MECHANICAL SYMBOLS LIST

AC-1 / EF-1	EQUIPMENT SYMBOL
	POINT OF NEW CONNECTION TO EXISTING

AIR DEVICES

	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN/EXHAUST
	SUPPLY GRILLE - SIDEWALL
	RETURN GRILLE - SIDEWALL

DUCT ACCESSORIES

BD	BACKDRAFT DAMPER
MD	MOTORIZED DAMPER

CONTROLS AND SENSORS

T	THERMOSTAT
T_S	TEMPERATURE SENSOR

DUCTWORK

	AIR DUCT W/ 1.5" ACOUSTICAL LINING
	FLEXIBLE DUCT
FC FC	FLEXIBLE CONNECTION
24X12	RECTANGULAR DUCT (WIDTH X DEPTH)
Ø12	ROUND DUCT (DIAMETER)
	ROUND DUCT CROSS SECTION
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION

MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AL	ACOUSTIC LINING
BD	BACKDRAFT DAMPER
CDS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
CP	CONDENSATE PUMP
CD	CONDENSATE DRAIN PIPE
EF	EXHAUST FAN
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
FD	FIRE DAMPER W/FUSIBLE LINK
FSD	FIRE SMOKE DAMPER
MD	MOTORIZED DAMPER
OAI	OUTSIDE AIR INTAKE
T-X	THERMOSTAT
VD	VOLUME DAMPER
W.M.S.	WIRE MESH SCREEN
S.A.E	SAME AS EXISTING
V.I.F	VERIFY IN FIELD
CU	CONDENSING UNIT
AC	AIR CONDITIONING UNIT

MECHANICAL DRAWING LIST

M0.01	MECHANICAL GENERAL NOTES, SYMBOL LIST AND ABBREVIATIONS
M0.02	MECHANICAL SPECIFICATIONS
M1.01	MECHANICAL FLOOR AND PARTIAL ROOF PLANS
M5.01	MECHANICAL DETAILS
M6.01	MECHANICAL SCHEDULES

CODE COMPLIANCE

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

A. 2024 INTERNATIONAL BUILDING CODE

B. 2024 UNIFORM MECHANICAL CODE

C. 2024 INTERNATIONAL PLUMBING CODE

D. 2024 INTERNATIONAL FIRE CODE

E. 2023 NATIONAL ELECTRICAL CODE

F. 2024 INTERNATIONAL ENERGY CONSERVATION CODE.

TEXAS BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2024 BUILDING CODE AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. THE CONTRACTOR SHALL ENGAGE THE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
2. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2024 BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].
3. 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.
4. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE 2024 UNIFORM MECHANICAL CODE:
   A. MECHANICAL VENTILATION - SECTION 402.3
5. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   A. STANDARDS OF HEATING - 2024 UMC
   B. DUCT CONSTRUCTION AND INSTALLATION - 2024 UMC 602 & 603
   C. AIR INTAKES, EXHAUSTS AND RELIEF - 2024 UMC 401
   D. AIR FILTERS - 2024 UMC 311.2
   E. SMOKE DETECTION CONTROL SYSTEM - 2024 UMC 609.1
6. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
7. VENTILATION OF ALL AREA SHALL COMPLY WITH 2024 UMC 401.
8. 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 UMC 2024 CHAPTER 4.
9. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
10. 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.
11. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
12. AIR BALANCING REPORT SHALL BE PROVIDED IN ACCORDANCE WITH 2024 IECC C408.2.2.

FIELD VERIFY ALL CONDITION

DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THE CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS. THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS TO THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST. BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

SCOPE OF WORK

A. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLANS, DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

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

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

Property of MY Engineers

GENERAL NOTES

1. CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
3. BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
4. 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.
5. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL MAKE ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE OTHER TRADES IS REQUIRED.
6. 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. 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.
7. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTWORK, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
8. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT REQUIRED TO BE WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
9. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
10. 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.
11. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
12. 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.
13. 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.
14. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
15. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
16. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
18. 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.
19. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
20. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
21. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
22. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.
23. 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.

DEFINITIONS:

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

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.
4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
6. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
8. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
11. PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO, AND WITHIN 50 FT. OF, ISOLATED EQUIPMENT (EXCEPT AT BASE ELBOW SUPPORTS AND ANCHOR POINTS).
12. LOCATE ALL TEMPERATURE, PRESSURE, 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.
13. 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.
14. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
15. 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.
16. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
17. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
18. 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.
19. ALL ROOF-MOUNTED EQUIPMENT CURBS/STEEL RAILS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
20. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
21. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
22. ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
23. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.

MEGAFORMER

MECHANICAL GENERAL NOTES, SYMBOL LIST & ABBREVIATIONS

M0.01

SPECIFICATIONS

SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

A. THE BIDDER BY MAKING A BID REPRESENTS THAT:

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

B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.

C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.

D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.

E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.

B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.

B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON-TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.

C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.

B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.

C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

1.2 CODE COMPLIANCE

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

END OF SECTION 0101

SECTION 0102 -REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

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

1.2 SUBMITTALS

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

1.3 RECORD DRAWINGS

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

1.4 EQUIPMENT OPERATING INSTRUCTIONS

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

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

C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 078413-PENETRATION FIRE-STOPPING

1.1 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR.

B. FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL

1.2 PENETRATION FIRESTOPPING

A. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479.

B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS PER ASTM E 814 OR UL 1479:

C. PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.

D. W-RATINGS: PER UL 1479.

1.3 INSTALLATION

A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.

1.4 FIELD QUALITY CONTROL

A. INSPECTION OF INSTALLED FIRE-STOPPING: BY OWNER-ENGAGED AGENCY ACCORDING TO ASTM E 2174.

1.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

FOR THE FOLLOWING SYSTEMS:

METALLIC AND NON-METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:

a. LATEX SEALANT
b. SILICONE SEALANT
c. INTUMESCENT PUTTY
d. MORTAR
e. SILICONE FOAM
f. PILLOWS/BAGS
g. INTUMESCENT WRAP STRIPS
h. INTUMESCENT COMPOSITE SHEET

1.6 MANUFACTURERS

A. HILTI CONSTRUCTION CHEMICAL, INC

B. TREMCO INC.

C. 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:

1. MOTORS.
2. CONDENSING UNITS.
3. AIR SYSTEM: 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 VALUES.

I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.

J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING

PART 1 - PRODUCTS

1.1 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.

1.2 FLOOR PLATES

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

PART 2 - EXECUTION

2.1 INSTALLATION

A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.

B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.

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

2.2 FIELD QUALITY CONTROL

A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND
3. DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.

1.2 SUBMITTALS

A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

1.3 QUALITY ASSURANCE

A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."

1.4 COMPONENTS

A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL

B. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE

D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER

E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE

F. THERMAL-HANGER SHIELD INSERTS:

G. FASTENER SYSTEMS: 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 233713 - DIFFUSERS, REGISTERS, AND GRILLES

1.1 PRODUCTS

A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.

B. MANUFACTURERS: TITUS

1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:

a. METALAIRE, INC.

b. RUSKIN

C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713

SECTION 230548 - VIBRATION CONTROLS FOR PIPING AND HVAC EQUIPMENT

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. SEISMIC-RESTRAINT LOADING:

1. SITE CLASS AS DEFINED IN THE IBC: A, B
2. ASSIGNED SEISMIC USE GROUP OR BUILDING CATEGORY AS DEFINED IN THE IBC: I II III
   a. COMPONENT IMPORTANCE FACTOR: 1.0
   b. COMPONENT RESPONSE MODIFICATION FACTOR: 2.5
   c. COMPONENT AMPLIFICATION FACTOR: 2.5.
3. DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (0.2 SECOND) 18%
4. DESIGN SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIOD: 8%

1.2 COMPONENTS

A. VIBRATION ISOLATORS:

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

B. AIR-MOUNTING SYSTEMS:

1. MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLOWS.
2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOWS.

C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.

D. VIBRATION ISOLATION EQUIPMENT BASES:

1. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.
2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

1.3 FIELD QUALITY CONTROL

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

PART-2 PRODUCTS

1.4 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. ACE MOUNTINGS CO., INC.
2. AMBER/BOOTH COMPANY, INC.
3. CALIFORNIA DYNAMICS CORPORATION.
4. COOPER B-LINE, INC.; A DIVISION OF COOPER INDUSTRIES.
5. HILTI, INC.
6. ISOLATION TECHNOLOGY, INC.
7. KINETICS NOISE CONTROL.
8. LOOS & CO.; CABLEWARE DIVISION.
9. MASON INDUSTRIES.
10. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
11. UNISTRUT; TYCO INTERNATIONAL, LTD.
12. VIBRATION ELIMINATOR CO., INC.
13. VIBRATION ISOLATION.
14. VIBRATION MOUNTINGS & CONTROLS, INC.

END OF SECTION 230548

SECTION 233113 - METAL DUCTS

1.1 CONSTRUCTION

A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 1 INCH WG PRESSURE, SEAL CLASS "A".

B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:

1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH. USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
2. SHEET STEEL SHALL COMPLY WITH ASTMA653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY-COATED (GALVANINEALED) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METALLIC-COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT-RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.
5. PROVIDE EXPANDED TAKE-OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90-DEGREE TAKE-OFF FITTINGS OR TRAIGHT TAPS WILL NOT BE ACCEPTED.
6. BUTTON PUNCH SNAP-LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.

C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

SUPPORT SCHEDULE - DUCTWORK

USG	MAX SIDE INCHES	TRANSVERSE JOINT AND BRACING
22	UP TO 12	S SLIP, DRIVE, ONE INCH POCKET ON 8 FOOT
22	13 TO 24	1"X1"X1/8" ANGLES ON 4 FOOT CENTERS
20	25 TO 35	1"X1"X1/8" ANGLES ON 2 FOOT CENTERS

D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:

1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.

E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS

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

1.2 MATERIALS

A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.

B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.

C. SHEET METAL MATERIALS:

1. GALVANIZED SHEET STEEL.
1. STAINLESS-STEEL SHEETS.
2. ALUMINUM SHEETS.
3. FACTORY-APPLIED ANTI-MICROBIAL COATING.

D. DUCT LINER:

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

E. SEALANT MATERIALS:

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

1.3 DUCT SCHEDULE

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

1. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

SECTION 230713 - DUCT INSULATION

1.1 QUALITY ASSURANCE

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

1.2 FIELD QUALITY CONTROL

A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;

A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:

B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET,

MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:

UNCONDITIONED SPACES WITHIN BUILDING: R-6
WITHIN BUILDING ENVELOPE ASSEMBLY: R-8
OUTSIDE OF BUILDING: R-8

1.4 ITEMS NOT INSULATED:

1. FIBROUS-GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.
3. FACTORY-INSULATED FLEXIBLE DUCTS.
4. FACTORY-INSULATED PLENUMS AND CASINGS.
5. FLEXIBLE CONNECTORS.
6. VIBRATION-CONTROL DEVICES.
7. FACTORY-INSULATED ACCESS PANELS AND DOORS.
8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

1.5 PRODUCTS

A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:

1. JOHNS-MANVILLE
2. OWENS-CORNING

1.6 ACOUSTICAL TREATMENT

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

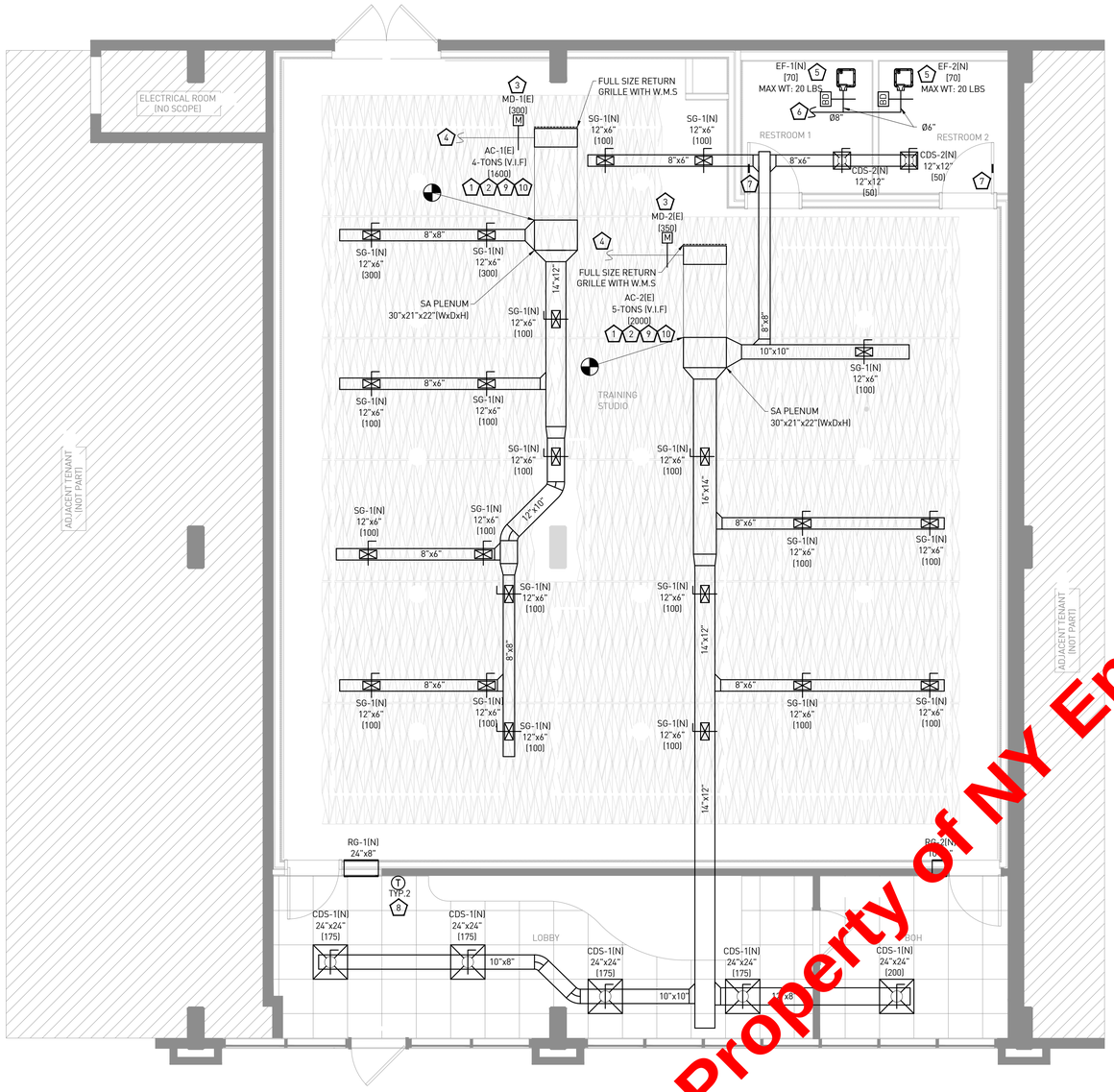
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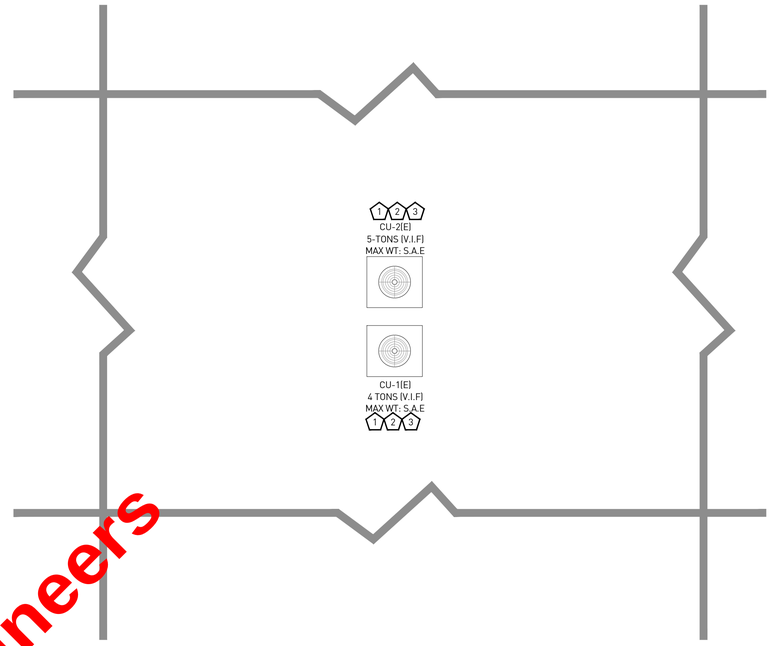
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MECHANICAL SPECIFICATIONS

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GENERAL NOTES:

A. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
B. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
D. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND OWNER.
E. ALL EXPOSED ROUND DUCTWORK SHALL BE INTERNALLY LINED. ALL DUCTWORK DIMENSIONS ARE INSIDE CLEAR.
F. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.
G. PROVIDE MINIMUM R-8 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.
H. ALL SUPPLY AND RETURN AIR PLENUMS SHALL BE STENCILED WITH INDOOR UNIT NUMBERS FOR IDENTIFICATION.
I. KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.

MECHANICAL FLOOR PLAN KEY NOTES

1. EXISTING AC UNIT TO REMAIN ALONG WITH REFRIGERANT PIPING AND ALL ACCESSORIES AND SUPPORTS. VERIFY EXACT LOCATION ON FIELD. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS/IF REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. NOTIFY ARCHITECT/OWNER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK.
2. EXISTING CONDENSATE DRAIN TO REMAIN AS IS FOR EXISTING AC UNITS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINE.
3. EXISTING MOTORIZED DAMPERS REMAIN SAME & REUSED. INTERLOCK WITH RESPECTIVE AC UNITS FOR CONTROL OF OUTSIDE AIR. CONTRACTOR TO FIELD VERIFY THE EXACT SIZE AND LOCATION OF EXISTING OUTSIDE AIR DUCT PRIOR TO BID. BALANCE THE OUTSIDE AIR CFM AS PER MECHANICAL SCHEDULES.
4. EXISTING OUTSIDE AIR DUCTWORK TO REMAIN & TO BE REUSED. CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. VERIFY EXACT LOCATION AND SIZE PRIOR TO BID.
5. PROVIDE A NEW CEILING MOUNTED LIGHT COMBINATION EXHAUST FAN. CONTRACTOR TO INSTALL FAN AS PER MANUFACTURER'S RECOMMENDATION. INTERLOCK EXHAUST FAN WITH THE LIGHT SWITCH. COORDINATE WITH THE ELECTRICAL CONTRACTOR.
6. ROUTE Ø8" EXHAUST DUCT & CONNECT TO EXISTING EXHAUST TERMINATION. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION ON SITE.
7. PROVIDE 6"X6" DOOR GRILLE FOR AIR TRANSFER.
8. RELOCATE & REUSE EXISTING THERMOSTAT. IF EXISTING THERMOSTAT IS NOT IN GOOD CONDITION TO REUSE, THEN INSTALL & WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. CONTRACTOR TO FIELD VERIFY PRIOR TO BID. COORDINATE EXACT LOCATION WITH ARCHITECT & OWNER PRIOR TO ROUGH-IN.
9. REUSE EXISTING REMOTE TEMP. SENSOR MOUNTED IN RETURN AIR DUCT. PROVIDE NEW IF EXISTING TEMP. SENSORS ARE DAMAGED OR NOT WORKING PROPERLY. CONTRACTOR TO VERIFY IN FIELD PRIOR TO BID.
10. EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM EXISTING AC UNITS TO SPACE. EXTEND AS SHOWN. TRANSITION DUCT AS NECESSARY TO MAKE CONNECTION. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.

GENERAL NOTES

A. COORDINATE LOCATION 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. ALL SOURCE OF MECHANICAL INTAKE SHALL REMAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTHS AS NEEDED.
E. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO GENERAL CONTRACTOR AND OWNER.
F. KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.

MECHANICAL ROOF PLAN KEY NOTES:

1. EXISTING CONDENSING UNIT TO REMAIN AND TO BE REUSED ALONG WITH THE REFRIGERANT PIPING AND ALL ACCESSORIES AND SUPPORTS. CONTRACTOR TO FIELD VERIFY WORKING CONDITION OF EXISTING UNITS. CLEAN AND REFURBISH TO "LIKE-NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS/IF REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. VERIFY EXACT LOCATION OF CONDENSING UNIT IN FIELD. NOTIFY ARCHITECT/OWNER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK.
2. REUSE EXISTING REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNIT AS PER MANUFACTURER'S RECOMMENDATION. PROVIDE WEATHER PROOF COATING FOR EXPOSED PIPING. PROVIDE INSULATION TO REFRIGERANT PIPING AS PER ENERGY CONSERVATION CODE.
3. COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL ENGINEER/DRAWINGS.

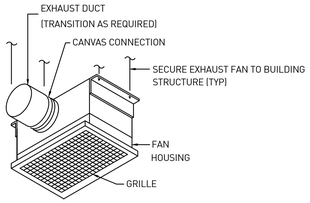
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MECHANICAL FLOOR AND PARTIAL ROOF PLANS

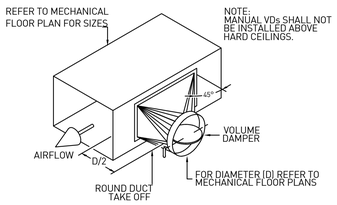
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MECHANICAL FLOOR AND PARTIAL ROOF PLANS 1

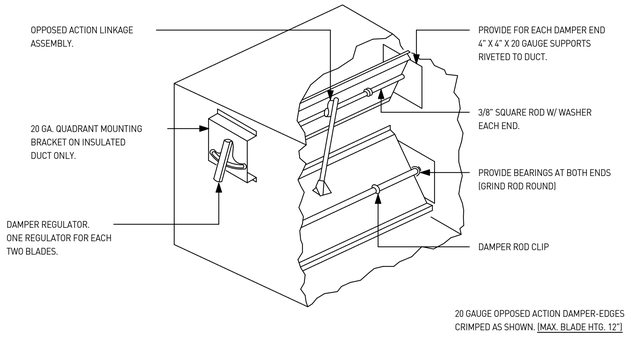
1/4" = 1'-0"



1 M5.01 CEILING EXHAUST FAN DETAIL
N.T.S

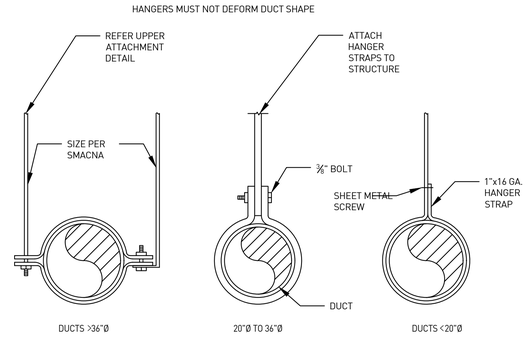


2 M5.01 ROUND DUCT TAKE OFF DETAIL
N.T.S

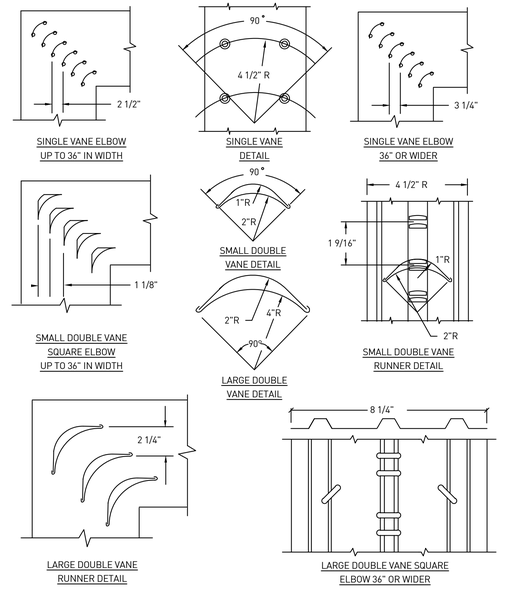


NOTE : 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

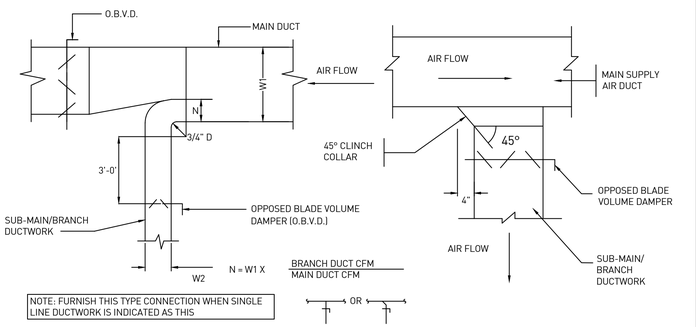
3 M5.01 LOW PRESSURE BALANCING DAMPER
N.T.S



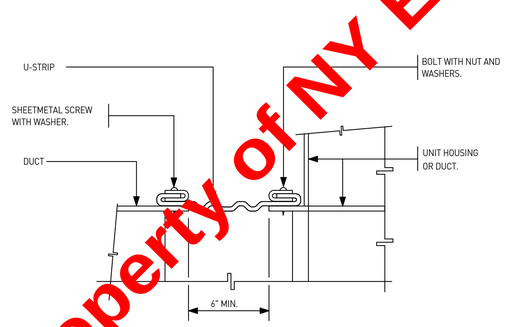
4 M5.01 ROUND DUCT SUPPORT DETAIL
N.T.S



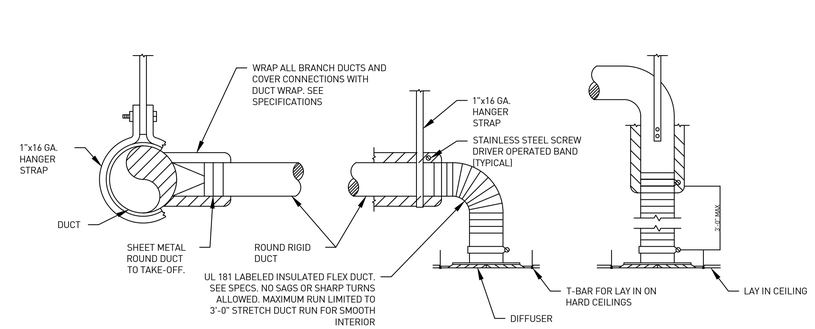
5 M5.01 LOW VELOCITY DUCTWORK ELBOWS
N.T.S



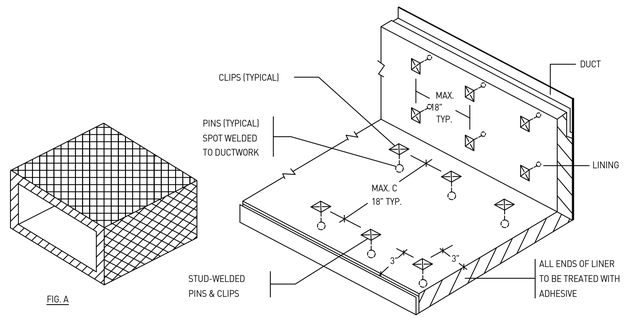
6 M5.01 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
N.T.S



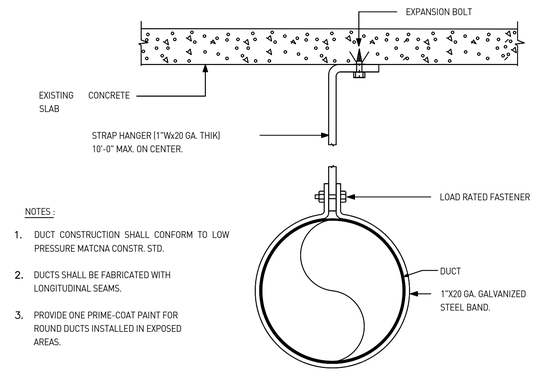
7 M5.01 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)
N.T.S



8 M5.01 TYPICAL DIFFUSER CONNECTION DETAIL
N.T.S



9 M5.01 ACOUSTICAL TREATMENT DUCT LINING
N.T.S



10 M5.01 METHOD OF HANGING DUCTWORK
N.T.S

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MECHANICAL DETAILS

M5.01

EXISTING CONDENSING UNITS SCHEDULE (OUTDOOR)

MAKE : S.A.E

TAG	LOCATION	INDOOR UNITS SERVED	CAPACITY (TON)	TOTAL COOLING CAP. (MBH)	COMPRESSOR TYPE	UNIT DIMENSIONS IN.(HxWxD)	WEIGHT (LBS)	PIPING DIAMETER		ELECTRICAL DATA			EER	SEER	SOUND RATING (DBA)	MODEL
								LIQUID	GAS	PH./V/Hz	MCA (A)	MOCP (A)				
CU-1(E)	SEE PLAN	AC-1(E)	4 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E
CU-2(E)	SEE PLAN	AC-2(E)	5 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E

NOTES :-

1. S.A.E :- SAME AS EXISTING, V.I.F:- VERIFY IN FIELD.
2. EXISTING UNIT WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.
3. CONTRACTOR TO CONFIRM IF EXISTING CONDENSING UNIT IS WORKING AT ITS 100% RATED CAPACITY. REPAIR AS NEEDED.
4. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION ON SITE.
5. REUSE EXISTING REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNIT AS PER MANUFACTURER'S RECOMMENDATION. PROVIDE WEATHER PROOF COATING FOR EXPOSED PIPING. PROVIDE INSULATION TO REFRIGERANT PIPING AS PER ENERGY CONSERVATION CODE.

EXISTING AIR CONDITIONING UNIT SCHEDULE (INDOOR)

MAKE: GOODMAN (V.I.F)

TAG	AREA SERVED	TYPE	CAPACITY (TON)	TOTAL COOLING CAP. (MBH)	SENSIBLE COOLING CAP. (MBH)	SUPPLY AIRFLOW (CFM)	OUTDOOR AIR (CFM)	EXTERNAL STATIC PRESSURE (IN. WC)	ELECTRICAL DATA			DIMENSIONS (HxWxD) (IN.)	REFRIGERANT PIPE SIZE (IN.)			WEIGHT (LBS.)	MODEL NO.
									PH/VOLT/HZ	MCA (A)	MOCP (A)		LIQUID	GAS	DRAIN		
AC-1(E)	SEE PLAN	S.A.E	4 (V.I.F)	S.A.E.	S.A.E.	1600 (V.I.F)	300	S.A.E	1/208-230/60 (V.I.F)	5 (V.I.F)	15 (V.I.F)	S.A.E	S.A.E	S.A.E	S.A.E	S.A.E	ARUF48D14AA (V.I.F)
AC-2(E)	SEE PLAN	S.A.E	5 (V.I.F)	S.A.E.	S.A.E.	2000 (V.I.F)	350	S.A.E.	1/208-230/60 (V.I.F)	6 (V.I.F)	15(V.I.F)	S.A.E.	S.A.E	S.A.E	S.A.E	S.A.E.	ARUF60D14AA (V.I.F)

NOTES :-

1. S.A.E :- SAME AS EXISTING, V.I.F:- VERIFY IN FIELD.
2. EXISTING AC WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.
3. CONTRACTOR TO CONFIRM IF UNITS ARE WORKING AT ITS 100% RATED CAPACITY.
4. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF UNITS ON SITE.
5. EXISTING THERMOSTAT AND TEMPERATURE SENSORS TO REMAIN AND REUSE, IF REQUIRED PROVIDE NEW. COORDINATE FINAL LOCATION OF T-SENSOR WITH ARCHITECT/OWNER.
6. CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING AC TO MATCH VALUES MENTIONED IN ABOVE TABLE.
7. THE CONTRACTOR SHALL INSTALL ALL NEW FILTERS IN EXISTING AND/OR NEW UNITS PRIOR TO TEST & BALANCE WORK OR JUST BEFORE TURNOVER TO OPERATOR.
8. PROVIDE CONDENSATE PUMP AS/IF REQUIRED.

FAN SCHEDULE

TAG	QUANTITY	LOCATION	FLOW RATE	ELECTRIC DATA				WEIGHT	BASIS OF DESIGN		NOTES
				SPEED	INPUT WATT	V/PH/HZ	FLA (A)				
			CFM	RPM				LBS.	MANUFACTURER	MODEL	
EF-1(N), EF-2(N)	2	SEE PLAN	70	773	16	115/60/1	0.29	20	GREENHECK (OR EQUIVALENT)	SP-LP-0511-1 (OR EQUIVALENT)	1-4

NOTES:-

1. INTERLOCK FAN WITH RESTROOM LIGHT SWITCH.
2. PROVIDE FACTORY MOUNTED AND INSTALLED DISCONNECT.
3. PROVIDE ACCESS DOOR TO SERVICE UNIT IF IN HARD CEILING.
4. PROVIDE BACK DRAFT DAMPER, AMCA SEAL & UL CERTIFIED & THERMAL OVERLOAD PROTECTION.

HVAC MATERIALS SCHEDULE

SYSTEM	MATERIAL	INSULATION
SUPPLY/RETURN (INDOORS)		R-8
SUPPLY/RETURN (OUTDOORS)	G-90 OR BETTER GALVANIZED SHEET METAL, SEALED	R-8
GENERAL EXHAUST		N/A
SUPPLY/RETURN FLEX DUCT	UL 181 HELICAL SPRING STEEL W/ VINYL FILM	R-8
CONDENSATE DRAIN (INDOORS)	TYPE L COPPER	R-3
CONDENSATE DRAIN (OUTDOORS)	TYPE L COPPER	N/A
REFRIGERANT PIPING (SUCTION)	TYPE K COPPER	R-3
REFRIGERANT PIPING (LIQUID)	TYPE K COPPER	N/A
NOTES:		
A. LOW PRESSURE DUCT THICKNESS WHEN LARGE DIMENSION IS:		
a. UP TO 12" 26 GA		
b. 13" TO 30" 24 GA		
c. 21" TO 54" 22 GA		
B. REFER TO EQUIPMENT MANUFACTURER'S INSTALLATION MANUAL FOR REFRIGERANT PIPING SIZE AND LINE LENGTH LIMITATIONS.		
C. ALL MATERIALS LOCATED IN ANY RETURN AIR PLENUM SHALL BE RATED WITH A 25/50 FLAME SPREAD/SMOKE RATING. MECHANICAL CONTRACTOR SHALL ADVISE OTHER TRADES OF MATERIALS REQUIREMENTS WHERE NECESSARY.		
D. NOT ALL SYSTEMS MAY APPEAR IN		

MECHANICAL AIR TERMINAL DEVICES SCHEDULE

TAG	SIZE (IN.)	DESCRIPTION	CONSTRUCTION	BASIS OF DESIGN		NOTES
				MANUFACTURER	MODEL	
SG-1 (N)	12"x6"	DOUBLE DEFLECTION SUPPLY GRILLE	ALUMINUM	TITUS	300FL	1-4
RG-1(N)	24"x8"	ALUMINUM EGGCRATE RETURN, ALUMINUM BORDER AND GRID	ALUMINUM	TITUS	50F	1-4
RG-2(N)	10"x6"	ALUMINUM EGGCRATE RETURN, ALUMINUM BORDER AND GRID	ALUMINUM	TITUS	50F	1-4
CDS-1(N)	24"x24"	ALUMINIUM HIGH PERFORMANCE THREE CONE DIFFUSER	ALUMINUM	TITUS	TMS-AA	1-4
CDS-2(N)	12"x12"	ALUMINIUM HIGH PERFORMANCE THREE CONE DIFFUSER	ALUMINUM	TITUS	TMS-AA	1-4

NOTES:

1. UNLESS OTHERWISE NOTED, BRANCH DUCTS SERVING AIR DEVICES SHALL BE SAME SIZE AS NECK OF AIR DEVICE.
2. PROVIDE FRAMES FOR SURFACE MOUNTING IN AREAS WITH HARD CEILINGS.
3. COORDINATE FINAL COLOUR/FINISH WITH ARCHITECT/OWNER.
4. MENTIONED SIZES ON PLAN ARE NECK SIZE OTHER THAN SQUARE FACE DIFFUSERES.

FOR ROUND NECK DIFFUSER NECK SIZE SHALL BE :

16"DIA : 751-900
14" DIA : 551-750
12" DIA : 401-550
10" DIA : 226-400
8" DIA : 101-225
6" DIA : 0-100

VENTILATION CALCULATION

ROOM NAME	AREA (SQ.FT.)	NUMBER OF PEOPLE/1000sq.ft AS PER UMC 2024	NUMBER OF PEOPLE AS PER UMC 2024	FINAL PEOPLE NO.	MIN OUTSIDE AIR AS PER UMC 2024		CFM REQ. OA (CFM)	PROVIDED OA (CFM)	EXHAUST AIRFLOW RATE (CFM/SQ.FT OR /FIXT.)	TOTAL EXHAUST (CFM)	PROVIDED EXHAUST (CFM)
					CFM/PEOPLE	CFM/SQ.FT					
LOBBY	295	10	3	3	5	0.06	33	650	0	0	0
BOH	104	5	1	1	5	0.06	11		0	0	0
TRAINING STUDIO	1803	7	13	13	20	0.18	585		0	0	0
RESTROOM-1	58	0	0	0	0	0	0		70	70	70
RESTROOM-2	58	0	0	0	0	0	0		70	70	70
TOTAL	**2318**	**-**	**17**	**17**	**-**	**-**	**628**	**650**	**-**	**140**	**140**

AIR BALANCE

UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
AC-1(E)	SEE PLAN	1600 CFM	300 CFM	1300 CFM	-
AC-2(E)	SEE PLAN	2000 CFM	350 CFM	1650 CFM	-
EF-1(N)	SEE PLAN	-	-	-	70 CFM
EF-2(N)	SEE PLAN	-	-	-	70 CFM
	TOTAL:	3600 CFM	650 CFM	2950 CFM	140 CFM
	BUILDING PRESSURE:	.....		510 CFM	**POSITIVE**

1. CONTRACTOR TO ADJUST MOTORIZED DAMPER ON OUTSIDE AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE.

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MECHANICAL SCHEDULES

M6.01

GENERAL LIGHTING NOTES

A. THE CONTRACTOR SHALL VERIFY EXACT LIGHTING FIXTURES, FINISHES, TRIM, COLOR TEMPERATURES AND ETC. WITH ARCHITECTS PRIOR TO PROCUREMENT.

B. REFER TO ARCHITECTURAL PLANS AND DETAILS FOR EXACT LOCATION AND MOUNTING REQUIREMENTS FOR ALL DIMMERS, AND SWITCHES.

C. CONTRACTOR SHALL COORDINATE WITH THE ARCHITECTURAL REFLECTED CEILING PLANS AND SITE PLAN FOR LIGHTING FIXTURE TYPES, QUANTITIES, AND LOCATIONS.

D. VERIFY THE TYPE OF CEILING SYSTEM WITH GENERAL CONTRACTOR OR CEILING CONTRACTOR. PROVIDE FIXTURES WHICH ARE COMPATIBLE WITH THE CEILING SYSTEM AND INCLUDE ALL REQUIRED MOUNTING ACCESSORIES AND HARDWARE.

E. NO EQUIPMENT JUNCTION BOXES, ETC. REQUIRING ACCESS SHALL BE LOCATED IN HARD CEILING AREAS (UNLESS ACCESS PANEL IS PROVIDED AND APPROVED BY THE ARCHITECT).

F. DRAWING SHOWS CIRCUITING, SWITCHING/DIMMING REQUIREMENTS, AND FIXTURE TYPES ONLY. VERIFY EXACT LIGHTING FIXTURES AND SWITCHING REQUIREMENTS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.

G. ANY FIXTURE SUBSTITUTION MUST BE APPROVED BY THE ARCHITECT, OWNER AND/OR LIGHTING DESIGNER PRIOR TO BID. CONTRACTOR MUST BE PREPARED TO SUPPLY A SAMPLE AND/OR PHOTOMETRIC DATA IF REQUIRED. IF SUBSTITUTION IS REJECTED, CONTRACTOR MUST BE PREPARED TO PROVIDE SPECIFIED PRODUCT WITHOUT DELAY.

H. SUPPORT CEILING MOUNTED LIGHTING FIXTURES DIRECTLY FROM THE BUILDING STRUCTURE. DO NOT SUPPORT FIXTURES FROM PIPING, DUCTWORK OR ANY OTHER EQUIPMENT, OR SOLELY FROM THE SUSPENDED CEILING.

I. ALL PENDANT FIXTURES SHALL BE PROVIDED WITH SUFFICIENT STEM OR SUSPENSION CABLE LENGTH PRIOR TO INSTALLATION. VERIFY LENGTHS WITH ARCHITECT.

J. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY HARDWARE, ELECTRICAL CABLES, TIMERS, TRANSFORMERS, POWER PACKS, ETC., AS REQUIRED FOR A COMPLETE INSTALLATION AND PROVIDE A COMPLETE WORKABLE SYSTEM MEETING THE DESIGN INTENT.

K. WHERE LOW VOLTAGE FIXTURES ARE NOT EQUIPPED WITH STEP DOWN TRANSFORMER, PROVIDE TRANSFORMER OF REQUIRED SIZE AND RATING TO ACCOMMODATE CONNECTED LIGHTING LOAD. COORDINATE EXACT REQUIREMENT WITH LIGHTING MANUFACTURER.

L. ALL EMERGENCY LIFE SAFETY LIGHT FIXTURES (CROSS HATCHED AND/OR -E SUFFIX) SHALL BE PROVIDED WITH 90 MINUTES OF EMERGENCY BATTERY BACKUP. PROVIDE HOT LEG AHEAD OF SWITCHING TO BATTERY CHARGERS. REFERENCE LIGHTING SEQUENCE OF OPERATION FOR METHOD OF CONTROL FOR EACH AREA.

M. ALL EXIT SIGNS SHALL BE READILY VISIBLE FROM ANY DIRECTION OF EGRESS TRAVEL.

N. CONTRACTOR SHALL PROVIDE ADDITIONAL EXIT SIGN(S) IF REQUIRED BY THE CITY FIRE MARSHALL INSPECTOR AT NO ADDITIONAL COST TO THE OWNER.

O. ALL BOXES AND ENCLOSURES FOR EMERGENCY CIRCUITS SHALL BE PERMANENTLY MARKED.

P. ALL EMERGENCY CIRCUIT WIRING SHALL BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND EQUIPMENT UNLESS OTHERWISE PERMITTED BY THE NATIONAL ELECTRICAL CODE.

Q. CONTRACTOR TO COORDINATE ALL CONTROL DEVICES REQUIREMENTS WITH MANUFACTURER AND INSTALL PER MANUFACTURER RECOMMENDATION, PRIOR TO ROUGH IN.

R. CONTRACTOR TO INSTALL LIGHTING CONTROLLERS IN ACCESSIBLE CEILING SPACE, PROVIDE 3 FEET MINIMUM WORKING SPACE PER THE NATIONAL ELECTRICAL CODE. FIELD COORDINATE WITH OTHER TRADES.

S. CONTRACTOR TO PROVIDE SHOP DRAWINGS, SHOWING MANUFACTURER RECOMMENDED DEVICE LOCATION AND COMPLETE BILL OF MATERIAL.

T. DISCREPANCY BETWEEN THE ARCHITECTURAL PLAN AND ELECTRICAL PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.

FIRE ALARM SYSTEM NOTES

A. ALL FIRE ALARM SYSTEM DESIGN INCLUDED IN THESE DOCUMENTS ARE FOR REFERENCE ONLY. FINAL INSTALLED SYSTEM SHALL BE DESIGNED BY CERTIFIED FIRE ALARM DESIGNER. REFER TO THE PROJECT MANUAL/SHEET SPECIFICATIONS FOR PERFORMANCE SPECIFICATIONS/ADDITIONAL REQUIREMENTS.

B. ALL FIRE ALARM SYSTEM DESIGN AND CONSTRUCTION DOCUMENTS SHALL BE PREPARED BY A CERTIFIED FIRE ALARM DESIGNER HOLDING A CURRENT STATE FIRE ALARM SYSTEM DESIGN LICENSE. CERITIFICATION SHALL MEET ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS AND SHALL BE A MINIMUM OF LEVEL III IN THE SUB-FIELD OF "FIRE ALARM SYSTEMS" ACCORDING TO THE NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES (NICET).

C. ALL FIRE ALARM SYSTEM SUBMITTALS SHALL ALSO BE REVIEWED BY THE CERTIFIED FIRE ALARM DESIGNER AND ARCHITECT.

D. ALL FIRE ALARM SYSTEM CONSTRUCTION DOCUMENTS SHALL BE SUBMITTED TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO THE INSTALLATION OF THE FIRE ALARM SYSTEM.

E. FIRE ALARM TIE IN TO BE CONDUCTED BY SIEMENS.

F. PROTECTION OF FIRE ALARM DEVICES SHALL BE REMOVED AT THE END OF EACH WORKDAY AND INSTALLED THE FOLLOWING MORNING PRIOR TO WORK STARTING AND COORDINATED EACH MORNING WITH THE BUILDING ENGINEERING.

GENERAL ELECTRICAL NOTES

A. REFER TO ARCHITECTURAL PLANS AND DETAILS FOR EXACT LOCATION AND MOUNTING REQUIREMENTS FOR ALL OUTLETS.

B. ALL BRANCH CIRCUITS AND FEEDERS SHALL BE PROVIDED WITH NEC REQUIRED NEUTRAL CONDUCTORS AND SHALL BE PROVIDED WITH A GREEN INSULATED EQUIPMENT GROUND CONDUCTOR. ALL GROUNDING AND PHASE CONDUCTORS SHALL BE IDENTIFIED AND BUNDLED.

C. WHERE MULTIPLE WIRING DEVICES ARE SHOWN IN ONE LOCATION, THESE DEVICES SHALL BE MOUNTED UNDER A COMMON COVER PLATE UNLESS OTHERWISE SPECIFIED BY THE ARCHITECT. VERIFY WITH ARCHITECT PRIOR.

D. BRANCH CIRCUITS UTILIZING MULTI-WIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH AN UL LISTED HANDLE TIE AS REQUIRED BY THE NATIONAL ELECTRICAL CODE.

E. THE CONTRACTOR SHALL MAKE FINAL CONNECTION TO ALL OWNER/TENANT FURNISHED FURNITURE AND EQUIPMENT PER RESPECTIVE MANUFACTURERS SPECIFICATIONS UNLESS NOTED OTHERWISE.

F. PROVIDE TYPE WRITTEN, SELF ADHESIVE STRIP WITH BRANCH CIRCUIT INFORMATION ON COVER PLATE OF EACH POWER RECEPTACLE AND FOR ALL JUNCTION BOXES.

G. THE CONTRACTOR SHALL PROVIDE A FLUSH WALL BOX WITH RING AND PULL WIRE TO 6 INCHES ABOVE ACCESSIBLE CEILING AT ALL WALL TELEPHONE AND DATA LOCATIONS.

H. PROVIDE GFI RECEPTACLES AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. PROVIDE GFI CIRCUIT BREAKER AS INDICATED ON PANEL SCHEDULES.

I. FOR ALL EQUIPMENT, PRIOR TO ROUGH-IN, VERIFY WITH EQUIPMENT MANUFACTURER EXACT TERMINATION REQUIRED. DO NOT HARDWIRE EQUIPMENT WHERE RECEPTACLE CONNECTION IS REQUIRED.

J. ALL EXPOSED CONDUITS SHALL BE EMT AND SHALL BE RUN 90 DEGREES PERPENDICULAR AND PARALLEL TO CEILING STRUCTURE AND SHALL BE MOUNTED TIGHT TO THE UNDERSIDE OF SLAB.

K. PROVIDE AND INSTALL #10 WIRES FOR 120V CIRCUIT HOMERUNS MORE THAN 100'-0".

L. WHERE PHASE CONDUCTORS ARE INCREASED, EQUIPMENT GROUNDING CONDUCTOR SHALL BE INCREASED IN SIZE PROPORTIONATELY, ACCORDING TO THE CIRCULAR MIL AREA OF THE PHASE CONDUCTOR.

M. ELECTRICAL CONTRACTOR SHALL DETERMINE VOLTAGE DROP REQUIREMENTS PER THE ACTUAL ROUTING LENGTHS INSTALLED IN THE FIELD. CONTRACTOR SHALL UPSIZE CONDUCTORS AND CONDUIT AS REQUIRED BY THE NATIONAL ELECTRICAL CODE TO MEET VOLTAGE DROP REQUIREMENTS.

N. DISCREPANCY BETWEEN THE ARCHITECTURAL PLAN AND ELECTRICAL PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.

O. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH RING AND STRING. LABEL EACH STRING WHERE OPPOSITE END IS LOCATED.

P. ISOLATED GROUND BRANCH CIRCUITS SHALL HAVE A DEDICATED NEUTRAL CONDUCTOR FOR EACH PHASE CONDUCTOR AND A SEPARATE EQUIPMENT GROUND CONDUCTOR AND ISOLATED GROUND CONDUCTOR. CONDUIT MAY NOT BE USED AS GROUND.

RENOVATION NOTES

A. BRANCH CIRCUITS SHOWN ARE TO BE FIELD VERIFIED FOR AVAILABILITY PRIOR TO CONSTRUCTION. IF THERE IS A DISCREPANCY IN THE NUMBER OF AVAILABLE CIRCUITS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT PRIOR TO CONSTRUCTION. CONTRACTOR SHALL UPDATE THE PANEL DIRECTORY OF THE EXISTING PANEL BOARD(S) USED FOR THIS SCOPE OF WORK. UPDATED DIRECTORY SHALL BE TYPEWRITTEN.

B. ALL EXISTING JUNCTION BOXES, AND OTHER ELECTRICAL, TELE/DATA AND LIFE SAFETY DEVICES WHICH ARE IN CONFLICT WITH NEW ARCHITECTURAL OR ARE NOW LOCATED IN AN UN-ACCESSIBLE SPACE DUE TO STRUCTURAL, HVAC OR ACOUSTICAL REVISIONS AS A RESULT FROM THIS BUILD-OUT, ARE TO BE RELOCATED TO AN ACCESSIBLE LOCATION. EXTEND CONDUIT AND CONDUCTORS AS REQUIRED FOR SUCH RELOCATION.

C. ALL WIRE AND CONDUIT TO BE ABANDONED SHALL BE REMOVED FROM ITS POINT OF SERVICE TO ITS POINT OF TERMINATION.

D. ALL ABANDONED FLOOR OUTLET PENETRATIONS SHALL BE RE-POURED AND FIRE SAFE SEALED.

E. LOCATE ANY EXISTING EQUIPMENT, JUNCTION BOXES, ETC., IN ACCESSIBLE CEILING AREAS.

F. NEW EXIT FIXTURES SHALL MATCH BUILDING STANDARD UNLESS NOTED OTHERWISE.

G. ALL EXIT SIGNS SHALL MATCH BUILDING STANDARD. FIELD CONFIRM EXACT FIXTURE MAKE AND MODEL.

H. FIELD COORDINATE EXISTING FIRE ALARM SYSTEM. NEW SYSTEM SHALL MATCH EXISTING. COORDINATE EXACT REQUIREMENTS WITH EXISTING SYSTEM MANUFACTURER PRIOR TO INSTALLATION.

I. NEW WIRING (DATA/TELECOM/FIBER, LOW VOLTAGE/HIGH VOLTAGE) TO BE RAN IN AN OPEN BASE BUILDING AREA (ELECTRICAL/MECHANICAL ROOM) SHALL BE RAN IN CONDUIT.

ELECTRICAL SYMBOLS LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONDUIT/CONDUCTOR(S)		GROUNDED DUPLEX RECEPTACLE (NEMA5-20R) - MOUNT AT 15" A.F.F. U.N.O.	M	FLOOR MOUNTED MICROPHONE OUTLET
	CONDUIT/CONDUCTOR(S) (IN OR UNDER FLOOR)	A	GROUNDED DUPLEX RECEPTACLE (NEMA5-20R) - MOUNT ABOVE COUNTER BACKSPLASHOR 42" A.F.F.	M	WALL MOUNTED MICROPHONE OUTLET
	CONDUIT (STUBBED UP)	C	GROUNDED DUPLEX RECEPTACLE (NEMA5-20R) - MOUNT AT CEILING	V	WALL MOUNTED VOLUME CONTROL OUTLET
	CONDUIT (STUBBED DOWN)	GFI	GROUNDED DUPLEX RECEPTACLE (NEMA5-20R) - GFI TYPE - MOUNT AT 18" A.F.F. U.N.O.	TV	RECESSED WALL MOUNTED TV OUTLET (REFERENCE SPECIAL DEVICE SCHEDULE)
	2'X4' LIGHTING FIXTURE	WP	GROUNDED DUPLEX GFI RECEPTACLE (NEMA5-20R) W/ "WEATHERPROOF WHILE IN USE"COVER	CR	WALL MOUNTED CARD READER
	2'X2' LIGHTING FIXTURE		GROUNDED DUPLEX RECEPTACLE (NEMA5-20R) WITH TOP RECEPTACLE CONTROLLER BY SWITCH/SENSOR AND BOTTOM RECEPTACLE SHALL NOT BE CONTROLLED BY SWITCH/SENSOR. CONTROLLED RECEPTACLE SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E) AND PROVIDED IN GREEN COLOR.		WALL MOUNTED PUSH BUTTON STATION
	STRIP LIGHTING FIXTURE	U	GROUNDED DUPLEX RECEPTACLE WITH INTEGRAL USB-A & USB-C CHARGING PORTS (EQUAL TO HUBBELL, #USB20ACS) - MOUNT AT 15" A.F.F. U.N.O.	EPO	WALL MOUNTED EMERGENCY POWER OFF PUSH BUTTON
	WALL MOUNTED STRIP LIGHTING FIXTURE	CL	CEILING MOUNTED RECEPTICAL (20A)		MOTOR
	DOWNLIGHT LIGHTING FIXTURE		GROUNDED DOUBLE DUPLEX RECEPTACLE (NEMA5-20R) - MOUNT AT 15" A.F.F. U.N.O.		FUSED DISCONNECT SWITCH
	WALL MOUNTED DOWNLIGHT LIGHTING FIXTURE		GROUNDED DOUBLE DUPLEX RECEPTACLE (NEMA5-20R) WITH TOP RECEPTACLE CONTROLLER BY SWITCH/SENSOR AND BOTTOM RECEPTACLE SHALL NOT BE CONTROLLED BY SWITCH/SENSOR. CONTROLLED RECEPTACLE SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E) AND PROVIDED IN GREEN COLOR.		NON FUSED DISCONNECT SWITCH (A/B/C/D) A= FRAME AMPERAGE; B= NUMBER OF POLES; C= FUSE AMPERAGE (NF = NON FUSED); D= NEMA RATING (IF NOT NOTED NEMA 1)
	CEILING MOUNTED LIGHTING FIXTURE W/ WALL WASHER	XX	FLOOR BOX POWER ONLY ("X" DENOTES TYPE REFERENCE FLOOR BOX SCHEDULE)		MAGNETIC MOTOR STARTER
	EMERGENCY LIGHTING FIXTURE	XX	FLOOR BOX COMBINATION ("X" DENOTES TYPE REFERENCE FLOOR BOX SCHEDULE)		COMBINATION MAGNETIC STARTER / DISCONNECT SWITCH
	POLE MOUNTED EXTERIOR LIGHTING FIXTURE		POWER POLE		(VFD) VARIABLE FREQUENCY DRIVE (REFER TO DIVISION 23 FOR SPECIFICATIONS)
	WALL MOUNTED EXTERIOR LIGHTING FIXTURE		WALL MOUNTED SPEAKER ASSEMBLY		TRANSFORMER
	EXIT LIGHTING FIXTURE (SINGLE FACE)		CEILING MOUNTED SPEAKER ASSEMBLY		GROUND CONNECT
	WALL MOUNTED EXIT LIGHTING FIXTURE (SINGLE FACE)		JUNCTION BOX		PANELBOARD (240/208/120V)
	EXIT LIGHTING FIXTURE (DOUBLE FACE)		WALL MOUNTED JUNCTION BOX		PANELBOARD FLUSH MOUNTED
EB	EMERGENCY BATTERY PACK LIGHTING FIXTURE		COMMUNICATION / DATA WALL OUTLET		PANELBOARD (480/277V)
	LIGHTING TRACK W/ TRACK FIXTURES		GROUND ROD		HOME RUN
$M	TOGGLE SWITCH W/ THERMAL OVERLOAD		GROUND ROD TEST WELL	H -1,3,5	ONE (1) THREE-POLE CIRCUIT
$T	DIGITAL TIMER SWITCH		DELTA CONNECTION	M	ELECTRICAL METER
$OC	LINE VOLTAGE, WALL MOUNTED VACANCY SENSOR SWITCH		WYE CONNECTION	M	ELECTRICAL METER WITH CT CABINET
$X	LOW VOLTAGE PUSH-BUTTON SWITCH (X DENOTES # QUANTITY OR LETTER FOR ZONES)		CIRCUIT BREAKER		DISTRIBUTION PANEL
DX	LOW VOLTAGE PUSH-BUTTON SWITCH W/ DIMMING ("X" DENOTES NUMBER QUANTITY OR LETTER FOR ZONES)		FUSE		SWITCHBOARD
		M	WALL MOUNTED VACANCY SENSOR (DUAL TECHNOLOGY)		GROUND BAR
P	PHOTOCELL SENSOR / DAYLIGHT RESPONSIVE CONTROL	M	CEILING MOUNTED OCCUPANCY SENSOR (DUAL TECHNOLOGY)		TRANSFORMER (SEE RISER / ONE-LINE)
	SECURITY CAMERA	SPD	SURGE PROTECTIVE DEVICE		TRANSFER SWITCH

FIRE ALARM LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CEILING MOUNTED SMOKE DETECTOR		UNDERFLOOR MOUNTED SMOKE DETECTOR		COMMUCEILING MOUNTED HEAT DETECTOR
D	DUCT MOUNTED SMOKE DETECTOR	D	UNDERFLOOR DUCT MOUNTED SMOKE DETECTOR	F	MANUAL PULL STATION
	FIRE ALARM SPEAKER / HORN	OR	FIRE ALARM VISUAL SIGNAL	F	COMBINATION FIRE ALARM AUDIO / VISUAL SIGNAL
	FIRE ALARM SPEAKER / HORN WITH VISUAL SIGNAL	F	CEILING MOUNTED FIRE ALARM SPEAKER / HORN	J	EMERGENCY / FIRE JACK
	EMERGENCY TELEPHONE / FIRE STATION	FSA	FIRE SYSTEM ANNUNCIATOR PANEL	BT	BEAM DETECTORS (TRANSMITTER)
FACP	FIRE ALARM CONTROL PANEL	DH	ELECTRIC DOOR HOLDER	BR	BEAM DETECTORS (RECEIVER)
P	PRESSURE SWITCH (SUPERVISORY)	W	WATERFLOW SWITCH	T	TAMPER SWITCH

ABBREVIATIONS

AC	ALTERNATING CURRENT	MOCP	MAXIMUM OVERCURRENT PROTECTION
AFF	ABOVE FINISHED FLOOR		
AHU	AIR HANDLING UNIT	MSB MSBD MSWB MSWBD	MAIN SWITCHBOARD
BAS	BUILDING AUTOMATION		
C	CONDUIT		
CHWP	CHILLED WATER PUMP	MSGR MSWG MSWGR	MAIN SWITCHGEAR
CU	COPPER		
CWP	CONDENSER WATER PUMP		
(D)	DEMOLITION	MTD	MOUNTED
DC	DIRECT CURRENT	MV	MEDIUM VOLTAGE
DP	DISTRIBUTION PANEL	NEC	NATIONAL ELECTRICAL CODE
(E)	EXISTING	NIC	NOT IN CONTRACT
E.C.	EMPTY CONDUIT	N3R	NEMA 3R
EDH	ELECTRIC DUCT HEATER	OCPD	OVERCURRENT PROTECTIVE DEVICE
EF	EXHAUST FAN	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
EPO	EMERGENCY POWER OFF		
EUH	ELECTRIC UNIT HEATER	OH	OVERHEAD
EWC	ELECTRIC WATER COOLER	PH	PHASE
EWH	ELECTRIC WATER HEATER	PNL	PANEL
(F)	FUTURE	PP	POWER POLE
FCU	FAN COIL UNIT	PV	PHOTOVOLTAIC
FDS	FUSED DISCONNECT SWITCH	PVC	POLYVINYL CHLORIDE PIPE
FLA	FULL LOAD AMPS	(R)	RELOCATED
FSD	FIRE SMOKE DAMPER (COMBINATION)	RE:	REFER TO
		RTU	ROOF TOP UNIT
FT	FEET	SBD	SWITCHBOARD
GFI	GROUND FAULT INTERRUPTER	SF	SQUARE FEET
		SMD	SMOKE DAMPER
GFPE	GROUND FAULT PROTECTION OF EQUIPMENT	SPD	SURGE PROTECTIVE DEVICE
		SWB SWBD	SWITCHBOARD
GND	GROUND		
GRS	GALVANIZE RIGID STEEL	SWG SWGR	SWITCHGEAR
GWH	GAS WATER HEATER		
HP	HORSE POWER	TPV	TRAP PRIMER VALVE
IFC	INTERNATIONAL FIRE CODE	U.N.O	UNLESS NOTED OTHERWISE
IG	ISOLATED GROUND	UG	UNDERGROUND
IWH	INSTANTANEOUS WATER HEATER	VFD	VARIABLE FREQUENCY DRIVE
KVA	KILO VOLT AMPERES	VIF	VERIFY IN FIELD
KW	KILO WATT	WH	WATER HEATER
MCA	MINIMUM CIRCUIT AMPACITY	WM	WALL MOUNTED
MDP	MAIN DISTRIBUTION PANEL	WP	WEATHER PROOF
MFG	MANUFACTURER	XFMR	TRANSFORMER

SYSTEM'S GENERAL NOTES

THESE NOTES APPLY TO ALL DRAWINGS

REFLECTIVE CEILING PLAN NOTES

RCP-1 COORDINATE ALL CEILING MOUNTED DEVICES WITH ARCHITECTURAL REFLECTED CEILING PLANS (RCPs).THE ARCHITECTURAL RCP DOES NOT INDICATE THE LOCATION FOR ANY CEILING MOUNTED ITEMS, CONFIRM WITH ARCHITECT THE EXACT LOCATION PRIOR TO ROUGH-IN AND INSTALLATION.

BUILDING LOW VOLTAGE SYSTEMS

ESV-1 CONTRACTOR SHALL COORDINATE AND INCORPORATE THE SCOPE REQUIRED FOR THE FOLLOWING SYSTEMS:
- A. FIRE ALARM
- B. FIRE PROTECTION
- C. SECURITY
- D. AUDIO VISUAL
- E. TELECOMMUNICATIONS
- F. LIGHTING CONTROLS
- G. HVAC CONTROLS
- H. SHOP EQUIPMENT
- I. SIGNAGE

ESV-2 FOR THE ABOVE VENDOR SYSTEMS, BUDGETS AND/OR BIDS FROM VENDORS SHALL BE REVIEWED WITH OWNERSHIP FOR SELECTIONS AND ASSIGNMENT TO THE CONTRACTS TO THE GENERAL CONTRACTOR.

ESV-3 THE DIVISION 26 CONTRACTOR SHALL COORDINATE AND INTERFACE WITH THE SELECT VENDORS FOR A COMPLETE INSTALLATION.'

ESV-4 DIVISON 26 SHALL PROVIDE POWER BRANCH CIRCUITS AND WIRING NECESSARY FOR THE SELECT VENDOR EQUIPMENT AS DETERMINED DURING COORDINATION PHASES AND SHALL NOTE IN THE PANEL BOARD DIRECTORIES AND AS-BUILTS

Property of NY Engineers

MEGAFORMER

ELECTRICAL GENERAL NOTES, SYMBOL LIST & ABBREVIATIONS

E0.01

PART 1 - GENERAL

1. CAREFULLY READ THE SPECIFICATIONS AND COMPLY WITH ALL REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO ASSIST THE CONTRACTOR DURING EXECUTION OF THE WORK. HOWEVER, THEY DO NOT COVER ALL OF THE SPECIFICATION REQUIREMENTS. ALL BIDDERS MUST BID PER PLANS AND SPECIFICATIONS.
2. THE TERM "PROVIDE" IN THESE SPECIFICATIONS AND ON THE DRAWINGS MEANS; FURNISH, TRANSPORT, INSTALL, CONNECT, WARRANTY AND START-UP, INCLUSIVELY.
3. THE SCOPE OF THE WORK SHALL INCLUDE THE FURNISHING AND INSTALLATION OF THE NECESSARY MATERIAL AND LABOR TO ACCOMPLISH THE WORK INDICATED BY THE DRAWINGS AND HEREIN SPECIFIED. ALL WORK BY CONTRACTOR SHALL CONFORM TO ALL APPLICABLE, FEDERAL, STATE AND LOCAL BUILDING CODES.
4. CONTRACTOR BEFORE SUBMITTING HIS BID, SHALL VISIT THE SITE, REVIEW THE EXISTING CONDITIONS AND ALLOW FOR ALL CHANGES THAT ARE NECESSARY TO COMPLETE INSTALLATION OF NEW ELECTRICAL WORK. SUBMISSION OF PROPOSALS SHALL BE TAKEN AS EVIDENCE THAT SUCH INSPECTIONS HAVE BEEN MADE. CLAIMS FOR EXTRA COMPENSATION FOR WORK THAT COULD HAVE BEEN FORESEEN BY SUCH INSPECTIONS, WHETHER SHOWN ON THE CONTRACT DOCUMENTS OR NOT SHALL NOT BE ACCEPTED NOR PAID.
5. COORDINATION: COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICT AND TO PROVIDE CORRECT ROUGH-IN AND CONNECTION FOR EQUIPMENT FURNISHED UNDER OTHER TRADES. REPORT NECESSARY CHANGES IN TIME TO PREVENT NEEDLESS RE-WORK.
6. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTWORK AND CIRCUITS. CONTRACTOR SHALL CHECK ALL INFORMATION AND REPORT ANY APPARENT DISCREPANCIES BEFORE SUBMITTING BID.
7. CONTRACTOR SHALL SECURE AND PAY FOR ALL CONSTRUCTION PERMITS AND LICENSES AND SHALL PAY ALL GOVERNMENTAL AND PUBLIC UTILITY CHARGES AND INSPECTION FEES NECESSARY FOR THE EXECUTION OF THE WORK.
8. SUBMITTALS
   A. PROVIDE PRODUCT DATA FOR ALL EQUIPMENT AND MATERIALS DESIGNATED ON THE DRAWINGS OR LISTED IN A SCHEDULE. THE SUBMITTALS SHALL INCLUDE WIRING DIAGRAMS, PRODUCT CERTIFICATION, MAINTENANCE DATA, AND WARRANTIES.
   B. IF REQUIRED PROVIDE SHOP DRAWINGS/COORDINATION DRAWINGS WITH DIMENSIONED PLANS AND SECTIONS OR ELEVATION LAYOUTS OF ELECTRICAL EQUIPMENT.
   C. DEVIATIONS: THE APPROVAL OF SUBMITTAL DRAWINGS BY THE ARCHITECT/ENGINEER, OR HIS REPRESENTATIVE, SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATION FROM DRAWINGS OR THE SPECIFICATIONS UNLESS HE HAS CALLED ATTENTION IN WRITING TO SUCH DEVIATIONS AT THE TIME OF SUBMISSION AND HAS OBTAINED WRITTEN APPROVAL FROM THE ARCHITECT/ENGINEER, OR HIS REPRESENTATIVE, OF SUCH DEVIATIONS.
9. DEMOLITION
   A. PROTECT THE EXISTING EQUIPMENT AND SYSTEMS TO REMAIN OPERATIONAL. IF DAMAGED OR DISTURBED IN THE COURSE OF THE DEMOLITION WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE WITH NEW PRODUCT OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.
   B. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO ARRANGE THE SHUT OFF OF UTILITIES.
   C. CONTRACTOR SHALL BOX AND/OR PALLETIZE ALL DEMOLISHED EQUIPMENT AND PROTECT IT ON SITE. REMOVE THESE ITEMS FROM THE SITE AT THE DIRECTION OF THE OWNER.
   D. CONTRACTOR SHALL NOT CONSIDER DEMOLITION AND ALTERATION NOTES TO BE ALL-INCLUSIVE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT AND ASSESS EACH AREA TO FULFILL THE INTENT OF THE COMPLETE DESIGN. REFER TO ARCHITECTURAL DOCUMENTS FOR DEFINITION OF SCOPE FOR DEMOLITION AREAS AND ADDITIONAL REQUIREMENTS. IT IS THE CONTRACTORS RESPONSIBILITY TO VISIT THE SITE TO CONFIRM THE EXTENT OF DEMOLITION AND RESOLVE ANY DISCREPANCIES WITH OWNER'S/LANDLORD'S CONSTRUCTION MANAGER.
   E. FOR DEMOLITION AREAS, THE CONTRACTOR SHALL REVIEW THE MECHANICAL, PLUMBING, AND FIRE SUPPRESSION DEMOLITION DRAWINGS AND REMOVE WIRING, RACEWAYS, AND ELECTRICAL EQUIPMENT ASSOCIATED WITH THE MECHANICAL, PLUMBING AND FIRE SUPPRESSION DEMOLITION.
   F. ENSURE THAT ALL LIFE SAFETY SYSTEMS REMAIN OPERATIONAL AND MEET LIFE SAFETY CODE REQUIREMENTS FOR ALL OCCUPIED AREAS THAT REMAIN OPERATIONAL DURING/AFTER DEMOLITION. THIS INCLUDES BUT IS NOT LIMITED TO EGRESS PATHS, FIRE ALARM SYSTEMS, EGRESS LIGHTING AND OTHER LIFE SAFETY SYSTEMS.
   G. PROTECT EXISTING EQUIPMENT AND SYSTEMS INTENDED TO REMAIN OPERATIONAL. IF DAMAGED OR DISTURBED IN THE COURSE OF THE DEMOLITION WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE WITH NEW PRODUCT OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.
   H. RE-ROUTE AND RE-CONNECT ANY CIRCUIT(S) THAT ARE TO REMAIN IN USE BUT INTERFERES WITH THE NEW CONSTRUCTION.
   I. WORK REQUIRING INTERRUPTION OF ELECTRICAL POWER, WHICH WOULD ADVERSELY AFFECT THE NORMAL OPERATION OF THE OWNER/LANDLORD 'S PROPERTY OR OTHER BUILDING TENANTS, SHALL BE DONE AT A TIME OTHER THAN NORMAL WORKING HOURS. SCHEDULE ALL OUTAGES WITH OWNER/LANDLORD PRIOR TO SHUTDOWN.
   J. OWNER/LANDLORD RESERVES THE RIGHTS TO ALL DEMOLISHED MATERIALS. COORDINATE AND VERIFY EQUIPMENT INTENDED TO BE SALVAGED PRIOR TO DEMOLITION. MATERIALS THAT OWNER/LANDLORD REQUESTS TO BE RE-USED OR SALVAGED, THE MATERIALS SHALL BE REMOVED IN A NEAT WORKMAN LIKE METHOD TO ALLOW THEIR RE-USE. PROTECT THE SALVAGE MATERIALS FOR REUSE BY PROPERLY PACKAGING THE MATERIALS TO PROTECT SALVAGED MATERIALS FROM DAMAGE; SECURELY PACKAGE ALL SALVAGE MATERIALS' INSTALLATION HARDWARE AND PARTS TO SALVAGED MATERIALS.
   K. REMOVE UNUSED BRANCH CIRCUITS BACK TO BRANCH PANELBOARD OF ORIGIN, MARK BREAKER AS 'SPARE' AND MAKE ELECTRICALLY SAFE. REMOVE ALL ABANDONED CONDUITS ABOVE LAY-IN CEILING, EXPOSED CONDUITS, FLEXIBLE CONDUITS, SURFACE RACEWAY, SURFACE MOUNTED OUTLET/JUNCTION BOXES AND EQUIPMENT UNLESS NOTED OTHERWISE.
   L. REMOVE DEMOLISHED MATERIAL FROM PROJECT SITE IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS AND REGULATIONS. FOLLOW ALL STATE AND LOCAL REGULATIONS AND CODES FOR PROPER DISPOSAL.
10. WITHIN 30 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, PROJECT RECORD DOCUMENTATION (DRAWINGS) AND MANUALS SHALL BE PROVIDE TO THE BUILDING OWNER AND SHALL INCLUDE:
    A. OPERATIONS & MAINTENANCE MANUALS: INCLUDE, AS APPROPRIATE TO EACH ITEM, SUFFICIENT INFORMATION TO PROVIDE FOR THE OWNER'S OPERATION AND MAINTENANCE OF EQUIPMENT FURNISHED. THE MANUALS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING.
       1. SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
       2. OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
       3. NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
    B. AS-BUILTS/RECORD DRAWINGS: PROVIDE PDF SET OF THE FOLLOWING:
       1. ELECTRONIC DRAWINGS FILES, IN AUTOCAD ".DWG"FORMAT, OF ALL DOCUMENTS ON CD DISKS OR FLASH DRIVES, CORRECTED WITH "AS INSTALLED"WORK.
       2. ELECTRONIC DRAWINGS FILES, IN "PDF"FORMAT, OF ALL DOCUMENTS ON CD DISKS OR FLASH DRIVES, CORRECTED WITH "AS INSTALLED"WORK.
       3. FULL-SIZE HARD COPIES OF ALL DOCUMENTS CORRECTED WITH "AS INSTALLED"WORK.
       4. AS-BUILT/RECORD DRAWINGS SHALL INDICATE THE ACTUAL INSTALLATION AND INCLUDE THE FOLLOWING:
          a. A SINGLE-LINE DIAGRAM OF THE BUILDING ELECTRICAL DISTRIBUTION SYSTEM
          b. FLOOR PLANS INDICATING LOCATION AND AREAS SERVED FOR ALL DISTRIBUTION.
    C. CONTACTS: INCLUDE WITH EACH PRODUCT, NAME, ADDRESS, AND TELEPHONE NUMBERS, OF INSTALLING CONTRACTOR, FACTORY AND LOCAL SERVICE REPRESENTATIVE.
    D. INSTRUCTIONS OF OWNER'S PERSONNEL: PRIOR TO FINAL INSPECTION AND ACCEPTANCE, FULLY INSTRUCT THE OWNER'S DESIGNATED OPERATING AND MAINTENANCE PERSONNEL IN THE OPERATING AND PERFORMANCE OF THE EQUIPMENT FURNISHED.
    E. WARRANTIES: INCLUDE WARRANTY INFORMATION PROPERLY EXECUTED BY RESPECTIVE MANUFACTURERS, SUPPLIERS, OR SUB-CONTRACTORS FOR THE EQUIPMENT AND SYSTEM FURNISHED.
11. IN ADDITION TO THE ABOVE, CONTRACTOR SHALL ACCUMULATE DURING THE JOB'S PROGRESS, THE FOLLOWING DATA, IN PDF FORMATE, PREPARED IN A NEAT BROCHURE OR PACKET FOLDER AND TURNED OVER TO THE ARCHITECT FOR REVIEW AND SUBSEQUENT DELIVERY TO THE OWNER.
    A. ALL WARRANTIES AND GUARENTEES AND MANUFACTURER'S DIRECTIONS ON EQUIPMENT AND MATERIAL COVERED IN THE CONTRACT INCLUDING THE NAMES, ADDRESSES AND TELEPHONE NUMBERS OF THE MANUFACTURER'S REPRESENTATIVE.
    B. APPROVED FIXTURE BROCHURES, WIRING DIAGRAMS AND CONTROL DIAGRAMS (ORIGINAL DATA, NO COPIES).
    C. COPIES OF APPROVED SHOP DRAWINGS.
12. ALL OF THE ABOVE DATA SHALL BE SUBMITTED TO THE ARCHITECT FOR HIS REVIEW AT SUCH TIME AS THE CONTRACTOR SUBMITS HIS LAST ESTIMATE PRIOR TO HIS FINAL PAYMENT, BUT IN NO CASE, LESS THAN TWO WEEKS BEFORE FINAL INSPECTION.
13. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN AND UPDATED TO SHOW THE NEW WORK.
14. OWNER FURNISHED EQUIPMENT
    A. CONTRACTOR SHALL REQUEST A COPY OF THE PRE-PURCHASED EQUIPMENT PROCUREMENT BID INSTRUCTIONS AND SPECIFICATIONS.
    B. WHERE THE OWNER HAS ELECTED TO PROCURE SOME EQUIPMENT FOR THE PROJECT, IT IS THE INTENT OF THESE SPECIFICATIONS THAT THE CONTRACTOR SHALL ACCEPT RESPONSIBILITY OF THIS EQUIPMENT AND PROVIDE THE FOLLOWING:
       1. COORDINATE SHOP DRAWING PREPARATION.
       2. PROVIDE SUPERVISION TO COORDINATE SHIPPING AND ACCEPT DELIVERY.
       3. INSTALL AND SET IN PLACE.
       4. PROVIDE POWER AND CONTROL WIRING TO PROVIDE FUNCTIONS IN ACCORDANCE WITH THESE SPECIFICATIONS.
       5. DELIVER THE EQUIPMENT TO THE OWNER IN A WORKABLE, OPERATING, AND TESTED CONDITION.
       6. PROVIDE SUPERVISION TO COORDINATE FACTORY AND ON-SITE TESTING, START-UP, AND COMMISSIONING IN ACCORDANCE WITH THESE SPECIFICATIONS.
       7. PROVIDE SUPERVISION TO COORDINATE OWNER TRAINING AND PREPARATION OF O&M MANUALS.
    C. COORDINATE LIST OF EQUIPMENT PROVIDED BY OWNER WITH OWNER AND GENERAL CONTRACTOR.
    D. THE CONTRACTOR SHALL REPLACE ANY OWNER EQUIPMENT/SYSTEMS UNDER HIS CONTROL OR SUPERVISION IF DAMAGED.

PART 2 - PRODUCTS

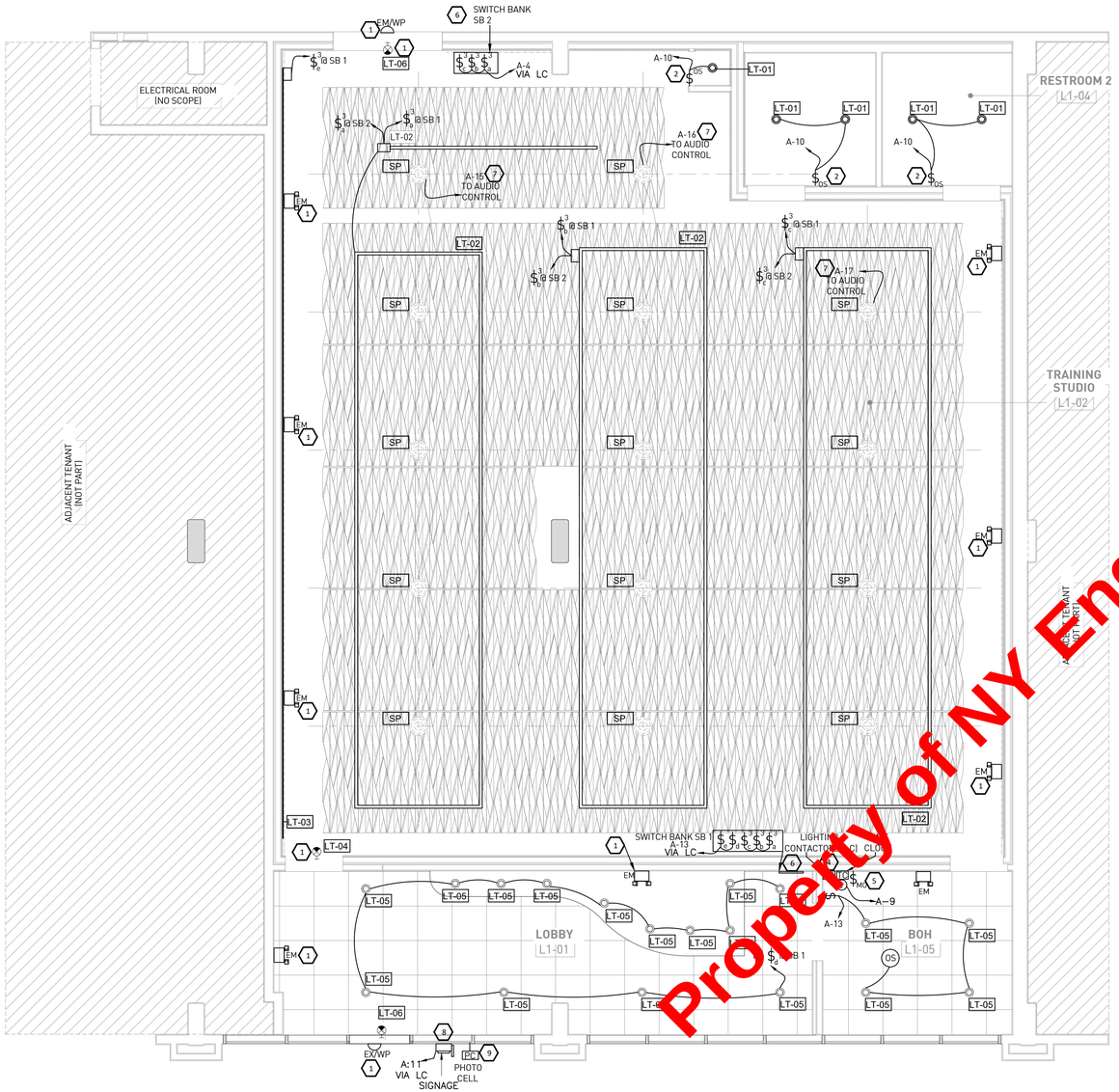
1. MATERIAL APPROVAL: ALL MATERIALS MUST BE NEW AND BEAR A UL LABEL. MATERIALS THAT ARE NOT COVERED BY UL TESTING STANDARDS SHALL BE TESTED AND APPROVED BY AN INDEPENDENT TESTING LABORATORY OR A GOVERNING AGENCY.
2. HOMERUNS TO PANEL BOARDS SHALL BE ELECTRICAL METALLIC TUBING (EMT) EQUAL TO ALLIED TUBE AND CONDUIT.
3. WHERE ALLOWED BY LOCAL CODES, TYPE 'MC' CABLE MAY BE USED. 'MC' CABLE MUST BE PROVIDED WITH ALL REQUIRED SUPPORTS. TYPE 'BX' OR 'AC' CABLE SHALL NOT BE UTILIZED ON THIS PROJECT.
4. ALL FUSES SHALL BE CURRENT-LIMITING TYPE AND BE U.L. LISTED. ACCEPTABLE MANUFACTURERS: LITTELFUSE, BUSSMAN
5. NEW SWITCHGEAR REQUIREMENTS SHALL UTILIZE EQUIPMENT OF THE SAME BRAND AND TYPE AS THE BASE BUILDING. IN NO CASE SHALL SAID EQUIPMENT BE OF LESS QUALITY THAN THE FOLLOWING:
   A. DRY TYPE TRANSFORMER SHALL BE ENERGY EFFICIENT, EQUAL TO SQUARE D GENERAL PURPOSE; FOR 3KVA TO 15KVA PROVIDE 115ºC TEMPERATURE RISE RATED AND FOR 30KVA AND ABOVE 150ºC TEMPERATURE RISE RATED.
   B. LIGHTING AND APPLIANCE PANEL BOARDS SHALL BE SQUARE D -'NQOD' FOR 120/208V. SERVICE, 'NF' FOR 277/480V. SERVICE. ALL PANEL BOARDS TO HAVE BOLT-ON CIRCUIT BREAKERS.
   C. SAFETY SWITCHES SHALL BE SQUARE D TYPE 'HD', PROVIDE WEATHERPROOF DEVICE WHEN INSTALLED OUTDOOR
   D. PROTECTIVE DEVICE SHORT CIRCUIT RATING: FULLY RATED TO INTERRUPT SYMMETRICAL SHORT CIRCUIT CURRENT AVAILABLE AT TERMINALS.
6. RACEWAYS:
   A. ELECTRIC METALLIC TUBING EXPOSED USE: FITTINGS SHALL BE OF WATERTIGHT STEEL COMPRESSION TYPE COUPLINGS FOR POWER, LIGHTING OR CONTROL WIRING.
   B. ELECTRIC METALLIC TUBING CONCEALED USE: IN WALLS AND ABOVE CEILINGS, IN DRYWALLS, COMPRESSION OR SET SCREW TYPE FITTINGS.
   C. ALL RACEWAY EXPOSED TO PHYSICAL DAMAGE SHALL BE RIGID STEEL, HOT DIPPED GALVANIZED AND SHALL BE ROUTED AT RIGHT ANGLES TO, OR PARALLEL WITH THE STRUCTURE. CONDUITS SHALL BE SECURED AT 8'-0"MAXIMUM INTERVALS AND WITHIN 36"OF EACH TERMINATION.
   D. MINIMUM SIZE FOR ALL CONDUITS SHALL BE 3/4".
   E. PROVIDE HANGER SUPPORTS FOR 'EMT" AT INTERVALS NOT OVER 10' AND PROVIDE ONE SUPPORT NOT OVER 1' FROM EACH CHANGE IN DIRECTION.
   F. PROVIDE PULL BOXES AS REQUIRED.
   G. RIGID METALS CONDUIT: USE IN CONCRETE WALLS OR UNDER CONCRETE FLOOR SLABS, THROUGH AND ON THE ROOF.
   H. FLEXIBLE METAL CONDUIT: GALVANIZED STEEL, INTERLOCKING, AND SINGLE STRIP TYPE. USE FOR FINAL CONNECTIONS TO TRANSFORMERS, MOTORS AND LIGHTING FIXTURES. CLAMP OR ANGLE WEDGE TYPE CONNECTORS.
   I. FITTINGS FOR COMMUNICATION SYSTEM RACEWAYS SHALL BE INDENTER OR SET SCREW TYPE COUPLINGS.
   J. PROVIDE PULL WIRE IN ALL RACEWAYS WITHOUT CONDUCTORS.
7. WIRES AND CABLES:
   A. CONNECTORS SHALL BE U.L. APPROVED FOR THE APPLICATION IN WHICH THEY ARE USED. INSULATION SHALL BE TYPE THHN/ THWN.
   B. ALL CONDUCTORS SHALL BE 98% CONDUCTIVITY SOFT DRAWN ANNEALED COPPER 600 VOLT WIRE.
   C. CONDUCTORS SHALL BE NO. 12 AWG MINIMUM EXCEPT AS PERMITTED FOR CONTROL CIRCUITS.
   D. CONDUCTORS NO. 8 AND LARGER SHALL BE STRANDED, CONDUCTORS NO. 10 AND SMALLER SHALL BE SOLID.
   E. MAKE ALL CONNECTIONS WITH SOLDERLESS INSULATED CONNECTORS E[illegible] SCOTCHLOCK FOR NO. 8 AWG AND SMALLER.
   F. CONDUCTORS NO. 6 AWG AND LARGER SHALL BE SPLICED UTILIZING COPPER BOLT CLAMP-TYPE CONNECTOR OR HYDRAULICALLY CRIMPED COPPER CRIMP CONNECTORS.
8. GROUNDING:
   A. ALL GROUNDING CONNECTIONS SHALL BE WITH GROUNDING CLAMPS OR EXOTHERMIC WELDS.
   B. WHERE FLEXIBLE CONDUIT IS USED, PROVIDE A CONTINUOUS COPPER GROUNDING CONDUCTOR.
   C. ALL CONDUITS SUPPLYING FEEDERS AND BRANCH CIRCUITS SHALL BE PROVIDED WITH GROUNDING CONDUCTOR.
   D. PROVIDE GREEN GROUNDING PIGTAIL FOR EACH RECEPTACLE AND PIECE OF EQUIPMENT RATED FOR THE AMPERAGE OF THE CIRCUIT BEING CONNECTED.
   E. BOND ALL NON-CURRENT CARRYING METAL PARTS TO GROUND:
      1. BRANCH CIRCUIT
      2. DISTRIBUTION PANELS
      3. SWITCHBOARDS
      4. TRANSFORMERS
      5. CONTROLLER ENCLOSURES
      6. MOTOR FRAMES
      7. RACEWAYS
      8. DEVICES AND DEVICE PLATES.
9. FURRED OUT WALLS:
   A. 1-1/2"DEEP, USED FOR FLUSH MOUNTED RECEPTACLES AND LIGHT SWITCHES.
   B. 4"X4"X1-1/2"DEEP WITH ½"RAISED SINGLE DEVICE COVER, USED FOR FLUSH MOUNTED COMMUNICATION/DATA ROUGH-IN.
10. OUTLET, JUNCTION AND PULL BOXES:
   A. OUTLET BOXES - HOT DIPPED GALVANIZED:
      1. 1-1/2"DEEP, USED FOR FLUSH MOUNTED RECEPTACLES AND LIGHT SWITCHES.
      2. 4"X2-1/8"DEEP WITH ½"RAISED SINGLE DEVICE COVER, USED FOR FLUSH MOUNTED COMMUNICATION/DATA ROUGH-IN.
   B. JUNCTION AND PULL BOXES: USE OUTLET BOXES WITH APPROPRIATE COVERS AS JUNCTION BOXES WHERE POSSIBLE. LARGER JUNCTION AND PULL BOXES SHALL BE FABRICATED FROM SHEET STEEL, SIZED ACCORDING TO CODE, WITH SCREW-ON COVERS, FINISH: GRAY BAKED ENAMEL.
11. WIRING DEVICES:
   A. CONVENIENCE RECEPTACLES: 2-POLE, 3-WIRE, GROUNDING TYPE NEMA 5-20R. STANDARD RECEPTACLE: LEVITON #5362-1; GFI RECEPTACLE LEVITON #6599-1, OR EQUAL.
   B. WALL SWITCHES SHALL BE PREMIUM INDUSTRIAL SPECIFICATION GRADE, TOGGLE, QUIET TYPE, 20 AMP, 120/227V. STANDARD SWITCH: LEVITON 122-1, THREE-WAY SWITCH: LEVITON 1223-1 OR EQUAL.
   C. DEVICE PLATES: STAINLESS STEEL FOR FLUSH AND ALL SURFACE MOUNTED DEVICES, EXCEPT PLENUM AREA MAY REQUIRE STAIN FINISH STAINLESS STEEL PLATES. CONFIRM FINISHES WITH ENGINEER BEFORE ORDERING.
   D. RECEPTACLES -HUBBELL #2162, IG-#2162, OR GF-8300 SERIES.
   E. DIMMER SWITCHES -LUTRON NOVA "N" SERIES OR EQUAL FOR INCANDESCENT LIGHTING AND LUTRON NOVA "NLV" SERIES OR EQUAL FOR LOW VOLTAGE INCANDESCENT LIGHTING. 3-WAY DIMMERS SHALL BE EQUAL TO NOVA N-XXO3 SERIES. WHERE SPST SWITCHES OCCUR ADJACENT TO DIMMERS, SWITCHES SHALL MATCH DIMMER(S) IN APPEARANCE. REFER TO PLANS FOR MINIMUM DIMMER WATTAGE REQUIREMENTS.
   F. FLOOR OUTLETS (PEDESTAL) -LEGRAND WIREMOLD FIT-200 SERIES OR EQUAL.
   G. FLOOR OUTLETS (FLUSH) -LEGRAND WIREMOLD RC4 OR 6ATC SERIES OR EQUAL UNLESS OTHERWISE SPECIFIED BY THE ARCHITECT.
   H. FLOOR OUTLET CONCRETE ENCASED: LEGRAND WIREMOLD RPNFP SERIES OR EQUAL WITH ACTIVATION DEVICES AS DIRECTED BY ARCHITECT.
   I. WALL OUTLETS TO BE INSTALLED WITH A CADDY "H"SERIES SUPPORT BRACKET.
   J. CEILING MOUNTED OCCUPANCY SENSOR SHALL BE DUAL TECHNOLOGY, INFRARED AND ULTRAPHONIC AS MANUFACTURED BY SENSORSWITCH #CM-PDT WHITE FINISH WITH (1) ONE #PP20 POWER PACK PER CONTROL CIRCUIT. CONTRACTOR SHALL VERIFY SENSOR TIME SETTING IS (20) TWENTY MINUTES MINIMUM. SUBSCRIPT '10' INDICATES #CM-PDT-10 SENSOR OF SAME FINISH AND TIME SETTING.
   K. WALL MOUNTED OCCUPANCY SENSOR SHALL BE DUAL TECHNOLOGY, INFRARED AND ULTRAPHONIC, AS MANUFACTURED BY SENSORSWITCH #WSD-PDT, WHITE FINISH. CONTRACTOR SHALL VERIFY SENSOR TIME SETTING IS (20) TWENTY MINUTES MINIMUM.
12. MOUNTING HEIGHTS FROM FINISHED FLOOR TO CENTER OF DEVICE:
   A. 18"FOR RECEPTACLES, TELEPHONE AND DATA OUTLETS UNLESS OTHERWISE INDICATED ON PLANS.
   B. +10"RECEPTACLES AT WORK BENCH (ABOVE WORK SURFACE) UNLESS OTHERWISE INDICATED BY THE ARCHITECT.
   C. +48"WALL SWITCHES
13. LIGHT FIXTURES:
   A. ALL FIXTURES SHALL BE UL-LISTED AND SUITABLE FOR THEIR ENVIRONMENT.
   B. PROVIDE FIXTURES AS LISTED IN THE LIGHTING FIXTURE SCHEDULE ON THE DRAWINGS.
   C. PROVIDE HIGH POWER FACTOR BALLASTS FOR COMPACT FLUORESCENT LAMPS.
   D. DRIVER VOLTAGE TO BE COMPATIBLE WITH CIRCUIT SOURCE VOLTAGE.
   E. EMERGENCY FIXTURES SHALL BE PROVIDED WITH BATTERY BACK-UP SYSTEM UNLESS NOTED OTHERWISE-REFER TO LIGHTING FIXTURE SCHEDULE.
   F. LINEAR EMERGENCY FIXTURES SHALL BURN STEADY PROVIDING NOT LESS THAN 1300LUMEN OUTPUT FOR A MINIMUM OF 90 MINUTES ON BATTERY POWER FOR EMERGENCY EGRESS.
14. FIRE ALARM:
   A. FIRE ALARM DEVICES INDICATED ON PLANS ARE FOR COORDINATION WITH OTHER TRADES ONLY AND NOT FOR PLANNING THE SYSTEM.
   B. ALL FIRE ALARM PLANNING AND CONSTRUCTION DOCUMENTS SHALL BE PREPARED BY A CERTIFIED FIRE ALARM DESIGNER HOLDING A CURRENT STATE ALARM PLANNING SUPERINTENDENT" LICENSE (APS) ISSUED BY THE STATE FIRE MARSHAL'S OFFICE IN ACCORDANCE WITH THE STATE INSURANCE CODE ARTICLE 5.43-2 AND WHO IS ALSO CERTIFIED TO A MINIMUM LEVEL III IN THE SUB-FIELD OF "FIRE ALARM SYSTEMS", THE NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES" (NICET).
   C. ALL CONSTRUCTION DOCUMENTS SHALL BE SUBMITTED TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR APPROVAL PRIOR TO INSTALLATION OR ALTERATION OF THE FIRE ALARM SYSTEM.

PART 3 - EXECUTION

1. GENERAL
   A. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHTING FIXTURES. VERIFY CEILING TYPES OF ALL ROOMS WITH ARCHITECT'S ROOM FINISH SCHEDULE PRIOR TO ORDERING LIGHT FIXTURES.
   B. LOCATION OF OUTLETS SHOWN IS APPROXIMATE ONLY. OUTLETS MAY BE MOVED TO SUIT CONFLICTING EQUIPMENT.
   C. EXACT LOCATION OF SWITCHES, FLOOR OUTLETS AND CONDUIT STUBS SHALL BE VERIFIED WITH THE ARCHITECT PRIOR TO INSTALLATION.
   D. RECESSED FIXTURES IN SUSPENDED CEILINGS SHALL BE SUPPORTED FROM OVERHEAD STRUCTURES BY CEILING GRID WIRE.
   E. PROVIDE NECESSARY BACKING REQUIRED TO INSURE RIGID MOUNTING OF OUTLET BOXES.
   F. CONDUIT ROUTES SHOWN ARE APPROXIMATE ONLY AND MUST BE ADJUSTED IN THE FIELD TO CLEAR OTHER FACILITIES. ALL CONDUIT ROUTING SHALL BE OVERHEAD, CONCEALED IN WALL OR CEILING, UNLESS NOTED OTHERWISE.
   G. ALL HOME RUNS ARE INDICATED AS STARTING FROM THE OUTLET NEAREST THE PANEL AND CONTINUE IN THE GENERAL DIRECTION OF THAT PANEL. CONTINUE SUCH CIRCUITS TO THE PANEL AS THOUGH THE ROUTES WERE COMPLETELY INDICATED. HOME RUNS TO PANELS SHALL BE IN INDIVIDUAL CONDUITS WITH CIRCUITS AS SHOWN, EXCEPT FOR SINGLE PHASE 120V CIRCUITS.
   H. ALL EXPOSED RACEWAY RUNS ABOVE GRADE SHALL BE RIGID STEEL, HOT DIPPED GALVANIZED AND SHALL BE ROUTED AT RIGHT ANGLES TO, OR PARALLEL WITH THE STRUCTURE. CONDUITS SHALL BE SECURED AT 8'-0"MAXIMUM INTERVALS AND WITHIN 36"OF EACH TERMINATION.
   I. JUNCTION AND PULL BOXES GENERALLY SHALL NOT BE EXPOSED IN FINISH PLACES. PROVIDE PULL BOXES AS INDICATED AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRES. COORDINATE THE LOCATIONS WITH OTHER TRADES. ALL JUNCTION AND PULL BOXES SHALL BE ACCESSIBLE. PROVIDE PULL BOXES FOR EVERY THREE 90-DEGREE BENDS AND AS INDICATED ON THE DRAWINGS.
   J. RUN LOW VOLTAGE CABLES ABOVE DROPPED CEILING PARALLEL OR PERPENDICULAR TO COLUMN LINES. SECURE LOW VOLTAGE CABLES ON 48"CENTERS TO UNISTRUT CHANNEL OR OTHER SUPPORTS FASTENED TO CONCRETE CEILING. "THOMAS AND BETTS TY-RAP"CABLE TIES, OR EQUAL, SHALL BE USED TO HANG CABLES.
   K. SECURELY FASTEN ALL EQUIPMENT BY MEANS OF RODS, HANGER SUPPORTS, GUIDES, ANCHORS AND SWAY BRACES TO MAINTAIN ALIGNMENT AND TO PREVENT EQUIPMENT MOVEMENT.
   L. INSTALLATION OF CONDUITS: USE RIGID STEEL IN WET LOCATIONS, WHERE SUBJECT TO MECHANICAL DAMAGE, IN CONCRETE OR BLOCK WALLS. USE EMT IN OTHER LOCATIONS WHERE PERMITTED BY CODE.
2. INSTALL MECHANICAL AND ELECTRICAL SYSTEMS TO FACILITATE SERVICING, MAINTENANCE, REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING WITH MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS.
3. RUN LOW VOLTAGE CABLES ABOVE DROPPED CEILING PARALLEL OR PERPENDICULAR TO COLUMN LINES. SECURE LOW VOLTAGE CABLES ON 48"CENTERS TO UNISTRUT CHANNEL OR OTHER SUPPORTS FASTENED TO CONCRETE CEILING. "THOMAS AND BETTS TY-RAP"CABLE TIES, OR EQUAL, SHALL BE USED TO HANG CABLES.
4. ALL EXPOSED CONDUIT PENETRATIONS IN FINISHED CEILING AND WALL AREAS SHALL HAVE AN ESCUTCHEON PLATE.
5. ALL CEILING AND WALL CONDUIT PENETRATIONS AT FIRE RATED AREAS SHALL BE SEALED TO KEEP FIRE RATING INTEGRITY. PROVIDE GYPSUM BOARD BOXES FOR RECESSED LIGHT FIXTURES IN FIRE RATED LOCATIONS.
6. DO NOT CUT OR REMOVE ANY EXISTING STRUCTURAL MEMBER WITHOUT PRIOR WRITTEN APPROVAL FROM ARCHITECT.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS TO MECHANICAL EQUIPMENT, UNLESS NOTED OTHERWISE. VERIFY EXACT EQUIPMENT LOCATION PRIOR TO INSTALLATION OF CONDUIT.
8. INSTALLATION OF WIRES:
   A. INSTALL ALL WIRES CONTINUOUS FROM OUTLET TO OUTLET, OR TERMINAL TO TERMINAL. SPLICES IN CABLES, WHEN REQUIRED, SHALL BE MADE IN PULL OR JUNCTION BOXES. MAKE BRANCH CIRCUIT SPLICES IN OUTLET BOXES WITH 8"OF CORRECTLY COLOR-CODED TAILS LEFT IN THE BOX.
   B. TERMINATE ALL GROUNDING, GROUNDED AND LINE CONNECTORS TO RECEPTACLES AND WIRING DEVICES TERMINALS AS RECOMMENDED BY MANUFACTURER.
   C. PROVIDE SEPARATE GROUNDED WIRE FOR EACH 120/208V BRANCH CIRCUIT AND DIMMING CIRCUIT.
   D. COLOR CODE WIRES AS FOLLOWS:

Conductors	120/208V	277/480V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

9. TRANSFORMER INSTALLATION:
   A. INSTALL AND ANCHOR THE TRANSFORMER ON A 4"THICK HOUSEKEEPING PAD.
   B. PROVIDE NEOPRENE WAFFLE PAD FOR VIBRATION ISOLATION, MASON TYPE WF OR EQUAL.
10. CONNECTIONS TO EQUIPMENT:
   A. FURNISH AND INSTALL REQUIRED POWER SUPPLY CONDUIT AND WIRING TO ALL OWNER FURNISHED EQUIPMENT.
   B. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ELECTRICAL CONNECTIONS TO MECHANICAL EQUIPMENT, UNLESS NOTED OTHERWISE. VERIFY EXACT EQUIPMENT LOCATION PRIOR TO INSTALLATION OF CONDUIT.
   C. FURNISH AND INSTALL A DISCONNECT SWITCH IMMEDIATELY AHEAD OF, AND ADJACENT TO EACH MAGNETIC MOTOR STARTER OR APPLIANCE, UNLESS THE MOTOR OR APPLIANCE IS LOCATED WITHIN SIGHT OF THE SERVICING PANEL BOARD, CIRCUIT BREAKER OR SWITCH. VERIFY ALL EQUIPMENT NAMEPLATE CURRENT RATINGS PRIOR TO INSTALLATION.
   D. FURNISH AND INSTALL MANUAL THERMAL PROTECTION FOR ALL FRACTIONAL HORSEPOWER MOTORS, NOT INTEGRALLY EQUIPPED WITH THERMAL PROTECTION.
   E. FURNISH 120V POWER TO EACH CONTROL PANEL AND TIME SWITCH REQUIRING POWER TO OPERATE.
11. IDENTIFICATION:
   A. PROVIDE LABELS, NAME PLATES, DIRECTORIES AND CODING INFORMATION.
   B. PROVIDE NAME PLATES CONSTRUCTED OF 1/16"THICK PLASTIC (BLACK OR WHITE) LAMINATED MATERIAL, ENGRAVED THROUGH BLACK SURFACE MATERIAL TO EXPOSE WHITE SUB-LAYER.
   C. IDENTIFICATION BANDING TAPE: BRADY "PERMA-CODE,"OR WESTLINE "T



ELECTRICAL LIGHTING PLAN

1/4" = 1'-0"

1

LIGHTING FIXTURE SCHEDULE						
TYPE	DESCRIPTION	MANUFACTURER	MODEL	WATTS	COMMENTS	NOTES
L-01	RECESSED DOWNLIGHT	ALPHABET	NU4-RD PRO	9		1
LT-02	SQUARE LINEAR PENDANT	ENVISION	ARCY-LINE DOWN LIGHT LED-ALIN2-12x12-L-3P25-D-5 CCT-WH LED-"ALIN2"XFT"3P25"D"5CC T"WH	6	ORDER PIECES AS NEEDED	1
LT-03	LED STRIP LIGHT	JESCO	DL-FLEX-NPX-RGB	4	ORDER LENGTH AS NECESSARY	1
LT-04	EXIT LIGHT	THE EXIT LIGHT CO.	COMB02R W BB	5		
LT-05	EXISTING RECESSED DOWNLIGHT	EXISTING	-	9	TO COORDINATE ANY NECESSARY LIGHTING REPAIR OR REPLACEMENT. REPLACEMENT TO MATCH EXISTING	1
LT-06	EXISTING EXIT LIGHT	EXISTING	-	5	G.C. TO COORDINATE ANY NECESSARY LIGHTING REPAIR OR REPLACEMENT. REPLACEMENT TO MATCH EXISTING.	
EM	EMERGENCY LIGHT	TBD	TBD			
EX/WP	EXTERIOR EMERGENCY LIGHT	TBD	TBD			
SP	PENDENT MOUNTED AUDIO SPEAKER	JBL	CONTROL 68HP			

1. COORDINATE EXACT MAKE/MODEL NUMBER WITH THE OWNER/ARCHITECT.

LIGHTING SEQUENCE OF OPERATION:

LOBBY

1. LIGHTING SHALL BE NETWORKED CONTROLLED WITH 0-10V DIMMING CAPABILITY AND TIME-CLOCK FUNCTIONALITY VIA NETWORK CONTROL WITH MULTIPLE ZONES AS NEEDED. CEILING MOUNTED SENSORS REQUIRED FOR AFTER HOURS CONTROL.
2. LIGHTS TO TURN ON AND OFF BASED OFF BUSINESS HOURS TIME CLOCK, WITH OVERRIDE STATION LOCKED OUT DURING BUSINESS HOURS.
3. AFTER HOURS LIGHTS CAN BE TURNED ON VIA OVERRIDE STATION OR CEILING MOUNTED OCCUPANCY SENSORS.

RESTROOMS

1. LIGHTING SHALL BE CONTROLLED WITH STAND-ALONE OCCUPANCY SENSOR WITH ON/OFF OPERATION ONLY.
2. MANUAL OVERRIDE SHALL BE KEYPAD.

TIME-CLOCK SCHEDULING

1. SHALL INCLUDE ASTRONOMICAL TIME-CLOCK INTEGRAL TO PROCESSOR.
2. SCHEDULES SHALL ALLOW FOR:
3. WEEKDAY OPEN
4. WEEKDAY CLOSE
5. WEEKEND OPEN
6. WEEKEND CLOSE
7. SCHEDULE OF BUSINESS HOURS TO BE COORDINATED WITH OWNER PRIOR TO START UP.

OCCUPANCY / VACANCY SENSORS

1. TIME-DELAYS SHALL BE SET TO MANUFACTURE DEFAULT AT START UP, NO MORE THAN 30 MINUTES AS REQUIRED.
2. OCCUPANCY SENSORS SHALL BE AUTO ON/ AUTO OFF.
3. VACANCY SENSORS SHALL BE MANUAL ON/ AUTO OFF. EMERGENCY EGRESS LIGHTING
4. ALL EMERGENCY LIGHTING SHALL MEET THE UL 924 STANDARDS FOR EMERGENCY LIGHTING AND CONTROLS.
5. THE ELECTRICAL SYSTEM MUST PROVIDE POWER WITHIN 10 SECONDS OF THE LOSS OF NORMAL POWER.
6. PERFORMANCE REQUIREMENTS FOR UNIT EQUIPMENT, AT LEAST 60% OF INITIAL ILLUMINATION MUST BE MAINTAINED FOR 90 MINUTES. THE BATTERY VOLTAGE SHALL REMAIN AT NO LESS THAN 87.5% OF ITS NOMINAL VOLTAGE DURING THE ENTIRE 90-MINUTE PERIOD.
7. UNDER NORMAL CONDITIONS, EGRESS LIGHTING MUST BE SERVED BY THE BUILDING'S PRIMARY ELECTRICAL SUPPLY. WHEN NORMAL SUPPLY FAILS, THE EMERGENCY POWER SUPPLY MUST ILLUMINATE ALL THINGS THAT LEAD TO EXITS, THE EXITS THEMSELVES, EXIT DISCHARGES, ELECTRICAL ROOMS, FIRE COMMAND CENTERS, FIRE PUMP ROOMS, AND GENERATOR ROOMS.
8. ALL EMERGENCY LUMINAIRES WITHIN AN AREA ARE TO FUNCTION THE SAME AS NONEMERGENCY LUMINAIRES WITHIN GIVEN AREA DURING NORMAL MODE UNLESS NOTED OTHERWISE.

LIGHTING FIXTURE SCHEDULE GENERAL NOTES:

A. ALL NEW LIGHTING FIXTURES SHOWN ON THE LIGHTING FIXTURES SCHEDULE ARE SUBJECT TO THE ARCHITECT'S APPROVAL. E.C. SHALL COORDINATE MAKE, MODEL, FINISHES, AND OTHER CRITICAL PARAMETERS WITH THE ARCHITECT BEFORE PURCHASING.

B. THE ADDITIONAL ACCESSORIES (HOLDERS, TRACKS, ADAPTERS, DRIVERS, AND CURRENT LIMITERS) REQUIRED FOR THE PROPER WORKING OF THE LIGHTING FIXTURES SHALL BE PURCHASED SEPARATELY IF NOT PROVIDED ALONG WITH THE FIXTURES.

C. ALL LIGHTING FIXTURES SHALL BE LED-TYPE OPERABLE AT 120V.

D. ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL HAVE A MINIMUM OF 90 MINUTES OF BATTERY BACKUP OR AS REQUIRED BY AHJ.

E. WATTS PER FACE FOR EXIT SIGNS SHALL NOT EXCEED 5 WATTS.

F. FIXTURES LOCATED IN SPECIFIC AREAS (WET OR DAMP LOCATIONS, VAPOR EXPOSED, COLD STORAGE, AND BUILDING EXTERIOR) SHALL BE RATED FOR THAT AREA.

ELECTRICAL LIGHTING PLAN GENERAL NOTES:

A. REFER TO ARCHITECTURAL DRAWINGS FOR ALL PARTITIONS HEIGHTS. ALL POWER, DATA, LIGHTING CONTROLS AND HVAC CONTROLS INSTALLED ON WALLS THAT ARE NOT FULL HEIGHT SHALL BE PROVIDED WITH RACEWAYS AND PULL STRINGS SERVED FROM THE FLOOR TO THE CLOSEST VERTICAL PATH.

B. WHERE MULTIPLE WIRING DEVICES ARE SHOWN IN ONE LOCATION, THESE DEVICES SHALL BE MOUNTED UNDER A COMMON COVER PLATE UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL CONTACT THE LIGHTING MANUFACTURER SELECTED DURING THE BIDDING PROCESS FOR SPECIFIC PRODUCT REQUIREMENTS, SHOP DRAWINGS AND WIRING DIAGRAMS FOR ALL AUTOMATIC LIGHTING CONTROLS, RELAYS, POWER PACKS, OCCUPANCY SENSORS, VACANCY SENSORS AND PHOTOCELLS.

D. CONTRACTOR SHALL PROVIDE POWER PACKS, OVERRIDE SWITCHES, ROOM CONTROLLERS, CABLING/WIRING AND ADDITIONAL EQUIPMENT AS REQUIRED TO ACCOMPLISH THE LIGHTING CONTROL INDICATED.

E. CONTRACTOR TO COORDINATE LIGHTING CONTROL MEETING BETWEEN OWNER AND LIGHTING MANUFACTURER PRIOR TO START-UP OF LIGHTING CONTROLS TO VERIFY PROPER SETTING REQUIREMENTS FROM OWNER.

F. LOCATE ULTRASONIC OCCUPANCY SENSORS A MINIMUM OF 3 FEET FROM MECHANICAL DIFFUSERS AND OTHER NOISE PRODUCING EQUIPMENT.

G. LOWERCASE LETTERING NEXT TO LIGHT SWITCHES AND LIGHT FIXTURES DENOTES SWITCHING SCHEME.

H. ALL CEILING MOUNTED DEVICES LOCATED IN LAY-IN CEILINGS SHALL BE CENTERED IN THE CEILING TILE.

I. PROVIDE UNSWITCHED CIRCUIT TO ALL EXIT SIGNS ORIGINATING FROM CIRCUIT INDICATED.

J. CONTRACTOR SHALL INDICATE LIGHTING CIRCUIT CONTROLLED BY EACH SWITCH BY PROVIDING TYPE WRITTEN LABELING LOCATED ON INSIDE FACE OF EACH SWITCH COVER PLATE.

K. SPRINKLER CONTRACTOR SHALL COORDINATE SPRINKLER HEAD LOCATIONS WITH CEILING MOUNTED LIGHTING FIXTURES.

L. ALL MATERIALS/EQUIPMENT/DEVICES INSTALLED IN PLENUM SPACES SHALL BE PLENUM RATED MATERIALS/EQUIPMENT/DEVICES.

M. ALL LOW VOLTAGE WIRING ROUTED THROUGH EXPOSED AREAS SHALL BE ROUTED IN CONDUIT.

N. ALL EXPOSED CONDUIT SHALL BE ROUTED PERPENDICULAR, PARALLEL, AND TIGHT TO COLUMNS AND BEAMS. ALL EXPOSED CONDUIT ROUTING SHALL BE COORDINATED WITH ENGINEER AND ARCHITECT PRIOR TO INSTALLATION. NO ADDITIONAL COST TO OWNER WILL BE ALLOWED FOR RELOCATING CONDUIT DUE TO THE LACK OF COORDINATION WITH ARCHITECT OR OTHER TRADES.

O. ALL ELECTRICAL CONDUIT, RACEWAYS, JUNCTION BOXES, SO CORD, LIGHTING FIXTURE POWER FEEDS, ETC ROUTED IN EXPOSED AREAS SHALL BE PAINTED TO MATCH EXPOSED CEILING AREA. REFER TO ARCHITECT FOR FINISH COLORS.

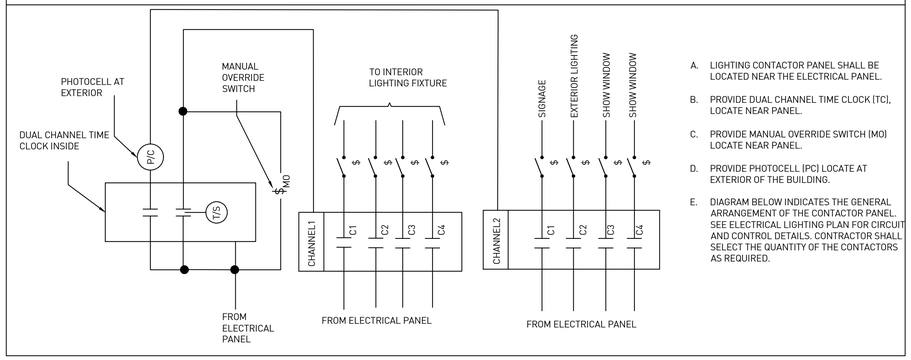
P. ALL NEW EMERGENCY LIGHTING FIXTURES PROVIDED WITH EMERGENCY DRIVERS SHALL HAVE AN UNSWITCHED HOT FOR LOSS OF VOLTAGE AND EMERGENCY DRIVER CHARGING (SAME CIRCUIT AS THE NORMAL POWER LIGHTING CIRCUIT). FIXTURES WITH EMERGENCY LED DRIVERS SHALL BE WIRED IN SUCH A MANNER AS TO ALLOW SWITCHING OF FIXTURES WITHOUT DISCHARGING THE EMERGENCY DRIVER. EMERGENCY DRIVER IS TO OPERATE ONLY IN THE EVENT OF A POWER OUTAGE.

Q. REFER TO RESPECTIVE SIDE OF THE BOUNDARY MATCHLINE FOR THE APPROPRIATE FLOOR PLAN KEYED NOTES.

ELECTRICAL LIGHTING PLAN KEY NOTES:

1. ALL THE EMERGENCY LIGHTS, EXIT SIGNS AND NIGHT LAMPS SHALL BE CONNECTED TO THE NEAREST LIGHTING CIRCUIT AHEAD OF SWITCHING FOR CONTINUOUS OPERATIONS.
2. WALL MOUNTED OCCUPANCY SENSOR WITH SWITCH. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT IN FIELD.
3. NOT USED.
4. E.C TO VERIFY THE LOCATION OF THE TIME CLOCK WITH THE ARCHITECT AND COORDINATE WITH THE TIME CLOCK VENDOR FOR MORE DETAILS AND PROVIDE ELECTRICAL CONNECTIONS AS REQUIRED.
5. MANUAL OVERRIDE SWITCH.
6. SWITCH BANK. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
7. NEW SPEAKER LAYOUT. CONTRACTOR SHALL COORDINATE EXACT POWER REQUIREMENTS WITH AVL CONSULTANT.
8. INSTALL A DISCONNECT SWITCH FOR THE SIGNAGE IN AN ACCESSIBLE LOCATION. CONNECT THE SIGNAGE TO THE SPECIFIED CIRCUIT THROUGH THE LIGHTING CONTACTOR (LC). COORDINATE WITH THE OWNER OR LANDLORD TO DETERMINE THE EXACT LOCATION AND SCHEDULE FOR THE TIME CLOCK.
9. E.C. TO ENSURE THAT THE PHOTOCELL IS CONCEALED FROM PUBLIC VIEW.

LIGHTING CONTACTORS (LC) TYPICAL DETAIL



A. LIGHTING CONTACTOR PANEL SHALL BE LOCATED NEAR THE ELECTRICAL PANEL.

B. PROVIDE DUAL CHANNEL TIME CLOCK (TC), LOCATE NEAR PANEL.

C. PROVIDE MANUAL OVERRIDE SWITCH (MO) LOCATE NEAR PANEL.

D. PROVIDE PHOTOCELL (PC) LOCATE AT EXTERIOR OF THE BUILDING.

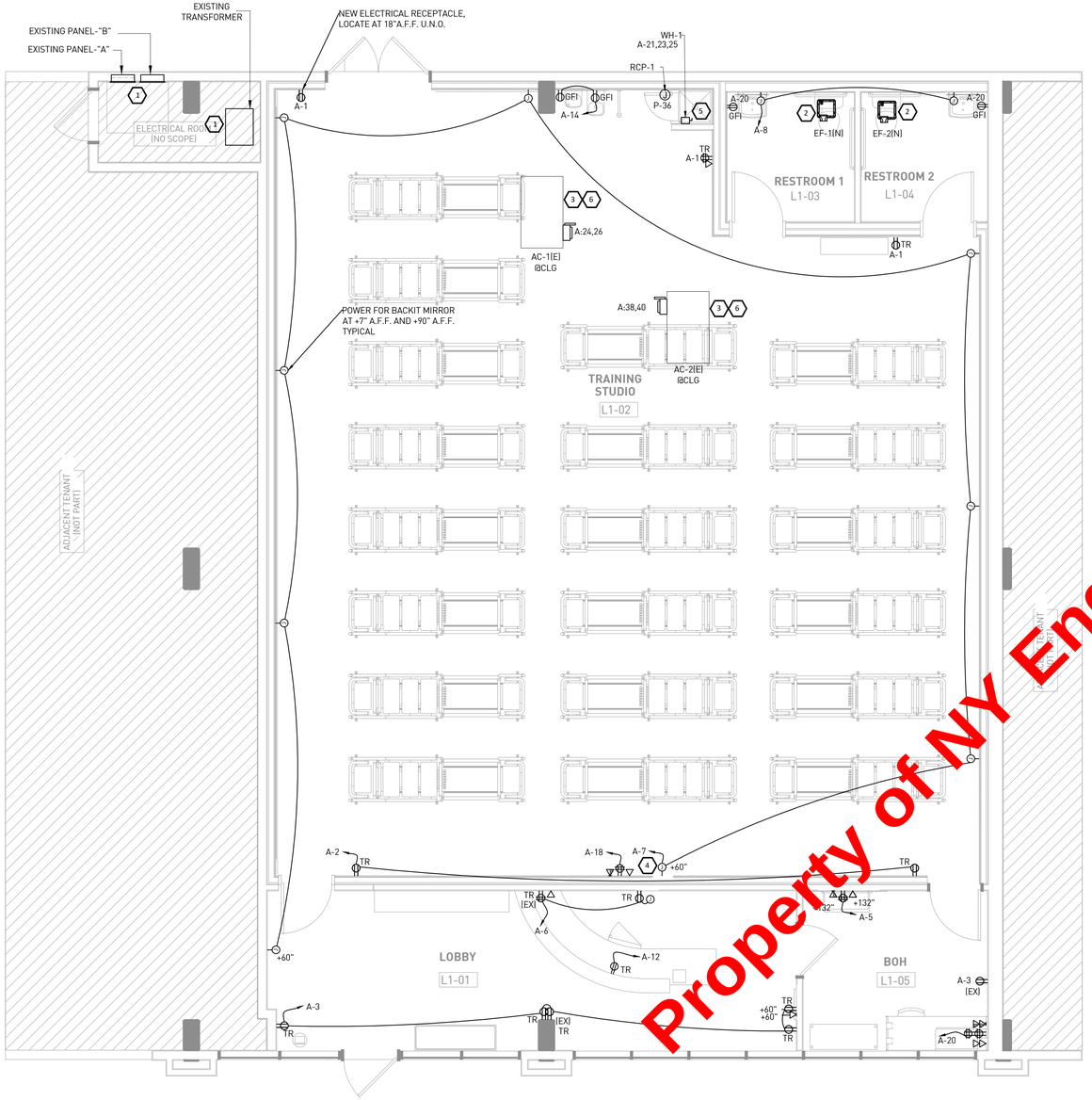
E. DIAGRAM BELOW INDICATES THE GENERAL ARRANGEMENT OF THE CONTACTOR PANEL. SEE ELECTRICAL LIGHTING PLAN FOR CIRCUIT AND CONTROL DETAILS. CONTRACTOR SHALL SELECT THE QUANTITY OF THE CONTACTORS AS REQUIRED.

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MEGAFORMER

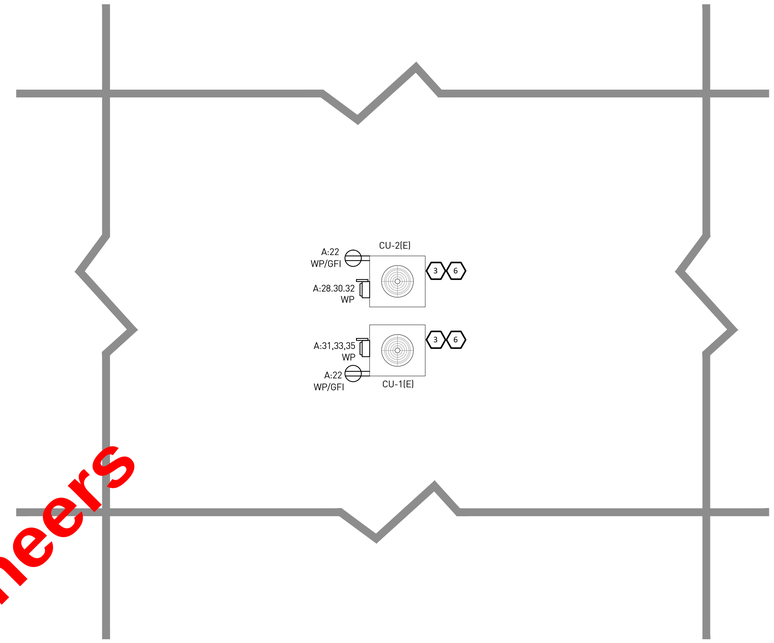
ELECTRICAL LIGHTING PLAN

E1.00



ELECTRICAL POWER PLAN | 1

1/4" = 1'-0"



ELECTRICAL PARTIAL ROOF POWER PLAN | 2

1/4" = 1'-0"

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ELECTRICAL POWER PLAN GENERAL NOTES:

A. REFER TO ARCHITECTURAL PLANS, ELEVATIONS AND DETAILS FOR EXACT LOCATION AND MOUNTING REQUIREMENTS FOR ALL RECEPTACLES. DISCREPANCY BETWEEN THE ARCHITECTURAL PLANS AND ELECTRICAL PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.

B. PRIOR TO ROUGH-IN CONTRACTOR SHALL COORDINATE FINAL CONNECTIONS AND LOCATION TO ALL OWNER FURNISHED EQUIPMENT AND EQUIPMENT FURNISHED UNDER OTHER DIVISIONS OF THE WORK IN ACCORDANCE WITH THE MANUFACTURES SPECIFICATIONS AND INSTALLATION REQUIREMENTS.

C. REFER TO ARCHITECTURAL DRAWINGS FOR ALL PARTITIONS HEIGHTS. ALL POWER, DATA, LIGHTING CONTROLS AND HVAC CONTROLS INSTALLED ON WALLS THAT ARE NOT FULL HEIGHT SHALL BE PROVIDED WITH RACEWAYS AND PULL STRINGS SERVED FROM THE FLOOR TO THE CLOSEST VERTICAL.

D. CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO EQUIPMENT. PROVIDE ALL NECESSARY MATERIALS AND LABOR FOR COMPLETE INSTALLATION. COORDINATE EXACT CONNECTION REQUIREMENTS WITH EQUIPMENT MANUFACTURE / PROVIDER PRIOR TO ROUGH-IN.

E. DISCREPANCIES BETWEEN THE ELECTRICAL BRANCH CIRCUIT EQUIPMENT SCHEDULE AND THE EQUIPMENT PROVIDE SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.

F. ALL RECEPTACLES LABELED "WP"SHALL BE WEATHER RESISTANT AND PROVIDED WITH A WEATHER PROOF "WHILE-IN-USE"COVER.

G. IN EXPOSED STRUCTURE AREAS, CONDUIT RUNNING PERPENDICULAR TO BAR JOIST SHALL BE ROUTED ALONG PERIMETER WALLS, CONDUITS RUNNING PARALLEL TO BAR JOIST SHALL BE ROUTED TIGHT TO BOTTOM OF BAR JOIST. CONSULT ARCHITECT AND OWNER FOR CONDUIT PAINT REQUIREMENTS.

H. DATA / TELEPHONE RACEWAYS / PATHWAYS; SHALL BE COORDINATED WITH SELECTED TECHNOLOGY CABLING CONSULTANT. FOR ALL CONDUIT AND RACEWAY FOR THE TECHNOLOGY / CABLING SYSTEMS. USE THE TECHNOLOGY / CABLING CONSULTANT'S DOCUMENTS FOR LOCATIONS OF ALL DATA / TELEPHONE OUTLETS.

I. COORDINATE THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENTS OF THE DUCT SMOKE DETECTORS, FIRE DAMPERS, FIRE SMOKE DAMPERS, MOTORIZED DAMPERS, AND THERMOSTATS IN THE FIELD WITH THE MECHANICAL DRAWING. PROVIDE WIRING AS REQUIRED.

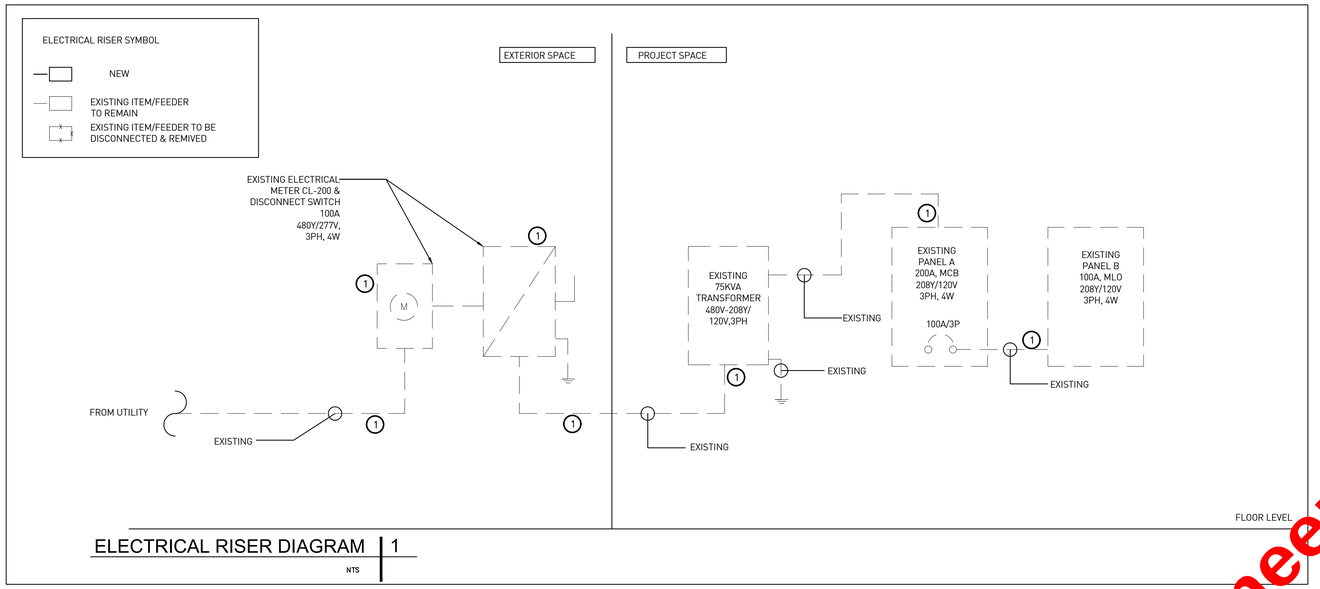
ELECTRICAL POWER PLAN KEY NOTES:

1. E.C. SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT LOCATION OF PANELS AND TRANSFORMER IN THE FIELD. ALSO, ENSURE CLEAR WORKING AND DEDICATED SPACE AS PER NEC 110.26..
2. EXHAUST FAN IN THE ROOM SHALL BE CIRCUITED TO LIGHTING CIRCUIT IN THE SAME ROOM.
3. E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
4. BACKLIT MIRROR. CONTRACTOR SHALL COORDINATE EXACT LOCATION FOR BACKLIT MIRROR LIGHT CONTROL WITH AVL CONSULTANT.
5. E.C. SHALL COORDINATE WITH THE PLUMBING CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
6. E.C. TO PROVIDE NEW WIRES, DISCONNECT AND RECEPTACLES AND CONNECT TO THE CIRCUIT AS INDICATED ON THE PLAN.

MEGAFORMER

ELECTRICAL POWER AND PARTIAL ROOF PLAN

E2.00



ELECTRICAL RISER DIAGRAM 1

NTS

PANEL:	A	(EXISTING)		-				MOUNTING:	SURFACE
208Y/120	VOLTS	PHASE	3	-	-	DEMAND LOAD	34.55	PANEL LOCATION:	ELECTRICAL ROOM
200A	MCB	WIRE	4	-	-	DEMAND CURRENT	96.00	FED FROM:	EXISTING TRANSFORMER

NOTE:

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA) A	B	C	NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20	TRAINING RM RECEPT	R	0.72	RWC	1.08			RWC	0.36	R	TRAINING RM RECEPT	20	2
3	20	LOBBY AREA RECEPT	R	1.08	RWC		4.39		RWC	3.31	L	TRAINING ROOM LIGHTING	20	4
5	20	BOH DATA RECEPT	R	0.36	RWC			0.90	RWC	0.54	R	RECEPTION RECEPT	20	6
7	20	TRAINING BACKLITE MIRROR	L	0.50	RWC	0.60			RWC	0.10	L	RESTROOM BACKLITE MIRROR	20	8
9	20	TIME CLOCK	L	0.10	RWC		0.15		RWC	0.05	L	RESTROOM LIGHTING	20	10
11	20	SIGNAGE	L	1.20	RWC			1.44	RWC	0.24	E	REFRIGERATOR RECEPT	20	12
13	20	LOBBY & BOH RM LIGHTING	L	0.16	RWC	0.52			RWC	0.36	R	DRINKING FOUNTAIN	20	14
15	20	SPEAKER	O	0.45	RWC		0.86		RWC	0.41	O	SPEAKER	20	16
17	20	SPEAKER	O	0.45	RWC			0.81	RWC	0.36	R	TARINING RM DATA RECEPT	20	18
19	20	RESTROOM RECEPTACLE	R	0.36	RWC	1.08			RWC	0.72	R	BOH RM DATA RECEPT	20	20
21	15/3P	WH-1	O	1.00	RWC, NBEP		1.36		RWC	0.36	R	ROOF SERVICE RECEPT	20	22
23			O	1.00				1.52	RWC,VIF	0.52	H	AC-1	20/2P	24
25			O	1.00		1.52				0.52	H			26
27	30/2P	SPARE					2.67			2.67	H			28
29								2.67	RWC,VIF	2.67	H	CU-1 (E) AND AC-2 (E)	30/3P	30
31	30/3P	CU-1 (E)	H	2.67	RWC,VIF	5.34				2.67	H			32
33			H	2.67			2.67					SPARE	15	34
35			H	2.37				2.47	RWC	0.10	O	RCP-1	15	36
37	100/3P	PANEL B	X	0.00	REFER RISER	0.62			RWC,VIF	0.62		AC-2	20/2P	38
39			X	0.00			0.62			0.62	M			40
41			X	0.00				0.00				SPACE		42
						10.76	12.71	9.81						

PANEL:	B	(EXISTING)		-				MOUNTING:	RECESSED
208Y/120	VOLTS	PHASE	3	-	-	DEMAND LOAD	0.00	PANEL LOCATION:	ELECTRICAL ROOM
100A	MLO	WIRE	4	-	-	DEMAND CURRENT	0.00	FED FROM:	PANEL A

NOTE:

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA) A	B	C	NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1		SPACE				0.00						SPACE		2
3		SPACE					0.00					SPACE		4
5		SPACE						0.00				SPACE		6
7		SPACE				0.00						SPACE		8
9		SPACE					0.00					SPACE		10
11		SPACE						0.00				SPACE		12
13		SPACE				0.00						SPACE		14
15		SPACE					0.00					SPACE		16
17	20	SPACE						0.00				SPACE		18
19	20/2P	SPARE				0.00						SPACE		20
21							0.00					SPACE		22
23	80/3P	SPARE						0.00				SPARE	20	24
25						0.00						SPARE	20	26
27							0.00					SPARE	20	28
29	15/2P	SPARE						0.00				SPARE	20	30
31						0.00						SPARE	40/3P	32
33	15/2P	SPARE					0.00							34
35								0.00						36
37	40/3P	SPARE				0.00						SPARE	50/3P	38
39							0.00							40
41								0.00						42
						0.00	0.00	0.00						

ELECTRICAL PANEL SCHEDULE 2

NTS

PANEL SCHEDULE ABBREVIATIONS	
L	LIGHTING
R	RECEPTACLE
H	HVAC
K	KITCHEN EQUIPMENT
M	LARGEST MOTOR
O	OTHER
N	NON COINCIDENT
X	LINKED CELL
*	SPLIT BREAKER
RWC	REFER TO THE WIRING CHART FOR WIRE SIZE
GFI	GROUND FAULT CIRCUIT INTERRUPTER
AFI	ARC FAULT CIRCUIT INTERRUPTER
NBEP	NEW BREAKER IN THE EXISTING PANEL
HACR	HEAT AIR CONDITIONING AND REFRIGERATION
PAN	PROVIDE ADDITIONAL WIRE FOR NEUTRAL
LO	LOCKOUT BREAKER
STB	SHUNT TRIP BREAKER
ETR	EXISTING TO REMAIN
SAE	SAME AS EXISTING
LC	WIRE THROUGH LIGHTING CONTACTOR
VIF	VERIFY IN FIELD

BRANCH CIRCUIT WIRING CHART	
BREAKER	BRANCH CIRCUIT SIZE
15/1P	2#12 + 1#12G, 3/4"C
20/1P	2#12 + 1#12G, 3/4"C
25/1P	2#10 + 1#10G, 3/4"C
30/1P	2#10 + 1#10G, 3/4"C
35/1P	2#8 + 1#10G, 3/4"C
40/1P	2#8 + 1#10G, 3/4"C
15/2P	2#12 + 1#12G, 3/4"C
20/2P	2#12 + 1#12G, 3/4"C
25/2P	2#10 + 1#10G, 3/4"C
30/2P	2#10 + 1#10G, 3/4"C
35/2P	2#8 + 1#10G, 3/4"C
40/2P	2#8 + 1#10G, 3/4"C
45/2P	2#8 + 1#10G, 3/4"C
50/2P	2#8 + 1#10G, 3/4"C
15/3P	3#12 + 1#12G, 3/4"C
20/3P	3#12 + 1#12G, 3/4"C
25/3P	3#10 + 1#10G, 3/4"C
30/3P	3#10 + 1#10G, 3/4"C
35/3P	3#8 + 1#10G, 3/4"C
40/3P	3#8 + 1#10G, 3/4"C
45/3P	3#8 + 1#10G, 3/4"C
50/3P	3#8 + 1#10G, 3/4"C
60/3P	3#6 + 1#10G, 3/4"C
70/3P	3#4 + 1#8G, 1"C
80/3P	3#4 + 1#8G, 1"C
90/3P	3#3 + 1#8G, 1"C
100/3P	3#3 + 1#8G, 1"C
110/3P	3#1 + 1#6G, 1 1/4"C
125/3P	3#1 + 1#6G, 1 1/4"C
150/3P	3#1/0 + 1#6G, 1 1/4"C
175/3P	3#2/0 + 1#6G, 1 1/2"C
200/3P	3#3/0 + 1#6G, 1 1/2"C

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ELECTRICAL RISER DIAGRAM GENERAL NOTES:

A. E.C. SHALL VERIFY/COORDINATE THE FOLLOWING INFORMATION IN THE FIELD WITH THE UTILITY/LANDLORD/OWNER AND INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY AND UTILITY. ALL THE INSTALLATIONS SHALL BE IN COMPLIANCE BEFORE BID.

B. THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE NEC, LOCAL CODES AND AHJ.

C. THE EXACT POWER DISTRIBUTION AND SCOPE OF WORK WITH THE LANDLORD/OWNER BEFORE BID.

D. COORDINATE THE EXACT LOCATION OF ALL THE NEW ELECTRICAL DEVICES SHOWN ON THE RISER. AND ENSURE THE CLEAR WORKING AND DEDICATED SPACE HAS BEEN PROVIDED AS PER NEC 110.26.

E. COORDINATE AVAILABLE FAULT CURRENT WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH EQUIPMENT IN THE FIELD. PROVIDE THE EQUIPMENT ACCORDINGLY. AIC RATING SHALL BE WRITTEN ON EACH EQUIPMENT

F. ENSURE THE COMBINED VOLTAGE DROP OF THE FEEDER AND BRANCH PER STANDARD. CIRCUIT SHALL NOT EXCEED 5% PER CODE.

G. PROVIDE GEC AND EGC AS PER 250.66 & 250.122 RESPECTIVELY, AS NEEDED. PROVIDE SEPARATE GROUND CONDUCTORS IN ALL CONDUITS.

H. REFER POWER PLAN FOR THE PROPOSED LOCATION OF THE ELECTRICAL METER, SERVICE DISCONNECT, PANELS, AND TRANSFORMERS. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY.

I. THE PART OF RISER MARKED AS EXISTING IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY THE EXACT POWER DISTRIBUTION (INCLUDING RISER IN THE FIELD. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY FOUND.

J. SPARE AMPS AVAILABLE IN THE EXISTING ELECTRICAL SERVICE SHALL BE MORE THAN THE NEWLY ADDED DEMAND AMPS.

K. VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF ALL THE EXISTING DEVICES INTENDED TO BE REUSED. REPLACE IF FOUND INOPERABLE (WITHIN THE SCOPE OF WORK). BASE BID ACCORDINGLY.

L. ADDITION OR ALTERATION TO THE EXISTING SYSTEM SHALL NOT BE DONE WITHOUT THE WRITTEN CONSENT OF THE OWNER.

M. REUSE OF THE EXISTING EQUIPMENT IS SUBJECT TO THE VERIFICATION OF THE LOCATION, RATING, OPERABLE CONDITION AND FAULT CURRENT IN THE FIELD. REPLACE THE EXISTING EQUIPMENT WITH A NEW ONE IF THE EXISTING EQUIPMENT CAN NOT BE REUSED DUE TO ANY OF THE REASONS MENTIONED EARLIER.

N. THE EXISTING ELECTRICAL EQUIPMENT THAT IS NOT INTENDED TO BE REUSED (WHETHER OR NOT SHOWN ON THE ELECTRICAL PLAN) SHALL BE DEMOLISHED. E.C. SHALL COORDINATE WITH THE OWNER/ARCHITECT IN THE FIELD BEFORE DEMOLITION.

ELECTRICAL RISER DIAGRAM KEY NOTES: (#)

1. E.C. SHALL VERIFY THE EXACT LOCATION, RATING AND OPERABLE CONDITION OF EVERY EQUIPMENT MARKED EXISTING IN THE FIELD. INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY, BEFORE BIDING.

PANEL SCHEDULE GENERAL NOTES:

A. ELECTRICAL CONTRACTOR SHALL VERIFY THE BREAKER AND CABLE RATING WITH EQUIPMENT SUPPLIER/OWNER AND ACCORDINGLY UPDATE THE BREAKER RATING CABLE SIZE IN FIELD.

B. GFI MARKED ON THE POWER PLAN INDICATES THAT THE CIRCUIT SHALL BE GFCI PROTECTED. E.C. SHALL PROVIDE GFCI BREAKER FOR THE GFI MARKED RECEPTACLES, IF EITHER RECEPTACLE IS NOT ACCESSIBLE OR NOT AVAILABLE.

C. PROVIDE HACR BREAKER FOR HAVC UNITS. COORDINATE WITH HVAC DRAWINGS.

D. PROVIDE LOCKING DEVICES ON CIRCUIT BREAKER WHERE EVER REQUIRED.

E. E.C. TO VERIFY SCOPE OF WORK WITH OWNER/ARCHITECT. PRIOR TO BID.

F. VERIFY EXACT POWER DISTRIBUTION IN FIELD.

COMMISSIONING REQUIREMENT

ELECTRICAL SYSTEM COMMISSIONING PER IECC SECTION C408

THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A REGISTERED PROFESSIONAL ENGINEER/COMMISSIONING FIRM TO COMMISSION THE ELECTRICAL SYSTEMS SPECIFIED BELOW FOR THIS PROJECT.

THE REGISTERED PROFESSIONAL ENGINEER/ COMMISSIONING FIRM SHALL DEVELOP A COMMISSIONING PLAN AND ACT AS THE PROJECT'S COMMISSIONING AUTHORITY. THE COMMISSIONING PLAN AND ACTIVITIES SHALL INCLUDE THE FOLLOWING:

1. A NARRATIVE DESCRIBING THE ACTIVITIES TO ACCOMPLISH DURING EACH COMMISSIONING PHASE.
2. PUBLISHED START-UP, PRE-FUNCTIONAL AND FUNCTIONAL TESTING FORMS AND SCRIPTS (AS APPLICABLE) FOR EACH SPECIFIC EQUIPMENT, APPLIANCE, AND SYSTEM. THE COMMISSIONING PLAN SHALL SATISFY THE REQUIREMENTS OF IECC SECTION C408.3.1 AND THE FOLLOWING SECTIONS FOR FUNCTIONAL PERFORMANCE TESTING FOR AUTOMATIC LIGHTING SYSTEMS.

A. MEET REQUIREMENTS OF C408.3.1.1 OCCUPANT SENSOR CONTROLS.

B. MEET REQUIREMENTS OF C408.3.1.2 TIME-SWITCH CONTROLS.

C. MEET REQUIREMENTS OF C408.3.1.3 DAYLIGHT RESPONSIVE CONTROLS.

3. THE COMMISSIONING AUTHORITY SHALL MAINTAIN AN OPEN ISSUE LOG ITEMIZING DEFICIENCIES FOUND DURING SITE VISITS AND COMMISSIONING ACTIVITIES. THE COMMISSIONING AUTHORITY SHALL PUBLISH THIS OPEN ISSUE LOG AND COMPLETED COMMISSIONING FORMS TO THE BUILDING OWNER AT THE COMPLETION OF THE COMMISSIONING ACTIVITIES.
4. PRIOR TO PASSING FINAL INSPECTION, PROVIDE EVIDENCE THAT THE LIGHTING CONTROL SYSTEMS HAVE BEEN TESTED TO ENSURE SYSTEM IS IN PROPER WORKING CONDITION PER THE CONSTRUCTION DOCUMENTS AND THE MANUFACTURER'S INSTRUCTIONS.
5. THE COMMISSIONING AUTHORITY IS RESPONSIBLE FOR ASSEMBLING AND ISSUING TO THE BUILDING OWNER THE FOLLOWING DOCUMENTATION WITHIN 90 DAYS OF THE DATE OF RECEIPT OF THE CERTIFICATION OF OCCUPANCY:

A. AS-BUILT CONSTRUCTION DOCUMENTATION INCLUDING EQUIPMENT LOCATION AND CATALONG NUMBER OF EACH PIECE OF EQUIPMENT.

B. EQUIPMENT OPERATIONS AND MAINTENANCE MANUALS INCLUDING THE INFORMATION PER IECC SECTION C408.3.2.2.

C. SYSTEMS' TESTING REPORTS PER C408.3.2.3.

D. FINAL COMMISSIONING REPORT.

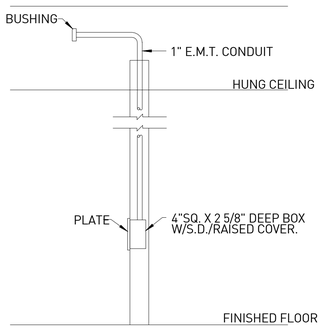
THE FOLLOWING ELECTRCIAL EQUIPMENT AND SYSTEMS SHALL BE INCLUDED IN THE COMMISSIONING PLAN:

1. CONTROLS FOR AUTOMATIC LIGHTING SYSTEMS.

MEGAFORMER

ELECTRICAL PANEL SCHEDULE RISER DIAGRAM

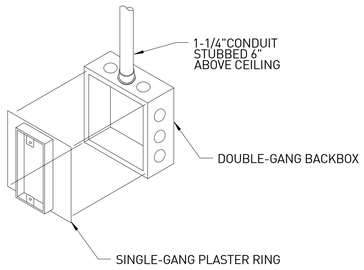
E3.01



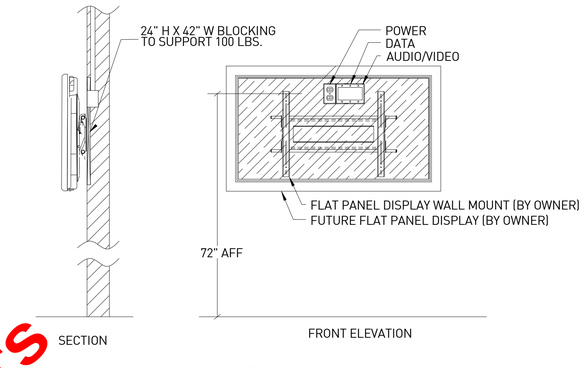
TELEPHONE & COMPUTER NOTES:

1. ALL CONDUITS FOR TELEPHONE OUTLETS SHALL BE 1" IPS MINIMUM SIZE UNLESS OTHERWISE SPECIFIED.

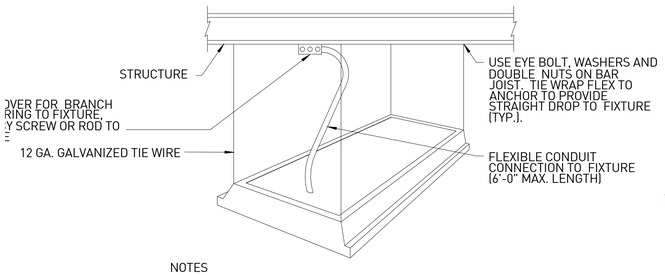
(5) TELEPHONE & COMPUTER OUTLET DETAIL
N.T.S.



(3) TELEDATA BACK BOX
N.T.S.



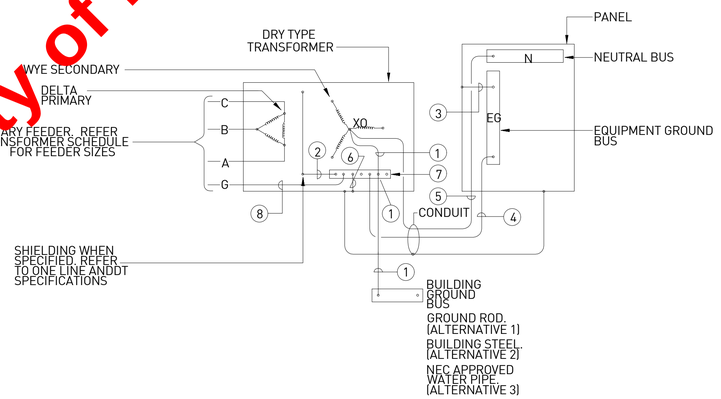
(2) FLAT PANEL DISPLAY MOUNTING
N.T.S.



NOTES

1. PROVIDE SUPPORT TIE WIRE IN TWO (2) OPPOSITE CORNERS FOR NORMAL USE LUMINAIRES.
2. PROVIDE SUPPORT TIE WIRES IN ALL FOUR (4) CORNERS FOR EMERGENCY USE LUMINAIRES.
3. SCREW FIXTURE AT EACH CORNER (4) TO GRID FOR ADDITIONAL SUPPORT OR PROVIDE SEISMIC CLIPS.

(4) RECESSED LIGHT MOUNTING
N.T.S.



NOTES BY SYMBOL -THIS DETAIL ONLY

1. PROVIDE CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE "XO" TERMINAL AND A NEC REQUIRED GROUNDING ELECTRODE AS SHOWN. PROVIDE A LUG AT THE TRANSFORMER GROUND BUS WHICH ALLOWS THE CONDUCTOR TO PASS THRU WITHOUT A SPLIT, BUT PROVIDES CONNECTION TO THE GROUND BUS. REFER TO TRANSFORMER SCHEDULE FOR SIZE.
2. PROVIDE JUMPER BETWEEN TRANSFORMER GROUND BUS AND TRANSFORMER SHIELDING. CONDUCTOR LENGTH MUST BE AS SHORT AS POSSIBLE WHILE NOT PUTTING UNNECESSARY STRESS ON CONNECTIONS.
3. PROVIDE JUMPER BETWEEN THE EQUIPMENT GROUND BAR AND THE PANEL ENCLOSURE. REFER TO TRANSFORMER SCHEDULE THIS DETAIL.
4. PROVIDE CONDUCTOR BETWEEN THE EQUIPMENT GROUND BUS AND THE TRANSFORMER GROUND BUS. REFER TO TRANSFORMER SCHEDULE THIS DETAIL.
5. PROVIDE CONDUCTOR BETWEEN THE NEUTRAL BUS AND TRANSFORMER. XO TERMINAL REFER TO TRANSFORMER SCHEDULE THIS DETAIL.
6. PROVIDE JUMPER BETWEEN TRANSFORMER GROUND BUS AND TRANSFORMER ENCLOSURE. REFER TO TRANSFORMER SCHEDULE THIS DETAIL.
7. PROVIDE GROUND BUS IN TRANSFORMER (2" WIDE, 1/4" THICK, COORDINATE LENGTH REQUIRED TO ACCOMMODATE ALL CONNECTIONS) MOUNTED TO THE TRANSFORMER ENCLOSURE.
8. PROVIDE CONNECTION OF GROUND CONDUCTOR FROM EACH INCOMING FEEDER TO THE GROUND BUS.

TRANSFORMER SCHEDULE

480 V Delta Primary 208Y/120V secondary

Transf. Kva	Primary Amps	Primary Overcurr.	Primary Feeder	Second. Amps	Second. Overcurr.	Secondary Feeder (4)(5)	GROUNDING ELECTRODE CONDUCTOR (JUMPERS) (1)(2)(3)(6)
15	18	30	3#10, 1#10G.,3/4" C.	42	50	4#6, 1#10G., 1" C.	#8 CU
30	36	60	3#4, 1#10G., 1" C.	83	100	4#1, 1#8G., 1-1/2" C.	#6 CU
45	54	90	3#2, 1#8G., 1-1/4" C.	125	150	4#1/0, 1#6G., 1-1/2" C.	#4 CU
75	90	150	3#1/0, 1#6G., 1-1/2" C.	208	250	4#250, 1#4G., 2-1/2" C.	#2 CU
112.5	135	225	3#4/0, 1#4G., 2" C.	312	400	2 sets 4#3/0, 1#3G., 2" C. EA.	#1/0 CU
150	180	250	3#250, 1#4G., 2" C.	415	500	2 sets 4#250, 1#2G., 2-1/2" C. EA.	#2/0 CU
225	270	400	3#600, 1#3G., 3" C.	625	800	2 sets 4#600, 1#1/0G., 3-1/2" C. EA.	#3/0 CU
300	360	500	2 sets 3#250, 1#2G., 2" C. EA.	832	1000	3 sets 4#400, 1#2/0G., 3" C. EA.	#3/0 CU

(1) TYPICAL DRY TYPE TRANSFORMER DIAGRAM
N.T.S.

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MEGAFORMER

ELECTRICAL DETAILS

E5.01

PLUMBING SYMBOLS LIST

SAN	SANITARY SEWER (UNDERFLOOR)
SAN	SANITARY SEWER (ABOVE FLOOR)
GSAN	GREASE SANITARY SEWER (UNDERFLOOR)
	VENT PIPING
	COLD WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
G	GAS PIPING
	P-TRAP
	PIPE UP
	PIPE DROP
	CLEANOUT
	PLUGGED OUTLET/CLEANOUT
	POINT OF CONNECTION

PLUMBING ABBREVIATIONS

CO	CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
AFF	ABOVE FINISH FLOOR
FD	FLOOR DRAIN
BFP	BACK FLOW PREVENTER
WH	WATER HEATER
EX.	EXSISTING
ET	EXPANSION TANK

PLUMBING DRAWING LIST

P0.01 PLUMBING NOTES, SYMBOLS, ABBREVIATIONS & SPECIFICATIONS

P1.01 PLUMBING SANITARY AND VENT FLOOR PLAN

P1.02 PLUMBING WATER FLOOR PLAN

P2.01 PLUMBING DETAILS

P3.01 PLUMBING SCHEDULES & RISERS

BUILDING DEPARTMENT PLUMBING NOTES

1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2024 UNIFORM PLUMBING CODE.
2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION UPC 701
3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 312.
4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 314.
5. RODENT PROOFING AS PER PC 312.12
6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION UPC 312, UPC 604, UPC 701, PC 903,UPC 1102.
7. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
8. DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER UPC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
9. DRAINAGE PIPE CLEANOUTS AS PER SECTION UPC 719.
10. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION UPC 313
11. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION UPC 601-603, 604, 606, 607, 608, 610
12. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION UPC 701, 704, 705, 706, 707, 708, 711.
13. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917 14. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION UPC 107.

PLUMBING SPECIFICATIONS

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

1.01 SCOPE

A. PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.

B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.

C. OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.

D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.

E. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.

F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.

G. ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.

H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.

I. MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.

J. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.

K. THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.02 SUBMITTALS

A. SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.

1. PIPE AND FITTINGS
2. VALVES
3. HANGERS AND SUPPORTS
4. PLUMBING PIPING LAYOUT
5. TESTS
6. PLUMBING FIXTURES
7. WATER HEATERS & ACCESSORIES
8. 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.

D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.

E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS 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 DRAIN.
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 POTABLE 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 INTERNATIONAL ENERGY CONSERVATION CODE 2024 SECTION C403.2.8.3 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)				
	CONDUCTIVITY BTU · IN./(H · FT2 · °F)	MEAN RATING TEMPERATURE, °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. AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2024, C404.6.1.1 DEMAND RECIRCULATION WATER SYSTEMS SHALL HAVE CONTROLS THAT 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.
8. AS PER 2024 INTERNATIONAL ENERGY CONSERVATION CODE., C404.6 WATER DISTRIBUTION SYSTEM 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 PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM.PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
   a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE,SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE.
   b. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F(40°C).
9. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2024 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 (INCHES)	MIXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
½"	2'	43'
¾"	0.5'	21'
1"	0.5'	13'
1¼"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'

10. AS PER IECC 2024, C404.6.1, CONTROLS ARE INSTALLED THAT LIMIT OPERATION OF A RECIRCULATION PUMP INSTALLED TO MAINTAIN TEMPERATURE OF A STORAGE TANK. SYSTEM RETURN PIPE IS A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. AUTOMATIC TIME SWITCHES INSTALLED TO AUTOMATICALLY SWITCH OFF THE RE-CIRCULATING HOT HOT WATER SYSTEM OR HEAT TRACE.
11. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.
12. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

C. HANGERS AND SUPPORTS:

1. HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNED OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
5. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

D. VALVES:

1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
2. ALL FIXTURES WITH THE EXCEPTION 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 SHUT-OFF VALVES ON SUPPLY LINES.
4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

E. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.

F. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

G. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

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

I. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

J. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.

K. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

L. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.

M. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.

N. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.

O. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

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

Q. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.

R. 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

A. 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.

B. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.

C. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.

D. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.

E. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.

F. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.

G. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.

H. 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.

I. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.

J. 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.

K. 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.

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

2.02 ABOVE GRADE

A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.

B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.

C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

3. TESTING

A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.

B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.

C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.

D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.

E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.

F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.

G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.

J. ALL EQUIPMENT WILL BE FACTORY TESTED.

I. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.

K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.

L. TESTING REQUIREMENTS
   a. 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 ADJACENT TENANT OR ESB SPACES.

M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.

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

4. WARRANTY

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.

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PLUMBING NOTES,SYMBOLS, ABBREVIATIONS & SPECIFICATIONS

P0.01



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GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
2. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
3. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.

SANITARY KEYED NOTES:

1. CONNECT NEW 4" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. CONTRACTOR TO FILED VERIFY THE SIZE, LOCATION AND INVERT OF EXISTING SANITARY LINE AND UPGRADE IF REQUIRED.
2. EXTEND AND CONNECT NEW 2" VENT PIPING TO EXISTING VENT PIPING IN SPACE. CONTRACTOR TO FILED VERIFY SIZE AND LOCATION OF EXISTING VENT PIPE. UPGRADE EXISTING VENT LINE IF REQUIRED.

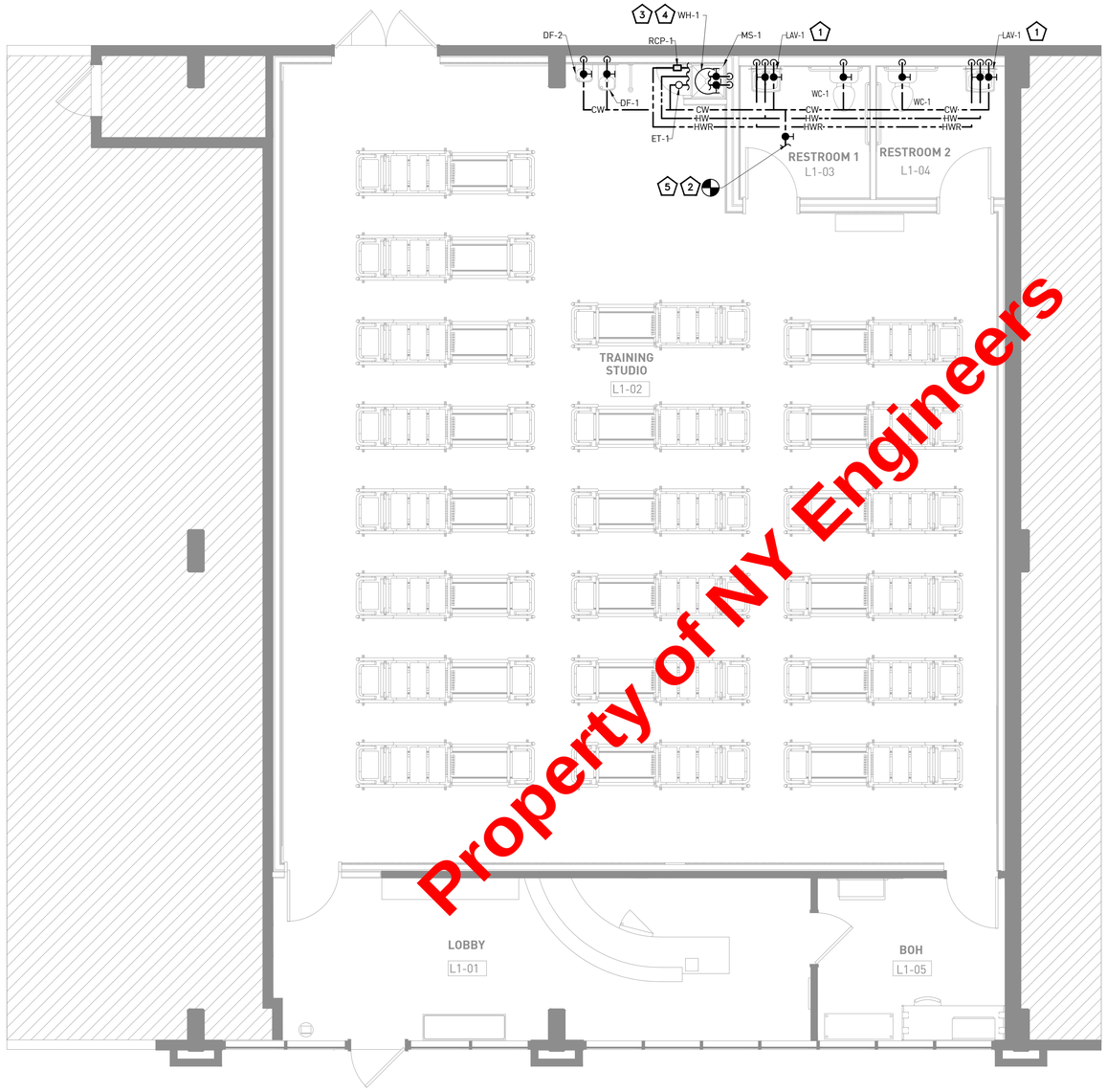
PLUMBING SANITARY AND VENT FLOOR PLAN | 1

1/4" = 1'-0"

MEGAFORMER

PLUMBING SANITARY AND VENT FLOOR PLAN

P1.01



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GENERAL NOTES:

1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2024
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. PROVIDE TRAP PRIMER/SEAL ON FLOOR DRAIN AS PER LOCAL JURISDICTION.

DOMESTIC WATER KEYED NOTES:

1. PROVIDE A TEMPERING VALVE FOR HAND SINK AND LAVATORY. POWER HYDROGUARD SERIES LFLM495, ASSE. 1070 OR EQUAL. SET TEMPERATURE TO A MAXIMUM OF 110° F.
2. CONNECT NEW 1" CW LINE WITH SHUT OFF VALVE TO EXISTING CW LINE IN SPACE. CONTRACTOR TO FIELD VERIFY SIZE, AND LOCATION OF EXISTING CW LINE.
3. ROUTE WATER HEATER T&P RELIEF DRAIN IN MOP SINK WITH APPROVED AIR GAP.
4. PROVIDE NEW ELECTRIC TANK TYPE WATER HEATER (WH-1) WITH ASSOCIATED ACCESSORIES, EXPANSION TANK (ET-1), AND RECIRCULATION PUMP (RCP-1). REFER SCHEDULE.
5. CONTRACTOR TO CONFIRM THE SPACE HAS EXISTING WATER METER AND BFP. PROVIDE NEW IF REQUIRED AS PER LOCAL CODE REQUIREMENTS.

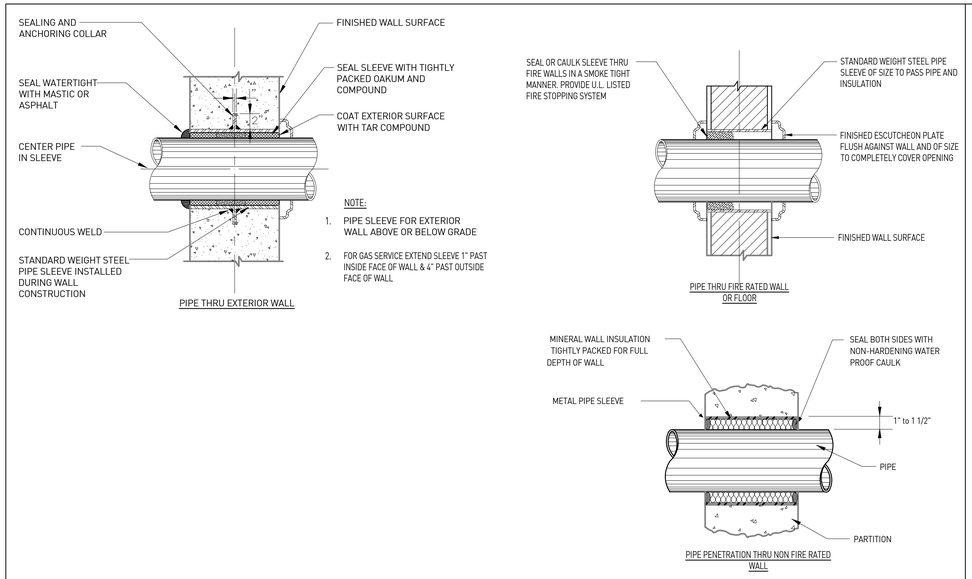
PLUMBING WATER FLOOR PLAN | 1

1/4" = 1'-0"

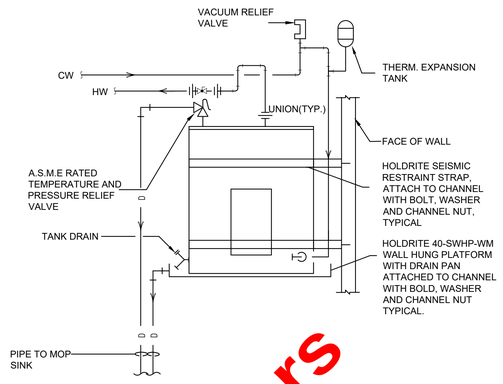
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PLUMBING WATER FLOOR PLAN

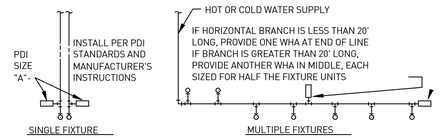
P1.02



1 P2.01 PIPE SLEEVE THRU WALL SECTION N.T.S



2 P2.01 ELECTRIC STORAGE WATER HEATER (WH-1) N.T.S



PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1-1/4"	61-113
E	1-1/2"	114-154
F	2"	154-330

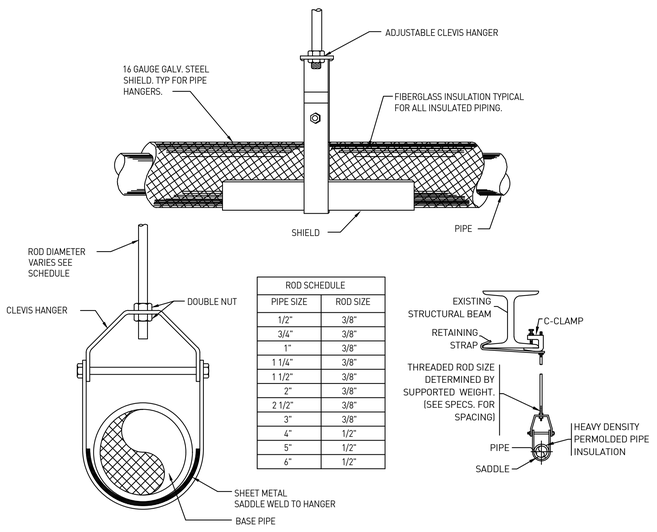
FIXTURE UNIT TABULATION		
FIXTURE	COLD	HOT
VALVE WATER CLOSET 10		--
TANK WATER CLOSET	5	--
URINAL	5	--
LAVATORY/SINK	1.5	1.5
JANITOR'S SINK	3	3
SHOWER/BATHTUB	2	2

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

NOTE:

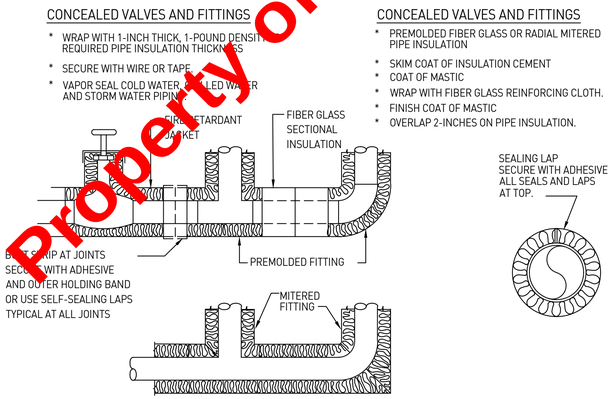
1. PROVIDE ASSE 1010 APPROVED WATER HAMMER ARRESTOR FOR FIXTURES WITH QUICK CLOSING VALVE.

3 P2.01 WATER HAMMER ARRESTORS N.T.S

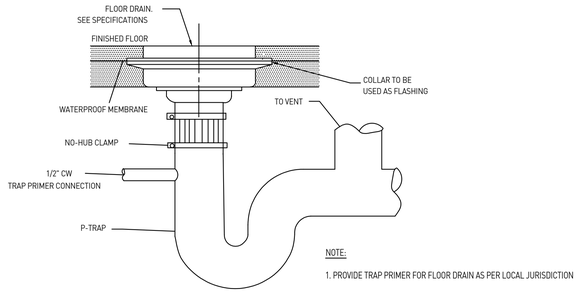


ROD SCHEDULE	
PIPE SIZE	ROD SIZE
1/2"	3/8"
3/4"	3/8"
1"	3/8"
1 1/4"	3/8"
1 1/2"	3/8"
2"	3/8"
2 1/2"	3/8"
3"	3/8"
4"	1/2"
5"	1/2"
6"	1/2"

4 P2.01 HANGER DETAIL N.T.S



5 P2.01 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS N.T.S



6 P2.01 FLOOR DRAIN DETAIL N.T.S

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MEGAFORMER

PLUMBING DETAILS

P2.01

STORAGE WATER HEATER SCHEDULE

TAG No.	QUANTITY	NO. ELEMENTS	LOCATION	MAX. INPUT KW	STOR. CAP (GAL)	RECOVERY CAP. (GPH) @90° RISE	TYPE	ELECT. CHARACTERISTICS CONTROLS	MANUFACTURER & MODEL NO.	REMARKS
WH-1	1	1	ABOVE MOP SINK	3 KW	15	15	ELECTRIC STORAGE TYPE WATER HEATER (SHELF MOUNTED)	208V/3Ø/60Hz	A.O.SMITH DEL-15	-DIMENSIONS 18"D X 26"H -PROVIDE EXPANSION TANK (ET-1) AS PER SCHEDULE -SHELF MOUNTED

NOTE: NSF RATED.PROVIDE CONDENSATE COLLECTOR,DRAIN TO FLOOR DRAIN. PROVIDE WITH VACUUM RELIEF VALVE. MOUNT ON FLOOR & COORDINATE EXACT LOCATION WITH OWNER IN FIELD.
PIPE INSULATION : PROVIDE HOT WATER PIPING WITH 1" INSULATION HAVING CONDUCTIVITY OF 0.27BTU PER INCH.

EXPANSION TANK SCHEDULE

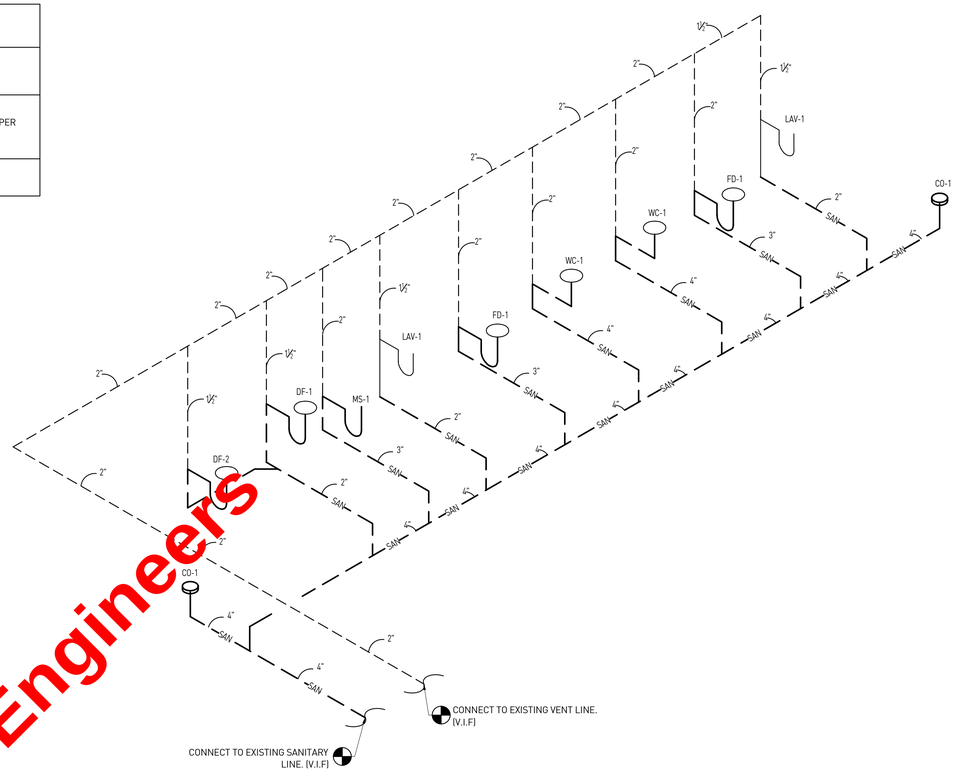
UNIT NUMBER	MANUFACTURER & MODEL NUMBER	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRESSURE RATING (PSI)	DIMENSIONS		OPERATING WEIGHT (LBS)	NOTES
						DIAMETER (INCH)	HEIGHT (INCH)		
ET-1	AMTROL	ST-5	2	0.9	150	8	12.5	25	1

GENERAL NOTES:
1. SET THE TANK PRESSURE TO EQUAL THE SYSTEM OPERATING PRESSURE. TANK MUST BE DRAINED BEFORE ADJUSTING SET PRESSURE.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON INCOMING COLD WATER LINE.

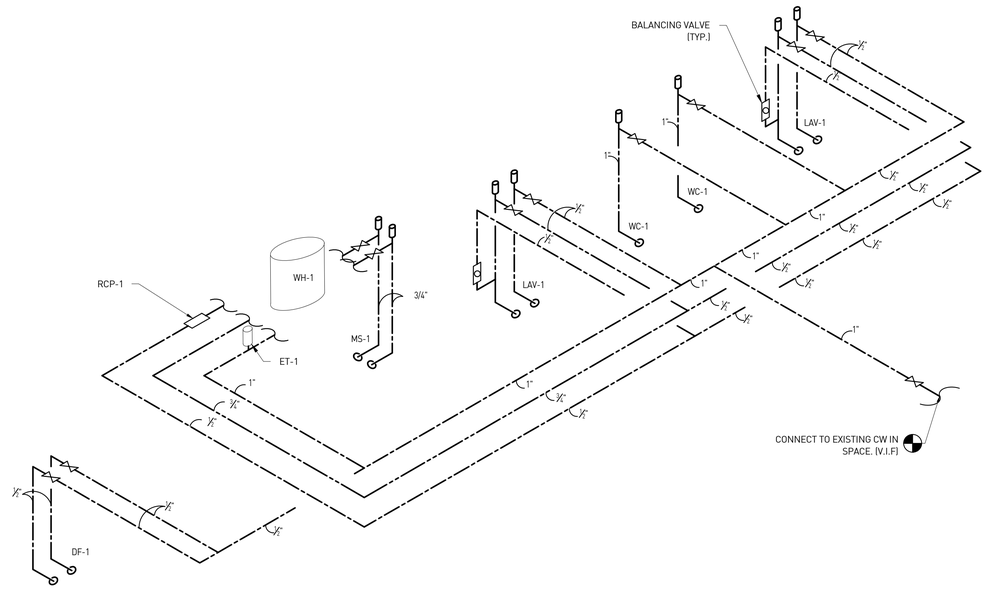
PLUMBING FIXTURE SCHEDULE

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE - INCHES					
		SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	REMARKS
WC-1	WATER CLOSET	4"	2"	1"	-	-	FLUSHOMETER VALVE
LAV-1	LAVATORY	2"	1½"	½"	½"	½"	P-TRAP
MS-1	MOP SINK	3"	2"	¾"	¾"	-	P-TRAP
DF-1	DRINKING FOUNTAIN	2"	1½"	½"	-	-	P-TRAP
FD-1	FLOOR DRAIN	3"	2"	-	-	-	P-TRAP

NOTE: CONTRACTOR TO COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION.



1 SANITARY AND VENT RISER
NTS



2 DOMESTIC WATER RISER
NTS

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MEGAFORMER

PLUMBING SCHEDULE & RISERS

P3.01