALMENT OF ANY PORTION OF A GREASE DUCT SYSTEM, A LEAKAGE TEST SHALL BE PERFORMED. DUCT SHALL BE CONSIDERED TO BE CONCEALED WHERE INSTALLED IN SHAFTS OR COVERED BY COATINGS OR WRAPS THAT PREVENT THE DUCTWORK FROM VISUALLY INSPECTED ON ALL SIDE. THE DUCT INSTALLER SHALL BE RESPONSIBLE FOR PROVIDING THE NECESSARY EQUIPMENT AND PERFORMING THE GREASE DUCT LEAKAGE TEST. THE DUCT LEAKAGE TEST SHALL BE PERFORMED FOR ALL THE DUCT SYSTEMS, INCLUDING THE DUCT-TO-DUCT CONNECTION. THE DUCTWORK SHALL BE PERMITTED TO BE TESTED IN SECTIONS, PROVIDED THAT EVERY JOINT IS TESTED (IF TEST IS FAILED, CONTRACTOR TO PROVIDE NEW KITCHEN EXHAUST DUCT). PROVIDE SMOKE TEST TO PROOF TIGHTNESS OF THE GREASE DUCT.

GREASE DUCT BRACING AND SUPPORTS SHALL BE OF NON-COMBUSTIBLE MATERIAL SECURELY ATTACHED TO THE STRUCTURE AND DESIGNED TO CARRY GRAVITY AND SEISMIC LADS WITHIN THE STREET LIMITATIONS OF THE NEW YORK CITY BUILDING CODE. BOLTS, SCREWS, RIVETS AND

OTHER MECHANICAL FASTENERS SHALL NOT PENETRATE DUCT WALLS. PROVIDE A FUSIBLE LINK FIRE DAMPER OF THE SAME GAGE AS THE HOOD EXHAUST DUCT SHALL BE ADDED AT THE POINT OF CONNECTION OF THE BRANCH DUCT TO THE EXHAUST DUCT. THE FIRE DAMPER SHALL BE CLOSED AUTOMATICALLY UPON THE PENETRATION OF THE FIRE-EXTINGUISHING SYSTEM, AND THE BRANCH DUCT SHALL BE MADE IN EITHER THE TOP OR SIDES OF THE MAIN DUCT IN A MANNER TO PREVENT GREASE FROM FLOWING INTO THE BRANCH DUCT.

CLEANOUT OPENINGS SHALL BE EQUIPPED WITH TIGHT-FITTING DOORS CONSTRUCTED OF STEEL HAVING A THICKNESS NOT LESS THAN THAT REQUIRED FOR THE DUCT. DOORS SHALL BE EQUIPPED WITH A SUBSTANTIAL METHOD OF LATCHING. SUFFICIENT TO HOLD THE DOOR TIGHTLY CLOSED. DOOR ASSEMBLIES SHALL HAVE A GASKET OR SEALANT THAT IS NON-COMBUSTIBLE AND LIQUID TIGHT AND SHALL NOT HAVE FASTENERS THAT PENETRATED THE DUCT.

THE CLEANOUTS FOR HORIZONTAL GREASE DUCT SHALL BE LOCATED ON THE SIDE OF THE DUCT WITH THE OPENING NOT LESS THAN 1.5" ABOVE THE BOTTOM OF THE DUCT AND NOT LESS THAN 1" BELOW THE TOP OF THE DUCT.

A GREASE DUCT SERVING THE TYPE-1 HOOD THAT PENETRATED A CEILING, WALL OR FLOOR SHALL BE ENCLOSED FROM THE FIRE POINT OF PENETRATION TO THE OUTLET TERMINAL. DUCT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT OF THE FIRE-RESISTANCE RATED ASSEMBLY PENETRATED BUT NEED NOT EXCEED 2 HOURS.

KITCHEN-EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS BUILDINGS, ADJACENT BUILDINGS AND ADJACENT PROPERTY LINE. THIS EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM AND NOT LESS THAN 3 FEET ABOVE AIR INTAKE OPENINGS INTO ANY BUILDING.

CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF THE DUCTWORK. MODIFY DUCTWORK AS PER SITE CONDITIONS IF REQUIRED.

-WATER HEATER -MAU-1 TO BE PROVIDED BY 24"X24" (4250)PLUMBING CONTRACTOR WT: 1631 LBS [833] -CONCENTRIC VENT KIT MAINTAIN 12" MINIMUM CLEARANCE ABOVE GRADE REMOTE CORE FIRE-SYSTEM CONTROL 12"X12" 24"X24" CABINET TIED INTO PCU-1(N). (300) CONFIRM FINAL 24"X24' LOCATION WITH ARCHITECT/OWNER /HOOD CONTRACTOR. \_10"ø l 4"X10" 24"X24" (300)24"X24" (300) -MAKE-UP AIR INTAKE LOUVER 60"X24" (4250) MIN. 50% FREE AREA REQUIRED. MAU SUPPLY -INSTALL AS HIGH 24"X12" AS POSSIBLE. (700) AN OVERSIZED DRIP-PAN TO BE 18"X6" PROVIDED BY MECHANICAL CONTRACTOR SD-1 (570) 24"X24" / 8 % -1&2 (218)14 16"X8" OUTSIDE AIR WT: 2441 LBS INTAKE LOUVER 12"X8" 36"X18" (1020) 50% FREE AREA REQUIRED. (450) INSTALL AS HIGH 18"X6" 40"X16"| (225) AS POSSIBLE. MAU \$UPPLY --RUN OA DUCT 24"X12" AS HIGH AS (716) POSSIBLE. EF-1(N)-18"X6" +SD-1 24"X24" 124"X24"|18"X10"/ 18"X6" (308)GREASE DRAIN LINES FROM EACH MODULE 14"X12" IN PCU-1(N) SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION WITH THE REQUIRED PITCH. ROUTE TO GREASE SG-1 SG-1 INTERCEPTOR. COORDINATE WITH PLUMBING RG-1 18"X6" 18"X6" 18"X6" CONTRACTOR. 24"X12" (225)(225)(225)[1000] 12"X12" TOILET EXHAUST LOUVER -KITCHEN EXHAUST LOUVER 48"X44" 10"X10" [140] MODEL:GREENHECK-FDS-402-48X44 (OR EQUIVALENT) TO TERMINATE ON THE SIDE WALL ABOVE OVERHANG

OUTSIDE THE STORE-FRONT

MECHANICAL KEY NOTES

1 PROVIDE DUCT MOUNTED SMOKE DETECTOR. TIE IN AUDIO-VISUAL ANNUNCIATOR. UPON DETECTION OF SMOKE, AHU UNIT SHALL SHUT DOWN AND ACTIVATE ALARM. COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENTS.

2| PROVIDE 7-DAY PROGRAMMABLE T-STAT AND H-STAT WITH AUTO-CHANGEOVER AND AUTOMATIC START CAPABILITY. MOUNT THERMOSTAT 48" ABOVE FINISHED FLOOR. COORDINATE FINAL INSTALLATION LOCATION OF THERMOSTAT WITH OWNER'S REPRESENTATIVE.

PROVIDE MICROPROCESSOR REMOTE INTERFACE. MOUNT 의 MICROPROCESSOR REMOTE INTERFACE 48" ABOVE FINISHED FLOOR. COORDINATE FINAL INSTALLATION LOCATION OF MICROPROCESSOR REMOTE INTERFACE WITH OWNER'S REPRESENTATIVE.

4 PROVIDE COMBINATION TEMPERATURE/HUMIDITY SENSOR. MOUNT SENSOR 48" ABOVE FINISHED FLOOR. HUMIDITY SENSOR SHALL OPERATE REFRIGERATION SYSTEM AND INITIATE HOT GAS REHEAT AS REQUIRED TO MAINTAIN SPACE HUMIDITY AT 55% RH.

司 INSTALL OWNER FURNISHED TYPE I GREASE EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. REFER TO HOOD DRAWING SET ON SHEET H100 TO H103 FOR HOOD SPECIFICATION AND ADDITIONAL INFORMATION.

6 INSTALL OWNER FURNISHED UL-2221 LISTED DOUBLE-WALL GREASE DUCT. EQUAL TO FRANKE SYSTEMS MODEL FRDW—2R ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL FROM HOOD COLLAR EXHAUST FAN ON ROOF. INSTALL EXHAUST DUCT PER MANUFACTURER'S INSTRUCTIONS. PROVIDE CLEANOUTS AT EVERY CHANGE OF DIRECTION IN THE DUCT AND/OR EVERY 10 FEET WITH MINIMUM OF 3 FEET OF CLEARANCE IN FRONT OF CLEAN-OUT.

| INSTALL ROOM TEMPERATURE SENSOR FOR HOOD THERMOSTATIC CONTROL. SEE HOOD DRAWING SET ON H100 TO H103 FOR HOOD SPECIFICATIONS AND ADDITIONAL INFORMATION.

8 CEILING MOUNTED EXHAUST FAN. INTERCONNECT EXHAUST FAN WITH LIGHTS IN THIS ROOM. REFER TO ELECTRICAL LIGHTING PLAN. FAN SHALL BE SUSPENDED FROM STRUCTURE ABOVE. VERIFY EXACT LOCATION OF STRUCTURAL MEMBERS PRIOR TO INSTALLATION.

9 CONNECT CD FROM AC UNITS TO NEAREST PLUMBING DRAIN WITH AIR GAP FITTING. PROVIDE CONDENSATE DRAIN PUMP IF REQUIRED. PROVIDE SECONDARY DRAIN PAN WITH WATER LEAK BUG SENSOR SHUT DOWN THE UNIT IN CASE OF LEAKAGE.

FO PROVIDE HORIZONTAL SLOPE IN THE DIRECTION OF DISCHARGE OF <sup>1</sup> NOT LESS TAN 1/8 UNIT VERTICAL IN 12 UNITS HO<mark>RIZO</mark>NTAL.

11 ALL FRESH AIR INTAKES SHALL BE LOCATED A MINIMUM OF FROM ANY SANITARY VENT. EXHAUST FAN DISCHARGE AND FLUE OF OTHER GAS FIRED EQUIPMENT. WHEN NECESSARY, EXTEND VENT OR PROVIDE ADDITIONAL FRESH AIR INTAKE DUCTWORK AS DIRECTED BY THE ENGINEER.

12 PROVIDE EXHAUST LOUVER AS SHO<mark>WN.</mark> ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND

ALL OUTSIDE AIR INTAKE DUCTS SHALL BE INSULATED WITH MIN. R-8 INSULATION.

RETURN MAIN DUCTS.

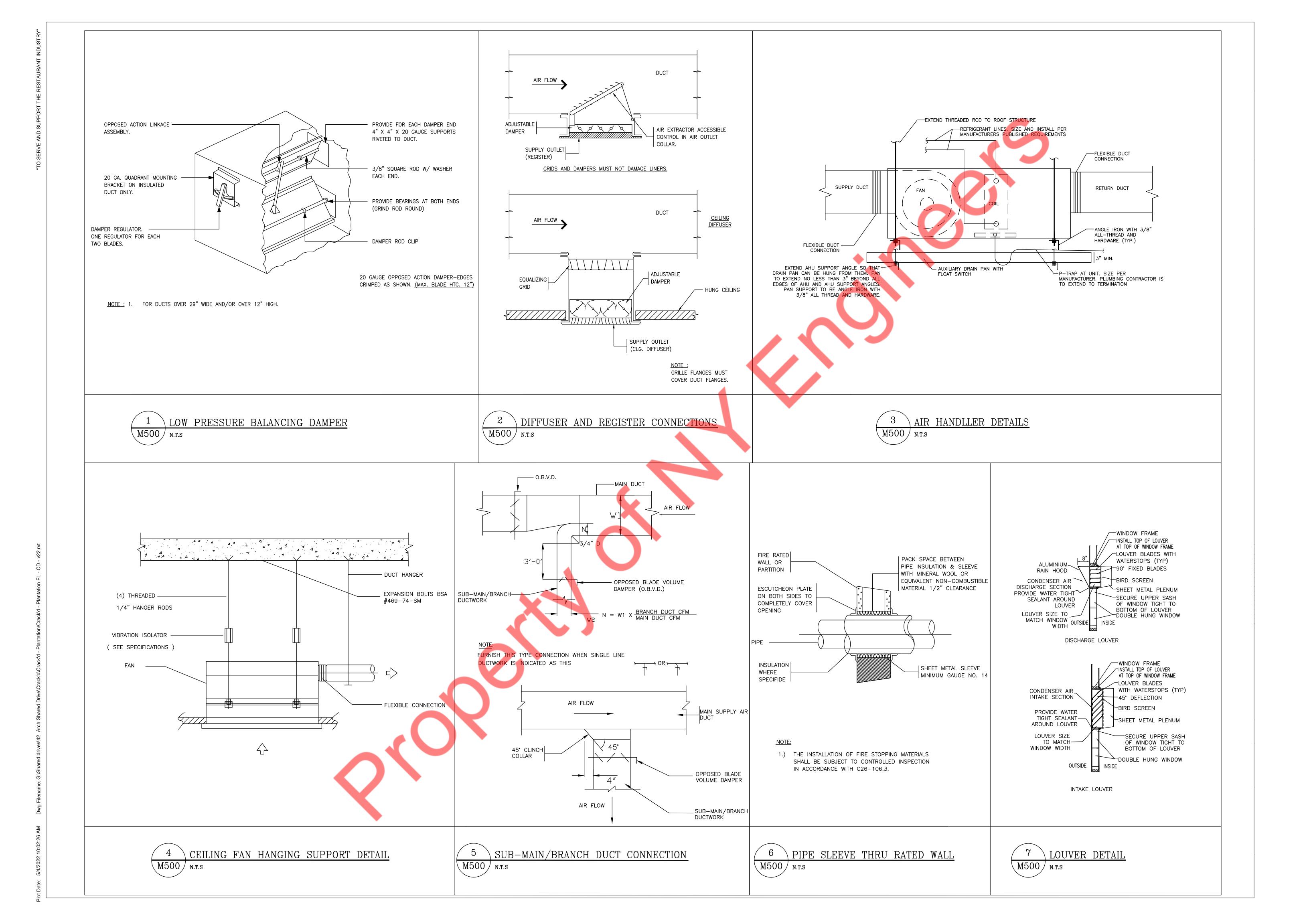
15 AHU MUST SHUT DOWN WITH FIRE SUPPRESSION SYSTEM ACTIVATION.

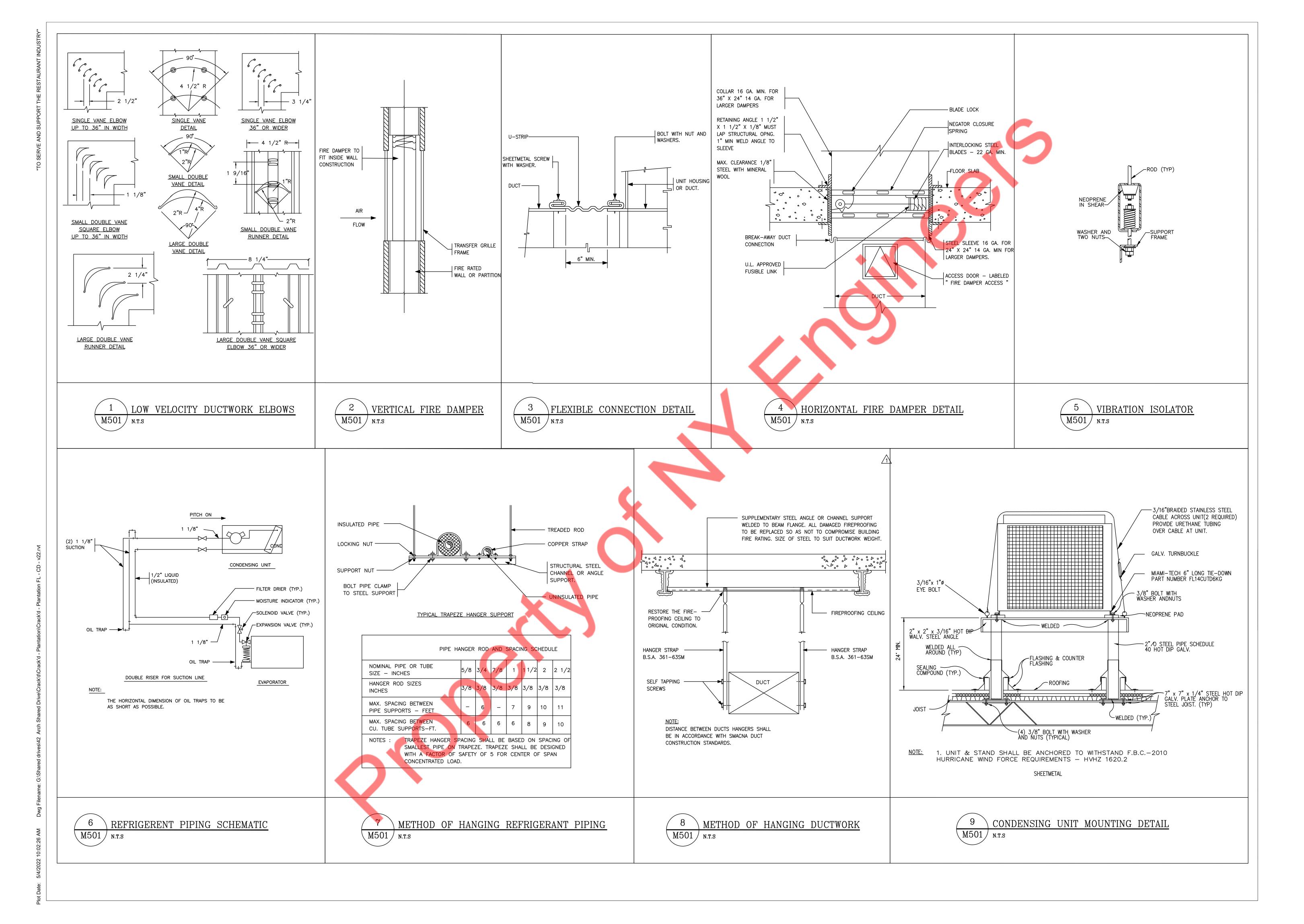


MECHANICAL PLAN KEY NOTES:

2 CONDENSER ON CONCRETE PAD/STEEL DUNNAGE WITH VIBRATION ISOLATORS.

3 INSTALL NEW REFRIGERANT PIPING UP TO RESPECTIVE AHU & MAU.





AHU UNIT SCHEDULE FAN DATA ELECTRICAL DATA HEATING LOCATION MANUFACTURER MODEL NO. (AS STANDARD) COOLING DIMENSIONS OA | MIN | MAX | ESP MCA MOCP (A) MBH W(IN)XH(IN)XD(IN)WEIGHT (LBS) HZ REMARKS (CFM) | (CFM) | (CFM) | (IN WG) PROVIDE DISCONNECT SWITCH, VIBRATION ISOLATION, REMOTE TEMP SENSOR, THERMOSTAT CONTROL, CONDENSATE PUMP, CONDENSATE OVERFLOW SENSOR HORIZONTAL DUCTED SEE DWG. TOSHIBA 72 1471 | 2236 | 1.0 | 208–230 | 60 5.7 15 55 X 18 X 35 218 AP0726HP-UL 450 AHU-2

1) SUPPLY AIR CFM BASED ON HIGH SPEED.

2) REFRIGERANT R410A SHALL BE PROVIDED. 3) PROVIDE MOUNTING BRACKETS AND ALL ASSOCIATED ACCESSORIES.

4) ALL REFRIGERANT PIPING TO BE SIZED PER MANUFACTURERS RECOMMENDATIONS.

5) PROVIDE MERV-13 FILTER ON ALL RETURNS TO UNIT. 6) INDOOR UNIT ACCESS PANEL FIELD-PROVIDED.

7) PROVIDE SECONDARY DRAIN PAN AND WATER LEAK SENSOR.

8) CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEEDS THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.

						HE	AT F	PUMP SC	HEDI	JLE							
TAG	LOCATION(S) SERVED	MANUFACTURER	MODEL NO.	TYPE	DIMENSIONS (WXHXD) (IN)	COOL	BH HEAT	VOLTS	ELECTRIC PHASE		MOCP	EER	COP	PIPING DI LIQUID (IN)		OPERATING WEIGHT (LBS)	REMARKS
CU-1	SEE DWG.	TOSHIBA	MMY- MAP0726HT9P	AIR COOLED	39X72X30	72.0	81.0	208-230	3	27 A	30A	13.7	3.88	1/2"	7/8"	574	PROVIDE DISCONNECT, ROOF EQUIPMENTS SUPPORTS, LOW AMBIENT COOLING KIT, LONG SET OF REFRIGERENT
CU-2	022 5110.	10011157	-UL	71111 000222	33772733	, 2.0					00/1	10.7	0.00	., _			PIPING AS PER MANUFACTURER STANDARD.

1) UNIT SHALL HAVE SEVEN YEAR EXTENDED WARRANTY FOR COMPRESSORS & FIVE YEARS FOR PARTS.

2) PROVIDE COMPRESSOR CYCLE PROTECTOR.

3) INSTALL CONDENSER ON STEEL DUNNAGE/CONCRETE PADS. PROVIDE NEW STEEL SUPPORT AS REQUIRED.

4) CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEED THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.

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				FAN SCHEDULE														
TAG	FAN UNIT MODEL#	SERVES	CFM	ESP (IN WG)	RPM	H.P	ø	VOLT	FLA (A)	WEIGHT (LBS.)	SONES	REMARKS						
EF-1	GREENHECK - SP-A390-VG	REST RM.	70	0.5	1174	0.04	1	208-230	0.9	24	3.5	PROVIDE DISCONNECT, HANGING BRACKETS, WALL VENT CAP						
EF-2	GREENHECK - SP-A390-VG	REST RM.	70	0.5	1174	0.04	1	208-230	0.9	24	3.5	PROVIDE DISCONNECT, HANGING BRACKETS, WALL VENT CAP						

1) ALL DIRECT DRIVE FANS SHALL BE FURNISHED WITH VARI-GREEN MOTOR CONTROL.

2) FAN SPEED SHALL BE EASILY FIELD ADJUSTABLE.

3) REFER TO DETAILS, FAN SHALL BE MOUNTED W/SUPPORT FRAMING BY OTHERS.

4) PROVIDE MOTOR STARTERS, DISCONNECTS WITH NEMA-3R (IF NOT FACTORY PROVIDED). ALL EQUIPMENT NORMAL POWER WIRING BY ELECTRICAL CONTRACTOR.

5) COORDINATE WITH ARCH./G.C. ACCESS DOORS FOR SERVICING ALL FANS WITHIN CEILINGS.

6) FANS SHALL BE UL-705 LISTED.

						$\bigcap$	101	J CON	ITRC	L UNIT S	CHEI	)    F
		1		T T		<u>ULLU</u>	$\frac{1101}{1101}$	N COIN		/L UNII C		
TAG	FAN UNIT MODEL#	SERVES	CFM	ESP (IN WG)	RPM	H.P	ø	VOLT	FLA (A)	WEIGHT (LBS.)	SONES	REMARKS
PCII-1	CAPTIVE AIRE— KR20	HOODS	5063	2.0	1722	10.0	3	208-230	27	2441	35	RESTAURANT DUTY PROVIDE DISCONNECT, HINGE KIT.

					M	1AKEU	IP AIR	UNI	SCH	EDULI	_ 									
TAG	FAN UNIT MODEL#	TEMP. RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BLOWER	CFM	ESP (IN WG)	HEAT INPUT (MBH)	HEAT OUTPUT (MBH)	BURNER EFF.(%)	H.P	В.Н.Р	ø	VOLT	MCA (A)	MOCF	, (A)	WEIGH	T (LBS.)	SONES
MAU-1	A2-D.250-20D-MPU	24°F	7 IN. W.C. – 14 IN. W.C.	NATURAL	20MF-2-MOD	4250	0.5	118.4	108.9	92	5.0	2.78	3	208	<b>18.2</b>	30		1	621	17.9

				MAU	CONDE	NSING	UNIT							
TAG	LOCATION(S)	MODEL NO.		TEM	PARATURE			COOLING			ELECTRIC			CEED
IAG	SERVED` ´	MODEL NO.	ENT DB	ENT WB	LEAVE DB	LEAVE WB	TOTAL	SENSIBLE	LATENT	VOLTS	PHASE	MCA(A)	MOCP(A)	SEER
MAU CU-1	SEE DWG.	A2-D.250-20D-MPU	91 <b>°</b> F	78 <b>°</b> F	76.8°F	70.9°F	120	63.9	56.1	208	3	17.4	30	14
MAU CU-2	SEE DWG.	A2-D.250-20D-MPU	91°F	78 <b>°</b> F	76.8°F	70.9°F	МВН	MBH	MBH	208	3	17.4	30	14

			REGI	STER, G	RILLE &	DIFFUSI	er sche	EDULE	
TAG	SERVICE	CFM	NECK SIZE	FRAME TYPE	PATTERN	DAMPER	MATERIAL	FINISH	MANUFACTURER & MODEL No.
SD	SUPPLY	AS NOTED	AS NOTED	NOTE 1	AS SHOWN	YES	STEEL	PER ARCH.	PRICE SMD
SG	SUPPLY	AS NOTED	AS NOTED	NOTE 1,2	AS SHOWN	YES	STEEL	PER ARCH.	PRICE SDG
RG	RETURN	AS NOTED	AS NOTED	NOTE 1,2	AS SHOWN	YES	STEEL	PER ARCH.	PRICE RDG
RR	RETURN	AS NOTED	AS NOTED	NOTE 1, 2	FIXED	NO	STEEL	PER ARCH.	PRICE 80
NOTES:									

1. COORDINATE MOUNTING REQUIREMENTS WITH ARCHITECTURAL REFLECTED CEILING PLANS.

PROVIDE FRAME SUITABLE FOR SURFACE MOUNTING, CEILING OR SIDEWALL.
 PROVIDE SQUARE TO ROUND TRANSITIONS WHERE NEEDED.

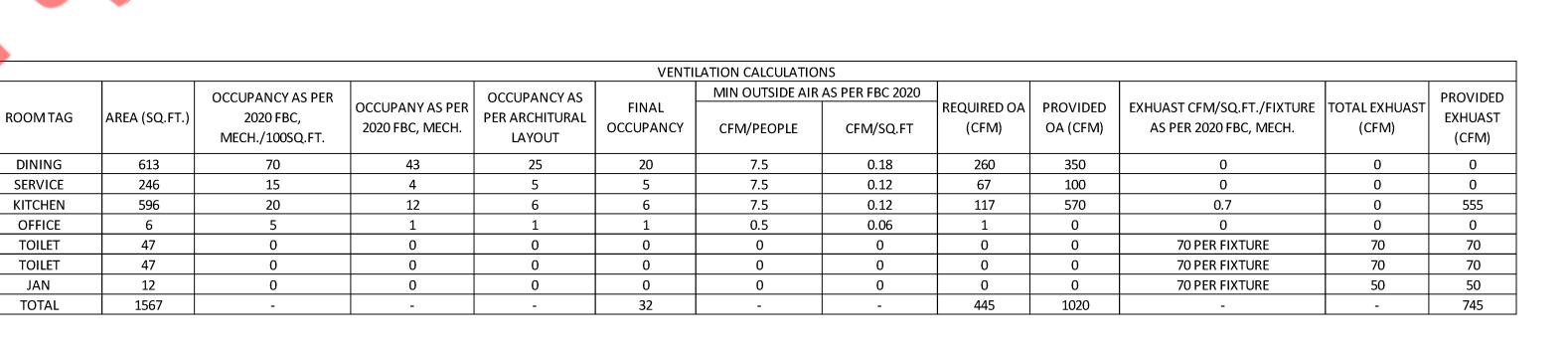
			AIR	CURTAIN	SCF	HFDUI 🔽						
			7 (11 (	001(17(11)		1 L D O L L	V.E. 0	OID	(ED) ()	V /DI /	<del>-</del>	THOD(A)
MARK	QTY	MANUFACTURER	MODEL	SIZE	CFM	NET WT.(LBS)	VELO	CHY	(FPM)	V/ PH./ F	Z AMPS	MCB(A)
AC-1	1	BERNER ARCH	ARD12-2072A	72(W)"X26"(D)X15"(H)	3014	182		1722	2	208/1/6	8.6	15

NOTES:

1. PROVIDE MANUFACTURER RECOMMENDED ACCESSORIES. 2. COORDINATE WITH ELECTRICAL CONTRACTOR FOR POWER REQUIREMENT.

	AIR BALANCE								
UNIT	SUPPLY AIR (CFM)	0	DE AIR %OA	RETURN AIR (CFM)	EXHUAST AIR (CFM)				
AHU-1	2236	570	25%	1666	-				
AHU-2	2236	450	20%	1786	-				
EF-1	_	-	_	-	70				
EF-2	_	-	_	-	70				
MUA-1	4250	425	50	_					
PCU-1	_	_	-	-	5063				
TOTAL	8722	527	70	3452	5203				
	BUI	LDING PRE	SSURE:	67 CFM	POSITIVE				





		E	ELECTRICAL SYMBOLS LIST					GENERAL NOTES
	LIGHTING		POWER AND TELECOMMUNICATION		ELECTRICAL AI	BBREVIA	TIONS	ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE NE      AND ALL COVERNING LOCAL      COVERNING LOCA
	LIQUITING FIVILIDE AND QUITLET DOV. HALE SHADED FIVILIDE OD	J	JUNCTION BOX WITH BLANK COVER PLATE	A	AMPERES	EA	EACH	2017, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
	LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY	_		A/C, AC	AIR CONDITIONING UNIT	EM	EMERGENCY	2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EX CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATIO
	SERVICE, U.O.N.  LUMINAIRE TYPE: INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE	-	SIMPLEX RECEPTACLE, +18" AFF OR AS NOTED.  SUFFIXE DENOTES FOLLOWING:	AF	AMPERE FRAME/AMP FUSE	EMT	ELECTRICAL METALLIC TUBING	WILL BE CONSIDERED FOR FAILURE TO DO SO.
	SCHEDULE.		A- NEMA 5-15R B- NEMA 6-15R	AFF	ABOVE FINISHED FLOOR	EQUIP	EQUIPMENT	3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY
	CIRCUIT NUMBER : INDICATED BY NUMBER		C- NEMA 14-30R D- NEMA 14-50R	AS	AMP SWITCH	ER	EXISTING TO BE RELOCATED	4. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A COD APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRAT
AO 2	SWITCHING INDICATED BY LOWER CASE LETTERS.	$\Box$	DUPLEX GFI RECEPTACLE	AIC	AMPS INTERRUPTING CAPACITY	FA	FIRE ALARM	SHALL BE SLEEVED AND SEALED WATERTIGHT.
•a •EM —	DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.	<u>™<sub>GFI</sub></u>	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AT	AMP TRIP	FA -		5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOL (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND
ONL —	DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS	\ \frac{\pi}{2}					EXISTING	BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL F
	UNSWITCHED CIRCUIT.	<b>•</b>	SPECIAL RECEPTACLE AS NOTED	ATS	AUTOMATIC TRANSFER SWITCH	FL	FLOOR	AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS CONTINUENT METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY
<b>○ ○ ○ ○ ○</b>	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONALARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN	$\nabla$	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 TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.	AUTO AWG	AUTOMATIC  AMERICAN WIRE GAUGE	G GFI	GROUND FAULT INTERRUPTER	RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH AT RIGHT ANGLES TO WALLS.  6. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL
	SWITCHES AND CONTROLS		TELEPHONE OUTLET	С	CONDUIT	GP	GENERAL PURPOSE	CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE/SWITCHED	$\overline{}$	4 PORT DATA OUTLET	C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER	7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH
\$ <sub>a</sub>	RECEPTACLE CONTROLLED.			СКТ	CIRCUIT	HWH	HOW WATER HEATER	ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTE OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PI
\$3 \$a	20A 3-WAY TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED			CLG	CEILING	HZ	HERTZ	DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, FOR CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM
			MOTORS AND CONTROLS	сомм	COMMUNICATION	IC	INTERRUPTING CAPACITY	FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
OS <sub>A</sub>	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.			СТ	CURRENT TRANSFORMER	PP	POWER PANEL	8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF F
	WIRING SYSTEMS	M) S <sub>N</sub>	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.	CU	COPPER DIAMETER	PWR R	POWER REMOVE	ACCEPTANCE.  9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
3 5	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION,	M WP	AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.	DISC	DISCONNECT	RE	RELOCATED EXISTING	10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES
UP-	NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES	DISC	DOWN	REC	RECEPTACLE	DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE—EXISTIN CONDITIONS OR BETTER.
3 5 7 UP-	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, 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.		AS NOTED.  30A/208V NON FUSED DISCONNECT SWITCH	DP	DISTRIBUTION PANEL	RGS	RIGID GALVANIZED STEEL	11. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRI METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DELINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
•	, , , , , , , , , , , , , , , , , , ,		60A/208V NON FUSED DISCONNECT SWITCH	DWG	DRAWING	RR	REMOVE & RELOCATE	12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE
}	CONDUIT AND WIRE TO BUILDING GROUND.		100A/208V NON FUSED DISCONNECT SWITCH	JB	JUNCTION BOX	SECT	SECTION	CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINAT OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
<del>-</del>				KCMIL KCMIL	ONE THOUSAND CIRCULAR MILS	SPDT	SINGLE POLE DOUBLE THROW	13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHAL CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTO
	UNDERGROUND		200A/208V NON FUSED DISCONNECT SWITCH	KV	KILOVOLT	SPST	SINGLE POLE SINGLE THROW	SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL A JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHER
	EXISTING	└ <u> 400</u> 350	FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP  NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.	KVA	KILOVOLT-AMPERES	SPEC	SPECIFICATION	REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR B' FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYP
	NEW			KW	KILOWATTS	SW	SWITCH	UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
		/M//M/	DUPLEX PUMP. NUMBER INDICATES HP RATING OF PUMP.	LTG	LIGHTING	SWBD	SWITCHBOARD	14. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDIN STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
		1.5 kW	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	MAX	MAXIMUM	SYM	SYMMETRICAL	15. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AN
			THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS	МС	MOTOR CONTROLLER	SYS	SYSTEMS	SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CE AND POWER PLANS.
	ELECTRICAL DRAWING LIST	S <sub>T</sub>	PER MOTOR RATING.	МСВ	MAIN CIRCUIT BREAKER	TELE	TELEPHONE	16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR
E001	ELECTRICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES	S <sub>M</sub>	MANUAL MOTOR SWITCH	MLO	MAIN LUGS ONLY	TEMP	TEMPERATURE	EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILL EXTERIOR MOUNTED RECEPTACIES SHALL BE OFFICE AND MOUNTED RECEPTACIES SHALL BE OFFICE AND MOUNTED
E002	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2		ANNOTATION	MTD	MOUNTED	TXF	TOILET EXHAUST FAN	EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED WEATHERPROOF ENCLOSURE.
E003	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2	$\bigcirc$	KEYED NOTE REFERENCE	MTS	MANUAL TRANSFER SWITCH	TYP	TYPICAL	17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRICE INSTALLATION.
E100	ELECTRICAL LIGHTING PLAN			N	NEUTRAL	UON	UNLESS OTHERWISE NOTED	18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALI
E101	ELECTRICAL POWER PLAN	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	NIC	NOT IN CONTRACT	V	VOLT/VOLTAGE	OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR F
E102	ELECTRICAL ROOF PLAN	1 E/2-1	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM			<u> </u>	VOLT AMPERE	VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND
E200	ELECTRICAL DETAILS			NTS	NOT TO SCALE	VA		SPECIFICATIONS FOR THIS PROJECT.  19. ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACE
E201	ELECTRICAL DETAILS		POWER DISTRIBUTION	PNL	PANEL	WP	WEATHER PROOF	UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONFLOOR SLAB.
E300	ELECTRICAL RISER DIAGRAM		MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND	W	WATT	Ø	PHASE	20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL
E301	ELECTRICAL PANEL SCHEDULE		AMPERAGE AS NOTED.					APPROVED FOR THAT APPLICATION.
			DISTRIBUTION PANELBOARD, 120/208V OR AS NOTED-SURFACE OR FLUSH MOUNTED.					21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE—RA' WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE—RATED BOXES OR PUTTY PADS ARE UT
								22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITRH THENGINEER AND OWNER BEFORE INSTALLATION.
								23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURA CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL
								DRAWINGS AND DETAILS.
								24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMIN AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
								25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECT DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
								26. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND
								INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.  27. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMEN
								INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CON TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMB AND RUN TO PANELBOARD.

### ELECTRICAL SPECIFICATIONS

#### 1. GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION,", LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- E. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- F. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- G. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- H. 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.
- I. 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.
- J. 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.
- K. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS
- L. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- M. 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.
- GENERAL PROVISIONS FOR ELECTRICAL WORK:
- A. DEFINITIONS:
- 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING 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 SWITCHES: 4 FT-0 IN.
  - WALL FIXTURES: 7 FT-0 IN.
  - MOTOR CONTROLLERS: 5 FT-0 IN.
  - CLOCKS: 7 FT 6 IN
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
  - 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES
  - 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- E. MATERIALS
- 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
- MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD—APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH
- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- 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 NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED. SUPPLIED OR SPECIFIED HEREIN.
- 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
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY 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.
- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE ILLINOIS 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 FNGINFFR.
  - B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
    - 1) PROJECT NAME AND LOCATION
    - 2) NAME OF ARCHITECT AND ENGINEER
  - 3) ITEM IDENTIFICATION
  - 4) APPROVAL STAMP OF PRIME CONTRACTOR
  - SUBMISSIONS:
  - 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
  - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
  - D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
  - 1) SAFETY/DISCONNECT SWITCHES
  - 2) FUSES
  - 3) CIRCUIT BREAKERS
  - 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
  - 5) RACEWAYS
  - 6) WIRE AND CABLE
  - 7) WALL SWITCHES
  - 8) INSERTION RECEPTACLES
  - 9) MOMENTARY CONTACT SWITCHES
  - 10) TIME SWITCHES
  - 11) LIGHTING FIXTURES.
  - 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.
- AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK.
  "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
- LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

STANDARDS.

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

  B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO 6808E. THREE-POLE SWITCHES SHALL BE SIMILAR
- 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.
- FUSES:
- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- B. MOTOR CIRCUITS ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW—PEAK DUAL—ELEMENT TIME—DELAY LPN—RK (AMP)SP (250V) /LPS—RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL—MAGNETIC, QUICK—MAKE—QUICK—BREAK, BOLT—ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP—FREE HANDLE. MULTI—POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT—TRIPPING, OPEN 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) 120/208 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
- B. DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:
- H. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
- I. NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
- J. 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.
- ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORE).
- DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.
- . 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

HIGH WHITE LETTERING.

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

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

ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.

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

THREADED.

THREADLESS.

GALVANIZED.

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

RIGID STEEL ELBOWS, 2 IN. OR LARGER.

- BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

  2) FITTINGS AND ACCESSORIES:
- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
- 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 TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.
- 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

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 2017 ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE 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.
- D. 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.
- E. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.
- 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:

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

- 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.
- 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
- 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
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
- PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

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

## 11. WIRING DEVICES:

FLOORS.

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

- B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/208 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).
- C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT
  - 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,
- E. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.
- F. COLORS: COORDINATE COLORS WITH ARCHITECT.
- G. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

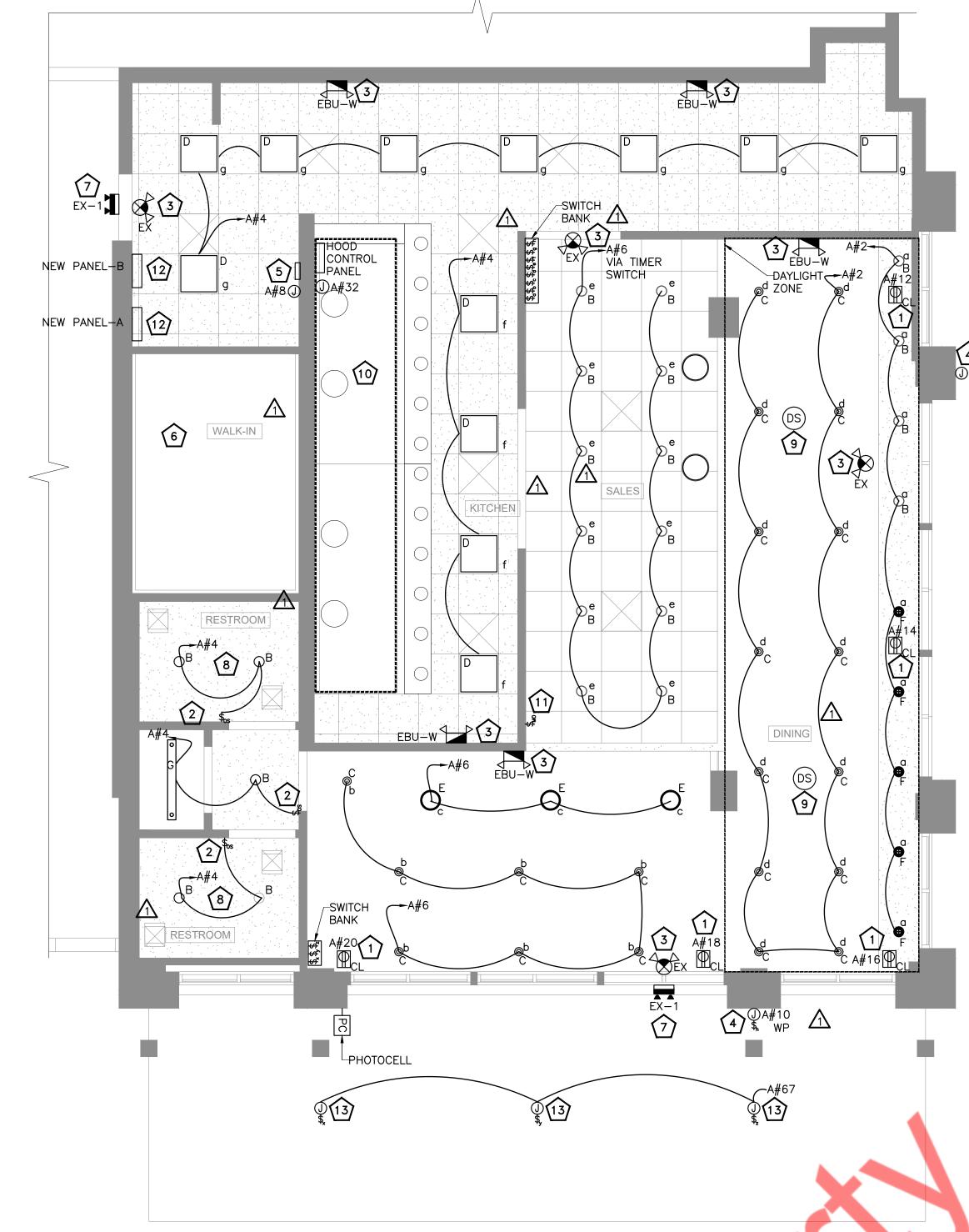
### 12. LIGHTING FIXTURES:

- A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED. WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.
- B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.
- C. 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 EQUA
- 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 THO OF LESS THAN 20% AT ALL INPUT VOLTAGES.
- 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.
- 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.
- 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.
- F. FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

## 14. GROUNDING AND BONDING:

- A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (2017) 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



# $\underbrace{1 \frac{\text{ELECTRICAL LIGHTING PLAN}}{1/4" = 1'-0"}}$

## LIGHTING PLAN GENERAL NOTES: #

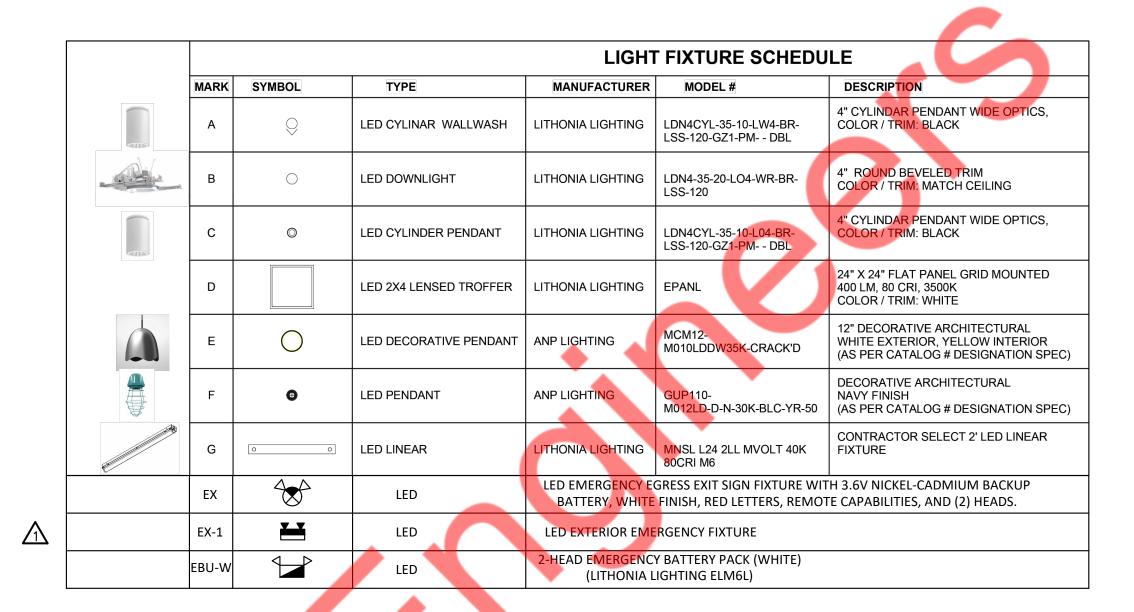
- A. CONTRACTOR IS ADVISED THAT ADJUSTMENTS TO EMERGENCY AND EXIT LIGHT FIXTURE LOCATIONS/QUANTITIES MAY BE REQUIRED BY AHJ UPON FINAL INSPECTION.
- B. ALL NIGHT LIGHT, EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED AHEAD OF SWITCHED LIGHTING CIRCUIT.
- C. ELECTRICAL CEILING FIXTURES IN SUSPENDED CEILING SHALL BE INSTALLED IN COMPLIANCE WITH THE ASTM C636 2.7.1, 2.7.2, 2.7.3.

(1) 2.7.1 MOUNT FIXTURES INSTALLED IN ACOUSTICAL TILE OR LAY-IN PANEL CEILINGS IN A MANNER THAT WILL NOT COMPROMISE CEILING PERFORMANCE.

(2) 2.7.2 FIXTURES SHALL NOT BE SUPPORTED FROM MAIN RUNNERS OR CROSS RUNNERS IF THE WEIGHT OF THE FIXTURE CAUSES THE TOTAL DEAD LOAD TO EXCEED THE DEFLECTION CAPABILITY OF THE CEILING SUSPENSION SYSTEM. IN SUCH CASES, THE FIXTURE LOAD SHALL BE SUPPORTED BY SUPPLEMENTAL HANGERS WITHIN 6 IN. [150 MM] OF EACH CORNER, OR THE FIXTURE SHALL BE SEPARATELY SUPPORTED.

(3) 2.7.3 FIXTURES SHALL NOT BE INSTALLED SO THAT MAIN RUNNERS OR CROSS RUNNERS WILL BE ECCENTRICALLY LOADED EXCEPT WHERE PROVISION IS INHERENT IN THE SYSTEM (OR IS SEPARATELY PROVIDED FOR) TO PREVENT UNDESIRABLE SECTION ROTATION OR DISPLACEMENT, OR BOTH. IN ANY CASE, RUNNERS SUPPORTING CEILING FIXTURES SHALL NOT ROTATE MORE THAN 2° AFTER THE FIXTURE LOADS ARE IMPOSED.

(4) 2.7.4 WHERE FIXTURE INSTALLATION WOULD PRODUCE ROTATION OF RUNNERS IN EXCESS OF 2°, INSTALL FIXTURES WITH THE USE OF SUITABLE ACCESSORY DEVICES. THESE DEVICES SHALL SUPPORT THE FIXTURE IN SUCH A MANNER THAT MAIN RUNNERS AND CROSS RUNNERS WILL BE LOADED SYMMETRICALLY RATHER THAN ECCENTRICALLY.



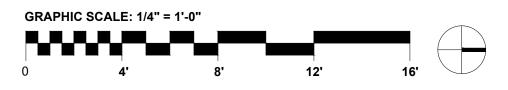
### **GENERAL NOTES:**

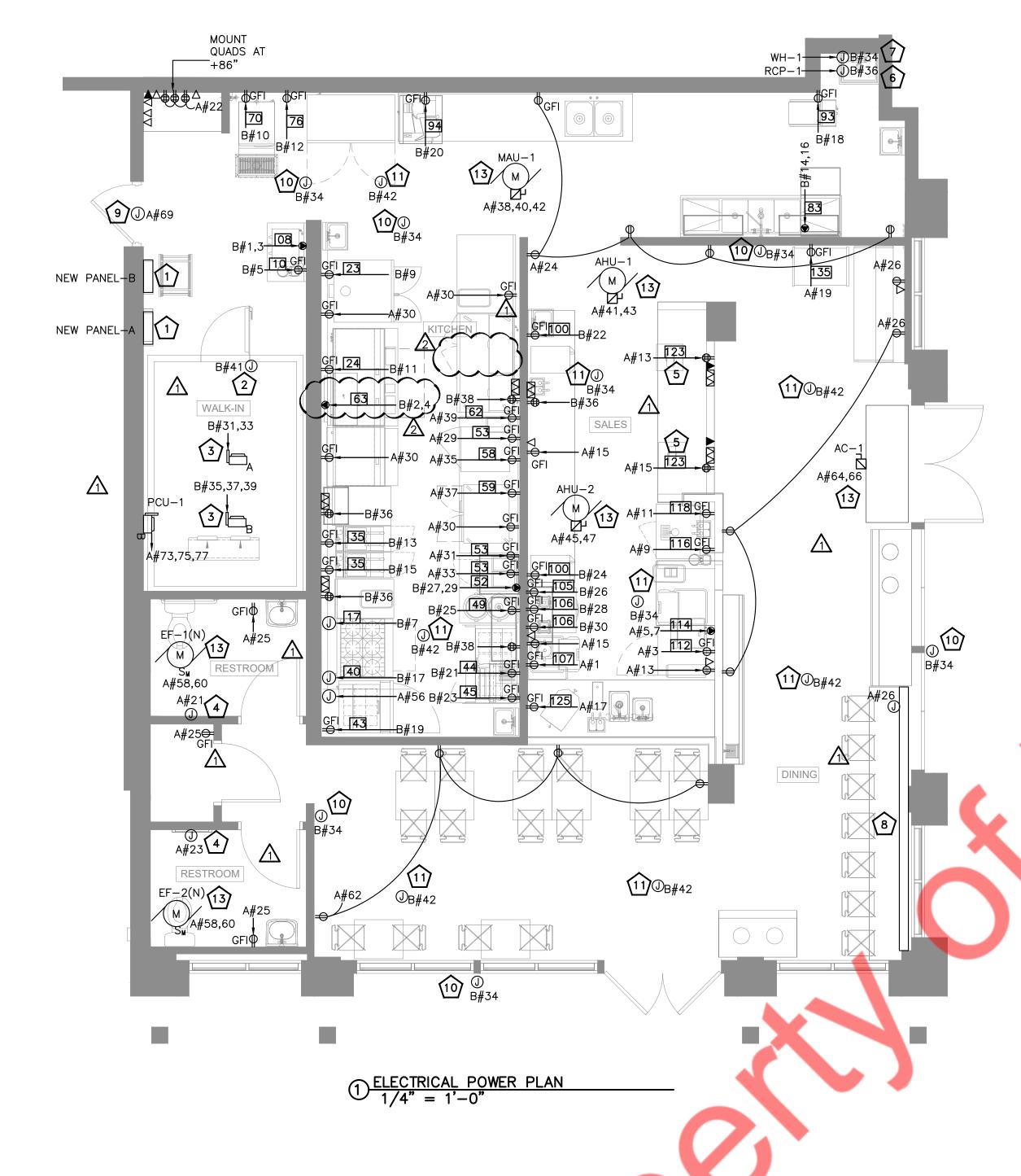
- A. VERIFY ALL LUMINAIRE COLORS, TRIMS, LENGTHS, ETC. WITH THE ARCHITECT PRIOR TO PLACING FINAL PURCHASE ORDERS. SUBMISSION PF SHOP DRAWINGS WILL BE INTERPRETED AS HAVING BEEN COORDINATED WITH THE ARCHITECTURAL DRAWINGS.
- B. PROVIDE ALL LENGTHS, FEEDS, ACCESSORIES, CONNECTORS, WIRING, POWER SUPPLIES, DRIVERS ETC. FOR A COMPLETE INSTALLATION. THE E.C. SHALL VERIFY
  THE COMPLETE BILL OF MATERIAL WITH MANUFACTURER'S REPRESENTATIVE AND ENSURE ALL EQUIPMENT ARE INCLUDED IN BID PRICE. COORDINATE INSTALLATION
  WITH ARCHITECTURAL DETAILS.
- C. VERIFY FINAL LUMINAIRE LOCATIONS WITH OTHER CEILING MOUNTED EQUIPMENTS SUCH AS DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLANS.
- D. VERIFY EXACT MOUNTING HEIGHT AND LOCATIONS OF ALL WALL MOUNTED LUMINAIRE WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN.
- E. ANY PROPOSED ALTERNATE LUMINAIRES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO FINAL BID PRICING.
- F. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT AND DEVICES OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEERS AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE A COMPLETE SPECIFICATIONS CUTSHEET SUBMITTAL AS OUTLINED IN THE SPECIFICATIONS, COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.

## LIGHTING PLAN KEYED WORK NOTES: (#)

- 1. CEILING MOUNTED RECEPTACLES FOR SHOW WINDOW. E.C. TO INSTALL RECEPTACLE WITHIN 18" OF THE TOP OF SHOW WINDOW PER NEC REQUIREMENTS.
- 2. WALL MOUNTED OCCUPANCY SENSOR. SET OFF TIME TO 15 MINUTES FOR RESTROOM, SET DIP SWITCH TO AUTOMATIC ON.
- 3. CONNECT ALL EMERGENCY EGRESS AND NIGHT LIGHTING 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.
- 4. JUNCTION BOX WITH TOGGLE DISCONNECT PER NEC FOR CONNECTION TO BUILDING MOUNTED SIGNAGE. VERIFY EXACT LOCATION AND CONNECT TO SIGN PER MANUFACTURE'S INSTRUCTION. ROUTE CIRCUIT TO PANEL AS INDICATED VIA EXTERIOR LIGHTING/SIGNAGE CONTROLLER.
- 5. COORDINATE EXACT LOCATION OF LIGHTING CONTROL PANEL WITH ARCHITECT.
- 6. ALL COOLER FREEZER LIGHTING FIXTURES AND RELATED LOCAL CONTROLS SHALL BE PROVIDED BY EQUIPMENT SUPPLIER. E.C. SHALL MAKE ALL FINAL CONNECTION TO FIXTURES AS REQUIRED TO ENSURE A COMPLETE OPERATION. CONNECT FIXTURES TO NEAREST 120V LIGHTING CIRCUIT.
- 7. WEATHERPROOF EMERGENCY LIGHT FIXTURE. E.C SHALL COORDINATE WITH ARCHITECT FOR FINAL FINISH & LOCATION. CONNECT ALL FIXTURES TO NEAREST LIGHTING CIRCUIT AHEAD OF SWITCHING FOR CONTINEOUS OPERATION.
- 8. EXHAUST FANS SHALL BE CIRCUITED AND CONTROLLED ALONG WITH THE LIGHT FIXTURES IN THE SAME ROOM.
- 9. LIGHTING IN DAYLIGHT ZONE SHALL BE CONTROLLED THROUGH DAYLIGHT SENSOR.
- 10. ALL THE LIGHT FIXTURES LOCATED BELOW HOOD SHALL BE WIRED VIA KITCHEN HOOD CONTROL PANEL. CO-ORDINATE WITH KITCHEN HOOD MANUFACTURER FOR DETAILS.
- 11. MANUAL OVER-RIDE SWITCH, E.C. SHALL CO-ORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF MANUAL OVER-RIDE SWITCH.
- 12. NEW PANELS "A" AND "B" FOR SPACE. E.C. SHALL CO-ORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF PANELS. REFER RISER AND PANEL SCHEDULE FOR MORE DETAIL.
- 13. PROVIDE JUNCTION BOX FOR FUTURE EXTERIOR CEILING FANS ON THE UNDERSIDE OF METAL CANOPY STRUCTURE.

LIGHTING RELAY ZONE SCHEDULE								
ZONE	SWITCH	CIRCUIT						
1	a	A#2						
2	b	A#6						
3	С	A#6						
4	d	A#2						
5	е	A#6						
6	f	A#4						
7	g	A#4						
8	h	A#10						
9	-	-						
10	-	-						
11	-	-						
12	-	-						
13	-	-						
14	-	-						
15	-	-						
16	-	-						



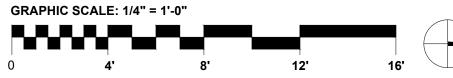


#### **ELECTRICAL POWER PLAN GENERAL NOTES:**

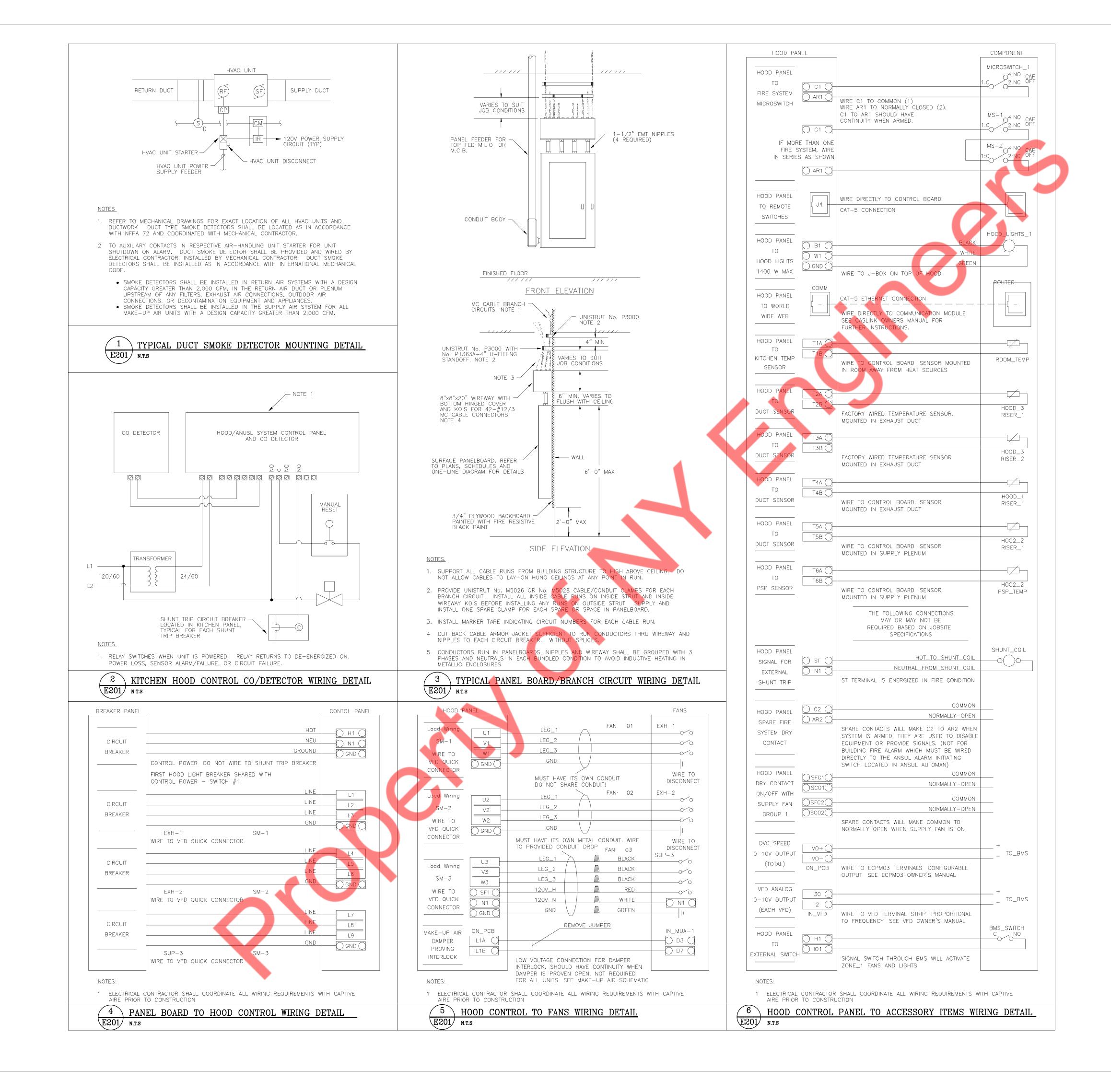
- A. E.C. SHALL COORDINATE LOCATIONS AND HEIGHT OF ALL OUTLETS WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN.
- B. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SUPPLYING / INSTALLING ALL ELECTRICAL COMPONENTS NECESSARY TO PROVIDE POWER TO EQUIPMENT. ELECTRICAL CONTRACTOR SHALL ALSO COMPLETE ALL INTERNAL WIRING AND FINAL CONNECTIONS TO EQUIPMENT PER MANUFACTURERS SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO:
- C. -PROVIDING CAPS AND CORDS TO APPLICABLE EQUIPMENT -STAINLESS STEEL COVER PLATES WHERE REQUIRED E. — MAIN BREAKER PANELS, CONTROL PANELS, DISCONNECT SWITCHES, STARTERS, ETC.
- F. REFER TO ARCHITECTURAL PLANS AND / OR CONSTRUCTION DOCUMENTS FOR ANY ADDITIONAL ELECTRICAL CONNECTIONS OR OUTLETS REQUIRED TO MEET LOCAL CODES.
- G. ALL SINGLE PHASE RECEPTACLES 150 VOLTS TO GROUND OR LESS 50 AMPS OR LESS, AND ALL THREE PHASE RECEPTACLES 150 VOLTS TO GROUND OR LESS, 100 AMPS OR LESS IN COMMERCIAL KITCHENS AND FOOD PREP AREAS MUST BE GFCI PROTECTED. ALL GFCI RESET MUST BE READILY ACCESSIBLE PER NEC 210.8B
- H. THE HOOD SUPPRESSION SYSTEM SHALL SHUTDOWN ALL FUEL AND POWER FOR EQUIPMENT LOCATED UNDER THE HOOD UPON INITIATION IN ACCORDANCE WITH FLORIDA FIRE PREVENTION CODE FFPC 1-50.4.6 AND FFPC 50.4.8.1.
- I. ALL ELECTRICAL EQUIPMENT SHALL BE LABEBLED TO INDICATE POTENTIAL ELECTRIC ARC FLASH HAZARDS PER NEC 110.16.

## ELECTRICAL POWER PLAN KEYED WORK NOTES:

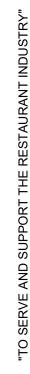
- 1. E.C. SHALL CO-ORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION
- 2. JUNCTION BOX FOR WALK-IN MISCELLANEOUS LOAD. E.C. SHALL COORDINATE WITH MANUFACTURER FOR EXACT POWER REQUIREMENTS.
- E.C. TO CO-ORDINATE WITH WALKIN BOX MANUFACTURER FOR EXACT POWER REQUIREMENTS. PROVIDE NECESSARY ELECTRICAL CONNECTIONS AS PER MANUFACTURER REQUIREMENTS. CO-ORDINATE EXACT LOCATION OF WALKIN BOX CONDESER AND EVAPORATOR PRIOR TO ROUGH-IN.
- PROVIDE LOCKOUTS AT DISTRIBUTION PANEL FOR RESTROOM HAND DRYERS PER NEC 422.33
- COORDINATE MOUNTING AND EXACT LOCATION OF DEVICES IN P.O.S. CABINETRY WITH G.C. EACH P.O.S. STATION SHALL BE (1) QUAD RECEPTACLE, (1) QUAD DATA OUTLETS, AND (1) VOICE OUTLET. COORDINATE EXACT REQUIREMENTS WITH FRANCHISEE/ARCHITECT.
- ELECTRICAL POWER PROVISION FOR HOT WATER RECIRCULATION PUMP (HWCP), E.C. SHALL COORDINATE WITH THE MANUFACTURER FOR THE EXACT POWER REQUIREMENT AND THE ARCHITECT FOR THE EXACT LOCATION BEFORE ROUGH-IN.
- 7. ELECTRICAL POWER PROVISION FOR WATER HEATER (WH). E.C. SHALL COORDINATE WITH THE MANUFACTURER FOR THE EXACT POWER REQUIREMENT AND THE ARCHITECT FOR THE EXACT LOCATION BEFORE ROUGH-IN.
- 8. MULTIOUTLET USB CHARGING SYSTEM (PLUGMOLD). COORDINATE WITH MANUFACTURER FOR ELECTRICAL REQUIREMENTS.
- 9. PROVIDE JUNCTION BOX AND ELECTRICAL SUPPLY FOR FAIL SAFE DOOR . COORDINATE WITH MANUFACTURER FOR EXACT POWER REQUIREMENT AND ELECTRICAL CONNECTION OF DOOR.
- 10. PROVIDE JUNCTION BOX FOR SECURITY CAMERAS. COORDINATE EXACT POWER REQUIREMENT AND LOCATION WITH LV VENDOR.
- 11. PROVIDE JUNCTION BOX OR CEILING OUTLET AS REQUIRED FOR SPEAKERS. COORDINATE POWER REQUIREMENT AND EXACT LOCATION WITH MANUFACTURER. TERMINATE SPEAKER WIRES AT OFFICE AUDIO BOX.
- 12. MOUNT DUPLEX AND DATA OUTLET ABOVE CEILING FOR FUTURE OLO SCREEN. COORDINATE EXACT LOCATION IN FIELD.
- 13. E.C. SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT LOCATION AND POWER REQUIREMENTS OF NEW MECHANICAL EQUIPMENTS. PROVIDE BREAKERS AND BRANCH CIRCUITS AS REQUIRED.

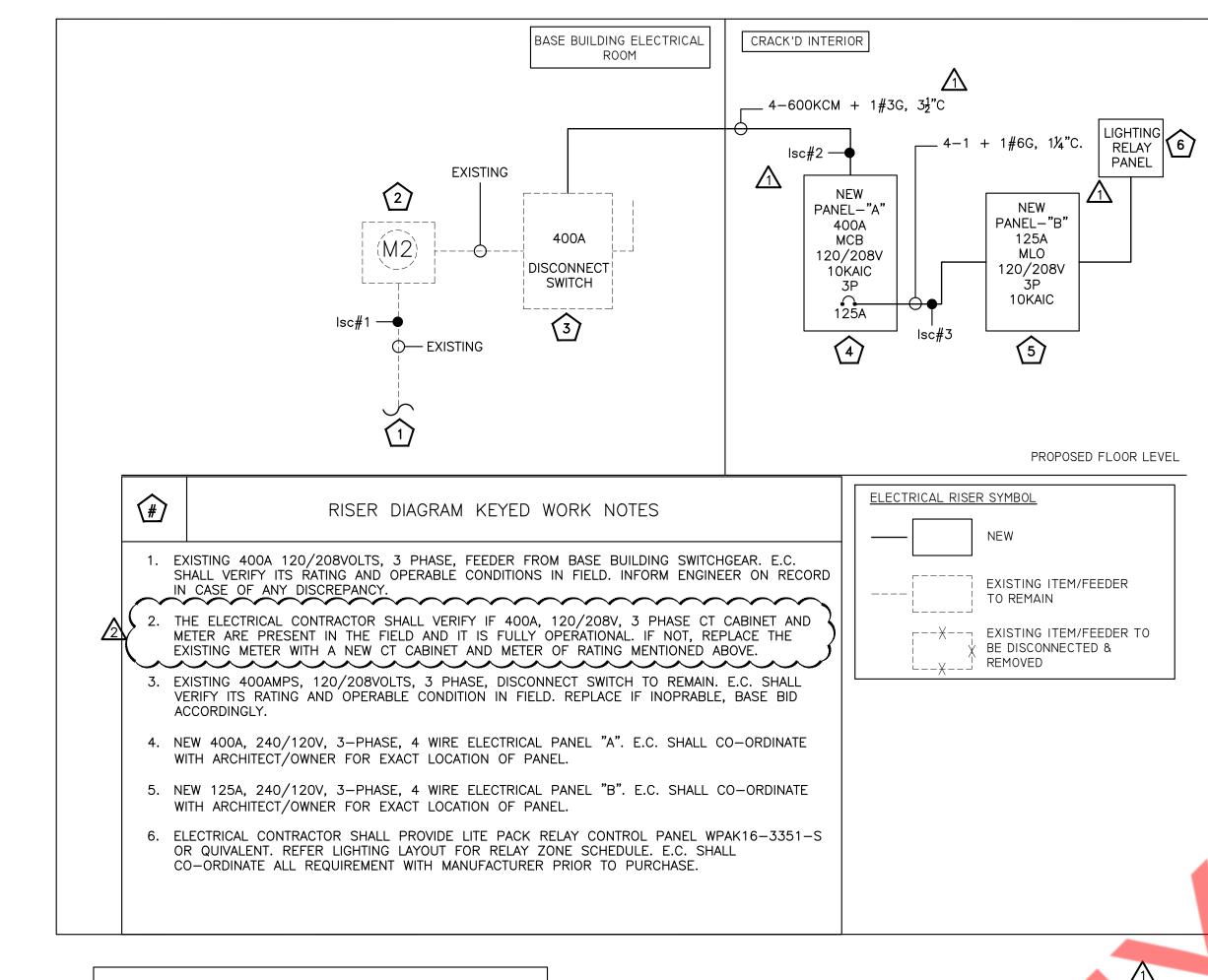






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RISER DIAGRAM GENERAL NOTES:

- A. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO BID.
- B. E.C. TO VERIFY EXACT POWER DISTRIBUTION IN FIELD. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.
- C. E.C. TO VERIFY AND OPERABLE CONDITIONS
  OF ALL EXISTING PANELS. FEEDER
  DISCONNECT, SWITCH ETC. IN FIELD. REPLACE
  IF FOUND IN OPERABLE. BASE BID
  ACCORDINGLY.
- D. E.C. SHALL VERIFY AVAILABLE FAULT CURRENT AT THE SERVICE EQUIPMENT. SERVICE EQUIPMENT MUST BE FIELD MARKED WITH AVAILABLE FAULT CURRENT PER NEC 110.24, 110.9 AND 110.10.

## FAULT CURRENT CALCULATIONS

AVAILABLE FAULT CURRENT AT METER LOCATION(Isc1) Isc1: 16,175 AMPS / FAULT CURRENT AT PANEL A(Isc2) LENGTH 150 FT CONDUCTOR SIZE 600 KCM QTY 1 TYPE THREE SINGLE CONDUCTORS CONDUIT STEEL WIRE CU, 600V FAULT CURRENT Isc2: 9,500 FAULT CURRENT AT PANEL B(Isc3) LENGTH: 5 CONDUCTOR SIZE: Jan-00 QTY: 1 TYPE: THREE SINGLE CONDUCTORS CONDUIT: STEEL WIRE: CU, 600V FAULT CURRENT Isc3: 9,493 AMPS



"TO SERVE AND SLIBBORT THE BESTALIBANT INDIEST

- A. ALL CIRCUITING SHOWN IS FOR REFERENCE PURPOSE ONLY.
- B. E.C. SHALL CO-ORDINATE WITH EQUPMENT MANUFACTURER FOR EXACT RATING OF BREAKER AND FEEDER BEFORE INSTALLATION.
- C. INFORM ENGINEER ON RECORD IN CASE OF ANY DISCREPANCY.
- D. ALL RECEPATCLES IN KITCHEN AREA SHALL BE GFCI PROTECTED.
- E. ANY BREAKER THAT CONTROLS ANY EXIT SIGN AND/OR EMERGENCY LIGHTS SHALL BE IDENTIFIED.



		LOAD CALCULATION	ON FOR PANEL A		
LOAD CLASSIFICATIO	ON	CONNECTED LOAD(KVA)	DEMAND FACTOR	DEMAND LOAD	
LIGHTING	L	13.13	1.25	16.41	
RECEPTACLE UPTO 10KVA	R	6.81	1	6.81	
RECEPTACLE ABOVE 10KVA	R	0	0.5	0.00	
HVAC	Н	50.7	1	50.70	
EQUIPMENTS	Ε	21.23	0.65	13.80	
OTHER	0	0	1	0.00	
TOTAL CONNECTED LOAD		91.87	KVA		
TOTAL DEMAND LOAD		87.72	KVA		
DEMAND CURRENT		243.78	AMPS		
		LOAD CALCULATION	ON FOR PANEL B		
LOAD CLASSIFICATIO	)N	CONNECTED LOAD(KVA)	DEMAND FACTOR	DEMAND LOAD	
LIGHTING	L	0	1.25	0.00	
RECEPTACLE UPTO 10KVA	R	3.52	1	3.52	
RECEPTACLE ABOVE 10KVA	R	0	0.5	0.00	
HVAC	Н	0	1	0.00	
EQUIPMENTS	Ε	43.5	0.65	28.28	
OTHER	0	0	1	0.00	
TOTAL CONNECTED LOAD		48.52	KVA		
TOTAL DEMAND LOAD		31.80	KVA		
DEMAND CURRENT		88.36	AMPS		
		TOTAL FOR PA	.NEL A AND B		
		CONNECTED LOAD(KVA)	DEMAND LOAD(KVA)	CONNECTED LOAD (AMP)	DEMAND LOAD (AMP)
PANEL A		91.87	87.72	255.31	243.78
PANEL B		48.52	31.80	134.84	88.36
TOTAL		140.39	119.517	390.15	332.14

PANEL:	Α	(NEW)							1			MOUNTING:	SURFACE	
208Y/120	VOLTC		1 2	DILACE		MUDE						DANIEL LOCATION	I DOLL	
<u> </u>	,		3	PHASE	4	WIRE	C - 10 KAK					PANEL LOCATION:		<u></u>
MCB	400A		BUS:	400A	MIN.	AIC RAIN	G : 10 KAI					FED FROM:	MAIN SERIC	.E
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PEF	R PHASE (K	VA)	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT N
1	20	107-BLENDER	E	1.70	2#12, 1#12, 3/4"C	1.93			2#12, 1#12, 3/4"C	0.23	L	FOH LIGHTING	20	2
3	20	112-UC REFRIGERATOR	E	0.30	2#12, 1#12, 3/4"C		0.90		2#12, 1#12, 3/4"C	0.60	L	BOH LIGHTING	20	4
5			E	3.10				3.60	2#12, 1#12, 3/4"C	0.50	L	KITCHEN LIGHTING	20	6
7	40/2P	114-ESPRESSO MACHINE	E	3.10	2#8, 1#10, 3/4"C	3.20			2#12, 1#12, 3/4"C	0.10	1	LCP	20	8
9	20	116-ESPRESSO GRINDER	E	1.50	2#12, 1#12, 3/4"C		2.50		2#12, 1#12, 3/4"C	1.00		EXTERIOR SIGNAGE	20	10
11	20	118-BREW DISPENSER	E	1.50	2#12, 1#12, 3/4"C			3.30	2#12, 1#12, 3/4"C	1.80	L	SHOW WINDOW RECEPTACLE	20	12
13	20	123-POS AND MEDIA PRINTER	Е	0.54	2#12, 1#12, 3/4"C	2.34			2#12, 1#12, 3/4"C	1.80	L	SHOW WINDOW RECEPTACLE	20	14
15	20	123-POS AND MEDIA PRINTER	E	0.54	2#12, 1#12, 3/4"C		2.34		2#12, 1#12, 3/4"C	1.80		SHOW WINDOW RECEPTACLE	20	16
17	30	125-ACAI MACHINE	E	2.30	2#10, 1#10, 3/4"C			4.10	2#12, 1#12, 3/4"C	1.80	L	SHOW WINDOW RECEPTACLE	20	18
19	20	135-BEVERAGE COOLER	E	1.80	2#12, 1#12, 3/4"C	3.60			2#12, 1#12, 3/4"C	1.80	L	SHOW WINDOW RECEPTACLE	20	20
21	20	HAND DRYER	R	0.90	2#12, 1#12, 3/4"C		1.44		2#12, 1#12, 3/4"C	0.54	R	OFFICE RECEPATCLES	20	22
23	20	HAND DRYER	R	0.90	2#12, 1#12, 3/4"C			1.80	2#12, 1# <mark>12</mark> , 3/4"C	0.90	R	BOH GENERAL RECEPTACLE	20	24
25	20	TOILET RECEPTACLE	R	0.36	2#12, 1#12, 3/4"C	1.08			2#12, 1#12, 3/4"C	0.72	R	OLO SCREEN AND DINING REC.	20	26
27	20	JANITOR RECEPTACLE	R	0.18	2#12, 1#12, 3/4"C		0.90		2#12, 1#12, 3/4"C	0.72	R	FOH GENERAL RECEPTACLE	20	28
29	20	53-CHEESE MELTER	E	0.35	2#12, 1#12, 3/4"C		4	1.25	2#12, 1#12, 3/4"C	0.90	R	KITCHEN GENERAL RECEPTACLE	20	30
31	20	53-CHEESE MELTER	E	0.35	2#12, 1#12, 3/4"C	0.85			2#12, 1#12, 3/4"C	0.50	L	HOOD CONTROL PANEL	20	32
33	20	53-CHEESE MELTER	E	0.35	2#12, 1#12, 3/4"C		0.45		2#12, 1#12, 3/4"C	0.10	E	WATER HEATER (WH-1)	20	34
35	20	58-UNDERCOUNTER REFRIG.	E	0.23	2#12, 1#12, 3/4"C			0.33	2#12, 1#12, 3/4"C	0.10	E	RECIRCULATION PUMP (RCP-1)	20	36
37	20	59-UNDERCOUNTER FREEZER	E	0.60	2#12, 1#12, 3/4"C	2.30				1.70	Н			38
39	20	62-SANDWICH PREP REFRIG.	E	0.49	2#12, 1#12, 3/4"C		2.19		3#10, 1#10, 3/4"C	1.70	H	MAU-1	30/3P	40
41	20/2P	AHU-1	Н	0.70	2#12, 1#12, 3/4"C			2.40		1.70	Н			42
43			Н	0.70		3.20			2440 4440 2/480	2.50	Н	AAA11 (C11 4)	20/25	44
45	20/2P	AHU-2	Н	0.70	2# <mark>12, 1</mark> #12, 3/4"C		3.20		3#10, 1#10, 3/4"C	2.50	Н	MAU (CU-1)	30/3P	46
47			Н	0.70		5 - 10		3.20		2.50	Н			48
49	30/3P	CU 1	Н	3.20	2#10 1#10 2/4"C	5.70	F 70		3#10, 1#10, 3/4"C	2.50	H H	MAU (CU-2)	30/3P	50
51 53	30/38	CU-1	Н	3.20	3#10, 1#10, 3/4"C		5.70	F 70	5#10, 1#10, 5/4 C	2.50	Н	IVIAO (CO-2)	30/38	52 54
55 			Н Н	3.20		4.40		5.70	2#12, 1#12, 3/4"C	1.20	11	FIRE SUPRESSION SYSTEM	20	56
57	30/3P	CU-2	Н	3.20	3#10, 1#10, 3/4"C	4.40	3.90		2#12, 1#12, 5/4 C	0.70	Н		20	58
	30/31	CO 2	Н	3.20	3110, 11110, 374 6		3.90	3.90	2#12, 1#12, 3/4"C	0.70	Н	EF-1, EF-2	20/2P	60
61			H.	1.80		2.52		3.90	2#12, 1#12, 3/4"C	0.72	R	DINING GENERAL RECEPTACLE	20	62
63	20/3P	KEF-1	Н	1.80	3#12, 1#12, 3/4"C	2.32	2.70			0.90	Н			64
65	, -		Н	1.80	, , , , , , -, -			2.70	2#12, 1#12, 3/4"C	0.90	Н	AC-1	20/2P	66
67	20	FOR FUTURE FAN	E	1.80	2#12, 1#12, 3/4"C	12.20		2.70		10.40				68
69	20	FAIL SAFE DOOR	E	0.50	2#12, 1#12, 3/4"C		10.90		4#1, 1#6, 1 1/4"C	10.40		TO PANEL B	125/3P	70
71	20	SPARE						10.40		10.40				72
73			Н	3.20		3.20						SPARE	20	74
75	40/3P	PCU-1	Н	3.20	3#8, 1#10, 3/4"C		3.20					SPARE	20	76
77	]		Н	3.20				3.20				SPARE	20	78
79	20	SPARE				0.00						SPARE	20	80
81	20	SPARE					0.00					SPARE	20	82
83	20	SPARE						0.00				SPARE	20	84
						43.31	37.11	42.68						

PANEL:	▲ B	(NEW)										MOUNTING	SURFACE	
			•						$\triangle$				•	
208Y/120	VOLTS,		3	PHASE	4	WIRE						PANEL LOCATION:	ВОН	
ИLO	125A		BUS:	125A	MIN.	AIC RATING	G : 10 KAIC					FED FROM:	PANEL A	
OTE:		•	•			•							•	
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH	PE	R PHASE (KV	4)	MINIMUM BRANCH	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CVT NO
KT NO.	TRIP AIVIPS	DESCRIPTION OF LOAD	LUAD TYPE	LOAD (KVA)	CIRCUIT	А	В	С	CIRCUIT	LOAD (KVA)	LUAD TYPE	DESCRIPTION OF LOAD	TRIP AIVIPS	CKI NO.
1	40/2P	8-COFFEE BREWER	E	3.10	2#8, 1#10, 3/4"C	4.34			2#12, 1#12, 3/4"C	1.24	E	63-CHEESE MELTER	20/2P	2
3	40/27	8-COFFEE BREWER	Е	3.10	2#6, 1#10, 3/4 C		4.34		2#12, 1#12, 3/4 C	1.24	E	03-CHEESE WIELTER	20/21	4
5	20	10-COFFEE GRINDER	Е	1.15	2#12, 1#12, 3/4"C			1.15				SPARE	20	6
7	20	17- EXHAUST HOOD	E	0.50	2#12, 1#12, 3/4"C	0.50		(				SPARE	20	8
9	20	23-CONVENCTION OVEN	E	0.70	2#12, 1#12, 3/4"C		2.48		2#12, 1#12, 3/4"C	1.78		70-ICE MAKER	20	10
11	20	24- REFRIGERATED EQUIP.	E	0.98	2#12, 1#12, 3/4"C			2.58	2#12, 1#12, 3/4"C	1.60	Е	76-REACH IN FREEZER	20	12
13	20	35-FRYER (GAS FIRED)	Е	0.57	2#12, 1#12, 3/4"C	2.57			2#10, 1#10, 3/4"C	2.00	Е	83-UC DISHWASHER	30/2P	14
15	20	35-FRYER (GAS FIRED)	E	0.57	2#12, 1#12, 3/4"C		2.57		Z#10, 1#10, 5/4 C	2.00	E	83-UC DISHWASHER	30/24	16
17	20	40- RANGE	E	0.57	2#12, 1#12, 3/4"C			1.72	2#12, 1#12, 3/4"C	1.15	E	93-OIL TRANSFER UNIT	20	18
19	20	43-SANDWICH PREP REFRIG.	E	0.38	2#12, 1#12, 3/4"C	0.67			2#12, 1#12, 3/4"C	0.29	Е	94-SLICER	20	20
21	20	44-SALAD PREP REFRIGERATOR	E	0.34	2#12, 1#12, 3/4"C		1.83		2#12, 1#12, 3/4"C	1.49	E	100-BEV. DISPENSER	20	22
23	20	45-LETTUCE DISPENSER	E	0.57	2#12, 1#12, 3/4"C			2.06	2#12, 1#12, 3/4"C	1.49	E	100-BEV. DISPENSER	20	24
25	20	49-RICE COOKER	E	1.60	2#12, 1#12, 3/4"C	1.90			2#12, 1#12, 3/4"C	0.30	Е	105-UC FREEZER	20	26
27	20/2P	52-MICROWAVE	Е	1.64	2#12, 1#12, 3/4"C		3.34		2#12, 1#12, 3/4"C	1.70	Е	106-BLENDER	20	28
29	20/27	32-WICKOWAVE	E	1.64	2#12, 1#12, 3/4 C			3.34	2#12, 1#12, 3/4"C	1.70	Е	106-BLENDER	20	30
31	20/2P	WIC EVAPORATOR	E	0.60	2#12, 1#12, 3/4"C	0.70			2#12, 1#12, 3/4"C	0.10	E	CO SYSTEM / SOLENOID VALVE	20	32
33			E	0.60	· ·		1.10		2#12, 1#12, 3/4"C	0.50	R	SECURITY CAMERAS	20	34
35			E	1.80				2.52	2#12, 1#12, 3/4"C	0.72	R	KDS SCREEN	20	36
37	20/3P	WIC CONDERSER	E	1.80	3#12, 1#12, 3/4"C	2.88			2#12, 1#12, 3/4"C	1.08	R	KDS SCREEN	20	38
39			E	1.80			2.52		2#12, 1#12, 3/4"C	0.72	R	MEDIA PRINTER	20	40
41	20	WIC MISCELLANEOUS	E	0.50	2#12, 1#12, 3/4"C			1.00	2#12, 1#12, 3/4"C	0.50	R	SPEAKERS	20	42
•			•			13.56	18.18	14.37			-		•	

### GENERAL NOTES

- 1. ALL PLUMBING WORK SHALL BE DONE IN ACCORDANCE WITH THE 2020 FLORIDA PLUMBING AND FUEL GAS CODE THE PLUMBING CONTRACTOR SHALL COORDINATE WITH THE PLUMBING INSPECTOR FOR ALL PLUMBING INSPECTIONS
- 2. CAREFULLY COORDINATE LOCATION OF PIPING WITH ALL OTHER TRADES AND ALL EXISTING CONDITIONS
- 3. ALL PIPING SHOWN DIAGRAMMATICALLY AND ALL EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD
- 4. ALL PIPING SHALL BE RUN CONCEALED ABOVE CEILINGS, IN WALLS AND IN CHASES WHEREVER POSSIBLE
- 5. NO STRUCTURAL MEMBERS SHALL BE CUT
- 6. ALL PIPING SHALL BE SUPPORTED FROM BUILDING STRUCTURE.

DOMESTIC WATER LOW POINTS AND PITCH PIPING TO DRAIN

- 7. RUN WATER PIPE ON THE WARM SIDE OF BUILDING INSULATION. NO WATER PIPING SHALL BE RUN IN EXTERIOR WALLS
- . PROVIDE DRAW OFFS WITH BALL VALVE, HOSE END VACUUM BREAKER, CAP & CHAIN AT ALL
- 9. ALL SANITARY WASTE PIPING SHALL PITCH A MIN OF 1/8" PER FT FOR PIPING 4" & LARGER, 1/4" FOR PIPING UP TO 3" ALL VERTICAL SANITARY LINES & DRAIN LINES ASSOCIATED WITH ICE MAKERS, SODA DISPENSERS ETC TO BE INSULATED, INSULATION AS SPECIFIED
- 10. PROVIDE ACCESSIBLE CLEANOUTS AT THE BASE OF ALL STACKS, AS SHOWN, AND AS REQUIRED
- 11. ALL PIPING SHALL BE NEW, INSTALLED PARALLEL TO BUILDING LINES AND PITCHED TO LOW POINTS
- 12. PLUMBING CONTRACTOR SHALL PROVIDE FIRE STOPPING FOR ALL PENETRATIONS THROUGH ALL FLOORS, FIRE WALLS AND FIRE RATED SEPARATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR THESE AREAS AND PROVIDE LINK SEAL FIRE STOPPING KITS
- 13. PLUMBING CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN ALL SCAFFOLDING, HOISTING EQUIPMENT, DERRICKS, ETC., NECESSARY FOR INSTALLATION OF WORK
- 14. ALL PLUMBING PIPING AND DRAINS SHALL BE KEPT CLEAR OF BLOCKAGE WHILE CONSTRUCTION IS UNDERWAY. ALL PLUMBING PIPING SHALL BE DEBURRED BEFORE JOINTS ARE MADE.
- 15. ALL EXISTING CONDITIONS SHOWN ARE APPROXIMATE ONLY. ALL EXISTING CONDITIONS SHALL BE VERIFIED IN THE FIELD. ALL NEW SYSTEMS SHALL BE COORDINATED WITH ALL EXISTING CONDITIONS AND TRADES EXACT LOCATIONS OF ALL CONNECTIONS TO EXISTING SYSTEMS AND EQUIPMENT SHALL BE DETERMINED IN FIELD.
- PRIOR TO BID, THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH ALL TRADE DRAWINGS AND ALL ASPECTS OF THE WORK AND ALL CONDITIONS TO WHICH THE WORK WILL BE INSTALLED. ANY DISCREPANCIES BETWEEN THE WORK SHOWN ON THE DRAWINGS AND ANY CONDITIONS SHALL BE SUBMITTED TO THE ARCHITECT IN WRITING FAILURE OF THE CONTRACTOR TO DO SO SHALL NOT CONSTITUTE AN EXTRA COST TO THE CONTRACT.
- 17. DIELECTRIC INSULATING FITTINGS SHALL BE USED WHERE PIPES OF DISSIMILAR METALS ARE CONNECTED, AND AT THE WATER HEATER
- 18. THE INFORMATION SHOWN ON THE DRAWINGS IS GENERALLY DIAGRAMMATIC AND IS NOT INTENDED TO INDICATE EXACT ROUTES OF PIPING OR LOCATIONS OF VALVES, DRAINS, EQUIPMENT, FIXTURES OR FINAL CONNECTIONS IT SHALL BE THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO DETERMINE THE BEST ROUTES OF PIPING AND LOCATIONS OF PIPING CONNECTIONS IN THE FIELD AND IN CONJUNCTION WITH COORDINATION BETWEEN ALL OTHER TRADES AT THE SIGHT.
- 19. ALL NEW SYSTEMS SHALL BE TESTED, BALANCED AND ADJUSTED TO ENSURE PROPER OPERATION AND CODE COMPLIANT INSTALLATION PIPING AND EQUIPMENT SHALL BE TESTED IN ACCORDANCE WITH THE STATE PLUMBING CODE
- 20. THE CONTRACTOR SHALL BE CAREFUL TO ENSURE THAT NO CROSS CONNECTIONS ARE MADE BETWEEN THE POTABLE WATER SUPPLY AND ALL SOURCES OF CONTAMINATION OR CROSS CONNECTION.
- 21. ALL PIPING MATERIALS, FITTINGS VALVES UNIONS, HANGERS, EQUIPMENT, INSTALLATION AND ALL ASPECTS OF THE PLUMBING WORK SHALL BE AS APPROVED BY THE 2020 FLORIDA PLUMBING CODE
- 22. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF WALLS AND FLOORS TO ACCOMMODATE INSTALLATION OF NEW PIPING AND EQUIPMENT. CONTRACTOR SHALL PATCH ALL SURFACES TO MATCH THE EXISTING CONDITIONS AND TO THE SATISFACTION OF THE ARCHITECT
- 23. PROVIDE SERVICE STOPS FOR ALL FIXTURES
- 24. THE TERM "CONTRACTOR" SHALL MEAN PLUMBING CONTRACTOR
- 25. PLUMBER SHALL FURNISH AND INSTALL ALL TRAPS, ANGLE STOPS, WASTE ARMS, STRAINERS, TAILPIECES, FIXTURE SUPPLIES AND ALL PLUMBING CONNECTIONS TO ALL PLUMBING FIXTURES REQUIRING PLUMBING AND AS REQUIRED FOR A COMPLETE PLUMBING SYSTEM
- 26. ALL PLUMBING FIXTURE TYPES AND LOCATIONS ARE APPROXIMATE ONLY THE CONTRACTOR SHALL HAVE THE APPROVAL OF THE ARCHITECT FOR ALL PLUMBING FIXTURE TYPES, QUANTITIES AND LOCATIONS PRIOR TO PURCHASE
- THE PLUMBING CONTRACTOR SHALL CREATE A SCALE DRAWING FOR THE BUILDING SHOWING THE LOCATIONS OF ALL BACK FLOW PREVENTION DEVICES AND DETAILS OF THEIR INSTALLATION METHODS. THE PLUMBING CONTRACTOR SHALL ALSO OBTAIN MANUFACTURER CUT SHEETS OF ALL BACK FLOW PREVENTION DEVICES AND SHALL INDICATE THE SIZES AND MODEL NUMBERS BEING USED. THE PLUMBING CONTRACTOR SHALL SUBMIT THESE DRAWINGS AND CUT SHEETS TO THE LOCAL WATER AUTHORITY FOR APPROVAL. NO BACK FLOW PREVENTION DEVICE SHALL BE INSTALLED UNTIL WRITTEN APPROVAL OF ALL BACK FLOW PREVENTION DEVICES HAS BEEN OBTAINED BY THE PLUMBING CONTRACTOR FROM THE LOCAL
- 28. IN THE EVENT THAT THERE ARE DISCREPANCIES BETWEEN PIPE SIZES SHOWN ON THE PLANS VERSUS THAT SHOWN ON THE DETAILS OR RISER DIAGRAMS, THE LARGER PIPE SIZE SHALL BE FOLLOWED.
- 29. THE PLUMBING CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR THE INSTALLATION OF ALL KITCHEN SINKS, FAUCETS AND ALL EQUIPMENT REQUIRING PLUMBING CONNECTIONS

## **ENERGY CONSERVATION NOTES**

- 1. AS PER 2020 FBC-ENERGY CONSERVATION CODE (ADOPTS IECC 2018) SECTION C404.4, PIPING FROM A WATER HEATER TO THE TERMINATION OF HEATED WATER FIXTURE SUPPLY PIPE SHALL BE INSULATED IN ACCORDANCE WITH TABLE C403.2.10 OF MINIMUM PIPE INSULATION
- 2. AS PER 2020 FBC—ENERGY CONSERVATION CODE, C404.6.1, 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 NOT DEMAND FOR HOT WATER.
- 3. AS PER 2020 FBC—ENERGY CONSERVATION CODE, C404.6.3. PUMPS THAT CIRCULATE WATER BETWEEN A HEATER AND STORAGE TANK HAVE CONTROLS THAT LIMIT OPERATION FROM STARTUP TO <= 5 MINUTES AFTER END OF HEATING CYCLE.
- 4. AS PER 2020 FBC-ENERGY CONSERVATION CODE, C404.7, THE CONTROLS SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO NOT GREATER THAN 104°F (40°C).

### **SPECIFICATIONS**

- CAREFULLY COORDINATE LOCATION OF PIPING WITH ALL OTHER TRADES AND ALL CONDITIONS AT THE SITE
- 2. DIELECTRIC INSULATING FITTINGS SHALL BE USED WHERE PIPES OF DISSIMILAR METALS
- ARE CONNECTED, AND AT THE WATER HEATERS
- 3. PROVIDE ACCESSIBLE CLEANOUTS AT THE BASE OF ALL STACKS, AS SHOWN, AND AS REQUIRED
- 4. ALL PIPING SHALL BE NEW, INSTALLED PARALLEL TO BUILDING LINES AND PITCHED TO LOW POINTS
- 5. CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL CONDITIONS AND COORDINATE BEST ROUTE OF NEW PIPING AND LOCATIONS OF NEW EQUIPMENT IN COORDINATION WITH THE WORK OF ALL OTHER TRADES AND ALL CONDITIONS TO ENSURE THAT ALL WORK WILL FIT IN THE SPACE WITH NO INTERFERENCE'S
- 6. ALL NEW SYSTEMS SHALL BE TESTED, BALANCED AND ADJUSTED TO ENSURE PROPER OPERATION AND CODE COMPLIANT INSTALLATION PIPING AND EQUIPMENT SHALL BE TESTED IN ACCORDANCE WITH THE STATE PLUMBING CODE
- 7. BAND HANGERS SHALL BE USED TO SUPPORT PIPING, PIPE SHIELDS SHALL BE INSTALLED TO PROTECT AGAINST DAMAGE TO THE PIPE INSULATION 3/8" RODS SHALL BE USED
- 8. ALL COLD WATER, HOT WATER, HOT WATER RETURN PIPING SHALL BE INSULATED WITH 1" FIBERGLASS INSULATION
  WITH FACTORY APPLIED JACKET ALL FITTINGS AND VALVES SHALL BE PROVIDED WITH INSULATION AND WHITE PREMOLDED PVC INSULATION COVERS
  ALL WATER PIPING MAINS AND BRANCH RUNOUTS THAT ARE EXPOSED SHALL BE COVERED WITH WHITE PVC PIPE COVERS. THIS SHALL INCLUDE
  ALL FITTINGS AND VALVES ALL FITTINGS AND VALVES SHALL BE PROVIDED WITH INSULATION AND WHITE PREMOLDED PVC INSULATION COVERS
- 9. THE PLUMBING CONTRACTOR SHALL OBTAIN PERMITS FOR ALL HOT WORK PRIOR TO ANY HOT WORK AT THE SITE
- 10. ABOVE GROUND WATER PIPING SHALL BE TYPE "L" COPPER WITH SOLDER JOINTS USING 95/5 SOLDER. DRAIN AND VENT PIPING 2" AND SMALLER SHALL BE TYPE "L" COPPER WITH SOLDER JOINTS AND DRAINAGE PATTERN FITTINGS BELOW GROUND WATER PIPING SHALL BE TYPE "K" COPPER WITH SILVER SOLDER JOINTS, FLARED END JOINTS OR OTHER MASSACHUSETTS PLUMBING CODE APPROVED FITTINGS.
- 11. BALL VALVES SHALL BE FULL PORT WITH STAINLESS STEEL BALL AND STEM WITH SOLDER OR THREADED FITTINGS AS APPLICABLE
- 12. DRAIN AND VENT PIPING ABOVE GROUND LARGER THAN 2" SHALL BE SERVICE WEIGHT CAST IRON WITH STAINLESS STEEL HUBLESS FITTINGS AND COUPLINGS WITH NEOPRENE GASKET. DRAIN PIPING BELOW GROUND SHALL BE AS ABOVE EXCEPT FOR MECHANICAL JOINT WITH PUSH ON FITTINGS AND RESILIENT GASKET
- 13. THE CONTRACTOR SHALL BE CAREFUL TO ENSURE THAT NO CROSS CONNECTIONS ARE MADE BETWEEN THE POTABLE WATER SUPPLY AND ALL SOURCES OF CONTAMINATION OR CROSS CONNECTION.
- 14. ALL PIPING MATERIALS, FITTINGS VALVES UNIONS, HANGERS, EQUIPMENT, INSTALLATION AND ALL ASPECTS OF THE PLUMBING WORK SHALL BE AS APPROVED BY THE MASSACHUSETTS PLUMBING AND FUEL GAS CODES
- 15. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF WALLS AND FLOORS TO ACCOMMODATE INSTALLATION OF NEW PIPING AND EQUIPMENT. CONTRACTOR SHALL PATCH ALL SURFACES TO MATCH THE EXISTING CONDITIONS AND TO THE SATISFACTION OF THE ARCHITECT
- 16. ALL VALVES INDICATED SHALL BE BY CONBRACO
- 17. INSTALL SHOCK ABSORBERS BY PRECISION PLUMBING PRODUCTS AT ENDS OF HOT AND COLD WATER PIPING RUNS BELOW THE LAST FIXTURE
- 18. ALL CLEANOUTS SHALL BE BY ZURN WITH BRONZE PLUGS. ALL CLEANOUTS SHALL BE TURNED UP INTO THE TENANT SPACE.
- 19. ALL EXPOSED PIPING, VALVES AND FITTINGS AT THE FIXTURES SHALL BE CHROME FINISH
- 20. ALL VALVES SHALL BE PROVIDED WITH TAGS, ALL PIPING SHALL BE LABELED WITH ADHESIVE DECALS PER ASME AND STATE PLUMBING CODE STANDARD
- 21. PROVIDE SERVICE STOPS FOR ALL FIXTURES
- 22. PROVIDE ACCESS PANELS BY MILACRON. ACCESS PANELS SHALL BE 18" X 18" AND SHALL BE WITH A PRIMED FINISH FOR PAINTING BY OTHERS. ACCESS PANELS SHALL BE GIVEN TO THE G C FOR INSTALLATION ALL ACCESS PANELS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO PURCHASE
- 23. SUBMIT SHOP DRAWINGS FOR ALL FIXTURES, TRIM, FAUCETS, VALVES, PIPING, INSULATION, WATER HEATERS FLOOR DRAINS, CLEANOUTS, PUMPS, ETC. ALL SHOP DRAWINGS SHALL HAVE THE APPROVAL OF THE ENGINEER PRIOR TO PURCHASE AND INSTALLATION OF ANY PLUMBING SYSTEMS
- 24. PROVIDE "P" TRAPS FOR ALL PLUMBING FIXTURE DRAINS
- 25. HOSE BIBBS SHALL BE 1/2" CHROME FINISH WITH LOOSE KEY HANDLE AND 3/4" VACUUM BREAKER HOSE END CONNECTION
- 26. ALL SHOCK ABSORBERS AND TRAP PRIMERS SHALL BE BY PRECISION PLUMBING PRODUCTS
- 27. THE DRAWINGS ARE DIAGRAMMATICAL ONLY THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT ROUTE OF ALL PIPING, IN THE FIELD AND IN CONJUNCTION WITH COORDINATION OF ALL EXISTING CONDITIONS, NEW CONSTRUCTION, AND COORDINATION WITH ALL OTHER TRADES TO ENSURE THE ALL OF THE PLUMBING SYSTEMS WILL FIT INTO THE SPACE WITH NO INTERFERENCES BETWEEN ANY EXISTING OR NEW CONDITIONS AND ANY OTHER TRADES
- 28. THE PLUMBING CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR THE INSTALLATION OF ALL KITCHEN SINKS, FAUCETS AND ALL EQUIPMENT REQUIRING PLUMBING CONNECTIONS
- 29. ALL WATER PIPING SHALL BE TESTED FOR COLIFORM BY A LICENSED TESTING LAB. A CERTIFIED REPORT FROM THE LAB SHALL BE SUBMITTED TO THE STATE PLUMBING INSPECTOR FOR REVIEW AND APPROVAL THIS SHALL BE DONE AND APPROVAL SHALL BE OBTAINED FROM THE INSPECTOR PRIOR TO FINAL ACCEPTANCE OF THE PLUMBING WORK
- 30. THE PLUMBING CONTRACTOR SHALL SUBMIT MANUFACTURERS SHOP DRAWINGS FOR ALL PROPOSED PLUMBING FIXTURES, MATERIALS, VALVES AND EQUIPMENT SHALL BE SUBMITTED TO THE PLUMBING ENGINEER FOR APPROVAL WRITTEN APPROVAL OF ALL PROPOSED PLUMBING FIXTURES, MATERIALS, VALVES AND EQUIPMENT SHALL BE RECEIVED FROM THE PLUMBING ENGINEER PRIOR TO THE COMMENCEMENT OF ANY PLUMBING WORK
- 31. ALL SANITARY PIPING INSTALLED BELOW THE FLOOR THAT IS ASSOCIATED WITH THE DRAINS FROM ALL ICE MAKERS, ICE MACHINES, ICE BINS AND SODA DISPENSERS SHALL BE PROVIDED WITH INSULATION THAT SHALL INCLUDE THE P-TRAP, FLOOR DRAIN BODY AND TAILPIECE AND 10 LINEAR FEET OF DRAIN PIPE INCLUDING ALL FITTINGS INSULATION SHALL BE 1" THICK FIBERGLASS WITH MANUFACTURERS APPLIED VAPOR BARRIER JACKET
- 32. ALL PIPE PENETRATIONS THROUGH THE FLOOR SLAB SHALL BE MADE WITH METAL PIPE SLEEVES THAT SHALL EXTEND A MINIMUM OF 2" ABOVE THE FINISH FLOOR THE SPACE BETWEEN THE PENETRATION AND THE
- SLEEVE SHALL BE PROVIDED WITH UL-APPROVED FIRE STOPPING. FOR MEMBRANE FLOORS, FLASHING SHALL BE PROVIDED AND SHALL EXTEND A MINIMUM OF 6" ABOVE THE FLOOR LEVEL COORDINATE WITH ARCHITECT FOR FLOOR TYPES ALL FLOOR DRAINS. FLOOR SINKS AND PIPE SLEEVES SHALL BE GROUTED SOLID.
- 33. ALL BUILDING SHUT-DOWNS ARE TO BE COORDINATED WITH THE OWNER/LANDLORI
- 34. WATER HAMMER ARRESTORS / SHOCK ABSORBERS TO PROVIDED AT ALL EQUIPMENT WITH QUICK ACTING VALVES AND AT THE TOILET ROOMS WITH FLUSH VALVES

## KITCHEN NOTES

- 1. ALL PIPING CONNECTIONS SHOWN ARE APPROXIMATE ONLY. THE PLUMBING CONTRACTOR SHALL COORDINATE WITH THE KITCHEN CONTRACTOR FOR THE EXACT LOCATIONS AND REQUIREMENTS OF ALL PIPING DROPS AND FINAL CONNECTIONS, AS WELL AS ALL VALVES THIS SHALL BE DONE PRIOR TO ANY INSTALLATION OF ANY PLUMBING SYSTEMS ASSOCIATED WITH THE KITCHEN
- 2. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FINAL PLUMBING CONNECTIONS TO ALL KITCHEN EQUIPMENT REQUIRING PLUMBING. ALL FINAL CONNECTIONS SHALL BE COORDINATED WITH THE KITCHEN CONTRACTOR PRIOR TO INSTALLATION ALL FINAL PLUMBING CONNECTIONS TO ALL KITCHEN EQUIPMENT SHALL BE IN ACCORDANCE WITH THAT EQUIPMENTS MANUFACTURERS RECOMMENDATIONS
- 3. THE TERM "KITCHEN EQUIPMENT" SHALL INCLUDE ALL FIXTURES, FAUCETS, SINKS, COOKING EQUIPMENT, ICE MAKERS, COFFEE MAKERS AND ANY EQUIPMENT OR FIXTURE OR FAUCET IN THE KITCHEN THAT REQUIRES PLUMBING CONNECTIONS.
- 4. ALL FINAL WATER CONNECTIONS SHALL BE PROVIDED WITH SHUT OFF VALVES OR SERVICE STOPS
- 5. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL KITCHEN EQUIPMENT DRAWINGS AND CUTSHEET INFORMATION AND TO PERFORM ALL COORDINATION WITH THE KITCHEN CONTRACTOR AND KITCHEN EQUIPMENT VENDORS SO AS TO FAMILIARIZE HIMSELF WITH EVERY PIECE OF KITCHEN EQUIPMENT REQUIRING PLUMBING CONNECTIONS. ALL FINAL CONNECTIONS POINTS, VALVE REQUIREMENTS AND DIMENSIONS SHALL DETERMINED AS A RESULT OF THIS COORDINATION. THE PLUMBING DRAWINGS SHALL NOT BE USED FOR DIMENSIONING OF ANY DRAINS, VENTS OR WATER PIPING.
- THE PLUMBING CONTRACTOR SHALL RUN ALL INDIRECT WASTE PIPING FROM KITCHEN EQUIPMENT TO INDIRECT WASTE AT FLOOR DRAINS AND FLOOR SINKS THE PLUMBING CONTRACTOR SHALL COORDINATE WITH THE KITCHEN CONTRACTOR FOR ALL REQUIRED INDIRECT WASTE DRAINS INDIRECT WASTE PIPING FROM KITCHEN EQUIPMENT SHALL BE COPPER AS APPROVED BY THE 2020 FLORIDA PLUMBING CODE
- 7. ALL FLOOR DRAIN AND FLOOR SINK LOCATIONS SHOWN ARE APPROXIMATE ONLY AND SHALL NOT BE USED BY THE PLUMBING CONTRACTOR FOR THE ACTUAL FLOOR DRAIN AND FLOOR SINK INSTALLATIONS. THE PLUMBING CONTRACTOR SHALL COORDINATE ALL FLOOR DRAIN AND FLOOR SINK LOCATIONS WITH THE KITCHEN EQUIPMENT CONTRACTOR FOR THE EXACT LOCATIONS AND TYPES OF ALL FLOOR DRAINS AND FLOOR SINKS.
- ALL KITCHEN EQUIPMENT, FIXTURES AND FAUCETS SHALL BE FURNISHED BY OTHERS. ALL EQUIPMENT AND FIXTURES SHALL BE INSTALLED BY OTHERS. ALL FAUCETS FOR FIXTURES AND EQUIPMENT SHALL BE INSTALLED BY THE PLUMBING CONTRACTOR ALL FAUCET AND FIXTURE TRIM, DRAINS, WASTES, SERVICE STOPS, P—TRAPS, WASTE ARMS, WATER SUPPLIES, SINK STRAINERS, TAILPIECES AND ALL PLUMBING TRIM ASSOCIATED WITH KITCHEN FIXTURES, FAUCETS AND EQUIPMENT INCLUDING ALL FINAL CONNECTIONS SHALL BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR
- 9. THE PLUMBING CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR THE INSTALLATION OF ALL KITCHEN SINKS, FAUCETS AND ALL EQUIPMENT REQUIRING PLUMBING CONNECTIONS
- 10. THE PLUMBING CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR COORDINATING WITH THE KITCHEN EQUIPMENT REQUIRING WATER CONNECTIONS TO INSURE THAT ALL REQUIRED BACKFLOW PROTECTION DEVICES ARE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR IN ACCORDANCE WITH THE 2020 FLORIDA PLUMBING CODE.

## PLUMBING FIXTURE NOTES:

1. PLUMBING FIXTURES ARE TO BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR FROM SPECIFICATIONS ON THE ARCHITECTURAL SET OF DRAWINGS PLUMBING CONTRACTOR IS TO COORDINATE WITH MANUFACTURER ON FIXTURE CODE COMPLIANCE AND FLORIDA APPROVAL. COORDINATE ALL FIXTURE INSTALLATION DIMENSIONS WITH THE DETAILS ON THE ARCHITECTURAL DRAWINGS AND PER FAC REQUIREMENTS.

2. ALL PLUMBING FIXTURES, FAUCETS, AND FLUSH VALVES SHALL BE FIELD ADJUSTED TO ENSURE PROPER CODE COMPLIANT OPERATION FOR TEMPERATURE AND FLOW.

3. ALL HANDWASHING FIXTURES SHALL BE FIELD ADJUSTED TO LIMIT THE HOT WATER TEMPERATURE TO 110°F AS REQUIRED

4. PROVIDE SERVICE STOPS FOR ALL NEW FIXTURES. ALL EXPOSED WATER & WASTE PIPING ASSOCIATED WITH FIXTURES SHALL BE CHROME FINISH. PROVIDE ALL SUPPLIES, SERVICE STOPS, TAILPIECES, AND TRAPS FOR FIXTURES AS REQUIRED PROVIDE ALL FINAL CONNECTIONS

5. PROVIDE CONCEALED WALL CARRIERS FOR ALL WALL MOUNTED FIXTURES CARRIERS SHALL BE BY ZURN OR APPROVED EQUAL

6. PROVIDE PRE-MOLDED INSULATION KITS ON ALL WASTE & WATER PIPING, VALVES & FITTINGS DIRECTLY BELOW ACCESSIBLE FIXTURES INSULATION KIT TO BE BY TRUBRO.

## PLUMBING SYMBOLS LIST

GREASE SANITARY SEWER
SANITARY SEWET
VENT PIPING
COLD WATER PIPING
HOT WATER PIPING
HOT WATER RETURN PIPING
EXISTING HOT WATER PIPING
EXISTING COLD WATER PIPING
GAS PIPING
P-TRAP
PIPE UP
PIPE DROP
CLEANOUT
PLUGGED OUTLET/CLEANOUT
POINT OF CONNECTION
RECIRCULATION PUMP
BALANCING VALVE

### PLUMBING ABBREVIATIONS

BACK FLOW PREVENTER

PLUMBING ABBREVIATIONS
CLEANOUT
COLD WATER
HOT WATER
HOT WATER RETURN
SANITARY
VENT
LAVATORY
WATER CLOSET
TYPICAL
DOWN
FLOOR DRAIN
BACK FLOW PREVENTER
WATER HEATER
NOT IN CONTRACT
EXPANSION TANK
1 HOT WATER CIRCULATION PUMP
CO PANEL-GAS DETECTION SYSTEM
CO SENSOR-GAS DETECTION SYSTEM

## PLUMBING DRAWING LIST

P-001 PLUMBING LEGEND, NOTES & SPECIFICATIONS

P-002 PLUMBING DETAILS

P-003 PLUMBING DETAILS

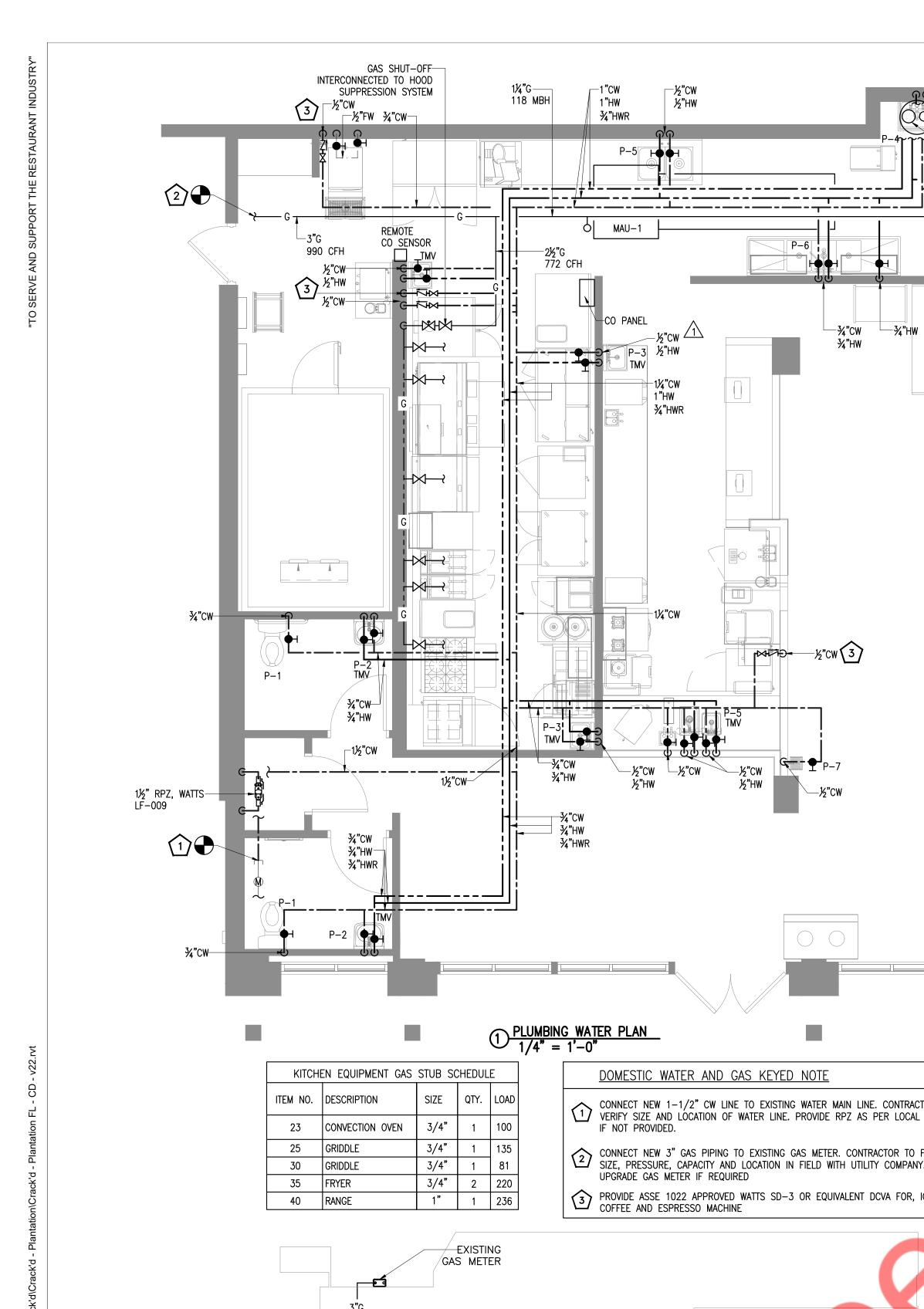
P-004 PLUMBING SCHEDULES

P-101 PLUMBING FLOOR PLANS
P-102 PLUMBING RISERS DIAGRAMS

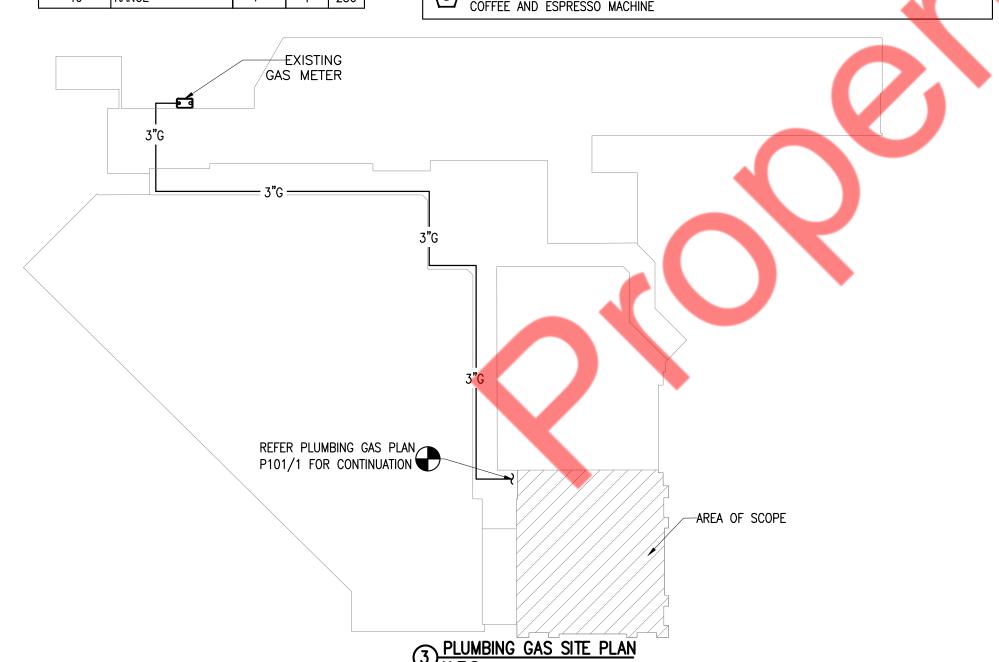
## DPH NOTES:

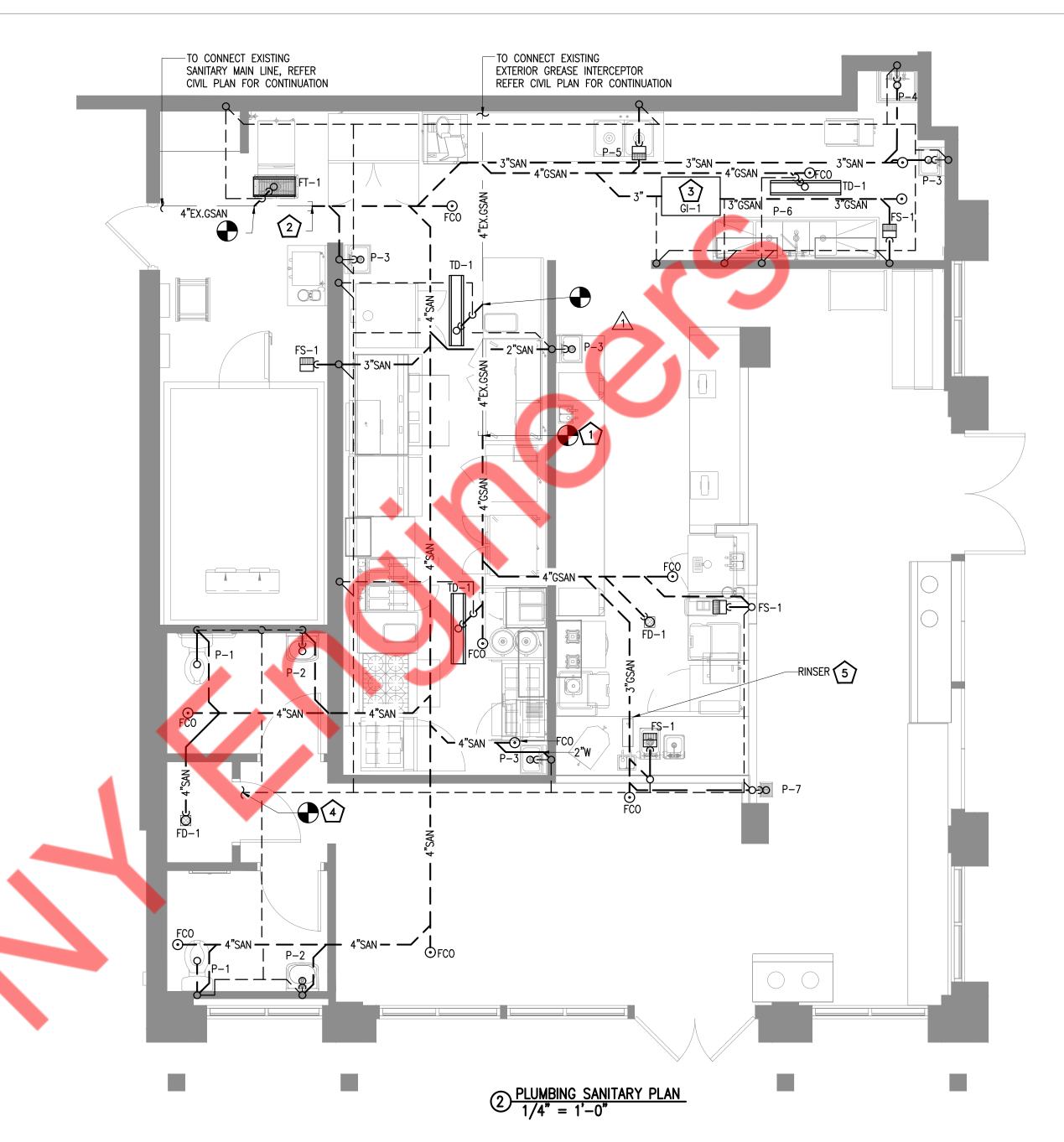
1. PRIOR TO THE COMMENCEMENT OF ANY PLUMBING WORK IN THE BUILDING, THE PLUMBING CONTRACTOR SHALL PRESENT THE PLUMBING KITCHEN PLANS TO THE LOCAL HEALTH INSPECTOR AND PLUMBING INSPECTOR WHO SHALL REVIEW AND APPROVE THE KITCHEN PLUMBING PLANS FOR ALL PLUMBING CONNECTIONS AND PIPING SYSTEMS. WRITTEN APPROVAL OF THE KITCHEN PLUMBING PLANS SHALL BE OBTAINED BY THE PLUMBING CONTRACTOR FROM THE LOCAL HEALTH INSPECTOR AND PLUMBING INSPECTOR PRIOR TO THE COMMENCEMENT OF ANY PLUMBING WORK IN THE BUILDING.

2. PRIOR TO THE COMMENCEMENT OF ANY PLUMBING WORK IN THE BUILDING, THE PLUMBING CONTRACTOR SHALL COORDINATE THE PLUMBING WORK WITH THE EXISTING SANITARY AND DOMESTIC WATER PIPING IN THE BUILDING.



- CONNECT NEW 1-1/2" CW LINE TO EXISTING WATER MAIN LINE. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION OF WATER LINE. PROVIDE RPZ AS PER LOCAL BUILDING CODE
- CONNECT NEW 3" GAS PIPING TO EXISTING GAS METER. CONTRACTOR TO FIELD VERIFY SIZE, PRESSURE, CAPACITY AND LOCATION IN FIELD WITH UTILITY COMPANY.
- PROVIDE ASSE 1022 APPROVED WATTS SD-3 OR EQUIVALENT DCVA FOR, ICE MACHINE, COFFEE AND ESPRESSO MACHINE

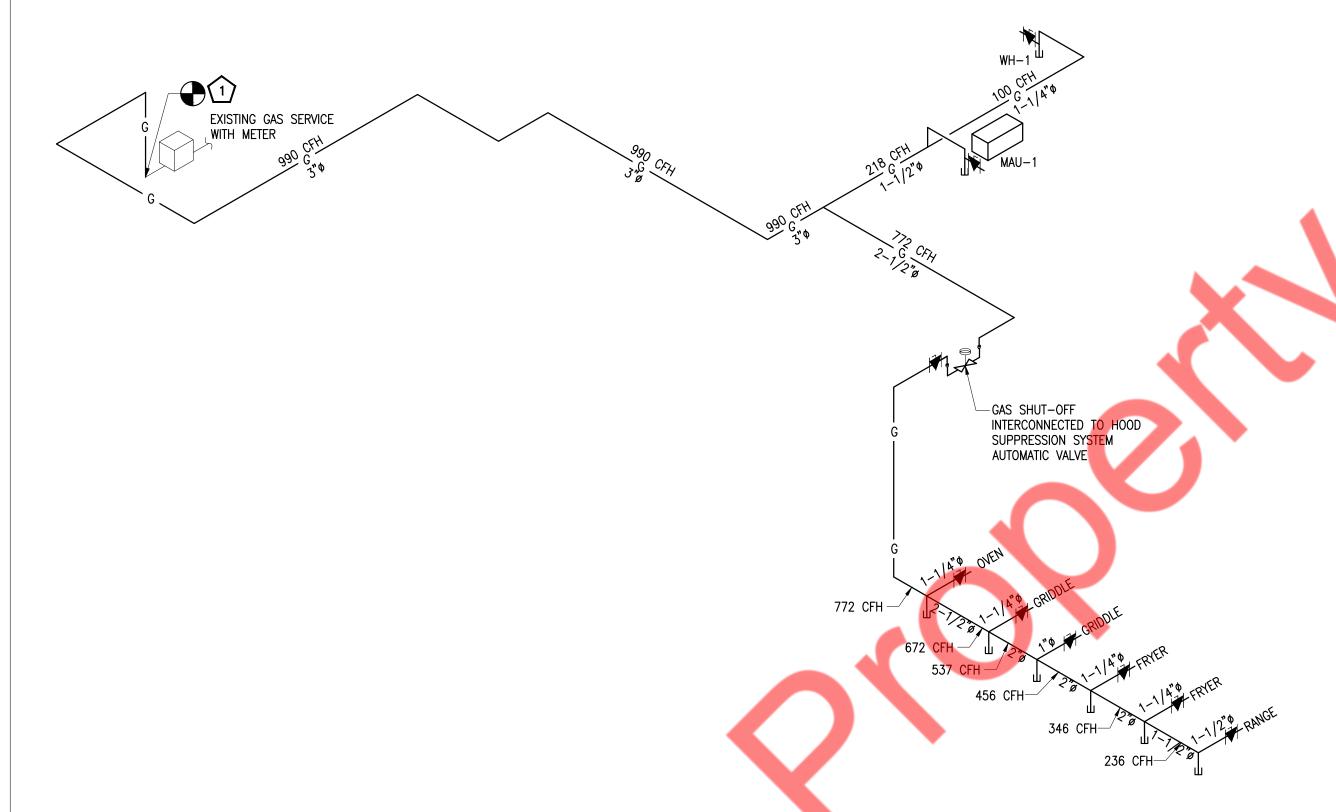


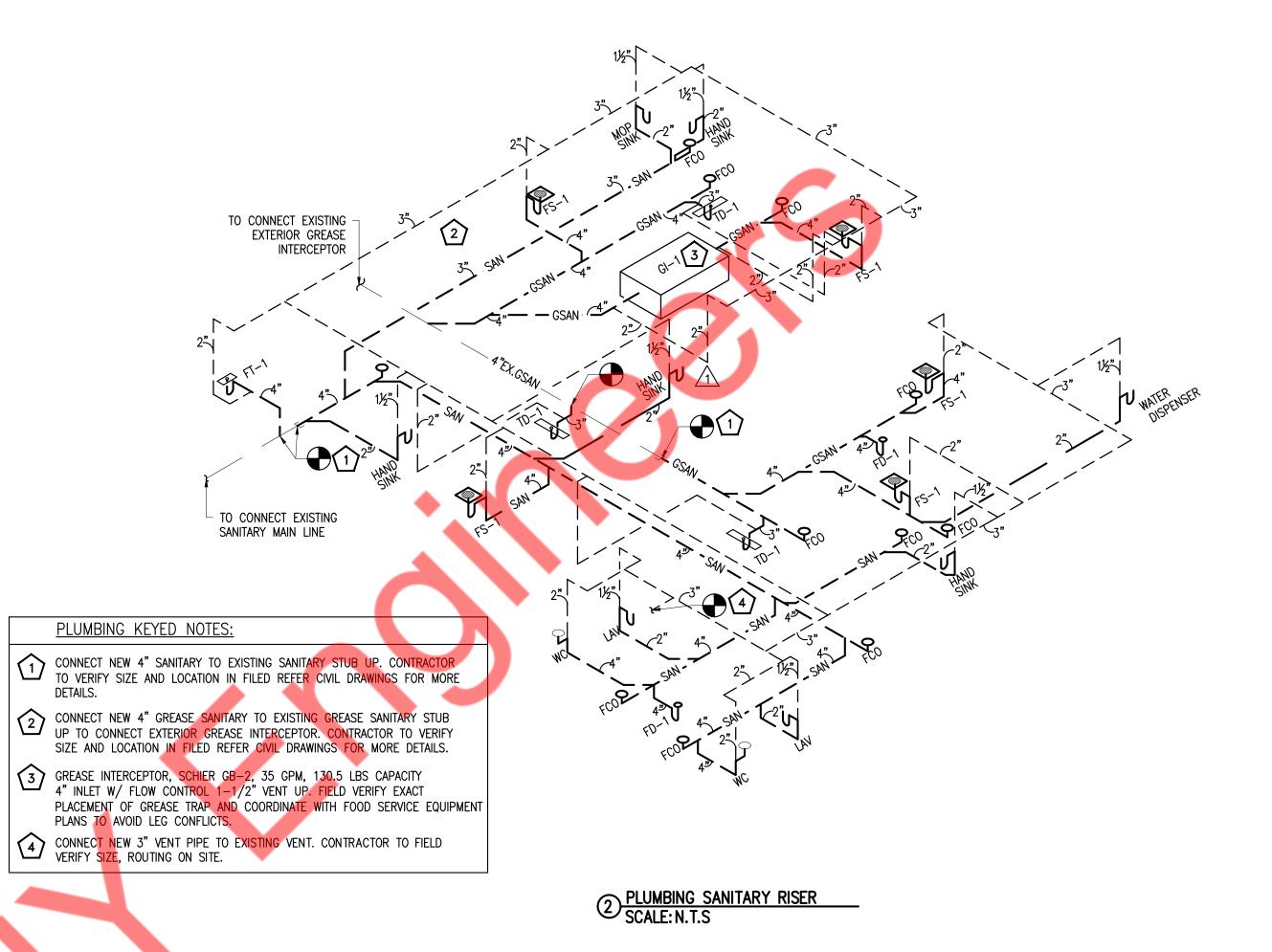


# SANITARY KEYED NOTES:

- CONNECT NEW 4" SANITARY TO EXISTING SANITARY STUB UP. CONTRACTOR TO VERIFY SIZE AND LOCATION IN FILED REFER CIVIL DRAWINGS FOR MORE
- CONNECT NEW 4" GREASE SANITARY TO EXISTING GREASE SANITARY STUB UP TO CONNECT EXTERIOR GREASE INTERCEPTOR. CONTRACTOR TO VERIFY SIZE AND LOCATION IN FILED REFER CIVIL DRAWINGS FOR MORE DETAILS.
- GREASE INTERCEPTOR, SCHIER GB-2, 35 GPM, 130.5 LBS CAPACITY 4" INLET W/ FLOW CONTROL 1-1/2" VENT UP. FIELD VERIFY EXACT PLACEMENT OF GREASE TRAP AND COORDINATE WITH FOOD SERVICE EQUIPMENT PLANS TO AVOID LEG CONFLICTS.
- CONNECT NEW 3" VENT PIPE TO EXISTING VENT. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING ON SITE.
- 5 ROUTE INDIRECT WASTE FROM RINSER TO FLOOR SINK WITH APPROVED AIR GAP.

# 1) PLUMBING WATER SUPPLY RISER SCALE: N.T.S





	GAS SCHEDULE						
ITE	M NO.	DESCRIPTION	QTY.	LOAD			
	23	CONVECTION OVEN	1	100			
	25	GRIDDLE	1	135			
	30	GRIDDLE	1	81			
	35	FRYER	2	220			
	40	RANGE	1	236			
		MAU	1	118			
		WH-1	1	100			
			TOTAL	990			

GAS KEYED NOTE

CONNECT NEW 3" GAS PIPING TO EXISTING GAS METER. CONTRACTOR TO FIELD VERIFY SIZE, PRESSURE, CAPACITY AND LOCATION IN FIELD WITH UTILITY COMPANY.UPGRADE GAS METER IF REQUIRED

NATURAL GAS PIPING SYSTEM
PROVIDE A COMPLETE GAS PIPING SYSTEM TO SERVE GAS EQUIPMENT
FURNISHED BY OTHERS, AS NOTED ON THE DRAWINGS. PROVIDE
EITHER THREADED STEEL OR MALLEABLE IRON PIPE WITH MALLEABLE
FITTINGS OR WELDED STEEL. PROVIDE ALL UNIONS, SHUT—OFF VALVES
AND DIRT LEGS REQUIRED BY NFPA—54 AND GOVERNING LOCAL
CODES AND AT EACH GAS APPLIANCE CONNECTION. PROVIDE ALL
TESTS, METERS, INSPECTIONS, HANGERS AND EQUIPMENT CONNECTIONS
REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.

NOTES:

1. GAS PIPING TO BE SCHEDULE 40 STEEL PIPE W/125 CAST IRON SCREWD FITTINGS

2. GAS SYSTEM TO BE INSTALLED BY QUALIFIED LICENSED CONTRACTOR.

 3. VERIFY ALL EQUIPMENT BTU'S PRIOR TO INSTALLATION. ADJUST PIPE SIZE ACCORDING TO 2020—FLORIDA FUEL GAS CODE, TABLE 402.4(2)

 4. ALL GAS LINES SHALL BE MARKED AT 5 FOOT INTERVALS, FROM

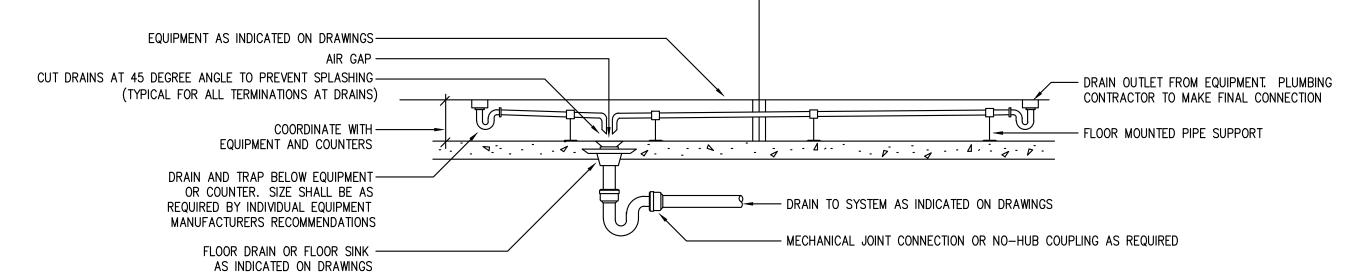
BEGINNING TO TERMINATION

5. MASTER SHUT-OFF VALVE SHALL BE NO HIGHER THAN 6' FROM

FLOOR AND IN AREA THAT PROVIDES AN UNOBSTRUCTED 3 FEET
ACCESS IN FRONT

GAS PIPE SIZING PER
TABLE 402.4(2) 2020 FLORIDA FUEL GAS CODE

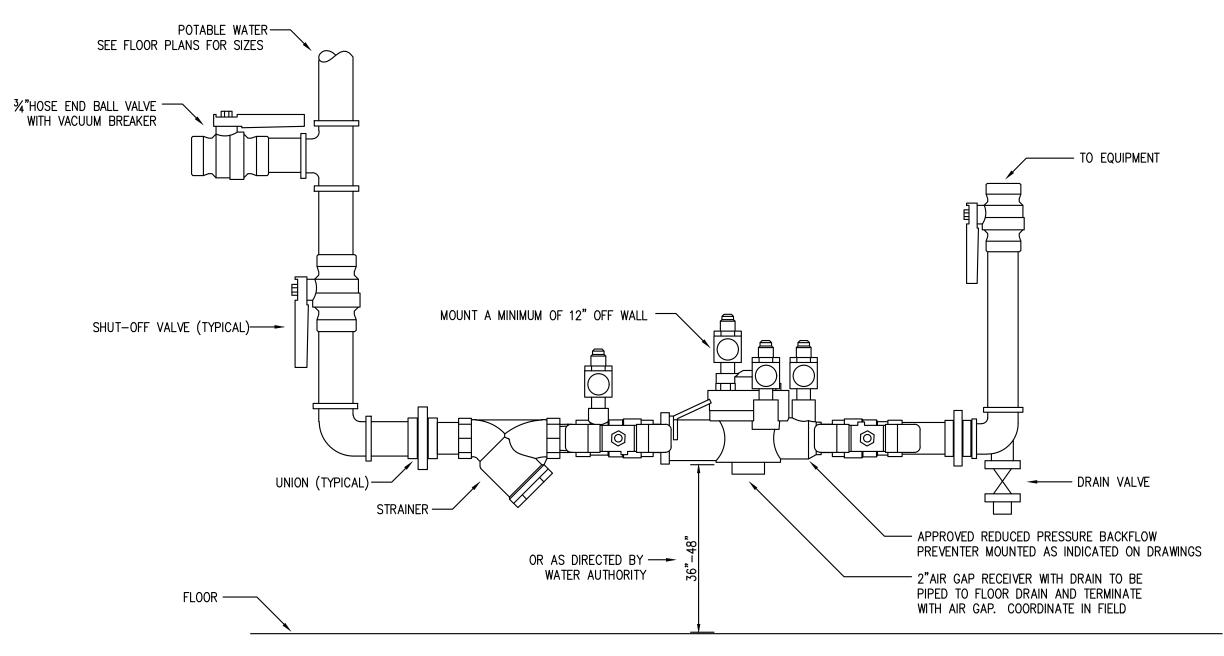
EQUIVALENT LENGTH OF PIPE = 350 FEET



NOTES:

1. EQUIPMENT DRAIN OUTLETS SHOWN ARE FOR GENERAL INFORMATION ONLY CONTRACTOR SHALL COORDINATE WITH ALL EQUIPMENT DRAIN REQUIREMENTS AND



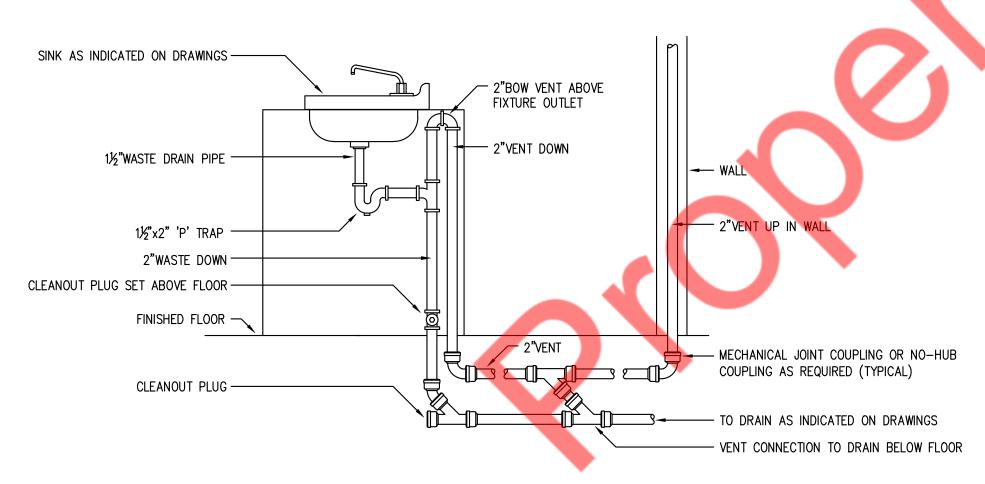


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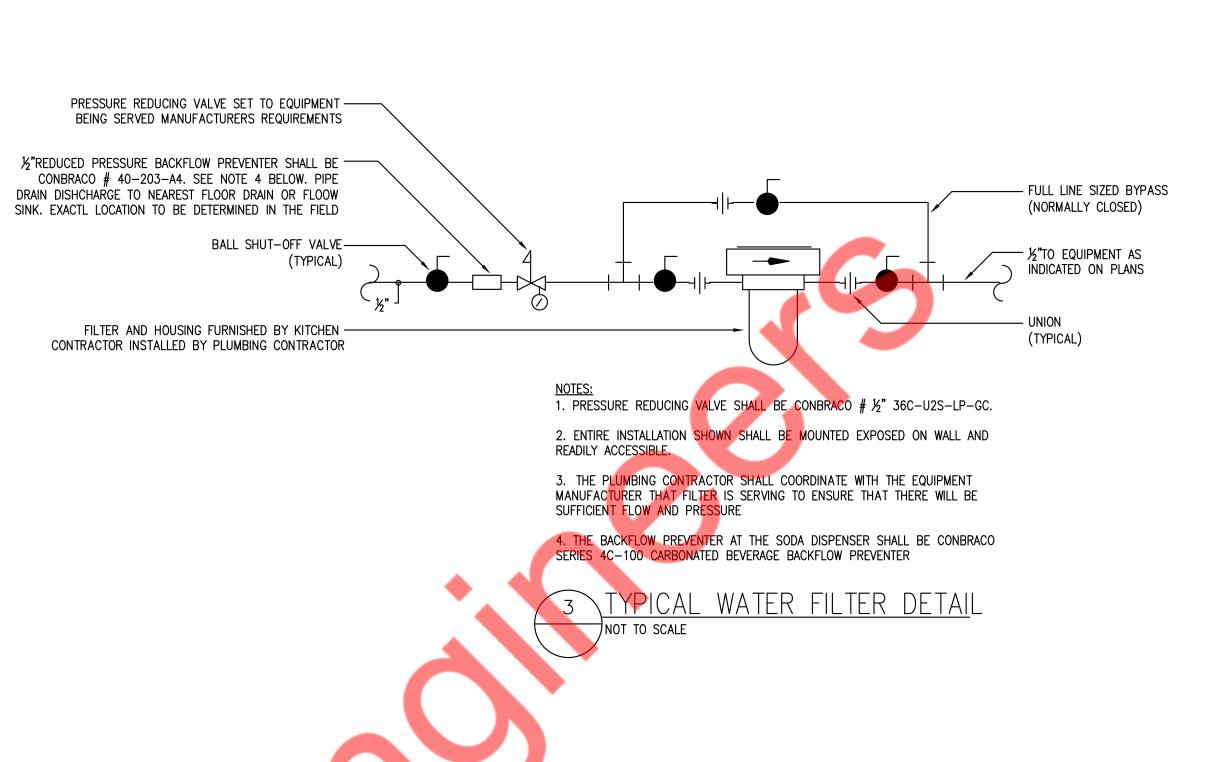
1. AIR GAP AS NECESSARY FOR BACKFLOW PREVENTER TYPE

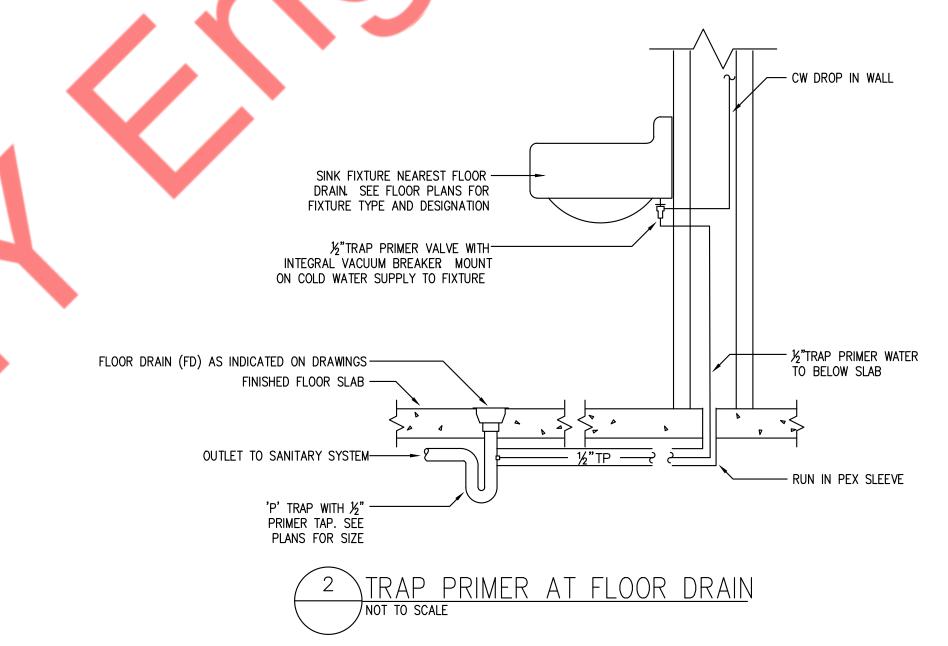
2. IF EQUIPMENT IS SUPPLIED/PROVIDED WITH INTEGRAL BACKFLOW PREVENTION FROM THE MANUFACTURER, THE INSTALLATION REQUIREMENT OF AN EXTERNAL BACKFLOW DEVICE MUST BE REVIEWED WITH THE WATER AUTHORITY

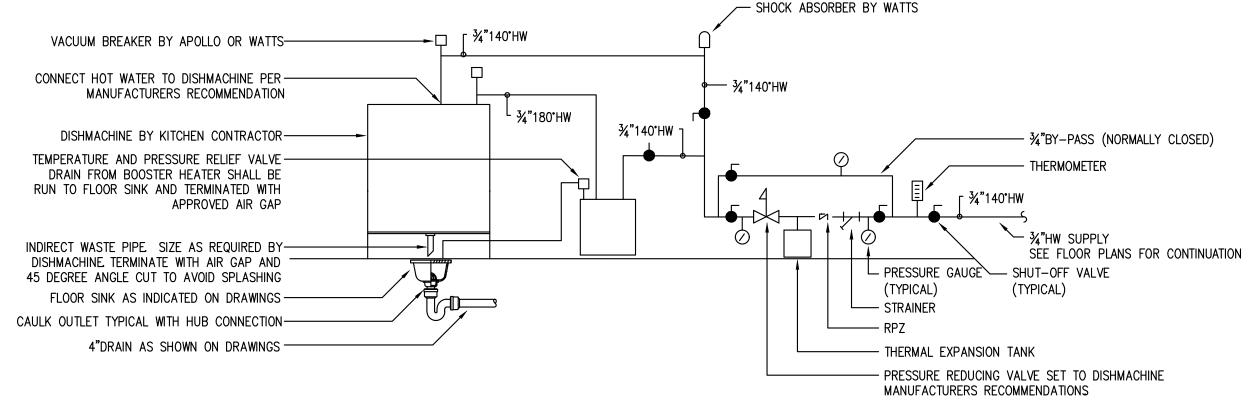
5 BACKFLOW PREVENTION DEVICE INSTALLATION NOT TO SCALE



4 ISLAND SINK VENT (BOW VENT) DETAIL
NOT TO SCALE







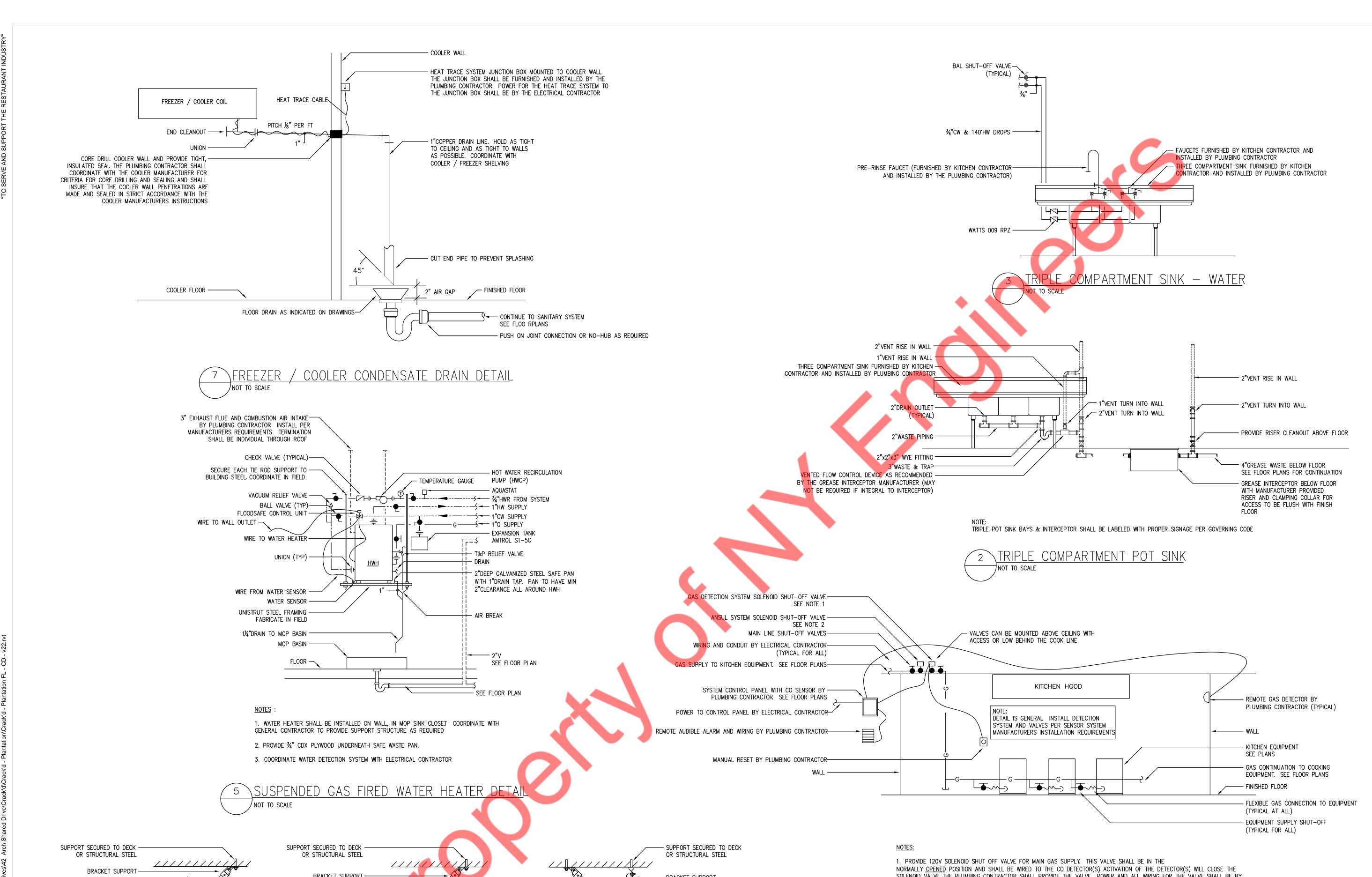
NOTES:

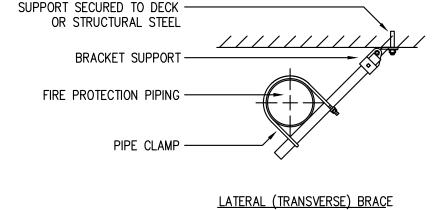
1. CONTRACTOR SHALL COORDINATE WITH DISHMACHINE MANUFACTURERS RECOMMENDATIONS FOR ALL PIPING AND VALVE INSTALLATION REQUIREMENTS

2. PRESSURE REDUCING VALVE SHALL BE 1" WILKINS 500YSBR

3. PIPING AND VALVES ASSOCIATED WITH THE HOT WATER BOOSTER MAY BE OMITTED IF A HOT WATER BOOSTER IS NOT USED. PLUMBING CONTRACTOR SHALL COORDINATE WITH THE KITCHEN CONTRACTOR FOR THE REQUIREMENT OF THE HOT WATER BOOSTER

1 DISHMACHINE PIPING SCHEMATIC
NOT TO SCALE





BRACKET SUPPORT -PIPE CLAMP FIRE PROTECTION PIPI

BRACKET SUPPORT - PIPE CLAMP - FIRE PROTECTION PIPING LONGITUDINAL/LATERAL BRACE

NOTES:

1. ALL APPLICABLE PIPING SYSTEMS SHALL BE SESMICALLY BRACED AND INSTALLED

1. ALL APPLICABLE PIPING SYSTEMS SHALL BE SESMICALLY BRACED AND INSTALLED FOR A STATE OF THE PROPERTY ASSESSMENT AS PER APPLICABLE SECTIONS OF THE STATE BUILDING CODE, LATEST ACCEPTED EDITION 2. SEISMIC BRACING SHALL BE BY TOLCO

TYPICAL SEISMIC BRACING DETAIL NOT TO SCALE

SOLENOID VALVE THE PLUMBING CONTRACTOR SHALL PROVIDE THE VALVE POWER AND ALL WIRING FOR THE VALVE SHALL BE BY THE ELECTRICAL CONTRACTOR THE PLUMBING CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR CONTROLS AND CONNECTION REQUIREMENTS. THE VALVE SHALL BE MANUAL RESET TYPE

2. PROVIDE 120V SOLENOID SHUT OFF VALVE FOR MAIN GAS SUPPLY THIS VALVE SHALL BE IN THE NORMALLY OPENED POSITION AND SHALL BE WIRED TO THE KITCHEN EXHAUST HOOD FIRE SUPPRESSION CONTROL SYSTEM. IN THE EVENT OF A FIRE UNDER THE EXHAUST HOOD THE EXHAUST HOOD FIRE SUPPRESSION CONTROL PANEL SHALL CLOSE THE SOLENOID VALVE THE PLUMBING CONTRACTOR SHALL PROVIDE THE VALVE POWER AND ALL WIRING FOR THE VALVE SHALL BE BY THE ELECTRICAL CONTRACTOR THE PLUMBING CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR CONTROLS AND CONNECTION REQUIREMENTS THE VALVE SHALL BE MANUAL RESET TYPE

3. THE DETECTOR SYSTEM INCLUDING ALL DETECTION DEVICES, ALARM DEVICES, CONTROL PANEL, MANUAL RESET DEVICE AND SOLENOID VALVES SHALL COMES AS A PACKAGE AND SHALL BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR ALL INTERCONNECTING WIRING AND CONDUIT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR



			PLUMBING FIXTURE SCHEDULE				
FIXTURE	QTY.	EQUIPMENT CATEGORY	DIRECT DRAIN SIZE(IN)	INDIRECT DRAIN SIZE(IN)	VENT	CW	HW
P-1	2	WATER CLOSET	4"		2"	3/4"	_
P-2	2	1 LAVATORY	2"		1-1/2"	1/2"	1/2"
P-3	4	HAND SINK	2"		1-1/2"	1/2"	1/2"
P-4	1	MOP SINK	2"		1-1/2"	1/2"	1/2"
P-5	1	PREP SINK		2"	1-1/2"	1/2"	1/2"
P-6	1	3 COMPARTMENT SINK		2"	2"	3/4"	3/4"
P-7	1	WATER DISPENSER	2"		1-1/2"	1/2"	_
	2	FLOOR DRAIN	4"		2"	-	_
	4	FLOOR SINK	4"		2"	-	_
	3	TRENCH DRAIN	4"		2"	-	_
	1	FLOOR TROUGH	4"		2"	-	_

EXTERIOR GREASE INTERCEPTOR CALCULATION - BUILDING-TI-M2-600,M2-700 & M2-900

PER FLORIDA PLUMBING CODE SECTI APENDIX A,SIZING METHOD UTILIZING		TH ASME 112.14.3
PIPE SIZE(INCHES)	MINIMUM SLOPE PER FBC	MAX GPM
4"	1/8" PER FT	100

	BUILDING-TI-M2-600,M2-700 & M2-900											
TOTAL SEATS		MEALS PER SEAT		TOTAL MEALS PER DAY								
259	X	4	=	1036								

PUMP-OUT FREQU	UENCY	Y PRODUCTION VALU	JES E	BY MEAL TYPE							
LOW GREASE PRO SANDWICH SHOP, BAR,SUSHI BAR,D BAR,FROZEN YOG BAR,RESIDENTIAL.	CONVE ELICA URT,H	ENIENCE STORE,FRES TESSEN,SNACK	SH	MEDIUM GREASE PRO COFFEE HOUSE,PIZZA CREAM PARLOR,CAFE PREP),JAPANESE,FAS GREASE OUTPUT FSE	,GROCER TERIA(NO T FOOD,I	RY STO D FOOI DRIVE-		HIGH GREASE PRODUCTION  CAFETERIA, FAMILY RESTAURANT, ITALIAN, STREAM HOUSE, BAKERY/DONUT SHOP, CHINESE, BUFFET, MEXICAN, SEAFOOD, FRIED CHICKEN, GROCERY STORE (W/FRYER), BARBECUE			
(A) NO FLATWAR 0.005 LBS/N		(B) WITH FLATWAR 0.0065 LBS/N		(C) NO FLATWARE: 0.025 LBS/MEAL	(D) WIT 0.0		.TWARE: .BS/MEAL	(E) NO FLATWARE: 0.035 LBS/MEAL	(F) WITH FLATWARE: 0.0455 LBS/MEAL		
CUSTOMER PER DAY	(	GREASE PRODUCTION PER DAY	N	POF IN DAYS			GREASE CAPACITY NEEDED IN LBS				
1036	х	0.0455	Х	90		=	4242				
	USE SCHIER GREASE INTERCEPTORS ASME A112.14.3 TO MEET THE GREASE CAPACITY				MODEL			GPM	GREASE CAP. IN LBS.		
CALCULATED ABO		IL GREASE CAPACIT	Ī	GB-1000			1	100	6,547		

<u>PROPOSE</u>	D	CRACK'D F	<sup>2</sup> L/	ATATION SPA	ACE.				
		G CODE SECTION 10 HOD UTILIZING MAXI		4,IN ACCORDANCE WITH PIPE FLOW.	ASME 1	12.14.	3		
PIPE SIZE(IN	ICHES	) м	NIMU	M SLOPE PER FBC		MAX	GPM		
4"			1	/8" PER FT		1	00		
		BUI	LDING	S-TI-M2-600					
TOTAL SEAT	S		MEA	LS PER SEAT	TOT	AL ME	ALS PER DAY		
23	Х		4	- =		g	92		
LOW GREASE PRO SANDWICH SHOP, BAR,SUSHI BAR,D BAR,FROZEN YOG BAR,RESIDENTIAL.	ODUC <sup>-</sup> CONVI ELICA SURT,F	ENIENCE STORE,FRES	SH	MEDIUM GREASE PRO COFFEE HOUSE,PIZZA CREAM PARLOR,CAFE PREP),JAPANESE,FAS GREASE OUTPUT FSE	,GROCER TERIA(NO T FOOD,I (W/FRYE	Y STO D FOOI DRIVE- IR)	D -IN,GREEK,IINDIAN,LOW	HOUSE,BAKERY/DON SHOP,CHINESE,BUFFE CHICKEN,GROCERY S	ESTAURANT,ITALIAN,STREAK UT ET,MEXICAN,SEAFOOD,FRIED ETORE(W/FRYER),BARBECUE
(A) NO FLATWAR 0.005 LBS/N	E: IEAL	(C) NO FLATWARE: 0.025 LBS/MEAL	(D) WIT 0.0		TWARE: .BS/MEAL	(E) NO FLATWARE: 0.035 LBS/MEAL	(F) WITH FLATWARE: 0.0455 LBS/MEAL		
CUSTOMER GREASE PRODUCTION POF IN DAYS							GREASE CAPACITY NEEDED IN LBS		
92	х	0.0455	Х	90		=	337		
		NTERCEPTORS ASME		MODEL			QUANTITY	GPM	GREASE CAP. IN LBS.
CALCULATED AB		HE GREASE CAPACIT	1	GB-1000			1	100	6,547

	THERMOSTATIC MIXING VALVE SCHEDULE												
TAG	LOCATION MANUFACTURES		MODEL	MIN OUTLET FLOW (GPM)	COMMENTS								
TMV	HANDWASH SINKS	SYMMONS MAXLINE	7–210	0.5	SET TO 110° AT ALL SINKS FOR HANDWASHING								

	TRAP PRIMER SCHEDULE											
TAG	DESIGNATION	MANUFACTURER	MODEL	COMMENTS								
TP-1	UNDER SINK TRAP PRIMER	PRECISION PLUMBING PRODUCTS	PR01-ULP500	MOUNT ON COLD WATER SUPPLY TO LAVATORY								
TP-2	MECHANICAL TRAP PRIMER	PRECISION PLUMBING PRODUCTS	PR01-500	PROVIDE DISTRIBUTION UNIT AS NECESSARY								
TP-3	MECHANICAL TRAP PRIMER	PRECISION PLUMBING PRODUCTS	P2-500	-								

	DRAINAGE SCHEDULE												
TAG	DESIGNATION	MANUFACTURER	MODEL	OUTLET	COMMENTS								
FD-1	FLOOR DRAIN	WADE	1100	4"	CAST IRON BODY WITH FLASHING COLLAR, SEEPAGE HOLES, FULL GRATE, DEEP SEAL TRAP & TRAP PRIMER CONNECTION								
FD-2	FLOOR DRAIN	WADE	1100	4"	CAST IRON BODY WITH FLASHING COLLAR, SEEPAGE HOLES, FULL GRATE, DEEP SEAL TRAP & TRAP PRIMER CONNECTION, WITH FUNNEL								
FS-1	FLOOR SINK	WADE	9110	4"	8"SQUARE, CAST IRON BODY WITH FLASHING COLLAR, SEEPAGE HOLES, ½ GRATE & ACID RESISTANT BODY								
TD-1	TRENCH DRAIN	WADE	2950	4"	6" WIDE MODULAR TRENCH DRAIN, PAINTED CAST IRON TRENCH DRAIN WITH DUCTILE IRON LOOSE SET SLOTTED GRATING, ANCHOR FLANGE AND BOTTOM OUTLET								
FT-1	FLOOR TROUGH	JOHN BOOS	FTSG 1224X	4"	ACCOMMODATES A 4" O.D DIAMETER DRAIN PIPE 3.25" LONG 5 DEGREE BREAKS IN BOTTOM FOR POSITIVE DRAINAGE TOWARDS DRAIN								

GREASE INTERCEPTOR SCHEDULE												
TAG	SERVICE / LOCATION	MANUFACTURER	MODEL	FLOW RATE (GPM)	INLET/OUTLET	COMMENTS						
GI-1	3BAY / KITCHEN	SCHIER	GB-2	35	3"/3"	COVER SHALL BE FLUSH WITH FINISH FLOOR. COORDINATE FINAL LOCATION & ELEVATIONS IN FIELD. PROVIDE FIELD CUT RISER FOR FLUSH WITH FINISH FLOOR ACCESS INSTALLATION						

GREASE INTERCEPTOR TO BE COORDINATED & CONFIRMED TO FIT AT LOCATION SHOWN & MAKE ALL REQUIRED CONNECTIONS PRIOR TO PURCHASE COORDINATE WITH GENERAL CONTRACTOR

		HOT WATER CIRCULATION PUMP SCHEDULE													
1	TAG	LOCATION	MANUFACTURER	MODEL	TYPE	FLOW (GPM)	HEAD (FT)	ELECTRICAL				COMMENTS			
						(GPM)		VOLT	HP	PHASE	hZ				
	RCP-1	CENTRAL DISTRIBUTION	GRUNDFOS	MAGNA	IN-LINE	2	5	115	0.5	1	60	DOMESTIC WATER RECIRCULATING WITH IMMERSION AQUASTAT			

	GAS DETECTION SYSTEM SCHEDULE													
T10	LOCATION	MANUEA OTUDED	MODEL	040 7/05	# OF	ALARM LEVELS			ELECTRICAL					
TAG		MANUFACTURER	MODEL	GAS TYPE	SËNSOR CARTRIDGES	Α	В	С	VOLT	PHASE	hZ	COMMENTS		
COOK LINE	KITCHEN	HONEYWELL	E3POINT	ω	2	25 PPM	200 PPM	225 PPM	120	1	60	EQUIPMENT SHALL INCLUDE: (1)E3SA BASE UNIT (1)E3SCO PLUG-IN CO CARTRIDGE (PLUG IN TO BASE UNIT) (1)E3SRMCO (REMOTE CO SENSOR) (1)ASCO 8044 GAS VALVE		

	STORAGE HOT WATER HEATER SCHEDULE													
TAG	LOCATION	MANUFACTURER	MODEL	TYPE	LOAD (CFH)	STORAGE	RECOVERY		ELECTRICAL		COMMENTS			
TAG			MODEL	TIFE		(GAL)	(GPH @ 100* RISE)	VOLT	PHASE	hZ	COMMENTS			
WH-1	RESTAURANT SERVICE	НТР	CROSSOVER RGH-100F	GAS	100	20	125	120 1		60	1 REQUIRED, FIELD SET TO 140° OUTPUT.VACCUUM, PRESSURE & TEMPERATURE RELIEF. PROVIDE CONDENSATE NEUTRALIZATION KIT			

MOTES: 1. WATER SHALL BE PRODUCED AT 140°F

2. PROVIDE STARTUP BY FACTORY CERTIFIED TECHNICIAN AND STANDARD MANUFACTURERS WARRANTY 3. WATER HEATER SHALL COME COMPLETE WITH TEMPERATURE AND PRESSURE RELIEF VALVE AND TANK DRAIN VALVE

4. PROVIDE VACUUM BREAKER RELIEF VALVE(S) AS REQUIRED BY THE STATE PLUMBING CODE INSTALL IN MULTIPLES IS REQUIRED

5. ALL DOMESTIC WATER HEATING COMPONENTS SHALL COME ASME APPROVED