MECHANICAL SYMBOLS LIST

SYMBOL	DESCRIPTION
AC-1 / TXF-1	EQUIPMENT SYMBOL
XX / X	RISER SYMBOL
	POINT OF NEW CONNECTION TO EXISTING
	POINT OF DISCONNECTION FROM EXISTING
AIR DEVICES	
	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN
	LINEAR DIFFUSER SUPPLY – CEILING
	LINEAR DIFFUSER RETURN – CEILING
	GRILLE SUPPLY –SIDE MOUNT
	GRILLE RETURN –SIDE MOUNT
	DOOR UNDER CUT
DUCT ACCESSORIES	
GD	GRAVITY DAMPER
M	MOTORIZED DAMPER W/ ACCESS DOOR
VD VD	VOLUME DAMPER W/ ACCESS DOOR
CONTROLS AND SENSORS	
T	THERMOSTAT
T_S	TEMPERATURE SENSOR
P	PRESSURE SENSOR
S	SMOKE DETECTOR
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

AL	ACOUSTIC LINING
GD	GRAVITY DAMPER
CD	CONDENSATE DRAIN
CFM	CUBIC FEET OF AIR PER MINUTE
COP	COEFFICIENT OF PERFORMANCE
CXF	CAFE EXHAUST FAN
CDS	CEILING DIFFUSER SUPPLY
DIA	DIAMETER
DN	DOWN
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
FD	FIRE DAMPER W/FUSIBLE LINK
FSD	FIRE SMOKE DAMPER
GXF	GENERAL EXHAUST FAN
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
HWHT	HOT WATER HEATER
IEER	INTEGRATED ENERGY EFFICIENCY RATIO
IN	INCH
KXF	KITCHEN EXHAUST FAN
OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
RA	RETURN AIR
RAD	RETURN AIR DUCT
REF	REFRIGERANT PIPING
RG	RETURN GRILLE
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SAD	SUPPLY AIR DUCT
SG	SUPPLY GRILLE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
TXF	TOILET EXHAUST FAN
VD	VOLUME CONTROL DAMPER
W	WEIGHT

CODE COMPLIANCE

A.	2020 MINNESOTA BUILDING CODE.
B.	2020 MINNESOTA PLUMBING CODE
C.	2020 MINNESOTA MECHANICAL AND FUEL GAS CODE
D.	2023 NATIONAL ELECTRICAL CODE
E.	2024 MINNESOTA COMMERCIAL ENERGY CODE.

MECHANICAL DRAWING LIST

M-001	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M-002	MECHANICAL SPECIFICATION
M-101	MECHANICAL FLOOR PLAN
M-102	MECHANICAL ROOF PLAN
M-501	MECHANICAL DETAILS
M-601	MECHANICAL SCHEDULES

MINNESOTA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2020 MINNESOTA BUILDING CODEAND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH INTERNATIONAL BUILDING CODE – 2018 IBC.
2. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
3. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION MC 107 AND THE FOLLOWING SECTIONS OF THE 2018 IMC:
   A. REFRIGERATION SYSTEMS – 2018 IMC 1108
   B. VENTILATION SYSTEM SERVING COMMERCIAL COOKING APPLIANCES– 2018 IMC 507.6
4. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   A. STANDARDS OF HEATING – 2018 IMC 309.1
   B. AIR FILTERS – 2018 IMC 605.
   C. DUCT CONSTRUCTION AND INSTALLATION – 2018 IMC 603.
   D. AIR INTAKES, EXHAUST AND RELIEF – 2018 IMC 401.5
5. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
6. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018 IMC 401.
7. 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 2018 IMC 403.3
8. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
9. 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.
10. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
11. 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:

	SUPPLY	RETURN	EXHAUST
EXTERIOR OF BUILDING:	R-12	R-12	R-12
UNCONDITIONED SPACED WITHIN BUILDING:	R-6	R-6	R-6
WITHIN CONDITIONED SPACES:	–	–	–

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. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
5. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
6. CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
7. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
8. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
9. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.
10. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
11. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
12. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
13. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
14. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
    ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
15. 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.
16. 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.
17. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
18. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
19. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
20. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
23. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
24. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
25. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
26. 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.
27. 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.
28. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

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.

SCOPE OF WORK

THE RETAIL SPACE SHALL BE CONDITIONED VIA #2 EXISTING RTUs.

1. TOILET SHALL BE VENTILATED VIA EXISTING EXHAUST SYSTEM.
2. KITCHEN SHALL BE VENTILATED VIA NEW EXHAUST FAN.
3. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
4. 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.
5. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL HVAC NOTES

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
12. MAINTAIN A MINIMUM 6'-8" CLEARANCE TO THE UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
13. 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.
14. ALL MECHANICAL ROOM DOORS SHALL BE A MINIMUM OF 4'-0" WIDE.
15. 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.
16. 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.
17. 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.
18. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
19. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
20. 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.
21. ALL ROOF-MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
22. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
23. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
24. ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH 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.
25. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
26. REINFORCEMENT, DETAILING, AND PLACEMENT OF CONCRETE SHALL CONFORM TO ASTM 315 AND ACI 318. CONCRETE SHALL CONFORM TO ASTM C94. CONCRETE WORK SHALL CONFORM TO ACI 318 PART ENTITLED "CONSTRUCTION REQUIREMENTS".COMPRESSIVE STRENGTH IN 28 DAYS SHALL BE 3,000 PSI. TOTAL AIR CONTENT OR EXTERIOR CONCRETE SHALL BE BETWEEN 5 AND 7 PERCENT BY VOLUME. SLUMP SHALL BE BETWEEN 3 AND 4 IN. CONCRETE SHALL BE CURED FOR 7 DAY AFTER PLACEMENT.
27. CONCRETE HOUSEKEEPING PADS TO SUIT MECHANICAL EQUIPMENT SHALL BE SIZED AND LOCATED BY THE MECHANICAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE 6 IN. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 6 IN. ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE SIZE AND LOCATION OF CONCRETE HOUSEKEEPING PADS WITH THE GENERAL CONTRACTOR.
28. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
29. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

HVAC DUCTWORK – SHEET METAL

1. CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK,ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
2. CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
3. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
4. SUPPLY AND RETURN DUCTWORK 20' FROM ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
5. RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
6. CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
7. IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
8. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
9. ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
11. PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
12. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
13. ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
14. LOCATE ALL MECHANICAL EQUIPMENT (SINGLE DUCT, CONSTANT VOLUME, UNIT HEATERS, ETC.) FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
15. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
16. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
17. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
18. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
19. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, HUMIDIFIERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
20. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
21. ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
22. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
23. TERMINATE GAS VENTS FOR GAS APPLIANCES A MINIMUM OF 30 IN. ABOVE THE ROOF WITH RAIN CAP
24. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.
25. EXTERIOR LOUVERS ARE INDICATED FOR SIZE, GENERAL LOCATION AND PERFORMANCE ONLY. DETAILED LOUVER DESCRIPTIONS ARE PROVIDED IN THE ARCHITECTURAL SPECIFICATIONS.
26. EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS, PRESSURE CLASSIFICATION 2 IN. W.G.
27. DUCTWORK STATIC PRESSURE CLASSIFICATION:
    a.2 IN OF W.G. UP TO 2 IN OF W.G.
    b.6 IN OF W.G. ABOVE 2 IN & UP TO 6 IN WG
28. SEALING OF DUCTWORK SHALL COMPLY WITH SECTION 603.9 OF THE MECHANICAL CODE OF NEW YORK STATE OR IN NEW YORK CITY, THE NEW YORK CITY CONSTRUCTION CODES.
29. VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.
30. ACCESS DOORS: INSULATED OR UNINSULATED, SAME AS DUCT.
    1) PROVIDE MINIMUM 20 IN. X 20 IN. (OR EQUIVALENT) ON ALL DUCTS, UNLESS OTHERWISE APPROVED, AT FIRE DAMPERS, AND AT ALL DUCT ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS, AND LOUVERS.
    2) ACCESS DOORS SHALL BE LOCATED AT THE BOTTOM OF THE DUCT OR ON THE SIDE, AND NOT MORE THAN 16 INCHES FROM THE DUCT ACCESSORY THAT IT SERVES (FIRE DAMPER, FSD, ETC.).
    3) WHERE DUCT SIZE DOES NOT PERMIT A 20 IN. X 20 IN. (OR EQUIVALENT AREA) ACCESS DOOR, THE ACCESS DOOR SHALL BE FABRICATED OF AN AREA EQUIVALENT TO A 20 IN. X 20 IN. WITH THE SMALLER DIMENSION BEING 2 INCHES SMALLER THAN THE DUCT SIZE WHERE IT WILL BE LOCATED, AND LOCATED NOT LESS THAN 1" FROM ANY DUCT EDGE.
    4) FOR DUCTS WHICH LARGEST DIMENSION IS 12 INCHES (WIDTH AND OR HEIGHT), IT IS PERMISSIBLE TO PROVIDE A 10 IN. X 10 IN. (OR EQUIVALENT AREA) ACCESS DOOR LOCATED AT THE BOTTOM OR THE SIDE OF THE DUCT. THAN
    5) ALL ACCESS DOORS TO BE HINGED, WITH LATCH SIMILAR TO VENTLOCK NO. 100.
31. FLEXIBLE CONNECTIONS: NEOPRENE-COATED GLASS FABRIC, 30 OZ PER SQ YD WITH SEWED AND CEMENTED SEAMS, SIMILAR TO VENT FABRICS. PROVIDE WITH METAL COLLARS. ALLOW MINIMUM MOVEMENT OF 1 IN.
32. TURNING VANES: GALVANIZED STEEL SMALL DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE RADIUS.
33. FIRE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION, MULTIBLADED TYPE, SPRING LOADED, EQUIPPED WITH FUSIBLE LINK, CONFORMING TO NFPA STANDARD 90A AND APPROVED BY NEW YORK CITY BOARD OF STANDARDS AND APPEALS FOR NYC CAL-100-65-5M. SIMILAR TO AIR BALANCE MODEL 319-P, RATED AS REQUIRED. SEE INSTALLATION ON DRAWING.
34. DUCTWORK FOR AREAS WITH HIGH HUMIDITY SHALL BE ALUMINUM FABRICATED ONE GAGE LARGER THAN GALVANIZED FOR THE SAME PRESSURE CLASSIFICATION. THESE DUCTS INCLUDE SHOWERS, OUTDOOR AIR INTAKE, HUMIDIFIERS, ETC.
35. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.
36. AUTOMATIC DAMPERS: COMPLETE WITH LINKAGE AND ELECTRIC OPERATOR. OPPOSED BLADE DAMPER OR GALVANIZED STEEL MIN. 4 IN., MAX. 8 IN. WIDE WITH COMPRESSIBLE EDGE SEALS TO PREVENT LEAKAGE. FACTORY-ASSEMBLE STEEL LINKAGE AND SHAFT WITH NYLON
    OR OIL-IMPREGNATED BRONZE BEARINGS. MOTOR WITH SUFFICIENT POWER TO LIMIT LEAKAGE TO 10 CFM PER SQ FT. LINKAGE TO WITHSTAND LOAD EQUAL TO TWICE MAXIMUM OPERATING FORCE WITHOUT DEFLECTION. DAMPER MOUNTED IN WELDED STEEL CHANNEL FRAME.
37. WIRE MESH SCREEN (WMS): NO. 16 USSG, 3/4 SQUARE MESH, 1 IN. WIDE GALVANIZED STEEL ENCLOSING FRAME. FLANGED DUCT OPENING TO RECEIVE FRAME.
38. COMBINATION FIRE AND SMOKE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE. BLADES SHALL BE AIRFOIL SHAPED, DOUBLE SKIN, SINGLE PIECE CONSTRUCTION. EQUIPPED WITH FUSIBLE LINK CONFORMING TO NFPA STANDARD 90A, 92A & 92B, AND COMPLY WITH LATEST STANDARD UL555 AND UL555S WITH LEAKAGE CLASS I SMOKE DAMPERS, BLADE SEALS. SIMILAR TO RUSKIN MODEL FSD 60, NYC BSA LISTING# 176-82-SM. ACTUATOR SHALL BE ELECTRICALLY POWERED, 120 V/1 PH, AND MOUNTED IN THE FACTORY AT THE TIME OF FABRICATION.

NOISE CONTROL

A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.

B. PROVIDE SOUND LINING FOR THE FOLLOWING DUCTWORK:

1) ALL DUCTWORK WITHIN MECHANICAL ROOMS AND NOT LESS THAN 20 FT ON EACH SIDE OF ALL FANS AND AC UNITS.

2) AIR TRANSFER DUCTS.

3) ALSO WHERE NOTED ON A DRAWING.

C. SOUND LINING IN DUCTWORK: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEG F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071 AND ASTM G21/G22. SIMILAR TO MANVILLE PERMACOTE LINA COUSTIC.

D. ALL SOUND LINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

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

1. AIR SYSTEMS: CONSTANT-VOLUME.
2. HYDRONIC SYSTEMS: CONSTANT-FLOW
3. HEAT EXCHANGERS.
4. CONDENSING UNITS.
5. BOILERS.

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 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.
B. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
C. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
D. 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.
E. 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.
F. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.

Haraz - Minneapolis MN

MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS

M001

G. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.

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

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

END OF SECTION 230593

A. LINEAR DIFFUSERS: EXTRUDED ALUMINUM CONSTRUCTION, NATURAL ANODIZED FINISH, REMOVABLE CORE, AIR DEFLECTION VANE AND CABLE DAMPER IN EACH BRANCH TAP WITH 3 FT CABLE TO DIFFUSER FACE. PROVIDE CABLE DAMPER SIMILAR TO ANEMOSTAT MODEL OBASL.

B. REGISTERS AND GRILLES:

1) RETURN AND EXHAUST REGISTERS: STEEL CONSTRUCTION WITH VOLUME DAMPER.

2) SUPPLY REGISTERS: ALUMINUM CONSTRUCTION ADJUSTABLE DOUBLE DEFLECTION ALUMINUM AIRFOIL LOUVERS, WITH VOLUME DAMPER. PROVIDE AIR EQUALIZING DEFLECTOR WHERE REGISTER COLLAR DUCT IS LESS THAN 2 FT LONG.

3) TRANSFER GRILLES: STEEL CONSTRUCTION WITHOUT VOLUME DAMPER.

INSULATION – GENERAL REQUIREMENTS

A. ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E–84), (ASA A2.5–1963). FLAMESPREAD: MAXIMUM 25. FUEL CONTRIBUTED AND SMOKE DEVELOPED: MAXIMUM 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.

B. DEFINITIONS:

1) EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS.

2) CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT WHICH IS NOT EXPOSED.

3) OUTDOOR: DUCTS, PIPING OR EQUIPMENT WHICH IS EXPOSED TO THE WEATHER.

DUCTWORK INSULATION

A. INSULATE ALL DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

INSULATION SCHEDULE – DUCTWORK

SERVICE	LOCATION	THICKNESS	TYPE	FINISH
SUPP/RET	CONCEALED	1.5"	D–1	VAPORSEAL
INTAKE	ALL	2"	D–3	VAPORSEAL
SUPP/RET	EXPOSED	1.5"	D–2	VAPORSEAL

B. NON–INSULATED DUCTWORK:

1) WHERE SOUND LINING IS OF MINIMUM THICKNESS SPECIFIED FOR INSULATION.

2) AIR CONDITIONING RETURN AIR DUCTWORK EXPOSED IN AIR CONDITIONED SPACES AND INSTALLED IN HUNG CEILINGS WHERE SPACE IMMEDIATELY ABOVE AND BELOW ARE BOTH AIR CONDITIONED.MATERIAL:

D. MATERIAL:

1) TYPE D–1: MINIMUM 1–LB DENSITY FIBERGLASS BLANKET, MAXIMUM 0.28 K–FACTOR AT 75 ADEG F MEAN TEMPERATURE WITH FACTORY–APPLIED FOIL–SKRIM–KRAFT FACING SIMILAR TO MANVILLE MICROLITE.

2) TYPE D–2: 3 LB. FIBERGLASS BOARD. THE MAXIMUM K FACTOR SHALL BE 0.23 AT 75 DEG F MEAN TEMPERATURE WITH A MINIMUM DENSITY OF 3 LB. THE INSULATION SHALL BE PROVIDED WITH A FACTORY–APPLIED ALL PURPOSE OR ALL SERVICE FACING. THE INSULATION SHALL BE EQUAL TO MANVILLE TYPE 814 SPIN–GLAS AP.

3) TYPE D–3: MINIMUM 6 LB FIBERGLASS BOARD. MAXIMUM 0.22 K–FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY APPLIED ALL PURPOSE OR ALL SERVICE FACING. SIMILAR TO MANVILLE 817 SPIN–GLAS AP

E. INSTALLATION:

1. FIBERGLASS BLANKET: 2 IN. LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALL DUCTS OVER 24 IN. WIDE WITH MIN. 2 ROWS OF WELD PINS 12 IN. ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE.

2. FIBERGLASS BOARD: SEAL JOINTS AND BREAKS IN FACING WITH 3 IN. WIDE TAPE TO MATCH FACING AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS, WELD PINS ON TOP, SIDES AND BOTTOM.

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 COMPONENTS.
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. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL

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

D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER

E. FIBERGLASS STRUT SYSTEMS: COOPER B–LINE

F. THERMAL–HANGER SHIELD INSERTS:

G. FASTENER SYSTEMS: POWDER–ACTUATED FASTENERS OR MECHANICAL–EXPANSION ANCHORS

H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB–MOUNTED TYPE

I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

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. WITHIN 90 DAYS, 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. WITHIN 90 DAYS, 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. WITHIN 90 DAYS, 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 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.

1.4 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,

END OF SECTION 230713

SECTION 233113 – METAL DUCTS

1.1 CONSTRUCTION

A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2–1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.

B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:

1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1–1/2"X1–1/2"X1/8" GALVANIZED ANGLES, TACK–WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS, GASKET SIMILAR TO 3M–1202 OR APPROVED EQUAL.
2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.
4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30–03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30–02 AND COVERED WITH APPROVED SEALING TAPE.
5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2.
6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.

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

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

E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3–6 AND AS SHOWN IN FIG. 3–1 AND 3–2 FOR ROUND DUCTWORK.

F. 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. DOUBLE–WALL RECTANGULAR DUCTS AND FITTINGS.

1. FIBROUS–GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION.
2. PERFORATED INNER DUCT.

C. SINGLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.

D. DOUBLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.

1. FIBROUS–GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION.
2. PERFORATED INNER DUCT.

E. SHEET METAL MATERIALS:

1. GALVANIZED SHEET STEEL.
2. PVC–COATED, GALVANIZED SHEET STEEL.
3. CARBON–STEEL SHEETS.
4. STAINLESS–STEEL SHEETS.
5. ALUMINUM SHEETS.
6. FACTORY–APPLIED ANTI–MICROBIAL COATING.

F. DUCT LINER:

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

G. SEALANT MATERIALS:

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

1.3 SEISMIC–RESTRAINT DEVICES

A. CHANNEL SUPPORT SYSTEM.

B. STAINLESS–STEEL RESTRAINT CABLES.

C. HANGER ROD STIFFENER: STEEL TUBE OR STEEL SLOTTED–SUPPORT–SYSTEM SLEEVE WITH INTERNALLY BOLTED CONNECTIONS OR REINFORCING STEEL ANGLE CLAMPED TO HANGER ROD.

1.4 DUCT CLEANING

A. CLEAN THE FOLLOWING ITEMS:

1. AIR OUTLETS AND INLETS.
2. SUPPLY, RETURN, AND EXHAUST FANS.
3. AIR–HANDLING UNITS.
4. COILS AND RELATED COMPONENTS.
5. RETURN–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
6. SUPPLY–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.

VIBRATION ISOLATION

A. GENERAL:

1) PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.

2) INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4".

4) ACCEPTABLE MANUFACTURERS:

a. MASON INDUSTRIES, INC.

b. VIBRATION ELIMINATOR CO.

c. KORFUND DYNAMICS CORP.

B. CEILING–HUNG FANS AND EQUIPMENT:

1) PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE PCHS.

2) 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM RESERVE DEFLECTION. FACTORY–PRELOADED TO 75% OF RATED LOAD.

3) PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS.

C. FLOOR MOUNTED EQUIPMENT HAVING INTERNAL ISOLATION:

1) PROVIDE 5/16 IN.–THICK NEOPRENE ACOUSTICAL BASE PADS OF RIB.

THERMOSTATIC CONTROLS

C403.4.1 THERMOSTATIC CONTROLS (MANDATORY)

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

EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:

1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM).
2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

C403.4.1.2 DEADBAND (MANDATORY)

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

EXCEPTIONS:

1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

C403.4.1.3 SETPOINT OVERLAP RESTRICTION (MANDATORY)

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.4.1.2.

C403.4.2 OFF–HOUR CONTROLS (MANDATORY)

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

EXCEPTIONS:

1. ZONES THAT WILL BE OPERATED CONTINUOUSLY.
2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH LOCATED WITH READY ACCESS.

C403.4.2.1 THERMOSTATIC SETBACK (MANDATORY)

THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

C403.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN (MANDATORY)

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

C403.4.2.3 AUTOMATIC START (MANDATORY)

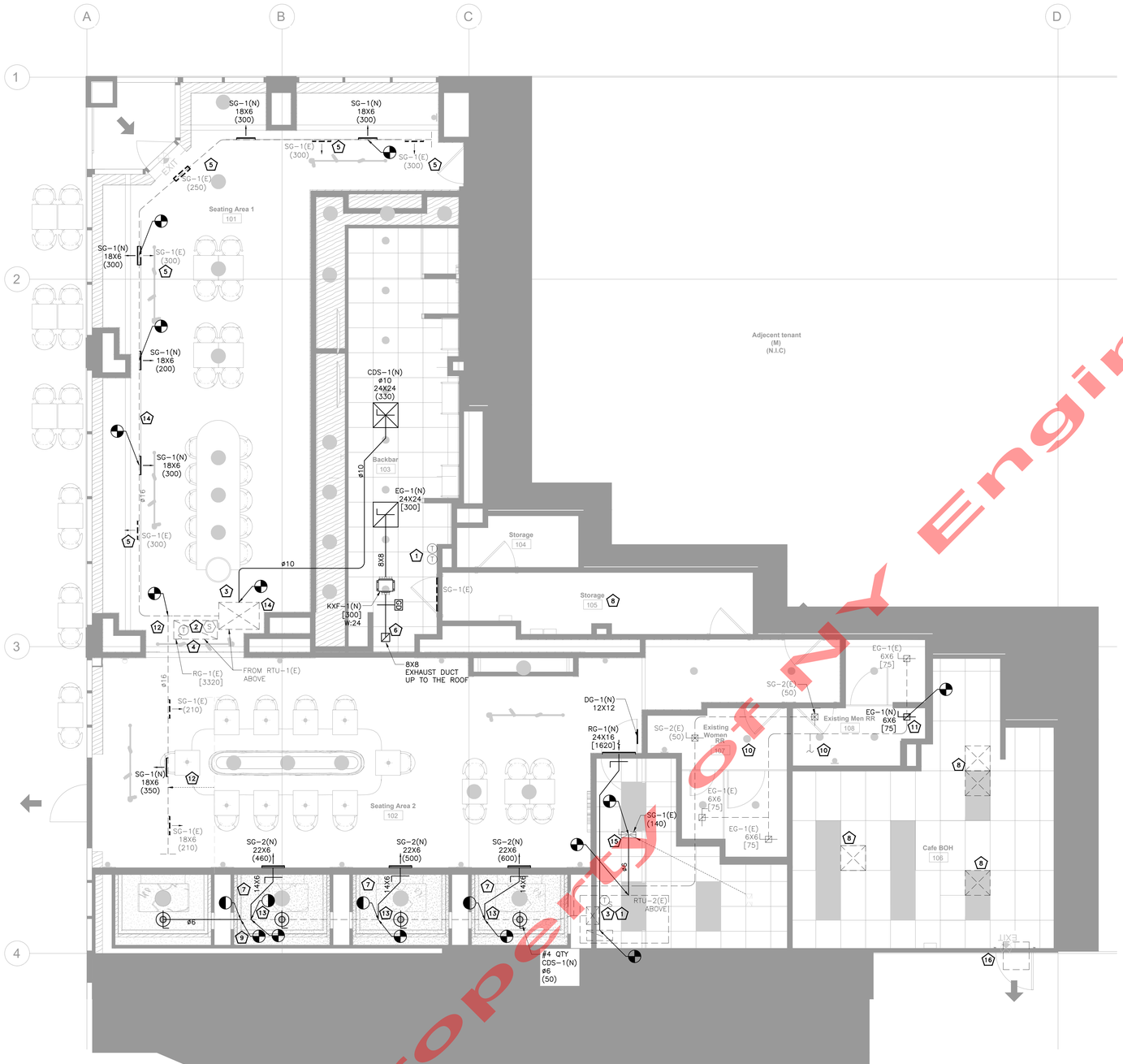
AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.

Proof Not For Engineering

Haraz - Minneapolis MN

MECHANICAL SPECIFICATIONS

M002



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

LEGENDS	
- - - - - - -	EXISTING EQUIPMENT/ DUCT
———	NEW EQUIPMENT/DUCT

KEYED NOTES:

1. EXISTING THERMOSTAT AND SENSORS TO BE RE-USED. CONTRACTOR TO VERIFY IN FIELD, REPLACE IN KINDS IF DAMAGED. RELOCATE AS/IF REQUIRED. CONFIRM AND COORDINATE WITH OWNER/ARCHITECT.
2. EXISTING SMOKE DETECTOR TO REMAIN AND REUSED. IF EXISTING SMOKE DETECTOR IS NOT IN CONDITION TO REUSE, THEN INSTALL NEW ONE. SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER NEC.
3. APPROXIMATE LOCATION OF EXISTING DUCTWORK DROP FOR RTU-1(E) AND RTU-2(E). CONTRACTOR TO VERIFY THE EXACT SIZE AND LOCATION IN FIELD. MODIFY/EXTEND AS REQUIRED IN PREPARATION FOR NEW DUCTWORK SYSTEM.
4. APPROXIMATE LOCATION OF EXISTING RETURN AIR GRILLE AND DUCTWORK FOR RTU-1(E). CONTRACTOR TO VERIFY THE EXACT SIZE AND LOCATION IN FIELD.
5. EXISTING GRILLE TO REMAIN. VERIFY SIZE AND LOCATION IN FIELD. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. CONTRACTOR TO BALANCE CFM'S AS INDICATED ON THE PLAN FOR ALL THE EXISTING GRILLES.
6. CONTRACTOR SHALL COORDINATE ON SITE WITH THE LANDLORD AND ARCHITECT TO DETERMINE THE ROUTING OF THE EXHAUST DUCT ROOF TERMINATION BASED ON SITE CONDITIONS.
7. ARCHITECT TO COORDINATE DOME HEIGHT WITH EXISTING AND NEW PROPOSED DUCTWORK ABOVE. VERIFY CLEARANCE AND ADJUST DOME PROFILE AS REQUIRED TO AVOID INTERFERENCE WITH EXISTING HVAC DUCTS.
8. EXISTING AIR CONDITIONING ARRANGEMENT WITH AIR DEVICES TO REMAIN AND BE REUSED.
9. DISCONNECT THE EXISTING SUPPLY DUCTWORK AND EXTEND IT AS SHOWN IN THE PLAN. PROVIDE ALL THE NECESSARY DUCT TRANSITIONS AS PER THE EXISTING DUCT SIZES. FINAL DUCT RUN OF THE PROPOSED DUCTWORK SHALL BE DETERMINED IN FIELD AS PER THE SITE CONDITIONS.CONTRACTOR TO VERIFY EXACT LOCATION IN FIELD.
10. EXISTING TOILET EXHAUST AND SUPPLY SYSTEM TO REMAIN ALONG WITH ALL DUCT, GRILLE, AND ACCESSORIES TO REMAIN. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. CONTRACTOR TO BALANCE CFM'S AS INDICATED ON THE PLANS FOR ALL THE EXISTING GRILLES. CONTRACTOR TO VERIFY THE EXACT LOCATION IN FIELD. REPORT TO THE DESIGN ENGINEER IF ANY DISCREPANCIES FOUND.
11. INSTALL NEW EXHAUST GRILLE AND CONNECT TO EXISTING TOILET EXHAUST DUCT.
12. CONTRACTOR TO RELOCATE THE EXISTING DUCT TO NEW LOCATION AS SHOWN ON PLAN. CONNECT THE EXISTING DUCTWORK WITH RTU-1(E) SUPPLY DUCT AND BALANCE THE CFM AS SHOWN ON THE PLAN
13. CONTRACTOR TO DEMOLISH EXISTING GRILLE. CONFECT THE NEW SUPPLY DUCT WORK AS SHOWN ON PLAN. CONTRACTOR TO VERIFY EXACT LOCATION IN FIELD.
14. CONTRACTOR TO VERIFY SIZE AND LOCATION OF EXISTING DUCTS IN FIELD. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION.
15. EXISTING GRILLE TO REMAIN. RELOCATE THE GRILLE AS SHOWN ON PLAN, VERIFY THE EXACT SIZE AND LOCATION IN FIELD. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. CONTRACTOR TO BALANCE CFM AS INDICATED ON THE PLAN. PROVIDE NEW GRILLE IF THE EXISTING GRILLE IS NOT FEASIBLE FOR THE CFM MENTION ON THE PLAN.
16. EXISTING WINDOW AC TO BE REMAIN. THE OPERATING CONDITION OF WINDOW AC SHALL BE DETERMINED IN THE FIELD, AND ANY REQUIRED REPAIRS, MODIFICATIONS, OR REPLACEMENTS SHALL BE MADE ACCORDING TO SITE CONDITIONS.REPORT TO THE DESIGN ENGINEER IF ANY DISCREPANCIES FOUND.

GENERAL NOTES:

1. ALL WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.
2. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS.
3. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.
4. THESE DRAWINGS, AS PREPARED, ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS CONSTRUCTION OF THE PROJECT AND THE WORK OF THE TRADES WILL PERMIT. EQUIPMENT LOCATIONS INDICATED ARE APPROXIMATE. COORDINATE EXACT LOCATIONS AND REQUIRED CLEARANCES WITH EQUIPMENT SUPPLIER AND ALL TRADES PRIOR TO INSTALLATION.
5. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL THE EQUIPMENT INDICATED WITHIN THE MECHANICAL DRAWINGS UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE UL LISTED. VERIFY LOCATION AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND / OR INSTALLATION.
6. DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
7. ALL METAL DUCT AND AIR DISTRIBUTION DEVICES SHALL BE INSULATED WITH R-6 LOCATED IN INTERIOR AND R-12 LOCATED IN EXTERIOR, 75 DENSITY FOIL-BACKED INSULATION WITH FIRE AND SMOKE RATING 25-50.
8. ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, SEALED, AND INSULATED PER THE LATEST ISSUE OF SMACNA LOW-VELOCITY DUCT MANUAL.
9. THE CONTRACTOR SHALL COORDINATE DIFFUSER LOCATIONS ON SITE WITH THE MOST RECENT REFLECTED CEILING PLAN.
10. THE CONTRACTOR IS TO MAKE ALL LOW-VOLTAGE WIRING CONNECTIONS FOR ALL HVAC EQUIPMENT INCLUDING TEMPERATURE CONTROLS, ROOF TOP UNITS, SMOKE DETECTORS AND CONTACTOR PANEL.
11. ALL WORK SHALL BE SUBJECT TO THE ACCEPTANCE AND APPROVAL OF THE ARCHITECT AND OWNER. THE ARCHITECT SHALL BE NOTIFIED OF ANY AND ALL DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. FAILURE OF PROPER NOTIFICATION DOES NOT RELIEVE THE CONTRACTOR. THE CONTRACTOR SHALL CORRECT ANY AND ALL WORK ARISING FROM SUCH FAILURE TO COORDINATE DISCREPANCIES TO THE SATISFACTION OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.
12. THE CONTRACTOR SHALL, UPON COMPLETION OF PROJECT, PERFORM A COMPLETE TEST AND BALANCE OF ALL EQUIPMENT. PROVIDE A WRITTEN REPORT TO THE ARCHITECT. ALL CAPACITIES MUST BE SET TO WITHIN ±5% OF AMOUNTS INDICATED ON THE FLOOR PLAN AND SCHEDULES.
13. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/ BARRIERS AS PER LOCAL CODE. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
14. PROVIDE VOLUME DAMPER AT EACH SUPPLY, RETURN AND EXHAUST DUCTWORK BRANCH.
15. PROVIDE CORD-OPERATED DAMPERS IN INACCESSIBLE CEILINGS.
16. PROVIDE 1" THICK ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
17. IF EXISTING GRILLE OR DIFFUSER ACCESSORIES ARE FOUND TO BE INOPERABLE, REPLACE THEM WITH NEW.
18. EXISTING AIR DISTRIBUTION DUCTS, DIFFUSERS, REGISTERS, AND GRILLES SHALL BE REUSED WHEREVER FEASIBLE, AS INDICATED ON THE PLANS. THE CONTRACTOR SHALL CLEAN AND REFURBISH ALL REUSED COMPONENTS TO A "LIKE-NEW" CONDITION. EXACT LOCATIONS AND SIZES MUST BE VERIFIED IN THE FIELD PRIOR TO BIDDING. NEW SUPPLY GRILLES SHALL BE PROVIDED AT THE LOCATIONS SHOWN, AND INSTALLED ON EXISTING DUCTWORK USING APPROPRIATE TRANSITIONS AS NEEDED. THE CONTRACTOR IS RESPONSIBLE FOR BALANCING THE AIRFLOW (CFM) OF ALL NEW AND EXISTING SUPPLY GRILLES TO ENSURE THE MECHANICAL UNIT OPERATES AT FULL CAPACITY AND DELIVERS OPTIMAL SYSTEM PERFORMANCE. INSTALL VOLUME DAMPERS OR COLLAR DAMPERS AS REQUIRED. CONFIRM ALL AIRFLOW RATES (CFM), DUCT SIZES, AND LOCATIONS ON SITE BEFORE SUBMITTING A BID.

DEMOLITION NOTES:

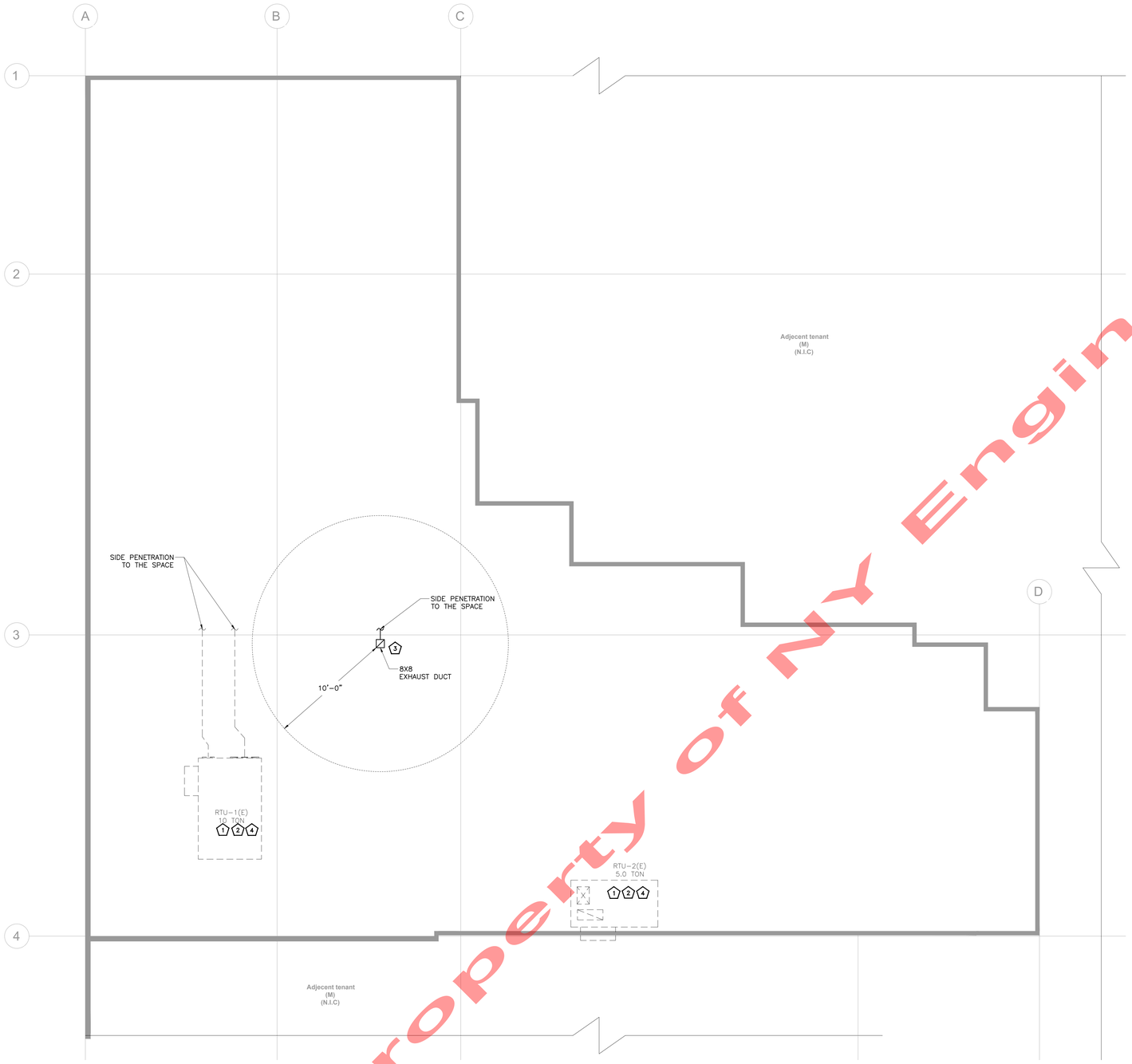
1. BEFORE STARTING DEMOLITION, PROVIDE NECESSARY PROTECTIVE DEVICES WHERE REQUIRED AND IN STRICT ACCORDANCE WITH APPLICABLE CODES AND BUILDING REGULATIONS.
2. TAKE NECESSARY PRECAUTIONS TO PREVENT DUST AND DIRT MIGRATING TO OCCUPIED AREAS OF THE BUILDING.
3. KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.
4. ALL DEMOLISHED MATERIALS SHALL BE REMOVED AND DISPOSED OF OFF SITE.
5. REPAIR/ REPLACE EXISTING EQUIPMENT/ MATERIALS NOT SCHEDULED OR NOTED TO BE DEMOLISHED BUT BECOME DAMAGED DURING THE PROGRESS OF THE WORK. MAKE ANY AND ALL SUCH REPAIRS, REPLACEMENTS, MODIFICATIONS TO RESTORE THE DAMAGED ITEMS TO THEIR ORIGINAL CONDITIONS AT THE TIME OF DAMAGE, TO THE SATISFACTION OF AND AT NO ADDITIONAL COST TO THE OWNER.
6. EXISTING CONDITIONS AND LOCATIONS OF EQUIPMENT WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCING WORK.
7. COORDINATE CUTTING, PATCHING OF EXISTING ROOF, WALLS, CEILINGS, AND FLOORS AFFECTED BY MECHANICAL DEMOLITION WITH GENERAL CONTRACTOR.

Property of NY Engineers

Haraz -
Minneapolis MN

MECHANICAL
FLOOR PLAN

M101



KEYED NOTES:

1. EXISTING RTU-1(E) & RTU-2(E) ALONG WITH ALL ITS ACCESSORIES TO REMAIN AND TO BE REUSED. INCLUDING BUT NOT LIMITED TO THE SMOKE DETECTOR, TEMPERATURE SENSORS, ASSOCIATED THERMOSTATS, ETC. THE OPERATING CONDITION OF THESE RTUs AND ACCESSORIES SHALL BE DETERMINED IN THE FIELD, AND ANY REQUIRED REPAIRS, MODIFICATIONS, OR REPLACEMENTS SHALL BE MADE ACCORDING TO SITE CONDITIONS
2. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR. CONTRACTOR TO FIELD VERIFY THAT LOCATION OF ANY EXHAUST SOURCE SHOULD BE AT LEASE 10' AWAY FROM THE RTU'S OUTSIDE AIR INTAKE.
3. TERMINATE ALL EXHAUST AIR DUCTS AT-LEAST 10' HORIZONTALLY AWAY OR 3' VERTICALLY ABOVE ALL OUTSIDE AIR INTAKE OPENINGS AND 10' FEET HORIZONTALLY AWAY FROM LOT LINES. TERMINATE EXHAUST WITH GOOSE NECK.
4. EXISTING CONDENSATE PIPING FOR THE RTU-1(E), RTU-2(E) TO REMAIN. CONTRACTOR TO FIELD VERIFY THE POINT OF TERMINATION AND MAKE SURE THAT IT COMPLIES WITH THE LOCAL CODES AND LANDLORD DESIGN GUIDELINES. ANY DISCREPANCIES IDENTIFIED SHALL BE REPORTED BACK TO THE EOR.

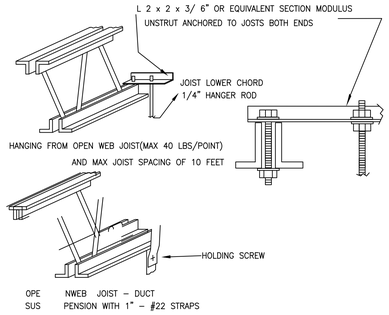
1 MECHANICAL ROOF PLAN
1/4" = 1'-0"

Property of NY Engineer

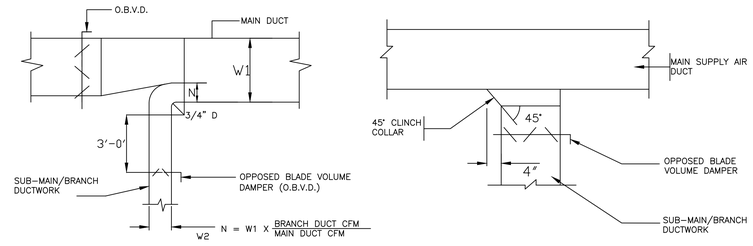
Haraz -
Minneapolis MN

MECHANICAL
ROOF PLAN

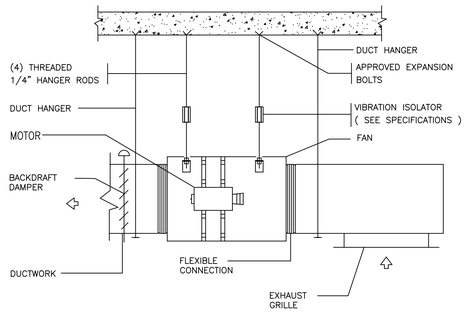
M102



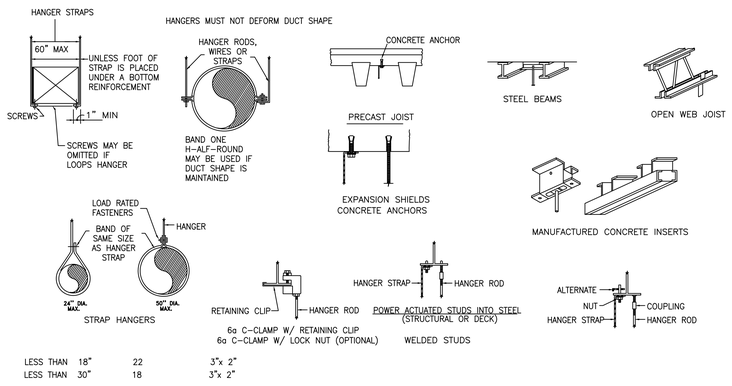
1/501 DUCT MOUNTING DETAIL
N.T.S



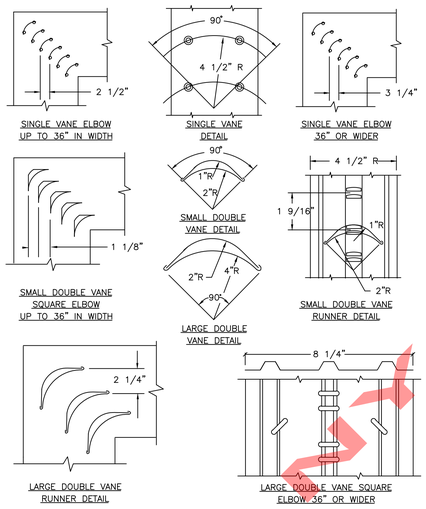
2/501 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
N.T.S



3/501 INLINE FAN HANGING SUPPORT DETAIL
N.T.S



5/501 UPPER & LOWER ATTACHMENTS & DEVICES
N.T.S



4/501 LOW VELOCITY DUCTWORK ELBOWS
N.T.S

Property of NY Engineers

Haraz - Minneapolis MN

M501

EXISTING ROOF TOP UNIT SCHEDULE

UNIT ID	MANUFACTURER	MODEL	AREA SERVED	NOMINAL TONS (VIF)	TOTAL COOLING MBH (VIF)	SENSIBLE COOLING MBH (VIF)	EER (VIF)	SEER (VIF)	HEATING MBH (IN) (VIF)	HEATING MBH (OUT) (VIF)	TEMPERATURE RISE (°F) (VIF)	THERMAL EFFICIENCY (VIF)	SUPPLY AIR (CFM) (VIF)	OUTDOOR AIR (CFM) (VIF)	ESP IN. W.C. (VIF)	ELECTRICAL (VIF)					OPERATING WEIGHT (LBS)(VIF)	REMARKS
																VOLTS	PHASE	HZ	MCA(A)	MOCP(A)		
RTU-1 (E)	CARRIER	48TCED12A5A0A0A0	SEE PLAN	10	114	SAE	11.10	-	224	184	65	82%	4000	680	SAE	208/230	3	60	50	60	930	1-7
RTU-2 (E)	CARRIER	48KCEA06A2A3A0A0A0	SEE PLAN	5	58.5	SAE	-	14.00	90	73.5	65	81%	2000	380	SAE	208/230	1	60	40	60	597	1-7

NOTES / ACCESSORIES -

1. SAE : SAME AS EXISTING, VIF: VERIFY IN FIELD
2. EXISTING RTU WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED
3. CONTRACTOR TO FIELD VERIFY IF RTU IS WORKING AT THEIR 100% RATED CAPACITY. INFORM THE DESIGN ENGINEER IF ANY DISCREPANCIES FOUND.
4. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF THE UNIT IN SITE.
5. IF REQUIRED, PROVIDE NEW THERMOSTAT, HUMIDISTAT, AND TEMPERATURE SENSOR COMPATIBLE WITH THE EXISTING RTU. COORINDATE FINAL LOCATION OF THE T-SENSOR, HUMIDISTAT WITH THE ARCHITECT/OWNER.
6. CONTRACTOR TO BALANCE OUTSIDE AIR DAMPER ON EXISTING RTU TO MATCH VALUE MENTION IN AIR BALANCE TABLE
7. REPLACE FILTERS WITH NEW MERV 13 FILTERS .

FANS SCHEDULE

UNIT ID	MANUFACTURER	AREA SERVED	MODEL	CFM	TYPE	DRIVE	FAN RPM	E.S.P.	MOTOR			INTERLOCKED	WEIGHT (LBS)	NOTES
								(IN. W.G.)	MCA	MOP	V/HZ/PH			
KXF-1(N)	GREENHECK	SEE PLAN	CSP-A390-VG	300	CABINET FAN	DIRECT	1370	0.5	1.9	15	115/60/1	RTU-1(E)	24	1-6

NOTES / ACCESSORIES:

1.CONTRACTOR TO PROVIDE MOUNTING FRAMES AND VIBRATION ISOLATORS FOR FAN MOUNTING . ALSO PROVIDE FLEXIBLE CONNECTION AT DUCT CONNECTION TO FAN.
2. PROVIDE BACKDRAFT DAMPER FOR ALL NEW FANS.
3. AMCA SEAL & UL CERTIFIED.
4. THERMAL OVERLOAD PROTECTION.
5. PROVIDE MOTOR STARTERS, DISCONNECTS WITH NEMA-3R (IF NOT FACTORY PROVIDED).

SCHEDULE OF SQUARE DIFFUSER

TAG	SIZE	DESCRIPTION	CONSTRUCTION	FINISH	BASIS OF DESIGN		ACCESSORIES
					MANUFACTURER	MODEL	
CDS-1(N)	6"	SUPPLY AIR DIFFUSER	ALUMINUM	WHITE	TITUS	TMR	VOLUME DAMPER

NOTES:

1. MAX. NC LEVEL 20 OR LESS.
2. COORDINATE WITH ARCHITECT/OWNER FOR FINAL MOUNTING, FRAME TYPE, PAINT AND FINISH.
3. PROVIDE INSULATED BACKS ON ALL DIFFUSERS/GRILLE.

FOR ROUND NECK DIFFUSERS:

6" DIA: 0-120 CFM
8" DIA: 125-220CFM
10" DIA: 225-400 CFM
12" DIA: 405-550 CFM
14" DIA: 550-650 CFM

SCHEDULE OF GRILLE

TAG	SIZE (IN)	DESCRIPTION	CONSTRUCTION	FINISH	BASIS OF DESIGN		ACCESSORIES
					MANUFACTURER	MODEL	
SG-1(N)	SEE PLAN	SUPPLY AIR GRILLE	ALUMINUM	WHITE	TITUS	S300F	AIR SCOOP DAMPER
SG-2(N)	SEE PLAN	SUPPLY AIR GRILLE	ALUMINUM	WHITE	TITUS	300F	COLLER DAMPER
RG-1(N)	SEE PLAN	RETURN AIR GRILLE	ALUMINUM	WHITE	TITUS	350R	COLLER DAMPER
EG-1(N)	SEE PLAN	EXAHUST AIR GRILLE	ALUMINUM	WHITE	TITUS	350R	COLLER DAMPER
RG-1(E)	S.A.E	RETURN AIR GRILLE	S.A.E	S.A.E	S.A.E	S.A.E	VOLUME DAMPER
EG-1(E)	S.A.E	EXAHUST AIR GRILLE	S.A.E	S.A.E	S.A.E	S.A.E	VOLUME DAMPER

NOTES:

A. SAE : SAME AS EXISTING, VIF: VERIFY IN FIELD.
1. MAX. NC LEVEL 20 OR LESS.
2. COORDINATE WITH ARCHITECT/OWNER FOR FINAL MOUNTING, FRAME TYPE, PAINT AND FINISH.
3. PROVIDE INSULATED BACKS ON ALL DIFFUSERS/GRILLE.

AIR BALANCE

UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
RTU-1(E)	SEE PLAN	4000 CFM	680 CFM	1315 CFM	0 CFM
RTU-2(E)	SEE PLAN	2000 CFM	380 CFM	1155 CFM	0 CFM
TOILE EXHAUST	SEE PLAN				300 CFM
KXF-1(N)	SEE PLAN	0 CFM	0 CFM	0 CFM	300 CFM
TOTAL:		6000 CFM	1060 CFM	2470 CFM	600 CFM
BUILDING PRESSURE:		.....		460 CFM	POSITIVE

VENTILATION CALCULATIONS

ROOM NAME	AREA SQ.FT.	OCCUPANCY PER 1000 SQFT AS PER MINNESOTA MECHANICAL CODE 2020	TOTAL OCCUPANCY AS PER MINNESOTA MECHANICAL CODE 2020	SELECTED OCCUPANCY AS PER ARCH	FINAL OCCUPANCY	MINIMUM OUTSIDE AIR AS PER IMC 2024		REQUIRED OA	PROVIDED OA	REQUIRED EXHAUST	REQUIRED EXHAUST	PROVIDED EXHAUST	SELECTED SPACE AS PER MINNESOTA MECHANICAL CODE 2020
						CFM/PERSON	CFM/SQ.FT	CFM	CFM	CFM/SQ.FT	CFM	CFM	
101-102-SEATING ARE-1&2	795	100	80	27	27	7.5	0.18	346	350	0	0	0	FOOD AND BEVERAGE SERVICE-CAFETERIA, FAST FOOD
	1127	100	113	40	40	7.5	0.18	503	510	0	0	0	FOOD AND BEVERAGE SERVICE-CAFETERIA, FAST FOOD
103-BACKBAR	419	10	4	2	4	7.5	0.12	80	100	0.7	293	300	FOOD AND BEVERAGE SERVICE-KITCHENS (COOKING)
104-STORAGE-1	38	0	0	1	1	0	0.12	5	15	0	0	0	RETAIL STORES, SALES FLOORS ANDSHOWROOM FLOORS-STORAGE ROOMS
105-STORAGE-2	116	0	0	1	1	0	0.12	14	15	0	0	0	RETAIL STORES, SALES FLOORS ANDSHOWROOM FLOORS-STORAGE ROOMS
106-CAFE BOH	365	0	0	3	3	0	0.12	44	50	0	0	0	RETAIL STORES, SALES FLOORS ANDSHOWROOM FLOORS-STORAGE ROOMS
106A-HALLWAY	163	0	0	0	0	0	0.12	20	20	0	0	0	FOOD AND BEVERAGE SERVICE-KITCHENS (COOKING)
107-WOMEN RR	103	0	0	0	0	0	0	0	0	75CFM/FIXTURE	150	150	PUBLIC SPACES - TOILET ROOMS — PUBLIC
108-MEN RR	80	0	0	0	0	0	0	0	0	75CFM/FIXTURE	150	150	PUBLIC SPACES - TOILET ROOMS — PUBLIC
TOTAL	3207			74	76	TOTAL		1011	1060		593	600	

Property of NY Engineers

Haraz -
Minneapolis MN

MECHANICAL SCHEDULES

M601

PLUMBING SYMBOL LIST

—SAN—	SANITARY SEWER PIPING (ABOVE FLOOR)
—SAN—	SANITARY SEWER PIPING (UNDERGROUND)
—GSAN—	GREASE SANITARY PIPING (UNDERGROUND)
— —V— —	VENT PIPING
—CW—	COLD WATER PIPING
—HW—	HOT WATER PIPING
—HWR—	HOT WATER RETURN PIPING
	P-TRAP
	PIPE UP
	PIPE DROP
	CLEANOUT
	PLUGGED OUTLET/CLEANOUT
	SHUT-OFF VALVE
	POINT OF CONNECTION

PLUMBING ABBREVATIONS

FCO / WCO	FLOOR AND WALL CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN & GSAN	SANITARY & GREASE SANITARY
V	VENT
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
FD/FS	FLOOR DRAIN / FLOOR SINK
WH	WATER HEATER
ET	EXPANSION TANK
RCP	RECIRCULTION PUMP
DW	DISH WASHER
BFP	BACK FLOW PREVENTER
TMV	THERMOSTATIC MIXING VALVE
UPC	UNIFORM PLUMBING CODE
TP	TRAP PRIMER
EX	EXISTING

PLUMBING DRAWING LIST

P001	PLUMBING SYMBOLS LIST, ABBREVIATION, GENERAL NOTES & SPECIFICATION
P101	PLUMBING SANITARY & VENT FLOOR PLAN
P102	PLUMBING WATER FLOOR PLAN
P103	PLUMBING ROOF GAS PLAN
P104	PLUMBING RISER DIAGRAMS
P201	PLUMBING DETAILS
P301	PLUMBING SCHEDULES

APPLICABLE CODES

A. 2020 MINNESOTA BUILDING CODE.

B. 2020 MINNESOTA PLUMBING CODE

C. 2020 MINNESOTA MECHANICAL AND FUEL GAS CODE

D. 2023 NATIONAL ELECTRICAL CODE

E. 2024 MINNESOTA COMMERCIAL ENERGY CODE.

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 2020 MINNESOTA PLUMBING CODE(2018 UPC).
2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF UPC CHPATER 7
3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER UPC SECTION 312.
4. TRENCHING, EXCAVATION AND BACKFILL AS PER UPC SECTION 314.
5. RODENT PROOFING AS PER UPC SECTION 312.12.
6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION UPC 303, UPC 605, UPC 702, UPC 902, UPC 1102.
7. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF UPC 2018 CHAPTERS 4, 5, 6, 7 AND 9.
8. DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER CPC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 2023 OPSC 708.
9. DRAINAGE PIPE CLEANOUTS AS PER SECTION 2023 OPSC 707.
10. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 2023 OPSC 313.
11. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED INACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION 2023 OPSC 601-603, 604, 606, 607, 608, 610
12. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF UPC 2018 CHAPTER 7 SECTION 701, 704, 705, 706, 707, 708, 711.
13. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF UPC 2018 CHAPTER 9 SECTIONS 901 THROUGH 912 THROUGH 917.
14. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 2023 OPSC 105.

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. FLOOR DRAINS
8. 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.

1.04 DEFINITIONS

A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.

B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

C. PROVIDE: TO FURNISH AND INSTALL.

D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

1.05 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.

1.06 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" AND ABOVE (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 2½" 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 COPPER OR COPPER ALLOY
3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
5. COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
6. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE RETARDANT, FACTORY APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY APPLIED VAPOR BARRIER. INSULATION REQUIREMENT WITH 2024 MINNESOTA COMMERCIAL ENERGY CODE. REFER BELOW TABLE FOR MINIMUM PIPE INSULATION THICKNESS ECC. 2024 MINNESOTA COMMERCIAL ENERGY CODE. SECTION 6 TABLE 6.8.3-1.

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	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.0	1.5	1.5	1.5
40 TO 60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0

7. AS PER 2024 MINNESOTA COMMERCIAL ENERGY CODE., SYSTEMS DESIGNED TO MAINTAIN USAGE TEMPERATURES IN HOT WATER PIPES, SUCH AS RECIRCULATING HOT WATER SYSTEM SHALL BE EQUIPPED WITH AUTOMATIC TIME SWITCHES OR OTHER CONTROLS THAT CAN BE SET TO SWITCH OF THE USAGE TEMPERATURE MAINTENANCE SYSTEM DURING EXTENDED PERIOD WHEN HOT WATER IS NOT REQUIRED.
8. AS PER 2024 MINNESOTA COMMERCIAL ENERGY CODE TEMPERATURE CONTROLLING MEANS SHALL BE PROVIDED TO LIMIT THE MAXIMUM TEMPERATURE OF WATER DELIVERED FROM LAVATORY FAUCETS IN PUBLIC FACILITY RESTROOMS TO 110°F.
9. AS PER 2024 MINNESOTA COMMERCIAL ENERGY CODE., SECTION 613.5, TEMPERATURE CONTROL VALVE SHALL BE PROVIDED TO AUTOMATICALLY REGULATE THE TEMPERATURE OF HOT WATER DELIVERED TO PLUMBING FIXTURE TO A RANGE OF 105°F (41°C) MINIMUM TO 120°F (49°C) MAXIMUM.

C. HANGERS AND SUPPORTS:

1. HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
5. UNLESS OTHERWISE INDICATED OR REQUIRED BY AUTHORITIES HAVING JURISDICTION, THE FOLLOWING SHALL BE PROVIDED WITH SEISMIC RESTRAINTS AS REQUIRED BY THE BOCA NATIONAL BUILDING CODE, SECTION 1610.6.4: ALL EQUIPMENT AND MACHINERY, ALL NEW PIPING 2-1/2" AND LARGER (1-1/4" AND LARGER INBOILER/MECHANICAL ROOMS) WITH HANGERS GREATER THAN 12" IN LENGTH FROM THE TOP OF PIPE TO THE STRUCTURE.
6. 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. SLEEVES AND ESCUTCHEONS:

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

G.

DRAINAGE ACCESSORIES

1.GENERAL:
a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.

H.

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.

I.

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.

J.

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

K.

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

L.

VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

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

O. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

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

Q. 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.

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

S. 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.

T. 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.

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

V. 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.

W. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.

X. MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.

1.07 DEMOLITION

A. VISIT THE SITE, EXAMINE THE EXISTING CONDITIONS AND BECOME FAMILIAR WITH THE EXTENT OF THE NECESSARY REMOVAL, RELOCATION, RECONNECTING AND REROUTING OF PLUMBING EQUIPMENT AND PIPING AS NECESSARY FOR THE COMPLETION OF THE PROJECT.

B. REVIEW AND CONFIRM WITH THE ARCHITECT/DESIGNER'S DRAWINGS FOR THE COMPLETE EXTENT OF DEMOLITION AND ALTERATION.

C. ENSURE THAT ALL EXISTING PLUMBING PIPING OR SYSTEMS, IN AREAS OUTSIDE THE AREAS OF THIS WORK, THAT ARE REQUIRED TO REMAIN IN SERVICE, SHALL DO SO.

D. RELOCATE ANY PLUMBING PIPING OR EQUIPMENT THAT IS REQUIRED TO REMAIN IN SERVICE, THAT IS SECURED TO EXISTING WALLS, FLOORS OR CEILINGS TO BE DEMOLISHED.

E. ALL EXISTING PLUMBING EQUIPMENT OR PIPING WHICH IS NO LONGER REQUIRED SHALL BE REMOVED AND DISPOSED OF, OFF SITE.

F. BE RESPONSIBLE AND PAY FOR ANY DAMAGE TO THE BASE BUILDING INCURRED BY WORK OF THIS DIVISION, OR REPAIR TO THE SATISFACTION OF THE CONSULTANT.

G. CARRY OUT THE WORK WITH MINIMUM OF NOISE, DUST AND DISTURBANCE

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. 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.

1. 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.
2. 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.

B. DRAINAGE ACCESSORIES

1. GENERAL:
a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.

C. DEVICES:

a. CLEANOUT & CLEANOUT PLUG

· THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS TIGHT CLEANOUT PLUG

· PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.

· LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.

b. CLEANOUT WALL PLATE

· IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRONZE COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER TO SECURE TO CLEANOUT PLUG.

c. CLEANOUT DECK PLATE

· IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY; ROUND, POLISHED NICKEL BRONZE SCORIATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER; THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.

· GRILLE FREE AREA SHOULD BE AT LEAST EQUAL TO CROSS-SECTION AREA OF PIPE TO WHICH CONNECTION MADE AND MADE OF POLISHED NICKEL BRONZE, WITH REMOVABLE GRATE, EITHER PERFORATED OR BAR TYPE. GRATE ATTACHED TO GRILLE BODY WITH VANDAL RESISTANT FASTENER.

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

2.03 LEAK DETECTION

A. VISIT THE SITE, EXAMINE THE EXISTING CONDITIONS AND BECOME FAMILIAR WITH THE EXTENT OF THE NECESSARY REMOVAL, RELOCATION, RECONNECTING AND REROUTING OF PLUMBING EQUIPMENT AND PIPING AS NECESSARY FOR THE COMPLETION OF THE PROJECT.

B. FURNISH AND INSTALL A FLOODMASTER RS-094-1 WATER HEATER LEAK DETECTION AND AUTOMATIC SHUT- OFF KIT, INCLUDING FULL-PORT SHUT-OFF VALVE, ACTUATOR, WATER SENSING PUCK, PLUG FOR A STANDARD 120 V AC OUTLET. RELAYS FOR CONNECTION TO BMS, THE KIT SHALL INCLUDE ALL SYSTEM COMPONENTS FOR A TYPICAL INSTALLATION. CONTACT RELIANCE DETECTION TECHNOLOGIES 888-771-4929.

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.

I. ALL EQUIPMENT WILL BE FACTORY TESTED.

J. 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 AS PER 2020 MINNESOTA PLUMBING CODE
b. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
c. 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. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.

N. INSPECTION & TESTING SHALL BE AS PER 2020 MINNESOTA PLUMBING CODE

4. WARRANTY

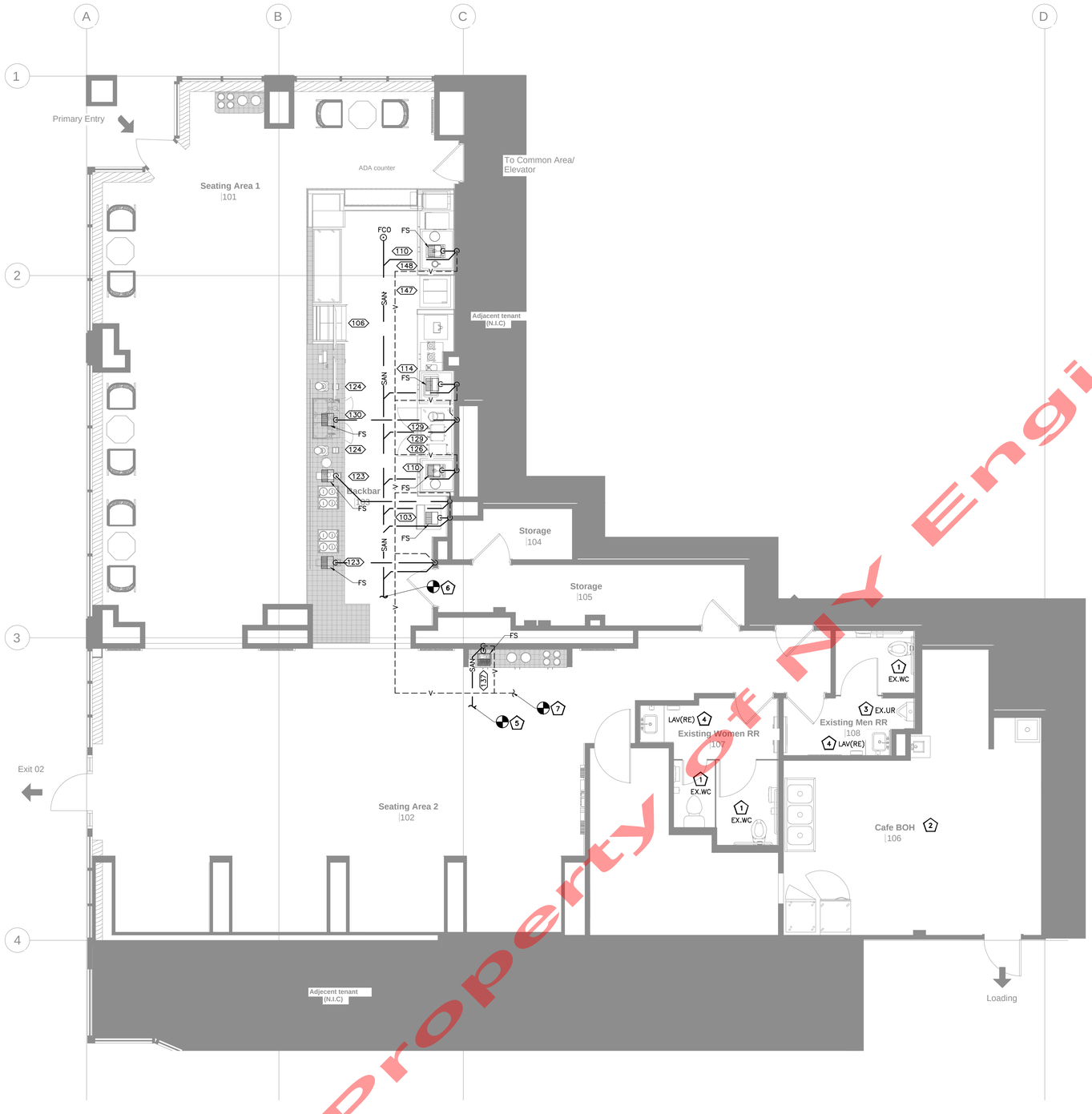
A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR 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.

Property of NY Engineers

Haraz - Minneapolis MN

PLUMBING SYMBOLS LIST, ABBREVIATION,GENERAL NOTES& SPECIFICATION

P001



1 PLUMBING SANITARY & VENT FLOOR PLAN
1/4" = 1'-0"

KEYED NOTES:

1. EXISTING WATER CLOSET AND ALL ASSOCIATED WASTE AND VENT PIPING TO REMAIN AS IS.
2. ALL EXISTING FIXTURES TO REMAIN IN CAFE BOH
3. EXISTING URINAL AND ALL ASSOCIATED WASTE AND VENT PIPING TO REMAIN AS IS.
4. REPLACE EXISTING LAVATORY WITH NEW AND ALL ASSOCIATED WASTE AND VENT PIPING TO REMAIN AS IS.
5. EXTEND AND CONNECT NEW 3" SAN PIPING TO THE EXISTING SANITARY PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE, INVERT AND FLOW DIRECTION OF EXISTING SANITARY PIPE AND UPGRADE IF REQUIRED.
6. EXTEND AND CONNECT NEW 4" SAN PIPING TO THE EXISTING SANITARY PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE, INVERT AND FLOW DIRECTION OF EXISTING SANITARY PIPE AND UPGRADE IF REQUIRED.
7. EXTEND AND CONNECT NEW 2" VENT PIPING TO THE EXISTING VENT PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE OF EXISTING VENT LINE IN SPACE AND UPGRADE IF REQUIRED.

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.
4. ALL CLEANOUTS TO BE ACCESSIBLE.
5. PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.
6. ANY UNUSED EXISTING FLOOR SINK/DRAIN AND PIPING MUST BE COMPLETELY REMOVED OR CAPPED. DO NOT ABANDON IN PLACE.
7. UNLESS OTHERWISE SPECIFIED, SLOPE OF DRAINAGE SYSTEM TO BE ⅛" PER FOOT OF RUN FOR PIPE 4" OR LARGER AND ¼" PER FOOT FOR PIPE SMALLER THAN 4".
8. ALL FLOOR SINKS TO BE MOUNTED IN FLOOR SUCH THAT THE TOP OF THE RIM WILL BE FLUSH WITH FINISHED FLOOR ELEVATION. FLOOR SINKS ALSO TO SERVE AS AREA FLOOR DRAINS IF NEED BE.
9. THIS DRAWING HAS BEEN PREPARED FROM THE ACTUAL ARCHITECTURAL WALL LAYOUT DRAWINGS. PLUMBING CONTRACTOR SHALL ALERT THE GENERAL CONTRACTOR ON SITE OF ANY DISCREPANCIES FOUND BETWEEN THIS DRAWING AND THE ACTUAL FIELD CONDITIONS.
10. PLUMBING CONTRACTOR TO PERFORM ALL WORK ACCORDING TO PREVAILING HEALTH AND BUILDING CODES. ALL FOOD SERVICE PLUMBING COMPONENTS AND EQUIPMENT SHALL BE IN STRICT ACCORDANCE WITH THE NATIONAL SANITATION FOUNDATION (N.S.F.) AND IN COMPLIANCE WITH STATE & LOCAL CODES.
11. PLUMBING CONTRACTOR TO PROVIDE AND INSTALL FLOOR DRAINS, FLOOR SINKS, TAILPIECES, TRAPS, SHUT-OFFS, LOOP VENTS AS REQUIRED AND TO COORDINATE ALL OF THESE ITEMS WITH THE FOOD SERVICE EQUIPMENT CONTRACTOR.
12. FLOORS IN KITCHEN AND SERVING AREAS TO BE "TRANSIT LEVEL", DO NOT SLOPE FLOOR TO FLOOR DRAINS IN KITCHEN AND SERVING AREAS.
13. CONTRACTOR TO REFER KITCHEN EQUIPMENT PLANS FOR THE ALL REQUIRED PLUMBING ROUGH IN LOCATIONS.

GREASE WASTE EXEMPTION NOTE:

THE PROPOSED TENET OPERATION IS HARAZ COFFEE SHOP, THERE IS NO COOKING EQUIPMENT OTHER THAN A SINGLE INDUCTION COOK TOP. THERE IS NO GREASY WASTE PRODUCED FOR THE OPERATION.

Property of NY Engineering

Haraz -
Minneapolis MN

PLUMBING SANITARY &
VENT FLOOR PLAN

P101



1 PLUMBING WATER FLOOR PLAN
1/4" = 1'-0"

KEYED NOTES:

1. EXISTING WATER CLOSET AND ALL ASSOCIATED WATER PIPING TO REMAIN AS IS.
2. ALL EXISTING FIXTURES TO REMAIN IN CAFE BOH
3. EXISTING URINAL AND ALL ASSOCIATED WATER PIPING TO REMAIN AS IS.
4. REPLACE EXISTING LAVATORY WITH NEW AND ALL ASSOCIATED WATER PIPING TO REMAIN AS IS. CONTRACTOR SHALL INSTALL A NEW TMV TO THE LAVATORY, IF NOT ALREADY PROVIDED, AND LIMIT THE HOT WATER TEMPERATURE TO 110°F.
5. EXTEND AND CONNECT NEW 1" CW PIPING TO THE EXISTING CW PIPING IN SPACE. CONTRACTOR TO FIELD VERIFY THE LOCATION, PRESSURE AND SIZE OF THE EXISTING DOMESTIC WATER LINE AND UPGRADE IF REQUIRED.
6. EXTEND AND CONNECT NEW ¾" HW AND ¾" HWR PIPING TO THE EXISTING HW AND HWR PIPING IN SPACE. CONTRACTOR TO FIELD VERIFY THE LOCATION, AND SIZE OF THE EXISTING HOT WATER AND HOT WATER RETURN PIPING LINE AND UPGRADE IF REQUIRED. IF HOT WATER RETURN PIPE DOES NOT EXISTS ON SITE PROVIDE NEW HOT WATER RETURN PIPING WITH THE HOT WATER RE_CIRCUALTION PUMP.
7. EXISTING WATER HEATER WITH EXISTING WATER PIPING CONNECTIONS, ASSOCIATED ACCESSORIES AND FITTINGS TO REMAIN. CONTRACTOR TO FIELD VERIFY THE LOCATION, CAPACITY AND UPGRADE IF REQUIRED.

GENERAL NOTES:

1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER 2024 MINNESOTA COMMERCIAL ENERGY CODE.
2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
3. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
4. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
5. PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.
6. PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY CONTROLS, VALVES, REGULATORS, TRIM, TRAPS, TAILPIECES, STRAINERS, BACK-FLOW PREVENTION DEVICES AND ANY OTHER DEVICES REQUIRED FOR A PROPER INSTALLATION. P.C. SHALL COORDINATE AND MAKE ALLOWANCES SO NOT TO INTERFERE WITH THE OPERATION OF THE FOOD SERVICE EQUIPMENT PROVIDED.
7. PLUMBING CONTRACTOR SHALL INSTALL AND INTERCONNECT ALL PLUMBING COMPONENTS, ACCESSORIES AND SYSTEMS PROVIDED BY THE FOOD SERVICE EQUIPMENT CONTRACTOR. P.C. TO FLUSH OUT ALL FOREIGN MATTER FROM LINE STRAINERS, FAUCET AERATORS, ETC. PRIOR TO FINAL CONNECTIONS.
8. PLUMBING CONTRACTOR TO CONCEAL WATER LINES WHENEVER POSSIBLE. EXTERNAL WALLS WATER LINES SHALL BE STUBBED UP ALONG THE INTERIOR FACE OF THE WALL TO AVOID POTENTIAL FREEZING UNLESS OTHERWISE NOTED.
9. PLUMBING CONTRACTOR TO VERIFY ALL REQUIREMENTS FOR ITEMS THAT ARE EXISTING, BY OWNER, BY VENDOR, N.I.C., AND BY OTHERS. P.C. TO PROVIDE ALL P.V.C. LINES WITH SWEEP ELS FOR BEVERAGE LINES AND TO VERIFY SIZE AND LOCATIONS WITH THE GENERAL CONTRACTOR.
10. CONTRACTOR TO REFER KITCHEN EQUIPMENT PLANS FOR THE ALL REQUIRED PLUMBING ROUGH IN LOCATIONS.

Property of NY Engineers

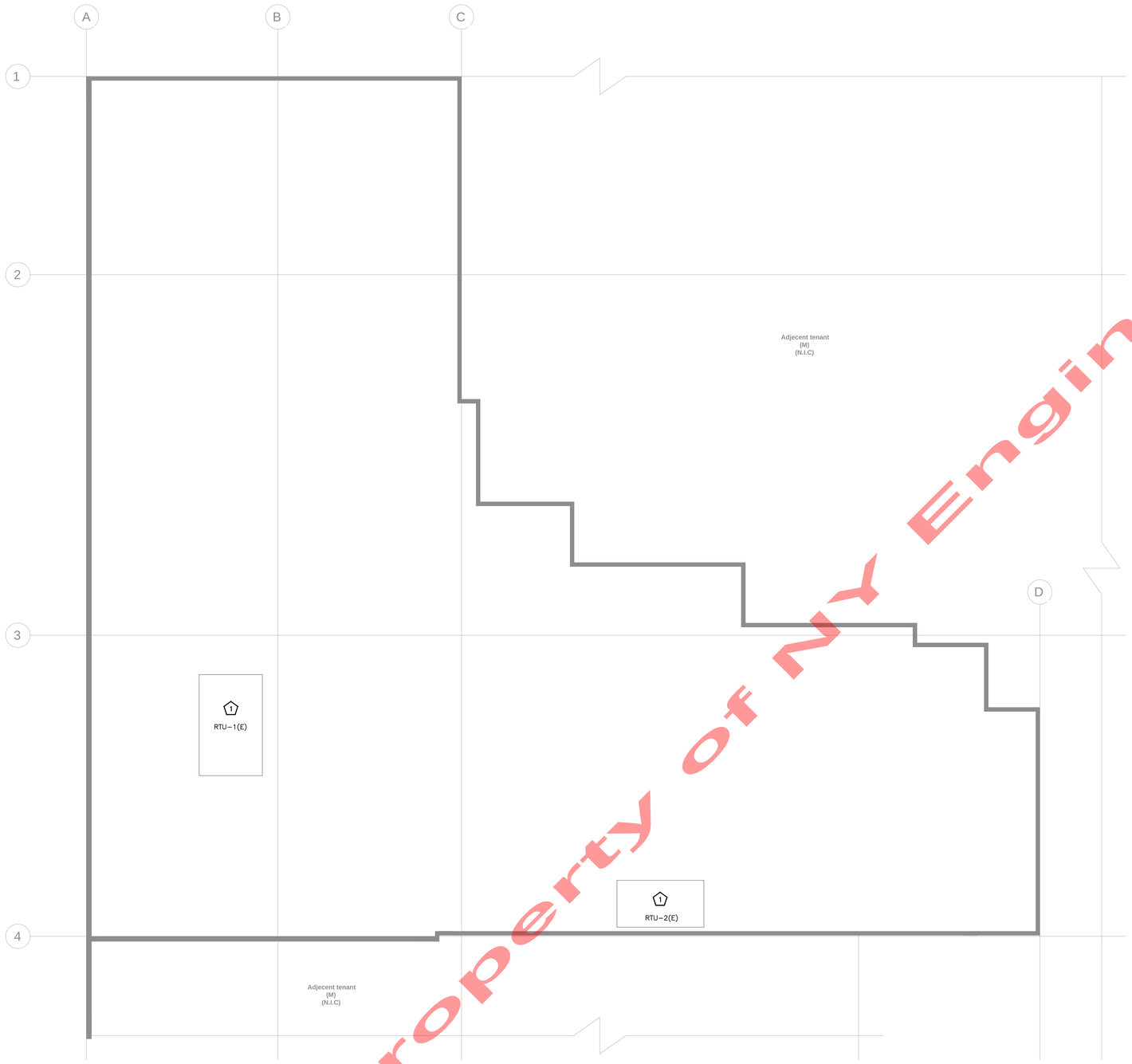
Haraz -
Minneapolis MN

PLUMBING WATER
FLOOR PLAN

P102

KEYED NOTES:

1 EXISTING RTU WITH EXISTING GAS PIPING TO REMAIN. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING AND REPLACE IF REQUIRED AND ADJUST BASE BIDACCORDINGLY FOR ANY CHANGES.



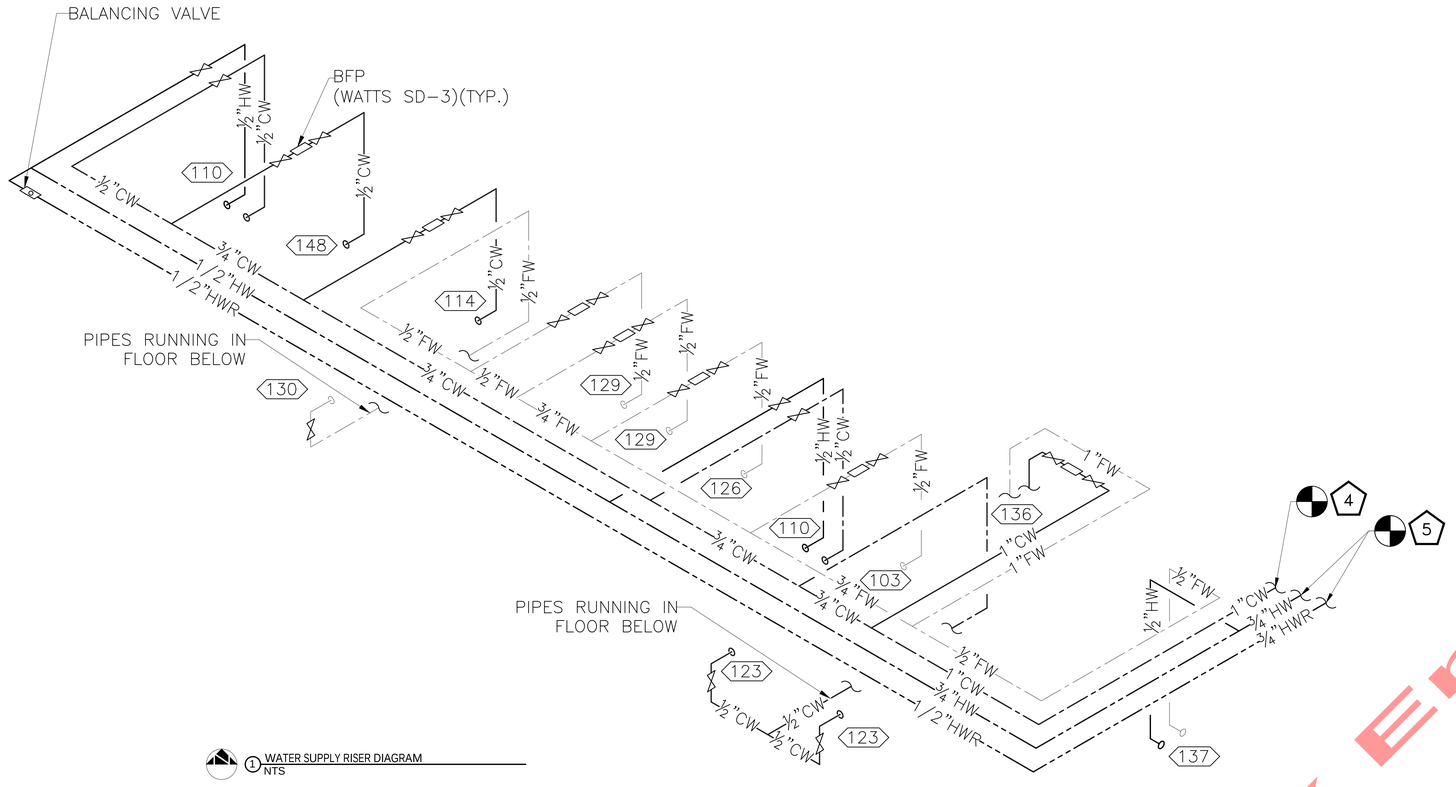
1 PLUMBING ROOF GAS PLAN
1/4" = 1'-0"

Property of NY Engineers

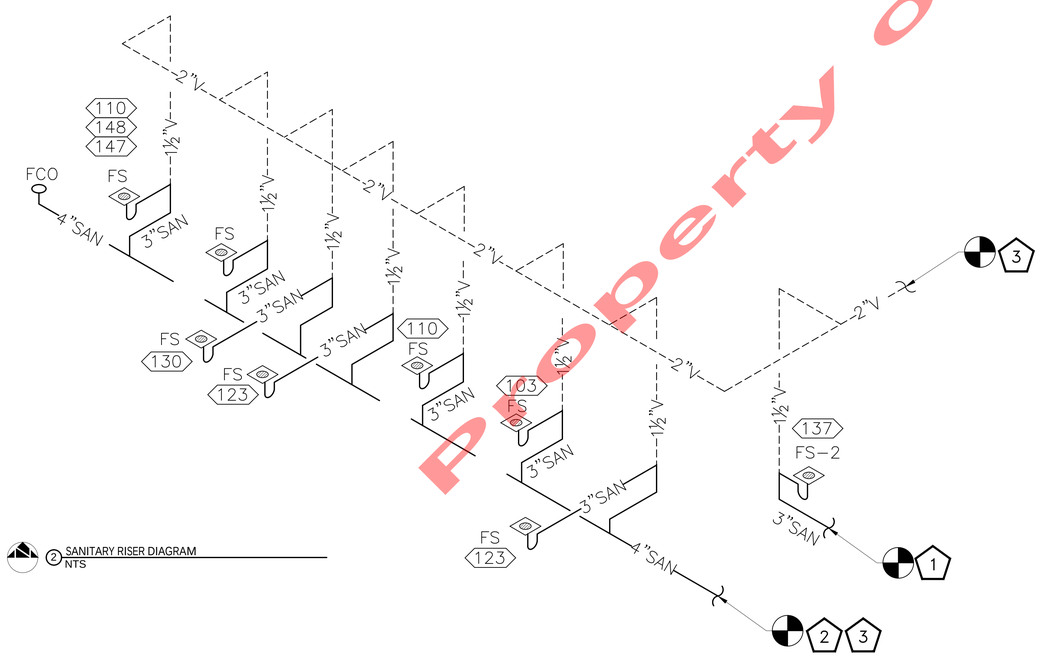
Haraz -
Minneapolis MN

PLUMBING ROOF GAS PLAN

P103



1 WATER SUPPLY RISER DIAGRAM
NTS



2 SANITARY RISER DIAGRAM
NTS

KEYED NOTES:

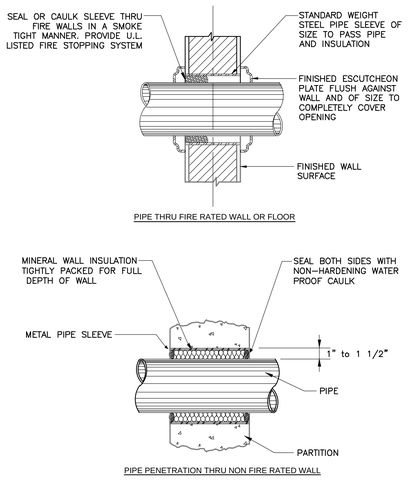
1. EXTEND AND CONNECT NEW 3" SAN PIPING TO THE EXISTING SANITARY PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE, INVERT AND FLOW DIRECTION OF EXISTING SANITARY PIPE AND UPGRADE IF REQUIRED.
2. EXTEND AND CONNECT NEW 4" SAN PIPING TO THE EXISTING SANITARY PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE, INVERT AND FLOW DIRECTION OF EXISTING SANITARY PIPE AND UPGRADE IF REQUIRED.
3. EXTEND AND CONNECT NEW 2" VENT PIPING TO THE EXISTING VENT PIPING OF ADEQUATE SIZE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION, SIZE OF EXISTING VENT LINE IN SPACE AND UPGRADE IF REQUIRED.
4. EXTEND AND CONNECT NEW 1" CW PIPING TO THE EXISTING CW PIPING IN SPACE. CONTRACTOR TO FIELD VERIFY THE LOCATION, PRESSURE AND SIZE OF THE EXISTING DOMESTIC WATER LINE AND UPGRADE IF REQUIRED.
5. EXTEND AND CONNECT NEW ¾" HW AND ¾" HWR PIPING TO THE EXISTING HW AND HWR PIPING IN SPACE. CONTRACTOR TO FIELD VERIFY THE LOCATION, AND SIZE OF THE EXISTING HOT WATER AND HOT WATER RETURN PIPING LINE AND UPGRADE IF REQUIRED.

Property of NY Engineers

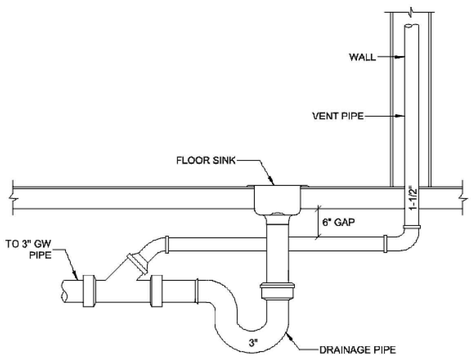
Haraz -
Minneapolis MN

PLUMBING RISER DIAGRAMS

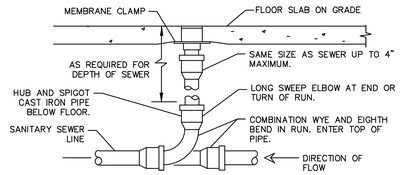
P104



1 / P201 PIPE SLEEVE THRU WALL SECTION N.T.S

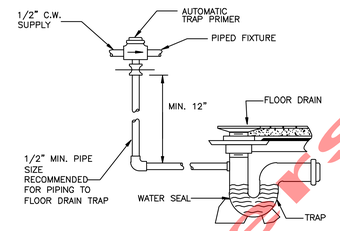


2 / P201 TYPICAL FLOOR SINK VENT DETAIL N.T.S

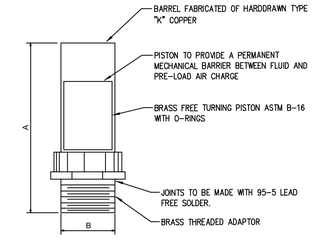


COMMENTS:
1. LOCATE AT BUILDING EXIT, AT ENDS OF RUNS, AT TURNS OF PIPE GREATER THAN 45 DEGREES, AT 50' INTERVALS ON STRAIGHT RUNS, AND/OR WHERE SHOWN ON PLANS. PROVIDE BACKFILL PER ARCHITECTURAL SPECIFICATIONS. LOCATE CLEANOUTS WHERE THERE IS 18" CLEAR AROUND. CONSULT LOCAL CODES FOR OTHER FCO REQUIREMENTS.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

3 / P201 FLOOR CLEANOUT DETAIL N.T.S



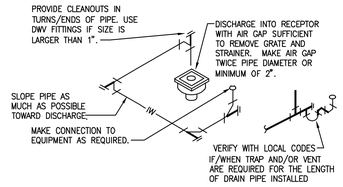
4 / P201 TRAP PRIMER DETAIL N.T.S



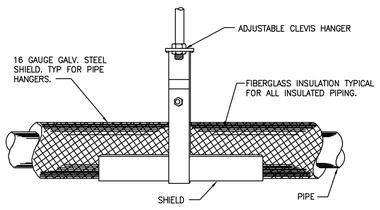
PIPE SIZE	P.D.I. SYMBOL	FIXTURE UNIT RATINGS	A SIZE	B SIZE
1/2"	A	1 – 11	5"	1/2"
3/4"	B	12 – 32	5"	3/4"
1"	C	33 – 60	7"	1"
1-1/4"	D	61 – 113	7"	1-1/4"
1-1/2"	E	114 – 154	9"	1-1/2"
2"	F	155 – 330	9"	2"

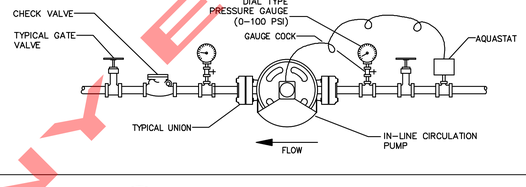
NOTE: LOCATE ONE FOR EACH BANK OF FLUSHOMETER FIXTURES AT LAST FIXTURE PROVIDE A STAINLESS STEEL ACCESS DOOR FOR EACH SUFFICIENT IN SIZE TO ALLOW REPLACEMENT OF ARRESTOR AT A FUTURE DATE.

5 / P201 WATER HAMMER ARRESTOR DETAIL N.T.S

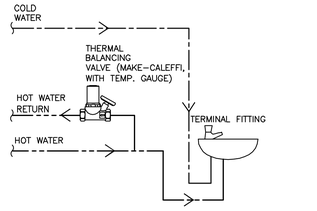


6 / P201 INDIRECT WASTE CONNECTION DETAIL N.T.S

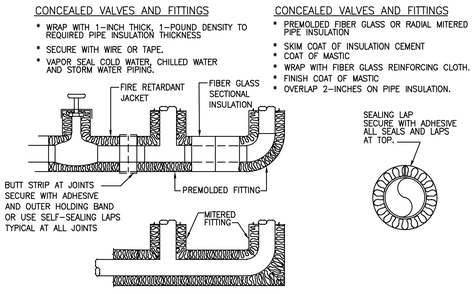




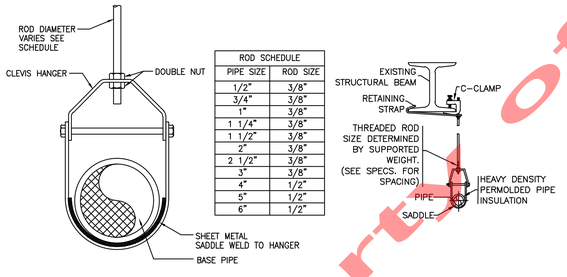
9 / P201 INLINE RECIRCULATING PUMP DETAIL N.T.S



12 / P201 BALANCING VALVE DETAIL N.T.S

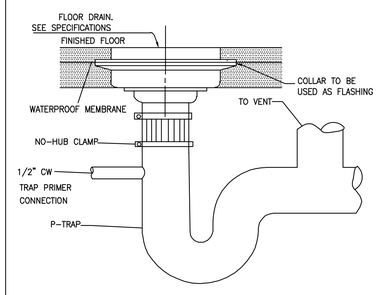


7 / P201 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS N.T.S

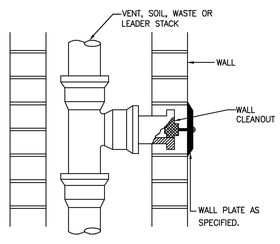


ROD SCHEDULE	
PIPE SIZE	ROD SIZE
1/2"	3/8"
3/4"	3/8"
1"	3/8"
1 1/4"	3/8"
1 1/2"	3/8"
2"	3/8"
2 1/2"	3/8"
3"	3/8"
4"	1/2"
5"	1/2"
6"	1/2"

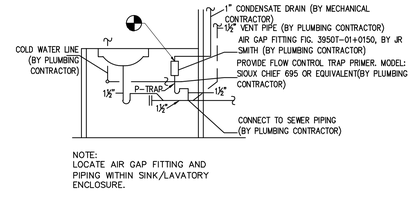
8 / P201 HANGER DETAIL N.T.S



10 / P201 FLOOR DRAIN DETAIL N.T.S



11 / P201 WALL CLEANOUT DETAIL N.T.S



NOTE:
LOCATE AIR GAP FITTING AND PIPING WITHIN SINK/LAVATORY ENCLOSURE.

13 / P201 AIRGAP FITTING DETAIL N.T.S

Property of NY Engineers

Haraz - Minneapolis MN

PLUMBING DETAILS

P201

PLUMBING ROUGH-IN SCHEDULE

ID	DESCRIPTION	QUANTITY	MANUFACTURER	MODEL	WATER			WASTE		VENT	NOTES
					HW	CW	FW	CONNECTION TYPE	SIZE	SIZE	
LAV-1	LAVATORY	2	X	X	EX	EX		EX	EX	EX	EXISTING FIXTURE TO REMAIN WITH ASSOCIATED FITTINGS
FS	FLOOR SINK	7	X	X		X		DIRECT	3"	1½"	
103	ICE MACHINE	1	ATOSA	YR140-AP-161-3M			½"	INDIRECT	¾"		
106	REFRIGERATED COUNTER CASE, SELF-SERVICE	1	STRUCTURAL CONCEPTS	CO33R-UC				INDIRECT	¾"		
110	SINK, DROP-IN, 1 COMP	2	BK RESOURCES	DDI-10141024S-P-G	½"	½"		INDIRECT	1½"		BOWL SIZE (10" X 14" X 10")
123	RINSER	2	ESPRESSO PARTS	EPPR715		½"		INDIRECT	½"		
114	RAPID RINSER	1	BLENDTEC	JRE-612		½"					
124	KNOCK BOX	2	ESPRESSO PARTS	EPKB665				INDIRECT	1¼"		
126	SINGLE COFFEE BREWER	1	CURTIS	G4GEMXN63A1000			½"				
129	HOT WATER DISPENSER	2	CURTIS	WB5GT63000			½"				
130	ESPRESSO MACHINE	1	LA MARZOCCO	STRADA 3AV			½"	INDIRECT	¾"		
136	WATER FILTER	1	EVERPURE	EV932503		¾"					
137	GLASS FILLER	1	T&S BRASS	B-1230	½"		½"	INDIRECT	1¼"		
147	ICE CREAM FREEZER	1	EXCELLENCE	HFF-4HC				INDIRECT	1"		
148	DIPPERWELL W/FAUCET	1	T&S BRASS	B-2282-01		½"		INDIRECT	1½"		

DOMESTIC WATER & WASTE CALCULATION

ID	DESCRIPTION	QUANTITY	WATER		WASTE	
			WSFU	TOTAL	DFU	TOTAL
FS	FLOOR SINK	7			6	42
103	ICE MACHINE	1	0.5	0.5	0.5	0.5
106	REFRIGERATED COUNTER CASE, SELF-SERVICE	1			0.5	0.5
110	SINK, DROP-IN, 1 COMP	2	2	4	2	4
123	RINSER	2	0.5	1	0.5	1
114	RAPID RINSER	1	0.5	0.5		
124	KNOCK BOX	2			1	2
126	SINGLE COFFEE BREWER	1	0.5	0.5		
129	HOT WATER DISPENSER	2	0.5	1		
130	ESPRESSO MACHINE	1	0.5	0.5	0.5	0.5
136	WATER FILTER	1				
137	GLASS FILLER	1	0.5	0.5	0.5	0.5
147	ICE CREAM FREEZER	1			0.5	0.5
148	DIPPERWELL W/FAUCET	1	1.5	1.5	1	1
TOTAL				WSFU= 10		DFU= 52.5

DFU AND WSFU VALUES AS PER 2020 MINNESOTA PLUMBING CODE

PER 2020 MINNESOTA PLUMBING CODE 10 WSFU EQUALS 8 GPM AND FOR 8 GPM CALCULATED PIPE SIZE IS 1".

PER 2020 MINNESOTA PLUMBING CODE CALCULATED PIPE SIZE FOR 52.5 DFU IS 4".

Property of NY Engineers

Haraz -
Minneapolis MN

PLUMBING SCHEDULES

P301

ELECTRICAL SYMBOLS LIST

LIGHTING

SYMBOL	DESCRIPTION
	LED LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.
A O 2 a	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.
	CIRCUIT NUMBER : INDICATED BY NUMBER
	SWITCHING INDICATED BY LOWER CASE LETTERS.
EM	DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.
NL	DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS UNSWITCHED CIRCUIT.
	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONALARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN
	EMERGENCY BATTERY UNIT WITH ATTACHED EMERGENCY FIXTURES AND OUTLET BOX.

SWITCHES AND CONTROLS

SYMBOL	DESCRIPTION
$a	20A SWITCH . "a" DENOTES LIGHTING FIXTURE CONTROLLED.
$OS	SWITCH WITH OCCUPANCY SENSOR
PC	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.
OS	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE

WIRING SYSTEMS

SYMBOL	DESCRIPTION
3 UP-	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 1#12 ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
3 5 UP-	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 ø & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
3 5 7 UP-	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 ø & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
	CONDUIT TURNING UP, SEE FLOOR PLANS FOR CONDITIONS.
	CONDUIT TUIRNING DOWN, SEE FLOOR PLANS FOR CONDITION.
	CONDUIT AND WIRE TO BUILDING GROUND.
	UNDERGROUND
	EXISTING
	NEW

ELECTRICAL DRAWING LIST

E001	ELECTRICAL LEGENDS AND GENERAL NOTES
E002	ELECTRICAL SPECIFICATIONS SHEET
E101	ELECTRICAL FLOOR POWER PLAN
E102	ELECTRICAL ROOF PLAN
E201	ELECTRICAL FLOOR LIGHTING PLAN
E301	ELECTRICAL RISER DIAGRAM & PANEL SCHEDULES
E401	ELECTRICAL DETAILS SHEET

CODE COMPLIANCE

A. 2020 MINNESOTA BUILDING CODE.
B. 2020 MINNESOTA PLUMBING CODE
C. 2020 MINNESOTA MECHANICAL AND FUEL GAS CODE
D. 2023 NATIONAL ELECTRICAL CODE
E. 2024 MINNESOTA COMMERCIAL ENERGY CODE.

POWER AND TELECOMMUNICATION

SYMBOL	DESCRIPTION
J	JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTE, +18" AFF OR AS NOTED.
J	JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED..
	DUPLEX CONVENIENCE RECEPTACLE, 20A, 120V +18" AFF OR AS NOTED.
	GFI DUPLEX RECEPTACLE, 20A, 120V +18" AFF OR AS NOTED.
CL/FL	CEILING / FLOOR MOUNTED RECEPTACLE AS INDICATED ON PLAN
	DOUBLE DUPLEX OR QUAD RECEPTACLE – 20A–1P, 125V, NEMA 5–20R.
	TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.
	TELEPHONE OUTLET, WALL–MOUNTED +48" AFF UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE REE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4"DIAMETER GROMMETED OPENING.
	DATA OUTLET – (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING.

MOTORS AND CONTROLS

SYMBOL	DESCRIPTION
M	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.
M WP	AC OUTDOOR UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.
	240V NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED ON PLANS.
400/350	FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED ON PLANS. TOP NUMBER DENOTES SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.

ELECTRICAL GENERAL NOTES

A. TENANT IS REQUIRED TO MAKE A FIELD SURVEY OF THE EXISTING ELECTRICAL SERVICE TO ENSURE THAT THE TOTAL CONNECTED LOAD DOES NOT EXCEED THE ELECTRICAL SERVICE. ANY/ ALL MODIFICATIONS OR UPGRADES NEEDED ARE SUBJECT TO LANDLORD'S PRIOR APPROVAL, AND WILL BE COMPLETED BY TENANT/ TENANT'S GC, AT TENANT'S SOLE EXPENSE.

B. EMT (ELECTRIC METALLIC TUBING) SHALL BE USED IN ALL DEMISING WALLS, HOME RUNS, AND BETWEEN J–BOXES AND PULL BOXES. MC CABLE MAY BE USED IN OTHER APPLICATION AS ALLOWED BY THE AUTHORITY HAVING JURISDICTION (AHJ). ALL EXPOSED CONDUIT,RIGID OR MC CABLE, SHALL BE INSTALLED IN TIGHT STRAIGHT LINES, PARALLEL OR IN RIGHT ANGLES TO THE BUILDING STRUCTURE. DO NOT LOOP EXCESS MC CABLE IN CEILING SPACE OR WALL CAVITY.

C. ALL FEEDERS SHALL BE COPPER. TYPE AC AND NM (ROMEX) CABLES ARE NOT ACCEPTABLE.

D. ALL PANELS SHALL BE UL LABELED WITH BOLT ON TYPE CIRCUIT BREAKERS. PANELS SHALL NOT BE RECESSED IN DEMISING AND SHALL BE MOUNTED ON PLYWOOD BACKER PANELS UNLESS RECESSED INTO A FURRED OUT OR INTERIOR WALL.

E. PANEL PHASE LOADS TO BE BALANCED WITHIN 10%.

F. ONLY 30 KVA AND SMALLER TRANSFORMERS MAY BE SUSPENDED FROM BUILDING STRUCTURE. ALL OTHER TRANSFORMERS MUST BE FLOOR SUPPORTED. STRUCTURAL SUPPORT DOCUMENTATION SHALL BE REQUIRED TO MEET AUTHORITIES HAVING JURISDICTION (AHJ).

G. NOTHING IS PERMITTED TO BE ATTACHED TO, SUSPENDED FROM, OR PENETRATE LANDLORD'S STRUCTURE, FLOOR DECK, OR ROOF DECK. YOU MAY ATTACH, NON–DESTRUCTIVELY, TO OR SUSPEND FROM THE TOP CHORD OF THE JOIST OR THE STRUCTURAL STEEL WHICH EXISTS ABOVE THE TENANT SPACE. WHEN ATTACHING TO LANDLORD'S STRUCTURE, DO NOT DRILL, WELD, SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY, NOTHING TO DAMAGE LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS, BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL

H. STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.

I. 7 DAY, 24 HOUR TIME CLOCK IS REQUIRED TO CONTROL STOREFRONT ENTRY LIGHTS, SHOW WINDOW LIGHTS, SHOW WINDOW RECEPTACLES AND STOREFRONT SIGNAGE. ILLUMINATED STOREFRONT SIGNS MUST REMAIN LIT DURING ALL MALL BUSINESS HOURS.

J. ALL EQUIPMENT, DEVICES AND FIXTURES SHALL BE GROUNDED IN COMPLIANCE WITH NEC AND UL REQUIREMENTS.

K. SLAB REQUIREMENTS:

SLAB ON GRADE: TENANT'S GENERAL CONTRACTOR SHALL ADVISE THE OPERATION TEAM PRIOR TO ANY SLAB MODIFICATIONS OR REMOVAL. TENANT GC SHALL VERIFY THAT WORK SHALL NOT CONFLICT WITH ANY EXISTING STRUCTURAL, UTILITY, OR OTHER UNDER–SLAB CONDITION. (NONDESTRUCTIVE VERIFICATION MAYBE REQUIRED.) ANY DAMAGE OR DOWNTIME CAUSED BY TENANT'S WORK SHALL BE REPAIRED AND REIMBURSED AT TENANT'S EXPENSE.

ELEVATED SLABS: TENANT'S GENERAL CONTRACTOR SHALL ADVISE THE OPERATIONS TEAM PRIOR TO ANY SLAB MODIFICATION OR REMOVAL. IF ANY ELEVATED SLAB IS TO BE MODIFIED IN ANYWAY (DRILLED, CORED, OR PENETRATED), TENANT SHALL PROVIDE STAMPED AND CERTIFIED DRAWINGS BY LICENSED STRUCTURAL ENGINEERED CERTIFIED IN THE LOCAL JURISDICTION. ALL PENETRATIONS SHALL BE CORE BORED ONLY. SAW CUTTING, JACK HAMMERING, AND TRENCHING IS STRICTLY PROHIBITED. ALL PENETRATIONS SHALL BE SLEEVED, SEALED, FIRE STOPPED, AND WATERPROOFED. THE PENETRATION SLEEVE SHALL EXTEND A MINIMUM OF 4" ON EITHER SIDE OF THE SLAB AND BE LABELED WITH THE REQUIRED NFPA RATING. TENANT GC SHALL VERIFY THAT WORK SHALL NOT CONFLICT WITH ANY EXISTING STRUCTURAL, UTILITY, OR OTHER UNDER–SLAB CONDITION.(NONDESTRUCTIVE VERIFICATION MAYBE REQUIRED.) ANY DAMAGE OR OWNTIME CAUSED BY TENANT'S WORK SHALL BE REPAIRED AND REIMBURSED AT TENANT'S EXPENSE.

ELECTRICAL ABBREVIATIONS

A	AMPERES	EA	EACH
A/C, AC	AIR CONDITIONING UNIT	EC	EMPTY CONDUIT/ ELECTRICAL CONTRACTOR
AF	AMPERE FRAME/AMP FUSE	EF	EXHAUST FAN
AFF	ABOVE FINISHED FLOOR	EM	EMERGENCY
AS	AMP SWITCH	EMT	ELECTRICAL METALLIC TUBING
AIC	AMPS INTERRUPTING CAPACITY	EQUIP	EQUIPMENT
AT	AMP TRIP	ER	EXISTING TO BE RELOCATED
ATS	AUTOMATIC TRANSFER SWITCH	ETR	EXISTING TO REMAIN
AUTO	AUTOMATIC	EWF	ELECTRIFIED WORKSTATION FURNITURE
AWG	AMERICAN WIRE GAUGE	EWH	ELECTRIC WATER HEATER
C	CONDUIT	FA	FIRE ALARM
C/B,CB	CIRCUIT BREAKER	FBO	FURNISHED BY OTHERS, INSTALLED & WIRED BY EC
CKT	CIRCUIT	FDR	FEEDER
CLG	CEILING	FIBO	FURNISHED & INSTALLED BY OTHERS, WIRED BY EC
COMM	COMMUNICATION	FIXT	FIXTURE
CT	CURRENT TRANSFORMER	FL	FLOOR
CU	COPPER	FLUOR	FLUORESCENT
°C	DEGREE CELSIUS	G	GROUND
°F	DEGREE FAHRENHEIT	GFI	GROUND FAULT INTERRUPTER
DIA	DIAMETER	GP	GENERAL PURPOSE
DISC	DISCONNECT	HC	HUNG CEILING
DN	DOWN	HP	HORSEPOWER
DP	DISTRIBUTION PANEL	HWH	HOW WATER HEATER
DWH	DOMESTIC WATER HEATER	HZ	HERTZ
DWG	DRAWING	IC	INTERRUPTING CAPACITY
JB	JUNCTION BOX	PP	POWER PANEL
KCMIL	ONE THOUSAND CIRCULAR MILS	PVC	POLYVINYL CHLORIDE
KV	KILOVOLT	PWR	POWER
KVA	KILOVOLT–AMPERES	R	REMOVE
KW	KILOWATTS	RE	RELOCATED EXISTING
LP	LIGHTING PANEL	REC	RECEPTACLE
LTG	LIGHTING	RGS	RIGID GALVANIZED STEEL
MAX	MAXIMUM	RR	REMOVE & RELOCATE
MC	MOTOR CONTROLLER	S.A.E	SAME AS EXISTING
MCB	MAIN CIRCUIT BREAKER	SECT	SECTION
MER	MECHANICAL EQUIPMENT ROOM	SPDT	SINGLE POLE DOUBLE THROW
MIN	MINIMUM	SPST	SINGLE POLE SINGLE THROW
MLO	MAIN LUGS ONLY	SPEC	SPECIFICATION
MTD	MOUNTED	SW	SWITCH
MTS	MANUAL TRANSFER SWITCH	SWBD	SWITCHBOARD
N	NEUTRAL	SYM	SYMMETRICAL
NIC	NOT IN CONTRACT	SYS	SYSTEMS
NL	NIGHT LIGHT	TEMP	TEMPERATURE
NTS	NOT TO SCALE	TXF	TOILET EXHAUST FAN
OC	ON CENTER	TYP	TYPICAL
P	POLES	UON	UNLESS OTHERWISE NOTED
PB	PULLBOX	V	VOLT/VOLTAGE
W	WATT	VA	VOLT AMPERE
W	WIRE	WP	WEATHER PROOF
E	EXISTING	XFMR	TRANSFORMER
USB	USB JACK	IG	ISOLATED GROUND
HD	HAND DRYER	TR	TAMPER RESISTANT

GENERAL NOTES

(APPLY TO ALL "E" DRAWINGS)

1. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
2. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
3. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
4. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
5. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
6. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
7. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
8. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
9. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE–EXISTING CONDITIONS OR BETTER.
10. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
11. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
12. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
13. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
14. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
15. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
16. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
17. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18. ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
19. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
20. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE–RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE–RATED BOXES OR PUTTY PADS ARE UTILIZED.
21. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITRH THE ENGINEER AND OWNER BEFORE INSTALLATION.
22. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
23. REFER TO ARCHITECTURAL PLANS FOR FINAL LOACTIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
25. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
26. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

ELECTRICAL SPECIFICATIONS

1. GENERAL:

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

B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.

C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.

D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOROPERATION,MAINTANANCE AND REPAIR, MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.

F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.

J. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.

K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.

2. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. DEFINITIONS:

1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.

3. SCOPE OF WORK:

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

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

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

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

E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH 2023 FBC – EXISTING BUILDING, 8TH EDITION. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

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

4. SHOP DRAWINGS

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

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

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

C. SUBMISSIONS:

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

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

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

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

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

6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

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

C. QUALITY ASSURANCE

1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.

2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.

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

4) HEIGHTS OF OUTLETS:

a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR: – RECEPTACLES AND TELEPHONES: 1 FT–6 IN. – WALL SWITCHES: 4 FT–0 IN. – WALL FIXTURES: 7 FT–0 IN. – MOTOR CONTROLLERS: 5 FT–0 IN. – CLOCKS: 7 FT 6 IN.

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

D. PRODUCT DELIVERY, STORAGE AND HANDLING

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

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

E. MATERIALS

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

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

3) INSERTS AND SUPPORTS:

a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED. – SINGLE ROD: SIMILAR TO GRINNELL FIG. 281. – MULTI–ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. – CLIP FORM NAILS FLUSH WITH INSERTS. – MAXIMUM LOADING 75 PERCENT OF RATING.

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

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

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

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

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

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

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

Haraz - Minneapolis MN

ELECTRICAL LEGENDS AND GENERAL NOTES

E001

ELECTRICAL SPECIFICATIONS (CONT.)

AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

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

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

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

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

LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

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

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

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

FUSES:

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

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

ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.

PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

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

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

120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM

DISTRIBUTION PANELBOARDS, CIRCUIT BREAKER TYPE:

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

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

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

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

HINGES: CONCEALED, CONTINUOUS PIANO HINGE AS DESCRIBED ABOVE.

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

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

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

F. MINIMUM GUTTER SPACES: PANELS WITH 225 AMPERE MAINS, 5-¾" MINIMUM, 400 AMPERES AND OVER, MINIMUM GUTTERS 8 " . FOR PANELS WITH THROUGH FEEDERS, INCREASE GUTTER WIDTH BY 2 " MINIMUM AND PROVIDE A SHEET STEEL BARRIER BETWEEN THE PANEL GUTTER AND THE THROUGH FEEDER PORTION OF THE BACK BOX. BRANCH CIRCUIT BREAKERS SHALL BE MECHANICALLY INTERLOCKED WHEN SHOWN ON DRAWINGS.

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

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

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

A. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.

B. NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.

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

9. DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:

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

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

F. DISCONNECTS

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

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

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

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

G. INSTALLATION

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

H. IDENTIFICATION

1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.

2) NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF ¼ " HIGH WHITE LETTERING.

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

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

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

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

M. MATERIALS

1) RACEWAYS:

a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.

b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.

c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.

d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

2) FITTINGS AND ACCESSORIES:

a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.

b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.

c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

d. BUSHINGS: METALLIC INSULATED TYPE.

BOXES:

OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.

JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED. PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR. SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES. EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS. EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE. RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS. CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING. ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS. EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION. RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTIURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE. INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

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

PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE,

INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

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

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

10. WIRE AND CABLE:

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

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

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

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

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

COLOR CODING SHALL BE AS FOLLOWS:

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

1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT. WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

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

H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

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

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

K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP. PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

11. WIRING DEVICES:

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

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

C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED. 1)SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT)

D. USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT,

D. INSERTION RECEPTACLES SHALL BE HOSPITAL GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT. GROUNDED, EXCEPT AS NOTED.

1) HEALTH CARE FACILITIES:

a) DUPLEX, 20 AMP, 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT: SIMILAR TO HUBBELL NO. 8300 HOSPITAL GRADE.

b) SINGLE, 20 AMP, 125 VOLT, 2 POLE, 3 WIRE, U GROUND SLOT: SIMILAR TO HUBBELL NO. 8310 HOSPITAL GRADE.

2) GROUND FAULT INTERRUPTER RECEPTACLES:

a. 20 AMP DUPLEX FEED-THROUGH TYPE. SIMILAR TO NO. GF8300.

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

F. COLORS: COORDINATE COLORS WITH ARCHITECT.

G. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL):

H. COORDINATE WITH ARCHITECT.

12. LIGHTING FIXTURES:

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

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

C. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24-INCH LAMPS AND RAPID START FOR 48-INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.

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

E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.

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

G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.

H. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED FOR USE IN NEW YORK CITY. AC POWERED WITH PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

13. TELEPHONE CONDUIT SYSTEM:

A. PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.

B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.

C. OUTLETS SHALL BE:

1) WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.

D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.

F. FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

14. GROUNDING AND BONDING:

A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) , AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.

B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.

C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.

D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

1) CIRCUITS SERVING ANY WALL BOX DIMMER.

2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE , OR AS OTHER WISE NOTED ON DRAWINGS.

3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES.

4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.

H. FURNISH ALL PANELBOARDS WITH FEED-THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

I. ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.

J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.

L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.

M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM AND 14,000 AMPERES R.M.S. SYMMETRICAL FOR 480Y/277 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.

EQUIPMENT SCHEDULE

| GC: GENERAL CONTRACTOR \| CSI: CONCEPT SERVICES \| PC: PLUMBING CONTRACTOR \| EC: ELECTRICAL CONTRACTOR \| MC: MECHANICAL CONTRACTOR |

ITEM #	QUANTITY	EQUIPMENT: EQUIPMENT DESCRIPTION	EQUIPMENT: MANUFACTURER	EQUIPMENT: MODEL NUMBER	EQUIPMENT: PROVIDED BY	EQUIPMENT: INSTALLED BY	ELECTICAL: VOLTS	ELECTICAL: PHASE	ELECTICAL: AMPS	ELECTICAL: CONNECTION TYPE	PLUMBING: WATER TYPE	PLUMBING: WATER TEMP	PLUMBING: CONNECTION SIZE	PLUMBING: DRIAN TYPE	MBTUS	REMARKS
101	1	REFRIGERATOR, UNDERCOUNTER	ATOSA	MGF8403GR	CSI	CSI	115 V	1	2.8 A	PLUG						
102	1	REFRIGERATOR, UNDERCOUNTER	BEVERAGE-AIR	UCR34HC	CSI	CSI	115 V	1	2.0 A	PLUG						
103	1	ICE MACHINE	ATOSA	YR140-AP-161-3M	CSI	CSI	115 V	1	3.1 A	PLUG						
104	1	DISPLAY CASE	MVP	KBF-72	CSI	CSI	110V-120V	1	7.5 A	PLUG						
106	1	REFRIGERATED COUNTER CASE, SELF-SERVE	STRUCTURAL CONCEPTS	CO33R-UC	CSI	CSI	110V-120V	1	10.9 A	PLUG						
110	2	SINK, DROP-IN, 1 COMP	BK RESOURCES	DDI-10141024S-P-G	CSI	CSI					UF	CW/HW	1.125"/1.125"	ID		
110.1	1	HAND SINK, WALL MOUNT	BK RESOURCES	BKHS-W-1410-RS-P-G	CSI	CSI					UF	CW/HW	1.000"/1.000"	D		
114	1	RAPID RINSER	BLENDTEC	JRE-612	CSI	CSI										
115	1	POS	SAMSUNG	ALL-IN-ONE	OTHER	OTHER										BY OTHERS - VERIFY ALL
119	2	PUQ PRESS	MAHLKÖNIG	PUQ Press M5	OTHER	OTHER										BY OTHERS - VERIFY ALL
120	1	STANDARD HOPPER	MAHLKÖNIG	EK43	OTHER	OTHER	120 V	1	7.0 A	PLUG						BY OTHERS - VERIFY ALL
121	2	GRINDER	MAHLKÖNIG	E80S	OTHER	OTHER										BY OTHERS - VERIFY ALL
123	2	RINSER	ESPRESSO PARTS	EPPR715	CSI	CSI					UF	CW	0.375"	ID		
124	2	KNOCK BOX	ESPRESSO PARTS	EPKB665	CSI	CSI										
126	1	SINGLE COFFEE BREWER	CURTIS	G4GEMXN63A1000	CSI	CSI	120 V	1	13.5 A	DIRECT	F	CW	0.375"			
127	1	ICE BIN, DROP-IN	BK RESOURCES	BK-DIBL-2218	CSI	CSI								ID		
128	1	SOTA SINGLE MAG	TurboChef	I1 SOTA SINGLE MAG	CSI	CSI	208V/240V	1	20.0 A	PLUG						
129	2	HOT WATER DISPENSER	CURTIS	WB5GT63000	CSI	CSI	120V/220V	1	12.5 A	DIRECT	F	FCW	0.250"			
130	1	ESPRESSO MACHINE	LA MARZOCCO	STRADA 3AV	OTHER	OTHER	208 V	1	31.0 A	PLUG	F		0.375"			BY OTHERS - VERIFY ALL
131	4	INDUCTION COUNTERTOP	AVANTCO	ID18DB	CSI	CSI	240 V	1	15.0 A	DIRECT						
132	2	FOOD BLENDER	VITAMIX	068255-ABAB	CSI	CSI	120 V	1	12.5 A	PLUG						
136	1	WATER FILTER	EVERPURE	EV932503	CSI	CSI					UF	CW	0.750"			
137	1	GLASS FILLER	T&S BRASS	B-1230	CSI	CSI					F	CW/HW	0.500"/0.500"	ID		
144	7	TRASH CHUTE AND RECEPTACLE			OTHER	OTHER										BY OTHERS - VERIFY ALL
146	8	STRAW DISPENSER	BOBRICK	B-532	OTHER	OTHER										BY OTHERS - VERIFY ALL
147	1	ICE CREAM FREEZER	EXCELLENCE	HFF-4HC	CSI	CSI	115 V	1	3.3 A	PLUG						
148	1	DIPPERWELL W/ FAUCET	T&S BRASS	B-2282-01	CSI	CSI					UF	CW	0.500"	ID		
160	1	MILKSHAKE MACHINE	VEVOR	LJY120-2	OTHER	OTHER										BY OTHERS - VERIFY ALL
161	1	24" WIDE COLD BREW/ COFFEE DISPENSER	SUMMIT	SBC7BRSCM2	CSI	CSI	115 V	1	0.8 A	DIRECT						

LIGHT FIXTURE SCHEDULE

TYPE	COUNT	MANUFACTURER & MODEL NO.	LAMP	WATTS	VOLTS	GENERAL DESCRIPTION
A1	4	COLUMBIA; LCAT24-40MLG-EDU	LED	30W	120	TROFFER
D1	16	NUWATT; NW-DL-4-MR16-LV-5CT-BLK	LED	10W	120	DOWNLIGHT
P1	10	MAXIM; 12121BKAB	LED	60W	120	PENDANT CEILING LIGHT
P2	4	BYOLIIMA; TDDYPNBJ1	LED	60W	120	PIRLO PENDANT
P4	21	DIRYZON; DB5226DU-J-15N	LED	40W	120	PENDANT CEILING LAMP
P5	6	AJBVP; AJ-001	LED	12W	120	TRACK LIGHT
S1	12	EDWARMLUX; PL-LR001-S	LED	40W	120	IRON WALL LAMP

Haraz - Minneapolis MN

ELECTRICAL SPECIFICATION SHEET

E002



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

POWER GENERAL NOTES:

1. THE ARCHITECTURAL PLAN SHALL TAKE PRECEDENCE OVER THE ELECTRICAL DRAWING FOR EQUIPMENT LOCATION AND MOUNTING. THE LOCATION OF ALL ELECTRICAL EQUIPMENT NOT PROVIDED IN THE ARCHITECTURAL PLAN SHALL BE VERIFIED WITH THE ARCHITECT/OWNER BEFORE BID.
2. POWER AND LOCATION OF ALL THE MECHANICAL AND PLUMBING UNITS SHALL BE COORDINATED WITH THE RESPECTIVE CONTACTORS BEFORE BID.
3. ELECTRICAL OUTLETS PLACED ON BOTH SIDES OF THE WALL PARTITION TO BE LOCATED OFFSET OF EACH OTHER.
4. ELECTRICAL OUTLETS AND DEVICES LOCATED IN DEMISING WALLS TO HAVE FIRE PUTTY AROUND THE BOX TO MAINTAIN PARTITION FIRE RATING.
5. ALL PENETRATIONS TO THE WALK-IN FREEZER AND COOLER NEED TO BE SEALED INSIDE AND OUT.
6. THE DISCONNECT SWITCHES FOR THE BRANCH CIRCUIT SHOWN ON THE PLAN SHALL BE RATED EQUAL TO OR HIGHER THAN THE BREAKER RATING. REFER TO BREAKER RATING IN THE PANEL SCHEDULE AND PROVIDE DISCONNECT AS NEEDED.
7. ALL 125V-250V RECEPTACLES SUPPLIED BY SINGLE-PHASE CIRCUITS RATED 150V OR LESS TO GROUND, 50A OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE-PHASE BRANCH CIRCUITS RATED 150V OR LESS TO GROUND, 100A OR LESS INSTALLED IN THE LOCATIONS SPECIFIED IN NEC 210.8(B)(1) THROUGH (12) SHALL HAVE GFCI PROTECTION.
8. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI RECEPTACLE DISCONNECT IN THE READILY ACCESSIBLE LOCATION. PROVIDE A GFI BREAKER IN THE PANEL IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE WHEN INSTALLED IN THE DESIRED LOCATION.
9. ALL ELECTRICAL COOKING EQUIPMENT UNDER THE HOOD SHALL BE FED FROM THE SHUNT TRIP BREAKERS.
10. 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.
11. WHEN WIRING TYPE AND INSULATION ARE NOT SPECIFIED IN THE DRAWING, THE CONTRACTOR SHALL PROVIDE ANY WIRING THAT IS APPROVED BY CODE AND SUITABLE FOR THE AREA OF USE. THE AREA INCLUDES BUT IS NOT LIMITED TO UNDERGROUND, OVERHEAD, WET LOCATION, PLANUM SPACE, SHAFTS, FIRE PUMP, EMERGENCY SYSTEM, OFFICES, AND HEALTH CARE FACILITIES.
12. MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOME-RUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM THE FIRST JUNCTION/OUTLET BOX TO THE BRANCH CIRCUIT PANEL BOARD. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM THE FIRST JUNCTION/OUTLET BOX TO THE BRANCH CIRCUIT PANEL BOARD.
    A QUAD AND DATA/TELEPHONE OUTLETS ARE TO BE PROVIDED ON THE PLYWOOD BACKING DESIGNED FOR THE L.V. RACK. EXTEND THE CONDUIT FROM THE L.V. RACKUP TO THE LOCATION DECIDED BY THE LANDLORD/OWNER/L.V. VENDOR OR SERVICE PROVIDER.
13. EC TO CCORDINATE EXACT LOCATIONS AND POWER REQUIREMENTS OF ALL THE ELECTRICALLY POWERED EQUIPMENTS WITH ARCHITECT/VENDOR.

KEYED NOTES:

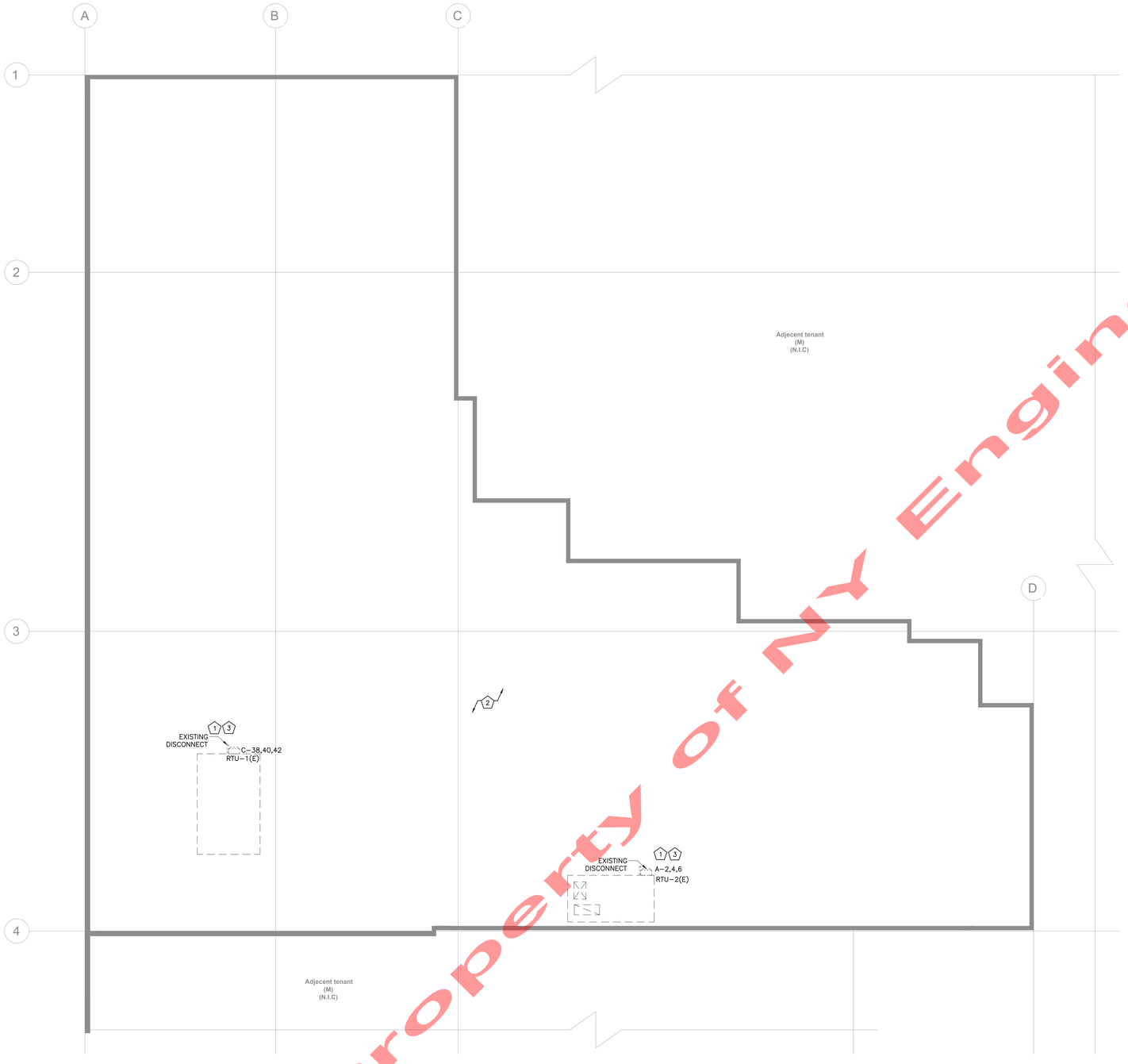
1. EC TO PROVIDE RECEPTACLE MOUNTED ABOVE WINDOW ON WALL OR CEILING AS REQUIRED TO MEET THE N.E.C.210.62 SHOW WINDOW REQUIREMENTS.
2. FOR COMBINATION USB OUTLET, EC TO COORDINATE WITH ARCHITECT/OWNER FOR THE LOCATION AND REQUIREMENT OF THE RECEPTACLE PRIOR TO INSTALLATION. BASE BID ACCORDINGLY.
3. GFCI PROTECTION IS REQUIRED FOR ALL 125V THROUGH 250V RECEPTACLES SUPPLIED BY SINGLE-PHASE BRANCH CIRCUITS RATED 150V OR LESS TO GROUND IN COMMERCIAL KITCHENS PER NEC ART. 210.8(B). ELECTRICAL CONTRACTOR SHALL PROVIDE GFCI RECEPTACLES FOR ALL KITCHEN EQUIPMENT OUTLETS. WHERE RECEPTACLES ARE NOT READILY ACCESSIBLE, PROVIDE GFCI PROTECTION VIA CIRCUIT BREAKERS.
4. RECEPTACLE FOR DISPLAY MENU. EC NEEDS TO COORDINATE WITH ARCHITECT/MANUFACTURER FOR THE EXACT LOCATION AND POWER REQUIREMENT PRIOR TO INSTALLATION. BASE BID ACCORDINGLY.
5. E.C TO PROVIDE DEDICATED SPACE FOR ELECTRICAL EQUIPMENT PER NEC 110.26. MAINTAIN A CLEAR ZONE EQUAL TO THE WIDTH AND DEPTH OF THE EQUIPMENT, EXTENDING 6 FEET ABOVE OR TO THE STRUCTURAL CEILING, WHICHEVER IS LOWER. FOREIGN SYSTEMS SUCH AS PIPING OR DUCTS ARE PERMITTED ABOVE THIS SPACE ONLY IF PROTECTED. A DRIP PAN SHALL BE INSTALLED TO PREVENT DAMAGE FROM LEAKS OR CONDENSATION.
6. EC TO COORDINATE WITH PLUMBING CONTRACTOR/VENDOR FOR THE LOCATION AND POINT OF CONNECTION OF THE PLUMBING EQUIPMENTS.
7. EXISTING MECHANICAL UNITS TO REMAIN. EC SHALL COORDINATE WITH ARCHITECT/VENDOR FOR THE EXACT LOCATION AND POWER REQUIREMENTS.
8. EXISTING 200A 120/240V, 3PH, 4W MCB PANEL-A. EC TO VERIFY ON FIELD THE EXACT LOCATION AND PROVIDE NECESSARY CLEARANCES ACCORDING TO NATIONAL ELECTRICAL CODE. EC TO FIELD VERIFY THE OPERABLE CONDITION OF THE PANEL AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
9. EXISTING 200A 120/240V, 3PH, 4W MLO PANEL-B. EC TO VERIFY ON FIELD THE EXACT LOCATION AND PROVIDE NECESSARY CLEARANCES ACCORDING TO NATIONAL ELECTRICAL CODE. EC TO FIELD VERIFY THE OPERABLE CONDITION OF THE PANEL AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
10. EXISTING 200A 120/240V, 3PH, 4W MLO PANEL-C. EC TO VERIFY ON FIELD THE EXACT LOCATION AND PROVIDE NECESSARY CLEARANCES ACCORDING TO NATIONAL ELECTRICAL CODE. EC TO FIELD VERIFY THE OPERABLE CONDITION OF THE PANEL AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
11. EXISTING ELECTRICAL WATER HEATER AND ITS ASSOCIATED ELECTRICAL COMPONENTS TO REMAIN. EC TO COORDINATE WITH ARCHITECT/PLUMBING CONTRACTOR FOR THE EXACT LOCATION. EC TO FIELD VERIFY THE OPERATING CONDITION OF POINT OF CONNECTION AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE. BAS BID ACCORDINGLY.
12. NEW MECHANICAL EQUIPMENTS. EC SHALL COORDINATE WITH THE ARCHITECT/MANUFACTURER FOR THE EXACT LOCATION AND POINT OF CONNECTION. BASE BID ACCORDINGLY.
13. EXISTING OUTLETS, EQUIPMENTS, ASSOCIATED CONDUITS AND BREAKERS TO REMAIN. EC SHALL COORDINATEE WITH ARCHITECT FOR THE EXACT LOCATION OF OUTLETS AND EQUIPMENTS ON SITE. EC TO FIELD VERIFY THE OPERABLE CONDITION OF THE OUTLETS AND EQUIPMENTS. PROVIDE NEW/REPLACE IF NOT FOUND OR FOUND INOPERABLE. BASE BID ACCORDINGLY.
14. EC TO TRACE THE EXISTING CIRCUIT AND RESHUFFLE THE BREAKERS IF NECESSARY. REPORT ANY DISCREPANCY BEFORE BIDDING.
15. ELECTRICAL CONTRACTOR SHALL VERIFY THE PRESENCE OF AN EXISTING RECEPTACLE NEAR THE PANEL. IF NO RECEPTACLE IS PRESENT, PROVIDE A NEW RECEPTACLE IN COMPLIANCE WITH NEC 210.63 REQUIREMENTS.
16. NEW MECHANICAL EQUIPMENTS. EC SHALL VERIFY WITH THE MANUFACTURER/MECHANICAL CONTRACTOR FOR THE POWER REQUIREMENT AND LOCATION ON SITE.

Property of NY Engineer

Haraz -
Minneapolis MN

ELECTRICAL FLOOR
POWER PLAN

E101



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

POWER GENERAL NOTES:

1. THE ARCHITECTURAL PLAN SHALL TAKE PRECEDENCE OVER THE ELECTRICAL DRAWING FOR EQUIPMENT LOCATION AND MOUNTING. THE LOCATION OF ALL ELECTRICAL EQUIPMENT NOT PROVIDED IN THE ARCHITECTURAL PLAN SHALL BE VERIFIED WITH THE ARCHITECT/OWNER BEFORE BID.
2. POWER AND LOCATION OF ALL THE MECHANICAL AND PLUMBING UNITS SHALL BE COORDINATED WITH THE RESPECTIVE CONTACTORS BEFORE BID.
3. ELECTRICAL OUTLETS PLACED ON BOTH SIDES OF THE WALL PARTITION TO BE LOCATED OFFSET OF EACH OTHER.
4. ELECTRICAL OUTLETS AND DEVICES LOCATED IN DEMISING WALLS TO HAVE FIRE PUTTY AROUND THE BOX TO MAINTAIN PARTITION FIRE RATING.
5. THE DISCONNECT SWITCHES FOR THE BRANCH CIRCUIT SHOWN ON THE PLAN SHALL BE RATED EQUAL TO OR HIGHER THAN THE BREAKER RATING. REFER TO BREAKER RATING IN THE PANEL SCHEDULE AND PROVIDE DISCONNECT AS NEEDED.
6. ALL 125V-250V RECEPTACLES SUPPLIED BY SINGLE-PHASE CIRCUITS RATED 150V OR LESS TO GROUND, 50A OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE-PHASE BRANCH CIRCUITS RATED 150V OR LESS TO GROUND, 100A OR LESS INSTALLED IN THE LOCATIONS SPECIFIED IN NEC 210.8(B)(1) THROUGH (12) SHALL HAVE GFCI PROTECTION.
7. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI RECEPTACLE DISCONNECT IN THE READILY ACCESSIBLE LOCATION. PROVIDE A GFI BREAKER IN THE PANEL IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE WHEN INSTALLED IN THE DESIRED LOCATION.
8. WHEN WIRING TYPE AND INSULATION ARE NOT SPECIFIED IN THE DRAWING, THE CONTRACTOR SHALL PROVIDE ANY WIRING THAT IS APPROVED BY CODE AND SUITABLE FOR THE AREA OF USE. THE AREA INCLUDES BUT IS NOT LIMITED TO UNDERGROUND, OVERHEAD, WET LOCATION, PLANUM SPACE, SHAFTS, FIRE PUMP, EMERGENCY SYSTEM, OFFICES, AND HEALTH CARE FACILITIES.
9. MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOME-RUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM THE FIRST JUNCTION/OUTLET BOX TO THE BRANCH CIRCUIT PANEL BOARD. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM THE FIRST JUNCTION/OUTLET BOX TO THE BRANCH CIRCUIT PANEL BOARD.
   A QUAD AND DATA/TELEPHONE OUTLETS ARE TO BE PROVIDED ON THE PLYWOOD BACKING DESIGNED FOR THE L.V. RACK. EXTEND THE CONDUIT FROM THE L.V. RACKUP TO THE LOCATION DECIDED BY THE LANDLORD/OWNER/L.V. VENDOR OR SERVICE PROVIDER.
10. EC TO COORDINATE EXACT LOCATIONS AND POWER REQUIREMENTS OF ALL THE ELECTRICALLY POWERED EQUIPMENTS WITH ARCHITECT/VENDOR.

KEYED NOTES:

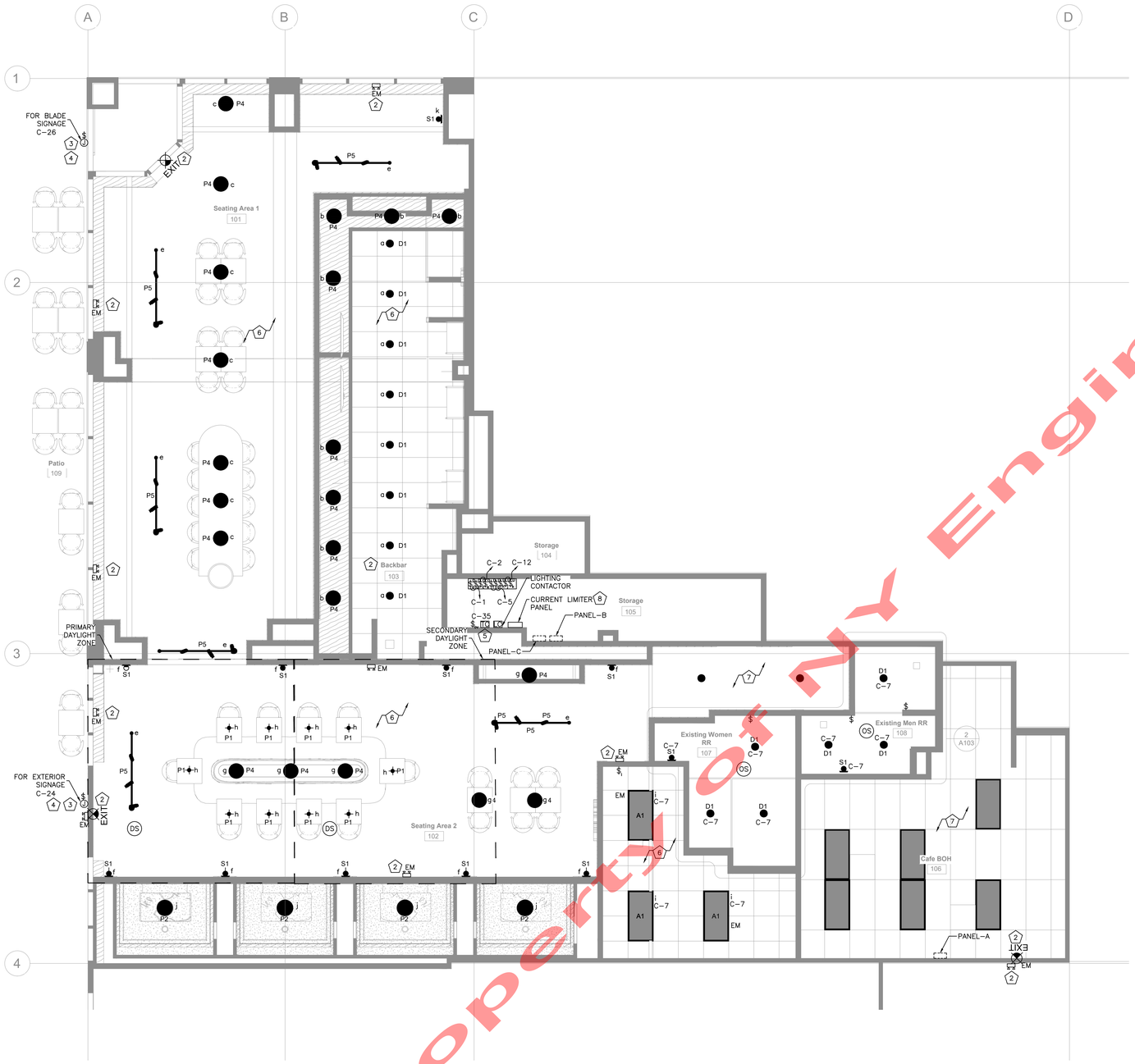
1. EXISTING MECHANICAL EQUIPMENTS TO REMAIN. EC TO COORDINATE WITH ARCHITECT FOR THE EXACT LOCATION OF THE MECHANICAL EQUIPMENTS. EC TO FIELD VERIFY THE LOCATION AND OPERABLE CONDITION OF THE POINT OF CONNECTION AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
2. EC TO COORDINATE THE AVAILABILITY AND OPERABILITY OF THE SERVICE RECEPTACLE WITHIN 25 FEET OF THE HVAC EQUIPMENTS ACCORDING TO NEC 210.63. PROVIDE NEW/REPLACE IF NOT FOUND. BASE BID ACCORDINGLY.
3. EC TO FIELD VERIFY IF THE EXISTING SWITCHGEARS ARE PROVIDED WITH NEMA-3R PROTECTION. PROVIDE IF NOT PROVIDED.

Property of NY Engineers

Haraz -
Minneapolis MN

ELECTRICAL ROOF PLAN

E102



1 ELECTRICAL FLOOR LIGHTING PLAN
1/4" = 1'-0"

GENERAL NOTES:

1. LIGHTING CONTROLS (SENSORS AND SWITCHES) SHALL BE RATED FOR LINE VOLTAGE (UON); ELSE PROVIDE POWER BASE.
2. THE PROPOSED LOCATION OF THE SWITCHES AND SENSORS IS SHOWN ON THE PLAN. FOR CONTROLS WITH DIFFERENT CAPABILITIES, THE CONTRACTOR SHALL ADJUST THE QUANTITY, LOCATION, AND MOUNTING HEIGHT ACCORDINGLY.
3. THE OCCUPANCY SENSOR, TIMERS, AND OTHER APPROVED LIGHTING CONTROLS SHALL MATCH THE CONTROL FUNCTION REQUIREMENT SPECIFIED IN THE IECC C405.2.
4. OCCUPANT SENSOR CONTROLS IN CORRIDORS SHALL UNIFORMLY REDUCE LIGHTING POWER TO AN UNOCCUPIED SETPOINT NOT MORE THAN 50 PERCENT OF FULL POWER WITHIN 15 MINUTES AFTER ALL OCCUPANTS HAVE LEFT THE SPACE.
5. OCCUPANCY SENSORS IN THE RESTROOMS, LOBBIES, STAIRCASE, AND LOCKER ROOMS SHALL BE SET TO TURN ON ALL THE LIGHTING FIXTURES AUTOMATICALLY AND TURN OFF WITHIN 15 MINUTES AFTER ALL OCCUPANTS HAVE LEFT THE SPACE.
6. OCCUPANCY SENSORS IN OTHER AREAS SHALL BE SET TO TURN ON A MAXIMUM OF 50% OF ALL THE LIGHTING FIXTURES AUTOMATICALLY AND AND REST MANUALLY. THE FIXTURES SHOULD TURN OFF WITHIN 15 MINUTES AFTER ALL OCCUPANTS HAVE LEFT THE SPACE.
7. ALL LIGHT FIXTURES NOT ON THE OCCUPANCY SENSOR/OTHER AUTOMATIC CONTROL SHALL BE CONTROLLED BY TIMER-CONTROLLED LIGHTING CONTACTOR(S). UON.
8. THE LIGHTING FIXTURES IN THE DAYLIGHT ZONE SHALL BE CONTROLLED THROUGH THE DAYLIGHT SENSOR. THE DAYLIGHT SENSOR SHALL MATCH THE CONTROL FUNCTION REQUIREMENT OF THE IECC.
9. THE TIME CLOCK (MIN. 2 CHANNEL) SHALL BE SCHEDULED AS PER THE REQUIREMENT OF THE PROJECT SPACE. COORDINATE EXACT LOCATION IN THE FIELD.
10. THE MANUAL OVERRIDE SWITCH SHALL TURN OFF THE INTENDED LIGHTING (TIME CLOCK AND CONTACTORS) BEFORE 2 HOURS. WHEN IT IS INITIATED.
11. A PHOTOCELLSHALL BE LOCATED INSTALLED IN ANY LOCATION EXPOSED TO THE SUNLIGHT BUT CONCEALED FROM PUBLIC VIEW. COORDINATE EXACT LOCATION IN FIELD.
12. REFER TO THE LIGHTING CONTACTOR DETAIL FOR TYPICAL CONNECTION OF THE TIME CLOCK, MANUAL OVERRIDE SWITCH, CONTACTORS AND PHOTOCELL.
13. INSTALL A DISCONNECT SWITCH FOR THE SIGNAGE IN AN ACCESSIBLE LOCATION. CONNECT THE SIGNAGE TO THE INDICATED CIRCUIT THROUGH THE LIGHTING CONTACTOR (LC). COORDINATE WITH THE OWNER OR LANDLORD TO DETERMINE THE EXACT LOCATION AND SCHEDULE FOR THE TIME CLOCK.
14. CONNECT THE EMERGENCY LIGHTING, EXIT SIGNS, OR EXIT SIGN AND BUG-EYE COMBO TO THE NEAREST LIGHTING CIRCUIT AHEAD OF SWITCHING. UON.
15. THE WATTAGE RATING OF THE CURRENT LIMITERS USED SHALL NOT EXCEED THE WATTAGE RATING OF THE CURRENT LIMITERS INDICATED ON THE PLAN.
16. EMERGENCY LIGHT FIXTURES (BUG EYES) SHALL TURN ON DURING POWER FAILURE WHEREAS ALL EXIT SIGNS SHALL BE PERMANENTLY ON. E.C. TO WIRE THE FIXTURE ACCORDINGLY.
17. THE ELR (EMERGENCY LIGHTING RELAY) SHALL CONNECT THE FIXTURE TO THE NORMAL CIRCUIT WHEN UTILITY POWER IS AVAILABLE, ALLOWING SWITCHING AND DIMMING THE FIXTURE, AND CONNECT TO THE BATTERY BACKUP OR EMERGENCY CIRCUIT TO ILLUMINATE THE FIXTURE AT FULL CAPACITY DURING POWER FAILURE. REFER ELR DIAGRAM FOR MORE DETAIL.
18. E.C. SHALL REARRANGE (IF REQUIRED) THE EMERGENCY FIXTURES TO PROVIDE INITIAL ILLUMINATION THAT IS NOT LESS THAN AN AVERAGE OF 1 FOOTCANDLE (11 LUX) AND A MINIMUM AT ANY POINT OF 0.1 FOOTCANDLE (1 LUX) MEASURED ALONG THE PATH OF EGRESS AT FLOOR LEVEL. ILLUMINATION LEVELS SHALL BE PERMITTED TO DECLINE TO 0.6 FOOTCANDLE (6 LUX) AVERAGE AND A MINIMUM AT ANY POINT OF 0.06 FOOTCANDLE (0.6 LUX) AT THE END OF THE EMERGENCY LIGHTING TIME DURATION. A MAXIMUM-TO-MINIMUM ILLUMINATION UNIFORMITY RATIO OF 40 TO 1 SHALL NOT BE EXCEEDED.
19. PROVIDE EMERGENCY LIGHTING ON THE EXTERIOR SIDE OF THE EXIT DISCHARGE DOORS. EMERGENCY LIGHTING SYSTEMS SHALL BE DESIGNED AND INSTALLED SO THAT THE FAILURE OF ANY INDIVIDUAL LIGHTING ELEMENT CANNOT LEAVE IN TOTAL DARKNESS ANY SPACE THAT REQUIRES EMERGENCY ILLUMINATION. A TWO-LAMP / TWO-LED (2-LAMP / 2-LED) DRIVER FIXTURE, OR MULTIPLE FIXTURES IN PROXIMITY TO EACH OTHER WILL ACCOMPLISH THIS.
SECTION: 1008.3.2; CEC 700.16

KEYED NOTES:

1. TRACK LIGHTS TO BE CONTROLLED BY CURRENT LIMITING PANEL. REFER TO THE CURRENT LIMITING PANEL SCHEDULE.
2. CONNECT EXIT/EGRESS/EMERGENCY LIGHTING AHEAD OF ALL LIGHTING CONTROLS OF NEAREST GENERAL LIGHTING CIRCUIT SERVING THIS AREA.
3. PROVIDE JUNCTION BOX FOR EXTERIOR SIGNAGE. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT/VENDOR FOR FINAL LOCATION AND POWER REQUIREMENTS. INSTALL A READILY ACCESSIBLE SWITCH WITHIN SIGHT OF THE SIGNAGE.
4. EXTERIOR SIGNAGE TO BE CONTROLLED BY TIMECLOCK.
5. NEW TIMECLOCK FOR LIGHTING CONTROL. EC SHALL COORDINATE WITH ARCHITECT FOR THE EXACT LOCATION AND MOUNTING OF TIMECLOCK.
6. ALL INTERIOR LIGHTING EXCEPT RESTROOM WILL BE CONTROLLED BY TIMECLOCK.
7. EXISTING LIGHTING TO REMAIN. EC SHALL COORDINATE WITH ARCHITECT FOR THE EXACT LOCATION OF THE EXISTING LIGHTS AND CONTROLS. EC SHALL VERIFY THE OPERATING CONDITIONS OF THE LIGHTS, CONTROL SWITCHES AND ASSOCIATED BREAKERS. REPLACE IF FOUND INOPERABLE OR MISSING. BASE BID ACCORDINGLY.
8. CURRENT LIMITER PANEL FOR THE TRACK LIGHTS. EC TO COORDINATE WITH ARCHITECT/MANUFACTURER FOR EXACT LOCATION, MOUNTING AND POWER REQUIREMENTS. BASE BID ACCORDINGLY.

CURRENT LIMITING PANEL

BREAKER	WATTS	AMP	DESCRRIPTION	CIRCUIT
1	240	2	SEATING AREA LIGHTS	C-2
2	–	–	SPARE	–
3	–	–	SPARE	–

Property of NY Engineers

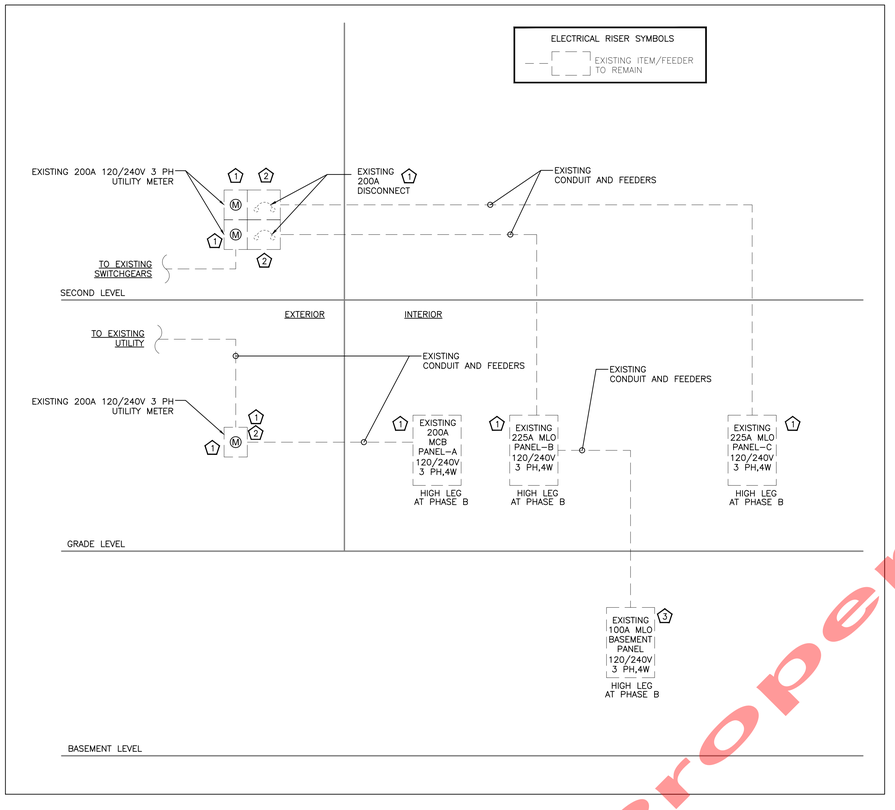
Haraz -
Minneapolis MN

ELECTRICAL FLOOR LIGHTING PLAN

E201

PANEL:	B	(EXISTING)	-							MOUNTING:	SURFACE
240/120	VOLTS		3	PHASE	-	-			DEMAND LOAD (in kVA) 44.41	PANEL LOCATION:	STORAGE 105
225	AMPS	MLO - MAIN LUG ONLY	4	WIRE	-	-			DEMAND CURRENT (in Amps) 106.97	FED FROM:	MAIN DISCONNECT

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	WIRE SIZE	PER PHASE (KVA) A	B	C	WIRE SIZE	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20/1P*	SINGLE COFFEE BREWER (126)	E	1.63	2#12 + 1#12G, 3/4"C	3.13			2#12 + 1#12G, 3/4"C	1.50	E	HOT WATER DISPENSER (129)	20/1P*	2
3	15/3P*	BASEMENT MIXER RECEPT			S.A.E		0.00		S.A.E			EXISTING LOAD	30/2P*	4
5								0.00						6
7						1.50			2#12 + 1#12G, 3/4"C	1.50	E	HOT WATER DISPENSER (129)	20/1P*	8
9		SPACE					0.00					SPACE		10
11	20/1P*	STANDARD HOPPER (120)	E	0.84	2#12 + 1#12G, 3/4"C			1.21	2#12 + 1#12G, 3/4"C	0.37	E	ICE MACHINE (103)	15/1P	12
13	20/1P*	PUQ PRESS (119)	E	0.08	2#12 + 1#12G, 3/4"C	1.08			2#12 + 1#12G, 3/4"C	1.00	E	POS (115)	20/1P*	14
15		SPACE					0.00					SPACE		16
17	20/1P*	TV MENU RECEPTACLES	E	0.40	2#12 + 1#12G, 3/4"C			1.48	2#12 + 1#12G, 3/4"C	1.08	R	SEATING AREA RECEPTACLE #2	20/1P*	18
19	20/1P*	SEATING AREA RECEPTACLE	R	1.26	2#12 + 1#12G, 3/4"C	1.98			2#12 + 1#12G, 3/4"C	0.72	R	SEATING AREA RECEPTACLE #3	20/1P*	20
21		SPACE					0.00					SPACE		22
23	20/1P*	RESTROOM RECEPTACLE	R	0.36	2#12 + 1#12G, 3/4"C			4.08	2#8 + 1#10G, 3/4"C	3.72	E	EXPERESSO MACHINE(130)	40/2P	24
25	20/1P*	STORAGE RECEPTACLE	R	0.18	2#12 + 1#12G, 3/4"C	3.90				3.72	E			26
27		SPACE					0.00					SPACE		28
29	20/1P	U.C REFRIGERATOR (101)	E	0.31	2#12 + 1#12G, 3/4"C			0.31				SPACE		30
31	20/1P	U.C REFRIGERATOR (102)	E	0.24	2#12 + 1#12G, 3/4"C	0.24						SPACE		32
33		SPACE					0.00					SPACE		34
35		SPACE						0.00				SPACE		36
`37	20/1P*	GENERAL PURPOSE RECEPTACLE	R	0.36	2#12 + 1#12G, 3/4"C	10.53			S.A.E	10.17	O	PANEL-C	100/3P*	38
39		SPACE					10.17			10.17	O			40
41		SPACE						10.17		10.17	O			42
						22.35	**10.17**	**17.25**						



1 ELECTRICAL RISER DIAGRAM
NTS

PANEL:	A	(EXISTING)	-							MOUNTING:	SURFACE
240/120	VOLTS		3	PHASE	-	-			DEMAND LOAD (in kVA) 27.01	PANEL LOCATION:	CAFÉ BOH
200	AMPS	MCB - MAIN CIRCUIT BREAKER	4	WIRE	-	-			DEMAND CURRENT (in Amps) 65.05	FED FROM:	MAIN DISCONNECT

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	WIRE SIZE	PER PHASE (KVA) A	B	C	WIRE SIZE	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20/2P*	EXISTING LOAD			S.A.E	3.20			S.A.E	3.20	H	RTU-2(E) 1	50/3P*	2
3							3.20			3.20	H			4
5	20/2P	INDUCTION COOKTOP (131)	E	1.80	2#12 + 1#12G, 3/4"C			5.00		3.20	H			6
7			E	1.80		3.11			2#12 + 1#12G, 3/4"C	1.31	E	REFRIGERATED COUNTER CASE, SELF-SERVE (160)	20/1P	8
9	25/2P	SOTA SINGLE MAG (128)	E	2.40	2#10 + 1#10G, 3/4"C		2.40					SPACE		10
11			E	2.40				2.40	S.A.E			EXISTING LOAD	15/1P*	12
13	15/2P*	EXISTING LOAD			S.A.E	0.00			2#12 + 1#12G, 3/4"C		E	BASEMENT ICEMAKER	20/1P*	14
15							0.00					SPACE		16
17	20/2P	INDUCTION COOKTOP (131)	E	1.80	2#12 + 1#12G, 3/4"C			3.60	2#12 + 1#12G, 3/4"C	1.80	E	INDUCTION COOKTOP (131)	20/2P	18
19			E	1.80		3.60				1.80	E			20
21	15/1P	SPACE					0.00					SPACE		22
23	15/1P	24" WIDE COLD BREW/ COFEEE DISPENSER (161)	E	0.10	2#12 + 1#12G, 3/4"C			1.90	2#12 + 1#12G, 3/4"C	1.80	E	INDUCTION COOKTOP (131)	20/2P	24
25	20/1P	FOOD BLENDER (132)	E	1.50	2#12 + 1#12G, 3/4"C	3.30				1.80	E			26
27		SPACE					0.00					SPACE		28
29	15/1P	MILKSHAKE MACHINE (160)	E	0.12	2#12 + 1#12G, 3/4"C			0.12	S.A.E		E	EXISTING LOAD	30/2P*	30
31	20/1P	FOOD BLENDER (132)	E	1.50	2#12 + 1#12G, 3/4"C	1.50					E			32
33	20/1P	SPACE					0.00					SPACE		34
35	15/1P	PUQ PRESS (119)	E	0.08	2#12 + 1#12G, 3/4"C			0.92	2#12 + 1#12G, 3/4"C	0.84	E	GRINDER (121)	15/1P	36
`37	20/1P*	BASEMENT OFFICE LIGHTS	L		2#12 + 1#12G, 3/4"C	0.84			2#12 + 1#12G, 3/4"C	0.84	E	GRINDER (121)	15/1P	38
39		SPACE					0.00					SPACE		40
41	15/1P	DISPLAY CASE (104)	E	0.90	2#12 + 1#12G, 3/4"C			1.30	2#12 + 1#12G, 3/4"C	0.40	E	ICE CREAM FREEZER (147)	15/1P	42
						15.55	**5.60**	**15.24**						

PANEL:	C	(EXISTING)	-							MOUNTING:	SURFACE
240/120	VOLTS		3	PHASE	-	-			DEMAND LOAD (in kVA) 30.50	PANEL LOCATION:	STORAGE 105
225	AMPS	MLO - MAIN LUG ONLY	4	WIRE	-	-			DEMAND CURRENT (in Amps) 73.46	FED FROM:	MAIN DISCONNECT

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	WIRE SIZE	PER PHASE (KVA) A	B	C	WIRE SIZE	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20/1P*	BACKBAR LIGHTING	L	0.40	2#12 + 1#12G, 3/4"C	0.92			2#12 + 1#12G, 3/4"C	0.52	L	SEATING AREA LIGHTING	20/1P*	2
3		SPACE					0.00					SPACE		4
5	20/1P*	SEATING AREA LIGHTING #2	L	1.20	2#12 + 1#12G, 3/4"C			1.20				SPARE	20/2P*	6
7	20/1P*	RESTROOM LIGHTING	L	0.15	2#12 + 1#12G, 3/4"C	0.15								8
9		SPACE					0.00					SPACE		10
11	15/1P	KXF-1(N)	M	0.22	2#12 + 1#12G, 3/4"C			0.36	2#12 + 1#12G, 3/4"C	0.14	L	GENERAL LIGHTING	20/1P*	12
13	20/1P*	SPARE				0.00						SPARE	20/1P*	14
15		SPACE					0.00					SPACE		16
17	20/1P*	SERVICE RECEPTACLE	R	0.18	2#12 + 1#12G, 3/4"C			0.18				SPARE	20/1P*	18
19	20/1P*	SPARE				0.00						SPARE	20/1P*	20
21		SPACE					0.00					SPACE		22
23	20/1P*	SHOW WINDOW	L	0.80	2#12 + 1#12G, 3/4"C			2.00	2#12 + 1#12G, 3/4"C	1.20	L	EXITERIOR SIGNAGE	20/1P*	24
25	20/1P*	SHOW WINDOW	L	1.60	2#12 + 1#12G, 3/4"C	2.80			2#12 + 1#12G, 3/4"C	1.20	L	BLADE SIGNAGE	20/1P*	26
27		SPACE					0.00					SPACE		28
29	60/2P*	EXISTING LOAD			S.A.E			0.00				SPARE	20/1P*	30
31						0.00						SPARE	20/1P*	32
33		SPACE					0.00					SPACE		34
35	20/1P*	TIMECLOCK	L	0.20	2#12 + 1#12G, 3/4"C			0.20				SPARE	20/1P*	36
`37	20/1P*	SPARE				6.93			S.A.E	6.93	H	RTU-1(E)	60/3P*	38
39		SPACE					6.93			6.93	H			40
41	20/1P*	SPARE						6.93		6.93	H			42
						10.80	**6.93**	**10.87**						

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.

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

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

D. 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 PER STANDARD.

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

F. REFER POWER PLAN FOR THE PROPOSED LOCATION OF THE ELECTRICAL PANELS. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY.

G. 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).

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

RISER DIAGRAM KEY NOTES:

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

2 EXISTING GROUNDING TO REMAIN. EC SHALL FIELD VERY THE LOCATION, RATING AND OPERABLE CONDITION OF THE GROUNDING WIRE.

3 EXISTING PANEL AND CIRCUIT TO REMAIN AS IS. EC SHALL COORDINATE THE EXACT LOCATION WITH ARCHITECT.

PANEL SCHEDULE NOTES:

1. VERIFY THE EXISTING BREAKERS FOR ALL THE EXISTING EQUIPMENTS ON SITE. INFORM IF FOUND ANY DISCREPANCIES PRIOR TO BID.
2. "*" STANDS FOR EXISTING BREAKER.
3. HIGH LEG DELTA SERVICE. HIGH LEG AT PHASE-B

PANEL SCHEDULE KEY NOTES:

1 EXISTING MECHANICAL UNITS WITH THEIR EXISTING CIRCUITING SHALL REMAIN CONNECTED TO THE EXISTING PANEL. E.C. SHALL FIELD VERIFY THE OPERABLE CONDITION OF THE EXISTING MECHANICAL UNITS AND THEIR RESPECTIVE BREAKER SIZES IN TERMS OF VOLTAGE/AMPS/PHASE IN THE EXISTING PANEL. PROVIDE NEW IF THE EXISTING BREAKER IS NOT OPERABLE OR NOT PER THE EXISTING MECHANICAL UNIT'S REQUIREMENTS. REPORT THE ENGINEER ON RECORD FOR ANY DISCREPANCY. BASE BID ACCORDINGLY.

Property of NY Engineers

Haraz -
Minneapolis MN

ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

E301

OAC AND VAC MANUAL MODE OPERATION:

1. SWITCHES ARE REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR WITH SWITCH.

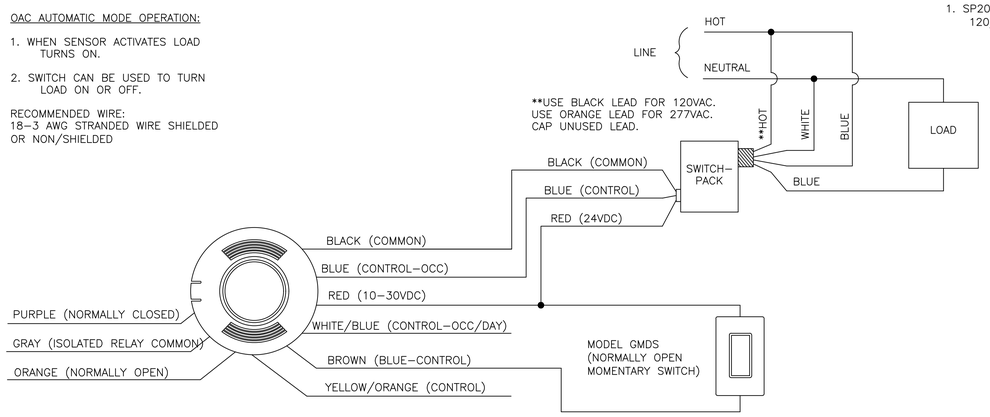
OAC AUTOMATIC MODE OPERATION:

1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. SWITCH CAN BE USED TO TURN LOAD ON OR OFF.

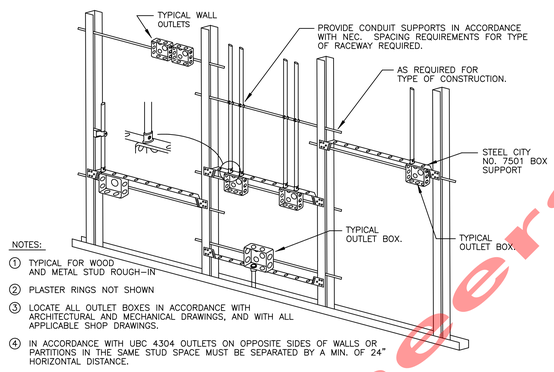
RECOMMENDED WIRE:
18–3 AWG STRANDED WIRE SHIELDED OR NON/SHIELDED

NOTES

1. SP20–RD4 SWITCHPACK SHOWN. 120/277VAC 20AMP RATING.



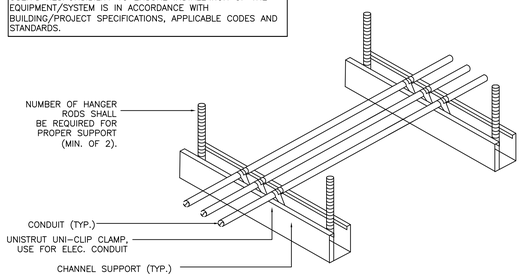
4 / E401 OCCUPANCY – AUTO ON/OFF. WIRING DIAGRAM – LOW VOLTAGE CEILING SENSOR
N.T.S



NOTES:
① TYPICAL FOR WOOD AND METAL STUD ROUGH–IN
② PLASTER RINGS NOT SHOWN
③ LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
④ IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.

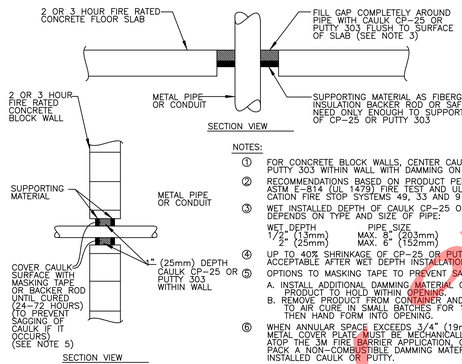
2 / E401 DETAIL TYPICAL ROUGH–IN REQUIREMENTS
N.T.S

NOTE:
THIS INFORMATION MAY NOT CONTAIN ALL DETAILS REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE DRAWINGS FOR THE SPECIFIC APPLICATION. IT IS THE USER'S RESPONSIBILITY TO ENSURE INSTALLATION OF THE EQUIPMENT/SYSTEM IS IN ACCORDANCE WITH BUILDING/PROJECT SPECIFICATIONS, APPLICABLE CODES AND STANDARDS.



NOTES:
1. ALL CONDUIT MAY BE COMBINED ON SAME SUPPORT CHANNEL WHERE PRACTICAL.
2. SUPPORT CHANNEL LENGTH SHALL NOT BE DETERMINED UNTIL ALL PIPING, CONDUIT, ETC. TO BE SUPPORTED IS COORDINATED.
3. SUPPORT CHANNEL SPACING SHALL BE NO MORE THAN 10'–0".
4. UNISTRUT AND CONDUIT INSTALLATION MAY BE REVERSED.

5 / E401 CONDUIT SUPPORT DETAIL
N.T.S



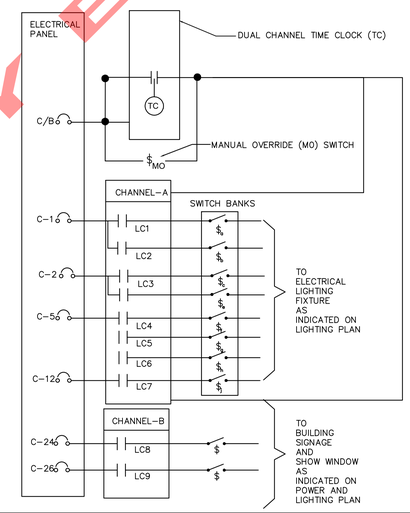
NOTES:
① FOR CONCRETE BLOCK WALLS, CENTER CAULK CP–25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
② RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E–814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
③ WET INSTALLED DEPTH OF CAULK CP–25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

WET DEPTH	PIPE SIZE	FIRE RATING
1/2" (13mm)	MAX. 8" (203mm)	2 HRS.
2" (25mm)	MAX. 6" (152mm)	3 HRS.

④ UP TO 40% SHRINKAGE OF CP–25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
⑤ OPTIONS TO MASKING TAPE TO PREVENT SAGGING:
A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
⑥ WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON–COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.

3 / E401 FIRE STOP DETAIL
N.T.S

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.



1 / E401 LIGHTING CONTACTOR DETAIL (TYPICAL)
N.T.S

Property of NY Engineers

Haraz - Minneapolis MN

ELECTRICAL DETAILS SHEET

E401