MECHANICAL GENERAL NOTES

- A. THE GENERAL CONDITIONS OF THE GENERAL SPECIFICATIONS, AND ALL APPLICABLE INSTRUCTIONS TO BIDDERS SHALL BE PART OF THESE SPECIFICATIONS.
- 3. "PROVIDE" AS USED HEREIN MEANS TO FURNISH AND INSTALL COMPLETE. C. "FURNISH" AS USED HEREIN MEANS TO PURCHASE AND DELIVER TO THE PROJECT SITE IN UNDAMAGED CONDITION. WHERE APPLICABLE, SUBMIT FOR REVIEW AND
- APPROVAL AND COORDINATE WITH THE CONTRACT DOCUMENTS. D. "INSTALL" AS USED HEREIN MEANS TO STORE AND PROTECT FROM DAMAGE, INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS, AND MAKE ALL CONNECTIONS
- COMPLETE. E. THE TERM "CONTRACTOR" AS USED HEREIN MEANS ANY CONTRACTOR OR SUBCONTRACTOR CONTRACTED TO PERFORM WORK INCLUDED IN AND DEFINED BY
- THIS SECTION. . MECHANICAL WORK SHALL BE PROVIDED IN STRICT COMPLIANCE WITH THE COLORADO AND CITY OF BOULDER MECHANICAL CODE 2018, ANDALL APPLICABLE LOCAL ORDINANCES, STATE LAWS AND FEDERAL LAWS.
- λ . THOROUGHLY REVIEW THE BID INSTRUCTIONS INCLUDING ALL CIVIL, ARCHITECTURAL, STRUCTURAL, AND MEP CONSTRUCTION DOCUMENTS. OBTAIN AND THOROUGHLY EXAMINE THE MANUFACTURERS' WRITTEN INSTALLATION INSTRUCTIONS, DETAILS, AND REQUIREMENTS FOR THE SCHEDULED AND SPECIFIED EQUIPMENT AND MATERIALS. FOR AMBIGUOUS, CONTRADICTORY, OR CONFLICTING ITEMS WITHIN THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR SHALL REQUEST CLARIFICATION IN A WRITTEN "REQUEST FOR INFORMATION" (RFI), AT LEAST FIVE (5) WORKING DAYS PRIOR TO BID DATE. RFI-RELATED WORK NOT CLARIFIED PRIOR TO BID SHALL BE PROVIDED PER THE ARCHITECT (ENGINEER) IN STRICT ACCORDANCE WITH THE MOST
- STRINGENT MATERIALS, EQUIPMENT, AND SCOPE OF WORK. B. IF THE CONTRACTOR BELIEVES THE DRAWINGS AND SPECIFICATIONS CONFLICT WITH CODE REQUIREMENTS. IMMEDIATELY NOTIFY THE ARCHITECT (ENGINEER) IN WRITING. C. NO ALLOWANCES WILL BE MADE DUE TO CONTRACTOR'S UNFAMILIARITY WITH THE CONSTRUCTION DOCUMENTS OR FOR THE FAILURE OF THE CONTRACTOR TO OBTAIN CLARIFICATIONS PRIOR TO BID.
- D. VISIT THE JOB SITE AND THOROUGHLY INVESTIGATE CONDITIONS. THE LACK OF SPECIFIC INFORMATION ON THE DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY.
- E. REFER TO APPLICABLE CODES CITED IN CONSTRUCTION DOCUMENTS, EXAMINE GOVERNING STATE AND LOCAL CODES, AND LOCAL REGULATIONS AND ORDINANCES, AND PROVIDE ALL EQUIPMENT AND INSTALLATION IN STRICT ACCORDANCE WITH

F. REFER TO CONSTRUCTION DOCUMENTS FOR SCHEDULED AND SPECIFIED MATERIALS

- AND EQUIPMENT. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS AND DETAILS. G. ALL WORK SHALL BE COMPLETED IN STRICT ACCORDANCE WITH THE LANDLORD'S CONSTRUCTION CRITERIA AND TENANT/LANDLORD AGREEMENT. THIS CONTRACTOR SHALL EXAMINE THE LANDLORD CRITERIA AND TENANT/LANDLORD AGREEMENT AND THEY SHALL BE PART OF THESE SPECIFICATIONS. NO ALLOWANCES WILL BE MADE DUE TO CONTRACTOR'S UNFAMILIARITY WITH THESE DOCUMENTS.
- A. SUBMISSION OF A BID ACKNOWLEDGES THAT THE CONTRACTOR HAS REVIEWED THE BID INSTRUCTIONS, HAS VISITED THE SITE, EXAMINED ALL CONSTRUCTION DOCUMENTS, AND AGREES TO ALL ITEMS AND CONDITIONS WITHIN THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR'S BID SHALL INCLUDE ALL MECHANICAL WORK IN THE CONSTRUCTION DOCUMENTS, INCLUDING MECHANICAL WORK RELATED TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS.
- A. SECURE AND PAY FOR ALL PERMITS, LICENSES, AND INSPECTIONS REQUIRED BY THE AHJ FOR THIS WORK.
- A. MANUFACTURERS' EQUIPMENT, APPLIANCES, AND MATERIALS SCHEDULED, NOTED, AND SPECIFIED IN THE CONSTRUCTION DOCUMENTS ARE THE DESIGN STANDARD. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL BY THE ARCHITECT OR ENGINEER. IN BIDDING, CONTRACTOR SHALL NOT ASSUME ACCEPTANCE OF SUBSTITUTIONS. CONTRACTOR MUST STATE IN SUBSTITUTION REQUEST: "PROPOSED SUBSTITUTIONS ARE OF EQUAL OR HIGHER QUALITY, EFFICIENCY AND DEPENDABILITY COMPARED TO THE SPECIFIED EQUIPMENT AND MATERIAL. CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ADDITIONAL ENGINEERING COSTS AND COSTS TO OTHER CONTRACTORS DUE TO SUBSTITUTIONS." IF DEEMED NECESSARY BY THE ARCHITECT OR ENGINEER, SUBSTITUTIONS WHICH ARE NOT APPROVED OR NOT EQUAL TO DESIGN STANDARD SHALL BE REMOVED AND THE SCHEDULED, NOTED, AND SPECIFIED EQUIPMENT AND MATERIALS SHALL BE INSTALLED AT CONTRACTOR'S EXPENSE. SUBMITTING CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ADDITIONAL ENGINEERING COSTS AND COSTS TO OTHER CONTRACTORS DUE TO SUBSTITUTIONS.
- A. THE UTILITY INFORMATION NOTED AND SPECIFIED IN THE CONSTRUCTION DOCUMENTS ARE THE DESIGN STANDARD AND AS ACCURATE AS COULD BE SECURED BUT IS NOT GUARANTEED. PRIOR TO INSTALLING ANY UTILITY-RELATED WORK, THIS CONTRACTOR SHALL CONTACT THE LOCAL UTILITY - IN WRITING - TO COORDINATE AND CONFIRM THE SERVICE AND CONNECTION REQUIREMENTS WITH THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL REQUEST THE UTILITY SERVICE AND CONNECTION IN AMPLE TIME TO MEET THE CONSTRUCTION SCHEDULE. ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND THE ACTUAL UTILITY SERVICE CONNECTION SHALL BE SUBMITTED WITHOUT DELAY TO THE ARCHITECT (ENGINEER) IN WRITING, AS A "REQUEST FOR INFORMATION" (RFI). RFI-SUBJECT UTILITY WORK MUST BE RESOLVED WITH THE ARCHITECT (ENGINEER) PRIOR TO INSTALLATION. THE CONTRACTOR ASSUMES FULL RESPONSIBILITY AND ALL COSTS FOR WORK NOT COORDINATED WITH THE UTILITY AND NOT SUBMITTED TO THE ARCHITECT (ENGINEER) FOR RESOLUTION.
- A. ALL PERFORMANCE OF CONSTRUCTION SHALL BE AS REQUIRED BY THE PACE OF THE GENERAL CONSTRUCTION, AS SCHEDULED BY THE GC. PROVIDE COMPLETE INFORMATION AND FULL COOPERATION WITH OTHER CONTRACTORS AND TRADES, AS REQUIRED FOR THE TIMELY COMPLETION AND COORDINATION OF THE COMPLETE PROJECT.
- B. PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY AHJ. C. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE PROJECT COMPLETION.
- A. PROVIDE PERMIT(S), INSPECTIONS, FINAL CERTIFICATE(S) OF INSPECTION BY AHJ, PERMIT AND INSPECTION FEES, AND ALL MATERIALS, EQUIPMENT, RIGGING, AND LABOR NECESSARY FOR A COMPLETE AND FULLY OPERATING HVAC SYSTEM. B. STRUCTURAL ENGINEERING FOR THE SUPPORT AND MOUNTING OF THE SCHEDULED AND SPECIFIED MATERIALS AND EQUIPMENT IS THE RESPONSIBILITY OF OTHERS
- ENGINEERING FOR SUPPORT OF MECHANICAL EQUIPMENT, APPLIANCES, OR SYSTEMS. C. THROUGHOUT CONSTRUCTION, THIS CONTRACTOR'S WORK SHALL INCLUDE ONGOING COORDINATION OF THIS WORK WITH THE CONSTRUCTION DOCUMENTS, THE WORK OF ALL OTHER TRADES, AND WITH UTILITY SERVICE(S) AND UTILITY CONNECTION(S). FOR AMBIGUOUS, CONTRADICTORY, OR CONFLICTING ITEMS WITHIN THE CONSTRUCTION DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE ACTUAL UTILITY SERVICE AND CONNECTION REQUIREMENTS, THE CONTRACTOR SHALL REQUEST CLARIFICATION IN A WRITTEN "REQUEST FOR INFORMATION" (RFI). RFI SHALL BE ISSUED WITHOUT DELAY AND PRIOR TO PROCEEDING WITH ANY RFI-SUBJECT WORK. RFI NOT CLARIFIED PRIOR TO BID SHALL BE PROVIDED PER THE ARCHITECT

THE MECHANICAL CONSTRUCTION DOCUMENT DO NOT INCLUDE STRUCTURAL

- (ENGINEER) IN STRICT ACCORDANCE WITH THE MOST STRINGENT MATERIALS, EQUIPMENT, AND SCOPE OF WORK, AT NO ADDITIONAL COST TO THE OWNER. D. PROVIDE HOISTING FOR ALL MATERIALS AND EQUIPMENT FURNISHED AND/OR INSTALLED, IN ACCORDANCE WITH ALL CITY, STATE AND FEDERAL RULES AND
- REGULATIONS. E. INSTALL ALL WORK AND EQUIPMENT RIGID, DEAD LEVEL, PLUMB, AND TRUE-TO-LINE. UNLESS NOTED OTHERWISE, SUPPORT AND MOUNTING OF EQUIPMENT, DUCT, PIPING, ETC., ARE THIS CONTRACTOR'S MEANS AND METHODS. THE CONTRACTOR SHALL UNDERSTAND THE SPECIFIED AND SCHEDULED EQUIPMENT AND MATERIALS AND MEANS AND METHODS OF INSTALLATION. THIS CONTRACTOR SHALL PROVIDE ALL ACCESSORIES REQUIRED FOR PROPER SUPPORT WHETHER SHOWN ON THE DRAWINGS OR NOT. IF SUPPORTS ARE REQUIRED, CONTRACTOR SHALL SUBMIT
- DRAWINGS TO THE ARCHITECT FOR APPROVAL F. PROVIDE ACCESSORY MOUNTING HARDWARE INCLUDING BUT NOT LIMITED TO STRUCTURAL STEEL. STRUT SYSTEMS. ALL THREAD RODS. AND BRACES. AS REQUIRED TO MOUNT EQUIPMENT. PROVIDE STEEL SHAPES AND FRAMES TO SUPPORT EQUIPMENT WHERE NEEDED. ALL SYSTEMS SHALL BE SUPPORTED
- INDEPENDENT OF AND ISOLATED FROM EQUIPMENT VIBRATION. G. PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' PRINTED INSTALLATION AND MAINTENANCE LITERATURE. COMPONENTS REQUIRING PERIODIC MAINTENANCE OR ADJUSTMENTS SHALL BE INSTALLED AS TO PERMIT ACCESS WITHOUT DAMAGE TO STRUCTURE, FINISHES, OR OTHER EQUIPMENT.
- H. PROVIDE ALL LABOR, EQUIPMENT AND MATERIAL REQUIRED FOR THE REINSTALLATION AND RE-SUPPORT OF EXISTING SERVICES (DUCTWORK, ELECTRICAL CONDUIT, PIPING, EXISTING EQUIPMENT, ETC.) DISTURBED BY THE INSTALLATION OF NEW WORK UNDER THIS CONTRACT, INCLUDING THE WORK OF OTHER TRADES. DEMOLITION: REFER TO THE ARCHITECTURAL DRAWINGS FOR THE GENERAL SCOPE OF DEMOLITION. THIS CONTRACTOR SHALL DISCONNECT AND CAREFULLY REMOVE ALL EXISTING HVAC EQUIPMENT LOCATED IN DEMOLISHED AREAS INCLUDING ROOF. PLENUMS, CEILINGS, WALLS, AND FLOORS. U.N.O., DISCONNECT AND REMOVE EXISTING HVAC SYSTEMS COMPLETE, INCLUDING EQUIPMENT, CURBS, DUCTS, INSULATION, AIR DEVICES, AND PIPING LOCATED IN THESE AREAS. ALL HVAC SYSTEM COMPONENTS INCLUDING AIR TERMINAL UNITS, FANS, MOTORS, CONTROL DEVICES AND SENSORS, DAMPERS, ACTUATORS, HANGERS, RESTRAINTS, MOUNTING HARDWARE, ETC., SHALL BE REMOVED AND LEGALLY DISPOSED OF BY THIS CONTRACTOR.
- J. UNLESS NOTED OTHERWISE, ABANDONMENT IN PLACE (AIP) IS NOT ACCEPTABLE. UNUSED EQUIPMENT, DUCT, PIPING, AND OTHER COMPONENTS WITHIN OR SERVING THIS SPACE MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. ENDS OF SYSTEMS BEYOND GENERAL SCOPE OF DEMOLITION MAY BE ABANDONED ONLY WITH WRITTEN APPROVAL OF ARCHITECT (ENGINEER). WHERE THESE ABANDONED ENDS TERMINATE, TRIM CLEANLY AND PROPERLY CAP OR SEAL IN AN APPROVED MANNER, LEAVING TERMINATION SAFE AND SECURE BEHIND NEW FINISHES. MAINTAIN SYSTEM CONTINUITY TO HVAC SYSTEMS SERVING AREAS BEYOND GENERAL DEMOLITION, AS NEEDED. THIS INCLUDES BUT IS NOT LIMITED TO REMOVAL, MODIFICATION AND/OR REINSTALLATION OF EQUIPMENT, AS NEEDED, COMPLETION OF THIS PROJECT SHALL INCLUDE RETURNING THESE ADJACENT AREAS TO FULLY FUNCTIONING OPERATION. K. CONTRACTOR SHALL PROVIDE DAILY CLEAN-UP, REMOVAL AND LEGAL DISPOSAL OF

- ALL RUBBISH GENERATED BY THIS WORK.
- L. AS-BUILT DRAWINGS: DURING CONSTRUCTION, AS WORK PROCEEDS, MAINTAIN AS-BUILT MARK-UPS OF ACTUAL INSTALLATION, AT CONSTRUCTION COMPLETION AND PRIOR TO TURNOVER TO OWNER, PROVIDE FINAL MARK-UPS IN PDF AND DWG
- FORMAT TO ARCHITECT AND ENGINEER. M. PROVIDE FINAL CONNECTIONS TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS, AS NOTED (GAS FIRED EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, LAUNDRY EQUIPMENT, ETC.).
- N. DO NOT ROUTE ANY PIPING OR DUCTWORK ABOVE ELECTRICAL PANELS. O. UNLESS NOTED OTHERWISE, ALL DUCT AND PIPE SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO WALLS, BEAMS, OR COLUMNS. PIPE SHALL BE RUN AS DIRECT AS POSSIBLE - AVOID UNNECESSARY OFFSETS AND MAXIMIZE HEADROOM.
- CONTRACTOR. Q. CONTRACTOR SHALL MAINTAIN ACTIVITIES WITHIN AREA APPROVED BY OWNER OR GC. CONTRACTOR'S ACTIVITIES SHALL NOT INTERFERE WITH THE OWNER'S

COORDINATION OF ELECTRICAL POWER REQUIREMENTS WITH THE ELECTRICAL

R. EXCEPT THOSE COORDINATED AND APPROVED BY THE G.C., CONTINUITY OF ALL BUILDING SERVICES AND UTILITIES SERVING BUILDING FACILITIES SHALL BE MAINTAINED UNINTERRUPTED AT NO ADDITIONAL COST. PROVIDE ALL NECESSARY CROSS CONNECTIONS AND TEMPORARY CONNECTIONS REQUIRED TO PERFORM THE CONSTRUCTION, AS DETERMINED BY THE G.C., AND NEEDED TO MAINTAIN CONTINUITY OF THE BUILDING SERVICE(S). THIS CONTRACTOR SHALL SCHEDULE WORK SUCH THAT ANY AND ALL CONNECTIONS, AND/OR REARRANGEMENT OF EXISTING EQUIPMENT, PIPING, ETC., SHALL ASSURE FULL RESUMPTION OF SERVICE(S) AT THE G.C.'S DESIGNATED TIME.

A. ALL WORK SHALL COMPLY WITH THE CONSTRUCTION DOCUMENTS OR, AS A. DIRECTED BY THE ARCHITECT (ENGINEER), AND SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS OF THE AHJ. WHETHER SO SHOWN OR NOT. CONTRACTOR SHALL BE FAMILIAR WITH PROVISIONS OF ALL APPLICABLE CODES AND SHALL ENSURE THE WORK COMPLIES WITH ALL LOCAL, STATE AND FEDERAL CODES, TRADE STANDARDS AND MANUFACTURER'S RECOMMENDATIONS. IF CONTRACTOR BELIEVES THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH CODE REQUIREMENTS. IMMEDIATELY NOTIFY THE G.C. IN WRITING. DO NOT INSTALL WORK NOT COMPLYING WITH CODE REQUIREMENTS. IN CASE OF CONFLICT BETWEEN THE CONSTRUCTION DOCUMENTS AND THE CODES AND ORDINANCES, THE HIGHEST STANDARD SHALL APPLY. AS A MINIMUM STANDARD, CONTRACTOR SHALL SATISFY CODE REQUIREMENTS. ALL MODIFICATIONS REQUIRED BY AHJ SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. BEFORE COMMENCING WORK NOT SHOWN IN DOCUMENTS BUT REQUIRED TO ACHIEVE FULL COMPLIANCE WITH CODES. CONTRACTOR SHALL NOTIFY ARCHITECT (ENGINEER).

A. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS A. REQUIRED FOR EQUIPMENT, PIPE, OR DUCTWORK. PRIOR TO CUTTING, PERFORM NON-DESTRUCTIVE TESTING TO VERIFY LOCATION OF PIPING, CONDUIT, AND STRUCTURAL COMPONENTS. NOTIFY ARCHITECT (ENGINEER) OF ANY DISCREPANCIES. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACE AND READY TO RECEIVE FINISH. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING.

A. PROVIDE FIRE STOPPING FOR PENETRATIONS OF DUCT, PIPING, AND A. OTHER MECHANICAL EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES), AND VERTICAL SERVICE SHAFT WALLS AND PARTITIONS. (WHERE THIS WORK IS BEING PERFORMED UNDER A GC, PRIOR TO INSTALLATION, THIS CONTRACTOR SHALL COORDINATE FIRESTOPPING WITH GC). FIRESTOP SYSTEM INSTALLATION MUST MEET REQUIREMENTS OF ASTM E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO OR GREATER THAN THAT OF CONSTRUCTION BEING PENETRATED. INSTALL IN STRICT ACCORDANCE WITH UL FIRE RESISTANCE DIRECTORY, AHJ, AND MANUFACTURER'S SPECIFIED REQUIREMENTS. ONLY TESTED FIRESTOP SYSTEMS BY "3M", "HILTI", OR EQUAL SHALL BE USED. REFER TO ARCHITECTURAL DRAWINGS FOR ASSEMBLY RATING.

- FREE OF DEFECTS, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND DETAILS, AND INDEPENDENTLY TESTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY UNDERWRITERS LABORATORIES (UL) OR INTERTEK (ETL). ALL LIKE MATERIALS USED
- B. ALL MATERIALS WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723. ALL MATERIALS INSTALLED IN PLENUM SPACES SHALL BE LISTED AND LABELED FOR SUCH APPLICATION.

- A. PROTECT ALL WORK FROM DAMAGE AND PROTECT THE OWNER'S PROPERTY FROM DIRT, DAMAGE, OR LOSS ARISING FROM CONTRACTOR WORK. B. COMPLY WITH OSHA REQUIREMENTS AND TAKE ALL NECESSARY PRECAUTIONS FOR
- EMPLOYEE SAFETY. TESTING AND BALANCING, REMOVE FILTERS FROM FILTER RACKS AND INSTALL NEW

A. THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL DAMAGES TO THE PROPERTY (GROUNDS, WALKS, ROADS, BUILDING COMPONENTS, FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS, HVAC SYSTEMS, AND THEIR EQUIPMENT AND CONTENT) CAUSED BY LEAKS IN THE SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED AS PART OF THIS WORK. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

- DUCTS, PIPES, AND EQUIPMENT AND THE METHODS OF CONNECTING AND CONTROL. THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONDITIONS AND THE WORK OF OTHER TRADES PERMIT. THE DRAWINGS ARE NOT INTENDED TO SHOW EVERY CONNECTION IN DETAIL OR ALL OFFSETS, TRANSITIONS, OR FITTINGS REQUIRED FOR A COMPLETE SYSTEM NOR IS IT IMPLIED THAT ALL CONFLICTS BETWEEN BUILDING ELEMENTS AND/OR OTHER TRADES ARE INDICATED. DO NOT SCALE DRAWINGS. EXAMINE FIELD CONDITIONS AND SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR EXACT LOCATION OF DOORS, WINDOWS, LIGHTS, ETC.
- WORK REQUIRED BY ONE BUT NOT BY THE OTHER SHALL BE REQUIRED BY BOTH. C. PRIOR TO INSTALLING EQUIPMENT, DUCT, OR PIPE COORDINATE PROPOSED. LOCATIONS WITH EACH TRADE/DISCIPLINE AND GC. EXAMINE EACH DISCIPLINE'S DRAWINGS FOR CONSTRUCTION DETAILS, CEILING HEIGHTS, REQUIRED CLEARANCES, AND SPACE CONSTRAINTS. PROVIDE SYSTEMS INSTALLATION BASED ON THIS EXAMINATION AND COORDINATION. IMMEDIATELY REPORT INSTALLATION CONFLICTS IN WRITING TO THE GC. RESOLVE ALL CONFLICTS WITH GC AND OTHER TRADES
- CORRECT INTERPRETATION AND APPLICATION OF ALL SIZES AND DIMENSIONS. D. SIGNIFICANT DEVIATIONS OR CHANGES FROM THE DRAWINGS, WHICH ARE REQUIRED TO ACCOMPLISH THE INTENT OF THE CONTRACT DOCUMENTS MUST BE REVIEWED AND APPROVED BY THE ARCHITECT (ENGINEER) BEFORE PROCEEDING. IF THE CONTRACTOR BELIEVES CHANGES TO THE CONTRACT DRAWINGS ARE NECESSARY. SHOP DRAWINGS WITH WRITTEN DESCRIPTIONS OF THE PROPOSED CHANGES SHALL
- BE SUBMITTED TO THE ARCHITECT (ENGINEER) FOR APPROVAL E. ALL PIPE, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED WATERPROOF. PROVIDE ALL FLASHING FOR PIPE AND DUCTWORK PENETRATING BUILDING ENVELOPE. PROVIDE DUCT AND/OR PIPE SLEEVES AT WALL

MOUNTING BASE. WHERE THERMOSTAT LOCATION IS SUBJECT TO DAMAGE, PROVIDE LOCKABLE HIGH-IMPACT GUARD.

- A. IN FINISHED AREAS, ALL PIPING SHALL BE CONCEALED UNLESS NOTED OTHERWISE. B. SEE PIPE SCHEDULE FOR PIPE MATERIALS AND PIPE INSULATION.
- C. DO NOT INSTALL PVC PIPING IN PLENUM AREAS.
- E. PROVIDE PIPE LABELS AND FLOW DIRECTION PER BUILDING OR FACILITY'S STANDARD OR AS SCHEDULED. ORIENT ALL MARKERS SO AS TO BE VISIBLE FROM FLOOR LEVEL. AT A MINIMUM PIPE LABELS AND FLOW
- DIRECTION MARKERS SHALL BE LOCATED:
- AT ACCESS DOORS

- P. PRIOR TO ORDERING EQUIPMENT, THIS CONTRACTOR SHALL PROVIDE FINAL
- OPERATIONS, EXCEPT AS APPROVED.

- A. ALL MANUFACTURED ARTICLES, MATERIALS, AND EQUIPMENT SHALL BE NEW U.N.O.,
- SHALL BE OF THE SAME MANUFACTURE AND QUALITY U.N.O.
- C. ALL WORK SHALL BE SUPERVISED BY THE INSTALLING CONTRACTOR'S COMPETENT AND SKILLED FOREMAN. ALL WORK SHALL BE PERFORMED BY COMPETENT AND SKILLED WORKERS, WITH ALL TRADE AND MANUFACTURER REQUIRED TRAINING, AND EXECUTED IN A NEAT AND WORKMANLIKE MANNER. ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE BEST QUALITY STANDARDS OF THE TRADE AND IN CONFORMANCE WITH ALL FEDERAL, STATE, AND LOCAL CODES AND STANDARDS, INCLUDING APPLICABLE OSHA REGULATIONS. PROPERLY PROTECT WORK DURING CONSTRUCTION. AT CONSTRUCTION COMPLETION, THOROUGHLY CLEAN WORK AND REMOVE ALL DEBRIS FROM THE PREMISES.

- C. PROTECT ALL OPEN PIPING, DUCT, AND EQUIPMENT, EXISTING AND NEW FROM CONSTRUCTION DIRT AND DUST. COVER, CAP, OR PLUG OPEN ENDS OF PIPING AND DUCT. KEEP EQUIPMENT CLOSED OR COVER AND SEAL EQUIPMENT OPENINGS. ANY MECHANICAL SYSTEMS, NEW AND/OR EXISTING OPERATED DURING CONSTRUCTION SHALL BE PROTECTED BY COVERING EACH RETURN AIR DUCT OPENING WITH MERV 8 FILTERS AND INSTALLING MERV 8 FILTER(S) IN EQUIPMENT FILTER RACK. PRIOR TO
- MERV 8 FILTERS. D. AT COMPLETION OF WORK, PRIOR TO EQUIPMENT START-UP, REMOVE COVERS, CAPS, OR PLUGS ON DUCT AND PIPING.

- A. DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO SHOW GENERAL LOCATIONS OF
- B. THE DRAWINGS AND SPECIFICATIONS ARE MUTUALLY COMPLEMENTARY, AND ANY
- PRIOR TO PROCEEDING. INSTALLING CONTRACTOR IS FULLY RESPONSIBLE FOR
- PENETRATIONS. SEAL ANNULAR SPACE WEATHER TIGHT.

A. PROVIDE COMPLETE EQUIPMENT CONTROLS. INCLUSIVE OF ALL COMPONENTS. VOLTAGES, PROGRAMMING, WIRING ETC. FOR COMPLETE AND OPERATIONAL SYSTEMS. MOUNT THERMOSTATS AND SWITCHES 4'-0" ABOVE FINISHED FLOOR. MOUNT OTHER SENSORS (HUMIDITY, CO2, CO, NOX, ETC.) PER MANUFACTURER'S IOM. PRIOR TO MOUNTING, COORDINATE THERMOSTAT LOCATION(S) WITH FINAL FIXTURE AND EQUIPMENT. DO NOT MOUNT THERMOSTATS IN DIRECT SUNLIGHT, IN DISCHARGE OR EQUIPMENT, ON WALLS WITH INTERNAL HEAT SOURCES (DUCT OR OR ON EXTERIOR WALLS. IF EXTERIOR WALL MOUNTING IS NECESSARY, PROVIDE INSULATED

- D. PAINT PIPE TO MATCH OWNER'S OR BUILDING STANDARD.
- AT LEAST ONCE IN EACH ROOM AT EQUIPMENT CONNECTIONS

- AT BRANCH MAINS ON ALL ACCESSIBLE PIPE A MAXIMUM OF 25' BETWEEN MARKERS. F. BRANCH TAKE-OFFS SHALL BE MADE WITH SWING CONNECTIONS AS REQUIRED T AVOID STRESS AT THESE POINTS.
- G. DO NOT INSTALL ANY PIPING ABOVE ELECTRICAL PANELS AND/OR TRANSFORMERS. H. INSTALL AND SIZE REFRIGERANT PIPE IN STRICT ACCORDANCE WITH EQUIPMENT/APPLIANCE MANUFACTURER'S IOM. DO NOT INSTALL REFRIGERANT PIPE BELOW GROUND. REFRIGERANT PIPE INSTALLED ON BUILDING EXTERIOR SHALL BE ROUTED TO MINIMIZE EXTERIOR EXPOSURE. INSULATE REFRIGERANT PIPE PER MANUFACTURER'S IOM. PROVIDE INSULATION EXPOSED TO AMBIENT CONDITIONS
- I. ROUTE PIPE THROUGH ROOF WITH ALUMINUM PIPE HOOD, PATE CURB MODEL "PHA-2" WITH 14" TALL MODEL "PC-2" CURB. SEAL PIPE THROUGH CURB WEATHER-TIGHT. J. ON HYDRONIC PIPING, PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS TO ALLOW BLEEDING OF AIR FROM THE SYSTEM, AND BALL VALVES WITH HOSE END DRAIN
- FITTINGS AT ALL LOW POINTS TO ALLOW DRAINING THE SYSTEM. K. PRIOR TO INSTALLING EQUIPMENT/APPLIANCES, CAREFULLY CONSIDER FALL REQUIREMENTS OF CONDENSATE DRAIN PIPE. PROVIDE MINIMUM 1/8" / FOOT SLOPE. EXTEND CONDENSATE DRAIN PIPE TO AN APPROVED RECEPTOR AND TERMINATE VIA AN INDIRECT CONNECTION.
- L. ALL HOLES REQUIRED THROUGH EXISTING FLOORS AND MASONRY WALLS SHALL BE CORE DRILLED.

DETECTING SMOKE, SHALL SHUT DOWN PROTECTED AIR SYSTEM.

A. DUCT MOUNTED SMOKE DETECTORS SHALL BE PROVIDED BY E.C. AND UPON

WITH A CONTINUOUS 30 MIL PVC JACKET.

- A. SUBMIT SHOP DRAWINGS ON SCHEDULED AND NOTED EQUIPMENT AND MATERIALS. PRIOR TO SUBMITTAL, EACH SHOP DRAWING SHALL BE REVIEWED BY THE CONTRACTOR TO ASSURE THAT THE PROPOSED EQUIPMENT IS CLEARLY MARKED, HIGHLIGHTED, AND NOTED. ALL DIMENSIONS, QUANTITIES, CONNECTIONS, CAPACITATES AND ACCESSORIES SHALL BE CLEARLY SHOWN IN CONFORMANCE WITH THE CONTRACT DOCUMENTS, AND SHALL BE MARKED OR STAMPED TO CONFIRM THAT SUCH REVIEW WAS MADE AND COMPLIANCE WAS CONFIRMED. SHOP DRAWING SUBMITTED WITHOUT BEING MARKED, HIGHLIGHTED, AND NOTED WILL BE REJECTED
- B. PROVIDE ADEQUATE TIME FOR SUBMITTAL REVIEW AND CORRECTIONS, IF ANY, T PREVENT CONSTRUCTION DELAY. DO NOT PERFORM ANY PORTION OF WORK WHICH REQUIRES APPROVED SUBMITTALS UNTIL THE RESPECTIVE SUBMITTALS HAVE BEEN APPROVED BY THE ENGINEER.
- C. REVIEW OF SHOP DRAWINGS BY THE OWNER, OWNER'S AGENT, ARCHITECT, OR ENGINEER IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR IS SOLELY RESPONSIBILITY FOR COMPLYING WITH ALL TERMS OF THE CONTRACT DOCUMENTS AND FOR PERFORMANCE OF ALL EQUIPMENT AND MATERIALS PURCHASED, FOR QUANTITIES, PROPER FIT, AND OTHER DIMENSIONAL REQUIREMENTS.
- A. REFER TO KEYED NOTES FOR CLARIFICATION OF DUCT DIMENSIONS. PROVIDE ALL DUCTWORK IN STRICT ACCORDANCE WITH THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION "HVAC DUCT CONSTRUCTION STANDARDS -METAL AND FLEXIBLE", LATEST EDITION. U.N.O. ALL RIGID DUCTWORK SHALL BE GALVANIZED SHEET METAL. ALL EXPOSED DUCTWORK SHALL HAVE A MILL-PHOSPHATIZED FINISH FOR PAINT ADHESION. EXPOSED ROUND DUCT SHALL BE SPIRAL SEAM TYPE. NO FIBERGLASS DUCTBOARD WILL BE ALLOWED.
- B. PROVIDE TURNING VANES AT ALL CHANGES IN DIRECTION. C. UNLESS NOTED OTHERWISE, EACH DUCTED AIR DEVICE SHALL BE PROVIDED WITH A VOLUME DAMPER, WHETHER SHOWN ON THE PLANS OR PROVIDE A VOLUME DAMPER AT EACH BRANCH DUCT SERVING AN AIR DEVICE AND/OR AS SHOWN, DETAILED, AND SPECIFIED. WHERE A DUCT MOUNTED VOLUME DAMPER WOULD BE INACCESSIBLE, PROVIDE A VOLUME DAMPER IN THE AIR DEVICE GRILLE NECK OR A DAMPER WITH REMOTE CABLE CONTROL. PROVIDE EACH ROUND BRANCH DUCT TAKE-OFF FROM MAIN DUCT WITH SPIN-IN FITTING AND VOLUME BALANCING DAMPER. VOLUME DAMPERS SHALL BE YOUNG REGULATOR MODEL 5020R LOCKING QUADRANT VOLUME DAMPER WITH 2" HANDLE STANDOFF FOR INSULATION THICKNESS. WHERE BRANCH TAKE-OFF IS INACCESSIBLE FOR BALANCING, PROVIDE BALANCING DAMPER IN GRILLE NECK OR BOWDEN "270-275" REMOTE CABLE CONTROL. ALL FLEXIBLE DUCT SHALL BE THERMAFLEX TYPE MAKE, MAXIMUM 5'-0" FLEXDUCT SHALL BE INSTALLED I ACCESSIBLE CONCEALED SPACES ONLY, FULLY STRETCHED OUT AND WITHOUT SAGS OR KINKS. CONNECTIONS TO FITTINGS AND AIR DEVICES SHALL BE MADE WITH TWO BAND CLAMPS. BAND CLAMP THE INNER LINER TIGHT TO FITTING OR AIR DEVICE, THEN THE INSULATION AND VAPOR-PROOF JACKET SHALL BE CLAMPED TIGHT. FLEX

A. IN CONDITIONED AREAS, SEAL ALL LONGITUDINAL AND TRANSVERSE JOINTS WITH A NON-HARDENING, NON-MIGRATING MASTIC OR LIQUID ELASTIC SEALANT, WITH VOC CONTENT NO GREATER THAN 250G/L AND RECOMMENDED BY THE MANUFACTURER FOR SEALING SHEET METAL SEAL ALL JOINTS, SPIN-IN FITTINGS, AND FASTENING SCREWS WITH HVAC SYSTEM LEAKAGE SHALL NOT EXCEED 5% OF DESIGN FLOW. DUCT TAPE IS NOT ALLOWED.

DUCT INSTALLATION ABOVE INACCESSIBLE CEILINGS IS UNACCEPTABLE.

VISIBLE.

- 1. ALL NEW SUPPLY AND RETURN AIR DUCTWORK WITHIN 10' OF HVAC UNIT SHALL BE ACOUSTICALLY LINED. DUCT SIZES SHOWN ON THE DRAWING ARE INTERNAL FREE AREA SIZES. INTERNAL LINER SHALL BE 1-INCH THICK DUCT LINER EQUIVALENT TO JOHNS MANVILLE "PERMACOTE LINACOUSTIC" ("R VALUE" = 6) AND SHALL BE APPLIED TO THE DUCTWORK WITH FIRE RESISTIVE ADHESIVES AND CADMIUM OR
- 2. ALL OUTSIDE AIR AND UNEXPOSED DUCTWORK WITHIN BUILDING, EXCEPT WHERE ACOUSTICALLY LINED, SHALL HAVE 2-INCH, FIBERGLASS DUCT WRAP INSULATION WITH FSK FACING EQUIVALENT TO JOHNS MANVILLE "MICROLITE XG TYPE 75"
- (INSTALLED "R VALUE" = 6).

COPPER PLATED MECHANICAL FASTENERS.

3. MININ	MUM INSULATION REQUIRE	MEN	ITS AS PER I	ECC 2018:		
				SI	JPPLY	RETURN
l	JNCONDITIONED SPACES :			R.	-6	R-6
I	NDIRECTLY CONDITIONED :	SPA	CE:	R	-12	R-12

- 4. LEADING EDGES OF DUCT INSULATION SHALL BE OVERLAPPED BY ADJOINING INSULATION AT LEAST 6 INCHES MINIMUM AND THEN SEALED WITH FOIL VAPOR BARRIER ADHESIVE AND DUCT MASTIC SO THAT NO FIBERGLASS INSULATION IS
- 5. ALL INSULATION ON EXISTING PIPING OR DUCTS THAT BECOMES WET, DAMAGED,
- DISTURBED OR GETS REMOVED SHALL BE REPLACED. INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES. INSULATION MUST COMPLY WITH NFPA 90A.
- ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NO HIGHER THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM TEST: C411 OR AS REQUIRED BY LOCAL CODES.
- 8. EXTERIOR SUPPLY AND RETURN DUCT INSULATION:
- A. SERVICE: RECTANGULAR, SUPPLY-AIR AND RETURN-AIR DUCTS.
- A.1. MATERIAL: INSULATION BOARD, 6 PSF MINIMUM AND PLAIN FACING.
- A.2. THICKNESS: 2 INCHES. A.3. NUMBER OF LAYERS: TWO.
- A.4. TOTAL THICKNESS = 4". A.5. VAPOR RETARDER REQUIRED: YES. B. INORGANIC GLASS FIBERS PREFORMED AND BONDED BY THERMOSETTING RESIN. MUST COMPLY WITH ASTM C 612, TYPE 1A & 1B, KNAUF INSULATION OR APPROVED
- C. INSULATION INSTALLED OUTDOORS: FLAME SPREAD RATING OF 25 OR LESS AND

SMOKE DEVELOPED RATING OF 50 OR LESS. APPLY INSULATION AS FOLLOWS:

23. EQUIPMENT

- A. APPLY TWO-LAYER INSULATION WITH JOINTS TIGHTLY BUTTED AND STAGGERED AT LEAST 3 INCHES. SECURE LAYERS WITH ADHESIVE, MECHANICAL FASTENERS OR BANDING. FASTENERS SHALL BE LOCATED A MAXIMUM OF 3" FROM EACH EDGE AND
- B. ON EXPOSED APPLICATIONS, FINISH INSULATION WITH A SKIM COAT OF MINERAL-FIBER. HYDRAULIC-SETTING CEMENT TO SURFACE OF INSTALLED INSULATION. WHEN DRY, APPLY FLOOD COAT OF LAGGING ADHESIVE AND PRESS ON ONE LAYER OF GLASS CLOTH OR TAPE. OVERLAP EDGES AT LEAST 1 INCH (25 MM). APPLY FINISH COAT OF LAGGING ADHESIVE OVER GLASS CLOTH OR TAPE. THIN THE FINISH COAT TO ACHIEVE SMOOTH FINISH. OUTDOOR JACKET: POLYGUARD PRODUCTS, INC. 'ALUMAGUARD 60' OR MFM BUILDING PRODUCTS CORP. 'FLEXCLAD
- A. INSTALL ALL EQUIPMENT AND MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION AND OPERATIONS MANUAL AND IN STRICT ACCORDANCE WITH ALL LOCAL CODES AND REGULATIONS. B. U.N.O. PROVIDE ALL MOTORIZED EQUIPMENT WITH VIBRATION ISOLATION MOUNTING
- AND FLEXIBLE DUCT AND FLEXIBLE PIPE CONNECTIONS. C. LABEL ALL EQUIPMENT WITH ID TAGS, LETTERING SHALL BE 1" HIGH BLACK ON WHIT BACKGROUND. ID TAGS IN PLENUM SPACES SHALL BE PLENUM EQUIPMENT NOT PLENUM MOUNTED SHALL BE LABELED WITH ENGRAVED PHENOLIC RESIN NAMEPLATES ADHERED TO UNIT CABINET WITH RTV SILICONE. LETTERING SHALL BE 1" HIGH BLACK ON WHITE BACKGROUND. ALL EQUIPMENT, DUCT, PIPE, ETC. MOUNTED FROM BOLTED CONNECTIONS SHALL HAVE DOUBLE NUTS AT ATTACHMENT TO STRUCTURE AND HANGER, NO EXCEPTIONS.
- 24. FIRE AND FIRE-SMOKE DAMPERS A. PROVIDE FIRE DAMPERS AND/OR FIRE SMOKE DAMPERS AT DUCT PENETRATIONS OF RATED ASSEMBLIES AND AS REQUIRED BY AHJ. REFER TO ARCHITECTURAL

DRAWINGS FOR ASSEMBLY RATINGS. INSTALL DAMPERS IN STRICT ACCORDANCE WITH MANUFACTURER'S DETAILS AND MAINTAIN MANUFACTURER'S DETAILS ONSITE FOR AHJ REVIEW. PROVIDE ACCESS PANELS OF ADEQUATE SIZE TO FACILITATE SERVICE ACCESS OF IN LIEU OF ACCESS PANELS. A REMOVABLE DUCT SECTION IS

A. PROVIDE A MINIMUM 10'-0" HORIZONTAL CLEARANCE BETWEEN MECHANICAL EQUIPMENT OUTDOOR AIR INTAKES AND EXHAUST FAN DISCHARGES, COMBUSTION EXHAUST, PLUMBING VENTS, AND ANY OTHER HAZARDOUS OR NOXIOUS CONTAMINANT.

A. PROVIDE THREE (3) SETS OF NEW MERV 8 DISPOSABLE AIR FILTERS, PER THE FOLLOWING: FOR HVAC SYSTEMS OPERATED DURING CONSTRUCTION, PROVIDE FILTERS IN EQUIPMENT AND ON RETURN AIR DUCT OPENINGS TO PROTECT DUCT FROM DIRT; IN HVAC EQUIPMENT PRIOR TO AIR TESTING, ADJUSTING, AND BALANCING; AND AT PROJECT COMPLETION - ONE (1) SPARE SET FOR HVAC EQUIPMENT.

27. SEISMIC RESTRAINT

A. PROVIDE SEISMIC RESTRAINT OF SYSTEMS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE BUILDING CODE. SUBMIT ALL REQUIRED DETAILS TO AHJ FOR REVIEW AND APPROVAL. IF REQUIRED BY AHJ, PROVIDE ENGINEERED SEISMIC-RESTRAINT DRAWINGS, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, LICENSED IN THE STATE. SUBMIT COPIES INCLUDING CALCULATIONS AND DETAILS, AS REQUIRED BY

AHJ TO ARCHITECT (ENGINEER) AND TO AHJ FOR REVIEW AND APPROVAL. 28. COMPLETION OF WORK

REQUIRED.

CONDITIONS IN EACH SPACE.

A. UPON COMPLETION OF WORK, INSPECT INSTALLATION OF ALL EQUIPMENT AND SYSTEMS. OPEN ALL ACCESS COVERS ON EQUIPMENT. REMOVE ALL SURPLUS MATERIALS AND DEBRIS AND PROPERLY DISPOSE OF SAME.

- 29. TESTING, ADJUSTING, & BALANCING A. PRIOR TO EQUIPMENT START-UP, REMOVE COVERS, CAPS, OR PLUGS ONDUCT AND
- B. UPON COMPLETION OF WORK, MC SHALL PROVIDE HVAC TESTING: i. AFTER INSTALLING EQUIPMENT AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS. ii. INSPECT FOR AND REMOVE SHIPPING BOLTS, BLOCKS, AND TIE-DOWN STRAPS. iii. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED,
- START UNITS TO CONFIRM PROPER MOTOR ROTATION, BELT TENSION, DAMPER FUNCTION, COOLING FUNCTION, HEATING FUNCTION, AND UNIT OPERATION. iv. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT. v. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED
- vi. SUBMIT TESTING REPORT TO ARCHITECT (ENGINEER). C. UPON COMPLETION OF WORK, PROVIDE AN HVAC TESTING, ADJUSTING, AND BALANCING REPORT PERFORMED BY AN INDEPENDENT CONTRACTOR CERTIFIED BY AABC, NEBB, OR TABB. BALANCE SYSTEMS WITHIN 10% OF DESIGN FLOW. TAB SHALL BE PERFORMED IN STRICT ACCORDANCE WITH SMACNA'S "TAB PROCEDURAL GUIDE", LATEST EDITION. MC SHALL BE PRESENT DURING TAB SHOULD ANY CORRECTIONS BE
- 30. CLOSEOUT AT CONSTRUCTION COMPLETION AND PRIOR TO TURNOVER TO OWNER
- A. PROVIDE FINAL MARK-UPS IN PDF (DWG) FORMAT TO ARCHITECT AND ENGINEER. B. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE PROJECT COMPLETION. C. PROVIDE THE OWNER WITH A BOUND OWNER'S MANUAL. THE MANUAL SHALL CONSIST OF A THREE-RING LOOSE-LEAF BINDER CONTAINING ALL PRINTED MATERIAL
- INFORMATION, SERVICE AND CLEANING INSTRUCTIONS, NOTICES TO OWNER, OPERATING MANUALS, AND MAINTENANCE INSTRUCTIONS. D. TRAIN THE OWNER IN THE THERMOSTATS FUNCTIONS AND OPERATING THE EQUIPMENT USING THE THERMOSTATS. CONTRACTOR SHALL PROGRAM THE

THERMOSTATS PER THE OWNER'S TIME SCHEDULES AND SETPOINTS.

FOR INSTALLED EQUIPMENT INCLUDING BUT NOT LIMITED TO: WARRANTY

- A. ON ALL WORK INCLUDED IN THIS CONTRACT, PROVIDE ONE (1) YEAR UNCONDITIONAL WRITTEN WARRANTY FOR LABOR, EQUIPMENT, AND MATERIALS TO REPLACE ALL
- FAULTY MATERIALS AND/OR LABOR, AT NO COST TO OWNER, BEGINNING ON DATE OF ACCEPTANCE BY OWNER. B. WITHIN THE WARRANTY PERIOD, DURING THE OPPOSITE SEASON (HEATING/COOLING) FROM THAT IN WHICH THE INITIAL ADJUSTMENTS WERE MADE, THIS CONTRACTOR SHALL MAKE AN INSPECTION OF THE INSTALLED BUILDING SYSTEMS. AT THIS INSPECTION, WITH SYSTEMS OPERATING, THIS CONTRACTOR SHALL MAKE ANY NECESSARY MODIFICATIONS TO THE INITIAL ADJUSTMENTS REQUIRED TO PRODUCE OPTIMUM OPERATION OF THE SYSTEM COMPONENTS, TO PRODUCE THE PROPER

-- END OF SPECIFICATIONS -

CITY OF BOULDER, CO BUILDING DEPARTMENT NOTES

AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF IBC 2018, AND ALL RULES

- 2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018 INTERNATIONAL MECHANICAL CODE, CHAPTER 4. 3. AS PER C408.2.5 OF IECC 2018, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD
- DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER. 4. AS PER C408.3.2 OF IECC 2018, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTAINED MANUAL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE

THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL

- ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH IBC 2018, REQUIREMENTS AS OUTLINES IN SECTION
- 6. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM
- 7. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF IMC 2018 CHAPTER 4: MECHANICAL VENTILATION - SECTION 403.

COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.

8. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:

ACCORDANCE WITH APPLICABLE CODES.

A. STANDARDS OF HEATING - IMC 2018. B. DUCT CONSTRUCTION AND INSTALLATION-SECTION 603 OF IMC 2018.

E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR

C. AIR INTAKES, EXHAUSTS AND RELIEF-SECTION 401 OF IMC 2018. D. AIR FILTERS -SECTION 605 OF IMC 2018

DISTRIBUTION SYSTEMS -SECTION 513 OF IMC 2018.

- 9. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT. 10. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY IMC 2018 CHAPTER 4 SECTION 403.3. HVAC SYSTEM SHALL BE BALANCED IN
- ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS AS REQUIRED BY IECC 2018 SECTION 408.2.2. 11. SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION 606 IMC 2018.
- TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN. 12. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.

13. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE

APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO

BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN

THERMOSTATIC CONTROLS

A. GENERAL 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.

B. DEAD BAND:

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEAD BAND 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.

THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND

2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

OFF-HOUR CONTROLS 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.

55°F (13°C) OR UP TO 85°F (29°C).

D. THERMOSTATIC SETBACK: THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO

E. AUTOMATIC SETBACK AND SHUTDOWN:

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.

F. SETPOINT OVERLAP RESTRICTION:

G. AUTOMATIC START:

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 DEADBAND

AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE

CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY

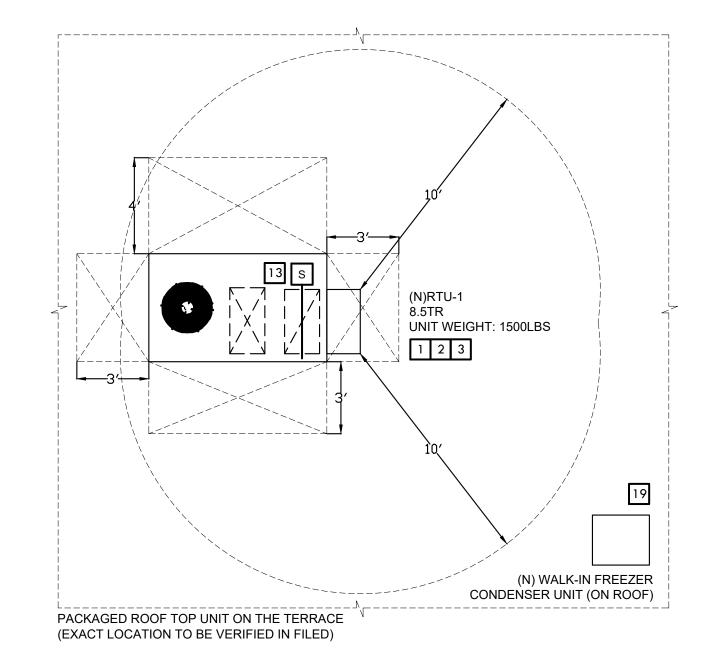
START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE

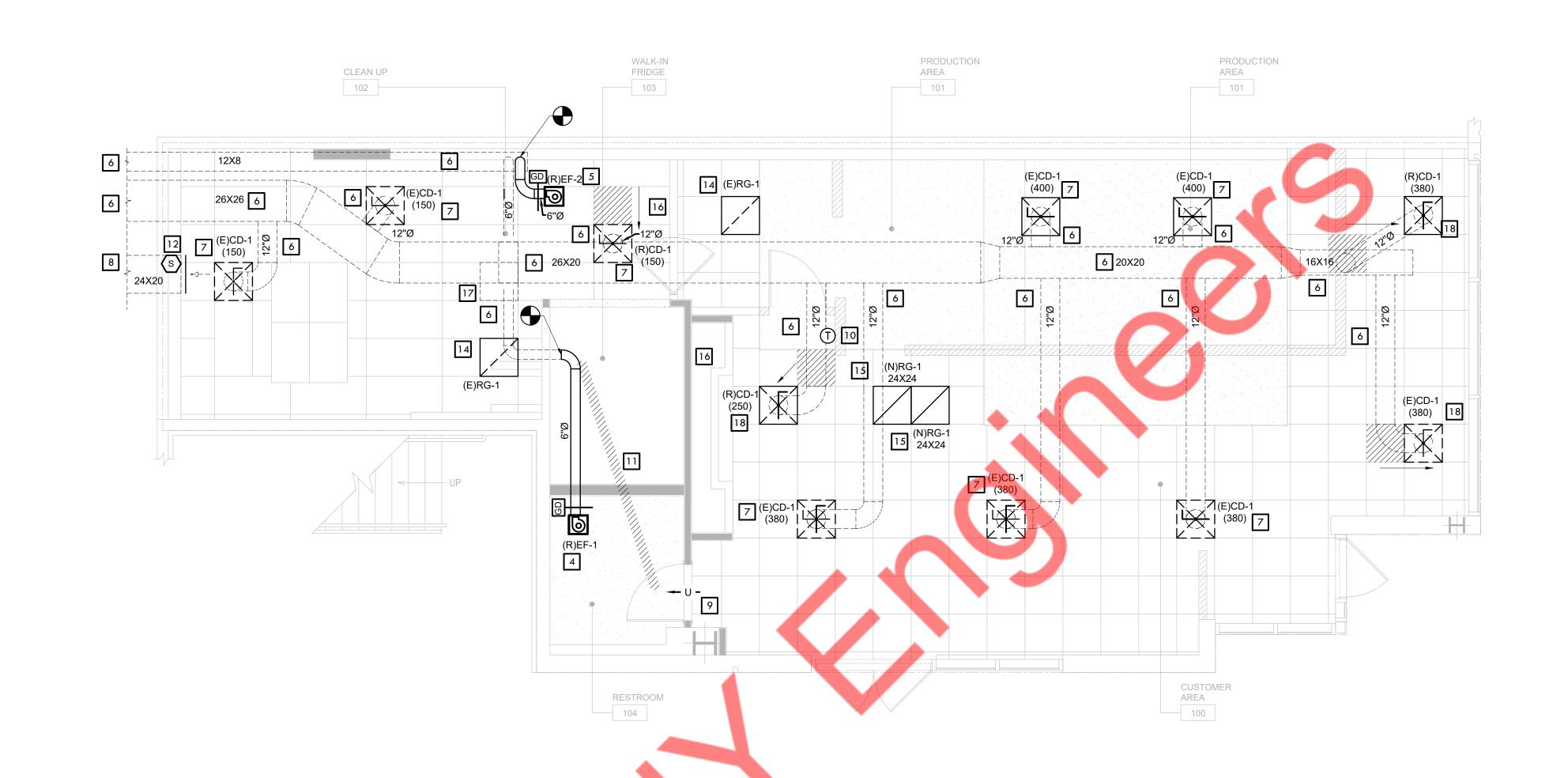
DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING

ant shall secure a contract for factory recommended maintenance and ser F THE HVAC UNITS SERVING THE PREMISES. A COPY OF THIS CONTRACT MUST BE DELIVERED BE LANDLORD'S ON-SITE MANAGEMENT STAFF PRIOR TO STORE OPENING.

AILS OF THE SEALANT. THE DETAILS SHALL MEET OR EXCEED RATINGS OF CONSTRUCTIONS PENETRATED. PENETRATION DETAILS SHALL BE EXACTLY AS TESTED BY AN APPROVITING LABORATORY OR AGENCY AND SHALL INCLUDE THEIR SYSTEM NUMBERS.





MEHCANICAL FLOOR PLAN

									NEV	N GA	S-FI	RED	PAC	KAG	ED RO	OOFTOP UI	VIT					
									COOL	ING				HEATING			EL	ECTRIC	AL			
TAG	SERVES	CFM	O.A.CFM		MOTOR BHP		TOTAL MBH	SENS. MBH		IEER	AMB DB	ENT DB/WB		OUTPUT MBH	% EFF.	FUEL TYPE	V/Ø/HZ	MCA	МОСР	WEIGHT (LBS)	MANUFACTURER MODEL#	REFRIGERANT
(N)RTU-1	SEE PLANS	3400	560	1.0	3.0	8.5	112.9	85.2	12.1	16.3	95	80/67	150	121.5	81%	NATURAL GAS	480/3/60	26	35	1500	TRANE/YHK102A4S0	M R-454B
2. PRO\	S:- QUIPMENTS /IDE ENTHALF /IDE 8-WIRE, 2	PY ECON	IOMIZER V	VITH BAR	OMETRIC	RELIEF	AND F	DD.						ГАТ.								

- PROVIDE 5-MINUTE ANTI-SHORT CYCLE TIMER. PROVIDE THRU THE BASE ELECTRICAL AND SINGLE POINT CONNECTION.
- PROVIDE WITH 2" MERV 8 FILTERS.
- PROVIDE WITH 14" ROOB CURB. CONTRACTOR SHALL FIELD INSULATE. SHIP ASAP AHEAD OF UNIT. PROVIDE POWERED CONVENIENCE OUTLET.
- PROVIDE WITH FACTORY INSTALLED NON-FUSED DISCONNECT. . PROVIDE WITH MOTORIZED DAMPER AND OUTSIDE AIR INTAKE HOOD.
- PROVIDE MANUFACTURER'S MOTOR AND DRIVE PACKAGE AS REQUIRED TO MEET SCHEDULED AIR CAPACITIES AND PRESSURE DROP. PROVIDE WITH RETURN AIR SMOKE DETECTOR.
- 3. PROVIDE ALL COMPRESSORS WITH 5 YEAR WARRANTY. 4. PROVIDE HOT GAS REHEAT.
- 5. PROVIDE LOW AMBIENT CONTROL & CONDENSER COIL HAIL GUARDS. 16. RUN 1" CONDENSATE DRAIN LINE TO NEAREST ROOF DRAIN, SPLASH BLOCK, OR OTHER APPROVED DRAINAGE LOCATION.

		VENTILAT	TION CALCUL	ATIONS A	AS PER IMO	C 2018			
ROOM NAME	AREA	NUMBER OF PEOPLE/1000sq.ft AS PER	NUMBER OF	FINAL	CFM AS PER	IMC 2018	CALCULATED	PROVIDED OAI	TOILET EXHAUST
	(SF)	IMC 2018	PEOPLE IMC 2018	PEOPLE NO.	CFM/PERSON	CFM/SQ.FT	VENT CFM	CFM	CFM
CUSTOMER AREA	670	70	47	30	7.5	0.18	346	350	0
PRODUCTION AREA	341	20	7	6	7.5	0.18	106	110	0
CLEANUP/STORAGE AREA	386	20	8	4	7.5	0.18	99	100	70
RESTOROOM	70	0	0	0	0	0	0	0	70
TOTAL	2355			-			-	560	140

		AIR BAI	LANCE		
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
(N)RTU-1	SEE PLAN	560 CFM	2840 CFM	-	
(R)EF-1	TOILET	-	-	-	70 CFM (V.I.F)
(R)EF-2	CLEAN UP	-	-	-	70 CFM (V.I.F)
	TOTAL:	560 CFM	2840 CFM	140 CFM (V.I.F)	
BUILDING P	RESSURE:		420 CFM	POSITIVE	

	NE	W DIFF	USE	R, REGI	STER, AND GRILLE SCHEDULE
<u>TAG</u>	MAKE & MODEL	DIFFUSER/ GRILL SIZE		CFM RANGE	DESCRIPTION
(N)RG-1	TITUS 350RL	24X24	-	80-350	STEEL CONSTRUCTION CEILING MOUNTABLE RETURN GRILLE.3/4" BLAD SPACING, 35 DEG FIXED DEFLECTION, REINFORCED CORNERS, BLADE PARALLEL TO LONG DIMENSION.

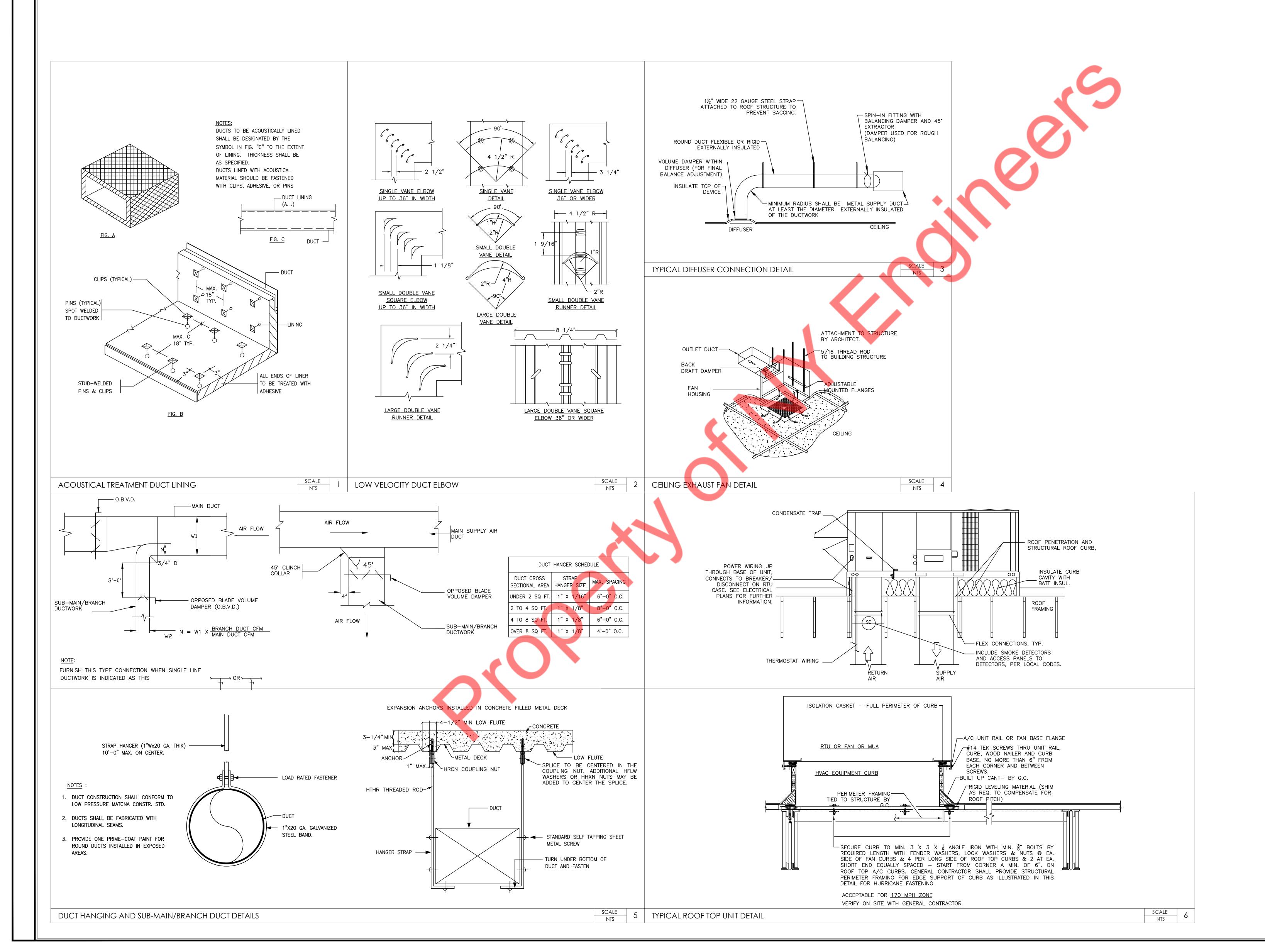
COORDINATE FINAL ACCESSORIES, FINISHES, AND LENGTHS WITH CONSTRUCTION MANAGER & ARCHITECT PRIOR TO

PROCUREMENT. SELECTION BASED ON TITUS OR APPROVED EQUIVALENT.

KEY NOTES MECHANICAL LEGENDS CONTRACTOR TO REPLACE EXISTING ROOF TOP UNIT WITH NEW UNIT AS PER SCHEDULE ON EXISTING ROOF CURB AND MODIFY THE DUCTWORK AS REQUIRED. CONTRACTOR TO COORDINATE EXACT LOCATION ON FIELD. CONTRACTOR TO BALANCE THE OA CFM AS MENTIONED IN THE SCHEDULE. CONNECT SUPPLY/RETURN AIR MAIN DUCT DROPPER TO THE EXISTING DUCTS, EXTEND/MODIFY AS NECESSARY. NEW FLEX DUCT AIR DIFFUSER (SAD) CONTRACTOR TO CONNECT CONDENSATE DRAIN OF THE NEW RTU TO THE EXISTING DRAIN LINE. CONTRACTOR TO ENSURE THE DRAIN PIPING SHALL BE CONVEYED TO AN APPROVED PLACE OF DISPOSAL. SUCH PIPING SHALL MAINTAIN A MINIMUM 1% HORIZONTAL SLOPE IN DIRECTION OF DISCHARGE. COORDINATE WITH PLUMBING DRAWINGS FOR PREFERRED DRAIN LOCATION. **VOLUME DAMPER** CEILING SUPPLY **VOLUME DAMPER** AIR DIFFUSER WITH CONTRACTOR TO ENSURE THAT THERE IS NO SOURCE OF EXHAUST AIR IN 10' OF RADIUS FROM THE ANY OUTDOOR AIR INTAKE, AS REQUIRED BY THE BUILDING REGULATION. W/ REMOTE OPERATOR BLANK-OFF SECTION SAD TYPE OF AIR DEVICE
AIR QUANTITY (CFM) EXISTING EXHAUST AIR FAN (E)EF-1 TO REMAIN AND RELOCATED AS ON SHOWN LOCATION ALONG WITH ALL ASSOCIATED SUPPORTS, CONTROLS. CLEAN AND REFURBISH TO "LIKE-NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. EXTEND/MODIFY THE BRANCH DUCTWORK AND CONNECT TO MAIN EXHAUST DUCT AS REQUIRED. VERIFY EXACT CAPACITY, LOCATION OF THE UNIT IN FILED AND NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK. EXHAUST FAN WALL TRANSFER X, INCHES, SIDE OF DUCT SHOWING GRILLE (TG) EXISTING EXHAUST AIR FAN (E)EF-2 TO REMAIN AND RELOCATED AS ON SHOWN LOCATION ALONG WITH ALL ASSOCIATED SUPPORTS, CONTROLS. CLEAN AND REFURBISH TO "LIKE-NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT. EXTEND/MODIFY THE BRANCH DUCTWORK AND CONNECT TO MAIN EXHAUST DUCT AS REQUIRED. VERIFY EXACT CAPACITY, LOCATION OF THERMOSTAT THE UNIT IN FILED AND NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK. M MOTORIZED DAMPER TEMPERATURE SENSOR EXISTING SUPPLY/EXHAUST DUCTWORK TO REMAIN, CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. VERIFY EXACT LOCATION, ROUTE AND SIZE IN FIELD, PATCH AND SEAL DUCTWORK AIRTIGHT. INSPECT, PATCH, REPAIR, AND/OR REPLACE INSULATION AS REQUIRED. COORDINATE IN FIELD PRIOR TO BID. DUCT MOUNTED SMOKE S DUCT MOUN
DETECTOR NEW DUCTWORK EXISTING SUPPLY DIFFUSER TO REMAIN ALONG WITH VOLUME CONTROL DAMPER. VERIFY SIZE, LOCATION ON FIELD. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. CONTRACTOR TO ENSURE THE AIR IS BALANCED AS PER MENTIONED ON THE PLAN. PROVIDE NEW VOLUME CONTROL DAMPER IN ABSENCE OF EXISTING ONE, VERIFY IN FIELD PRIOR TO BID. (E) -- EXISTING EXISTING DUCT TO MAIN RETURN DUCT CONNECTING TO UNIT FROM PLENUM CEILING TO REMAIN. CONTRACTOR TO FIELD VERIFY EXISTING RETURN AIR DUCTING/PATH IN FIELD. MODIFY DUCTING/MAKE NECESSARY PROVISION IF REQUIRE TO ENSURE THAT ALL RETURN AIR IS TRANSFERRED BACK TO THE RTU. PROVIDE WMS IN ABSENCE OF EXISTING ONE. BACK DRAFT DAMPER 9 CONTRACTOR TO PROVIDE 1" DOOR UNDERCUT FOR AIR TRANSFER AS SHOWN ON PLAN. PROVIDE NEW PROGRAMMABLE THERMOSTAT WITH LOCKING COVER. COORDINATE LOCATION ON SITE WITH ARCHITECT / OWNER. SEAL WALL OPENINGS WITH CAULK. COORDINATE LOCATION ON SITE WITH GENERAL CONTRACTOR AND EQUIPMENT. RTU — ROOF TOP UNIT WMS—— WIRE MESH SCREEN CONTRACTOR TO REMOVE & SCRAP EXISTING DUCT WORK AS MARKED ON PLAN ALONG WITH THE ALL ASSOCIATED SUPPORT AND ARRANGEMENTS, PATCH AND SEAL THE DUCT AIR TIGHT WITH INSULATION. FIELD CONNECTION PROVIDE DUCT MOUNTED TEMP SENSOR IN RETURN DUCTWORK AND WIRE BACK TO T-STAT SHOWN ON PLAN.. ← U — DOOR UNDER CUT CONTRACTOR TO PROVIDE NEW DUCT SMOKE DETECTOR IN RETURN DUCTWORK. COORDINATE WITH RTU MANUFACTURER FOR COMPATIBLE CONTROLS AS REQUIRED. SUPPLY AIR FLOW 14 EXISTING RETURN AIR GRILLE TO REMAIN, CONTRACTOR SHALL CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. VERIFY EXACT LOCATION IN FIELD PRIOR TO BID. PROVIDE NEW RETURN AIR GRILLE AS SHOWN ON PLAN. COORDINATE WITH ARCHITECT FOR FINAL COLOR AND FINISH. (N) — NEW PROVIDE TRANSFER AIR GRILLE AND DUCT AS REQUIRED, IF NEW DEMISING WALLS ARE EXTENDED UP TO THE DECK. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO BID AND START OF WORK. SYMBOL LIST SHOWN IS FOR GENERAL REFERENCE ONLY. THE PRESENCE OF A SYMBOL DOES NOT IMPLY ITS USE ON THIS PROJECT. REFER TO DRAWINGS FOR SPECIFIC SYMBOLS USED. CONTRACT TO REMOVE AND SCRAP EXISTING RETURN AIR GRILLE AS MARKED ON THE PLAN AND CLOSE THE CEILING AIR TIGHT WITH SAME KIND. RELOCATE THE EXISTING SUPPLY AIR DIFFUSER AS SHOWN ON PLAN ALONG WITH ALL ACCESSORIES AND VOLUME CONTROL DAMPER. CLEAN AND REFURBISH TO "LIKE NEW" CONDITION. CONNECT TO THE EXISTING BRANCH DUCT, PROVIDE NEW OR EXTEND/MODIFY THE BRANCH DUCT AS SHOWN IN THE PLAN. CONTRACTOR SHALL BALANCE CFM AS SHOWN ON PLAN. IN ABSENCE OF EXISTING VOLUME CONTROL DAMPER PROVIDE NEW VOLUME CONTROL DAMPER, VERIFY IN FIELD PRIOR TO BID.

CONTRACTOR TO FIELD VERIFY THE POSSIBLE LOCATION OF THE CONDENSER UNITS AND RELATED PIPE PORTAL AND ROUTING. COORDINATE EXACT LOCATION ON FILED. CONTRACTOR TO INSTALL THE CONDENSER UNIT AS PER MANUFACTURER'S RECOMMENDATIONS.

REMARKS: 1. (V.I.F) VERIFY IN FIELD.



ELECTRICAL SPECIFICATIONS

- A. GENERAL AND SUPPLEMENTARY CONDITIONS WITHIN THE SPECIFICATIONS ARE HEREBY INCORPORATED AND BECOME PART OF THESE SPECIFICATIONS AND AS SUCH SHALL BE APPLICABLE TO THE WORK OF THE ELECTRICAL CONTRACT. PRIOR TO SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND LIMITATIONS THAT IMPACT THE WORK OF THIS CONTRACT. NO ADDITIONAL
- BIDDING AND IDENTIFY ITEMS THAT WERE ABLE TO BE VERIFIED DURING A SITE VISIT PRIOR TO THE SUBMISSION OF A BID PROPOSAL CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, RIGGING, AND MISCELLANEOUS ITEMS AS REQUIRED FOR A COMPLETE, OPERATIONAL, FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION AS SHOWN ON THE DRAWINGS AND AS SPECIFIED IN THESE SPECIFICATIONS.

A RESULT OF THE CONTRACTORS FAILURE TO VISIT THE SITE PRIOR TO

COSTS TO THE OWNER SHALL BE PERMITTED FOR CHANGES TO THE WORK AS SHOP DRAWINGS:

LANDLORDS REQUIREMENTS

- WITH THE REQUIREMENTS OF THE LANDLORD'S WORK LETTER, LANDLORD'S CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT. THIS CONTRACTOR SHALL EXAMINE THESE DOCUMENTS PRIOR TO THE SUBMISSION OF A BID PROPOSAL
- . ALL APPLICABLE REQUIREMENTS OF THE LANDLORD'S WORK LETTER, **ELECTRICAL COORDINATION DRAWINGS** LANDLORDS CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT DOCUMENTS SHALL BE CONSIDERED PART OF THESE A. SPECIFICATIONS.

EXISTING CONDITIONS

- A. THE CONTRACT DOCUMENTS ARE BASED ON INFORMATION PROVIDED TO THE CONSULTANT AT THE TIME OF DESIGN. THIS CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING A BID PROPOSAL. BIDS AND POWER SYSTEM STUDIES - GENERAL SUBSTITUTIONS A.PRIOR TO SUBMISSION OF A BID PROPOSAL, CONTRACTOR SHALL THOROUGHLY REVIEW THE BID INSTRUCTIONS AND ALL CIVIL, A. PROVIDE COMPUTER-BASED, POWER SYSTEM STUDIES THAT INCLUDES:
- DOCUMENTS. FOR ANY EQUIPMENT, THE CONTRACTOR SHALL SUBMIT A VOLUNTARY OR NEAR ELECTRICAL EQUIPMENT. STATING THE MANUFACTURER'S NAME, MODEL NUMBER, WRITTEN, DETAILED
- PRODUCT DATA. WORK PERFORMED OR CONSTRUCTED WITH UNAPPROVED EQUALS IS AT INCORPORATING UNAPPROVED EQUALS SHALL BE AT CONTRACTOR'S SOLE
- COST AND EXPENSE D. NO SUBSTITUTIONS PERMITTED FOR LIGHTING FIXTURES.

QUALITY ASSURANCE

- A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW.
- AUTHORITY HAVING JURISDICTION, PERMIT AND INSPECTION FEES AND ALL MATERIALS, EQUIPMENT AND LABOR AS REQUIRED FOR A COMPLETE, F FUNCTIONAL, FULLY OPERATIONAL AND CODE COMPLIANT ELECTRICAL SYSTEM.
- THIS CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND ACCESSORIES FOR A COMPLETE FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION, WHETHER OR NOT SHOWN ON THE DRAWINGS OR SPECIFIED IN THESE SPECIFICATIONS
- D. EC SHALL VERIFY THE VOLTAGE AND AMPERAGE REQUIREMENTS OF ALL EQUIPMENT DELIVERED TO THE SITE PRIOR TO CONNECTION. EC SHALL NOTIFY THE OWNER OF ANY DIFFERENCES REQUIREMENTS OF REGULATORY AGENCIES:
- PERMITS: ARRANGE AND PAY FOR ALL PERMITS, INSPECTIONS AND UTILITY CONNECTIONS REQUIRED
- PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY THE AUTHORITY SHORT CIRCUIT STUDY HAVING JURISDICTION
- THE PROJECT. INCLUDE IN OPERATION AND MAINTENANCE MANUALS.
- COMPLY WITH SPECIFIED CODES AND STANDARDS. IF CONFLICT EXISTS BETWEEN CODES OR STANDARDS AND DRAWINGS, PROJECT MANUAL OR ADDENDA REQUIREMENTS, REQUEST CLARIFICATION FROM
- CONFORM TO THE INSTALLATION RULES AND REGULATIONS OF THE CODES AND STANDARDS LISTED INCLUDING ALL SUBSEQUENTLY PUBLISHED AMENDMENTS THERETO ISSUED PRIOR TO THE DATE OF THE CONFORM TO THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL
- AGENCIES WHICH HAVE AUTHORITY OVER THIS PROJECT. COMPLY WITH THE APPLICABLE EDITION OF THE FOLLOWING CODES AND STANDARDS THAT HAVE BEEN ADOPTED BY AND ARE ENFORCED BY THE **AUTHORITY HAVING JURISDICTION:**
- a. INTERNATIONAL BUILDING CODE b. INTERNATIONAL ENERGY CONSERVATION CODE
- c. INTERNATIONAL MECHANICAL CODE d. NATIONAL ELECTRICAL CODE e. INTERNATIONAL FIRE CODE
- f. LIFE SAFETY CODE, NFPA 101
- AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES ALL LOCAL CODES AND ORDINANCES ADOPTED AND ENFORCED BY THE AUTHORITY HAVING JURISDICTION. G. REFERENCED STANDARDS
- 1. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE RATED, TESTED, FABRICATED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE INDUSTRY STANDARDS
- 2. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (UL, ETL, ETC)

ELECTRICAL CONTRACT DOCUMENTS

- A. THE ELECTRICAL DRAWINGS (DRAWINGS) AND THE SPECIFICATIONS SHALL TOGETHER FORM A SET OF CONTRACT DOCUMENTS FOR THE ELECTRICAL WORK. NEITHER THE DRAWINGS OR THE SPECIFICATIONS SHALL BE COMPLETE WITHOUT THE OTHER. ANY ITEM SHOWN ONLY ON THE DRAWINGS OR SPECIFIED ONLY IN THE SPECIFICATIONS SHALL BE CONSIDERED AS IF SHOWN AND SPECIFIED IN BOTH.
- B. ELECTRICAL DRAWINGS AND SPECIFICATIONS: COMPLY WITH THE FOLLOWING REQUIREMENTS CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL DRAWINGS AND SPECIFICATIONS WITHIN THE CONTRACT DOCUMENTS, INCLUDING, BUT NOT NECESSARILY LIMITED TO, GEOTECHNICAL, LANDSCAPE, CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE, MECHANICAL, PLUMBING,
- 2. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE **RECORD DOCUMENTS** INTENDED TO INDICATE APPROXIMATE LOCATION ONLY OF ELECTRICAL INTERFERE WITH THE LOCATION, CLEARANCES, ETC. REQUIRED BY THE
- WORK OF OTHER TRADES. PRIOR TO ROUGH-IN, CONTRACTOR SHALL COORDINATE ALL DEVICE LOCATIONS WITH THE ARCHITECTURAL WALL ELEVATIONS, CASEWORK/CABINETRY ELEVATIONS AND DETAILS AND THE FINAL,
- APPROVED FOOD SERVICE SHOP DRAWINGS. DEFINITIONS: THE FOLLOWING TERMS ARE USED ON THE ELECTRICA DRAWINGS AND IN THE SPECIFICATIONS AND SHALL BE DEFINED AS FOLLOWS: 1. CONTRACTOR - THE ELECTRICAL CONTRACTOR OR ANY OF THEIR
- SUB-CONTRACTORS WORK - ALL MATERIAL, LABOR, TRANSPORTATION OF THE ELECTRICAL
- CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS. FURNISH - PURCHASE, SUBMIT FOR REVIEW AND APPROVAL, COORDINATE WITH THE CONTRACT DOCUMENTS AND DELIVER TO THE
- PROJECT SITE IN NEW, UNDAMAGED CONDITION, STORE AS DIRECTED, PROTECT FROM DAMAGE DURING STORAGE. 4. INSTALL - INSTALL IN PLACE, MAKE READY FOR CONNECTION TO THE REQUIRED SERVICE.
- CONNECT CONNECT TO THE REQUIRED SERVICE AS REQUIRED FOR PROPER OPERATION, TEST FOR PROPER OPERATION AND FUNCTIONALITY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND REQUIREMENTS SPECIFIED WITHIN THESE SPECIFICATIONS AND TURN OVER TO THE OWNER IN FULL OPERATING
- PROVIDE FURNISH, INSTALL AND CONNECT AS DEFINED HEREIN FOR A
- WALL COVERING, LAY-IN OR DRYWALL CEILINGS, AND FINISHED FLOORING MATERIALS. EXAMPLES OF FINISHED SPACES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ALL SPACES IN A DWELLING UNIT, OFFICES, LOBBIES, CORRIDORS, TOILET ROOMS, ETC.
- AND TYPICALLY ARE NOT EQUIPPED WITH A CEILING. EXAMPLES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, MECHANICAL ROOMS, ELECTRICAL ROOMS, SERVICE AREAS, ETC.
- SHALL ACTION THAT IS REQUIRED WITHOUT OPTION OR QUALIFICATION. 10. REMOVE - DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF SITE UNLESS INDICATED TO BE REMOVED AND F SALVAGED OR REMOVED AND RE-INSTALLED.
- 11. REMOVE AND SALVAGE CAREFULLY DETACH FROM EXISTING CONSTRUCTION IN A MANNER TO PREVENT DAMAGE AND DELIVER TO OWNER READY FOR RE-USE. 12. REMOVE AND REINSTALL - DETACH ITEMS FROM EXISTING

CONSTRUCTION. PREPARE FOR RE-USE. RE-INSTALL AND RECONNECT

- WHERE INDICATED SUCH THAT THE RE-INSTALLED ITEM IS FULLY OPERATIONAL 13. EXISTING TO REMAIN - EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE PERMANENTLY REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED OR REMOVED
- AND RE-INSTALLED.

A. REVIEW OF THE SHOP DRAWINGS IS RENDERED AS A SERVICE ONLY AND SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OR OF TEMPORARY POWER BUILDING CONDITIONS; NOR SHALL IT BE CONSTRUED AS RELIEVING THE

- ARCHITECT/ENGINEER WILL REVIEW SHOP DRAWINGS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT OF THE PROJECT. REVIEW BY THE ARCHITECT/ENGINEER SHALL NOT BE CONSTRUED:
- AS PERMITTING ANY DEPARTURE FROM THE CONTRACT REQUIREMENTS. 2. AS RELIEVING THE CONTRACTOR OF THE RESPONSIBILITY FOR ANY ERROR IN DETAILS, DIMENSIONS OR OTHERWISE THAT MAY EXIST. 3. AS APPROVED DEPARTURES FROM ADDITIONAL DETAILS OR **SEQUENCING AND SCHEDULING** INSTRUCTIONS PREVIOUSLY FURNISHED BY THE ARCHITECT/ENGINEER.
- 1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESCRIPTIVE LITERATURE OF EQUIPMENT TO BE FURNISHED UNDER THIS CONTRACT. DRAWINGS SHALL STATE CAPACITIES, SIZES, ETC., OF ALL EQUIPMENT SUPPLEMENTARY CONDITIONS FOR ADDITIONAL REQUIREMENTS. . PROVIDE SUBMITTALS FOR LIGHTING FIXTURES, TRANSFORMERS,

PANELBOARDS, LIGHTING CONTROL DEVICES, CONTACTORS, WIRING

A. ALL WORK OF THIS CONTRACT SHALL BE COMPLETED IN STRICT ACCORDANCE B. THE CONTRACTOR SHALL PERFORM NO PORTION OF THE WORK REQUIRING SUBMITTAL AND REVIEW OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES OR SIMILAR SUBMITTALS UNTIL THE RESPECTIVE SUBMITTALS HAS BEEN APPROVED BY THE ENGINEER

DEVICES, DISCONNECT SWITCHES, POWER SYSTEM STUDY.

PREPARE ELECTRICAL COORDINATION DRAWINGS AS REQUIRED BY THE WORK AND AS DIRECTED BY THE GENERAL CONTRACTOR. B. MEET WITH REPRESENTATIVES OF THE OTHER DISCIPLINES/TRADES TO COORDINATE THE ELECTRICAL WORK WITH THE WORK OF EACH DISCIPLINE AND TO OBTAIN INFORMATION REGARDING THEIR WORK THAT IS TO BE INDICATED ON THE COORDINATION DRAWINGS.

- ARCHITECTURAL, STRUCTURAL, FOOD SERVICE AND MEPFP CONSTRUCTION A SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES: SHOULD THE CONTRACTOR WISH TO SUBMIT AN ALTERNATE PRODUCT TO THE AN ARC-FLASH STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE MANUFACTURERS NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON
- ALTERNATIVE A MINIMUM OF SEVEN (7) CALENDAR DAYS PRIOR TO BID. B. STUDIES SHALL BE PERFORMED UTILIZING COMPUTER PROGRAMS THAT ARE DISTRIBUTED NATIONALLY AND ARE IN WIDE USE. SOFTWARE ALGORITHMS SHALL COMPLY WITH REQUIREMENTS OF STANDARDS AND GUIDES SPECIFIED SEISMIC RESTRAINT IN THIS SECTION. MANUAL CALCULATIONS ARE UNACCEPTABLE. CONTRACTOR'S RISK AND ANY REQUIRED CORRECTION OF WORK C. SOFTWARE DEVELOPERS: SUBJECT TO COMPLIANCE WITH SPECIFIED A. REQUIREMENTS, PERFORM STUDIES UTILIZING SOFTWARE PRODUCTS BY ONE
 - EASY POWER

OF THE FOLLOWING

- POWER ANALYTICS CORPORATION
- 3. SKM SYSTEMS ANALYSIS D. ALL STUDIES SHALL BE BASED ON THE DEVICE CHARACTERISTICS OF ACTUAL CUTTING & PATCHING EXISTING COMPONENTS AND THE NEW COMPONENTS BEING INSTALLED. B. PROVIDE PERMITS, INSPECTIONS, FINAL CERTIFICATES OF INSPECTION BY THE E. PROVIDE ALL FIELD LABOR AS REQUIRED TO OBTAIN ALL DATA NECESSARY TO A. PRIOR TO CORE DRILLING OR SAW CUTTING OPERATIONS, CONTRACTOR SHALL
 - CONDUCT THE STUDIES SPECIFIED HEREIN. . SUBMIT STUDIES FOR REVIEW BEFORE SUBMITTING THE SYSTEM OVERCURRENT PROTECTIVE DEVICE AND POWER DISTRIBUTION EQUIPMENT SUBMITTALS. SUBMIT STUDY REPORT FOR REVIEW PRIOR TO RECEIVING FINAL EQUIPMENT SUBMITTALS.
 - WHERE FORMAL COMPLETION OF STUDIES WILL CAUSE A DELAY IN THE ORDERING AND MANUFACTURING OF OVERCURRENT PROTECTIVE DEVICES FOR PRELIMINARY SUBMITTAL OF SUFFICIENT STUDY DATA TO ENSURE THAT THE SELECTION OF DEVICES AND ASSOCIATED CHARACTERISTICS IS SATISFACTORY AND IN COMPLIANCE WITH THE RESULTS OF THE STUDIES BEING PERFORMED.

- PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE COMPLETION OF A. PROVIDE A COMPUTER-BASED, SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS C.
 - **PROJECT** FOR EXISTING RELOCATED EQUIPMENT AND EXISTING EQUIPMENT THAT IS EXISTING TO REMAIN. OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED D. PROVIDE AN ISOLATED GROUND CONDUCTOR IN ADDITION TO THE EQUIPMENT TECHNICIANS AND ENGINEERS. THE QUALIFICATIONS OF TECHNICIANS AND ENGINEERS SHALL BE QUALIFIED AS DEFINED BY NFPA 70E
 - D. GATHER AND TABULATE ALL REQUIRED DATA TO SUPPORT THE SHORT-CIRCUIT E. PROVIDE A #6 AWG GREEN INSULATED GROUNDING CONDUCTOR FROM THE E. 277/480V: BROWN-A, ORANGE-B YELLOW-C, NEUTRAL WHITE OR GRAY, STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 551 AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD.
 - BEGIN SHORT-CIRCUIT CURRENT ANALYSIS AT THE SERVICE, EXTENDING DOWN TO THE SYSTEM OVERCURRENT PROTECTIVE DEVICES AS FOLLOWS: TO NORMAL SYSTEM LOW-VOLTAGE LOAD BUSES WHERE FAULT CURRENT IS 10 KA OR LESS

ARC FLASH HAZARD STUDY

- A. PROVIDE A COMPUTER-BASED, ARC-FLASH HAZARD STUDY TO DETERMINE THE PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR EXISTING AND NEW ELECTRICAL EQUIPMENT
- ELECTRICAL SURVEY DATA: GATHER AND TABULATE ALL REQUIRED INPUT DATA TO SUPPORT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 1584 AND NFPA 70E AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED
- C. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT D. FOR EXISTING EQUIPMENT, WHETHER OR NOT RELOCATED, OBTAIN REQUIRED
- ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS. HAZARD LABELS SHALL HAVE AN ORANGE HEADER WITH THE WORDING. "WARNING, ARC-FLASH HAZARD," AND SHALL INCLUDE THE FOLLOWING INFORMATION TAKEN DIRECTLY FROM THE ARC-FLASH HAZARD ANALYSIS:
- 1. LOCATION DESIGNATION NOMINAL VOLTAGE.
- 3. FLASH PROTECTION BOUNDARY
- HAZARD RISK CATEGORY INCIDENT ENERGY
- WORKING DISTANCE 7. ENGINEERING REPORT NUMBER, REVISION NUMBER, AND ISSUE DATE. ARC FLASH HAZARD WARNING LABELS SHALL BE A 3.5-BY-5-INCH THERMAL TRANSFER LABEL OF HIGH-ADHESION POLYESTER FOR EACH WORK LOCATION C.
- INCLUDED IN THE ANALYSIS. TELECOMMUNICATION AND FIRE PROTECTION DRAWINGS AND G. LABELS SHALL BE MACHINE PRINTED, WITH NO FIELD-APPLIED MARKINGS.

WORK. THE ACTUAL LOCATION OF ANY ELECTRICAL WORK SHALL NOT A. DURING THE PROGRESS OF THE WORK, CONTRACTOR SHALL MAINTAIN A CURRENT (DAILY) AS-BUILT SET OF THE DRAWINGS AND SPECIFICATIONS. INDICATING THEREON ALL WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS INCLUDING, WITHOUT LIMITATION, WORK COVERED BY ADDENDA, FIELD WORK ORDERS, CHANGE ORDERS, AND ENGINEERS CONTRACTOR SHALL PROVIDE THE TENANT WITH THE FINAL AS-BUILT SET OF

DRAWINGS AT THE COMPLETION OF THE WORK. COORDINATION WITH LANDLORD AND UTILITY COMPANIES

- A. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL COORDINATE THE WORK OF THIS CONTRACT WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE AND AUTHORIZED REPRESENTATIVES OF EACH SERVING UTILITY THAT WILL PROVIDE SERVICE TO THIS SITE, INCLUDING BUT NOT NECESSARILY LIMITED TO, ELECTRIC, TELEPHONE AND CABLE/SATELLITE TV
- SERVICE PROVIDERS. B. CONTRACTOR SHALL MEET WITH AUTHORIZED REPRESENTATIVES OF THE LANDLORD AND EACH UTILITY TO DISCUSS LANDLORD UTILITY COMPANY SCOPE OF WORK, CONTRACTOR SCOPE OF WORK, POINT OF SERVICE PICK-UP, DETAILS REGARDING SYSTEM INTERFACE, UTILITY COMPANY STANDARDS TO BE COMPLIED WITH, ETC.

COORDINATION WITH OTHER TRADES

- A. ELECTRICAL WORK SHALL BE INSTALLED SO AS TO NOT CONFLICT WITH THE WORK OF OTHER TRADES.
- COMPLETE, FUNCTIONAL AND CODE COMPLIANT INSTALLATION READY B. SET ALL SLEEVES AND CUT AND PATCH ALL MISCELLANEOUS HOLES NECESSARY FOR THE CONVENIENT AND PROPER INSTALLATION OF THE WORK. FINISHED SPACE - SPACES HAVING WALLS PAINTED OR FINISHED WITH C. CONFER WITH THE OTHER CONTRACTORS REGARDING THE LOCATION AND SIZE OF PIPES, EQUIPMENT, DUCTS, OPENINGS AND SPECIAL ARCHITECTURAL TREATMENTS IN ORDER THAT THERE MAY BE NO INTERFERENCES BETWEEN THE INSTALLATION OR THE PROGRESS OF THE WORK OF ANY CONTRACTOR ON P.
- THE PROJECT 8. UNFINISHED SPACES - SPACES WITH UNFINISHED WALLS AND FLOORS D. ALL LINE VOLTAGE WIRING AND FINAL CONNECTIONS TO COMPLETE MECHANICAL SYSTEMS SHALL BE PROVIDED BY THE ELECTRICAL E. PROVIDE FINAL ELECTRICAL CONNECTIONS TO EQUIPMENT
 - FURNISHED/PROVIDED BY OTHERS, (HVAC EQUIPMENT, PLUMBING EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, ETC. COORDINATE THE NEMA CONFIGURATION OF THE RECEPTACLE TO BE R. ACCEPTABLE MANUFACTURERS FOR GALVANIZED RIGID CONDUIT, EMT, Q. PROVIDE HANDLE TIES ON ALL MULTI-WIRE BRANCH CIRCUITS IN ACCORDANCE PROVIDED WITH THE NEMA PLUG CONFIGURATION OF THE CORD/PLUG ASSEMBLY FURNISHED WITH THE EQUIPMENT TO BE INSTALLED. PROVIDE RECEPTACLES HAVING A NEMA CONFIGURATION THAT MATCHES THE NEMA
 - G. PROVIDE FINAL COORDINATION OF AVAILABLE POWER (VOLTAGE/PHASE) WITH OTHER TRADES PRIOR TO THEIR ORDERING OF EQUIPMENT. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING ELECTRICAL WORK TO BE PROVIDED ASSOCIATED WITH MECHANICAL A. ALL CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER, #12 AWG EQUIPMENT. WHERE ELECTRICAL WORK (CONDUIT BOXES, RECEPTACLES, DISCONNECT B. CONDUCTORS #12 AND #10 AWG SHALL BE SOLID; #8 AWG AND LARGER SHALL

CONFIGURATION OF THE PLUG ON THE EQUIPMENT.

- SWITCHES, ETC.) ARE SECURED DIRECTLY TO THE HOUSING OF MECHANICAL EQUIPMENT, THEY SHALL BE INSTALLED ON A PORTION OF THE EQUIPMENT. C. THE USE OF ALUMINUM CONDUCTORS IS NOT ACCEPTABLE. HOUSING NOT REQUIRED TO BE REMOVED FOR ROUTINE MAINTENANCE. PRIOR D. EXPOSED, INTERIOR FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN TO INSTALLATION, COORDINATE ALL ELECTRICAL WORK AT MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR.

CONTRACTOR'S OF BASIC RESPONSIBILITIES UNDER HIS CONTRACT. A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEMPORARY G. EXPOSED, INTERIOR, BRANCH CIRCUITS: TYPE THHN-THWN, SINGLE

CONSTRUCTION POWER AND LIGHTING TO ALLOW ALL CONTRACTORS AND SUB-CONTRACTORS TO PERFORM THE WORK OF THEIR CONTRACTS. B. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL CONTACT THE GENERAL CONTRACTOR TO COORDINATE THE TYPE OF I. EQUIPMENT TO BE UTILIZED DURING THE WORK OF THIS CONTRACT

COMPONENTS.

A. COORDINATE ELECTRICAL EQUIPMENT INSTALLATION WITH OTHER BUILDING COMPONENTS AND THE PROJECT PHASING PLAN.

UTILITY COMPANY METERING EQUIPMENT

- AND SHALL BE CERTIFIED. SEE GENERAL CONDITIONS AND A. PROVIDE ALL EQUIPMENT REQUIRED FOR ELECTRICITY METERING BY UTILITY EQUIPMENT SHALL BE IN COMPLIANCE WITH ALL UTILITY COMPANY REQUIREMENTS.
 - B. ELECTRICAL SERVICE CONNECTIONS: COORDINATE WITH UTILITY COMPANIES AND COMPONENTS THEY FURNISH AS FOLLOWS: 1. COMPLY WITH REQUIREMENTS OF UTILITIES PROVIDING ELECTRICAL
 - POWER SERVICES SERVICES, INCLUDING PROVISION FOR ELECTRICITY-METERING
 - ELECTRICAL CONTRACTOR. D. METER SOCKETS: COMPLY WITH REQUIREMENTS OF ELECTRICAL-POWER UTILITY COMPANY. INSTALL ALL CONDUITS AND EQUIPMENT ACCORDING TO UTILITY COMPANY'S WRITTEN REQUIREMENTS. PROVIDE EMPTY CONDUITS FOR

METERING LEADS AND EXTEND GROUNDING CONNECTIONS AS REQUIRED BY

FIRE STOPPING

UTILITY COMPANY.

A. PROVIDE FIRE STOPPING FOR PENETRATIONS BY CONDUIT OR CABLES AND OTHER EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND 1) PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES) AND VERTICAL SHAFT WALLS AND PARTITIONS. B. FIRESTOP SYSTEM INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ATME E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING V. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 3 PERCENT.

EQUAL TO OR GREATER THAN THAT OF THE CONSTRUCTION BEING

PROVIDE SEISMIC RESTRAINT FOR ELECTRICAL WORK AND SYSTEMS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE APPLICABLE BUILDING CODE AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

B. SUBMIT ALL REQUIRED DETAILS TO THE AUTHORITY HAVING JURISDICTION FOR

REVIEW AND APPROVAL

X-RAY OR GROUND PENETRTING RADAR (GPR) THE EXISTING SLAB TO DETERMINE THE LOCATION OF ANY EXISTING UTILITIES, STRUCTURAL MEMBERS. ETC. COORDINATE ALL SCANNING, CUTTING AND CORE DRILLING OPERATIONS WITH GC AND LANDLORD PRIOR TO COMMENCEMENT OF WORK. APPROVAL OF THE OVERCURRENT PROTECTIVE DEVICE AND DISTRIBUTION B. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS REQUIRED FOR THE INSTALLATION OF THE ELECTRICAL WORK. STRUCTURAL

COMPONENTS, INCLUDING BUT NOT NECESSARILY LIMITED TO, COLUMNS,

BEAMS, GIRDERS, PLATES OR JOISTS SHALL NOT BE CUT. AND POWER DISTRIBUTION EQUIPMENT, OBTAIN APPROVAL FROM ENGINEER C. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACES AND PREPARE TO RECEIVE SPECIFIED FINISHES. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING SYSTEM. ALL ROOF WORK SHALL BE PERFORMED TO MEET THE WARRANTY REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.

- WITH APPLICABLE N.E.C. REQUIREMENTS.
- AN EQUIPMENT GROUNDING CONDUCTOR. PROVIDE AN INSULATED EQUIPMENT GROUND CONDUCTOR WITHIN ALL FEEDERS AND BRANCH CIRCUITS. THIS EQUIPMENT GROUND CONDUCTOR SHALL BE IN ADDITION TO THE EQUIPMENT GROUND CONDUCTOR FORMED BY THE METALLIC CONDUIT SYSTEM.
- GROUNDING CONDUCTOR IN SELECT BRANCH CIRCUITS AS NOTED ON THE D. 120/208V: EQUIPMENT GROUND--GREEN, ISOLATED GROUND--GREEN WITH
- PROVIDE A COPPER GROUNDING BAR AT THE TELEPHONE TERMINAL BOXES AND FITTINGS BACKBOARD. GROUNDING BAR SHALL BE 1/4 INCH X 4 INCHES X 12 INCHES, STAND-OFF BRACKETS WITH INSULATORS. CHATSWORTH PRODUCTS 10622-012

GROUND BAR AT TELEPHONE TERMINAL BOARD TO THE ELECTRICAL SERVICE

OR APPROVED EQUAL **EQUIPMENT IDENTIFICATION**

- ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH A. PROVIDE EQUIPMENT LABELS ON PANELBOARDS, DISCONNECT SWITCHES BE ENGRAVED PHENOLIC RESIN NAMEPLATES ATTACHED TO ENCLOSURE WITH MECHANICAL FASTENERS. SELF-ADHESIVE NAMEPLATES ARE NOT ACCEPTABLE. LETTERING SHALL BE 1/2" HIGH, BLACK TEXT ON WHITE E. BACKGROUND.
 - EQUIPMENT DESIGNATION, NAME OF THE "UPSTREAM" POWER SOURCE (AS APPLICABLE). VOLTAGE AND PHASE C. THE COVERS OF ALL OUTLET AND JUNCTION BOXES INSTALLED ABOVE CEILINGS AND INSTALLED EXPOSED IN UNFINISHED SPACES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL, VOLTAGE, PHASE AND CIRCUIT NUMBERS CONTAINED WITHIN THE BOX. LABEL SHALL BE LEGIBLY
 - HANDWRITTEN WITH BLACK, FELT TIP PERMANENT MARKER. D. THE COVER PLATES OF ALL WIRING DEVICES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL AND THE CIRCUITS SERVING THE DEVICE. LABELS SHALL I BE MACHINE PRINTED, BLACK TEXT ON A CLEAR, SELF ADHESIVE LABEL.

EQUIPMENT INSTALLER

MINIMUM. CONDUCTORS

 ALL INTERIOR AND EXTERIOR CONDUITS SHALL BE INSTALLED AND SUPPORTED IN ACCORDANCE WITH N.E.C. REQUIREMENTS. B. MINIMUM CONDUIT SIZE SHALL BE 3/4" TRADE SIZE. SWITCH LEGS SHALL BE TRADE SIZE

WITHIN INTERIOR FINISHED AREAS, ALL CONDUIT SHALL BE INSTALLED

- CONCEALED WITHIN NEW AND EXISTING WALLS AND ABOVE NEW AND EXISTING D. CONDUIT INSTALLED WITHIN THE INTERIOR OF THE BUILDING SHALL BE GALVANIZED ELECTRICAL METALLIC TUBING (EMT). CONDUIT FITTINGS FOR B. INDOOR EMT CONDUITS SHALL BE CAST METAL, COMPRESSION TYPE. E. EMT SHALL BE USED FOR INTERIOR FEEDERS AND BRANCH CIRCUITS
- INSTALLED EXPOSED IN UNFINISHED SPACES, CONCEALED ABOVE NEW OR EXISTING CEILINGS OR CONCEALED WITHIN EXISTING AND NEW INTERIOR PARTITIONS. F. CONDUITS INSTALLED EXPOSED ON THE EXTERIOR OF THE BUILDING SHALL BE GALVANIZED RIGID STEEL. FITTINGS SHALL BE THREADED TYPE. G. CONDUITS INSTALLED UNDER SLAB ON GRADE CONSTRUCTION SHALL BE RIGID NON-METALLIC (RNC), SCHEDULE 40 PVC. RNC COMPLYING WITH NEMA TC 2
- AND UL 651 UNLESS OTHERWISE INDICATED. FITTINGS FOR RIGID NON-METALLIC CONDUIT SHALL COMPLY WITH NEMA TC 3; MATCH TO CONDUIT TYPE AND MATERIAL PROVIDE CONDUIT EXPANSION FITTINGS IN ALL CONDUIT RUNS THAT EXTEND F. PANEL BOARDS SHALL BE EQUIPPED WITH FLUSH TYPE LOCK AND CATCH. ALL ACROSS BUILDING EXPANSION JOINTS AND WHERE MOVEMENT MAY BE
- CONDUIT SHALL BE SUPPORTED FROM STRUCTURE ONLY. C CONDUIT SHALL ONLY BE USED BELOW GRADE. EQUIPMENT WITHIN INTERIOR DRY LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT IN WET OR OUTDOOR LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES
- LIGHT FIXTURES (FIXTURE WHIPS). MAXIMUM CONDUIT LENGTH SHALL BE 72 PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL ELECTRICAL CONNECTIONS TO FOOD SERVICE EQUIPMENT CONDUITS THAT EXTEND UP TO THE ROOF LEVEL TO SERVE ROOF MOUNTED THE EQUIPMENT CURB. COORDINATE ELECTRICAL WORK WITH MECHANICAL
- NON-REFRIGERATED SPACES TO REFRIGERATED SPACES PER NEC 300.7(A). PROVIDE EXPANSION JOINTS FOR CONDUIT AS REQUIRED TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION. Q. ALL CONDUITS INSTALLED IN ASSOCIATION WITH THE WALK-IN COOLER FREEZER SHALL BE INSTALLED IN ACCORDANCE WITH THE WALK-IN O. ALL "SPARE" CIRCUIT BREAKERS SHALL BE SET TO THE "OFF" POSITION. MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS. COORDINATE P. PROVIDE THREE (3) EMPTY 1 INCH CONDUITS FROM EACH FLUSH MOUNTED ALL CONDUIT INSTALLATION WITH WALK-IN EQUIPMENT INSTALLER.
- FLEXIBLE METAL CONDUITS AND LIQUID-TIGHT FLEXIBLE METAL CONDUITS SHALL BE ALLIED, REPUBLIC, WHEATLAND, ELECTRI-FLEX AND ANACONDA. ACCEPTABLE MANUFACTURERS FOR CONDUIT FITTINGS SHALL BE THOMAS AND BETTS OR APPROVED EQUAL.
- BE STRANDED.
- THHN-THWN, SINGLE CONDUCTORS IN CONDUIT. UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN PVC CONDUIT.

CONDUCTORS IN CONDUIT H. BRANCH CIRCUITS CONCEALED IN EXISTING AND NEW CEILINGS, WALLS, AND PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

K. CLASS 1 CONTROL CIRCUITS: TYPE THHN-THWN, IN CONDUIT.

- BRANCH CIRCUITS CONCEALED BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN. SINGLE CONDUCTORS IN CONDUIT J. ACCEPTABLE MANUFACTURERS FOR CONDUCTORS: GENERAL CABLE B. COMPANY, CAROL, ANACONDA, ROME, SOUTHWIRE,
- L. CLASS 2 CONTROL CIRCUITS: POWER-LIMITED PLENUM RATED CABLE, CONCEALED IN BUILDING FINISHES M. THE USE OF NON-METALLIC-SHEATHED CABLE (TYPE NM) AND ARMORED CABLE
- (TYPE AC OR BX) IS NOT ACCEPTABLE N. WIRE CONNECTORS SHALL BE EQUAL TO SCOTCH LOCK FOR #8 AWG AND SMALLER, THOMAS AND BETTS LOCK-TITE FOR #6 AND LARGER. COMPANY. ALL METERING EQUIPMENT AND THE INSTALLATION OF THE O. PROVIDE #10 AWG CONDUCTORS FOR BRANCH CIRCUITS HAVING A
 - CONDUCTOR LENGTH LONGER THAN 75 FEET P. SIZE OF CONDUCTORS AND CABLES INDICATED OR SPECIFIED ARE IN AMERICAN WIRE GAGE (AWG - BROWN AND SHARPE) Q. INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES, EXCEPT
- WHERE SPECIFIED OR INDICATED, FOR LOW-VOLTAGE WIRING OR, WHERE TYPE MC CABLE IS INDICATED, SPECIFIED AS ACCEPTABLE, OR BOTH. COORDINATE INSTALLATION AND CONNECTION OF UTILITIES AND R. SUPPORT ALL CONDUCTORS AND CABLES IN VERTICAL INSTALLATIONS, AS G. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES AND REQUIRED BY NFPA-70, BY INSTALLING CABLE SUPPORTS OR PLUG-TYPE
- CONDUIT RISER SUPPORTS, OR WIRE-MESH SAFETY GRIPS. C. METERS SHALL BE FURNISHED BY UTILITY COMPANY; INSTALLED BY S. INSTALL ALL CONDUCTORS AND CABLE IN RACEWAYS CONTINUOUS WITHOUT GFCI PROTECTION TAPS OR SPLICES. SPLICE OR TAP ONLY IN APPROVED BOXES AND ENCLOSURES WITH APPROVED SOLDERLESS CONNECTORS, OR CRIMP A. CONNECTORS AND TERMINAL BLOCKS FOR CONTROL WIRING, AND KEEP TO THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS
 - T. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS: DESIGNED, PROPERLY SIZED, AND UL LISTED FOR THE SPECIFIC APPLICATION THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS. WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS • INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM OF 3' FOOT "PIGTAIL" AT THE BOX, TAPE THE ENDS OF

TYPE MC CABLE

CONDUCTORS, AND COVER THE BOX.

REQUIRED BY CODE.

- A. USES PERMITTED 1. TYPE MC CABLE: 600V, UNJACKETED: ANSI E119 AND E814, UL STANDARDS 44 OR 83 (AS APPLICABLE), AND 1569, NFPA 70 ARTICLE 330; ALUMINUM OR GALVANIZED STEEL INTERLOCKED ARMOR: THHM- OR XHHW-INSULATED CONDUCTORS; COLOR CODE: ICEA METHOD 1, WITH GREEN INSULATED
- GROUNDING CONDUCTOR. 2. IN LIEU OF FLEXIBLE CONDUIT AND WIRING FROM LIGHT FIXTURES IN ACCESSIBLE CEILINGS TO JUNCTION BOXES (ATTACHED TO BUILDING STRUCTURE) ABOVE THE CEILING. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5' FOOT RADIUS OF ITS INSTALLED LOCATION, BUT NOT EXCEEDING 6' FEET IN UNSUPPORTED LENGTHS.
- FOR VERTICAL DROPS IN STUD WALLS. USES NOT PERMITTED HOMERUNS TO PANELBOARDS.
- WHERE EXPOSED TO VIEW. WHERE EXPOSED TO DAMAGE.
- 4. HAZARDOUS LOCATIONS. WET LOCATIONS.
- 6. INSTALLED HORIZONTALLY WITHIN STUD WALL. 7. WHEN RESTRICTED OTHERWISE ABOVE, AND WHEN SPECIFICALLY

DISALLOWED BY THE LOCAL AHJ, OWNER OR BOTH.

- A. PROVIDE ELECTRICAL SYSTEM AND EQUIPMENT GROUNDING IN ACCORDANCE A. PROVIDE COLOR CODING SYSTEM AS LISTED BELOW FOR ALL FEEDERS AND BRANCH CIRCUITS AND USED AS A BASIS FOR BALANCING LOAD ON PANELS. B. THE METALLIC CONDUIT SYSTEM SHALL BE GROUNDED AND BONDED TO FORM B. COLOR CODING FOR CONDUCTOR #12 AWG THROUGH #6 AWG SHALL CONSIST OF COLOR CODED THERMOPLASTIC INSULATION OF THE COLORS SPECIFIED
 - C. COLOR CODING FOR CONDUCTORS #8 AWG AND LARGER SHALL BE FIELD APPLIED SELF ADHESIVE TAPE OF THE COLOR SPECIFIED HEREIN FOR THE PARTICULAR PHASE. PHASE A-BLACK, PHASE B--RED, PHASE NEUTRAL--WHITE
 - DISTINCTIVE WHITE OR YELLOW MARKINGS. EQUIPMENT GROUND - GREEN.

- PRE-DRILLED FOR CONDUCTOR TERMINATIONS, WITH NON-METALLIC A. ALL OUTLET BOXES SHALL BE ULLISTED AND LABELED FOR USE IN THE SPACE THEY OCCUPY AND THE PURPOSE THEY SERVE. B. SHEET METAL OUTLET AND DEVICE BOXES FOR DRY, INTERIOR APPLICATIONS: COMPLY WITH NEMA OS 1 AND UL 514A
- C. CAST-METAL OUTLET AND DEVICE BOXES FOR EXTERIOR APPLICATIONS: COMPLY WITH NEMA FB 1, FERROUS ALLOY, TYPE FS OR FD, WITH GASKETED CONTACTORS, TRANSFORMERS, CONTROLS, ETC. EQUIPMENT LABELS SHALL D. OUTLET BOXES INSTALLED WITHIN FIRE RATED ASSEMBLIES SHALL HAVE A
- FIRE RATING EQUAL TO OR GREATER THAN THE RATING OF THE WALL IN WHICH OUTLET BOXES SHALL BE 4 INCHES SQUARE BY 2 1/8 INCHES DEEP, EXCEPT FOR 2" PARTITIONS SHALL BE AT LEAST 1-1/2" DEEP. B. ENGRAVED NAMEPLATES ATTACHED TO COMPONENTS SHALL IDENTIFY THE F. OUTLET BOXES FOR VOICE AND DATA DEVICES SHALL BE 4 11/16 INCHES
 - SQUARE BY 2 1/8 INCHES DEEP. ALL PULLBOXES SHALL BE CONSTRUCTED OF GALVANIZED STEEL, OF METAL GAUGE AND PHYSICAL SIZE AS REQUIRED BY THE N.E.C. FOR THE NUMBER AND SIZE OF CONDUITS AND CONDUCTORS ASSOCIATED WITH THE PULLBOX. FIXTURE OUTLET BOXES IN/OR ON CEILINGS SHALL NOT BE LESS THAN 1-1/2" DEEP OR LESS THAN 4" SQUARE. ALL OUTLET BOXES INTENDED TO SUPPORT FIXTURES SHALL BE EQUIPPED WITH 3/8" FIXTURE STUDS FASTENED THROUGH
 - IE BOTTOM OF THE BOX WITH FOUR BOLTS. NEW OUTLET BOXES INSTALLED WITHIN NEW OR EXISTING STUD WALL CONSTRUCTION SHALL BE MOUNTED TO A STUD OR MOUNTED IN A BRACKET THAT SPANS STUD-TO-STUD, CADDY TSGB BRACKET OR APPROVED EQUAL. THE USE OF "OLD WORK" TYPE BOXES THAT.
 - ACCEPTABLE MANUFACTURERS FOR BOXES: APPLETON, STEEL CITY, RACO. **PANELBOARDS** PANELBOARDS SHALL BE LIGHTING AND APPLIANCE TYPE, DEAD FRONT SAFETY TYPE, FURNISHED WITH BRANCH CIRCUIT BREAKER OVERCURRENT PROTECTIVE DEVICES, COPPER PHASE, NEUTRAL AND EQUIPMENT GROUNDING BUS BARS, MAIN CIRCUIT BREAKER OR MAIN LUG ONLY AS NOTED ON THE DRAWINGS. MAIN BUSES AND CONNECTORS SHALL BE HARD DRAWN COPPER OF 98% CONDUCTIVITY. LOAD CENTERS ARE NOT ACCEPTABLE FOR USE. CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE SUITABLE FOR
 - VOLTAGE AND AMPERE RATINGS INDICATED ON DRAWINGS AND IN PANEL SCHEDULES. REFER TO THE PANEL SCHEDULES ON THE DRAWINGS FOR ADDITIONAL ACCESSORIES TO BE PROVIDED AT SELECT CIRCUIT BREAKERS. CIRCUIT BREAKERS SHALL HAVE A MINIMUM AMPERE INTERRUPTING CAPACITY (AIC) OF 10,000 AMPERES FOR 120/208V SYSTEMS, 14,000 FOR 277/480V D. D.WHERE THE POWER SYSTEM STUDY IDENTIFIES AVAILABLE FAULT CURRENT
 - VALUES AT EXISTING AND NEW PANELS THAT ARE HIGHER THAN THE MINIMUM AIC RATINGS SPECIFIED HEREIN, PROVIDE CIRCUIT BREAKERS IN THE PANELS THAT HAVE AIC RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY. PROVIDE NEMA 1 ENCLOSURES FOR INTERIOR PANELS.

LOCKS SHALL BE KEYED ALIKE, WITH TWO KEYS SUPPLIED WITH EACH LOCK.

- G. CIRCUIT BREAKERS SERVING LIGHTING CIRCUITS SHALL BE RATED FOR SWITCH H. CIRCUIT BREAKERS SERVING HVAC EQUIPMENT SHALL BE HACR RATED. PROVIDE FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING I. ALL LUGS SHALL BE OF THE SOLDERLESS TYPE AND RATED AT A MINIMUM OF J. PROVIDE NEW CIRCUIT DIRECTORIES WITHIN NEW AND EXISTING PANELS TO REFLECT THE WORK OF THIS CONTRACT. DIRECTORY SHALL BE TYPEWRITTEN
- OR COMPUTER GENERATED. HANDWRITTEN CIRCUIT DIRECTORIES ARE NOT ACCEPTABLE M. PROVIDE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO RECESSED K. UTILIZE FINAL, OWNER ASSIGNED ROOM NAMES AND NUMBERS TO IDENTIFY SPACES WITHIN THE CIRCUIT DIRECTORIES. COMPLY WITH NEC 408.4 WHEN IDENTIFYING CIRCUITS IN CIRCUIT DIRECTORIES. PANEL CIRCUITS SHALL BE CONFIGURED SUCH THAT THE LOAD IS DISTRIBUTED
- EVENLY ACROSS ALL THREE PHASES TO WITHIN 10% IN ACCORDANCE WITH N.E.C. REQUIREMENTS MECHANICAL EQUIPMENT INSTALLED ON A CURB SHALL BE ROUTED WITHIN M. ALL NEW AND EXISTING PANEL BOARDS SHALL BE LABELED TO IDENTIFY THE AMOUNT OF FAULT CURRENT AVAILABLE AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED. LABEL SHALL BE MACHINE PROVIDE CONDUIT SEALING FITTINGS IN ALL CONDUITS THAT EXTEND FROM PRINTED, BLACK TEXT ON CLEAR, SELF ADHESIVE TAPE. INSTALL LABEL
 - ALL NEW AND EXISTING PANEL BOARDS SHALL BE LABELED TO IDENTIFY THE ARC FLASH HAZARD CHARACTERISTICS AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED.

ADJACENT TO PANEL BOARDS ENGRAVED NAMEPLATE.

PANEL STUBBED UP TO ABOVE ACCESSIBLE CEILING.

INSTALLATION OF OUTLET BOXES FOR SWITCHES.

WITH NEC 210.4(B) R. ACCEPTABLE MANUFACTURERS FOR PANELBOARDS BY SCHNEIDER, ABB, SIEMENS OR EATON.

THE DRAWINGS, 20 AMPERES, 120/277 VOLT AC TYPE, SPECIFICATION GRADE WITH SCREW TERMINALS. HUBBELL 1221-X, 1223-X OR 1224-X OR APPROVED EQUIVALENT BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN. B. TOGGLE SWITCHES SHALL BE MOUNTED AT DOORS, INSTALLED ADJACENT TO THE TRIM ON THE STRIKING SIDE OF THE DOOR, REGARDLESS OF THE LOCATION INDICATED ON THE DRAWINGS. VERIFY ALL DOOR SWINGS PRIOR TO

E. FEEDERS INSTALLED CONCEALED IN CEILINGS, WALLS, PARTITIONS: TYPE C. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT. PROVIDE A NEUTRAL CONDUCTOR TO ALL SWITCH LOCATIONS F. FEEDERS INSTALLED CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE AND E. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES: LEGRAND,

RECEPTACLES

- A. RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL 5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN. GFCI RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, FEED THROUGH TYPE CAPABLE OF PROTECTING DOWNSTREAM RECEPTACLES ON A SINGLE CIRCUIT, SOLID STATE GROUND FAULT SENSING AND SIGNALING, 5 MILLIAMP TRIP LEVEL, NEMA 5-20R WITH SCREW TERMINALS.
- HUBBELL GF5362-X OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN. ISOLATED GROUND RECEPTACLES SHALL BE ORANGE, 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS.
- HUBBELL IG-5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.
- PROVIDE SPECIAL PURPOSE RECEPTACLES HAVING NEMA CONFIGURATIONS THAT MATE AND MATCH THE NEMA PLUG CONFIGURATION PROVIDED WITH THE FIRE ALARM SYSTEM EQUIPMENT TO BE CONNECTED.
- "WEATHERPROOF WHILE IN USE" F. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

RECEPTACLES: LEGRAND, LEVITON.

- ALL KITCHEN SINGLE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPS OR LESS AND THREE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPS OR LESS SHALL HAVE GROUND FAULT CIRCUIT INTERRUPTER PROTECTION FOR PERSONNEL IN ACCORDANCE WITH NEC 210.8, (B), (1) - (10), OR THE EQUIVALENT REQUIREMENT WITHIN THE APPLICABLE
- ELECTRICAL CODE. AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH B. THE "GFCI" NOTATION AT A DEVICE OR CIRCUIT BREAKER INDICATES THAT GFC PROTECTION SHALL BE PROVIDED FOR THE CIRCUIT OR CIRCUITS INDICATED. GFCI PROTECTION SHALL BE PROVIDED BY ONE OF THE FOLLOWING MEANS: INTEGRAL GFCI PROTECTION WITHIN THE DEVICE (NEMA 5-20R_
 - RECEPTACLES), WHEN THE DEVICE IS ABLE TO BE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE APPLICABLE ELECTRICAL CODE. GFCI CIRCUIT BREAKER INSTALLED WITHIN THE PANEL FOR SERVICE TO THE CIRCUIT OR CIRCUITS.
 - DEAD-FRONT GFCI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE NEC (APPLICABLE TO 20 AMP, 120 VOLT AN INDIVIDUALLY MOUNTED EXTERNAL SPECIAL PURPOSE GROUND FAULT CIRCUIT INTERRUPTER (SPGFCI) DEVICE SIMILAR TO "SHOCK BLOCK"

PRODUCTS AS MANUFACTURED BY LITTLE FUSE, OR APPROVED EQUAL.

DEAD FRONT DEVISES SHALL BE BE LABELED TO IDENTIFY THE CIRCUIT

GFCI CIRCUIT BREAKER INSTALLED WITHIN AN INDIVIDUAL ENCLOSURE

EXTERNAL TO THE PANEL FOR SERVICE TO THE CIRCL

AND THE LOAD SERVED BY THE DEVICE.

- COVER PLATES FOR TOGGLE SWITCHES AND RECEPTACLES COVER PLATES WITHIN NON-FOOD SERVICE AREAS SHALL BE NYLON, OF CONFIGURATION TO MATCH THE WIRING DEVICE. B. COVER PLATES WITHIN THE FOOD SERVICE AREA SHALL BE STAINLESS STEEL
- WITH STAINLESS STEEL HARDWARE, UNLESS OTHERWISE NOTED. C. CONFIGURATION AND COLOR OF COVER PLATE SHALL MATCH THAT OF THE WIRING DEVICE THAT THE PLATE WILL BE INSTALLED ON. D. COVER PLATE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT. E. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR COVER PLATES: LEGRAND,

MOUNTING HEIGHTS FOR ELECTRICAL DEVICES AND EQUIPMENT

CONVENIENCE RECEPTACLES -TOP OF DEVICE 18" AFF

DISCONNECT SWITCHES - TOP OF ENCLOSURE 66" AFF

- A.DEVICES AND EQUIPMENT SHALL BE INSTALLED AT THE MOUNTING HEIGHTS NOTED BELOW UNLESS NOTED OTHERWISE ON THE DRAWINGS OR REQUIRED BY APPLICABLE CODES AND STANDARDS: 1TOGGLE SWITCHES, WALL SWITCH OCCUPANCY SENSORS AND DIMMERS FOR LIGHTING CONTROL - TOP OF DEVICE 48" AFF
- CONVENIENCE RECEPTACLES AT COUNTERTOPS BOTTOM OF DEVICE 44" AFF OR AS NOTED ON THE DRAWINGS RECEPTACLES AT FOOD SERVICE EQUIPMENT - AS INDICATED ON THE FINAL,
- APPROVED FOOD SERVICE SHOP DRAWINGS. TELEPHONE AND DATA OUTLETS - TOP OF DEVICE 18" AFF OR AS REQUIRED BY THE ADJACENT CASEWORK

PANELBOARDS - TOP OF ENCLOSURE 72" AFF

- A. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, UL LISTED AND LABELED EQUIPPED WITH A LUG FOR TERMINATION OF THE EQUIPMENT GROUNDING
- DISCONNECT SWITCHES SHALL HAVE NEMA 1 ENCLOSURES FOR DRY, INDOOR APPLICATIONS; NEMA 3R ENCLOSURES FOR OUTDOOR OR WET LOCATION APPLICATIONS DISCONNECT SWITCHES INSTALLED EXPOSED IN FOOD SERVICE AREAS SHALI BE NEMA 4X STAINLESS STEEL
- ALL DISCONNECT SWITCHES SHALL BE EQUIPPED WITH AN ENGRAVED NAMEPLATE TO IDENTIFY THE SERVING PANEL, CIRCUIT NUMBERS AND THE LOAD SERVED BY THE SWITCH.

ACCEPTABLE MANUFACTURERS FOR DISCONNECT SWITCHES: SCHNEIDER. ABB. SIEMENS OR EATON

- DUCT MOUNTED SMOKE DETECTORS PROVIDE A 120 VOLT POWER SOURCE TO ALL DUCT MOUNTED SMOKE DETECTORS INSTALLED WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT
- PROVIDE A DUCT MOUNTED SMOKE DETECTORS WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT AS REQUIRED BY APPLICABLE CODES. FINAL ELECTRICAL CONNECTION AND ALL INTERLOCK WIRING BY THE ELECTRICAL CONTRACTOR.
- PROVIDE ALL INTERLOCK WIRING IN CONDUIT BETWEEN ALL DUCT DETECTORS SUCH THAT UPON DETECTING SMOKE IN ANY ONE DETECTOR, ALL ROOF TOP UNITS SHALL BE SHUT DOWN. PROVIDE TEST/RESET SWITCH AND PIEZO ALERT SOUNDER AND REMOTE ANNUNCIATORS ALARM LED MOUNTED AS DIRECTED BY LOCAL AHJ. EC TO

PROVIDE ALL REQUIRED INTERLOCK WIRING BETWEEN DUCT DETECTOR AND REFER TO DETAILS ON MECHANICAL DRAWINGS FOR ADDITIONAL

- INFORMATION. PROVIDE ALL TESTS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
- PROVIDE THE TESTS AS OUTLINED HEREINAFTER AND OTHER TESTS REQUIRED TO ESTABLISH THE ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS AND SUITABLE OPERATION OF EACH SYSTEM. PROMPTLY CORRECT ANY FAILURES, DEFICIENCIES AND/OR DEFECTS REVEALED BY THESE TESTS. AFTER CORRECTING FAILURES, DEFICIENCIES OF

RECTIFIED AND THE SYSTEM IS FUNCTIONING PROPERLY

DEFECTS, CONDUCT NEW TESTING TO VERIFY THAT THE DEFICIENCY HAS BEEN

NEW AND EXISTING PANELBOARDS SHALL HAVE PHASE CURRENTS BALANCED

TO WITHIN +/- 10% VARIATION BETWEEN AVERAGE PHASE CURRENT AND

AN OPERATIONAL TEST OF THE EMERGENCY LIGHTING/EXIT SIGNAGE SYSTEM SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER AND THE AUTHORITY HAVING JURISDICTION TO DEMONSTRATE PROPER OPERATION AND

MEASURED INDIVIDUAL PHASE.

OPERATION AND MAINTENANCE MANUALS THIRTY (30) DAYS PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT OPERATING AND MAINTENANCE MANUALS FOR EQUIPMENT TO ENGINEER FOR APPROVAL INCLUDE ONE COPY OF EACH FINAL APPROVED SUBMITTAL FOR RECORD PURPOSES, INDICATING THE ACTUAL PRODUCT INSTALLED. INCLUDE

SIGNIFICANT CHANGES IN THE PRODUCT DELIVERED TO PROJECT SITE AND

CHANGES IN MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION.

COMPLIANCE WITH APPLICABLE CODES AND SPECIFIED REQUIREMENTS.

PROVIDE COMPREHENSIVE CONTACT LIST INCLUDING CONTRACTOR AND SUBCONTRACTOR'S NAMES, ADDRESSES, TELEPHONE AND CONTACT PERSON FOR OWNER'S USE.

TRAINING OF OWNER'S DESIGNATED PERSONNE PREPARE AND SUBMIT OPERATING INSTRUCTIONS AND PROVIDE ON-SITE TRAINING OF OWNER'S PERSONNEL IN USE AND MAINTENANCE OF OPERATING

- THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIPMENT AND THE INSTALLATION TO BE FREE OF DEFECTS THAT MAY DEVELOP IN ANY PART OF THEIR WORK CAUSED BY FAULTY WORKMANSHIP, MATERIAL OR EQUIPMENT FAILURES, FOR A MINIMUM OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OR FOR AS LONG AS NORMAL EQUIPMENT MANUFACTURER
- WARRANTIES ARE IN EFFECT FROM THE DATE OF OWNER ACCEPTANCE OF THE PROJECT, WHICHEVER IS LATER. DURING THE ONE (1) YEAR WARRANTY PERIOD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR DEFECTS IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED UNDER THE WORK OF THE ELECTRICAL CONTRACT.

DRY-TYPE TRANSFORMERS SHALL BE OF THE ENCLOSED, VENTILATED TYPE A. TOGGLE SWITCHES SHALL BE SINGLE POLE, 3-WAY OR 4-WAY AS NOTED ON WITH KVA AND VOLTAGE RATING AS NOTED ON DRAWINGS SOUND LEVEL SHALL BE LOW. INSTALLATION SHALL INCLUDE KORFUND OR EQUAL VIBRATION DAMPENING

MOUNTS AND FLEXIBLE STEEL CONDUIT FOR PRIMARY AND SECONDARY.

MOUNT TRANSFORMER ON VIBRATION ISOLATORS. LOCATE TRANSFORMER AS

NOT TO CAUSE SERVICING OR CLEARANCE DIFFICULTIES OR VIOLATIONS WITH

TRANSFORMERS COMPLY NEMA TP 1 ENERGY-EFFICIENCY LEVELS AS VERIFIED BY TESTING ACCORDING TO NEMA TP 2. CORES: ELECTRICAL GRADE, NON-AGING SILICON STEEL WITH HIGH PERMEABILITY AND LOW HYSTERESIS LOSSES. G. COILS: CONTINUOUS WINDINGS WITHOUT SPLICES EXCEPT FOR TAPS.

INTERNAL COIL CONNECTIONS: BRAZED OR PRESSURE TYPE.

OTHER EQUIPMENT. 15 KVA RATED AND LARGER: WITH

- COIL MATERIAL: ALUMINUM. H. ENCLOSURE: VENTILATED.
 - 1. NEMA 250, TYPE 2: CORE AND COIL SHALL BE ENCAPSULATED WITHIN RESIN COMPOUND TO SEAL OUT MOISTURE AND AIR.
 - 2. KVA RATINGS: BASED ON CONVECTION COOLING ONLY AND NOT RELYING ON AUXILIARY FANS TRANSFORMER ENCLOSURE FINISH: COMPLY WITH NEMA 250. FINISH COLOR: GRAY.
 - INSULATION CLASS, 30 KVA AND LARGER: 220 DEG C UL-COMPONENT-RECOGNIZED INSULATION SYSTEM WITH A MAXIMUM OF 150-DEG C RISE ABOVE 40-DEG C AMBIENT TEMPERATURE TAPS: PROVIDE TWO (2) 2.5% TAPS ABOVE AND FOUR (4) 2.5% TAPS BELOW NORMAL FULL CAPACITY. ACCEPTABLE MANUFACTURERS FOR TRANSFORMERS: SCHNEIDER, ABB, SIEMENS OR EATON.

- E. COVER PLATES FOR EXTERIOR RECEPTACLES SHALL BE RATED FOR A. FIRE ALARM SYSTEM WORK IS A DELEGATED DESIGN AND IS NOT INCLUDED AS PART OF THE ELECTRICAL SCOPE OF WORK. B. FIRE ALARM SYSTEM WORK SHALL BE PROVIDED BY THE GENERAL CONTRACTOR AS A DELEGATED DESIGN.
 - C. GENERAL CONTRACTOR (GC) SHALL BE RESPONSIBLE FOR RETAINING THE SERVICES OF A FIRE ALARM SYSTEM VENDOR/DESIGN PROFESSIONAL TO PREPARE THE FIRE ALARM SYSTEM DESIGN, DETAILS, CALCULATIONS, ETC. AS REQUIRED BY ALL APPLICABLE CODES AND THE AUTHORITY HAVING JURISDICTION. GC/VENDOR/DESIGN PROFESSIONAL SHALL BE RESPONSIBLE FOR VERIFYING ALL APPLICABLE CODE REQUIREMENTS AND ALL LOCAL FIRE ALARM SYSTEM REQUIREMENTS WITH THE LOCAL AUTHORITY HAVING JURISDICTION. GC/VENDOR/DESIGN PROFESSIONAL SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED SUBMITTAL DRAWINGS TO THE AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.

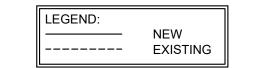
GC/VENDOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS

FOR THE FIRE ALARM WORK.

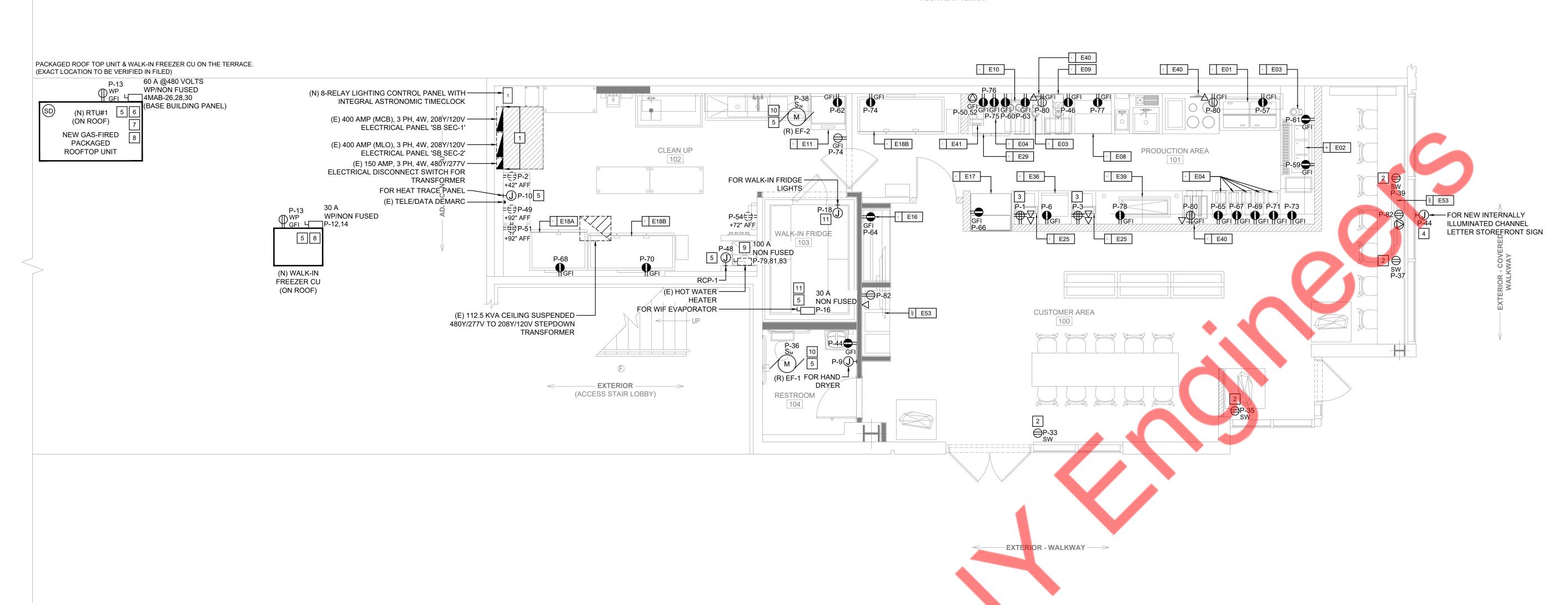
- **HOOD FIRE SUPPRESSION SYSTEM ELECTRICAL WORK** ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING INSTALLED WITHIN CONDUIT BETWEEN THE HOOD FIRE SUPPRESSION SYSTEM CONTROL PANEL AND ANY COMPONENT REQUIRED TO BE AUTOMATICALLY CONTROLLED OR DISCONNECTED FROM ITS POWER SUPPLY UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM.
- SHUNT-TRIP CIRCUIT BREAKERS IN AN ELECTRICAL PANEL, THE COIL OF ANY SHUNT-TRIP CONTACTOR, ELECTRICALLY OPERATED GAS VALVE. C. EC TO COORDINATE ALL ELECTRICAL WORK WITH MECHANICAL CONTRACTOR AND HOOD FIRE SUPPRESSION SYSTEM INSTALLER.

B. COMPONENTS TO BE CONNECTED TO THE HOOD FIRE SUPPRESSION SYSTEM

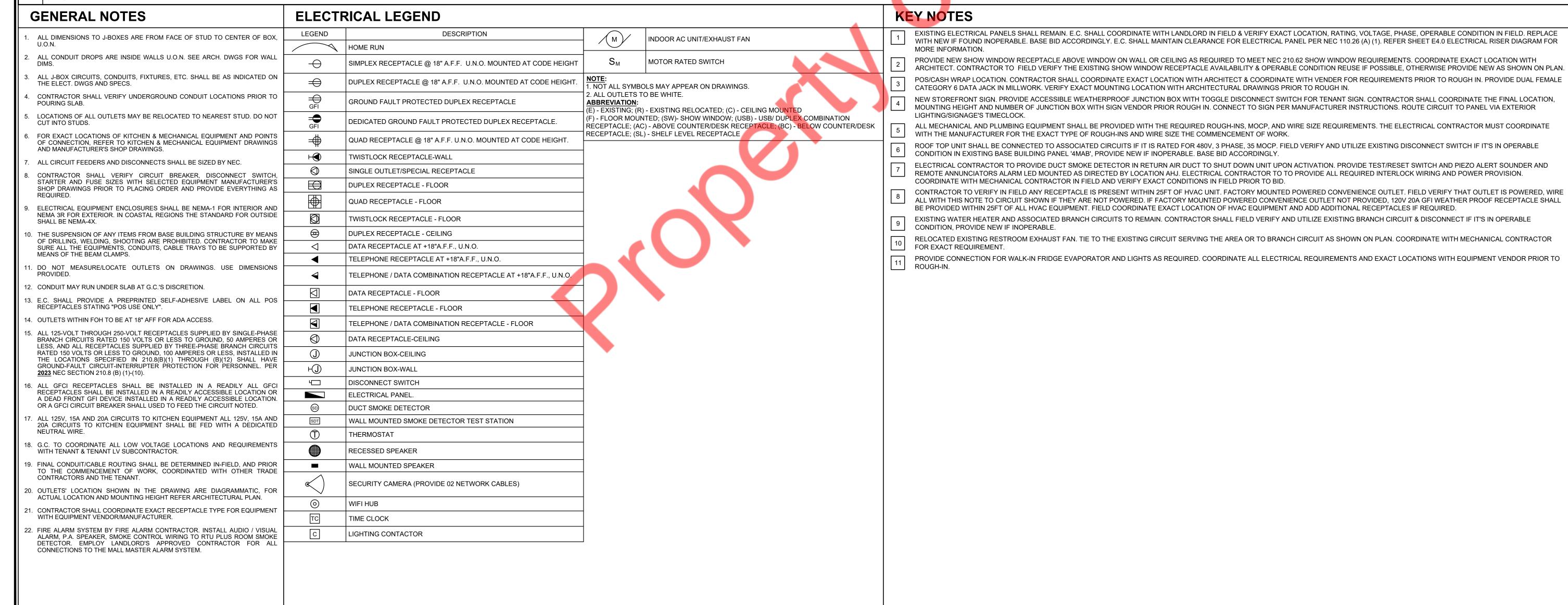
CONTROL PANEL INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, THE

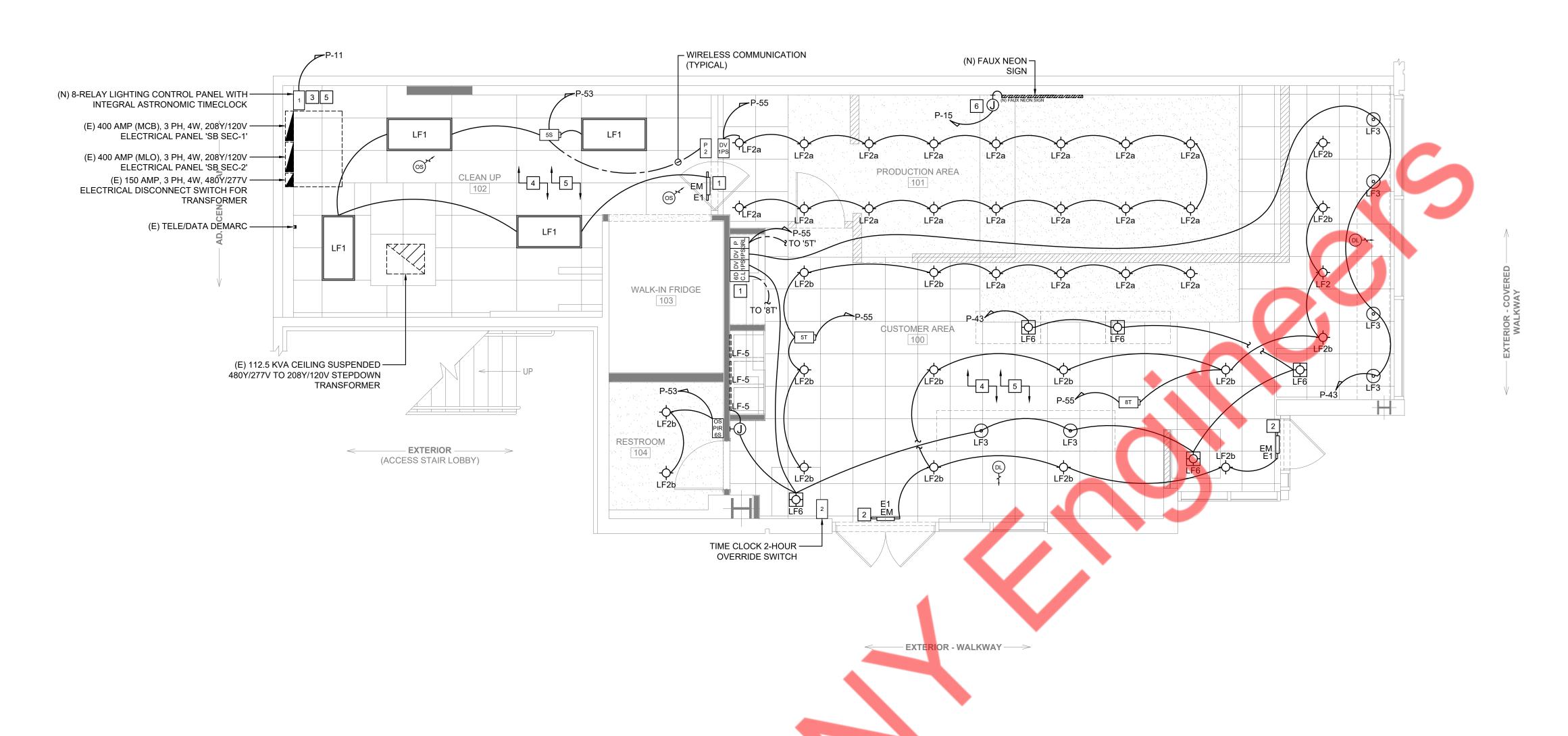






1 ELECTRICAL POWER PLAN





LIGHTING PLAN

(E):EXISTING, (R):RELOCATED, (NL):FIXTURE CONNECTED TO NIGHT LIGHT CIRCUIT, (EM):FIXTURE WITH EMERGENCY BATTERY BACK-UP.

PICO-WBX-ADAPT

LUTRON

NOTE: ANY LIGHTING CONTROL SUBSTITUTIONS TO BE APPROVED BY SUNLIFE ORGANICS LTD.

LIGHT FIX	XTUF	RE SCHEDUL	.E						
STYLE	TAG	MANUFACTURER	MODEL	DESCRIPTION	LAMP	WATTS	VOLTAGE	MOUNTING	REMARK
	LF1	HALCO	90520 (FPL-24-LS-CS-UNV)	2X4 FLAT PANEL, LUMEN SELECTABLE, CCT SELECTABLE, UNV 120-277V 0-10V DIMMABLE	LED	30-35 WATTS	120V	RECESSED	NEW LIGHTS TO MATCH EXISTING LIGHT
ф	LF2a	EIKO	CD6-PS208FCCT- UDIM-WH	6" ROUND FIXED RECESSED DOWNLIGHTING	LED	12 WATTS	120V	RECESSED	EXISTING CLOUD CEILING AT PRODUCTION AREA. CENTERED OR EQUALLY SPACED
ф	LF2b	LITHONIA	WF4LED 30K40K50K 90CRI MW	RECESSED LED LIGHT(SWITCHABLE WHITE COLOR TEMPERATURE)	LED	10.5 WATTS	120V	RECESSED	EXISTING DECK CEILING AT FRONT OF THE HOUSE. CENTERED OR EQUALL SPACED
\odot	LF3	KUZCO	ARCHIBALD 492316-BK/GD or CHROMA PD1712-BK	PENDANT LIGHT	LED	13 WATTS	120V	PENDANT	CUSTOMER AREA BAR COUNTER & CUSTOMER TABLE.
	J ₽4/		LYGYT PLANE+2R LPX2R-TM-FN-SILEWG7HJ-05-30-90-SL-V01/ SW-YNY-DC	LIMEAR RECESSED LED STRIP LIGHT	KED	3-12.2 WATTSKET	1/29/1	RECESSED	
	LF5	ALCON LIGHTING	12100-10-PR	SHELVING LIGHT: RECESSED LED STRIP LIGHT	LED	3-12.2 WATTS/FT	120V	RECESSED	LOCATED AT BUILT-IN-SHELVING AS BACKLIGHTING INSTALLED PER SHELVING INSERTS.
igorphi	LF6	LEVITON CONTECH	RDA4L230KC12D2M-WHT-P	ADJUSTABLE RECESSED MULTIPLES LIGHT	LED	14 WATTS	120V	RECESSED	CENTERED TO SPOT EACH FREE STANDING CRYSTAL
	E1	EXITRONIX	QCRS-U-WH	LED EXIT & EMERGENCY COMBO (MINIMUM 90-MINUTE EMERGENCY ILLUMINATION.)	LED	>5 WATTS	120V	CEILING, END OR WALL MOUNTED	PLACED AT ALL EXIT DOORS. USE GREEN LETTERING
<>	E2	SIGNIFY	VLLU	LED EMERGENCY LIGHT (MINIMUM 90-MINUTE EMERGENCY ILLUMINATION.)	LED	>5 WATTS	120V	CEILING, END OR WALL MOUNTED	3.6V, WHITE FINISH
$\otimes \overrightarrow{\otimes}$	E3	MAG TECH	KD800R-RC-W-1	LED EXIT SIGN (MINIMUM 90-MINUTE EMERGENCY ILLUMINATION.)	LED	>5 WATTS	120V	CEILING, END OR WALL MOUNTED	USE RED LETTERING
NOTE: ANY LIGHTING C	CONTROL	SUBSTITUTIONS TO BE APP	PROVED BY SUNLIFE ORGANICS LTD.						

LIGHTING	G CON	TROL SCH	IEDULE		X	
STYLE	TAG	MANUFACTURER	MODEL	DESCRIPTION	QUANTITY	REMARK
	DV 1PS	LUTRON	CA-1PS-WH	120/277 V, 15 A DIVA SWITCH, SINGLE POLE	3	
	OS PIR 6S	LUTRON	MS-OPS6M2-DV-WH	120/277 V, 6 A MAESTRO SWITCH WITH XCT, PIR OCCUPANCY AND VACANCY SENSOR, SINGLE-POLE/MULTI-LOCATION	1	
CONTROLS	P 2	LUTRON	PJ2-2B-GWH-L01	2 BUTTON WITH LIGHT ICON - PICO KEYPAD	1	
CONTROLS	P 3RL	LUTRON	PJ2-3BRL-GWH-L01	3 BUTTON WITH RAISE/LOWER AND LIGHT ICON - PICO KEYPAD	1	
	2	LUTRON	SS-1BI-GWH-E00	1-BUTTON LOW VOLTAGE 2-HOUR OVERRIDE SWITCH	1	
	1	LUTRON	XPS8-FT	8-RELAY LIGHTING CONTROL PANEL WITH INTEGRAL ASTRONOMIC TIMECLOCK	1	
SENSORS	\ -\DL	LUTRON	LRF2-DCRB-WH	RADIO POWR SAVR WIRELESS CEILING MOUNT DAYLIGHT SENSOR	2	
SENSORS	- \ -(0s)	LUTRON	LRF2-OCR2B-P-WH	RADIO POWR SAVR WIRELESS CEILING OCCUPANCY SENSOR	2	
	6D C.L	LUTRON	MRF2S-6CL-WH	MAESTRO WIRELESS DIMMER: SINGLE-POLE/MULTI-LOCATION, 120 V/150 W CFL/LED, 120 V/600 W INC.	1	
VIVE	58	LUTRON	RMJS-5R-DV-B	POWPAK 5 A RELAY MODULE WITH SOFTSWITCH	2	
	8T	LUTRON	RMJS-8T-DV-B	POWPAK DIMMING MODULE WITH 0-10 V CONTROL		
	-	LUTRON	CW-1-WH	CLARO WALLPLATE		
ACCESSORIES	-	LUTRON	CW-4-WH	CLARO WALLPLATE 4-GANG		

PICO WIRELESS CONTROL WALLBOX ADAPTER KIT

GENERAL NOTES

- ALL ELECTRICAL WORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE OR LOCAL CODE AND/OR OTHER AUTHORITIES HAVING JURISDICTION.
- 2. THE CONTRACTOR SHALL VISIT THE PROJECT SITE, REVIEW EXISTING CONDITIONS BIDDING AND START OF WORK.
- SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION AND QUANTITY OF LIGHTING FIXTURES. EMERGENCY AND EXIT LIGHTS SHALL BE INSTALLED AND CIRCUITED PER LATEST
- NATIONAL ELECTRICAL CODE AND ALL LOCAL CODES. ALL EMERGENCY AND EXIT FIXTURES SHALL HAVE A MINIMUM 90-MINUTE BATTERY BACK-UP.
- ELECTRICAL CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS AS REQUIRED FOR A FULLY COMPLETE AND OPERABLE SYSTEM.
- 6. ALL EQUIPMENT SHALL HAVE UL OR CSA LABELS.

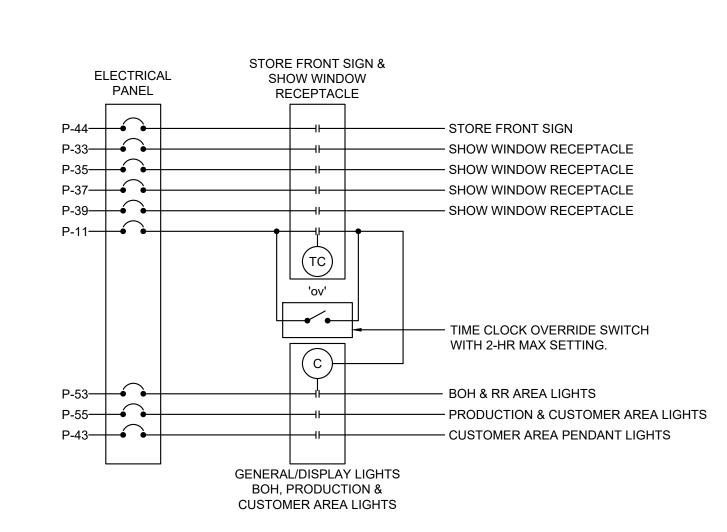
FIRE RATING OF THE CEILING.

- 7. G.C. IS RESPONSIBLE FOR ALL FINAL CONNECTION S, TERMINATIONS, AND COORDINATION IN ALL MILLWORK FIXTURES.
- ELECTRICAL CONTRACTOR'S BID SHALL INCLUDE INSTALLATION OF ALL LIGHT FIXTURES AND ASSOCIATED LAMPS. SOME FIXTURES REQUIRE ASSEMBLY, E.C. IS RESPONSIBLE TO ENSURE THE ADJUSTABILITY OF ALL DIRECTIONAL FIXTURES AFTER INSTALLATION AND SHALL AIM FIXTURES PER DIRECTION FROM OWNER. IF THE CEILING SYSTEMS ARE FIRE RATED, E.C. SHALL CLOSELY COORDINATE RECESSED FIXTURE REQUIREMENT WITH OWNER AND SUPPLIER TO MAINTAIN THE
- 9. G.C. SHALL PROVIDE TIME CLOCK PROGRAMMING TRAINING SESSION FOR THE STORE MANAGER AND AT LEAST ONE OTHER EMPLOYEE PRIOR TO PROJECT
- 10. ALL FIXTURES INSTALLED OUTDOORS SHALL BE RATED FOR DAMP/WET LOCATIONS AS REQUIRED. THE CONTRACTOR SHALL COORDINATE DAMP/WET LOCATION RATING PER NEC ARTICLE 410.10 (A). ALL INSTALLATIONS SHALL CONFORM TO NEC ARTICLE 410, ALL SUB ARTICLES. ALL FLUORESCENT FIXTURES THAT UTILIZE DOUBLE ENDED LAMPS AND CONTAIN BALLAST(S) THAT CAN BE SERVICED IN PLACE SHALL BE CODE COMPLIANT WITH N.E.C. 410.130(G)
- 1. THE ELECTRICAL LIGHTING INSTALLATIONS SHALL CONFORM TO ALL STATE AND LOCAL SEISMIC AND CODE REQUIREMENTS REGARDING LIGHT FIXTURE SUPPORT. ALL ELECTRICAL METALLIC TUBING (EMT), RIGID NON-METALLIC CONDUITS, "SEAL TIGHT" TYPE CONDUITS AND ALL OTHER CONDUITS THAT DO NOT CONTAIN A CODE SIZED GROUND WIRE SHALL HAVE A CODE SIZED BOND WIRE INSTALLED WITH THE CIRCUIT CONDUCTORS.
- 12. IF STORE IS AN OPEN DECK THEN ALL CAMERA AND SHOPPERTRAX LINES RUN THROUGH CONDUIT SO CAMERA/ SHOPPERTRAX CAN BE SECURED AT THE PROPER

KEY NOTES

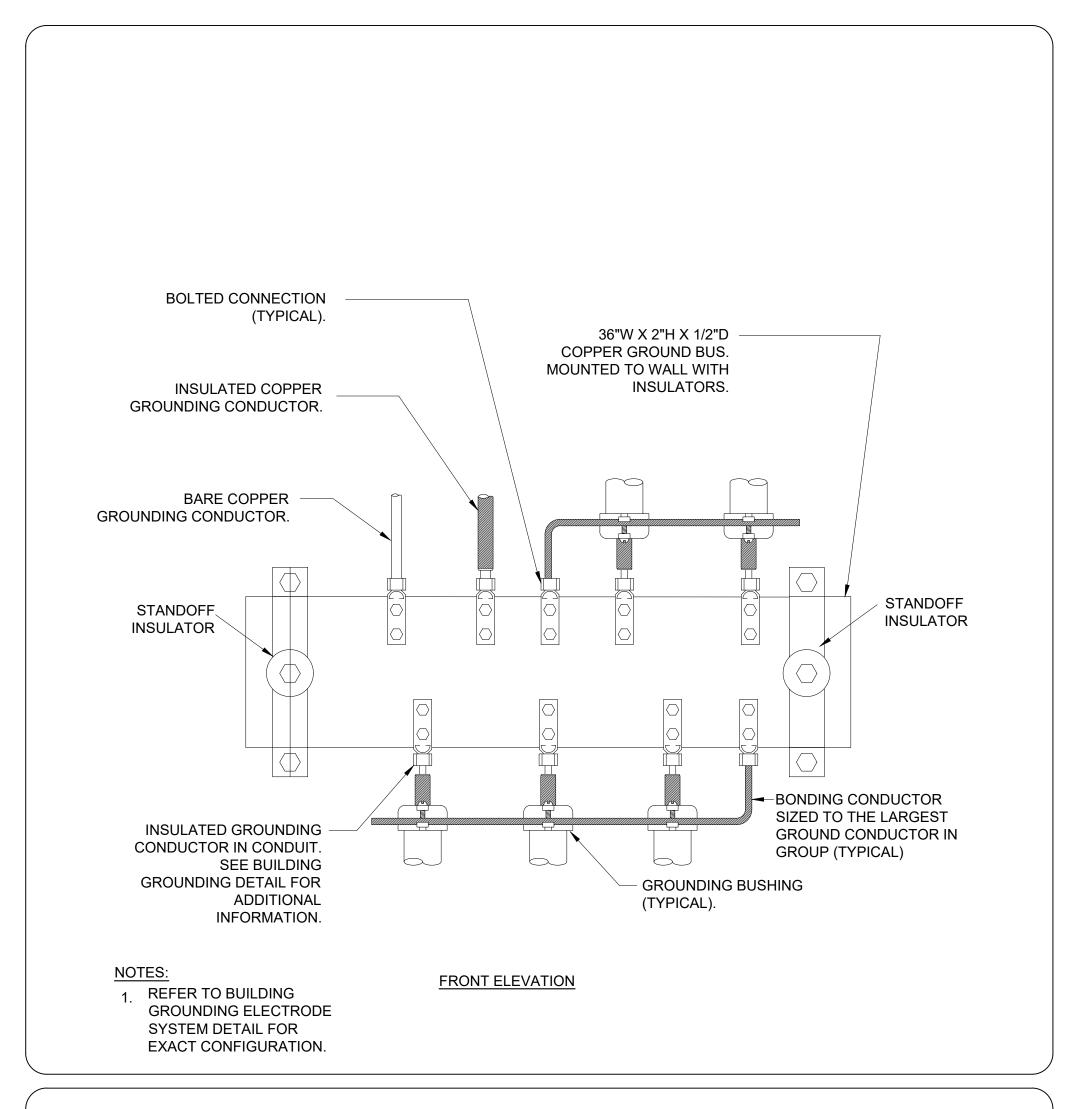
- NEW MASTER SWITCH BANK LOCATION. SEE DETAIL IN THIS SHEET FOR ADDITIONAL INFORMATION. VERIFY/CONFIRM LOCATION WITH OWNER PRIOR TO INSTALLATION AND ROUGH-IN.
- TIE NEW/EXISTING/RELOCATED NIGHT LIGHT, EXIT SIGN & EMERGENCY LIGHT WITH MINIMUM 90-MINUTES BATTERY BACK-UP TO AREA NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF CONTROL/SWITCHING, OR TO BRANCH CIRCUIT AS SHOWN ON PLAN.
- TIME CLOCK FOR LIGHTING & STOREFRONT SIGN CONTROL. CONTRACTOR SHALL VERIFY THE EXACT LOCATION & OPERABLE CONDITION IN FIELD REUSE IF POSSIBLE. OTHERWISE PROVIDE NEW TIME AGAINST THE PLANS, AND FAMILIARIZE HIMSELF WITH THE WORK PRIOR TO 3 CLOCK & LIGHTING CONTACTOR AS REQUIRED. REFER TO THE 'TIME CLOCK AND LIGHTING CONTACTOR DETAILS' ON TO SHEET E2.0. BASE BID ACCORDINGLY.
 - CONTRACTOR SHALL COORDINATE FINAL LOCATION, QUANTITY OF LOW VOLTAGE DEVICES (i.e., SPEAKERS, SECURITY SYSTEM DEVICES & CAMERAS) WITH ARCHITECT/OWNER AND EXACT ELECTRICAL REQUIREMENTS WITH SYSTEM VENDOR PRIOR TO ROUGH PER THE SITE CONDITIONS.
 - CONTRACTOR SHALL COORDINATE WITH LIGHTING SYSTEM VENDOR (i.e., LUTRON) FOR LIGHTING CONTROL PANEL AND CONTROL DEVICE'S EXACT ELECTRICAL REQUIREMENTS PRIOR TO ROUGH. BASE BID ACCORDINGLY. BASE BID ACCORDINGLY.
 - G.C TO COORDINATE EXACT LOCATION & POWER REQUIREMENT FOR THE FAUX NEON SIGN WITH BRAND STANDARD VENDOR PRIOR TO ROUGH-IN. PROVIDE CONCEALED ACCESSIBLE POWER FOR FAUX NEON SIGN. SIGN SUPPLIED BY BRAND STANDARD VENDOR, INSTALLED BY G.C.; CENTER VERTICALLY.

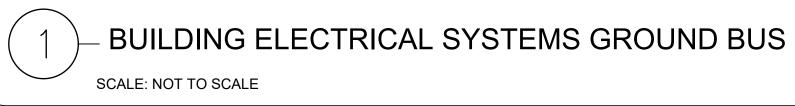
TIME CLOCK AND LIGHTING CONTACTOR DETAILS

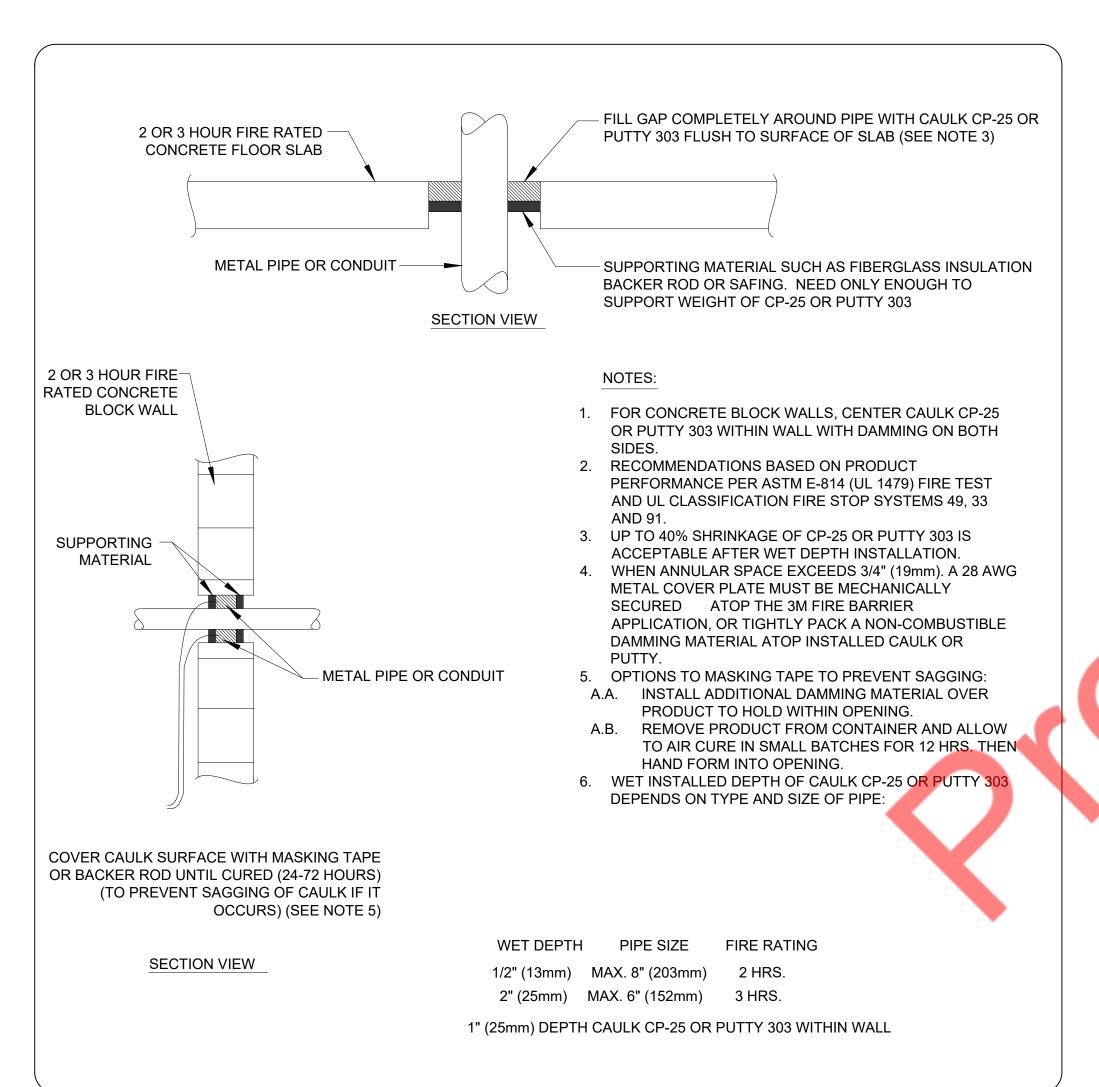


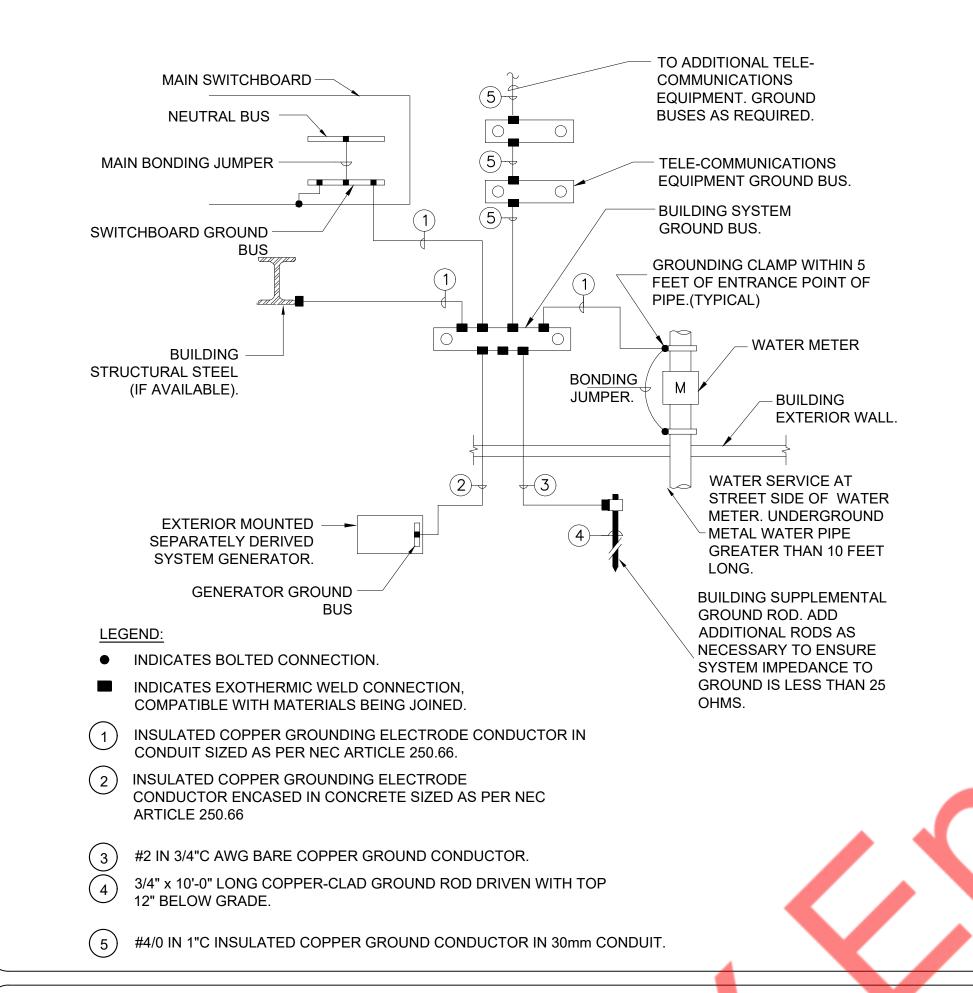
TIME CLOCK SCHEDULE:

- CONTRACTOR TO SET TIME CLOCK SETTINGS AND VERIFY WITH OWNER: LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM.
- DURING SET "OFF" TIME LIGHTING TO BE CONTROLLED BY A 2-HR MANUAL OVERRIDE SWITCH. COORDINATE WITH LIGHTING SYSTEM VENDOR (i.e., LUTRON) FOR
- LIGHTING CONTROL PANEL AND CONTROL DEVICES EXACT ELECTRICAL REQUIREMENTS PRIOR TO ROUGH. BASE BID ACCORDINGLY.

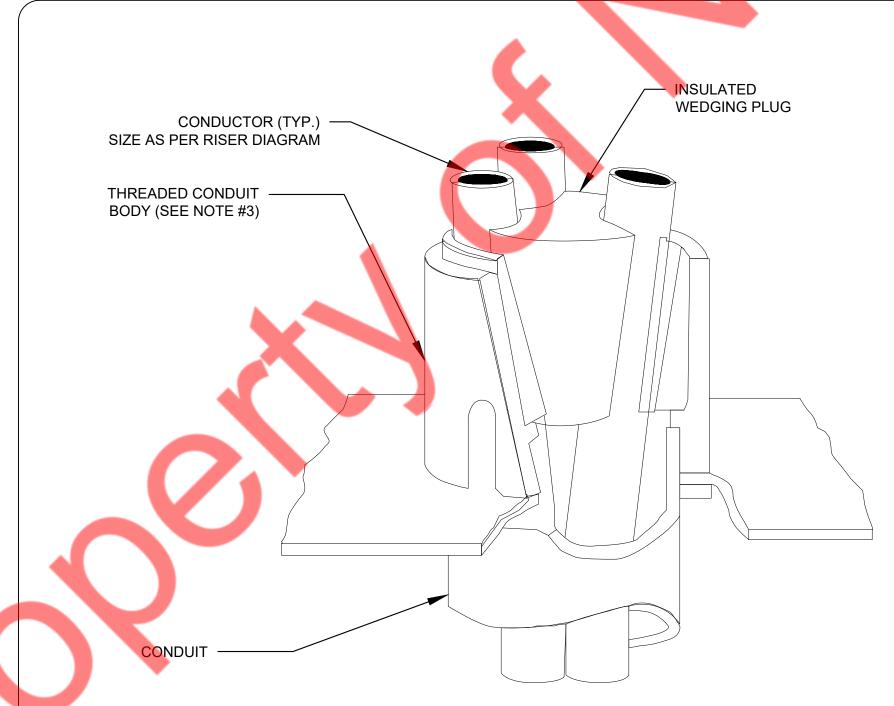




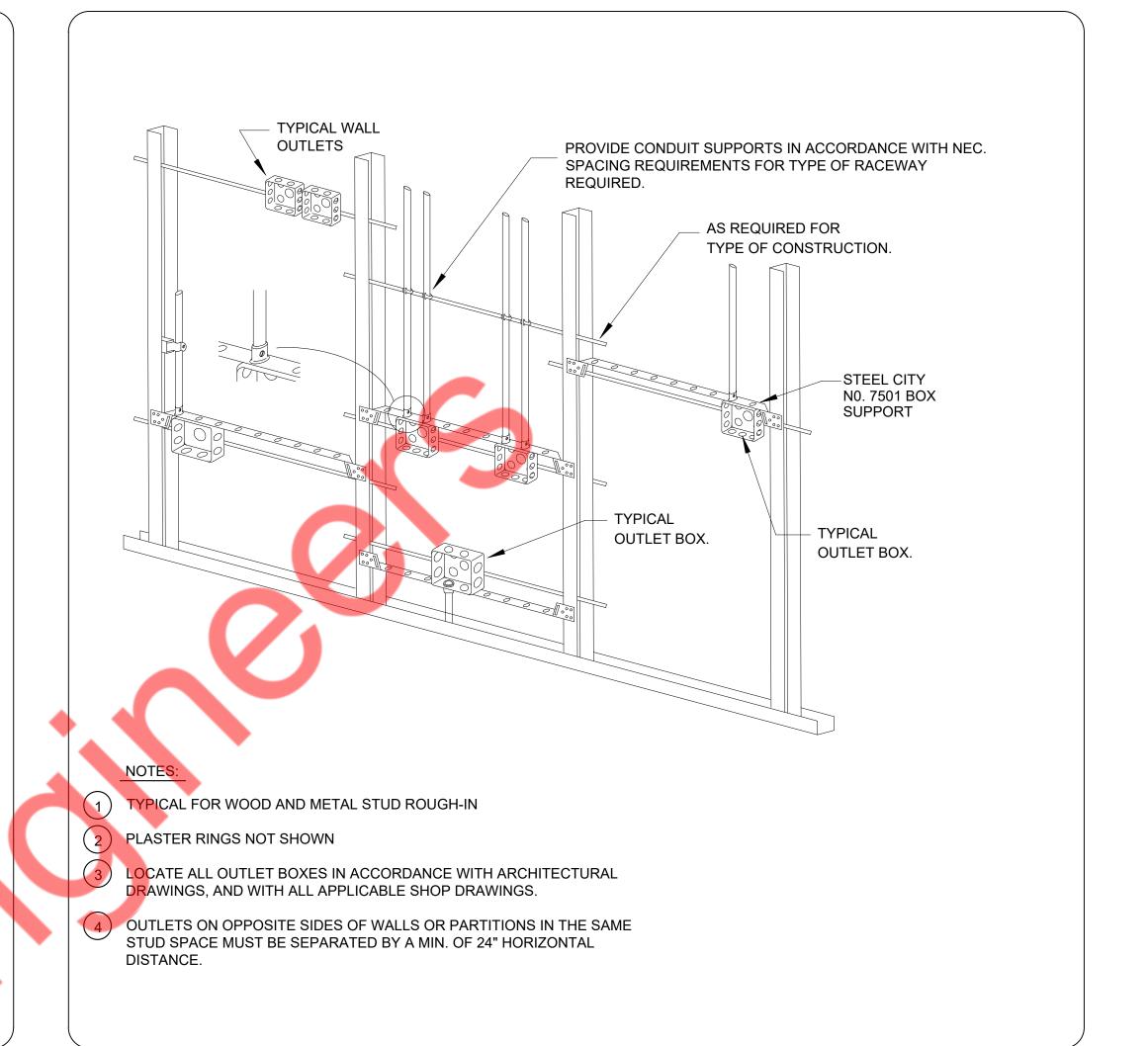






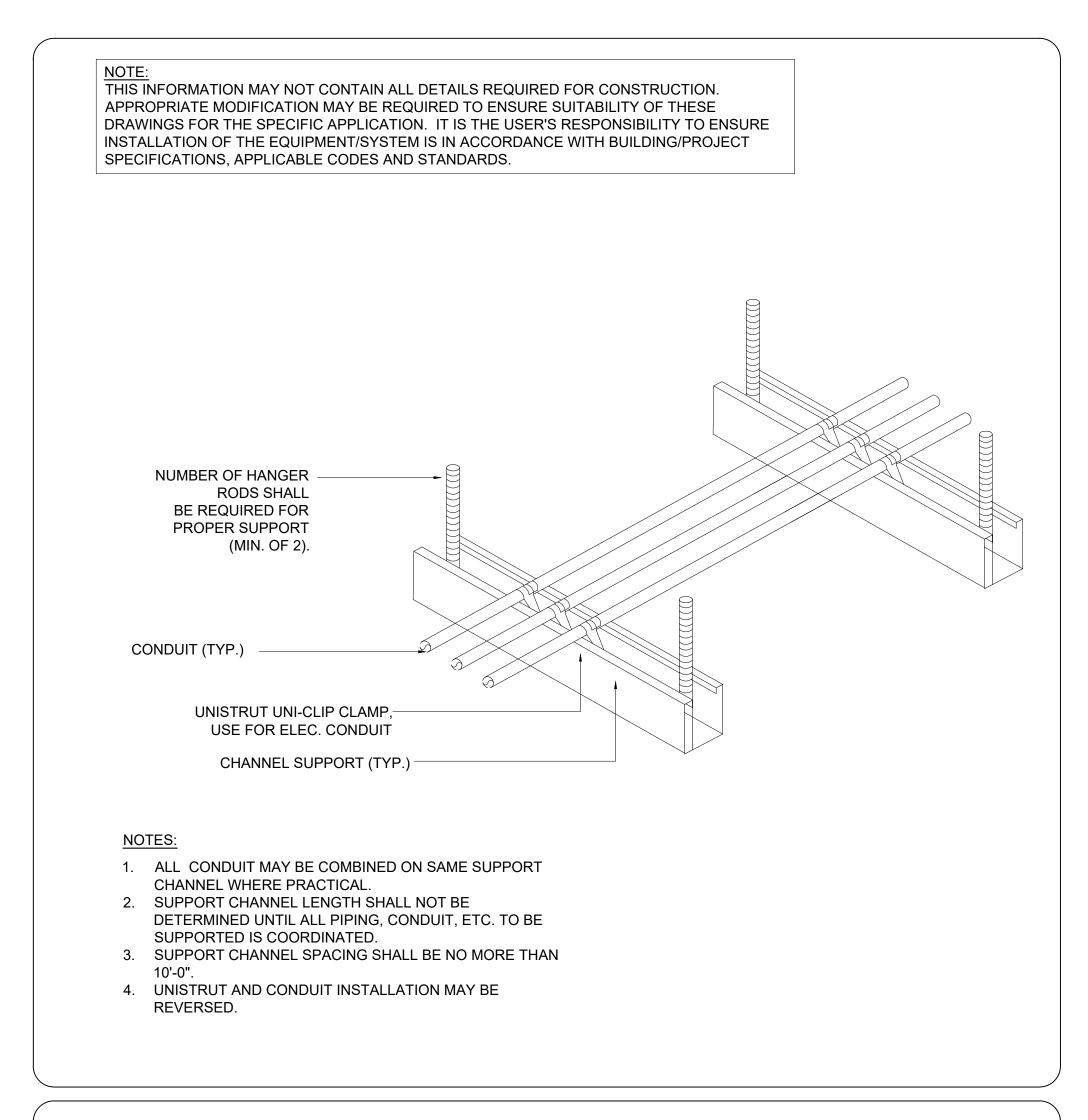


- . ALL CONDUCTORS IN VERTICAL RACEWAYS SHALL BE SUPPORTED IN ACCORDANCE WITH ARTICLE 300.19 OF NEC. CABLE SUPPORTS SHALL BE LOCATED AT THE INTERVALS REQUIRED BY THE NEC.
- 2. CABLE SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY O-Z GEDNEY WITH pOZi-GRIP "S-STYLE" WEDGING PLUG OR APPROVED EQUAL.
- 3. FOR THREADLESS CONDUIT (RIGID, IMC OR EMT), ATTACH CONDUIT BODY TO MALE THREADS OF A SET SCREW OR COMPRESSION CONNECT, AS PERMITTED BY SPECIFICATIONS.
- 4. PROVIDE PULL BOX AT EACH LOCATION OF CABLE SUPPORTS. PULL BOX SHALL BE SIZED AS PER CODE TO ACCOMMODATE ALL CONDUITS.





SCALE: NOT TO SCALE







SCALE: NOT TO SCALE



SCALE: NOT TO SCALE



A. HVAC CIRCUIT BREAKERS TO BE "HACR" TYPE WHERE REQUIRED BY EQUIPMENT BALANCE ALL PANELS AND ELECTRICAL EQUIPMENT, UNDER LOAD CONDITIONS, TO ±10% BETWEEN PHASES: A/B, B/C, C/A REGARDLESS OF CIRCUITING INDICATED. PROVIDE PROPER CLEARANCE MUST BE MAINTAINED ABOUT ELECTRICAL EQUIPMENT PER N.E.C. FIELD VERIFY EXACT MOUNTING SPACE AVAILABLE IN ELECTRICAL ROOM/AREA PRIOR TO MAKE ALL FINAL ELECTRICAL CONNECTIONS FOR A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM. ALL CONNECTIONS/DISCONNECTIONS TO LANDLORDS/UTILITIES → SUNLIFE SERVICE EQUIPMENT SHALL BE AS DIRECTED BY LANDLORDS/UTILITIES SITE LANDLORD — INTERIOR REPRESENTATIVE. TENANT GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ELECTRICAL ROOM SYSTEM SHALL BE GROUNDED TO THE MAIN BUILDING'S GROUNDING SYSTEM. - EXISTING 112.5KVA CEILING SUSPENDED DISCONNECT SWITCHES AND PANELS SHALL BE INSTALLED ON PLYWOOD TRANSFORMER, DRY TYPE STEP DOWN FROM 480V TO 208/120V. #6 GRD TO BUILDING STEEL AS PER NEC #250 TENANT CONTRACTOR MUST VERIFY ELECTRICAL SERVICE, SUB-FEED WIRING AND EXISTING 150AMP, 480Y/277V PANELS PRIOR TO START OF TENANT'S ELECTRICAL WORK. TENANT GENERAL 3PH DISCONNECT SWITCH CONTRACTOR SHALL MAKE APPLICATION TO THE LOCAL UTILITY FOR CONTINUED - EXISTING FEEDER SHALL REMAIN METERED ELECTRIC SERVICE IN THE TENANT'S NAME. TENANT GENERAL CONTRACTOR 4-600KCM + 1#3G, 3 1/2"C. (V.I.F.) SHALL CONFIRM ALL LOCAL UTILITY GUIDELINES AND REQUIREMENTS PRIOR TO BID, ______ SHALL INCLUDE THE COSTS OF THESE REQUIREMENTS IN THE BID, AND SHALL COMPLY - EXISTING ELECTRICAL PANELBOARD WITH THEM DURING CONSTRUCTION. AVAILABLE FAULT CURRENT AT SERVICE 208Y/120V, 3PH, 4W, 400AMP (MCB), 42-POLE EQUIPMENT SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER NATIONAL ELECTRICAL CODE ARTICLE 110.24. — EXISTING ELECTRICAL PANELBOARD 208Y/120V, 3PH, 4W, 400AMP (MLO), 42-POLE 4-----CONTRACTOR SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND EXISTING FEEDER SHALL REMAIN -3-1/0 + 1#6G, 1 1/2"C. (V.I.F.) CONTRACTOR SHALL COORDINATE WITH BASE BUILDING FOR THE EXACT LOCATION OF AMP 'SB SEC-1' "-___" 'SB SEC-2' K. CONTRACTOR SHALL VERIFY OPERABLE CONDITION INFIELD OF ALL EXISTING TO AMP REMAIN ELECTRICAL DEVICES/EQUIPMENTS AND REPLACE WITH NEW IF FOUND #1020 PANEL

'4T1AB'

800

EXISTING ELECTRICAL PANELBOARD ———

208Y/120V, 3PH, 4W, 800AMP (MCB)

EXISTING SERVICE FROM

ELECTRICAL EQUIPMENT SCHEDULE

LEGEND:

ROOF

GRADE LEVEL

EXISTING

	· ·		Г				ELEC	IRIC		EQUIPMENT SCH	IEDULE			T		
					1					ELECRTICAL		,				
ITEM NO.	QTY.	EQUIPMENT DISCRIPTION	VOLTS	PHASE	AMPS	KW	НР	DIRECT	PLUG	NEMA	CIRCUIT BREAKER & POLES	WIRE	AFF (IN)	MANUFACTURER	MODEL NUMBER	NOTE
E01	1	CHEST FREEZER	115	1	8	0.92				-	20A/1P	2-12 + 1#12G, 3/4"C.		NELSO MFG.	BD8	1,2,3
E02	1	COLD PAN	115	1	5	0.58	1/4		X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		RANDELL	9946SCN	1,2,3
E03	2	DIPPER WELL	120	1	1	0.10			X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		SERVER	87770	1,2,3
E04	6	BLENDER-THE QUIET ONE	120	1	15	1.50				-	20A/1P	2-12 + 1#12G, 3/4"C.		VITAMIX	36019	1,2,3
E08	1	JUICE COOLER	120	1	15	1.00			X	NEMA 5-20P OR NEMA L5-20P	20A/1P	2-12 + 1#12G, 3/4"C.		REVEAL	NE3620RSSV	1,2,3
E09	1	JUICER	120	1	9	1.08	1 1/3			-	20A/1P	2-12 + 1#12G, 3/4"C.		ROBOT-COUPE	J 100	1,2,4
E10	1	SOUP WARMER	120	1	12.5	1.50			X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		AVANTCO	177WK15002X7	1,2,4
E11	1	ICE MACHINE	115	1	11	1.27				-	20A/1P	2-12 + 1#12G, 3/4"C.		ICE-O-MATIC	CIM0430	1,2,3
E16	1	REFRIGERATED SELF-SERVICE CASE	120	1	16	1.20			X	NEMA 5-20P OR NEMA L5-20P	20A/1P	2-12 + 1#12G, 3/4"C.		STRUCTURAL CONCEPTS		1,2,3
E17	1	REFRIGERATED SELF-SERVICE UC CASE	120	1	10.8	0.98			X	NEMA 5-20P OR NEMA L5-20P	20A/1P	2-12 + 1#12G, 3/4"C.		STRUCTURAL CONCEPTS	C33R-UC	1,2,3
E18A	1	2 DOOR FREEZER	115	1	6.3	0.75	2/3		X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		TURBO AIR	M3F47-2-N	1,2
E18B	2	3 DOOR FREEZER	115	1	7.9	0.91	3/4		X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		TURBO AIR	M3F72-3-N	1,2
E25	2	POS REGISTER	115	1	5	0.58				-	20A/1P	2-12 + 1#12G, 3/4"C.				1,2,3
E29	1	UC FRIDGE	115	1	2	0.24	1/6		X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		BEVERAGE-AIR	UCR34HC	1,2,3
E36	1	UC FREEZER	115	1	3.6	0.41	2/5		X	-	20A/1P	2-12 + 1#12G, 3/4"C.		EXCELLENCE INDUSTRIES	CTF-3HC	1,2,3
E39	1	DROP IN COLD PAN	115	1	3.5	0.36	1/4		X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.		RANDELL	RCP-2N	1,2,3
E40	3	KITCHEN DISPLAY SCREENS	120	1					X	NEMA 5-15P	20A/1P	2-12 + 1#12G, 3/4"C.				1,2
E41	1	ESPRESSO	208	1	13	2.80			X	NEMA 6-20P	20A/2P	2-12 + 1#12G, 3/4"C.		SIMONELLI	PRONTOBAR TOUCH	1,2,4
E53	2	65 TV SUSPENDED	120	1						-	20A/1P	2-12 + 1#12G, 3/4"C.				1,2
WIF	1	WALK-IN FRIDGE CONDENSE <mark>R UN</mark> IT	208/230	1	15	3.10		X		-	20A/2P	2-12 + 1#12G, 3/4"C.				2
4411	1	WALK-IN FRIDGE EVAPORATOR	120	1	0.9	0.10		X		-	20A/1P	2-12 + 1#12G, 3/4"C.				2

NOTES: 1 THE CONTRACTOR SHALL COORDINATE THE EXACT RECEPTACLE TYPE FOR EQUIPMENT WITH THE VENDOR/MANUFACTURER AND THE EXACT MOUNTING HEIGHT WITH THE ARCHITECT.

ALL EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZE REQUIREMENTS. THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE FOR THE WORK COMMENCEMENT

3 RECEPTACLES SHALL BE MOUNTED TO BELOW COUNTER HEIGHT. 4 RECEPTACLES SHALL BE MOUNTED TO ABOVE BACK SPLASH.

CONTRACTOR TO VERIFY EXISTING CONDUIT DURING BIDDING STAGE AND REPORT TO

TENANT ARCHITECT ANY DISCREPANCIES THAT IS DIFFERENT THAN SHOWN ON PLANS.

ELECTRICAL WORK BEING SHOWN IN SCHEMATIC IS EXISTING UNLESS OTHERWISE

CONTRACTOR TO PROVIDE NEW NAME PLATE ON ELECTRICAL METER FOR IDENTIFICATION.

CONTRACTOR TO VERIFY IN FIELD THE EXACT USE OF THE EXISTING LIGHTING CONTACTORS PRIOR TO BID, REUSE IF POSSIBLE. PROVIDE NEW IF REQUIRED. SEE CONTACTORS DETAIL ON SHEET E4.0.

VERIFY THE FOLLOWING PRIOR TO BID/ PRICING:

ELECTRICAL RISER DIAGRAM

BALANCE SHEET TO CONSTRUCTION MANAGER AT PUNCHLIST.

THE EXISTING SWITCH GEAR AND EXACT POWER DISTRIBUTION .

INSTALLATION OF ELECTRICAL EQUIPMENT.

TERMINATION/DETERMINATION EXPENSES.

RISER DIAGRAM NOTES:

BACKERBOARDS.

INOPERABLE.

NAMEPLATE PER N.E.C.

- EXISTING CONDUIT AND FEEDERS SIZE BETWEEN TENANT SPACE AND LANDLORD SWITCHBOARD.
- EXISTING MAIN SERVICE DISCONNECT RATING. EXISTING METER.
- IF THE EXISTING SERVICE DISCONNECT AND FEEDERS ARE RATED FOR LESS THAN THE RATING SHOWN ON THIS RISER. NOTIFY THE PROJECT MANAGER AND ENGINEER IMMEDIATELY PRIOR TO SUBMITTING BID/ PRICING PACKAGE SO DRAWINGS CAN BE REVISED AND UPDATED ACCORDINGLY

RISER DIAGRAM KEYED NOTES: #

1. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF EXISTING DEMAND EMON METER OF PROJECT SPACE WITH BASE BUILDING /LANDLORD. OTHERWISE PROVIDE NEW DEMAND EMON METER AS REQUIRED. BASE BID ACCORDINGLY.

EXISTING FEEDER SHALL REMAIN

3-1/0 + 1#6G, 1 1/2"C. (V.I.F.)

ELECTRICAL PANEL SCHEDULE AND LOAD SUMMARY

PANEL SCHEDULE GENERAL NOTES:

- 1. ALL CIRCUITING SHOWN IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY CIRCUITING OF THE EXISTING DEVICES ON FIELD AND INFORM ENGINEER FOR DISCREPANCIES.
- 2. ELECTRICAL CONTRACTOR TO VERIFY THE EXACT PANEL SIZES AND INCOMING FEEDER
- 3. ALL EXISTING TO REMAIN ELECTRICAL DEVICES/EQUIPMENTS SHALL BE CONNECTED TO RESPECTIVE NEW/EXISTING PANELS. E.C. TO VERIFY EXACT DETAILS & CIRCUIT
- 4. ELECTRICAL CONTRACTOR TO COORDINATE WITH THE MANUFACTURER OF EQUIPMENT FOR THE WIRE SIZE & RATING OF MOCP BEFORE THE COMMENCEMENT OF WORK.
- 5. ELECTRICAL CONTRACTOR TO COORDINATE EXACT LOCATION AND ELECTRICAL REQUIREMENT OF PLUMBING/MECHANICAL EQUIPMENTS WITH RESPECTIVE SYSTEM CONTRACTOR/OWNER/ARCHITECT.
- 6. E.C. SHALL VERIFY THE EXACT CIRCUIT, CIRCUIT NUMBER IN FIELD & ADJUST / MODIFY CIRCUITING AS REQUIRED.

CODE NOTE PER NEC 408.4: EVERY CIRCUIT AND CIRCUIT MODIFICATION SHALL BE LEGIBLY IDENTIFIED AS ITS CLEAR, EVIDENT, AND SPECIFIC PURPOSE OR USE. THE IDENTIFICATION SHALL INCLUDE SUFFICIENT DETAIL TO ALLOW EACH CIRCUIT TO BE DISTINGUISHED FROM ALL OTHERS. CIRCUIT DIRECTORY SHALL BE LOCATED ON THE FACE OR INSIDE THE PANEL DOOR IN THE CASE OF THE PANELBOARD.

CONTRACTOR TO VERIFY ANY EXISTING CIRCUITS TO REMAIN, MAINTAIN AS REQUIRED.

CONTRACTOR TO MAKE UNUSED BRANCH CIRCUIT BREAKER SPARE AND AVAILABLE FOR NEW CIRCUIT. ALL ELECTRICAL WORK SHALL BE DESIGNED PER UCC ELECTRICAL SUBCODE (NEC-2020

ADDITIONS. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES

OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.

WITH AMENDMENTS AND ADDITIONS), AND ASHRAE 90.1, 2019 WITH AMENDMENTS AND

THE MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER CONDUCTORS AND BRANCH CIRCUIT CONDUCTORS TO THE FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5 PERCENT.

					EL	EC	TRI	CAL	PANI	EL SO	CHE	DUL	E.					
PANE	LBOAR	RD		SB SEC-1' (P)	VOLTAC	3E	120	/ 208 V	PHASE			3	WIRE		4			
PANE	L TYPE	.		MCB	MAINS		400	OA MCB	BUS RAT	ING	40	00A	AIC RATII	NG	FIELD VERIFY	7	•	
NEMA	TYPE	ENCLO	SURE	1	MOUNT	ING	SU	RFACE	OPTIONS				NOTE		EXISTING PANEL			
СКТ.	EQT	СКТ	DECOR	DTION	POLE	WIRE	BKR.	TOTAL	PHASE	TOTAL	BKR.	WIRE	POLE	DE	CODIDTION	СКТ	EQT	СКТ.
NO.	TAG	TAG	DESCRI	PHON		SIZE	SIZE	WATTS		WATTS	SIZE	SIZE		DE	SCRIPTION	TAG	TAG	NO.
1		(N)	E25 POS R	REGISTER	1	12	20	360	Α	360	20	12	1	REC GFI B	ACK ROOM ELECT	(N)		2
3		(N)	E25_POS R	REGISTER	1	12	20	360	В	1,500	20	12	1	INSTA	HOT WATER			4
5			SPA	DE	2		50		С	500	20	12	1	E36_U	JC FREEZER	(N)		6
7									Α	540	20	12	1		I_GFI_BOH	(N)		8
9		(N)	HAND D		1	12	20	1,500	В	1,500	20	12	1	A HEAT 1	RACE PANEL	(N)		10
11		(N)	LCP/TIME		1	12	20	500	С	1,550	20	12	2	WALK-	IN FRIDGE CU	(N)		12
13		(N)	REC_WP/		1	12	20	180	A	1,550						<u> </u>		14
15		(N)	FAUX NE	ON SIGN	1	12	20	1,200	В	55	20	12	1		DGE EVAPORATOR	(N)		16
17			SPA	RE	2		50		С	100	20	12	1	WALK-IN	FRIDGE LIGHTS	(N)		18
19			SPA	DE .	1		20		A		50		2		SPARE			20
21 23			SPA SPA		1		20		B							-		22 24
25			SPA SPA		1		20		A		50		2		SPARE			26
27					•				В							1		28
29			SPA	RE	2		30		C		50		2		SPARE			30
31			SPA	RE	1		20		A									32
33		(N)	REC_SHOW	WINDOW	1	12	20	500	В		50		2		SPARE			34
35		(N)	REC_SHOW	WINDOW	1	12	20	500	С	500	20	12	1	(R) EF-1	(N)		36
37		(N)	REC_SHOW	WINDOW	1	12	20	500	Α	500	20	12	1		R) EF-2	(N)		38
39		(N)	REC_SHOW		1	12	20	500	В	180	20	12	1		C_GFI_RR	(N)		40
41		(N)	REC_GEN SE	ATING AREA	1	12	20	1,080	C						SPACE			42
ALL P	HASES	S TO BE	BALANCED TO W	ITHIN 7%						(E)	EXISTING	G TO REM	IAIN					
A=	3,990			WATTS						(N)	NEW CIF	RCUIT						
B=	7,295			WATTS						GFCI	GROUNE	FAULT (CURRENT	INTERRUPTER				
C=	4,730			WATTS						IG	CIRCUIT	S WITH IS	OLATED G	ROUND				
	,									тс	CIRCUIT	S ON TIM	ECLOCK					
									<i>_</i>				EMS PANE	=1				
TOTA	I CONI	NECTE	D LOAD	16,015	WATTS			45	AMPS		BREAKE							
		AND LC		16,790	WATTS			45	AMPS			_	ROLLING L	ICHTS				
IOIA		MIND LC	שאי	10,730	WAIIS			4/	AIVIPS	i a,b,c	SWITCH	ES CONT	NOLLING L	IGU 19				-

			PANE	LBOAF	RD
	•		PANE	L TYPE	•
			NEMA	TYPE	ΕN
СКТ	EQT	СКТ.	CKT.	EQT	C
TAG	TAG	NO.	NO.	TAG	T
(N)		2	43		(I
		4	45		
(N)		6	47		
(N)		8	49		(
(N)		10	51		(
(N)		12	53		(1
(14)		14	55		Ü
(N)		16	57		(1
(N)		18	59		(1
		20	61		(1
		22	63		(1
		24	65		(1
		26	67		(1
		28	69		(1
		30	71		(1
		32	73		(1
		34	75		(1
(N)		36	77		(1
(N)		38	79		
(N)		40	81		(1
		42	83		
			ALL P	HASES	S T
			A=	20,055	5
			B=	18,350)
			C=	15,740)
				L CON	
			TOTA	L DEM	ANI

		Е	LECTRICAL LO	AD S	UMN	1 ARY	
DESCRIPT	ION		NEC CONNECTED kW	VOLT	PHASE	NEC DEMAND FACTOR	NEC DEMAND kW
LIGHTING	i- 120V		2.8	120	1	1.25	3.5
INTERIOR	SIGN		1.2	120	1	1.25	1.5
RECEPTAC	CLES		9.2	120	1	>10kW=10+[0.5*(kW-10)]	9.2
STOREFRO	ONT SIGN		1.2	120	1	1.25	1.5
s/w out	LETS		2.0	120	1	1.25	2.5
EXH. FAN	S		1.0	208	1	1.00	1.0
REFRIGER	ATION EQUIPMENT		3.2	208	1	1.00	3.2
KITCHEN	EQUIPMENT		25.4	208	1	0.65	16.5
HOT WAT	ER HEATER		24.1	208	3	1.00	24.1
TOTALS			70.2				63.1
**		EST MOTOR OR 12 REQUIREME	COMPRESSOR IN SYSTEM NT (200 VA PER FOOT OF				
	N.E.C. DEMAND kV			MINIMU	JM FEEDE	ER AMPERAGE	
63.1	<u>x 1000 = </u>	<u>63,056</u>	175.0	AMPS	USE (EXI	STING) 400AMP FEEDER FRO	M BASE BUILDING.
<u> </u>					•	•	

PANE	LBOAR	D		SB SEC-2' (P)	VOLT	AGE	120	/ 208 V	PHASE			3	WIRE		4	<u> </u>		
PANE	L TYPE			FEED THROUGH	MAINS	3	40	OA MCB	BUS RATI	NG	40	0A	AIC R	ATING	FIELD VERIFY			
NEMA	TYPE	ENCLO	SURE	1	MOUN	ITING	SL	JRFACE	OPTIONS				NOTE		EXISTING PANEL			
СКТ.	EQT	СКТ			POLE	WIRE	BKR.	TOTAL	PHASE	TOTAL	BKR.	WIRE	POLE			СКТ	EQT	СК
NO.	TAG	TAG	DESCR	RIPTION		SIZE	SIZE	WATTS		WATTS	SIZE	SIZE		DESCR	IPTION	TAG	TAG	NC
43		(N)	LIGHTING_PF	REP, DINNING	1	12	20	500	Α	1,200	20	12	1	STOREFR	ONT SIGN	(N)		44
45			SP/		1		20		В	800	20	12	1	E09 JI	JICER	` '		46
47			SPA	\RE	1		20		С	125	20	12	1	RCI	P-1	(N)		48
49		(E)	REC_DED_CAI	VIERA SYSTEM	1	12	20	1,500	Α	1,400	20	12	2	E41_ESF	DECCO	/NI\		50
51		(E)	REC_DED_SEC	CURITY ALARM	1	12	20	1,500	В	1,400	20	12		E41_E3F	KESSU	(N)		52
53		(N)	LIGHTING	RR/BOH	1	12	20	500	С	180	20	12	1	REC_GFI_I	MOP SINK	(E)		54
55		(N)	LIGHTING_PF	REP, DINNING	1	12	20	1,200	Α		30		2	SPA	DE			56
57		(N)	E01_CHES	T FREEZER	1	12	20	920	В		30			357				58
59		(N)	E02_CO	LD PAN	1	12	20	575	С	1,500	20	12	1	E10_SOUP	WARMER	(N)		6
61		(N)	E03_DIPP	ER WELL	1	12	20	100	A	1,275	20	12	1	E11_ICE I	MACHINE	(N)		6
63		(N)	E03_DIPP		1	12	20	100	В	980	20	12	1	E16_REF SELF-		(N)		64
65		(N)	E04_BLENDER-	THE QUIET ONE	1	12	20	1,500	С	1,200	20	12	1	E17_REF SELF-SE	RVICE UC CASE	(N)		60
67		(N)	E04_BLENDER-		1	12	20	1,500	A	750	20	12	1	E18A_2 DOO		(N)		68
69		(N)	E04_BLENDER-		1	12	20	1,500	В	910	20	12	1	E18B_3 DOO	R FREEZER	(N)		7
71		(N)	E04_BLENDER-		1	12	20	1,500	С		20		1	SPA				7:
73		(N)	E04_BLENDER-		1	12	20	1,500	A	910	20	12	1	W18B_3 DOC		(N)		74
75		(N)	E04_BLENDER-		1	12	20	1,500	В	240	20	12	1	E29_UC		(N)		70
77		(N)	E08_JUICE	COOLER	1	12	20	800	С	360	20	12	1	E39_DROP IN		(N)		78
79								7,500	A	720	20	12	1	E40_KITCHEN DIS		(N)		80
81		(E)	WATER	HEATER	3	4	80	7,500	В	1,000	20	12	1	E53_65 TV S		(N)		82
83								7,500	С		15		1	SPA	ARE			84
			BALANCED TO V								EXIST			AIN				
A =	20,055			WATTS						` ,	NEW							
B=	18,350			WATTS						GFC	GROL	JND FA	ULT C	URRENT INTERRU	IPTER			
C=	15,740			WATTS						IG	CIRCL	JITS W	ITH IS	OLATED GROUND				
										TC	CIRCL	JITS O	N TIME	CLOCK				
										EMS	ROUT	ING TO	THE	EMS PANEL				
TOTA	L CON	NECTE	D LOAD	54,145	WATI	S		151	AMPS		BREA							
	L DEMA			46,266	WATI			129	AMPS					ROLLING LIGHTS				

LUMBING SPECIFICATIONS

THE "ARCHITECTURAL GENERAL CONDITIONS" GOVERN WORK UNDER THIS SECTION.

BEFORE SUBMITTING A PROPOSAL, THIS CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS. IT IS EXPRESSLY UNDERSTOOD THAT THIS PROPOSAL IS BASED ON THE ABOVE REQUIREMENTS AND THAT IT COVERS EVERYTHING NECESSARY TO DO AND COMPLETE THE WORK.

NO DEVIATION FROM THE DRAWINGS AND /OR SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF ARCHITECT OR ENGINEER. THIS 10. CUTTING AND PATCHING CONTRACTOR SHALL COOPERATE WITH THE OTHER CONTRACTORS TO ALLOW FOR THE INSTALLATION OF THEIR WORK AS WELL AS HIS OWN.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK FITTING IN PLACE ALL OF THIS CONTRACTOR'S WORK, EXCEPT WHERE NOTED OTHERWISE. WITHOUT CONFLICT WITH THE OTHER TRADES, WHERE PROPER PLANNING COULD

NOTHING IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE INTERPRETED TO AND/OR FLOOR PENETRATED. CONFLICT WITH ANY CITY OR PROVINCIAL LAW, REGULATION, CODE, ORDINANCE,

SHOULD THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH SUCH LAWS OR 11. ACCESS PANELS ORDINANCES, THE CONFLICTING PORTION OF THE WORK SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH SUCH LAWS AND ORDINANCES WITHOUT EXTRA

THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED FOR THIS INSTALLATION OF HIS WORK.

4. ACCURACY OF DATA

AVOID INTERFERENCE.

BE SECURED, BUT ITS EXTREME ACCURACY IS NOT GUARANTEED. THIS CONTRACTOR SHALL EXAMINE THE LOCATIONS AND VERIFY ALL MEASUREMENTS, MINIMUM SIZE FOR VALVES. DISTANCES, ELEVATIONS AND EXISTING PIPE SIZES BEFORE STARTING THE WORK AS ALL PIPING SYSTEMS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY OFFSETS, RAISED AND

ADDITIONAL COST.

MECHANICAL DRAWINGS SHALL NOT BE USED FOR GENERAL CONSTRUCTION DIMENSIONS OR FOR TYPE OF MATERIAL USED. FOR EXACT BUILDING LAYOUT, DIMENSIONS AND BUILDING MATERIAL USED, THIS CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS.

SHOP OR INSTALLATION DRAWINGS, FOUNDATION PLANS, EQUIPMENT OR APPARATUS DRAWINGS SHALL BE FURNISHED BY THIS CONTRACTOR. THESE DRAWINGS SHALL BE CLEARLY MARKED INDICATING WHICH ITEMS ARE TO BE SUPPLIED AND SHALL STATE CAPACITIES, SIZES AND GENERAL DESCRIPTION OF THE SUBMITTALS.

SHOP DRAWINGS OF SPECIAL APPARATUS OR EQUIPMENT WHICH IS TO BE FABRICATED INDIVIDUALLY FOR THIS PROJECT AND IS NOT DESCRIBED BY STANDARD MANUFACTURER'S DRAWINGS OR BULLETINS SHALL BE SUBMITTED FOR PROCESSING BEFORE FABRICATION.

THESE DRAWINGS SHALL BE SUBMITTED IN A TIMELY MANNER.

NOT PURCHASE ANY EQUIPMENT UNTIL SHOP DRAWINGS HAVE BEEN PROCESSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY FEES ACCRUED FROM THE RETURN OF FIXTURES PURCHASED PRIOR TO THE REVIEW OF SHOP DRAWINGS AND THAT ARE NOT APPROVED.

THIS CONTRACTOR SHALL SUBMIT NO DRAWINGS WITHOUT NOTATION INDICATING DATE OF CONTRACTOR'S REVIEW AND SIGNATURE OF CHECK FOR 15. EXPANSION JOINTS CONTRACTOR TOGETHER WITH CONTRACTOR'S NAME AND PROJECT IDENTIFICATION.

ARCHITECT'S PROCESSING WILL NOT CONSTITUTE A COMPLETE CHECK BUT WILL INDICATE ONLY THAT GENERAL METHOD OF CONSTRUCTION AND DETAILING IS SATISFACTORY.

ARCHITECT'S PROCESSING WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS SINCE THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR DIMENSIONS AND DESIGNS OF ADEQUATE CONNECTIONS, DETAILS AND SATISFACTORY CONSTRUCTION OF ALL WORK, AS WELL AS FURNISHING MATERIALS AND WORKMANSHIP REQUIRED BY DRAWINGS AND SPECIFICATIONS WHICH MAY NOT BE INDICATED ON THE SUBMITTALS WHEN APPROVED.

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING ENGINEER REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM SHALL NOT INCLUDE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE CONTRACTOR IS RESPONSIBLE FOR: EQUIPMENT VOLTAGES AND DIMENSIONS TO BE CONFIRMED AND CORRELATED WITH ALL DISCIPLINES PRIOR TO PURCHASE; INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES. SEQUENCES AND PROCEDURES OF CONSTRUCTION; COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN A

6. SUBSTITUTIONS OF EQUIPMENT OR MATERIAL

SAFE AND SATISFACTORY MANNER.

THE BRAND NAMES OF EQUIPMENT OR MATERIALS SPECIFIED HEREIN SHALL

APPROVAL OF SUBSTITUTED ITEMS WILL BE BASED ON ABILITY AND CAPACITY TO PERFORM FUNCTION SERVED, QUALITY AND AVAILABILITY OF PARTS AND 17. VALVES SERVICE, QUALITY OF EQUIPMENT, DELIVERY SCHEDULE, ETC. THE ARCHITECT SHALL REVIEW ALL SUCH REQUESTS BUT RESERVES THE SOLE RIGHT OF THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVES OF ONE JUDGEMENT TO APPROVE OR REJECT THE PROPOSED SUBSTITUTIONS.

CONTROLS OR INSTALLATION REQUIRED BECAUSE OF THE SUBSTITUTION OR CONSIDERED EQUIVALENT. EQUIPMENT SHALL BE PAID FOR BY THIS CONTRACTOR PROPOSING THE SUBSTITUTION.

7. ERECTION OF APPARATUS

ALL WORK SHALL BE DONE UNDER THE PERSONAL SUPERVISION OF THIS CONTRACTOR WHO SHALL PROVIDE A COMPETENT FOREMAN TO LAY OUT ALL WORK. ALL WORK SHALL BE LAID OUT WITH DUE REGARD FOR THE SPACE REQUIREMENTS OF THE OTHER CONTRACTORS. THIS CONTRACTOR SHALL REPORT ANY CONFLICTS OR DIFFICULTIES IN REGARD TO THE INSTALLATION IMMEDIATELY.

WHERE CROWDED LOCATIONS EXIST OR WHERE THERE IS A POSSIBILITY OF BALL VALVE UP TO 3" IN SIZE SHALL BE APOLLO SERIES #70 BRONZE VALVE WITH CONFLICT BETWEEN TRADES, THIS CONTRACTOR SHALL MAKE COMPOSITE CHROME-PLATED BALL AND TEFLON SEAT. DRAWINGS SHOWING THE EXACT LOCATIONS OF PIPES, DUCT, CONDUIT AND BY ARCHITECT AND ENGINEER BEFORE INSTALLATION OF THE WORK.

EQUIPMENT OF A TYPE TO REQUIRE REPLACEMENT, SERVICING, ADJUSTING OR HOSE END VALVES SHALL BE #438 GATE VALVES WITH HOSE END NIPPLES. MAINTENANCE SHALL BE LOCATED TO ALLOW EASY ACCESS AND SPACE FOR REMOVAL OF INTERNAL ASSEMBLIES, IT REQUIRED.

8. EXCAVATION AND BACKFIL

THIS CONTRACTOR SHALL DO ALL EXCAVATION REQUIRED TO INSTALL PIPES AND ABLE TO INSTALL HIS WORK WITHOUT CUTTING OR BREAKING OF FLOORS OR EQUIPMENT SHOWN ON THE PLANS OR REQUIRED FOR PROPER OPERATION. WALLS. ALL SLEEVES FOR INSULATED PIPING SHALL BE LARGE ENOUGH TO EXCESS EXCAVATION BELOW THE REQUIRED LEVEL SHALL BE BACKFILLED WITH ALLOW INSULATION TO PASS THROUGH SLEEVE. EARTH AND THOROUGHLY TAMPED. UTILITIES SERVICES LINES SHALL BE INSPECTED AND APPROVED BY THE PROPER INSPECTION AUTHORITY BEFORE ALL SLEEVES PASSING THROUGH FLOORS WHICH ARE WATERPROOFED

INSTALLATION RECOMMENDATIONS OF THE PIPE AND FITTINGS MANUFACTURER, REMAINING SPACE FILLED WITH MASTIC AND MUST BE WATERTIGHT. APPENDIX X1 OF ASTM D2265 (STORAGE AND INSTALLATION PROCEDURES FOR PLASTIC DRAIN, WASTE, AND VENT PIPING) AND FOR BURIED PIPE ASTM D2321 ALL SLEEVES PASSING THROUGH INNER WALLS SHALL BE STANDARD PIPE (STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC THIMBLES EQUAL TO THE THICKNESS OF THE WALL PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS). SUCH INSTRUCTIONS SHALL INCLUDE BUT ARE NOT LIMITED TO CUTTING, SOLVENT SPACES BETWEEN PIPES AND SLEEVES THROUGH OUTSIDE WALLS, ABOVE CEMENTING AND PRIMING, JOINTS, CONNECTIONS, TRANSITIONS, ALIGNMENT AND

GRADE, SHALL BE CAULKED WITH CAULKING COMPOUND; THOSE BELOW GRADE GRADE, TRENCHING, BEDDING, BACKFILL AND COMPACTION, SUPPORTS AND SHALL BE MADE WATERTIGHT. SPACING AND ALLOWANCE FOR THERMAL EXPANSION.

CAST IRON PIPING TRENCHING SHALL BE IN ACCORDANCE TO THE CAST IRON SOIL PIPE AND FITTINGS HANDBOOK ISSUED BY THE CAST IRON SOIL PIPE INSTITUTE.

THE BOTTOM OF TRENCHES SHALL BE TAMPED HARD AN GRADED TO SECURE THE BUILDING FELTS OR FOAM WRAP. REQUIRED FALL. ROCK, WHERE ENCOUNTERED SHALL BE EXCAVATED TO A DEPTH 19. HANGERS OF SIX INCHES (6") BELOW THE BOTTOM OF THE PIPE, AND BEFORE THE PIPE IS LAID. THE SPACE BETWEEN BOTTOM PIPE AND ROCK SURFACE SHALL BE FILLED WITH GRAVEL. IF TRENCHES ARE DEEPER THAN BOTTOM OF FLOORING OR CLOSER THAN THREE FEET (3'0") TO FOOTING THEY MUST BE FILLED WITH COHESIVE SOIL AND COMPACTED TO 95% OF MAXIMUM DENSITY, STANDARD PROCTOR, ASTM D- 698. ALL OTHER EXCAVATIONS UNDER FLOOR SLABS COMPACTED TO 95% STANDARD PROCTOR.

WHEN EXCESS DIRT HAS BEEN REMOVED. THE TRENCH SHALL BE BROUGHT TO THE REQUIRED LEVEL WITH SAND AND GRAVEL FIRMLY COMPACTED.

TRENCHES AND EXCAVATION SHALL BE BACKFILLED IN 6" LAYERS OF EARTH, FREE FROM CLODS, AND STONES THOROUGHLY TAMPED TO A DEPTH OF 12" ABOVE THE PIPE. AFTER THAT DEPTH HAS BEEN REACHED, BACKFILLING SHALL BE DONE IN 12" LAYERS, THOROUGHLY TAMPED.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO ANY DAMAGES OR SAGS TO THE PIPING SYSTEMS THAT OCCUR FROM THE IMPROPER EXCAVATION AND BACKFILL METHODS.

ANY STRUCTURAL STEEL MEMBERS REQUIRED TO ADAPT THE EQUIPMENT AND PIPING AS FURNISHED BY THIS CONTRACTOR, TO THE BUILDING STEEL OR STRUCTURE, SHALL BE INCLUDED IN THE BID OF THE CONTRACTOR FURNISHING THE EQUIPMENT OR PIPING. HANGING OF ALL EQUIPMENT AND REQUIRED SUPPORTING STEEL AND BRACING SHALL BE FURNISHED BY THE CONTRACTOR WHO SUPPLIES THE EQUIPMENT.

THIS CONTRACTOR SHALL INCLUDE ALL CUTTING, PATCHING AND PAINTING OF PATCHED AREAS REQUIRED FOR AND RESULTING FROM THE INSTALLATION OF

ALL OPENINGS AROUND PIPE PENETRATIONS THROUGH SMOKE OR FIRE-RATED FLOORS, CEILINGS OR WALLS SHALL BE SEALED AIRTIGHT WITH MATERIAL HAVING A RATING EQUAL TO THE MATERIAL OF THE WALL, CEILING

RULING, OR FIRE UNDERWRITER'S REQUIREMENT APPLICABLE TO THIS CLASS OF ALL PATCHING SHALL BE NEATLY FINISHED TO THE SATISFACTION OF THE

THIS CONTRACTOR SHALL LOCATE AND FURNISH FOR INSTALLATION BY THE GENERAL CONTRACTOR, ALL ACCESS PANELS AS REQUIRED FOR ACCESS TO VALVES, AND THE PROPER SERVICING OF EQUIPMENT AND LINES INSTALLED UNDER THE CONTRACT.

ALL PANELS SHALL BE MILCOR, STYLE "M" FOR MASONRY, "A" FOR ACOUSTICAL TILE AND "K" FOR PLASTER; EXCEPT FOR FIRE-RATED UL 1-1/2 HOUR AND "B" THE INFORMATION GIVEN HEREIN AND ON THE DRAWINGS IS AS EXACT AS COULD LABEL ACCESS PANELS SHALL BE FURNISHED IN FIRE-RATED WALLS AND CEILINGS AS INDICATED ON THE DRAWINGS. ACCESS DOORS SHALL BE 12" X 12"

FOR THE PREVENTION OF ELECTROLYTIC CORROSION AT CONNECTIONS DROPS IN PIPING AND DUCTWORK AS REQUIRED BY BUILDING CONDITIONS AT NO BETWEEN PIPE OF DISSIMILAR METALS OR BETWEEN PIPE AND EQUIPMENT CONNECTIONS OF DISSIMILAR METALS. PROVIDE DIELECTRIC UNIONS OR

13. MOTORS, STARTERS AND DISCONNECTS

UNLESS SPECIFIED TO BE FURNISHED WITH EQUIPMENT, ALL MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

THREADS ON SCREWED PIPE SHALL BE STANDARD, CLEAN BUTT AND TAPERED. ALL EQUIPMENT. ANY CHANGES FROM THE SPECIFIED ITEMS SHALL BE NOTED ON PIPE SHALL BE REAMED OF BURRS AND KEPT CLEAN OF SCALE, DIRT AND SHAVINGS. TREADS SHALL BE MADE WITH FLAKED GRAPHITE AND LUBRICATING

OIL OR APPROVED PIPE COMPOUND ON THE MALE THREAD ONLY.

COPPER-TO-STEEL AND COPPER-TO-BRASS JOINTS SHALL BE MADE WITH SILVER SOLDER. ALL OTHER COPPER-TO-COPPER JOINTS ABOVE GROUND SHALL BE MADE WITH LEAD FREE SOLDER. COPPER PIPE SHALL BE CUT SQUARE, BURRS INSTALLATION OF FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH REMOVED AND CARE SHALL BE GIVEN TO KEEP THE LINES FREE OF DIRT AND AND IN STRICT CONFORMITY WITH MANUFACTURER'S PRINTED INSTRUCTIONS AS MOISTURE. ALL TUBING AND FITTINGS SHALL BE THOROUGHLY CLEANED.

IT SHALL BE THIS CONTRACTORS RESPONSIBILITY TO MAINTAIN LIAISON WITH ALL WELDED PIPE SHALL HAVE BUTT WELDED SINGLE "V" TYPE JOINTS FOR WHICH APPLICABLE CODE AUTHORITIES. PARTIES CONCERNED WITH THE MATERIAL SUBMITTED. THIS CONTRACTOR SHALL PIPE HAS BEEN BEVELED TO 45 DEGREES. WELD SHALL BE ONE-FOURTH GREATER THICKNESS THAN THE PIPE. CONNECTIONS TO EQUIPMENT, ACCESSORIES, ETC. SHALL BE MADE BY MEANS OF FLANGES AND/OR ADAPTERS.

> UNIONS SHALL BE PROVIDED AT EACH SCREWED VALVE AND UNIONS OR FLANGES AT EACH EQUIPMENT CONNECTION.

FURNISH AND INSTALL FLEXONICS EXPANSION JOINTS IN PIPING SYSTEM WHERE SHOWN OR NECESSARY FOR EXPANSION AND CONTRACTION.

EXPANSION JOINTS IN PIPE 4" AND GREATER SHALL BE THE PACKLESS TYPE WITH STAINLESS STEEL BELLOWS AND HAVE WELDED OR FLANGED END. JOINTS SHALL HAVE TRAVERSE AS INDICATED ON THE PLANS. EXPANSION JOINTS SHALL BE OF THE CONTROLLED FLEXING TYPE.

EXPANSION JOINTS IN COPPER PIPE UNDER 4" IN SIZE SHALL BE OF THE

COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL BELLOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES. EXPANSION JOINTS IN STEEL PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL ELBOWS

AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES. PROVIDE GUIDES ON EACH SIDE OF EXPANSION JOINT, AT 4 PIPE DIAMETERS, 14

PIPE DIAMETERS, AND A THIRD GUIDE AS RECOMMENDED BY THE MANUFACTURER.

16. PIPE FLEXIBLE CONNECTIONS

FLEXIBLE PIPE CONNECTIONS SHALL BE RESISTOFLEX #R6904 OR APPROVED EQUAL FLEXIBLE CONNECTIONS MADE FROM TEFLON.

PROVIDE FOR MOVEMENT IN PIPING BY USE OF SWING JOINTS AT CONNECTION ESTABLISH QUALITY, CAPACITY, TYPE AND DIMENSIONS TO BE INCLUDED IN THE OF ALL BRANCHES TO MAINS AND RISERS. ALL BRANCHES FROM MAINS AND RISERS SHALL HAVE 1/4" CLEARANCE BETWEEN PIPE INSULATION AND SLEEVE TO

MANUFACTURER, FIGURE NUMBER AND TYPE THROUGHOUT THE ENTIRE INSTALLATION OF THE WORK, UNLESS OTHERWISE SPECIFIED. THE FOLLOWING ACCEPTANCE OR REJECTION OF PROPOSED SUBSTITUTIONS SHALL NOT CAUSE NUMBERS ARE FROM THE CRANE CATALOG. EQUAL VALVES OF REPUTABLE ADDITIONAL COST. ANY CHANGES OF PIPING, DUCTWORK, ELECTRICAL MANUFACTURERS, SUCH AS HAMMOND, NIBCO-SCOTT AND/OR JENKINS WILL BE

> ALL VALVES SHALL BE BUILT FOR A MINIMUM OF 125 PSIG WORKING PRESSURE. ISOLATION VALVES SHALL BE PROVIDED ON ALL INDIVIDUAL FIXTURES AND

> CHECK VALVES 2-1/2" AND SMALLER SHALL BE #36 (SCREWED ENDS) OR #1342 (SOLDER-JOINT ENDS) SWING-TYPE WITH BRONZE BODY AND BRONZE TRIM. BUTTERFLY VALVES 2" AND LARGER SHALL BE #12F, IRON BODY, CAST-IRON

EQUIPMENT. DRAWINGS SHALL BE BASED ON FIELD MEASUREMENTS AND AFTER GAS LINE COCKS UP TO 4" SHALL BE #320. 1/2 PSI FOR INDOOR APPLIANCE CONSULTATION AND AGREEMENT BETWEEN THE TRADES, SHALL BE APPROVED CONNECTIONS SHALL CONFORM TO ANSI Z21.15 AND CSA 9.1. 5 PSI FOR INDOOR SHUTOFF SHALL CONFORM TO CGA 91-002 AND ASME B16.44

18. PIPE SLEEVES AND COLLARS

WAFER W/LOCK LEVER.

THIS CONTRACTOR SHALL LAY OUT ALL HIS WORK AND SET SLEEVES IN NEW CONSTRUCTION AS CONCRETE FORMS AND WALL ARE ERECTED SO AS TO BE

SHALL BE COPPER TUBING SLEEVES EXTENDING 1" ABOVE FINISHED FLOOR. ALL OTHER SLEEVES SHALL BE 24 GAUGE GALVANIZED PIPES AND SLEEVES INSTALL PLASTIC PIPE AND FITTINGS IN STRICT ACCORDANCE WITH THE TO BE THOROUGHLY PACKED WITH WATERPROOF SEALANT AND THE

FLOORS SHALL BE SEALED AIRTIGHT WITH MATERIALS OR EQUIPMENT AS SPECIFIED UNDER FIRESTOPPING. ALL PIPE PENETRATIONS OF SLABS ON GRADE SHALL BE WRAPPED WITH #15

SPACE AROUND ALL PIPING THROUGH FIRE OR SMOKE RATED PARTITIONS OR

- A. PIPE HANGER AND SUPPORT PRODUCTS INSTALLATION a VERTICAL PIPING: MSS TYPE 8 OR 42 CLAMPS
 - LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER ALTERNATE IF ALLOWED BY LOCAL AHJ. HANGERS. LONGER THAN 100 FEET IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
- c. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER:MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS
- d. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

B. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT

- EACH FLOOR.
- C. ROD DIAMETER MAY BE REDUCED ONE SIZE FOR

ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN

- DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH D. INSTALL HANGERS FOR ALL PIPING PER MSS SP-69, MANUFACTURERS MANUALS AND AS PER HANGER SUPPORT
- INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
- INSTALL SUPPORTS FOR VERTICAL STEEL PIPING EVERY 15 FEET. SUPPORT PIPING AND TUBING NOT LISTED IN THIS ARTICLE

20. DAMAGE BY LEAKS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO THE GROUNDS, WALKS, ROADS, ALL BUILDING COMPONENTS AND FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS AND THEIR EQUIPMENT AND CONTENT, CAUSED BY LEAKS IN THE PIPING SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED HEREIN. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

21. PIPE MARKERS

FURNISH AND INSTALL BRADY #B-350 THIN FILM OR APPROVED EQUAL PIPE MARKERS. MARKERS SHALL BE 1-1/8" HIGH FOR PIPES 3" AND UNDER AND 2-1/4" HIGH FOR PIPES OVER 3". MARKERS SHALL INDICATE TYPE OF SERVICE AND DIRECTION OF FLOW.

PIPE MARKERS SHALL BE LOCATED: · AT EQUIPMENT CONNECTIONS · AT ACCESS DOORS

· AT BRANCH MAINS · ON ALL ACCESSIBLE PIPE A MAXIMUM OF 75' BETWEEN MARKERS. · AT ALL PENETRATIONS ON EITHER SIDE OF PENETRATION

22. FLOOR, WALL AND CEILING PLATES

PIPES PASSING THROUGH FLOORS AND FINISHED CEILINGS. FITTED WITH CHROME- PLATED PLATES OR ESCUTCHEONS LARGE ENOUGH TO COMPLETELY CLOSE OPENING AROUND PIPE OR PIPE COVERING AND FLOOR SUPPORT IN THE CASE OF VERTICAL PIPING, SECURELY HELD IN PLACE; CAULK WATERTIGHT AROUND PIPE IN UNFINISHED ROOMS.

23. FIRE STOPPING THE PENETRATIONS OF FIRE AND/OR SMOKE RATED WALLS OR FLOORS SHALL BE PROTECTED BY A UL APPROVED MATERIAL TO RETAIN THE INTEGRITY OF THE TIME-RATED CONSTRUCTION BY MAINTAINING AS EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE AND GASES. IT SHALL BE USED IN ALL DUCT CABLE, CONDUIT AND PIPING PENETRATIONS THROUGH FLOOR SLABS AND

FIRESTOPPING MATERIAL SHALL BE 3M FIRE BARRIER SEALING SYSTEM OF APPROVED EQUAL. FIRESTOPPING MATERIAL SHALL CONSTITUTE ONE OR MORE OF THE FOLLOWING PRODUCTS:

TIME-RATED WALLS, AND/OR FLOORS. THE RATING OF THE FIRESTOPPING SHALL

· CAULK: CP-25 · PUTTY: #303

WRAP/STRIP: FS195

EQUAL THE RATING OF THE TIME-RATED ASSEMBLY.

· COMPOSITE SHEET: CS195 · PENETRATING SEALING SYSTEMS: 7900 SERIES

TO SURFACE PREPARATION. INSTALLATION AND QUALITY CONTROL. AREAS OF WORK SHALL REMAIN ACCESSIBLE UNTIL INSPECTION AND APPROVAL BY THE

ON INSULATED PIPES, THE FIRE-RATING CLASSIFICATION SHALL NOT REQUIRE REMOVAL OF THE INSULATION.

SUBMIT MANUFACTURER'S PRODUCT DATA, LETTER OF CERTIFICATION OR CERTIFIED LABORATORY TEST REPORT THAT THE MATERIAL OR COMBINATION OF MATERIALS MEET THE REQUIREMENTS SPECIFIED IN ASTM E814 AND ARE SO CLASSIFIED IN UL'S BUILDING MATERIALS DIRECTORY. MATERIALS SHALL MEET AND BE ACCEPTABLE FOR USE BY ALL MODEL BUILDING CODES. MATERIALS SHALL MEET THE REQUIREMENTS OF NFPME61- LIFE SAFETY CODE AND NFPA 70 NATIONAL ELECTRICAL CODE.

SUBMIT SHOP DRAWINGS. PRODUCT DATA. CERTIFICATES AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUBMIT MANUFACTURER'S PRODUCT DATA FOR ALL MATERIALS AND PREFABRICATED DEVICES, PROVIDING DESCRIPTIONS SUFFICIENT FOR IDENTIFICATION AT THE JOB SITE. INCLUDE MANUFACTURER'S

SUBMIT SHOP DRAWINGS SHOWING PROPOSED MATERIAL, REINFORCEMENT, ANCHORAGE, FASTENINGS, AND METHOD OF INSTALLATION. CONSTRUCTION DETAILS SHALL ACCURATELY REFLECT ACTUAL JOB CONDITIONS.

24. CLEANUP AND ADJUSTMENT

INSTRUCTIONS FOR INSTALLATION.

ALL PARTS WORK LEFT CLEAN: EQUIPMENT, FIXTURES, VALVES, PIPES AND FITTINGS CLEANED OF GREASE AND METAL CUTTINGS. ANY DISCOLORATION OR OTHER DAMAGE TO PORTIONS OF BUILDING, ITS FINISH OR FURNISHING DUE TO THIS CONTRACTORS FAILURE TO PROPERLY CLEAN INTERIOR OF PIPING. REPAIRED AT THIS CONTRACTOR'S EXPENSE. ALL AUTOMATIC CONTROL DEVISES ADJUSTED FOR PROPER OPERATION. ALL SURPLUS MATERIALS AND ANY RUBBISH REMOVED AS IT ACCUMULATES. ALL EQUIPMENT LEFT IN SAFE, PROPER

DAMAGE TO ANY PORTIONS MUST BE REPAIRED OF THE PART REPLACED BY THIS CONTRACTOR AND ALL PARTS LEFT WITHOUT DENTS, SCRATCHES, THROUGH THE

FINISH PAINT, LOOSE PLASTER, STAINS OR OTHER BLEMISHES.

PIPE TESTING AND START-UP

OPERATING CONDITION.

ALL PIPING TO BE TESTED IN ACCORDANCE WITH THE FOLLOWING: · WATER - 100 PSI WATER PRESSURE ALL TESTING MUST HOLD FOR AT LEAST 24 HOURS WITHOUT LOSS OF PRESSURI OR VACUUM. ALL CONCEALED PIPING SHALL BE TESTED IN THE PRESENCE O THE OWNER'S REPRESENTATIVE PRIOR TO COVERING. BEFORE STARTING ANY SYSTEM, ALL EQUIPMENT SHALL BE LUBRICATED PER MANUFACTURERS REQUIREMENTS BY THIS CONTRACTOR. TEST ENTIRE BUILDING SYSTEMS UNDER FULL LOAD CONDITIONS FOR A PERIOD OF NOT LESS THAT ONE (1) WEEK DURING WHICH TIME THE OPERATING PERSONNEL SHALL BE FULLY INSTRUCTED IN THE OPERATION AND MAINTENANCE OF THE PLANT. AFTER THE PLANT IS IN FULL OPERATION, THIS CONTRACTOR IS TO FURNISH WHATEVER ADDITIONAL SERVICE IS REQUIRED TO RECALIBRATE AND RESET CONTROLS, VALVES, BALANCING

COCKS, ETC. TO ENSURE PROPER OPERATION OF THIS SYSTEM

26. TESTING AND BALANCING THIS CONTRACTOR SHALL AT THE TIME OF INSTALLATION ENSURE THAT ALL DEVICES TO COMPLETE TESTING AND BALANCING AS DIRECTED HEREIN ARE FURNISHED AND INSTALLED DURING FABRICATION AND INSTALLATION OF WORK. THIS WORK SHALL BE PERFORMED PRIOR TO TURNOVER TO BUILDING OCCUPANT AND WITH AMPLE TIME TO MAKE ANY NECESSARY REPAIRS OR CHANGES TO

27. <u>SEISMIC RESTRAINTS ON MECHANICAL EQUIPMENT</u>

ACHIEVE A PROPERLY OPERATING SYSTEM.

ALL PLUMBING EQUIPMENT SHALL BE PROVIDED WITH SEISMIC RESTRAINING SERVICES AS REQUIRED BY LOCAL BUILDING CODES. CONTRACTOR SHALL HAVE LOCAL BUILDING OFFICE REVIEW EACH PIECE OF EQUIPMENT WHEN INSTALLED AND THE CONTRACTOR SHALL INSTALL ALL REQUIRED TIE DOWN, ANCHORS, STRAPS OR OTHER DEVICES REQUIRED.

IS CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIALS, AND LABOR FURNISHED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS FOR A PERIOD ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AND SHALL REPAIR OR REPLACE ANY EQUIPMENT OR MATERIAL WHICH IS DEFECTIVE OR IMPROPERLY INSTALLED. IN ADDITION, THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO THE BUILDINGS AND ITS CONTENTS OR THER EQUIPMENT, CAUSED BY DEFECTS OR IMPROPER INSTALLATION OF EQUIPMENT OR MATERIALS INSTALLED UNDER THIS SECTION OF THE

TEMPORARY WATER SERVICE (IF REQUIRED) TO THE BUILDING SHALL BE PROVIDED BY THIS CONTRACTOR TO THE BUILDING FOR CONSTRUCTION PURPOSES. THIS CONTRACTOR TO MAINTAIN WATER SERVICE AS REQUIRED DURING CONSTRUCTION.

30. <u>DOMESTIC WATER SERVICE</u>

THIS CONTRACTOR SHALL COORDINATE EXACT AVAILABLE DELIVERY PRESSURE AND PROVIDE ALTERNATE FEE FOR A PRESSURE BOOSTING SYSTEM IF PRESSURE IS LESS THAN REQUIRED PRESSURE. PROVIDE PRESSURE REDUCING VALVE WITH STRAINER IN SERVICE LINE IF REQUIRED BY LOCAL CODES OR PRESSURE IS ABOVE 80 PSI.

JOINTS SHALL BE CLEANED AND DEBURRED AS RECOMMENDED BY THE MANUFACTURER AND FEDERAL, STATE, AND LOCAL CODES AND PRESS FITTINGS ARE AN ACCEPTABLE IF ALLOWED BY LOCAL AHJ. WHERE PRESS b. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: 100 FEET AND FITTING S ARE NOT ALLOWED SOLDERED AS LISTED BELOW. FLUX SHALL BE LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS. NON-CORROSIVE. VICTAULIC GROUVED COUPLINGS ARE ACCEPTABLE

ABOVE GRADE - WHERE FITTINGS ARE SOLDERED BOTH FITTINGS AND TUBING

SHALL BE CLEANED AS DESCRIBED ABOVE. UNDER NO CIRCUMSTANCES SHALL

DISSIMILAR METALS COME INTO DIRECT CONTACT WITH COPPER TUBING; E.G., GALVANIZED STRAPPING, HANGERS, OR CLAMPS TO SECURE THE TUBING. BELOW GRADE, OR FLOOR SLAB ON EARTH OR STONE FILL - HIGH TEMPERATURE,

SOLDER, 1200 DEG. F OR GREATER MELTING POINT.

NOTE: WATER PIPE TO BE PROPERLY SECURED AND ALIGNED SO AS NOT TO EXERT VERTICAL OR HORIZONTAL STRESSES ON THE SEATING OF THE MATING (MALE AND FEMALE) SURFACES OF THE UNIONS.

MATERIALS - UNDERGROUND: TYPE "K" COPPER TUBE, SOFT TEMPER MATERIALS - ABOVEGROUND: TYPE "L" COPPER TUBE, HARD DRAWN. ALTERNATE MATERIALS - PEX-A PIPING IS AN ACCEPTABLE ALTERNATE IF NOT INSTALLED IN A PLENUM AND APPROVED BY LOCAL CODE OFFICIALS. VIEGA, PROPRESS COPPER 1/2-INCH THROUGH 4-INCH WITH EPDM SEALING ELEMENT AND/OR VIEGA. PROPRESS 304 OR 316 STAINLESS 1/2-INCH THROUGH 4-INCH WITH EPDM OR FKM SEALING ELEMENT IS ACCEPTABLE IF ALLOWED BY LOCAL

31. <u>STERILIZATION OF DOMESTIC WATER SYSTEM</u>

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE FLUSHED CLEAR OF ANY DEBRIS AND THOROUGHLY STERILIZED WITH A SOLUTION CONTAINING NOT LESS THAN 100 PARTS PER MILLION OF AVAILABLE CHLORINE THE SOLUTION SHALL REMAIN IN THE SYSTEM FOR TWO (2) HOURS DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUE CHLORINE CONTENT IS NOT GREATER THAN THE CHLORINE LEVEL OF THE AVAILABLE WATER SUPPLY.

STERILIZATION SHALL BE PERFORMED PRIOR TO TURNOVER TO OCCUPANT AS TO NOT ALLOW FOR THE WATER SYSTEM TO REMAIN STAGNANT FOR LONGER THAN

THIS CONTRACTOR SHALL HAVE THE WATER TESTED AND APPROVED BY THE HEALTH DEPARTMENT.

32. SANITARY SEWERS

THIS CONTRACTOR SHALL CONNECT SANITARY SEWER AS INDICATED ON THE

DRAWINGS. VERIFY DIRECTION OF FLOW PRIOR TO ANY ROUGH-IN WORK. EACH PIPE SHALL BE LAID TO THE LINE AND GRADE INDICATED ON THE PLANS AND SUCH A MANNER AS TO FORM A CLOSE CONCENTRIC JOINT WITH THE ADJOINING PIPE AND TO PRESENT OFFSETS IN FLOW LINE. ALL PIPE SHALL BE LAID WITH THE BELLS UPHILL.

THE SUB-GRADES SHALL BE KEPT FREE FROM WATER WHILE PIPES ARE BEING LAID. ALL PIPE SHALL BE LAID WITH ENDS ABUTTING AND TRUE TO LINE AND GRADE. THEY SHALL BE FITTED AND MATCHED SO THAT THEY WILL FORM A SEWER WITH A SMOOTH AND UNIFORM INVERT.

EACH JOINT SHALL BE CLEANED AS IT IS LAID AND ALL BELLS SHALL BE CLEANED BEFORE PIPES ARE JOINED. PVC SEWER PIPE MAY BE USED IN LIEU OF THAT SPECIFIED ABOVE IF ALLOWED

BY LOCAL CODES.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

33. WASTE, SOIL, DRAIN AND VENT PIPING

AND FREE FROM ANY SAGS.

NO CEILING.

ABS AND FOAM CORE PVC ARE NOT ACCEPTABLE MATERIALS.

THE DRAINS, SOIL WASTE AND VENT PIPE AND FITTINGS INCLUDING EXTENSIONS TO SEWERS SHALL BE OF THE SIZES INDICATED ON THE DRAWINGS. PIPE AND FITTINGS TO BE, CYLINDRICAL AND FREE FROM CRACKS OR OTHER DEFECTS.

ALL TRENCHES TO BE DUG WITH GRADUAL FALL, THE PIPING TO BE STRAIGHT

THE ARRANGEMENT OF THE SYSTEM SHALL BE AS SHOWN ON THE DRAWINGS AND AS DIRECT AS POSSIBLE, AVOIDING ALL UNNECESSARY OFFSETS. THE STACKS SHALL BE FIRMLY SECURED IN POSITION WITH WROUGHT IRON CLAMPS

ALL CHANGES IN DIRECTION OF SOIL OR WASTE PIPE SHALL BE MADE BY MEANS OF "Y" BRANCHES AND 1/8 BENDS. NINETY DEGREE SHORT TURN FITTINGS WILL THE FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.

SANITARY CLEANOUTS ARE TO BE PROVIDED AT EVERY TURN GREATER THAN 45°,

AT INTERVALS OF NO GREATER THAN 50', AT ANY STACK ROUTING BELOW GRADE.

NOT ALL CLEANOUTS LOCATIONS MAY BE SHOWN ON THE DRAWING. ALL TRAP SCREWS MUST BE OF FULL SIZE OF PIPE UP TO 4" AND 4" FOR ALL OVER THIS SIZE. CONNECTIONS BETWEEN OUTLETS OF FIXTURES AND SOIL OR WASTE PIPE SHALL BE MADE WITH "Y" BRANCHES TO "TY" BRANCHES WHEREVER POSSIBLE. ALL HORIZONTAL SOIL WASTE AND VENT PIPE SHALL BE GRADED TOWARD OUTLETS AND PIPE NOT BURIED SHALL BE INSTALLED ABOVE THE CEILING OR CLOSE AS POSSIBLE TO THE CONSTRUCTION ABOVE WHERE THERE IS

THE STACKS SHALL BE EXTENDED THROUGH ROOF OF BUILDING TO POINTS NOT LESS THAT 12" ABOVE ROOF. EXTENSIONS THROUGH ROOF SHALL BE MADE WATER- TIGHT BY MEANS OF A LEAD FLASHING OF FOUR POINTS SHEET LEAD SPREAD OVER A DISTANCE OF NOT LESS THAN TWELVE INCHES (12") AROUND PIPE. THIMBLE TO BE SOLDERED TO BASE AND EXTENDED OVER AND TURNED DOWN INTO END OF PIPE IN AN APPROVED MANNER.

ALL CLEANOUTS IN FLOORS TO BE JOSAM #8360 OR EQUAL. ADJUSTABLE CLEANOUT WITH BODY TO MATCH THE PIPING MATERIAL, CAST BRASS SCORIATED COVER WITH LETTERS C.O. CAST IN TOP AND CONCEALED BRASS PLUG.

CLEANOUTS SHALL BE INSTALLED IN BASE OF EACH STACK. CONCEALED

CLEANOUTS SHALL HAVE JOSAM #8600 OR EQUAL. CAST BRASS CHROMIUM

PLATED FLAT ACCESS COVER PLATES. JOINTS OF CAST IRON PIPE SHALL BE MADE WITH MANUFACTURERS ECOMMENDED JOINING MATERIAL. AT THE CONTRACTOR'S OPTION HE MAY USE)-HUB PIPE, FITTINGS, COUPLING AND GASKETS IN LIEU OF CAULKED JOINTS IF

PROVED BY THE LOCAL CODES AND ORDINANCES. IF APPROVED BY THE LOCAL CODES, SCHEDULE 40 PVC PIPE WITH DWV FITTINGS MAY BE USED FOR THE WASTE AND VENT SYSTEM. PVC PIPE AND FITTINGS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL CODES. ENCASEMENT OF PVC PIPES WITHIN RATED SHAFTS SHALL BE THE COST OF THIS CONTRACTOR.

SCHEDULE 40 PVC SHALL NOT BE INSTALLED WITHIN A PLENUM. ABS AND FOAM CORE PVC ARE NOT ACCEPTABLE MATERIALS.

SDR 35 IS NOT ACCEPTABLE FOR UNDER BUILDING USE.

EACH VENT FLASHING SHALL BE MADE WATER-TIGHT WITH THE ROOF BY PROPER

WATER PROOF FLASHING.

35. WASTE, VENT AND WATER CONNECTIONS THE MINIMUM SIZE OF WASTE, VENT, AND WATER CONNECTION TO THE

INDIVIDUAL FIXTURES SHALL BE AS SHOWN ON DRAWINGS. WHERE FIXTURES ARE GROUPED PIPES SHALL BE INCREASED IN PROPORTION: IN ALL CASES THE SIZE ARRANGEMENTS AND CONNECTIONS OF WATER AND VENT PIPING SHALL NOT BE LESS THAN SIZE OF OPENINGS SPECIFIED FOR FIXTURES AND APPEARING IN FIXTURE LIST. NO WATER PIPE LESS THAN 1/2" SHALL BE INSTALLED IN CONCEALED PLACES SUCH AS IN PARTITIONS OR WALLS ETC.

36. PLUMBING FIXTURES AND TRIM

OF THE WATER CLOSET.

PLUMBING FIXTURES SHALL BE FURNISHED AND INSTALLED IN A NEAT AND WORKMANLIKE MANNER WITH PROPER CONNECTIONS TO SUPPLY AND DRAINAGE PIPING. ALL FIXTURES SHALL BE FREE OF FLAWS AND DEFECTS OF ANY SORT IN MATERIAL AND WORKMANSHIP AND SHALL OPERATE PERFECTLY WHEN

MATERIALS: FIXTURES SHALL BE THE STANDARD PRODUCT OF ONE OF THE MANUFACTURER'S LISTED IN THE PLUMBING FIXTURE SCHEDULE, OR ANY EQUAL UNIT APPROVED BY THE ENGINEER

INSTALLED IN ACCORDANCE WITH MANUFACTURER'S DIRECTION.

THE PLUMBING FIXTURES AND ACCESSORIES DURING CONSTRUCTION. HE SHALL REPLACE AT HIS EXPENSE ANY MATERIAL THAT IS MARRED, SCRATCHED, DEFACED AND/OR BROKEN. FIXTURES SHALL BE COVERED WITH BUILDING PAPER AND WOODEN CRATES DURING CONSTRUCTION.

INSTALLATION: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF

CONTRACTOR SHALL COORDINATE EXACT AND PROVIDE ROUGH-IN LOCATIONS

WITH FIELD CONDITIONS AND PLANS PRIOR TO ANY WORK. CONTRACTOR SHALL

CONNECT ALL FIXTURES TO THE PLUMBING SYSTEM. ALL FIXTURES TO BE INSTALLED TO DIMENSIONS WITH CHROME-PLATED SUPPLIES WITH STOPS. ALL FIXTURES INSTALLED TO DIMENSIONS SHOWN ON THE DRAWINGS. ALL WATER CLOSETS SHALL HAVE CAULKING BETWEEN THE FLOOR AND UNDERSIDE

PLUMBING EQUIPMENT: (REFER TO SCHEDULE ON THE DRAWINGS)

1. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT. FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH 2020 CITY OF BOULDER ENERGY CONSERVATION CODE SECTION C-404.4 & TABLE C403.11.3 REFER BELOW

MINIMUM PIPE INSULATION THICKNESS								
FLUID OPERATING	INSULATION CO	ONDUCTIVITY	NOMINAL PIPE OR TUBE SIZE (INCHES)				BE	
EMPERATURE RANGE AND USAGE (°F)	CONDUCTIVITY BTU· IN./ (H. FT2 °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4	4 to < 8	<u>></u> 8	
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5	
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0	

AS PER 2020 CITY OF BOULDER ENERGY CONSERVATION CODE C404.6.1 THE CONTROLS ON PUMPS THAT CIRCULATE WATER BETWEEN A WATER HEATER AND A HEATED-WATER STORAGE TANK SHALL LIMIT OPERATION OF THE PUMP FROM HEATING CYCLE STARTUP TO NOT GREATER THAN 5 MINUTES AFTER THE END OF THE CYCLE.

3. AS PER 2020 CITY OF BOULDER ENERGY CONSERVATION CODE C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOI CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

CONSERVATION CODE C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:

4. WATER DISTRIBUTION SYSTEM AS PER 2020 CITY OF BOULDER ENERGY

APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE. b. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER

SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR

a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A

ENTERING THE COLD-WATER PIPING TO 104°F (40°C). HEATED WATER SUPPLY PIPING SHALL BE IN ACCORDANCE WITH 2020 CITY OF BOULDER ENERGY CONSERVATION CODE SECTION C404.5.1 OR C404.5.2. THE FLOW RATE THROUGH 1/4-INCH PIPING SHALL BE NOT GREATER THAN 0.5 GPM. THE FLOW RATE THROUGH 5/16-INCH PIPING SHALL BE NOT GREATER THAN 1 GPM. THE FLOW RATE THROUGH 3/8-INCH PIPING SHALL

HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2020 CITY OF BOULDER C404.5.1. THE HW PIPE LENGTH ROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

BE NOT GREATER THAN 1.5 GPM.

MINAL PIPE SIZE (INCHES)	MAXIMUM PIPING LENGTH (FEET)				
,	PUBLIC LAV	OTHER FIXTURES			
1/2"	2'	43'			
3/4"	0.5'	21'			
1"	0.5'	13'			
11/4"	0.5'	8'			
11/4"	0.5'	6'			

PLUMBING S	SYMBOL LIST
	VENT PIPING
— — EX.V —— —	EXISTING VENT PIPING
SAN	WASTE PIPE ABOVE GROUND
GSAN	GREASE WASTE ABOVE GROUND
EX.SAN	EXISTING WASTE PIPE ABOVE GROUND
	COLD WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
	FILTER WATER PIPING
	EXISTING COLD WATER PIPING
———∞	P-TRAP
	PIPE UP
	PIPE DROP
	PIPE CAP
——⋈—	CONTROL VALVE
	FLOOR DRAIN / HUB DRAIN
	BACKFLOW PREVENTER
•	POINT OF CONNECTION
ı 	CLEANOUT
	BALANCING VALVE
	FLOOR SINK
	A DDDEL (I A TIONIO

PLUMBIN	G ABBREVIATIONS			
SAN	SANITARY			
V	VENT			
GSAN	GREASE SANITARY			
FFD	FUNNEL FLOOR DRAIN			
HD	HUB DRAIN			
EX.	EXISTING			
FD	FLOOR DRAIN			
CW	COLD WATER			
HW	HOT WATER			
HWR	HOT WATER RETURN			
TYP.	TYPICAL			
DN	DOWN			
AFF	ABOVE FINISH FLOOR			
BFP	BACK FLOW PREVENTER			
M	WATER METER			
PRV	PRESSURE REDUCING VALVE			
UNGD	UNDERGROUND			
HS	HAND SINK			
FS	FLOOR SINK			
FW	FILTERED WATER			
СО	CLEANOUT			
WH	WATER HEATER			
RCP-1	RECIRCULATION PUMP			
ET VIF E	EXPANSION TANK VERIFY IN FIELD EXISTING			

	KITCHEN	EQUIPMENT	SCHEDULE			
ITEM NUMBER	DESCRIPTION	MFR	MODEL	FURNISH	INST	DIRECT /INDIREC
E01	FREEZER	NELSON MFG	BD8	GC	GC	INDIRECT
E02	LIQUID DROP-IN	RANDALL	9946SCN	GC	GC	INDIRECT
E05	ICE BIN	JOHN BOOS	D-30-IBL (CUSTOM)	GC	GC	INDIRECT
E06	DUMP SINK	JOHN BOOS	PB-DISINK201612-X	GC	GC	INDIRECT
E06.1	DUMP SINK FILTERED WATER SPIGOT	LIKUAN	NCP8883CP	GC	GC	INDIRECT
E06.2	BLENDER RINSER	BLENTEC	JRE-610	GC	GC	INDIRECT
E06.3	DUMP SINK SPRAYER FAUCET	WATERLOO	1.15 GPM LOW PROFILE WALL-MOUNTED PRE-RINSE FAUCET WITH 8" CENTER AND 6" ADD ON FAUCET	GC	GC	
E07	DROP-IN SINK	ADVANCE TABCO	TBD	GC		INDIRECT
E07.1	DROP-IN SINK FAUCET	FISHER	53740	GC	GC	
E11	ICE MACHINE	ICE-O-MATIC	CIM0430HA	GC	GC	INDIRECT
E12	3-COMPARTMENT SINK	GSW	SE18183D20	GC	GC	INDIRECT
E12.1	3-COMPARTMENT SINK FAUCET COMBO	FISHER	68128 STAINLESS STEEL 8" BACKSPLASH SPRING STYLE PRE-RINSE UNIT WITH ULTRA SPRAY VALVE, ADD ON FAUCET AND 12" SWING SPOUT, LEVER HANDLE	GC	GC	
E13	PREP TABLE W/ BUILT IN SINK	GSW	WT-PS3060L	GC	GC	INDIRECT
E13.1	PREP SINK FAUCET	FISHER	53775	GC	GC	
EX.MS	EXISTING MOP SINK	E	E	GC	GC	DIRECT
E20	URN TROUGHS (DRIP TRAY)	JOHN BOOS	URN48	GC	GC	
E21	DROP IN BAR DRIP TRAY	KROWNE METAL	KR-D24 (CUSTOM)	GC	GC	DIRECT
E33	HAND SINK	GSW	HS-0810S	GC	GC	DIRECT
E41	ESPRESSO MACHINE	NUOVA SIMONELLI PRONTOBAR TOUCH 2-STEP SUPER AUTOMATIC ESPRESSO MACHINE	ITEM # 238PT2 MFR # MPROTFTCAP21000003	GC	GC	INDIREC [*]

	EXISTII	NG WATE	R HEA	ATER SCHE	EDULE	
MARK	MFR	MODEL	STORAGE	RECOVERY	ELECTRICAL DATA	REMARK
EX.WH	STATE	SSE30A	30	109 GPH @ 90°F	24KW	EXISTING TO REMAIN
				_		

	PLUMBING FIXTURE SCHEDULE									
MARK	FIXTURE	SAN.	VENT	C.W.	H.W.	REMARKS				
FS-1	FLOOR SINK - HALF GRATE	3"	2"	-	-	J.R. SMITH 3060Y-12, CAST IRON FLANGED, ROUND RECEPTOR WITH SEEPAGE OPENINGS, ACID RESISTANT COATED INTERIOR, NB HALF GRATE, INTERIOR DOME STRAINER.				
EX.FS	EXISTING FLOOR SINK	Е	Е	-	-	EXISTING TO REMAIN				
FD-1	FLOOR DRAIN	3"	2"	-	-	J.R. SMITH 2010Y, CAST IRON FLANGED, ROUND.				
RCP-1	CIRCULATION PUMP	-	-	3/4"	-	BELL AND GOSSETT NBF-33, ALL BRONZE BODY, 125 WATTS, 120 VOLT WITH TC-1 AUTOMATIC TIMER KIT. WHEN INSTANTANEOUS WATER IS SPECIFIED, REFER TO MANUFACTURER FOR WIRING. PROVIDE AS NEAR TO WATER HEATER AS FEASIBLE. LOCATIONS SHOWN ARE DIAGRAMMATIC. PROVIDE NEW IF NOT EXISTING.				
TMV	THERMOSTATIC MIXING VAVLE POINT OF USE	-	-	1/2"	1/2"	ACORN ST-70 SET TO 110°F. PROVIDE TO LAVATORY AND HAND SINK				
WC-1	WATER CLOSET	4"	2"	1"	-	KOHLER K-4325-0. ADA COMPLIANT ELONGATED BOWL WITH WALL CARRIER.				
LV-1	LAVATORY	2"	2"	1/2"	1/2"	KOHLER K-2007-0. WALL HUNG WITH CONCEALED ARM, FLOOR PEDESTAL CARRIER, ADA COMPLIANT. PROVIDE WITH KOHLER K-13466 FAUCET.				
HD-1	HUB DRAIN	3"	2"	-	-	ZURN MODEL 325-NH. INDIRECT WASTE FUNNEL WITH INTEGRAL BACKWATER VALVE.				

TYPE OF EQUIPMENT ON SYSTEM	METHOD OF CROSS CONNECTION CONTROL	MANUFACTURE AND MODEL NUMBER	REMARKS				
ESPRESSO MACHINE	DUAL CHECK VALVE BACKFLOW PREVENTER	WATTS SD-3	ASSE 1022 APPROVED LEAD FREE				
ICE MACHINE	DUAL CHECK VALVE BACKFLOW PREVENTER	WATTS LF9D	ASSE 1012 APPROVED LEAD FREE				
WATER SERVICE RPZ E EXISTING TO REMAIN							
1. CONTRACTOR SHALL PROVIDE INDIVIDUAL BACKFLOW PREVENTERS FOR EACH PIECE OF EQUIPMENT IF REQUIRED 2. EACH BACKFLOW PREVENTER MUST HAVE TESTING PORTS. 3. BRONZE BODIED BACKFLOW PREVENTERS ARE PERMISSABLE IF ALLOWED BY LOCAL CODES.							

PIPE MATERIAL SCHEDULE							
PIPES	MATERIALS						
WASTE AND VENT	-ABOVE GROUND: PVC SCH. 40, CAST IRON - HUB TYPE WITH NEOPRENE JOINTS WITH STAINLESS STEEL CONNECTORS WHEN PVC IS NOT ALLOWED PER LOCA CODE.						
	-SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3 AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER.						
	-PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED II CEILING PLENUM SPACES.						
	-WHERE THE DRAINAGE PIPING IS UPSTREAM OF GREASE TRAP, THE SLOPE OF THE PIPING SHALL BE NOT LESS THAN 1/4" PER FOOT.						
WATER PIPING	 A. UNDERGROUND: TYPE "K" COPPER TUBE, SOFT TEMPER B. ABOVEGROUND: TYPE "L" COPPER TUBE, HARD DRAWN. C. INSULATION: INSULATION FOR HOT AND COLD WATER PIPING SHALL BE AS PERBOULDER 2020 ENERGY CONSERVATION CODE (IECC 2018) 						
	PEX PIPE SHALL BE USED FOR ALL FILTERED AND R.O. WATER LINES						

(GENERAL NOTES		
1.	VERIFY ALL PIPING IS GRADED AS PER CODE AND INSTALLED AS CALLED FOR IN DRAWINGS AND REQUIRED FOR PROPER OPERATION.	10.	PLUMBING CONTRACTOR TO FURNISH AND INSTALL A MATERIAL AND PIPING REQUIRED FROM ROUGH LOCATION TO EQUIPMENT CONNECTION LOCATIONS, BO
2.	PROVIDE WALL PLATES, STOPS, SUPPLIES, TRAPS AND DRAIN OUTLETS FOR ALL KITCHEN EQUIPMENT AND	4.4	SUPPLY AND WASTE (DIRECT & INDIRECT)
3.	MISCELLANEOUS EQUIPMENT. CONNECT ALL EQUIPMENT AND FIXTURES SUPPLIES BY OTHERS.		ALL HORIZONTAL LINES AS EXTENDED AND CONNECTED EQUIPMENT SHALL BE RUN AT HIGHEST POSSIBELEVATION AND NOT LESS THAT 6 INCHES ABOVE FINISH FLOOR SURFACE TO PROVIDE CLEARANCE FOR CLEANI AT ALL SUCH LOCATIONS
4.	ALL HOT WATER PIPING SHALL BE FIBERGLASS INSULATED.	12.	PLUMBING CONTRACTOR TO INSTALL FAUCETS, AND WAS
5.	PROVIDE NAIL GUARDS AS REQUIRED.		ON ALL SINKS AND MAKE FINAL CONNECTIONS.
6.	ALL WORK TO BE DONE IN ACCORDANCE WITH ALL LOCAL CODES AND REQUIREMENTS.	13.	ALL INTERIOR PIPING FOR GREASE WASTE SYSTEM SHABE PCV, SOLVENT WELDED IF LOCAL CODE PERMIT.
7.	VERIFY EXACT SIZE AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO BID AND START OF WORK.	14.	WHEN PERMITTED BY CODE AND THE OWN CONTRACTOR MAY USE PEX AS ALTERNATE SYSTEM F POTABLE WATER SYSTEMS
8.	ALL EXPOSED PIPING FOR DESIGNATED DISABLED ACCESS FIXTURES SHALL BE COVERED OR OTHERWISE WRAPPED IN ACCORDANCE WITH A.D.A REQUIREMENTS AND LOCAL AUTHORITY.		TOTABLE WATEROTOTEMO
9.	ALTERNATE MATERIAL NOT IDENTIFIED IN DRAWINGS BUT APPROVED BY LOCAL AUTHORITY SHALL BE SUBMITTED TO ARCHITECT AND PLUMBING ENGINEER FOR REVIEW PRIOR TO INSTALLATION.		

PLUMBING FIXTURE	QTY.	WSFU	TOTAL WSFU
3 COMPARTMENT SINK	1	4	4
PREP SINK	1	4	4
MOP SINK	1	3	3
WATER CLOSET	1	10	10
HAND SINK	1	0.7	0.7
LAVATORY	1	2	2
ICE MACHINE	1	0.25	0.25
DUMP SINK	1	1.4	1.4
DROP-IN SINK	1	1.4	1.4
ESPRESSO MACHINE	1	0.25	0.25
BLENDER RINSER	1	0.25	0.25
TOTAL WATER FIXTURE UNITS	27.25		
GPM WATER CLOSET FLUSH VALVE	42		
WATER SERVICE, TYPE L COP	1-1/2"		

TABLE TO CAL	CULATI	E TOTAL	. DRAI	NAGE FIXT	URES UNITS
PLUMBING FIXTURE	TRAP SIZE	DRAINA <mark>GE</mark> F UNIT	_	NUMBER OF FIXTURES	TOTAL DFU
FLOOR DRAINS (FD-1) (EMERGENCY)	3"	0		1	0
WATER CLOSET	4"	6		1	6

HAND SINK HUB DRAIN (HD-1 10 TOTAL DRAINAGE FIXTURE UNITS 55

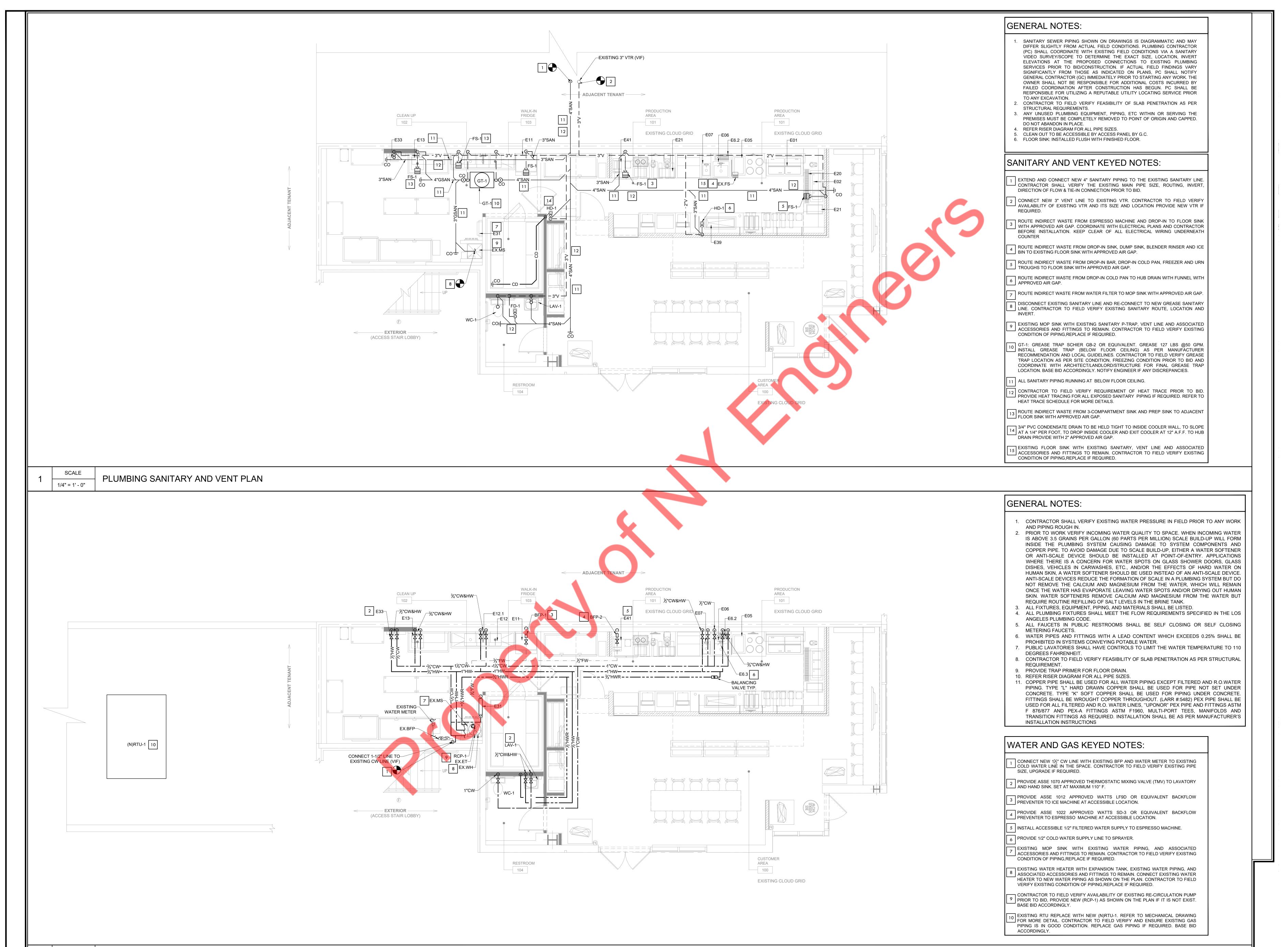
Reference No. 76080	Project Name: Sunlife				
Step 1: Flow rate to greas Fixture flow rate: (cu in / 231,	e interceptor) = gal x 0.75 / 2 min = 2 min flo	ow rate		.,	
NAME	TYPE	DIMENSIONS	QTY	CU IN	FLOW RATE
3 Compartment Sink	3 Compartment Sink	18" x 18" x 12" (3)	1	11,664	18.94 GPM
Floor Sink	Floor Sink	N/A	4	N/A	0 GPM
Mop Basin	Mop Basin	20" x 20" x 10"	1	4,000	6.49 GPM
Pre-Rinse Sink One Bowl	Pre-Rinse Sink One Bowl	16" x 20" x 14"	1	4,480	7.27 GPM
Total					32.7 GPM
Step 2: Grease Production	ı r seat x Grease Production Valı	ue x Days between _l	oump-c	out = Grea	
Step 2: Grease Production Number of Seats x 4 turns per Number of seats in facility: 2	r seat x Grease Production Valo 5 05 lbs per serving (Bar - Drinks			out = Grea	
Number of seats in facility: 2 Grease production value: 0.0	r seat x Grease Production Valo 5 05 lbs per serving (Bar - Drinks) days			out = Grea	

GREASE TRAP SCHEDULE							
ITÉM	SERVICE	FLOW CAPACITY (GPM)	GREASE CAPACITY (LBS)	LIQUID CAPACITY (GALLON)	MANUFACTURER AND MODEL		
GT-1: GREA <mark>SE</mark> TRAP	KITCHEN WASTE	50	127	20	SCHIER GB2		
NOTE- CONTRACTOR TO PROVIDE ALL REQUIRED ACCESSORIES FOR SATISFACTORY WORKING OF GREASE TRAP AS PER SITE CONDITIONS.							

Liquid Capacity: 20 gal

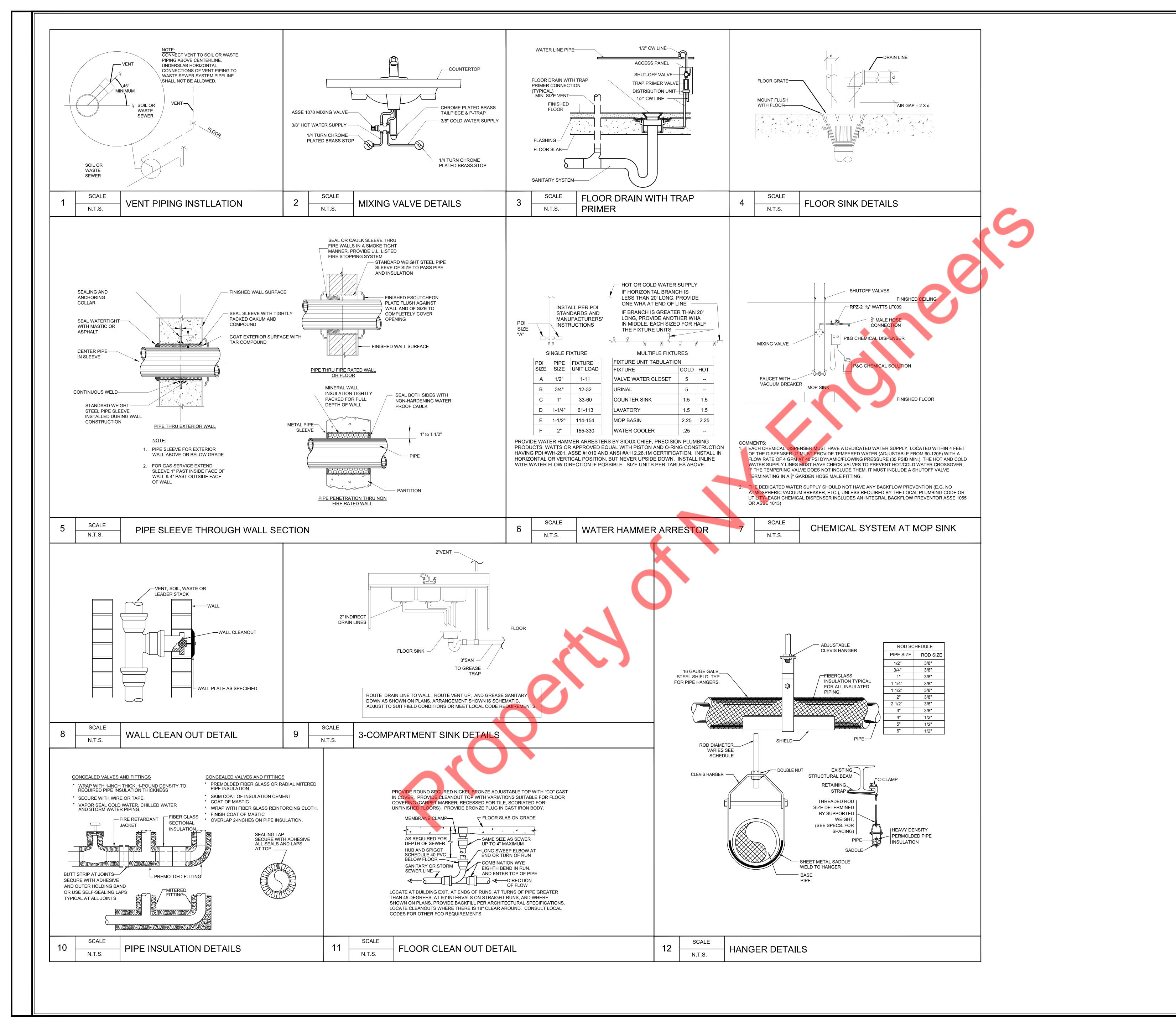
Dimensions: Length: 35", Width: 23", Height: 13.75"
Flow Rate/Grease Capacity: 35 GPM / 130 lbs

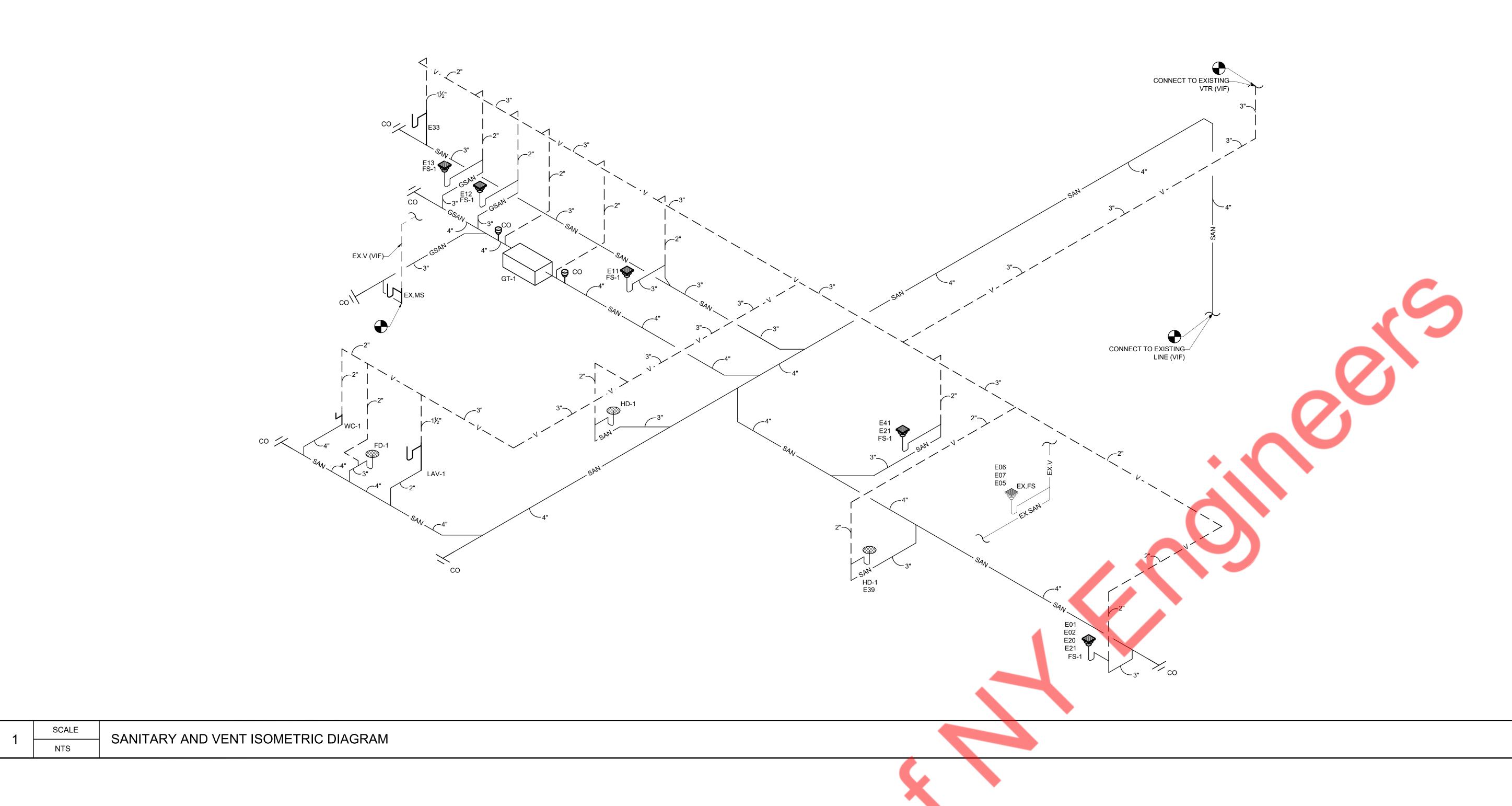
	LLLOTTKI	 						RY DRAINAGE PIPING
MAKE MOD		ELECTRICAL DATA						
	MODEL	VOLTAGE	APPROX LENGTH (FT.)	WATTS/F T	AMPS	DISCIPLINE	FLOOR (AREA)	REMARK
RAYCHEM	5XL1-CR	120	200	4.5 W/FT	20	PLUMBING	REFER PLAN	-PROVIDE CONNECTION KITS AND ACCESSORIES, SPLICES, POWER CONNECTIONS, TEE KITS CROSS CONNECTIONS, TAPE, ETC., -PROVIDE AN AMBIENT THERMOSTAT SENSING RTD-200 BY RAYCHEM -PROVIDE ONE CONTROLLER ACS-30 FOR ALL DATA ELECTRIC CIRCUITS. -PROVIDE MAX. FIVE(5) CIRCUITS PER PANEL ACS-PCM2-5



WATER SUPPLY AND GAS PLAN

1/4" = 1' - 0"





BALANCING-/ VALVE TYP.

EXISTING WATER-

EXISTING BFP

GENERAL NOTES:

1. SANITARY SEWER PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC AND MAY DIFFER SLIGHTLY FROM ACTUAL FIELD CONDITIONS. PLUMBING CONTRACTOR (PC) SHALL COORDINATE WITH EXISTING FIELD CONDITIONS VIA A SANITARY VIDEO SURVEY/SCOPE TO DETERMINE THE EXACT SIZE, LOCATION, INVERT ELEVATIONS AT THE PROPOSED CONNECTIONS TO EXISTING PLUMBING SERVICES PRIOR TO BID/CONSTRUCTION. IF ACTUAL FIELD FINDINGS VARY SIGNIFICANTLY FROM THOSE AS INDICATED ON PLANS, PC SHALL NOTIFY GENERAL CONTRACTOR (GC) IMMEDIATELY PRIOR TO STARTING ANY WORK. THE OWNER SHALL NOT BE RESPONSIBLE FOR ADDITIONAL COSTS INCURRED BY FAILED COORDINATION AFTER CONSTRUCTION HAS BEGUN. PC SHALL BE RESPONSIBLE FOR UTILIZING A REPUTABLE UTILITY LOCATING SERVICE PRIOR TO ANY EXCAVATION.

GENERAL NOTES:

- CONTRACTOR SHALL VERIFY EXISTING WATER PRESSURE IN FIELD PRIOR TO ANY WORK AND PIPING ROUGH IN.
- 2. PRIOR TO WORK VERIFY INCOMING WATER QUALITY TO SPACE. WHEN INCOMING WATER IS ABOVE 3.5 GRAINS PER GALLON (60 PARTS PER MILLION) SCALE BUILD-UP WILL FORM INSIDE THE PLUMBING SYSTEM CAUSING DAMAGE TO SYSTEM COMPONENTS AND COPPER PIPE. TO AVOID DAMAGE DUE TO SCALE BUILD-UP, EITHER A WATER SOFTENER OR ANTI-SCALE DEVICE SHOULD BE INSTALLED AT POINT-OF-ENTRY. APPLICATIONS WHERE THERE IS A CONCERN FOR WATER SPOTS ON GLASS SHOWER DOORS, GLASS DISHES, VEHICLES IN CARWASHES, ETC., AND/OR THE EFFECTS OF HARD WATER ON HUMAN SKIN, A WATER SOFTENER SHOULD BE USED INSTEAD OF AN ANTI-SCALE DEVICE. ANTI-SCALE DEVICES REDUCE THE FORMATION OF SCALE IN A PLUMBING SYSTEM BUT DO NOT REMOVE THE CALCIUM AND MAGNESIUM FROM THE WATER, WHICH WILL REMAIN ONCE THE WATER HAS EVAPORATE LEAVING WATER SPOTS AND/OR DRYING OUT HUMAN SKIN. WATER SOFTENERS REMOVE CALCIUM AND MAGNESIUM FROM
- BRINE TANK.

 3. ALL FIXTURES, EQUIPMENT, PIPING, AND MATERIALS SHALL BE LISTED.

 4. ALL PLUMBING FIXTURES SHALL MEET THE FLOW REQUIREMENTS

THE WATER BUT REQUIRE ROUTINE REFILLING OF SALT LEVELS IN THE

- SPECIFIED IN THE LOS ANGELES PLUMBING CODE.

 5. ALL FAUCETS IN PUBLIC RESTROOMS SHALL BE SELF CLOSING OR SELF
- CLOSING METERING FAUCETS.

 6. WATER PIPES AND FITTINGS WITH A LEAD CONTENT WHICH EXCEEDS
- 0.25% SHALL BE PROHIBITED IN SYSTEMS CONVEYING POTABLE WATER.
 7. PUBLIC LAVATORIES SHALL HAVE CONTROLS TO LIMIT THE WATER TEMPERATURE TO 110 DEGREES FAHRENHEIT.

HOT WATER NOTE:

1. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2020 CITY OF BOULDER C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

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