MECHANI	CAL SYMBOLS LIST
AC-1) (TXF-1)	EQUIPMENT SYMBOL
	AIR DEVICES
\boxtimes	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN
DU	CT ACCESSORIES
BD	BACKDRAFT DAMPER
	VOLUME DAMPER W/ ACCESS DOOR
CONTR	ROLS AND SENSORS
T	THERMOSTAT
$\qquad \qquad (H)$	HUMIDISTAT
Ts	TEMPERATURE SENSOR
\mathbb{H}_{S}	HUMIDITY-SENSOR
	DUCTWORK
======	AIR DUCT W/ 1.5" ACOUSTICAL LINING
- ~~-	FLEXIBLE DUCT
FC FC	FLEXIBLE CONNECTION
24X12	RECTANGULAR DUCT (WIDTH X DEPTH)
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION
ø12	ROUND DUCT (DIAMETER)
0	ROUND DUCT CROSS SECTION

ABI	BREVIATIONS
AL	ACOUSTIC LINING
BD	BACKDRAFT DAMPER
CDS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
FC	FLEXIBLE CONNECTION
JEED.	INTEGRATED ENERGY
IEER	EFFICIENCY RATIO
EER	ENERGY EFFICIENCY RATIO
RTU	ROOF TOP UNIT
DN	DOWN
TEF	TOILET EXHAUST FAN
VD	VOLUME DAMPER
KEF	KITCHEN EXHAUST FAN
TEF	TOILET EXHAUST FAN
SAE	SAME AS EXISTING

	MECHANICAL DRAWING LIST
MO.1	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M0.2	MECHANICAL SPECIFICATIONS
M1.1	MECHANICAL FLOOR AND ROOF PLANS
M5.1	MECHANICAL DETAILS (1 OF 2)
M5.2	MECHANICAL DETAILS (2 OF 2)
M6.1	MECHANICAL SCHEDULES

CHICAGO BUILDING DEPARTMENT NOTES

- ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF CHICAGO BUILDING CODE 2019 AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.
- 1. THE CONTRACTOR SHALL ENGAGE THE THE SERVICES OF A 2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- 2. 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.
- 3. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE INTERIM CHICAGO MECHANICAL CODE (TITLE 14M):
 - A. REFRIGERATION SYSTEMS MC 18-28-1108 B. VENTILATION SYSTEM SERVING COMMERCIAL COOKING APPLIANCES - MC 18-28-507.17
- 4. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE
- OR STANDARD: A. DUCT CONSTRUCTION AND INSTALLATION— 18-28-601
- C. GAS FIRED EQUIPMENT INTERIM CHICAGO FUEL GAS
- 5. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- 6. 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 MC 18-28-401.
- 7. 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.
- 8. A FINAL REPORT OF TEST PROCEDURES AND RESULTS IDENTIFIED AS "FINAL COMMISSIONING REPORT" SHALL BE DELIVERED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT. THE REPORT SHALL BE ORGANIZED WITH MECHANICAL SYSTEM AND SERVICE HOT WATER SYSTEM FINDINGS IN SEPARATE SECTIONS TO ALLOW INDEPENDENT REVIEW.
- 9. A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND MEASUREMENTS COMPLETED IN ACCORDANCE WITH SECTION IECC 2018 C408.2.5.2.
- 10. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 11. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- 12. SMOKE DETECTOR SHALL MEET UL268A.

GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- 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 25. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- 4. 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
- B. AIR INTAKES, EXHAUSTS AND RELIEFS MC 18-28-401.5 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.
 - CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS 29. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, DETERMINED BY ARCHITECT.
 - 9. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH DEFINITIONS: 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
 - 10. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIE 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM -CLAMPS IN APPROVED MANNER.
 - 11. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING 1. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
 - 12. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
 - 13. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
 - 14. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
 - 15. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR 3.THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
 - 6. 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. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE _GENERAL: DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST

22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

TO THE OWNER.

- 23. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- 24. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT 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.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- 27. 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 REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL
- 28. 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.
- THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.
- "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO INLESS SPECIFICALLY OTHERWISE NOTED.
- "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED

SCOPE OF WORK

SCOPE OF WORK

- 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 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 FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- 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 19. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL HVAC NOTES

- 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
- ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO 4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL
 - 5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., 7. IN CORRIDORS WHERE CEILING SPEAKERS AND AIR SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
 - NSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND 8. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM
 - WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF QUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED
 - COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR 10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE 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 11. PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
 - 10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
 - 11. LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
 - 12. WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
 - 13. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
 - 14. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
 - 15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT 17. ALL DUCTWORK SHALL BE COORDINATED WITH ALL BE SUPPORTED FROM A METAL DECK.
- FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE 16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE 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 20. SMOKE DETECTORS SHALL BE FURNISHED AND INVOLVED.
 - CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- FOR ALL EXPENSES INCURRED IN REPAIRING AND 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 OR GUTTER OR DOWN SPOUT PROVIDED THAT DOWNSPOUT DOES NOT DISCHARGE ONTO PAVEMENT. 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
- CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- 4. SUPPLY AND RETURN DUCTWORK 20' FROM ALL HVAC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL
- 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.
- DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- 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.
- DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- 12. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- 13. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- 14. 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
- 15. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.

EQUIPMENT UNLESS OTHERWISE INDICATED.

- 16. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- 18. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- 19. 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
- WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- 21. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS

SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

A. THE BIDDER BY MAKING A BID REPRESENTS THAT:

THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.

- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH 1.2 SLEEVE-SEAL FITTINGS LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

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

END OF SECTION 0001

SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

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

1.2 CODE COMPLIANCE

A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES 3.1 INSTALLATION 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 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC 1.2 SUBMITTALS 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. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING

INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK

- 1. ADVANCE PRODUCTS & SYSTEMS, INC.
- 2. CALPICO, INC.
- 3. METRAFLEX COMPANY (THE).
- 4. PIPELINE SEAL AND INSULATOR, INC.

5. PROCO PRODUCTS, INC.

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,
- b. PIPING NPS 6 (DN 150) AND GALVANIZED-STEEL-SHEET SLEEVES.

END OF SECTION 230517

SECTION 230518 ESCUTCHEONS FOR HVAC

PRODUCTS

2.1 ESCUTCHEONS

- A. ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.
- B. ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN BOX-SHAPED BRASS WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.
- C. ONE-PIECE, STAMPED-STEEL TYPE: WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.

2.2 FLOOR PLATES

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

PART 3 - EXECUTION

- 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 OR
- 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

WRITTEN 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/SEL 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.

A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL

ENGINEER

1.3 QUALITY ASSURANCE

- A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE STEEL. 1.4 COMPONENTS
- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
- B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL C. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY
- COMPOSITES, COOPER B-LINE D. METAL FRAMING SYSTEMS: MFMA 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 FOR HVAC PIPING AND EQUIPMENT PART 1 - GENERAL

1.1 COMPONENTS

- A. VIBRATION ISOLATORS:
- 1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS
- 2. MOUNTS: DOUBLE-DEFLECTION TYPE.
- 3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING. 4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE
- OPEN-SPRING TYPE. 5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL,
- OPEN-SPRING TYPE WITH SEISMIC RESTRAINT. 6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
- 7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE. 8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND
- 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.

INSERT IN COMPRESSION.

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

1.2 FIELD QUALITY CONTROL

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

PART-2 PRODUCTS

- 1.1 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING RODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE **OLLOWING:**
 - ACE MOUNTINGS CO., INC.
 - AMBER/BOOTH COMPANY, INC.
 - 5. CALIFORNIA DYNAMICS CORPORATION.
 - 4. HILTI, INC.

END OF SECTION 230548

- 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.

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

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

1.2 QUALITY ASSURANCE

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

1.3 EXECUTION

- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS S3ECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITEC
- ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND

TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING

SEASONAL TESTS. END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

1.1 QUALITY ASSURANCE

SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTME 84.

.2 FIELD QUALITY CONTROL A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

- INDOOR DUCT AND PLENUM INSULATION SCHEDULE; CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND
- B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET,

MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS: UNCONDITIONED SPACES WITHIN BUILDING: R-6 WITHIN BUILDING ENVELOPE ASSEMBLY: R-12

1.4 ITEMS NOT INSULATED:

OUTSIDE OF BUILDING:

AIR PLENUM INSULATION:

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

R-12

- ANDASHRAE/IESNA 90.1.
- 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 A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:

2. OWENS—CORNING

1.6 ACOUSTICAL TREATMENT

1. JOHNS-MANVILLE

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE. 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED,

END OF SECTION 230713

SECTION 233113 - METAL DUCTS

- 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
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
- FROM 1-1/2"X1-1/2"X1/8" GALVANIZED ANGLES, TACK-WELDED OR RIVETED TO THE DUCT. UPRIGHT OF ANGLE AND EACH CORNER SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS, GASKET SIMILAR TO
- 3M-1202 OR APPROVED EQUAL 2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
- LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK BE PITTSBURGH LOCK SEAMS WITH SEALING
- 5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING
- NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.

STATE GAUGES AND/OR STIFFENERS TO BE USED OR,

WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE

C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY

- USG MAX. SIDE INCHES TRANSVERSE JOINTS AND
- POCKET LOCK ON 8 FOOT 13 TO 24 1"X1"X1/8" ANGLES ON 4

FOOT CENTERS

- D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE
- TAPPING LOCATED AS FOLLOWS:
- 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
- SHOWN IN FIG. 3-1 AND 3-2 FOR ROUND DUCTWORK. F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND

- 1.2 MATERIALS
- A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.

C. SHEET METAL MATERIALS:

2. STAINLESS-STEEL SHEETS.

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

- 1. TWO-PART TAPE SEALING SYSTEM.
- 2. WATER-BASED JOINT AND SEAM SEALANT
- SOLVENT-BASED JOINT AND SEAM SEALANT. 4. FLANGED JOINT SEALANT
- 5. FLANGE GASKETS. 6. ROUND DUCT JOINT O-RING SEALS.
- 1.3 DUCT CLEANING A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING ADJUSTING, AND BALANCING.
- B. CLEAN THE FOLLOWING ITEMS:
- 1. AIR OUTLETS AND INLETS. 2. SUPPLY, RETURN, AND EXHAUST FANS.

- AIR—HANDLING UNITS.

- 4. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING
- 5. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.

1.4 DUCT SCHEDULE

- 8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

1.1 PRODUCTS

A. DIFFUSERS 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

B. MANUFACTURERS: TITUS

- 1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE
- a. CARNES.
- b. HART & COOLEY INC.
- d. **METALAIRE**, **INC**.
- e. NAILOR INDUSTRIES INC.
- AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED. D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED

THERMOSTATIC CONTROLS:

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

BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:

45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM) 2.THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS

1.THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE

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

EXCEPTIONS:

EXCEPTIONS:

C403.4.1.2 DEADBAND (MANDATORY) WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING

ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE

COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A

LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL

SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING

CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

C403.4.2 OFF-HOUR CONTROLS (MANDATORY) EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME

C403.4.2.1 THERMOSTATIC SETBACK (MANDATORY) THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE

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

C403.4.2.3 AUTOMATIC START (MANDATORY) AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC

HOURS: OR AN OCCUPANCY SENSOR.

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.

MECHANICAL SPECIFICATIONS

1.1 CONSTRUCTION

- VELOCITY IN THE DUCT.
- 1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY END OF SECTION 233113 FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE
- 3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.
- OMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30-03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30-02 AND COVERED WITH APPROVED SEALING TAPE.
- RODS, ASTM 215; AWG A5.2. 6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE END OF SECTION 233713

- UP TO 12 S SLIP, DRIVE SLIP, ONE INCH
- 25 TO 35 1"X1"X1/8" ANGLES ON 2 FOOT CENTERS

SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED

- 1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
- DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3-6 AND AS

- CLASS 3 FOR ROUND DUCTS.
- B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS
- 1. GALVANIZED SHEET STEEL.

3. ALUMINUM SHEETS.

- 4. FACTORY-APPLIED ANTI-MICROBIAL COATING.
- D. DUCT LINER:

2. FLEXIBLE ELASTOMERIC.

- E. SEALANT MATERIALS:

- 2. COILS AND RELATED COMPONENTS.
- 3. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING

- A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:

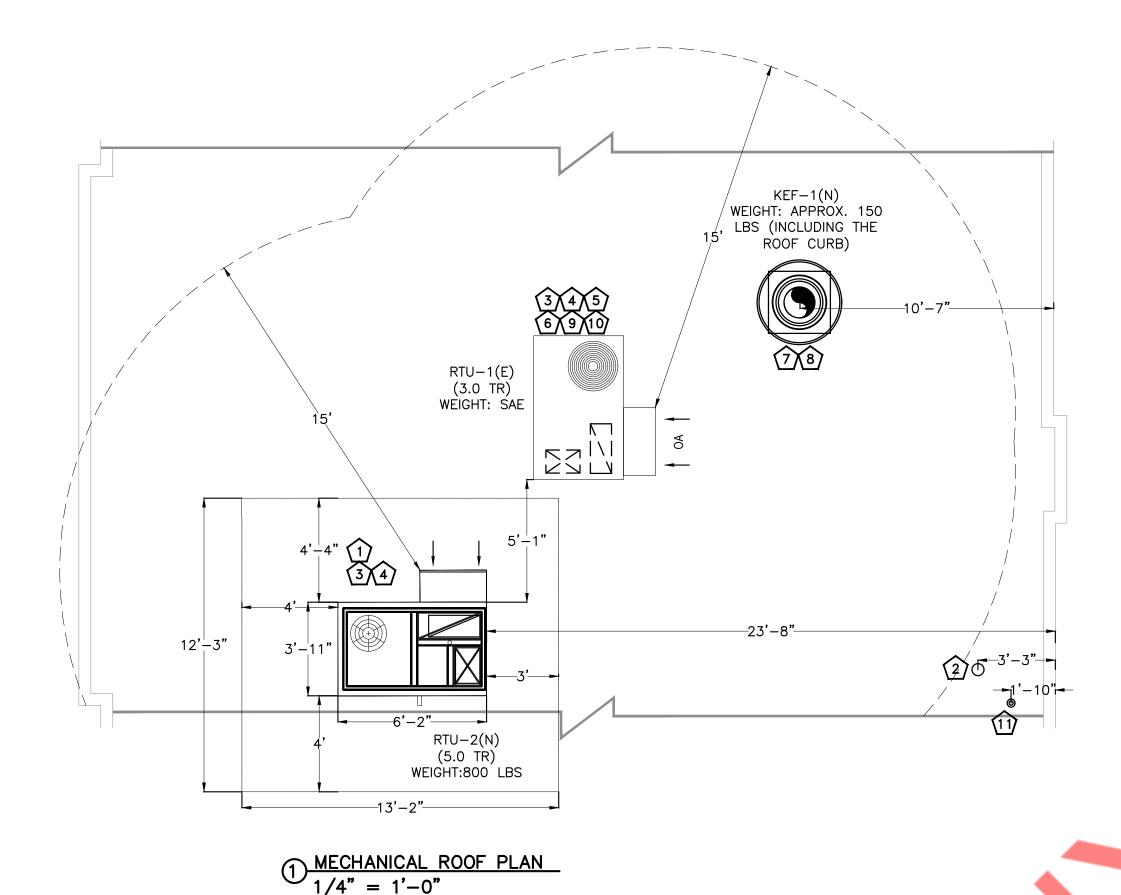
CONNECTING SEAMS OF COMPANION ANGLES, FORMED SECTION 233713 - DIFFUSERS AND GRILLES

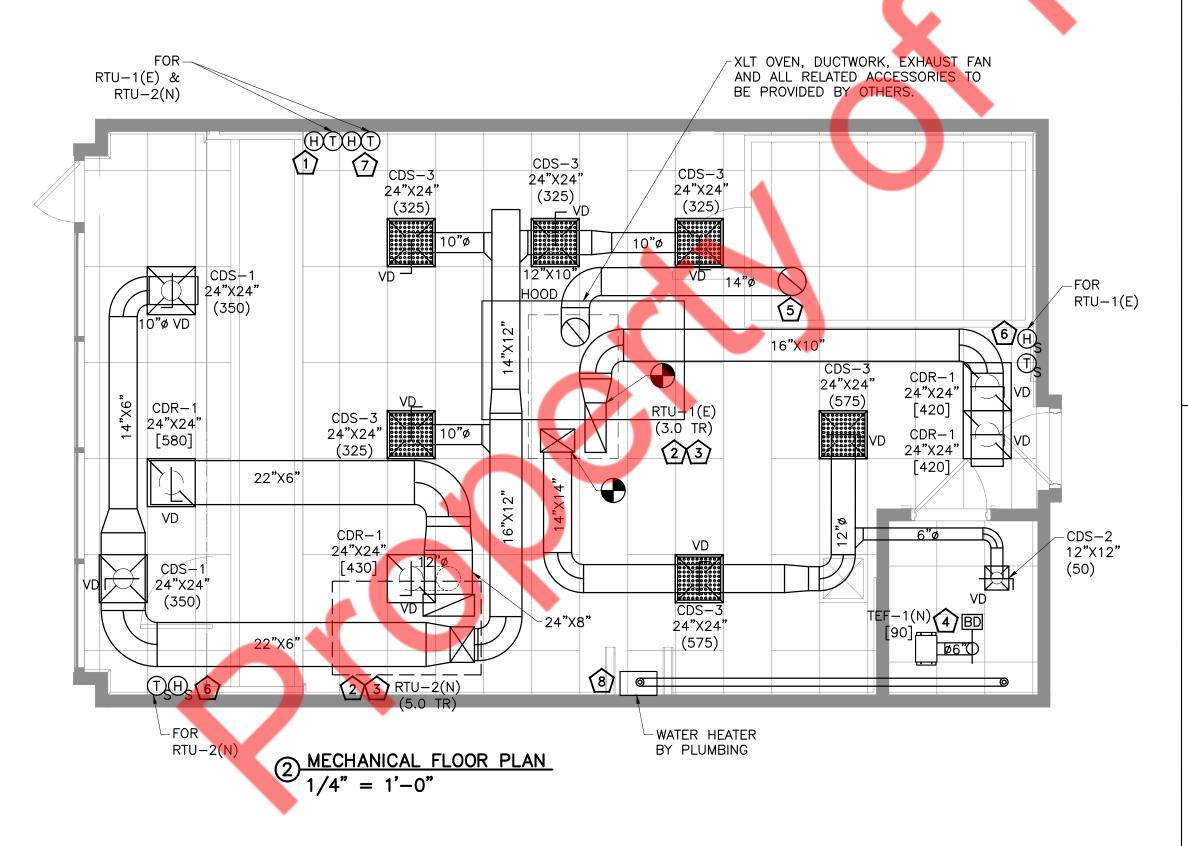
- - PRODUCT BY ONE OF THE FOLLOWING:

NOTED IN BAKED WHITE ENAMEL.

- c. KRUEGER.
- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID
- BLADE DAMPER UNLESS OTHERWISE NOTED.
- C403.4.1 THERMOSTATIC CONTROLS (MANDATORY)
- SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM. EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES. GAINS OR
- THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ±
- 1.THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES. 2.REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL. C403.4.1.3 SETPOINT OVERLAP RESTRICTION (MANDATORY)
- SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.4.1.2.
- 1.ZONES THAT WILL BE OPERATED CONTINUOUSLY. 2.ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH LOCATED WITH READY ACCESS.
- C403.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN (MANDATORY)

TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).





MECHANICAL GENERAL NOTES

- A. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
- B. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF
- DUCTWORK, PIPING ETC.

 C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 15 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT
- LENGTH AS NEEDED.

 F. ALL ITEMS TO BE RE-USED OR RELOCATED SHALL BE CLEANED, REPAIRED, AND
- RESTORED TO LIKE NEW CONDITION PRIOR TO RE-USE.

 G. MATERIAL FROM EXISTING SYSTEM WHICH IS RENDERED USELESS SHALL BE REMOVED
- AND DISPOSED OF OFF SITE.

 H. REPAIR/ REPLACE EXISTING EQUIPMENT/ MATERIALS NOT SCHEDULED OR NOTED TO
- BE DEMOLISHED BUT BECOME DAMAGED DURING THE PROGRESS OF THE WORK. MAKE ANY AND ALL SUCH REPAIRS, REPLACEMENTS, MODIFICATIONS TO RESTORE THE DAMAGED ITEMS TO THEIR ORIGINAL CONDITIONS AT THE TIME OF DAMAGE, TO THE
- SATISFACTION OF AND AT NO ADDITIONAL COST TO THE OWNER.

 I. COORDINATE CUTTING, PATCHING OF EXISTING ROOF, WALLS, CEILINGS, AND FLOORS AFFECTED BY MECHANICAL DEMOLITION WITH G.C.

MECHANICAL ROOF PLAN KEY NOTES:

- (1) COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL REQUIREMENT.
- TERMINATE 6"Ø EXHAUST DUCT UP THROUGH ROOF WITH GOOSENECK & BIRDSCREEN. MAINTAIN A MINIMUM OF 15'-0" FROM ALL OUTSIDE AIR INTAKES.
- CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 15' AWAY FROM THE RTUS.
- CONTRACTOR TO RUN CONDENSATE DRAIN FROM RTU'S TO SINK TAIL PIECE CONNECTION OR NEAREST ROOF DRAIN.
- EXISTING RTU TO REMAIN WITH ALL ASSOCIATED ACCESSORIES. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION OF EXISTING RTU AND DUCT PENETRATION.
- 6 CONTRACTOR TO RE BALANCE OUTSIDE AIR DAMPER ON RTU-1(E) TO 360 CFM.
- PROVIDE 2 FEET HIGH WIND—BAND FOR THE KEF—1(N) TO MAINTAIN 3 FEET VERTICAL DISTANCE BETWEEN EXHAUST AND ADJACENT INTAKE AIR SOURCE.
- 8 CONTRACTOR TO VERIFY THE SIZE AND EXACT LOCATION OF KITCHEN EXHAUST FAN WITH ARCHITECT BEFORE PROCUREMENT OF THE FAN.
- ONTRACTOR TO CLEAN EXISTING RTU AND REPLACE PARTS IF DAMAGED OR NOT WORKING.
- 10 PROVIDE NEW MERV8 FILTER FOR EXISTING RTU.
- Ø2"/Ø4" CONCENTRIC VENT FROM HOT WATER HEATERS. TERMINATE VENT AT LEAST 36" ABOVE ROOF. INSTALL AS PER MANUFACTURES RECOMMENDATIONS.

MECHANICAL GENERAL NOTES

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

 H. ALL EXPOSED DUCTWORK SHALL BE AS SHOWN, DOUBLE WALL, INSULATED METAL, PRIMED FOR PAINTING. ALL CONCEALED DUCTWORK SHALL BE INSULATED METAL RECTANGULAR UNLESS OTHERWISE ALLOWED IN WRITING BY THE ENGINEER OF
- RECORD. COORDINATE FINAL FINISH WITH ARCHITECT.

 I. PROVIDE MINIMUM R-6 INSULATION (INTERNAL FOR EXPOSED DUCTS AND EXTERNAL FOR CONCEALED DUCTS) FOR SUPPLY & RETURN AIR DUCTS. PROVIDE ACOUSTIC
- INSULATION ON MAIN SUPPLY AND RETURN DUCTS UP TO 10 FT. FROM HVAC UNIT.

 J. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR THE FIRE RATINGS OF THE WALLS.

MECHANICAL FLOOR PLAN KEY NOTES:

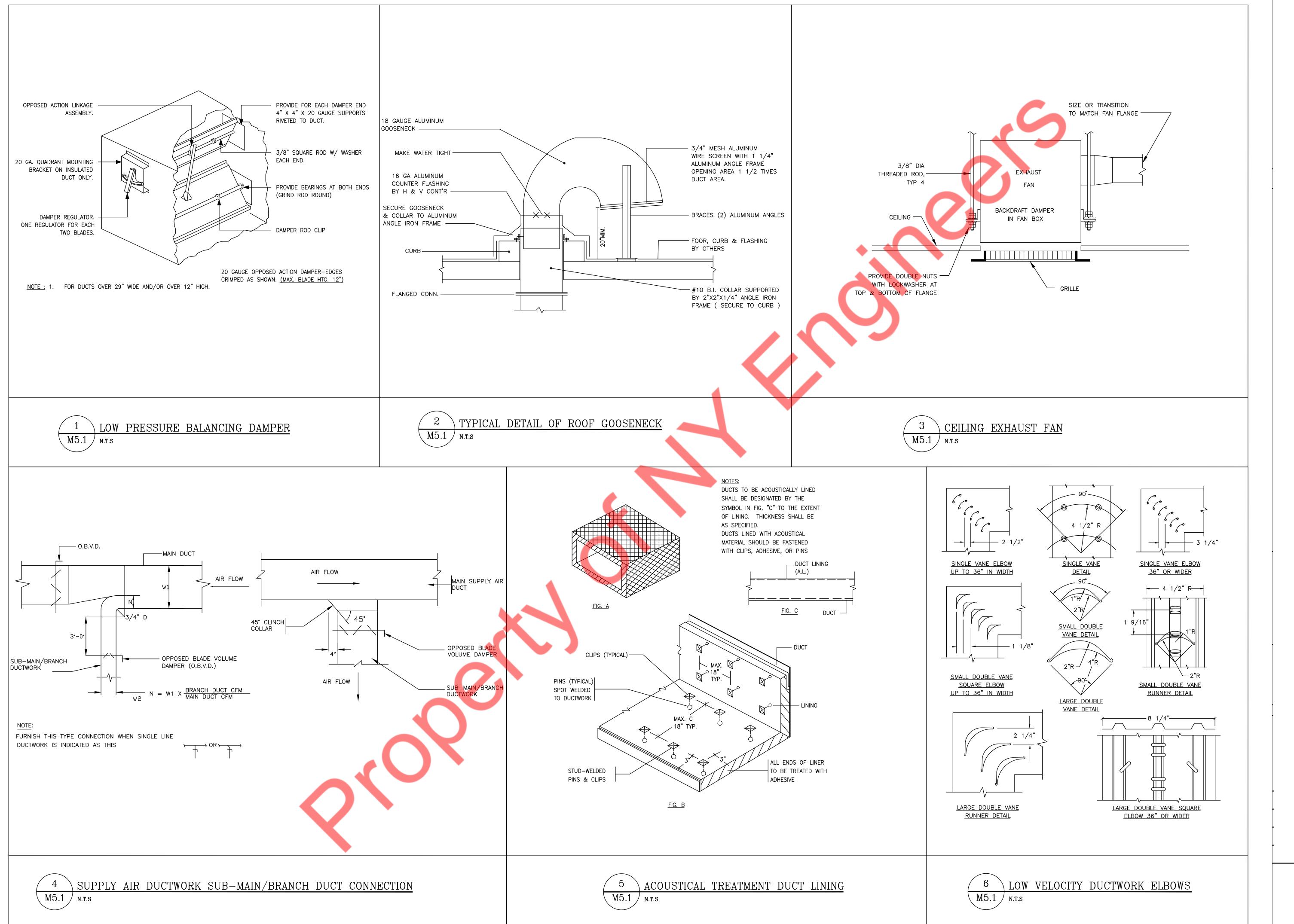
- LOCATION OF DIGITAL THERMOSTAT CONTROL. INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT & HUMIDISTAT. COORDINATE FINAL LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN. PROVIDE LOCKABLE COVER.
- EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM ROOFTOP UNITS TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
- PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCT CONNECTIONS. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR. TRANSITION AND CONNECT SUPPLY AND RETURN DUCTWORK FROM BELOW. COORDINATE ROUTING THROUGH STRUCTURAL TRUSSES AND OFFSET AS REQUIRED IN CURB SPACE.
- 4 ø6" EXHAUST DUCT UP THROUGH ROOF.
- 5 Ø14" KITCHEN EXHAUST DUCT GOING UP TO KEF-1(N) ON ROOF.
- 6 TEMPERATURE & HUMIDITY SENSOR FOR THERMOSTAT AND HUMIDISTAT SERVING DESIGNATED RTU.
- RELOCATE AND REUSE EXISTING THERMOSTAT, IF EXISTING THERMOSTAT IS NOT IN CONDITION TO REUSE THEN INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- 8 ø2"/ø4" CONCENTRIC VENT FROM HOT WATER HEATERS. TERMINATE VENT AT LEAST 36" ABOVE ROOF. INSTALL AS PER MANUFACTURES RECOMMENDATIONS.

MECHANICAL FLOOR AND ROOF PLANS

M1.1

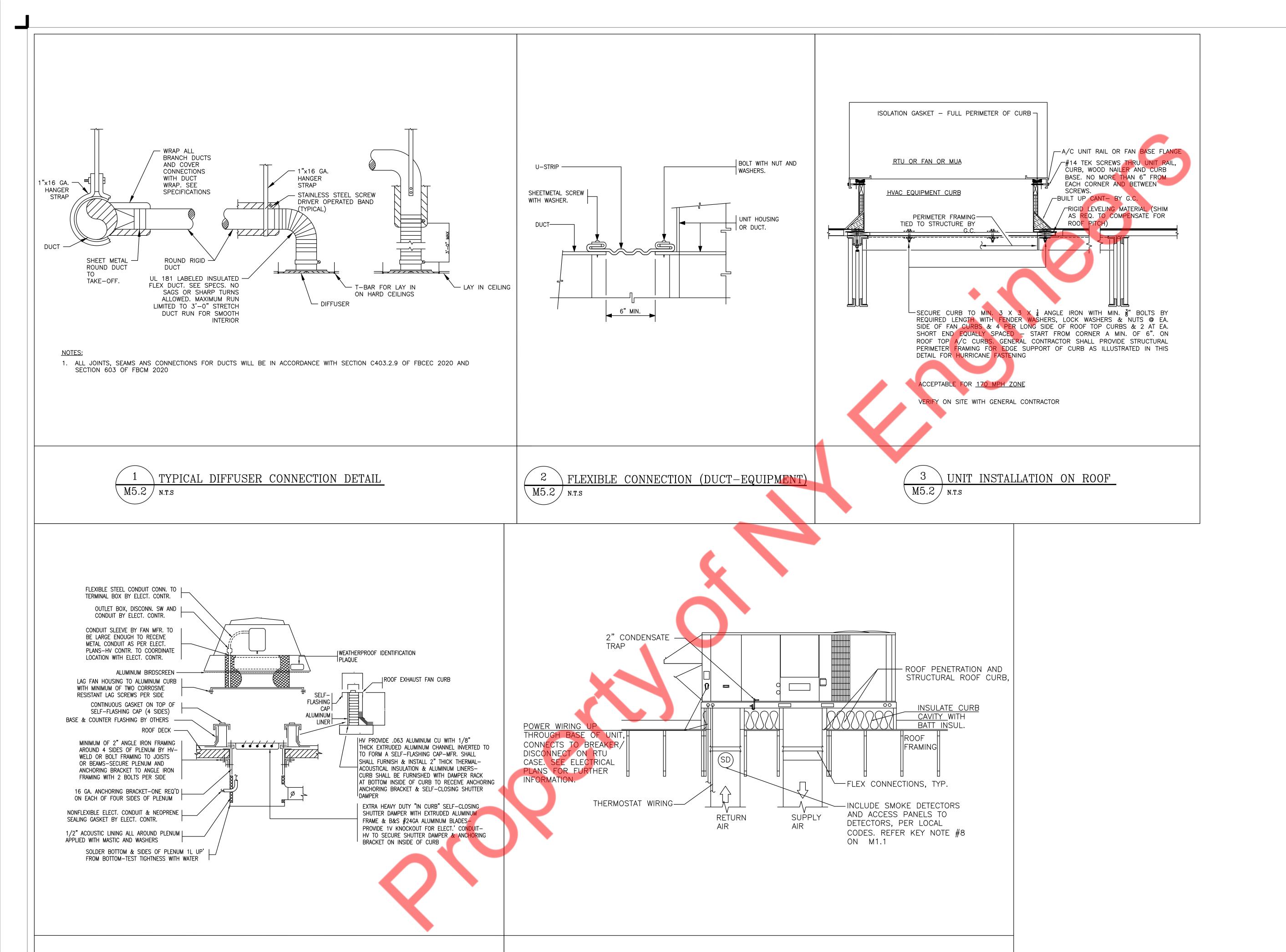
GRAPHIC SCALE: 1/4" = 1'-0"

0 4' 8' 12' 16'



MECHANICAL DETAILS (1 OF 2)

M5.1



ROOF EXHAUST FAN DETAIL

M5.2 / N.T.S

TYPICAL ROOF TOP UNIT DETAIL

M5.2 / N.T.S

DRAWN BY:

QAQC:

NYE

APPROVED BY:

PROJECT NUMBER:

2235

MECHANICAL DETAILS (2 OF 2)

M5.2

									ROOF TOF	UNIT SCHE	DULE										
			AREA	NOMINAL		SUPPLY FAN		GAS HEAT	ING CAPACITY			COOLING CAPACI	TY			ELE	CTRICAL		STEADY		OPERATIN
UNITID	MANUFACTURER	MODEL	SERVED	TONS	SUPPLY AIR CFM	OUTSIDE AIR CFM	MAX. ESP (IN. OF W.G.)	INPUT MBH	OUTPUT MBH	TOTAL MBH	SENSIBLE MBH	AMBIENT TEMP. DB (°F)	ENTERING TEMP. DB / WB (°F)	STAGES	VOLTS	PHASE	MCA (A)	MOCP (A)	STATE EFFICIENCY	EER/SEER	WEIGHT (LB:
RTU-1(E)	BRYANT	SAE	SEE PLAN	3	SAE	360	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE	SAE
RTU-2(N)	CARRIER (OR EQUIVALENT)	48HCB06A (OR EQUIVALENT)	SEE PLAN	5	2000	990	0.8	130	106	60.4	48	95	80/67	1	208/230	1	45	60	82%	12.45/15.2	800
NOTES FO	R NEW RTU		•		•				•	•		•						•	•	·	•
1	ALL EQUIPMENT MUS	T BE STANDARD/HIG	H EFFICIEN	T, MEETING	OR EXCEEDIN	NG THE BRANDS	S MINIMUM REC	QUIREMENTS.													
2	ELECTRICAL CONNECT	ION TO BE SINGLE P	OINT AND	TO BE THRO	DUGH THE BOT	TOM OF THE U	NIT.														
3	PROVIDE DISCONNEC	T SWITCH AND AN U	JNPOWERE	D GFIC REC	EPTACLE.																
4	14" ROOF CURB - CON	TRACTOR SHALL FIE	LD INSULAT	E. SHIP AS	AP AHEAD OF	THE UNIT.															
5	CONDENSATE DRAIN	WITH 2" DEEP VENT	ED TRAP DIS	SCHARGE T	O NEAREST DE	RAIN OR GUTTE	R OR DOWN SP	OUT.													
6	CABINET WITH 1/2" F	BERGLASS INSULATI	ON.																		
7	PROVIDE 8-WIRE, 24\	AC, AUTOMATIC CH	IANGEOVER	R, 1-STAGE	HEAT / COOL,	REMOTELY PRO	OGRAMMABLE T	THERMOSTAT.													
8	REMOTE SENSORS SH	ALL BE PROVIDED IN	SPACE WIF	RED BACK T	O PROGRAMN	/IABLE, 24 HOU	R, 7 DAY, THERN	OSTATS.													
9	ANTI SHORT CYCLE TII	ΛER.																			
10	THROWAWAY 2" FILT	ERS (MERV 8).																			
11	PROVIDE HOT GAS RE	HEAT OR ANY OTHE	R EQUIVALE	ENT HUMIC	ITY CONTROL	OPTION.															
12	PROVIDE ALL COMPR	SSORS WITH 5 YEAR	R WARRANT	Ϋ.																	
	PROVIDE ECONOMIZE	· · · · · · · · · · · · · · · · · · ·		OMIZER).																	
14	PROVIDE CONDENSA	TE OVERFLOW SWIT	CH.																		
NOTES FO	R EXISTING RTU																				
1	S.A.E : SAME AS EXIST	ING.																			
2	EXISTING RTU WITH A	LL ACCCESSORIES TO	REMAIN S	AME AND	O BE REUSED																
3	CONTRACTOR TO CO	IFIRM IF EXISTING F	RTUIS WOR	KING AT IT	S 100% RATEC	CAPACITY.															
4	CONTRACTOR TO FIEL	D VARIFY EXACT LO	CATION AN	D CONFIGU	JRATION OF F	RTU ON SITE.															

		AID DAI	ANCE							
		AIR BAI	LANCE							
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR					
RTU-1 (E)	TOTAL SPACE	1200 CFM	360 CFM	840 CFM	0 CFM					
RTU-2(N)	TOTAL SPACE	2000 CFM	990 CFM	1010 CFM	0 CFM					
KEF-1(N)	KITCHEN	-	-	-	1254 CFM					
TEF-1(N)	RESTROOM	-	-	-	90 CFM					
	TOTAL:	3200 CFM	1350 CFM	1850 CFM	1344 CFM					
BUILDING PRESSURE: 6 CFM POSITIVE										
1) CONTRACTOR TO BALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON RTUS TO										
MATCH VALUES MENTIONED IN ABOVE TABLE.										

					Е	XHAUST FAN	SCHEDULE					
		FLOW RATE	EXTERNAL	SPEED		ELECTRIC DA	TA	MAXIMUM	BASIS OF	DESIGN	WEIGHTS	
TAG	QUANTITY	FLOW RATE	STATIC PRESSURE	SPLLD	\//DU/U7	MOTOR HR	FLA (AMPS)	LOUDNESS	DASIS OF	DESIGN	(LBS)	REMARK
		CFM	IN W.G.	RPM	RPM		FLA (AIVIPS)	DBA	MANUFACTURER	MODEL	(LD3)	
TEF-1 (N)	1	90	0.5	900	115/1/60	-	0.46	47	GREENHECK	SP-A200	24	1,2,3,4
KEF-1(N)	1	1254	1	1750	115/1/60	1/2	-	61	ACME	PNURG160RG	150	1,2,3,5,6
NOTES:												
1) PROVIDI	E FACTORY I	MOUNTED AN	ND INSTALLED WEAT	THER PRO	OOF DISCO	NNECT SWIT	CH.					
2) PROVIDI	E THERMAL (OVERLOAD P	ROTECTION, BACKE	RAFT DA	MPER, AM	CA SEAL & U	L CERTIFIED.					
3) PROVIDI	E ALL NECES	SARY ACCESS	SORIES AS PER MAN	UFACTU	RER'S RECO	MMENDATIO	ONS.					
4) INTERLO	4) INTERLOCK TOILET EXHAUST FAN TEF-1(N) WITH RTU-1(E). COORDINATE WITH ELECTRICAL CONTRACTOR.											
5) PROVIDI	E ROOF CUR	B, BACK DRA	FT DAMPER, WEATH	HER PRO	OF DISCON	NECT SWITC	H, AMCA SEA	L & UL CERTI	FIED, THERMAL OV	ERLOAD PROTEC	CTION FOR	KEF-1(N).

6) KITCHEN EXHAUST FAN CAN HAVE SEPARATE WALL CONTROL SWITCH OR TIME CLOCK. COORDINATE WITH OWNER FOR FINAL REQUIREMENT AND LOCATION.

6 CONTRACTOR TO RE-BALANCE OUTSIDE AIR DAMPERS ON EXISTING RTU TO MATCH VALUES MENTIONED IN ABOVE TABLE.

7 REPLACE FILTERS, IF REQUIRED.

5 IF REQUIRED, PROVIDE NEW THERMOSTAT AND TEMPERATURE SENSOR COMPATIBLE WITH EXISTING RTU. CO-ORDINATE FINAL LOCATION OF T-SENOSR WITH ARCHITECT/OWNER.

		AIR T	TERMINAL DEVICE	S SCHEDUL	.E							
TAG	SIZE (IN.)	DESCRIPTION	CONSTRUCTION	FINISH	NECK SIZE (IN.)	BASIS OF D	ESIGN	NOTES				
IAG	SIZE (IIV.)	DESCRIPTION	CONSTRUCTION	FIIVISH	NECK SIZE (IIV.)	MANUFACTURER	MODEL	NOTES				
CDS-1	24X24	PLAQUE FACE DIFFUSER	ER ALUMINUM WH		PER PLAN	TITUS	OMNI	ALL				
CDS-2	12X12 PLAQUE FACE DIFFUSER		ALUMINUM WHIT		PER PLAN	TITUS	OMNI	ALL				
CDS-3	24X24	PERFORATED DIFFUSER	ALUMINUM	WHITE	PER PLAN	TITUS	PAR-AA	ALL				
CDR-1	CDR-1 24X24 EGGCRATE ALUMINUM WHITE 22"x22" TITUS 50F ALL											
NOTES:-								•				
1) PROVID	E STANDARD	WHITE FINISH FOR ALL AIR DEVICES UN	NLESS NOTED OTH	ERWISE ON	I PLAN.							
2) PAINT A	LL SURFACES	S VISIBLE THROUGH FACE OF RETURN AI	R GRILLE FLAT BLA	CK. THIS SI	HALL INCLUDE PIF	PING, CONDUIT, DU	JCTWORK AND)				
3) PROVID	E FRAME FOR	R MOUNTING AIR DEVICE IN LAY-IN GRI	D CEILING UNLESS	REFLECTED	CEILING PLAN II	NDICATES HARD CE	ILING. IN AREA	AS WITH				
4) UNLESS	OTHERWISE	NOTED, BRANCH DUCTS SERVING AIR D	EVICES SHALL BE S	SAME SIZE	AS NECK OF AIR D	DEVICE.						
5) COORDI	NATE FINAL	COLOR/FINISH WITH ARCHITECT/OWNI	ER.									
6) AIR DEV	ICE SHALL BE	OF GALVANIZED FINISH WHEN INSTAL	LED ON EXPOSED I	DUCTWORI	K							
7) MAXIMI	JM NOISE CR	ITERION RATING < 35 DBA.										
FOR ROUN	D NECK DIFF	USERS: NECK SIZES SHALL BE:-										
6" DIA: 0-1	00 CFM											
8" DIA: 101	8" DIA: 101-225 CFM											
10" DIA: 226-400 CFM												
12" DIA: 40	01-600 CFM											
14" DIA: 60	01-900 CFM											
15" DIA: 90	01-1100 CFM											

		VENTIL	ATION CALCULATION	NS AS PER Tal	ole 18-28-403.3 OF MU	JNICIPAL CO	ODE OF CHI	CAGO		
ROOM DESCRIPTION	ΩNI	ORDINANC	E REUIREMENTS	MINIM	UM REQUIRED		ACTU	JAL PROVI	DED	
KOOIVI DESCRIPTIO	JIV	MECHANIC	AL VENITLATION	MECHANIC	CAL VENITLATION	OA (CFM)				DENANDES / POOM ELINICTION
DOOM NAME	FLOOR	SUPPLY AIR	EXHAUST AIR	SUPPLY AIR	EXHAUST AIR FROM	(1/3RD)	OA (CFM)	SA (CFM)	EA (CFM)	REMARKS/ROOM FUNCTION
ROOM NAME	AREA (SF)	(CFM/SF)	(CFM/SF)	(CFM)	ROOM (CFM)	(1/360)				
CUSTOMER AREA	118	1.5	1.5	180	180	60			0	RETAIL STORE
STAFF RESTROOM	45	0	2	0	90	0	1350	3200	90	PUBLIC SPACES-TOILET ROOM
KITCHEN	140	1.2	4	170	560	57	1550	3200	1254	KITCHEN-PUBLIC
SCULLARY/DRY STORAGE	508	0.5	0.5	255	255	85				STORAGE
	TOTAL	•		605	1085	202	1350	3200	1344	-

MECHANICAL SCHEDULES

	E	ELECTRICAL SYMBOLS LIST					GENERAL NOTES
LIGHTING		POWER AND TELECOMMUNICATION		ELECTRICAL A	BBREVIA	TIONS	ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CHICAGO ELECTRICAL CODE (NEC 2017 WITH AMENDMENTS, LOCAL JURISDICTION
LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR		JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.	А	AMPERES	EA	EACH	REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS. 2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING
"EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.	$\Phi_{\!\scriptscriptstyle{A}}$	SIMPLEX RECEPTACLE, +18" AFF OR AS NOTED. SUFFIXE DENOTES FOLLOWING:	A/C, AC	AIR CONDITIONING UNIT AMPERE FRAME/AMP FUSE	EM EMT	EMERGENCY ELECTRICAL METALLIC TUBING	CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.		A- NEMA 5-15R B- NEMA 6-15R	AF AFF	ABOVE FINISHED FLOOR	EQUIP	EQUIPMENT	3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND 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 CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS
SWITCHING INDICATED BY LOWER CASE LETTERS.	Φ_{GFI}	DUPLEX GFI RECEPTACLE	AIC	AMPS INTERRUPTING CAPACITY	FA	FIRE ALARM	SHALL BE SLEEVED AND SEALED WATERTIGHT. 5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS
DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.	Φ	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AT	AMP TRIP	E	EXISTING	(HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK) NAILS RAWL PLUCS
ONL DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS UNSWITCHED CIRCUIT.	₽	DEDICATED DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	ATS AUTO	AUTOMATIC TRANSFER SWITCH AUTOMATIC	FL	FLOOR GROUND	SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY
CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONALARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN	▼	TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.	AWG	AMERICAN WIRE GAUGE	GFI	GROUND FAULT INTERRUPTER	RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
SWITCHES AND CONTROLS	Ψ _(E)	EXISTING DUPLEX RECEPTACLE TO REMAIN.	С	CONDUIT	GP	GENERAL PURPOSE	6. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE/SWITCHED		MOTORS AND CONTROLS	C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER	7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING
\$\frac{3}{a} 20A 3-WAY TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED	M	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.	CLG	CEILING	HWH	HOW WATER HEATER HERTZ	OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG
(OS) CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY	M WP	AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.	СОММ	COMMUNICATION	IC	INTERRUPTING CAPACITY	CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES	CT	CURRENT TRANSFORMER COPPER	PP	POWER PANEL POWER	8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
WIRING SYSTEMS		AS NOTED. 30A/240V NON FUSED DISCONNECT SWITCH	DIA	DIAMETER	R	REMOVE	9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF		60A/240V NON FUSED DISCONNECT SWITCH	DISC	DISCONNECT	RE	RELOCATED EXISTING	10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE—EXISTING
UP- 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED. POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION,		100A/240V NON FUSED DISCONNECT SWITCH	DN	DOWN	REC	RECEPTACLE	CONDITIONS OR BETTER. 11. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL
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.		200A/240V NON FUSED DISCONNECT SWITCH	DP	DISTRIBUTION PANEL	RGS	RIGID GALVANIZED STEEL	METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
CONDUIT AND WIRE TO BUILDING GROUND.		COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH, FURNISHED BY	DWG JB	DRAWING JUNCTION BOX	RR SECT	REMOVE & RELOCATE SECTION	12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN
= CONDON AND WINE TO BOILDING GROUND.		HVAC/CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR. FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP	KCMIL	ONE THOUSAND CIRCULAR MILS	SPDT	SINGLE POLE DOUBLE THROW	OR FASTEN RACEWAYS TO MOTOR FOUNDATION. 13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE
UNDERGROUND	└ <u></u> 400 350	NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.	KV	KILOVOLT	SPST	SINGLE POLE SINGLE THROW	CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHERE
EXISTING	M/M/	DUPLEX PUMP. NUMBER INDICATES HP RATING OF PUMP.	KVA KW	KILOVOLT—AMPERES KILOWATTS	SPEC	SPECIFICATION SWITCH	REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS, AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL
——— NEW	1.5 kW	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	LTG	LIGHTING	SWBD	SWITCHBOARD	COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE. 14. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING
	S _T	THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS PER MOTOR RATING.	MAX	MAXIMUM	SYM	SYMMETRICAL	STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS. 15. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND
ELECTRICAL DRAWING LIST		MANUAL MOTOR SWITCH	MC	MOTOR CONTROLLER	SYS	SYSTEMS	SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
E0.1 ELECTRICAL SYMBOLS, GENERAL NOTES, LIGHT FIXTURE SCHEDULE & CONTROLS E0.2 ELECTRICAL SPECIFICATIONS SHEET 1 OF 2		ANNOTATION	мсв	MAIN CIRCUIT BREAKER	TELE	TELEPHONE	16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE
E0.3 ELECTRICAL SPECIFICATIONS SHEET 2 OF 2	\bigcirc	KEYED NOTE REFERENCE	MLO MTD	MAIN LUGS ONLY MOUNTED	TEMP TXF	TEMPERATURE TOILET EXHAUST FAN	TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
E1.0 ELECTRICAL LIGHTING PLAN	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	MTS	MANUAL TRANSFER SWITCH	TYP	TYPICAL	17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
E1.1 ELECTRICAL POWER PLAN E2.0 ELECTRICAL DETAILS	1 E/2-1	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP: DRAWING NUMBER INDICATED ON BOTTOM	N	NEUTRAL	UON	UNLESS OTHERWISE NOTED	18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED
E3.0 ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE			NIC	NOT IN CONTRACT	V	VOLT/VOLTAGE	TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND
		POWER DISTRIBUTION	NTS Still	NOT TO SCALE	VA	VOLT AMPERE	SPECIFICATIONS FOR THIS PROJECT.
		MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND AMPERAGE AS NOTED.	PNL W	PANEL WATT	WP ø	WEATHER PROOF PHASE	19. ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
		DISTRIBUTION PANELBOARD, 120/208V—SURFACE OR FLUSH MOUNTED.	S _D	DUCT SMOKE DETECTOR	·		20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
							21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE—RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE—RATED BOXES OR PUTTY PADS ARE UTILIZED.
							22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITRH THE ENGINEER AND OWNER BEFORE INSTALLATION.
							23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL
							CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
							24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
							25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL 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 EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT
							TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

ELECTRICAL SYMBOLS, GENERAL NOTES, LIGHT FIXTURE SCHEDULE & CONTROLS

ELECTRICAL SPECIFICATIONS

GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION." AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- 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.
- 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.
- 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.
- 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
- 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.

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
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.

WITH END CAPS AND CLOSURE STRIPS.

- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- 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
- 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.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY F ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR
- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE ARIZONA 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.

- 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.
- 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
- 9) MOMENTARY CONTACT SWITCHES

8) INSERTION RECEPTACLES

- 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 A 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 INSTRUC<mark>TION BOOKLET S</mark>HALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED NDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

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

7. FUSES:

SYMMETRICAL.

- CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS
- B. MOTOR CIRCUITS ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (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) 120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM

DISTRIBUTION PANELBOARDS. SWITCH AND FUSE:

- THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
- NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH ANI DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
- C. PANELBOARD SHALL BE CONSTRUCTED OF CODE-GAUGE STEEL GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.
- D. ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORI
- DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.
- F. DISCONNECTS
 - 1) DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.
 - 2) SWITCHING MECHANISM SHALL BE QUICK-MAKE, QUICK-BREAK, SINGLE THROW WITH EXTERNAL OPERATING HANDLE MECHANCIALLY NTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO NTERIOR 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.

INSTALLATION

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

H. IDENTIFICATION

- 1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.
- 2) NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF 1/4"
- DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A

MINIMUM OF 30" WIDE AND 10" DEEP.

- POWER PANELBOARDS SHALL BE SIMILAR TO GENERAL ELECTRIC TYPE "OMR", AS MANUFACTURED BY ATLAS SWITCH COMPANY. ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.
- K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
- PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).

M. MATERIALS

THREADED.

THREADLESS.

GALVANIZED.

- 1) RACEWAYS: 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 STEEL WITH GROUND CONTINUITY. FINISH GAUGE SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

2) FITTINGS AND ACCESSORIES:

INSULATED THROAT.

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

ELECTRICAL SPECIFICATIONS SHEET 1 OF 2

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

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

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

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

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

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

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

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

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

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

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

- O. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS 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).
- P. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING

- AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.
- Q. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR—TO—CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.
- R FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE—PARTITIONS ROOMS.
- PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

9. WIRE AND CABLE:

- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.
- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).
- E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.
- F. COLOR CODING SHALL BE AS FOLLOWS:

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

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

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

- G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.
- H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION—TYPE OF TWIST—ON SPRING—LOADED CONNECTORS AND CLEAR NYLON—INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG
- I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOL SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.
- J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
- K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

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

11. WIRING DEVICES:

- A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.
- B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/208 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 AS NOTED.
 - 1)SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).
- 2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT,
- D. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.
- E. COLORS: COORDINATE COLORS WITH ARCHITECT.
- 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 EQUAL.
- D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.
- E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.
- F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.
- G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.
- H. EXIT SIGNS SHALL BE PRECISION DIE—CAST ALUMINUM HOUSING WITH LASER—FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED. AC POWERED WITH PREMIUM LONG—LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3—HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

13. TELEPHONE CONDUIT SYSTEM:

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

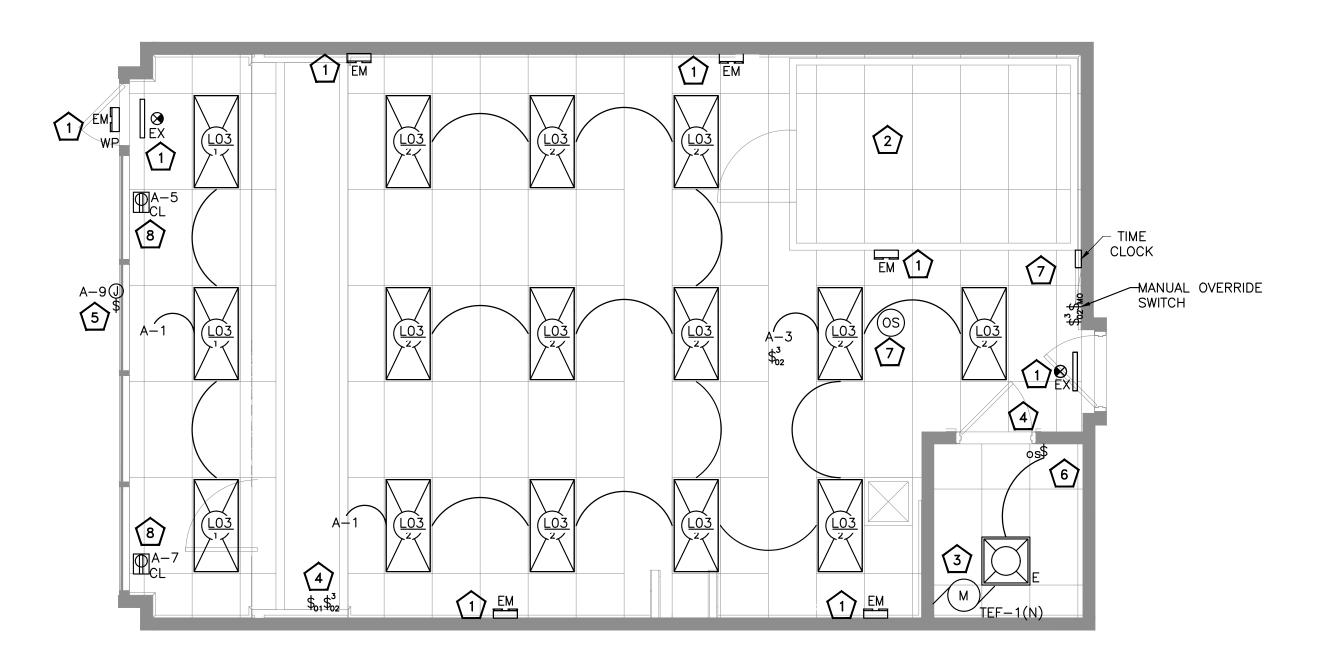
14. GROUNDING AND BONDING:

- 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.

15. PANELBOARDS:

- A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.
- B. CIRCUIT BREAKERS SHALL BE OF THE BOLT—ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.
- LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.
- D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.
- E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR-IN-DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.
- F. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.
- I. FURNISH ALL PANELBOARDS WITH FEED—THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.
- J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
- K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS.
 MAXIMUM 42 CIRCUITS ALLOWED.
- L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.
- M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.
- N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.



1/4" = 1'-0"

LIGHT FIXTURE SCHEDULE:

FIXTURE TAG	FIXTURE DETAIL	MANUFACTURER	MODEL	VOLTAGE	WATTAGE
EX	EXIT SIGN WITH DUAL LAMP	SURE-LITE	APCH7-R	120V	5W
ЕМ	EMERGENCY EGRESS FIXTURE	SURE-LITE	CU2-LED	120V	5W
L-03	24" X 48" TROFFER	LITHONIA/APPROVED	2GTL	120V	45W

LIGHTING CONTROLS GENERAL NOTES:

- A. AUTOMATIC LIGHTING CONTROLS: OCCUPANCY SENSOR SHALL BE CAPABLE OF TURNING OFF LIGHTS WITHIN 20 MINUTES OF ALL OCCUPANT LEAVING THE SPACE AND SHALL BE MANUAL ON.
- B. ALL ILLUMINATED EXIT SIGN TO HAVE A MAX WATTAGE OF 5 PER SIDE.
- C. ALL EMERGENCY LIGHT SHALL OPERATE IN EMERGENCY CONDITION.
- D. LIGHTING REDUCTION IS ACHIEVED BY CONTROLLING ALL LUMINAIRES.

ELECTRICAL LIGHTING GENERAL NOTES:

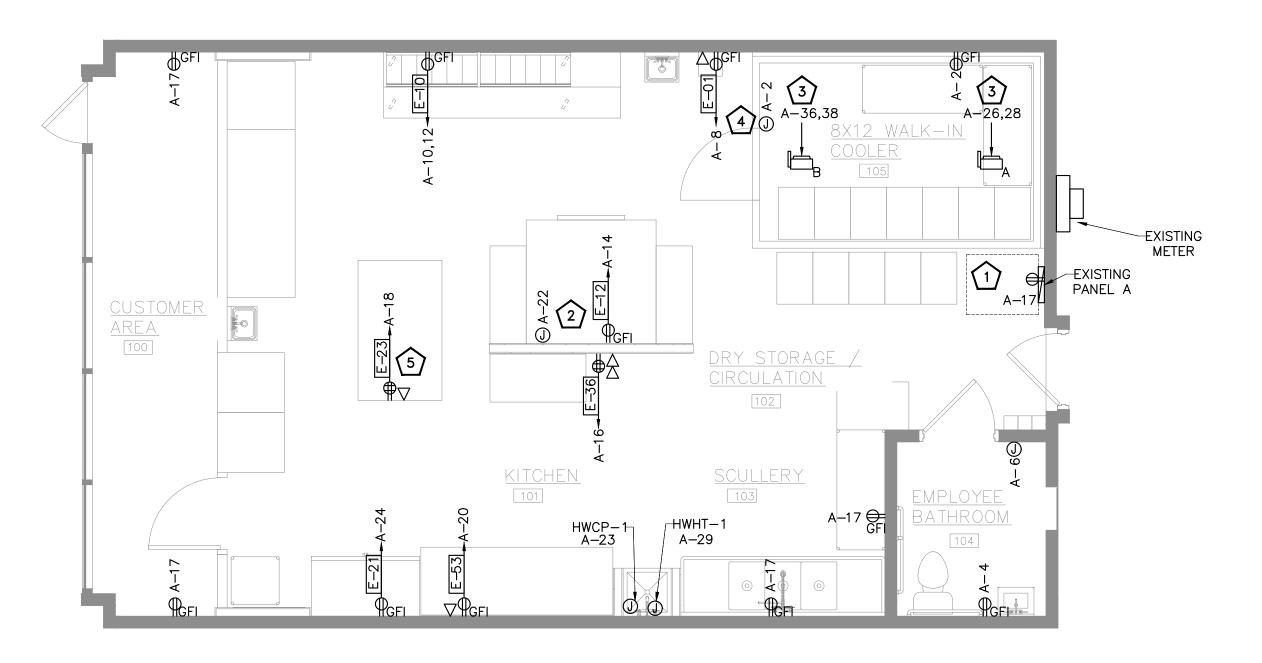
- A. COORDINATE FINAL FIXTURE MAKE AND MODEL WITH ARCHITECT.
- B. COORDINATE FINAL REQUIREMENT / MODEL / QUANTITY OF DIMMER WITH ARCHITECT/OWNER.
- C. CONTRACTOR TO PROVIDE MANUAL SWITCHING AS PER IECC 2018, C405.2.5 AND LIGHTING CONTROL PER C405.2.2.
- D. FIXTURES DESIGNATED WITH "E" ARE EXISTING TO REMAIN.

ELECTRICAL LIGHTING PLAN KEYED WORK NOTES:

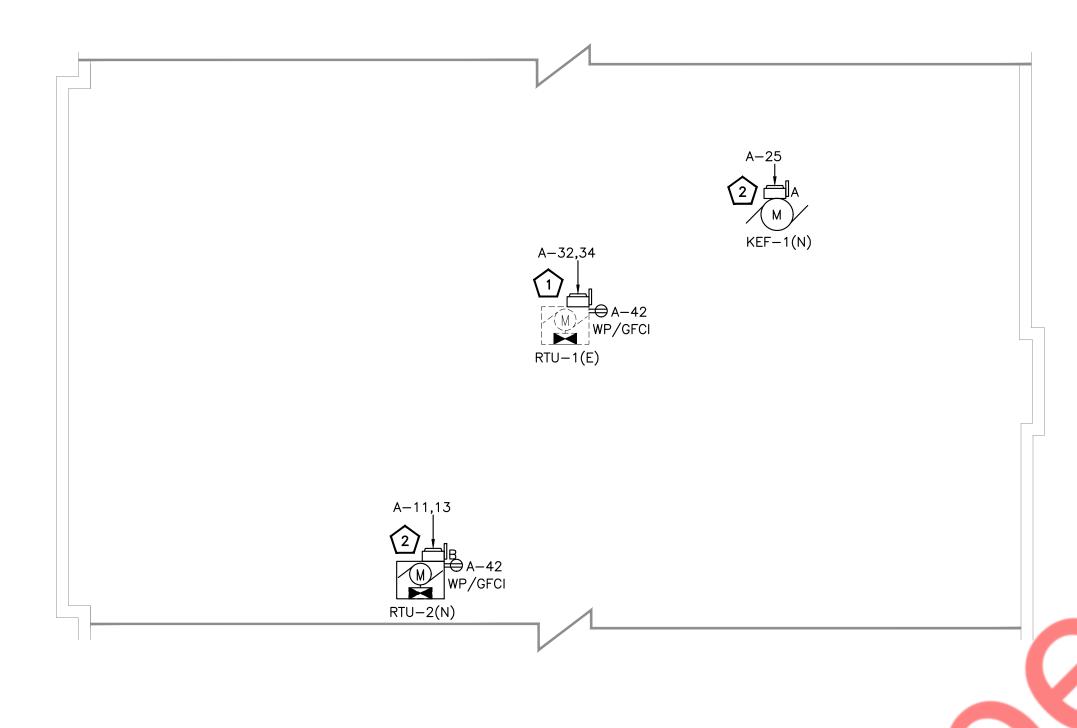
- 1. CONNECT ALL EMERGENCY EGRESS LIGHTING FIXTURES TO NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES. EXIT SIGNS SHALL NOT EXCEED 5 WATTS PER FACE.
- 2. ALL COOLER FREEZER LIGHTING FIXTURES AND RELATED LOCAL CONTROLS SHALL BE PROVIDED BY EQUIPMENT SUPPLIER. E.C. SHALL MAKE ALL FINAL CONNECTION TO FIXTURES AS REQUIRED TO ENSURE A COMPLETE OPERATION.
- 3. E.C. TO COORDINATE WITH MECHANICAL CONTRACTOR FOR INTERLOCKING OF EXHAUST FAN WITH RTU-1(E). PROVIDE NECESSARY WIRING AND CONTROL AS REQUIRED.
- SWITCHES FOR LIGHTING CONTROL. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
- 5. JUNCTION BOX FOR EXTERIOR SIGNAGE CONTROLLED WITH TIMECLOCK. ALSO COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
- 6. WALL MOUNTED OCCUPANCY SENSOR.
- 7. COORDINATE EXACT LOCATION OF TIME CLOCK WITH ARCHITECT/OWNER.
- . PROVIDE DUPLEX RECEPTACLE FOR SHOW WINDOW LIGHTING ABOVE STORE FRONT WINDOW WITHIN 18" OF TOP OF THE STORE FRONT WINDOW.

ELECTRICAL LIGHTING PLAN

E1.0



1) ELECTRICAL POWER PLAN
1/4" = 1'-0"



2 ROOF POWER PLAN
1/4" = 1'-0"

GENERAL POWER PLAN NOTES:

- A. EXACT LOCATION OF MECHANICAL, PLUMBING, KITCHEN, FURNITURE SYSTEMS, OWNER FURNISHED EQUIPMENT ETC. THAT REQUIRE ELECTRICAL CONNECTIONS ARE SHOWN ON THE MECHANICAL, PLUMBING, AND/OR ARCHITECTURAL DRAWINGS. COORDINATE EXACT LOCATIONS WITH RESPECTIVE CONTRACTORS AND/OR VENDORS PRIOR TO ANY ROUGH—INS.
- B. REVIEW AND COORDINATE WITH ALL TRADES CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR EQUIPMENT WITH ELECTRICAL CONNECTIONS. COORDINATE EXACT MOUNTING LOCATIONS WITH THE SPECIFIC TRADE AND ARCHITECT.
- C. MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOMERUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANELBOARD. FOR 120V BRANCH CIRCUITS WITH HOMERUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANELBOARD.
- D. ALL WIRINGS SHALL BE IDENTIFIED BY PANELBOARD AND CIRCUIT NUMBERS IN ALL CABINETS, JUNCTION BOXES, WIRING TROUGHS, ENCLOSURES, SPLICE OR TERMINATION POINTS, ETC.
- E. A NEW TYPED PANELBOARD DIRECTORY CARD SHALL BE PROVIDED FOR ALL PANELS INSTALLED OR MODIFIED UNDER THIS CONTRACT. NEW DIRECTORY CARDS SHALL BE LOCATED ON THE INSIDE DOOR OF ASSOCIATED PANELS.
- F. ALL RECEPTACLES IN THE KITCHEN/FOOD PREPARATION AREA SHALL BE OF GFCI TYPE.
- G. E.C SHALL VERIFY THAT WHEREVER CIRCUIT CONDUCTORS ARE SPLICED IN A BOX, ANY/ALL EQUIPMENT GROUNDING CONDUCTORS ASSOCIATED WITH THESE CIRCUITS MUST BE BONDED ("PIGTAILED") TO THE BOX.
- H. E.C SHALL VERIFY THAT AS PER NEC 210.8(B) ALL SINGLE—PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPERES OR LESS AND THREE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPERES OR LESS SHALL BE GFCI PROTECTED
- I. GFCI DEVICES TO BE INSTALLED IN A READILY ACCESSIBLE LOCATION.
- J. THE DEFINITION OF A KITCHEN IS ANY LOCATION WHERE FOOD AND DRINKS ARE PREPARED, SERVED OR DISPENSED

ELECTRICAL POWER PLAN KEYED WORK NOTES: (#)

- E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF PANEL IN THE FIELD.
- 2. INTERCEPTOR SWITCH (MICRO SWITCH) FOR ANSUL SYSTEM COORDINATE WITH MANUFACTURER FOR LOCATION OF SWITCH AND SPECIFICATIONS.
- 3. E.C. SHALL COORDINATE WITH WALK—IN BOX MANUFATURER FOR EXACT LOCATION AND POWER REQUIREMENT OF WALK—IN BOX EQUIPMENT. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
- PROVIDE JUNCTION BOX FOR WALK—IN BOX DOOR HEATER AND MISCELLANEOUS LOAD. COORDINATE EXACT POWER REQUIREMENT WITH WALK—IN BOX VENDOR.
- 5. POWER AND DATA OUTLET OVER CUTTING EDGE TABLE (E-23). E.C TO COORDINATE EXACT LOCATION OF THE OUTLETS IN FIELD AND ROUTE THE WIRES ACCORDINGLY PER SITE CONDITIONS.

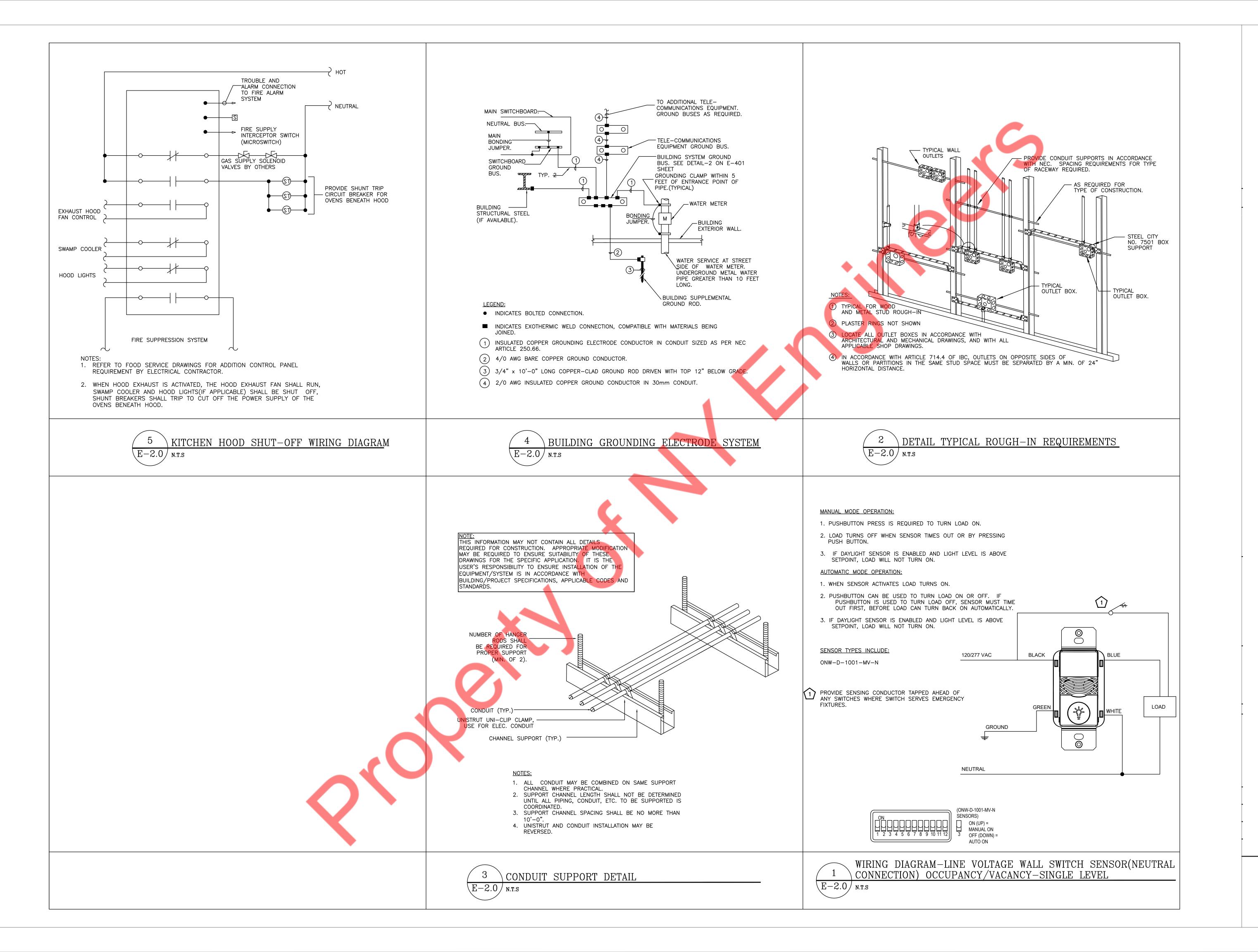
ELECTRICAL ROOF PLAN GENERAL NOTES:

A. E.C. SHALL VERIFY EXISTING ELECTRICAL CONNECTIONS, WIRE SIZES AND OPERABLE CONDITION OF THE ALL ELECTRICAL DEVICES OF THE EXISTING MECHANICAL UNITS IN FIELD.

ELECTRICAL ROOF POWER PLAN KEYED WORK NOTES:

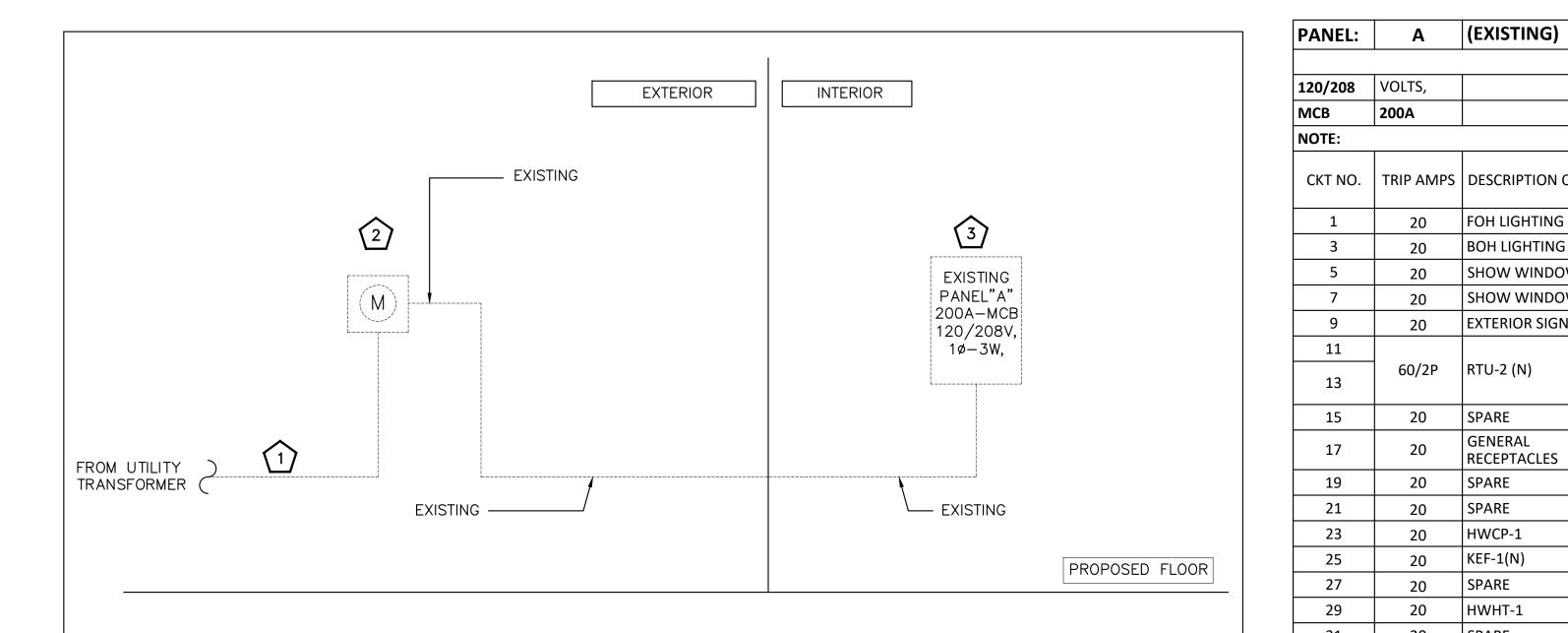
- 1. EXISTING ROOF TOP UNIT TO "RTU-1(E)" SHALL REMAIN. E.C. SHALL VERIFY POWER REQUIREMENT AND OPERABLE CONDITIONS OF THE EXISTING ELECTRICAL CONNECTIONS IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- 2. ELECTRICAL CONTRACTOR SHALL COORDINATE DISCONNECT AND FUSE REQUIREMENT FOR MECHANICAL UNIT WITH MECHANICAL CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH—IN AND PROVIDE AS REQUIRED. COORDINATE LOCATION OF DISCONNECT WITH OWNER AND MECHANICAL CONTRACTOR PRIOR TO ROUGH—IN. LOCATE AS REQUIRED TO MAINTAIN NEC CLEARANCES.

ELECTRICAL POWER PLAN



ELECTRICAL DETAILS

E2.0

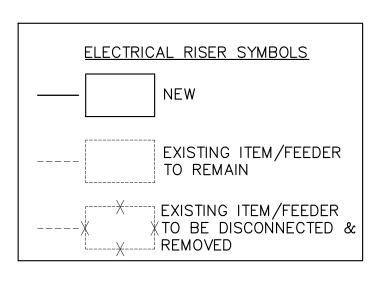


<u>ELECTRICAL RISER KEYED NOTES:</u>

- 1. EXISTING 200A, 120/208V, 10 ELECTRICAL SERVICE FEEDER SHALL REMAIN. E.C. SHALL VERIFY EXACT AMPERAGE/VOLTAGE RATING AND POWER DISTRIBUTION IN FIELD. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY PRIOR TO BID.
- 2. EXISTING 200A, 120/208V, 10 METER FOR THE SPACE SHALL REMAIN. E.C. SHALL VERIFY EXACT LOCATION, RATING AND OPERABLE CONDITION OF THE METER IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- 3. EXISTING 200A, 120/208V, 1ø, 3W ELECTRICAL PANEL-A FOR THE SPACE SHALL REMAIN. E.C. SHALL VERIFY EXACT LOCATION, RATING AND OPERABLE CONDITION OF THE PANEL IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

ELECTRICAL RISER GENERAL NOTE:

- A. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO BID.
- B. RISER DIAGRAM SHOWN IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD.
- C. E.C. SHALL VERIFY EXACT SERVICE VOLTAGE IN FIELD. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.



1 ELECTRICAL RISER DIAGRAM N.T.S

120/208	VOLTS,		1	PHASE	3	WIRE					PANEL LOCATION:	GROUND FL	OOR
ИСВ	200A		BUS:	200A	MIN.						FED FROM	MAIN SERVI	CE
NOTE:													
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHA	SE (KVA)	MINIMUM - BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20	FOH LIGHTING	L	1.00	2#12, #12G, 3/4"C	1.50		2#12,#12G,3/4"C	0.50	R	WALK IN MISC.	20	2
3	20	BOH LIGHTING	L	1.00	2#12, #12G, 3/4"C		1.18	2#12, #12G, 3/4"C	0.18	R	RESTROOM RECEPTACLES	20	4
5	20	SHOW WINDOW	R	1.20	2#12, #12G, 3/4"C	2.40		2#12, #12G, 3/4"C	1.20	R	HAND DRYER	20	6
7	20	SHOW WINDOW	R	1.20	2#12, #12G, 3/4"C		1.38	2#12, #12G, 3/4"C	0.18	E	E01 - PHONE STATION	20	8
9 11	20	EXTERIOR SIGN	L H	1.20 3.68	2#12, #12G, 3/4"C	2.20	4.68	2#12, #12G, 3/4"C	1.00	E	E10 - DOMINOS 6' MAKELINE	20/2P	10 12
13	60/2P	RTU-2 (N)	Н	3.68	2-6 + 1#10G, 3/4"C.	4.68		2#12, #12G, 3/4"C	1.00	E	E12 - XLT TRIPLE CONVEYOR OVEN W/HOOD	20	14
15	20	SPARE					0.36	2#12, #12G, 3/ <mark>4"C</mark>	0.36	E	E36 - WORK TABLE	20	16
17	20	GENERAL RECEPTACLES	R	0.90	2#12, #12G, 3/4"C	1.26		2#12, #12G, 3/4"C	0.36	R	E23 - TABLE	20	18
19	20	SPARE					0.18	2#12, #12G, 3/4"C	0.18	R	E53 - DOUGH TABLE	20	20
21	20	SPARE				0.50		2#12, #12G, 3/4"C	0.50	R	HOOD CONTROL PANEL	20	22
23	20	HWCP-1	М	0.50	2#12, #12G, 3/4"C		1.34	2#12, #12G, 3/4"C	0.84	Е	E21 - 54" DOUBLE DOOR VISI-COOLER	20	24
25	20	KEF-1(N)	M	0.50	2#12, #12G, 3/4"C	2.06		2#12,#12G,3/4"C	1.56	M	WALK-IN COOLER EVAPORATOR	20/2P	26
27	20	SPARE		0.10	2412 4126 2/446	0.64	1.56	2#12 #12C 2/4"C	1.56	M	CEDIUCE DECEDIACIES	20	28
29	20	HWHT-1	0	0.10	2#12, #12G, 3/4"C	0.64	4.50	2#12, #12G, 3/4"C	0.54	K	SERVICE RECEPTACLES	20	30
31	20	SPARE SPARE				4.50	1.50	2#10,#10G,3/4"C	1.50	H	EX. RTU-1 (E)	30/2P	32
33 35	20	SPARE				1.50	2.04		1.50	M			36
35	20	SPARE				2.01	2.91	2#8,#10G,3/4"C	2.91	M	WALK-IN COOLER CONDENSER	40/2P	38
39	20	SPARE				2.91	0.00		2.91	IVI	SPARE	20	40
		JI AILL				19.65	15.09				JI AILE	20	40

PANEL SCHEDULE GENERAL NOTE:

- A. E.C. SHALL VERIFY EXACT CIRCUIT FEEDING THE EXISTING EQUIPMENT IN FIELD.
- B. PROVIDE NEW BREAKERS IN PLACE OF EXISTING BREAKERS WHEREVER REQUIRED TO FEED NEW EQUIPMENT AS INDICATED IN THE PANEL SCHEDULES.

ELECTRICAL PANEL ABBREVIATION:

MOUNTING: RECESSED

- L = LIGHTINGR = RECEPTACLE
- H = HVAC
- M = MOTOR
- E = EQUIPMENTO = OTHER

ELECTRICAL RISER DIAGRAM & PANEL SCHEDULE

E3.0

PLUMBING SYMBOLS LIST

SANITARY SEWER (UNDERFLOOR) —— SAN —— SANITARY SEWER (ABOVE FLOOR) —— GSAN —— GREASE SANITARY SEWER (ABOVE FLOOR) _____ ____ COLD WATER PIPING HOT WATER PIPING ____ HOT WATER RETURN PIPING ____ —— G — GAS PIPING _____

EXISTING HOT WATER PIPING

EXISTING COLD WATER PIPING P-TRAP

CLEANOUT

 $-\infty$ PIPE UP PIPE DROP

- \bigcirc - \downarrow

POINT OF CONNECTION GAS VALVE

PLUMBING ABBREVIATIONS

PLUGGED OUTLET/CLEANOUT

CO CLEANOUT CODP CLEAN OUT DECK PLATE COLD WATER HOT WATER

HOT WATER RETURN SANITARY VENT LAVATORY

WATER CLOSET TYP. TYPICAL DOWN FLOOR DRAIN

BACK FLOW PREVENTER WATER HEATER HWHT-1 NOT IN SCOPE EXPANSION TANK

HOT WATER CIRCULATION PUMP HWCP-1

PLUMBING DRAWING LIST

P1.1 PLUMBING NOTES, SYMBOLS, ABBREVIATIONS & SPECIFICATIONS

P2.1 PLUMBING FLOOR PLANS

P3.1 PLUMBING DETAILS

P3.2 PLUMBING DETAILS

P4.1 PLUMBING RISERS AND SCHEDULES

BUILDING DEPARTMENT PLUMBING NOTES

- 1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER, STORM) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2019 CHICAGO PLUMBING CODE.
- 2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 18-29-702.2
- 3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 18-29-305.1.
- 4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 18-29-306.2.
- 5. RODENT PROOFING AS PER PC 18-29-304.4
- 6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 18-29-303, 18-29-605.4, 18-29-702, 18-29-902, 18-29-1102.
- 7. DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 18-29-1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 18-29-1202.5.4
- 8. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 18-29-308.2
- 9. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION 18-29-604, 605, 606, 607, 608, 610
- 10. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 18-29-701, 704, 705, 706, 707, 708, 711.
- 11. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 18-29-901 THROUGH PC 18-29-912 THROUGH PC 18-29-917
- 12. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 18-29-105.4.6.
- 13. GAS PIPING INSTALLATION SHALL IN ACCORDANCE WITH INTERNATIONAL FUEL GAS CODE CHAPTER 4

PLUMBING SPECIFICATIONS:

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

1.02 SUBMITTALS

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

1.03 SUBSTITUTIONS

- A. ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
- B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

1.05 DEFINITIONS

- A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
- B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
- C. PROVIDE: TO FURNISH AND INSTALL.
- D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

1.06 DRAWINGS

- A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
- B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
- C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
- FIXTURE ROUGHING SIZE REQUIREMENTS.
- E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.
- F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.07 PRODUCTS A. SANITARY AND VENT PIPING:

- 1. ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER COUPLING.
- 2. SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO
- 3. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.

B. DOMESTIC WATER PIPING:

- 1. ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
- 2. FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
- 3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
- 4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
- 5. COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
- 6. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH 2019 (TITLE 14N) CHICAGO ENERGY CONSERVATION CODE 14N SECTION C403.11.3 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS

				A				
FLUID OPERATING	INSULATION	N <mark>OMIN</mark> AL PIPE OR TUBE SIZE (INCHES)						
TEMPERATURE RANGE AND USAGE (*F)	CONDUCTIVITY BTU?IN./ (H?FT2?*F)	MEAN RATING EMPERATURE, F	<1	1 to < 1½	1½	to 4	4 to < 8	<8
141-200	0.25-0.29	125	1.5	1.5		2	2	2
105-140	0.21-0.28	100	1.0	1.0	1	.5	1.5	1.5
40-60	0.21-0.27	75	0.5	0.5	1	.0	1.0	1.0

- 7. WATER DISTRIBUTION SYSTEM AS PER 2019 (TITLE 14N) CHICAGO ENERGY CONSERVATION CODE 14N C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY IPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
 - THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F
- 8. AS PER 2019 (TITLE 14N) CHICAGO ENERGY CONSERVATION CODE 14N C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.
- 9. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2019 (TITLE 14N) CHICAGO ENERGY CONSERVATION CODE 14N C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE	MAXIMUM (FEET)	PIPING LENGTH
(INCHES)	PUBLIC LAV	OTHER FIXTURES
1/2"	2'	43'
3/4"	0.5'	21'
1"	0.5'	13'
11/4"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'
•	•	-

- 10. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.
- 11. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

C. GAS PIPING:

- 1. GAS PIPING SHALL BE SIZED IN ACCORDANCE WITH PIPE SIZING TABLES OR SIZING EQUATIONS IN ACCORDANCE WITH IFGC 2000 SECTION 402.3(2).
- 2. INDIVIDUAL OUTLETS TO GAS RANGES SHALL NOT BE LESS THAN 34 INCHES NPS.
- 3. METALLIC PIPE SHALL COMPLY WITH SECTIONS
- 403.4.1 THROUGH 403.4.4. 4. PIPING SYSTEM INSTALLATION SHALL COMPLY WITH
- REQUIREMENTS OF IFGC 2000 SECTION 404. 5. AS PER 2000 INTERNATIONAL FUEL GAS CODE. SECTION 404.4 UNDERGROUND PIPING. WHERE INSTALLED BELOW GRADE THROUGH THE OUTER FOUNDATION OR BASEMENT WALL OF A BUILDING, SHALL BE ENCASED IN A PROTECTIVE PIPE SLEEVE.
- THE SLEEVE SHALL BE SEALED. 6. PIPING INSTALLED UNDERGROUND BENEATH BUILDINGS IS PROHIBITED EXCEPT WHERE THE PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE DESIGNED TO WITHSTAND SUPERIMPOSED LOADS. THE CONDUIT SHALL BE PROTECTED FROM CORROSION IN ACCORDANCE WITH

THE ANNULAR SPACE BETWEEN THE GAS PIPING AND

- 7. AS PER 2000 INTERNATIONAL FUEL GAS CODE SECTION 404.9; UNDERGROUND PIPING SYSTEMS SHALL BE INSTALLED A MINIMUM DEPTH OF 12 INCHES BELOW GRADE.
- 8. THE GAS PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE TO WITH STAND THE SUPERIMPOSED LOADS.
- 9. SHUTOFF VALVES SHALL BE LOCATED IN PLACES SO AS TO PROVIDE ACCESS FOR OPERATION AND SHALL BE INSTALLED SO AS TO BE PROTECTED FROM

D. HANGERS AND SUPPORTS:

SECTION 404.11

- NGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM
- SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
- SUPPORTS. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH

ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED

ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES

AND STANDARDS AND THE REQUIREMENTS OF

- AUTHORITIES HAVING JURISDICTION. 5. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE
- 1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2' AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES
- 2. ALL FIXTURES WITH THE EXCEPTION O FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME—PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
- 3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE
- 4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- 5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- 6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

- F. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.
- G. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.
- H. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- I. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- J. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.
- K. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- L. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
- M. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
- ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
- O. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
- WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.
- Q. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

2. INSTALLATION

2.01 GENERAL

R. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO

MAINTAIN ANY EXISTING ROOF WARRANTIES.

- S. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- T. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- U. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- V. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- W. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY. X. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH
- FLANGES AND UNIONS. Y. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
- Z. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
- AA. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.
- AB. THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.

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

TESTING

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

TESTING.

- L. TESTING REQUIREMENTS
- a. TEST ALL DOMESTIC WATER PIPING HYDROSTATICALLY TO 125 PSIG. b. HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO VARIATION FOR 120 MINUTES.
- c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER. d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND
- M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION

ADJACENT TENANT OR ESB SPACES.

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

4. WARRANTY

AS STIPULATED.

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

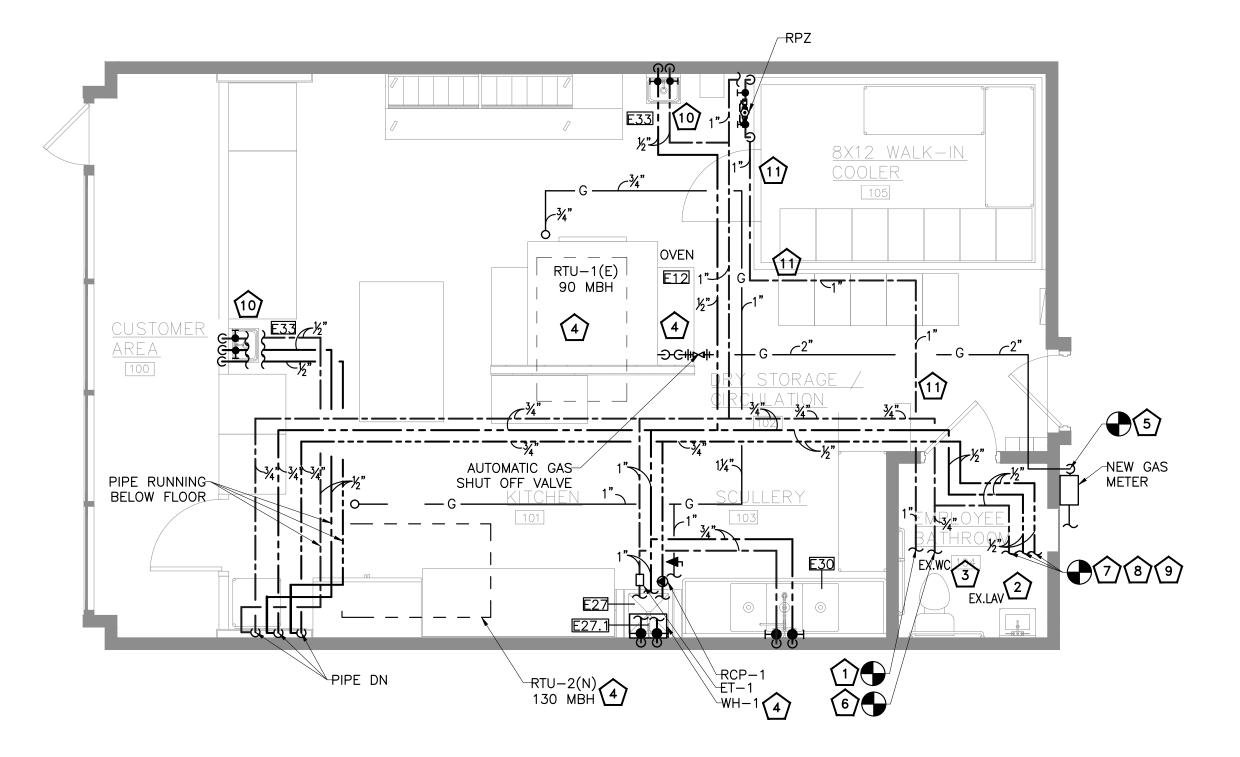
> PLUMBING NOTES, SYMBOLS, ABBREVIATIONS & **SPECIFICATIONS**

PIPING MANUFACTURER. E. VALVES:

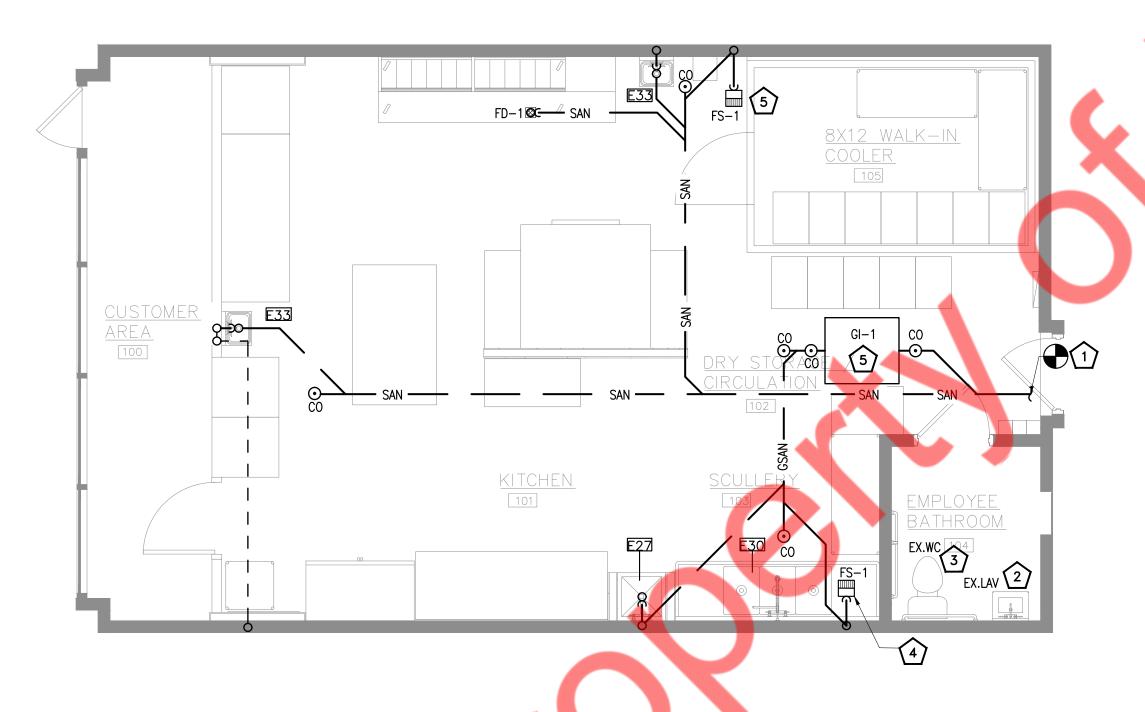
FOR SHUT-OFF DUTY.

SHUT-OFF VALVES ON SUPPLY LINES.

AC. WHEN CONNECTING TO EXISTING STACKS AND RISERS PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.



1 DOMESTIC WATER & GAS PIPING PLAN SCALE: 1/4" = 1'-0"



2 SANITARY PIPING PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

JURISDICTION.

- 1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER CHICAGO ENERGY CONSERVATION CODE 14N(REFER SHEET P1.1)
- 2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
- 3. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- 4. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- 5. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
- 6. WATER HEATER DRAIN SPILLS TO THE MOP SINK.7. PROVIDE TRAP PRIMER FOR FLOOR DRAIN AS PER LOCAL

DOMESTIC WATER, GAS PIPING KEYED NOTES:

- ROUTE NEW 1" CW PIPING WITH SHUT OFF VALVE AND TIE-INTO THE EXISTING WATER LINE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING, WATER SUBMETER AND PROVIDE NEW BFP FOR OUR SPACE REQUIREMENTS WITH LANDLORD.
- EXISTING LAVATORY WITH EXISTING HOT AND COLD WATER LINES WITH ASSOCIATED ACCESSORIES AND FITTINGS TO REMAIN. CONTRACTOR TO VERIFY IN FIELD CONDITION OF EXISTING PIPING AND REPLACED IF REQUIRED.
- EXISTING WATER CLOSET WITH EXISTING HOT AND COLD WATER LINES WITH ASSOCIATED ACCESSORIES AND FITTINGS TO REMAIN. CONTRACTOR TO VERIFY IN FIELD CONDITION OF EXISTING PIPING AND REPLACED IF REQUIRED.
- CONTRACTOR TO FIELD VERIFY EXISTING AVAILABLE GAS PRESSURE AND MAKE SURE TO PROVIDE ADEQUATE INLET PRESSURE REQUIRED FOR OVEN, RTU-1(E), RTU-2(N) AND WATER HEATER.
- CONNECT NEW 2" GAS WITH NEW GAS METER TO EXISTING GAS MAIN IN THIS AREA FOR TENANT. EXTEND NEW PIPING AS INDICATED. FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING MAIN. CONTRACTOR TO COORDINATE WITH LANDLORD/UTILITY COMPANY FOR FINAL GAS METER LOCATION.
- 6 CONNECT NEW 3/4" CW LINE TO EXISTING CW LINE FOR WATER CLOSET. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING COLD WATER LINE IN FIELD.
- CONNECT NEW 1/2" HW LINE TO EXISTING HW LINE FOR LAVATORY.
 CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF
 EXISTING HOT WATER LINE IN FIELD.
- CONNECT NEW 1/2" CW LINE TO EXISTING CW LINE FOR LAVATORY.
 CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF
 EXISTING COLD WATER LINE IN FIELD.
- CONNECT NEW 1/2" HOT WATER RETURN LINE WITHIN 2' OF EXISTING LAVATORY. CONTRACTOR TO FIELD VERIFY EXACT SIZE, LOCATION AND CONDITION OF EXISTING HOT WATER RETURN PIPING. PROVIDE NEW IF NOT EXISTING.
- PROVIDE A TEMPERING VALVE FOR LAVATORIES AND HAND SINK.
 POWER HYDROGUARD SERIES LFLM495, ASSE. 1070 OR EQUAL. SET TEMPERATURE TO A MAXIMUM OF 110 F.
- (11) NO TAP OFF TO BE TAKEN BEFORE BFP

SANITARY KEYED PLAN NOTES:

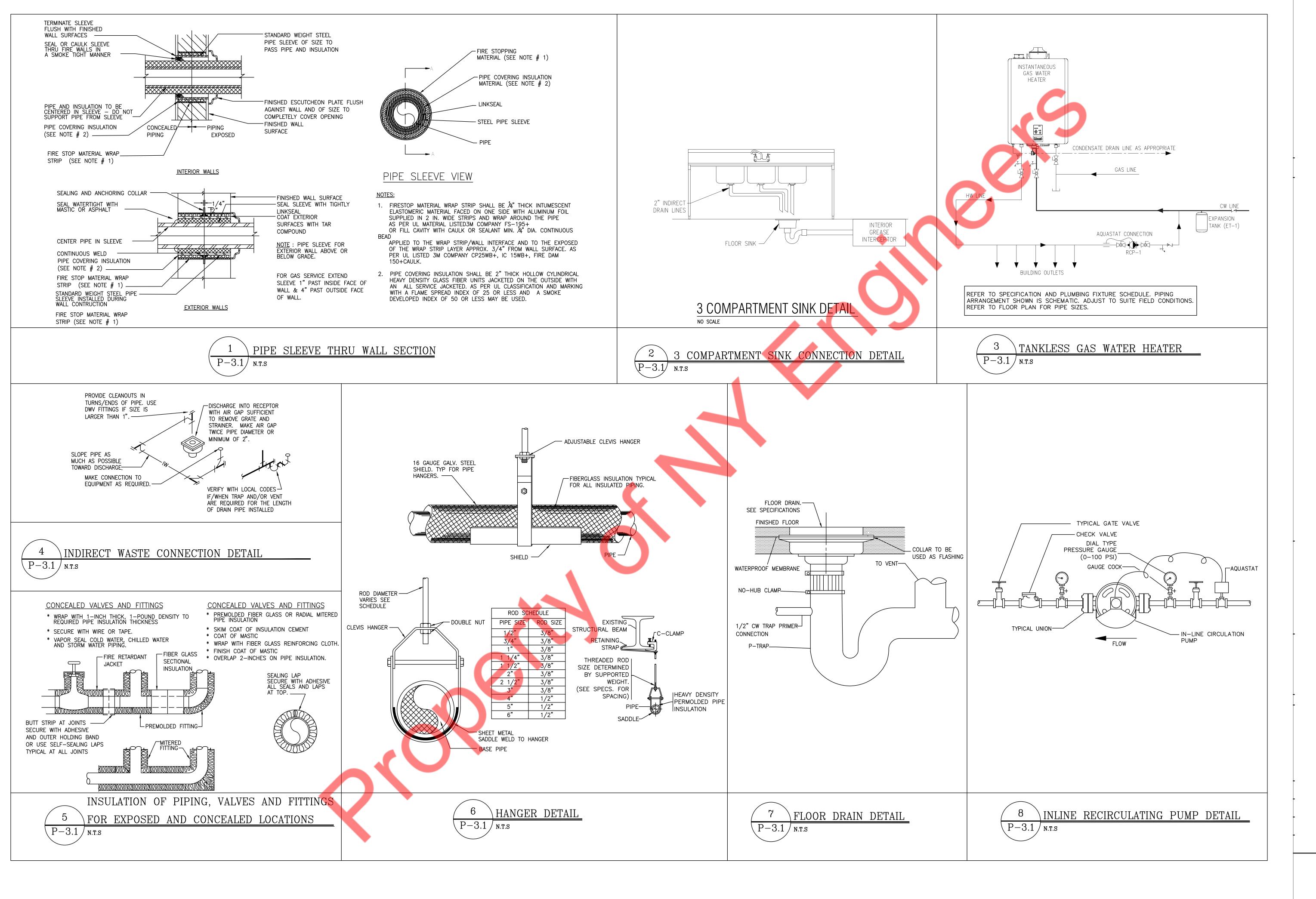
- CONNECT NEW 4" SANITARY WASTE PIPING TO EXISTING SANITARY LINE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT ON SITE.
- EXISTING LAVATORY TO REMAIN WITH EXISTING SANITARY, VENT LINES WITH ASSOCIATED ACCESSORIES AND FITTINGS.
- EXISTING WATER CLOSET TO REMAIN WITH EXISTING SANITARY, VENT LINES WITH ASSOCIATED ACCESSORIES AND FITTINGS.
- indirect waste from 3 compartment sink to floor sink with approved air gap.
- NEW GREASE TRAP SCHIER GB-50 OR EQUIVALENT. GC TO FIELD VERIFY AVAILABILITY OF EXISTING GREASE INTERCEPTOR ON SITE AND NOTIFY SIZE AND LOCATION TO ARCHITECT/OWNER PRIOR TO CONSTRUCTION.
- 5 INDIRECT DRAIN FROM RPZ AND WALK-IN COOLER TO FLOOR SINK WITH APPROVED AIR GAP.

GRAPHIC SCALE: 1/4" = 1'-0"

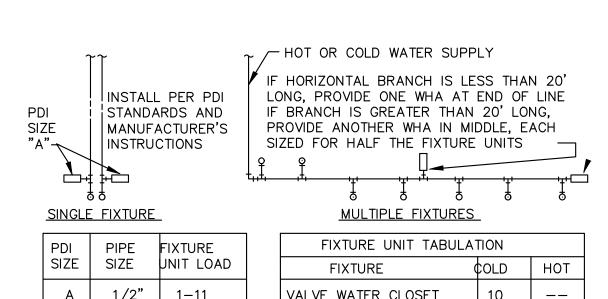
0 4' 8' 12' 16'

PLUMBING FLOOR PLANS

P2.



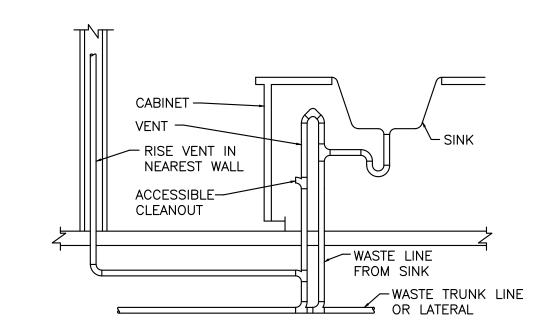
PLUMBING DETAILS

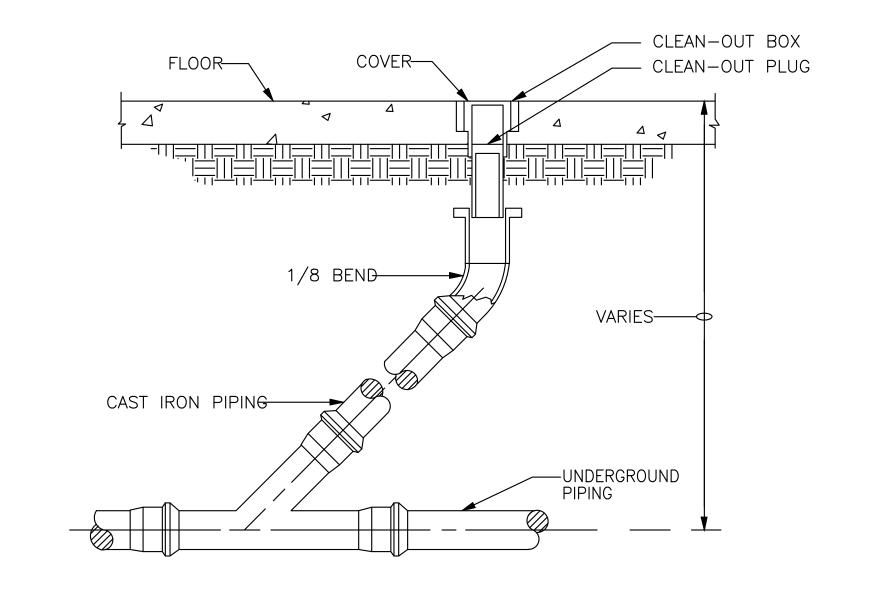


PIPE	FIXTURE] [FIXTURE UNIT TABULA	TION	
SIZE	UNIT LOAD		FIXTURE	¢old	НОТ
1/2"	1-11		VALVE WATER CLOSET	10	
3/4"	12-32		TANK WATER CLOSET	5	
1"	33–60		URINAL	5	
1-1/4"	61–113		LAVATORY/SINK	1.5	1.5
1-1/2"	114-154		JANITOR'S SINK	3	3
2"	154-330		SHOWER/BATHTUB	2	2
	SIZE 1/2" 3/4" 1" 1-1/4" 1-1/2"	SIZE JNIT LOAD 1/2" 1-11 3/4" 12-32 1" 33-60 1-1/4" 61-113 1-1/2" 114-154	SIZE UNIT LOAD 1/2" 1-11 3/4" 12-32 1" 33-60 1-1/4" 61-113 1-1/2" 114-154	SIZE JNIT LOAD FIXTURE 1/2" 1-11 VALVE WATER CLOSET 3/4" 12-32 TANK WATER CLOSET 1" 33-60 URINAL 1-1/4" 61-113 LAVATORY/SINK 1-1/2" 114-154 JANITOR'S SINK	SIZE JNIT LOAD FIXTURE COLD 1/2" 1-11 VALVE WATER CLOSET 10 3/4" 12-32 TANK WATER CLOSET 5 1" 33-60 URINAL 5 1-1/4" 61-113 LAVATORY/SINK 1.5 1-1/2" 114-154 JANITOR'S SINK 3

PC TO PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUIVALENT WITH PISTON AND 0-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN .INSTALL IN LINE WITH WATER FLOW DIRECTION IF POSSIBLE . SIZE THE UNITS AS SHOWN ON THE DRAWINGS AND/OR PER THE TABLES SHOWN ABOVE.

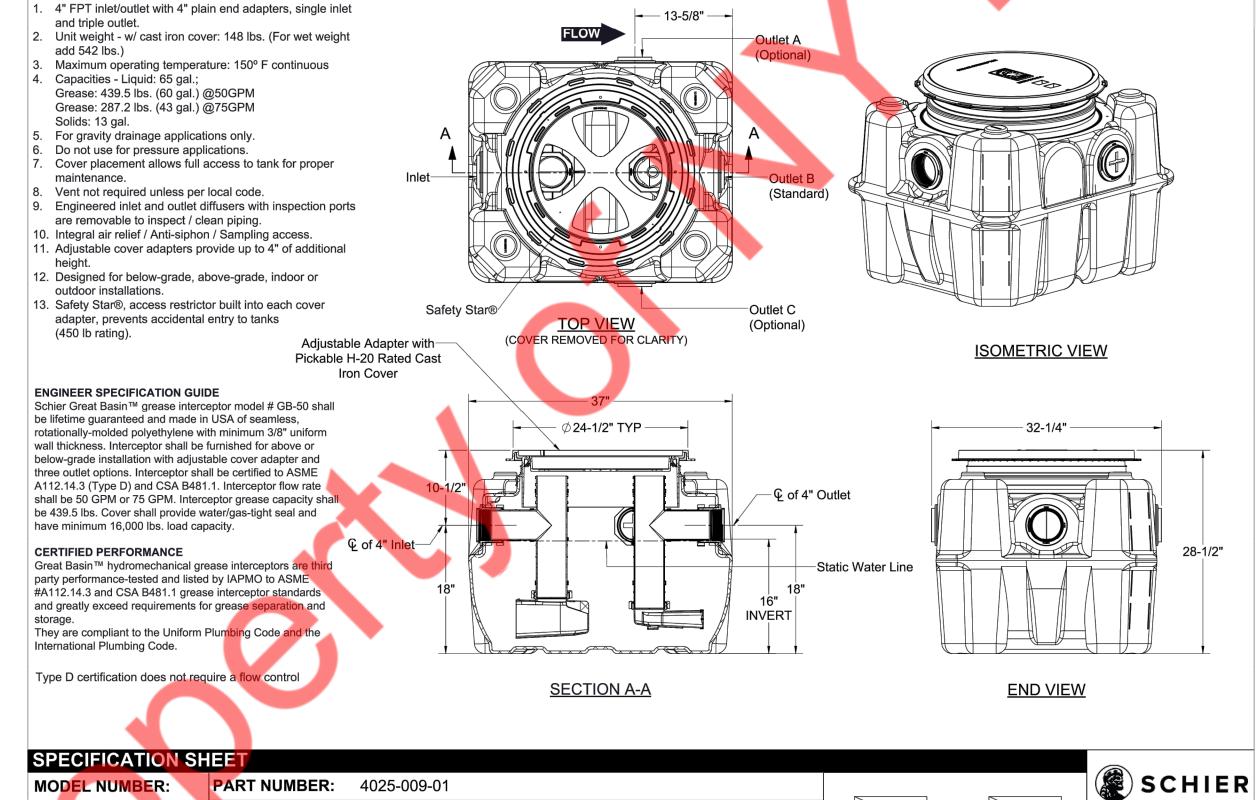






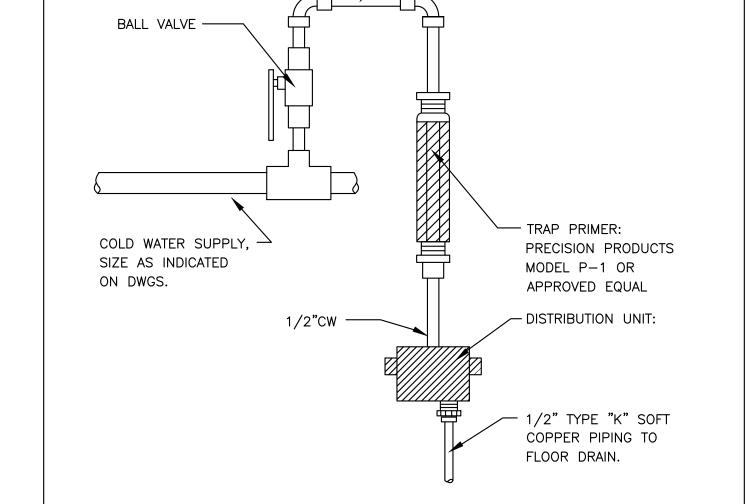






GB-50 GREASE INTERCEPTOR 50 GPM / 75 GPM, 4" INLET/OUTLET, H-20 RATED CAST IRON COVER

DATE: 8/16/2022 **REV:** - **ECO:**



-WALL CLEANOUT

LEADER STACK

WALL CLEANOUT DETAIL

4 TYPICAL ISLAND SINK PLUMBING CONNECTIONS
P-3.2 N.T.S

5 GREASE INTERCEPTOR DETAIL P-3.2 N.T.S

ESCRIPTION:

DWG BY: T.ASAY

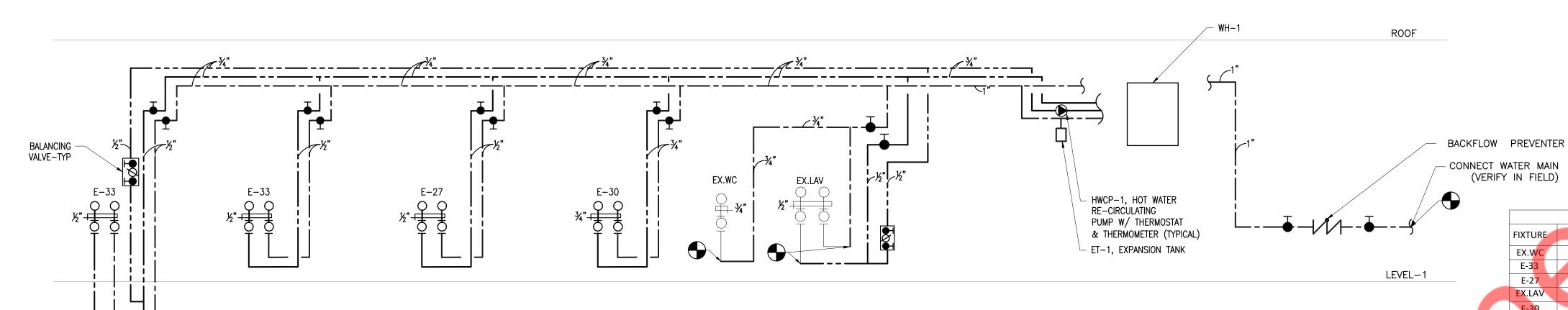
SPECIFICATIONS

6 TRAP PRIMER DETAIL
P-3.2 N.T.S

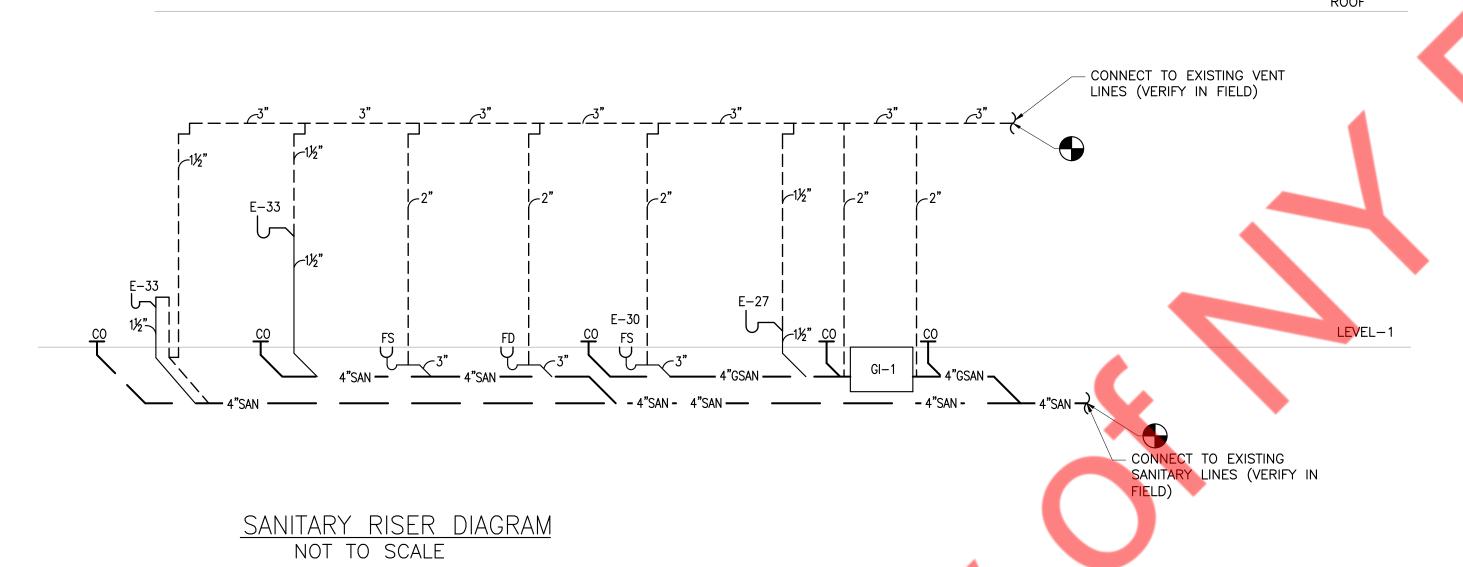
6455 Woodland Dr Shawnee, KS 66218 Tel: 913-951-3300 Fax: 913-951-3399

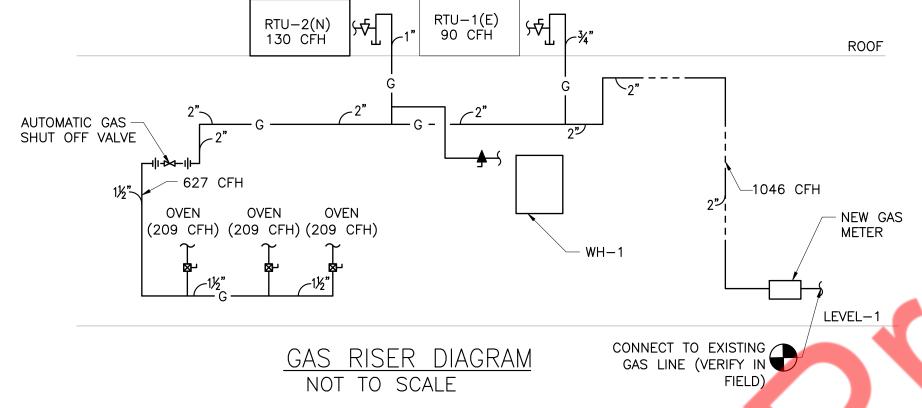
schierproducts.com

PLUMBING DETAILS



DOMESTIC WATER SUPPLY RISER DIAGRAM NOT TO SCALE





		GAS	LOAD SUMMARY			
ITEM NO.	QTY.	DESCRIPTION	MANUFACTURER	MODEL	SIZE	BTU/HR.
RTU-1(E)	1	ROOF TOP UNIT	EXISTING	EXISTING	3/4"	90,000
RTU-2(N)	1	ROOF TOP UNIT	-	-	1"	130,000
E12	3	OVEN	XLT	3265-DS	1-1/2"	627,000
WH-1	1	WATER HEATER	RINNAI	CU199i	1"	199,000
				TOTA	AL LOAD	1046,000

GAS PIPE SIZING PER INTERNATIONAL FUEL GAS CODE 2000
INLET PRESSURE— LESS THAN 2 PSI SPECIFIC GRAVITY— 0.6 PRESSURE DROP 0.5" WC
<u>EQUIVALENT LENGTH OF PIPE =</u> 50 + FITTINGS (+40%) = 70 FEET

GAS NOTE:

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

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

				PLU	MBING FIXTURE	SCHEDULE			
	FIXTURE	QTY.	EQUIPMENT	CATEGORY	DIRECT DRAIN SIZE(IN)	INDIRECT DRAIN SIZE(IN)	VENT	CW	HW
	EX.WC	1	EXISTING WAT	TER CLOSET	Е	E	E	E	Е
	E-33	2	HAND S	SINK	1-1/2"	-	1-1/2"	1/2"	1/2"
	E-27	1	MOP S	SINK	2"	-	1-1/2"	1/2"	1/2"
	EX.LAV	1	EXISTING LA	AVATORY	Е	Е	Е	E	Е
	E-30	1	3 COMPARTI	MENT SINK	-	2"	2"	3/4"	3/4"
	FS	1	FLOOR	SINK	4"	-	2"	-	ı
	FD	2	FLOOR [DRAIN	3"	-	2"	-	ı
	FS	1	FLOOR	SINK	3"	-	2"	-	-
1	NOTE: ALL	FIXTURE	MAY BE SUBST	TTUTED WITH	H APPROVED EQU	JAL. CONTACT OW	/NER FOR	APPROVAL	

		FIX	TURE UNIT	CALCULATI	ON			
			UNI	TS PER FIXT	JRE		TOTAL	
FIXTURE	QTY.	EQUIPMENT CATEGORY	CW	HW	TOTAL	CW	HW	TOTAL
EX.WC	1	EXISTING WATER CLOSET	2.2	-	2.2	2.2	-	2.2
EX.LAV	1	EXISTING LAVATORY	1.5	1.5	2	1.5	1.5	2
E-33	2	HAND SINK	0.5	0.5	0.7	1	1	1.4
E-27	1	MOP SINK	2.25	2.25	3	2.25	2.25	3
E-30	1	3 COMPARTMENT SINK	3	3	4	3	3	4
			TO	TAL FIXTUR	E UNITS	9.95	7.75	12.6
					TOTAL FI	XTURE UNI	TS -12.6 = 1	15.4 GPM
WSFU VAL	UES AS P	ER CHICAGO PLUMBING COD	E SECTION	18-29. TAB	LE 18-29 10).2 PART-1		
FOR 15.4	GPM CA	LCULATED PIPE SIZE IS 1"						

GREASE INTERCEPTOR SCHEDULE										
ITEM	SERVICE	FLOW CAPACITY (GPM)	GREASE CAPACITY (LBS)	LIQUID CAPACITY (GALLON)	MANUFACTURER AND MODEL					
GREASE INTERCEPTOR GI-1	KITCHEN WASTE	50	439.5	65	SCHIER MODEL GB-50					
NOTE- CONTRACTOR TO PER SITE CONDITIONS.	O PROVIDE ALL RE	QUIRED ACCESSO	RIES FOR SATISFACT	ORY WORKING OF	GREASE TRAP AS					

			GREASE	INTERCEPT	OR SIZING	j			
FIXTURE	QTY	DIN	MENSIONS	3	VOLU	JME	%USAGE	GPM	GPM
FIXTURE	QII	LENGTH	WIDTH	DEPTH	CU.IN	GALLONS	70USAGE	1 MIN	2 MIN
3 COMP SINK	01	24	24	14	24192	74.8	0.75	56.1	28
MOP SINK	01	24	24	10	5760	24.9	0.75	18.7	9.3
						TOT	AL GPM	96.2	37.3

	TANKLESS GA	S WATER HEATER SC	HEDULE				
HEATER TAG	LOCATION	ELECTRICAL CHARACTERISTICS	TYPE	GAS CONSUMPTION (BTU/HR)	FLOW RATE (GPM)@90°F	MANUFACTURER /MODEL	WEIGHT (LBS)
WH-1	ABOVE MOP SINK	120V/60HZ	GAS	199,000	4.2	RINNAI/CU199i	64

	RECIRCULATING PUMP SCHEDULE											
ITEM	QUANTITY	GPM	TOTAL	MOTOR	MANUFACTURER &	REMARK						
			HEAD(FT)	HP	MODEL NO							
HWCP-1	1	1	10	0.03	GRUNDFOS	PROVIDE AQUASTAT AND						
110001 1	_		10	0.05	UP 15-10 B5	TIMER KIT FOR CONTROL						

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

PLUMBING RISERS